

**PICEANCE ENERGY, LLC  
2013 ANNUAL PRODUCTION MONITORING  
REPORT FOR THE FURR 16-22B SENTINEL  
TIER II GAS WELL RULISON FIELD,  
GARFIELD COUNTY, COLORADO**

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**PREPARED FOR**

**PICEANCE ENERGY, LLC  
1512 LARIMER STREET, SUITE 1000  
DENVER, COLORADO 80202**

**PREPARED BY**

**OLSSON ASSOCIATES  
4690 TABLE MOUNTAIN DRIVE, SUITE 200  
GOLDEN, COLORADO 80403**

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*James W. Hix*

James W. Hix, PG

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## 1.0 Introduction

Piceance Energy, LLC (Piceance Energy), a subsidiary of Laramie Energy II, LLC, has developed natural gas resources in the vicinity of Jack's Pocket on the north flank of Battlement Mesa in Garfield County, Colorado. Piceance Energy retained Olsson Associates Inc. (Olsson) to collect natural gas and produced water samples from the Furr lease wells to comply with the Colorado Oil and Gas Conservation Commission (COGCC) Rulison Sampling and Analysis Plan (RSAP) requirement developed by URS Corporation (URS) for all natural gas wells within a three-mile radius of the former Project Rulison site.

The Piceance Energy natural gas wells discussed in this report are all located within a 3-mile radius of the Project Rulison underground nuclear test site conducted in September 1969 by the Atomic Energy Commission, a predecessor agency to the Department of Energy (DOE), and Austral Oil, a private oil company. Project Rulison was a subsurface natural gas stimulation nuclear test designed to produce natural gas from tight gas sands in the Cretaceous age Williams Fork Formation.


In general, the RSAP requires all companies drilling or producing natural gas wells within specified zones and sectors surrounding the former Rulison site to review certain drilling data (gamma ray logs) and to sample certain production media (natural gas and produced water) to document the presence or absence of potential impacts associated with Project Rulison.

The COGCC permitted natural gas wells located within the three-mile radius of Project Rulison (including Laramie Energy II wells) are shown on [Figure 1](#). Piceance Energy's Furr Gas wells are shown more specifically on [Figure 2](#). This report presents the 2013 production monitoring results gas and produced water samples collected from the separator for the Piceance Energy Furr 16-22B Tier 2 Sentinel Well on December 19, 2013.

For purposes of classifying the Piceance Energy wells within the context of the current RSAP, the Furr wells are considered Tier II well located in sectors 10 and 11. The Furr 16-22B is currently considered to be the closest natural gas well to the former Project Rulison site in sector 11; since there are no Tier I wells in this sector. The Furr 16-22D has a surface location in sector 11 and a bottom hole location in sector 10, but the bottom hole location is near the sector dividing line. The Furr 16-22D well was not sampled in 2013 because there are Tier I wells operated by other companies located within sector 10.

The baseline sampling results from sampling conducted in November and December 2008, and the subsequent production monitoring sample results conducted in 2009, October 2010, May 2011, November 2011, June 2012, and December 2013 do not indicate the presence of any Project Rulison related radioactivity in any of the Piceance Energy Tier II wells. A summary table of Laramie Energy II well locations and sampling activities is presents as [Table 1](#). Laboratory analytical results for gas and produced water samples collected from the Furr 16-22B Tier 2 sentinel well are presented in [Table 2](#) through [Table 5](#).

## 1.1 Tier II Zone Monitoring Requirements

URS Corporation (URS) is working for Noble Energy, EnCana Oil & Gas (USA), Inc., and Williams Production RMT  are also conducting natural gas well drilling operations in the vicinity of Project Rulison. URS has developed a Rulison Sampling Analysis Plan (RSAP), Revision 3 issued in July 2010.

The URS RSAP defines Tier II wells as those gas wells located outside the 1-mile radius, but within the 3-mile radius of Project Rulison; whereas Tier I wells are defined as those gas wells located within the 1-mile radius of Project Rulison. This RSAP has been adopted by the COGCC, and outlines the required sampling and analysis for all operators within a three-mile radius of Project Rulison.

According to the July 2010 Revision 3 of the URS RSAP the Tier II well monitoring includes:

- Drilling Monitoring;
- Production Monitoring; and
- Baseline produced water and natural gas monitoring.

According to the URS RSAP [Table 2 - Tier I and II Sampling and Analysis Scheme for Gas Wells within a Three Mile Radius of Project Rulison](#) well production sampling provisions require that Tier II wells, such as the Furr 16-22 B well, are to be sampled and analyzed as follows:

- A one-time sampling and analysis of produced water for the radiological and non-radiological analytes listed in Table 3 and Table 4 of the RSAP. The Tier II wells are to be sampled as soon as possible after frac-ing but no later than 30 days after the first gas delivery from a new gas well;
- If a Tier II gas well is the closest well in a sector (i.e. no Tier I well), produced water and natural gas will be sampled and analyzed for the radiological

analytes listed in Table 3 quarterly during the first year, semi-annually (twice a year) during the second and third year, and annually thereafter; and

- Further testing contingent on verified Project Rulison-related radionuclide detection in Tier I zone wells.

The one-time sampling and analysis of radiological and non-radiological results were reported for the Furr wells, including the Furr 16-22B in previous reports which can be found on the COGCC website.

## 1.2 Piceance Energy Furr 16-22B Tier 2 Gas Well

The Laramie Energy Furr 16-22B well is the closest Tier II well in Sector 11, and the surface location is shown on [Figure 2](#). This report is presented to satisfy the annual sampling well requirement in the RSAP.

Copies of the Isotech Laboratories Inc. laboratory reports for the Furr 16-22B gas sample submitted for tritium and carbon-14 ( $^{14}\text{C}$ ) analysis, and the report for the produced water sample aliquot submitted to Isotech for tritium analysis are included as [Appendix A](#). The analytical results for the produced water sample aliquot analyzed by GEL Laboratory LLC are presented as [Appendix B](#).

Monthly produced water volumes have declined over time in the Furr 16-22B well. Graphs showing the monthly production for the Furr 16-22 B data on the COGCC internet website are included as [Appendix C](#). Copies of the production records for the Furr 16-22B well production data and graphs showing the rates of decline are presented in [Appendix D](#).

## 1.3 Data Verification and Validation Requirements

Section 9 of the RSAP outlines the data verification and validation requirements. Olsson retained Diane Short & Associates of Lakewood, Colorado to perform the independent data validation on the December 2013 radiochemistry production data for the Furr 16-22B well natural gas and produced water samples. The data verification and validation report is included as [Appendix E](#).

## 1.4 Radionuclides of Concern and Background Radiation

According to the DOE Rulison Path Forward Document (June 2009), tritium is the only contaminant of concern. This is consistent with the conclusions of the 1973 AEC Project Manager's report. Tritium, a radioactive isotope of hydrogen ( $^3\text{H}$ ), is produced naturally in small quantities in the upper atmosphere, and produced in much larger quantities during the detonation of a nuclear device. Tritium is a weak beta emitter and does not emit gamma rays. Since tritium can potentially be entrained within natural gas, and tritium is the most abundant and most

mobile nuclide in the Rulison inventory, it is the primary radionuclide of concern. Tritium levels were evaluated in groundwater and surface water in the area before and after the Project Rulison experiment and were found to be comparable to background concentrations for the 1960s in both sets of samples.

Of the 10,000 curies of tritium estimated to have been produced by the Rulison detonation, 2,824 curies were removed by production testing measurements in the early 1970s. Following correction for decay, the estimated remaining tritium activity in and around the Rulison cavity in Lot 11 was estimated to be between 700 curies and 1,036 curies by late 2009. The DOE Rulison path forward states that even if tritium were to reach a producing gas well the risk is low in that there is no reasonable exposure scenario. Water vapor is removed from the gas stream at the well pad where it condenses out and is separated as a waste byproduct. The produced water is separated from the gas stream prior to the gas entering the distribution system. The gas in the distribution system is co-mingled with gas from other wells producing throughout the area.

Laboratories are capable of measuring tritium activity in picocuries per liter (pCi/L), which is one trillionth of a curie. An older unit of measuring tritium activities was the tritium unit. One tritium unit (TU) is equivalent to 3.2 pCi/L. Background tritium concentrations were higher during the 1960s and 1970s due to nuclear testing conducted in the 1950s.

The USGS sample results for a well water sample collected in May 1969, approximately four months before Project Rulison was conducted, ranged from less than 220 TU (not detected) to a reported maximum of 618 TU. Since background activities for tritium were higher at the time due to nuclear weapons testing, tritium activities in the late 1960s and early 1970s ranged from 700 pCi/L to more than 1,000 pCi/L (Voegeli and Claassen, 1971).

Today natural background tritium levels in precipitation typically range from 10 TU to 20 TU (32 pCi/L to 64 pCi/L). The CDPHE basic groundwater quality standard for tritium is 20,000 pCi/L referenced as the level of activity that could potentially result in an annual dose of 4 millirems of beta radiation. The U.S. EPA maximum contaminant level (MCL) for tritium is also 20,000 pCi/L.

The following information is presented for comparison for tritium impacted groundwater and provide context for the Project Rulison site. According to the U.S. Nuclear Regulatory Commission (NRC) *Fact Sheet on Tritium, Radiation Protection Limits, and Drinking Water Standards*, the NRC has evaluated several instances of abnormal releases of liquid tritium from several nuclear power plants, which have resulted in groundwater contamination. The NRC

determined, that while these releases were unplanned, that the levels of tritium were within radiation protection limits and did not pose a threat to public health and safety.

Although Project Rulison is regulated by the DOE Legacy Management, and not regulated by the NRC, the NRC Fact Sheet provides a general overview of the health effects of tritium and the technical basis for the regulatory standards that the NRC uses to protect public health and safety, as well as the drinking water standards established by the U.S. EPA. The NRC Fact Sheet on Tritium can be found at <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/tritium-radiation-fs.html>.

The Fact Sheet states the following about tritium:

- Tritium is almost always found as a liquid and primarily enters the body when people eat food or drink water containing tritium or absorb it through their skin. People can also inhale tritium as a gas in the air.
- Once tritium enters the body, it disperses quickly and is uniformly distributed throughout the soft tissues. Half of the tritium is excreted within approximately 10 days after exposure.
- Everyone is exposed to small amounts of tritium every day, because it occurs naturally in the environment and in the foods that we eat. Workers in Federal weapons facilities, medical, biomedical, or university research facilities; or nuclear fuel cycle facilities may receive increased exposures to tritium.
- The type of radiation dose from tritium is the same as from any other type of radiation, including natural background radiation and medical administrations.
- The tritium dose from nuclear power plants is much lower than the exposures attributable to natural background radiation and medical administrations (e.g. x-rays), and exposures from consumer products.

Tritium concentrations have not been detected in natural gas and produced water samples collected from Laramie Energy's Furr 16-22B, Furr 16-22D, or samples collected from the other completed gas wells. Commercial laboratories are capable of measuring very low activities of tritium. Isotech Laboratory in Champaign, Illinois has a method detection limit that can measure down to 10 tritium units, or approximately 32 pCi/L. GEL Laboratories in Charleston, South Carolina has a method detection limit that measures tritium activities down to approximately 460 pCi/L.



Most of the longer-lived radionuclides produced by the detonation were incorporated into the molten rock that cooled to form a melt glass at the bottom of the cavity. Krypton-85 and carbon-14 were two other longer-lived radionuclides that were produced by the detonation that could potentially be present in natural gas. However, gas production testing of the re-entry well in 1970 removed almost all of the krypton-85 and carbon-14 created by the detonation, leaving tritium as the only contaminant of concern. According to the DOE Rulison Path forward, *Table 1 - Radionuclides in Re-entry Well Gas* the estimated remaining krypton-85 was < 10 curies, and the remaining carbon-14 was estimated at < 1 curie; where the curie is a unit of radioactivity measurement.

The re-entry well drilled into the nuclear chimney produced an estimated 455 million standard cubic feet (MMscf) of gas. The only gaseous radionuclides detected (Cooper et al. 2009) were  $^3\text{H}$ ,  $^{85}\text{Kr}$ ,  $^{14}\text{C}$ ,  $^{37}\text{Ar}$ ,  $^{39}\text{Ar}$ , and mercury-203 ( $^{203}\text{Hg}$ ). Analysis of gas produced during the tests (Smith 1971a; 1971b) indicates that the concentrations of  $^3\text{H}$ ,  $^{85}\text{Kr}$ , and  $^{14}\text{C}$  in the natural gas declined steadily throughout production testing, as shown in Figure 6. These results indicate that some of the  $^3\text{H}$  and the majority of the  $^{85}\text{Kr}$  and  $^{14}\text{C}$  produced during the explosion at Project Rulison were removed during the gas calibration flaring and production flow testing (AEC 1973), leaving  $^3\text{H}$  as the most mobile radionuclide that remains in a sufficient quantity to pose a potential health concern if released.

## 1.5 Rulison Path Forward

In June 2009 the U.S. Department of Energy (DOE), Office of Legacy Management issued a draft report entitled “Rulison Path Forward” which was intended to serve as a guide for discussions with the Colorado State regulators and other interested stakeholders in response to increased drilling for natural gas reserves near the underground nuclear explosion site at Rulison, Colorado. The report outlines the DOE’s recommendation that gas development occur in a conservative, staged drilling approach as the gas production companies move closer toward the COGCC established half-mile radius surrounding the DOE 40-acre institutional control boundary around the Rulison site. Operators wishing to drill within the COGCC half-mile radius would require a full hearing before the commission before the application for permit to drill (APD) could be approved.

Institutional controls are legally enforceable spatial boundaries that limit intrusion at a site to a safe distance to be protective of human health and the environment. The institutional controls at Rulison prohibit drilling below the 6,000 feet depth within the 40-acres known as Lot 11 (NE ¼, SW ¼ Section 25, T7S, R95W)

surrounding the Project Rulison site. The depth at which the detonation occurred (8,426 feet bgs) and the low permeability of the Williams Fork Formation and overlying strata inhibit any potential migration of impacted water from the cavity.

The U.S. EPA and CDPHE conducted investigations and remediation of surface contamination in the 1970s up through 1996 with the cleanup of non-radiological contamination associated with the drilling mud pits and effluent pond that were remediated in 1996, as documented in the Rulison Site Surface Report Published in July 1998. Although no feasible technology exists to remove the subsurface radioactivity contamination from in or around the cavity, the DOE has no evidence that indicates radionuclides from the Rulison site have migrated or ever will migrate beyond the 40-acre institutional control boundary.

Additionally the COGCC has established a half-mile radius around the Rulison surface ground zero as a buffer zone. Drilling within this half-mile radius would require a hearing with the COGCC and stakeholders before an APD would be approved for drilling a well within this half-mile area.

## 2.0 Natural Gas and Produced Water Sampling

Piceance Energy authorized sampling of the Furr 16-22B sentinel Tier II well and Olsson performed the 2012 annual sampling of the natural gas and produced water by following the URS RSAP, Revision 3, July 2010. There are no Tier I wells within Sector 10; therefore, the Furr 16-22B is the closest Tier II well in this sector.

### 2.1 Production Sampling

Well Identification:

Well Surface Location:

- Furr 16-22B SE ¼, SE ¼, Section 22, T7S, R95W, Sixth P.M.

Olsson personnel sampled natural gas and produced water from the Furr 16-22B well on December 19, 2013 for the radiochemistry parameters listed in Table 3 of the URS RSAP. The samples consisted of natural gas and produced water collected from the Furr 16-22B well separator with the assistance of Piceance Energy's pumper.

### 2.2 Natural Gas Sample Analysis

The natural gas sample collected from the Furr 16-22B Tier 2 well was submitted to Isotech in Champaign, Illinois for gas compositional analysis including carbon-14 ( $^{14}\text{C}$ ) and tritium ( $^3\text{H}$ ), a radioactive form of hydrogen. Isotech performed the sample preparation and the tritium analysis, but subcontracted the  $^{14}\text{C}$  analysis to Beta Analytic Laboratories in Miami, Florida.

The natural gas sample was collected in an evacuated propane tank provided by Isotech, using a two-stage pressure regulator connected to the separator or the natural gas wellhead. Copies of the laboratory reports from Isotech are included in [Appendix A](#).

Isotech reported the tritium ( $^3\text{H}$ ) results in tritium units (TU). One TU is equivalent to 3.19 picocuries per liter (pCi/L), and the results, which indicate that tritium was not detected, and shown less than the reporting limit of 10 TU are presented in [Table 2](#).

The tritium analysis measures counts above background, and if the concentration is high enough the laboratory can report a finite value with a calculated uncertainty. If the concentration is low relative to the standard deviation of the measurement then the values are reported as "less than" the laboratory reporting limit, meaning that tritium was not detected. Isotech's reporting limit for tritium ranges from about 10 TU to 15 TU.

Beginning in about 1954, atmospheric tritium levels rose in excess of 1,000 TU due to nuclear weapons testing, peaking in 1963. These tritium levels have declined back to natural background levels since then as a result of the ban on nuclear testing. Current natural background levels for tritium in the atmosphere range from 5 TU to 50 TU (15.9 pCi/L to 159.5 pCi/L). The isotopic composition of hydrogen is compared relative to the Vienna Standard Mean Ocean Water (VSMOW) standard.

Isotopic composition of carbon is relative to the Vienna Peedee Belemnite (VPDB)  $\delta^{13}$  Standard and is based on the carbon isotopes in the shell of a marine fossil. The laboratory detection limit is approximately 1 percent modern carbon (pMC). The results indicate that carbon-14 ( $^{14}\text{C}$ ) is not present in the natural gas and the natural gas has been isolated from sources of modern carbon. According to the DOE Rulison End State Vision (2005) and the Rulison Path Forward (2009) the amount of  $^{14}\text{C}$  present in the Rulison Site source term was estimated at 2.2 curies to 2.4 curies. Less than 1 curie is estimated to remain in the Rulison cavity corrected for the  $^{14}\text{C}$  activity that was removed during production testing in the early 1970s.

### 2.3 Produced Water Sample Analysis

Produced water samples were collected from the dump line on the separator unit for the Furr 16-22B gas well on December 19, 2012. The produced water samples were submitted for analysis of radiochemistry parameters as listed in Table 3, as specified for Tier II wells in Table 2 of the URS RSAP. The produced water samples were collected from the separator dump line into a 5-gallon white plastic bucket equipped with a bottom loading valve assembly. The produced water samples were transferred to the laboratory provided sample bottles. Natural gas condensate floating on the produced water in the bucket was disposed in the onsite tank battery sump. This was done to allow inspection of the produced water for sediment and to remove a separate floating layer of natural gas condensate that in the past had presented problems for the laboratory as a result of collecting the samples directly into the plastic bottle ware.

Produced water sample aliquots were submitted to Isotech (Champaign, IL) and to GEL Laboratories, LLC in Charleston, South Carolina for tritium analysis. Additionally produced water samples were submitted to GEL laboratories for other radiochemistry analysis which included gamma spectroscopy, gas flow proportional counting for gross alpha and gross beta, strontium-90 ( $^{90}\text{Sr}$ ), liquid scintillation analysis for Technetium-99 ( $^{99}\text{Tc}$ ).

## 3.0 Laboratory Analytical Results

The following sections present the laboratory analytical results for natural gas samples and produced water samples collected from the Furr 16-22B. The laboratory analytical results for the natural gas and produced water samples show that there are no Project Rulison related radionuclides present in the natural gas or produced water samples.

### 3.1 Natural Gas Sample Results

The natural gas sample results from Isotech are presented in [Table 2](#), for the Furr 16-22B Tier II gas well. Copies of the Isotech laboratory gas sample reports are presented in [Appendix A](#). The Isotech laboratory reports present the compositional analysis reported in mol percent for components in each of the gas samples. The results show that the samples are predominantly composed of methane with lesser concentrations of helium, hydrogen, oxygen, carbon dioxide, nitrogen, ethane, propane, iso-butane, N-butane, iso-pentane, and hexanes. Argon, carbon monoxide, hydrogen sulfide, and ethylene gas were not detected. The gas samples were also analyzed for the radionuclides tritium ( $^3\text{H}$ ) and carbon-14 ( $^{14}\text{C}$ ).

#### 3.1.1 Tritium Results

The tritium ( $^3\text{H}$ ) in the gas samples collected from the Furr 16-22B in the December 19, 2013 gas sample were reported as < 10 TU. The results were reported as '<' indicates that tritium was not detected above the laboratory method detection limits in the sample. One TU is equal to 3.19 pCi/L so this corresponds to a method detection limit of approximately 31.9 pCi/L.

#### 3.1.2 Carbon-14 Results

The carbon-14 results reported for the December 2013 gas sample collected from the Furr 16-22B were reported as < 0.2 percent modern carbon (pMC). This indicates that carbon-14 activities were very low in the gas sample.

### 3.2 Produced Water Samples - Radiochemistry Results

The following sections present the laboratory analytical results for the produced water sample aliquots collected on December 19, 2013, from the Furr 16-22B gas well that were submitted to Isotech and to GEL for radiochemistry analyses. Copies of the laboratory reports from Isotech and GEL Laboratories, LLC (GEL) are included as [Appendix A](#) and [Appendix B](#), respectively.

Since the DOE has identified tritium as the only radionuclide of concern, produced water sample aliquots were submitted to both Isotech and GEL for tritium analysis. The produced water tritium results are summarized in [Table 3](#).

### 3.2.1 Tritium Results

The Isotech laboratory results for tritium ( $^3\text{H}$ ) in the produced water sample submitted from the Furr 16-22 B was reported as  $< 10.0$  TU which indicates that  $^3\text{H}$  was not detected. The minimum detectable activity (MDA) that Isotech is able to achieve for  $^3\text{H}$  using the direct count method is 10.0 TU. The laboratory method detection limit of 10 TU correlates to approximately 31.9 pCi/L.

The GEL laboratory results for tritium in the December 2013 produced water sample aliquot collected from the Furr 16-22B well also indicate that  $^3\text{H}$  was not detected. The  $^3\text{H}$  result reported for the produced water sample was  $259 \pm 314$  pCi/L, and the result is qualified with a “U” which indicates that tritium was not detected. The GEL detection limit was reported at 531 pCi/L and the laboratory reporting limit was 700 pCi/L.

### 3.2.2 Gross Alpha Radiation Results

The GEL laboratory results for gross alpha activities show that alpha radiation was not detected with a result reported as  $-71.5 \pm 64.9$  pCi/L in the December 2013 produced water sample. The GEL laboratory minimum detectable concentration (MDC) and reporting limit (RL) for gross alpha radiation were reported as 127 pCi/L and 5.0 pCi/L, respectively.

The results for the gross alpha activities in the produced water samples collected from the Furr 16-22B well from 2008 to 2013 are summarized on [Table 4](#) and copies of the laboratory report are presented in [Appendix B](#).

### 3.2.3 Gross Beta Radiation Results

The GEL laboratory results for the December 2013 produced water sample showed that gross beta activities were detected at  $56.8 \pm 35.4$  pCi/L. The MDC was reported at 54.7 pCi/L and the RL was 5.00 pCi/L.

The gross beta results in the December 2013 produced water sample are within the expected range of natural background radiation for the area and are likely due to the presence of naturally occurring radionuclides present in sediment entrained in the produced water. The results for the gross beta activities for the 2013 samples are summarized on [Table 4](#) and copies of the laboratory reports are presented in [Appendix B](#).

### 3.2.4 Strontium-90 and Technetium-99 Results

The produced water samples submitted to GEL Laboratories were analyzed for Strontium-90 ( $^{90}\text{Sr}$ ) and Technetium-99 ( $^{99}\text{Tc}$ ) and the results are qualified with a “U” indicating that these radionuclides were not detected in the Furr 16-22B well December 2013 produced water sample. The laboratory results show that Strontium- $^{90}\text{Sr}$  results were reported at  $0.202 \pm 0.371$  pCi/L, and a MDC of 0.634 pCi/L and a RL of 2.00 pCi/L.

The results for  $^{99}\text{Tc}$  activities in the produced water sample were reported as “U”  $16.0 \pm 24.7$  pCi/L with a MDC of 41.9 pCi/L and a RL of 50.0 pCi/L. The  $^{90}\text{Sr}$  and  $^{99}\text{Tc}$  results are summarized on [Table 4](#) and copies of the laboratory reports are presented in [Appendix B](#).

### 3.2.5 Gamma-Emitting Radionuclide Results

The results for the gamma-emitting radionuclides analysis show that gamma activities were not detected for 46 of the radionuclides reported. This is indicated with a letter ‘U’ in the results of the laboratory report and also in the first row of [Table 5](#) and [Table 5A](#). Copies of the laboratory reports for gamma spectroscopy results are included in [Appendix B](#).

The naturally occurring radionuclide Bismuth-214 was reported at  $35.8 \pm 11.7$  pCi/L and a MDC of 10.6 pCi/L. Other naturally occurring radionuclides including Lead-214 ( $24.8 \pm 13.2$  pCi/L, MDC 19.8 pCi/L), and Potassium-40 ( $104 \pm 48.9$  pCi/L, MDC 61.5 pCi/L) were also detected in the December 2013 produced water sample. These radionuclides are not related to Project Rulison.

## **3.3 Data Verification and Validation**

The following section presents a summary of the data verification and validation analysis of the Isotech Laboratory Reports (23895 and 23896) and GEL laboratory reports (339804) for natural gas and produced water samples collected on December 19, 2013. Diane Short and Associates reviewed and validated the Isotech and GEL laboratory data and prepared two separate validation reports. These reports are included as [Appendix D](#).

The first report was prepared for the tritium analyses performed by both labs, and other analyses performed by GEL including gas flow proportional counting (GFPC) for gross alpha/beta, and Sr-90, and liquid scintillation counting (LSC) for Tc-99 in water. The second report was for validation of the of the gamma spectroscopy analyses performed by GEL.

### 3.3.1 Isotech Gas Analysis and Isotech and GEL Tritium Results

The following sections present the findings of the data verification and validation reports for tritium and carbon-14 in natural gas samples and tritium and other radionuclides in produced water samples. Telephone logs were not included; however, relevant email correspondence with the laboratories was provided to Diane Short & Associates. No contractual violations with the laboratories exist.

#### Natural Gas Sample

Isotech performed analysis of tritium and carbon-14 on natural gas samples from the Furr 16-22B. Isotech subcontracted Beta Analytic in Miami, Florida to analyze the carbon-14 in the gas samples. Beta Analytic did not provide the raw data so it was not possible for Diane Short & Associates to evaluate the C-14 results. The information was requested of Beta Analytic, but it was not provided. Diane Short & Associates also noted that the original report from Isotech did not include the signed chain-of-custody from Isotech to Beta Analytic. Olsson requested that Isotech provide a copy of the signed chain-of-custody and a copy of the signed chain-of-custody from Isotech to Beta Analytic was provided.

Beta Analytic does not provide full raw data so the request has not been met. Beta Analytic provided standards on which they state that their results are based. Diane Short & Associates was not able to perform authentication of the C-14 results to laboratory QC and final data results. While this does not invalidate the data, it means that the C-14 validation cannot be validated at the requested level IV. All the standards are provided within acceptance limits.

Isotech analyzed the tritium concentration in the natural gas sample. Tritium was reportedly not detected. Although not all methods were spiked in this sample set, the recommended frequency of matrix spikes has been met. Isotech did not provide matrix spike results for tritium or C-14. GEL does not perform analyses on natural gas samples.

#### Produced Water Sample

A produced water sample was collected and submitted to Isotech for tritium analysis. An aliquot of the produced water sample was also submitted to GEL for tritium analysis in addition to other radiochemistry analyses. The GEL data packages include standard certifications, quench curves, spectrum plots, and raw data. The Isotech packages do not contain this level of information, but do include count data, standard data, and detailed calculations.

The GEL results for tritium in produced water are reported in pCi/L and the Isotech results are reported in TU (tritium units). For water, 1 TU is 3.231 pCi/L.



After conversion, the GEL results have significantly higher reporting limits, but they are consistent with the results from Isotech in that  $^3\text{H}$  was not detected in either of the produced water sample aliquots submitted to the labs. Uncertainties were provided in the laboratory reports. However, the raw data provides the uncertainties and the review was conducted using that information.

The analytical report or data sheets were present and complete for the requested analyses, contract holding times were met, and the samples were properly preserved, or applicable preservative was used. In the overall assessment of the data, Diane Short & Associates concluded that the data are considered fully usable for project purposes with consideration of the qualifications or comments.

### 3.3.2 GEL Results for Gas Flow Proportional Counting/Liquid Scintillation

The GEL Laboratories data package included raw data, and a level IV review was conducted. The data are considered fully useable for project purposes with consideration of the qualifications or comments.

### 3.3.3 GEL Results for Total Uranium

Olsson did not request the total uranium analysis for the produced water sample aliquot that was submitted to GEL. Therefore, total uranium results were not reported for the December 2013 sample.

### 3.3.4 GEL Results for Gamma Spectroscopy

The GEL Laboratories data are considered fully useable for project purposes with consideration of the qualifications or comments. The GEL Laboratories data package included raw data, and at client request a level IV review was conducted. The method used is EPA 901.1.

Samples were collected in pre-preserved bottles but due to the buffering capacity of the produced water, the samples were received at the laboratory at a pH of  $> 2$  standard pH units. The laboratory added preservative to bring the sample pH into the acceptance range prior to conducting the analysis. This is permissible per 40 CFR and has no impact on the results. No qualifiers were added.

Data Exception Reports (DER) are generated by the laboratory to document any procedural anomalies that may deviate from referenced SOP or contractual documents. Diane Short & Associates noted that some analytes did not meet the Data Exception Report (DER) limit.

The laboratory flagged a number of results with "UI" or uncertain identification to indicate that they suffer from some type of detection issue. These results are qualified as JQ to indicate that they could be biased. It should be noted that these results were reported for the naturally occurring radionuclides  $^{234}\text{Th}$ ,  $^{238}\text{U}$

and daughter products  $^{212}\text{Pb}$  and  $^{214}\text{Pb}$  were the results were reported as '0.00 ± Uncertainty.'

### 3.3.5 Overall Assessment of the Data

According to the Radiochemistry Data Quality Review Report prepared by Diane Short & Associates, Inc. for the GFPC, LSC for H-3 and C-14, Beta Analytic did not provide full raw data sets for the C-14 analysis. While this does not invalidate the data, it means that the C-14 validation cannot be validated at the requested level IV. All the standards are within acceptance limits.

Isotech performed H-3 analysis on both a natural gas sample and a produced water sample collected from the Furr 16-22B well. GEL performed tritium analysis on an aliquot of the produced water sample collected from the Furr 16-22B well, but does not analyze natural gas samples.

The Isotech data packages do not contain the same level of information as the GEL data package, but the Isotech data package does include count data, standard data, and detailed calculations. The Isotech data package also contains efficiency determination data, and the package meets the requirements for the purposes of validation.

The GEL data package include standard certifications, quench curves, spectrum plots, and all raw data. Neither laboratory detected H-3 activities in the produced water sample aliquots. Although the reporting limits and H-3 units are different for each of the laboratories, the results are consistent.

There were no detections observed for gross alpha or gross beta radiation. The reporting limit is elevated due to matrix effects. The produced water sample contains high total dissolved solids (TDS) and the total weight must be kept to a level within the calibration range. This limits the sample size and therefore the reporting limits.

The data are considered fully useable for project purposes with consideration of the qualifications or comments noted above, or otherwise described in the report from Diane Short & Associates, which is contained in [Appendix D](#).

Diane Short & Associates also provided a Radiochemistry Quality Review Report for Gamma Spectrometry. The data are considered fully useable for project purposes with consideration of the qualifications or comments.

## 4.0 Summary

The results of the December 19, 2013 sampling of Piceance Energy's closest Tier II well, the Furr 16-22B, indicate that radiation related to Project Rulison not was not detected. The surface location and bottom hole location for the Furr 16-22B are in Section 22, Township 7S, Range 95 West of the Sixth Principal Meridian. Even though this well was directionally drilled to the north, away from Project Rulison, the bottom hole location is still the closest to the Project Rulison out of the wells that Piceance Energy has drilled and completed. The Furr 16-22B is the closest Tier II well in RSAP sector 11 and is located within the 3-mile radius of Project Rulison. The locations of the wells are shown on [Figure 1](#) and [Figure 2](#).

Isotech indicated that the LP tanks containing the gas samples and the produced water samples submitted for tritium analysis arrived in good condition. GEL indicated that the produced water sample arrived in good condition and met most of the sample receipt criteria.

GEL indicated that the produced water sample was received with a pH equal to 4 standard pH units and that nitric acid was added to the sample at the laboratory to bring it into the proper pH. The produced water sample was collected into a laboratory provided bottle that contained nitric acid; however, the buffering capacity of the salts within the produced water neutralized the acid. Olsson granted the laboratory permission to add more nitric acid to the sample to bring it to the proper pH for the method.

Isotech reported that Tritium ( $^3\text{H}$ ) was not detected at or above laboratory method detection limits in the gas sample analyzed by Isotech. Carbon-14 ( $^{14}\text{C}$ ) was not detected in the December 2013 natural gas sample. Tritium ( $^3\text{H}$ ) was not detected in the produced water sample analyzed by Isotech or the produced water sample aliquot analyzed by GEL.

The Isotech analytical results for the natural gas samples collected from the Furr 16-22B gas sample show that  $^{14}\text{C}$  was detected at  $< 0.2$  pMC; however, this value is at or slightly above the laboratory method detection limit and within the range of natural background. The laboratory results suggest the sample has been isolated from modern carbon sources.

Neither gross alpha nor gross beta activities were detected in the Furr 16-22B produced water sample

The laboratory analytical results indicate that  $^{90}\text{Sr}$ , and  $^{99}\text{Tc}$ , results were reported as "U" meaning that they were 'not detected' in the produced water

samples. The results for total uranium using ICPMS show that uranium was detected at low levels in all of the samples.

Olsson did not request the total uranium analysis for the produced water sample aliquot that was submitted to GEL. Therefore, total uranium results were not reported for the December 2013 sample.

The produced water samples submitted to GEL Laboratories were analyzed for Strontium-90 ( $^{90}\text{Sr}$ ) and Technetium-99 ( $^{99}\text{Tc}$ ) and the results are qualified with a "U" indicating that these radionuclides were not detected in the Furr 16-22B well December 2013 produced water sample.

The laboratory data was reviewed by Diane Short and Associates. Results of the data verification and validation indicate that the data is usable for the purposes of this project with consideration of the qualifications and comments mentioned in the laboratory report, and those of the independent data reviewer. The data verification and validation is discussed in section 3.3 of this report. The data validation report is included as [Appendix D](#).

## 5.0 References

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# TABLES AND FIGURES

TABLE 1

Piceance Energy - Furr Lease Rulison Tier II Wells  
 Jacks Pocket - Garfield County Colorado  
 Sampling History

WELL	PAD	Surface Location					TOTAL DEPTH (FT.)	FIRST PRODUCTION DATE	4th Quarter 2008	1st Quarter 2009	2nd Quarter 2009	3rd Quarter 2009	4th Quarter 2009	October 2010
		QTR/QTR	SEC	TWP	RNG	Elevation								
Furr A11-15B	Furr A-11	NE SW	15	7S	95W	6,428	7,690	9/27/08	B (11/13/08)	N/A	N/A	N/A	N/A	N/A
Furr A11-15D	Furr A-11	NE SW	15	7S	95W	6,428	7,684	10/7/08	B (11/13/08)	N/A	N/A	N/A	N/A	N/A
Furr Hagen 6-22B	F-1	SW NE	22	7S	95W	6,657	8,225	10/28/08	B (12/17/08)	N/A	N/A	N/A	N/A	N/A
Furr Hagen 6-22D	F-1	SW NE	22	7S	95W	6,657	8,225	10/10/08	B (12/17/08)	N/A	N/A	N/A	N/A	N/A
Furr 7-22B	F-1	SW NE	22	7S	95W	6,695	8,077	10/20/08	B (12/17/08)	N/A	N/A	N/A	N/A	N/A
Furr 7-22D	F-1	SW NE	22	7S	95W	6,696	8,110	10/21/08	B (12/17/08)	N/A	N/A	N/A	N/A	N/A
Furr 10-22B	F-1	SW NE	22	7S	95W	6,698	8,130	10/25/08	B (12/17/08)	N/A	N/A	N/A	N/A	N/A
Furr 9-22B	F-2	SE SE	22	7S	95W	7,119	8,820	11/3/08	B (12/17/08)	N/A	N/A	N/A	N/A	N/A
Furr 9-22D	F-2	SE SE	22	7S	95W	7,117	8,720	11/11/08	B (12/17/08)	N/A	N/A	N/A	N/A	N/A
Furr 16-22B	F-2	SE SE	22	7S	95W	7,118	8,520	11/3/08	B (12/17/08)	P (NS)	P (6/24/09)	P (10/01/09)	P (12/16/09)	P (10/07/10)
Furr 16-22D	F-2	SE SE	22	7S	95W	7,115	8,540	11/11/08	B (12/17/08)	P (4/14/09)	P (6/24/09) D	P (10/01/09)	P (12/16/09)	P (10/07/10)
Furr 10-22D	F-3	SW SE	22	7S	95W	7,130	8,606	11/17/08	B (12/17/08)	N/A	N/A	N/A	N/A	N/A
Furr 15-22B	F-3	SW SE	22	7S	95W	7,131	9,172	11/17/08	B (12/17/08)	N/A	N/A	N/A	N/A	N/A
Furr 15-22D	F-3	SW SE	22	7S	95W	7,123	8,476	11/17/08	B (12/17/08)	N/A	N/A	N/A	N/A	N/A
Furr 22-09A	F-4	SW SE	22	7S	95W	6,984	8,388	7/7/10	N/A	N/A	N/A	N/A	N/A	B (10/07/10)
Furr 22-09C	F-4	SW SE	22	7S	95W	6,987	8,235	7/1/10	N/A	N/A	N/A	N/A	N/A	B (10/07/10)
Furr 22-10A	F-4	SW SE	22	7S	95W	6,991	8,460	7/29/10	N/A	N/A	N/A	N/A	N/A	B (10/07/10)
Furr 22-10C	F-4	SW SE	22	7S	95W	6,985	8,306	7/16/10	N/A	N/A	N/A	N/A	N/A	B (10/07/10)
Furr 22-15A	F-4	SW SE	22	7S	95W	6,988	8,177	7/13/10	N/A	N/A	N/A	N/A	N/A	B (10/07/10)
Furr 22-15C	F-4	SW SE	22	7S	95W	6,991	8,115	7/13/10	N/A	N/A	N/A	N/A	N/A	B (10/07/10)
Furr 22-16A	F-4	SW SE	22	7S	95W	6,985	8,255	7/6/10	N/A	N/A	N/A	N/A	N/A	B (10/07/10)

Note: Rows shaded in gray indicate wells that were sampled during 2013 - Furr 16-22B which is the closest Tier 2 well in the sector as specified for Tier 2 wells in the URS RSAP, Revision 3, July 2010.

NS - Not Sampled

N/A - Not Applicable

B - Baseline Sampling (One Time)

P - Production Sampling of the Closest Tier II Wells

TABLE 2

FURR 16-22B GAS SAMPLE DATA  
 Rulison Area Well Monitoring  
 Furr 16-22B Tier 2 Well  
 Natural Gas Samples - Piceance Energy - Rulison Field, Garfield County, Colorado

Well Name/ No.	Sample Source	Latitude/	Longitude	Isotech Job No.	Isotech Lab No.	Sample Name	Date Sampled	CO %	H <sub>2</sub> S %	He %	H <sub>2</sub> %	Ar %	O <sub>2</sub> %	CO <sub>2</sub> %	N <sub>2</sub> %	C <sub>1</sub> %	C <sub>2</sub> %	C <sub>2</sub> H <sub>4</sub> %	C <sub>3</sub> %	iC <sub>4</sub> %	nC <sub>4</sub> %	iC <sub>5</sub> %	nC <sub>5</sub> %	C <sub>6</sub> + %	<sup>14</sup> C <sub>1</sub> pMC	Std. Dev. (±)	Tritium TU	Std. Dev. (±)	Total BTU calc	Specific Gravity calc	
Furr 16-22B	Separator	39.41662	-107.97507	10796	152400	Furr 16-22B	12/17/2008	ND	ND	0.0029	0.0036	ND	ND	2.97	0.029	89.26	5.12	ND	1.50	0.335	0.322	0.139	0.0981	0.220	< 0.4	N/A	< 10.0	N/A	1076	0.642	
				N/A	N/A	Furr 16-22B	4/14/2009	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
				11610	165099	Furr 16-22B	6/24/2009	ND	ND	0.0033	0.0029	ND	0.0324	3.00	0.17	89.76	4.86	ND	1.35	0.278	0.248	0.0969	0.0640	0.133	< 0.5	N/A	< 10.0	N/A	1061	0.634	
				12055	172338	Furr 16-22B	10/1/2009	ND	ND	0.0030	0.0026	NA	0.006*	3.58	0.056	88.86	5.04	ND	1.47	0.340	0.292	0.0830	0.0574	0.211	< 0.4	N/A	< 10.0	NA	1065	0.644	
				12367	176955	Furr 16-22B	12/16/2009	ND	ND	0.0029	0.0027	ND	0.027	3.60	0.14	89.25	4.97	ND	1.19	0.253	0.190	0.102	0.0773	0.192	< 0.5	N/A	< 10.0	N/A	1055	0.640	
				13942	196345	Furr 16-22B	10/7/2010	ND	ND	0.0023	0.0026	ND	ND	2.93	0.078	89.77	4.92	ND	1.33	0.289	0.269	0.116	0.0813	0.214	1.2	0.1	< 10.0	N/A	1068	0.636	
				15352	211832	Furr 16-22B	5/23/2011	ND	ND	ND	ND	NA	0.037*	2.96	0.22	89.36	4.91	ND	1.48	0.314	0.285	0.106	0.0792	0.251	< 0.7	N/A	< 10.0	N/A	1070	0.640	
				16947	228828	Furr 16-22B	11/29/2011	ND	NA	NA	ND	NA	0.021*	2.64	0.15	90.1	4.65	ND	1.36	0.300	0.294	0.130	0.0935	0.257	< 0.2	N/A	< 10.6	N/A	1072	0.635	
				18536	252646	Furr 16-22B	6/19/2012	ND	NA	NA	ND	NA	0.13*	2.87	0.50	89.25	4.75	ND	1.46	0.315	0.313	0.130	0.0906	0.193	0.7	0.1	< 10.0	N/A	1065	0.640	
				18536	252646	Furr 16-22B	12/19/2013	ND	NA	ND	ND	ND	0.024	3.25	0.14	89.00	5.04	ND	1.6	0.339	0.322	0.113	0.0674	0.105	< 0.2	N/A	< 10.0	N/A	1067	0.642	

Note: Shaded rows present the analytical data for the samples collected in 2013 which are discussed in this report. The table presents the data as compared to the results for samples collected previously from the Furr 16-22B. The Furr 16-22B is the closest Tier 2 well in the sector.

<sup>14</sup>C<sub>1</sub> - Carbon 14      Carbon-14 (14C) Detection Limit is 1.0 pMC. Isotopic composition of carbon is relative to the Vienna Pee Dee Belemnite (VPDB).  
 Tritium      Tritium (<sup>3</sup>H) Detection Limit 10.0 TU. Isotopic composition of hydrogen is relative to Vienna Standard Mean Ocean Water (VSMOW).  
 Std. Dev./ (±)      Standard Deviation (±) Uncertainty

Gas Component:  
 CO - Carbon Monoxide  
 H<sub>2</sub>S - Hydrogen Sulfide  
 He - Helium  
 H<sub>2</sub> - Hydrogen  
 Ar - Argon  
 O<sub>2</sub> - Oxygen  
 CO<sub>2</sub> - Carbon Dioxide  
 N<sub>2</sub> - Nitrogen  
 C<sub>1</sub> - Methane  
 C<sub>2</sub> - Ethane  
 C<sub>2</sub>H<sub>4</sub> - Ethylene  
 C<sub>3</sub> - Propane  
 iC<sub>4</sub> - Iso-Butane  
 nC<sub>4</sub> - N-Butane  
 iC<sub>5</sub> - Iso-Pentane  
 nC<sub>5</sub> - n-Pentane  
 C<sub>6</sub>+ - Hexanes+

Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol.% Chemical analysis based on standards accurate to within 2%.

\* Isotech did not analyze Argon separately, but reported combined results for Oxygen and Argon

Acronyms:

pMC - Percent Modern Carbon.  
 TU - Tritium Units (One TU is equivalent to 3.19 pCi/L of water)  
 < - Not Detected (ND) (Above Laboratory Method Detection Limit)  
 Std. Dev. (±) - Standard Deviation  
 BTU - British Thermal Units (cu. Ft. dry calculated at 60°F and 14.7 psia)  
 calc - calculated value  
 N/A - not applicable  
 NA - not analyzed  
 ND - not detected  
 NS - not sampled (Furr 16-22B was shut in on 04/14/09)



**TABLE 3**

**TRITIUM ANALYTICAL RESULTS FOR PRODUCED WATER SAMPLES  
Furr 16-22B Tier II Well Production Data  
Piceance Energy, Rulison Field, Garfield County, Colorado**

Well Name/Number	Sample Source	Latitude	Longitude	Qtr/ Qtr	Section	Township	Range	P.M.	Sample ID	Lab Job No.	Lab Number	Date Sampled	Time Sampled	Laboratory	Tritium (TU)	Tritium (pCi/L) calculated	Tritium Result Qualifier	Tritium (pCi/L)	Uncertainty (pCi/L)								
Furr 16-22B	Separator	39.41669	-107.97507	SE SE	22	7S	95W	6th	Furr 16-22B	10797	152413	12/17/2008	12:54	ISO	< 10.8	< 34.5	N/A	N/A	N/A								
Furr 16-22B										NS	NS	4/14/2009	NS	ISO	NS	NS	NS	NS	NS								
Furr 16-22B										11602	165053	6/24/2009	11:55	ISO	< 13.7	< 43.7	N/A	N/A	N/A								
Furr 16-22B										12055	172338	10/1/2009	11:30	ISO	< 10.0	< 31.9	N/A	N/A	N/A								
Furr 16-22B										12373	177011	12/16/2009	13:00	ISO	< 10.0	< 31.9	N/A	N/A	N/A								
Furr 16-22B										13942	196345	10/7/2010	15:00	ISO	< 10.0	< 31.9	N/A	N/A	N/A								
Furr 16-22B										15352	211837	5/23/2011	12:45	ISO	< 10.0	< 31.9											
Furr 16-22B										CORD00100	278674001	5/23/2011	12:45	GEL			U	-153	± 240								
Furr 16-22B										16948	228829	11/29/2011	12:25	ISO	< 10.0	< 31.9											
Furr 16-22B										OLSS00111	291078001	11/29/2011	12:25	GEL			U	-19.6	± 322								
Furr 16-22B										18529	252333	6/19/2012	13:30	ISO	< 10.0	< 31.9											
Furr 16-22B										OLSS00111	306572001	6/19/2012	13:30	GEL			U	-244	±322								
Furr 16-22B																		23895	400718	12/19/2012	10:40	ISO	< 10.0	< 31.9			
Furr 16-22B																		OLSS00111	339804001	12/19/2012	10:15	GEL			U	259	±314

Note: Shaded rows present the results for samples collected in 2013 as presented in this report. Tritium was not detected by either laboratory. The table also presents the results from previous sampling events for the Furr 16-22B Tier 2 Gas Well.

Tritium (<sup>3</sup>H) Detection Limit 10.0 TU. Isotopic composition of hydrogen is relative to Vienna Standard Mean Ocean Water (VSMOW).  
Modern background levels for Tritium range from 100 pCi/L to 300 pCi/L

**Abbreviations:**

ISO - Isotech Laboratories, Inc. of Champaign, IL  
GEL - GEL Laboratories LLC Charleston, SC  
TU - Tritium Units (One TU is equivalent to 3.19 pCi/L of water) Note: Isotech reported the tritium results in TU and Olsson Associates converted to equivalent picocuries per liter.  
pCi/L - picocuries per liter

< - Result is less than the method detection limit  
U - Analyte was not detected above GEL Laboratory's Minimum Detectable Activity (MDA)  
NS - Not Sampled (Furr 16-22B was shut-in and the separator did not yield sufficient water volume to enable sample collection in April 14, 2009.)  
N/A - Not Applicable (Produced water samples were not analyzed for tritium by GEL Laboratories from 2008 to 2010.)

TABLE 4

Radiochemistry Gas Flow Proportional Counting/Liquid Scintillation Analysis/Total Uranium for Produced Water Samples  
 Furr 16-22B Tier II Well  
 Piceance Energy - Rulison Field, Garfield County, Colorado

WELL NAME/ Sample ID	Sample Source	Latitude/ Longitude	QTR/ QTR	Section	Township	Range	P.M.	SAMPLE ID	DATE SAMPLED	TIME SAMPLED	Laboratory	GFPC Gross Alpha	Result ± Uncertainty (pCi/L)	Detection Limit (pCi/L)	GFPC Gross Beta	Result ± Uncertainty (pCi/L)	Detection Limit (pCi/L)	GFPC Chlorine-36	Result ± Uncertainty (pCi/L)	Detection Limit (pCi/L)	GFPC Strontium-90	Result ± Uncertainty (pCi/L)	Detection Limit (pCi/L)	LSA Technetium-99	Result (pCi/L)	Detection Limit (pCi/L)	Total Uranium	Result ± Uncertainty (µg/L)	Detection Limit (µg/L)						
Furr 16-22B	Separator	39.41669 -107.97507	SW SE	22	7S	95W	6th	16-22B	12/17/2008	12:54	GEL	U	5.88 ± 16.8	30.4	U	15.9 ± 27.6	46.8	U	-98.4 ± 152	271	U	0.817 ± 0.781	1.27	U	8.00 ± 17.5	29.7	NS	0.548 ± 0.116	0.267						
									4/14/2009	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
									6/24/2009	11:55	GEL	U	21.8 ± 13.3	20.2	U	31.9 ± 11.6	18.1	U	125 ± 136	229	U	-0.98 ± 0.861	1.93	U	-8.79 ± 13.0	22.8	U	-0.0389 ± 0.0302	0.0766	U	-0.0389 ± 0.0302	0.0766	U	-0.0389 ± 0.0302	0.0766
									10/1/2009	11:30	GEL	U	26.0 ± 11.5	15.9	U	11.1 ± 10.9	18.3	U	37.1 ± 135	234	U	0.103 ± 0.785	1.44	U	4.47 ± 27.2	46.8	U	0.0175 ± 0.0161	0.928	U	0.0175 ± 0.0161	0.928	U	0.0175 ± 0.0161	0.928
									12/16/2009	13:00	GEL	U	-1.05 ± 12.9	23.4	U	20.1 ± 11.2	18.2	U	75.7 ± 244	416	U	-0.136 ± 0.947	1.85	U	8.67 ± 18.2	31.1	U	0.0057 ± 0.000823	0.66	U	0.0057 ± 0.000823	0.66	U	0.0057 ± 0.000823	0.66
									10/7/2010	15:00	GEL	U	24.0 ± 24.7	39.8	U	29.8 ± 23.4	38.8	U	28.8 ± 53.5	95.0	U	-13.1 ± 10.3	19.7	U	-20.2 ± 20.6	36.1	U	-20.2 ± 20.6	36.1	U	-20.2 ± 20.6	36.1	U	-20.2 ± 20.6	36.1
								Furr 16-22B	5/23/2011	12:45	GEL	U	39.4 ± 19.9	27.1	U	23.8 ± 25.9	43.4	U	243 ± 218	363.0	U	-0.785 ± 0.605	1.26	U	11.0 ± 25.1	43.2	U	0.067	0.067						
								Furr 16-22B	11/29/2011	11:15	GEL	U	30.7 ± 35.1	58.9	U	42.7 ± 23.6	37.9	NA	NA	U	-0.00829 ± 0.677	1.27	U	-5.88 ± 21.2	37.6	U	0.067	0.067							
								Furr 16-22B	6/19/2012	13:30	GEL	U	-13 ± 26.2	49.3	U	65.3 ± 26.2	41.7	NA	NA	U	0.0446 ± 0.908	1.65	U	0.00 ± 17.3	30.3	U	0.067	0.067							
								Furr 16-22B	12/19/2013	10:15	GEL	U	-71.5 ± 64.9	127	U	56.8 ± 35.4	57.4	NA	NA	U	0.202 ± 0.371	0.634	U	16.0 ± 24.7	41.9	NA	NA	NA							

April 2009 GEL Reporting Limits:	5	5	100	2	50	1
June 2009 GEL Reporting Limits:	5	5	100	2	50	1
October 2009 GEL Reporting Limits:	5	5	100	2	50	1
December 2009 GEL Reporting Limits:	5	5	100	2	50	1
October 2010 GEL Reporting Limits:	5	5	100	2	50	1
May 2011 GEL Reporting Limits:	5	5	100	2	50	1
November 2011 GEL Reporting Limits:	5	5	5	2	50	1
June 2012 GEL Reporting Limits:	5	5	5	2	50	1
December 2013 GEL Reporting Limits:	5	5	5	2	50	1

Table presents the 2011 (shaded) and previous laboratory analytical results for produced water samples collected from the Furr 16-22B Tier 2 Well.  
 The Furr 16-22B well was shut-in and was not sampled during the April 14, 2009 sampling event.

Abbreviations:

pCi/L - picocuries per liter (activity in parts per trillion)  
 µg/L - micrograms per liter (concentration in parts per billion)  
 Qualifier

U - Result is less than the sample specific Minimum Detectable Concentration (MDC) or Minimum Detectable Activity (MDA).

Method Detection Limit (MDL), Limits of Detection (LOD), total propagated uncertainty (TPU), or laboratory reporting limit (RL).

NS - Not Sampled (Furr 16-22B well was shut-in during the 4/14/09 sampling event and was not sampled)

NA - Not Analyzed

N/A - Not Applicable

GFPC - Gas Flow Proportional Counting

LSA - Liquid Scintillation Analysis

TABLE 5

GAMMA SPECTROSCOPY RESULTS FOR PRODUCED WATER SAMPLES  
 Furr 16-22B Tier II Well - 2011 Sample Results  
 Piceance Energy - Rulison Field, Garfield County, Colorado

WELL NAME/No.	Sample Collection Point	Latitude/ Longitude	QTR/QTR	SEC	TWP	RNG	P.M.	SAMPLE ID	DATE SAMPLED	TIME SAMPLED	Gamma Emitting Radionuclides	Ac-228 Result (pCi/L)	Am-241 Result (pCi/L)	Sb-124 Result (pCi/L)	Sb-125 Result (pCi/L)	Ba-133 Result (pCi/L)	Ba-140 Result (pCi/L)	Be-7 Result (pCi/L)	Bi-212 Result (pCi/L)	Bi-214 Result (pCi/L)	Ce-139 Result (pCi/L)	Ce-141 Result (pCi/L)	Ce-144 Result (pCi/L)	Cs-134 Result (pCi/L)	Cs-136 Result (pCi/L)	Cs-137 Result (pCi/L)	Cr-51 Result (pCi/L)	Co-56 Result (pCi/L)	Co-57 Result (pCi/L)	Co-58 Result (pCi/L)	Co-60 Result (pCi/L)	Eu-152 Result (pCi/L)	Eu-154 Result (pCi/L)	Eu-155 Result (pCi/L)	Ir-192 Result (pCi/L)	Fe-59 Result (pCi/L)	Kr-85 Result (pCi/L)					
Furr 16-22B	Separator	39.4167 -107.97507	SE SE	22	7S	95W	6th	16-22B	12/17/2008	12:54	Qualifier Result Uncertainty (±) MDC	U 3.91 15.7 15.6	U 0.459 11.6 17.3	U 1.22 4.83 8.58	U -1.04 5.60 9.02	U -0.923 3.29 4.63	U 16.6 25.1 44.1	U -4.13 20.1 34.0	U -3.67 15.9 25.9	U 4.67 5.23 8.60	U 0.590 2.03 3.55	U -0.838 4.96 8.54	U -6.11 14.1 22.2	U 1.19 2.41 4.20	U 11.4 9.13 17.6	U 0.177 2.18 3.41	U 6.72 31.3 52.8	U -0.858 1.78 3.52	U 0.0899 2.47 2.90	U -3.17 2.47 3.47	U 0.181 2.39 3.54	U -5.17 5.88 9.11	U -0.406 5.55 9.20	U -7.3 7.85 11.3	U -0.128 2.49 4.13	U -2.27 4.80 7.62	U -1760 638 928					
									4/14/2009	NS	Qualifier Result Uncertainty (±) MDC	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS	NS NS NS
									6/24/2009	11:55	Qualifier Result Uncertainty (±) MDC	U 11.6 14.6 19.8	U -3.81 16.1 27.2	U -0.143 4.82 8.14	U 3.25 6.38 11.2	U -7.26 3.46 4.99	U -19.4 13.0 15.9	U -14.5 20.0 31.7	U 18.6 19.0 34.2	U 8.74 8.05 10.9	U -2.29 2.40 3.81	U 1.36 4.54 7.43	U -7.7 16.7 27.3	U 3.36 2.62 5.04	U 0.283 3.86 6.58	U -0.784 2.31 3.69	U -1.22 22.8 39.0	U 0.205 2.15 3.72	U 1.31 2.17 3.73	U -1.14 2.01 3.22	U -1.26 2.30 3.47	U 2.57 6.37 11.2	U -0.359 5.55 9.15	U -2.93 9.14 15.2	U 0.868 2.31 4.05	U -1.35 4.48 7.24	U -911 737 1160					
									10/1/2009	11:30	Qualifier Result Uncertainty (±) MDC	U 0.00 12.1 17.2	U 7.60 14.4 23.2	U 1.67 4.83 8.57	U 5.38 5.26 9.33	U 0.881 2.73 4.36	U 0.820 8.67 14.3	U -0.107 17.2 28.4	U 7.16 15.6 27.2	U 19.5 8.70 6.38	U -1.97 1.95 3.09	U 1.36 3.61 6.10	U 3.43 14.1 23.8	U 0.565 2.50 4.26	U -0.589 3.40 5.73	U 0.433 2.13 3.67	U -5.4 18.3 30.6	U 0.180 1.97 3.07	U 2.67 2.03 3.07	U -0.88 2.03 3.27	U 1.32 2.24 3.98	U -3.69 5.97 9.75	U 0.355 6.25 10.6	U 0.0159 7.73 13.1	U 0.730 1.94 3.36	U 1.38 4.12 7.24	U 706 496 797					
									12/16/2009	13:00	Qualifier Result Uncertainty (±) MDC	U 12.4 7.70 5.02	U 3.01 5.28 7.91	U -0.276 2.19 3.67	U -1.17 2.49 4.17	U 0.825 1.29 2.01	U 2.26 7.16 12.2	U -3.22 8.77 14.6	U -0.0361 12.5 12.9	U 12.3 4.96 2.97	U -0.159 0.905 1.52	U -0.501 2.03 3.42	U -2.45 6.24 10.5	U 1.16 1.06 1.91	U 0.966 0.943 1.52	U -0.412 10.7 16.9	U -5.03 0.964 1.64	U -0.197 0.814 1.42	U 0.640 0.943 1.62	U -0.0759 0.961 1.71	U 1.11 2.61 4.37	U -0.0193 0.770 4.42	U 0.770 -0.174 5.72	U -0.188 0.332 5.72	U -0.358 2.12 4.41	U -2250 341 370						
									10/7/2010	15:00	Qualifier Result Uncertainty (±) MDC	U 8.69 66.8 101	U -22.2 76.8 127	U 1.89 38.6 65.8	U 5.65 35.9 59.6	U -8.23 19.5 31.3	U 145 245 432	U 159 149 278	U -136 249 350	U -17.7 48.0 60.8	U 1.29 12.2 55.9	U -61.4 43.6 125	U -7.01 17.2 27.50	U -4.73 89 153	U 11.7 13.4 23.1	U 3.15 236 371	U -173 17.4 27.80	U -3.52 9.55 16.1	U 4.48 16.3 24.5	U -10.3 13.6 24.0	U 5.15 42.10 67.6	U -17.4 39.2 61.4	U -13.5 41.3 65.6	U -22.2 17.2 29.0	U 2.34 38.2 68.4	U 17.2 4010 7590						
Furr 16-22B								Furr 16-22B	5/23/2011	12:45	Qualifier Result Uncertainty (±) MDC	U 0.0 12.6 10.1	U -5.86 10.6 14.9	U -1.56 4.97 7.91	U -3.0 4.77 7.68	U -0.857 2.43 3.56	U -1.63 15.9 24.5	U -0.133 16.1 27.1	U 19.7 25.9 45.7	U 0.00 6.61 9.16	U 0.234 1.74 2.91	U 3.06 3.87 6.54	U -4.06 11.7 19.5	U 0.603 2.04 3.61	U 4.49 4.68 8.86	U -0.59 1.75 2.76	U -1.84 1.73 3.01	U 0.245 1.55 2.79	U 1.78 2.37 3.41	U -1.29 1.90 3.10	U -0.0342 4.99 8.32	U -2.41 5.64 8.17	U -4.18 6.41 11.0	U -0.686 1.93 3.19	U 0.53 4.25 7.33	U 1.04 584 811						
									Furr 16-22B	11/29/2011	11:15	Qualifier Result Uncertainty (±) MDC	U 10.7 23.4 29.7	U 1.64 5.21 9.16	U -0.411 7.99 16.1	U -4.73 8.53 14.9	U 0.757 4.12 6.89	U -3.9 16.3 30.4	U 14.4 34.1 65.2	U 22.3 41.0 83.5	U -3.2 7.79 17.3	U -0.791 17.1 31.5	U 4.61 3.50 6.95	U 1.36 4.77 9.48	U 8.95 14.8 31.2	U -1.58 4.77 9.48	U 31.3 44.2 86.6	U -3.09 3.75 6.28	U 0.453 2.29 4.21	U 0.934 3.84 7.52	U 1.08 3.19 6.63	U -4.03 9.12 16.3	U -1.77 8.74 16.7	U 3.00 7.98 15.0	U -0.47 3.44 6.35	U 4.67 8.70 17.7	U NA NA NA					
									Furr 16-22B	6/19/2012	13:30	Qualifier Result Uncertainty (±) MDC	U 13.6 9.96 21.6	U 11.7 13.3 21.8	U -0.389 4.98 10.1	U -3.6 6.77 11.4	U 0.231 3.32 5.28	U -0.235 4.09 8.28	U -0.0167 18.9 36.2	U 18.7 35.9 71.2	U 18.6 9.11 8.88	U -1.84 2.24 3.81	U 5.08 4.51 8.69	U 0.583 15.8 28.8	U 1.20 2.47 5.02	U -3.62 5.46 9.09	U 0.947 2.20 4.45	U 1.35 24.0 43.3	U -1.61 2.79 4.80	U -1.75 2.17 3.74	U -1.36 2.57 4.47	U 0.21 1.90 4.02	U -3.57 8.0 13.6	U -4.19 5.37 9.09	U 6.31 9.10 17.2	U -1.47 2.61 4.41	U -3.14 4.92 8.74	U NA NA NA				
									Furr 16-22B	12/19/2013	10:15	Qualifier Result Uncertainty (±) MDC	U 17.1 14.3 29.3	U 30.1 24.3 46.3	U -0.73 8.53 15.2	U 2.32 8.47 16.2	U -4.45 4.89 6.54	U -1.94 4.29 7.71	U -13.6 26.9 47.5	U 35.1 79.4 10.6	U 38.5 11.7 10.6	U -1.32 3.07 5.38	U -3.72 5.67 9.85	U -7.59 20.2 36.0	U -0.73 3.30 6.19	U 1.70 4.79 9.82	U 3.26 3.10 6.53	U 1.28 31.1 55.1	U -1.13 2.84 5.08	U -0.131 2.79 5.08	U -0.671 2.62 4.24	U -3.2 3.30 5.00	U -3.5 11.2 16.6	U 1.42 9.41 18.60	U -3.08 12.6 21.1	U 1.69 3.30 6.11	U 1.78 6.62 13.1	U NA NA NA				

Table presents gamma spectroscopy analytical results for the Furr 16-22B Tier 2 well - 2013 data is shaded in gray. Samples were all analyzed by GEL Laboratories, LLC in Charleston, SC

GEL Laboratories  
 May 2011 Reporting Limit: 5  
 November 2011 Reporting Limit: 10

- Four Rows:  
 1) Qualifier The laboratory data qualifiers are designated by one or two letters to provide information about the reported results.  
 2) Result Results are the level of activity reported for the individual produced water sample.  
 3) Uncertainty (±) The margin of error, or range of activity, when added to the result.  
 4) MDC The laboratory minimum detectable concentration (MDC) for the analytical method.  
 If the result is less than the reporting limits the radionuclide is reported as 'not detected' (U).

Bismuth-214 was detected at 18.6 ± 9.11 pCi/L. Bismuth-214 is a naturally occurring radionuclide, and this low detection is related to naturally occurring radiation.

The qualifiers used in the laboratory reports are listed below:

- U - Result is less than the sample specific Minimum Detectable Concentration (MDC) or Minimum Detectable Activity (MDA), Method Detection Limit (MDL), Limits of Detection (LOD), total propagated uncertainty (TPU), or laboratory reporting limit (RL).
- UI - Gamma Spectroscopy Uncertain Identification
- NS - Not Sampled (Furr 16-22B was shut-in on April 14, 2009 and was not sampled)
- NA - Not Analyzed
- N/A - Not Applicable

Note: Values shown in blue represent a detection or an uncertain identification. The gamma emitting radionuclides that were detected are naturally occurring potassium-40 (<sup>40</sup>K), lead-212 (<sup>212</sup>Pb), lead-214 (<sup>214</sup>Pb), and bismuth-214 (<sup>214</sup>Bi) in a few of the samples.



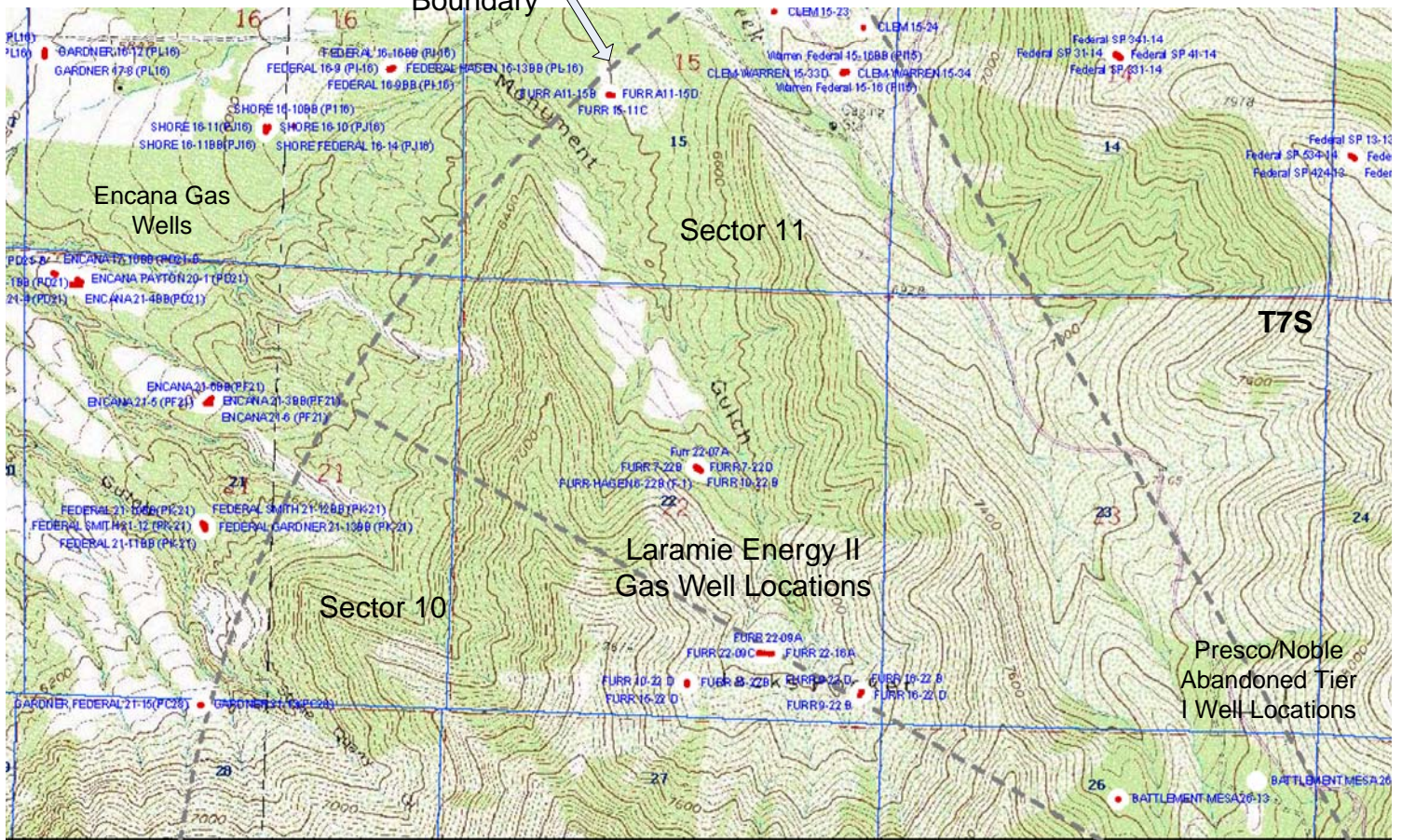
Base Map – USGS Rulison 7.5-minute Quadrangle adapted from the COGCC GIS Database Website

R 95 W

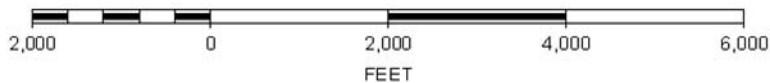
Project Rulison  
3-Mile Radius  
Boundary

Encana Gas  
Wells

Sector 12



SCALE 1 : 24,042



Colorado Index Map



LEGEND:

● Furr 16-22B Gas Well Location and Name

--- Project Rulison  
3-Mile Radius Boundary and  
Sector Dividing Lines

PROJECT NO: 014-0151  
DRAWN BY: JWH  
DATE: 04/14/14

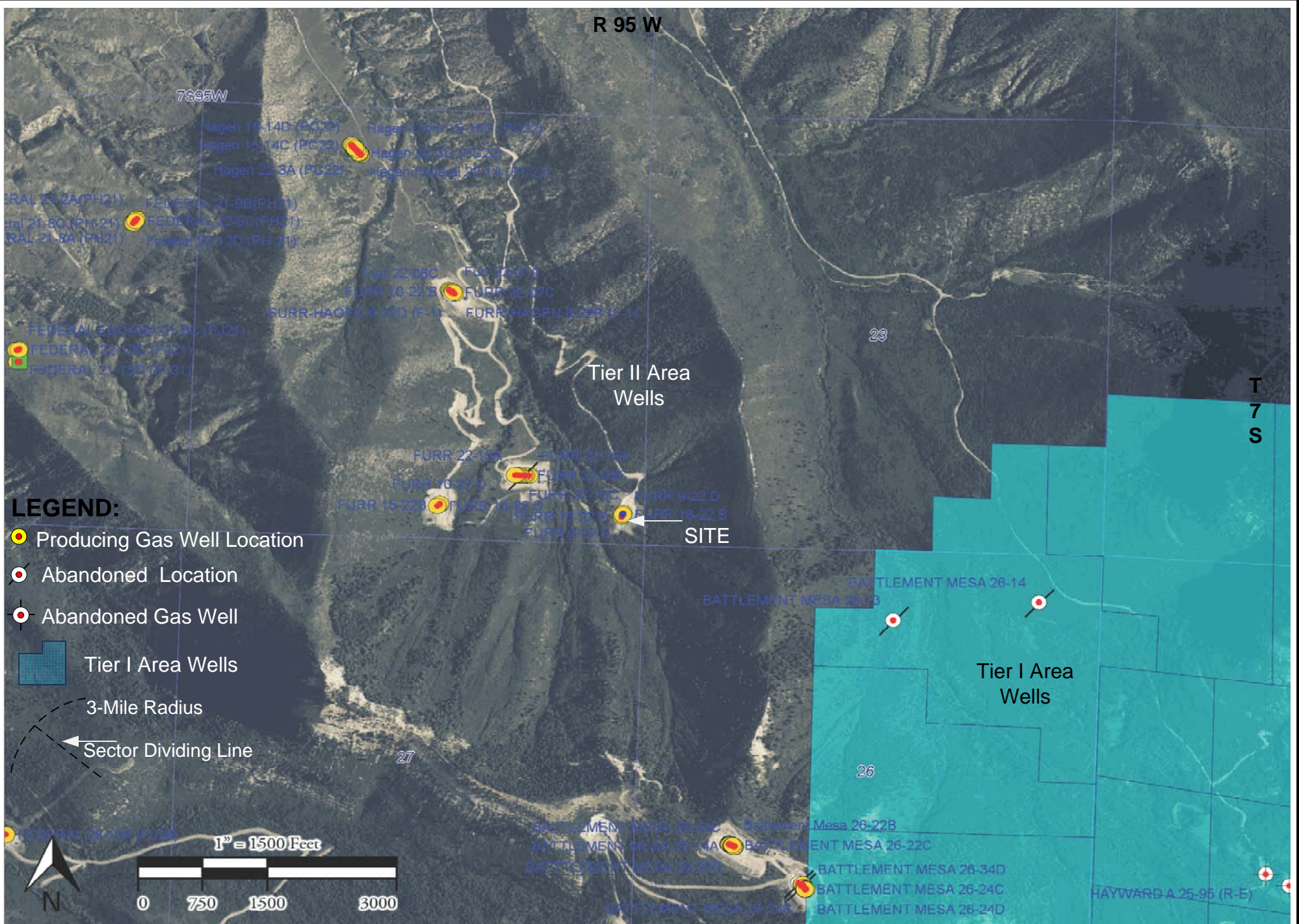
Piceance Energy  
Tier II Gas Well Locations  
Project Rulison Area

**OLSSON**  
ASSOCIATES

4690 Table Mountain Dr. #200  
Golden, CO 80403  
TEL 303.237.2072  
FAX 303.237-2659

FIGURE

1



**LEGEND:**

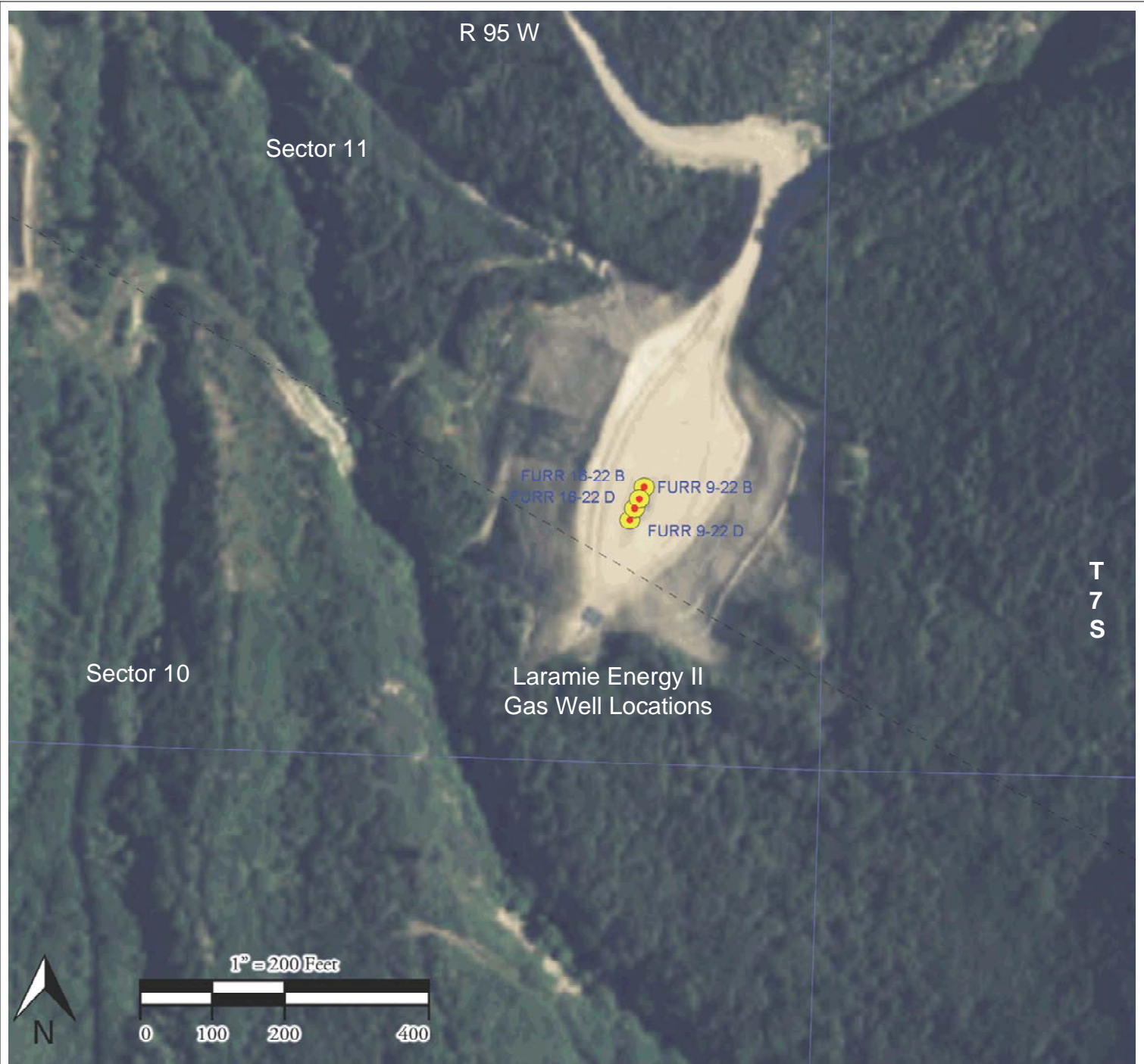
-  Producing Gas Well Location
-  Abandoned Location
-  Abandoned Gas Well
-  Tier I Area Wells
-  3-Mile Radius  
Sector Dividing Line

PROJECT NO:	014-0151
DRAWN BY:	JWH
DATE:	04/14/14

Piceance Energy – Tier II Gas Well Locations  
Rulison Area – Garfield County, Colorado




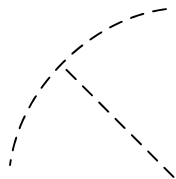
4690 Table Mountain Drive #200  
Golden, Colorado 80403  
TEL 303.237.2072  
FAX 303.237.2659



T  
7  
S

**LEGEND:**

 Furr 16-22B Gas Well Location and Name

 Project Rulison  
3-Mile Radius Boundary and  
Sector Dividing Lines

Note: The Furr 16-22B well is a directionally drilled well. The Furr 16-22B well is the closest Piceance Energy Tier 2 Well to the Project Rulison Surface Ground Zero within Sector 11. There are no other closer Tier 2 or Tier 1 wells within Sector 11.

PROJECT NO:	014-0151
DRAWN BY:	JWH
DATE:	04/14/2014

Piceance Energy  
Furr 16-22B Well Location  
Project Rulison Area



4690 Table Mountain Dr. #200  
Golden, CO 80403  
TEL 303.237.2072  
FAX 303.237-2659

FIGURE  
3

---

**APPENDIX A**  
**ISOTECH LABORATORIES INC.**  
**SAMPLE RESULTS**



Lab #: 400722 Job #: 23896 IS-68686  
 Sample Name/Number: Furr 16-22B  
 Company: Olsson Associates  
 Date Sampled: 12/19/2013  
 Container: Steel tank  
 Field/Site Name: Piceance Energy - Rulison Area Well Monitoring  
 Location: Furr Hagen Field  
 Formation/Depth:  
 Sampling Point:  
 Date Received: 12/20/2013 Date Reported: 1/29/2014

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	$\delta\text{D}$ ‰	$^{14}\text{C}$ conc. pMC	Tritium TU
Carbon Monoxide -----	nd				
Helium -----	nd				
Hydrogen -----	nd				
Argon -----	nd				
Oxygen -----	0.024				
Nitrogen -----	0.14				
Carbon Dioxide -----	3.25				
Methane -----	89.00	-37.55		< 0.2	< 10.0
Ethane -----	5.04				
Ethylene -----	nd				
Propane -----	1.60				
Propylene -----	nd				
Iso-butane -----	0.339				
N-butane -----	0.322				
Iso-pentane -----	0.113				
N-pentane -----	0.0674				
Hexanes + -----	0.105				

Total BTU/cu.ft. dry @ 60deg F & 14.73psia, calculated: 1067

Specific gravity, calculated: 0.642

Remarks:

Tank ID - 68A

nd = not detected. na = not analyzed. Isotopic composition of hydrogen is relative to VSMOW. Isotopic composition of carbon is relative to VPDB. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.



## Water Analysis

Lab Number: 400718 Job Number: 23895 IS-68686

Submitter Sample Name: Furr 16-22B

Submitter Sample ID:

Submitter Job #:

Company: Olsson Associates

Field or Site: Piceance Energy - Rulison Area Well Monitoring

Location: Furr Hagen Field

Depth/Formation:

Container Type: 1 Liter Plastic Bottle

Sample Collected: 12/19/2013 Results Reported: 1/09/2014

$\delta$ D of water	-----	na
$\delta^{18}$ O of water	-----	na
Tritium content of water	-----	< 10.0 TU
$\delta^{13}$ C of DIC	-----	na
$^{14}$ C content of DIC	-----	na
$\delta^{15}$ N of nitrate	-----	na
$\delta^{18}$ O of nitrate	-----	na
$\delta^{34}$ S of sulfate	-----	na
$\delta^{18}$ O of sulfate	-----	na

Remarks:



Samples Submitted to

Beta Analytic

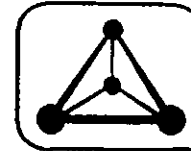
Analysis Requested by

Alan Langenfeld

Isotech Laboratories, Inc.

1308 Parkland Court

Champaign, IL 61821-1826

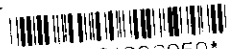


ISOTECH

Analyses & Services Requested

Sample Identification

Sample Number	Type or Description of Sample	Analyses & Services Requested										Comments	
		Carbon-14 Analysis	Tritium Enrichment	Tritium Analysis	Tritium Counting Only								
400722	2.15cc CO <sub>2</sub> & methane	<input checked="" type="checkbox"/>											

  
 \*369718\*232050\*  
 Pelphrey S / C13 / BioC  
 722

Chain of Custody Record

Signature	Company	Date	Time
Relinquished by <i>Doug Riner</i>	Shipped via <i>UPS</i>	<i>11/3/14</i>	<i>10:30</i>
Received by <i>Brenda Pereda</i>		<i>1/9/14</i>	<i>10:00</i>
Relinquished by			
Received by			
Relinquished by			
Received by			

Upon receipt please sign this form and FAX a copy to (217) 398-3493.  
 The original should then be returned with the analytical results.

---

**APPENDIX B**  
**GEL LABORATORIES, LLC**  
**SAMPLE RESULTS**



January 10, 2014

Mr. James Hix  
Olsson Associates  
4690 Table Mountain Drive  
Suite 200  
Golden, Colorado 80403

Re: Laramie Energy II - Rulison Furr 16-22B  
Work Order: 339804

Dear Mr. Hix:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on December 20, 2013. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4453.

Sincerely,

Edith Kent  
Project Manager

Purchase Order: 008-2362 100 100001  
Enclosures



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# Case Narrative

**Case Narrative  
for  
Olson Associates  
SDG: 339804**

**January 10, 2014**

**Laboratory Identification:**

GEL Laboratories LLC  
2040 Savage Road  
Charleston, South Carolina 29407  
(843) 556-8171

**Summary**

**Sample Receipt** The sample arrived at GEL Laboratories LLC, Charleston, South Carolina on December 20, 2013 for analysis. The sample was delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. Shipping container temperature was checked, documented, and within specifications. There are no additional comments concerning sample receipt.

**Sample Identification** The laboratory received the following sample:

<b><u>Laboratory ID</u></b>	<b><u>Client ID</u></b>
339804001	FURR 16-22B

**Case Narrative**

Sample analyses were conducted using methodology as outlined in GEL Laboratories, LLC (GEL) Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

**Data Package**

The enclosed data package contains the following sections: General Narrative, Chain of Custody and Supporting Documentation, and data from the following fractions: Radiochemistry.



Edith Kent  
Project Manager

# **Chain of Custody and Supporting Documentation**

Page: 1 of 1  
Project #: 012-1919-100-100001  
GEL Quote #:  
COC Number (1):  
PO Number:

GEL Laboratories, LLC  
2040 Savage Road  
Charleston, SC 29407  
Phone: (843) 556-8171  
Fax: (843) 766-1178

# GEL Chain of Custody and Analytical Request

GEL Work Order Number: 339804

Client Name: Olson Assoc. James Hix  
Project/Site Name: Peace Energy - Robinson Area Well Mon.  
Address: 4690 Table Mtn. Dr. Ste 200 Golden CO 80403

Sample Analysis Requested (5) (Fill in the number of containers for each test)

Sample Analysis Requested (5)	(1)	(2)	(3)	(4)	(5)	(6)
Preservative Type						

Phone #: 303.237.2072  
Fax #: 303.237.2059  
Send Results To: jhix@olsonassociates.com

Sample ID	*Date Collected (mm-dd-yy)	*Time Collected (Military) (hhmm)	QC Code (b)	Field Filtered (d)	Sample Matrix (e)	Should this sample be considered:		Total number of containers	Comments
						Radioactive	TSCA Regulated		
FURR 16-22-B	12-19-13	1015	N	N	W			3	

Sample Shipping and Delivery Details

Circle Deliverable: C of A / QC Summary / Level 1 / Level 2 / Level 3 / Level 4  
Sample Collection Time Zone: Eastern Pacific Other Mountain

TAT Requested: Normal:  Rush: \_\_\_\_\_ Specify: \_\_\_\_\_ (Subject to Surcharge) Fax Results:  Yes / No  
**Remarks:** Are there any known hazards applicable to these samples? If so, please list the hazards

Chain of Custody Signatures			Sample Shipping and Delivery Details		
Refiniquished By (Signed)	Date	Time	Received by (signed)	Date	Time
	12/19/13	1630		12/20/13	10:45

GEL Work Order Number: 339804

Chain of Custody Number = Client Determined

QC Codes: N = Normal Sample, TB = Trip Blank, FD = Field Duplicate, EB = Equipment Blank, MS = Matrix Spike Sample, MSD = Matrix Spike Duplicate Sample, G = Grab, C = Composite

Field Filtered: For liquid matrices, indicate with a 'Y' for yes the sample was field filtered or -N- for sample was not field filtered.

Matrix Codes: DW=Drinking Water, GW=Groundwater, SW=Surface Water, WW=Waste Water, W=Water, SO=Soil, SD=Sediment, SL=Sludge, SS=Solid Waste, O=Oil, F=Filter, P=Wipe, U=Urine, F=Feet, N=Nasal

Sample Analysis Requested: Analytical method requested (i.e. 8260B, 6010B/7470A) and number of containers provided for each (i.e. 8260B - 3, 6010B/7470A - 1).

Preservative Type: HA = Hydrochloric Acid, NI = Nitric Acid, SH = Sodium Hydroxide, SA = Sulfuric Acid, AA = Ascorbic Acid, HX = Hexane, ST = Sodium Thioculfate. If no preservative is added = leave field blank

For Lab Receiving Use Only

Custody Seal Intact? YES NO

Cooler Temp: 8 C

WHITE = LABORATORY YELLOW = FILE PINK = CLIENT

**SAMPLE RECEIPT & REVIEW FORM**

Client: <u>OLSS</u>		SDG/AR/COC/Work Order: <u>339804</u>
Received By: <b>SHANTA WHITLOCK</b>		Date Received: <u>12-20-13 @ 10:45</u>
<b>Suspected Hazard Information</b>	Yes <input type="checkbox"/> No <input type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
COC/Samples marked as radioactive?	<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>30 CPM</u>
Classified Radioactive II or III by RSO?	<input checked="" type="checkbox"/>	If yes, Were swipes taken of sample containers < action levels?
COC/Samples marked containing PCBs?	<input checked="" type="checkbox"/>	
Package, COC, and/or Samples marked as beryllium or asbestos containing?	<input checked="" type="checkbox"/>	If yes, samples are to be segregated as Safety Controlled Samples, and opened by the GEL Safety Group.
Shipped as a DOT Hazardous?	<input checked="" type="checkbox"/>	Hazard Class Shipped: UN#:
Samples identified as Foreign Soil?	<input checked="" type="checkbox"/>	

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>			Preservation Method: <u>Ice bags</u> Blue ice Dry ice None Other (describe) <u>20</u> all temperatures are recorded in Celsius
2a Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: <u>130462962</u> Secondary Temperature Device Serial # (If Applicable):
3 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
4 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
5 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's, containers affected and observed pH: If Preservation added, Lot#:
6 VOA vials free of headspace (defined as < 6mm bubble)?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
7 Are Encore containers present?	<input checked="" type="checkbox"/>			(If yes, immediately deliver to Volatiles laboratory)
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			
14 Carrier and tracking number.	<input checked="" type="checkbox"/>			Circle Applicable: FedEx Air FedEx Ground UPS Field Services Courier Other <u>5632 6808 3875</u>

Comments (Use Continuation Form if needed):

# **Data Review Qualifier Definitions**

## Data Review Qualifier Definitions

Qualifier	Explanation
*	A quality control analyte recovery is outside of specified acceptance criteria
**	Analyte is a surrogate compound
<	Result is less than value reported
>	Result is greater than value reported
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL
A	The TIC is a suspected aldol-condensation product
B	Target analyte was detected in the associated blank
B	Metals-Either presence of analyte detected in the associated blank, or MDL/IDL < sample value < PQL
BD	Results are either below the MDC or tracer recovery is low
C	Analyte has been confirmed by GC/MS analysis
D	Results are reported from a diluted aliquot of the sample
d	5-day BOD-The 2:1 depletion requirement was not met for this sample
E	Organics-Concentration of the target analyte exceeds the instrument calibration range
E	Metals-%difference of sample and SD is >10%. Sample concentration must meet flagging criteria
H	Analytical holding time was exceeded
h	Preparation or preservation holding time was exceeded
J	Value is estimated
N	Metals-The Matrix spike sample recovery is not within specified control limits
N	Organics-Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
N/A	Spike recovery limits do not apply. Sample concentration exceeds spike concentration by 4X or more
ND	Analyte concentration is not detected above the reporting limit
UI	Gamma Spectroscopy-Uncertain identification
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	QC Samples were not spiked with this compound
Z	Paint Filter Test-Particulates passed through the filter, however no free liquids were observed.

- P Organics-The concentrations between the primary and confirmation columns/detectors is >40% difference.  
For HPLC, the difference is >70%.
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.



# **Laboratory Certifications**

**List of current GEL Certifications as of 10 January 2014**

<b>State</b>	<b>Certification</b>
Alaska	UST-110
Arkansas	88-0651
CLIA	42D0904046
California NELAP	01151CA
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC000122013-10
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-12-00283, P330-12-00284
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC000122013-10
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA130005
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC000122013-10
Nebraska	NE-OS-26-13
Nevada	SC000122014-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
Oklahoma	9904
Pennsylvania NELAP	68-00485
Plant Material Permit	PDEP-12-00260
South Carolina Chemistry	10120001
South Carolina GVL	23611001
South Carolina Radiochemi	10120002
Tennessee	TN 02934
Texas NELAP	T104704235-13-8
Utah NELAP	SC000122013-11
Vermont	VT87156
Virginia NELAP	460202
Washington	C780-12
Wisconsin	999887790

# **Radiological Analysis**

**Radiochemistry Case Narrative  
Olson Associates (OLSS)  
SDG 339804**

**Method/Analysis Information**

**Product:**                               **Gammasec, Gamma, Liquid (Standard List)**  
Analytical Method:                   EPA 901.1  
Analytical Batch Number:       1355780

<b>Sample ID</b>	<b>Client ID</b>
339804001	FURR 16-22B
1203009338	Method Blank (MB)
1203009339	339804001(FURR 16-22B) Sample Duplicate (DUP)
1203009340	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-013 REV# 25.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**

The blank volume is representative of the sample volume in this batch.

**Designated QC**

The following sample was used for QC: 339804001 (FURR 16-22B).

**QC Information**

All of the QC samples meet the required acceptance limits with the following exceptions: Refer to Data Exception Report (DER).

**Technical Information:**

**Holding Time**

All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. The following DER was generated for this SDG: DER 1258514 was generated due to Failed RPD for DUP. Sample 339804001 and duplicate 1203009339 did not meet the relative percent difference (0-20%) or relative error ratio (0-3) requirement for Bi-214. Precision requirements were not met due to the escape of radon gas. Reporting results.

**Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

<b>Qualifier</b>	<b>Reason</b>	<b>Analyte</b>	<b>Sample</b>	<b>Client Sample</b>
UI	Data rejected due to no valid peak.	Potassium-40	1203009339	FURR 16-22B(339804001DUP)

**Method/Analysis Information**

**Product:** GFPC, Gross A/B, liquid  
**Analytical Method:** EPA 900.0/SW846 9310  
**Analytical Batch Number:** 1355958

<b>Sample ID</b>	<b>Client ID</b>
339804001	FURR 16-22B
1203009780	Method Blank (MB)
1203009781	339628001(32577-01) Sample Duplicate (DUP)
1203009782	339628001(32577-01) Matrix Spike (MS)
1203009783	339628001(32577-01) Matrix Spike Duplicate (MSD)
1203009784	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-001 REV# 16.

### **Calibration Information:**

#### **Calibration Information**

All initial and continuing calibration requirements have been met.

#### **Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

#### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

### **Quality Control (QC) Information:**

#### **Blank Information**

The blank volume is representative of the sample volume in this batch.

#### **Designated QC**

The following sample was used for QC: 339628001 (32577-01).

#### **QC Information**

All of the QC samples meet the required acceptance limits with the following exceptions: The matrix spike and matrix spike duplicate 1203009782 (32577-01) and 1203009783 (32577-01) do not meet the alpha relative percent difference requirement; however they do meet the recovery requirement.

### **Technical Information:**

#### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

#### **Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

#### **Chemical Recoveries**

All chemical recoveries meet the required acceptance limits for this sample set.

#### **Gross Alpha/Beta Preparation Information**

High hygroscopic salt content in evaporated samples can cause the sample mass to fluctuate due to moisture absorption. To minimize this interference, the salts are converted to oxides by heating the sample under a flame until a dull red color is obtained. The conversion to oxides stabilizes the sample weight and ensures that proper alpha/beta efficiencies are assigned for each sample. Volatile radioisotopes of carbon, hydrogen, technetium, polonium and cesium may be lost during sample heating.

### **Miscellaneous Information:**

#### **Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

#### **Additional Comments**

The matrix spike and matrix spike duplicate, 1203009782 (32577-01) and 1203009783 (32577-01), aliquots were reduced to conserve sample volume. Samples 1203009781 (32577-01) and 339804001 (FURR 16-22B) did

not meet the alpha required detection limit due to low sample volume. No more volume could be used due to not exceeding the maximum net weight limit of the calibration curve. The samples counted for 500 minutes. Sample 339804001 (FURR 16-22B) did not meet the beta required detection limit due to low sample volume. No more volume could be used due to not exceeding the maximum net weight limit of the calibration curve. The sample counted for 500 minutes.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** GFPC, Sr90, liquid  
**Analytical Method:** EPA 905.0 Modified  
**Analytical Batch Number:** 1356857

<b>Sample ID</b>	<b>Client ID</b>
339804001	FURR 16-22B
1203011969	Method Blank (MB)
1203011970	339804001(FURR 16-22B) Sample Duplicate (DUP)
1203011971	339804001(FURR 16-22B) Matrix Spike (MS)
1203011972	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-004 REV# 17.

**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**

The blank volume is representative of the sample volume in this batch.

**Designated QC**

The following sample was used for QC: 339804001 (FURR 16-22B).

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**

Sample 1203011970 (FURR 16-22B) was recounted due to high MDC. The recount is reported. Sample 339804001 (FURR 16-22B) was recounted due to a suspected false positive. The recount is reported.

**Chemical Recoveries**

All chemical recoveries meet the required acceptance limits for this sample set.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Additional Comments**

The matrix spike, 1203011971 (FURR 16-22B), aliquot was reduced to conserve sample volume.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

**Product:** Liquid Scint Tc99, Liquid  
**Analytical Method:** DOE EML HASL-300, Tc-02-RC Modified  
**Analytical Batch Number:** 1356537

<b>Sample ID</b>	<b>Client ID</b>
339804001	FURR 16-22B
1203011105	Method Blank (MB)
1203011106	339804001(FURR 16-22B) Sample Duplicate (DUP)
1203011107	339804001(FURR 16-22B) Matrix Spike (MS)
1203011108	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

**SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with



**Calibration Information:**

**Calibration Information**

All initial and continuing calibration requirements have been met.

**Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

**Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

**Quality Control (QC) Information:**

**Blank Information**

The blank volume is representative of the sample volume in this batch.

**Designated QC**

The following sample was used for QC: 339804001 (FURR 16-22B).

**QC Information**

All of the QC samples met the required acceptance limits.

**Technical Information:**

**Holding Time**

All sample procedures for this sample set were performed within the required holding time.

**Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

**Miscellaneous Information:**

**Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

**Additional Comments**

The matrix spike, 1203011107 (FURR 16-22B), aliquot was reduced to conserve sample volume.

**Qualifier Information**

Manual qualifiers were not required.

**Method/Analysis Information**

<b>Product:</b>	<b>LSC, Tritium Dist, Liquid</b>
Analytical Method:	EPA 906.0 Modified
Analytical Batch Number:	1357134

<b>Sample ID</b>	<b>Client ID</b>
339804001	FURR 16-22B
1203012727	Method Blank (MB)
1203012728	339804001(FURR 16-22B) Sample Duplicate (DUP)
1203012729	339804001(FURR 16-22B) Matrix Spike (MS)
1203012730	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

#### **SOP Reference**

Procedure for preparation, analysis and reporting of analytical data are controlled by GEL Laboratories LLC as Standard Operating Procedure (SOP). The data discussed in this narrative has been analyzed in accordance with GL-RAD-A-002 REV# 21.

#### **Calibration Information:**

##### **Calibration Information**

All initial and continuing calibration requirements have been met.

##### **Standards Information**

Standard solutions for these analysis are NIST traceable or verified with a NIST traceable standard and used before the expiration dates.

##### **Sample Geometry**

All counting sources were prepared in the same geometry as the calibration standards.

#### **Quality Control (QC) Information:**

##### **Blank Information**

The blank volume is representative of the sample volume in this batch.

##### **Designated QC**

The following sample was used for QC: 339804001 (FURR 16-22B).

##### **QC Information**

All of the QC samples met the required acceptance limits.

#### **Technical Information:**

##### **Holding Time**

All sample procedures for this sample set were performed within the required holding time.

##### **Sample Re-prep/Re-analysis**

None of the samples in this sample set required reprep or reanalysis.

#### **Miscellaneous Information:**

##### **Data Exception (DER) Documentation**

Data exception reports are generated to document any procedural anomalies that may deviate from referenced SOP or contractual documents. A data exception report (DER) was not generated for this SDG.

##### **Additional Comments**

Additional comments were not required for this sample set.

**Qualifier Information**

Manual qualifiers were not required.

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Qualifier Definition Report for

OLSS001 Olson Associates

Client SDG: 339804 GEL Work Order: 339804

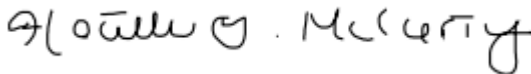
### The Qualifiers in this report are defined as follows:

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, or LOD.
- UI Gamma Spectroscopy--Uncertain identification

### Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 

Name: Heather McCarty

Date: 10 JAN 2014

Title: Analyst II

**DATA EXCEPTION REPORT**

<b>Mo.Day Yr.</b> 09-JAN-14	<b>Division:</b> Radiochemistry	<b>Quality Criteria:</b> Specifications	<b>Type:</b> Process
<b>Instrument Type:</b> GAMMA SPECTROMETER	<b>Test / Method:</b> EPA 901.1	<b>Matrix Type:</b> Liquid	<b>Client Code:</b> OLSS001
<b>Batch ID:</b> 1355780	<b>Sample Numbers:</b> 339804001, 120300339		
<b>Potentially affected work order(s)(SDG): 339804</b>			
<b>Application Issues:</b> Failed RPD for DUP			
<b>Specification and Requirements Exception Description:</b>		<b>DER Disposition:</b>	
Sample 339804001 and duplicate 1203009339 did not meet the relative percent difference (0-20%) or relative error ratio (0-3) requirement for Bi-214.		Precision requirements were not met due to the escape of radon gas. Reporting results.	

**Originator's Name:**  
Bryan Williams      09-JAN-14

**Data Validator/Group Leader:**  
Spencer Collins      09-JAN-14

# **Sample Data Summary**

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company : Olsson Associates  
 Address : 4690 Table Mountain Drive  
 Suite 200  
 Golden, Colorado 80403

Report Date: January 10, 2014

Contact: Mr. James Hix  
 Project: Laramie Energy II - Rulison Furr 16-22B

Client Sample ID: FURR 16-22B  
 Sample ID: 339804001  
 Matrix: Water  
 Collect Date: 19-DEC-13  
 Receive Date: 20-DEC-13  
 Collector: Client

Project: OLSS00111  
 Client ID: OLSS001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>													
<i>Gammascpec, Gamma, Liquid (Standard List) "As Received"</i>													
Actinium-228	U	17.1	+/-14.3	29.3	+/-16.3		pCi/L		MJH1	12/24/13	1413	1355780	1
Americium-241	U	30.1	+/-24.3	46.3	+/-27.9		pCi/L						
Antimony-124	U	-0.73	+/-8.53	15.2	+/-8.54		pCi/L						
Antimony-125	U	2.32	+/-8.47	16.2	+/-8.54		pCi/L						
Barium-133	U	-4.45	+/-4.89	6.54	+/-5.30		pCi/L						
Barium-140	U	-1.94	+/-4.29	7.71	+/-4.39		pCi/L						
Beryllium-7	U	-13.6	+/-26.9	47.5	+/-27.7		pCi/L						
Bismuth-212	U	35.1	+/-79.4	97.6	+/-81.0		pCi/L						
Bismuth-214		38.5	+/-11.7	10.6	+/-12.2		pCi/L						
Cerium-139	U	-1.32	+/-3.07	5.38	+/-3.14		pCi/L						
Cerium-141	U	-3.72	+/-5.67	9.85	+/-5.92		pCi/L						
Cerium-144	U	-7.59	+/-20.2	36.0	+/-20.5		pCi/L						
Cesium-134	U	-0.726	+/-3.30	6.19	+/-3.31		pCi/L						
Cesium-136	U	1.70	+/-4.79	9.82	+/-4.86		pCi/L						
Cesium-137	U	3.26	+/-3.10	6.53	+/-3.44	10.0	pCi/L						
Chromium-51	U	1.28	+/-31.1	55.1	+/-31.1		pCi/L						
Cobalt-56	U	-1.13	+/-2.84	5.20	+/-2.89		pCi/L						
Cobalt-57	U	-0.131	+/-2.79	5.08	+/-2.79		pCi/L						
Cobalt-58	U	-0.671	+/-2.62	4.24	+/-2.64		pCi/L						
Cobalt-60	U	-3.2	+/-3.30	5.00	+/-3.61		pCi/L						
Europium-152	U	-3.5	+/-11.2	16.6	+/-11.4		pCi/L						
Europium-154	U	1.42	+/-9.41	18.6	+/-9.43		pCi/L						
Europium-155	U	-3.08	+/-12.6	21.1	+/-12.6		pCi/L						
Iridium-192	U	1.69	+/-3.30	6.11	+/-3.39		pCi/L						
Iron-59	U	1.78	+/-6.62	13.1	+/-6.67		pCi/L						
Lead-210	U	595	+/-808	1510	+/-854		pCi/L						
Lead-212	U	4.59	+/-8.21	10.1	+/-8.22		pCi/L						
Lead-214		24.8	+/-13.2	19.8	+/-13.4		pCi/L						
Manganese-54	U	0.339	+/-3.06	5.95	+/-3.07		pCi/L						
Mercury-203	U	-1.97	+/-3.52	5.87	+/-3.64		pCi/L						
Neodymium-147	U	-2.77	+/-26.6	49.1	+/-26.7		pCi/L						
Neptunium-239	U	-3.39	+/-29.8	54.2	+/-29.9		pCi/L						
Niobium-94	U	-2.17	+/-3.92	5.55	+/-4.04		pCi/L						
Niobium-95	U	-1.28	+/-3.57	6.20	+/-3.62		pCi/L						
Potassium-40		104	+/-48.9	61.5	+/-49.8		pCi/L						
Promethium-144	U	1.11	+/-3.34	6.31	+/-3.38		pCi/L						
Promethium-146	U	1.10	+/-4.12	7.66	+/-4.15		pCi/L						
Radium-228	U	17.1	+/-14.3	29.3	+/-16.3		pCi/L						
Ruthenium-106	U	-22.8	+/-28.0	46.3	+/-29.9		pCi/L						
Silver-110m	U	-0.947	+/-2.91	5.17	+/-2.94		pCi/L						

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company : Olsson Associates  
 Address : 4690 Table Mountain Drive  
 Suite 200  
 Golden, Colorado 80403

Report Date: January 10, 2014

Contact: Mr. James Hix  
 Project: Laramie Energy II - Rulison Furr 16-22B

Client Sample ID: FURR 16-22B  
 Sample ID: 339804001

Project: OLSS00111  
 Client ID: OLSS001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
<b>Rad Gamma Spec Analysis</b>													
<i>Gammascpec, Gamma, Liquid (Standard List) "As Received"</i>													
Sodium-22	U	0.565	+/-3.32	6.57	+/-3.33		pCi/L						
Thallium-208	U	2.92	+/-4.69	5.58	+/-4.69		pCi/L						
Thorium-234	U	62.9	+/-257	357	+/-257		pCi/L						
Tin-113	U	2.95	+/-3.80	7.61	+/-4.03		pCi/L						
Uranium-235	U	3.14	+/-26.0	40.8	+/-26.0		pCi/L						
Uranium-238	U	62.9	+/-257	357	+/-257		pCi/L						
Yttrium-88	U	-0.537	+/-3.22	6.32	+/-3.23		pCi/L						
Zinc-65	U	-7.27	+/-8.28	10.6	+/-8.95		pCi/L						
Zirconium-95	U	-3.22	+/-6.24	10.6	+/-6.41		pCi/L						
<b>Rad Gas Flow Proportional Counting</b>													
<i>GFPC, Gross A/B, liquid "As Received"</i>													
Alpha	U	-71.5	+/-64.9	127	+/-64.9	5.00	pCi/L		JAOC	01/03/14	1458	1355958	2
Beta	U	56.8	+/-35.4	57.4	+/-36.7	5.00	pCi/L						
<i>GFPC, Sr90, liquid "As Received"</i>													
Strontium-90	U	0.202	+/-0.371	0.634	+/-0.373	2.00	pCi/L		EXK2	01/08/14	1624	1356857	3
<b>Rad Liquid Scintillation Analysis</b>													
<i>LSC, Tritium Dist, Liquid "As Received"</i>													
Tritium	U	259	+/-314	531	+/-318	700	pCi/L		BYS1	01/06/14	1518	1357134	4
<i>Liquid Scint Tc99, Liquid "As Received"</i>													
Technetium-99	U	16.0	+/-24.7	41.9	+/-24.8	50.0	pCi/L		MYM1	01/07/14	0818	1356537	5

**The following Analytical Methods were performed**

Method	Description
1	EPA 901.1
2	EPA 900.0/SW846 9310
3	EPA 905.0 Modified
4	EPA 906.0 Modified
5	DOE EML HASL-300, Tc-02-RC Modified

Surrogate/Tracer Recovery	Test	Batch ID	Recovery%	Acceptable Limits
Strontium Carrier	GFPC, Sr90, liquid "As Received"	1356857	93.9	(25%-125%)
Technetium-99m Tracer	Liquid Scint Tc99, Liquid "As Received"	1356537	72.1	(15%-125%)



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Company : Olsson Associates  
Address : 4690 Table Mountain Drive  
Suite 200  
Golden, Colorado 80403

Report Date: January 10, 2014

Contact: Mr. James Hix

Project: Laramie Energy II - Rulison Furr 16-22B

Client Sample ID: FURR 16-22B

Project: OLSS00111

Sample ID: 339804001

Client ID: OLSS001

Parameter	Qualifier	Result	Uncertainty	MDC	TPU	RL	Units	DF	Analyst	Date	Time	Batch	Mtd.
Surrogate/Tracer	Recovery	Test					Batch ID	Recovery%	Acceptable	Limits			

### Notes:

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

# Quality Control Data

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Report Date: January 10, 2014  
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**Client :** Olsson Associates  
4690 Table Mountain Drive  
Suite 200  
Golden, Colorado

**Contact:** Mr. James Hix

**Workorder:** 339804

Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1355780										
QC1203009339	339804001 DUP										
Actinium-228	U	17.1	U	19.8	pCi/L	0		N/A	MJH1	12/26/13	10:34
	Uncert:	+/-14.3		+/-13.3							
	TPU:	+/-16.3		+/-16.2							
Americium-241	U	30.1	U	-3.15	pCi/L	0		N/A			
	Uncert:	+/-24.3		+/-11.3							
	TPU:	+/-27.9		+/-11.3							
Antimony-124	U	-0.73	U	-0.00711	pCi/L	0		N/A			
	Uncert:	+/-8.53		+/-6.81							
	TPU:	+/-8.54		+/-6.81							
Antimony-125	U	2.32	U	-1.46	pCi/L	0		N/A			
	Uncert:	+/-8.47		+/-8.39							
	TPU:	+/-8.54		+/-8.41							
Barium-133	U	-4.45	U	-2.14	pCi/L	0		N/A			
	Uncert:	+/-4.89		+/-4.42							
	TPU:	+/-5.30		+/-4.53							
Barium-140	U	-1.94	U	0.996	pCi/L	0		N/A			
	Uncert:	+/-4.29		+/-4.32							
	TPU:	+/-4.39		+/-4.34							
Beryllium-7	U	-13.6	U	6.27	pCi/L	0		N/A			
	Uncert:	+/-26.9		+/-22.7							
	TPU:	+/-27.7		+/-22.9							
Bismuth-212	U	35.1	U	-18.7	pCi/L	0		N/A			
	Uncert:	+/-79.4		+/-40.2							
	TPU:	+/-81.0		+/-41.1							
Bismuth-214		38.5	U	9.78	pCi/L	116*		(0% - 100%)			
	Uncert:	+/-11.7		+/-9.67							
	TPU:	+/-12.2		+/-9.70							
Cerium-139	U	-1.32	U	-0.805	pCi/L	0		N/A			
	Uncert:	+/-3.07		+/-2.66							
	TPU:	+/-3.14		+/-2.69							
Cerium-141	U	-3.72	U	-0.738	pCi/L	0		N/A			
	Uncert:	+/-5.67		+/-5.64							
	TPU:	+/-5.92		+/-5.65							
Cerium-144	U	-7.59	U	1.31	pCi/L	0		N/A			
	Uncert:	+/-20.2		+/-18.8							
	TPU:	+/-20.5		+/-18.9							
Cesium-134	U	-0.726	U	0.157	pCi/L	0		N/A			
	Uncert:	+/-3.30		+/-3.01							
	TPU:	+/-3.31		+/-3.01							
Cesium-136	U	1.70	U	0.913	pCi/L	0		N/A			
	Uncert:	+/-4.79		+/-5.24							

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## QC Summary

Workorder: 339804

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1355780										
Cesium-137		TPU:	+/-4.86								
	U		3.26	U							N/A
		Uncert:	+/-3.10								
Chromium-51		TPU:	+/-3.44								
	U		1.28	U							N/A
		Uncert:	+/-31.1								
Cobalt-56		TPU:	+/-31.1								
	U		-1.13	U							N/A
		Uncert:	+/-2.84								
Cobalt-57		TPU:	+/-2.89								
	U		-0.131	U							N/A
		Uncert:	+/-2.79								
Cobalt-58		TPU:	+/-2.79								
	U		-0.671	U							N/A
		Uncert:	+/-2.62								
Cobalt-60		TPU:	+/-2.64								
	U		-3.2	U							N/A
		Uncert:	+/-3.30								
Europium-152		TPU:	+/-3.61								
	U		-3.5	U							N/A
		Uncert:	+/-11.2								
Europium-154		TPU:	+/-11.4								
	U		1.42	U							N/A
		Uncert:	+/-9.41								
Europium-155		TPU:	+/-9.43								
	U		-3.08	U							N/A
		Uncert:	+/-12.6								
Iridium-192		TPU:	+/-12.6								
	U		1.69	U							N/A
		Uncert:	+/-3.30								
Iron-59		TPU:	+/-3.39								
	U		1.78	U							N/A
		Uncert:	+/-6.62								
Lead-210		TPU:	+/-6.67								
	U		595	U							N/A
		Uncert:	+/-808								
Lead-212		TPU:	+/-854								
	U		4.59	U							N/A
		Uncert:	+/-8.21								
Lead-214		TPU:	+/-8.22								
	U		24.8	U							(0% - 100%)
		Uncert:	+/-13.2								
Manganese-54		TPU:	+/-13.4								
	U		0.339	U							N/A
		Uncert:	+/-3.06								
		TPU:	+/-3.07								

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 339804

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1355780										
Mercury-203	U	-1.97	U	-0.70	pCi/L	0			N/A		
	Uncert:	+/-3.52		+/-3.08							
	TPU:	+/-3.64		+/-3.10							
Neodymium-147	U	-2.77	U	13.3	pCi/L	0			N/A		
	Uncert:	+/-26.6		+/-27.5							
	TPU:	+/-26.7		+/-28.1							
Neptunium-239	U	-3.39	U	-26	pCi/L	0			N/A		
	Uncert:	+/-29.8		+/-25.8							
	TPU:	+/-29.9		+/-28.4							
Niobium-94	U	-2.17	U	1.72	pCi/L	0			N/A		
	Uncert:	+/-3.92		+/-2.85							
	TPU:	+/-4.04		+/-2.95							
Niobium-95	U	-1.28	U	-0.568	pCi/L	0			N/A		
	Uncert:	+/-3.57		+/-3.02							
	TPU:	+/-3.62		+/-3.03							
Potassium-40		104	UI	0.00	pCi/L	92.4		(0% - 100%)			
	Uncert:	+/-48.9		+/-34.0							
	TPU:	+/-49.8		+/-34.2							
Promethium-144	U	1.11	U	-2.69	pCi/L	0			N/A		
	Uncert:	+/-3.34		+/-2.67							
	TPU:	+/-3.38		+/-2.94							
Promethium-146	U	1.10	U	2.52	pCi/L	0			N/A		
	Uncert:	+/-4.12		+/-3.82							
	TPU:	+/-4.15		+/-4.00							
Radium-228	U	17.1	U	19.8	pCi/L	0			N/A		
	Uncert:	+/-14.3		+/-13.3							
	TPU:	+/-16.3		+/-16.2							
Ruthenium-106	U	-22.8	U	-9.6	pCi/L	0			N/A		
	Uncert:	+/-28.0		+/-26.2							
	TPU:	+/-29.9		+/-26.6							
Silver-110m	U	-0.947	U	1.31	pCi/L	0			N/A		
	Uncert:	+/-2.91		+/-2.78							
	TPU:	+/-2.94		+/-2.85							
Sodium-22	U	0.565	U	-0.391	pCi/L	0			N/A		
	Uncert:	+/-3.32		+/-2.14							
	TPU:	+/-3.33		+/-2.15							
Thallium-208	U	2.92	U	2.53	pCi/L	0			N/A		
	Uncert:	+/-4.69		+/-4.89							
	TPU:	+/-4.69		+/-4.89							
Thorium-234	U	62.9	U	-92.4	pCi/L	0			N/A		
	Uncert:	+/-257		+/-114							
	TPU:	+/-257		+/-124							
Tin-113	U	2.95	U	6.13	pCi/L	0			N/A		
	Uncert:	+/-3.80		+/-4.44							
	TPU:	+/-4.03		+/-4.46							
Uranium-235	U	3.14	U	2.57	pCi/L	0			N/A		

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## QC Summary

Workorder: 339804

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1355780										
Uranium-238		Uncert:		+/-26.0							
		TPU:		+/-26.0							
	U		62.9	U	-92.4	pCi/L	0		N/A		
		Uncert:		+/-257							
		TPU:		+/-257							
Yttrium-88			U	-0.537	U	-1.39	pCi/L	0	N/A		
		Uncert:		+/-3.22							
		TPU:		+/-3.23							
Zinc-65			U	-7.27	U	-3.07	pCi/L	0	N/A		
		Uncert:		+/-8.28							
		TPU:		+/-8.95							
Zirconium-95			U	-3.22	U	2.11	pCi/L	0	N/A		
		Uncert:		+/-6.24							
		TPU:		+/-6.41							
QC1203009340	LCS										
Actinium-228			U		376	pCi/L			MJH1	12/24/1314:14	
		Uncert:			+/-420						
		TPU:			+/-455						
Americium-241	34500				38800	pCi/L	112	(75%-125%)			
		Uncert:			+/-1270						
		TPU:			+/-3330						
Antimony-124			U		-31.2	pCi/L					
		Uncert:			+/-73.0						
		TPU:			+/-74.4						
Antimony-125			U		-18.1	pCi/L					
		Uncert:			+/-240						
		TPU:			+/-240						
Barium-133			U		-107	pCi/L					
		Uncert:			+/-104						
		TPU:			+/-115						
Barium-140			U		11.7	pCi/L					
		Uncert:			+/-46.2						
		TPU:			+/-46.5						
Beryllium-7			U		328	pCi/L					
		Uncert:			+/-725						
		TPU:			+/-740						
Bismuth-212			U		383	pCi/L					
		Uncert:			+/-1220						
		TPU:			+/-1230						
Bismuth-214			U		165	pCi/L					
		Uncert:			+/-170						
		TPU:			+/-186						
Cerium-139					774	pCi/L					
		Uncert:			+/-107						
		TPU:			+/-195						
Cerium-141			U		-40.8	pCi/L					

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 339804

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>										
Batch	1355780									
	Uncert:		+/-116							
	TPU:		+/-117							
Cerium-144		U	-197	pCi/L						
	Uncert:		+/-562							
	TPU:		+/-569							
Cesium-134		U	36.8	pCi/L						
	Uncert:		+/-101							
	TPU:		+/-103							
Cesium-136		U	-8.73	pCi/L						
	Uncert:		+/-146							
	TPU:		+/-146							
Cesium-137	14200		14400	pCi/L		101	(75%-125%)			
	Uncert:		+/-343							
	TPU:		+/-1200							
Chromium-51		U	-366	pCi/L						
	Uncert:		+/-642							
	TPU:		+/-664							
Cobalt-56		U	-54.6	pCi/L						
	Uncert:		+/-95.9							
	TPU:		+/-99.2							
Cobalt-57			2480	pCi/L						
	Uncert:		+/-125							
	TPU:		+/-275							
Cobalt-58		U	-20.1	pCi/L						
	Uncert:		+/-92.3							
	TPU:		+/-92.8							
Cobalt-60	18800		19000	pCi/L		101	(75%-125%)			
	Uncert:		+/-418							
	TPU:		+/-1590							
Europium-152		U	-72	pCi/L						
	Uncert:		+/-239							
	TPU:		+/-241							
Europium-154		U	-49.2	pCi/L						
	Uncert:		+/-145							
	TPU:		+/-147							
Europium-155		U	22.8	pCi/L						
	Uncert:		+/-288							
	TPU:		+/-289							
Iridium-192		U	3.28	pCi/L						
	Uncert:		+/-74.6							
	TPU:		+/-74.6							
Iron-59		U	-51.8	pCi/L						
	Uncert:		+/-206							
	TPU:		+/-207							
Lead-210			4.59E+05	pCi/L						
	Uncert:		+/-27600							
	TPU:									

# GEL LABORATORIES LLC

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## QC Summary

Workorder: 339804

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>										
Batch	1355780									
Lead-212		U	+/-49800 -7.52	pCi/L						
	Uncert:		+/-140							
	TPU:		+/-140							
Lead-214		U	84.5	pCi/L						
	Uncert:		+/-174							
	TPU:		+/-179							
Manganese-54		U	-46.5	pCi/L						
	Uncert:		+/-93.0							
	TPU:		+/-95.4							
Mercury-203		U	-17	pCi/L						
	Uncert:		+/-76.1							
	TPU:		+/-76.5							
Neodymium-147		U	-318	pCi/L						
	Uncert:		+/-608							
	TPU:		+/-625							
Neptunium-239		U	784	pCi/L						
	Uncert:		+/-799							
	TPU:		+/-877							
Niobium-94		U	57.6	pCi/L						
	Uncert:		+/-72.8							
	TPU:		+/-77.5							
Niobium-95		U	-57.1	pCi/L						
	Uncert:		+/-86.4							
	TPU:		+/-90.3							
Potassium-40		U	24.9	pCi/L						
	Uncert:		+/-338							
	TPU:		+/-338							
Promethium-144		U	-65.3	pCi/L						
	Uncert:		+/-73.4							
	TPU:		+/-79.3							
Promethium-146		U	89.0	pCi/L						
	Uncert:		+/-116							
	TPU:		+/-123							
Radium-228		U	376	pCi/L						
	Uncert:		+/-420							
	TPU:		+/-455							
Ruthenium-106		U	39.0	pCi/L						
	Uncert:		+/-714							
	TPU:		+/-715							
Silver-110m		U	126	pCi/L						
	Uncert:		+/-98.4							
	TPU:		+/-114							
Sodium-22		U	-11.6	pCi/L						
	Uncert:		+/-50.8							
	TPU:		+/-51.0							



# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Workorder: 339804

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>										
Batch	1355780									
Thallium-208		U	48.3	pCi/L						
	Uncert:		+/-81.4							
	TPU:		+/-84.3							
Thorium-234		U	-5730	pCi/L						
	Uncert:		+/-4500							
	TPU:		+/-5350							
Tin-113			669	pCi/L						
	Uncert:		+/-176							
	TPU:		+/-184							
Uranium-235		U	318	pCi/L						
	Uncert:		+/-491							
	TPU:		+/-512							
Uranium-238		U	-5730	pCi/L						
	Uncert:		+/-4500							
	TPU:		+/-5350							
Yttrium-88			850	pCi/L						
	Uncert:		+/-101							
	TPU:		+/-122							
Zinc-65			8010	pCi/L						
	Uncert:		+/-549							
	TPU:		+/-1210							
Zirconium-95		U	0.486	pCi/L						
	Uncert:		+/-151							
	TPU:		+/-151							
QC1203009338	MB									
Actinium-228		U	-6.75	pCi/L				MJH1	12/24/13	14:14
	Uncert:		+/-11.5							
	TPU:		+/-12.0							
Americium-241		U	12.1	pCi/L						
	Uncert:		+/-16.5							
	TPU:		+/-16.6							
Antimony-124		U	-0.857	pCi/L						
	Uncert:		+/-5.81							
	TPU:		+/-5.82							
Antimony-125		U	-3.18	pCi/L						
	Uncert:		+/-6.33							
	TPU:		+/-6.49							
Barium-133		U	-0.968	pCi/L						
	Uncert:		+/-2.78							
	TPU:		+/-2.81							
Barium-140		U	3.94	pCi/L						
	Uncert:		+/-3.07							
	TPU:		+/-3.56							
Beryllium-7		U	12.1	pCi/L						
	Uncert:		+/-15.4							
	TPU:		+/-16.4							

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## QC Summary

Workorder: 339804

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>										
Batch	1355780									
Bismuth-212		U	16.9	pCi/L						
	Uncert:		+/-33.1							
	TPU:		+/-34.0							
Bismuth-214		U	5.23	pCi/L						
	Uncert:		+/-10.5							
	TPU:		+/-10.7							
Cerium-139		U	0.110	pCi/L						
	Uncert:		+/-1.93							
	TPU:		+/-1.93							
Cerium-141		U	-0.584	pCi/L						
	Uncert:		+/-4.11							
	TPU:		+/-4.12							
Cerium-144		U	2.41	pCi/L						
	Uncert:		+/-12.7							
	TPU:		+/-12.8							
Cesium-134		U	0.258	pCi/L						
	Uncert:		+/-2.76							
	TPU:		+/-2.76							
Cesium-136		U	-0.714	pCi/L						
	Uncert:		+/-3.33							
	TPU:		+/-3.34							
Cesium-137		U	-1.5	pCi/L						
	Uncert:		+/-2.32							
	TPU:		+/-2.42							
Chromium-51		U	-1.68	pCi/L						
	Uncert:		+/-16.9							
	TPU:		+/-16.9							
Cobalt-56		U	0.905	pCi/L						
	Uncert:		+/-2.41							
	TPU:		+/-2.44							
Cobalt-57		U	0.155	pCi/L						
	Uncert:		+/-1.80							
	TPU:		+/-1.80							
Cobalt-58		U	-0.421	pCi/L						
	Uncert:		+/-2.23							
	TPU:		+/-2.23							
Cobalt-60		U	-0.875	pCi/L						
	Uncert:		+/-2.65							
	TPU:		+/-2.68							
Europium-152		U	0.463	pCi/L						
	Uncert:		+/-6.16							
	TPU:		+/-6.17							
Europium-154		U	-2.07	pCi/L						
	Uncert:		+/-5.05							
	TPU:		+/-5.14							
Europium-155		U	-4.83	pCi/L						

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## QC Summary

Workorder: 339804

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>										
Batch	1355780									
			Uncert:							
			TPU:							
Iridium-192		U	0.309	pCi/L						
			Uncert:							
			TPU:							
Iron-59		U	0.539	pCi/L						
			Uncert:							
			TPU:							
Lead-210		U	750	pCi/L						
			Uncert:							
			TPU:							
Lead-212		U	8.46	pCi/L						
			Uncert:							
			TPU:							
Lead-214		U	1.27	pCi/L						
			Uncert:							
			TPU:							
Manganese-54		U	2.17	pCi/L						
			Uncert:							
			TPU:							
Mercury-203		U	2.59	pCi/L						
			Uncert:							
			TPU:							
Neodymium-147		U	-8.19	pCi/L						
			Uncert:							
			TPU:							
Neptunium-239		U	18.8	pCi/L						
			Uncert:							
			TPU:							
Niobium-94		U	-0.304	pCi/L						
			Uncert:							
			TPU:							
Niobium-95		U	-1.22	pCi/L						
			Uncert:							
			TPU:							
Potassium-40		U	-30.6	pCi/L						
			Uncert:							
			TPU:							
Promethium-144		U	0.854	pCi/L						
			Uncert:							
			TPU:							
Promethium-146		U	-0.109	pCi/L						
			Uncert:							
			TPU:							
Radium-228		U	-6.75	pCi/L						
			Uncert:							
			TPU:							

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## QC Summary

Workorder: 339804

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Gamma Spec</b>											
Batch	1355780										
Ruthenium-106			U	+/-12.0 8.23	pCi/L						
				Uncert: TPU:							
				+/-20.9 +/-21.2							
Silver-110m			U	0.0836	pCi/L						
				Uncert: TPU:							
				+/-1.98 +/-1.98							
Sodium-22			U	-0.139	pCi/L						
				Uncert: TPU:							
				+/-1.63 +/-1.63							
Thallium-208			U	-0.292	pCi/L						
				Uncert: TPU:							
				+/-2.74 +/-2.75							
Thorium-234			U	20.2	pCi/L						
				Uncert: TPU:							
				+/-163 +/-163							
Tin-113			U	-1.94	pCi/L						
				Uncert: TPU:							
				+/-2.69 +/-2.83							
Uranium-235			U	6.56	pCi/L						
				Uncert: TPU:							
				+/-16.3 +/-16.6							
Uranium-238			U	20.2	pCi/L						
				Uncert: TPU:							
				+/-163 +/-163							
Yttrium-88			U	0.0121	pCi/L						
				Uncert: TPU:							
				+/-2.66 +/-2.66							
Zinc-65			U	-3.13	pCi/L						
				Uncert: TPU:							
				+/-4.93 +/-5.14							
Zirconium-95			U	-1.55	pCi/L						
				Uncert: TPU:							
				+/-3.28 +/-3.36							
<b>Rad Gas Flow</b>											
Batch	1355958										
QC1203009781	339628001 DUP										
Alpha	U	-2.07	U	-7.1	pCi/L	0			N/A JAOC	01/03/1414:59	
		Uncert: TPU:		+/-4.97 +/-4.97							
				+/-5.00 +/-5.00							
Beta		9.82		7.07	pCi/L	32.6		(0% - 100%)			
		Uncert: TPU:		+/-4.50 +/-4.80							
				+/-3.58 +/-3.79							
QC1203009784	LCS										
Alpha	123			123	pCi/L		99.4	(75%-125%)	JAOC	01/03/1414:59	
		Uncert:		+/-11.8							

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## QC Summary

Workorder: 339804

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date Time
<b>Rad Gas Flow</b>									
Batch	1355958								
Beta	457		TPU: +/-23.6 509	pCi/L		111	(75%-125%)		
			Uncert: +/-18.0						
			TPU: +/-86.5						
QC1203009780	MB								
Alpha		U	-1.57	pCi/L				JAOC	01/03/1414:58
			Uncert: +/-0.830						
			TPU: +/-0.830						
Beta		U	0.0878	pCi/L					
			Uncert: +/-0.957						
			TPU: +/-0.958						
QC1203009782	339628001	MS							
Alpha	1230	U	-2.07	pCi/L		118	(75%-125%)	JAOC	01/03/1414:59
			Uncert: +/-4.97						
			TPU: +/-4.97						
Beta	4570		9.82	pCi/L		117	(75%-125%)		
			Uncert: +/-4.50						
			TPU: +/-4.80						
QC1203009783	339628001	MSD							
Alpha	1230	U	-2.07	pCi/L	26.3*	90.4	(0%-20%)	JAOC	01/03/1414:59
			Uncert: +/-4.97						
			TPU: +/-4.97						
Beta	4570		9.82	pCi/L	10.9	104	(0%-20%)		
			Uncert: +/-4.50						
			TPU: +/-4.80						
Batch	1356857								
QC1203011970	339804001	DUP							
Strontium-90		U	0.202	pCi/L	0			N/A EXK2	01/09/1416:12
			Uncert: +/-0.371						
			TPU: +/-0.373						
QC1203011972	LCS								
Strontium-90	120			pCi/L		99.2	(75%-125%)	EXK2	01/08/1413:20
			Uncert: +/-6.17						
			TPU: +/-20.5						
QC1203011969	MB								
Strontium-90		U	0.322	pCi/L				EXK2	01/08/1413:20
			Uncert: +/-0.971						
			TPU: +/-0.972						
QC1203011971	339804001	MS							
Strontium-90	239	U	0.202	pCi/L		77.3	(75%-125%)	EXK2	01/08/1413:20
			Uncert: +/-0.371						
			TPU: +/-0.373						
<b>Rad Liquid Scintillation</b>									
Batch	1356537								
QC1203011106	339804001	DUP							

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## QC Summary

Workorder: 339804

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Parmname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
<b>Rad Liquid Scintillation</b>											
Batch	1356537										
Technetium-99	U	16.0	U	6.02	pCi/L	0			N/AMYM1	01/07/1409:12	
	Uncert:	+/-24.7		+/-24.8							
	TPU:	+/-24.8		+/-24.8							
QC1203011108	LCS										
Technetium-99	869			907	pCi/L		104	(75%-125%)	MYM1	01/07/1410:06	
	Uncert:			+/-39.0							
	TPU:			+/-108							
QC1203011105	MB										
Technetium-99			U	-9.99	pCi/L				MYM1	01/07/1408:45	
	Uncert:			+/-18.3							
	TPU:			+/-18.3							
QC1203011107	339804001	MS									
Technetium-99	1740	U	16.0	1900	pCi/L		109	(75%-125%)	MYM1	01/07/1409:39	
	Uncert:		+/-24.7	+/-84.6							
	TPU:		+/-24.8	+/-227							
Batch	1357134										
QC1203012728	339804001	DUP									
Tritium	U	259	U	369	pCi/L	0			N/A	BYS1	01/06/1415:50
	Uncert:	+/-314		+/-324							
	TPU:	+/-318		+/-331							
QC1203012730	LCS										
Tritium	1840			2210	pCi/L		120	(75%-125%)	BYS1	01/06/1416:22	
	Uncert:			+/-486							
	TPU:			+/-647							
QC1203012727	MB										
Tritium			U	40.3	pCi/L				BYS1	01/06/1415:34	
	Uncert:			+/-285							
	TPU:			+/-285							
QC1203012729	339804001	MS									
Tritium	1850	U	259	1910	pCi/L		103	(75%-125%)	BYS1	01/06/1416:06	
	Uncert:		+/-314	+/-468							
	TPU:		+/-318	+/-596							

**Notes:**

TPU and Counting Uncertainty are calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded
- J Value is estimated
- K Analyte present. Reported value may be biased high. Actual value is expected to be lower.

# GEL LABORATORIES LLC

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## QC Summary

Workorder: 339804

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Parmname	NOM	Sample Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
L										
M										
M										
N/A										
N1										
ND										
NJ										
Q										
R										
U										
UI										
UJ										
UL										
X										
Y										
^										
h										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more.

\*\* Indicates analyte is a surrogate/tracer compound.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

# **Gamma Spectroscopy Raw Data**



09-Jan-2014

Batch# 1355780 Product: X Liquid Date: 1/9/14

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			N/A
Samples have been blank corrected (if required). Blank correction reported included (if required).			N/A
If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	✓		
Instrument source check is within limits.	✓		
Instrument bkg check is within limits.	✓		
Method RDL/ LLD has been met.	✓		
If duplicate activities are: Less than 5* MDA/ MDC, then RPD is 100% or less, If greater 5* MDA/ MDC, then RPD 20% or less, If below the MDA/ MDC, the RPD is 0%, Or meets the client's required RER acceptance criteria.	<sup>84</sup> 1/9/14	✓	DCI # 1258514
Tracer yield is 15-125% . Carrier yield 25-125%. (Or meets the client's contract acceptance criteria).			N/A
Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity)	✓		
Sample was run within hold time.	✓		
Sample was correctly preserved if required.			N/A
Smears Taken for Radioactive batches.			N/A
Method Spike and LCS are within 75-125% (or meets the client's contract acceptance criteria).	✓		
No blank spaces on data forms. All line outs initialed and dated. No transcription errors are apparent.	✓		
Aux data is correct.			N/A
Client Special requirements page has been checked.	✓		
Raw Data and/ or spectrum are included and properly stated.	✓		
MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified	✓		
Hit notification complete (if necessary)			N/A
Batch entered into Case Narrative.	✓		
Batch Data Exception Reports (DER) completed, if applicable.	✓		DCI # 1258514
Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed.	✓		
Aliquot Correction completed if required.			N/A
Review sample historical results if available (If REMP, results above MDC have been verified by historical results, recount or re-analysis.)			N/A

Primary Review Performed By: [Signature] 1/9/14

Secondary Review Performed By: [Signature] 1/9/14

# Gamma Spec Queue Sheet

12/20/2013

Batch #: 1355780    Analyst: MJH1    First Client Due Date: 01/17/2014    Internal Due Date: 01/06/2014  
 Gamma LCS Isotope: Mixed Gamma    LCS Code: 1604    Expiration Date: 9/18/39    Vol: 1.0  
 Initials: WMSJH    Prep Date: 12/23/13    Library: LISLID    Balance ID: 40109033

Sample ID	Client Description / Container ID	Type	Hazard Code	Client	Matrix	Collect Date	Geometry	Aliquot (W/Dry) (T/g / F)	Detector	Sealing Date/Time (if Applicable)
339804001-1	FURR 16-22B	SAMPLE		OLSS001	WATER	19-DEC-13 10:15:00	ZLMB	2.0	8	
1203009338-1	MB	MB		QC ACCOUNT	WATER	12/23/13	ZLMB	2.0	9	
1203009339-1	DUP FURR 16-22B(339804001)	DUP		QC ACCOUNT	WATER	19-DEC-13 10:15:00	ZLMB	2.0	7	
1203009340-1	LCS	LCS		QC ACCOUNT	WATER	12/23/13	ZLMB	2.0	11	

WMSJH  
12/23/13

GEL Laboratories LLC, Radiochemistry Division

Data Reviewed By: B. Walker 1/9/14  
 Page 1 of 1

VAX/VMS Nuclide Identification Report Generated 24-DEC-2013 16:14:04.76

```

*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                                 *
*                               Charleston, SC 29407                          *
*****
Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G339804001.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM08.CNF;174
Background date : 21-DEC-2013 11:48:15
Sample date     : 19-DEC-2013 10:15:00 Acquisition date : 24-DEC-2013 14:13:35
Sample ID      : G339804001 Sample quantity   : 2.00000E+00 LITER
Detector name  : GAM08 Detector geometry   : 2LMB
Elapsed live time: 0 02:00:00.00 Elapsed real time: 0 02:00:01.23 0.0%
Energy tolerance : 1.50000 keV Analyst Initials : MJH1
Abundance limit : 75.00000 Sensitivity    : 3.00000
Batch ID       : 1355780 Detector SN#    :
Matrix Spike ID : LCS ID           : 1604
*****

```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.55*	9	116	0.81	127.26	126	6	1.28E-03	208.4	
2	0	77.27*	13	126	0.91	154.74	152	7	1.76E-03	161.4	
3	4	87.91	40	133	1.63	176.03	171	23	5.57E-03	56.2	1.59E+00
4	4	90.63	27	118	1.50	181.48	171	23	3.74E-03	82.1	
5	4	92.62*	31	116	1.46	185.47	171	23	4.34E-03	79.1	
6	10	138.47	9	34	1.22	277.26	276	8	1.20E-03	99.4	5.93E+00
7	10	139.77	27	105	1.67	279.86	276	8	3.69E-03	69.0	
8	0	154.58	37	102	2.17	309.51	304	10	5.11E-03	54.0	
9	0	185.79*	7	166	1.19	371.98	366	13	1.04E-03	388.0	
10	0	197.65*	13	114	1.16	395.74	392	10	1.77E-03	166.0	
11	2	238.86*	20	74	1.33	478.23	471	22	2.73E-03	91.3	1.32E+00
12	2	242.02	34	67	1.63	484.57	471	22	4.74E-03	54.1	
13	0	253.16	26	77	2.76	506.86	501	10	3.58E-03	66.8	
14	0	295.74*	27	69	0.85	592.11	588	8	3.71E-03	59.9	
15	0	306.71	11	44	0.78	614.07	610	8	1.46E-03	113.8	
16	0	339.23*	40	67	0.80	679.17	671	16	5.49E-03	52.0	
17	0	352.24*	68	55	1.48	705.22	699	13	9.50E-03	27.2	
18	0	535.03	48	69	16.25	1071.14	1048	35	6.71E-03	55.9	
19	0	583.56*	14	21	0.80	1168.31	1163	10	1.89E-03	81.9	
20	0	596.48	35	8	1.26	1194.17	1190	9	4.80E-03	23.0	
21	0	600.55	12	6	1.34	1202.31	1199	6	1.64E-03	43.9	
22	0	609.33*	94	23	1.11	1219.89	1214	13	1.30E-02	15.5	
23	0	709.22	20	17	1.06	1419.86	1412	12	2.73E-03	48.5	
24	0	722.59	15	16	0.98	1446.62	1440	13	2.11E-03	60.2	
25	0	728.85*	27	11	0.54	1459.16	1453	14	3.76E-03	36.8	
26	0	818.78	27	16	6.26	1639.18	1629	21	3.76E-03	41.4	
27	0	862.46	8	4	1.42	1726.62	1723	6	1.05E-03	57.1	
28	0	893.54	9	12	0.96	1788.84	1783	12	1.18E-03	88.6	
29	0	911.66*	17	6	1.05	1825.11	1820	11	2.42E-03	42.5	
30	0	1014.45	9	4	0.76	2030.88	2028	6	1.18E-03	50.9	
31	0	1120.43	22	8	0.84	2243.01	2237	14	3.11E-03	33.0	
32	0	1214.74	9	3	0.70	2431.81	2425	11	1.27E-03	48.3	
33	0	1461.35*	30	3	2.09	2925.44	2919	11	4.17E-03	24.0	
34	0	1588.31	7	2	1.41	3179.58	3174	9	9.95E-04	52.3	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1683.77	9	0	2.37	3370.67	3366	9	1.25E-03	33.3	
36	0	1765.53*	14	7	0.68	3534.31	3527	13	1.93E-03	49.7	

Flag: "\*" = Peak area was modified by background subtraction

```

Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G339804001.CNF;1
Analyses by       : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title      : MJH1
Sample date       : 19-DEC-2013 10:15:00 Acquisition date : 24-DEC-2013 14:13:35
Sample ID        : G339804001 Sample quantity   : 2.0000 LITER
Sample type      : LIQUID Sample geometry    :
Detector name    : GAMMA8 Detector geometry: 2LMB
Elapsed live time: 0 02:00:00.00 Elapsed real time: 0 02:00:01.23 0.0%
Energy tolerance : 1.50 keV Half life ratio   : 10.00
Errors propagated: No Systematic Error    : 0.00 %
Efficiency type  : Empirical Efficiencies at  : Peak Energy
Abundance limit  : 75.00
    
```

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
PB-214	351.93	BI-211	351.06
PB-214	87.09	SN-126	86.94
PB-214	87.09	SN-126	87.57
PB-214	87.09	CD-109	88.03
PB-214	242.00	RA-224	240.99

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error	Status
K-40	1460.82	10.66*	5.086E-01	1.040E+02	1.040E+02	47.98	OK
CU-67	91.27	7.00	1.781E+00	4.056E+01	1.646E+02	164.22	OK
	93.31	16.10	1.833E+00	1.988E+01	8.069E+01	158.23	OK
	184.58	48.70*	2.114E+00	1.363E+00	5.531E+00	776.04	OK
AS-74	595.83	59.00*	1.020E+00	1.078E+01	1.321E+01	46.01	OK
	634.78	15.40	9.760E-01	-----	Line Not Found	-----	Absent
CD-109	88.03	3.70*	1.703E+00	1.040E+02	1.048E+02	130.36	OK
SN-126	64.28	9.60	7.420E-01	2.425E+01	2.425E+01	416.82	OK
	86.94	8.90	1.703E+00	4.322E+01	4.322E+01	130.36	OK
	87.57	37.00*	1.703E+00	1.040E+01	1.040E+01	130.36	OK
RE-188	61.49	1.39	6.522E-01	-----	Line Not Found	-----	Absent
	63.00	2.38	7.420E-01	9.783E+01	1.030E+02	416.82	OK
	155.04	15.61*	2.249E+00	1.969E+01	2.073E+01	107.97	OK
	477.99	1.08	1.188E+00	-----	Line Not Found	-----	Absent
TL-208	632.98	1.37	9.780E-01	-----	Line Not Found	-----	Absent
	277.37	6.60	1.692E+00	-----	Line Not Found	-----	Absent
	583.19	85.00*	1.036E+00	2.904E+00	2.919E+00	163.79	OK
BI-211	860.56	12.50	7.770E-01	-----	Line Not Found	-----	Absent
	72.87	1.23	1.151E+00	-----	Line Not Found	-----	Absent
PB-212	351.06	12.92*	1.453E+00	2.233E+01	2.234E+01	298.43	OK
	74.82	10.28	1.233E+00	-----	Line Not Found	-----	Absent
	77.11	17.10	1.332E+00	1.043E+01	1.049E+01	322.89	OK
BI-214	238.63	43.60*	1.853E+00	4.563E+00	4.587E+00	182.57	OK
	300.09	3.30	1.610E+00	-----	Line Not Found	-----	Absent
	609.32	45.49*	1.005E+00	3.852E+01	3.852E+01	30.94	OK
	1120.29	14.92	6.285E-01	4.483E+01	4.483E+01	65.91	OK
PB-214	1764.49	15.30	4.464E-01	3.813E+01	3.813E+01	99.46	OK
	74.82	5.80	1.233E+00	-----	Line Not Found	-----	Absent
	77.11	9.70	1.332E+00	1.839E+01	1.839E+01	322.89	OK
	87.09	3.41	1.678E+00	-----	Line Not Found	-----	<<INT Reject
	242.00	7.25	1.839E+00	-----	Line Not Found	-----	<<INT Reject
RA-224	295.22	18.42	1.625E+00	1.674E+01	1.674E+01	119.84	OK
	351.93	35.60*	1.453E+00	-----	Line Not Found	-----	<<INT Reject
	240.99	4.10*	1.839E+00	5.535E+01	5.563E+01	178.09	OK
RA-226	186.21	3.59*	2.114E+00	1.848E+01	1.848E+01	776.04	OK
TH-228	74.82	10.28	1.233E+00	-----	Line Not Found	-----	Absent
	77.11	17.10	1.332E+00	1.043E+01	1.049E+01	322.89	OK
	238.63	43.60*	1.853E+00	4.563E+00	4.587E+00	182.57	OK
TH-232	300.09	3.30	1.610E+00	-----	Line Not Found	-----	Absent
	63.81	0.26*	7.420E-01	8.955E+02	8.955E+02	416.82	OK
TH-234	140.88	0.02	2.279E+00	1.094E+04	1.094E+04	137.94	OK
	63.29	3.70*	7.420E-01	6.293E+01	6.293E+01	416.82	OK
U-235	92.59	4.23	1.833E+00	7.566E+01	7.566E+01	158.23	OK
	89.96	3.47	1.781E+00	8.181E+01	8.181E+01	164.22	OK
	93.35	5.60	1.833E+00	5.715E+01	5.715E+01	158.23	OK
	143.76	10.96*	2.275E+00	-----	Line Not Found	-----	Absent
	163.33	5.08	2.217E+00	-----	Line Not Found	-----	Absent
	185.72	57.20	2.114E+00	1.160E+00	1.160E+00	776.04	OK
	205.31	5.01	2.015E+00	-----	Line Not Found	-----	Absent

Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error	Status
U-238	63.29	3.70*	7.420E-01	6.293E+01	6.293E+01	416.82	OK
	92.59	4.23	1.833E+00	7.566E+01	7.566E+01	158.23	OK

Flag: "\*" = Keyline

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*                               *                                               *
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G339804001.CNF;1  *
* Acquisition date   : 24-DEC-2013 14:13:35 Sensitivity      : 3.000          *
* Detector ID       : GAM08 Energy tolerance: 1.500         *
* Elapsed live time : 0 02:00:00.00 Abundance limit : 75.000    *
* Elapsed real time : 0 02:00:01.23 Half life ratio : ***** *
* Sample date       : 19-DEC-2013 10:15:00 Nuclide Library  : LIQUID      *
* Sample ID        : G339804001 Analyst initials: MJH1       *
* Batch Number     : 1355780 Sample Quantity : 2.0000E+00 LITER *
* Wet wt corr      : 1.00000 Wet Weight      : 0.00000       *
*                               Dry Weight     : 0.00000       *
*****
*                               CALIBRATION INFORMATION                         *
*                               *                                               *
* Eff. Cal. date    : 9-JUL-2013 08:16:20 Eff. Geometry    : 2LMB          *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM08_2LMB.CNF;11 *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.  
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER )	Cnt uncert (1.96-sigma)	MDA (pCi/LITER )
K-40	1.040E+02	4.891E+01	6.146E+01
CU-67	5.531E+00	4.207E+01	3.490E+01
AS-74	1.321E+01	5.956E+00	9.361E+00
CD-109	1.048E+02	1.339E+02	1.429E+02
SN-126	1.040E+01	1.328E+01	1.429E+01
RE-188	2.073E+01	2.194E+01	3.003E+01
TL-208	2.919E+00	4.686E+00	5.583E+00
BI-211	2.234E+01	6.532E+01	3.538E+01
PB-212	4.587E+00	8.207E+00	1.014E+01
BI-214	3.852E+01	1.168E+01	1.057E+01
PB-214	2.484E+01	1.324E+01	1.978E+01
RA-224	5.563E+01	9.709E+01	1.086E+02
RA-226	1.848E+01	1.406E+02	1.172E+02
TH-228	4.587E+00	8.207E+00	1.014E+01
TH-232	8.955E+02	3.658E+03	5.139E+03
TH-234	6.293E+01	2.570E+02	3.571E+02
U-235	3.142E+00	2.600E+01	4.084E+01
U-238	6.293E+01	2.570E+02	3.571E+02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/LITER )	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/LITER )	
BE-7	-1.362E+01	2.693E+01	4.745E+01	NOT IDENT.
NA-22	5.651E-01	3.316E+00	6.568E+00	NOT IDENT.
NA-24	-7.810E+01	1.175E+03	2.288E+03	NOT IDENT.
AL-26	1.223E+00	3.275E+00	7.122E+00	NOT IDENT.
SC-46	-1.898E+00	3.198E+00	4.616E+00	FAIL ABUN
V-48	2.161E+00	3.933E+00	8.108E+00	NOT IDENT.
CR-51	1.280E+00	3.110E+01	5.513E+01	NOT IDENT.
MN-52	3.717E-02	7.156E+00	1.406E+01	NOT IDENT.
MN-54	3.392E-01	3.062E+00	5.953E+00	NOT IDENT.
CO-56	-1.130E+00	2.838E+00	5.202E+00	NOT IDENT.
CO-57	-1.312E-01	2.790E+00	5.076E+00	NOT IDENT.
CO-58	-6.712E-01	2.619E+00	4.235E+00	NOT IDENT.



FE-59	1.778E+00	6.619E+00	1.308E+01	NOT IDENT.
CO-60	-3.195E+00	3.296E+00	5.001E+00	NOT IDENT.
ZN-65	-7.271E+00	8.283E+00	1.062E+01	NOT IDENT.
GE-68	-3.180E+01	9.243E+01	1.689E+02	NOT IDENT.
SE-75	4.380E+00	4.222E+00	8.151E+00	NOT IDENT.
BR-77	3.933E+01	7.037E+01	1.178E+02	FAIL ABUN
SR-82	-5.877E+00	2.348E+01	4.161E+01	NOT IDENT.
RB-83	-4.232E+00	7.462E+00	1.091E+01	NOT IDENT.
RB-84	2.157E+00	4.496E+00	9.295E+00	NOT IDENT.
KR-85	-1.140E+03	9.898E+02	1.628E+03	NOT IDENT.
SR-85	-5.392E+00	4.683E+00	7.704E+00	NOT IDENT.
RB-86	-1.820E+01	4.047E+01	7.258E+01	NOT IDENT.
Y-88	-5.374E-01	3.218E+00	6.324E+00	NOT IDENT.
Y-91	-1.744E+02	1.305E+03	2.458E+03	NOT IDENT.
NB-94	-2.172E+00	3.915E+00	5.551E+00	NOT IDENT.
NB-95	-1.277E+00	3.572E+00	6.201E+00	NOT IDENT.
NB-95M	-4.563E+00	1.250E+01	1.877E+01	NOT IDENT.
ZR-95	-3.217E+00	6.240E+00	1.062E+01	NOT IDENT.
MO-99	1.442E+01	9.481E+01	1.773E+02	FAIL ABUN
TC-99M	0.000E+00	5.887E+06	0.000E+00	SHORT HLIF
RH-101	1.251E+00	3.434E+00	6.385E+00	FAIL ABUN
RH-102M	-3.030E+00	2.714E+00	4.437E+00	NOT IDENT.
RU-103	1.848E+00	3.298E+00	6.443E+00	FAIL ABUN
RH-106	-2.280E+01	2.797E+01	4.633E+01	NOT IDENT.
RU-106	-2.280E+01	2.797E+01	4.633E+01	NOT IDENT.
AG-108M	1.746E+00	2.756E+00	5.454E+00	FAIL ABUN
AG-110M	-9.469E-01	2.908E+00	5.166E+00	NOT IDENT.
SN-113	2.950E+00	3.798E+00	7.611E+00	NOT IDENT.
IN-114M	3.750E+00	1.841E+01	2.964E+01	NOT IDENT.
CD-115	9.217E+00	4.771E+01	9.071E+01	NOT IDENT.
SN-117M	2.275E+00	4.103E+00	6.811E+00	FAIL ABUN
I-123	-5.012E+02	2.443E+03	3.804E+03	NOT IDENT.
TE-123M	-7.001E-01	3.565E+00	5.555E+00	NOT IDENT.
SB-124	-7.301E-01	8.533E+00	1.522E+01	FAIL ABUN
SB-125	2.319E+00	8.470E+00	1.621E+01	FAIL ABUN
TE-125M	4.215E+02	1.081E+03	1.888E+03	NOT IDENT.
I-126	-9.979E+00	1.130E+01	1.837E+01	NOT IDENT.
SB-126	3.359E+00	7.363E+00	1.300E+01	NOT IDENT.
SB-127	-8.661E+00	1.875E+01	3.258E+01	FAIL ABUN
I-131	-3.219E+00	5.446E+00	9.029E+00	NOT IDENT.
I-132	0.000E+00	5.955E+16	0.000E+00	SHORT HLIF
TE-132	-6.211E+00	8.265E+00	1.393E+01	NOT IDENT.
BA-133	-4.450E+00	4.891E+00	6.536E+00	NOT IDENT.
I-133	1.531E+01	1.899E+02	3.571E+02	NOT IDENT.
CS-134	-7.264E-01	3.297E+00	6.190E+00	NOT IDENT.
CS-135	-9.346E-01	1.503E+01	2.668E+01	NOT IDENT.
I-135	0.000E+00	5.377E+06	0.000E+00	SHORT HLIF
CS-136	1.704E+00	4.790E+00	9.815E+00	FAIL ABUN
BA-137M	3.081E+00	2.932E+00	6.180E+00	NOT IDENT.
CS-137	3.255E+00	3.098E+00	6.529E+00	NOT IDENT.
CE-139	-1.315E+00	3.068E+00	5.380E+00	NOT IDENT.
BA-140	-1.935E+00	4.294E+00	7.706E+00	NOT IDENT.
LA-140	-1.935E+00	4.294E+00	7.706E+00	NOT IDENT.
CE-141	-3.722E+00	5.666E+00	9.850E+00	NOT IDENT.
CE-143	2.712E+01	1.021E+02	1.622E+02	FAIL ABUN
CE-144	-7.594E+00	2.021E+01	3.598E+01	NOT IDENT.
PM-144	1.114E+00	3.339E+00	6.314E+00	NOT IDENT.
PR-144	8.296E+01	2.486E+02	4.701E+02	NOT IDENT.
PM-146	1.100E+00	4.117E+00	7.663E+00	NOT IDENT.
ND-147	-2.770E+00	2.664E+01	4.914E+01	FAIL ABUN
PM-147	2.803E+04	8.293E+04	1.542E+05	NOT IDENT.
PM-149	4.161E+01	4.399E+02	7.849E+02	NOT IDENT.
EU-152	-3.501E+00	1.124E+01	1.661E+01	NOT IDENT.
GD-153	-2.699E+00	1.137E+01	1.695E+01	NOT IDENT.
EU-154	1.419E+00	9.405E+00	1.858E+01	FAIL ABUN
EU-155	-3.080E+00	1.256E+01	2.111E+01	FAIL ABUN
HO-166M	4.340E+00	5.127E+00	9.790E+00	FAIL ABUN
TM-171	1.367E+03	3.546E+03	6.431E+03	NOT IDENT.
LU-176	1.327E+00	2.959E+00	4.878E+00	FAIL ABUN
HF-181	-1.654E-01	3.857E+00	7.092E+00	NOT IDENT.
W-181	-8.594E+00	3.293E+01	5.689E+01	NOT IDENT.
TA-182	-8.255E+00	1.317E+01	2.005E+01	FAIL ABUN
RE-183	-1.211E+01	3.105E+01	5.307E+01	NOT IDENT.
RE-184	2.080E+00	7.611E+00	1.526E+01	FAIL ABUN
W-188	-7.610E+01	7.857E+02	1.204E+03	FAIL ABUN
OS-191	1.133E+00	1.090E+01	1.998E+01	FAIL ABUN
IR-192	1.691E+00	3.299E+00	6.105E+00	FAIL ABUN
HG-203	-1.970E+00	3.523E+00	5.869E+00	NOT IDENT.

BI-207	1.293E+00	4.355E+00	8.699E+00	NOT IDENT.
PB-210	5.946E+02	8.079E+02	1.509E+03	NOT IDENT.
PB-211	6.647E+01	6.748E+01	1.364E+02	NOT IDENT.
BI-212	3.511E+01	7.938E+01	9.764E+01	NOT IDENT.
BI-213	3.170E+00	1.040E+01	1.912E+01	NOT IDENT.
RN-219	-7.367E+00	3.955E+01	7.239E+01	NOT IDENT.
FR-221	2.033E+00	2.219E+01	3.984E+01	NOT IDENT.
RA-223	8.285E+01	7.126E+01	1.255E+02	FAIL ABUN
AC-227	-1.498E+01	3.010E+01	4.431E+01	NOT IDENT.
TH-227	-1.498E+01	3.010E+01	4.431E+01	NOT IDENT.
AC-228	1.710E+01	1.425E+01	2.930E+01	FAIL ABUN
RA-228	1.710E+01	1.425E+01	2.930E+01	FAIL ABUN
TH-229	4.101E+00	5.998E+01	9.534E+01	FAIL ABUN
TH-230	4.605E+02	1.715E+03	2.729E+03	NOT IDENT.
PA-231	5.522E+01	1.545E+02	2.817E+02	NOT IDENT.
TH-231	3.507E+01	5.625E+01	9.170E+01	NOT IDENT.
PA-233	-4.050E+00	7.639E+00	1.175E+01	FAIL ABUN
PA-234	-1.301E+01	2.184E+01	3.850E+01	NOT IDENT.
PA-234M	-2.262E+02	3.912E+02	6.956E+02	NOT IDENT.
U-234	5.124E+03	1.227E+04	2.235E+04	NOT IDENT.
NP-237	-4.050E+00	7.639E+00	1.175E+01	FAIL ABUN
NP-239	-3.385E+00	2.982E+01	5.417E+01	NOT IDENT.
AM-241	3.009E+01	2.425E+01	4.630E+01	NOT IDENT.
AM-242	3.504E+01	8.323E+01	1.399E+02	NOT IDENT.
AM-243	4.847E-01	8.467E+00	1.298E+01	NOT IDENT.
CM-243	9.221E-01	1.301E+01	2.236E+01	NOT IDENT.
CM-247	-1.688E+00	3.701E+00	6.600E+00	NOT IDENT.
CF-249	3.669E-01	3.526E+00	6.688E+00	FAIL ABUN
CF-251	-7.512E+00	1.363E+01	2.365E+01	NOT IDENT.
CF-252	1.665E+04	2.154E+04	3.884E+04	NOT IDENT.
ANH-511	-8.423E+00	4.930E+00	9.403E+00	NOT IDENT.

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	63.55	37	116	0.81	127.26	126	6	5.15E-03	48.7	
2	0	77.27	34	126	0.91	154.74	152	7	4.65E-03	58.9	
3	4	87.91	40	133	1.63	176.03	171	23	5.57E-03	56.2	1.59E+00
4	4	90.63	27	118	1.50	181.48	171	23	3.74E-03	82.1	
5	4	92.62	131	116	1.46	185.47	171	23	1.82E-02	17.7	
6	10	138.47	9	34	1.22	277.26	276	8	1.20E-03	99.4	5.93E+00
7	10	139.77	27	105	1.67	279.86	276	8	3.69E-03	69.0	
8	0	154.58	37	102	2.17	309.51	304	10	5.11E-03	54.0	
9	0	185.79	81	166	1.19	371.98	366	13	1.13E-02	34.6	
10	0	197.65	20	114	1.16	395.74	392	10	2.83E-03	99.9	
11	2	238.86	76	74	1.33	478.23	471	22	1.05E-02	21.7	1.32E+00
12	2	242.02	34	67	1.63	484.57	471	22	4.74E-03	54.1	
13	0	253.16	26	77	2.76	506.86	501	10	3.58E-03	66.8	
14	0	295.74	35	69	0.85	592.11	588	8	4.90E-03	43.9	
15	0	306.71	11	44	0.78	614.07	610	8	1.46E-03	113.8	
16	0	339.23	49	67	0.80	679.17	671	16	6.84E-03	40.0	
17	0	352.24	87	55	1.48	705.22	699	13	1.21E-02	20.6	
18	0	510.91	76	79	2.01	1022.86	1014	15	1.05E-02	28.5	
19	0	535.03	48	69	16.25	1071.14	1048	35	6.71E-03	55.9	
20	0	583.56	31	21	0.80	1168.31	1163	10	4.33E-03	33.4	
21	0	596.48	35	8	1.26	1194.17	1190	9	4.80E-03	23.0	
22	0	600.55	12	6	1.34	1202.31	1199	6	1.64E-03	43.9	
23	0	609.33	103	23	1.11	1219.89	1214	13	1.43E-02	13.7	
24	0	709.22	20	17	1.06	1419.86	1412	12	2.73E-03	48.5	
25	0	722.59	15	16	0.98	1446.62	1440	13	2.11E-03	60.2	
26	0	728.85	30	11	0.54	1459.16	1453	14	4.21E-03	31.3	
27	0	818.78	27	16	6.26	1639.18	1629	21	3.76E-03	41.4	
28	0	862.46	8	4	1.42	1726.62	1723	6	1.05E-03	57.1	
29	0	893.54	9	12	0.96	1788.84	1783	12	1.18E-03	88.6	
30	0	911.66	28	6	1.05	1825.11	1820	11	3.82E-03	25.2	
31	0	1014.45	9	4	0.76	2030.88	2028	6	1.18E-03	50.9	
32	0	1120.43	22	8	0.84	2243.01	2237	14	3.11E-03	33.0	
33	0	1214.74	9	3	0.70	2431.81	2425	11	1.27E-03	48.3	
34	0	1461.35	37	3	2.09	2925.44	2919	11	5.13E-03	18.7	
35	0	1588.31	7	2	1.41	3179.58	3174	9	9.95E-04	52.3	
36	0	1683.77	9	0	2.37	3370.67	3366	9	1.25E-03	33.3	
37	0	1765.53	18	7	0.68	3534.31	3527	13	2.43E-03	38.4	

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
K-40	1460.82	30	10.66*	5.086E-01	1.040E+02	1.040E+02	47.98
CU-67	91.27	27	7.00	1.781E+00	4.056E+01	1.646E+02	164.22
	93.31	31	16.10	1.833E+00	1.988E+01	8.069E+01	158.23
	184.58	7	48.70*	2.114E+00	1.363E+00	5.531E+00	776.04
AS-74	595.83	35	59.00*	1.020E+00	1.078E+01	1.321E+01	46.01
	634.78	-----	15.40	9.760E-01	-----	Line Not Found	-----
CD-109	88.03	40	3.70*	1.703E+00	1.194E+02	1.203E+02	112.46
SN-126	64.28	9	9.60	7.420E-01	2.425E+01	2.425E+01	416.82
	86.94	40	8.90	1.703E+00	4.963E+01	4.963E+01	112.46
	87.57	40	37.00*	1.703E+00	1.194E+01	1.194E+01	112.46
RE-188	61.49	-----	1.39	6.522E-01	-----	Line Not Found	-----
	63.00	9	2.38	7.420E-01	9.783E+01	1.030E+02	416.82
	155.04	37	15.61*	2.249E+00	1.969E+01	2.073E+01	107.97
	477.99	-----	1.08	1.188E+00	-----	Line Not Found	-----
TL-208	632.98	-----	1.37	9.780E-01	-----	Line Not Found	-----
	277.37	-----	6.60	1.692E+00	-----	Line Not Found	-----
	583.19	14	85.00*	1.036E+00	2.904E+00	2.919E+00	163.79
BI-211	860.56	-----	12.50	7.770E-01	-----	Line Not Found	-----
	72.87	-----	1.23	1.151E+00	-----	Line Not Found	-----
PB-212	351.06	68	12.92*	1.453E+00	6.844E+01	6.847E+01	54.37
	74.82	-----	10.28	1.233E+00	-----	Line Not Found	-----
	77.11	13	17.10	1.332E+00	1.043E+01	1.049E+01	322.89
BI-214	238.63	20	43.60*	1.853E+00	4.563E+00	4.587E+00	182.57
	300.09	-----	3.30	1.610E+00	-----	Line Not Found	-----
	609.32	94	45.49*	1.005E+00	3.852E+01	3.852E+01	30.94
	1120.29	22	14.92	6.285E-01	4.483E+01	4.483E+01	65.91
PB-214	1764.49	14	15.30	4.464E-01	3.813E+01	3.813E+01	99.46
	74.82	-----	5.80	1.233E+00	-----	Line Not Found	-----
	77.11	13	9.70	1.332E+00	1.839E+01	1.839E+01	322.89
	87.09	40	3.41	1.703E+00	1.295E+02	1.295E+02	112.46
	242.00	34	7.25	1.839E+00	4.804E+01	4.804E+01	108.27
RA-224	295.22	27	18.42	1.625E+00	1.674E+01	1.674E+01	119.84
	351.93	68	35.60*	1.453E+00	2.484E+01	2.484E+01	54.37
	240.99	34	4.10*	1.839E+00	8.494E+01	8.538E+01	108.27
	186.21	7	3.59*	2.114E+00	1.848E+01	1.848E+01	776.04
	74.82	-----	10.28	1.233E+00	-----	Line Not Found	-----
TH-228	77.11	13	17.10	1.332E+00	1.043E+01	1.049E+01	322.89
	238.63	20	43.60*	1.853E+00	4.563E+00	4.587E+00	182.57
	300.09	-----	3.30	1.610E+00	-----	Line Not Found	-----
TH-232	63.81	9	0.26*	7.420E-01	8.955E+02	8.955E+02	416.82
TH-234	140.88	27	0.02	2.279E+00	1.094E+04	1.094E+04	137.94
	63.29	9	3.70*	7.420E-01	6.293E+01	6.293E+01	416.82
U-235	92.59	31	4.23	1.833E+00	7.566E+01	7.566E+01	158.23
	89.96	27	3.47	1.781E+00	8.181E+01	8.181E+01	164.22
	93.35	31	5.60	1.833E+00	5.715E+01	5.715E+01	158.23
	143.76	-----	10.96*	2.275E+00	-----	Line Not Found	-----
	163.33	-----	5.08	2.217E+00	-----	Line Not Found	-----

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
	185.72	7	57.20	2.114E+00	1.160E+00	1.160E+00	776.04
	205.31	-----	5.01	2.015E+00	-----	Line Not Found	-----
U-238	63.29	9	3.70*	7.420E-01	6.293E+01	6.293E+01	416.82
	92.59	31	4.23	1.833E+00	7.566E+01	7.566E+01	158.23

Flag: "\*" = Keyline

Total number of lines in spectrum 36  
 Number of unidentified lines 9  
 Number of lines tentatively identified by NID 27 75.00%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/LITER	Decay Corr pCi/LITER	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
K-40	1.25E+09Y	1.00	1.040E+02	1.040E+02	0.499E+02	47.98	
CU-67	61.83H	4.06	1.363E+00	5.531E+00	42.93E+00	776.04	
AS-74	17.77D	1.23	1.078E+01	1.321E+01	0.608E+01	46.01	
CD-109	461.40D	1.01	1.194E+02	1.203E+02	1.353E+02	112.46	
SN-126	2.30E+05Y	1.00	1.194E+01	1.194E+01	1.343E+01	112.46	
RE-188	69.78D	1.05	1.969E+01	2.073E+01	2.239E+01	107.97	
TL-208	1.91Y	1.01	2.904E+00	2.919E+00	4.781E+00	163.79	
BI-211	21.77Y	1.00	6.844E+01	6.847E+01	3.723E+01	54.37	
PB-212	1.91Y	1.01	4.563E+00	4.587E+00	8.375E+00	182.57	
BI-214	1600.00Y	1.00	3.852E+01	3.852E+01	1.192E+01	30.94	
PB-214	1600.00Y	1.00	2.484E+01	2.484E+01	1.351E+01	54.37	
RA-224	1.91Y	1.01	8.494E+01	8.538E+01	9.244E+01	108.27	
RA-226	1600.00Y	1.00	1.848E+01	1.848E+01	14.34E+01	776.04	
TH-228	1.91Y	1.01	4.563E+00	4.587E+00	8.375E+00	182.57	
TH-232	1.41E+10Y	1.00	8.955E+02	8.955E+02	37.33E+02	416.82	
TH-234	4.47E+09Y	1.00	6.293E+01	6.293E+01	26.23E+01	416.82	
U-235	7.04E+08Y	1.00	1.160E+00	1.160E+00	9.003E+00	776.04	K
U-238	4.47E+09Y	1.00	6.293E+01	6.293E+01	26.23E+01	416.82	
Total Activity :			1.537E+03	1.546E+03			

Grand Total Activity : 1.537E+03 1.546E+03

Flags: "K" = Keyline not found "M" = Manually accepted  
 "E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
10	138.47	9	34	1.22	277.26	276	8	1.20E-03	****	2.28E+00	
0	197.65	13	114	1.16	395.74	392	10	1.77E-03	****	2.05E+00	T
0	253.16	26	77	2.76	506.86	501	10	3.58E-03	****	1.79E+00	T
0	306.71	11	44	0.78	614.07	610	8	1.46E-03	****	1.59E+00	T
0	339.23	40	67	0.80	679.17	671	16	5.49E-03	****	1.49E+00	T
0	535.03	48	69	16.25	1071.14	1048	35	6.71E-03	****	1.10E+00	
0	600.55	12	6	1.34	1202.31	1199	6	1.64E-03	87.8	1.02E+00	T
0	709.22	20	17	1.06	1419.86	1412	12	2.73E-03	97.1	9.00E-01	
0	722.59	15	16	0.98	1446.62	1440	13	2.11E-03	****	8.88E-01	T
0	728.85	27	11	0.54	1459.16	1453	14	3.76E-03	73.6	8.82E-01	
0	818.78	27	16	6.26	1639.18	1629	21	3.76E-03	82.9	8.08E-01	T
0	862.46	8	4	1.42	1726.62	1723	6	1.05E-03	****	7.76E-01	
0	893.54	9	12	0.96	1788.84	1783	12	1.18E-03	****	7.54E-01	T
0	911.66	17	6	1.05	1825.11	1820	11	2.42E-03	85.0	7.42E-01	T
0	1014.45	9	4	0.76	2030.88	2028	6	1.18E-03	****	6.81E-01	
0	1214.74	9	3	0.70	2431.81	2425	11	1.27E-03	96.5	5.89E-01	
0	1588.31	7	2	1.41	3179.58	3174	9	9.95E-04	****	4.79E-01	
0	1683.77	9	0	2.37	3370.67	3366	9	1.25E-03	66.7	4.60E-01	

Flags: "T" = Tentatively associated

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G339804001.CNF;1
* Acquisition date   : 24-DEC-2013 14:13:35 Sensitivity      : 3.000
* Detector ID        : GAM08 Energy tolerance: 1.500
* Elapsed live time  : 0 02:00:00.00 Abundance limit : 75.000
* Elapsed real time  : 0 02:00:01.23 Half life ratio : *****
* Sample date        : 19-DEC-2013 10:15:00 Nuclide Library : LIQUID
* Sample ID          : G339804001 Analyst initials: MJH1
* Batch Number       : 1355780 Sample Quantity : 2.0000E+00 LITER
*                               Quantity Err(%) : 5.0000E-03 %
* Wet wt corr        : 1.00000 Wet Weight : 0.00000
*                               Dry Weight  : 0.00000
*****
*                               CALIBRATION INFORMATION                          *
*
* Eff. Cal. date     : 9-JUL-2013 08:16:20 Eff. Geometry    : 2LMB
* Eff. File          : DKA100:[CANBERRA.GAMMA]EFF_GAM08_2LMB.CNF;11
*****

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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.  
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER )	Act Error (1.96-sigma)	Lc (pCi/LITER )	TPU (1.96-sigma)
K-40	1.040E+02	4.975E+01	2.606E+01	4.975E+01
CU-67	5.531E+00	4.207E+01	1.646E+01	4.207E+01
AS-74	1.321E+01	6.133E+00	4.166E+00	6.133E+00
CD-109	1.048E+02	1.343E+02	6.745E+01	1.343E+02
SN-126	1.040E+01	1.332E+01	6.744E+00	1.332E+01
RE-188	2.073E+01	2.202E+01	1.426E+01	2.202E+01
TL-208	2.919E+00	4.693E+00	2.503E+00	4.693E+00
BI-211	2.234E+01	6.558E+01	1.635E+01	6.558E+01
PB-212	4.587E+00	8.217E+00	4.758E+00	8.217E+00
BI-214	3.852E+01	1.217E+01	4.730E+00	1.217E+01
PB-214	2.484E+01	1.340E+01	9.405E+00	1.340E+01
RA-224	5.563E+01	9.728E+01	5.095E+01	9.728E+01
RA-226	1.848E+01	1.406E+02	5.527E+01	1.406E+02
TH-228	4.587E+00	8.217E+00	4.758E+00	8.217E+00
TH-232	8.955E+02	3.660E+03	2.441E+03	3.660E+03
TH-234	6.293E+01	2.574E+02	1.692E+02	2.574E+02
U-235	3.142E+00	2.600E+01	1.941E+01	2.600E+01
U-238	6.293E+01	2.574E+02	1.692E+02	2.574E+02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/LITER )	K.L Act error (1.96-sigma)	Lc (pCi/LITER )	TPU (1.96-sigma)	
BE-7	-1.362E+01	2.696E+01	2.154E+01	2.765E+01	NOT IDENT.
NA-22	5.651E-01	3.316E+00	2.834E+00	3.326E+00	NOT IDENT.
NA-24	-7.810E+01	1.175E+03	9.915E+02	1.175E+03	NOT IDENT.
AL-26	1.223E+00	3.277E+00	2.984E+00	3.323E+00	NOT IDENT.
SC-46	-1.898E+00	3.204E+00	1.958E+00	3.316E+00	FAIL ABUN
V-48	2.161E+00	3.939E+00	3.600E+00	4.058E+00	NOT IDENT.
CR-51	1.280E+00	3.110E+01	2.569E+01	3.111E+01	NOT IDENT.
MN-52	3.717E-02	7.156E+00	6.093E+00	7.156E+00	NOT IDENT.
MN-54	3.392E-01	3.062E+00	2.655E+00	3.066E+00	NOT IDENT.
CO-56	-1.130E+00	2.841E+00	2.264E+00	2.886E+00	NOT IDENT.
CO-57	-1.312E-01	2.790E+00	2.405E+00	2.791E+00	NOT IDENT.



CO-58	-6.712E-01	2.620E+00	1.788E+00	2.637E+00	NOT IDENT.
FE-59	1.778E+00	6.623E+00	5.778E+00	6.671E+00	NOT IDENT.
CO-60	-3.195E+00	3.305E+00	2.035E+00	3.605E+00	NOT IDENT.
ZN-65	-7.271E+00	8.323E+00	4.502E+00	8.945E+00	NOT IDENT.
GE-68	-3.180E+01	9.249E+01	7.217E+01	9.360E+01	NOT IDENT.
SE-75	4.380E+00	4.238E+00	3.823E+00	4.676E+00	NOT IDENT.
BR-77	3.933E+01	7.045E+01	5.624E+01	7.264E+01	FAIL ABUN
SR-82	-5.877E+00	2.349E+01	1.850E+01	2.363E+01	NOT IDENT.
RB-83	-4.232E+00	7.492E+00	4.931E+00	7.731E+00	NOT IDENT.
RB-84	2.157E+00	4.501E+00	4.110E+00	4.605E+00	NOT IDENT.
KR-85	-1.140E+03	9.947E+02	7.623E+02	1.120E+03	NOT IDENT.
SR-85	-5.392E+00	4.706E+00	3.607E+00	5.297E+00	NOT IDENT.
RB-86	-1.820E+01	4.052E+01	3.080E+01	4.134E+01	NOT IDENT.
Y-88	-5.374E-01	3.219E+00	2.556E+00	3.228E+00	NOT IDENT.
Y-91	-1.744E+02	1.305E+03	1.054E+03	1.307E+03	NOT IDENT.
NB-94	-2.172E+00	3.920E+00	2.496E+00	4.040E+00	NOT IDENT.
NB-95	-1.277E+00	3.574E+00	2.785E+00	3.620E+00	NOT IDENT.
NB-95M	-4.563E+00	1.251E+01	8.812E+00	1.267E+01	NOT IDENT.
ZR-95	-3.217E+00	6.247E+00	4.736E+00	6.413E+00	NOT IDENT.
MO-99	1.442E+01	9.483E+01	7.974E+01	9.505E+01	FAIL ABUN
TC-99M	4.355E+06	5.915E+06	0.000E+00	6.232E+06	SHORT HLIF
RH-101	1.251E+00	3.443E+00	3.029E+00	3.489E+00	FAIL ABUN
RH-102M	-3.030E+00	2.738E+00	1.995E+00	3.060E+00	NOT IDENT.
RU-103	1.848E+00	3.302E+00	2.958E+00	3.405E+00	FAIL ABUN
RH-106	-2.280E+01	2.806E+01	2.057E+01	2.988E+01	NOT IDENT.
RU-106	-2.280E+01	2.806E+01	2.057E+01	2.988E+01	NOT IDENT.
AG-108M	1.746E+00	2.760E+00	2.507E+00	2.870E+00	FAIL ABUN
AG-110M	-9.469E-01	2.909E+00	2.297E+00	2.940E+00	NOT IDENT.
SN-113	2.950E+00	3.805E+00	3.509E+00	4.031E+00	NOT IDENT.
IN-114M	3.750E+00	1.842E+01	1.399E+01	1.849E+01	NOT IDENT.
CD-115	9.217E+00	4.772E+01	4.117E+01	4.790E+01	NOT IDENT.
SN-117M	2.275E+00	4.107E+00	3.236E+00	4.233E+00	FAIL ABUN
I-123	-5.012E+02	2.443E+03	1.807E+03	2.454E+03	NOT IDENT.
TE-123M	-7.001E-01	3.565E+00	2.639E+00	3.579E+00	NOT IDENT.
SB-124	-7.301E-01	8.533E+00	6.375E+00	8.540E+00	FAIL ABUN
SB-125	2.319E+00	8.472E+00	7.441E+00	8.536E+00	FAIL ABUN
TE-125M	4.215E+02	1.082E+03	8.976E+02	1.098E+03	NOT IDENT.
I-126	-9.979E+00	1.134E+01	8.105E+00	1.220E+01	NOT IDENT.
SB-126	3.359E+00	7.375E+00	5.791E+00	7.529E+00	NOT IDENT.
SB-127	-8.661E+00	1.877E+01	1.439E+01	1.917E+01	FAIL ABUN
I-131	-3.219E+00	5.453E+00	4.173E+00	5.642E+00	NOT IDENT.
I-132	9.145E+15	5.963E+16	0.000E+00	0.000E+00	SHORT HLIF
TE-132	-6.211E+00	8.292E+00	6.501E+00	8.752E+00	NOT IDENT.
BA-133	-4.450E+00	4.905E+00	2.985E+00	5.299E+00	NOT IDENT.
I-133	1.531E+01	1.899E+02	1.617E+02	1.900E+02	NOT IDENT.
CS-134	-7.264E-01	3.298E+00	2.735E+00	3.314E+00	NOT IDENT.
CS-135	-9.346E-01	1.503E+01	1.243E+01	1.504E+01	NOT IDENT.
I-135	-2.982E+06	5.397E+06	0.000E+00	5.562E+06	SHORT HLIF
CS-136	1.704E+00	4.796E+00	4.280E+00	4.857E+00	FAIL ABUN
BA-137M	3.081E+00	2.945E+00	2.793E+00	3.256E+00	NOT IDENT.
CS-137	3.255E+00	3.111E+00	2.951E+00	3.440E+00	NOT IDENT.
CE-139	-1.315E+00	3.081E+00	2.544E+00	3.137E+00	NOT IDENT.
BA-140	-1.935E+00	4.297E+00	3.113E+00	4.385E+00	NOT IDENT.
LA-140	-1.935E+00	4.297E+00	3.113E+00	4.385E+00	NOT IDENT.
CE-141	-3.722E+00	5.677E+00	4.669E+00	5.920E+00	NOT IDENT.
CE-143	2.712E+01	1.022E+02	7.613E+01	1.029E+02	FAIL ABUN
CE-144	-7.594E+00	2.023E+01	1.698E+01	2.052E+01	NOT IDENT.
PM-144	1.114E+00	3.340E+00	2.876E+00	3.378E+00	NOT IDENT.
PR-144	8.296E+01	2.487E+02	2.141E+02	2.515E+02	NOT IDENT.
PM-146	1.100E+00	4.119E+00	3.515E+00	4.149E+00	NOT IDENT.
ND-147	-2.770E+00	2.664E+01	2.215E+01	2.667E+01	FAIL ABUN
PM-147	2.803E+04	8.298E+04	7.317E+04	8.394E+04	NOT IDENT.
PM-149	4.161E+01	4.400E+02	3.674E+02	4.404E+02	NOT IDENT.
EU-152	-3.501E+00	1.124E+01	7.661E+00	1.136E+01	NOT IDENT.
GD-153	-2.699E+00	1.138E+01	8.023E+00	1.144E+01	NOT IDENT.
EU-154	1.419E+00	9.406E+00	8.011E+00	9.427E+00	FAIL ABUN
EU-155	-3.080E+00	1.256E+01	9.980E+00	1.264E+01	FAIL ABUN
HO-166M	4.340E+00	5.144E+00	4.374E+00	5.504E+00	FAIL ABUN
TM-171	1.367E+03	3.549E+03	3.036E+03	3.602E+03	NOT IDENT.
LU-176	1.327E+00	2.962E+00	2.269E+00	3.021E+00	FAIL ABUN
HF-181	-1.654E-01	3.857E+00	3.256E+00	3.857E+00	NOT IDENT.
W-181	-8.594E+00	3.301E+01	2.678E+01	3.324E+01	NOT IDENT.
TA-182	-8.255E+00	1.319E+01	8.369E+00	1.370E+01	FAIL ABUN
RE-183	-1.211E+01	3.109E+01	2.501E+01	3.156E+01	NOT IDENT.
RE-184	2.080E+00	7.615E+00	6.647E+00	7.673E+00	FAIL ABUN
W-188	-7.610E+01	7.858E+02	5.616E+02	7.866E+02	FAIL ABUN
OS-191	1.133E+00	1.090E+01	9.463E+00	1.091E+01	FAIL ABUN
IR-192	1.691E+00	3.302E+00	2.847E+00	3.389E+00	FAIL ABUN

HG-203	-1.970E+00	3.527E+00	2.736E+00	3.637E+00	NOT IDENT.
BI-207	1.293E+00	4.357E+00	3.832E+00	4.396E+00	NOT IDENT.
PB-210	5.946E+02	8.103E+02	7.121E+02	8.535E+02	NOT IDENT.
PB-211	6.647E+01	6.773E+01	6.318E+01	7.406E+01	NOT IDENT.
BI-212	3.511E+01	7.945E+01	4.451E+01	8.101E+01	NOT IDENT.
BI-213	3.170E+00	1.040E+01	8.782E+00	1.050E+01	NOT IDENT.
RN-219	-7.367E+00	3.957E+01	3.332E+01	3.971E+01	NOT IDENT.
FR-221	2.033E+00	2.219E+01	1.879E+01	2.221E+01	NOT IDENT.
RA-223	8.285E-01	7.126E+01	5.865E+01	7.127E+01	FAIL ABUN
AC-227	-1.498E+01	3.019E+01	2.066E+01	3.093E+01	NOT IDENT.
TH-227	-1.498E+01	3.019E+01	2.066E+01	3.093E+01	NOT IDENT.
AC-228	1.710E+01	1.436E+01	1.333E+01	1.630E+01	FAIL ABUN
RA-228	1.710E+01	1.436E+01	1.333E+01	1.630E+01	FAIL ABUN
TH-229	4.101E+00	5.998E+01	4.492E+01	6.001E+01	FAIL ABUN
TH-230	4.605E+02	1.717E+03	1.293E+03	1.729E+03	NOT IDENT.
PA-231	5.522E+01	1.546E+02	1.320E+02	1.566E+02	NOT IDENT.
TH-231	3.507E+01	5.649E+01	4.345E+01	5.866E+01	NOT IDENT.
PA-233	-4.050E+00	7.647E+00	5.457E+00	7.862E+00	FAIL ABUN
PA-234	-1.301E+01	2.646E+01	1.632E+01	2.710E+01	NOT IDENT.
PA-234M	-2.262E+02	3.920E+02	3.040E+02	4.050E+02	NOT IDENT.
U-234	5.124E+03	1.228E+04	1.053E+04	1.249E+04	NOT IDENT.
NP-237	-4.050E+00	7.647E+00	5.457E+00	7.862E+00	FAIL ABUN
NP-239	-3.385E+00	2.982E+01	2.565E+01	2.986E+01	NOT IDENT.
AM-241	3.009E+01	2.442E+01	2.192E+01	2.793E+01	NOT IDENT.
AM-242	3.504E+01	8.350E+01	6.643E+01	8.498E+01	NOT IDENT.
AM-243	4.847E-01	8.467E+00	6.187E+00	8.470E+00	NOT IDENT.
CM-243	9.221E-01	1.301E+01	1.059E+01	1.301E+01	NOT IDENT.
CM-247	-1.688E+00	3.714E+00	3.037E+00	3.791E+00	NOT IDENT.
CF-249	3.669E-01	3.526E+00	3.063E+00	3.530E+00	FAIL ABUN
CF-251	-7.512E+00	1.367E+01	1.115E+01	1.408E+01	NOT IDENT.
CF-252	1.665E+04	2.633E+04	1.845E+04	2.738E+04	NOT IDENT.
ANH-511	-8.423E+00	4.983E+00	4.480E+00	6.265E+00	NOT IDENT.

\*\*\*\*\*  
 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \* GAMMA SPECTROSCOPY BACKGROUND REPORT \*  
 \*\*\*\*\*

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	91.7639	88.34	93.7339	152.32	119.4404
46.54	75.2581	88.47	93.7566	152.43	116.5067
49.72	92.3218	89.96	94.0108	153.25	95.9591
51.35	74.1742	91.11	94.2056	323.87	110.8557
52.39	84.7033	91.27	94.2325	155.04	118.3691
53.20	78.6680	92.59	94.4543	156.02	122.9590
56.28	82.4044	93.31	94.5748	158.56	102.5406
57.36	93.0800	93.35	94.5812	158.97	127.8683
57.53	93.1182	94.56	94.7824	159.00	127.8725
57.53	93.1187	94.65	94.7974	162.33	108.2385
57.98	99.5039	94.67	94.8008	163.33	112.1063
59.32	72.5029	97.43	112.2643	165.86	112.4469
59.54	72.5406	98.43	107.3445	176.31	100.5468
61.49	85.5459	98.44	107.3464	176.60	101.5289
63.00	111.2785	99.53	105.1550	177.52	105.4344
63.29	109.7612	100.11	96.8282	181.07	91.5527
63.58	132.6493	100.20	96.8429	184.41	90.3625
63.81	119.9773	103.18	112.2099	184.58	91.9116
64.28	103.0986	103.37	106.5185	143.76	92.0273
64.99	118.1671	105.31	108.0062	186.21	92.0771
65.08	95.8304	106.12	111.5997	190.27	87.8615
66.73	96.1812	109.28	112.1666	193.51	86.6216
66.98	96.2343	111.00	112.4715	198.01	99.0818
67.24	94.6839	111.76	112.6057	201.83	112.3515
67.67	99.5920	116.24	120.1081	205.31	101.7934
67.75	99.6091	116.30	120.1191	210.85	84.6510
69.67	120.4578	116.74	109.6706	218.12	89.2310
70.83	89.4877	117.23	109.7522	222.11	78.6305
72.81	128.6190	99.53	96.1800	227.09	70.0075
72.87	128.6347	120.90	104.1773	227.38	70.0267
74.66	120.6328	121.12	104.2110	228.16	83.0937
74.82	122.3030	121.22	104.2268	228.18	83.0950
74.97	122.3408	121.78	113.1528	116.74	83.0950
77.11	127.7849	122.06	110.5466	235.69	88.7251
79.69	120.2056	123.07	116.9104	235.96	88.7473
80.12	126.8991	127.23	103.3596	238.63	76.8350
80.19	126.9162	129.43	103.6842	238.98	76.8599
80.57	113.8143	131.20	99.4632	240.99	77.0020
81.00	112.2587	133.02	98.8172	242.00	77.0727
81.07	112.2738	133.52	104.2798	244.70	78.0756
83.79	81.3256	136.00	92.3688	252.40	75.7491
84.21	76.4072	57.53	92.4039	252.80	75.7756
85.43	119.8685	136.47	82.3188	256.23	77.2370
86.55	103.4353	140.51	142.3046	260.90	73.2198
86.94	93.4930	140.88	133.6583	264.66	52.7650
87.09	93.5190	143.76	99.1686	268.22	63.3028
87.57	93.6019	144.24	128.4175	269.46	78.9514
88.03	93.6810	145.44	129.7156	271.23	63.4638

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
273.65	63.5922	414.70	41.4893	667.71	0.0000
276.40	65.8272	427.09	37.1577	677.62	16.8395
277.37	70.0629	427.87	37.1748	685.70	25.3447
277.60	69.0303	433.94	32.6459	695.00	30.7424
278.00	79.5161	440.45	32.7711	696.49	29.7008
279.20	67.0273	453.88	31.1397	696.51	29.7008
279.54	68.0935	463.37	31.3081	697.00	36.0727
280.46	62.9031	468.07	39.9523	697.49	35.0190
283.69	65.1711	473.00	21.9387	702.65	37.2200
284.31	60.9975	475.06	44.8824	706.68	33.7301
285.41	64.2094	476.78	38.2344	711.68	12.4522
285.90	69.4996	477.60	41.1203	720.70	16.0682
287.50	72.7534	477.99	36.3468	721.93	19.6484
290.67	67.6523	482.18	43.1411	722.78	19.6551
293.27	71.1826	487.02	41.3324	722.91	21.4434
351.93	68.9584	492.35	37.5961	723.31	21.4468
295.96	62.6299	497.08	32.8591	724.19	21.4541
299.98	51.1135	511.00	43.8113	727.33	21.4810
300.09	49.4140	514.00	101.4102	733.00	23.3234
300.13	49.4154	520.40	40.7644	735.93	19.7580
301.36	78.8847	520.69	39.1396	739.50	24.8221
302.85	59.7657	522.65	0.0000	744.23	22.7057
256.23	49.5839	527.90	29.4639	747.24	17.3199
306.78	51.3831	529.59	29.4888	752.31	21.6924
308.46	54.8797	529.87	29.4932	753.82	18.4493
311.90	70.2122	531.02	29.5107	756.73	30.4213
316.51	52.8423	546.56	0.0000	763.94	37.0422
319.41	70.2497	552.55	27.8414	765.80	31.6175
320.08	61.6340	563.25	20.9903	766.42	28.3537
321.04	69.2529	569.33	28.0697	766.84	21.8140
323.87	67.2288	946.00	28.0718	772.60	0.0000
325.23	67.2960	569.70	24.0639	776.52	25.1781
328.76	57.6760	583.19	25.2283	779.50	24.0963
333.37	47.1689	595.83	21.9941	778.90	23.0093
334.37	47.2032	427.87	30.5208	783.70	20.8555
338.28	51.4995	602.73	20.3672	785.37	25.2618
338.32	51.5009	604.72	20.3862	792.07	23.8571
311.90	51.5805	609.32	24.5150	795.86	22.0527
340.55	51.5827	610.33	32.3609	810.29	9.5014
344.28	54.5800	614.28	37.5377	344.28	9.5020
345.93	48.4741	618.01	29.7392	810.76	12.6708
351.06	49.5325	621.93	32.8734	815.77	9.5204
351.93	47.5712	630.19	0.0000	1048.07	13.8977
356.01	58.5778	631.29	15.4742	832.01	21.4137
364.49	62.4882	155.04	19.6151	834.85	21.4352
366.42	39.1058	633.25	20.6499	836.80	0.0000
356.01	44.3064	634.78	19.6309	846.77	19.6542
388.16	38.0830	635.95	19.6411	856.80	16.1007
388.63	40.8153	636.99	24.8209	860.56	13.1663
391.70	33.6256	645.85	21.8029	871.09	16.0458
264.66	42.0429	657.76	26.0901	873.19	17.9466
401.81	48.4757	661.66	15.6804	875.33	20.7955
402.40	53.0687	664.57	27.2130	880.51	17.0446
404.85	34.8225	666.33	31.4231	881.60	14.2093
410.95	40.4739	666.50	27.2353	883.24	8.5303

<u>ENERGY</u>	<u>MDA COUNTS</u>	<u>ENERGY</u>	<u>MDA COUNTS</u>	<u>ENERGY</u>	<u>MDA COUNTS</u>
657.76	9.3104	1434.09	14.1964		
889.28	17.9095	1457.56	0.0000		
894.76	21.2053	1460.82	10.4744		
898.04	21.2288	1489.16	13.4160		
903.28	12.4919	1596.21	9.5050		
911.20	14.3515	1620.50	8.8710		
926.36	18.2698	1678.03	0.0000		
935.54	17.3602	1690.97	9.7993		
937.49	10.6157	1764.49	8.1158		
944.13	12.5729	1063.66	7.1091		
946.00	16.4511	1771.35	3.5553		
949.00	21.3103	1791.20	0.0000		
667.71	0.0000	1808.65	6.1383		
964.08	22.3865	1836.06	7.1982		
968.97	20.4715				
983.53	14.6896				
996.26	15.7311				
1001.03	13.7850				
1274.44	16.7579				
1037.84	10.9526				
1038.76	0.0000				
475.06	10.9812				
1048.07	11.9849				
1050.41	13.9920				
1063.66	15.0500				
1077.00	15.1086				
1077.34	15.1105				
1085.87	13.1280				
1099.25	16.2194				
1112.07	7.3254				
1112.84	6.1060				
1115.54	22.6965				
1120.29	15.2966				
1120.55	15.2979				
1221.41	19.2354				
1129.67	15.9504				
1131.51	0.0000				
1173.23	11.3827				
1189.05	13.5094				
1204.77	13.5660				
1221.41	15.3727				
1231.02	14.7109				
1235.36	22.0912				
1238.28	16.8438				
1260.41	0.0000				
1274.44	11.6879				
1274.54	11.6884				
1291.59	8.5371				
1298.22	7.4822				
1312.11	9.6533				
1332.49	12.9355				
1365.19	13.0381				
1368.63	14.9129				
1384.29	15.9037				
1408.01	10.3482				

VAX/VMS Nuclide Identification Report Generated 24-DEC-2013 16:14:43.56

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                            *
*****
Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203009338.CNF;1
Background file  : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM09.CNF;201
Background date  : 21-DEC-2013 11:48:21
Sample date     : 23-DEC-2013 00:00:00 Acquisition date : 24-DEC-2013 14:14:04
Sample ID      : G1203009338 Sample quantity   : 2.00000E+00 LITER
Detector name   : GAM09 Detector geometry: 2LMB
Elapsed live time: 0 02:00:00.00 Elapsed real time: 0 02:00:00.54 0.0%
Energy tolerance : 1.50000 keV Analyst Initials : MJH1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID       : 1355780 Detector SN# :
Matrix Spike ID : LCS ID : 1604
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	1	42.84	17	40	0.87	86.04	76	21	2.36E-03	61.3	2.44E+00
2	1	45.41	22	34	0.88	91.16	76	21	3.07E-03	49.6	
3	0	58.86	14	39	0.66	118.04	116	5	1.99E-03	69.8	
4	1	63.27*	3	49	0.93	126.83	124	13	4.63E-04	412.0	2.40E+00
5	1	66.42*	8	46	0.94	133.12	124	13	1.12E-03	155.1	
6	0	92.77*	67	83	1.14	185.77	180	13	9.37E-03	35.1	
7	0	143.57*	10	45	1.25	287.24	285	5	1.36E-03	126.6	
8	0	199.98	81	75	3.37	399.92	393	17	1.12E-02	27.1	
9	0	206.61*	11	48	0.74	413.19	409	8	1.52E-03	122.2	
10	0	238.47*	41	36	1.16	476.83	472	9	5.68E-03	35.8	
11	0	296.18*	22	29	2.40	592.12	588	10	3.10E-03	55.4	
12	0	447.56	19	29	3.92	894.54	887	13	2.63E-03	63.2	
13	0	479.90	12	15	0.91	959.16	956	8	1.71E-03	60.4	
14	0	609.66*	15	39	4.31	1218.43	1212	13	2.04E-03	102.1	
15	0	748.44	8	6	0.49	1495.72	1490	8	1.10E-03	64.6	
16	0	793.99	10	4	1.26	1586.75	1583	8	1.39E-03	46.9	
17	0	820.69	19	0	3.18	1640.11	1636	10	2.64E-03	22.9	
18	0	916.80	7	4	1.32	1832.15	1828	7	9.03E-04	61.8	
19	0	1002.42*	1	8	0.98	2003.26	1998	10	1.45E-04	615.3	
20	0	1053.18	5	3	0.94	2104.70	2101	6	6.94E-04	70.7	
21	0	1055.80	7	4	0.87	2109.92	2107	7	9.03E-04	61.8	
22	0	1064.28	9	0	1.38	2126.89	2124	6	1.25E-03	33.3	
23	0	1324.58	5	4	1.19	2647.11	2642	7	6.25E-04	83.5	

Flag: "\*" = Peak area was modified by background subtraction

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203009338.CNF;1  
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4  
Sample title : MJH1  
Sample date : 23-DEC-2013 00:00:00 Acquisition date : 24-DEC-2013 14:14:04  
Sample ID : G1203009338 Sample quantity : 2.0000 LITER  
Sample type : LIQUID Sample geometry :  
Detector name : GAMMA9 Detector geometry: 2LMB  
Elapsed live time: 0 02:00:00.00 Elapsed real time: 0 02:00:00.54 0.0%  
Energy tolerance : 1.50 keV Half life ratio : 10.00  
Errors propagated: No Systematic Error : 0.00 %  
Efficiency type : Empirical Efficiencies at : Peak Energy  
Abundance limit : 75.00

Interference Report

No interference correction performed

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
RE-183	57.98	14	34.30*	6.198E-01	1.264E+01	1.284E+01	139.66
	59.32	14	58.90	6.198E-01	7.358E+00	7.478E+00	139.66
	67.24	8	12.90	9.982E-01	1.173E+01	1.192E+01	310.26
	162.33	-----	23.30	2.490E+00	-----	Line Not Found	-----
PB-210	46.54	22	4.25*	1.300E-01	7.500E+02	7.501E+02	99.25
TH-230	67.67	8	0.38*	9.982E-01	3.983E+02	3.983E+02	310.26
TH-232	63.81	3	0.26*	8.373E-01	2.876E+02	2.876E+02	823.95
	140.88	-----	0.02	2.561E+00	-----	Line Not Found	-----
TH-234	63.29	3	3.70*	8.373E-01	2.021E+01	2.021E+01	823.95
	92.59	67	4.23	2.096E+00	1.428E+02	1.428E+02	70.27
U-238	63.29	3	3.70*	8.373E-01	2.021E+01	2.021E+01	823.95
	92.59	67	4.23	2.096E+00	1.428E+02	1.428E+02	70.27
AM-241	59.54	14	35.90*	6.198E-01	1.207E+01	1.207E+01	139.66

Flag: "\*" = Keyline



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*****
*                                     GEL Laboratories LLC                       *
*                                     2040 Savage Road                          *
*                                     Charleston, SC 29407                      *
*****
*                                     DETECTOR AND SAMPLE DATA                 *
*                                     *                                         *
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203009338.CNF;1  *
* Acquisition date   : 24-DEC-2013 14:14:04 Sensitivity      : 3.000           *
* Detector ID        : GAM09 Energy tolerance: 1.500         *
* Elapsed live time  : 0 02:00:00.00 Abundance limit : 75.000    *
* Elapsed real time  : 0 02:00:00.54 Half life ratio : *****          *
* Sample date        : 23-DEC-2013 00:00:00 Nuclide Library : LIQUID        *
* Sample ID          : G1203009338 Analyst initials: MJH1         *
* Batch Number       : 1355780 Sample Quantity : 2.0000E+00 LITER *
* Wet wt corr        : 1.00000 Wet Weight : 0.00000           *
* Dry Weight         : 0.00000           *
*****
*                                     CALIBRATION INFORMATION                   *
*                                     *                                         *
* Eff. Cal. date     : 6-JUN-2013 11:59:19 Eff. Geometry   : 2LMB           *
* Eff. File          : DKA100:[CANBERRA.GAMMA]EFF_GAM09_2LMB.CNF;11         *
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.  
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER )	Cnt uncert (1.96-sigma)	MDA (pCi/LITER )
RE-183	1.284E+01	1.758E+01	2.774E+01
PB-210	7.501E+02	7.296E+02	9.644E+02
TH-230	3.983E+02	1.211E+03	1.691E+03
TH-232	2.876E+02	2.323E+03	2.772E+03
TH-234	2.021E+01	1.632E+02	2.008E+02
U-238	2.021E+01	1.632E+02	2.008E+02
AM-241	1.207E+01	1.652E+01	2.983E+01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/LITER )	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/LITER )	
BE-7	1.210E+01	1.542E+01	3.067E+01	NOT IDENT.
NA-22	-1.389E-01	1.631E+00	3.498E+00	NOT IDENT.
NA-24	5.317E-01	1.123E+01	2.445E+01	NOT IDENT.
AL-26	6.971E-01	2.079E+00	4.841E+00	NOT IDENT.
K-40	-3.057E+01	2.572E+01	4.432E+01	NOT IDENT.
SC-46	-5.621E-01	2.413E+00	4.497E+00	NOT IDENT.
V-48	2.249E+00	2.024E+00	4.867E+00	NOT IDENT.
CR-51	-1.683E+00	1.687E+01	3.176E+01	NOT IDENT.
MN-52	-1.448E+00	3.283E+00	6.053E+00	NOT IDENT.
MN-54	2.168E+00	2.552E+00	5.395E+00	NOT IDENT.
CO-56	9.052E-01	2.407E+00	4.884E+00	NOT IDENT.
CO-57	1.548E-01	1.799E+00	3.312E+00	NOT IDENT.
CO-58	-4.210E-01	2.226E+00	4.214E+00	NOT IDENT.
FE-59	5.386E-01	3.396E+00	7.122E+00	NOT IDENT.
CO-60	-8.752E-01	2.649E+00	5.017E+00	NOT IDENT.
ZN-65	-3.134E+00	4.930E+00	8.374E+00	NOT IDENT.
CU-67	-9.998E+00	7.753E+00	1.323E+01	FAIL ABUN
GE-68	-1.283E+01	6.399E+01	1.221E+02	NOT IDENT.
AS-74	2.616E+00	4.130E+00	8.175E+00	NOT IDENT.
SE-75	-1.310E+00	2.961E+00	4.980E+00	NOT IDENT.
BR-77	2.569E+01	1.801E+01	2.764E+01	FAIL ABUN
SR-82	-3.809E+00	1.383E+01	2.605E+01	NOT IDENT.
RB-83	3.008E+00	4.395E+00	8.907E+00	NOT IDENT.

RB-84	-3.015E+00	3.372E+00	5.573E+00	NOT IDENT.
KR-85	-1.340E+03	9.098E+02	1.434E+03	NOT IDENT.
SR-85	-6.105E+00	4.146E+00	6.536E+00	NOT IDENT.
RB-86	1.482E+00	2.523E+01	5.084E+01	NOT IDENT.
Y-88	1.209E-02	2.660E+00	5.440E+00	NOT IDENT.
Y-91	-3.300E+02	7.522E+02	1.355E+03	NOT IDENT.
NB-94	-3.040E-01	2.352E+00	4.459E+00	NOT IDENT.
NB-95	-1.222E+00	2.312E+00	4.148E+00	NOT IDENT.
NB-95M	-2.627E+00	7.631E+00	1.149E+01	NOT IDENT.
ZR-95	-1.547E+00	3.281E+00	6.035E+00	NOT IDENT.
MO-99	-3.334E+00	2.269E+01	4.407E+01	NOT IDENT.
TC-99M	-7.361E+01	1.908E+02	2.871E+02	NOT IDENT.
RH-101	9.559E-02	2.301E+00	4.205E+00	NOT IDENT.
RH-102M	-5.174E-01	1.845E+00	2.912E+00	NOT IDENT.
RU-103	-1.607E-01	2.079E+00	3.865E+00	FAIL ABUN
RH-106	8.234E+00	2.088E+01	4.093E+01	NOT IDENT.
RU-106	8.234E+00	2.088E+01	4.093E+01	NOT IDENT.
AG-108M	-7.484E-01	1.961E+00	3.518E+00	NOT IDENT.
CD-109	3.230E+01	5.792E+01	1.025E+02	NOT IDENT.
AG-110M	8.363E-02	1.977E+00	3.750E+00	NOT IDENT.
SN-113	-1.944E+00	2.686E+00	4.628E+00	NOT IDENT.
IN-114M	-2.916E+00	1.088E+01	1.898E+01	NOT IDENT.
CD-115	1.473E+00	1.095E+01	2.100E+01	NOT IDENT.
SN-117M	1.682E+00	2.050E+00	3.929E+00	NOT IDENT.
I-123	1.405E+01	1.532E+01	2.956E+01	NOT IDENT.
TE-123M	1.799E+00	1.961E+00	3.785E+00	NOT IDENT.
SB-124	-8.567E-01	5.809E+00	1.139E+01	NOT IDENT.
SB-125	-3.180E+00	6.327E+00	1.114E+01	NOT IDENT.
TE-125M	-2.712E+01	6.129E+02	1.121E+03	NOT IDENT.
I-126	2.443E+00	7.445E+00	1.434E+01	NOT IDENT.
SB-126	7.649E-01	4.209E+00	8.428E+00	NOT IDENT.
SN-126	2.774E+00	5.849E+00	1.027E+01	FAIL ABUN
SB-127	1.910E+00	5.897E+00	1.204E+01	NOT IDENT.
I-131	3.750E-01	2.488E+00	4.767E+00	NOT IDENT.
I-132	0.000E+00	3.067E+05	0.000E+00	SHORT HLIF
TE-132	5.373E-01	2.668E+00	4.852E+00	NOT IDENT.
BA-133	-9.680E-01	2.776E+00	5.046E+00	NOT IDENT.
I-133	3.972E+00	7.764E+00	1.562E+01	NOT IDENT.
CS-134	2.584E-01	2.759E+00	4.802E+00	NOT IDENT.
CS-135	8.281E+00	1.105E+01	2.107E+01	NOT IDENT.
I-135	-3.053E+02	4.453E+02	7.317E+02	NOT IDENT.
CS-136	-7.137E-01	3.326E+00	5.337E+00	NOT IDENT.
BA-137M	-1.419E+00	2.200E+00	3.653E+00	NOT IDENT.
CS-137	-1.499E+00	2.324E+00	3.859E+00	NOT IDENT.
CE-139	1.102E-01	1.931E+00	3.502E+00	NOT IDENT.
BA-140	3.936E+00	3.067E+00	7.626E+00	NOT IDENT.
LA-140	3.936E+00	3.067E+00	7.626E+00	NOT IDENT.
CE-141	-5.839E-01	4.114E+00	6.522E+00	NOT IDENT.
CE-143	9.003E+00	9.542E+00	1.804E+01	NOT IDENT.
CE-144	2.414E+00	1.270E+01	2.364E+01	NOT IDENT.
PM-144	8.542E-01	2.469E+00	4.913E+00	NOT IDENT.
PR-144	6.241E+01	1.833E+02	3.646E+02	NOT IDENT.
PM-146	-1.088E-01	2.632E+00	4.802E+00	FAIL ABUN
ND-147	-8.190E+00	1.585E+01	2.750E+01	NOT IDENT.
PM-147	-5.076E+03	5.254E+04	9.550E+04	NOT IDENT.
PM-149	-2.903E+01	9.907E+01	1.686E+02	NOT IDENT.
EU-152	4.633E-01	6.162E+00	1.180E+01	NOT IDENT.
GD-153	8.305E-01	7.023E+00	1.130E+01	NOT IDENT.
EU-154	-2.072E+00	5.050E+00	9.789E+00	NOT IDENT.
EU-155	-4.827E+00	9.045E+00	1.459E+01	NOT IDENT.
HO-166M	2.868E+00	4.216E+00	8.795E+00	NOT IDENT.
TM-171	1.006E+03	2.412E+03	4.334E+03	FAIL ABUN
LU-176	-7.622E-02	1.716E+00	3.250E+00	NOT IDENT.
HF-181	1.488E+00	2.357E+00	4.411E+00	FAIL ABUN
W-181	1.367E+01	1.871E+01	3.734E+01	FAIL ABUN
TA-182	6.212E+00	1.090E+01	2.265E+01	FAIL ABUN
RE-184	-6.953E+00	5.772E+00	8.726E+00	NOT IDENT.
RE-188	2.886E+00	1.044E+01	1.923E+01	FAIL ABUN
W-188	-1.240E+01	4.285E+02	7.569E+02	FAIL ABUN
OS-191	1.544E-01	6.396E+00	1.165E+01	FAIL ABUN
IR-192	3.088E-01	1.989E+00	3.840E+00	FAIL ABUN
HG-203	2.593E+00	2.186E+00	4.361E+00	NOT IDENT.
BI-207	2.991E+00	1.954E+00	6.024E+00	FAIL ABUN
TL-208	-2.915E-01	2.743E+00	4.923E+00	NOT IDENT.
BI-211	3.264E+00	1.451E+01	2.781E+01	NOT IDENT.
PB-211	4.194E+00	5.335E+01	1.001E+02	NOT IDENT.
BI-212	1.688E+01	3.314E+01	6.836E+01	NOT IDENT.
PB-212	8.463E+00	5.932E+00	9.287E+00	FAIL ABUN

BI-213	-2.750E+00	7.523E+00	1.236E+01	NOT IDENT.
BI-214	5.227E+00	1.046E+01	1.370E+01	FAIL ABUN
PB-214	1.267E+00	5.741E+00	1.066E+01	FAIL ABUN
RN-219	2.801E+00	2.915E+01	5.505E+01	NOT IDENT.
FR-221	2.142E+00	1.478E+01	2.668E+01	NOT IDENT.
RA-223	-1.665E+01	4.736E+01	8.592E+01	FAIL ABUN
RA-224	2.264E+01	4.702E+01	7.905E+01	NOT IDENT.
RA-226	-7.448E+01	6.712E+01	1.159E+02	NOT IDENT.
AC-227	2.439E+00	1.996E+01	3.555E+01	NOT IDENT.
TH-227	2.439E+00	1.996E+01	3.555E+01	NOT IDENT.
AC-228	-6.750E+00	1.153E+01	1.747E+01	NOT IDENT.
RA-228	-6.750E+00	1.153E+01	1.747E+01	NOT IDENT.
TH-228	8.463E+00	5.932E+00	9.287E+00	FAIL ABUN
TH-229	6.349E+00	3.954E+01	6.837E+01	NOT IDENT.
PA-231	4.682E+01	1.017E+02	1.895E+02	NOT IDENT.
TH-231	1.623E+00	3.764E+01	6.532E+01	NOT IDENT.
PA-233	-1.070E+00	4.912E+00	8.158E+00	NOT IDENT.
PA-234	-7.471E+00	2.074E+01	3.766E+01	NOT IDENT.
PA-234M	2.925E+01	3.528E+02	6.211E+02	FAIL ABUN
U-234	7.538E+03	8.370E+03	1.580E+04	NOT IDENT.
U-235	6.559E+00	1.627E+01	3.020E+01	FAIL ABUN
NP-237	-1.070E+00	4.912E+00	8.158E+00	NOT IDENT.
NP-239	1.881E+01	2.022E+01	3.957E+01	NOT IDENT.
AM-242	1.747E+01	5.189E+01	9.210E+01	NOT IDENT.
AM-243	1.141E+00	4.185E+00	7.958E+00	FAIL ABUN
CM-243	3.047E+00	7.802E+00	1.484E+01	NOT IDENT.
CM-247	4.366E-01	2.535E+00	4.854E+00	NOT IDENT.
CF-249	3.226E+00	2.510E+00	5.437E+00	NOT IDENT.
CF-251	-5.173E+00	9.361E+00	1.594E+01	NOT IDENT.
CF-252	-1.077E+04	1.292E+04	2.221E+04	NOT IDENT.
ANH-511	-2.643E+00	4.676E+00	9.285E+00	NOT IDENT.

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	1	42.84	17	40	0.87	86.04	76	21	2.36E-03	61.3	2.44E+00
2	1	45.41	22	34	0.88	91.16	76	21	3.07E-03	49.6	
3	0	58.86	14	39	0.66	118.04	116	5	1.99E-03	69.8	
4	1	63.27	46	49	0.93	126.83	124	13	6.38E-03	28.5	2.40E+00
5	1	66.42	20	46	0.94	133.12	124	13	2.81E-03	56.7	
6	0	92.77	173	83	1.14	185.77	180	13	2.41E-02	13.3	
7	0	143.57	27	45	1.25	287.24	285	5	3.78E-03	41.3	
8	0	186.44	33	113	0.78	372.89	368	9	4.58E-03	61.3	
9	0	199.98	81	75	3.37	399.92	393	17	1.12E-02	27.1	
10	0	206.61	16	48	0.74	413.19	409	8	2.22E-03	79.1	
11	0	238.47	59	36	1.16	476.83	472	9	8.19E-03	22.5	
12	0	296.18	33	29	2.40	592.12	588	10	4.60E-03	35.3	
13	0	447.56	19	29	3.92	894.54	887	13	2.63E-03	63.2	
14	0	479.90	12	15	0.91	959.16	956	8	1.71E-03	60.4	
15	0	511.22	156	58	1.81	1021.74	1015	15	2.17E-02	13.2	
16	0	609.66	35	39	4.31	1218.43	1212	13	4.86E-03	40.5	
17	0	748.44	8	6	0.49	1495.72	1490	8	1.10E-03	64.6	
18	0	793.99	10	4	1.26	1586.75	1583	8	1.39E-03	46.9	
19	0	820.69	19	0	3.18	1640.11	1636	10	2.64E-03	22.9	
20	0	916.80	7	4	1.32	1832.15	1828	7	9.03E-04	61.8	
21	0	1002.42	9	8	0.98	2003.26	1998	10	1.31E-03	63.3	
22	0	1053.18	5	3	0.94	2104.70	2101	6	6.94E-04	70.7	
23	0	1055.80	7	4	0.87	2109.92	2107	7	9.03E-04	61.8	
24	0	1064.28	9	0	1.38	2126.89	2124	6	1.25E-03	33.3	
25	0	1324.58	5	4	1.19	2647.11	2642	7	6.25E-04	83.5	

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
RE-183	57.98	14	34.30*	6.198E-01	1.264E+01	1.284E+01	139.66
	59.32	14	58.90	6.198E-01	7.358E+00	7.478E+00	139.66
	67.24	8	12.90	9.982E-01	1.173E+01	1.192E+01	310.26
	162.33	-----	23.30	2.490E+00	-----	Line Not Found	-----
PB-210	46.54	22	4.25*	1.300E-01	7.500E+02	7.501E+02	99.25
TH-230	67.67	8	0.38*	9.982E-01	3.983E+02	3.983E+02	310.26
TH-232	63.81	3	0.26*	8.373E-01	2.876E+02	2.876E+02	823.95
	140.88	-----	0.02	2.561E+00	-----	Line Not Found	-----
TH-234	63.29	3	3.70*	8.373E-01	2.021E+01	2.021E+01	823.95
	92.59	67	4.23	2.096E+00	1.428E+02	1.428E+02	70.27
U-238	63.29	3	3.70*	8.373E-01	2.021E+01	2.021E+01	823.95
	92.59	67	4.23	2.096E+00	1.428E+02	1.428E+02	70.27
AM-241	59.54	14	35.90*	6.198E-01	1.207E+01	1.207E+01	139.66

Flag: "\*" = Keyline

Total number of lines in spectrum 23  
 Number of unidentified lines 9  
 Number of lines tentatively identified by NID 14 60.87%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/LITER	Decay Corr pCi/LITER	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
RE-183	70.00D	1.02	1.264E+01	1.284E+01	1.794E+01	139.66	
PB-210	22.20Y	1.00	7.500E+02	7.501E+02	7.445E+02	99.25	
TH-230	7.54E+04Y	1.00	3.983E+02	3.983E+02	12.36E+02	310.26	
TH-232	1.41E+10Y	1.00	2.876E+02	2.876E+02	23.70E+02	823.95	
TH-234	4.47E+09Y	1.00	2.021E+01	2.021E+01	16.65E+01	823.95	
U-238	4.47E+09Y	1.00	2.021E+01	2.021E+01	16.65E+01	823.95	
AM-241	432.60Y	1.00	1.207E+01	1.207E+01	1.686E+01	139.66	
Total Activity :			1.501E+03	1.501E+03			

Grand Total Activity : 1.501E+03 1.501E+03

Flags: "K" = Keyline not found "M" = Manually accepted  
 "E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
1	42.84	17	40	0.87	86.04	76	21	2.36E-03	****	8.10E-02	T
0	143.57	10	45	1.25	287.24	285	5	1.36E-03	****	2.56E+00	T
0	199.98	81	75	3.37	399.92	393	17	1.12E-02	54.2	2.29E+00	
0	206.61	11	48	0.74	413.19	409	8	1.52E-03	****	2.25E+00	T
0	238.47	41	36	1.16	476.83	472	9	5.68E-03	71.5	2.08E+00	T
0	296.18	22	29	2.40	592.12	588	10	3.10E-03	****	1.83E+00	T
0	447.56	19	29	3.92	894.54	887	13	2.63E-03	****	1.42E+00	
0	479.90	12	15	0.91	959.16	956	8	1.71E-03	****	1.36E+00	
0	609.66	15	39	4.31	1218.43	1212	13	2.04E-03	****	1.16E+00	T
0	748.44	8	6	0.49	1495.72	1490	8	1.10E-03	****	1.00E+00	T
0	793.99	10	4	1.26	1586.75	1583	8	1.39E-03	93.8	9.58E-01	
0	820.69	19	0	3.18	1640.11	1636	10	2.64E-03	45.9	9.33E-01	
0	916.80	7	4	1.32	1832.15	1828	7	9.03E-04	****	8.55E-01	
0	1002.42	1	8	0.98	2003.26	1998	10	1.45E-04	****	7.95E-01	T
0	1053.18	5	3	0.94	2104.70	2101	6	6.94E-04	****	7.64E-01	
0	1055.80	7	4	0.87	2109.92	2107	7	9.03E-04	****	7.62E-01	
0	1064.28	9	0	1.38	2126.89	2124	6	1.25E-03	66.7	7.57E-01	T
0	1324.58	5	4	1.19	2647.11	2642	7	6.25E-04	****	6.33E-01	

Flags: "T" = Tentatively associated

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203009338.CNF;1
* Acquisition date   : 24-DEC-2013 14:14:04 Sensitivity      : 3.000
* Detector ID        : GAM09 Energy tolerance: 1.500
* Elapsed live time  : 0 02:00:00.00 Abundance limit : 75.000
* Elapsed real time  : 0 02:00:00.54 Half life ratio : *****
* Sample date        : 23-DEC-2013 00:00:00 Nuclide Library : LIQUID
* Sample ID          : G1203009338 Analyst initials: MJH1
* Batch Number       : 1355780 Sample Quantity : 2.0000E+00 LITER
*                               Quantity Err(%) : 5.0000E-03 %
* Wet wt corr        : 1.00000 Wet Weight : 0.00000
*                               Dry Weight  : 0.00000
*****
*                               CALIBRATION INFORMATION                          *
*
* Eff. Cal. date     : 6-JUN-2013 11:59:19 Eff. Geometry    : 2LMB
* Eff. File           : DKA100:[CANBERRA.GAMMA]EFF_GAM09_2LMB.CNF;11
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.  
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER )	Act Error (1.96-sigma)	Lc (pCi/LITER )	TPU (1.96-sigma)
RE-183	1.284E+01	1.766E+01	1.257E+01	1.766E+01
PB-210	7.501E+02	7.369E+02	4.442E+02	7.369E+02
TH-230	3.983E+02	1.213E+03	7.832E+02	1.213E+03
TH-232	2.876E+02	2.323E+03	1.274E+03	2.323E+03
TH-234	2.021E+01	1.633E+02	9.226E+01	1.633E+02
U-238	2.021E+01	1.633E+02	9.226E+01	1.633E+02
AM-241	1.207E+01	1.658E+01	1.384E+01	1.658E+01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/LITER )	K.L Act error (1.96-sigma)	Lc (pCi/LITER )	TPU (1.96-sigma)	
BE-7	1.210E+01	1.545E+01	1.352E+01	1.639E+01	NOT IDENT.
NA-22	-1.389E-01	1.631E+00	1.359E+00	1.632E+00	NOT IDENT.
NA-24	5.317E-01	1.123E+01	9.702E+00	1.124E+01	NOT IDENT.
AL-26	6.971E-01	2.080E+00	1.922E+00	2.104E+00	NOT IDENT.
K-40	-3.057E+01	2.586E+01	1.810E+01	2.930E+01	NOT IDENT.
SC-46	-5.621E-01	2.413E+00	1.955E+00	2.427E+00	NOT IDENT.
V-48	2.249E+00	2.042E+00	2.097E+00	2.280E+00	NOT IDENT.
CR-51	-1.683E+00	1.687E+01	1.436E+01	1.689E+01	NOT IDENT.
MN-52	-1.448E+00	3.285E+00	2.504E+00	3.349E+00	NOT IDENT.
MN-54	2.168E+00	2.563E+00	2.422E+00	2.743E+00	NOT IDENT.
CO-56	9.052E-01	2.409E+00	2.160E+00	2.444E+00	NOT IDENT.
CO-57	1.548E-01	1.799E+00	1.539E+00	1.801E+00	NOT IDENT.
CO-58	-4.210E-01	2.226E+00	1.833E+00	2.234E+00	NOT IDENT.
FE-59	5.386E-01	3.396E+00	2.936E+00	3.405E+00	NOT IDENT.
CO-60	-8.752E-01	2.650E+00	2.105E+00	2.679E+00	NOT IDENT.
ZN-65	-3.134E+00	4.946E+00	3.496E+00	5.144E+00	NOT IDENT.
CU-67	-9.998E+00	7.801E+00	6.275E+00	9.010E+00	FAIL ABUN
GE-68	-1.283E+01	6.401E+01	5.050E+01	6.427E+01	NOT IDENT.
AS-74	2.616E+00	4.139E+00	3.700E+00	4.304E+00	NOT IDENT.
SE-75	-1.310E+00	2.963E+00	2.269E+00	3.022E+00	NOT IDENT.
BR-77	2.569E+01	1.816E+01	1.298E+01	2.154E+01	FAIL ABUN
SR-82	-3.809E+00	1.383E+01	1.122E+01	1.394E+01	NOT IDENT.



RB-83	3.008E+00	4.419E+00	4.012E+00	4.623E+00	NOT IDENT.
RB-84	-3.015E+00	3.389E+00	2.355E+00	3.652E+00	NOT IDENT.
KR-85	-1.340E+03	9.164E+02	6.721E+02	1.098E+03	NOT IDENT.
SR-85	-6.105E+00	4.176E+00	3.063E+00	5.001E+00	NOT IDENT.
RB-86	1.482E+00	2.523E+01	2.126E+01	2.524E+01	NOT IDENT.
Y-88	1.209E-02	2.660E+00	2.209E+00	2.660E+00	NOT IDENT.
Y-91	-3.300E+02	7.526E+02	5.319E+02	7.672E+02	NOT IDENT.
NB-94	-3.040E-01	2.352E+00	1.988E+00	2.356E+00	NOT IDENT.
NB-95	-1.222E+00	2.315E+00	1.812E+00	2.380E+00	NOT IDENT.
NB-95M	-2.627E+00	7.636E+00	5.249E+00	7.727E+00	NOT IDENT.
ZR-95	-1.547E+00	3.285E+00	2.539E+00	3.358E+00	NOT IDENT.
MO-99	-3.334E+00	2.269E+01	1.891E+01	2.274E+01	NOT IDENT.
TC-99M	-7.361E+01	1.911E+02	1.334E+02	1.939E+02	NOT IDENT.
RH-101	9.559E-02	2.301E+00	1.957E+00	2.302E+00	NOT IDENT.
RH-102M	-5.174E-01	1.846E+00	1.261E+00	1.861E+00	NOT IDENT.
RU-103	-1.607E-01	2.079E+00	1.717E+00	2.080E+00	FAIL ABUN
RH-106	8.234E+00	2.089E+01	1.823E+01	2.122E+01	NOT IDENT.
RU-106	8.234E+00	2.089E+01	1.823E+01	2.122E+01	NOT IDENT.
AG-108M	-7.484E-01	1.962E+00	1.566E+00	1.991E+00	NOT IDENT.
CD-109	3.230E+01	5.802E+01	4.775E+01	5.982E+01	NOT IDENT.
AG-110M	8.363E-02	1.977E+00	1.630E+00	1.977E+00	NOT IDENT.
SN-113	-1.944E+00	2.690E+00	2.060E+00	2.829E+00	NOT IDENT.
IN-114M	-2.916E+00	1.089E+01	8.779E+00	1.097E+01	NOT IDENT.
CD-115	1.473E+00	1.095E+01	9.305E+00	1.097E+01	NOT IDENT.
SN-117M	1.682E+00	2.055E+00	1.838E+00	2.191E+00	NOT IDENT.
I-123	1.405E+01	1.537E+01	1.383E+01	1.662E+01	NOT IDENT.
TE-123M	1.799E+00	1.968E+00	1.771E+00	2.128E+00	NOT IDENT.
SB-124	-8.567E-01	5.809E+00	4.670E+00	5.822E+00	NOT IDENT.
SB-125	-3.180E+00	6.332E+00	4.990E+00	6.492E+00	NOT IDENT.
TE-125M	-2.712E+01	6.129E+02	5.213E+02	6.130E+02	NOT IDENT.
I-126	2.443E+00	7.448E+00	6.398E+00	7.529E+00	NOT IDENT.
SB-126	7.649E-01	4.210E+00	3.713E+00	4.224E+00	NOT IDENT.
SN-126	2.774E+00	5.855E+00	4.781E+00	5.987E+00	FAIL ABUN
SB-127	1.910E+00	5.900E+00	5.156E+00	5.962E+00	NOT IDENT.
I-131	3.750E-01	2.488E+00	2.162E+00	2.494E+00	NOT IDENT.
I-132	-6.254E+04	3.068E+05	0.000E+00	3.081E+05	SHORT HLIF
TE-132	5.373E-01	2.669E+00	2.235E+00	2.680E+00	NOT IDENT.
BA-133	-9.680E-01	2.777E+00	2.274E+00	2.811E+00	NOT IDENT.
I-133	3.972E+00	7.774E+00	6.966E+00	7.977E+00	NOT IDENT.
CS-134	2.584E-01	2.759E+00	2.090E+00	2.761E+00	NOT IDENT.
CS-135	8.281E+00	1.108E+01	9.724E+00	1.169E+01	NOT IDENT.
I-135	-3.053E+02	4.465E+02	2.822E+02	4.673E+02	NOT IDENT.
CS-136	-7.137E-01	3.328E+00	2.218E+00	3.343E+00	NOT IDENT.
BA-137M	-1.419E+00	2.204E+00	1.569E+00	2.294E+00	NOT IDENT.
CS-137	-1.499E+00	2.328E+00	1.658E+00	2.424E+00	NOT IDENT.
CE-139	1.102E-01	1.932E+00	1.622E+00	1.932E+00	NOT IDENT.
BA-140	3.936E+00	3.084E+00	3.285E+00	3.558E+00	NOT IDENT.
LA-140	3.936E+00	3.084E+00	3.285E+00	3.558E+00	NOT IDENT.
CE-141	-5.839E-01	4.114E+00	3.049E+00	4.123E+00	NOT IDENT.
CE-143	9.003E+00	9.581E+00	8.290E+00	1.040E+01	NOT IDENT.
CE-144	2.414E+00	1.270E+01	1.093E+01	1.275E+01	NOT IDENT.
PM-144	8.542E-01	2.470E+00	2.215E+00	2.500E+00	NOT IDENT.
PR-144	6.241E+01	1.834E+02	1.644E+02	1.855E+02	NOT IDENT.
PM-146	-1.088E-01	2.632E+00	2.124E+00	2.633E+00	FAIL ABUN
ND-147	-8.190E+00	1.587E+01	1.207E+01	1.629E+01	NOT IDENT.
PM-147	-5.076E+03	5.255E+04	4.424E+04	5.260E+04	NOT IDENT.
PM-149	-2.903E+01	9.917E+01	7.703E+01	1.000E+02	NOT IDENT.
EU-152	4.633E-01	6.163E+00	5.330E+00	6.166E+00	NOT IDENT.
GD-153	8.305E-01	7.024E+00	5.254E+00	7.034E+00	NOT IDENT.
EU-154	-2.072E+00	5.053E+00	3.783E+00	5.138E+00	NOT IDENT.
EU-155	-4.827E+00	9.062E+00	6.788E+00	9.319E+00	NOT IDENT.
HO-166M	2.868E+00	4.225E+00	3.948E+00	4.418E+00	NOT IDENT.
TM-171	1.006E+03	2.415E+03	2.009E+03	2.457E+03	FAIL ABUN
LU-176	-7.622E-02	1.716E+00	1.475E+00	1.716E+00	NOT IDENT.
HF-181	1.488E+00	2.360E+00	1.968E+00	2.454E+00	FAIL ABUN
W-181	1.367E+01	1.906E+01	1.724E+01	2.004E+01	FAIL ABUN
TA-182	6.212E+00	1.091E+01	9.922E+00	1.127E+01	FAIL ABUN
RE-184	-6.953E+00	5.844E+00	3.569E+00	6.632E+00	NOT IDENT.
RE-188	2.886E+00	1.044E+01	8.964E+00	1.052E+01	FAIL ABUN
W-188	-1.240E+01	4.285E+02	3.440E+02	4.285E+02	FAIL ABUN
OS-191	1.544E-01	6.396E+00	5.426E+00	6.396E+00	FAIL ABUN
IR-192	3.088E-01	1.989E+00	1.744E+00	1.994E+00	FAIL ABUN
HG-203	2.593E+00	2.200E+00	2.014E+00	2.491E+00	NOT IDENT.
BI-207	2.991E+00	1.990E+00	2.563E+00	2.404E+00	FAIL ABUN
TL-208	-2.915E-01	2.743E+00	2.212E+00	2.746E+00	NOT IDENT.
BI-211	3.264E+00	1.452E+01	1.272E+01	1.459E+01	NOT IDENT.
PB-211	4.194E+00	5.336E+01	4.564E+01	5.339E+01	NOT IDENT.
BI-212	1.688E+01	3.318E+01	3.047E+01	3.404E+01	NOT IDENT.

PB-212	8.463E+00	5.985E+00	4.365E+00	7.098E+00	FAIL ABUN
BI-213	-2.750E+00	7.526E+00	5.501E+00	7.627E+00	NOT IDENT.
BI-214	5.227E+00	1.046E+01	6.374E+00	1.073E+01	FAIL ABUN
PB-214	1.267E+00	5.742E+00	4.900E+00	5.770E+00	FAIL ABUN
RN-219	2.801E+00	2.915E+01	2.501E+01	2.918E+01	NOT IDENT.
FR-221	2.142E+00	1.478E+01	1.233E+01	1.481E+01	NOT IDENT.
RA-223	-1.665E+01	4.739E+01	3.932E+01	4.798E+01	FAIL ABUN
RA-224	2.264E+01	4.707E+01	3.655E+01	4.816E+01	NOT IDENT.
RA-226	-7.448E+01	6.745E+01	5.501E+01	7.534E+01	NOT IDENT.
AC-227	2.439E+00	1.997E+01	1.644E+01	2.000E+01	NOT IDENT.
TH-227	2.439E+00	1.997E+01	1.644E+01	2.000E+01	NOT IDENT.
AC-228	-6.750E+00	1.156E+01	7.590E+00	1.195E+01	NOT IDENT.
RA-228	-6.750E+00	1.156E+01	7.590E+00	1.195E+01	NOT IDENT.
TH-228	8.463E+00	5.985E+00	4.365E+00	7.098E+00	FAIL ABUN
TH-229	6.349E+00	3.954E+01	3.172E+01	3.964E+01	NOT IDENT.
PA-231	4.682E+01	1.018E+02	8.685E+01	1.040E+02	NOT IDENT.
TH-231	1.623E+00	3.764E+01	3.056E+01	3.764E+01	NOT IDENT.
PA-233	-1.070E+00	4.913E+00	3.710E+00	4.937E+00	NOT IDENT.
PA-234	-7.471E+00	2.245E+01	1.630E+01	2.270E+01	NOT IDENT.
PA-234M	2.925E+01	3.528E+02	2.727E+02	3.530E+02	FAIL ABUN
U-234	7.538E+03	8.420E+03	7.332E+03	9.080E+03	NOT IDENT.
U-235	6.559E+00	1.629E+01	1.420E+01	1.655E+01	FAIL ABUN
NP-237	-1.070E+00	4.913E+00	3.710E+00	4.937E+00	NOT IDENT.
NP-239	1.881E+01	2.033E+01	1.852E+01	2.203E+01	NOT IDENT.
AM-242	1.747E+01	5.200E+01	4.295E+01	5.259E+01	NOT IDENT.
AM-243	1.141E+00	4.186E+00	3.712E+00	4.217E+00	FAIL ABUN
CM-243	3.047E+00	7.811E+00	6.904E+00	7.931E+00	NOT IDENT.
CM-247	4.366E-01	2.536E+00	2.196E+00	2.544E+00	NOT IDENT.
CF-249	3.226E+00	2.533E+00	2.472E+00	2.921E+00	NOT IDENT.
CF-251	-5.173E+00	9.386E+00	7.366E+00	9.672E+00	NOT IDENT.
CF-252	-1.077E+04	1.622E+04	1.025E+04	1.693E+04	NOT IDENT.
ANH-511	-2.643E+00	4.681E+00	4.450E+00	4.830E+00	NOT IDENT.

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 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \* GAMMA SPECTROSCOPY BACKGROUND REPORT \*  
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ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	45.2531	88.34	42.9312	152.32	53.9984
46.54	45.7118	88.47	42.9431	152.43	54.0066
49.72	35.6481	89.96	57.8872	153.25	57.0748
51.35	50.0792	91.11	48.5807	154.21	59.1596
52.39	45.3372	91.27	48.5969	155.04	57.2227
53.20	38.0782	92.59	48.7304	156.02	60.3186
56.28	38.0122	93.31	48.8026	158.56	52.4650
57.36	33.1569	93.35	48.8068	158.97	51.4861
57.53	33.1730	94.56	48.9276	159.00	51.4882
57.53	33.1732	94.65	48.9367	162.33	64.9141
57.98	31.5548	94.67	48.9386	163.33	51.8000
59.32	41.0095	97.43	49.2113	165.86	51.9805
59.54	55.0465	98.43	42.4606	176.31	56.8458
61.49	42.7652	98.44	42.4616	176.60	56.8670
63.00	42.9403	99.53	49.4162	177.52	61.0760
63.29	42.9737	100.11	65.0472	181.07	71.7564
63.58	43.0069	100.20	65.0588	184.41	78.3279
63.81	43.0333	103.18	51.6108	184.58	78.3447
64.28	43.0870	103.37	51.6296	185.72	66.9505
64.99	43.1679	105.31	61.9994	186.21	72.2253
65.08	43.1781	106.12	62.0938	190.27	56.8109
66.73	43.3641	109.28	59.6631	193.51	51.9672
66.98	42.1156	111.00	57.0457	198.01	55.7561
67.24	42.1438	111.76	52.4422	201.83	56.0104
67.67	52.4183	116.24	57.5837	205.31	12.8549
67.75	52.4290	116.30	51.9250	210.85	48.5156
69.67	51.3998	116.74	51.0205	218.12	46.7421
70.83	50.5175	117.23	51.0645	222.11	43.6743
72.81	64.7499	120.54	59.9181	227.09	43.9128
72.87	66.4864	120.90	60.9069	227.38	38.4354
74.66	58.9694	121.12	55.2175	228.16	41.7654
74.82	55.5218	121.22	55.2271	228.18	41.7662
74.97	51.2025	121.78	56.2332	235.69	44.8720
77.11	65.4182	122.06	56.2599	235.96	44.8848
79.69	54.4029	123.07	49.6701	238.63	41.1210
80.12	57.9699	127.23	59.6350	238.98	55.0334
80.19	57.9789	129.43	60.8166	240.99	40.1082
80.57	52.7539	131.20	60.9922	242.00	40.1499
81.00	66.0069	133.02	50.4903	244.70	51.4454
81.07	66.0172	133.52	46.6436	252.40	46.2130
83.79	54.9072	136.00	58.5345	252.80	52.9969
84.21	56.7311	136.28	49.7762	256.23	48.6523
85.43	63.1047	136.47	49.7912	260.90	39.7830
86.55	65.0405	140.51	58.9471	264.66	43.3515
86.94	71.6942	140.88	56.0317	268.22	34.3420
87.09	63.1538	143.76	63.1901	269.46	42.4056
87.57	50.8970	144.24	72.6230	271.23	33.2923
88.03	49.6064	145.44	72.7538	273.65	37.9716

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
276.40	53.0668	427.09	31.1660	677.62	16.7743
277.37	42.7225	427.87	32.1566	685.70	8.9795
277.60	45.0414	433.94	27.3946	695.00	17.1334
278.00	39.2821	440.45	27.5117	696.49	23.4616
279.20	27.7593	453.88	20.3884	696.51	23.4616
279.54	27.7681	463.37	19.9414	697.00	26.1743
280.46	48.6351	468.07	15.0000	697.49	28.8891
283.69	32.5203	473.00	19.0580	702.65	24.4318
284.31	27.8901	475.06	17.6763	706.68	27.1948
285.41	32.5715	476.78	11.2603	711.68	17.2619
285.90	43.0598	477.60	9.6565	720.70	16.4188
287.50	29.1372	477.99	9.6589	721.93	15.5150
290.67	33.8959	482.18	14.5252	722.78	14.6078
293.27	26.7113	487.02	23.2681	722.91	14.6086
295.22	43.6573	492.35	16.2385	723.31	19.1774
295.96	42.2769	497.08	22.3907	724.19	22.8387
299.98	45.2563	511.00	33.8613	727.33	16.4663
300.09	45.2602	514.00	114.0961	733.00	18.3413
300.13	39.6040	520.40	18.5702	735.93	8.2641
301.36	31.1513	520.69	14.4456	739.50	13.7944
302.85	36.3311	522.65	0.0000	744.23	9.2151
304.50	35.4962	527.90	18.6493	747.24	13.8406
306.78	32.8989	529.59	18.6674	752.31	7.7057
308.46	33.8368	529.87	16.5957	753.82	10.2808
311.90	33.0435	531.02	23.8718	756.73	13.8962
316.51	30.4836	546.56	24.0788	763.94	17.6552
319.41	30.5578	552.55	18.9064	765.80	22.3189
320.08	31.4742	563.25	20.0721	766.42	20.4644
321.04	38.6991	569.33	19.0778	766.84	19.5378
323.87	45.1050	569.50	19.0794	772.60	0.0000
325.23	38.8342	569.70	20.1417	776.52	15.8798
328.76	39.8528	583.19	20.2855	777.92	15.8889
333.37	36.3660	595.83	21.4929	778.90	16.8306
334.37	35.4860	600.60	37.7045	783.70	20.6116
338.28	33.7723	602.73	27.3202	785.37	16.8754
338.32	33.7735	604.72	37.9994	792.07	15.6681
340.48	34.7460	609.32	36.7891	795.86	14.1229
340.55	34.7477	610.33	36.8077	801.95	18.8770
344.28	28.4310	614.28	26.0339	810.29	15.1523
345.93	33.0595	618.01	26.0823	810.45	15.1531
351.06	35.0365	621.93	17.4219	810.76	17.0495
351.93	31.3697	630.19	0.0000	815.77	11.0725
356.01	33.3204	631.29	18.5963	818.51	15.8354
364.49	29.8101	632.98	24.0860	832.01	20.0587
366.42	41.9815	633.25	22.9937	834.85	15.2996
383.85	42.5267	634.78	18.6280	836.80	27.7518
388.16	16.1157	635.95	24.1209	846.77	15.3703
388.63	19.9144	636.99	18.6482	856.80	17.3584
391.70	32.3134	645.85	23.1347	860.56	11.5887
400.66	28.6935	657.76	14.4032	871.09	15.5133
401.81	31.5886	661.66	19.9797	873.19	15.5258
402.40	27.7712	664.57	14.4492	875.33	12.6245
404.85	34.5333	666.33	18.9113	880.51	19.4604
410.95	29.8633	666.50	20.0248	881.60	19.4683
414.70	25.1109	667.71	0.0000	883.24	16.5580

<u>ENERGY</u>	<u>MDA COUNTS</u>	<u>ENERGY</u>	<u>MDA COUNTS</u>	<u>ENERGY</u>	<u>MDA COUNTS</u>
884.68	12.6687	1434.09	11.4941		
889.28	17.5711	1457.56	6.7437		
894.76	16.6285	1460.82	7.7132		
898.04	9.7935	1489.16	8.7367		
903.28	18.6433	1596.21	2.9856		
911.20	14.7605	1620.50	2.0013		
926.36	12.8626	1678.03	6.0801		
935.54	9.9268	1690.97	8.1292		
937.49	11.9203	1764.49	7.2242		
944.13	17.9222	1770.23	6.1995		
946.00	17.9341	1771.35	6.2009		
949.00	8.9765	1791.20	7.2640		
954.55	0.0000	1808.65	3.1243		
964.08	13.0343	1836.06	6.2830		
968.97	13.0562				
983.53	4.0374				
996.26	15.2054				
1001.03	5.0765				
1004.73	8.4715				
1037.84	7.1941				
1038.76	12.3363				
1046.59	9.0183				
1048.07	10.3115				
1050.41	10.3193				
1063.66	9.3265				
1077.00	8.3254				
1077.34	9.3674				
1085.87	9.3924				
1099.25	6.2877				
1112.07	3.1563				
1112.84	4.2094				
1115.54	14.7451				
1120.29	9.4926				
1120.55	8.4387				
1121.30	9.4957				
1129.67	11.6354				
1131.51	11.6418				
1173.23	8.5727				
1189.05	8.6121				
1204.77	7.5698				
1221.41	10.8657				
1231.02	14.1635				
1235.36	18.5439				
1238.28	9.8257				
1260.41	8.7879				
1274.44	6.4323				
1274.54	4.5947				
1291.59	3.6929				
1298.22	9.2489				
1312.11	8.3547				
1332.49	12.1335				
1365.19	1.8826				
1368.63	4.7109				
1384.29	5.6758				
1408.01	3.8066				

```

*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                           *
*****
Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203009339.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM07.CNF;357
Background date : 21-DEC-2013 11:48:10
Sample date     : 19-DEC-2013 10:15:00 Acquisition date : 26-DEC-2013 10:34:41
Sample ID      : G1203009339 Sample quantity   : 2.00000E+00 LITER
Detector name  : GAM07 Detector geometry   : 2LMB
Elapsed live time: 0 02:00:00.00 Elapsed real time: 0 02:00:00.68 0.0%
Energy tolerance : 1.50000 keV Analyst Initials : MJH1
Abundance limit : 75.00000 Sensitivity    : 3.00000
Batch ID       : 1355780 Detector SN#    :
Matrix Spike ID : LCS ID           : 1604
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.02*	42	145	1.25	91.66	86	10	5.80E-03	60.0	
2	0	52.92	38	96	0.86	105.45	103	7	5.29E-03	45.7	
3	0	87.14	39	66	1.46	173.90	172	5	5.36E-03	35.4	
4	0	91.92*	19	204	1.19	183.48	178	11	2.57E-03	164.3	
5	0	103.06	24	108	1.19	205.74	204	8	3.29E-03	78.4	
6	0	140.39	19	205	1.00	280.43	274	12	2.58E-03	157.3	
7	0	143.87*	4	101	0.86	287.38	285	7	5.72E-04	449.6	
8	0	185.50*	24	113	1.35	370.67	366	10	3.33E-03	96.3	
9	0	198.89*	16	100	1.04	397.44	394	8	2.23E-03	123.6	
10	0	212.36	31	117	3.35	424.39	416	13	4.28E-03	75.3	
11	0	238.73*	31	98	1.08	477.13	471	12	4.34E-03	71.3	
12	0	294.88*	16	64	1.03	589.47	585	9	2.19E-03	103.1	
13	2	338.15	36	56	1.75	676.03	670	16	5.03E-03	43.1	1.78E+00
14	2	341.38	27	22	1.44	682.48	670	16	3.77E-03	39.6	
15	0	351.95*	45	45	1.03	703.63	698	10	6.31E-03	35.4	
16	0	383.55	24	66	3.48	766.84	756	16	3.30E-03	80.1	
17	0	392.45	32	27	1.51	784.64	780	11	4.48E-03	36.9	
18	0	403.53	50	107	14.71	806.81	790	33	6.89E-03	65.1	
19	0	456.00	7	35	1.43	911.77	904	10	1.01E-03	159.7	
20	0	486.10	14	9	0.95	971.98	969	6	1.99E-03	42.1	
21	4	516.06	18	18	2.17	1031.92	1013	24	2.54E-03	60.5	1.21E+00
22	0	572.29	13	19	1.52	1144.40	1139	11	1.85E-03	69.2	
23	0	583.96*	14	33	1.52	1167.76	1162	12	1.89E-03	98.8	
24	0	609.53*	27	29	1.67	1218.90	1212	13	3.82E-03	50.5	
25	0	743.80	12	5	1.15	1487.52	1483	8	1.61E-03	46.4	
26	0	803.62	10	13	1.88	1607.20	1604	8	1.38E-03	69.2	
27	0	911.09*	23	6	2.20	1822.20	1817	11	3.24E-03	34.4	
28	0	921.86	16	0	2.50	1843.75	1838	11	2.22E-03	25.0	
29	0	926.67	9	4	1.10	1853.38	1850	7	1.28E-03	47.4	
30	0	961.33	17	3	1.49	1922.71	1917	10	2.41E-03	29.5	
31	0	1113.15	5	14	1.57	2226.44	2220	11	6.62E-04	158.2	
32	0	1121.32	18	6	2.57	2242.79	2238	10	2.49E-03	36.5	
33	0	1138.60	7	10	1.19	2277.36	2269	13	9.76E-04	99.3	
34	5	1208.01	8	0	1.72	2416.23	2414	11	1.11E-03	33.1	6.71E-01

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	5	1210.38	17	3	2.36	2420.98	2414	11	2.37E-03	26.9	
36	0	1230.66	9	7	1.31	2461.55	2456	9	1.18E-03	64.6	
37	0	1250.25	6	13	5.67	2500.76	2488	14	7.82E-04	146.4	
38	0	1379.24	14	3	2.39	2758.83	2753	11	1.99E-03	34.6	
39	0	1450.58	9	2	0.54	2901.57	2896	11	1.21E-03	49.6	
40	0	1460.98*	14	0	0.79	2922.37	2915	15	2.01E-03	40.7	
41	0	1542.81	20	0	0.62	3086.10	3080	13	2.78E-03	22.4	

Flag: "\*" = Peak area was modified by background subtraction

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203009339.CNF;1  
Analyses by : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4  
Sample title : MJH1  
Sample date : 19-DEC-2013 10:15:00 Acquisition date : 26-DEC-2013 10:34:41  
Sample ID : G1203009339 Sample quantity : 2.0000 LITER  
Sample type : LIQUID Sample geometry :  
Detector name : GAMMA7 Detector geometry: 2LMB  
Elapsed live time: 0 02:00:00.00 Elapsed real time: 0 02:00:00.68 0.0%  
Energy tolerance : 1.50 keV Half life ratio : 10.00  
Errors propagated: No Systematic Error : 0.00 %  
Efficiency type : Empirical Efficiencies at : Peak Energy  
Abundance limit : 75.00

Interference Report

No interference correction performed



Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
K-40	1460.82	14	10.66*	5.970E-01	4.261E+01	4.261E+01	81.43
CU-67	91.27	19	7.00	2.538E+00	1.958E+01	1.307E+02	328.65
	93.31	19	16.10	2.538E+00	8.515E+00	5.683E+01	328.65
	184.58	24	48.70*	2.513E+00	3.672E+00	2.451E+01	192.68
CD-109	88.03	39	3.70*	2.440E+00	8.021E+01	8.106E+01	70.74
SN-113	391.70	32	64.97*	1.587E+00	5.876E+00	6.131E+00	73.86
SN-126	64.28	-----	9.60	1.630E+00	-----	Line Not Found	-----
	86.94	39	8.90	2.440E+00	3.334E+01	3.334E+01	70.74
	87.57	39	37.00*	2.440E+00	8.021E+00	8.021E+00	70.74
TL-208	277.37	-----	6.60	2.004E+00	-----	Line Not Found	-----
	583.19	14	85.00*	1.197E+00	2.507E+00	2.525E+00	197.58
	860.56	-----	12.50	8.989E-01	-----	Line Not Found	-----
PB-210	46.54	42	4.25*	6.413E-01	2.877E+02	2.879E+02	120.06
BI-211	72.87	-----	1.23	2.007E+00	-----	Line Not Found	-----
	351.06	45	12.92*	1.711E+00	3.859E+01	3.862E+01	70.80
BI-214	609.32	27	45.49*	1.160E+00	9.775E+00	9.775E+00	100.90
	1120.29	18	14.92	7.339E-01	3.075E+01	3.075E+01	72.90
	1764.49	-----	15.30	5.161E-01	-----	Line Not Found	-----
RA-226	186.21	24	3.59*	2.513E+00	4.981E+01	4.981E+01	192.68
U-234	53.20	38	0.12*	1.022E+00	5.830E+03	5.830E+03	91.32
	120.90	-----	0.04	2.779E+00	-----	Line Not Found	-----
U-235	89.96	-----	3.47	2.500E+00	-----	Line Not Found	-----
	93.35	19	5.60	2.538E+00	2.448E+01	2.448E+01	328.65
	143.76	4	10.96*	2.740E+00	2.573E+00	2.573E+00	899.16
	163.33	-----	5.08	2.645E+00	-----	Line Not Found	-----
	185.72	24	57.20	2.513E+00	3.126E+00	3.126E+00	192.68
CM-247	205.31	-----	5.01	2.392E+00	-----	Line Not Found	-----
	278.00	-----	3.40	2.001E+00	-----	Line Not Found	-----
	287.50	-----	2.00	1.959E+00	-----	Line Not Found	-----
	402.40	50	72.00*	1.557E+00	8.307E+00	8.307E+00	130.11

Flag: "\*" = Keyline

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203009339.CNF;1
* Acquisition date   : 26-DEC-2013 10:34:41 Sensitivity      : 3.000
* Detector ID        : GAM07 Energy tolerance: 1.500
* Elapsed live time  : 0 02:00:00.00 Abundance limit : 75.000
* Elapsed real time  : 0 02:00:00.68 Half life ratio : *****
* Sample date        : 19-DEC-2013 10:15:00 Nuclide Library : LIQUID
* Sample ID          : G1203009339 Analyst initials: MJH1
* Batch Number       : 1355780 Sample Quantity : 2.0000E+00 LITER
* Wet wt corr        : 1.00000 Wet Weight : 0.00000
*                               Dry Weight : 0.00000
*****
*                               CALIBRATION INFORMATION                         *
*
* Eff. Cal. date     : 26-JUL-2013 11:27:41 Eff. Geometry   : 2LMB
* Eff. File          : DKA100:[CANBERRA.GAMMA]EFF_GAM07_2LMB.CNF;12
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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.  
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER )	Cnt uncert (1.96-sigma)	MDA (pCi/LITER )
K-40	4.261E+01	3.401E+01	3.828E+01
CU-67	2.451E+01	4.627E+01	4.707E+01
CD-109	8.106E+01	5.619E+01	1.056E+02
SN-113	6.131E+00	4.438E+00	6.142E+00
SN-126	8.021E+00	5.560E+00	1.049E+01
TL-208	2.525E+00	4.889E+00	5.765E+00
PB-210	2.879E+02	3.387E+02	3.212E+02
BI-211	3.862E+01	2.679E+01	2.996E+01
BI-214	9.775E+00	9.666E+00	1.029E+01
RA-226	4.981E+01	9.405E+01	1.029E+02
U-234	5.830E+03	5.218E+03	7.517E+03
U-235	2.573E+00	2.267E+01	3.325E+01
CM-247	8.307E+00	1.059E+01	6.121E+00

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/LITER )	K.L. Cnt Uncert (1.96-sigma)	MDA (pCi/LITER )	
BE-7	6.267E+00	2.273E+01	4.361E+01	NOT IDENT.
NA-22	-3.905E-01	2.142E+00	4.267E+00	NOT IDENT.
NA-24	0.000E+00	7.690E+03	0.000E+00	SHORT HLIF
AL-26	1.779E+00	2.667E+00	6.187E+00	NOT IDENT.
SC-46	5.953E-01	2.693E+00	5.330E+00	FAIL ABUN
V-48	1.929E-01	3.503E+00	6.789E+00	NOT IDENT.
CR-51	-8.764E+00	2.654E+01	4.569E+01	NOT IDENT.
MN-52	-1.596E+00	7.221E+00	1.369E+01	FAIL ABUN
MN-54	-3.681E-01	2.134E+00	4.082E+00	NOT IDENT.
CO-56	-7.783E-01	3.042E+00	5.545E+00	NOT IDENT.
CO-57	-2.845E-01	2.558E+00	4.329E+00	NOT IDENT.
CO-58	-2.562E+00	2.981E+00	4.739E+00	NOT IDENT.
FE-59	3.510E+00	5.537E+00	1.155E+01	NOT IDENT.
CO-60	1.849E+00	2.748E+00	6.045E+00	NOT IDENT.
ZN-65	-3.067E+00	1.328E+01	1.178E+01	NOT IDENT.
GE-68	5.026E+01	7.375E+01	1.606E+02	NOT IDENT.
AS-74	2.936E+00	5.997E+00	1.153E+01	NOT IDENT.

SE-75	7.089E-02	3.928E+00	6.998E+00	NOT IDENT.
BR-77	9.045E+01	1.264E+02	1.657E+02	FAIL ABUN
SR-82	-1.459E+01	2.136E+01	3.738E+01	NOT IDENT.
RB-83	-2.615E+00	6.051E+00	9.063E+00	NOT IDENT.
RB-84	-2.526E+00	4.336E+00	7.634E+00	NOT IDENT.
KR-85	1.413E+03	6.727E+02	1.429E+03	NOT IDENT.
SR-85	6.817E+00	3.245E+00	6.892E+00	NOT IDENT.
RB-86	7.459E+00	3.793E+01	7.571E+01	NOT IDENT.
Y-88	-1.393E+00	3.107E+00	5.576E+00	NOT IDENT.
Y-91	-5.760E+02	1.425E+03	2.077E+03	NOT IDENT.
NB-94	1.721E+00	2.846E+00	5.532E+00	NOT IDENT.
NB-95	-5.678E-01	3.018E+00	5.611E+00	NOT IDENT.
NB-95M	-2.879E+00	1.058E+01	1.614E+01	NOT IDENT.
ZR-95	2.105E+00	4.253E+00	8.602E+00	NOT IDENT.
MO-99	-1.569E+02	1.492E+02	1.814E+02	FAIL ABUN
TC-99M	0.000E+00	1.283E+09	0.000E+00	SHORT HLIF
RH-101	8.537E-01	3.041E+00	5.285E+00	FAIL ABUN
RH-102M	-8.560E-01	2.353E+00	4.213E+00	FAIL ABUN
RU-103	1.296E+00	2.818E+00	5.482E+00	FAIL ABUN
RH-106	-9.603E+00	2.619E+01	4.603E+01	NOT IDENT.
RU-106	-9.603E+00	2.619E+01	4.603E+01	NOT IDENT.
AG-108M	2.565E+00	2.712E+00	5.398E+00	NOT IDENT.
AG-110M	1.312E+00	2.781E+00	5.390E+00	NOT IDENT.
IN-114M	9.459E+00	1.607E+01	2.685E+01	NOT IDENT.
CD-115	1.631E+01	7.804E+01	1.475E+02	NOT IDENT.
SN-117M	-1.182E+00	3.400E+00	6.035E+00	NOT IDENT.
I-123	0.000E+00	1.762E+04	0.000E+00	SHORT HLIF
TE-123M	-8.588E-01	2.538E+00	4.507E+00	NOT IDENT.
SB-124	-7.111E-03	6.809E+00	1.352E+01	NOT IDENT.
SB-125	-1.455E+00	8.386E+00	1.525E+01	NOT IDENT.
TE-125M	-5.507E+02	8.742E+02	1.437E+03	NOT IDENT.
I-126	8.867E+00	1.296E+01	2.521E+01	NOT IDENT.
SB-126	3.913E+00	7.781E+00	1.500E+01	NOT IDENT.
SB-127	5.591E+00	2.504E+01	4.723E+01	NOT IDENT.
I-131	-4.515E+00	5.449E+00	8.823E+00	NOT IDENT.
I-132	0.000E+00	4.234E+22	0.000E+00	SHORT HLIF
TE-132	1.853E+00	1.000E+01	1.828E+01	NOT IDENT.
BA-133	-2.141E+00	4.419E+00	6.375E+00	FAIL ABUN
I-133	1.277E+02	7.843E+02	1.473E+03	NOT IDENT.
CS-134	1.572E-01	3.006E+00	5.798E+00	NOT IDENT.
CS-135	-1.711E+01	1.531E+01	2.288E+01	NOT IDENT.
I-135	0.000E+00	4.805E+08	0.000E+00	SHORT HLIF
CS-136	9.128E-01	5.239E+00	1.019E+01	FAIL ABUN
BA-137M	-1.139E+00	3.270E+00	5.705E+00	NOT IDENT.
CS-137	-1.204E+00	3.455E+00	6.026E+00	NOT IDENT.
CE-139	-8.051E-01	2.661E+00	4.727E+00	NOT IDENT.
BA-140	9.964E-01	4.317E+00	9.012E+00	FAIL ABUN
LA-140	9.964E-01	4.317E+00	9.012E+00	FAIL ABUN
CE-141	-7.382E-01	5.638E+00	8.947E+00	NOT IDENT.
CE-143	0.000E+00	1.957E+02	3.682E+02	NOT IDENT.
CE-144	1.313E+00	1.884E+01	3.221E+01	NOT IDENT.
PM-144	-2.692E+00	2.666E+00	4.216E+00	NOT IDENT.
PR-144	-2.001E+02	1.988E+02	3.144E+02	NOT IDENT.
PM-146	2.519E+00	3.823E+00	6.769E+00	NOT IDENT.
ND-147	1.325E+01	2.745E+01	5.354E+01	FAIL ABUN
PM-147	2.713E+04	7.439E+04	1.300E+05	NOT IDENT.
PM-149	-1.874E+02	6.269E+02	1.089E+03	NOT IDENT.
EU-152	5.287E-01	9.454E+00	1.474E+01	FAIL ABUN
GD-153	-8.002E+00	7.915E+00	1.198E+01	FAIL ABUN
EU-154	-1.111E+00	6.095E+00	1.214E+01	NOT IDENT.
EU-155	-3.076E+00	1.146E+01	1.712E+01	FAIL ABUN
HO-166M	2.548E-01	4.845E+00	8.942E+00	FAIL ABUN
TM-171	1.499E+03	1.342E+03	2.153E+03	FAIL ABUN
LU-176	-8.732E-01	2.443E+00	4.196E+00	FAIL ABUN
HF-181	2.097E+00	3.106E+00	5.636E+00	NOT IDENT.
W-181	-9.507E+00	1.487E+01	2.392E+01	NOT IDENT.
TA-182	3.060E+00	1.166E+01	2.300E+01	FAIL ABUN
RE-183	1.841E+00	1.287E+01	2.301E+01	NOT IDENT.
RE-184	6.892E+00	8.161E+00	1.679E+01	NOT IDENT.
RE-188	6.806E+00	1.368E+01	2.552E+01	NOT IDENT.
W-188	-4.607E+01	6.002E+02	9.314E+02	NOT IDENT.
OS-191	5.574E+00	1.076E+01	1.897E+01	NOT IDENT.
IR-192	-1.064E+00	2.962E+00	5.080E+00	FAIL ABUN
HG-203	-7.001E-01	3.079E+00	5.370E+00	NOT IDENT.
BI-207	-1.421E-02	4.444E+00	8.305E+00	NOT IDENT.
PB-211	0.000E+00	2.019E+02	9.426E+01	FAIL ABUN
BI-212	-1.872E+01	4.015E+01	6.892E+01	NOT IDENT.
PB-212	6.165E+00	8.617E+00	1.126E+01	FAIL ABUN

BI-213	-7.252E+00	8.229E+00	1.397E+01	NOT IDENT.
PB-214	1.401E+01	9.718E+00	1.535E+01	FAIL ABUN
RN-219	-6.643E+00	4.078E+01	6.457E+01	NOT IDENT.
FR-221	-5.646E+00	1.897E+01	3.213E+01	NOT IDENT.
RA-223	6.674E+00	5.954E+01	1.061E+02	FAIL ABUN
RA-224	-2.533E+01	6.357E+01	9.524E+01	NOT IDENT.
AC-227	-3.133E+00	2.370E+01	4.176E+01	NOT IDENT.
TH-227	-3.133E+00	2.370E+01	4.176E+01	NOT IDENT.
AC-228	1.978E+01	1.333E+01	2.744E+01	FAIL ABUN
RA-228	1.978E+01	1.333E+01	2.744E+01	FAIL ABUN
TH-228	6.165E+00	8.617E+00	1.126E+01	FAIL ABUN
TH-229	-5.200E+01	5.028E+01	8.096E+01	FAIL ABUN
TH-230	-5.477E+02	9.053E+02	1.486E+03	NOT IDENT.
PA-231	1.251E+02	1.272E+02	2.439E+02	NOT IDENT.
TH-231	-9.605E+00	4.024E+01	6.033E+01	NOT IDENT.
TH-232	-4.607E+02	1.608E+03	2.793E+03	FAIL ABUN
PA-233	2.330E+00	6.342E+00	1.150E+01	FAIL ABUN
PA-234	8.485E+00	2.067E+01	4.225E+01	FAIL ABUN
PA-234M	1.217E+02	3.476E+02	6.892E+02	NOT IDENT.
TH-234	-9.235E+01	1.144E+02	1.932E+02	FAIL ABUN
NP-237	2.330E+00	6.342E+00	1.150E+01	FAIL ABUN
U-238	-9.235E+01	1.144E+02	1.932E+02	FAIL ABUN
NP-239	-2.597E+01	2.582E+01	4.108E+01	FAIL ABUN
AM-241	-3.153E+00	1.125E+01	1.952E+01	NOT IDENT.
AM-242	3.197E+01	6.018E+01	9.772E+01	FAIL ABUN
AM-243	-1.103E+00	4.664E+00	7.997E+00	NOT IDENT.
CM-243	7.905E+00	1.214E+01	1.740E+01	FAIL ABUN
CF-249	3.772E+00	3.831E+00	5.663E+00	NOT IDENT.
CF-251	6.136E+00	1.161E+01	2.165E+01	NOT IDENT.
CF-252	6.358E+03	1.656E+04	2.654E+04	NOT IDENT.
ANH-511	-5.173E+00	4.315E+00	8.190E+00	NOT IDENT.

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.02	78	145	1.25	91.66	86	10	1.09E-02	31.0	
2	0	52.92	38	96	0.86	105.45	103	7	5.29E-03	45.7	
3	0	62.88	19	179	0.60	125.38	123	8	2.63E-03	123.6	
4	0	87.14	39	66	1.46	173.90	172	5	5.36E-03	35.4	
5	0	91.92	96	204	1.19	183.48	178	11	1.33E-02	30.6	
6	0	103.06	24	108	1.19	205.74	204	8	3.29E-03	78.4	
7	0	140.39	19	205	1.00	280.43	274	12	2.58E-03	157.3	
8	0	143.87	23	101	0.86	287.38	285	7	3.25E-03	73.8	
9	0	185.50	75	113	1.35	370.67	366	10	1.04E-02	28.9	
10	0	198.89	36	100	1.04	397.44	394	8	4.94E-03	52.1	
11	0	212.36	31	117	3.35	424.39	416	13	4.28E-03	75.3	
12	0	238.73	78	98	1.08	477.13	471	12	1.08E-02	28.0	
13	0	294.88	31	64	1.03	589.47	585	9	4.28E-03	49.9	
14	2	338.15	36	56	1.75	676.03	670	16	5.03E-03	43.1	1.78E+00
15	2	341.38	27	22	1.44	682.48	670	16	3.77E-03	39.6	
16	0	351.95	67	45	1.03	703.63	698	10	9.35E-03	22.2	
17	0	383.55	24	66	3.48	766.84	756	16	3.30E-03	80.1	
18	0	392.45	32	27	1.51	784.64	780	11	4.48E-03	36.9	
19	0	403.53	50	107	14.71	806.81	790	33	6.89E-03	65.1	
20	0	456.00	7	35	1.43	911.77	904	10	1.01E-03	159.7	
21	0	486.10	14	9	0.95	971.98	969	6	1.99E-03	42.1	
22	4	510.96	96	33	2.38	1021.71	1013	24	1.33E-02	17.3	1.21E+00
23	4	516.06	18	18	2.17	1031.92	1013	24	2.54E-03	60.5	
24	0	572.29	13	19	1.52	1144.40	1139	11	1.85E-03	69.2	
25	0	583.96	27	33	1.52	1167.76	1162	12	3.80E-03	47.4	
26	0	609.53	49	29	1.67	1218.90	1212	13	6.75E-03	27.1	
27	0	743.80	12	5	1.15	1487.52	1483	8	1.61E-03	46.4	
28	0	803.62	10	13	1.88	1607.20	1604	8	1.38E-03	69.2	
29	0	911.09	35	6	2.20	1822.20	1817	11	4.79E-03	21.5	
30	0	921.86	16	0	2.50	1843.75	1838	11	2.22E-03	25.0	
31	0	926.67	9	4	1.10	1853.38	1850	7	1.28E-03	47.4	
32	0	961.33	17	3	1.49	1922.71	1917	10	2.41E-03	29.5	
33	0	1113.15	5	14	1.57	2226.44	2220	11	6.62E-04	158.2	
34	0	1121.32	18	6	2.57	2242.79	2238	10	2.49E-03	36.5	
35	0	1138.60	7	10	1.19	2277.36	2269	13	9.76E-04	99.3	
36	5	1208.01	8	0	1.72	2416.23	2414	11	1.11E-03	33.1	6.71E-01
37	5	1210.38	17	3	2.36	2420.98	2414	11	2.37E-03	26.9	
38	0	1230.66	9	7	1.31	2461.55	2456	9	1.18E-03	64.6	
39	0	1250.25	6	13	5.67	2500.76	2488	14	7.82E-04	146.4	
40	0	1379.24	14	3	2.39	2758.83	2753	11	1.99E-03	34.6	
41	0	1450.58	9	2	0.54	2901.57	2896	11	1.21E-03	49.6	
42	0	1460.98	27	0	0.79	2922.37	2915	15	3.75E-03	19.2	
43	0	1542.81	20	0	0.62	3086.10	3080	13	2.78E-03	22.4	

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
K-40	1460.82	14	10.66*	5.970E-01	4.261E+01	4.261E+01	81.43
CU-67	91.27	19	7.00	2.538E+00	1.958E+01	1.307E+02	328.65
	93.31	19	16.10	2.538E+00	8.515E+00	5.683E+01	328.65
	184.58	24	48.70*	2.513E+00	3.672E+00	2.451E+01	192.68
CD-109	88.03	39	3.70*	2.440E+00	8.021E+01	8.106E+01	70.74
SN-113	391.70	32	64.97*	1.587E+00	5.876E+00	6.131E+00	73.86
SN-126	64.28	-----	9.60	1.630E+00	-----	Line Not Found	-----
	86.94	39	8.90	2.440E+00	3.334E+01	3.334E+01	70.74
	87.57	39	37.00*	2.440E+00	8.021E+00	8.021E+00	70.74
TL-208	277.37	-----	6.60	2.004E+00	-----	Line Not Found	-----
	583.19	14	85.00*	1.197E+00	2.507E+00	2.525E+00	197.58
	860.56	-----	12.50	8.989E-01	-----	Line Not Found	-----
PB-210	46.54	42	4.25*	6.413E-01	2.877E+02	2.879E+02	120.06
BI-211	72.87	-----	1.23	2.007E+00	-----	Line Not Found	-----
	351.06	45	12.92*	1.711E+00	3.859E+01	3.862E+01	70.80
	609.32	27	45.49*	1.160E+00	9.775E+00	9.775E+00	100.90
BI-214	1120.29	18	14.92	7.339E-01	3.075E+01	3.075E+01	72.90
	1764.49	-----	15.30	5.161E-01	-----	Line Not Found	-----
	186.21	24	3.59*	2.513E+00	4.981E+01	4.981E+01	192.68
U-234	53.20	38	0.12*	1.022E+00	5.830E+03	5.830E+03	91.32
	120.90	-----	0.04	2.779E+00	-----	Line Not Found	-----
	89.96	-----	3.47	2.500E+00	-----	Line Not Found	-----
U-235	93.35	19	5.60	2.538E+00	2.448E+01	2.448E+01	328.65
	143.76	4	10.96*	2.740E+00	2.573E+00	2.573E+00	899.16
	163.33	-----	5.08	2.645E+00	-----	Line Not Found	-----
	185.72	24	57.20	2.513E+00	3.126E+00	3.126E+00	192.68
	205.31	-----	5.01	2.392E+00	-----	Line Not Found	-----
CM-247	278.00	-----	3.40	2.001E+00	-----	Line Not Found	-----
	287.50	-----	2.00	1.959E+00	-----	Line Not Found	-----
	402.40	50	72.00*	1.557E+00	8.307E+00	8.307E+00	130.11

Flag: "\*" = Keyline

Total number of lines in spectrum 41  
 Number of unidentified lines 14  
 Number of lines tentatively identified by NID 27 65.85%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected	Decay Corr	Decay Corr	2-Sigma	Flags
			pCi/LITER	pCi/LITER	2-Sigma Error	%Error	
K-40	1.25E+09Y	1.00	4.261E+01	4.261E+01	3.470E+01	81.43	
CU-67	61.83H	6.67	3.672E+00	2.451E+01	4.722E+01	192.68	
CD-109	461.40D	1.01	8.021E+01	8.106E+01	5.734E+01	70.74	
SN-113	115.09D	1.04	5.876E+00	6.131E+00	4.528E+00	73.86	
SN-126	2.30E+05Y	1.00	8.021E+00	8.021E+00	5.674E+00	70.74	
TL-208	1.91Y	1.01	2.507E+00	2.525E+00	4.989E+00	197.58	
PB-210	22.20Y	1.00	2.877E+02	2.879E+02	3.457E+02	120.06	
BI-211	21.77Y	1.00	3.859E+01	3.862E+01	2.734E+01	70.80	
BI-214	1600.00Y	1.00	9.775E+00	9.775E+00	9.863E+00	100.90	
RA-226	1600.00Y	1.00	4.981E+01	4.981E+01	9.597E+01	192.68	
U-234	2.45E+05Y	1.00	5.830E+03	5.830E+03	5.325E+03	91.32	
U-235	7.04E+08Y	1.00	2.573E+00	2.573E+00	23.13E+00	899.16	
CM-247	1.56E+07Y	1.00	8.307E+00	8.307E+00	10.81E+00	130.11	
Total Activity :			6.370E+03	6.392E+03			

Grand Total Activity : 6.370E+03 6.392E+03

Flags: "K" = Keyline not found "M" = Manually accepted  
 "E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	103.06	24	108	1.19	205.74	204	8	3.29E-03	****	2.69E+00	T
0	140.39	19	205	1.00	280.43	274	12	2.58E-03	****	2.75E+00	T
0	198.89	16	100	1.04	397.44	394	8	2.23E-03	****	2.43E+00	T
0	212.36	31	117	3.35	424.39	416	13	4.28E-03	****	2.35E+00	
0	238.73	31	98	1.08	477.13	471	12	4.34E-03	****	2.20E+00	T
0	294.88	16	64	1.03	589.47	585	9	2.19E-03	****	1.93E+00	T
2	338.15	36	56	1.75	676.03	670	16	5.03E-03	86.2	1.76E+00	T
2	341.38	27	22	1.44	682.48	670	16	3.77E-03	79.1	1.75E+00	T
0	383.55	24	66	3.48	766.84	756	16	3.30E-03	****	1.61E+00	T
0	456.00	7	35	1.43	911.77	904	10	1.01E-03	****	1.43E+00	
0	486.10	14	9	0.95	971.98	969	6	1.99E-03	84.2	1.37E+00	T
4	516.06	18	18	2.17	1031.92	1013	24	2.54E-03	****	1.31E+00	
0	572.29	13	19	1.52	1144.40	1139	11	1.85E-03	****	1.21E+00	
0	743.80	12	5	1.15	1487.52	1483	8	1.61E-03	92.7	1.00E+00	T
0	803.62	10	13	1.88	1607.20	1604	8	1.38E-03	****	9.46E-01	
0	911.09	23	6	2.20	1822.20	1817	11	3.24E-03	68.8	8.61E-01	T
0	921.86	16	0	2.50	1843.75	1838	11	2.22E-03	50.0	8.53E-01	
0	926.67	9	4	1.10	1853.38	1850	7	1.28E-03	94.8	8.50E-01	T
0	961.33	17	3	1.49	1922.71	1917	10	2.41E-03	59.0	8.26E-01	
0	1113.15	5	14	1.57	2226.44	2220	11	6.62E-04	****	7.38E-01	T
0	1138.60	7	10	1.19	2277.36	2269	13	9.76E-04	****	7.25E-01	
5	1208.01	8	0	1.72	2416.23	2414	11	1.11E-03	66.3	6.93E-01	
5	1210.38	17	3	2.36	2420.98	2414	11	2.37E-03	53.7	6.91E-01	
0	1230.66	9	7	1.31	2461.55	2456	9	1.18E-03	****	6.83E-01	T
0	1250.25	6	13	5.67	2500.76	2488	14	7.82E-04	****	6.74E-01	
0	1379.24	14	3	2.39	2758.83	2753	11	1.99E-03	69.2	6.24E-01	
0	1450.58	9	2	0.54	2901.57	2896	11	1.21E-03	99.3	6.00E-01	
0	1542.81	20	0	0.62	3086.10	3080	13	2.78E-03	44.7	5.72E-01	

Flags: "T" = Tentatively associated



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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203009339.CNF;1
* Acquisition date   : 26-DEC-2013 10:34:41 Sensitivity      : 3.000
* Detector ID        : GAM07 Energy tolerance: 1.500
* Elapsed live time  : 0 02:00:00.00 Abundance limit : 75.000
* Elapsed real time  : 0 02:00:00.68 Half life ratio : *****
* Sample date        : 19-DEC-2013 10:15:00 Nuclide Library : LIQUID
* Sample ID          : G1203009339 Analyst initials: MJH1
* Batch Number       : 1355780 Sample Quantity : 2.0000E+00 LITER
*                               Quantity Err(%) : 5.0000E-03 %
* Wet wt corr        : 1.00000 Wet Weight : 0.00000
*                               Dry Weight  : 0.00000
*****
*                               CALIBRATION INFORMATION                          *
*
* Eff. Cal. date     : 26-JUL-2013 11:27:41 Eff. Geometry   : 2LMB
* Eff. File          : DKA100:[CANBERRA.GAMMA]EFF_GAM07_2LMB.CNF;12
*****

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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.  
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER )	Act Error (1.96-sigma)	Lc (pCi/LITER )	TPU (1.96-sigma)
K-40	4.261E+01	3.422E+01	1.515E+01	3.422E+01
CU-67	2.451E+01	4.632E+01	2.217E+01	4.632E+01
CD-109	8.106E+01	5.686E+01	5.003E+01	5.686E+01
SN-113	6.131E+00	4.464E+00	2.816E+00	4.464E+00
SN-126	8.021E+00	5.610E+00	4.968E+00	5.610E+00
TL-208	2.525E+00	4.893E+00	2.633E+00	4.893E+00
PB-210	2.879E+02	3.398E+02	1.517E+02	3.398E+02
BI-211	3.862E+01	2.701E+01	1.384E+01	2.701E+01
BI-214	9.775E+00	9.699E+00	4.667E+00	9.699E+00
RA-226	4.981E+01	9.414E+01	4.866E+01	9.414E+01
U-234	5.830E+03	5.243E+03	3.556E+03	5.243E+03
U-235	2.573E+00	2.267E+01	1.579E+01	2.267E+01
CM-247	8.307E+00	1.070E+01	2.836E+00	1.070E+01

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/LITER )	K.L Act error (1.96-sigma)	Lc (pCi/LITER )	TPU (1.96-sigma)	
BE-7	6.267E+00	2.273E+01	1.989E+01	2.291E+01	NOT IDENT.
NA-22	-3.905E-01	2.143E+00	1.749E+00	2.150E+00	NOT IDENT.
NA-24	-3.055E+03	7.695E+03	0.000E+00	7.817E+03	SHORT HLIF
AL-26	1.779E+00	2.671E+00	2.592E+00	2.789E+00	NOT IDENT.
SC-46	5.953E-01	2.694E+00	2.359E+00	2.707E+00	FAIL ABUN
V-48	1.929E-01	3.503E+00	2.971E+00	3.504E+00	NOT IDENT.
CR-51	-8.764E+00	2.656E+01	2.118E+01	2.685E+01	NOT IDENT.
MN-52	-1.596E+00	7.222E+00	5.843E+00	7.258E+00	FAIL ABUN
MN-54	-3.681E-01	2.135E+00	1.761E+00	2.141E+00	NOT IDENT.
CO-56	-7.783E-01	3.043E+00	2.476E+00	3.063E+00	NOT IDENT.
CO-57	-2.845E-01	2.558E+00	2.057E+00	2.561E+00	NOT IDENT.
CO-58	-2.562E+00	2.990E+00	2.079E+00	3.206E+00	NOT IDENT.
FE-59	3.510E+00	5.559E+00	5.104E+00	5.779E+00	NOT IDENT.
CO-60	1.849E+00	2.752E+00	2.626E+00	2.876E+00	NOT IDENT.
ZN-65	-3.067E+00	1.328E+01	5.199E+00	1.336E+01	NOT IDENT.
GE-68	5.026E+01	7.400E+01	6.973E+01	7.739E+01	NOT IDENT.

AS-74	2.936E+00	6.005E+00	5.285E+00	6.150E+00	NOT IDENT.
SE-75	7.089E-02	3.928E+00	3.283E+00	3.928E+00	NOT IDENT.
BR-77	9.045E+01	1.267E+02	7.899E+01	1.331E+02	FAIL ABUN
SR-82	-1.459E+01	2.140E+01	1.660E+01	2.239E+01	NOT IDENT.
RB-83	-2.615E+00	6.064E+00	4.074E+00	6.178E+00	NOT IDENT.
RB-84	-2.526E+00	4.343E+00	3.334E+00	4.490E+00	NOT IDENT.
KR-85	1.413E+03	6.827E+02	6.696E+02	9.338E+02	NOT IDENT.
SR-85	6.817E+00	3.293E+00	3.230E+00	4.505E+00	NOT IDENT.
RB-86	7.459E+00	3.794E+01	3.282E+01	3.809E+01	NOT IDENT.
Y-88	-1.393E+00	3.109E+00	2.253E+00	3.172E+00	NOT IDENT.
Y-91	-5.760E+02	1.426E+03	8.858E+02	1.449E+03	NOT IDENT.
NB-94	1.721E+00	2.849E+00	2.524E+00	2.953E+00	NOT IDENT.
NB-95	-5.678E-01	3.019E+00	2.527E+00	3.029E+00	NOT IDENT.
NB-95M	-2.879E+00	1.059E+01	7.576E+00	1.066E+01	NOT IDENT.
ZR-95	2.105E+00	4.257E+00	3.793E+00	4.361E+00	NOT IDENT.
MO-99	-1.569E+02	1.499E+02	7.838E+01	1.658E+02	FAIL ABUN
TC-99M	4.163E+08	1.284E+09	0.000E+00	1.298E+09	SHORT HLIF
RH-101	8.537E-01	3.046E+00	2.509E+00	3.070E+00	FAIL ABUN
RH-102M	-8.560E-01	2.355E+00	1.914E+00	2.386E+00	FAIL ABUN
RU-103	1.296E+00	2.820E+00	2.507E+00	2.880E+00	FAIL ABUN
RH-106	-9.603E+00	2.620E+01	2.076E+01	2.656E+01	NOT IDENT.
RU-106	-9.603E+00	2.620E+01	2.076E+01	2.656E+01	NOT IDENT.
AG-108M	2.565E+00	2.720E+00	2.511E+00	2.955E+00	NOT IDENT.
AG-110M	1.312E+00	2.783E+00	2.446E+00	2.845E+00	NOT IDENT.
IN-114M	9.459E+00	1.609E+01	1.270E+01	1.665E+01	NOT IDENT.
CD-115	1.631E+01	7.806E+01	6.732E+01	7.840E+01	NOT IDENT.
SN-117M	-1.182E+00	3.401E+00	2.861E+00	3.443E+00	NOT IDENT.
I-123	-5.815E+03	1.763E+04	0.000E+00	1.782E+04	SHORT HLIF
TE-123M	-8.588E-01	2.539E+00	2.137E+00	2.569E+00	NOT IDENT.
SB-124	-7.111E-03	6.809E+00	5.675E+00	6.809E+00	NOT IDENT.
SB-125	-1.455E+00	8.387E+00	7.056E+00	8.413E+00	NOT IDENT.
TE-125M	-5.507E+02	8.755E+02	6.813E+02	9.100E+02	NOT IDENT.
I-126	8.867E+00	1.298E+01	1.157E+01	1.358E+01	NOT IDENT.
SB-126	3.913E+00	7.795E+00	6.821E+00	7.992E+00	NOT IDENT.
SB-127	5.591E+00	2.504E+01	2.131E+01	2.517E+01	NOT IDENT.
I-131	-4.515E+00	5.463E+00	4.071E+00	5.830E+00	NOT IDENT.
I-132	1.744E+22	4.303E+22	0.000E+00	0.000E+00	SHORT HLIF
TE-132	1.853E+00	1.000E+01	8.553E+00	1.004E+01	NOT IDENT.
BA-133	-2.141E+00	4.423E+00	2.948E+00	4.527E+00	FAIL ABUN
I-133	1.277E+02	7.844E+02	6.728E+02	7.865E+02	NOT IDENT.
CS-134	1.572E-01	3.006E+00	2.586E+00	3.006E+00	NOT IDENT.
CS-135	-1.711E+01	1.541E+01	1.067E+01	1.723E+01	NOT IDENT.
I-135	1.264E+08	4.811E+08	0.000E+00	4.844E+08	SHORT HLIF
CS-136	9.128E-01	5.240E+00	4.502E+00	5.257E+00	FAIL ABUN
BA-137M	-1.139E+00	3.272E+00	2.595E+00	3.312E+00	NOT IDENT.
CS-137	-1.204E+00	3.456E+00	2.741E+00	3.499E+00	NOT IDENT.
CE-139	-8.051E-01	2.667E+00	2.240E+00	2.691E+00	NOT IDENT.
BA-140	9.964E-01	4.318E+00	3.806E+00	4.341E+00	FAIL ABUN
LA-140	9.964E-01	4.318E+00	3.806E+00	4.341E+00	FAIL ABUN
CE-141	-7.382E-01	5.638E+00	4.252E+00	5.648E+00	NOT IDENT.
CE-143	3.708E+02	1.988E+02	1.735E+02	2.598E+02	NOT IDENT.
CE-144	1.313E+00	1.884E+01	1.527E+01	1.885E+01	NOT IDENT.
PM-144	-2.692E+00	2.676E+00	1.863E+00	2.938E+00	NOT IDENT.
PR-144	-2.001E+02	1.995E+02	1.390E+02	2.189E+02	NOT IDENT.
PM-146	2.519E+00	3.832E+00	3.113E+00	3.996E+00	NOT IDENT.
ND-147	1.325E+01	2.747E+01	2.442E+01	2.811E+01	FAIL ABUN
PM-147	2.713E+04	7.442E+04	6.183E+04	7.542E+04	NOT IDENT.
PM-149	-1.874E+02	6.276E+02	5.066E+02	6.332E+02	NOT IDENT.
EU-152	5.287E-01	9.454E+00	6.822E+00	9.457E+00	FAIL ABUN
GD-153	-8.002E+00	7.946E+00	5.651E+00	8.727E+00	FAIL ABUN
EU-154	-1.111E+00	6.096E+00	4.977E+00	6.117E+00	NOT IDENT.
EU-155	-3.076E+00	1.147E+01	8.120E+00	1.155E+01	FAIL ABUN
HO-166M	2.548E-01	4.845E+00	4.020E+00	4.846E+00	FAIL ABUN
TM-171	1.499E+03	1.349E+03	1.022E+03	1.508E+03	FAIL ABUN
LU-176	-8.732E-01	2.444E+00	1.954E+00	2.475E+00	FAIL ABUN
HF-181	2.097E+00	3.111E+00	2.561E+00	3.251E+00	NOT IDENT.
W-181	-9.507E+00	1.507E+01	1.132E+01	1.567E+01	NOT IDENT.
TA-182	3.060E+00	1.166E+01	1.008E+01	1.174E+01	FAIL ABUN
RE-183	1.841E+00	1.288E+01	1.090E+01	1.290E+01	NOT IDENT.
RE-184	6.892E+00	8.200E+00	7.516E+00	8.769E+00	NOT IDENT.
RE-188	6.806E+00	1.369E+01	1.212E+01	1.403E+01	NOT IDENT.
W-188	-4.607E+01	6.003E+02	4.311E+02	6.006E+02	NOT IDENT.
OS-191	5.574E+00	1.077E+01	9.016E+00	1.106E+01	NOT IDENT.
IR-192	-1.064E+00	2.964E+00	2.363E+00	3.002E+00	FAIL ABUN
HG-203	-7.001E-01	3.080E+00	2.513E+00	3.096E+00	NOT IDENT.
BI-207	-1.421E-02	4.444E+00	3.709E+00	4.444E+00	NOT IDENT.
PB-211	1.583E+02	2.023E+02	4.282E+01	2.146E+02	FAIL ABUN
BI-212	-1.872E+01	4.019E+01	3.071E+01	4.106E+01	NOT IDENT.

PB-212	6.165E+00	8.636E+00	5.368E+00	9.072E+00	FAIL ABUN
BI-213	-7.252E+00	8.251E+00	6.319E+00	8.875E+00	NOT IDENT.
PB-214	1.401E+01	9.793E+00	7.261E+00	1.165E+01	FAIL ABUN
RN-219	-6.643E+00	4.079E+01	2.984E+01	4.090E+01	NOT IDENT.
FR-221	-5.646E+00	1.898E+01	1.511E+01	1.915E+01	NOT IDENT.
RA-223	6.674E+00	5.955E+01	4.955E+01	5.962E+01	FAIL ABUN
RA-224	-2.533E+01	6.361E+01	4.479E+01	6.462E+01	NOT IDENT.
AC-227	-3.133E+00	2.371E+01	1.962E+01	2.375E+01	NOT IDENT.
TH-227	-3.133E+00	2.371E+01	1.962E+01	2.375E+01	NOT IDENT.
AC-228	1.978E+01	1.348E+01	1.258E+01	1.616E+01	FAIL ABUN
RA-228	1.978E+01	1.348E+01	1.258E+01	1.616E+01	FAIL ABUN
TH-228	6.165E+00	8.636E+00	5.368E+00	9.072E+00	FAIL ABUN
TH-229	-5.200E+01	5.046E+01	3.816E+01	5.564E+01	FAIL ABUN
TH-230	-5.477E+02	9.103E+02	7.058E+02	9.432E+02	NOT IDENT.
PA-231	1.251E+02	1.277E+02	1.144E+02	1.396E+02	NOT IDENT.
TH-231	-9.605E+00	4.027E+01	2.856E+01	4.050E+01	NOT IDENT.
TH-232	-4.607E+02	1.610E+03	1.336E+03	1.623E+03	FAIL ABUN
PA-233	2.330E+00	6.346E+00	5.399E+00	6.433E+00	FAIL ABUN
PA-234	8.485E+00	2.285E+01	1.860E+01	2.317E+01	FAIL ABUN
PA-234M	1.217E+02	3.478E+02	3.070E+02	3.521E+02	NOT IDENT.
TH-234	-9.235E+01	1.163E+02	9.229E+01	1.235E+02	FAIL ABUN
NP-237	2.330E+00	6.346E+00	5.399E+00	6.433E+00	FAIL ABUN
U-238	-9.235E+01	1.163E+02	9.229E+01	1.235E+02	FAIL ABUN
NP-239	-2.597E+01	2.592E+01	1.939E+01	2.844E+01	FAIL ABUN
AM-241	-3.153E+00	1.125E+01	9.255E+00	1.134E+01	NOT IDENT.
AM-242	3.197E+01	6.047E+01	4.622E+01	6.216E+01	FAIL ABUN
AM-243	-1.103E+00	4.665E+00	3.818E+00	4.692E+00	NOT IDENT.
CM-243	7.905E+00	1.218E+01	8.253E+00	1.269E+01	FAIL ABUN
CF-249	3.772E+00	3.852E+00	2.592E+00	4.210E+00	NOT IDENT.
CF-251	6.136E+00	1.164E+01	1.026E+01	1.196E+01	NOT IDENT.
CF-252	6.358E+03	1.753E+04	1.254E+04	1.777E+04	NOT IDENT.
ANH-511	-5.173E+00	4.336E+00	3.904E+00	4.924E+00	NOT IDENT.

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 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \* GAMMA SPECTROSCOPY BACKGROUND REPORT \*  
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ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	92.1421	88.34	103.3340	152.32	132.1757
46.54	97.3995	88.47	103.3613	152.43	132.1959
49.72	96.8902	89.96	103.6768	153.25	137.7504
51.35	81.1354	91.11	133.1449	323.87	116.2980
52.39	97.6601	91.27	133.1881	155.04	103.7959
53.20	102.8336	92.59	133.5403	156.02	107.5523
56.28	91.2664	93.31	127.2076	158.56	121.5336
57.36	130.5561	93.35	127.2177	158.97	0.0000
57.53	123.7106	94.56	96.4588	159.00	120.6987
57.53	123.7113	94.65	96.4759	162.33	104.8347
57.98	104.2214	94.67	96.4795	163.33	116.8428
59.32	104.5999	97.43	124.9467	165.86	117.2363
59.54	119.7572	98.43	107.6167	176.31	110.4776
61.49	128.4705	98.44	107.6187	176.60	107.7314
63.00	135.0698	99.53	85.8334	177.52	93.9100
63.29	135.1706	100.11	85.9278	181.07	95.6352
63.58	127.1348	100.20	85.9425	184.41	87.0269
63.81	127.2098	103.18	88.0837	184.58	87.0453
64.28	123.2870	103.37	88.1148	143.76	93.9293
64.99	152.0900	105.31	121.7985	186.21	100.7527
65.08	152.1246	106.12	128.6615	190.27	86.1360
66.73	121.9991	109.28	132.1942	193.51	120.2768
66.98	126.1781	111.00	132.5970	198.01	122.0029
67.24	126.2588	111.76	129.3978	201.83	93.4383
67.67	134.6140	116.24	144.0093	205.31	93.8098
67.75	134.6400	116.30	144.0242	210.85	69.6357
69.67	128.0440	116.74	125.9737	218.12	91.3627
70.83	117.0100	117.23	112.4480	222.11	80.2865
72.81	139.4068	99.53	107.3627	227.09	83.6647
72.87	139.4266	120.90	113.1409	227.38	83.6907
74.66	156.7253	121.12	113.1822	228.16	67.0070
74.82	156.7825	121.22	113.2008	228.18	67.0086
74.97	145.3353	121.78	124.7506	116.74	67.0086
77.11	132.3863	122.06	124.8080	235.69	85.8054
79.69	144.7744	123.07	111.2519	235.96	74.7031
80.12	129.0454	127.23	108.5376	238.63	71.7188
80.19	129.0653	129.43	106.6008	238.98	71.7446
80.57	121.7617	131.20	120.8414	240.99	79.8779
81.00	113.3974	133.02	108.3657	242.00	75.1616
81.07	103.8753	133.52	109.6160	244.70	96.2102
83.79	110.3504	136.00	110.9703	252.40	90.8830
84.21	104.0460	57.53	106.8017	252.80	82.8371
85.43	97.8954	136.47	106.8323	256.23	84.1256
86.55	112.6028	140.51	114.5559	260.90	74.3211
86.94	111.0848	140.88	114.6182	264.66	76.6285
87.09	109.5091	143.76	117.9488	268.22	78.9339
87.57	106.3940	144.24	119.4539	269.46	66.7089
88.03	106.4952	145.44	126.7859	271.23	71.9589

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
273.65	81.3904	414.70	40.7270	667.71	0.0000
276.40	66.1025	427.09	43.5777	677.62	22.2843
277.37	65.1274	427.87	54.7320	685.70	25.5604
277.60	67.2088	433.94	40.9777	695.00	23.5275
278.00	71.3700	440.45	44.8893	696.49	34.2445
279.20	76.6253	453.88	31.4376	696.51	34.2445
279.54	76.6490	463.37	36.9976	697.00	35.3227
280.46	77.7489	468.07	38.0552	697.49	36.4006
283.69	55.1019	473.00	41.9853	702.65	26.8262
284.31	56.1720	475.06	39.1712	706.68	32.2485
285.41	64.5572	476.78	34.4298	711.68	25.8551
285.90	66.6689	477.60	31.5760	720.70	25.9559
287.50	62.5900	477.99	36.3686	721.93	30.2982
290.67	53.5594	482.18	22.3874	722.78	34.6391
293.27	41.9385	487.02	35.6017	722.91	34.6406
351.93	78.9774	492.35	31.8519	723.31	30.3160
295.96	60.5320	497.08	30.9719	724.19	25.9951
299.98	59.0540	511.00	32.1951	727.33	29.2834
300.09	64.6847	514.00	32.2497	733.00	17.3949
300.13	64.6866	520.40	34.3275	735.93	15.2397
301.36	76.0155	520.69	34.3326	739.50	30.8886
302.85	56.0270	522.65	0.0000	744.23	13.1083
256.23	55.0469	527.90	33.4854	747.24	12.7601
306.78	70.0011	529.59	32.5311	752.31	14.2486
308.46	64.7892	529.87	34.5078	753.82	15.3542
311.90	69.2361	531.02	28.6099	756.73	13.1766
316.51	67.3614	546.56	0.0000	763.94	17.4375
319.41	66.4492	552.55	22.9568	765.80	30.3091
320.08	61.1244	563.25	31.1166	766.42	31.2358
321.04	54.7330	569.33	50.3479	766.84	28.4841
323.87	64.5392	946.00	43.6380	772.60	0.0000
325.23	63.5329	569.70	43.6433	776.52	30.4420
328.76	71.2721	583.19	37.1859	779.50	20.3059
333.37	76.3018	595.83	32.6609	778.90	24.9307
334.37	69.4199	427.87	35.8083	783.70	31.4551
338.28	58.7527	602.73	34.1390	785.37	20.3672
338.32	58.7543	604.72	30.7559	792.07	23.2066
311.90	58.8532	609.32	31.8530	795.86	22.3115
340.55	58.8565	610.33	35.9810	810.29	24.9322
344.28	50.7188	614.28	29.1842	344.28	24.9338
345.93	39.4008	618.01	33.0211	810.76	29.1757
351.06	49.2242	621.93	34.1175	815.77	17.8021
351.93	47.4972	630.19	0.0000	1048.07	20.6348
356.01	52.9373	631.29	31.1565	832.01	17.9138
364.49	65.4801	155.04	36.3783	834.85	15.1019
366.42	40.0106	633.25	37.4221	836.80	0.0000
356.01	42.0171	634.78	19.7649	846.77	22.7554
388.16	18.0620	635.95	21.8577	856.80	22.8413
388.63	18.0681	636.99	26.0339	860.56	20.0139
391.70	40.7406	645.85	20.9146	871.09	20.0921
264.66	53.1394	657.76	25.2375	873.19	18.1929
401.81	53.1815	661.66	40.0308	875.33	12.4575
402.40	53.2028	664.57	35.8652	880.51	15.3613
404.85	53.2918	666.33	30.6157	881.60	23.0513
410.95	35.1649	666.50	29.5620	883.24	16.3377

<u>ENERGY</u>	<u>MDA COUNTS</u>	<u>ENERGY</u>	<u>MDA COUNTS</u>	<u>ENERGY</u>	<u>MDA COUNTS</u>
657.76	12.5001	1434.09	13.5674		
889.28	17.3368	1457.56	0.0000		
894.76	14.4760	1460.82	4.8769		
898.04	26.0876	1489.16	12.7656		
903.28	13.9395	1596.21	8.0502		
911.20	18.4443	1620.50	6.0701		
926.36	10.0384	1678.03	0.0000		
935.54	18.6026	1690.97	9.2442		
937.49	19.5951	1764.49	7.3003		
944.13	22.5859	1063.66	18.7942		
946.00	13.7570	1771.35	13.5767		
949.00	17.7056	1791.20	0.0000		
667.71	0.0000	1808.65	4.2088		
964.08	33.8993	1836.06	9.5214		
968.97	19.4470				
983.53	15.9232				
996.26	24.9852				
1001.03	18.0179				
1274.44	24.0527				
1037.84	15.1947				
1038.76	0.0000				
475.06	14.2210				
1048.07	17.2767				
1050.41	19.3239				
1063.66	23.4895				
1077.00	12.3062				
1077.34	8.2051				
1085.87	12.3398				
1099.25	12.3906				
1112.07	20.7308				
1112.84	24.8828				
1115.54	24.9033				
1120.29	11.2223				
1120.55	11.2232				
1221.41	17.6703				
1129.67	3.5727				
1131.51	0.0000				
1173.23	11.6092				
1189.05	11.6615				
1204.77	16.4299				
1221.41	13.9082				
1231.02	11.7998				
1235.36	9.2058				
1238.28	21.4974				
1260.41	0.0000				
1274.44	8.3738				
1274.54	8.3738				
1291.59	11.2161				
1298.22	7.4905				
1312.11	8.4579				
1332.49	8.5028				
1365.19	11.4325				
1368.63	0.0000				
1384.29	13.4019				
1408.01	8.6666				

VAX/VMS Nuclide Identification Report Generated 24-DEC-2013 14:30:07.29

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                                 *
*                               Charleston, SC 29407                            *
*****
Configuration   : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203009340.CNF;1
Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM11.CNF;368
Background date : 21-DEC-2013 11:48:26
Sample date     : 23-DEC-2013 00:00:00 Acquisition date : 24-DEC-2013 14:14:29
Sample ID      : G1203009340 Sample quantity   : 2.00000E+00 LITER
Detector name  : GAM11 Detector geometry: 2LMB
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:07.46 0.8%
Energy tolerance : 1.50000 keV Analyst Initials : MJH1
Abundance limit : 75.00000 Sensitivity : 3.00000
Batch ID       : 1355780 Detector SN# :
Matrix Spike ID : LCS ID : 1604
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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.35*	4796	5145	0.82	92.71	88	9	5.33E+00	3.1	
2	0	51.85	156	2655	1.02	103.73	102	5	1.74E-01	50.1	
3	0	59.38	9685	4586	0.83	118.80	114	10	1.08E+01	1.7	
4	0	87.90	11492	3587	0.86	175.87	171	10	1.28E+01	1.4	
5	0	117.45	114	1373	1.46	235.00	232	6	1.27E-01	52.0	
6	0	121.91	3902	1879	0.89	243.91	239	9	4.34E+00	2.6	
7	0	136.16	505	1937	0.95	272.43	268	10	5.61E-01	16.9	
8	0	165.75	1084	1468	1.03	331.65	327	9	1.20E+00	7.1	
9	0	244.30	54	756	1.23	488.83	487	6	6.05E-02	81.2	
10	0	391.59	467	924	1.20	783.54	779	11	5.18E-01	13.5	
11	0	510.51*	242	828	1.34	1021.48	1015	14	2.69E-01	26.1	
12	0	609.69*	61	316	1.70	1219.92	1217	8	6.73E-02	52.4	
13	0	661.59*	9369	746	1.37	1323.74	1316	15	1.04E+01	1.2	
14	0	674.27	64	274	1.60	1349.11	1347	8	7.10E-02	46.5	
15	0	684.96	21	428	1.42	1370.50	1364	11	2.39E-02	187.8	
16	0	875.93	42	235	0.65	1752.52	1750	6	4.69E-02	59.6	
17	0	897.98	421	635	1.40	1796.64	1791	11	4.68E-01	12.6	
18	0	904.05	52	380	0.99	1808.77	1805	8	5.77E-02	66.8	
19	0	1070.01	73	285	1.97	2140.74	2137	9	8.13E-02	43.3	
20	0	1115.48	2091	620	1.62	2231.69	2223	17	2.32E+00	3.5	
21	0	1173.21	9541	343	1.68	2347.16	2338	18	1.06E+01	1.1	
22	0	1188.34	27	70	0.90	2377.42	2375	6	2.97E-02	53.0	
23	0	1305.66	26	76	0.79	2612.06	2601	17	2.89E-02	79.4	
24	0	1332.50	8592	121	1.81	2665.74	2657	19	9.55E+00	1.1	
25	0	1576.53	24	11	3.03	3153.76	3147	14	2.70E-02	34.9	
26	0	1673.88	24	20	5.89	3348.42	3338	20	2.67E-02	50.0	
27	0	1762.07	4	4	1.24	3524.75	3519	8	4.44E-03	100.0	
28	0	1835.95	302	8	2.10	3672.47	3664	15	3.35E-01	6.1	
29	0	1893.53	10	0	1.29	3787.60	3784	8	1.11E-02	31.6	
30	0	1952.16	8	3	0.69	3904.83	3901	9	9.39E-03	47.4	
31	0	1957.07	7	4	0.95	3914.64	3911	8	7.78E-03	62.3	
32	0	1960.20	10	0	0.98	3920.90	3918	8	1.11E-02	31.6	
33	0	2015.88	14	4	3.56	4032.22	4027	13	1.58E-02	37.6	

Flag: "\*" = Peak area was modified by background subtraction

```

Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203009340.CNF;1
Analyses by       : PEAK V16.9,PEAKEFF V2.2,ENBACK V1.6,NID V3.4,INTERF V2.4
Sample title      : MJH1
Sample date       : 23-DEC-2013 00:00:00 Acquisition date : 24-DEC-2013 14:14:29
Sample ID        : G1203009340 Sample quantity   : 2.0000 LITER
Sample type      : LIQUID Sample geometry    :
Detector name    : GAMMA11 Detector geometry: 2LMB
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:07.46 0.8%
Energy tolerance : 1.50 keV Half life ratio   : 10.00
Errors propagated: No Systematic Error    : 0.00 %
Efficiency type  : Empirical Efficiencies at  : Peak Energy
Abundance limit  : 75.00
    
```

Interference Report

Interfering		Interfered	
Nuclide	Line	Nuclide	Line
CO-57	122.06	U-234	120.90
CO-57	122.06	PM-147	121.22



Nuclide Type:

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error	Status
CO-57	122.06	85.60*	2.772E+00	2.470E+03	2.480E+03	5.13	OK
	136.47	10.68	2.773E+00	2.559E+03	2.569E+03	33.82	OK
CO-60	1173.23	99.85	7.483E-01	1.918E+04	1.919E+04	2.24	OK
	1332.49	99.98*	6.788E-01	1.901E+04	1.902E+04	2.24	OK
ZN-65	1115.54	50.60*	7.779E-01	7.976E+03	8.013E+03	6.99	OK
Y-88	898.04	93.70	9.177E-01	7.354E+02	7.431E+02	25.14	OK
	1836.06	99.20*	5.427E-01	8.409E+02	8.497E+02	12.18	OK
CD-109	88.03	3.70*	2.319E+00	2.011E+05	2.016E+05	2.71	OK
SN-113	391.70	64.97*	1.629E+00	6.621E+02	6.685E+02	26.90	OK
SN-126	64.28	9.60	1.318E+00	-----	Line Not Found	-----	Absent
	86.94	8.90	2.319E+00	8.359E+04	8.359E+04	2.71	OK
	87.57	37.00*	2.319E+00	2.011E+04	2.011E+04	2.71	OK
BA-137M	661.66	89.90*	1.146E+00	1.366E+04	1.366E+04	2.43	OK
CS-137	661.66	85.10*	1.146E+00	1.443E+04	1.443E+04	2.43	OK
CE-139	165.86	80.00*	2.648E+00	7.682E+02	7.744E+02	14.13	OK
TM-171	51.35	0.27	6.307E-01	1.378E+05	1.380E+05	100.24	OK
	52.39	0.47*	6.307E-01	7.918E+04	7.930E+04	100.24	OK
	66.73	0.14	1.449E+00	-----	Line Not Found	-----	Absent
PB-210	46.54	4.25*	3.690E-01	4.592E+05	4.593E+05	6.13	OK
U-234	53.20	0.12*	6.307E-01	3.101E+05	3.101E+05	100.24	OK
	120.90	0.04	2.769E+00	-----	Line Not Found	-----	<<INT Reject
AM-241	59.54	35.90*	1.045E+00	3.878E+04	3.878E+04	3.34	OK
ANH-511	511.00	100.00*	1.368E+00	2.653E+02	2.653E+02	52.28	OK

Flag: "\*" = Keyline

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*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                          *
*****
*                               DETECTOR AND SAMPLE DATA                       *
*                               *                                               *
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203009340.CNF;1  *
* Acquisition date   : 24-DEC-2013 14:14:29 Sensitivity      : 3.000          *
* Detector ID       : GAM11 Energy tolerance: 1.500         *
* Elapsed live time: 0 00:15:00.00 Abundance limit : 75.000    *
* Elapsed real time: 0 00:15:07.46 Half life ratio : ***** *
* Sample date       : 23-DEC-2013 00:00:00 Nuclide Library : LIQUID      *
* Sample ID        : G1203009340 Analyst initials: MJH1       *
* Batch Number     : 1355780 Sample Quantity : 2.0000E+00 LITER *
* Wet wt corr      : 1.00000 Wet Weight      : 0.00000        *
*                               Dry Weight     : 0.00000        *
*****
*                               CALIBRATION INFORMATION                         *
*                               *                                               *
* Eff. Cal. date    : 12-JUL-2013 08:13:46 Eff. Geometry   : 2LMB        *
* Eff. File        : DKA100:[CANBERRA.GAMMA]EFF_GAM11_2LMB.CNF;10 *
*****

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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.  
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER )	Cnt uncert (1.96-sigma)	MDA (pCi/LITER )
CO-57	2.480E+03	1.246E+02	1.084E+02
CO-60	1.902E+04	4.184E+02	9.380E+01
ZN-65	8.013E+03	5.493E+02	3.692E+02
Y-88	8.497E+02	1.014E+02	5.805E+01
CD-109	2.016E+05	5.355E+03	3.810E+03
SN-113	6.685E+02	1.762E+02	1.736E+02
SN-126	2.011E+04	5.342E+02	3.821E+02
BA-137M	1.366E+04	3.248E+02	1.452E+02
CS-137	1.443E+04	3.431E+02	1.533E+02
CE-139	7.744E+02	1.072E+02	1.140E+02
TM-171	7.930E+04	7.791E+04	1.307E+05
PB-210	4.593E+05	2.759E+04	2.529E+04
U-234	3.101E+05	3.046E+05	4.918E+05
AM-241	3.878E+04	1.268E+03	9.792E+02
ANH-511	2.653E+02	1.359E+02	1.183E+02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/LITER )	K.L.	Cnt Uncert (1.96-sigma)	MDA (pCi/LITER )	
BE-7	3.280E+02		7.250E+02	1.236E+03	NOT IDENT.
NA-22	-1.155E+01		5.076E+01	9.038E+01	NOT IDENT.
NA-24	-6.218E+01		2.252E+02	4.040E+02	NOT IDENT.
AL-26	1.267E+01		3.320E+01	6.560E+01	NOT IDENT.
K-40	2.490E+01		3.378E+02	6.368E+02	NOT IDENT.
SC-46	2.631E+01		1.089E+02	1.873E+02	NOT IDENT.
V-48	1.078E+01		1.146E+02	1.952E+02	NOT IDENT.
CR-51	-3.663E+02		6.419E+02	1.090E+03	NOT IDENT.
MN-52	1.247E+01		4.175E+01	8.055E+01	NOT IDENT.
MN-54	-4.649E+01		9.295E+01	1.573E+02	NOT IDENT.
CO-56	-5.458E+01		9.590E+01	1.617E+02	NOT IDENT.
CO-58	-2.010E+01		9.230E+01	1.580E+02	NOT IDENT.
FE-59	-5.181E+01		2.056E+02	3.432E+02	NOT IDENT.
CU-67	-6.052E+01		1.792E+02	2.927E+02	NOT IDENT.
GE-68	1.565E+03		3.467E+03	5.790E+03	NOT IDENT.

AS-74	1.744E+01	1.225E+02	2.169E+02	NOT IDENT.
SE-75	-2.538E+01	1.015E+02	1.754E+02	FAIL ABUN
BR-77	-9.672E+01	4.193E+02	7.287E+02	NOT IDENT.
SR-82	-2.967E+01	5.851E+02	1.011E+03	NOT IDENT.
RB-83	-6.887E+01	1.614E+02	2.670E+02	NOT IDENT.
RB-84	-2.945E+00	1.650E+02	2.656E+02	NOT IDENT.
KR-85	9.436E+03	1.889E+04	2.828E+04	NOT IDENT.
SR-85	4.298E+01	8.605E+01	1.288E+02	NOT IDENT.
RB-86	6.943E+02	1.398E+03	2.267E+03	NOT IDENT.
Y-91	1.075E+04	2.525E+04	4.623E+04	NOT IDENT.
NB-94	5.762E+01	7.282E+01	1.305E+02	NOT IDENT.
NB-95	-5.714E+01	8.639E+01	1.464E+02	NOT IDENT.
NB-95M	-6.154E+01	2.508E+02	4.357E+02	NOT IDENT.
ZR-95	4.859E-01	1.508E+02	2.616E+02	NOT IDENT.
MO-99	2.558E+02	9.479E+02	1.663E+03	NOT IDENT.
TC-99M	-2.621E+03	5.678E+03	8.314E+03	NOT IDENT.
RH-101	1.789E+01	8.040E+01	1.351E+02	NOT IDENT.
RH-102M	2.260E+01	7.933E+01	1.346E+02	NOT IDENT.
RU-103	7.323E+00	7.841E+01	1.324E+02	FAIL ABUN
RH-106	3.900E+01	7.143E+02	1.257E+03	NOT IDENT.
RU-106	3.900E+01	7.143E+02	1.257E+03	NOT IDENT.
AG-108M	2.081E+00	7.939E+01	1.345E+02	NOT IDENT.
AG-110M	1.259E+02	9.839E+01	1.571E+02	NOT IDENT.
IN-114M	1.985E+01	3.929E+02	6.451E+02	NOT IDENT.
CD-115	1.922E+02	4.257E+02	7.243E+02	NOT IDENT.
SN-117M	-5.694E+01	6.927E+01	1.127E+02	NOT IDENT.
I-123	-3.162E+02	4.909E+02	8.016E+02	NOT IDENT.
TE-123M	-5.182E+01	6.592E+01	1.073E+02	NOT IDENT.
SB-124	-3.116E+01	7.302E+01	1.280E+02	NOT IDENT.
SB-125	-1.811E+01	2.401E+02	4.060E+02	NOT IDENT.
TE-125M	-1.480E+04	2.250E+04	3.740E+04	NOT IDENT.
I-126	-6.614E+00	2.789E+02	4.238E+02	NOT IDENT.
SB-126	-1.391E+02	1.551E+02	2.619E+02	NOT IDENT.
SB-127	1.046E+02	3.850E+02	4.641E+02	FAIL ABUN
I-131	-1.246E+00	8.986E+01	1.537E+02	NOT IDENT.
I-132	0.000E+00	8.966E+06	0.000E+00	SHORT HLIF
TE-132	-3.264E+01	9.886E+01	1.717E+02	FAIL ABUN
BA-133	-1.068E+02	1.037E+02	1.729E+02	NOT IDENT.
I-133	5.759E+01	2.949E+02	4.974E+02	FAIL ABUN
CS-134	3.681E+01	1.013E+02	1.770E+02	NOT IDENT.
CS-135	3.347E+02	3.646E+02	6.462E+02	NOT IDENT.
I-135	-1.827E+02	1.017E+04	1.838E+04	NOT IDENT.
CS-136	-8.732E+00	1.457E+02	2.460E+02	NOT IDENT.
BA-140	1.168E+01	4.621E+01	8.715E+01	NOT IDENT.
LA-140	1.168E+01	4.621E+01	8.715E+01	NOT IDENT.
CE-141	-4.076E+01	1.158E+02	1.912E+02	NOT IDENT.
CE-143	-3.189E+01	3.171E+02	5.473E+02	NOT IDENT.
CE-144	-1.972E+02	5.618E+02	8.273E+02	NOT IDENT.
PM-144	-6.525E+01	7.344E+01	1.244E+02	NOT IDENT.
PR-144	-4.893E+03	5.456E+03	9.240E+03	NOT IDENT.
PM-146	8.896E+01	1.159E+02	1.996E+02	NOT IDENT.
ND-147	-3.183E+02	6.079E+02	1.001E+03	NOT IDENT.
PM-147	0.000E+00	3.731E+06	6.429E+06	FAIL ABUN
PM-149	-1.246E+00	3.199E+03	5.541E+03	NOT IDENT.
EU-152	-7.202E+01	2.385E+02	4.063E+02	FAIL ABUN
GD-153	3.020E+01	2.192E+02	3.715E+02	NOT IDENT.
EU-154	-4.918E+01	1.454E+02	2.566E+02	FAIL ABUN
EU-155	2.282E+01	2.884E+02	4.868E+02	FAIL ABUN
HO-166M	5.940E+01	1.365E+02	2.415E+02	NOT IDENT.
LU-176	-5.131E+01	6.522E+01	1.105E+02	FAIL ABUN
HF-181	-2.111E+01	9.295E+01	1.554E+02	NOT IDENT.
W-181	0.000E+00	9.764E+02	1.648E+03	FAIL ABUN
TA-182	5.536E+01	2.212E+02	4.033E+02	FAIL ABUN
RE-183	0.000E+00	1.348E+03	1.906E+03	FAIL ABUN
RE-184	2.311E+02	3.024E+02	4.985E+02	FAIL ABUN
RE-188	2.237E+02	3.577E+02	6.009E+02	NOT IDENT.
W-188	1.470E+04	1.533E+04	2.710E+04	NOT IDENT.
OS-191	-9.219E+01	2.230E+02	3.697E+02	NOT IDENT.
IR-192	3.277E+00	7.458E+01	1.287E+02	NOT IDENT.
HG-203	-1.698E+01	7.612E+01	1.313E+02	NOT IDENT.
BI-207	-7.399E+01	1.518E+02	2.364E+02	NOT IDENT.
TL-208	4.825E+01	8.135E+01	1.461E+02	NOT IDENT.
BI-211	1.043E+02	4.887E+02	8.430E+02	NOT IDENT.
PB-211	-4.055E+02	1.727E+03	2.920E+03	NOT IDENT.
BI-212	3.834E+02	1.218E+03	2.138E+03	NOT IDENT.
PB-212	-7.515E+00	1.396E+02	2.435E+02	NOT IDENT.
BI-213	-6.355E+01	2.839E+02	4.771E+02	NOT IDENT.
BI-214	1.650E+02	1.696E+02	2.700E+02	FAIL ABUN

PB-214	8.454E+01	1.743E+02	3.029E+02	FAIL ABUN
RN-219	-6.387E+02	9.919E+02	1.659E+03	NOT IDENT.
FR-221	6.421E+01	5.327E+02	9.349E+02	NOT IDENT.
RA-223	7.235E+02	1.509E+03	2.631E+03	NOT IDENT.
RA-224	7.371E+02	1.659E+03	2.583E+03	NOT IDENT.
RA-226	-4.805E+02	1.609E+03	2.629E+03	NOT IDENT.
AC-227	-2.972E+01	6.245E+02	1.086E+03	NOT IDENT.
TH-227	-2.972E+01	6.245E+02	1.086E+03	NOT IDENT.
AC-228	3.759E+02	4.203E+02	7.357E+02	NOT IDENT.
RA-228	3.759E+02	4.203E+02	7.357E+02	NOT IDENT.
TH-228	-7.515E+00	1.396E+02	2.435E+02	NOT IDENT.
TH-229	6.828E+02	1.241E+03	2.209E+03	FAIL ABUN
TH-230	3.789E+04	3.567E+04	6.186E+04	NOT IDENT.
PA-231	1.339E+03	3.518E+03	6.148E+03	NOT IDENT.
TH-231	1.608E+03	1.661E+03	2.560E+03	NOT IDENT.
TH-232	-1.111E+05	6.391E+04	9.489E+04	NOT IDENT.
PA-233	9.324E-01	1.583E+02	2.732E+02	NOT IDENT.
PA-234	-1.366E+03	9.861E+02	1.607E+03	NOT IDENT.
PA-234M	4.362E+03	1.269E+04	2.178E+04	NOT IDENT.
TH-234	-5.726E+03	4.504E+03	6.751E+03	NOT IDENT.
U-235	3.175E+02	4.907E+02	8.277E+02	NOT IDENT.
NP-237	9.324E-01	1.583E+02	2.732E+02	NOT IDENT.
U-238	-5.726E+03	4.504E+03	6.751E+03	NOT IDENT.
NP-239	7.844E+02	7.988E+02	1.273E+03	FAIL ABUN
AM-242	1.142E+03	1.742E+03	2.978E+03	FAIL ABUN
AM-243	-3.958E+01	1.649E+02	2.800E+02	NOT IDENT.
CM-243	-1.927E+02	2.934E+02	4.889E+02	NOT IDENT.
CM-247	-1.445E+01	9.058E+01	1.536E+02	NOT IDENT.
CF-249	-9.741E-01	1.140E+02	1.702E+02	NOT IDENT.
CF-251	1.224E+01	3.164E+02	5.218E+02	NOT IDENT.
CF-252	1.809E+05	4.806E+05	8.172E+05	NOT IDENT.

PEAK REPORT WITHOUT BACKGROUND SUBTRACTION

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.35	4800	5145	0.82	92.71	88	9	5.33E+00	3.1	
2	0	51.85	156	2655	1.02	103.73	102	5	1.74E-01	50.1	
3	0	59.38	9685	4586	0.83	118.80	114	10	1.08E+01	1.7	
4	0	87.90	11492	3587	0.86	175.87	171	10	1.28E+01	1.4	
5	0	117.45	114	1373	1.46	235.00	232	6	1.27E-01	52.0	
6	0	121.91	3902	1879	0.89	243.91	239	9	4.34E+00	2.6	
7	0	136.16	505	1937	0.95	272.43	268	10	5.61E-01	16.9	
8	0	165.75	1084	1468	1.03	331.65	327	9	1.20E+00	7.1	
9	0	244.30	54	756	1.23	488.83	487	6	6.05E-02	81.2	
10	0	391.59	467	924	1.20	783.54	779	11	5.18E-01	13.5	
11	0	510.51	261	828	1.34	1021.48	1015	14	2.91E-01	24.2	
12	0	609.69	62	316	1.70	1219.92	1217	8	6.89E-02	51.3	
13	0	661.59	9372	746	1.37	1323.74	1316	15	1.04E+01	1.2	
14	0	674.27	64	274	1.60	1349.11	1347	8	7.10E-02	46.5	
15	0	684.96	21	428	1.42	1370.50	1364	11	2.39E-02	187.8	
16	0	875.93	42	235	0.65	1752.52	1750	6	4.69E-02	59.6	
17	0	897.98	421	635	1.40	1796.64	1791	11	4.68E-01	12.6	
18	0	904.05	52	380	0.99	1808.77	1805	8	5.77E-02	66.8	
19	0	1070.01	73	285	1.97	2140.74	2137	9	8.13E-02	43.3	
20	0	1115.48	2091	620	1.62	2231.69	2223	17	2.32E+00	3.5	
21	0	1173.21	9541	343	1.68	2347.16	2338	18	1.06E+01	1.1	
22	0	1188.34	27	70	0.90	2377.42	2375	6	2.97E-02	53.0	
23	0	1305.66	26	76	0.79	2612.06	2601	17	2.89E-02	79.4	
24	0	1332.50	8592	121	1.81	2665.74	2657	19	9.55E+00	1.1	
25	0	1576.53	24	11	3.03	3153.76	3147	14	2.70E-02	34.9	
26	0	1673.88	24	20	5.89	3348.42	3338	20	2.67E-02	50.0	
27	0	1762.07	4	4	1.24	3524.75	3519	8	4.44E-03	100.0	
28	0	1835.95	302	8	2.10	3672.47	3664	15	3.35E-01	6.1	
29	0	1893.53	10	0	1.29	3787.60	3784	8	1.11E-02	31.6	
30	0	1952.16	8	3	0.69	3904.83	3901	9	9.39E-03	47.4	
31	0	1957.07	7	4	0.95	3914.64	3911	8	7.78E-03	62.3	
32	0	1960.20	10	0	0.98	3920.90	3918	8	1.11E-02	31.6	
33	0	2015.88	14	4	3.56	4032.22	4027	13	1.58E-02	37.6	

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/LITER	Decay Corr pCi/LITER	2-Sigma %Error
CO-57	122.06	3902	85.60*	2.772E+00	2.470E+03	2.480E+03	5.13
	136.47	505	10.68	2.773E+00	2.559E+03	2.569E+03	33.82
CO-60	1173.23	9541	99.85	7.483E-01	1.918E+04	1.919E+04	2.24
	1332.49	8592	99.98*	6.788E-01	1.901E+04	1.902E+04	2.24
ZN-65	1115.54	2091	50.60*	7.779E-01	7.976E+03	8.013E+03	6.99
Y-88	898.04	421	93.70	9.177E-01	7.354E+02	7.431E+02	25.14
	1836.06	302	99.20*	5.427E-01	8.409E+02	8.497E+02	12.18
CD-109	88.03	11492	3.70*	2.319E+00	2.011E+05	2.016E+05	2.71
SN-113	391.70	467	64.97*	1.629E+00	6.621E+02	6.685E+02	26.90
SN-126	64.28	-----	9.60	1.318E+00	-----	Line Not Found	-----
	86.94	11492	8.90	2.319E+00	8.359E+04	8.359E+04	2.71
	87.57	11492	37.00*	2.319E+00	2.011E+04	2.011E+04	2.71
BA-137M	661.66	9369	89.90*	1.146E+00	1.366E+04	1.366E+04	2.43
CS-137	661.66	9369	85.10*	1.146E+00	1.443E+04	1.443E+04	2.43
CE-139	165.86	1084	80.00*	2.648E+00	7.682E+02	7.744E+02	14.13
PM-147	121.22	3902	0.00*	2.772E+00	7.418E+07	7.426E+07	5.13
TM-171	51.35	156	0.27	6.307E-01	1.378E+05	1.380E+05	100.24
	52.39	156	0.47*	6.307E-01	7.918E+04	7.930E+04	100.24
	66.73	-----	0.14	1.449E+00	-----	Line Not Found	-----
PB-210	46.54	4796	4.25*	3.690E-01	4.592E+05	4.593E+05	6.13
U-234	53.20	156	0.12*	6.307E-01	3.101E+05	3.101E+05	100.24
	120.90	3902	0.04	2.772E+00	5.285E+06	5.285E+06	5.13
AM-241	59.54	9685	35.90*	1.045E+00	3.878E+04	3.878E+04	3.34
ANH-511	511.00	242	100.00*	1.368E+00	2.653E+02	2.653E+02	52.28

Flag: "\*" = Keyline

Total number of lines in spectrum 33  
 Number of unidentified lines 11  
 Number of lines tentatively identified by NID 22 66.67%

Nuclide Type :

Nuclide	Hlife	Decay	Uncorrected pCi/LITER	Decay Corr pCi/LITER	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CO-57	271.74D	1.00	2.470E+03	2.480E+03	0.127E+03	5.13	
CO-60	1925.28D	1.00	1.901E+04	1.902E+04	0.043E+04	2.24	
ZN-65	244.06D	1.00	7.976E+03	8.013E+03	0.560E+03	6.99	
Y-88	106.63D	1.01	8.409E+02	8.497E+02	1.035E+02	12.18	
CD-109	461.40D	1.00	2.011E+05	2.016E+05	0.055E+05	2.71	
SN-113	115.09D	1.01	6.621E+02	6.685E+02	1.798E+02	26.90	
SN-126	2.30E+05Y	1.00	2.011E+04	2.011E+04	0.055E+04	2.71	
BA-137M	30.08Y	1.00	1.366E+04	1.366E+04	0.033E+04	2.43	
CS-137	30.08Y	1.00	1.443E+04	1.443E+04	0.035E+04	2.43	
CE-139	137.64D	1.01	7.682E+02	7.744E+02	1.094E+02	14.13	
PM-147	2.62Y	1.00	7.418E+07	7.426E+07	0.381E+07	5.13	
TM-171	1.92Y	1.00	7.918E+04	7.930E+04	7.950E+04	100.24	
PB-210	22.20Y	1.00	4.592E+05	4.593E+05	0.282E+05	6.13	
U-234	2.45E+05Y	1.00	3.101E+05	3.101E+05	3.109E+05	100.24	
AM-241	432.60Y	1.00	3.878E+04	3.878E+04	0.129E+04	3.34	
ANH-511	1.00E+09Y	1.00	2.653E+02	2.653E+02	1.387E+02	52.28	
Total Activity :			7.534E+07	7.543E+07			

Grand Total Activity : 7.534E+07 7.543E+07

Flags: "K" = Keyline not found "M" = Manually accepted  
 "E" = Manually edited "A" = Nuclide specific abn. limit

It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	%Eff	Flags
0	117.45	114	1373	1.46	235.00	232	6	1.27E-01	****	2.76E+00	T
0	244.30	54	756	1.23	488.83	487	6	6.05E-02	****	2.19E+00	T
0	609.69	61	316	1.70	1219.92	1217	8	6.73E-02	****	1.21E+00	T
0	674.27	64	274	1.60	1349.11	1347	8	7.10E-02	93.0	1.13E+00	
0	684.96	21	428	1.42	1370.50	1364	11	2.39E-02	****	1.12E+00	T
0	875.93	42	235	0.65	1752.52	1750	6	4.69E-02	****	9.35E-01	T
0	904.05	52	380	0.99	1808.77	1805	8	5.77E-02	****	9.13E-01	T
0	1070.01	73	285	1.97	2140.74	2137	9	8.13E-02	86.5	8.03E-01	
0	1188.34	27	70	0.90	2377.42	2375	6	2.97E-02	****	7.41E-01	T
0	1305.66	26	76	0.79	2612.06	2601	17	2.89E-02	****	6.89E-01	
0	1576.53	24	11	3.03	3153.76	3147	14	2.70E-02	69.8	6.00E-01	
0	1673.88	24	20	5.89	3348.42	3338	20	2.67E-02	****	5.76E-01	
0	1762.07	4	4	1.24	3524.75	3519	8	4.44E-03	****	5.57E-01	
0	1893.53	10	0	1.29	3787.60	3784	8	1.11E-02	63.2	5.33E-01	
0	1952.16	8	3	0.69	3904.83	3901	9	9.39E-03	94.8	5.24E-01	
0	1957.07	7	4	0.95	3914.64	3911	8	7.78E-03	****	5.23E-01	
0	1960.20	10	0	0.98	3920.90	3918	8	1.11E-02	63.2	5.23E-01	
0	2015.88	14	4	3.56	4032.22	4027	13	1.58E-02	75.2	5.15E-01	

Flags: "T" = Tentatively associated



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*****
*
*           GEL Laboratories LLC
*           2040 Savage Road
*           Charleston, SC 29407
*****
*
*           DETECTOR AND SAMPLE DATA
*
* Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]G1203009340.CNF;1
* Acquisition date   : 24-DEC-2013 14:14:29 Sensitivity      : 3.000
* Detector ID        : GAM11 Energy tolerance: 1.500
* Elapsed live time  : 0 00:15:00.00 Abundance limit : 75.000
* Elapsed real time  : 0 00:15:07.46 Half life ratio  : *****
* Sample date        : 23-DEC-2013 00:00:00 Nuclide Library : LIQUID
* Sample ID          : G1203009340 Analyst initials: MJH1
* Batch Number       : 1355780 Sample Quantity : 2.0000E+00 LITER
*                    : Quantity Err(%) : 5.0000E-03 %
* Wet wt corr        : 1.00000 Wet Weight : 0.00000
*                    : Dry Weight : 0.00000
*****
*
*           CALIBRATION INFORMATION
*
* Eff. Cal. date     : 12-JUL-2013 08:13:46 Eff. Geometry : 2LMB
* Eff. File          : DKA100:[CANBERRA.GAMMA]EFF_GAM11_2LMB.CNF;10
*****

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Combined Activity-MDA Report

NOTE: Not all "Identified Nuclides" are valid.  
Please refer to Certificate of Analysis.

---- Identified Nuclides ----

Nuclide	Activity (pCi/LITER )	Act Error (1.96-sigma)	Lc (pCi/LITER )	TPU (1.96-sigma)
CO-57	2.480E+03	2.745E+02	5.337E+01	2.745E+02
CO-60	1.902E+04	1.585E+03	4.393E+01	1.585E+03
ZN-65	8.013E+03	1.206E+03	1.795E+02	1.206E+03
Y-88	8.497E+02	1.216E+02	2.522E+01	1.216E+02
CD-109	2.016E+05	2.243E+04	1.883E+03	2.243E+04
SN-113	6.685E+02	1.836E+02	8.489E+01	1.836E+02
SN-126	2.011E+04	1.968E+03	1.888E+02	1.968E+03
BA-137M	1.366E+04	1.137E+03	7.064E+01	1.137E+03
CS-137	1.443E+04	1.200E+03	7.463E+01	1.200E+03
CE-139	7.744E+02	1.953E+02	5.606E+01	1.953E+02
TM-171	7.930E+04	7.825E+04	6.474E+04	7.825E+04
PB-210	4.593E+05	4.978E+04	1.253E+04	4.978E+04
U-234	3.101E+05	3.059E+05	2.436E+05	3.059E+05
AM-241	3.878E+04	3.331E+03	4.845E+02	3.331E+03
ANH-511	2.653E+02	1.376E+02	5.768E+01	1.376E+02

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/LITER )	K.L Act error (1.96-sigma)	Lc (pCi/LITER )	TPU (1.96-sigma)	
BE-7	3.280E+02	7.254E+02	6.046E+02	7.404E+02	NOT IDENT.
NA-22	-1.155E+01	5.077E+01	4.231E+01	5.104E+01	NOT IDENT.
NA-24	-6.218E+01	2.252E+02	1.841E+02	2.270E+02	NOT IDENT.
AL-26	1.267E+01	3.321E+01	2.909E+01	3.370E+01	NOT IDENT.
K-40	2.490E+01	3.378E+02	2.884E+02	3.380E+02	NOT IDENT.
SC-46	2.631E+01	1.090E+02	9.148E+01	1.096E+02	NOT IDENT.
V-48	1.078E+01	1.146E+02	9.513E+01	1.148E+02	NOT IDENT.
CR-51	-3.663E+02	6.427E+02	5.340E+02	6.635E+02	NOT IDENT.
MN-52	1.247E+01	4.176E+01	3.644E+01	4.214E+01	NOT IDENT.
MN-54	-4.649E+01	9.307E+01	7.659E+01	9.540E+01	NOT IDENT.
CO-56	-5.458E+01	9.606E+01	7.876E+01	9.916E+01	NOT IDENT.
CO-58	-2.010E+01	9.232E+01	7.693E+01	9.276E+01	NOT IDENT.
FE-59	-5.181E+01	2.057E+02	1.670E+02	2.070E+02	NOT IDENT.
CU-67	-6.052E+01	1.792E+02	1.439E+02	1.813E+02	NOT IDENT.

GE-68	1.565E+03	3.473E+03	2.817E+03	3.544E+03	NOT IDENT.
AS-74	1.744E+01	1.225E+02	1.055E+02	1.228E+02	NOT IDENT.
SE-75	-2.538E+01	1.015E+02	8.609E+01	1.021E+02	FAIL ABUN
BR-77	-9.672E+01	4.193E+02	3.583E+02	4.216E+02	NOT IDENT.
SR-82	-2.967E+01	5.851E+02	4.919E+02	5.853E+02	NOT IDENT.
RB-83	-6.887E+01	1.617E+02	1.302E+02	1.647E+02	NOT IDENT.
RB-84	-2.945E+00	1.650E+02	1.296E+02	1.650E+02	NOT IDENT.
KR-85	9.436E+03	1.891E+04	1.380E+04	1.938E+04	NOT IDENT.
SR-85	4.298E+01	8.612E+01	6.287E+01	8.827E+01	NOT IDENT.
RB-86	6.943E+02	1.401E+03	1.103E+03	1.435E+03	NOT IDENT.
Y-91	1.075E+04	2.527E+04	2.204E+04	2.573E+04	NOT IDENT.
NB-94	5.762E+01	7.298E+01	6.342E+01	7.747E+01	NOT IDENT.
NB-95	-5.714E+01	8.655E+01	7.124E+01	9.030E+01	NOT IDENT.
NB-95M	-6.154E+01	2.509E+02	2.142E+02	2.524E+02	NOT IDENT.
ZR-95	4.859E-01	1.508E+02	1.272E+02	1.508E+02	NOT IDENT.
MO-99	2.558E+02	9.482E+02	8.084E+02	9.552E+02	NOT IDENT.
TC-99M	-2.621E+03	5.687E+03	4.091E+03	5.809E+03	NOT IDENT.
RH-101	1.789E+01	8.048E+01	6.652E+01	8.088E+01	NOT IDENT.
RH-102M	2.260E+01	7.937E+01	6.585E+01	8.002E+01	NOT IDENT.
RU-103	7.323E+00	7.842E+01	6.457E+01	7.849E+01	FAIL ABUN
RH-106	3.900E+01	7.143E+02	6.119E+02	7.146E+02	NOT IDENT.
RU-106	3.900E+01	7.143E+02	6.119E+02	7.146E+02	NOT IDENT.
AG-108M	2.081E+00	7.939E+01	6.582E+01	7.940E+01	NOT IDENT.
AG-110M	1.259E+02	9.890E+01	7.673E+01	1.140E+02	NOT IDENT.
IN-114M	1.985E+01	3.929E+02	3.174E+02	3.930E+02	NOT IDENT.
CD-115	1.922E+02	4.261E+02	3.533E+02	4.348E+02	NOT IDENT.
SN-117M	-5.694E+01	6.942E+01	5.542E+01	7.401E+01	NOT IDENT.
I-123	-3.162E+02	4.915E+02	3.942E+02	5.118E+02	NOT IDENT.
TE-123M	-5.182E+01	6.605E+01	5.277E+01	7.006E+01	NOT IDENT.
SB-124	-3.116E+01	7.307E+01	5.640E+01	7.441E+01	NOT IDENT.
SB-125	-1.811E+01	2.401E+02	1.987E+02	2.402E+02	NOT IDENT.
TE-125M	-1.480E+04	2.255E+04	1.843E+04	2.351E+04	NOT IDENT.
I-126	-6.614E+00	2.789E+02	2.061E+02	2.790E+02	NOT IDENT.
SB-126	-1.391E+02	1.560E+02	1.272E+02	1.681E+02	NOT IDENT.
SB-127	1.046E+02	3.851E+02	2.256E+02	3.879E+02	FAIL ABUN
I-131	-1.246E+00	8.986E+01	7.524E+01	8.987E+01	NOT IDENT.
I-132	-3.713E+06	8.979E+06	0.000E+00	9.133E+06	SHORT HLIF
TE-132	-3.264E+01	9.892E+01	8.447E+01	1.000E+02	FAIL ABUN
BA-133	-1.068E+02	1.041E+02	8.462E+01	1.147E+02	NOT IDENT.
I-133	5.759E+01	2.949E+02	2.426E+02	2.961E+02	FAIL ABUN
CS-134	3.681E+01	1.014E+02	8.618E+01	1.027E+02	NOT IDENT.
CS-135	3.347E+02	3.662E+02	3.171E+02	3.960E+02	NOT IDENT.
I-135	-1.827E+02	1.017E+04	8.624E+03	1.017E+04	NOT IDENT.
CS-136	-8.732E+00	1.457E+02	1.197E+02	1.458E+02	NOT IDENT.
BA-140	1.168E+01	4.622E+01	3.969E+01	4.652E+01	NOT IDENT.
LA-140	1.168E+01	4.622E+01	3.969E+01	4.652E+01	NOT IDENT.
CE-141	-4.076E+01	1.159E+02	9.406E+01	1.173E+02	NOT IDENT.
CE-143	-3.189E+01	3.171E+02	2.684E+02	3.174E+02	NOT IDENT.
CE-144	-1.972E+02	5.622E+02	4.073E+02	5.692E+02	NOT IDENT.
PM-144	-6.525E+01	7.364E+01	6.039E+01	7.930E+01	NOT IDENT.
PR-144	-4.893E+03	5.471E+03	4.485E+03	5.899E+03	NOT IDENT.
PM-146	8.896E+01	1.162E+02	9.773E+01	1.230E+02	NOT IDENT.
ND-147	-3.183E+02	6.085E+02	4.880E+02	6.252E+02	NOT IDENT.
PM-147	7.426E+07	8.215E+06	3.191E+06	3.447E+07	FAIL ABUN
PM-149	-1.246E+00	3.199E+03	2.718E+03	3.199E+03	NOT IDENT.
EU-152	-7.202E+01	2.386E+02	1.989E+02	2.408E+02	FAIL ABUN
GD-153	3.020E+01	2.192E+02	1.831E+02	2.196E+02	NOT IDENT.
EU-154	-4.918E+01	1.454E+02	1.201E+02	1.471E+02	FAIL ABUN
EU-155	2.282E+01	2.884E+02	2.399E+02	2.886E+02	FAIL ABUN
HO-166M	5.940E+01	1.366E+02	1.173E+02	1.392E+02	NOT IDENT.
LU-176	-5.131E+01	6.537E+01	5.413E+01	6.934E+01	FAIL ABUN
HF-181	-2.111E+01	9.297E+01	7.594E+01	9.345E+01	NOT IDENT.
W-181	7.144E+03	2.079E+03	8.174E+02	3.833E+03	FAIL ABUN
TA-182	5.536E+01	2.212E+02	1.913E+02	2.226E+02	FAIL ABUN
RE-183	4.124E+04	4.595E+03	9.471E+02	1.915E+04	FAIL ABUN
RE-184	2.311E+02	3.038E+02	2.434E+02	3.211E+02	FAIL ABUN
RE-188	2.237E+02	3.582E+02	2.957E+02	3.722E+02	NOT IDENT.
W-188	1.470E+04	1.546E+04	1.330E+04	1.682E+04	NOT IDENT.
OS-191	-9.219E+01	2.232E+02	1.820E+02	2.270E+02	NOT IDENT.
IR-192	3.277E+00	7.458E+01	6.306E+01	7.459E+01	NOT IDENT.
HG-203	-1.698E+01	7.614E+01	6.443E+01	7.652E+01	NOT IDENT.
BI-207	-7.399E+01	1.521E+02	1.149E+02	1.557E+02	NOT IDENT.
TL-208	4.825E+01	8.145E+01	7.115E+01	8.430E+01	NOT IDENT.
BI-211	1.043E+02	4.888E+02	4.127E+02	4.911E+02	NOT IDENT.
PB-211	-4.055E+02	1.727E+03	1.427E+03	1.737E+03	NOT IDENT.
BI-212	3.834E+02	1.219E+03	1.041E+03	1.231E+03	NOT IDENT.
PB-212	-7.515E+00	1.396E+02	1.197E+02	1.396E+02	NOT IDENT.
BI-213	-6.355E+01	2.839E+02	2.335E+02	2.854E+02	NOT IDENT.

BI-214	1.650E+02	1.701E+02	1.314E+02	1.856E+02	FAIL	ABUN
PB-214	8.454E+01	1.745E+02	1.483E+02	1.786E+02	FAIL	ABUN
RN-219	-6.387E+02	9.960E+02	8.105E+02	1.037E+03	NOT	IDENT.
FR-221	6.421E+01	5.328E+02	4.601E+02	5.336E+02	NOT	IDENT.
RA-223	7.235E+02	1.511E+03	1.289E+03	1.546E+03	NOT	IDENT.
RA-224	7.371E+02	1.661E+03	1.270E+03	1.694E+03	NOT	IDENT.
RA-226	-4.805E+02	1.609E+03	1.293E+03	1.624E+03	NOT	IDENT.
AC-227	-2.972E+01	6.245E+02	5.332E+02	6.247E+02	NOT	IDENT.
TH-227	-2.972E+01	6.245E+02	5.332E+02	6.247E+02	NOT	IDENT.
AC-228	3.759E+02	4.225E+02	3.594E+02	4.552E+02	NOT	IDENT.
RA-228	3.759E+02	4.225E+02	3.594E+02	4.552E+02	NOT	IDENT.
TH-228	-7.515E+00	1.396E+02	1.197E+02	1.396E+02	NOT	IDENT.
TH-229	6.828E+02	1.242E+03	1.087E+03	1.280E+03	FAIL	ABUN
TH-230	3.789E+04	3.628E+04	3.059E+04	4.010E+04	NOT	IDENT.
PA-231	1.339E+03	3.520E+03	3.016E+03	3.571E+03	NOT	IDENT.
TH-231	1.608E+03	1.678E+03	1.267E+03	1.828E+03	NOT	IDENT.
TH-232	-1.111E+05	6.541E+04	4.687E+04	8.240E+04	NOT	IDENT.
PA-233	9.324E-01	1.583E+02	1.339E+02	1.583E+02	NOT	IDENT.
PA-234	-1.366E+03	1.853E+03	7.848E+02	1.953E+03	NOT	IDENT.
PA-234M	4.362E+03	1.270E+04	1.061E+04	1.285E+04	NOT	IDENT.
TH-234	-5.726E+03	4.686E+03	3.334E+03	5.350E+03	NOT	IDENT.
U-235	3.175E+02	4.915E+02	4.073E+02	5.119E+02	NOT	IDENT.
NP-237	9.324E-01	1.583E+02	1.339E+02	1.583E+02	NOT	IDENT.
U-238	-5.726E+03	4.686E+03	3.334E+03	5.350E+03	NOT	IDENT.
NP-239	7.844E+02	8.026E+02	6.274E+02	8.770E+02	FAIL	ABUN
AM-242	1.142E+03	1.755E+03	1.468E+03	1.829E+03	FAIL	ABUN
AM-243	-3.958E+01	1.650E+02	1.384E+02	1.659E+02	NOT	IDENT.
CM-243	-1.927E+02	2.943E+02	2.409E+02	3.069E+02	NOT	IDENT.
CM-247	-1.445E+01	9.062E+01	7.506E+01	9.085E+01	NOT	IDENT.
CF-249	-9.741E-01	1.140E+02	8.328E+01	1.140E+02	NOT	IDENT.
CF-251	1.224E+01	3.164E+02	2.565E+02	3.164E+02	NOT	IDENT.
CF-252	1.809E+05	5.080E+05	4.028E+05	5.145E+05	NOT	IDENT.

\*\*\*\*\*  
 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \* GAMMA SPECTROSCOPY BACKGROUND REPORT \*  
 \*\*\*\*\*

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
43.53	3283.7188	88.34	2136.6045	152.32	1293.7037
46.54	3301.0518	88.47	2137.1089	152.43	1288.3135
49.72	2858.2815	89.96	1552.2662	153.25	1294.0785
51.35	3115.5991	91.11	1459.2581	154.21	1213.0449
52.39	3282.4482	91.27	1445.9321	155.04	1176.3020
53.20	3449.4922	92.59	1476.8243	156.02	1134.0969
56.28	3222.5864	93.31	1464.8816	158.56	1234.0983
57.36	3447.5623	93.35	1464.9836	158.97	1203.2847
57.53	3448.9463	94.56	1474.1895	159.00	1216.7985
57.53	3448.9648	94.65	1474.4165	162.33	1181.6637
57.98	3531.1296	94.67	1474.4678	163.33	1203.3818
59.32	2749.9827	97.43	1462.8936	165.86	1137.3724
59.54	2751.3970	98.43	1472.5660	176.31	1104.1617
61.49	1995.8311	98.44	1472.5879	176.60	1099.9316
63.00	2135.4846	99.53	1449.4603	177.52	1070.1066
63.29	2162.8762	100.11	1441.5525	181.07	1078.9454
63.58	2164.2751	100.20	1461.4095	184.41	1111.7938
63.81	2273.8662	103.18	1505.9474	184.58	1121.2468
64.28	2177.7747	103.37	1512.6455	185.72	1179.3486
64.99	2243.0630	105.31	1474.6492	186.21	1148.7155
65.08	2243.5027	106.12	1407.6853	190.27	1190.9584
66.73	2307.8604	109.28	1494.4207	193.51	1108.9827
66.98	2319.7874	111.00	1491.0536	198.01	1134.4386
67.24	2351.2063	111.76	1434.8978	201.83	1122.1420
67.67	2342.6755	116.24	1519.9417	205.31	1134.9778
67.75	2358.6296	116.30	1526.4404	210.85	1168.9104
69.67	2449.3208	116.74	1525.8528	218.12	1215.8632
70.83	2517.9065	117.23	1503.0884	222.11	1207.0244
72.81	2419.0796	120.54	1548.8429	227.09	1238.9851
72.87	2419.3799	120.90	1301.5183	227.38	1252.8984
74.66	2426.1814	121.12	1301.9401	228.16	1203.9905
74.82	2418.0740	121.22	1302.1261	228.18	1204.0210
74.97	2418.8093	121.78	1303.1868	235.69	1137.6193
77.11	2513.3645	122.06	1303.7140	235.96	1107.7916
79.69	2563.8784	123.07	1260.6523	238.63	1095.8557
80.12	2557.0229	127.23	1270.8372	238.98	1101.6979
80.19	2557.3621	129.43	1317.9777	240.99	1032.5648
80.57	2555.2344	131.20	1239.4442	242.00	1051.1180
81.00	2618.2671	133.02	1284.8940	244.70	1069.6650
81.07	2618.6138	133.52	1319.9950	252.40	970.4666
83.79	2630.0430	136.00	1229.5962	252.80	974.5158
84.21	2632.0945	136.28	1230.0667	256.23	955.1188
85.43	2780.0605	136.47	1230.3765	260.90	921.6368
86.55	2761.5359	140.51	1258.3816	264.66	920.8334
86.94	2131.2063	140.88	1272.1663	268.22	829.7347
87.09	2131.7859	143.76	1172.8824	269.46	896.3547
87.57	2133.6426	144.24	1185.7300	271.23	869.4505
88.03	2135.4133	145.44	1226.1980	273.65	887.2130

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
276.40	873.1586	427.09	670.1232	677.62	398.6411
277.37	850.2063	427.87	683.0255	685.70	380.9277
277.60	859.8162	433.94	672.8338	695.00	383.3387
278.00	864.8245	440.45	700.7551	696.49	406.5308
279.20	897.8776	453.88	665.6838	696.51	406.5308
279.54	896.2288	463.37	745.2667	697.00	408.5273
280.46	899.7371	468.07	692.4578	697.49	400.9552
283.69	830.7908	473.00	681.4196	702.65	353.8472
284.31	850.2249	475.06	639.0838	706.68	410.1327
285.41	829.0821	476.78	628.8938	711.68	367.6470
285.90	845.5891	477.60	608.6649	720.70	422.0848
287.50	875.2769	477.99	582.8879	721.93	414.5674
290.67	803.8624	482.18	602.6064	722.78	424.3702
293.27	837.1121	487.02	582.4847	722.91	426.3251
295.22	796.1850	492.35	542.8118	723.31	427.3566
295.96	842.7117	497.08	512.5493	724.19	405.2618
299.98	819.3420	511.00	509.6948	727.33	433.8469
300.09	820.3828	514.00	498.1656	733.00	410.5454
300.13	820.3958	520.40	527.6118	735.93	391.5869
301.36	812.5015	520.69	527.6993	739.50	379.4788
302.85	807.6381	522.65	0.0000	744.23	374.3250
304.50	765.1835	527.90	483.0887	747.24	392.3230
306.78	823.6141	529.59	490.1549	752.31	381.3545
308.46	772.3248	529.87	491.3315	753.82	423.6444
311.90	772.3762	531.02	519.3589	756.73	410.4072
316.51	750.6607	546.56	446.2205	763.94	420.3721
319.41	784.5105	552.55	437.4289	765.80	464.8934
320.08	771.2061	563.25	418.5063	766.42	459.1103
321.04	734.5902	569.33	427.8594	766.84	462.1284
323.87	697.8765	569.50	427.8941	772.60	0.0000
325.23	737.8174	569.70	427.9403	776.52	434.2100
328.76	709.2063	583.19	431.5761	777.92	439.3723
333.37	710.5627	595.83	417.6252	778.90	431.6229
334.37	707.1177	600.60	435.9772	783.70	446.2544
338.28	691.2582	602.73	418.9500	785.37	437.6189
338.32	691.2688	604.72	407.6805	792.07	457.5560
340.48	716.1281	609.32	394.3953	795.86	425.3981
340.55	716.1611	610.33	409.3234	801.95	452.2377
344.28	740.9076	614.28	406.3555	810.29	468.5992
345.93	729.8012	618.01	413.5186	810.45	468.6222
351.06	694.4274	621.93	427.2128	810.76	468.6794
351.93	658.8492	630.19	0.0000	815.77	492.5526
356.01	753.9163	631.29	455.9656	818.51	491.0288
364.49	681.6010	632.98	438.6072	832.01	434.9953
366.42	671.3724	633.25	439.5961	834.85	477.7610
383.85	674.9692	634.78	438.9637	836.80	460.9385
388.16	665.1521	635.95	439.1822	846.77	487.8603
388.63	689.9425	636.99	440.3105	856.80	474.3311
391.70	648.5869	645.85	423.2865	860.56	567.4816
400.66	663.5941	657.76	472.1987	871.09	540.9597
401.81	646.5082	661.66	433.6982	873.19	510.7056
402.40	624.0178	664.57	394.8940	875.33	521.2932
404.85	621.8630	666.33	414.0837	880.51	578.5319
410.95	590.9574	666.50	414.1158	881.60	530.0837
414.70	668.2928	667.71	0.0000	883.24	534.9990

ENERGY	MDA COUNTS	ENERGY	MDA COUNTS	ENERGY	MDA COUNTS
884.68	560.8887	1434.09	25.8328		
889.28	554.5679	1457.56	29.9652		
894.76	596.7373	1460.82	28.9870		
898.04	539.0231	1489.16	30.1770		
903.28	522.7722	1596.21	30.8765		
911.20	519.3053	1620.50	24.8252		
926.36	586.3480	1678.03	25.1162		
935.54	582.8694	1690.97	24.1324		
937.49	620.7988	1764.49	16.4211		
944.13	552.0668	1770.23	20.2447		
946.00	662.2546	1771.35	20.2493		
949.00	569.6860	1791.20	13.9072		
954.55	0.0000	1808.65	16.0992		
964.08	556.6253	1836.06	14.7946		
968.97	575.3928				
983.53	467.9092				
996.26	462.3043				
1001.03	443.8159				
1004.73	449.6526				
1037.84	442.3066				
1038.76	432.7389				
1046.59	429.4241				
1048.07	426.3608				
1050.41	424.4899				
1063.66	421.5318				
1077.00	391.8691				
1077.34	400.3714				
1085.87	410.3320				
1099.25	444.7563				
1112.07	459.9215				
1112.84	489.3479				
1115.54	405.3465				
1120.29	321.1406				
1120.55	321.1548				
1121.30	324.3753				
1129.67	284.4822				
1131.51	278.1851				
1173.23	216.1406				
1189.05	165.5990				
1204.77	125.8922				
1221.41	105.6790				
1231.02	102.1597				
1235.36	104.1679				
1238.28	88.1335				
1260.41	78.1496				
1274.44	79.3829				
1274.54	77.4734				
1291.59	75.8819				
1298.22	64.3217				
1312.11	59.5773				
1332.49	72.7631				
1365.19	31.2891				
1368.63	40.1225				
1384.29	38.3065				
1408.01	35.5547				

# **Method Calibration Data**

**GEL Laboratories, LLC**

2040 Savage Road, Charleston, SC 29414  
(843)556-8171

**Gamma Spectrometer Geometry Calibration Package**

Detector: Gamma 7

Geometry: 2LMD

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate? the secondary standard(s) documentation? the nuclide library used? the VMS certificate file?	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
2) Is the energy calibration graph included?	<input checked="" type="checkbox"/>		
3) Is the detector efficiency curve printout included?	<input checked="" type="checkbox"/>		
4) Is the efficiency calibration report included and reviewed?	<input checked="" type="checkbox"/>		
5) Is the raw count data included for: the calibration peak report? the calibration verification PEAK report? the calibration verification NID report? the last instrument background?	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
	<input checked="" type="checkbox"/>		
6) Are the calibration verification calculations included?	<input checked="" type="checkbox"/>		
7) Are the instrument settings included: amp, HVPS, ADC settings?	<input checked="" type="checkbox"/>		

Prepared By: R. Futen

Date: 7/30/13

Reviewed By: K. Stamp

Date: 7/31/13

Effective Date: 7/26/13



1663

**CERTIFICATE OF CALIBRATION**  
Standard Radionuclide Source

93344

2.0 Liter Solid in 230G GA-MA Beaker

**Customer:** GEL Laboratories, LLC  
**P.O. No.:** GEL 1303471, Item 8  
**Reference Date:** 01-Apr-2013  
**Product Code:** MIX-8400-EG-SD  
**12:00 PM EST Grams of Master Source:** 0.0082376

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Additional radionuclides were added gravimetrically from solutions calibrated by gamma-ray spectrometry, ionization chamber, or liquid scintillation counting. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1998, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Density of solid matrix 1.15 g/cc.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* yps/gram	This Source yps	Uncertainty* , %			Calibration Method*
					u <sub>A</sub>	u <sub>B</sub>	U	
Pb-210	46.5	8.109E+03	—	1.522E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	—	9.575E+02	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.620E+05	1.334E+03	0.5	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	8.866E+04	7.303E+02	0.4	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.250E+05	1.030E+03	0.4	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.653E+05	2.185E+03	0.3	1.9	3.8	HPGe
Sn-113	391.7	1.151E+02	1.737E+05	1.431E+03	0.4	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.145E+05	9.432E+02	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.178E+05	3.442E+03	0.5	1.9	3.9	HPGe
Zn-65	1115.6	2.441E+02	—	1.848E+03	0.1	1.7	3.5	IC
Co-60	1173.2	1.925E+03	2.103E+05	1.732E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.104E+05	1.733E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.423E+05	3.644E+03	0.7	1.9	4.0	HPGe

\* Master Source refers to Analytcs' 8-isotope mixture which is calibrated quarterly.

**Calibration Methods:** 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)



Source Prepared by:

K. Eardley  
K. Eardley, Radiochemist

QA Approved:

J.D. McCorvey  
J.D. McCorvey, Counting Room Manager

Date: 25 APR 13



# Standard Logbook

**Serial ID:** 1663                      **Open/Reference Date:** 01-APR-13  
**Name:** Mixed gamma- 2LMB        **Received:** 01-APR-13  
**Type:** Source Material            **Expires:** 01-APR-14  
**Employee:** Maggie Stamps        **Verified:** 08-MAY-13  
**Supplier:** Eckert & Zeigler Analytics  
**Description:** 2LMB Calibration Standard 93344  
**Comments:** None

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Analyte	Concentration	Analyte	Concentration
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## CERTIFICATE OF CALIBRATION

### Standard Radionuclide Source

### 82292-278

### 2.0 Liter Solid in 230G GA-MA Beaker

**Customer:** GEL Laboratories, LLC

**P.O. No.:** 954255 RD, Item 1

**Reference Date:** 01-Apr-2010      12:00 PM EST      **Grams of Master Source:** 0.0070315

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytix (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.16, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101. Density of solid matrix 1.15 g/cc.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* $\mu\text{ps}/\text{gram}$	This Source $\mu\text{ps}$	Uncertainty, %			Calibration Method
					$u_A$	$u_B$	U	
Pb-210	46.5	8.120E+03	————	1.267E+03	0.1	2.1	4.1	4 $\pi$ LS
Am-241	59.5	1.580E+05	————	8.600E+02	0.1	1.7	3.5	4 $\pi$ LS
Cd-109	88.0	4.626E+02	1.679E+05	1.181E+03	0.4	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	9.065E+04	6.374E+02	0.4	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.271E+05	8.937E+02	0.3	1.9	3.8	HPGe
Hg-203	279.2	4.661E+01	2.737E+05	1.925E+03	0.2	1.9	3.8	HPGe
Sn-113	391.7	1.151E+02	1.789E+05	1.258E+03	0.3	1.9	3.8	HPGe
Cs-137	661.7	1.098E+04	1.128E+05	7.932E+02	0.5	1.9	3.9	HPGe
Y-88	898.0	1.066E+02	4.329E+05	3.044E+03	0.3	1.9	3.8	HPGe
Co-60	1173.2	1.925E+03	2.148E+05	1.510E+03	0.7	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.148E+05	1.510E+03	0.5	1.9	3.9	HPGe
Y-88	1836.1	1.066E+02	4.583E+05	3.223E+03	0.4	1.9	3.9	HPGe

\* Master Source refers to Analytix' 8-isotope mixture which is calibrated quarterly.

**Calibration Methods:** 4 $\pi$  LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty,  $k = 2$ . See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)



This standard will expire one year after the reference date.

Source Prepared by: M. I. Taskaeva  
M. I. Taskaeva, Radiochemist

QA Approved: J. D. McCorvey  
J. D. McCorvey, QA Manager Alternate

Date: 5/24/10



# Standard Logbook

**Serial ID:** 1478                      **Open/Reference Date:** 01-APR-10  
**Name:** 2LMB                              **Received:** 29-JUN-10  
**Type:** Source Material                **Expires:** 09-JUN-36  
**Employee:** Maggie Stamps            **Verified:** 09-JUN-10  
**Supplier:** Eckert & Ziegler  
**Description:** MIXED GAMMA STANDARD (82292-278)  
**Comments:** None

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Analyte	Concentration	Analyte	Concentration
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Title: Mixed Gamma + Am-241 & Pb-210

Nuclide Name	Nuclide Type	Half Life	Key Line?	No Wtmean?	Energy (keV)	%Abn
CO-57		271.74D	*		122.06	85.60
					136.47	10.68
CO-60		1925.28D			1173.23	99.85
			*		1332.49	99.98
ZN-65		244.06D	*		1115.54	50.60
SR-85		64.84D	*		514.00	96.00
Y-88		106.63D			898.04	93.70
			*		1836.06	99.20
CD-109		461.40D	*		88.03	3.70
SN-113		115.09D	*		391.70	64.97
I-129	FISSION	1.57E+07Y	*		29.62	56.60
					33.59	10.04
					39.58	7.51
CS-137		30.08Y	*		661.66	85.10
CE-139		137.64D	*		165.86	80.00
HG-203		46.59D			70.83	3.69
					72.87	6.19
			*		279.20	81.56
PB-210		22.20Y	*		46.54	4.25
AM-241		432.60Y	*		59.54	35.90
					0.00	0.00

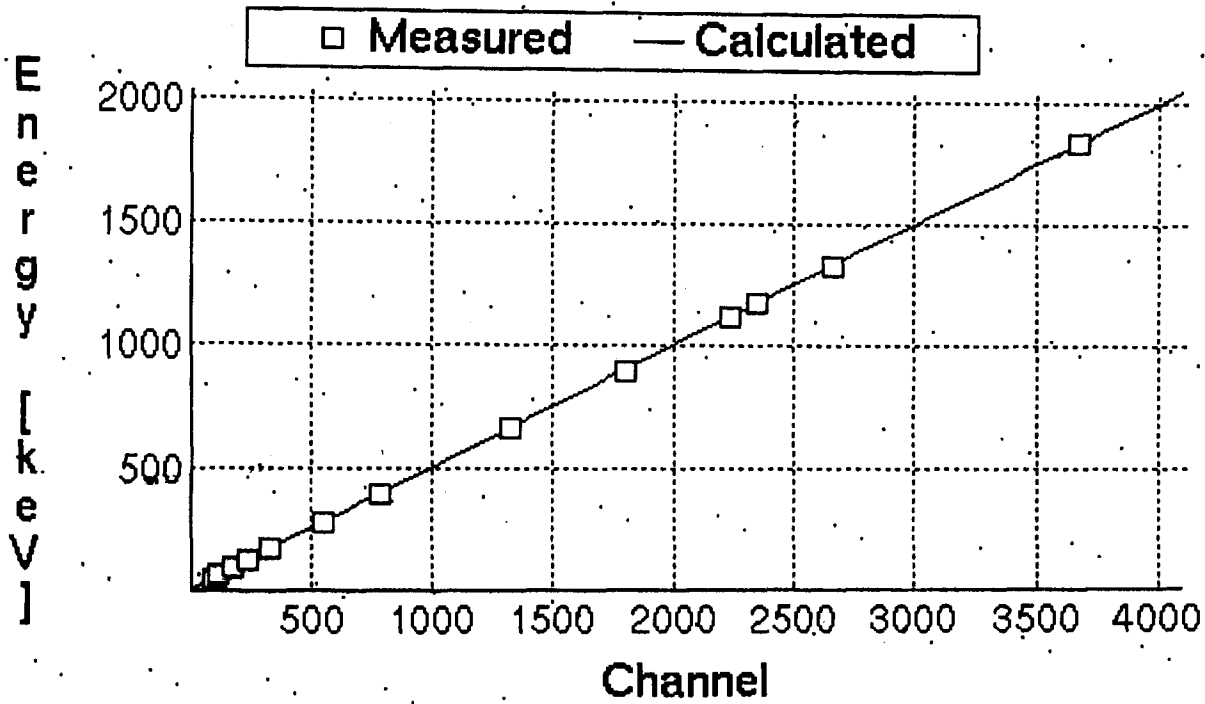
Title: 2LMB 93344

Quantity: 1.00

Assay date: 1-APR-2013 12:00:00.0

Nuclide Name	Half Life	Energy (keV)	Rate	% Err	% Abn	CAL/INIT
PB-210	22.20Y	46.5	1522	4.10	4.3	Yes
AM-241	432.60Y	59.5	958	3.50	35.9	Yes
CD-109	461.40D	88.0	1334	4.70	3.7	Yes
CO-57	271.74D	122.1	730	4.10	85.6	Yes
CE-139	137.64D	165.9	1030	3.90	80.0	Yes
HG-203	46.59D	279.2	2185	3.80	81.6	Yes
SN-113	115.09D	391.7	1431	3.90	65.0	Yes
CS-137	30.08Y	661.7	943	4.00	85.1	Yes
Y-88	106.63D	898.0	3442	3.90	93.7	Yes
ZN-65	244.06D	1115.6	1848	3.50	50.6	Yes
CO-60	1925.28D	1173.2	1732	4.00	99.8	Yes
CO-60	1925.28D	1332.5	1733	4.00	100.0	Yes
Y-88	106.63D	1836.1	3644	4.00	99.2	Yes





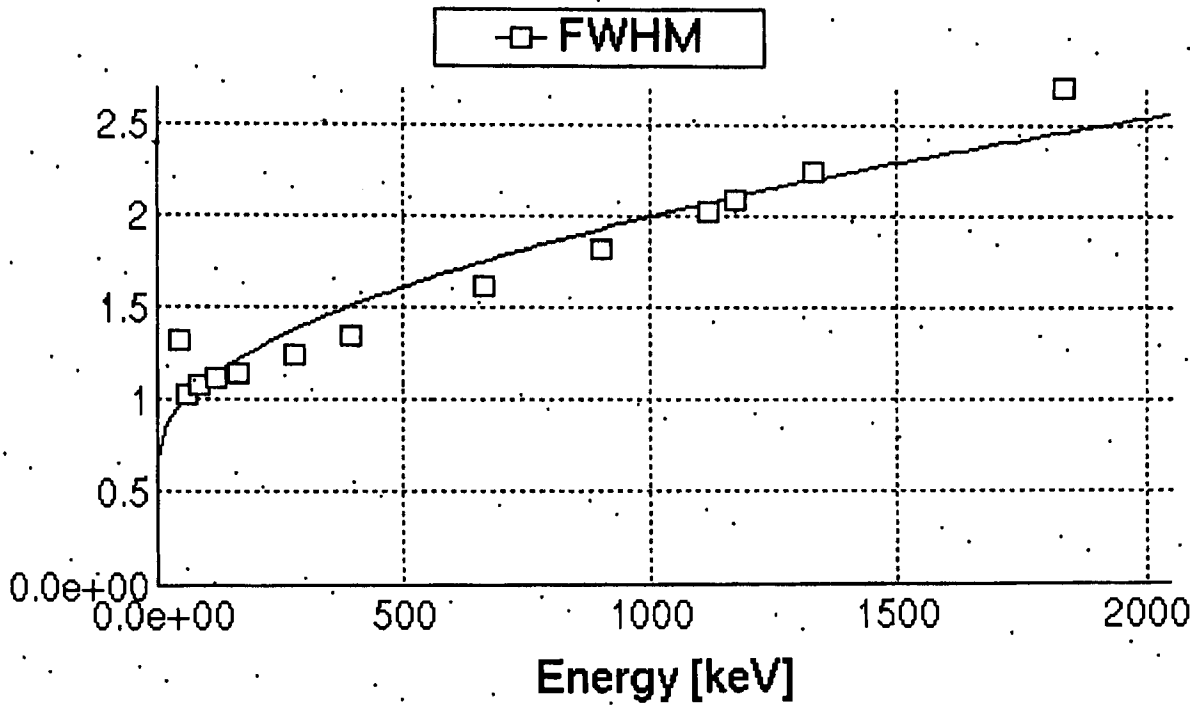
Datasource:

Energy =  $2.002e-01$  keV +  $4.999e-01$  \*Ch +  $-2.163e-08$  \*Ch<sup>2</sup> [CHISQ =  $3.242e-02$ ]

FWHM =  $6.851e-01$  keV +  $4.161e-02$  \*E<sup>1/2</sup> [CHISQ =  $2.442e-02$ ]

Lo Tail =  $0.000e+00$  keV +  $0.000e+00$  \*E [CHISQ =  $0.000e+00$ ]

energy calibration 87 7/25/13



Datasource:

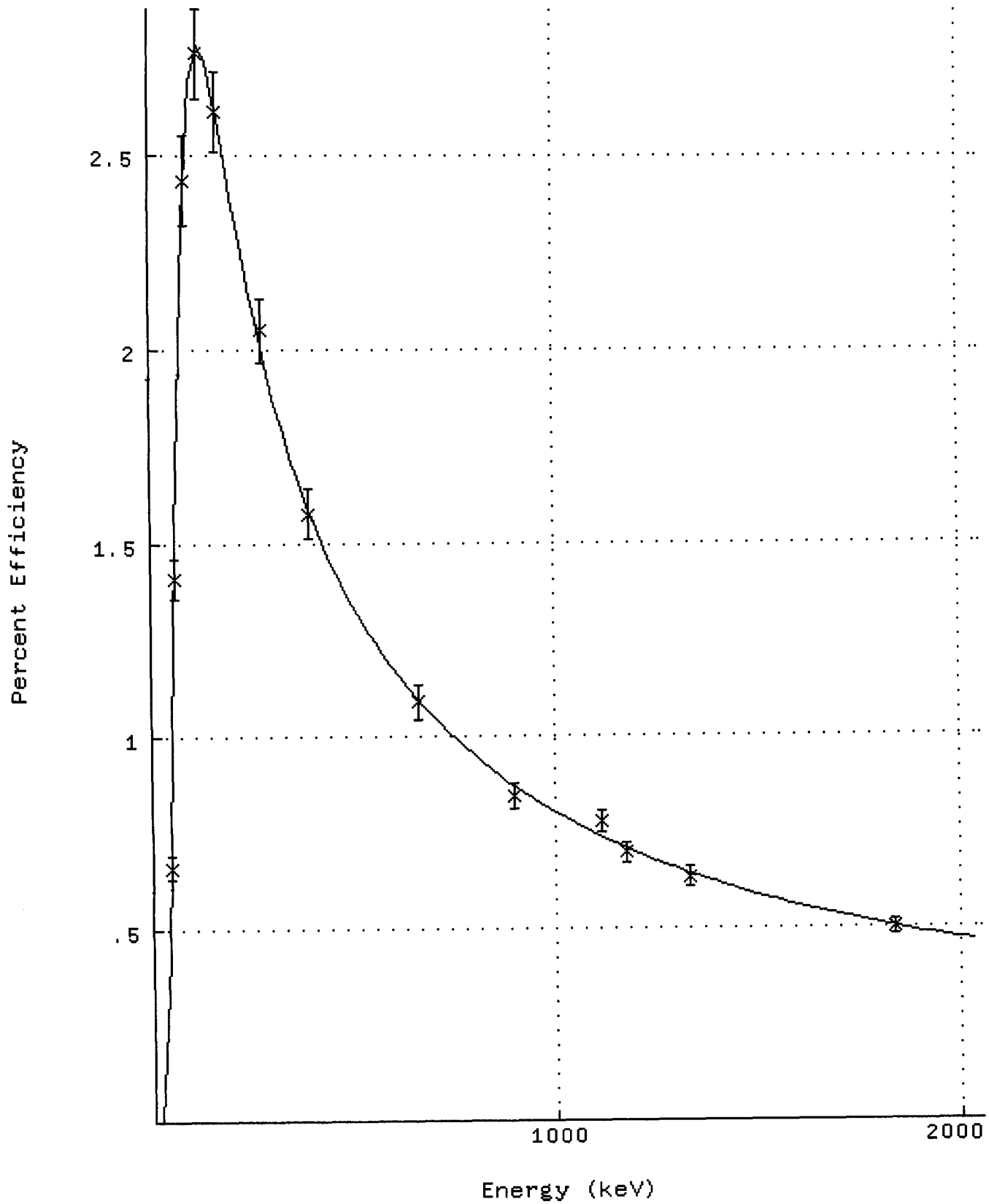
Energy =  $2.002e-01 \text{ keV} + 4.999e-01 * \text{Ch} + -2.163e-08 * \text{Ch}^2$  [CHISQ =  $3.242e-02$ ]

FWHM =  $6.851e-01 \text{ keV} + 4.161e-02 * \text{E}^{1/2}$  [CHISQ =  $2.442e-02$ ]

Lo Tail =  $0.000e+00 \text{ keV} + 0.000e+00 * \text{E}$  [CHISQ =  $0.000e+00$ ]

Shape calibration 87 7/25/13

Spectrum : DKA100: [CANBERRA, GAMMA] EFF\_GAM07\_2LMB.CNF; 12  
Calib Date: 26-JUL-2013 11:27  
Detector : GAMMA7                    Geometry        : 2LMB  
Fit type : 5 Deg. Empirical



$$\text{Energy} = 0.2002 + 0.4999 \cdot \text{Channel} + -2.1632\text{E-}08 \cdot (\text{Channel}^2)$$

Nbr	Centroid Channel	True Energy	Computed Energy	Difference
1	92.50	46.54	46.44	0.097
2	118.70	59.54	59.54	0.000
3	175.71	88.03	88.04	-0.010
4	243.80	122.06	122.08	-0.022
5	331.44	165.86	165.89	-0.033
6	558.17	279.20	279.23	-0.034
7	783.20	391.70	391.73	-0.029
8	1323.21	661.66	661.67	-0.010
9	1796.09	898.04	898.04	-0.001
10	2231.23	1115.60	1115.54	0.059
11	2346.65	1173.23	1173.23	0.002
12	2665.30	1332.49	1332.49	-0.004
13	3672.89	1836.06	1836.08	-0.016

FWHM Calibration Report

$$\text{FWHM} = 0.6851 + 4.1611\text{E-}02 \cdot (\text{Energy}^{1/2})$$

Nbr	Energy	True FWHM	Computed FWHM	Difference
1	46.54	1.32	0.97	0.354
2	59.54	1.03	1.01	0.024
3	88.03	1.09	1.08	0.010
4	122.06	1.12	1.14	-0.028
5	165.86	1.15	1.22	-0.070
6	279.20	1.25	1.38	-0.133
7	391.70	1.35	1.51	-0.160
8	661.66	1.62	1.76	-0.131
9	898.04	1.83	1.93	-0.103
10	1115.60	2.03	2.07	-0.044
11	1173.23	2.10	2.11	-0.013
12	1332.49	2.25	2.20	0.046
13	1836.06	2.72	2.47	0.248

Sample ID : 93344

Acquisition date : 26-JUL-2013 10:18:34

$$\text{Eff} = \exp(a_2 + a_3 \cdot x + a_4 \cdot x^2 + a_5 \cdot x^3 + a_6 \cdot x^4 + a_7 \cdot x^5), \quad x = \ln(a_1 / \text{energy})$$

a1	a2	a3	a4	a5	a6	a7
941.3	-4.780	0.7630	-4.2515E-02	-1.1313E-02	3.1766E-02	-1.8009E-02

Average Deviation = 1.59 %      Reduced Chi-Square = 0.566

Nbr	Energy (keV)	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/ Error	% Diff
1	46.54	6.62E-03	2.86E-04	6.69E-03	-0.23	-0.99
2	59.54	1.41E-02	5.12E-04	1.39E-02	0.42	1.51
3	88.03	2.43E-02	1.15E-03	2.46E-02	-0.23	-1.07
4	122.06	2.76E-02	1.15E-03	2.78E-02	-0.18	-0.77
5	165.86	2.61E-02	1.04E-03	2.63E-02	-0.18	-0.70
6	279.20	2.05E-02	8.08E-04	2.00E-02	0.64	2.53
7	391.70	1.58E-02	6.24E-04	1.59E-02	-0.23	-0.90
8	661.66	1.09E-02	4.43E-04	1.09E-02	-0.11	-0.46
9	898.04	8.43E-03	3.33E-04	8.70E-03	-0.83	-3.28
10	1115.60	7.76E-03	2.77E-04	7.37E-03	1.42	5.07
11	1173.23	6.95E-03	2.81E-04	7.08E-03	-0.47	-1.91
12	1332.49	6.33E-03	2.55E-04	6.41E-03	-0.34	-1.37
13	1836.06	5.00E-03	2.02E-04	5.01E-03	-0.04	-0.16

Configuration : DKA100:[CANBERRA.GAMMA.SCUSR.ARCHIVE]CAL\_GAM07\_2LMB\_252254.CNF;1

---- Sample Information ----

Sample Title : 2LMB 93344  
 Sample ID : 93344 Sample Quantity : 1.00000E+00 SAMPLE  
 Sample Type : CAL Sample Geometry :  
 Sample Number : 252237 Spctrm Collector : gamma spec user  
 Sample Collector : Sample Analyst : gamma spec user

---- Sample Deposition Information ----

Dep. Correction? : No Dep. Duration :  
 Deposition Start : Deposition End : 1-APR-2013 12:00:00.

---- Sample Decay/Count Information ----

Sample Date : 1-APR-2013 12:00:00. Acquisition date : 26-JUL-2013 10:18:34  
 Decay time : 115 22:18:34.92 % dead time : 1.4%  
 Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:49.56

---- Detector Parameters ----

Energy cal. time : 25-JUL-2013 13:04:38 Energy cal. oper.: gamma spec user  
 Detector name : GAMMA7 Counting geometry: 2LMB  
 Effic. cal. time : 26-JUL-2013 11:27:41 Effic. cal. oper.: gamma spec user

---- Processing Parameters ----

Start channel : 1 End channel : 4096  
 Sensitivity : 3.00000 Gaussian Sens. : 10.00000  
 Critical level? : No Propagate Errors?: No  
 Efficiency Type : EMPIRICA Library-based eff: No  
 Energy tolerance : 2.00000 Half life ratio : 8.00000  
 Abundance limit : 75.00000 WTM error limit : 3.00000  
 MDA Width (FWHM) : 3.00000 MDA Confid Level : 5.00000 %

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.34	36669	52022	1.09	92.30	86	11	1.02E+01	1.3	
2	0	50.60	550	26451	1.32	100.81	98	6	1.53E-01	46.9	
3	0	59.45	49580	47252	1.07	118.52	113	11	1.38E+01	1.0	
4	10	67.51	3594	43696	2.21	134.64	129	23	9.98E-01	11.6	8.89E+00
5	10	70.41	3331	40820	1.70	140.45	129	23	9.25E-01	11.6	
6	10	72.82	4163	46140	1.84	145.27	129	23	1.16E+00	10.1	
7	8	83.09	4125	58016	2.28	165.81	159	24	1.15E+00	12.1	3.40E+01
8	8	85.34	5026	40077	1.72	170.30	159	24	1.40E+00	7.7	
9	8	88.01	101171	21619	1.08	175.66	159	24	2.81E+01	0.4	
10	0	122.05	55140	31782	1.08	243.74	238	12	1.53E+01	0.8	
11	5	134.59	499	9241	0.99	268.83	267	11	1.39E-01	27.5	4.42E+00
12	5	136.47	6681	13694	1.03	272.58	267	11	1.86E+00	3.0	
13	0	165.88	54762	27352	1.16	331.41	324	14	1.52E+01	0.8	
14	0	216.63	432	9310	1.54	432.94	430	6	1.20E-01	35.6	
15	0	255.12	1595	11144	1.12	509.93	506	9	4.43E-01	12.2	
16	0	279.22	29371	14042	1.23	558.14	551	14	8.16E+00	1.0	
17	0	298.22	171	6861	0.57	596.15	593	8	4.75E-02	84.3	
18	0	391.71	40871	8577	1.31	783.16	776	13	1.14E+01	0.7	
19	0	480.68	26	4249	0.57	961.15	958	8	7.13E-03	441.4	
20	0	511.06	4258	8061	2.58	1021.92	1014	16	1.18E+00	5.0	
21	0	661.65	37042	7525	1.57	1323.17	1315	16	1.03E+01	0.7	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
22	0	814.05	665	3534	1.61	1628.05	1623	10	1.85E-01	17.2	
23	0	859.86	65	2586	1.24	1719.70	1716	7	1.81E-02	130.2	
24	0	898.02	49624	8281	1.77	1796.04	1786	19	1.38E+01	0.6	
25	0	1115.51	37458	4156	1.98	2231.18	2221	19	1.04E+01	0.7	
26	0	1173.19	42041	2763	2.01	2346.57	2336	20	1.17E+01	0.6	
27	0	1190.75	92	1071	2.28	2381.70	2378	10	2.55E-02	67.4	
28	4	1325.44	1043	1639	3.22	2651.18	2641	34	2.90E-01	10.0	9.99E+00
29	4	1332.47	37866	1078	2.19	2665.26	2641	34	1.05E+01	0.5	
30	0	1606.29	36	1142	0.87	3213.11	3211	10	1.00E-02	176.4	
31	0	1647.87	189	1013	1.36	3296.30	3288	16	5.24E-02	38.5	
32	0	1836.01	30956	688	2.54	3672.76	3662	23	8.60E+00	0.6	
33	0	1987.01	24	159	5.02	3974.89	3958	18	6.76E-03	122.8	

\*\*\*\*\*  
 \* GEL Laboratories LLC \*  
 \* 2040 Savage Road \*  
 \* Charleston, SC 29407 \*  
 \*\*\*\*\*

Configuration : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER\_GAM07\_2LMB.CNF;1  
 Background file : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG\_GAM07.CNF;335  
 Background date : 21-JUL-2013 12:59:10  
 Sample date : 1-APR-2010 12:00:00. Acquisition date : 26-JUL-2013 11:31:19  
 Sample ID : VER\_GAM07\_2LMB Sample quantity : 1.00000E+00 SAMPLE  
 Detector name : GAM07 Detector geometry: 2LMB  
 Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:00:13.05 0.4%  
 Energy tolerance : 1.50000 keV Analyst Initials :  
 Abundance limit : 75.00000 Sensitivity : 3.00000  
 Batch ID : Detector SN# :  
 Matrix Spike ID : LCS ID :  
 \*\*\*\*\*

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.40*	26870	22125	1.04	92.42	87	9	7.46E+00	1.2	
2	0	50.58	524	17076	1.38	100.77	98	8	1.45E-01	43.4	
3	4	57.02	1123	8537	1.33	113.66	112	12	3.12E-01	11.2	3.38E+01
4	4	59.53	43537	7725	0.99	118.68	112	12	1.21E+01	0.6	
5	0	88.01	17293	8515	1.04	175.65	170	12	4.80E+00	1.3	
6	0	122.05	2929	5226	1.07	243.73	239	10	8.14E-01	5.0	
7	0	136.65	278	3333	1.12	272.95	270	7	7.72E-02	35.0	
8	0	165.62	216	2870	0.96	330.90	328	7	5.99E-02	41.8	
9	0	188.94	190	2405	1.40	377.54	375	6	5.27E-02	41.6	
10	0	198.19*	74	2026	1.33	396.05	395	5	2.04E-02	92.7	
11	0	238.51*	86	2157	1.20	476.70	473	6	2.40E-02	86.2	
12	0	263.63	129	2390	0.52	526.94	524	8	3.59E-02	66.1	
13	0	275.84	134	1855	1.45	551.37	549	7	3.72E-02	54.1	
14	0	467.62	101	1198	1.15	935.02	932	6	2.82E-02	54.8	
15	0	478.87	112	1384	1.23	957.53	955	8	3.11E-02	58.5	
16	0	568.10	143	1133	3.10	1136.03	1131	11	3.98E-02	46.2	
17	0	661.68	28686	1457	1.52	1323.23	1316	15	7.97E+00	0.7	
18	0	898.07	99	1036	1.59	1796.15	1792	9	2.74E-02	59.7	
19	0	1173.24	24490	905	1.95	2346.67	2338	20	6.80E+00	0.7	
20	0	1204.23	39	313	1.66	2408.67	2400	12	1.08E-02	92.7	
21	0	1332.51	21908	348	2.07	2665.33	2655	21	6.09E+00	0.7	
22	0	1429.73	57	57	1.04	2859.85	2851	21	1.58E-02	36.0	
23	0	1517.94	34	73	2.82	3036.34	3024	23	9.38E-03	68.6	
24	0	1667.22	12	30	3.59	3335.02	3328	13	3.46E-03	93.9	
25	4	1758.81	12	10	1.59	3518.28	3516	19	3.23E-03	49.9	2.44E+00
26	4	1763.12	26	29	2.94	3526.90	3516	19	7.28E-03	48.0	
27	0	1775.44	24	13	4.20	3551.57	3545	14	6.70E-03	38.5	
28	0	1876.07	36	115	22.81	3752.92	3707	53	9.88E-03	117.0	
29	0	2003.46	21	16	3.20	4007.81	4001	13	5.71E-03	46.1	

Flag: "\*" = Peak area was modified by background subtraction



Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/SAMPLE	Decay Corr pCi/SAMPLE	2-Sigma %Error
CO-57	122.06	2929	85.60*	2.781E+00	9.238E+02	2.033E+04	9.95
	136.47	278	10.68	2.764E+00	7.068E+02	1.556E+04	70.05
CO-60	1173.23	24490	99.85	7.085E-01	2.599E+04	4.021E+04	1.42
	1332.49	21908	99.98*	6.415E-01	2.565E+04	3.967E+04	1.42
CD-109	88.03	17293	3.70*	2.460E+00	1.427E+05	8.811E+05	2.64
CS-137	661.66	28686	85.10*	1.093E+00	2.315E+04	2.499E+04	1.32
CE-139	165.86	216	80.00*	2.632E+00	7.685E+01	3.439E+04	83.58
PB-210	46.54	26870	4.25*	6.613E-01	7.178E+05	7.961E+05	2.34
AM-241	59.54	43537	35.90*	1.387E+00	6.566E+04	6.601E+04	1.18

Flag: "\*" = Keyline

QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC\_GAM07.QAF;1

Sample ID : Bkg Sample quantity : 1.00 ea  
Sample date : 21-JUL-2013 12:59:10 Acquisition date : 21-JUL-2013 12:59:10  
Elapsed live time: 0 16:40:00.00 Elapsed real time: 0 16:40:04.89

Out-of-range Test: N-SIGMA

Parameter Description	Value	Deviation	Flag
[Mean+/-Stdev]			
*Spectrum Background Rate	1.4902E+00	-1.51	
[1.51582+/-0.01695]			

Flags: "\*" means the out-of-range test is parameter-dependent

Approved by: RF Approval Date: 7/30/13

Sample ID : Bkg

Acquisition date : 21-JUL-2013 12:59:10

VMS Gamma Spectroscopy Report generated 22-JUL-2013 05:39:27

Configuration : DKA100:[CANBERRA.GAMMA.SCUSR.ARCHIVE]BKG\_BKG\_GAM07\_\_251404.CNF;1

---- Sample Information ----

Sample Title : Weekly Background  
 Sample ID : Bkg Sample Quantity : 1.00000E+00 ea  
 Sample Type : bkg Sample Geometry :  
 Sample Number : 251404 Spctrm Collector : gamma spec user  
 Sample Collector : Sample Analyst : gamma spec user

---- Sample Deposition Information ----

Dep. Correction? : No Dep. Duration :  
 Deposition Start : Deposition End : 21-JUL-2013 12:59:10

---- Sample Decay/Count Information ----

Sample Date : 21-JUL-2013 12:59:10 Acquisition date : 21-JUL-2013 12:59:10  
 Decay time : 0 00:00:00.00 % dead time : 0.0%  
 Elapsed live time: 0 16:40:00.00 Elapsed real time: 0 16:40:04.89

---- Detector Parameters ----

Energy cal. time : Energy cal. oper.:  
 Detector name : GAMMA7 Counting geometry:  
 Effic. cal. time : 9-JUL-2012 15:19:08. Effic. cal. oper.: gamma spec user

---- Processing Parameters ----

Start channel : 1 End channel : 4096  
 Sensitivity : 3.00000 Gaussian Sens. : 10.00000  
 Critical level? : No Propagate Errors?: No  
 Efficiency Type : SPLINE Library-based eff: No  
 Energy tolerance : 2.00000 Half life ratio : 8.00000  
 Abundance limit : 75.00000 WTM error limit : 3.00000  
 MDA Width (FWHM) : 3.00000 MDA Confid Level : 5.00000 %

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.20	411	852	1.00	92.41	88	10	6.86E-03	14.2	
2	0	53.21	87	630	1.50	106.43	103	8	1.45E-03	51.3	
3	0	62.90	401	651	1.02	125.81	122	8	6.68E-03	12.1	
4	0	66.17	111	548	1.98	132.33	130	7	1.85E-03	36.2	
5	0	74.80	77	727	1.46	149.60	146	7	1.28E-03	59.1	
6	0	77.31	74	571	1.18	154.62	152	6	1.23E-03	53.1	
7	2	80.59	94	506	1.31	161.18	158	14	1.56E-03	39.4	7.35E-01
8	2	84.15	192	586	1.17	168.29	158	14	3.20E-03	22.1	
9	0	92.52	706	856	1.13	185.04	180	9	1.18E-02	8.4	
10	0	98.31	99	708	2.24	196.63	193	9	1.65E-03	49.5	
11	0	115.90	65	560	1.42	231.80	229	7	1.08E-03	61.6	
12	0	142.41	193	1215	0.81	284.83	277	15	3.22E-03	40.1	
13	0	163.52	67	849	1.54	327.04	320	11	1.12E-03	84.9	
14	0	185.83	406	788	0.98	371.66	366	11	6.76E-03	14.4	
15	0	197.97	144	686	2.48	395.95	391	10	2.40E-03	35.1	
16	0	238.65	193	774	1.13	477.29	471	11	3.22E-03	28.8	
17	0	308.53	41	477	1.82	617.07	611	10	6.77E-04	102.4	
18	0	339.15	66	451	1.59	678.30	670	11	1.10E-03	63.5	
19	0	351.35	109	402	1.25	702.70	698	10	1.81E-03	35.8	

20	0	355.93	84	354	0.66	711.87	708	10	1.40E-03	43.4	
21	0	406.35	16	237	0.76	812.70	812	7	2.73E-04	158.1	
22	0	469.81	32	211	1.29	939.63	936	8	5.25E-04	82.0	
23	0	503.52	14	246	1.52	1007.05	1005	8	2.34E-04	194.9	
24	0	510.99	1332	500	2.63	1021.99	1014	19	2.22E-02	4.9	
25	0	583.18	111	231	1.86	1166.35	1161	11	1.86E-03	28.1	
26	0	608.99	117	211	1.49	1217.99	1214	9	1.94E-03	24.5	
27	0	663.27	65	257	1.40	1326.54	1319	14	1.08E-03	54.4	
28	0	769.95	118	300	9.23	1539.90	1529	26	1.97E-03	41.1	
29	0	802.87	56	177	0.89	1605.74	1600	13	9.38E-04	50.4	
30	0	822.76	20	160	2.18	1645.53	1637	12	3.41E-04	126.1	
31	0	911.88	72	157	1.48	1823.77	1816	13	1.20E-03	38.1	
32	0	928.66	21	91	1.68	1857.33	1851	11	3.47E-04	92.4	
33	7	964.57	32	73	1.85	1929.15	1926	17	5.26E-04	46.6	2.68E+00
34	7	969.03	56	92	2.63	1938.06	1926	17	9.34E-04	35.1	
35	0	1001.37	68	113	0.82	2002.73	1997	13	1.13E-03	35.0	
36	0	1099.72	30	56	2.43	2199.44	2196	8	5.06E-04	45.9	
37	0	1141.03	46	286	9.63	2282.06	2251	36	7.65E-04	117.8	
38	3	1460.61	74	64	2.86	2921.21	2912	26	1.23E-03	28.6	1.66E+00
39	3	1467.50	25	18	2.15	2935.00	2912	26	4.16E-04	28.5	
40	0	1614.54	36	63	8.62	3229.08	3218	21	6.00E-04	57.6	
41	0	1663.37	27	67	6.42	3326.73	3313	21	4.48E-04	79.1	
42	0	1715.59	30	47	6.15	3431.19	3421	17	5.03E-04	55.0	
43	0	1765.88	112	29	2.98	3531.75	3522	23	1.86E-03	15.7	
44	0	1801.09	13	27	1.86	3602.18	3594	12	2.11E-04	86.7	
45	0	2042.29	19	24	1.66	4084.58	4079	12	3.17E-04	56.4	

Master Verification Spreadsheet (solid standard)

**Gamma Spectroscopy Calibration Verification**

Instrument: GAMMA 7

Calibration Date: 7/26/2013

Geometry: 2LMB

Manufacturer Standard Id: 82292-278

GEL Standard Id: 1478

Nuclide	Energy	Abundance (decimal)	Emission Rate (dps)	Calibrated Activity (pCi)	Measured Activity (pCi)	DIFFERENCE (%)
Am-241	59.5	0.359	860	6.4744E+04	6.601E+04	1.95
Cs-137	661.7	0.851	793.2	2.5191E+04	2.499E+04	-0.80
Co-60	1173.2	0.9985	1510	4.0872E+04	4.021E+04	-1.62
Co-60	1332.5	0.9998	1510	4.0819E+04	3.967E+04	-2.81

Prepared By: R. Fulen

Date: 7/30/13

Reviewed By: H. Stamp

Date: 7/31/13

Validated by MJSH on 3/10/11

Verification results are considered acceptable if all differences are less than +/- 10%.

GEL Laboratories, LLC

2040 Savage Road, Charleston, SC 29414  
(843)556-8171

**Gamma Spectrometer Front End Electronics Setup**

Detector: Gamma 7

Date Performed: 7/25/13

Performed By: RF

<p><b>High Voltage Power Supply</b></p> <p>Model No. <u>3106 D</u> High Voltage <u>2.00 Kv</u></p>	<p><b>Spectroscopy Amplifier</b></p> <p>Model No. <u>2026</u> Course Gain <u>50</u> Fine Gain <u>1.051</u> Time Constant <u>4 <math>\mu</math>sec</u> Input polarity <u>positive</u> BSLR rate <u>no</u> BSLR mode <u>no</u> Threshold <u>no</u></p>
<p><b>ADC</b></p> <p>Model No. <u>8701</u> Gain <u>4K</u></p>	
<p><b>AIM Module</b></p> <p>Model No. <u>W0556</u> Address <u>3F7:2</u></p>	

**GEL Laboratories, LLC**

2040 Savage Road, Charleston, SC 29414  
(843)556-8171

**Gamma Spectrometer Geometry Calibration Package**

Detector: Gamma 8

Geometry: 2cmB

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate? the second standard(s) documentation? the nuclide library used? the VMS certificate file?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2) Is the energy calibration graph included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3) Is the detector efficiency curve printout included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4) Is the efficiency calibration report included and reviewed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5) Is the raw count data included for: the calibration peak report? the calibration verification PEAK report? the calibration verification NID report? the last instrument background?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6) Are the calibration verification calculations included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7) Are the instrument settings included: amp, HVPS, ADC settings?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Prepared By: R. Futeh

Date: 7/9/13

Reviewed By: W. Hampy

Date: 7/11/13

Effective Date: 7/9/13

1663

**CERTIFICATE OF CALIBRATION**  
Standard Radionuclide Source

93344

2.0 Liter Solid in 230G GA-MA Beaker

**Customer:** GEL Laboratories, LLC  
**P.O. No.:** GEL 1303471, Item 8  
**Reference Date:** 01-Apr-2013  
**Product Code:** MIX-8400-EG-SD  
**12:00 PM EST Grams of Master Source:** 0.0082376

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Additional radionuclides were added gravimetrically from solutions calibrated by gamma-ray spectrometry, ionization chamber, or liquid scintillation counting. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytcs (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Density of solid matrix 1.15 g/cc.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* yps/gram	This Source yps	Uncertainty*, %			Calibration Method*
					u <sub>A</sub>	u <sub>B</sub>	U	
Pb-210	46.5	8.109E+03	—	1.522E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.880E+05	—	9.575E+02	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.620E+05	1.334E+03	0.5	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	8.866E+04	7.303E+02	0.4	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.250E+05	1.030E+03	0.4	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.653E+05	2.185E+03	0.3	1.9	3.8	HPGe
Sn-113	391.7	1.151E+02	1.737E+05	1.431E+03	0.4	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.145E+05	9.432E+02	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.178E+05	3.442E+03	0.5	1.9	3.9	HPGe
Zn-65	1115.6	2.441E+02	—	1.848E+03	0.1	1.7	3.5	IC
Co-60	1173.2	1.925E+03	2.103E+05	1.732E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.104E+05	1.733E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.423E+05	3.644E+03	0.7	1.9	4.0	HPGe

\* Master Source refers to Analytcs' 8-isotope mixture which is calibrated quarterly.

**Calibration Methods:** 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)



MGS Certificate Rev 4, 23 August 2012

RC-S-065-092 Page 1 of 2

**Corporate Office**  
24937 Avenue Tibbitts Valencia, California 91355

**Laboratory**  
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318



Source Prepared by: K. Eardley  
K. Eardley, Radiochemist

QA Approved: J.D. McCorvey  
J.D. McCorvey, Counting Room Manager

Date: 25 APR 13



# Standard Logbook

**Serial ID:** 1663                      **Open/Reference Date:** 01-APR-13  
**Name:** Mixed gamma- 2LMB        **Received:** 01-APR-13  
**Type:** Source Material            **Expires:** 01-APR-14  
**Employee:** Maggie Stamps        **Verified:** 08-MAY-13  
**Supplier:** Eckert & Zeigler Analytics  
**Description:** 2LMB Calibration Standard 93344  
**Comments:** None

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Analyte	Concentration	Analyte	Concentration
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## CERTIFICATE OF CALIBRATION

### Standard Radionuclide Source

### 82292-278

#### 2.0 Liter Solid in 230G GA-MA Beaker

**Customer:** GEL Laboratories, LLC

**P.O. No.:** 954255 RD, Item 1

**Reference Date:** 01-Apr-2010      **12:00 PM EST**      **Grams of Master Source:** 0.0070315

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytix (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.18, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101. Density of solid matrix 1.18 g/cc.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* $\gamma$ ps/gram	This Source $\gamma$ ps	Uncertainty, %			Calibration Method
					$u_A$	$u_B$	U	
Pb-210	46.5	8.120E+03	————	1.267E+03	0.1	2.1	4.1	4 $\pi$ LS
Am-241	59.5	1.580E+05	————	8.600E+02	0.1	1.7	3.5	4 $\pi$ LS
Cd-109	88.0	4.626E+02	1.679E+05	1.181E+03	0.4	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	9.065E+04	6.374E+02	0.4	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.271E+05	8.937E+02	0.3	1.9	3.8	HPGe
Hg-203	279.2	4.661E+01	2.737E+05	1.925E+03	0.2	1.9	3.8	HPGe
Sn-113	391.7	1.151E+02	1.789E+05	1.258E+03	0.3	1.9	3.8	HPGe
Cs-137	661.7	1.098E+04	1.128E+05	7.932E+02	0.5	1.9	3.9	HPGe
Y-88	898.0	1.066E+02	4.329E+05	3.044E+03	0.3	1.9	3.8	HPGe
Co-60	1173.2	1.925E+03	2.148E+05	1.510E+03	0.7	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.148E+05	1.510E+03	0.5	1.9	3.9	HPGe
Y-88	1836.1	1.066E+02	4.583E+05	3.223E+03	0.4	1.9	3.9	HPGe

\* Master Source refers to Analytix' 8-isotope mixture which is calibrated quarterly.

**Calibration Methods:** 4 $\pi$  LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)



This standard will expire one year after the reference date.

Source Prepared by: M. I. Taskaeva  
M. I. Taskaeva, Radiochemist

QA Approved: J. D. McCorvey  
J. D. McCorvey, QA Manager Alternate

Date: 5/24/10



# Standard Logbook

**Serial ID:** 1478                      **Open/Reference Date:** 01-APR-10  
**Name:** 2LMB                              **Received:** 29-JUN-10  
**Type:** Source Material                      **Expires:** 09-JUN-36  
**Employee:** Maggie Stamps                      **Verified:** 09-JUN-10  
**Supplier:** Eckert & Ziegler  
**Description:** MIXED GAMMA STANDARD (82292-278)  
**Comments:** None

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Analyte	Concentration	Analyte	Concentration
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Title: Mixed Gamma + Am-241 & Pb-210

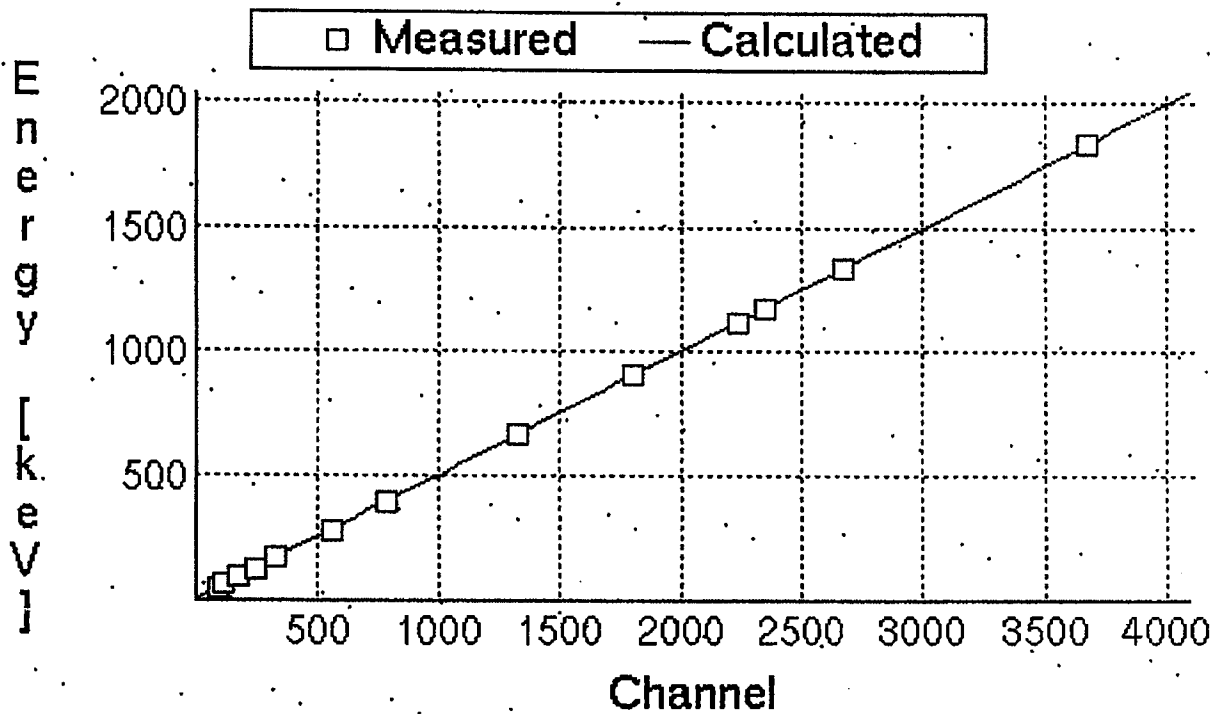
Nuclide Name	Nuclide Type	Half Life	Key Line?	No Wtmean?	Energy (keV)	%Abn
CO-57		271.74D	*		122.06	85.60
					136.47	10.68
CO-60		1925.28D			1173.23	99.85
			*		1332.49	99.98
ZN-65		244.06D	*		1115.54	50.60
SR-85		64.84D	*		514.00	96.00
Y-88		106.63D			898.04	93.70
			*		1836.06	99.20
CD-109		461.40D	*		88.03	3.70
SN-113		115.09D	*		391.70	64.97
I-129	FISSION	1.57E+07Y	*		29.62	56.60
					33.59	10.04
					39.58	7.51
CS-137		30.08Y	*		661.66	85.10
CE-139		137.64D	*		165.86	80.00
HG-203		46.59D			70.83	3.69
					72.87	6.19
			*		279.20	81.56
PB-210		22.20Y	*		46.54	4.25
AM-241		432.60Y	*		59.54	35.90
					0.00	0.00

Title: 2LMB 93344

Quantity: 1.00

Assay date: 1-APR-2013 12:00:00.0

Nuclide Name	Half Life	Energy (keV)	Rate	% Err	% Abn	CAL/INIT
PB-210	22.20Y	46.5	1522	4.10	4.3	Yes
AM-241	432.60Y	59.5	958	3.50	35.9	Yes
CD-109	461.40D	88.0	1334	4.70	3.7	Yes
CO-57	271.74D	122.1	730	4.10	85.6	Yes
CE-139	137.64D	165.9	1030	3.90	80.0	Yes
HG-203	46.59D	279.2	2185	3.80	81.6	Yes
SN-113	115.09D	391.7	1431	3.90	65.0	Yes
CS-137	30.08Y	661.7	943	4.00	85.1	Yes
Y-88	106.63D	898.0	3442	3.90	93.7	Yes
ZN-65	244.06D	1115.6	1848	3.50	50.6	Yes
CO-60	1925.28D	1173.2	1732	4.00	99.8	Yes
CO-60	1925.28D	1332.5	1733	4.00	100.0	Yes
Y-88	106.63D	1836.1	3644	4.00	99.2	Yes



Datasource:

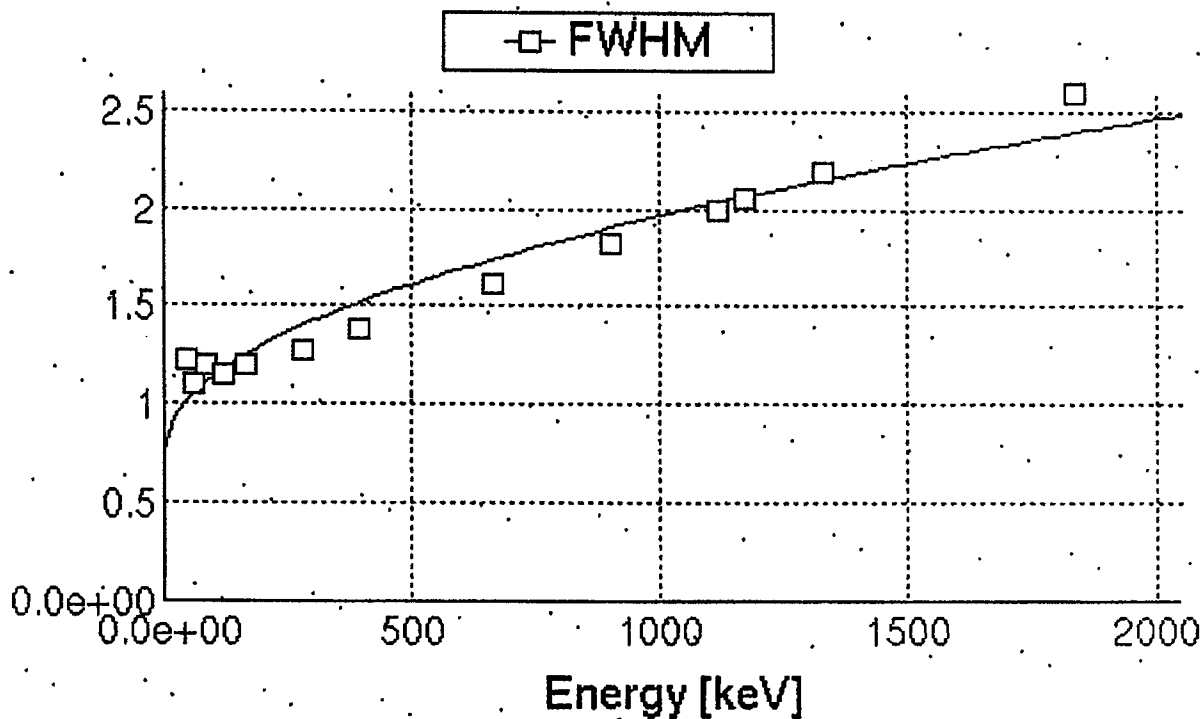
Energy =  $-1.863e-02$  keV +  $4.995e-01$  \*Ch +  $1.460e-08$  \*Ch<sup>2</sup> [CHISQ =  $1.164e-02$ ]

FWHM =  $7.545e-01$  keV +  $3.833e-02$  \*E<sup>1/2</sup> [CHISQ =  $1.416e-02$ ]

Lo Tail =  $0.000e+00$  keV +  $0.000e+00$  \*E [CHISQ =  $0.000e+00$ ]

energy calibration 78 3/22/13





Datasource:

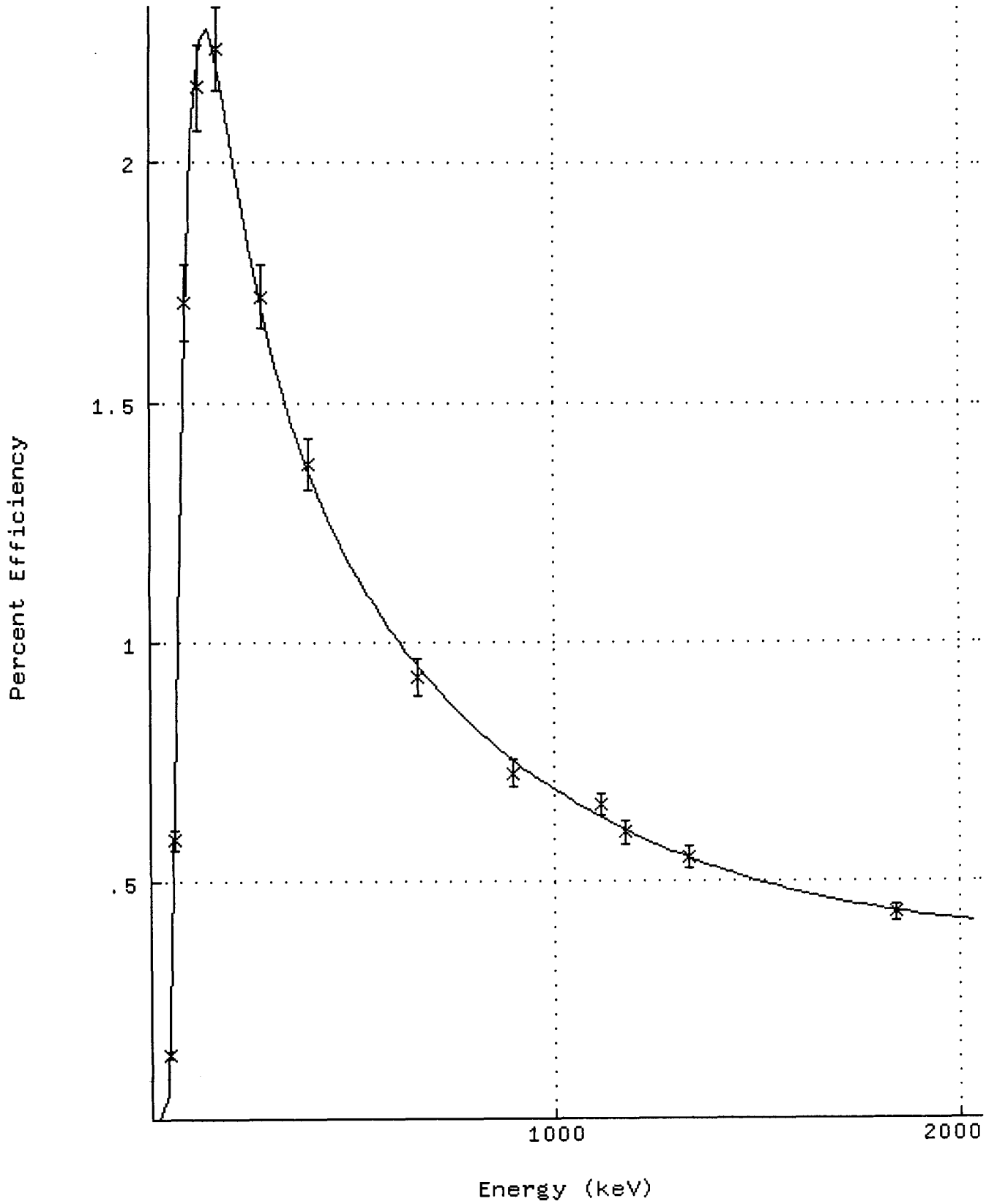
Energy =  $-1.863e-02 \text{ keV} + 4.995e-01 *Ch + 1.460e-08 *Ch^2$  [CHISQ =  $1.164e-02$ ]

FWHM =  $7.545e-01 \text{ keV} + 3.833e-02 *E^{1/2}$  [CHISQ =  $1.416e-02$ ]

Lo Tail =  $0.000e+00 \text{ keV} + 0.000e+00 *E$  [CHISQ =  $0.000e+00$ ]

shape calibration 85 3/22/13

Spectrum : DKA100:[CANBERRA.GAMMA]EFF\_GAM08\_2LMB.CNF;11  
Calib Date: 9-JUL-2013 08:16;  
Detector : GAMMA8                   Geometry/Shelf: 2LMB/0  
Fit type : 5 Deg. Empirical



$$\text{Energy} = -1.8634\text{E-}02 + 0.4995*\text{Channel} + 1.4603\text{E-}08*(\text{Channel}**2)$$

Nbr	Centroid Channel	True Energy	Computed Energy	Difference
1	93.06	46.54	46.46	0.076
2	119.18	59.54	59.51	0.027
3	176.31	88.03	88.05	-0.016
4	244.43	122.06	122.07	-0.012
5	332.16	165.86	165.89	-0.033
6	559.07	279.20	279.24	-0.035
7	784.28	391.70	391.74	-0.036
8	1324.68	661.66	661.68	-0.018
9	1797.84	898.04	898.04	0.001
10	2233.23	1115.60	1115.54	0.063
11	2348.71	1173.23	1173.23	0.003
12	2667.51	1332.49	1332.49	0.002
13	3675.52	1836.06	1836.08	-0.020

FWHM Calibration Report

$$\text{FWHM} = 0.7545 + 3.8333\text{E-}02*(\text{Energy}**1/2)$$

Nbr	Energy	True FWHM	Computed FWHM	Difference
1	46.54	1.22	1.02	0.206
2	59.54	1.09	1.05	0.044
3	88.03	1.20	1.11	0.089
4	122.06	1.15	1.18	-0.024
5	165.86	1.19	1.25	-0.053
6	279.20	1.28	1.39	-0.117
7	391.70	1.38	1.51	-0.136
8	661.66	1.62	1.74	-0.124
9	898.04	1.83	1.90	-0.077
10	1115.60	1.99	2.03	-0.042
11	1173.23	2.05	2.07	-0.014
12	1332.49	2.19	2.15	0.040
13	1836.06	2.60	2.40	0.208

Sample ID : 93344

Acquisition date : 8-JUL-2013 14:11:27

$$\text{Eff} = \exp(a_2 + a_3 \cdot x + a_4 \cdot x^2 + a_5 \cdot x^3 + a_6 \cdot x^4 + a_7 \cdot x^5), \quad x = \ln(a_1 / \text{energy})$$

a1	a2	a3	a	a5	a6	a7
941.3	-4.928	0.7995	-8.2078E-02	-0.1013	0.1406	-4.8984E-02

Average Deviation = 1.97 %      Reduced Chi-Square = 0.698

Nbr	Energy (keV)	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/ /Error	% Diff
1	46.54	1.37E-03	6.73E-05	1.40E-03	-0.48	-2.35
2	59.54	5.85E-03	2.18E-04	5.69E-03	0.71	2.66
3	88.03	1.70E-02	8.04E-04	1.71E-02	-0.02	-0.10
4	122.06	2.15E-02	8.95E-04	2.25E-02	-1.04	-4.32
5	165.86	2.23E-02	8.80E-04	2.21E-02	0.30	1.20
6	279.20	1.72E-02	6.63E-04	1.69E-02	0.48	1.85
7	391.70	1.37E-02	5.38E-04	1.36E-02	0.26	1.01
8	661.66	9.26E-03	3.74E-04	9.47E-03	-0.58	-2.34
9	898.04	7.25E-03	2.84E-04	7.51E-03	-0.93	-3.64
10	1115.60	6.58E-03	2.33E-04	6.31E-03	1.18	4.17
11	1173.23	6.00E-03	2.42E-04	6.05E-03	-0.22	-0.88
12	1332.49	5.48E-03	2.20E-04	5.46E-03	0.08	0.32
13	1836.06	4.33E-03	1.74E-04	4.36E-03	-0.20	-0.82

Configuration : DKA100:[CANBERRA.GAMMA.SCUSR.ARCHIVE]CAL\_GAM08\_2LMB\_250146.CNF;1

---- Sample Information ----

Sample Title : 2LMB 93344  
 Sample ID : 93344 Sample Quantity : 1.00000E+00 SAMPLE  
 Sample Type : CAL Sample Geometry :  
 Sample Number : 250086 Spctrm Collector : gamma spec user  
 Sample Collector : Sample Analyst : gamma spec user

---- Sample Deposition Information ----

Dep. Correction? : No Dep. Duration :  
 Deposition Start : Deposition End : 1-APR-2013 12:00:00.

---- Sample Decay/Count Information ----

Sample Date : 1-APR-2013 12:00:00. Acquisition date : 8-JUL-2013 14:11:27.  
 Decay time : 98 02:11:27.17 % dead time : 1.3%  
 Elapsed live time: 0 02:00:00.00 Elapsed real time: 0 02:01:36.01

---- Detector Parameters ----

Energy cal. time : 22-MAR-2013 10:01:07 Energy cal. oper.: gamma spec user  
 Detector name : GAMMA8 Counting geometry: 2LMB  
 Effic. cal. time : 9-JUL-2013 08:16:20. Effic. cal. oper.: gamma spec user

---- Processing Parameters ----

Start channel : 1 End channel : 4096  
 Sensitivity : 3.00000 Gaussian Sens. : 10.00000  
 Critical level? : No Propagate Errors?: No  
 Efficiency Type : EMPIRICA Library-based eff: No  
 Energy tolerance : 2.00000 Half life ratio : 8.00000  
 Abundance limit : 75.00000 WTM error limit : 3.00000  
 MDA Width (FWHM) : 3.00000 MDA Confid Level : 5.00000 %

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	23.26	5947	33187	2.11	46.61	45	6	8.26E-01	5.0	
2	0	46.45	14603	45677	1.11	93.03	89	9	2.03E+00	2.8	
3	0	59.50	40364	60453	1.10	119.16	114	11	5.61E+00	1.3	
4	0	67.53	626	38026	1.31	135.24	133	6	8.70E-02	49.3	
5	4	70.88	1607	39194	1.05	141.95	139	11	2.23E-01	19.6	8.24E-01
6	4	72.90	2820	38911	0.96	145.99	139	11	3.92E-01	11.3	
7	10	83.77	7266	97048	2.86	167.75	160	24	1.01E+00	9.3	3.64E+01
8	10	85.57	8197	68754	1.78	171.35	160	24	1.14E+00	7.1	
9	10	88.08	141308	39915	1.11	176.38	160	24	1.96E+01	0.4	
10	0	122.12	89286	66002	1.15	244.51	238	13	1.24E+01	0.7	
11	0	136.47	11669	45049	1.17	273.25	269	10	1.62E+00	3.5	
12	0	165.95	102145	48252	1.18	332.27	326	13	1.42E+01	0.5	
13	0	189.84	381	18360	1.46	380.09	378	6	5.29E-02	56.5	
14	0	255.21	3889	21418	1.25	510.97	507	9	5.40E-01	7.0	
15	0	279.30	63595	28315	1.25	559.20	552	14	8.83E+00	0.7	
16	0	371.50	135	10556	0.99	743.77	742	8	1.87E-02	132.2	
17	0	391.79	78940	15895	1.34	784.39	777	13	1.10E+01	0.5	
18	0	471.53	157	8735	0.70	944.04	942	8	2.18E-02	103.5	
19	0	511.07	8449	15081	2.63	1023.18	1016	16	1.17E+00	3.4	
20	0	539.78	107	7070	1.34	1080.65	1080	8	1.49E-02	136.2	
21	0	661.74	62874	14161	1.54	1324.80	1317	15	8.73E+00	0.6	

Sample ID : 93344

Acquisition date : 8-JUL-2013 14:11:27

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
22	0	813.98	1219	7104	1.50	1629.57	1625	10	1.69E-01	13.3	
23	0	835.65	214	5467	0.57	1672.95	1671	8	2.97E-02	60.2	
24	0	898.09	95830	13039	1.72	1797.94	1789	17	1.33E+01	0.4	
25	0	956.66	171	5174	1.38	1915.19	1912	8	2.37E-02	73.3	
26	0	981.95	287	3577	2.09	1965.81	1963	7	3.99E-02	35.1	
27	0	1000.89	211	3808	0.88	2003.72	2000	8	2.93E-02	51.1	
28	0	1089.22	8	5179	0.94	2180.55	2170	12	1.08E-03	*****	
29	0	1115.59	66845	7716	1.90	2233.34	2223	19	9.28E+00	0.5	
30	0	1173.27	72701	5409	1.94	2348.80	2338	20	1.01E+01	0.4	
31	0	1244.82	27	1630	3.68	2492.01	2487	10	3.80E-03	276.9	
32	0	1289.87	83	1386	1.74	2582.20	2580	9	1.15E-02	81.5	
33	0	1301.62	17	1607	0.81	2605.72	2598	10	2.30E-03	454.6	
34	4	1325.21	1862	3216	3.15	2652.95	2642	35	2.59E-01	7.7	1.02E+01
35	4	1332.57	66020	2163	2.10	2667.67	2642	35	9.17E+00	0.4	
36	0	1429.22	147	1163	1.73	2861.13	2858	8	2.03E-02	41.2	
37	0	1522.26	107	2139	1.82	3047.38	3041	11	1.49E-02	84.4	
38	0	1526.87	154	2094	3.69	3056.59	3051	11	2.14E-02	58.1	
39	0	1652.53	41	1076	1.33	3308.13	3304	8	5.63E-03	141.0	
40	0	1681.96	34	1021	1.29	3367.04	3364	9	4.67E-03	172.3	
41	0	1703.51	172	1114	3.43	3410.17	3404	14	2.39E-02	41.9	
42	0	1747.28	24	618	0.71	3497.78	3490	13	3.35E-03	213.7	
43	0	1836.15	60427	913	2.42	3675.66	3664	25	8.39E+00	0.4	
44	0	1929.05	50	319	5.56	3861.61	3854	20	6.92E-03	89.0	
45	0	2013.73	45	159	1.06	4031.11	4026	11	6.25E-03	56.3	

```
*****
*                               GEL Laboratories LLC                       *
*                               2040 Savage Road                         *
*                               Charleston, SC 29407                     *
*****
```

```
Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAM08_2LMB.CNF;1
Background file    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM08.CNF;150
Background date    : 7-JUL-2013 14:53:18.
Sample date        : 1-APR-2010 12:00:00. Acquisition date : 9-JUL-2013 08:19:03.
Sample ID          : VER_GAM08_2LMB      Sample quantity  : 1.00000E+00 SAMPLE
Detector name      : GAM08              Detector geometry: 2LMB
Elapsed live time  : 0 01:00:00.00      Elapsed real time: 0 01:00:11.69 0.3%
Energy tolerance   : 1.50000 keV        Analyst Initials   :
Abundance limit    : 75.00000           Sensitivity        : 3.00000
Batch ID           :                    Detector SN#       :
Matrix Spike ID    :                    LCS ID            :
```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	35.13	216	4411	1.82	70.37	68	6	6.01E-02	49.1	
2	0	46.21	5559	8317	1.09	92.55	87	10	1.54E+00	3.4	
3	0	59.31	18258	9453	1.14	118.77	113	12	5.07E+00	1.3	
4	0	87.89	12033	6816	1.16	176.00	171	12	3.34E+00	1.7	
5	0	121.95*	2335	4997	1.14	244.17	239	11	6.49E-01	6.2	
6	0	136.67	340	3408	1.14	273.65	270	8	9.46E-02	30.2	
7	0	165.77	225	2554	1.05	331.90	329	7	6.25E-02	37.8	
8	0	378.17	82	1248	1.31	757.13	755	7	2.27E-02	72.3	
9	0	391.92	84	1464	1.22	784.65	781	8	2.32E-02	80.1	
10	0	469.96	193	1953	3.79	940.88	936	11	5.36E-02	44.9	
11	0	528.16	73	663	0.87	1057.39	1055	6	2.04E-02	56.5	
12	0	568.98	114	655	1.30	1139.11	1136	7	3.17E-02	38.4	
13	0	661.87	24866	1221	1.53	1325.06	1317	14	6.91E+00	0.7	
14	0	793.31	82	1737	5.19	1588.19	1572	20	2.28E-02	124.9	
15	0	802.62*	44	700	0.55	1606.83	1604	8	1.22E-02	105.3	
16	0	1033.27	35	776	1.80	2068.54	2061	9	9.65E-03	146.4	
17	0	1173.70	21001	831	2.00	2349.66	2340	19	5.83E+00	0.8	
18	0	1307.97	23	105	1.52	2618.42	2611	12	6.40E-03	92.2	
19	0	1313.11	25	77	2.36	2628.71	2625	8	6.92E-03	64.5	
20	0	1333.07	19054	267	2.04	2668.67	2658	20	5.29E+00	0.8	
21	0	1408.99	34	56	1.62	2820.64	2813	17	9.50E-03	52.7	
22	0	1445.63	26	48	4.50	2893.99	2884	15	7.17E-03	62.1	
23	0	1532.44	23	23	4.89	3067.76	3059	15	6.25E-03	50.6	
24	0	1664.12	19	24	3.64	3331.32	3320	18	5.19E-03	68.6	
25	0	1682.89	33	23	6.67	3368.90	3358	19	9.14E-03	39.5	
26	2	1825.91	23	10	2.89	3655.17	3651	36	6.34E-03	27.8	1.32E+00
27	2	1836.81	29	19	2.90	3676.99	3651	36	8.19E-03	40.8	

Flag: "\*" = Peak area was modified by background subtraction

QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC\_GAM08.QAF;1

Sample ID : Bkg Sample quantity : 1.00 ea  
Sample date : 7-JUL-2013 14:53:18 Acquisition date : 7-JUL-2013 14:53:18  
Elapsed live time: 0 16:40:00.00 Elapsed real time: 0 16:40:08.69

Out-of-range Test: N-SIGMA

Parameter Description	Value	Deviation	Flag
[Mean+/-Stdev]			
*Spectrum Background Rate	1.4449E+00	-1.19	
[1.46807+/-0.01947]			

Flags: "\*" means the out-of-range test is parameter-dependent

Approved by: R.F. Approval Date: 7 / 9 / 13



Sample ID : Bkg

Acquisition date : 7-JUL-2013 14:53:18

VMS Gamma Spectroscopy Report generated 8-JUL-2013 07:33:54

Configuration : DKA100:[CANBERRA.GAMMA.SCUSR.ARCHIVE]BKG\_BKG\_GAM08\_\_249979.CNF;1

---- Sample Information ----

Sample Title : Weekly Background  
 Sample ID : Bkg Sample Quantity : 1.00000E+00 ea  
 Sample Type : bkg Sample Geometry :  
 Sample Number : 249979 Spctrm Collector : gamma spec user  
 Sample Collector : Sample Analyst : gamma spec user

---- Sample Deposition Information ----

Dep. Correction? : No Dep. Duration :  
 Deposition Start : Deposition End : 7-JUL-2013 14:53:18.

---- Sample Decay/Count Information ----

Sample Date : 7-JUL-2013 14:53:18. Acquisition date : 7-JUL-2013 14:53:18.  
 Decay time : 0 00:00:00.00 % dead time : 0.0%  
 Elapsed live time: 0 16:40:00.00 Elapsed real time: 0 16:40:08.69

---- Detector Parameters ----

Energy cal. time : 22-MAR-2013 10:01:07 Energy cal. oper.: gamma spec user  
 Detector name : GAMMA8 Counting geometry:  
 Effic. cal. time : 16-JUL-2012 15:14:23 Effic. cal. oper.: gamma spec user

---- Processing Parameters ----

Start channel : 1 End channel : 4096  
 Sensitivity : 3.00000 Gaussian Sens. : 10.00000  
 Critical level? : No Propagate Errors?: No  
 Efficiency Type : SPLINE Library-based eff: No  
 Energy tolerance : 2.00000 Half life ratio : 8.00000  
 Abundance limit : 75.00000 WTM error limit : 3.00000  
 MDA Width (FWHM) : 3.00000 MDA Confid Level : 5.00000 %

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	53.48	103	846	1.21	107.10	102	11	1.72E-03	55.6	
2	0	63.43	345	813	1.04	127.02	122	10	5.76E-03	16.4	
3	0	77.41	109	671	1.06	155.02	152	7	1.82E-03	40.8	
4	0	84.12	110	551	1.10	168.44	166	6	1.83E-03	35.2	
5	0	92.67	886	1123	1.19	185.56	181	12	1.48E-02	8.3	
6	0	109.06	69	482	1.18	218.37	216	6	1.14E-03	52.0	
7	0	121.45	42	605	1.23	243.17	239	7	7.04E-04	97.7	
8	0	134.71	76	536	0.76	269.72	267	7	1.26E-03	52.1	
9	0	139.89	69	540	0.82	280.10	278	7	1.15E-03	56.8	
10	0	144.08	158	750	1.61	288.49	284	9	2.63E-03	32.3	
11	0	185.79	680	752	1.15	371.98	367	11	1.13E-02	8.7	
12	0	192.75	32	447	1.38	385.93	384	7	5.41E-04	109.1	
13	0	198.27	149	653	2.09	396.98	392	10	2.48E-03	33.2	
14	0	238.80	536	833	0.95	478.11	472	12	8.94E-03	11.6	
15	0	300.15	64	322	0.75	600.93	597	8	1.07E-03	50.0	
16	0	312.67	61	329	0.82	626.00	622	9	1.01E-03	55.5	
17	0	328.13	63	297	1.80	656.95	653	8	1.05E-03	49.0	
18	0	339.25	101	367	2.09	679.22	675	10	1.69E-03	36.7	
19	0	351.75	88	403	1.38	704.24	699	11	1.47E-03	45.2	

20	0	369.28	71	463	5.67	739.32	735	16	1.19E-03	68.4
21	0	457.82	37	150	1.52	916.57	914	7	6.16E-04	57.3
22	0	511.27	1141	416	2.83	1023.58	1017	17	1.90E-02	5.1
23	0	557.17	27	164	3.76	1115.48	1109	10	4.42E-04	93.6
24	0	583.38	225	176	1.64	1167.93	1163	12	3.75E-03	13.7
25	0	609.59	108	259	2.23	1220.41	1215	11	1.79E-03	30.5
26	0	672.20	39	176	4.39	1345.74	1338	13	6.54E-04	71.9
27	0	727.72	48	181	1.86	1456.89	1449	13	7.99E-04	59.8
28	0	774.30	23	101	1.77	1550.15	1546	8	3.87E-04	78.0
29	0	803.11	68	74	1.46	1607.81	1602	11	1.13E-03	27.5
30	0	811.39	19	79	1.45	1624.38	1620	8	3.12E-04	85.7
31	0	861.14	41	109	1.60	1723.98	1717	11	6.87E-04	51.6
32	0	911.21	43	138	1.46	1824.20	1819	11	7.19E-04	54.8
33	0	925.34	31	86	1.48	1852.49	1846	11	5.13E-04	61.5
34	0	938.00	22	55	0.69	1877.83	1874	7	3.66E-04	60.3
35	0	969.36	63	153	4.76	1940.60	1931	17	1.05E-03	47.3
36	0	1000.97	73	152	2.34	2003.88	1993	16	1.22E-03	39.5
37	0	1015.66	19	57	1.36	2033.29	2030	8	3.22E-04	71.0
38	0	1110.34	23	78	4.58	2222.82	2215	13	3.81E-04	71.9
39	0	1122.14	23	128	3.91	2246.45	2236	18	3.78E-04	118.2
40	0	1180.84	39	46	4.09	2363.95	2358	11	6.54E-04	37.2
41	0	1327.73	15	61	1.76	2657.98	2649	12	2.46E-04	110.2
42	0	1391.50	11	34	0.60	2785.62	2779	9	1.79E-04	98.2
43	0	1443.24	17	62	3.39	2889.19	2878	14	2.81E-04	102.6
44	0	1461.16	99	40	2.45	2925.06	2917	16	1.65E-03	17.4
45	0	1549.85	9	51	1.24	3102.60	3094	12	1.45E-04	167.9
46	0	1744.43	28	70	12.08	3492.07	3472	25	4.66E-04	85.1
47	0	1764.80	90	25	3.04	3532.84	3524	20	1.49E-03	17.3
48	0	1842.81	17	41	3.98	3688.99	3676	19	2.79E-04	96.6
49	0	1892.95	63	47	13.69	3789.36	3766	37	1.05E-03	36.7
50	0	1994.11	18	10	1.55	3991.83	3987	11	3.04E-04	44.4

## Nuclide Line Activity Report

## Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/SAMPLE	Decay Corr pCi/SAMPLE	2-Sigma %Error
CO-57	122.06	2335	85.60*	2.245E+00	9.122E+02	1.922E+04	12.42
	136.47	340	10.68	2.280E+00	1.050E+03	2.212E+04	60.37
CO-60	1173.23	21001	99.85	6.052E-01	2.609E+04	4.012E+04	1.53
	1332.49	19054	99.98*	5.462E-01	2.620E+04	4.028E+04	1.51
CD-109	88.03	12033	3.70*	1.703E+00	1.434E+05	8.633E+05	3.32
CS-137	661.66	24866	85.10*	9.470E-01	2.316E+04	2.498E+04	1.40
CE-139	165.86	225	80.00*	2.207E+00	9.572E+01	3.929E+04	75.53
PB-210	46.54	5559	4.25*	1.329E-01	7.387E+05	8.181E+05	6.70
AM-241	59.54	18258	35.90*	5.596E-01	6.822E+04	6.858E+04	2.62

Flag: "\*" = Keyline

Master Verification Spreadsheet (solid standard)

**Gamma Spectroscopy Calibration Verification**

Instrument: GAMMA 08

Calibration Date: 7/8/2013

Geometry: 2LMB

Manufacturer Standard Id: 82292-278

GEL Standard Id: 1478

Nuclide	Energy	Abundance (decimal)	Emission Rate (dps)	Calibrated Activity (pCi)	Measured Activity (pCi)	DIFFERENCE (%)
Am-241	59.5	0.359	860	6.4744E+04	6.858E+04	5.92
Cs-137	661.7	0.851	793.2	2.5191E+04	2.498E+04	-0.84
Co-60	1173.2	0.9985	1510	4.0872E+04	4.012E+04	-1.84
Co-60	1332.5	0.9998	1510	4.0819E+04	4.028E+04	-1.32

Prepared By: R. Futen

Date: 7/11/13

Reviewed By: M. Stamp

Date: 7/16/13

Validated by MJSH on 3/10/11

Verification results are considered acceptable if all differences are less than +/- 10%.

**GEL Laboratories, LLC**

2040 Savage Road, Charleston, SC 29414  
(843)558-8171

**Gamma Spectrometer Front End Electronics Setup**

**Detector:** Gamma 8

Date Performed: 7/9/17

Performed By: RP

<p><b>High Voltage Power Supply</b></p> <p>Model No. <u>3060</u> High Voltage <u>3.51KV</u></p>	<p><b>Spectroscopy Amplifier</b></p> <p>Model No. <u>2026</u> Course Gain <u>5</u> Fine Gain <u>1.99</u> Time Constant <u>4 <math>\mu</math>sec</u> Input polarity <u>positive</u> BSLR rate <u>na</u> BSLR mode <u>na</u> Threshold <u>na</u></p>
<p><b>ADC</b></p> <p>Model No. <u>8701</u> Gain <u>4K</u></p>	
<p><b>AIM Module</b></p> <p>Model No. <u>556A</u> Address <u>F04:1</u></p>	

**GEL Laboratories, LLC**

2040 Savage Road, Charleston, SC 29414  
(843)556-8171

**Gamma Spectrometer Geometry Calibration Package**

Detector: Gamma 9

Geometry: 2LMB

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate? the secondary standard(s) documentation? the nuclide library used? the VMS certificate file?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2) Is the energy calibration graph included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3) Is the detector efficiency curve printout included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4) Is the efficiency calibration report included and reviewed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5) Is the raw count data included for: the calibration peak report? the calibration verification PEAK report? the calibration verification NID report? the last instrument background?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6) Are the calibration verification calculations included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7) Are the instrument settings included: amp, HVPS, ADC settings?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Prepared By: R. Futch

Date: 6/7/13

Reviewed By: M. Stamp

Date: 6/7/13

Effective Date: 6/6/13

1663

**CERTIFICATE OF CALIBRATION**  
Standard Radionuclide Source

93344

2.0 Liter Solid in 230G GA-MA Beaker

**Customer:** GEL Laboratories, LLC  
**P.O. No.:** GEL 1303471, Item 8  
**Reference Date:** 01-Apr-2013  
**Product Code:** MIX-8400-EG-SD  
**12:00 PM EST Grams of Master Source:** 0.0082376

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Additional radionuclides were added gravimetrically from solutions calibrated by gamma-ray spectrometry, ionization chamber, or liquid scintillation counting. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Density of solid matrix 1.18 g/cc.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* $\mu\text{ps/gram}$	This Source $\mu\text{ps}$	Uncertainty* , %			Calibration Method*
					$u_A$	$u_B$	U	
Pb-210	46.5	8.109E+03	—	1.822E+03	0.1	2.1	4.1	4 $\pi$ LS
Am-241	59.5	1.580E+05	—	9.875E+02	0.1	1.7	3.5	4 $\pi$ LS
Cd-109	88.0	4.626E+02	1.620E+05	1.334E+03	0.5	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	8.866E+04	7.303E+02	0.4	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.250E+05	1.030E+03	0.4	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.653E+05	2.185E+03	0.3	1.9	3.8	HPGe
Sn-113	391.7	1.151E+02	1.737E+05	1.431E+03	0.4	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.145E+05	9.432E+02	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.178E+05	3.442E+03	0.5	1.9	3.9	HPGe
Zn-65	1115.6	2.441E+02	—	1.848E+03	0.1	1.7	3.5	IC
Co-60	1173.2	1.925E+03	2.103E+05	1.732E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.104E+05	1.733E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.423E+05	3.644E+03	0.7	1.9	4.0	HPGe

\* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

Calibration Methods: 4 $\pi$  LS - 4  $\pi$  Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. Uncertainty: U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1287, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)

ANALYTICAL CHEMISTRY

MGS Certificate Rev 4, 23 August 2012




PC-S-065-092 Page 1 of 2

Corporate Office  
24937 Avenue Tibbitts Valencia, California 91355

Laboratory  
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

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Source Prepared by:   
K. Eardley, Radiochemist

QA Approved:   
J.D. McCorvey, Counting Room Manager

Date: 25 APR 13





# Standard Logbook

**Serial ID:** 1663                      **Open/Reference Date:** 01-APR-13  
**Name:** Mixed gamma- 2LMB            **Received:** 01-APR-13  
**Type:** Source Material                **Expires:** 01-APR-14  
**Employee:** Maggie Stamps            **Verified:** 08-MAY-13  
**Supplier:** Eckert & Zeigler Analytics  
**Description:** 2LMB Calibration Standard 93344  
**Comments:** None

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Analyte	Concentration	Analyte	Concentration
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**CERTIFICATE OF CALIBRATION**  
 Standard Radionuclide Source

82292-278

2.0 Liter Solid in 230G GA-MA Beaker

**Customer:** GEL Laboratories, LLC**P.O. No.:** 954255 RD, Item 1**Reference Date:** 01-Apr-201012:00 PM EST **Grams of Master Source:** 0.0070315

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101. Density of solid matrix 1.15 g/cc.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* γps/gram	This Source γps	Uncertainty, %			Calibration Method
					$u_A$	$u_B$	U	
Pb-210	46.5	8.120E+03	————	1.267E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	————	8.600E+02	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.679E+05	1.181E+03	0.4	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	9.065E+04	6.374E+02	0.4	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.271E+05	8.937E+02	0.3	1.9	3.8	HPGe
Hg-203	279.2	4.661E+01	2.737E+05	1.925E+03	0.2	1.9	3.8	HPGe
Sn-113	391.7	1.151E+02	1.789E+05	1.258E+03	0.3	1.9	3.8	HPGe
Cs-137	661.7	1.098E+04	1.128E+05	7.932E+02	0.5	1.9	3.9	HPGe
Y-88	898.0	1.066E+02	4.329E+05	3.044E+03	0.3	1.9	3.8	HPGe
Co-60	1173.2	1.925E+03	2.148E+05	1.510E+03	0.7	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.148E+05	1.510E+03	0.5	1.9	3.9	HPGe
Y-88	1836.1	1.066E+02	4.583E+05	3.223E+03	0.4	1.9	3.9	HPGe

\* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

**Calibration Methods:** 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)



This standard will expire one year after the reference date.

Source Prepared by: M. I. Taskaeva  
M. I. Taskaeva, Radiochemist

QA Approved: J. D. McCorvey  
J. D. McCorvey, QA Manager Alterhate

Date: 5/24/10



# Standard Logbook

**Serial ID:** 1478                      **Open/Reference Date:** 01-APR-10  
**Name:** 2LMB                            **Received:** 29-JUN-10  
**Type:** Source Material              **Expires:** 09-JUN-36  
**Employee:** Maggie Stamps          **Verified:** 09-JUN-10  
**Supplier:** Eckert & Ziegler  
**Description:** MIXED GAMMA STANDARD (82292-278)  
**Comments:** None

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Analyte	Concentration	Analyte	Concentration
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Title: Mixed Gamma + Am-241 & Pb-210

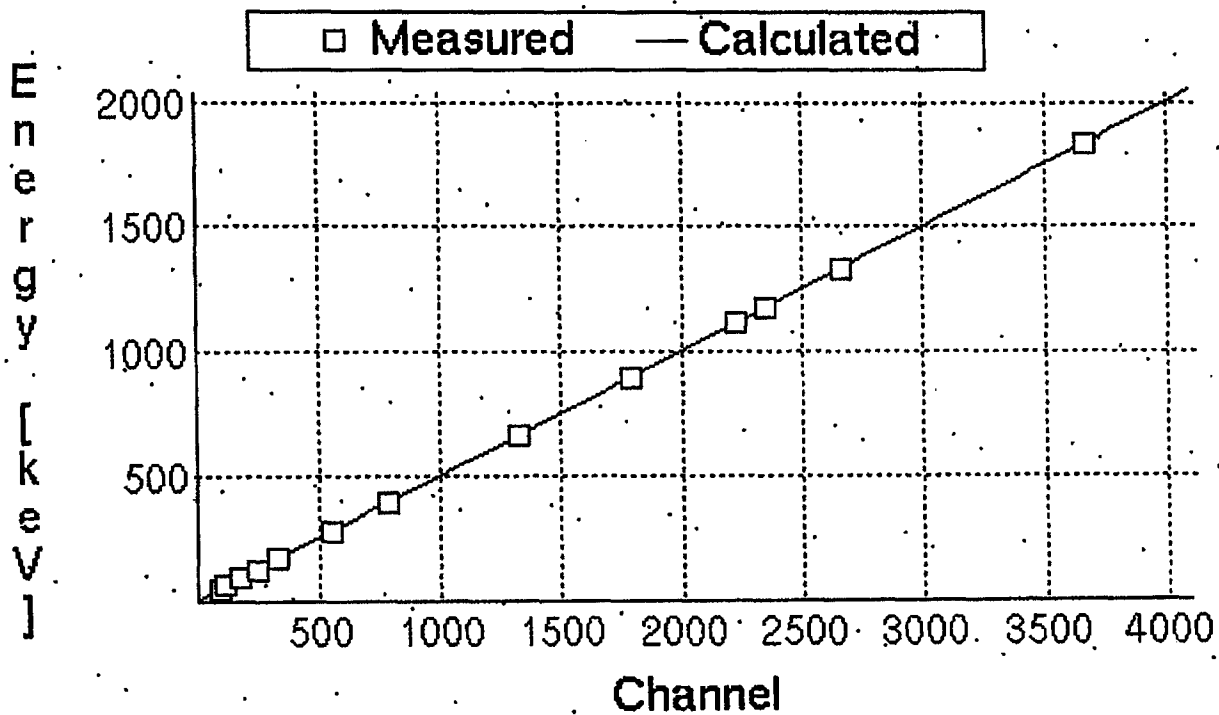
Nuclide Name	Nuclide Type	Half Life	Key Line?	No Wtmean?	Energy (keV)	%Abn
CO-57		271.74D	*		122.06	85.60
					136.47	10.68
CO-60		1925.28D			1173.23	99.85
			*		1332.49	99.98
ZN-65		244.06D	*		1115.54	50.60
SR-85		64.84D	*		514.00	96.00
Y-88		106.63D			898.04	93.70
			*		1836.06	99.20
CD-109		461.40D	*		88.03	3.70
SN-113		115.09D	*		391.70	64.97
I-129	FISSION	1.57E+07Y	*		29.62	56.60
					33.59	10.04
					39.58	7.51
CS-137		30.08Y	*		661.66	85.10
CE-139		137.64D	*		165.86	80.00
HG-203		46.59D			70.83	3.69
					72.87	6.19
			*		279.20	81.56
PB-210		22.20Y	*		46.54	4.25
AM-241		432.60Y	*		59.54	35.90
					0.00	0.00

Title: 2LMB 93344

Quantity: 1.00

Assay date: 1-APR-2013 12:00:00.0

Nuclide Name	Half Life	Energy (keV)	Rate	% Err	% Abn	CAL/INIT
PB-210	22.20Y	46.5	1522	4.10	4.3	Yes
AM-241	432.60Y	59.5	958	3.50	35.9	Yes
CD-109	461.40D	88.0	1334	4.70	3.7	Yes
CO-57	271.74D	122.1	730	4.10	85.6	Yes
CE-139	137.64D	165.9	1030	3.90	80.0	Yes
HG-203	46.59D	279.2	2185	3.80	81.6	Yes
SN-113	115.09D	391.7	1431	3.90	65.0	Yes
CS-137	30.08Y	661.7	943	4.00	85.1	Yes
Y-88	106.63D	898.0	3442	3.90	93.7	Yes
ZN-65	244.06D	1115.6	1848	3.50	50.6	Yes
CO-60	1925.28D	1173.2	1732	4.00	99.8	Yes
CO-60	1925.28D	1332.5	1733	4.00	100.0	Yes
Y-88	106.63D	1836.1	3644	4.00	99.2	Yes



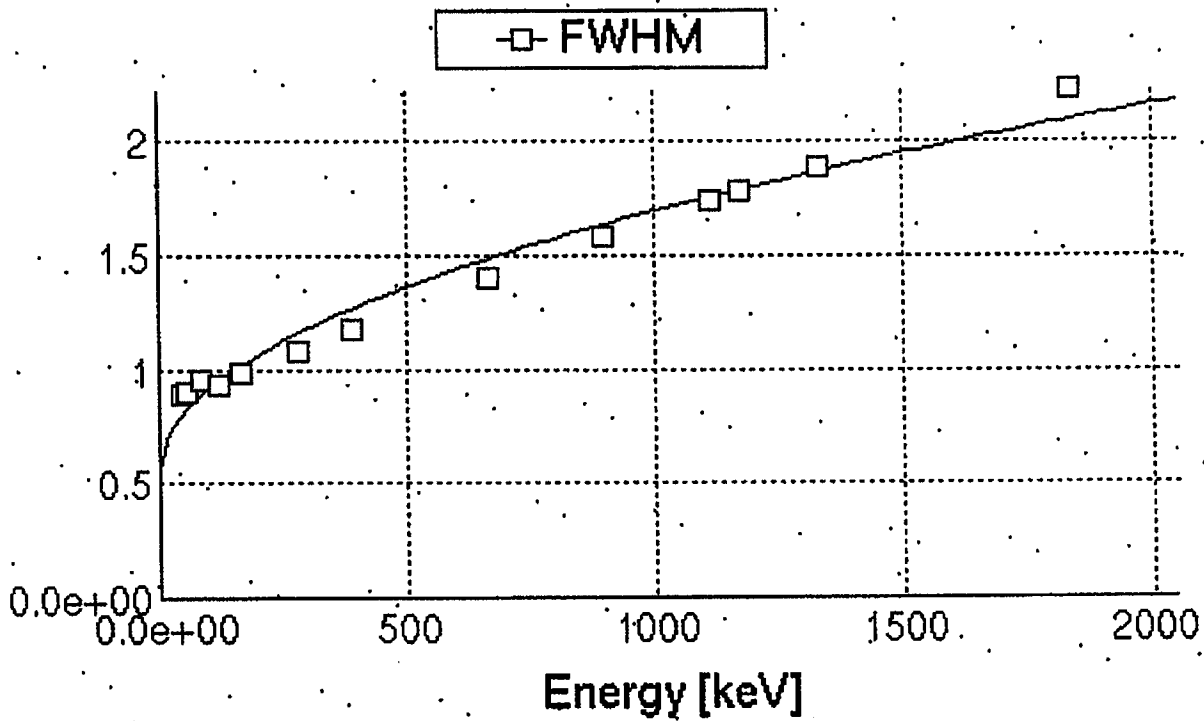
Datasource:

$$\text{Energy} = -2.270e-01 \text{ keV} + 5.006e-01 * \text{Ch} + -5.659e-08 * \text{Ch}^2 \quad [\text{CHISQ} = 2.141e-02]$$

$$\text{FWHM} = 5.579e-01 \text{ keV} + 3.592e-02 * \text{E}^{1/2} \quad [\text{CHISQ} = 5.891e-03]$$

$$\text{Lo Tail} = 0.000e+00 \text{ keV} + 0.000e+00 * \text{E} \quad [\text{CHISQ} = 0.000e+00]$$

energy calibration 89 6/5/10



Datasource:

Energy =  $-2.270e-01$  keV +  $5.006e-01$  \*Ch +  $-5.659e-08$  \*Ch<sup>2</sup> [CHISQ =  $2.141e-02$ ]

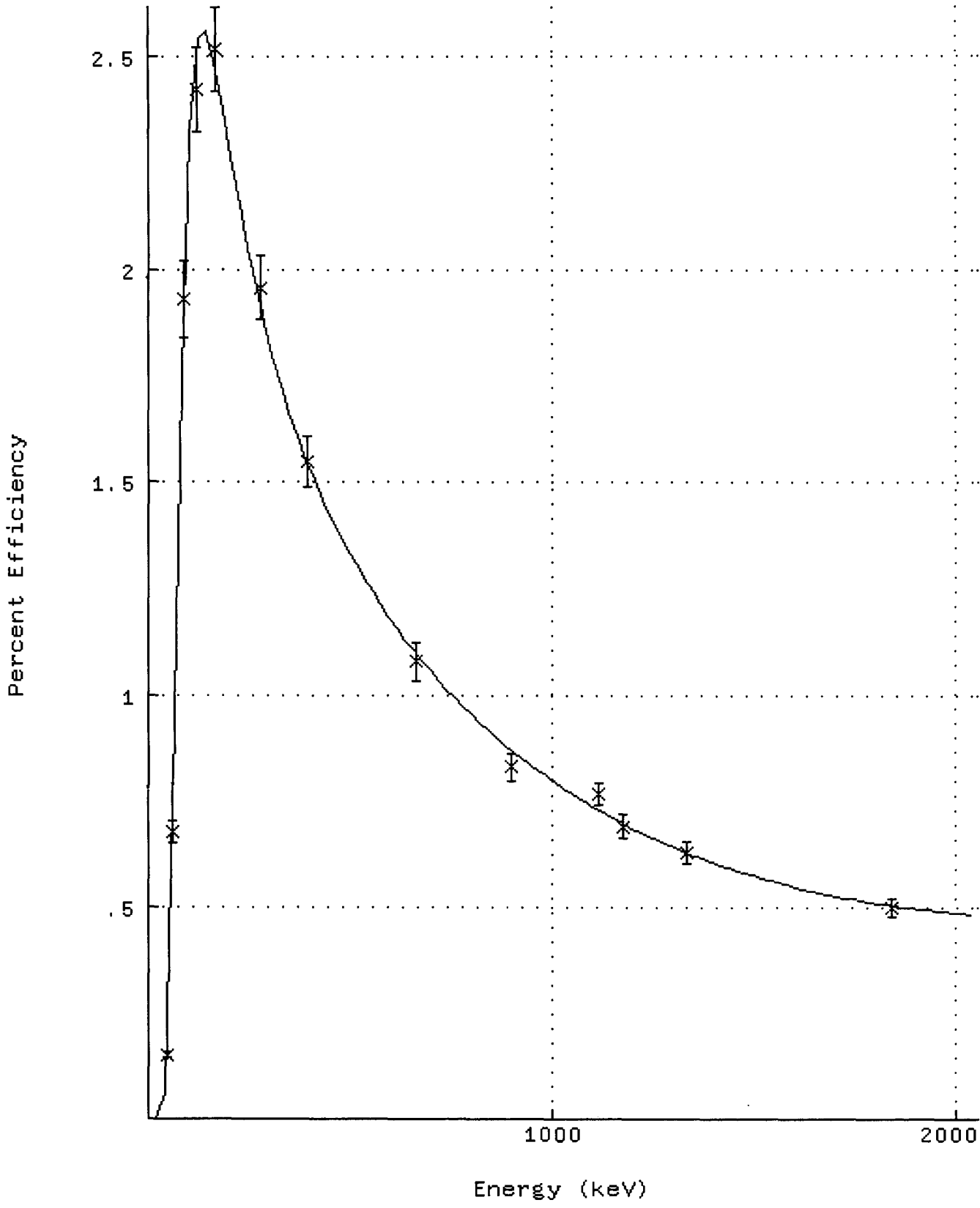
FWHM =  $5.579e-01$  keV +  $3.592e-02$  \*E<sup>1/2</sup> [CHISQ =  $5.891e-03$ ]

Lo Tail =  $0.000e+00$  keV +  $0.000e+00$  \*E [CHISQ =  $0.000e+00$ ]

Shape calibration Y9 6/5/13



Spectrum : DKA100:[CANBERRA.GAMMA]EFF\_GAM09\_2LMB.CNF;11  
Calib Date: 6-JUN-2013 11:59:  
Detector : GAMMA9 Geometry : 2LMB  
Fit type : 5 Deg. Empirical



$$\text{Energy} = -0.2270 + 0.5006 \cdot \text{Channel} + -5.6587\text{E-}08 \cdot (\text{Channel}^2)$$

Nbr	Centroid Channel	True Energy	Computed Energy	Difference
1	93.38	46.54	46.52	0.018
2	119.37	59.54	59.53	0.008
3	176.28	88.03	88.02	0.011
4	244.29	122.06	122.06	-0.005
5	331.79	165.86	165.87	-0.006
6	558.22	279.20	279.21	-0.013
7	783.00	391.70	391.72	-0.024
8	1322.35	661.66	661.67	-0.014
9	1794.69	898.04	898.05	-0.011
10	2229.33	1115.60	1115.54	0.055
11	2344.62	1173.23	1173.23	0.001
12	2662.94	1332.49	1332.50	-0.010
13	3669.55	1836.06	1836.07	-0.010

FWHM Calibration Report

$$\text{FWHM} = 0.5579 + 3.5917\text{E-}02 \cdot (\text{Energy}^{1/2})$$

Nbr	Energy	True FWHM	Computed FWHM	Difference
1	46.54	0.89	0.80	0.088
2	59.54	0.91	0.84	0.074
3	88.03	0.96	0.89	0.066
4	122.06	0.94	0.95	-0.015
5	165.86	0.99	1.02	-0.035
6	279.20	1.08	1.16	-0.076
7	391.70	1.17	1.27	-0.095
8	661.66	1.40	1.48	-0.078
9	898.04	1.58	1.63	-0.058
10	1115.60	1.74	1.76	-0.019
11	1173.23	1.78	1.79	-0.011
12	1332.49	1.88	1.87	0.015
13	1836.06	2.24	2.10	0.144

Sample ID : 93342

Acquisition date : 5-JUN-2013 10:32:17

$$\text{Eff} = \exp(a2 + a3*x + a4*x**2 + a5*x**3 + a6*x**4 + a7*x**5), \quad x=\ln(a1/\text{energy})$$

a1	a2	a3	a4	a5	a6	a7
941.3	-4.067	0.8693	-0.1077	-0.1093	0.1533	-5.1776E-02

Average Deviation = 2.13 %      Reduced Chi-Square = 1.13

Nbr	Energy (keV)	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/ /Error	% Diff
1	46.54	3.66E-03	1.65E-04	3.72E-03	-0.36	-1.64
2	59.54	1.55E-02	5.68E-04	1.52E-02	0.60	2.18
3	88.03	4.48E-02	2.11E-03	4.50E-02	-0.09	-0.42
4	122.06	5.62E-02	2.32E-03	5.81E-02	-0.81	-3.36
5	165.86	5.69E-02	2.23E-03	5.62E-02	0.30	1.19
6	279.20	4.26E-02	1.63E-03	4.21E-02	0.33	1.26
7	391.70	3.37E-02	1.32E-03	3.35E-02	0.17	0.66
8	661.66	2.28E-02	9.20E-04	2.29E-02	-0.15	-0.61
9	898.04	1.68E-02	6.60E-04	1.78E-02	-1.51	-5.91
10	1115.60	1.58E-02	5.58E-04	1.47E-02	1.91	6.76
11	1173.23	1.38E-02	5.54E-04	1.41E-02	-0.60	-2.40
12	1332.49	1.25E-02	5.02E-04	1.26E-02	-0.20	-0.82
13	1836.06	9.74E-03	3.92E-04	9.80E-03	-0.14	-0.55

Configuration : DKA100:[CANBERRA.GAMMA.SCUSR.ARCHIVE]CAL\_GAM09\_500MLMB\_246549.CNF;1

---- Sample Information ----

Sample Title : 500MLMB 93342  
 Sample ID : 93342 Sample Quantity : 1.00000E+00 SAMPLE  
 Sample Type : CAL Sample Geometry :  
 Sample Number : 246522 Spctrm Collector : gamma spec user  
 Sample Collector : Sample Analyst : gamma spec user

---- Sample Deposition Information ----

Dep. Correction? : No Dep. Duration :  
 Deposition Start : Deposition End : 1-APR-2013 12:00:00.

---- Sample Decay/Count Information ----

Sample Date : 1-APR-2013 12:00:00. Acquisition date : 5-JUN-2013 10:32:17.  
 Decay time : 64 22:32:17.50 % dead time : 2.9%  
 Elapsed live time: 0 01:00:00.00 Elapsed real time: 0 01:01:47.05

---- Detector Parameters ----

Energy cal. time : 5-JUN-2013 11:45:18. Energy cal. oper.: gamma spec user  
 Detector name : GAMMA9 Counting geometry: 500MLMB  
 Effic. cal. time : 5-JUN-2013 11:45:38. Effic. cal. oper.: gamma spec user

---- Processing Parameters ----

Start channel : 1 End channel : 4096  
 Sensitivity : 3.00000 Gaussian Sens. : 10.00000  
 Critical level? : No Propagate Errors?: No  
 Efficiency Type : EMPIRICA Library-based eff: No  
 Energy tolerance : 2.00000 Half life ratio : 8.00000  
 Abundance limit : 75.00000 WTM error limit : 3.00000  
 MDA Width (FWHM) : 3.00000 MDA Confid Level : 5.00000 %

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.50	15914	26555	1.02	93.33	90	7	4.42E+00	1.9	
2	0	59.48	43638	42415	1.02	119.28	114	11	1.21E+01	1.0	
3	7	70.71	5425	42047	1.68	141.70	133	18	1.51E+00	7.3	1.52E+01
4	7	72.90	5639	25764	0.94	146.07	133	18	1.57E+00	4.7	
5	8	82.85	5308	48809	1.89	165.95	159	26	1.47E+00	8.0	4.82E+01
6	8	85.48	6054	46716	1.91	171.21	159	26	1.68E+00	8.6	
7	8	88.02	156485	23321	0.96	176.28	159	26	4.35E+01	0.3	
8	0	122.07	101157	34054	1.02	244.29	240	10	2.81E+01	0.5	
9	0	136.44	13007	28873	0.91	273.01	269	9	3.61E+00	2.5	
10	0	165.87	122885	29483	1.02	331.78	327	11	3.41E+01	0.4	
11	0	213.43	125	14027	1.36	426.80	426	6	3.48E-02	149.9	
12	0	255.22	4295	16964	1.05	510.29	506	9	1.19E+00	5.7	
13	0	279.21	102685	19324	1.12	558.22	553	12	2.85E+01	0.4	
14	0	372.41	189	6633	1.42	744.41	742	6	5.26E-02	68.5	
15	0	391.73	94706	13683	1.21	783.01	777	13	2.63E+01	0.4	
16	0	429.90	257	7489	1.42	859.27	856	8	7.15E-02	58.6	
17	0	510.95	8449	13349	2.47	1021.20	1013	16	2.35E+00	3.2	
18	0	661.67	62218	13014	1.41	1322.35	1315	15	1.73E+01	0.6	
19	0	704.84	338	5800	2.28	1408.60	1405	8	9.39E-02	39.4	
20	0	813.93	1248	6587	1.57	1626.59	1622	10	3.47E-01	12.5	
21	0	844.39	119	5966	1.36	1687.45	1683	9	3.31E-02	117.1	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
22	0	898.05	110343	11445	1.59	1794.68	1787	15	3.07E+01	0.4	
23	0	960.24	208	4689	1.36	1918.97	1916	8	5.77E-02	57.6	
24	0	976.36	62	3977	0.50	1951.18	1946	8	1.73E-02	176.4	
25	0	1077.36	75	2765	0.93	2153.02	2150	7	2.08E-02	116.8	
26	0	1115.54	70591	6766	1.76	2229.32	2220	18	1.96E+01	0.5	
27	0	1173.23	67682	4642	1.81	2344.61	2336	18	1.88E+01	0.5	
28	0	1291.27	123	1294	1.53	2580.55	2577	8	3.41E-02	51.6	
29	5	1324.99	2189	3259	2.90	2647.94	2639	35	6.08E-01	6.2	3.02E+00
30	5	1332.50	61036	2008	1.88	2662.94	2639	35	1.70E+01	0.4	
31	0	1529.53	96	1496	1.72	3056.77	3054	7	2.67E-02	67.4	
32	0	1666.92	153	1642	3.46	3331.41	3326	12	4.26E-02	53.6	
33	0	1722.23	65	768	1.28	3441.97	3438	10	1.81E-02	80.7	
34	0	1735.03	48	708	4.28	3467.57	3462	10	1.33E-02	105.0	
35	0	1836.06	67484	1344	2.21	3669.53	3659	21	1.87E+01	0.4	
36	0	1963.64	12	299	1.28	3924.59	3919	10	3.34E-03	270.9	

```

*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                           *
*****
Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAM09_2LMB.CNF;2
Background file    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM09.CNF;171
Background date    : 2-JUN-2013 16:06:17.
Sample date       : 1-APR-2010 12:00:00. Acquisition date : 6-JUN-2013 12:00:52.
Sample ID        : VER_GAM09_2LMB      Sample quantity  : 1.00000E+00 SAMPLE
Detector name     : GAM09              Detector geometry: 2LMB
Elapsed live time: 0 01:00:00.00      Elapsed real time: 0 01:00:15.44  0.4%
Energy tolerance  : 1.50000 keV       Analyst Initials  :
Abundance limit   : 75.00000          Sensitivity       : 3.00000
Batch ID          :                   Detector SN#      :
Matrix Spike ID   :                   LCS ID           :
*****

```

BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	8	45.20	672	5347	1.60	90.74	88	9	1.87E-01	19.6	4.02E+00
2	8	46.50*	6209	4236	0.85	93.34	88	9	1.72E+00	2.1	
3	0	59.47	20741	9328	0.98	119.25	114	11	5.76E+00	1.1	
4	0	87.98	14513	7367	0.98	176.20	170	12	4.03E+00	1.4	
5	0	107.06	127	2410	1.18	214.32	212	5	3.52E-02	58.9	
6	0	122.05	2799	4619	0.97	244.26	240	9	7.78E-01	4.8	
7	0	136.39	421	3664	1.19	272.90	269	8	1.17E-01	25.4	
8	0	144.64*	136	2619	1.44	289.39	287	6	3.79E-02	60.2	
9	0	166.04	408	2762	0.91	332.13	329	7	1.13E-01	21.9	
10	0	313.59*	56	1442	1.04	626.89	626	6	1.56E-02	108.1	
11	0	430.92	60	1613	1.47	861.30	858	8	1.67E-02	116.6	
12	0	458.43	97	1641	0.87	916.27	913	8	2.68E-02	73.4	
13	0	523.83	123	1116	1.64	1046.94	1043	9	3.42E-02	49.9	
14	0	572.19	43	802	1.12	1143.55	1140	7	1.18E-02	111.5	
15	0	606.01	73	830	1.19	1211.14	1208	8	2.01E-02	69.7	
16	0	640.90	29	847	1.31	1280.85	1280	8	7.94E-03	176.9	
17	0	661.70	28603	1578	1.39	1322.41	1315	15	7.95E+00	0.7	
18	0	735.51	44	716	1.31	1469.89	1468	8	1.21E-02	107.0	
19	0	758.98	89	565	1.63	1516.78	1514	7	2.46E-02	45.9	
20	0	783.33	55	777	1.10	1565.44	1560	8	1.53E-02	89.0	
21	0	925.45	91	1043	1.53	1849.43	1846	8	2.54E-02	62.1	
22	0	1051.46	55	702	1.15	2101.27	2098	8	1.53E-02	84.3	
23	0	1173.29	24238	882	1.80	2344.73	2335	17	6.73E+00	0.7	
24	0	1257.63	44	147	3.39	2513.30	2508	12	1.22E-02	57.5	
25	0	1332.54	22483	189	1.85	2663.03	2654	18	6.25E+00	0.7	
26	0	1357.12	17	27	0.93	2712.15	2709	7	4.84E-03	54.4	
27	0	1419.79	12	18	1.39	2837.42	2834	6	3.33E-03	62.9	
28	0	1461.72*	18	47	1.59	2921.22	2915	11	5.09E-03	76.5	
29	8	1531.62	33	18	2.79	3060.95	3056	22	9.06E-03	30.8	2.13E+00
30	8	1537.09	25	23	3.01	3071.87	3056	22	6.91E-03	42.7	
31	0	1836.20	48	24	2.90	3669.80	3663	14	1.33E-02	26.3	
32	0	1938.56	10	20	3.46	3874.46	3866	12	2.81E-03	95.5	
33	5	1975.43	37	10	3.47	3948.16	3939	23	1.02E-02	26.2	2.09E+00
34	5	1980.60	16	3	2.33	3958.50	3939	23	4.45E-03	24.6	

Sample ID : VER\_GAM09\_2LMB

Acquisition date : 6-JUN-2013 12:00:52

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
35	0	1994.21	21	35	3.31	3985.72	3974	20	5.93E-03	71.2	

Flag: "\*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/SAMPLE	Decay Corr pCi/SAMPLE	2-Sigma %Error
CO-57	122.06	2799	85.60*	2.535E+00	9.685E+02	1.877E+04	9.56
	136.47	421	10.68	2.565E+00	1.155E+03	2.238E+04	50.73
CO-60	1173.23	24238	99.85	6.983E-01	2.610E+04	3.965E+04	1.40
	1332.49	22483	99.98*	6.295E-01	2.682E+04	4.075E+04	1.36
CD-109	88.03	14513	3.70*	1.949E+00	1.511E+05	8.657E+05	2.90
CS-137	661.66	28603	85.10*	1.096E+00	2.303E+04	2.478E+04	1.33
CE-139	165.86	408	80.00*	2.472E+00	1.549E+02	5.388E+04	43.86
PB-210	46.54	6209	4.25*	1.555E-01	7.054E+05	7.791E+05	4.10
AM-241	59.54	20741	35.90*	6.489E-01	6.684E+04	6.719E+04	2.30

Flag: "\*" = Keyline



QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC\_GAM09.QAF;1

Sample ID : Bkg Sample quantity : 1.00 ea  
Sample date : 2-JUN-2013 16:06:17 Acquisition date : 2-JUN-2013 16:06:17  
Elapsed live time: 0 16:40:00.00 Elapsed real time: 0 16:40:04.69

Out-of-range Test: N-SIGMA

Parameter Description [Mean+/-Stdev]	Value	Deviation	Flag
*Spectrum Background Rate [1.42250+/-0.02976]	1.3981E+00	-0.82	

Flags: "\*" means the out-of-range test is parameter-dependent

Approved by:     P.F     Approval Date:   6   /   7   /   13

Sample ID : Bkg

Acquisition date : 2-JUN-2013 16:06:17

VMS Gamma Spectroscopy Report generated 3-JUN-2013 08:46:19

Configuration : DKA100:[CANBERRA.GAMMA.SCUSR.ARCHIVE]BKG\_BKG\_GAM09\_\_246169.CNF;1

## ---- Sample Information ----

Sample Title : Weekly Background  
 Sample ID : Bkg Sample Quantity : 1.00000E+00 ea  
 Sample Type : bkg Sample Geometry :  
 Sample Number : 246169 Spctrm Collector : gamma spec user  
 Sample Collector : Sample Analyst : gamma spec user

## ---- Sample Deposition Information ----

Dep. Correction? : No Dep. Duration :  
 Deposition Start : Deposition End : 2-JUN-2013 16:06:17.

## ---- Sample Decay/Count Information ----

Sample Date : 2-JUN-2013 16:06:17. Acquisition date : 2-JUN-2013 16:06:17.  
 Decay time : 0 00:00:00.00 % dead time : 0.0%  
 Elapsed live time: 0 16:40:00.00 Elapsed real time: 0 16:40:04.69

## ---- Detector Parameters ----

Energy cal. time : 6-FEB-2013 08:02:35. Energy cal. oper.: gamma spec user  
 Detector name : GAMMA9 Counting geometry:  
 Effic. cal. time : 21-FEB-2013 06:56:10 Effic. cal. oper.: gamma spec user

## ---- Processing Parameters ----

Start channel : 1 End channel : 4096  
 Sensitivity : 3.00000 Gaussian Sens. : 10.00000  
 Critical level? : No Propagate Errors?: No  
 Efficiency Type : SPLINE Library-based eff: No  
 Energy tolerance : 2.00000 Half life ratio : 8.00000  
 Abundance limit : 75.00000 WTM error limit : 3.00000  
 MDA Width (FWHM) : 3.00000 MDA Confid Level : 5.00000 %

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.97	90	542	0.95	94.08	91	7	1.50E-03	44.3	
2	0	63.32	367	582	0.89	126.75	123	7	6.11E-03	12.1	
3	0	66.53	67	445	0.93	133.18	131	5	1.12E-03	48.8	
4	0	84.15	71	566	1.35	168.37	166	6	1.19E-03	53.9	
5	0	92.72	934	971	1.04	185.49	181	10	1.56E-02	7.1	
6	0	98.68	76	652	1.48	197.40	194	8	1.26E-03	59.6	
7	0	139.71	59	664	1.18	279.37	276	8	9.83E-04	76.8	
8	0	143.62	184	616	1.30	287.20	283	8	3.07E-03	24.5	
9	0	163.31	139	640	1.20	326.54	323	9	2.31E-03	33.9	
10	0	185.78	624	607	1.06	371.43	367	9	1.04E-02	8.2	
11	0	198.30	139	608	1.02	396.45	392	9	2.31E-03	33.1	
12	0	238.68	163	582	0.77	477.13	473	9	2.72E-03	27.7	
13	0	312.12	101	428	0.95	623.86	620	10	1.68E-03	39.8	
14	0	338.26	54	285	1.59	676.09	673	8	9.07E-04	55.2	
15	0	351.97	68	306	1.47	703.51	700	9	1.13E-03	47.8	
16	0	369.86	33	273	0.87	739.24	734	8	5.43E-04	90.2	
17	0	510.97	1265	439	2.76	1021.23	1014	15	2.11E-02	4.6	
18	0	538.49	20	226	0.45	1076.22	1070	11	3.36E-04	146.1	
19	0	583.08	132	268	1.70	1165.32	1157	17	2.20E-03	29.7	

20	0	609.16	91	212	1.87	1217.44	1213	10	1.52E-03	31.5	
21	0	614.71	58	236	1.85	1228.54	1223	12	9.75E-04	54.4	
22	0	675.35	44	149	2.10	1349.71	1345	11	7.39E-04	56.0	
23	0	746.99	16	112	0.93	1492.89	1487	10	2.69E-04	125.3	
24	4	790.27	52	105	2.25	1579.39	1574	18	8.74E-04	38.8	2.10E+00
25	4	794.00	45	82	2.08	1586.84	1574	18	7.42E-04	41.9	
26	0	803.94	59	143	0.92	1606.71	1599	13	9.83E-04	43.8	
27	0	890.92	33	157	3.50	1780.55	1773	17	5.55E-04	88.0	
28	0	911.06	51	101	1.28	1820.80	1817	11	8.49E-04	40.4	
29	0	1001.62	60	81	1.34	2001.82	1997	11	9.99E-04	32.0	
30	0	1120.52	54	121	5.74	2239.47	2231	16	8.96E-04	48.2	
31	0	1237.60	31	63	1.45	2473.50	2469	13	5.10E-04	56.1	
32	0	1345.17	22	34	1.04	2688.55	2685	8	3.73E-04	49.7	
33	0	1359.46	29	22	2.20	2717.11	2714	7	4.91E-04	31.8	
34	0	1399.08	38	42	5.68	2796.32	2789	14	6.34E-04	39.6	
35	2	1460.62	51	28	2.30	2919.34	2915	20	8.45E-04	23.3	1.50E+00
36	2	1465.35	32	33	2.30	2928.80	2915	20	5.40E-04	41.4	
37	0	1517.90	18	49	1.97	3033.85	3026	11	2.94E-04	80.9	
38	0	1675.26	13	19	1.18	3348.48	3345	8	2.14E-04	64.3	
39	0	1691.09	51	59	11.14	3380.11	3363	31	8.53E-04	47.5	
40	0	1717.10	11	50	4.02	3432.13	3420	16	1.80E-04	152.3	
41	0	1750.50	31	44	2.79	3498.90	3488	18	5.24E-04	52.9	
42	0	1785.11	37	30	1.93	3568.11	3559	17	6.23E-04	37.2	
43	0	1813.92	21	32	4.34	3625.71	3617	16	3.50E-04	64.1	

Master Verification Spreadsheet (solid standard)

**Gamma Spectroscopy Calibration Verification**

Instrument: GAMMA 09

Calibration Date: 6/6/2013

Geometry: 2LMB

Manufacturer Standard Id: 82292-278

GEL Standard Id: 1478

Nuclide	Energy	Abundance (decimal)	Emission Rate (dps)	Calibrated Activity (pCi)	Measured Activity (pCi)	DIFFERENCE (%)
Am-241	59.5	0.359	860	6.4744E+04	6.719E+04	3.78
Cs-137	661.7	0.851	793.2	2.5191E+04	2.478E+04	-1.63
Co-60	1173.2	0.9985	1510	4.0872E+04	3.965E+04	-2.99
Co-60	1332.5	0.9998	1510	4.0819E+04	4.075E+04	-0.17

Prepared By: R. Fusch

Date: 6/7/13

Reviewed By: M. Stamp

Date: 6/7/13

Validated by MJSH on 3/10/11

Verification results are considered acceptable if all differences are less than +/- 10%.

GEL Laboratories, LLC

2040 Savage Road, Charleston, SC 29414  
(843)556-8171

**Gamma Spectrometer Front End Electronics Setup**  
Detector: Gamma 9

Date Performed: 6/5/17 Performed By: RIF

<p><b>High Voltage Power Supply</b></p> <p>Model No. <u>3106D</u> High Voltage <u>2.501kV</u></p>	<p><b>Spectroscopy Amplifier</b></p> <p>Model No. <u>671</u> Course Gain <u>50</u> Fine Gain <u>.920</u> Time Constant <u>6 <math>\mu</math>s</u> Input polarity <u>Positive</u> BSLR rate <u>19</u> BSLR mode <u>12</u> Threshold <u>112</u></p>
<p><b>ADC</b></p> <p>Model No. <u>8701</u> Gain <u>4K</u></p>	
<p><b>AIM Module</b></p> <p>Model No. <u>MD556</u> Address <u>ICE:2</u></p>	

**GEL Laboratories, LLC**

2040 Savage Road, Charleston, SC 29414  
(843)556-8171

**Gamma Spectrometer Geometry Calibration Package**

Detector: Gamma II Geometry: 2LmB

	YES	NO	Comments
1) Is all calibration standard information enclosed for: the primary standard certificate? the second standard(s) documentation? the nuclide library used? the VMS certificate file?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2) Is the energy calibration graph included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3) Is the detector efficiency curve printout included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
4) Is the efficiency calibration report included and reviewed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5) Is the raw count data included for: the calibration peak report? the calibration verification PEAK report? the calibration verification NID report? the last instrument background?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6) Are the calibration verification calculations included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
7) Are the instrument settings included: amp, HVPS, ADC settings?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Prepared By: R. Fuchs  
 Reviewed By: M. Stamp  
 Effective Date: 7/12/13

Date: 7/12/13 <sup>12</sup> RF  
 Date: 7/15/13

1663

**CERTIFICATE OF CALIBRATION**  
Standard Radionuclide Source

93344

2.0 Liter Solid in 230G GA-MA Beaker

**Customer:** GEL Laboratories, LLC  
**P.O. No.:** GEL 1303471, Item 8  
**Reference Date:** 01-Apr-2013  
**Product Code:** MIX-8400-EG-SD  
**12:00 PM EST Grams of Master Source:** 0.0082376

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Additional radionuclides were added gravimetrically from solutions calibrated by gamma-ray spectrometry, ionization chamber, or liquid scintillation counting. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1998, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Density of solid matrix 1.15 g/cc.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* yps/gram	This Source yps	Uncertainty* , %			Calibration Method*
					u <sub>A</sub>	u <sub>B</sub>	U	
Pb-210	46.8	8.109E+03	—	1.522E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+05	—	9.575E+02	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.620E+05	1.334E+03	0.5	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	8.866E+04	7.303E+02	0.4	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.250E+05	1.030E+03	0.4	1.9	3.9	HPGe
Hg-203	279.2	4.661E+01	2.653E+05	2.185E+03	0.3	1.9	3.8	HPGe
Sn-113	391.7	1.151E+02	1.737E+05	1.431E+03	0.4	1.9	3.9	HPGe
Cs-137	661.7	1.098E+04	1.145E+05	9.432E+02	0.7	1.9	4.0	HPGe
Y-88	898.0	1.066E+02	4.178E+05	3.442E+03	0.5	1.9	3.9	HPGe
Zn-65	1115.6	2.441E+02	—	1.848E+03	0.1	1.7	3.5	IC
Co-60	1173.2	1.925E+03	2.103E+05	1.732E+03	0.6	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.104E+05	1.733E+03	0.7	1.9	4.0	HPGe
Y-88	1836.1	1.066E+02	4.423E+05	3.644E+03	0.7	1.9	4.0	HPGe

\* Master Source refers to Analytics' 8-isotope mixture which is calibrated quarterly.

**Calibration Methods:** 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1287, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)



MGS Certificate Rev 4, 23 August 2012

RC-S-065-092 Page 1 of 2

**Corporate Office**  
24937 Avenue Tibbitts Valencia, California 91355

**Laboratory**  
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318

Source Prepared by: K. Eardley  
K. Eardley, Radiochemist

QA Approved: J.D. McCorvey  
J.D. McCorvey, Counting Room Manager

Date: 25 APR 13





# Standard Logbook

**Serial ID:** 1663                      **Open/Reference Date:** 01-APR-13  
**Name:** Mixed gamma- 2LMB        **Received:** 01-APR-13  
**Type:** Source Material            **Expires:** 01-APR-14  
**Employee:** Maggie Stamps        **Verified:** 08-MAY-13  
**Supplier:** Eckert & Zeigler Analytics  
**Description:** 2LMB Calibration Standard 93344  
**Comments:** None

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Analyte	Concentration	Analyte	Concentration
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## CERTIFICATE OF CALIBRATION

### Standard Radionuclide Source

**82292-278**

**2.0 Liter Solid in 230G GA-MA Beaker**

**Customer:** GEL Laboratories, LLC

**P.O. No.:** 954255 RD, Item 1

**Reference Date:** 01-Apr-2010      **12:00 PM EST**      **Grams of Master Source:** 0.0070316

This standard radionuclide source was prepared using aliquots measured gravimetrically from master radionuclide solutions. Calibration and purity were checked using a germanium gamma spectrometer system. At the time of calibration no interfering gamma-ray emitting impurities were detected. The gamma-ray emission rates for the most intense gamma-ray lines are given. Eckert & Ziegler Analytcs (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101. Density of solid matrix 1.15 g/cc.

Nuclide	Gamma-Ray Energy (keV)	Half-Life, Days	Master Source* ypa/gram	This Source yps	Uncertainty, %			Calibration Method
					$u_k$	$u_p$	U	
Pb-210	46.5	8.120E+03	—	1.267E+03	0.1	2.1	4.1	4π LS
Am-241	59.5	1.580E+06	—	8.600E+02	0.1	1.7	3.5	4π LS
Cd-109	88.0	4.626E+02	1.679E+05	1.181E+03	0.4	2.3	4.7	HPGe
Co-57	122.1	2.718E+02	9.068E+04	6.374E+02	0.4	2.0	4.1	HPGe
Ce-139	165.9	1.376E+02	1.271E+05	8.937E+02	0.3	1.9	3.8	HPGe
Hg-203	279.2	4.661E+01	2.737E+05	1.928E+03	0.2	1.9	3.8	HPGe
Sn-113	391.7	1.151E+02	1.789E+05	1.258E+03	0.3	1.9	3.8	HPGe
Cs-137	661.7	1.098E+04	1.128E+05	7.932E+02	0.5	1.9	3.9	HPGe
Y-88	898.0	1.066E+02	4.329E+05	3.044E+03	0.3	1.9	3.8	HPGe
Co-60	1173.2	1.925E+03	2.148E+05	1.510E+03	0.7	1.9	4.0	HPGe
Co-60	1332.5	1.925E+03	2.148E+05	1.510E+03	0.5	1.9	3.9	HPGe
Y-88	1836.1	1.066E+02	4.583E+05	3.223E+03	0.4	1.9	3.9	HPGe

\* Master Source refers to Analytcs' 8-isotope mixture which is calibrated quarterly.

**Calibration Methods:** 4π LS - 4 pi Liquid Scintillation Counting, HPGe - High Purity Germanium Gamma-Ray Spectrometer, IC - Ionization Chamber. **Uncertainty:** U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

(Certificate continued on reverse side)



This standard will expire one year after the reference date.

Source Prepared by: M. I. Taskaeva  
M. I. Taskaeva, Radiochemist

QA Approved: J. D. McCorvey  
J. D. McCorvey, QA Manager Alternate

Date: 5/24/10



# Standard Logbook

**Serial ID:** 1478                      **Open/Reference Date:** 01-APR-10  
**Name:** 2LMB                              **Received:** 29-JUN-10  
**Type:** Source Material                      **Expires:** 09-JUN-36  
**Employee:** Maggie Stamps                      **Verified:** 09-JUN-10  
**Supplier:** Eckert & Ziegler  
**Description:** MIXED GAMMA STANDARD (82292-278)  
**Comments:** None

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Analyte	Concentration	Analyte	Concentration
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Title: Mixed Gamma + Am-241 & Pb-210

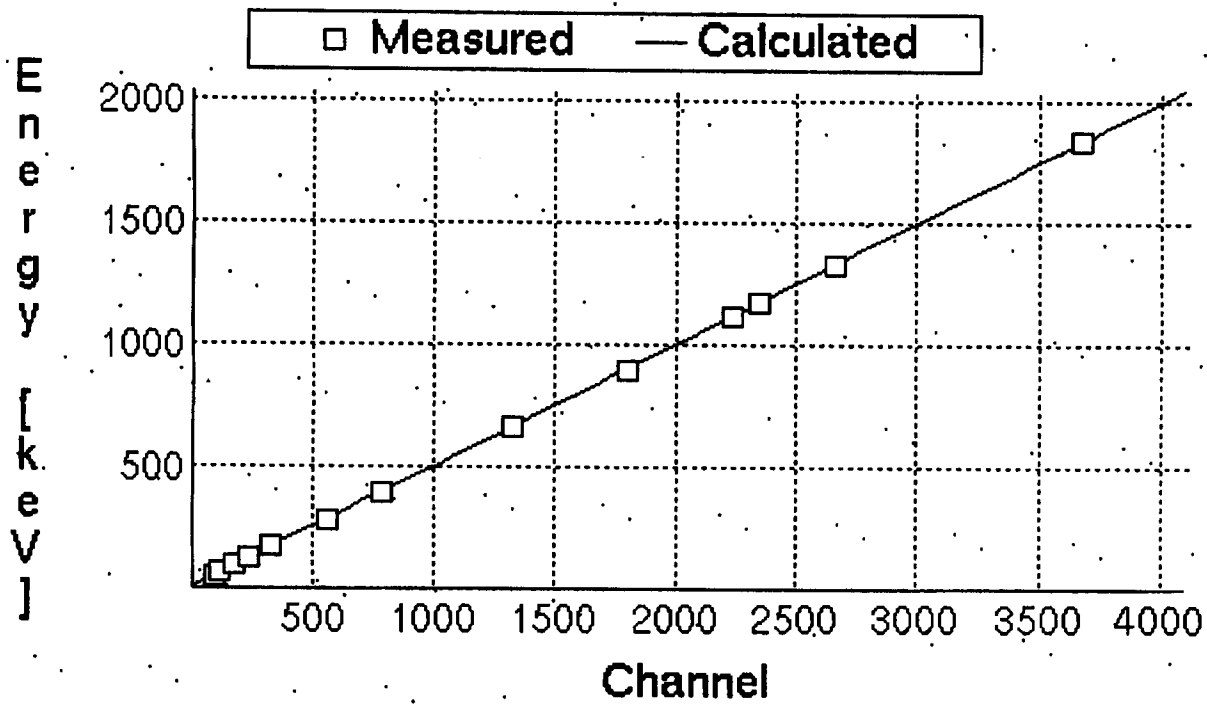
Nuclide Name	Nuclide Type	Half Life	Key Line?	No Wtmean?	Energy (keV)	%Abn
CO-57		271.74D	*		122.06	85.60
					136.47	10.68
CO-60		1925.28D			1173.23	99.85
			*		1332.49	99.98
ZN-65		244.06D	*		1115.54	50.60
SR-85		64.84D	*		514.00	96.00
Y-88		106.63D			898.04	93.70
			*		1836.06	99.20
CD-109		461.40D	*		88.03	3.70
SN-113		115.09D	*		391.70	64.97
I-129	FISSION	1.57E+07Y	*		29.62	56.60
					33.59	10.04
					39.58	7.51
CS-137		30.08Y	*		661.66	85.10
CE-139		137.64D	*		165.86	80.00
HG-203		46.59D			70.83	3.69
					72.87	6.19
			*		279.20	81.56
PB-210		22.20Y	*		46.54	4.25
AM-241		432.60Y	*		59.54	35.90
					0.00	0.00

Title: 2LMB 93344

Quantity: 1.00

Assay date: 1-APR-2013 12:00:00.0

Nuclide Name	Half Life	Energy (keV)	Rate	% Err	% Abn	CAL/INIT
PB-210	22.20Y	46.5	1522	4.10	4.3	Yes
AM-241	432.60Y	59.5	958	3.50	35.9	Yes
CD-109	461.40D	88.0	1334	4.70	3.7	Yes
CO-57	271.74D	122.1	730	4.10	85.6	Yes
CE-139	137.64D	165.9	1030	3.90	80.0	Yes
HG-203	46.59D	279.2	2185	3.80	81.6	Yes
SN-113	115.09D	391.7	1431	3.90	65.0	Yes
CS-137	30.08Y	661.7	943	4.00	85.1	Yes
Y-88	106.63D	898.0	3442	3.90	93.7	Yes
ZN-65	244.06D	1115.6	1848	3.50	50.6	Yes
CO-60	1925.28D	1173.2	1732	4.00	99.8	Yes
CO-60	1925.28D	1332.5	1733	4.00	100.0	Yes
Y-88	106.63D	1836.1	3644	4.00	99.2	Yes



Datasource:

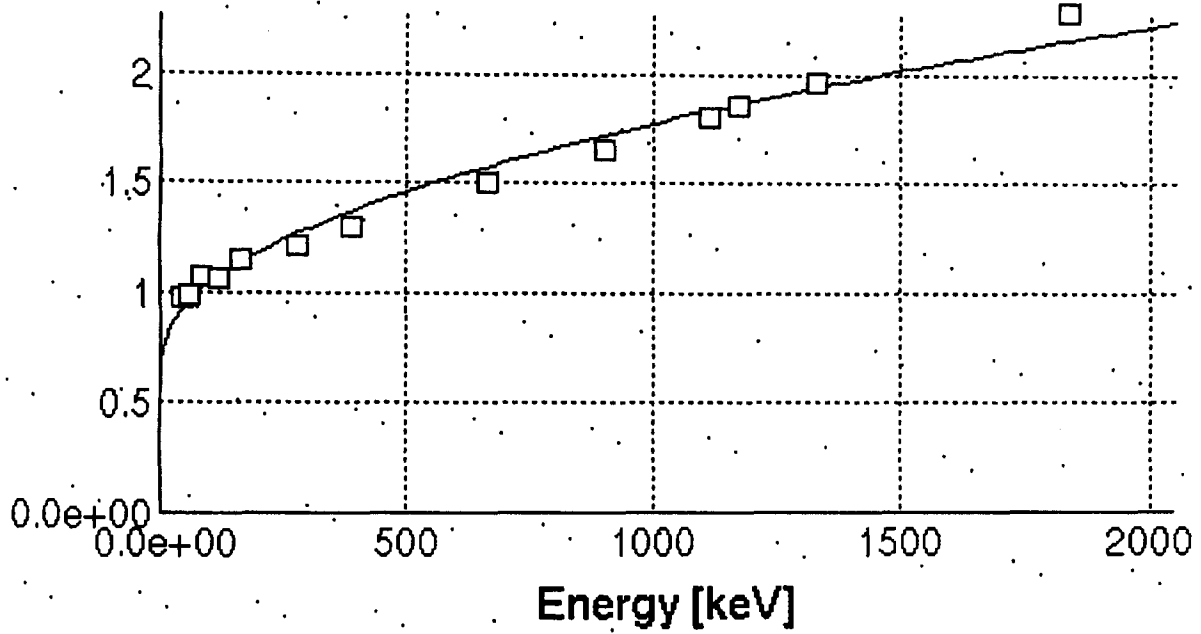
Energy =  $2.041e-02$  keV +  $4.997e-01$  \*Ch +  $6.164e-08$  \*Ch<sup>2</sup> [CHISQ =  $2.424e-02$ ]

FWHM =  $6.905e-01$  keV +  $3.421e-02$  \*E<sup>1/2</sup> [CHISQ =  $3.691e-03$ ]

Lo Tail =  $0.000e+00$  keV +  $0.000e+00$  \*E [CHISQ =  $0.000e+00$ ]

Energy calibration 811 7/11/13

□ FWHM

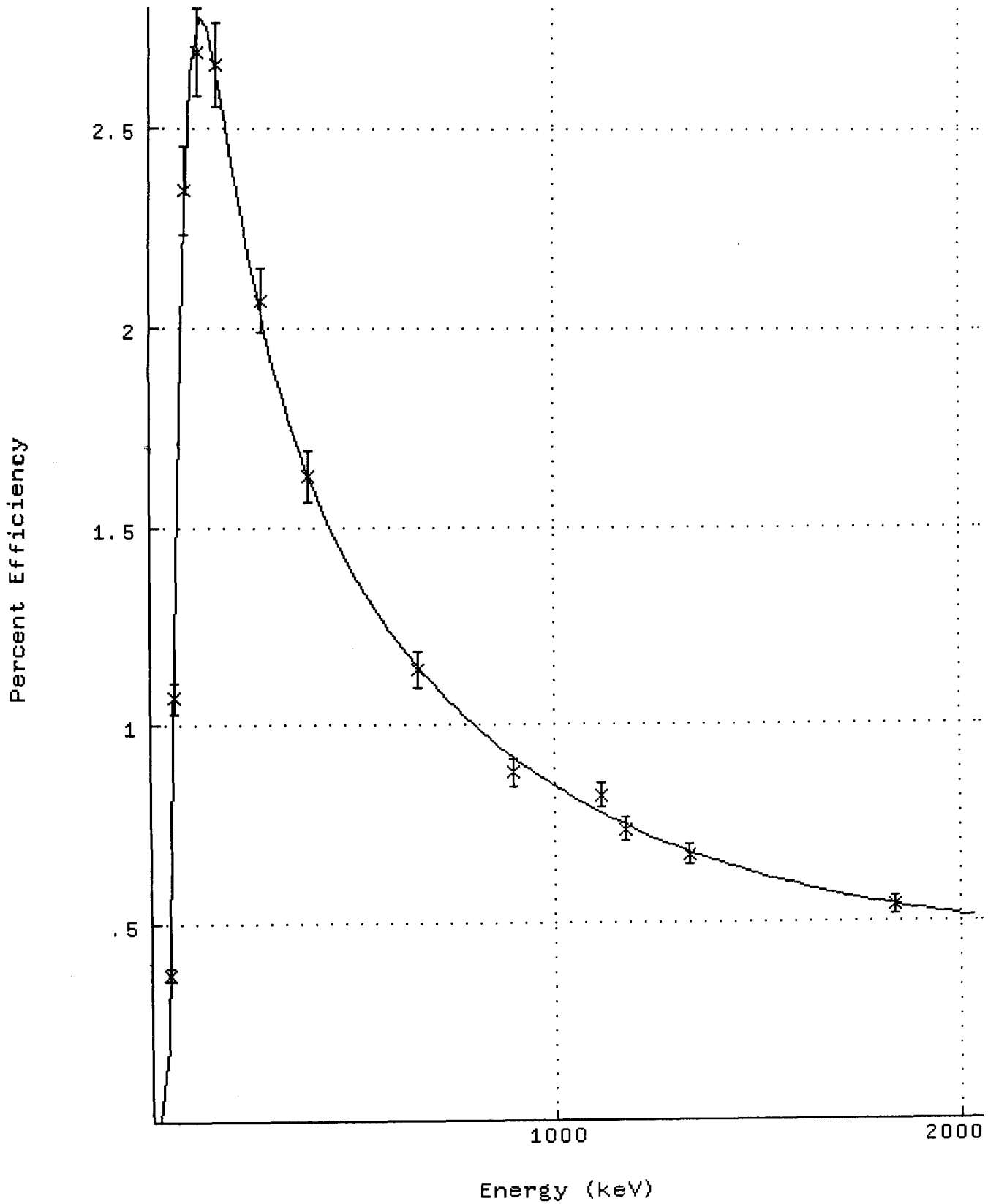


Datasource:  
Energy =  $2.041e-02 \text{ keV} + 4.997e-01 * \text{Ch} + 6.164e-08 * \text{Ch}^2$  [CHISQ =  $2.424e-02$ ]  
FWHM =  $6.905e-01 \text{ keV} + 3.421e-02 * E^{1/2}$  [CHISQ =  $3.691e-03$ ]  
Lo Tail =  $0.000e+00 \text{ keV} + 0.000e+00 * E$  [CHISQ =  $0.000e+00$ ]

Shape calibration 811 7/4/13



Spectrum : DKA100:[CANBERRA.GAMMA]EFF\_GAM11\_2LMB.CNF;10  
Calib Date: 12-JUL-2013 08:13  
Detector : GAMMA11 Geometry : 2LMB  
Fit type : 5 Deg. Empirical



Sample ID : 93344

Acquisition date : 11-JUL-2013 13:20:29

$$\text{Energy} = 2.0410\text{E-}02 + 0.4997*\text{Channel} + 6.1642\text{E-}08*(\text{Channel}**2)$$

Nbr	Centroid Channel	True Energy	Computed Energy	Difference
1	93.05	46.54	46.52	0.022
2	119.14	59.54	59.55	-0.012
3	176.15	88.03	88.04	-0.012
4	244.23	122.06	122.06	-0.005
5	331.89	165.86	165.87	-0.010
6	558.65	279.20	279.19	0.011
7	783.76	391.70	391.69	0.007
8	1323.87	661.66	661.65	0.006
9	1796.78	898.04	898.05	-0.013
10	2231.85	1115.60	1115.56	0.039
11	2347.22	1173.23	1173.24	-0.014
12	2665.77	1332.49	1332.52	-0.026
13	3672.68	1836.06	1836.05	0.007

## FWHM Calibration Report

$$\text{FWHM} = 0.6905 + 3.4207\text{E-}02*(\text{Energy}**1/2)$$

Nbr	Energy	True FWHM	Computed FWHM	Difference
1	46.54	0.97	0.92	0.046
2	59.54	0.99	0.95	0.034
3	88.03	1.07	1.01	0.063
4	122.06	1.06	1.07	-0.007
5	165.86	1.15	1.13	0.014
6	279.20	1.21	1.26	-0.049
7	391.70	1.30	1.37	-0.072
8	661.66	1.50	1.57	-0.066
9	898.04	1.65	1.72	-0.068
10	1115.60	1.81	1.83	-0.027
11	1173.23	1.85	1.86	-0.012
12	1332.49	1.96	1.94	0.020
13	1836.06	2.28	2.16	0.123

$$\text{Eff} = \exp(a_2 + a_3*x + a_4*x**2 + a_5*x**3 + a_6*x**4 + a_7*x**5), \quad x=\ln(a_1/\text{energy})$$

a1	a2	a3	a4	a5	a6	a7
941.3	-4.727	0.7563	-6.1993E-02	-6.5819E-02	9.4632E-02	-3.4636E-02

Average Deviation = 1.75 %      Reduced Chi-Square = 0.724

Nbr	Energy (keV)	Measured Efficiency	Efficiency Error	Computed Efficiency	Diff/ /Error	% Diff
1	46.54	3.73E-03	1.61E-04	3.77E-03	-0.25	-1.07
2	59.54	1.07E-02	3.84E-04	1.05E-02	0.38	1.36
3	88.03	2.34E-02	1.10E-03	2.32E-02	0.17	0.79
4	122.06	2.69E-02	1.11E-03	2.77E-02	-0.76	-3.13
5	165.86	2.66E-02	1.04E-03	2.65E-02	0.08	0.31
6	279.20	2.07E-02	7.96E-04	2.02E-02	0.59	2.26
7	391.70	1.62E-02	6.38E-04	1.63E-02	-0.08	-0.32
8	661.66	1.14E-02	4.59E-04	1.15E-02	-0.17	-0.69
9	898.04	8.80E-03	3.45E-04	9.18E-03	-1.09	-4.28
10	1115.60	8.22E-03	2.90E-04	7.78E-03	1.54	5.42
11	1173.23	7.35E-03	2.96E-04	7.48E-03	-0.43	-1.74
12	1332.49	6.72E-03	2.70E-04	6.79E-03	-0.25	-1.00
13	1836.06	5.41E-03	2.17E-04	5.43E-03	-0.09	-0.38

Configuration : DKA100:[CANBERRA.GAMMA.SCUSR.ARCHIVE]CAL\_GAM11\_2LMB\_250476.CNF;1

---- Sample Information ----

Sample Title : 2LMB 93344  
 Sample ID : 93344 Sample Quantity : 1.00000E+00 SAMPLE  
 Sample Type : CAL Sample Geometry :  
 Sample Number : 250434 Spctrm Collector : gamma spec user  
 Sample Collector : Sample Analyst : gamma spec user

---- Sample Deposition Information ----

Dep. Correction? : No Dep. Duration :  
 Deposition Start : Deposition End : 1-APR-2013 12:00:00.

---- Sample Decay/Count Information ----

Sample Date : 1-APR-2013 12:00:00. Acquisition date : 11-JUL-2013 13:20:29  
 Decay time : 101 01:20:29.64 % dead time : 2.1%  
 Elapsed live time: 0 02:00:00.00 Elapsed real time: 0 02:02:31.50

---- Detector Parameters ----

Energy cal. time : 10-JUL-2013 14:23:44 Energy cal. oper.: gamma spec user  
 Detector name : GAMMA11 Counting geometry: 2LMB  
 Effic. cal. time : 12-JUL-2013 08:13:46 Effic. cal. oper.: gamma spec user

---- Processing Parameters ----

Start channel : 1 End channel : 4096  
 Sensitivity : 3.00000 Gaussian Sens. : 10.00000  
 Critical level? : No Propagate Errors?: No  
 Efficiency Type : EMPIRICA Library-based eff: No  
 Energy tolerance : 2.00000 Half life ratio : 8.00000  
 Abundance limit : 75.00000 WTM error limit : 3.00000  
 MDA Width (FWHM) : 3.00000 MDA Confid Level : 5.00000 %

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	33.21	6718	37052	1.89	66.42	65	6	9.33E-01	4.6	
2	0	46.43	41776	77224	0.84	92.87	88	10	5.80E+00	1.3	
3	0	59.47	76671	77686	0.85	118.98	114	10	1.06E+01	0.8	
4	6	66.94	3204	47256	1.72	133.92	131	19	4.45E-01	11.0	3.89E+00
5	6	68.75	3410	79767	1.72	137.55	131	19	4.74E-01	15.8	
6	6	70.86	5498	81503	1.58	141.75	131	19	7.64E-01	9.9	
7	6	72.86	5300	49763	0.99	145.76	131	19	7.36E-01	6.8	
8	8	82.11	4177	76335	2.14	164.28	160	23	5.80E-01	11.6	1.71E+02
9	8	85.62	12664	102098	2.15	171.30	160	23	1.76E+00	6.2	
10	8	88.00	193194	42973	1.01	176.06	160	23	2.68E+01	0.3	
11	0	122.03	111568	68992	0.96	244.17	238	12	1.55E+01	0.6	
12	0	136.45	14190	45753	0.95	273.02	269	9	1.97E+00	2.8	
13	0	165.84	120552	50978	1.01	331.83	326	12	1.67E+01	0.5	
14	0	255.14	4394	24147	1.12	510.53	507	9	6.10E-01	6.6	
15	0	279.17	73545	31975	1.15	558.62	552	14	1.02E+01	0.6	
16	0	358.57	219	12269	1.54	717.48	714	8	3.04E-02	88.0	
17	0	391.68	92201	20207	1.20	783.72	777	14	1.28E+01	0.5	
18	0	510.96	9742	18327	2.60	1022.38	1014	17	1.35E+00	3.3	
19	0	661.66	77604	17377	1.42	1323.87	1316	16	1.08E+01	0.5	
20	0	670.82	201	6976	1.63	1342.20	1338	7	2.79E-02	69.4	
21	0	707.25	186	6151	1.52	1415.09	1413	7	2.58E-02	70.4	

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
22	0	814.08	1197	7244	1.17	1628.80	1625	9	1.66E-01	13.1	
23	0	835.79	296	7147	1.11	1672.24	1669	9	4.10E-02	51.9	
24	0	898.06	114209	17083	1.57	1796.79	1788	18	1.59E+01	0.4	
25	0	1014.90	151	3253	1.35	2030.50	2027	6	2.10E-02	60.3	
26	0	1115.58	83151	8384	1.68	2231.88	2223	18	1.15E+01	0.4	
27	0	1173.26	89347	5997	1.74	2347.25	2337	19	1.24E+01	0.4	
28	0	1247.34	56	1296	1.37	2495.41	2493	7	7.84E-03	106.7	
29	5	1325.22	2419	3538	3.12	2651.18	2640	38	3.36E-01	6.2	8.71E+00
30	5	1332.55	81423	1952	1.89	2665.83	2640	38	1.13E+01	0.4	
31	0	1485.78	45	2050	0.60	2972.27	2970	10	6.30E-03	187.0	
32	0	1547.78	86	2216	1.21	3096.26	3094	9	1.19E-02	99.5	
33	0	1769.57	82	835	5.03	3539.76	3531	17	1.14E-02	81.1	
34	0	1778.06	17	454	1.03	3556.73	3554	9	2.37E-03	223.3	
35	0	1836.10	74161	1206	2.09	3672.77	3662	22	1.03E+01	0.4	
36	0	1964.25	65	397	2.40	3928.98	3923	18	9.06E-03	72.7	
37	0	1978.40	20	278	3.15	3957.28	3950	12	2.74E-03	171.3	
38	0	2009.91	51	253	3.06	4020.27	4015	12	7.05E-03	64.1	

```

*****
*                               GEL Laboratories LLC                               *
*                               2040 Savage Road                               *
*                               Charleston, SC 29407                           *
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Configuration      : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]VER_GAM11_2LMB.CNF;2
Background file    : DKA100:[CANBERRA.GAMMA.ARCHIVE.GAMMA]BKG_GAM11.CNF;344
Background date    : 7-JUL-2013 14:53:28.
Sample date        : 1-APR-2010 12:00:00. Acquisition date : 12-JUL-2013 08:14:39
Sample ID          : VER_GAM11_2LMB      Sample quantity   : 1.00000E+00 SAMPLE
Detector name      : GAM11              Detector geometry  : 2LMB
Elapsed live time  : 0 01:00:00.00      Elapsed real time  : 0 01:00:18.49  0.5%
Energy tolerance   : 1.50000 keV        Analyst Initials   :
Abundance limit    : 75.00000           Sensitivity        : 3.00000
Batch ID           :                    Detector SN#       :
Matrix Spike ID    :                    LCS ID           :
*****

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BACKGROUND CORRECTED SAMPLE PEAK REPORT

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	8	41.03	1512	13909	1.94	82.08	77	20	4.20E-01	14.9	6.28E+01
2	8	44.27	2631	16606	1.96	88.55	77	20	7.31E-01	11.2	
3	8	46.46*	17617	8268	1.05	92.93	77	20	4.89E+00	1.1	
4	0	49.81	148	6298	0.75	99.63	98	4	4.10E-02	76.2	
5	9	58.47	1806	9625	1.59	116.98	114	12	5.02E-01	12.0	2.43E+00
6	9	59.53	32280	5729	0.82	119.09	114	12	8.97E+00	0.7	
7	0	87.98	16491	6917	0.81	176.02	171	10	4.58E+00	1.2	
8	2	120.44	76	531	0.87	240.98	240	9	2.10E-02	34.2	9.95E-01
9	2	122.03	3060	3101	0.92	244.16	240	9	8.50E-01	3.4	
10	0	136.35	255	2901	1.23	272.82	271	6	7.09E-02	33.9	
11	0	165.61	292	2375	1.47	331.36	329	6	8.11E-02	27.1	
12	0	391.11	102	1670	1.67	782.59	781	8	2.82E-02	70.3	
13	0	418.24	104	1767	1.64	836.87	833	9	2.89E-02	73.7	
14	0	453.15	40	1712	1.14	906.72	905	8	1.10E-02	180.9	
15	0	511.16*	106	1894	2.54	1022.78	1017	12	2.96E-02	82.9	
16	0	543.51	108	824	1.57	1087.51	1085	7	3.01E-02	44.8	
17	0	547.98	59	835	0.96	1096.46	1095	7	1.65E-02	81.9	
18	0	661.62*	30296	1707	1.40	1323.81	1316	16	8.42E+00	0.7	
19	0	831.74	50	860	0.84	1664.12	1659	8	1.40E-02	102.0	
20	0	978.86	264	1380	2.99	1958.43	1952	14	7.34E-02	30.5	
21	0	1002.38*	47	986	2.74	2005.46	2003	9	1.32E-02	120.0	
22	0	1109.60	64	1175	3.73	2219.92	2213	12	1.77E-02	108.4	
23	0	1125.47	77	456	1.10	2251.67	2249	7	2.15E-02	47.4	
24	0	1173.23	25816	901	1.72	2347.20	2338	18	7.17E+00	0.7	
25	0	1217.81	33	200	1.68	2436.35	2430	9	9.21E-03	79.1	
26	0	1332.50	23799	286	1.78	2665.74	2656	19	6.61E+00	0.7	
27	0	1378.77*	19	51	2.35	2758.27	2752	10	5.32E-03	74.5	
28	0	1384.34	16	41	0.96	2769.41	2764	10	4.53E-03	78.4	
29	0	1435.03	36	39	4.27	2870.77	2865	14	9.90E-03	40.6	
30	0	1461.62*	6	34	0.52	2923.96	2919	7	1.58E-03	183.3	
31	0	1608.82	17	23	2.89	3218.32	3211	12	4.61E-03	63.8	
32	0	1644.80	11	20	1.28	3290.26	3284	10	3.10E-03	83.7	
33	0	1836.36	34	28	1.35	3673.29	3669	10	9.33E-03	34.0	
34	0	1916.09	10	40	5.61	3832.71	3816	18	2.81E-03	150.9	

Sample ID : VER\_GAM11\_2LMB

Acquisition date : 12-JUL-2013 08:14:39

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
----	----	--------	------	-------	------	---------	------	----	---------	------	-----

Flag: "\*" = Peak area was modified by background subtraction

Nuclide Line Activity Report

Nuclide Type:

Nuclide	Energy	Area	%Abn	%Eff	Uncorrected pCi/SAMPLE	Decay Corr pCi/SAMPLE	2-Sigma %Error
CO-57	122.06	3060	85.60*	2.772E+00	9.682E+02	2.056E+04	6.81
	136.47	255	10.68	2.773E+00	6.475E+02	1.375E+04	67.82
CO-60	1173.23	25816	99.85	7.482E-01	2.594E+04	3.993E+04	1.36
	1332.49	23799	99.98*	6.788E-01	2.633E+04	4.052E+04	1.34
CD-109	88.03	16491	3.70*	2.321E+00	1.441E+05	8.716E+05	2.45
CS-137	661.66	30296	85.10*	1.146E+00	2.333E+04	2.516E+04	1.30
CE-139	165.86	292	80.00*	2.649E+00	1.034E+02	4.308E+04	54.13
PB-210	46.54	17617	4.25*	3.736E-01	8.329E+05	9.227E+05	2.21
AM-241	59.54	32280	35.90*	1.053E+00	6.412E+04	6.445E+04	1.35

Flag: "\*" = Keyline



QA filename : DKA100:[CANBERRA.GAMMA.SCUSR.QA]LBC\_GAM11.QAF;1

Sample ID : Bkg Sample quantity : 1.00 ea  
Sample date : 7-JUL-2013 14:53:28 Acquisition date : 7-JUL-2013 14:53:28  
Elapsed live time: 0 16:40:00.00 Elapsed real time: 0 16:40:04.15

Out-of-range Test: N-SIGMA

Parameter Description	Value	Deviation	Flag
[Mean+/-Stdev]			
*Spectrum Background Rate	1.5220E+00	-1.54	
[1.55675+/-0.02257]			

Flags: "\*" means the out-of-range test is parameter-dependent

Approved by: R.F Approval Date: 7 / 12 / 13

Sample ID : Bkg

Acquisition date : 7-JUL-2013 14:53:28

VMS Gamma Spectroscopy Report generated 8-JUL-2013 07:33:29

Configuration : DKA100:[CANBERRA.GAMMA.SCUSR.ARCHIVE]BKG\_BKG\_GAM11\_\_249981.CNF;1

## ---- Sample Information ----

Sample Title : Weekly Background  
 Sample ID : Bkg Sample Quantity : 1.00000E+00 ea  
 Sample Type : bkg Sample Geometry :  
 Sample Number : 249981 Spctrm Collector : gamma spec user  
 Sample Collector : Sample Analyst : gamma spec user

## ---- Sample Deposition Information ----

Dep. Correction? : No Dep. Duration :  
 Deposition Start : Deposition End : 7-JUL-2013 14:53:28.

## ---- Sample Decay/Count Information ----

Sample Date : 7-JUL-2013 14:53:28. Acquisition date : 7-JUL-2013 14:53:28.  
 Decay time : 0 00:00:00.00 % dead time : 0.0%  
 Elapsed live time: 0 16:40:00.00 Elapsed real time: 0 16:40:04.15

## ---- Detector Parameters ----

Energy cal. time : Energy cal. oper.:  
 Detector name : GAMMA11 Counting geometry:  
 Effic. cal. time : 16-JUL-2012 12:07:04 Effic. cal. oper.: gamma spec user

## ---- Processing Parameters ----

Start channel : 1 End channel : 4096  
 Sensitivity : 3.00000 Gaussian Sens. : 10.00000  
 Critical level? : No Propagate Errors?: No  
 Efficiency Type : SPLINE Library-based eff: No  
 Energy tolerance : 2.00000 Half life ratio : 8.00000  
 Abundance limit : 75.00000 WTM error limit : 3.00000  
 MDA Width (FWHM) : 3.00000 MDA Confid Level : 5.00000 %

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	46.05	218	795	0.69	92.10	88	9	3.63E-03	24.4	
2	0	63.28	395	622	1.03	126.55	123	7	6.59E-03	11.6	
3	0	66.38	77	534	1.01	132.75	131	6	1.28E-03	49.2	
4	0	69.91	101	711	1.64	139.82	137	8	1.68E-03	46.9	
5	0	77.45	110	660	1.28	154.90	152	7	1.84E-03	39.9	
6	0	84.11	135	652	0.78	168.22	165	7	2.26E-03	32.4	
7	0	92.74	974	936	1.04	185.49	181	10	1.62E-02	6.7	
8	0	98.48	97	803	1.67	196.96	193	10	1.61E-03	56.1	
9	0	104.83	100	608	1.85	209.65	207	8	1.67E-03	43.8	
10	0	112.48	109	689	1.29	224.96	222	8	1.82E-03	42.5	
11	0	143.40	133	720	0.92	286.81	284	9	2.22E-03	37.2	
12	0	162.87	62	756	0.80	325.74	323	9	1.03E-03	81.0	
13	0	185.80	613	734	1.12	371.61	366	10	1.02E-02	9.2	
14	0	198.27	155	788	1.23	396.54	392	11	2.58E-03	36.0	
15	0	238.75	182	427	0.87	477.49	474	6	3.04E-03	19.4	
16	0	294.42	26	506	1.28	588.85	585	10	4.28E-04	166.2	
17	0	338.73	100	392	2.00	677.45	673	9	1.67E-03	37.1	
18	0	352.05	120	299	1.95	704.09	700	9	2.00E-03	27.5	
19	0	439.08	43	348	4.00	878.15	872	13	7.22E-04	90.3	

20	0	471.76	37	358	1.37	943.53	936	13	6.16E-04	106.8	
21	0	511.24	1210	471	2.61	1022.48	1016	14	2.02E-02	4.8	
22	0	570.25	49	161	1.41	1140.51	1137	8	8.24E-04	46.8	
23	0	584.07	76	289	1.58	1168.15	1160	12	1.26E-03	46.5	
24	0	609.61	113	270	1.39	1219.23	1215	10	1.88E-03	28.7	
25	0	662.17	129	206	1.18	1324.33	1318	12	2.15E-03	23.9	
26	0	670.15	53	138	1.72	1340.29	1337	9	8.80E-04	42.4	
27	0	752.29	16	171	3.76	1504.59	1497	12	2.70E-04	163.6	
28	0	803.36	97	117	2.00	1606.71	1600	13	1.62E-03	25.1	
29	0	870.52	17	148	1.37	1741.04	1737	11	2.86E-04	139.5	
30	0	911.69	72	137	1.41	1823.38	1817	13	1.19E-03	35.7	
31	0	935.39	29	58	1.96	1870.78	1868	8	4.83E-04	48.6	
32	0	946.61	64	93	1.33	1893.21	1886	15	1.07E-03	35.0	
33	3	997.98	27	28	1.42	1995.97	1994	14	4.44E-04	35.1	2.49E+00
34	3	1001.09	68	73	2.34	2002.19	1994	14	1.13E-03	28.3	
35	0	1064.30	45	53	1.59	2128.60	2124	10	7.43E-04	34.4	
36	0	1120.61	42	70	1.80	2241.21	2236	12	7.03E-04	42.9	
37	0	1138.18	11	102	3.74	2276.36	2264	14	1.86E-04	194.2	
38	0	1156.68	28	82	4.37	2313.36	2304	14	4.73E-04	70.9	
39	0	1178.67	45	78	4.49	2357.35	2349	15	7.49E-04	45.5	
40	0	1239.37	18	70	2.92	2478.74	2470	13	3.03E-04	98.6	
41	0	1377.30	25	36	1.15	2754.60	2749	10	4.13E-04	50.2	
42	0	1461.61	58	57	1.36	2923.22	2918	9	9.59E-04	27.3	
43	0	1481.28	28	46	4.77	2962.56	2956	14	4.63E-04	55.0	
44	0	1622.18	10	42	3.60	3244.35	3238	9	1.66E-04	124.5	
45	0	1638.28	67	83	12.15	3276.56	3257	33	1.12E-03	42.8	
46	0	1765.23	65	48	1.55	3530.46	3524	16	1.08E-03	26.9	
47	7	1813.57	44	27	3.33	3627.14	3618	18	7.31E-04	31.4	1.66E+00
48	7	1816.58	9	9	1.59	3633.15	3618	18	1.53E-04	61.9	
49	0	1842.68	14	17	1.02	3685.36	3679	10	2.33E-04	61.8	
50	0	2022.94	23	25	5.20	4045.89	4038	15	3.77E-04	56.0	

Master Verification Spreadsheet (solid standard)

**Gamma Spectroscopy Calibration Verification**

Instrument: GAMMA 11

Calibration Date: 7/11/2013

Geometry: 2LMB

Manufacturer Standard Id: 82292-278

GEL Standard Id: 1478

Nuclide	Energy	Abundance (decimal)	Emission Rate (dps)	Calibrated Activity (pCi)	Measured Activity (pCi)	DIFFERENCE (%)
Am-241	59.5	0.359	860	6.4744E+04	6.445E+04	-0.45
Cs-137	661.7	0.851	793.2	2.5191E+04	2.516E+04	-0.12
Co-60	1173.2	0.9985	1510	4.0872E+04	3.993E+04	-2.31
Co-60	1332.5	0.9998	1510	4.0819E+04	4.052E+04	-0.73

Prepared By: R. F. Usher

Date: 7/12/13

Reviewed By: M. Stamp

Date: 7/15/13

Validated by MJSH on 3/10/11

Verification results are considered acceptable if all differences are less than +/- 10%.

GEL Laboratories, LLC

2040 Savage Road, Charleston, SC 29414  
(843)556-8171

**Gamma Spectrometer Front End Electronics Setup**  
Detector: Gamma 11

Date Performed: 7/9/13

Performed By: RF

<p><b>High Voltage Power Supply</b></p> <p>Model No. <u>TC 950</u> High Voltage <u>2.50 kV</u></p>	<p><b>Spectroscopy Amplifier</b></p> <p>Model No. <u>2026</u> Course Gain <u>50</u> Fine Gain <u>.789</u> Time Constant <u>6 <math>\mu</math>sec</u> Input polarity <u>positive</u> BSLR rate <u>nc</u> BSLR mode <u>nc</u> Threshold <u>nc</u></p>
<p><b>ADC</b></p> <p>Model No. <u>ND579</u> Gain <u>4K</u></p>	
<p><b>AIM Module</b></p> <p>Model No. <u>ND556</u> Address <u>3F7.1</u></p>	

# **Continuing Calibration Data**

★ = OUT OF SERVICE

Review of Gamma Spectrometer QA results (Daily calibration & background checks)  
 24-DEC-2013 13:38:09.37

Run Date	Detector	Parameter	Flag
24-DEC-2013	GAM01	Cal Check NLACTVTY-59	Action
21-DEC-2013	GAM01	Bkg Check may not have run since 24-DEC-2013	★
24-DEC-2013	GAM02	Bkg Check BACKRATE	Investigate OK
23-DEC-2013	GAM03	Cal Check may not have run since 24-DEC-2013	★
21-DEC-2013	GAM03	Bkg Check may not have run since 24-DEC-2013	★
24-DEC-2013	GAM04	All Parameters Passed	
24-DEC-2013	GAM05	All Parameters Passed	
24-DEC-2013	GAM06	All Parameters Passed	
24-DEC-2013	GAM07	Cal Check PSFWHM-59	Investigate OK
24-DEC-2013	GAM08	All Parameters Passed	
24-DEC-2013	GAM09	All Parameters Passed	
24-DEC-2013	GAM10	All Parameters Passed	
24-DEC-2013	GAM11	Cal Check PSFWHM-662	Investigate OK
24-DEC-2013	GAM12	All Parameters Passed	
24-DEC-2013	GAM13	All Parameters Passed	
24-DEC-2013	GAM14	All Parameters Passed	
24-DEC-2013	GAM15	Cal Check PSFWHM-59	Investigate OK
23-DEC-2013	GAM16	Cal Check may not have run since 24-DEC-2013	★
21-DEC-2013	GAM16	Bkg Check may not have run since 24-DEC-2013	★
23-DEC-2013	GAM17	Cal Check may not have run since 24-DEC-2013	★
21-DEC-2013	GAM17	Bkg Check may not have run since 24-DEC-2013	★
23-DEC-2013	GAM18	Cal Check may not have run since 24-DEC-2013	★
21-DEC-2013	GAM18	Bkg Check may not have run since 24-DEC-2013	★
24-DEC-2013	GAM19	Bkg Check BACKRATE	Action ★
24-DEC-2013	GAM20	All Parameters Passed	
24-DEC-2013	GAM21	Cal Check PSFWHM-59	Investigate OK
24-DEC-2013	GAM22	All Parameters Passed	
24-DEC-2013	GAM23	Cal Check PSFWHM-662	Investigate OK

24-DEC-2013	GAM24	All Parameters Passed		
24-DEC-2013	GAM25	All Parameters Passed		
24-DEC-2013	GAM26	All Parameters Passed		
24-DEC-2013	GAM27	All Parameters Passed		
24-DEC-2013	GAM28	All Parameters Passed		
24-DEC-2013	GAM29	All Parameters Passed		
24-DEC-2013	GAM30	All Parameters Passed		
24-DEC-2013	GAM31	All Parameters Passed		
24-DEC-2013	GAM32	All Parameters Passed		
24-DEC-2013	GAM33	All Parameters Passed		
24-DEC-2013	GAM36	Bkg Check	BACKRATE	Investigate OK
20-DEC-2013	GAM40	Cal Check may not have run since 24-DEC-2013		
24-DEC-2013	GAM40	Bkg Check	BACKRATE	Action
24-DEC-2013	WELL	All Parameters Passed		
24-DEC-2013	XRAY1	All Parameters Passed		
24-DEC-2013	XRAY2	All Parameters Passed		
24-DEC-2013	XRAY3	All Parameters Passed		
24-DEC-2013	XRAY5	Cal Check	PSFWHM-59	Action
24-DEC-2013	XRAY5	Cal Check	PSFWHM-109	Action
24-DEC-2013	XRAY5	Cal Check	PSFWHM-210	Action
24-DEC-2013	XRAY5	Cal Check	NLACTVTY-59	Action
24-DEC-2013	XRAY5	Cal Check	NLACTVTY-210	Action
24-DEC-2013	XRAY6	Cal Check	NLACTVTY-109	Investigate OK

APPROVAL DATE: 12/24/13

APPROVAL TIME: 14:00

APPROVED BY: *[Signature]*

PROCEDURE # GL-RAD-I-001

Report completed at 24-DEC-2013 13:41:30.60



★ = OUT OF SERVICE

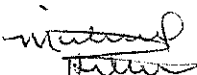
Review of Gamma Spectrometer QA results (Daily calibration & background checks)  
 26-DEC-2013 16:30:03.90

Run Date	Detector	Parameter	Flag
26-DEC-2013	GAM01	Cal Check NLACTVTY-59	Action ★
26-DEC-2013	GAM02	All Parameters Passed	
23-DEC-2013	GAM03	Cal Check may not have run since 26-DEC-2013	★
21-DEC-2013	GAM03	Bkg Check may not have run since 26-DEC-2013	
26-DEC-2013	GAM04	All Parameters Passed	
26-DEC-2013	GAM05	Cal Check PSFWHM-1332	Investigate OK
26-DEC-2013	GAM06	Cal Check NLACTVTY-59	Investigate > OK
26-DEC-2013	GAM06	Cal Check PSFWHM-59	Investigate > OK
26-DEC-2013	GAM07	All Parameters Passed	
26-DEC-2013	GAM08	All Parameters Passed	
26-DEC-2013	GAM09	Cal Check PSFWHM-1332	Investigate OK
26-DEC-2013	GAM10	Cal Check NLACTVTY-1332	Investigate OK
26-DEC-2013	GAM11	Cal Check NLACTVTY-662	Investigate OK
26-DEC-2013	GAM12	All Parameters Passed	
26-DEC-2013	GAM13	All Parameters Passed	
26-DEC-2013	GAM14	Cal Check PSFWHM-1332	Investigate > OK
26-DEC-2013	GAM14	Cal Check NLACTVTY-59	Investigate > OK
26-DEC-2013	GAM15	All Parameters Passed	
23-DEC-2013	GAM16	Cal Check may not have run since 26-DEC-2013	★
21-DEC-2013	GAM16	Bkg Check may not have run since 26-DEC-2013	
23-DEC-2013	GAM17	Cal Check may not have run since 26-DEC-2013	★
21-DEC-2013	GAM17	Bkg Check may not have run since 26-DEC-2013	
26-DEC-2013	GAM18	Cal Check PSFWHM-1332	Investigate OK
24-DEC-2013	GAM19	Cal Check may not have run since 26-DEC-2013	★
21-DEC-2013	GAM19	Bkg Check may not have run since 26-DEC-2013	
26-DEC-2013	GAM20	All Parameters Passed	
26-DEC-2013	GAM21	All Parameters Passed	
26-DEC-2013	GAM22	All Parameters Passed	

26-DEC-2013	GAM23	Cal Check	PSFWMH-59	Investigate	OK
26-DEC-2013	GAM24	Cal Check	PSFWMH-59	Investigate	>OK
26-DEC-2013	GAM24	Cal Check	PSFWMH-662	Investigate	
26-DEC-2013	GAM25	All Parameters Passed			
26-DEC-2013	GAM26	All Parameters Passed			
26-DEC-2013	GAM27	All Parameters Passed			
26-DEC-2013	GAM28	All Parameters Passed			
26-DEC-2013	GAM29	All Parameters Passed			
26-DEC-2013	GAM30	All Parameters Passed			
26-DEC-2013	GAM31	Cal Check	PSFWMH-59	Investigate	OK
26-DEC-2013	GAM32	All Parameters Passed			
26-DEC-2013	GAM33	All Parameters Passed			
26-DEC-2013	GAM36	Cal Check	PSENERGY-59	missing	} *
26-DEC-2013	GAM36	Cal Check	PSENERGY-662	missing	
26-DEC-2013	GAM36	Cal Check	PSENERGY-1332	missing	
26-DEC-2013	GAM36	Cal Check	PSFWMH-59	missing	
26-DEC-2013	GAM36	Cal Check	PSFWMH-662	missing	
26-DEC-2013	GAM36	Cal Check	PSFWMH-1332	missing	
26-DEC-2013	GAM36	Cal Check	NLACTVTY-59	missing	
26-DEC-2013	GAM36	Cal Check	NLACTVTY-662	missing	
26-DEC-2013	GAM36	Cal Check	NLACTVTY-1332	missing	
20-DEC-2013	GAM40	Cal Check may not have run since 26-DEC-2013 *			
26-DEC-2013	GAM40	Bkg Check	BACKRATE	Action	*
26-DEC-2013	WELL	All Parameters Passed			
26-DEC-2013	XRAY1	All Parameters Passed			
24-DEC-2013	XRAY2	Cal Check may not have run since 26-DEC-2013 * Not Used mgt 12/26/13			
26-DEC-2013	XRAY3	All Parameters Passed			
24-DEC-2013	XRAY5	Cal Check may not have run since 26-DEC-2013 *			
26-DEC-2013	XRAY5	Bkg Check	BACKRATE	Action	*
26-DEC-2013	XRAY6	Cal Check	PSFWMH-59	Investigate	>OK
26-DEC-2013	XRAY6	Cal Check	NLACTVTY-109	Investigate	

APPROVAL DATE: 12/26/13

APPROVAL TIME: 17:15

APPROVED BY: 

PROCEDURE # GL-RAD-I-001

Report completed at 26-DEC-2013 16:33:52.94

# Runlogs

# Instrument Run Log

Instrument Type: **GAMMA SPECTROMETER**

Batch ID: **1355780**

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
339804001	SAMPLE	MJH1	GAM08	DEC-24-13 14:13:35	DONE 2LMB		09-JUL-13 00:00
1203009338	MB	MJH1	GAM09	DEC-24-13 14:14:04	DONE 2LMB		06-JUN-13 00:00
1203009340	LCS	MJH1	GAM11	DEC-24-13 14:14:29	DONE 2LMB		12-JUL-13 00:00
1203009339	DUP	MJH1	GAM07	DEC-26-13 10:34:41	DONE 2LMB		26-JUL-13 00:00

# **Gas Flow Raw Data**

02-Jan-2014

Batch# 1355958 Product: LAT3 Date: 11/7/14

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.	/		
Samples have been blank corrected (if required). Blank correction reported included (if required).			NA
If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	/		
Instrument source check is within limits.	/		
Instrument bkg check is within limits.	/		
Method RDL/ LLD has been met.	/		see case narrative
If duplicate activities are: Less than 5* MDA/ MDC, then RPD is 100% or less, If greater 5* MDA/ MDC, then RPD 20% or less, If below the MDA/ MDC, the RPD is 0%, Or meets the client's required RER acceptance criteria.	/		see case narrative
Tracer yield is 15-125% . Carrier yield 25-125%. (Or meets the client's contract acceptance criteria).			MP
Method blank is less than the RDL/ LLD. (If rad samples, < 5% of lowest activity)	/		
Sample was run within hold time.	/		
Sample was correctly preserved if required.	/		
Smears Taken for Radioactive batches.	/		
Method Spike and LCS are within 75-125% (or meets the client's contract acceptance criteria).	/		
No blank spaces on data forms. All line outs initialed and dated. No transcription errors are apparent.	/		
Aux data is correct.			NA
Client Special requirements page has been checked.	/		
Raw Data and/ or spectrum are included and properly stasused.	/		
MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified	/		
Hit notification complete (if necessary)			NA
Batch entered into Case Narrative.	/		
Batch Data Exception Reports (DER) completed, if applicable.			ND
Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed.			NA ND
Aliquot Correction completed if required.			
Review sample historical results if available (If REMP, results above MDC have been verified by historical results, recount or re-analysis.)	/		

Primary Review Performed By: [Signature]

119  
SEEW/ PABE/ HIRE/ OLSS

Secondary Review Performed By: [Signature]

# Gross Alpha Beta Queue Sheet

12/30/2013 03:09:12

Batch #: 1355958    Analyst: JAOC    First Client Due Date: 01/09/2014    Internal Due Date: 01/03/2014

Alpha Spike Isotope: Th-230    Spike Code: 1240-F    Balance #: 5804863  
 Beta Spike Isotope: Sr-90    Spike Code: 1243-L    Pipette #: 140263  
 Alpha LCS Isotope: Th-230    LCS Code: 1240-F    Prep Date: 12/15/13  
 Beta LCS Isotope: Sr-90    LCS Code: 1243-L    Initials: JL

10% HNO<sub>3</sub>: 1955788  
 Conc HNO<sub>3</sub>: 1945314.1  
 Conc HCl:  
 Conc HF:  
 Conc Boric:

Analytical Scale # 11757073  
 Witness: KA

Sample ID	Client Description	Type	Hazard Code	RDL Alpha/Beta	Client	Matrix	Bkr#	Wet/Dry Aliquot (ml) or g)	Carrier or Det#	Initial Wt (g)	Final Wt (g)	Net Wt (mg)
339628001-1	32577-01	SAMPLE		5 pCi/L	SEEW001	WATER	1	30 DS 913	9C	7.5844	7.6530	730
339629001-1	32493-01	SAMPLE		5 pCi/L	SEEW001	WATER	2	100	9C	7.6268	7.6369	0.1
339630001-1	Outfall 001	SAMPLE		5 pCi/L	PABR001	WASTE WATER	3	0.3	9D	7.6470	7.7064	64.4
339739001-1	Outfall 501	SAMPLE		5 pCi/L	HTRT001	WASTE WATER	4	0.4	10A	7.6049	7.6692	64.3
339804001-1	FURR 16-22B	SAMPLE		5 pCi/L	OLSS001	WATER	5	30	10C	7.6274	7.7019	74.5
1203009780-1	MB	MB		5 pCi/L	QC ACCOUNT	WATER	6	100	10D	7.6095	7.6289	0
1203009781-1	DUP 32577-01(339628001)	DUP		5 pCi/L	QC ACCOUNT	WATER	7	30	12A	7.6243	7.6714	646
1203009782-1	MS 32577-01(339628001)	MS		5 pCi/L	QC ACCOUNT	WATER	8	25-10	12B	7.5838	7.6127	282
1203009783-1	MSD 32577-01(339628001)	MSD		5 pCi/L	QC ACCOUNT	WATER	9	25-10	12C	7.6267	7.6250	27.6
1203009784-1	LCS	LCS		5 pCi/L	QC ACCOUNT	WATER	10	100	12D	7.5598	7.5589	0

AN 11/7/13    W/V    der lin

Have the planchets been flamed?  Yes  No

Data Reviewed By: [Signature]

# Gross Alpha/Beta Liquid

Filename : GAB.XLS  
 File type : Excel  
 Version # : 1.3.9

Batch : 1355958  
 Analyst : JAOC  
 Prep Date : 12/30/2013  
 Alpha Method Uncertainty : 0.0829  
 Beta Method Uncertainty : 0.0821

Procedure Code : GFCCGANBL  
 Parmname1 : Alpha  
 Parmname2 : Beta  
 Required Alpha MDA : 5 pCi/L  
 Required Beta MDA : 5 pCi/L

Geometry: 2 inch Planchett

Sample Characteristics			Count Raw Data			Counting Time (min.)		Gross Counts		Count Start Date/Time	
Pos.	Sample ID	Sample Aliquot L	Sample Residue Wt. (mg)	Sample Aliquot StDev. L	Sample Date/Time	Detector ID	Alpha	Beta	Alpha	Beta	Count Start Date/Time
1	339628001.1	0.0300	73	6.1297E-06	12/17/2013 11:40	D3	34	706	34	706	1/6/2014 12:15
2	339629001.1	0.1000	0.1	1.1370E-05	12/13/2013 7:30	9C	80	337	80	337	1/3/2014 14:58
3	339630001.1	3.000E-04	64.4	1.2867E-06	12/16/2013 15:00	9D	83	276	83	276	1/3/2014 14:58
4	339739001.1	4.000E-04	64.3	1.7265E-06	12/18/2013 5:00	D4	17	616	17	616	1/6/2014 12:15
5	339804001.1	0.0030	74.5	3.5304E-06	12/19/2013 10:15	10C	55	335	55	335	1/3/2014 14:58
6	1203009780.1	0.1000	0	1.1370E-05	12/30/2013 0:00	10D	48	311	48	311	1/3/2014 14:58
7	1203009781.1	0.0300	69	6.1297E-06	12/17/2013 11:40	12A	28	347	28	347	1/3/2014 14:59
8	1203009782.1	0.0100	25.2	4.2391E-06	12/17/2013 11:40	12B	285	2955	285	2955	1/3/2014 14:59
9	1203009783.1	0.0100	27.6	4.2391E-06	12/17/2013 11:40	12C	259	2872	259	2872	1/3/2014 14:59
10	1203009784.1	0.1000	0	1.1370E-05	12/30/2013 0:00	12D	447	3262	447	3262	1/3/2014 14:59



Pipet, 0.1 ml Stdev : +/- 0.000200 ml  
 Pipet, 0.5 ml Stdev : +/- 0.001000 ml  
 Pipet, 1 ml Stdev : +/- 0.002000 ml

Analytical SOP: GL-RAD-A-001  
 Instrument SOP: GL-RAD-I-006, GL-RAD-I-016

Pos.	Calibration Data				Alpha				Beta				Weekly Background								
	Counted on	Calibration Date	Calibration Due Date	Calibration Source Used	Calibration Date	Calibration Due Date	Calibration Source Used	Calibration Source Used	Detector Efficiency (cpm/dpm)	Det. Eff. Error (cpm/dpm)	X-Talk	Calibration Date	Calibration Due Date	Calibration Source Used	Detector Efficiency (cpm/dpm)	Det. Eff. Error (cpm/dpm)	X-Talk	Alpha	C/PM	Beta	Count Start Date/Time
1	LB4100	10/1/2013	9/30/2014	Th230	10/1/2013	9/30/2014	Sr90	0.1025	0.04268	0.03652	10/1/2013	9/30/2014	Sr90	0.4641	0.02505	0.00009	0.082	1.106		1/5/2014 17:58	500
2	PIC	10/1/2013	9/30/2014	Th230	10/1/2013	9/30/2014	Sr90	0.2469	0.01265	0.05004	10/1/2013	9/30/2014	Sr90	0.4529	0.00584	0.00262	0.176	0.614		12/29/2013 12:10	500
3	PIC	10/1/2013	9/30/2014	Th230	10/1/2013	9/30/2014	Sr90	0.1126	0.02427	0.05763	10/1/2013	9/30/2014	Sr90	0.3977	0.02610	0.00264	0.184	0.500		12/29/2013 12:10	500
4	LB4100	10/1/2013	9/30/2014	Th230	10/1/2013	9/30/2014	Sr90	0.1169	0.03190	0.03167	10/1/2013	9/30/2014	Sr90	0.4703	0.02356	0.00013	0.074	1.282		1/5/2014 17:58	500
5	PIC	10/1/2013	9/30/2014	Th230	10/1/2013	9/30/2014	Sr90	0.1050	0.00710	0.08392	10/1/2013	9/30/2014	Sr90	0.4036	0.00638	0.00295	0.158	0.508		12/29/2013 12:10	500
6	PIC	10/1/2013	9/30/2014	Th230	10/1/2013	9/30/2014	Sr90	0.2507	0.00593	0.07382	10/1/2013	9/30/2014	Sr90	0.4571	0.00557	0.00207	0.182	0.606		12/29/2013 12:10	500
7	PIC	10/1/2013	9/30/2014	Th230	10/1/2013	9/30/2014	Sr90	0.1059	0.01685	0.16871	10/1/2013	9/30/2014	Sr90	0.4005	0.01964	0.00010	0.106	0.496		12/29/2013 12:11	500
8	PIC	10/1/2013	9/30/2014	Th230	10/1/2013	9/30/2014	Sr90	0.1430	0.01085	0.29243	10/1/2013	9/30/2014	Sr90	0.4003	0.01114	0.00022	0.124	0.422		12/29/2013 12:11	500
9	PIC	10/1/2013	9/30/2014	Th230	10/1/2013	9/30/2014	Sr90	0.1675	0.02199	0.08064	10/1/2013	9/30/2014	Sr90	0.4405	0.01666	0.00052	0.142	0.702		12/29/2013 12:11	500
10	PIC	10/1/2013	9/30/2014	Th230	10/1/2013	9/30/2014	Sr90	0.2650	0.01863	0.06400	10/1/2013	9/30/2014	Sr90	0.4684	0.01845	0.00028	0.214	1.006		12/29/2013 12:11	500

Notes:  
 1 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date

Alpha Spike S/N : 1242-F  
 Spike Exp Date : 1/8/2014  
 Spike Activity (dpm/ml): 274.05  
 Spike Volume Added: 0.10  
 Spike Nuclide: Th-230

Alpha LCS S/N : 1242-F  
 LCS Exp Date : 1/8/2014  
 LCS Activity (dpm/ml): 274.05  
 LCS Volume Added: 0.10  
 LCS Nuclide: Th-230

\* - RPD changed to 0% due to sample & dup activity below MDA

Pos.	Alpha Results		Critical Level pCi/L	Required MDA pCi/L	MDA pCi/L	Sample Act. Conc. pCi/L	Sample Act. Error pCi/L	Net Count Rate CPM	Net Count Rate Error CPM	2 SIGMA Counting		2 SIGMA Total Prop.		Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery
	Decision Level pCi/L	MDA pCi/L								Uncertainty pCi/L	Uncertainty pCi/L	Uncertainty pCi/L	Uncertainty pCi/L						
1	6.1827	4.3650	0.7962	5	9.6092	-2.0683	1.2379	-0.0140	0.0173	4.9740	4.9742				SAMPLE				
2	1.1278	0.7962	0.7962	5	1.7019	-0.3242	1.6202	-0.0160	0.0259	0.9269	0.9269				SAMPLE				
3	843.2479	595.3403	595.3403	5	1270.7214	-259.5351	1.4701	-0.0180	0.0265	691.7761	691.7909				SAMPLE				
4	386.2692	272.7094	272.7094	5	603.2337	-386.9819	0.3688	-0.0400	0.0147	277.5692	277.5895				SAMPLE				
5	83.7882	59.1552	59.1552	5	126.8930	-71.4867	0.4824	-0.0480	0.0232	64.9093	64.9110				SAMPLE				
6	1.1295	0.7974	0.7974	5	1.7027	-1.5683	0.2742	-0.0880	0.0236	0.8303	0.8304				MB				
7	6.8000	4.8008	4.8008	5	10.4521	-7.0960	0.3604	-0.0500	0.0180	5.0003	5.0005				DUP	0.0%		1234.4528	117.8%
8	35.3106	24.9296	24.9296	5	65.6090	1453.8191	0.0618	4.6260	0.2618	173.9849	295.3036				MS			1234.4528	90.4%
9	32.2558	22.7729	22.7729	5	58.9903	1115.7731	0.0680	4.1747	0.2688	141.6396	235.9478				MSD	26.3%		1234.4528	90.4%
10	2.5030	1.7671	1.7671	5	4.3840	122.7239	0.0522	7.2360	0.3530	11.7588	23.6174				LCS			123.4453	99.4%

Notes:  
 1 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date

Beta Spike S/N : 1243-L  
 Spike Exp Date : 12/4/2014  
 Spike Activity (dpm/ml): 507.68  
 Spike Volume Added: 0.10  
 Spike Nuclide: Sr-90

Beta LCS S/N : 1243-L  
 LCS Exp Date : 12/4/2014  
 LCS Activity (dpm/ml): 507.68  
 LCS Volume Added: 0.10  
 LCS Nuclide: Sr-90

Beta Results																
Pos.	Decision Level pCi/L	Critical Level pCi/L	Required MDA pCi/L	MDA pCi/L	Sample Act. Conc. pCi/L	Sample Act. Error pCi/L	Net Count Rate CPM	Net Count Rate Error CPM	2 SIGMA		Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery
									Counting Uncertainty pCi/L	Total Prop. Uncertainty pCi/L						
1	5.0140	3.5399	5	7.2740	9.8198	0.2333	0.3060	0.0710	4.5001	4.7984		SAMPLE				
2	1.1484	0.6108	5	1.6813	0.5171	0.8459	0.0600	0.0508	0.9894	0.9940		SAMPLE				
3	393.4149	277.7543	-	578.1619	160.2108	0.8825	0.0520	0.0459	339.4367	341.0557		SAMPLE				
4	399.5289	282.0708	-	578.5087	-122.3205	1.4184	-0.0500	0.0709	332.7913	332.7922		SAMPLE				
5	39.0780	27.5894	5	57.4112	56.8392	0.2997	0.1620	0.0485	35.3964	36.7091		SAMPLE				
6	1.1304	0.7981	5	1.6553	0.0878	3.0974	0.0160	0.0495	0.9572	0.9575		MB				
7	3.8904	2.7467	5	5.7183	7.0681	0.2472	0.1980	0.0488	3.5944	3.7889	339628001.1	DUP	32.6%		4573.7060	116.5%
8	23.2720	16.4303	5	38.4873	5338.5604	0.0217	48.8280	0.9065	199.9382	914.4593	339628001.1	MS			4573.7060	104.5%
9	27.2754	19.2567	5	43.6264	4787.5428	0.0252	47.1647	0.8940	179.1809	811.9637	339628001.1	MSD	10.9%		457.3706	111.2%
10	3.0702	2.1676	5	4.8160	508.5200	0.0257	53.3607	0.9530	17.9603	86.5104		LCS				

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
339628001	D3	500	34	706	1/6/2014 12:15	1/6/2014 20:35	LB4100	1355958
339629001	9C	500	80	337	1/3/2014 14:58	1/3/2014 23:18	PIC	1355958
339630001	9D	500	83	276	1/3/2014 14:58	1/3/2014 23:18	PIC	1355958
339739001	D4	500	17	616	1/6/2014 12:15	1/6/2014 20:35	LB4100	1355958
339804001	10C	500	55	335	1/3/2014 14:58	1/3/2014 23:18	PIC	1355958
1203009780	10D	500	48	311	1/3/2014 14:58	1/3/2014 23:18	PIC	1355958
1203009781	12A	500	28	347	1/3/2014 14:59	1/3/2014 23:19	PIC	1355958
1203009782	12B	60	285	2955	1/3/2014 14:59	1/3/2014 15:59	PIC	1355958
1203009783	12C	60	259	2872	1/3/2014 14:59	1/3/2014 15:59	PIC	1355958
1203009784	12D	60	447	3262	1/3/2014 14:59	1/3/2014 15:59	PIC	1355958

# **Method Calibration Data**

# Gas Flow Proportional Counter Calibration Package

Method: Gross Alpha Beta

Instrument (circle one): LB4100 / Protean

## Part 1: Efficiency determination

- 1 Efficiency spreadsheet (eff pts, graphs, trendline equation)
- 2 Applicable portion of GFPC\_Machines.XLS
- 3 Raw Data for Calibration standards
- 4 Verification Spreadsheet and Raw Data (recoveries 75%-125%)
- 5 Plateau graph and raw data
- 6 Standardization of Carrier (if applicable)

Included/  
Acceptable

Comments

✓	
✓	
✓	
✓	
✓	
	NA

## Part 2. Documentation for Calibration Source

- 1 Vendor Certificate
- 2 Standard Traceability Log (from LIMS)
- 3 Current Verification of Source
- 4 Source preparation sheet

✓	
✓	
✓	
✓	

## Part 3. Documentation for Verification Source

- 1 Vendor Certificate
- 2 Standard Traceability Log (from LIMS)
- 3 Current Verification of Source
- 4 Source preparation sheet

✓	
✓	
✓	
✓	

## Part 4. Enter into LIMS

- 1 Alpha LIMS instrument calibration updated

✓	
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Primary Review of Package

[Signature]

Secondary Review of Package

Amanda L. Lehu

Effective Date:

10 | 1 | 13

Exp. Date: 9 | 30 | 14

Alpha Calibration - LB4100 - Aug 2013

Standard Data	Isotope	Th-230
	Standard ID number	1105-A
	Half Life (days)	27532545
	Std. Act. (dpm/mL)	22077.2901
	Reference Date	6/14/2007
	Volume of spike (mL)	2.0
	Std. Nominal (dpm)	44152.08
	Decay Date	8/10/2013

Source Weight	
Source	Measured weight (mg)
1	1.0
2	13.3
3	24.0
4	49.8
5	46.9
6	73.4
7	84.9
8	109.4

The following detectors were not calibrated:

A4

\*Background is considered negligible.

\*\*Decay corrected to mid-point of count

Detector (#)	Source ID (#)	Raw Count Data			Raw Alpha (cpm)	Th-230 (cpm)*	Decay Corrected Nominal (dpm)**	Th-230 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
		Start Time	Count Time (min)	Alpha (counts)					
A1	1	8/10/2013 15:00	5	39451	7890.2	7890.20	44152.08	0.1787	0.1744
A1	2	8/10/2013 15:23	5	27443	5488.6	5488.60	44152.08	0.1243	0.1374
A1	3	8/10/2013 15:16	5	27719	5543.8	5543.80	44152.08	0.1256	0.1149
A1	4	8/10/2013 15:09	5	20173	4034.6	4034.60	44152.08	0.0914	0.0868
A1	5	8/10/2013 15:32	5	18268	3653.6	3653.60	44152.08	0.0828	0.0886
A1	6	8/10/2013 16:01	5	17081	3416.2	3416.20	44152.08	0.0774	0.0770
A1	7	8/10/2013 15:54	5	15618	3123.6	3123.60	44152.08	0.0707	0.0721
A1	8	8/10/2013 15:46	5	10917	2183.4	2183.40	44152.08	0.0495	0.0490
A2	1	8/10/2013 15:09	5	45155	9031	9031.00	44152.08	0.2045	0.2002
A2	2	8/10/2013 15:00	5	31233	6246.6	6246.60	44152.08	0.1415	0.1594
A2	3	8/10/2013 15:23	5	34090	6818	6818.00	44152.08	0.1544	0.1337
A2	4	8/10/2013 15:16	5	23491	4698.2	4698.20	44152.08	0.1064	0.0991
A2	5	8/10/2013 15:46	5	18334	3666.8	3666.80	44152.08	0.0830	0.1015
A2	6	8/10/2013 15:32	5	21324	4264.8	4264.80	44152.08	0.0966	0.0865
A2	7	8/10/2013 16:01	5	16522	3304.4	3304.40	44152.08	0.0748	0.0817
A2	8	8/10/2013 15:54	5	14054	2810.8	2810.80	44152.08	0.0637	0.0629
A3	1	8/10/2013 15:16	5	46267	9253.4	9253.40	44152.08	0.2096	0.2022
A3	2	8/10/2013 15:09	5	30442	6088.4	6088.40	44152.08	0.1379	0.1587
A3	3	8/10/2013 15:00	5	32372	6474.4	6474.40	44152.08	0.1466	0.1316
A3	4	8/10/2013 15:23	5	23637	4727.4	4727.40	44152.08	0.1071	0.0964
A3	5	8/10/2013 15:54	5	19618	3923.6	3923.60	44152.08	0.0889	0.0988
A3	6	8/10/2013 15:46	5	18299	3659.8	3659.80	44152.08	0.0829	0.0842
A3	7	8/10/2013 15:32	5	17059	3411.8	3411.80	44152.08	0.0773	0.0792
A3	8	8/10/2013 16:01	5	12902	2580.4	2580.40	44152.08	0.0584	0.0575
B1	1	8/10/2013 15:39	5	60804	12160.8	12160.80	44152.08	0.2754	0.2646
B1	2	8/10/2013 16:01	5	38639	7727.8	7727.80	44152.08	0.1750	0.2032
B1	3	8/10/2013 15:54	5	40863	8172.6	8172.60	44152.08	0.1851	0.1668
B1	4	8/10/2013 15:46	5	30868	6173.6	6173.60	44152.08	0.1398	0.1253
B1	5	8/10/2013 15:00	5	25134	5026.8	5026.80	44152.08	0.1139	0.1276
B1	6	8/10/2013 15:25	5	27019	5403.8	5403.80	44152.08	0.1224	0.1153
B1	7	8/10/2013 15:16	5	21669	4333.8	4333.80	44152.08	0.0982	0.1098
B1	8	8/10/2013 15:09	5	17265	3453	3453.00	44152.08	0.0782	0.0753
B2	1	8/10/2013 15:46	5	54021	10804.2	10804.20	44152.08	0.2447	0.2433
B2	2	8/10/2013 15:39	5	41224	8244.8	8244.80	44152.08	0.1867	0.1955
B2	3	8/10/2013 16:01	5	39388	7877.6	7877.60	44152.08	0.1784	0.1655
B2	4	8/10/2013 15:54	5	29421	5884.2	5884.20	44152.08	0.1333	0.1251
B2	5	8/10/2013 15:09	5	24602	4920.4	4920.40	44152.08	0.1114	0.1280
B2	6	8/10/2013 15:00	5	25370	5074	5074.00	44152.08	0.1149	0.1092
B2	7	8/10/2013 15:25	5	21903	4380.6	4380.60	44152.08	0.0992	0.1022
B2	8	8/10/2013 15:16	5	16606	3321.2	3321.20	44152.08	0.0752	0.0751
B3	1	8/10/2013 15:54	5	50698	10139.6	10139.60	44152.08	0.2297	0.2228
B3	2	8/10/2013 15:46	5	34881	6976.2	6976.20	44152.08	0.1580	0.1836
B3	3	8/10/2013 15:39	5	40700	8140	8140.00	44152.08	0.1844	0.1576
B3	4	8/10/2013 16:01	5	27790	5558	5558.00	44152.08	0.1259	0.1183
B3	5	8/10/2013 15:16	5	22609	4521.8	4521.80	44152.08	0.1024	0.1215

Detector (#)	Source ID (#)	Raw Count Data			Raw Alpha (cpm)	Th-230 (cpm)*	Decay Corrected Nominal (dpm)**	Th-230	Calculated
		Start Time	Count Time (min)	Alpha (counts)				Efficiency (cpm/dpm)	Efficiency (cpm/dpm)
B3	6	8/10/2013 15:09	5	23937	4787.4	4787.40	44152.08	0.1084	0.0997
B3	7	8/10/2013 15:00	5	19086	3817.2	3817.20	44152.08	0.0865	0.0925
B3	8	8/10/2013 15:25	5	16160	3232	3232.00	44152.08	0.0732	0.0724
B4	1	8/10/2013 16:01	5	47472	9494.4	9494.40	44152.08	0.2150	0.2062
B4	2	8/10/2013 15:54	5	31710	6342	6342.00	44152.08	0.1436	0.1651
B4	3	8/10/2013 15:46	5	33347	6669.4	6669.40	44152.08	0.1511	0.1396
B4	4	8/10/2013 15:39	5	26770	5354	5354.00	44152.08	0.1213	0.1061
B4	5	8/10/2013 15:25	5	21589	4317.8	4317.80	44152.08	0.0978	0.1085
B4	6	8/10/2013 15:16	5	20884	4176.8	4176.80	44152.08	0.0946	0.0927
B4	7	8/10/2013 15:09	5	17279	3455.8	3455.80	44152.08	0.0783	0.0859
B4	8	8/10/2013 15:00	5	13304	2660.8	2660.80	44152.08	0.0603	0.0580
C1	1	8/10/2013 16:09	5	58913	11782.6	11782.60	44152.08	0.2669	0.2569
C1	2	8/10/2013 16:36	5	38126	7625.2	7625.20	44152.08	0.1727	0.1998
C1	3	8/10/2013 16:28	5	40886	8177.2	8177.20	44152.08	0.1852	0.1663
C1	4	8/10/2013 16:18	5	32621	6524.2	6524.20	44152.08	0.1478	0.1287
C1	5	8/10/2013 16:45	5	24910	4982	4982.00	44152.08	0.1128	0.1308
C1	6	8/10/2013 17:10	5	26573	5314.6	5314.60	44152.08	0.1204	0.1190
C1	7	8/10/2013 17:02	5	23541	4708.2	4708.20	44152.08	0.1066	0.1128
C1	8	8/10/2013 16:53	5	16918	3383.6	3383.60	44152.08	0.0766	0.0747
C2	1	8/10/2013 16:18	5	52523	10504.6	10504.60	44152.08	0.2379	0.2323
C2	2	8/10/2013 16:09	5	36922	7384.4	7384.40	44152.08	0.1672	0.1822
C2	3	8/10/2013 16:36	5	35507	7101.4	7101.40	44152.08	0.1608	0.1506
C2	4	8/10/2013 16:28	5	26653	5330.6	5330.60	44152.08	0.1207	0.1087
C2	5	8/10/2013 16:53	5	21928	4385.6	4385.60	44152.08	0.0993	0.1116
C2	6	8/10/2013 16:45	5	22091	4418.2	4418.20	44152.08	0.1001	0.0950
C2	7	8/10/2013 17:10	5	18346	3669.2	3669.20	44152.08	0.0831	0.0906
C2	8	8/10/2013 17:02	5	16476	3295.2	3295.20	44152.08	0.0746	0.0729
C3	1	8/10/2013 16:28	5	46580	9316	9316.00	44152.08	0.2110	0.2065
C3	2	8/10/2013 16:18	5	33758	6751.6	6751.60	44152.08	0.1529	0.1685
C3	3	8/10/2013 16:09	5	34931	6986.2	6986.20	44152.08	0.1582	0.1432
C3	4	8/10/2013 16:36	5	23855	4771	4771.00	44152.08	0.1081	0.1047
C3	5	8/10/2013 17:02	5	21758	4351.6	4351.60	44152.08	0.0986	0.1078
C3	6	8/10/2013 16:53	5	20363	4072.6	4072.60	44152.08	0.0922	0.0862
C3	7	8/10/2013 16:45	5	16348	3269.6	3269.60	44152.08	0.0741	0.0790
C3	8	8/10/2013 17:10	5	13284	2656.8	2656.80	44152.08	0.0602	0.0594
C4	1	8/10/2013 16:36	5	40698	8139.6	8139.60	44152.08	0.1844	0.1791
C4	2	8/10/2013 16:28	5	28204	5640.8	5640.80	44152.08	0.1278	0.1444
C4	3	8/10/2013 16:18	5	30592	6118.4	6118.40	44152.08	0.1386	0.1231
C4	4	8/10/2013 16:09	5	23371	4674.2	4674.20	44152.08	0.1059	0.0953
C4	5	8/10/2013 17:10	5	17830	3566	3566.00	44152.08	0.0808	0.0972
C4	6	8/10/2013 17:02	5	20501	4100.2	4100.20	44152.08	0.0929	0.0838
C4	7	8/10/2013 16:53	5	15231	3046.2	3046.20	44152.08	0.0690	0.0777
C4	8	8/10/2013 16:45	5	11799	2359.8	2359.80	44152.08	0.0534	0.0519
D1	1	8/10/2013 16:46	5	57216	11443.2	11443.20	44152.08	0.2592	0.2513
D1	2	8/10/2013 17:12	5	39526	7905.2	7905.20	44152.08	0.1790	0.2027
D1	3	8/10/2013 17:03	5	42333	8466.6	8466.60	44152.08	0.1918	0.1721
D1	4	8/10/2013 16:54	5	31443	6288.6	6288.60	44152.08	0.1424	0.1309
D1	5	8/10/2013 16:11	5	25974	5194.8	5194.80	44152.08	0.1177	0.1338
D1	6	8/10/2013 16:37	5	26974	5394.8	5394.80	44152.08	0.1222	0.1143
D1	7	8/10/2013 16:29	5	21632	4326.4	4326.40	44152.08	0.0980	0.1069
D1	8	8/10/2013 16:19	5	17640	3528	3528.00	44152.08	0.0799	0.0781
D2	1	8/10/2013 16:54	5	53496	10699.2	10699.20	44152.08	0.2423	0.2359
D2	2	8/10/2013 16:46	5	37349	7469.8	7469.80	44152.08	0.1692	0.1889
D2	3	8/10/2013 17:12	5	38857	7771.4	7771.40	44152.08	0.1760	0.1594
D2	4	8/10/2013 17:03	5	28870	5774	5774.00	44152.08	0.1308	0.1197
D2	5	8/10/2013 16:19	5	23759	4751.8	4751.80	44152.08	0.1076	0.1226
D2	6	8/10/2013 16:11	5	24308	4861.6	4861.60	44152.08	0.1101	0.1042
D2	7	8/10/2013 16:37	5	20010	4002	4002.00	44152.08	0.0906	0.0974
D2	8	8/10/2013 16:29	5	15950	3190	3190.00	44152.08	0.0723	0.0708
D3	1	8/10/2013 17:03	5	53239	10647.8	10647.80	44152.08	0.2412	0.2340
D3	2	8/10/2013 16:54	5	36771	7354.2	7354.20	44152.08	0.1666	0.1867
D3	3	8/10/2013 16:46	5	38062	7612.4	7612.40	44152.08	0.1724	0.1571
D3	4	8/10/2013 17:12	5	28693	5738.6	5738.60	44152.08	0.1300	0.1176
D3	5	8/10/2013 16:29	5	23403	4680.6	4680.60	44152.08	0.1060	0.1204



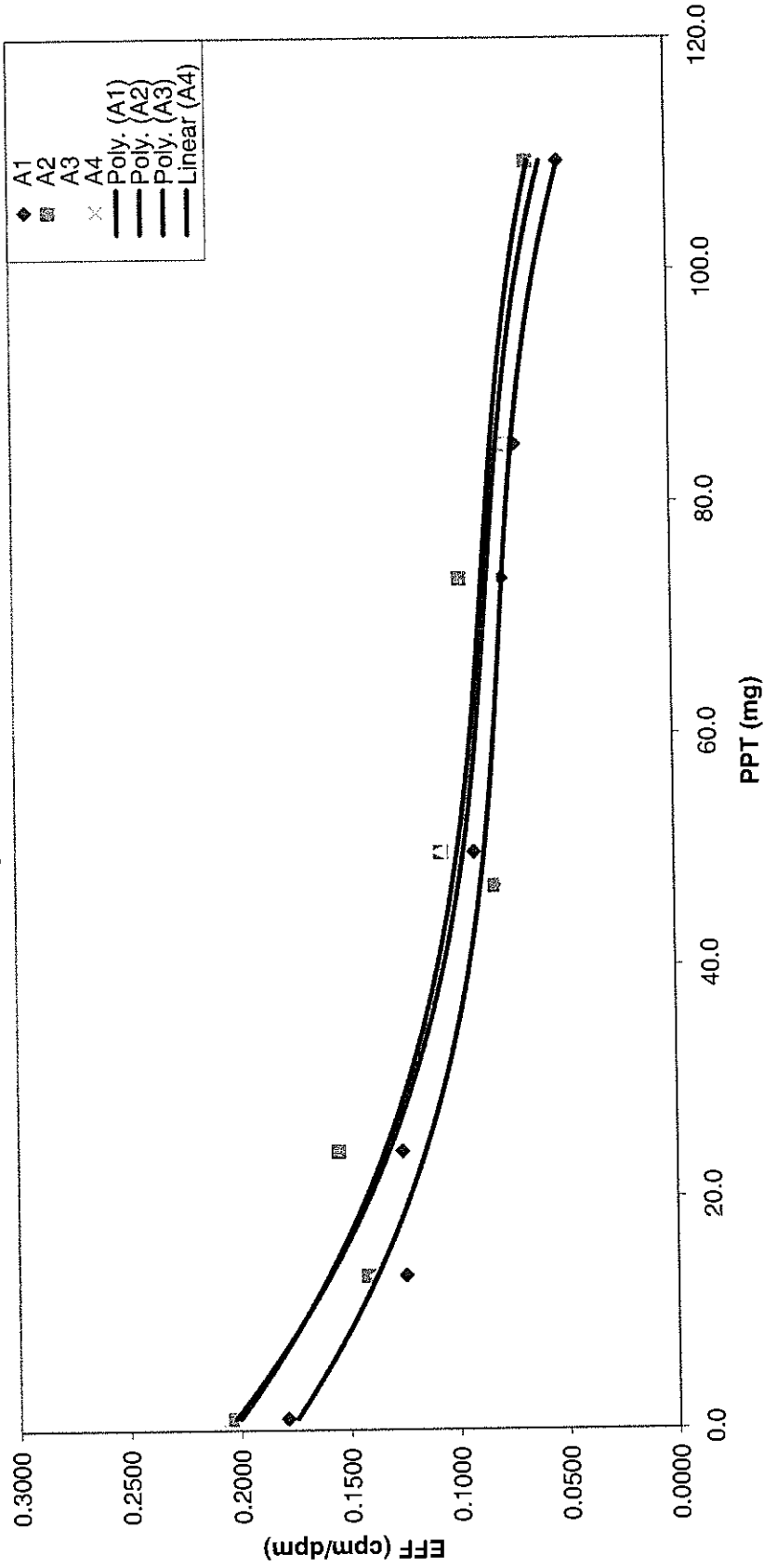
Detector (#)	Source ID (#)	Raw Count Data			Raw Alpha (cpm)	Th-230 (cpm)*	Decay Corrected Nominal (dpm)**	Th-230	Calculated
		Start Time	Count Time (min)	Alpha (counts)				Efficiency (cpm/dpm)	Efficiency (cpm/dpm)
D3	6	8/10/2013 16:19	5	23871	4774.2	4774.20	44152.08	0.1081	0.1023
D3	7	8/10/2013 16:11	5	19319	3863.8	3863.80	44152.08	0.0875	0.0955
D3	8	8/10/2013 16:37	5	15510	3102	3102.00	44152.08	0.0703	0.0685
D4	1	8/10/2013 17:12	5	54761	10952.2	10952.20	44152.08	0.2481	0.2410
D4	2	8/10/2013 17:03	5	38334	7666.8	7666.80	44152.08	0.1736	0.1952
D4	3	8/10/2013 16:54	5	40785	8157	8157.00	44152.08	0.1847	0.1664
D4	4	8/10/2013 16:46	5	30940	6188	6188.00	44152.08	0.1402	0.1276
D4	5	8/10/2013 16:37	5	25013	5002.6	5002.60	44152.08	0.1133	0.1304
D4	6	8/10/2013 16:29	5	26164	5232.8	5232.80	44152.08	0.1185	0.1115
D4	7	8/10/2013 16:19	5	21174	4234.8	4234.80	44152.08	0.0959	0.1039
D4	8	8/10/2013 16:11	5	16867	3373.4	3373.40	44152.08	0.0764	0.0748
E1	1	9/26/2013 13:26	5	54720	10944	10944.00	44152.03	0.2479	0.2411
E1	2	9/26/2013 13:53	5	36926	7385.2	7385.20	44152.03	0.1673	0.1894
E1	3	9/26/2013 13:42	5	39311	7862.2	7862.20	44152.03	0.1781	0.1573
E1	4	9/26/2013 13:35	5	28883	5776.6	5776.60	44152.03	0.1308	0.1160
E1	5	9/26/2013 14:00	5	21453	4290.6	4290.60	44152.03	0.0972	0.1187
E1	6	9/26/2013 14:20	5	24158	4831.6	4831.60	44152.03	0.1094	0.1021
E1	7	9/26/2013 14:13	5	19633	3926.6	3926.60	44152.03	0.0889	0.0963
E1	8	9/26/2013 14:07	5	15963	3192.6	3192.60	44152.03	0.0723	0.0710
E2	1	9/26/2013 13:35	5	42735	8547	8547.00	44152.03	0.1936	0.1885
E2	2	9/26/2013 13:27	5	29263	5852.6	5852.60	44152.03	0.1326	0.1482
E2	3	9/26/2013 13:53	5	30194	6038.8	6038.80	44152.03	0.1368	0.1233
E2	4	9/26/2013 13:42	5	22598	4519.6	4519.60	44152.03	0.1024	0.0918
E2	5	9/26/2013 14:07	5	17592	3518.4	3518.40	44152.03	0.0797	0.0938
E2	6	9/26/2013 14:00	5	19245	3849	3849.00	44152.03	0.0872	0.0813
E2	7	9/26/2013 14:20	5	15525	3105	3105.00	44152.03	0.0703	0.0768
E2	8	9/26/2013 14:13	5	12674	2534.8	2534.80	44152.03	0.0574	0.0561
E3	1	9/26/2013 13:42	5	55065	11013	11013.00	44152.03	0.2494	0.2423
E3	2	9/26/2013 13:35	5	36771	7354.2	7354.20	44152.03	0.1666	0.1888
E3	3	9/26/2013 13:27	5	38761	7752.2	7752.20	44152.03	0.1756	0.1559
E3	4	9/26/2013 13:53	5	28406	5681.2	5681.20	44152.03	0.1287	0.1141
E3	5	9/26/2013 14:13	5	21314	4262.8	4262.80	44152.03	0.0965	0.1168
E3	6	9/26/2013 14:07	5	24023	4804.6	4804.60	44152.03	0.1088	0.1006
E3	7	9/26/2013 14:00	5	19048	3809.6	3809.60	44152.03	0.0863	0.0951
E3	8	9/26/2013 14:20	5	15600	3120	3120.00	44152.03	0.0707	0.0690
E4	1	9/26/2013 13:53	5	51629	10325.8	10325.80	44152.03	0.2339	0.2279
E4	2	9/26/2013 13:42	5	34755	6951	6951.00	44152.03	0.1574	0.1783
E4	3	9/26/2013 13:35	5	37195	7439	7439.00	44152.03	0.1685	0.1477
E4	4	9/26/2013 13:27	5	26585	5317	5317.00	44152.03	0.1204	0.1089
E4	5	9/26/2013 14:20	5	20222	4044.4	4044.40	44152.03	0.0916	0.1114
E4	6	9/26/2013 14:13	5	23211	4642.2	4642.20	44152.03	0.1051	0.0964
E4	7	9/26/2013 14:07	5	18446	3689.2	3689.20	44152.03	0.0836	0.0911
E4	8	9/26/2013 14:00	5	14959	2991.8	2991.80	44152.03	0.0678	0.0666
F1	1	9/26/2013 14:00	5	55321	11064.2	11064.20	44152.03	0.2506	0.2438
F1	2	9/26/2013 14:20	5	37122	7424.4	7424.40	44152.03	0.1682	0.1902
F1	3	9/26/2013 14:13	5	39263	7852.6	7852.60	44152.03	0.1779	0.1575
F1	4	9/26/2013 14:07	5	28765	5753	5753.00	44152.03	0.1303	0.1170
F1	5	9/26/2013 13:27	5	21963	4392.6	4392.60	44152.03	0.0995	0.1196
F1	6	9/26/2013 13:53	5	24985	4997	4997.00	44152.03	0.1132	0.1044
F1	7	9/26/2013 13:42	5	19889	3977.8	3977.80	44152.03	0.0901	0.0988
F1	8	9/26/2013 13:35	5	15956	3191.2	3191.20	44152.03	0.0723	0.0707
F2	1	9/26/2013 14:07	5	48479	9695.8	9695.80	44152.03	0.2196	0.2151
F2	2	9/26/2013 14:00	5	34059	6811.8	6811.80	44152.03	0.1543	0.1709
F2	3	9/26/2013 14:20	5	35641	7128.2	7128.20	44152.03	0.1614	0.1437
F2	4	9/26/2013 14:13	5	26207	5241.4	5241.40	44152.03	0.1187	0.1088
F2	5	9/26/2013 13:35	5	20487	4097.4	4097.40	44152.03	0.0928	0.1111
F2	6	9/26/2013 13:27	5	23397	4679.4	4679.40	44152.03	0.1060	0.0969
F2	7	9/26/2013 13:53	5	18598	3719.6	3719.60	44152.03	0.0842	0.0916
F2	8	9/26/2013 13:42	5	15213	3042.6	3042.60	44152.03	0.0689	0.0679
F3	1	9/26/2013 14:13	5	48976	9795.2	9795.20	44152.03	0.2219	0.2161
F3	2	9/26/2013 14:07	5	32849	6569.8	6569.80	44152.03	0.1488	0.1669
F3	3	9/26/2013 14:00	5	33848	6769.6	6769.60	44152.03	0.1533	0.1371
F3	4	9/26/2013 14:20	5	25199	5039.8	5039.80	44152.03	0.1141	0.1008
F3	5	9/26/2013 13:42	5	18720	3744	3744.00	44152.03	0.0848	0.1030

Detector (#)	Source ID (#)	Raw Count Data			Raw Alpha (cpm)	Th-230 (cpm)*	Decay Corrected Nominal (dpm)**	Th-230 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
		Start Time	Count Time (min)	Alpha (counts)					
F3	6	9/26/2013 13:35	5	21531	4306.2	4306.20	44152.03	0.0975	0.0906
F3	7	9/26/2013 13:27	5	17356	3471.2	3471.20	44152.03	0.0786	0.0861
F3	8	9/26/2013 13:53	5	13899	2779.8	2779.80	44152.03	0.0630	0.0616
F4	1	9/26/2013 14:20	5	40304	8060.8	8060.80	44152.03	0.1826	0.1781
F4	2	9/26/2013 14:13	5	27326	5465.2	5465.20	44152.03	0.1238	0.1375
F4	3	9/26/2013 14:07	5	27595	5519	5519.00	44152.03	0.1250	0.1130
F4	4	9/26/2013 14:00	5	20614	4122.8	4122.80	44152.03	0.0934	0.0834
F4	5	9/26/2013 13:53	5	15894	3178.8	3178.80	44152.03	0.0720	0.0852
F4	6	9/26/2013 13:42	5	17715	3543	3543.00	44152.03	0.0802	0.0752
F4	7	9/26/2013 13:35	5	14544	2908.8	2908.80	44152.03	0.0659	0.0715
F4	8	9/26/2013 13:27	5	11508	2301.6	2301.60	44152.03	0.0521	0.0510
G1	1	9/26/2013 14:28	5	48654	9730.8	9730.80	44152.03	0.2204	0.2147
G1	2	9/26/2013 15:02	5	33061	6612.2	6612.20	44152.03	0.1498	0.1686
G1	3	9/26/2013 14:50	5	34912	6982.4	6982.40	44152.03	0.1581	0.1401
G1	4	9/26/2013 14:42	5	25742	5148.4	5148.40	44152.03	0.1166	0.1040
G1	5	9/26/2013 15:19	5	19241	3848.2	3848.20	44152.03	0.0872	0.1064
G1	6	9/26/2013 15:54	5	22059	4411.8	4411.80	44152.03	0.0999	0.0920
G1	7	9/26/2013 15:42	5	17469	3493.8	3493.80	44152.03	0.0791	0.0867
G1	8	9/26/2013 15:35	5	14076	2815.2	2815.20	44152.03	0.0638	0.0625
G2	1	9/26/2013 14:42	5	45998	9199.6	9199.60	44152.03	0.2084	0.2043
G2	2	9/26/2013 14:28	5	32652	6530.4	6530.40	44152.03	0.1479	0.1635
G2	3	9/26/2013 15:02	5	34236	6847.2	6847.20	44152.03	0.1551	0.1379
G2	4	9/26/2013 14:50	5	25392	5078.4	5078.40	44152.03	0.1150	0.1036
G2	5	9/26/2013 15:35	5	19080	3816	3816.00	44152.03	0.0864	0.1060
G2	6	9/26/2013 15:19	5	21705	4341	4341.00	44152.03	0.0983	0.0908
G2	7	9/26/2013 15:54	5	17585	3517	3517.00	44152.03	0.0797	0.0856
G2	8	9/26/2013 15:42	5	14536	2907.2	2907.20	44152.03	0.0658	0.0650
G3	1	9/26/2013 14:50	5	45655	9131	9131.00	44152.03	0.2068	0.2012
G3	2	9/26/2013 14:42	5	30893	6178.6	6178.60	44152.03	0.1399	0.1567
G3	3	9/26/2013 14:28	5	31725	6345	6345.00	44152.03	0.1437	0.1294
G3	4	9/26/2013 15:02	5	24039	4807.8	4807.80	44152.03	0.1089	0.0956
G3	5	9/26/2013 15:42	5	17765	3553	3553.00	44152.03	0.0805	0.0977
G3	6	9/26/2013 15:35	5	20514	4102.8	4102.80	44152.03	0.0929	0.0853
G3	7	9/26/2013 15:19	5	15991	3198.2	3198.20	44152.03	0.0724	0.0809
G3	8	9/26/2013 15:54	5	13332	2666.4	2666.40	44152.03	0.0604	0.0588
G4	1	9/26/2013 15:02	5	49434	9886.8	9886.80	44152.03	0.2239	0.2184
G4	2	9/26/2013 14:50	5	33309	6661.8	6661.80	44152.03	0.1509	0.1695
G4	3	9/26/2013 14:42	5	34769	6953.8	6953.80	44152.03	0.1575	0.1395
G4	4	9/26/2013 14:28	5	25017	5003.4	5003.40	44152.03	0.1133	0.1022
G4	5	9/26/2013 15:54	5	19083	3816.6	3816.60	44152.03	0.0864	0.1045
G4	6	9/26/2013 15:42	5	21931	4386.2	4386.20	44152.03	0.0993	0.0909
G4	7	9/26/2013 15:35	5	17292	3458.4	3458.40	44152.03	0.0783	0.0861
G4	8	9/26/2013 15:19	5	14074	2814.8	2814.80	44152.03	0.0638	0.0625
H1	1	9/26/2013 15:19	5	53647	10729.4	10729.40	44152.03	0.2430	0.2374
H1	2	9/26/2013 15:54	5	36854	7370.8	7370.80	44152.03	0.1669	0.1879
H1	3	9/26/2013 15:41	5	39595	7919	7919.00	44152.03	0.1794	0.1569
H1	4	9/26/2013 15:35	5	28707	5741.4	5741.40	44152.03	0.1300	0.1158
H1	5	9/26/2013 14:28	5	20905	4181	4181.00	44152.03	0.0947	0.1186
H1	6	9/26/2013 15:02	5	24003	4800.6	4800.60	44152.03	0.1087	0.1010
H1	7	9/26/2013 14:50	5	19658	3931.6	3931.60	44152.03	0.0890	0.0951
H1	8	9/26/2013 14:41	5	15930	3186	3186.00	44152.03	0.0722	0.0713
H2	1	9/26/2013 15:35	5	49532	9906.4	9906.40	44152.03	0.2244	0.2176
H2	2	9/26/2013 15:19	5	33034	6606.8	6606.80	44152.03	0.1496	0.1704
H2	3	9/26/2013 15:54	5	35116	7023.2	7023.20	44152.03	0.1591	0.1412
H2	4	9/26/2013 15:41	5	26333	5266.6	5266.60	44152.03	0.1193	0.1036
H2	5	9/26/2013 14:42	5	19122	3824.4	3824.40	44152.03	0.0866	0.1061
H2	6	9/26/2013 14:28	5	21134	4226.8	4226.80	44152.03	0.0957	0.0911
H2	7	9/26/2013 15:02	5	17648	3529.6	3529.60	44152.03	0.0799	0.0859
H2	8	9/26/2013 14:50	5	14137	2827.4	2827.40	44152.03	0.0640	0.0627
H3	1	9/26/2013 15:41	5	51661	10332.2	10332.20	44152.03	0.2340	0.2282
H3	2	9/26/2013 15:35	5	35151	7030.2	7030.20	44152.03	0.1592	0.1799
H3	3	9/26/2013 15:19	5	37786	7557.2	7557.20	44152.03	0.1712	0.1500
H3	4	9/26/2013 15:54	5	27330	5466	5466.00	44152.03	0.1238	0.1113
H3	5	9/26/2013 14:50	5	20453	4090.6	4090.60	44152.03	0.0926	0.1139

Detector (#)	Source ID (#)	Raw Count Data			Raw Alpha (cpm)	Th-230 (cpm)*	Decay Corrected Nominal (dpm)**	Th-230 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
		Start Time	Count Time (min)	Alpha (counts)					
H3	6	9/26/2013 14:42	5	23536	4707.2	4707.20	44152.03	0.1066	0.0978
H3	7	9/26/2013 14:28	5	18671	3734.2	3734.20	44152.03	0.0846	0.0921
H3	8	9/26/2013 15:02	5	15112	3022.4	3022.40	44152.03	0.0685	0.0673
H4	1	9/26/2013 15:54	5	45198	9039.6	9039.60	44152.03	0.2047	0.1994
H4	2	9/26/2013 15:41	5	31053	6210.6	6210.60	44152.03	0.1407	0.1576
H4	3	9/26/2013 15:35	5	32426	6485.2	6485.20	44152.03	0.1469	0.1315
H4	4	9/26/2013 15:19	5	24380	4876	4876.00	44152.03	0.1104	0.0973
H4	5	9/26/2013 15:02	5	18104	3620.8	3620.80	44152.03	0.0820	0.0997
H4	6	9/26/2013 14:50	5	20098	4019.6	4019.60	44152.03	0.0910	0.0852
H4	7	9/26/2013 14:42	5	16273	3254.6	3254.60	44152.03	0.0737	0.0800
H4	8	9/26/2013 14:28	5	13189	2637.8	2637.80	44152.03	0.0597	0.0585
I1	1	8/10/2013 13:13	5	52823	10564.6	10564.60	44152.08	0.2393	0.2318
I1	2	8/10/2013 14:11	5	35693	7138.6	7138.60	44152.08	0.1617	0.1835
I1	3	8/10/2013 14:01	5	37771	7554.2	7554.20	44152.08	0.1711	0.1538
I1	4	8/10/2013 13:31	5	28004	5600.8	5600.80	44152.08	0.1269	0.1160
I1	5	8/10/2013 14:20	5	23164	4632.8	4632.80	44152.08	0.1049	0.1186
I1	6	8/10/2013 14:51	5	23946	4789.2	4789.20	44152.08	0.1085	0.1030
I1	7	8/10/2013 14:37	5	19804	3960.8	3960.80	44152.08	0.0897	0.0969
I1	8	8/10/2013 14:29	5	15669	3133.8	3133.80	44152.08	0.0710	0.0694
I2	1	8/10/2013 13:31	5	58257	11651.4	11651.40	44152.08	0.2639	0.2563
I2	2	8/10/2013 13:13	5	40054	8010.8	8010.80	44152.08	0.1814	0.2045
I2	3	8/10/2013 14:11	5	42404	8480.8	8480.80	44152.08	0.1921	0.1726
I2	4	8/10/2013 14:01	5	31370	6274	6274.00	44152.08	0.1421	0.1317
I2	5	8/10/2013 14:29	5	26309	5261.8	5261.80	44152.08	0.1192	0.1344
I2	6	8/10/2013 14:20	5	27501	5500.2	5500.20	44152.08	0.1246	0.1171
I2	7	8/10/2013 14:51	5	22543	4508.6	4508.60	44152.08	0.1021	0.1103
I2	8	8/10/2013 14:37	5	18067	3613.4	3613.40	44152.08	0.0818	0.0802
I3	1	8/10/2013 14:01	5	59102	11820.4	11820.40	44152.08	0.2677	0.2606
I3	2	8/10/2013 13:31	5	41263	8252.6	8252.60	44152.08	0.1869	0.2089
I3	3	8/10/2013 13:13	5	43275	8655	8655.00	44152.08	0.1960	0.1769
I3	4	8/10/2013 14:11	5	32321	6464.2	6464.20	44152.08	0.1464	0.1351
I3	5	8/10/2013 14:37	5	26778	5355.6	5355.60	44152.08	0.1213	0.1380
I3	6	8/10/2013 14:29	5	28089	5617.8	5617.80	44152.08	0.1272	0.1196
I3	7	8/10/2013 14:20	5	23008	4601.6	4601.60	44152.08	0.1042	0.1124
I3	8	8/10/2013 14:51	5	18446	3689.2	3689.20	44152.08	0.0836	0.0820
I4	1	8/10/2013 14:11	5	57921	11584.2	11584.20	44152.08	0.2624	0.2554
I4	2	8/10/2013 14:01	5	39818	7963.6	7963.60	44152.08	0.1804	0.2029
I4	3	8/10/2013 13:31	5	42202	8440.4	8440.40	44152.08	0.1912	0.1706
I4	4	8/10/2013 13:13	5	30814	6162.8	6162.80	44152.08	0.1396	0.1295
I4	5	8/10/2013 14:51	5	25516	5103.2	5103.20	44152.08	0.1156	0.1323
I4	6	8/10/2013 14:37	5	27230	5446	5446.00	44152.08	0.1233	0.1156
I4	7	8/10/2013 14:29	5	22436	4487.2	4487.20	44152.08	0.1016	0.1092
I4	8	8/10/2013 14:20	5	17951	3590.2	3590.20	44152.08	0.0813	0.0799
J1	1	8/10/2013 14:20	5	55750	11150	11150.00	44152.08	0.2525	0.2463
J1	2	8/10/2013 14:51	5	37934	7586.8	7586.80	44152.08	0.1718	0.1929
J1	3	8/10/2013 14:37	5	39810	7962	7962.00	44152.08	0.1803	0.1602
J1	4	8/10/2013 14:29	5	28982	5796.4	5796.40	44152.08	0.1313	0.1192
J1	5	8/10/2013 13:13	5	22838	4567.6	4567.60	44152.08	0.1035	0.1219
J1	6	8/10/2013 14:11	5	24534	4906.8	4906.80	44152.08	0.1111	0.1057
J1	7	8/10/2013 14:01	5	20801	4160.2	4160.20	44152.08	0.0942	0.0995
J1	8	8/10/2013 13:31	5	15617	3123.4	3123.40	44152.08	0.0707	0.0698
J2	1	8/10/2013 14:29	5	57503	11500.6	11500.60	44152.08	0.2605	0.2533
J2	2	8/10/2013 14:20	5	39509	7901.8	7901.80	44152.08	0.1790	0.2006
J2	3	8/10/2013 14:51	5	41066	8213.2	8213.20	44152.08	0.1860	0.1680
J2	4	8/10/2013 14:37	5	30691	6138.2	6138.20	44152.08	0.1390	0.1260
J2	5	8/10/2013 13:31	5	24812	4962.4	4962.40	44152.08	0.1124	0.1288
J2	6	8/10/2013 13:13	5	25577	5115.4	5115.40	44152.08	0.1159	0.1112
J2	7	8/10/2013 14:11	5	21740	4348	4348.00	44152.08	0.0985	0.1046
J2	8	8/10/2013 14:01	5	16940	3388	3388.00	44152.08	0.0767	0.0754
J3	1	8/10/2013 14:37	5	55730	11146	11146.00	44152.08	0.2524	0.2435
J3	2	8/10/2013 14:29	5	37407	7481.4	7481.40	44152.08	0.1694	0.1933
J3	3	8/10/2013 14:20	5	39250	7850	7850.00	44152.08	0.1778	0.1616
J3	4	8/10/2013 14:51	5	29168	5833.6	5833.60	44152.08	0.1321	0.1188
J3	5	8/10/2013 14:01	5	24012	4802.4	4802.40	44152.08	0.1088	0.1218

Detector (#)	Source ID (#)	Raw Count Data			Alpha (counts)	Raw Alpha (cpm)	Th-230 (cpm)*	Decay Corrected Nominal (dpm)**	Th-230	Calculated
		Start Time	Count Time (min)	Efficiency (cpm/dpm)					Efficiency (cpm/dpm)	
J3	6	8/10/2013 13:31	5	23627	4725.4	4725.40	44152.08	0.1070	0.1025	
J3	7	8/10/2013 13:13	5	19361	3872.2	3872.20	44152.08	0.0877	0.0960	
J3	8	8/10/2013 14:11	5	16147	3229.4	3229.40	44152.08	0.0731	0.0710	
J4	1	8/10/2013 14:51	5	56608	11321.6	11321.60	44152.08	0.2564	0.2473	
J4	2	8/10/2013 14:37	5	37888	7577.6	7577.60	44152.08	0.1716	0.1971	
J4	3	8/10/2013 14:29	5	40729	8145.8	8145.80	44152.08	0.1845	0.1657	
J4	4	8/10/2013 14:20	5	29953	5990.6	5990.60	44152.08	0.1357	0.1242	
J4	5	8/10/2013 14:11	5	25078	5015.6	5015.60	44152.08	0.1136	0.1271	
J4	6	8/10/2013 14:01	5	25327	5065.4	5065.40	44152.08	0.1147	0.1081	
J4	7	8/10/2013 13:31	5	20203	4040.6	4040.60	44152.08	0.0915	0.1007	
J4	8	8/10/2013 13:13	5	16141	3228.2	3228.20	44152.08	0.0731	0.0710	

# Alpha Calibration



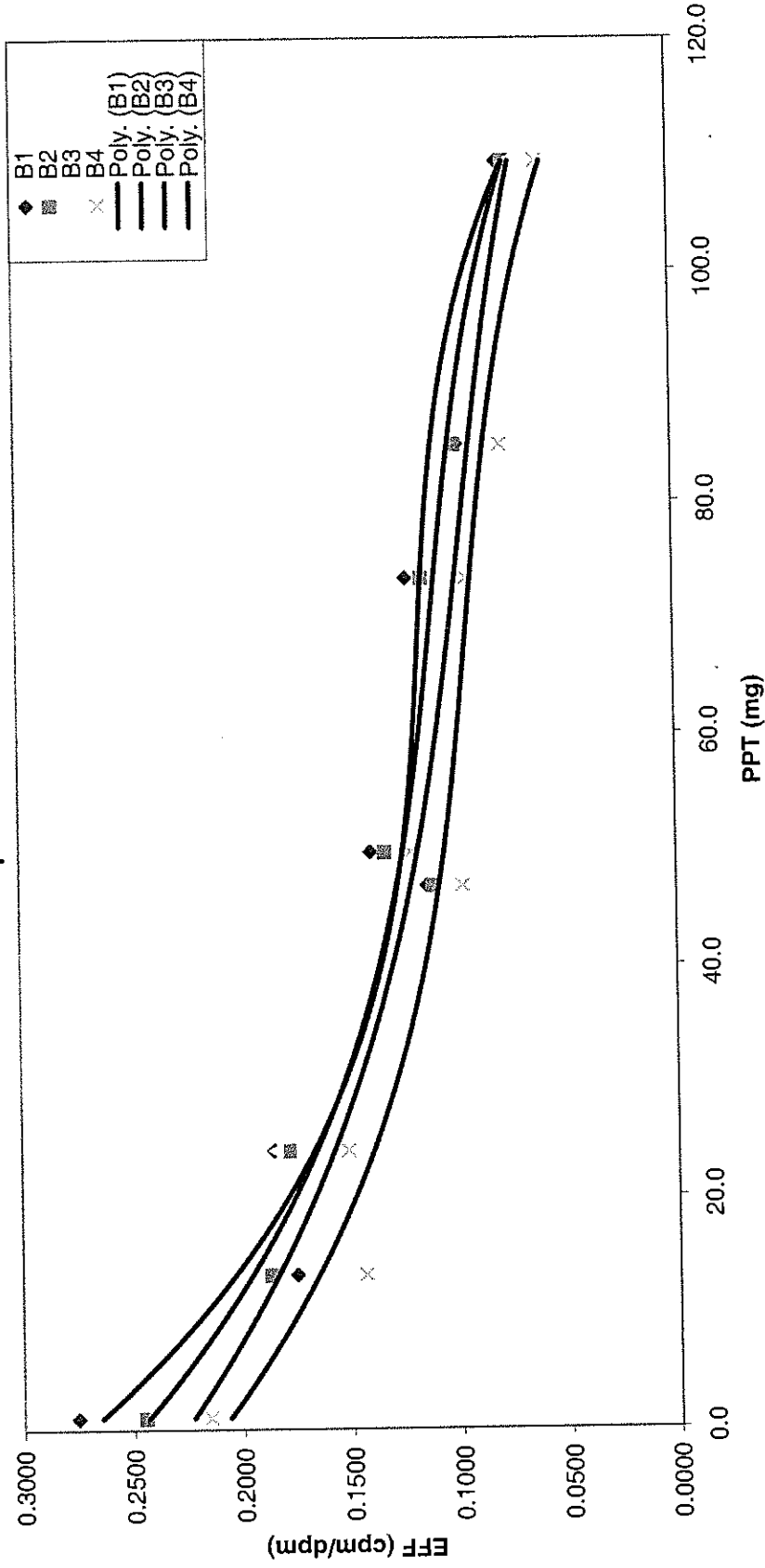
A1  $y = -2.328682E-07x^3 + 4.801743E-05x^2 - 3.645242E-03x + 1.779830E-01$

A2  $y = -2.147111E-07x^3 + 4.790063E-05x^2 - 3.960985E-03x + 2.040953E-01$

A3  $y = -2.453695E-07x^3 + 5.328563E-05x^2 - 4.254121E-03x + 2.064257E-01$

A4

# Alpha Calibration



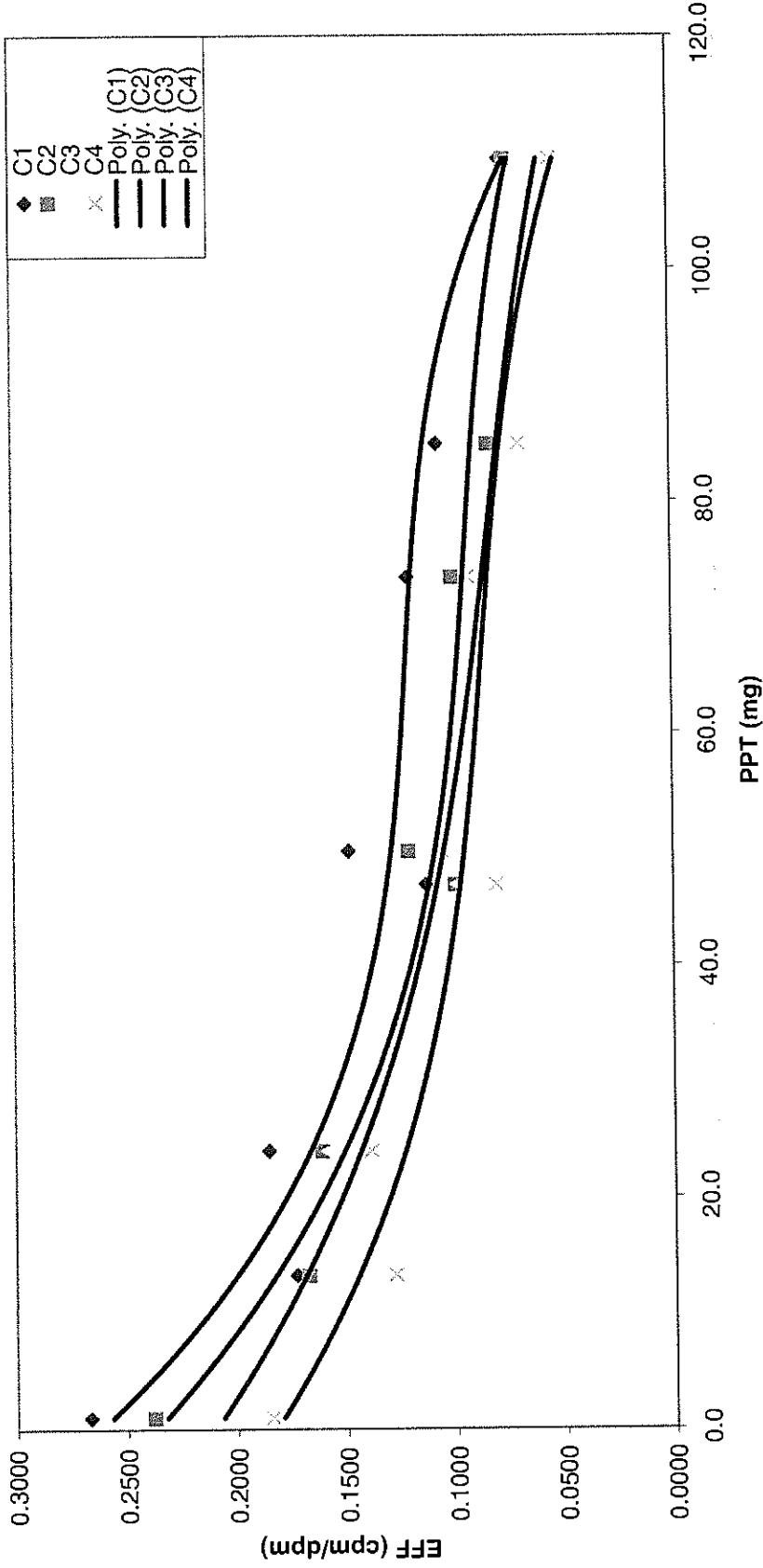
$$B1y = -4.157973E-07x^3 + 8.522647E-05x^2 - 6.133047E-03x + 2.706825E-01$$

$$B2y = -2.643198E-07x^3 + 5.694109E-05x^2 - 4.644462E-03x + 2.478399E-01$$

$$B3y = -1.677069E-07x^3 + 3.951569E-05x^2 - 3.723971E-03x + 2.264920E-01$$

$$B4y = -2.494813E-07x^3 + 5.142555E-05x^2 - 4.031375E-03x + 2.101617E-01$$

# Alpha Calibration



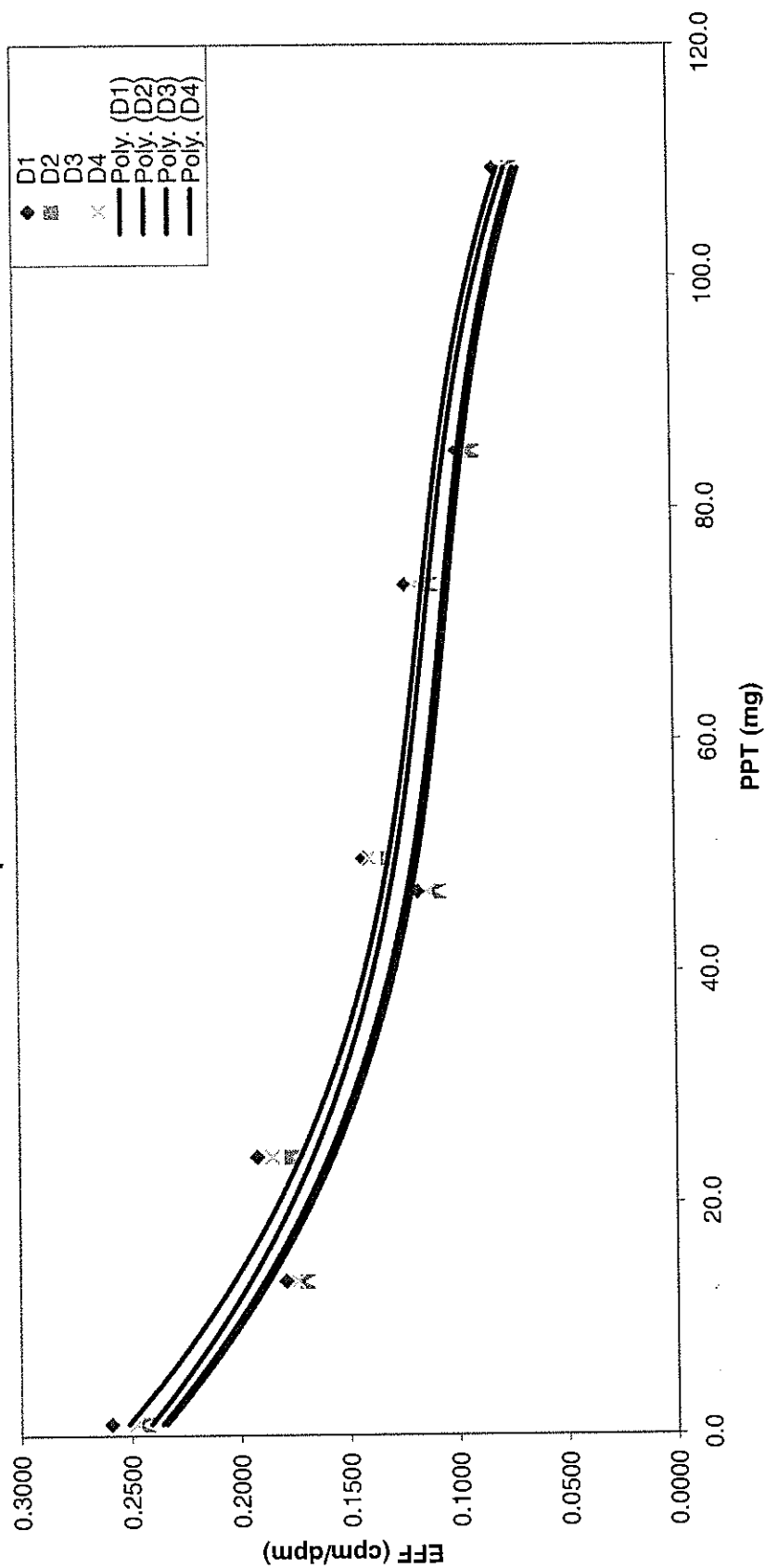
$$C1y = -4.096804E-07x^3 + 8.151979E-05x^2 - 5.732448E-03x + 2.625876E-01$$

$$C2y = -2.533768E-07x^3 + 5.839991E-05x^2 - 4.856810E-03x + 2.370503E-01$$

$$C3y = -1.593158E-07x^3 + 3.774753E-05x^2 - 3.599714E-03x + 2.100360E-01$$

$$C4y = -2.190743E-07x^3 + 4.424358E-05x^2 - 3.411722E-03x + 1.825089E-01$$

# Alpha Calibration



$$D1\ y = -2.721322E-07x^3 + 5.819057E-05x^2 - 4.735209E-03x + 2.559995E-01$$

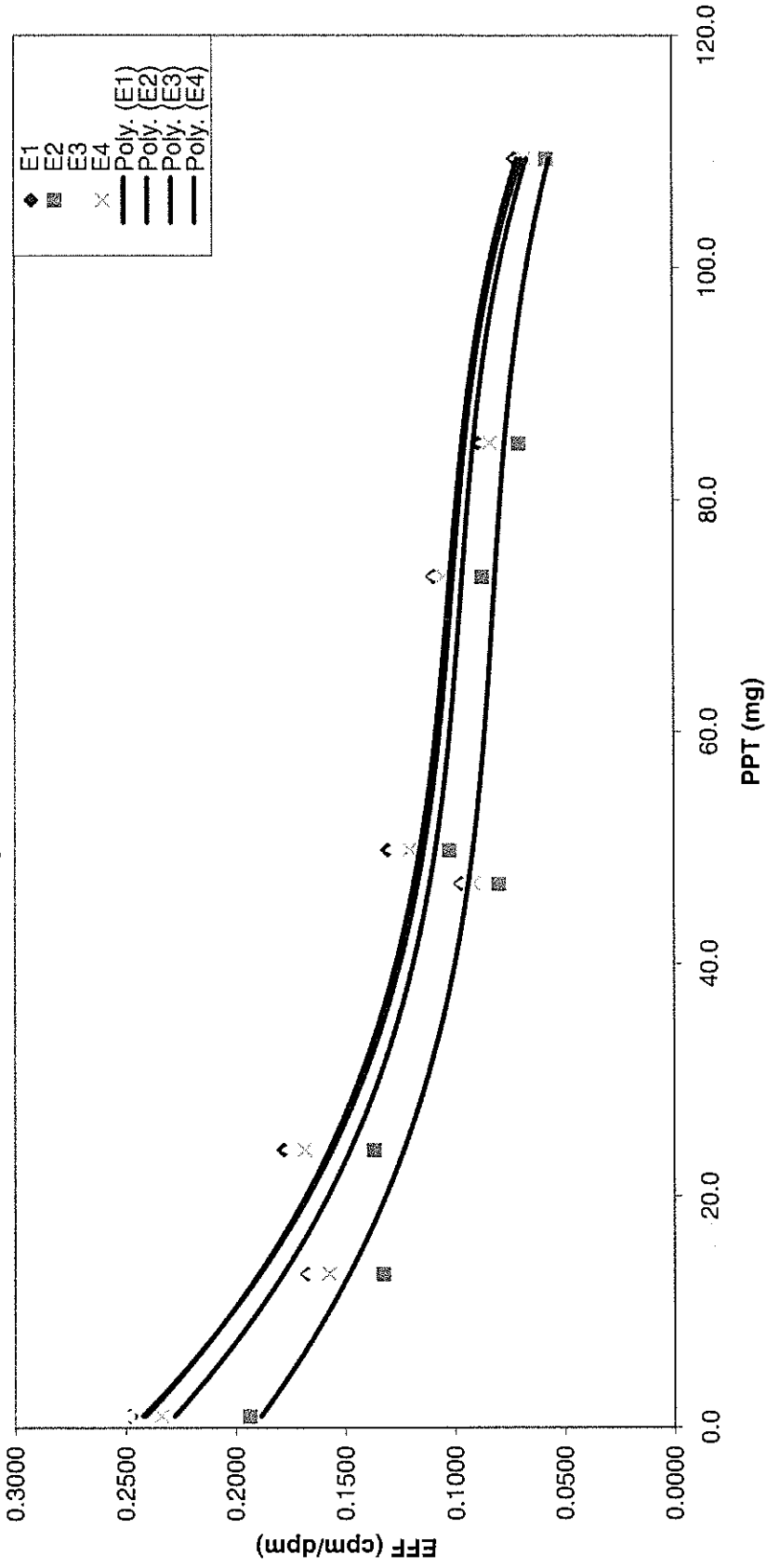
$$D2\ y = -2.613299E-07x^3 + 5.624678E-05x^2 - 4.575366E-03x + 2.403826E-01$$

$$D3\ y = -2.661803E-07x^3 + 5.705303E-05x^2 - 4.610823E-03x + 2.385835E-01$$

$$D4\ y = -2.610231E-07x^3 + 5.508141E-05x^2 - 4.461314E-03x + 2.453902E-01$$



# Alpha Calibration



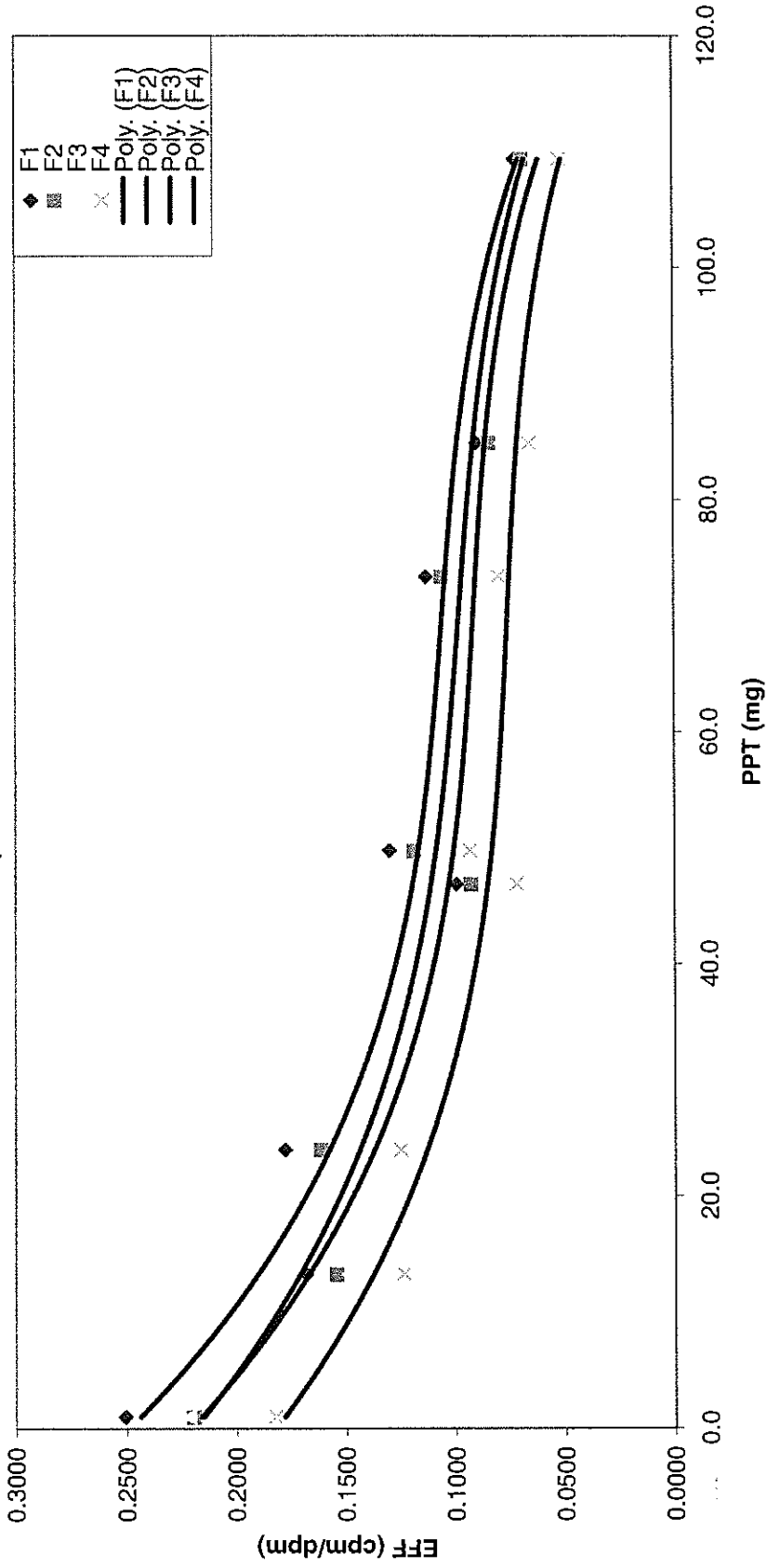
$E1y = -2.944249E-07x^3 + 6.386145E-05x^2 - 5.063939E-03x + 2.461336E-01$

$E2y = -2.361720E-07x^3 + 5.059947E-05x^2 - 3.954277E-03x + 1.923637E-01$

$E3y = -3.104714E-07x^3 + 6.699926E-05x^2 - 5.245474E-03x + 2.474741E-01$

$E4y = -2.893207E-07x^3 + 6.228420E-05x^2 - 4.869671E-03x + 2.326831E-01$

# Alpha Calibration



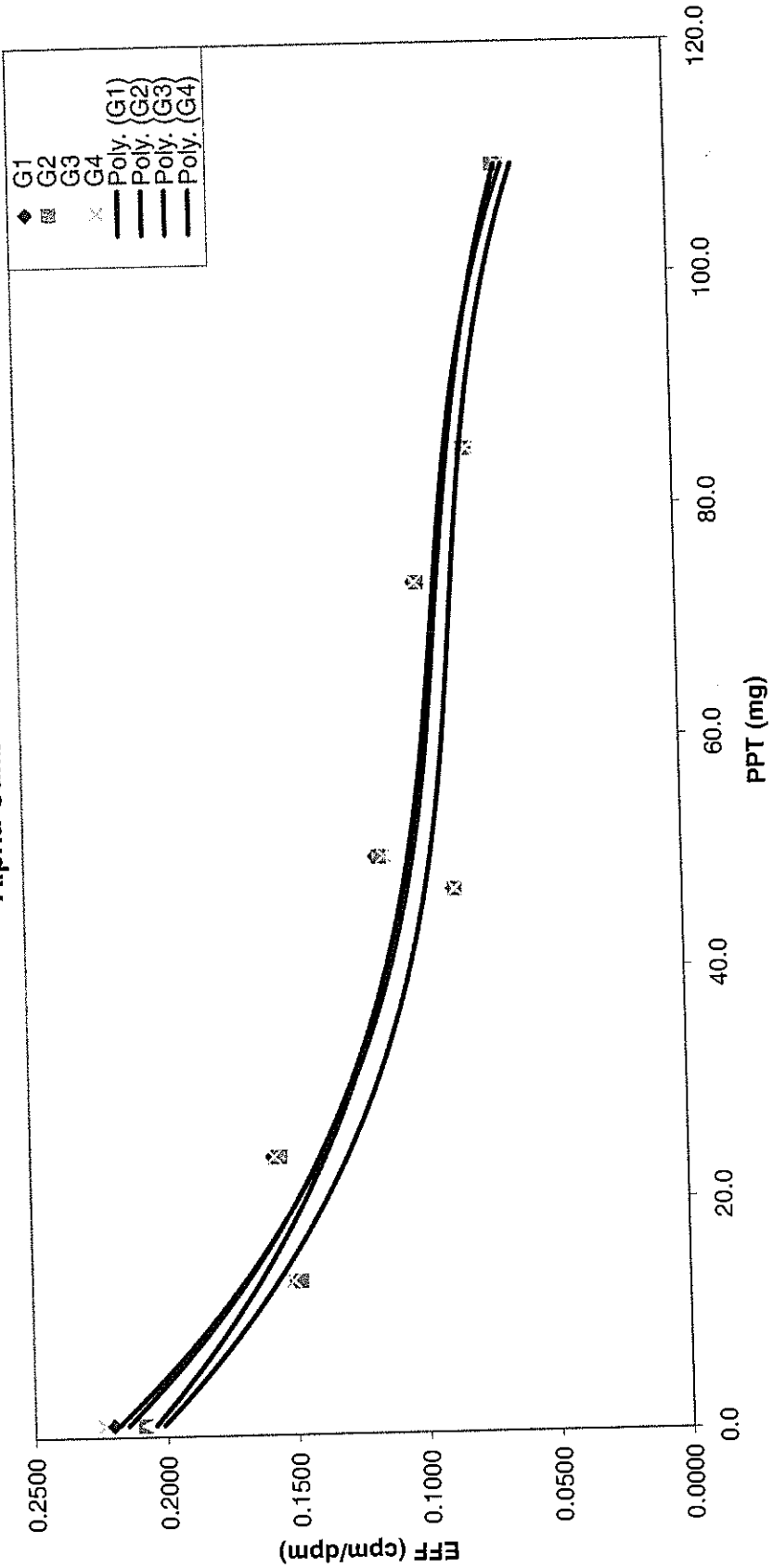
$$F1y = -3.257606E-07x^3 + 6.899259E-05x^2 - 5.278365E-03x + 2.489683E-01$$

$$F2y = -2.594262E-07x^3 + 5.530814E-05x^2 - 4.330376E-03x + 2.193433E-01$$

$$F3y = -3.033749E-07x^3 + 6.432344E-05x^2 - 4.862612E-03x + 2.208974E-01$$

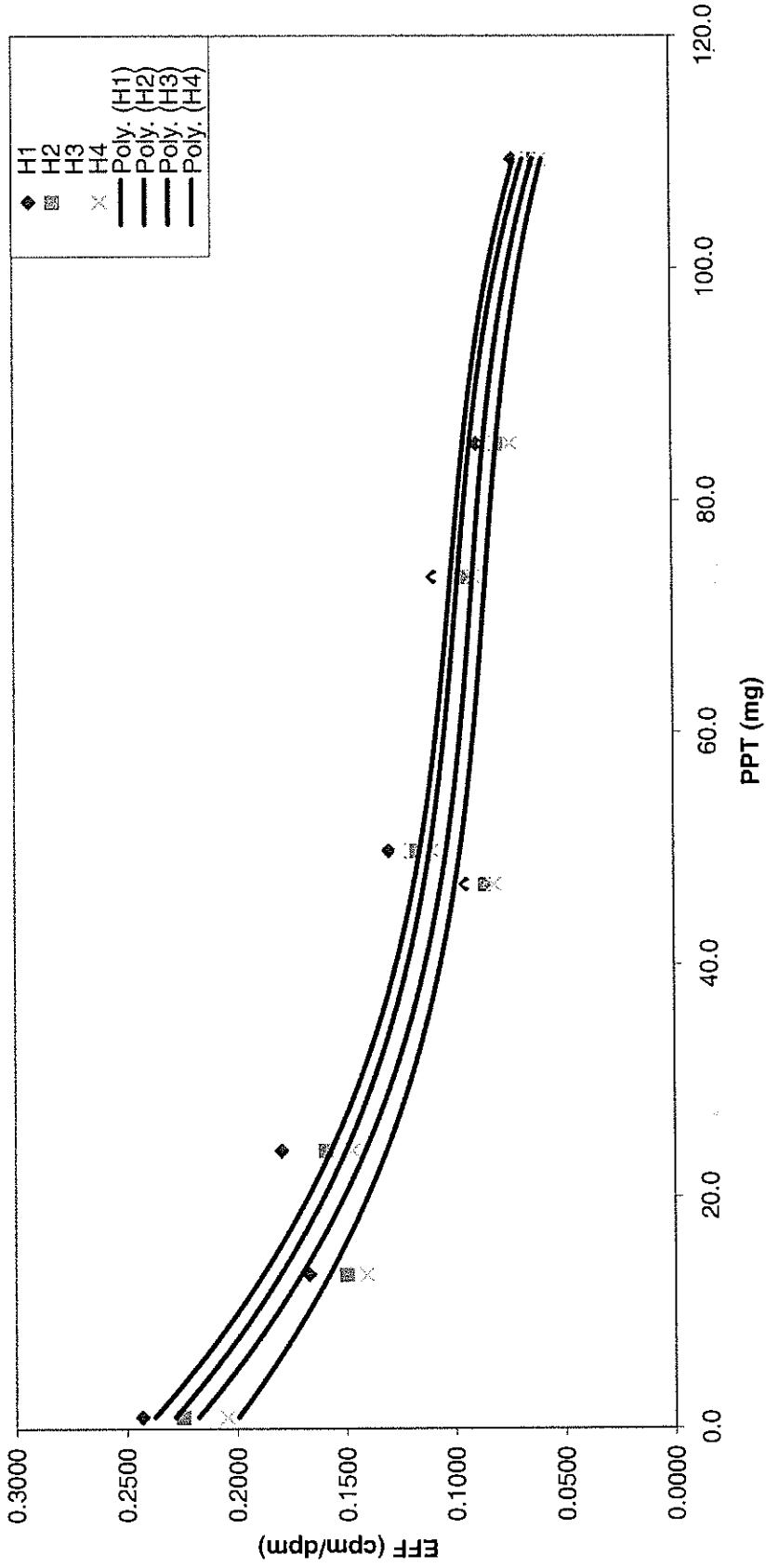
$$F4y = -2.529765E-07x^3 + 5.341564E-05x^2 - 4.013705E-03x + 1.820602E-01$$

# Alpha Calibration



$G1y = -2.724311E-07x^3 + 5.815453E-05x^2 - 4.534397E-03x + 2.192128E-01$   
 $G2y = -2.206781E-07x^3 + 4.842290E-05x^2 - 3.964716E-03x + 2.081867E-01$   
 $G3y = -2.671510E-07x^3 + 5.707172E-05x^2 - 4.388154E-03x + 2.055589E-01$   
 $G4y = -2.903859E-07x^3 + 6.234454E-05x^2 - 4.813809E-03x + 2.231384E-01$

# Alpha Calibration



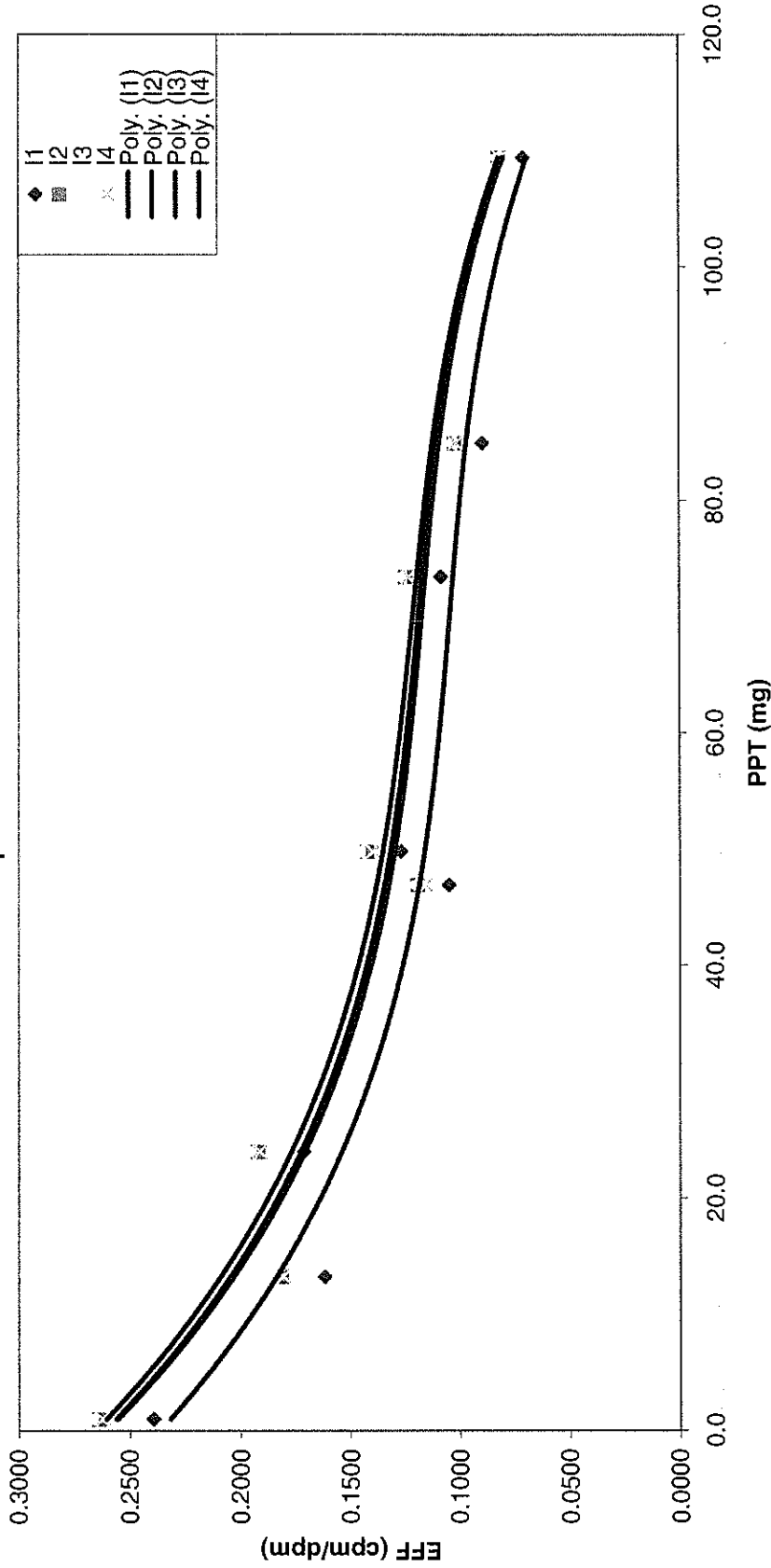
$$H1y = -2.689930E-07x^3 + 5.921211E-05x^2 - 4.820133E-03x + 2.421679E-01$$

$$H2y = -2.704863E-07x^3 + 5.855799E-05x^2 - 4.626818E-03x + 2.222067E-01$$

$$H3y = -2.753157E-07x^3 + 5.939350E-05x^2 - 4.715465E-03x + 2.328068E-01$$

$$H4y = -2.355666E-07x^3 + 5.103185E-05x^2 - 4.088321E-03x + 2.034652E-01$$

# Alpha Calibration



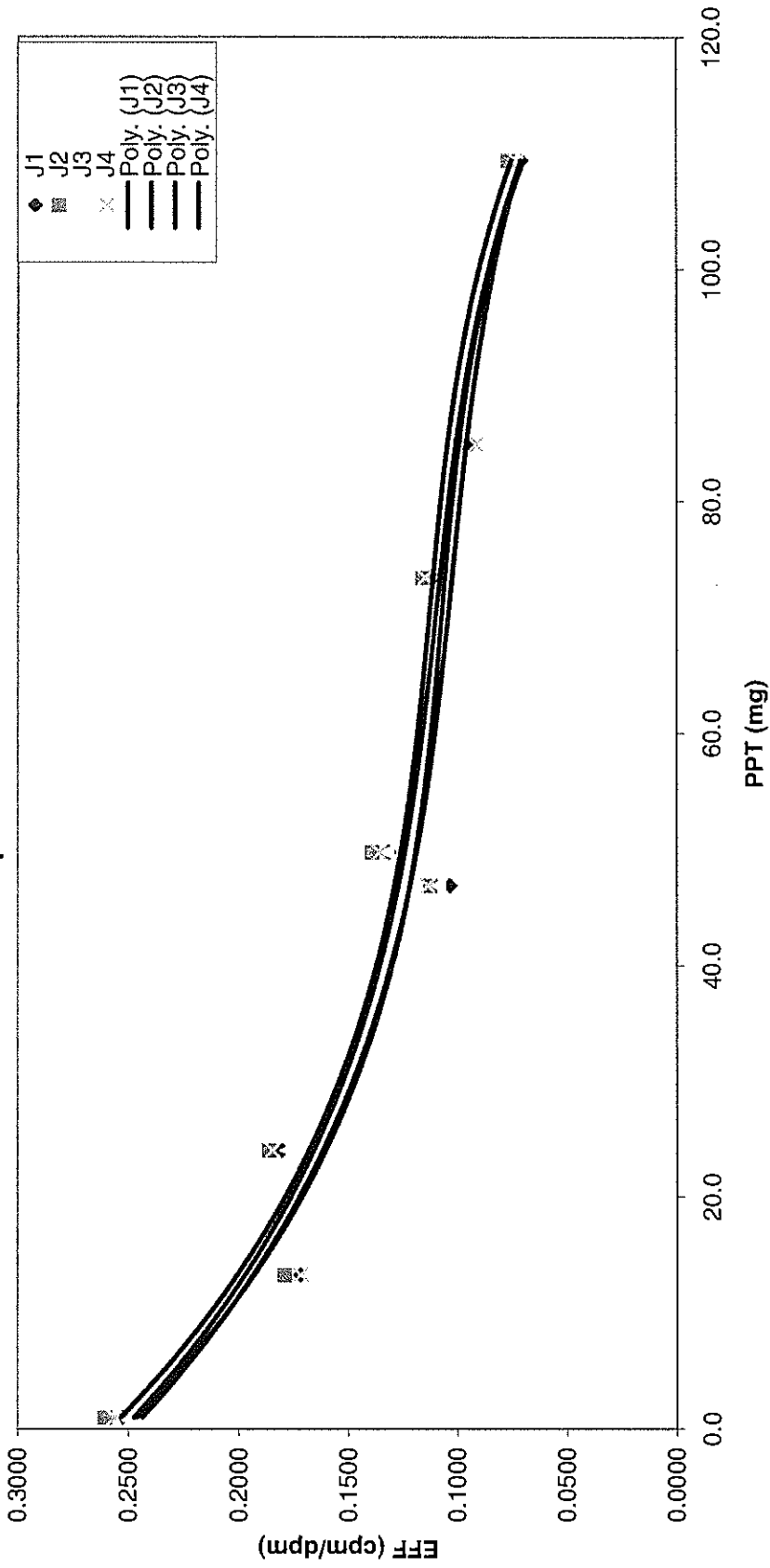
I1  $y = -2.904155E-07x^3 + 6.118384E-05x^2 - 4.745378E-03x + 2.364924E-01$

I2  $y = -3.103020E-07x^3 + 6.530136E-05x^2 - 5.086035E-03x + 2.613414E-01$

I3  $y = -3.037608E-07x^3 + 6.417544E-05x^2 - 5.064032E-03x + 2.656339E-01$

I4  $y = -3.148243E-07x^3 + 6.655813E-05x^2 - 5.164176E-03x + 2.605274E-01$

# Alpha Calibration



$$J1y = -3.245900E-07x^3 + 6.836196E-05x^2 - 5.254675E-03x + 2.514655E-01$$

$$J2y = -3.098945E-07x^3 + 6.587287E-05x^2 - 5.171066E-03x + 2.584407E-01$$

$$J3y = -2.667589E-07x^3 + 5.893603E-05x^2 - 4.875963E-03x + 2.483578E-01$$

$$J4y = -2.890213E-07x^3 + 6.135766E-05x^2 - 4.909859E-03x + 2.521976E-01$$

Current Calibration - LB4100

Geometry 2 inch Planchett

Alpha LB4100	Cal Date A0	10/1/2013 A1	Exp Date A2	9/30/2014 A3	A4
A1	1.779830E-01	-3.645242E-03	4.801743E-05	-2.328682E-07	
A2	2.040953E-01	-3.960985E-03	4.790063E-05	-2.147111E-07	
A3	2.064257E-01	-4.254121E-03	5.328563E-05	-2.453695E-07	
A4	#N/A	#N/A	#N/A	#N/A	
B1	2.706825E-01	-6.133047E-03	8.522647E-05	-4.157973E-07	
B2	2.478399E-01	-4.644462E-03	5.694109E-05	-2.643198E-07	
B3	2.264920E-01	-3.723971E-03	3.951569E-05	-1.677069E-07	
B4	2.101617E-01	-4.031375E-03	5.142555E-05	-2.494813E-07	
C1	2.625876E-01	-5.732448E-03	8.151979E-05	-4.096804E-07	
C2	2.370503E-01	-4.856810E-03	5.839991E-05	-2.533768E-07	
C3	2.100360E-01	-3.599714E-03	3.774753E-05	-1.593158E-07	
C4	1.825089E-01	-3.411722E-03	4.424358E-05	-2.190743E-07	
D1	2.559995E-01	-4.735209E-03	5.819057E-05	-2.721322E-07	
D2	2.403826E-01	-4.575366E-03	5.624678E-05	-2.613299E-07	
D3	2.385835E-01	-4.610823E-03	5.705303E-05	-2.661803E-07	
D4	2.453902E-01	-4.461314E-03	5.508141E-05	-2.610231E-07	
E1	2.461336E-01	-5.063939E-03	6.386145E-05	-2.944249E-07	
E2	1.923637E-01	-3.954277E-03	5.059947E-05	-2.361720E-07	
E3	2.474741E-01	-5.245474E-03	6.699926E-05	-3.104714E-07	
E4	2.326831E-01	-4.869671E-03	6.228420E-05	-2.893207E-07	
F1	2.489683E-01	-5.278365E-03	6.899259E-05	-3.257606E-07	
F2	2.193433E-01	-4.330376E-03	5.530814E-05	-2.594262E-07	
F3	2.208974E-01	-4.862612E-03	6.432344E-05	-3.033749E-07	
F4	1.820602E-01	-4.013705E-03	5.341564E-05	-2.529765E-07	
G1	2.192128E-01	-4.534397E-03	5.815453E-05	-2.724311E-07	
G2	2.081867E-01	-3.964716E-03	4.842290E-05	-2.206781E-07	
G3	2.055589E-01	-4.388154E-03	5.707172E-05	-2.671510E-07	
G4	2.231384E-01	-4.813809E-03	6.234454E-05	-2.903859E-07	
H1	2.421679E-01	-4.820133E-03	5.921211E-05	-2.689930E-07	
H2	2.222067E-01	-4.626818E-03	5.855799E-05	-2.704863E-07	
H3	2.328068E-01	-4.715465E-03	5.939350E-05	-2.753157E-07	
H4	2.034652E-01	-4.088321E-03	5.103185E-05	-2.355666E-07	
I1	2.364924E-01	-4.745378E-03	6.118384E-05	-2.904155E-07	
I2	2.613414E-01	-5.086035E-03	6.530136E-05	-3.103020E-07	
I3	2.656339E-01	-5.064032E-03	6.417544E-05	-3.037608E-07	
I4	2.605274E-01	-5.164176E-03	6.655813E-05	-3.148243E-07	
J1	2.514655E-01	-5.254675E-03	6.836196E-05	-3.245900E-07	
J2	2.584407E-01	-5.171066E-03	6.587287E-05	-3.098945E-07	
J3	2.483578E-01	-4.875963E-03	5.893603E-05	-2.667589E-07	
J4	2.521976E-01	-4.909859E-03	6.135766E-05	-2.890213E-07	

LB4100\_Alpha\_Aug13\_RawData.xls

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
T1	A1	5	39451	17242	8/10/2013 15:00	8/10/2013 15:05	LB4100	GABT13
T2	A1	5	27443	12474	8/10/2013 15:23	8/10/2013 15:28	LB4100	GABT13
T3	A1	5	27719	12646	8/10/2013 15:16	8/10/2013 15:21	LB4100	GABT13
T4	A1	5	20173	9293	8/10/2013 15:09	8/10/2013 15:14	LB4100	GABT13
T5	A1	5	18268	8401	8/10/2013 15:32	8/10/2013 15:37	LB4100	GABT13
T6	A1	5	17081	8602	8/10/2013 16:01	8/10/2013 16:06	LB4100	GABT13
T7	A1	5	15618	7637	8/10/2013 15:54	8/10/2013 15:59	LB4100	GABT13
T8	A1	5	10917	5845	8/10/2013 15:46	8/10/2013 15:51	LB4100	GABT13
T1	A2	5	45155	15718	8/10/2013 15:09	8/10/2013 15:14	LB4100	GABT13
T2	A2	5	31233	11582	8/10/2013 15:00	8/10/2013 15:05	LB4100	GABT13
T3	A2	5	34090	12485	8/10/2013 15:23	8/10/2013 15:28	LB4100	GABT13
T4	A2	5	23491	8940	8/10/2013 15:16	8/10/2013 15:21	LB4100	GABT13
T5	A2	5	18334	7203	8/10/2013 15:46	8/10/2013 15:51	LB4100	GABT13
T6	A2	5	21324	8675	8/10/2013 15:32	8/10/2013 15:37	LB4100	GABT13
T7	A2	5	16522	6803	8/10/2013 16:01	8/10/2013 16:06	LB4100	GABT13
T8	A2	5	14054	6031	8/10/2013 15:54	8/10/2013 15:59	LB4100	GABT13
T1	A3	5	46267	16571	8/10/2013 15:16	8/10/2013 15:21	LB4100	GABT13
T2	A3	5	30442	11541	8/10/2013 15:09	8/10/2013 15:14	LB4100	GABT13
T3	A3	5	32372	12115	8/10/2013 15:00	8/10/2013 15:05	LB4100	GABT13
T4	A3	5	23637	9509	8/10/2013 15:23	8/10/2013 15:28	LB4100	GABT13
T5	A3	5	19618	8053	8/10/2013 15:46	8/10/2013 15:51	LB4100	GABT13
T6	A3	5	18299	8094	8/10/2013 15:32	8/10/2013 15:37	LB4100	GABT13
T7	A3	5	17059	7331	8/10/2013 16:01	8/10/2013 16:06	LB4100	GABT13
T8	A3	5	12902	5985	8/10/2013 15:39	8/10/2013 15:44	LB4100	GABT13
T1	B1	5	60804	15106	8/10/2013 16:01	8/10/2013 16:06	LB4100	GABT13
T2	B1	5	38639	9846	8/10/2013 15:54	8/10/2013 15:59	LB4100	GABT13
T3	B1	5	40863	10321	8/10/2013 15:46	8/10/2013 15:51	LB4100	GABT13
T4	B1	5	30868	8272	8/10/2013 15:00	8/10/2013 15:05	LB4100	GABT13
T5	B1	5	25134	6598	8/10/2013 15:25	8/10/2013 15:30	LB4100	GABT13
T6	B1	5	27019	7793	8/10/2013 15:16	8/10/2013 15:21	LB4100	GABT13
T7	B1	5	21669	6451	8/10/2013 15:09	8/10/2013 15:14	LB4100	GABT13
T8	B1	5	17265	5400	8/10/2013 15:46	8/10/2013 15:51	LB4100	GABT13
T1	B2	5	54021	16420	8/10/2013 15:39	8/10/2013 15:44	LB4100	GABT13
T2	B2	5	41224	12658	8/10/2013 16:01	8/10/2013 16:06	LB4100	GABT13
T3	B2	5	39388	11935	8/10/2013 15:54	8/10/2013 15:59	LB4100	GABT13
T4	B2	5	29421	9151	8/10/2013 15:28	8/10/2013 15:33	LB4100	GABT13



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T5	B2	5	24602	7589	8/10/2013 15:09	8/10/2013 15:14	LB4100	GABT13
T6	B2	5	25370	8388	8/10/2013 15:00	8/10/2013 15:05	LB4100	GABT13
T7	B2	5	21903	7470	8/10/2013 15:25	8/10/2013 15:30	LB4100	GABT13
T8	B2	5	16606	5768	8/10/2013 15:16	8/10/2013 15:21	LB4100	GABT13
T1	B3	5	50698	17845	8/10/2013 15:54	8/10/2013 15:59	LB4100	GABT13
T2	B3	5	34881	12444	8/10/2013 15:46	8/10/2013 15:51	LB4100	GABT13
T3	B3	5	40700	14394	8/10/2013 15:39	8/10/2013 15:44	LB4100	GABT13
T4	B3	5	27790	10145	8/10/2013 16:01	8/10/2013 16:06	LB4100	GABT13
T5	B3	5	22609	8451	8/10/2013 15:16	8/10/2013 15:21	LB4100	GABT13
T6	B3	5	23937	9366	8/10/2013 15:09	8/10/2013 15:14	LB4100	GABT13
T7	B3	5	19086	7512	8/10/2013 15:00	8/10/2013 15:05	LB4100	GABT13
T8	B3	5	16160	6882	8/10/2013 15:25	8/10/2013 15:30	LB4100	GABT13
T1	B4	5	47472	15695	8/10/2013 16:01	8/10/2013 16:06	LB4100	GABT13
T2	B4	5	31710	11105	8/10/2013 15:54	8/10/2013 15:59	LB4100	GABT13
T3	B4	5	33347	11419	8/10/2013 15:46	8/10/2013 15:51	LB4100	GABT13
T4	B4	5	26770	9583	8/10/2013 15:39	8/10/2013 15:44	LB4100	GABT13
T5	B4	5	21589	7592	8/10/2013 15:25	8/10/2013 15:30	LB4100	GABT13
T6	B4	5	20884	7883	8/10/2013 15:16	8/10/2013 15:21	LB4100	GABT13
T7	B4	5	17279	6469	8/10/2013 15:09	8/10/2013 15:14	LB4100	GABT13
T8	B4	5	13304	5413	8/10/2013 15:00	8/10/2013 15:05	LB4100	GABT13
T1	C1	5	58913	12531	8/10/2013 16:09	8/10/2013 16:14	LB4100	GABT13
T2	C1	5	38126	8332	8/10/2013 16:36	8/10/2013 16:41	LB4100	GABT13
T3	C1	5	40886	8619	8/10/2013 16:28	8/10/2013 16:33	LB4100	GABT13
T4	C1	5	32621	7610	8/10/2013 16:18	8/10/2013 16:23	LB4100	GABT13
T5	C1	5	24910	5408	8/10/2013 16:45	8/10/2013 16:50	LB4100	GABT13
T6	C1	5	26573	6167	8/10/2013 17:10	8/10/2013 17:15	LB4100	GABT13
T7	C1	5	23541	5508	8/10/2013 17:02	8/10/2013 17:07	LB4100	GABT13
T8	C1	5	16918	4257	8/10/2013 16:53	8/10/2013 16:58	LB4100	GABT13
T1	C2	5	52523	17244	8/10/2013 16:18	8/10/2013 16:23	LB4100	GABT13
T2	C2	5	36922	12414	8/10/2013 16:09	8/10/2013 16:14	LB4100	GABT13
T3	C2	5	35507	11882	8/10/2013 16:36	8/10/2013 16:41	LB4100	GABT13
T4	C2	5	26653	9375	8/10/2013 16:28	8/10/2013 16:33	LB4100	GABT13
T5	C2	5	21928	7646	8/10/2013 16:53	8/10/2013 16:58	LB4100	GABT13
T6	C2	5	22091	8386	8/10/2013 16:45	8/10/2013 16:50	LB4100	GABT13
T7	C2	5	18346	6987	8/10/2013 17:10	8/10/2013 17:15	LB4100	GABT13
T8	C2	5	16476	6612	8/10/2013 17:02	8/10/2013 17:07	LB4100	GABT13
T1	C3	5	46580	17367	8/10/2013 16:28	8/10/2013 16:33	LB4100	GABT13

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T2	C3	5	33758	13114	8/10/2013 16:18	8/10/2013 16:23	LB4100	GABT13
T3	C3	5	34931	13284	8/10/2013 16:09	8/10/2013 16:14	LB4100	GABT13
T4	C3	5	23855	9813	8/10/2013 16:36	8/10/2013 16:41	LB4100	GABT13
T5	C3	5	21758	8842	8/10/2013 17:02	8/10/2013 17:07	LB4100	GABT13
T6	C3	5	20363	9117	8/10/2013 16:53	8/10/2013 16:58	LB4100	GABT13
T7	C3	5	16348	7281	8/10/2013 16:45	8/10/2013 16:50	LB4100	GABT13
T8	C3	5	13284	6270	8/10/2013 17:10	8/10/2013 17:15	LB4100	GABT13
T1	C4	5	40698	17696	8/10/2013 16:36	8/10/2013 16:41	LB4100	GABT13
T2	C4	5	28204	12333	8/10/2013 16:28	8/10/2013 16:33	LB4100	GABT13
T3	C4	5	30592	13219	8/10/2013 16:18	8/10/2013 16:23	LB4100	GABT13
T4	C4	5	23371	10482	8/10/2013 16:09	8/10/2013 16:14	LB4100	GABT13
T5	C4	5	17830	8130	8/10/2013 17:10	8/10/2013 17:15	LB4100	GABT13
T6	C4	5	20501	9922	8/10/2013 17:02	8/10/2013 17:07	LB4100	GABT13
T7	C4	5	15231	7490	8/10/2013 16:53	8/10/2013 16:58	LB4100	GABT13
T8	C4	5	11799	6448	8/10/2013 16:45	8/10/2013 16:50	LB4100	GABT13
T1	D1	5	57216	19695	8/10/2013 16:46	8/10/2013 16:51	LB4100	GABT13
T2	D1	5	39526	14172	8/10/2013 17:12	8/10/2013 17:17	LB4100	GABT13
T3	D1	5	42333	14289	8/10/2013 17:03	8/10/2013 17:08	LB4100	GABT13
T4	D1	5	31443	11121	8/10/2013 16:54	8/10/2013 16:59	LB4100	GABT13
T5	D1	5	25974	9036	8/10/2013 16:11	8/10/2013 16:16	LB4100	GABT13
T6	D1	5	26974	10055	8/10/2013 16:37	8/10/2013 16:42	LB4100	GABT13
T7	D1	5	21632	8103	8/10/2013 16:29	8/10/2013 16:34	LB4100	GABT13
T8	D1	5	17640	6977	8/10/2013 16:19	8/10/2013 16:24	LB4100	GABT13
T1	D2	5	53496	20630	8/10/2013 16:54	8/10/2013 16:59	LB4100	GABT13
T2	D2	5	37349	14660	8/10/2013 16:46	8/10/2013 16:51	LB4100	GABT13
T3	D2	5	38857	15449	8/10/2013 17:12	8/10/2013 17:17	LB4100	GABT13
T4	D2	5	28870	11791	8/10/2013 17:03	8/10/2013 17:08	LB4100	GABT13
T5	D2	5	23759	9727	8/10/2013 16:19	8/10/2013 16:24	LB4100	GABT13
T6	D2	5	24308	10665	8/10/2013 16:11	8/10/2013 16:16	LB4100	GABT13
T7	D2	5	20010	8775	8/10/2013 16:37	8/10/2013 16:42	LB4100	GABT13
T8	D2	5	15950	7585	8/10/2013 16:29	8/10/2013 16:34	LB4100	GABT13
T1	D3	5	53239	20245	8/10/2013 17:03	8/10/2013 17:08	LB4100	GABT13
T2	D3	5	36771	14447	8/10/2013 16:54	8/10/2013 16:59	LB4100	GABT13
T3	D3	5	38062	14865	8/10/2013 16:46	8/10/2013 16:51	LB4100	GABT13
T4	D3	5	28693	11467	8/10/2013 17:12	8/10/2013 17:17	LB4100	GABT13
T5	D3	5	23403	9404	8/10/2013 16:29	8/10/2013 16:34	LB4100	GABT13
T6	D3	5	23871	10629	8/10/2013 16:19	8/10/2013 16:24	LB4100	GABT13

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T7	D3	5	19319	8524	8/10/2013 16:11	8/10/2013 16:16	LB4100	GABT13
T8	D3	5	15510	7445	8/10/2013 16:37	8/10/2013 16:42	LB4100	GABT13
T1	D4	5	54761	20503	8/10/2013 17:12	8/10/2013 17:17	LB4100	GABT13
T2	D4	5	38334	14709	8/10/2013 17:03	8/10/2013 17:08	LB4100	GABT13
T3	D4	5	40785	15230	8/10/2013 16:54	8/10/2013 16:59	LB4100	GABT13
T4	D4	5	30940	11858	8/10/2013 16:46	8/10/2013 16:51	LB4100	GABT13
T5	D4	5	25013	9982	8/10/2013 16:37	8/10/2013 16:42	LB4100	GABT13
T6	D4	5	26164	10982	8/10/2013 16:29	8/10/2013 16:34	LB4100	GABT13
T7	D4	5	21174	8715	8/10/2013 16:19	8/10/2013 16:24	LB4100	GABT13
T8	D4	5	16867	7370	8/10/2013 16:11	8/10/2013 16:16	LB4100	GABT13
T1	E1	5	54720	14121	9/26/2013 13:26	9/26/2013 13:31	LB4100	GABT13
T2	E1	5	36926	10098	9/26/2013 13:53	9/26/2013 13:58	LB4100	GABT13
T3	E1	5	39311	10510	9/26/2013 13:42	9/26/2013 13:47	LB4100	GABT13
T4	E1	5	28883	8063	9/26/2013 13:35	9/26/2013 13:40	LB4100	GABT13
T5	E1	5	21453	6207	9/26/2013 14:00	9/26/2013 14:05	LB4100	GABT13
T6	E1	5	24158	7355	9/26/2013 14:20	9/26/2013 14:25	LB4100	GABT13
T7	E1	5	19633	5858	9/26/2013 14:13	9/26/2013 14:18	LB4100	GABT13
T8	E1	5	15963	5369	9/26/2013 14:07	9/26/2013 14:12	LB4100	GABT13
T1	E2	5	42735	17629	9/26/2013 13:35	9/26/2013 13:40	LB4100	GABT13
T2	E2	5	29263	12150	9/26/2013 13:27	9/26/2013 13:32	LB4100	GABT13
T3	E2	5	30194	12682	9/26/2013 13:53	9/26/2013 13:58	LB4100	GABT13
T4	E2	5	22598	9722	9/26/2013 13:42	9/26/2013 13:47	LB4100	GABT13
T5	E2	5	17592	7367	9/26/2013 14:07	9/26/2013 14:12	LB4100	GABT13
T6	E2	5	19245	9180	9/26/2013 14:00	9/26/2013 14:05	LB4100	GABT13
T7	E2	5	15525	7246	9/26/2013 14:20	9/26/2013 14:25	LB4100	GABT13
T8	E2	5	12674	6310	9/26/2013 14:13	9/26/2013 14:18	LB4100	GABT13
T1	E3	5	55065	15424	9/26/2013 13:42	9/26/2013 13:47	LB4100	GABT13
T2	E3	5	36771	10706	9/26/2013 13:35	9/26/2013 13:40	LB4100	GABT13
T3	E3	5	38761	11254	9/26/2013 13:27	9/26/2013 13:32	LB4100	GABT13
T4	E3	5	28406	8679	9/26/2013 13:53	9/26/2013 13:58	LB4100	GABT13
T5	E3	5	21314	6596	9/26/2013 14:13	9/26/2013 14:18	LB4100	GABT13
T6	E3	5	24023	7941	9/26/2013 14:07	9/26/2013 14:12	LB4100	GABT13
T7	E3	5	19048	6457	9/26/2013 14:00	9/26/2013 14:05	LB4100	GABT13
T8	E3	5	15600	5520	9/26/2013 14:20	9/26/2013 14:25	LB4100	GABT13
T1	E4	5	51629	16770	9/26/2013 13:53	9/26/2013 13:58	LB4100	GABT13
T2	E4	5	34755	11542	9/26/2013 13:42	9/26/2013 13:47	LB4100	GABT13
T3	E4	5	37195	12409	9/26/2013 13:35	9/26/2013 13:40	LB4100	GABT13

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T4	E4	5	26585	9273	9/26/2013 13:27	9/26/2013 13:32	LB4100	GABT13
T5	E4	5	20222	7232	9/26/2013 14:20	9/26/2013 14:25	LB4100	GABT13
T6	E4	5	23211	8648	9/26/2013 14:13	9/26/2013 14:18	LB4100	GABT13
T7	E4	5	18446	6952	9/26/2013 14:07	9/26/2013 14:12	LB4100	GABT13
T8	E4	5	14959	6093	9/26/2013 14:00	9/26/2013 14:05	LB4100	GABT13
T1	F1	5	55321	16276	9/26/2013 14:00	9/26/2013 14:05	LB4100	GABT13
T2	F1	5	37122	11365	9/26/2013 14:20	9/26/2013 14:25	LB4100	GABT13
T3	F1	5	39263	11854	9/26/2013 14:13	9/26/2013 14:18	LB4100	GABT13
T4	F1	5	28765	8917	9/26/2013 14:07	9/26/2013 14:12	LB4100	GABT13
T5	F1	5	21963	6860	9/26/2013 13:27	9/26/2013 13:32	LB4100	GABT13
T6	F1	5	24985	8242	9/26/2013 13:53	9/26/2013 13:58	LB4100	GABT13
T7	F1	5	19889	6766	9/26/2013 13:42	9/26/2013 13:47	LB4100	GABT13
T8	F1	5	15956	5655	9/26/2013 13:35	9/26/2013 13:40	LB4100	GABT13
T1	F2	5	48479	17412	9/26/2013 14:07	9/26/2013 14:12	LB4100	GABT13
T2	F2	5	34059	11969	9/26/2013 14:00	9/26/2013 14:05	LB4100	GABT13
T3	F2	5	35641	12470	9/26/2013 14:20	9/26/2013 14:25	LB4100	GABT13
T4	F2	5	26207	9562	9/26/2013 14:13	9/26/2013 14:18	LB4100	GABT13
T5	F2	5	20487	7130	9/26/2013 13:35	9/26/2013 13:40	LB4100	GABT13
T6	F2	5	23397	8633	9/26/2013 13:27	9/26/2013 13:32	LB4100	GABT13
T7	F2	5	18598	6998	9/26/2013 13:53	9/26/2013 13:58	LB4100	GABT13
T8	F2	5	15213	5969	9/26/2013 13:42	9/26/2013 13:47	LB4100	GABT13
T1	F3	5	48976	17852	9/26/2013 14:13	9/26/2013 14:18	LB4100	GABT13
T2	F3	5	32849	12740	9/26/2013 14:07	9/26/2013 14:12	LB4100	GABT13
T3	F3	5	33848	13222	9/26/2013 14:00	9/26/2013 14:05	LB4100	GABT13
T4	F3	5	25199	9935	9/26/2013 14:20	9/26/2013 14:25	LB4100	GABT13
T5	F3	5	18720	7758	9/26/2013 13:42	9/26/2013 13:47	LB4100	GABT13
T6	F3	5	21531	9325	9/26/2013 13:35	9/26/2013 13:40	LB4100	GABT13
T7	F3	5	17356	7466	9/26/2013 13:27	9/26/2013 13:32	LB4100	GABT13
T8	F3	5	13899	6432	9/26/2013 13:53	9/26/2013 13:58	LB4100	GABT13
T1	F4	5	40304	18183	9/26/2013 14:20	9/26/2013 14:25	LB4100	GABT13
T2	F4	5	27326	12871	9/26/2013 14:13	9/26/2013 14:18	LB4100	GABT13
T3	F4	5	27595	13373	9/26/2013 14:07	9/26/2013 14:12	LB4100	GABT13
T4	F4	5	20614	10220	9/26/2013 14:00	9/26/2013 14:05	LB4100	GABT13
T5	F4	5	15894	7888	9/26/2013 13:53	9/26/2013 13:58	LB4100	GABT13
T6	F4	5	17715	9600	9/26/2013 13:42	9/26/2013 13:47	LB4100	GABT13
T7	F4	5	14544	7659	9/26/2013 13:35	9/26/2013 13:40	LB4100	GABT13
T8	F4	5	11508	6560	9/26/2013 13:27	9/26/2013 13:32	LB4100	GABT13

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T1	G1	5	48654	15703	9/26/2013 14:28	9/26/2013 14:33	LB4100	GABT13
T2	G1	5	33061	10943	9/26/2013 15:02	9/26/2013 15:07	LB4100	GABT13
T3	G1	5	34912	11786	9/26/2013 14:50	9/26/2013 14:55	LB4100	GABT13
T4	G1	5	25742	8760	9/26/2013 14:42	9/26/2013 14:47	LB4100	GABT13
T5	G1	5	19241	6711	9/26/2013 15:19	9/26/2013 15:24	LB4100	GABT13
T6	G1	5	22059	8209	9/26/2013 15:54	9/26/2013 15:59	LB4100	GABT13
T7	G1	5	17469	6552	9/26/2013 15:42	9/26/2013 15:47	LB4100	GABT13
T8	G1	5	14076	5707	9/26/2013 15:35	9/26/2013 15:40	LB4100	GABT13
T1	G2	5	45998	17116	9/26/2013 14:42	9/26/2013 14:47	LB4100	GABT13
T2	G2	5	32652	11821	9/26/2013 14:28	9/26/2013 14:33	LB4100	GABT13
T3	G2	5	34236	12250	9/26/2013 15:02	9/26/2013 15:07	LB4100	GABT13
T4	G2	5	25392	9536	9/26/2013 14:50	9/26/2013 14:55	LB4100	GABT13
T5	G2	5	19080	7020	9/26/2013 15:35	9/26/2013 15:40	LB4100	GABT13
T6	G2	5	21705	8482	9/26/2013 15:19	9/26/2013 15:24	LB4100	GABT13
T7	G2	5	17585	6818	9/26/2013 15:54	9/26/2013 15:59	LB4100	GABT13
T8	G2	5	14536	5921	9/26/2013 15:42	9/26/2013 15:47	LB4100	GABT13
T1	G3	5	45655	18830	9/26/2013 14:50	9/26/2013 14:55	LB4100	GABT13
T2	G3	5	30893	13616	9/26/2013 14:42	9/26/2013 14:47	LB4100	GABT13
T3	G3	5	31725	13838	9/26/2013 14:28	9/26/2013 14:33	LB4100	GABT13
T4	G3	5	24039	10857	9/26/2013 15:02	9/26/2013 15:07	LB4100	GABT13
T5	G3	5	17765	8124	9/26/2013 15:42	9/26/2013 15:47	LB4100	GABT13
T6	G3	5	20514	9751	9/26/2013 15:35	9/26/2013 15:40	LB4100	GABT13
T7	G3	5	15991	7799	9/26/2013 15:19	9/26/2013 15:24	LB4100	GABT13
T8	G3	5	13332	6921	9/26/2013 15:54	9/26/2013 15:59	LB4100	GABT13
T1	G4	5	49434	16293	9/26/2013 15:02	9/26/2013 15:07	LB4100	GABT13
T2	G4	5	33309	11316	9/26/2013 14:50	9/26/2013 14:55	LB4100	GABT13
T3	G4	5	34769	11615	9/26/2013 14:42	9/26/2013 14:47	LB4100	GABT13
T4	G4	5	25017	8566	9/26/2013 14:28	9/26/2013 14:33	LB4100	GABT13
T5	G4	5	19083	6866	9/26/2013 15:54	9/26/2013 15:59	LB4100	GABT13
T6	G4	5	21931	8243	9/26/2013 15:42	9/26/2013 15:47	LB4100	GABT13
T7	G4	5	17292	6636	9/26/2013 15:35	9/26/2013 15:40	LB4100	GABT13
T8	G4	5	14074	5496	9/26/2013 15:19	9/26/2013 15:24	LB4100	GABT13
T1	H1	5	53647	17654	9/26/2013 15:19	9/26/2013 15:24	LB4100	GABT13
T2	H1	5	36854	12390	9/26/2013 15:54	9/26/2013 15:59	LB4100	GABT13
T3	H1	5	39595	12689	9/26/2013 15:41	9/26/2013 15:46	LB4100	GABT13
T4	H1	5	28707	9816	9/26/2013 15:35	9/26/2013 15:40	LB4100	GABT13
T5	H1	5	20905	7261	9/26/2013 14:28	9/26/2013 14:33	LB4100	GABT13

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T6	H1	5	24003	8835	9/26/2013 15:02	9/26/2013 15:07	LB4100	GABT13
T7	H1	5	19658	7080	9/26/2013 14:50	9/26/2013 14:55	LB4100	GABT13
T8	H1	5	15930	6106	9/26/2013 14:41	9/26/2013 14:46	LB4100	GABT13
T1	H2	5	49532	18303	9/26/2013 15:35	9/26/2013 15:40	LB4100	GABT13
T2	H2	5	33034	12943	9/26/2013 15:19	9/26/2013 15:24	LB4100	GABT13
T3	H2	5	35116	13174	9/26/2013 15:54	9/26/2013 15:59	LB4100	GABT13
T4	H2	5	26333	10151	9/26/2013 15:41	9/26/2013 15:46	LB4100	GABT13
T5	H2	5	19122	7632	9/26/2013 14:42	9/26/2013 14:47	LB4100	GABT13
T6	H2	5	21134	9251	9/26/2013 14:28	9/26/2013 14:33	LB4100	GABT13
T7	H2	5	17648	7384	9/26/2013 15:02	9/26/2013 15:07	LB4100	GABT13
T8	H2	5	14137	6232	9/26/2013 14:50	9/26/2013 14:55	LB4100	GABT13
T1	H3	5	51661	18203	9/26/2013 15:41	9/26/2013 15:46	LB4100	GABT13
T2	H3	5	35151	12648	9/26/2013 15:35	9/26/2013 15:40	LB4100	GABT13
T3	H3	5	37786	13422	9/26/2013 15:19	9/26/2013 15:24	LB4100	GABT13
T4	H3	5	27330	10292	9/26/2013 15:54	9/26/2013 15:59	LB4100	GABT13
T5	H3	5	20453	7707	9/26/2013 14:50	9/26/2013 14:55	LB4100	GABT13
T6	H3	5	23536	9227	9/26/2013 14:42	9/26/2013 14:47	LB4100	GABT13
T7	H3	5	18671	7778	9/26/2013 14:28	9/26/2013 14:33	LB4100	GABT13
T8	H3	5	15112	6527	9/26/2013 15:02	9/26/2013 15:07	LB4100	GABT13
T1	H4	5	45198	18323	9/26/2013 15:54	9/26/2013 15:59	LB4100	GABT13
T2	H4	5	31053	12712	9/26/2013 15:41	9/26/2013 15:46	LB4100	GABT13
T3	H4	5	32426	13236	9/26/2013 15:35	9/26/2013 15:40	LB4100	GABT13
T4	H4	5	24380	10279	9/26/2013 15:19	9/26/2013 15:24	LB4100	GABT13
T5	H4	5	18104	7545	9/26/2013 15:02	9/26/2013 15:07	LB4100	GABT13
T6	H4	5	20098	9098	9/26/2013 14:50	9/26/2013 14:55	LB4100	GABT13
T7	H4	5	16273	7376	9/26/2013 14:42	9/26/2013 14:47	LB4100	GABT13
T8	H4	5	13189	6475	9/26/2013 14:28	9/26/2013 14:33	LB4100	GABT13
T1	I1	5	52823	11931	8/10/2013 13:13	8/10/2013 13:18	LB4100	GABT13
T2	I1	5	35693	8251	8/10/2013 14:11	8/10/2013 14:16	LB4100	GABT13
T3	I1	5	37771	8581	8/10/2013 14:01	8/10/2013 14:06	LB4100	GABT13
T4	I1	5	28004	6739	8/10/2013 13:31	8/10/2013 13:36	LB4100	GABT13
T5	I1	5	23164	5724	8/10/2013 14:20	8/10/2013 14:25	LB4100	GABT13
T6	I1	5	23946	6243	8/10/2013 14:51	8/10/2013 14:56	LB4100	GABT13
T7	I1	5	19804	5096	8/10/2013 14:37	8/10/2013 14:42	LB4100	GABT13
T8	I1	5	15669	4416	8/10/2013 14:29	8/10/2013 14:34	LB4100	GABT13
T1	I2	5	58257	12089	8/10/2013 13:31	8/10/2013 13:36	LB4100	GABT13
T2	I2	5	40054	8526	8/10/2013 13:13	8/10/2013 13:18	LB4100	GABT13

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T3	I2	5	42404	8887	8/10/2013 14:11	8/10/2013 14:16	LB4100	GABT13
T4	I2	5	31370	6940	8/10/2013 14:01	8/10/2013 14:06	LB4100	GABT13
T5	I2	5	26309	5819	8/10/2013 14:29	8/10/2013 14:34	LB4100	GABT13
T6	I2	5	27501	6280	8/10/2013 14:20	8/10/2013 14:25	LB4100	GABT13
T7	I2	5	22543	5300	8/10/2013 14:51	8/10/2013 14:56	LB4100	GABT13
T8	I2	5	18067	4609	8/10/2013 14:37	8/10/2013 14:42	LB4100	GABT13
T1	I3	5	59102	12219	8/10/2013 14:01	8/10/2013 14:06	LB4100	GABT13
T2	I3	5	41263	8725	8/10/2013 13:31	8/10/2013 13:36	LB4100	GABT13
T3	I3	5	43275	8869	8/10/2013 13:13	8/10/2013 13:18	LB4100	GABT13
T4	I3	5	32321	7260	8/10/2013 14:11	8/10/2013 14:16	LB4100	GABT13
T5	I3	5	26778	6033	8/10/2013 14:37	8/10/2013 14:42	LB4100	GABT13
T6	I3	5	28089	6565	8/10/2013 14:29	8/10/2013 14:34	LB4100	GABT13
T7	I3	5	23008	5459	8/10/2013 14:20	8/10/2013 14:25	LB4100	GABT13
T8	I3	5	18446	4724	8/10/2013 14:51	8/10/2013 14:56	LB4100	GABT13
T1	I4	5	57921	12939	8/10/2013 14:11	8/10/2013 14:16	LB4100	GABT13
T2	I4	5	39818	9188	8/10/2013 14:01	8/10/2013 14:06	LB4100	GABT13
T3	I4	5	42202	9406	8/10/2013 13:31	8/10/2013 13:36	LB4100	GABT13
T4	I4	5	30814	7448	8/10/2013 13:13	8/10/2013 13:18	LB4100	GABT13
T5	I4	5	25516	6146	8/10/2013 14:51	8/10/2013 14:56	LB4100	GABT13
T6	I4	5	27230	6889	8/10/2013 14:37	8/10/2013 14:42	LB4100	GABT13
T7	I4	5	22436	5702	8/10/2013 14:29	8/10/2013 14:34	LB4100	GABT13
T8	I4	5	17951	4895	8/10/2013 14:20	8/10/2013 14:25	LB4100	GABT13
T1	J1	5	55750	12489	8/10/2013 14:20	8/10/2013 14:25	LB4100	GABT13
T2	J1	5	37934	8791	8/10/2013 14:51	8/10/2013 14:56	LB4100	GABT13
T3	J1	5	39810	8953	8/10/2013 14:37	8/10/2013 14:42	LB4100	GABT13
T4	J1	5	28982	6949	8/10/2013 14:29	8/10/2013 14:34	LB4100	GABT13
T5	J1	5	22838	5616	8/10/2013 13:13	8/10/2013 13:18	LB4100	GABT13
T6	J1	5	24534	6400	8/10/2013 14:11	8/10/2013 14:16	LB4100	GABT13
T7	J1	5	20801	5445	8/10/2013 14:01	8/10/2013 14:06	LB4100	GABT13
T8	J1	5	15617	4297	8/10/2013 13:31	8/10/2013 13:36	LB4100	GABT13
T1	J2	5	57503	11286	8/10/2013 14:29	8/10/2013 14:34	LB4100	GABT13
T2	J2	5	39509	8081	8/10/2013 14:20	8/10/2013 14:25	LB4100	GABT13
T3	J2	5	41066	8142	8/10/2013 14:51	8/10/2013 14:56	LB4100	GABT13
T4	J2	5	30691	6240	8/10/2013 14:37	8/10/2013 14:42	LB4100	GABT13
T5	J2	5	24812	5149	8/10/2013 13:31	8/10/2013 13:36	LB4100	GABT13
T6	J2	5	25577	5637	8/10/2013 13:13	8/10/2013 13:18	LB4100	GABT13
T7	J2	5	21740	4862	8/10/2013 14:11	8/10/2013 14:16	LB4100	GABT13

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T8	J2	5	16940	4081	8/10/2013 14:01	8/10/2013 14:06	LB4100	GABT13
T1	J3	5	55730	11480	8/10/2013 14:37	8/10/2013 14:42	LB4100	GABT13
T2	J3	5	37407	8279	8/10/2013 14:29	8/10/2013 14:34	LB4100	GABT13
T3	J3	5	39250	8299	8/10/2013 14:20	8/10/2013 14:25	LB4100	GABT13
T4	J3	5	29168	6397	8/10/2013 14:51	8/10/2013 14:56	LB4100	GABT13
T5	J3	5	24012	5482	8/10/2013 14:01	8/10/2013 14:06	LB4100	GABT13
T6	J3	5	23627	5856	8/10/2013 13:31	8/10/2013 13:36	LB4100	GABT13
T7	J3	5	19361	4809	8/10/2013 13:13	8/10/2013 13:18	LB4100	GABT13
T8	J3	5	16147	4260	8/10/2013 14:11	8/10/2013 14:16	LB4100	GABT13
T1	J4	5	56608	12616	8/10/2013 14:51	8/10/2013 14:56	LB4100	GABT13
T2	J4	5	37888	9150	8/10/2013 14:37	8/10/2013 14:42	LB4100	GABT13
T3	J4	5	40729	9145	8/10/2013 14:29	8/10/2013 14:34	LB4100	GABT13
T4	J4	5	29953	7331	8/10/2013 14:20	8/10/2013 14:25	LB4100	GABT13
T5	J4	5	25078	6231	8/10/2013 14:11	8/10/2013 14:16	LB4100	GABT13
T6	J4	5	25327	6687	8/10/2013 14:01	8/10/2013 14:06	LB4100	GABT13
T7	J4	5	20203	5477	8/10/2013 13:31	8/10/2013 13:36	LB4100	GABT13
T8	J4	5	16141	4626	8/10/2013 13:13	8/10/2013 13:18	LB4100	GABT13



Beta Calibration - LB4100 - Sep 2013

Standard Data	Isotope	Sr-90
	Standard ID number	0133-T
	Half Life (days)	10555.725
	Std. Act. (dpm/mL)***	55362.7
	Reference Date	4/1/1996
	Volume of spike (mL)	0.5
	Std. Nominal (dpm)	18219.08
	Decay Date	9/9/2013

Source Weight	
Source	Measured weight (mg)
1	0.0
2	12.8
3	27.7
4	50.8
5	60.8
6	73.2
7	98.4
8	115.8

\*\*\* Includes activity of Y-90, which is in equilibrium.

The following detectors were not calibrated:

A4

\*Background is considered negligible.

\*\*Decay corrected to mid-point of count

Detector (#)	Source ID (#)	Raw Count Data			Beta (counts)	Raw Beta (cpm)	Sr-90 (cpm)*	Decay Corrected Nominal (dpm)**	Sr-90 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
		Start Time	Count Time (min)	Count						
A1	1	9/10/2013 15:42	5	41944	8388.80	8388.80	18217.10	0.4605	0.4518	
A1	2	9/10/2013 16:05	2	16623	8311.50	8311.50	18217.08	0.4562	0.4424	
A1	3	9/10/2013 15:59	2	14820	7410.00	7410.00	18217.09	0.4068	0.4315	
A1	4	9/10/2013 15:54	2	14963	7481.50	7481.50	18217.09	0.4107	0.4145	
A1	5	9/10/2013 16:09	2	14981	7490.50	7490.50	18217.08	0.4112	0.4072	
A1	6	9/10/2013 16:22	2	14295	7147.50	7147.50	18217.07	0.3924	0.3981	
A1	7	9/10/2013 16:18	2	13861	6930.50	6930.50	18217.07	0.3804	0.3796	
A1	8	9/10/2013 16:15	2	13617	6808.50	6808.50	18217.08	0.3737	0.3669	
A2	1	9/10/2013 15:54	2	17030	8515.00	8515.00	18217.09	0.4674	0.4533	
A2	2	9/10/2013 15:42	5	40964	8192.80	8192.80	18217.10	0.4497	0.4445	
A2	3	9/10/2013 16:05	2	14806	7403.00	7403.00	18217.08	0.4064	0.4343	
A2	4	9/10/2013 15:59	2	14998	7499.00	7499.00	18217.09	0.4116	0.4184	
A2	5	9/10/2013 16:15	2	15442	7721.00	7721.00	18217.08	0.4238	0.4116	
A2	6	9/10/2013 16:09	2	14760	7380.00	7380.00	18217.08	0.4051	0.4031	
A2	7	9/10/2013 16:22	2	14003	7001.50	7001.50	18217.07	0.3843	0.3857	
A2	8	9/10/2013 16:18	2	13712	6856.00	6856.00	18217.07	0.3764	0.3738	
A3	1	9/10/2013 15:59	2	16694	8347.00	8347.00	18217.09	0.4582	0.4513	
A3	2	9/10/2013 15:54	2	16345	8172.50	8172.50	18217.09	0.4486	0.4428	
A3	3	9/10/2013 15:42	5	37987	7597.40	7597.40	18217.10	0.4170	0.4329	
A3	4	9/10/2013 16:05	2	15032	7516.00	7516.00	18217.08	0.4126	0.4176	
A3	5	9/10/2013 16:18	2	15315	7657.50	7657.50	18217.07	0.4203	0.4110	
A3	6	9/10/2013 16:15	2	14534	7267.00	7267.00	18217.08	0.3989	0.4028	
A3	7	9/10/2013 16:09	2	14016	7008.00	7008.00	18217.08	0.3847	0.3861	
A3	8	9/10/2013 16:22	2	13798	6899.00	6899.00	18217.07	0.3787	0.3746	
B1	1	9/10/2013 16:09	2	16671	8335.50	8335.50	18217.08	0.4576	0.4472	
B1	2	9/10/2013 16:22	2	16228	8114.00	8114.00	18217.07	0.4454	0.4384	
B1	3	9/10/2013 16:18	2	14481	7240.50	7240.50	18217.07	0.3975	0.4282	
B1	4	9/10/2013 16:15	2	15155	7577.50	7577.50	18217.08	0.4160	0.4123	
B1	5	9/10/2013 15:42	5	38570	7714.00	7714.00	18217.10	0.4234	0.4055	
B1	6	9/10/2013 16:05	2	14167	7083.50	7083.50	18217.08	0.3888	0.3970	
B1	7	9/10/2013 15:59	2	13625	6812.50	6812.50	18217.09	0.3740	0.3797	
B1	8	9/10/2013 15:54	2	13598	6799.00	6799.00	18217.09	0.3732	0.3677	
B2	1	9/10/2013 16:15	2	17643	8821.50	8821.50	18217.08	0.4842	0.4684	
B2	2	9/10/2013 16:09	2	16606	8303.00	8303.00	18217.08	0.4558	0.4597	
B2	3	9/10/2013 16:22	2	15755	7877.50	7877.50	18217.07	0.4324	0.4495	
B2	4	9/10/2013 16:18	2	15521	7760.50	7760.50	18217.07	0.4260	0.4338	
B2	5	9/10/2013 15:54	2	15993	7996.50	7996.50	18217.09	0.4390	0.4270	
B2	6	9/10/2013 15:42	5	38171	7634.20	7634.20	18217.10	0.4191	0.4186	
B2	7	9/10/2013 16:05	2	14422	7211.00	7211.00	18217.08	0.3958	0.4015	
B2	8	9/10/2013 15:59	2	14420	7210.00	7210.00	18217.09	0.3958	0.3896	
B3	1	9/10/2013 16:19	2	16974	8487.00	8487.00	18217.07	0.4659	0.4712	
B3	2	9/10/2013 16:15	2	17237	8618.50	8618.50	18217.08	0.4731	0.4612	
B3	3	9/10/2013 16:09	2	15708	7854.00	7854.00	18217.08	0.4311	0.4497	
B3	4	9/10/2013 16:22	2	15693	7846.50	7846.50	18217.07	0.4307	0.4317	
B3	5	9/10/2013 15:59	2	16196	8098.00	8098.00	18217.09	0.4445	0.4240	

Detector (#)	Source ID (#)	Raw Count Data			Raw Beta (cpm)	Sr-90 (cpm)*	Decay Corrected Nominal (dpm)**	Sr-90 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
		Start Time	Count Time (min)	Beta (counts)					
B3	6	9/10/2013 15:54	2	15101	7550.50	7550.50	18217.09	0.4145	0.4143
B3	7	9/10/2013 15:42	5	35723	7144.60	7144.60	18217.10	0.3922	0.3947
B3	8	9/10/2013 16:05	2	13702	6851.00	6851.00	18217.08	0.3761	0.3812
B4	1	9/10/2013 16:22	2	15385	7692.50	7692.50	18217.07	0.4223	0.4119
B4	2	9/10/2013 16:19	2	14759	7379.50	7379.50	18217.07	0.4051	0.4053
B4	3	9/10/2013 16:15	2	13746	6873.00	6873.00	18217.08	0.3773	0.3976
B4	4	9/10/2013 16:09	2	13793	6896.50	6896.50	18217.08	0.3786	0.3857
B4	5	9/10/2013 16:05	2	14250	7125.00	7125.00	18217.08	0.3911	0.3805
B4	6	9/10/2013 16:00	2	14077	7038.50	7038.50	18217.09	0.3864	0.3741
B4	7	9/10/2013 15:54	2	13103	6551.50	6551.50	18217.09	0.3596	0.3611
B4	8	9/10/2013 15:42	5	31691	6338.20	6338.20	18217.10	0.3479	0.3521
C1	1	9/9/2013 16:39	2	17220	8610.00	8610.00	18218.25	0.4726	0.4618
C1	2	9/9/2013 17:15	2	16587	8293.50	8293.50	18218.22	0.4552	0.4537
C1	3	9/9/2013 17:06	2	15382	7691.00	7691.00	18218.23	0.4222	0.4443
C1	4	9/9/2013 17:02	2	15389	7694.50	7694.50	18218.23	0.4224	0.4296
C1	5	9/9/2013 16:58	2	15925	7962.50	7962.50	18218.24	0.4371	0.4233
C1	6	9/9/2013 16:52	2	15427	7713.50	7713.50	18218.24	0.4234	0.4154
C1	7	9/9/2013 16:47	2	14394	7197.00	7197.00	18218.24	0.3950	0.3994
C1	8	9/9/2013 16:43	2	14144	7072.00	7072.00	18218.25	0.3882	0.3884
C2	1	9/9/2013 16:43	2	17907	8953.50	8953.50	18218.25	0.4915	0.4808
C2	2	9/9/2013 16:39	2	17359	8679.50	8679.50	18218.25	0.4764	0.4709
C2	3	9/9/2013 17:15	2	15716	7858.00	7858.00	18218.22	0.4313	0.4593
C2	4	9/9/2013 17:06	2	15736	7868.00	7868.00	18218.23	0.4319	0.4413
C2	5	9/9/2013 17:02	2	16600	8300.00	8300.00	18218.23	0.4556	0.4336
C2	6	9/9/2013 16:58	2	15578	7789.00	7789.00	18218.24	0.4275	0.4239
C2	7	9/9/2013 16:52	2	14551	7275.50	7275.50	18218.24	0.3994	0.4043
C2	8	9/9/2013 16:47	2	14259	7129.50	7129.50	18218.24	0.3913	0.3908
C3	1	9/9/2013 16:47	2	17961	8980.50	8980.50	18218.24	0.4929	0.4816
C3	2	9/9/2013 16:43	2	17295	8647.50	8647.50	18218.25	0.4747	0.4720
C3	3	9/9/2013 16:39	2	16131	8065.50	8065.50	18218.25	0.4427	0.4609
C3	4	9/9/2013 17:15	2	16057	8028.50	8028.50	18218.22	0.4407	0.4436
C3	5	9/9/2013 17:06	2	16003	8001.50	8001.50	18218.23	0.4392	0.4361
C3	6	9/9/2013 17:02	2	15550	7775.00	7775.00	18218.23	0.4268	0.4268
C3	7	9/9/2013 16:58	2	14930	7465.00	7465.00	18218.24	0.4098	0.4080
C3	8	9/9/2013 16:52	2	14472	7236.00	7236.00	18218.24	0.3972	0.3950
C4	1	9/9/2013 16:52	2	18081	9040.50	9040.50	18218.24	0.4962	0.4817
C4	2	9/9/2013 16:47	2	17321	8660.50	8660.50	18218.24	0.4754	0.4724
C4	3	9/9/2013 16:43	2	15903	7951.50	7951.50	18218.25	0.4365	0.4615
C4	4	9/9/2013 16:39	2	15908	7954.00	7954.00	18218.25	0.4366	0.4446
C4	5	9/9/2013 17:15	2	16579	8289.50	8289.50	18218.22	0.4550	0.4373
C4	6	9/9/2013 17:06	2	15400	7700.00	7700.00	18218.23	0.4227	0.4283
C4	7	9/9/2013 17:02	2	14945	7472.50	7472.50	18218.23	0.4102	0.4099
C4	8	9/9/2013 16:58	2	14593	7296.50	7296.50	18218.24	0.4005	0.3972
D1	1	9/9/2013 16:58	2	16225	8112.50	8112.50	18218.24	0.4453	0.4505
D1	2	9/9/2013 16:52	2	17018	8509.00	8509.00	18218.24	0.4671	0.4440
D1	3	9/9/2013 16:47	2	15340	7670.00	7670.00	18218.24	0.4210	0.4363
D1	4	9/9/2013 16:43	2	15210	7605.00	7605.00	18218.25	0.4174	0.4245
D1	5	9/9/2013 16:39	2	15139	7569.50	7569.50	18218.25	0.4155	0.4194
D1	6	9/9/2013 17:15	2	15215	7607.50	7607.50	18218.22	0.4176	0.4130
D1	7	9/9/2013 17:06	2	14693	7346.50	7346.50	18218.23	0.4032	0.4001
D1	8	9/9/2013 17:02	2	14275	7137.50	7137.50	18218.23	0.3918	0.3911
D2	1	9/9/2013 17:02	2	19299	9649.50	9649.50	18218.23	0.5297	0.5181
D2	2	9/9/2013 16:58	2	18598	9299.00	9299.00	18218.24	0.5104	0.5086
D2	3	9/9/2013 16:52	2	17475	8737.50	8737.50	18218.24	0.4796	0.4976
D2	4	9/9/2013 16:47	2	17380	8690.00	8690.00	18218.24	0.4770	0.4804
D2	5	9/9/2013 16:43	2	17604	8802.00	8802.00	18218.25	0.4831	0.4730
D2	6	9/9/2013 16:39	2	16484	8242.00	8242.00	18218.25	0.4524	0.4638
D2	7	9/9/2013 17:15	2	16650	8325.00	8325.00	18218.22	0.4570	0.4451
D2	8	9/9/2013 17:06	2	15653	7826.50	7826.50	18218.23	0.4296	0.4322
D3	1	9/9/2013 17:06	2	19375	9687.50	9687.50	18218.23	0.5317	0.5192
D3	2	9/9/2013 17:02	2	18612	9306.00	9306.00	18218.23	0.5108	0.5095
D3	3	9/9/2013 16:58	2	17451	8725.50	8725.50	18218.24	0.4789	0.4983
D3	4	9/9/2013 16:52	2	17221	8610.50	8610.50	18218.24	0.4726	0.4808
D3	5	9/9/2013 16:47	2	17654	8827.00	8827.00	18218.24	0.4845	0.4733

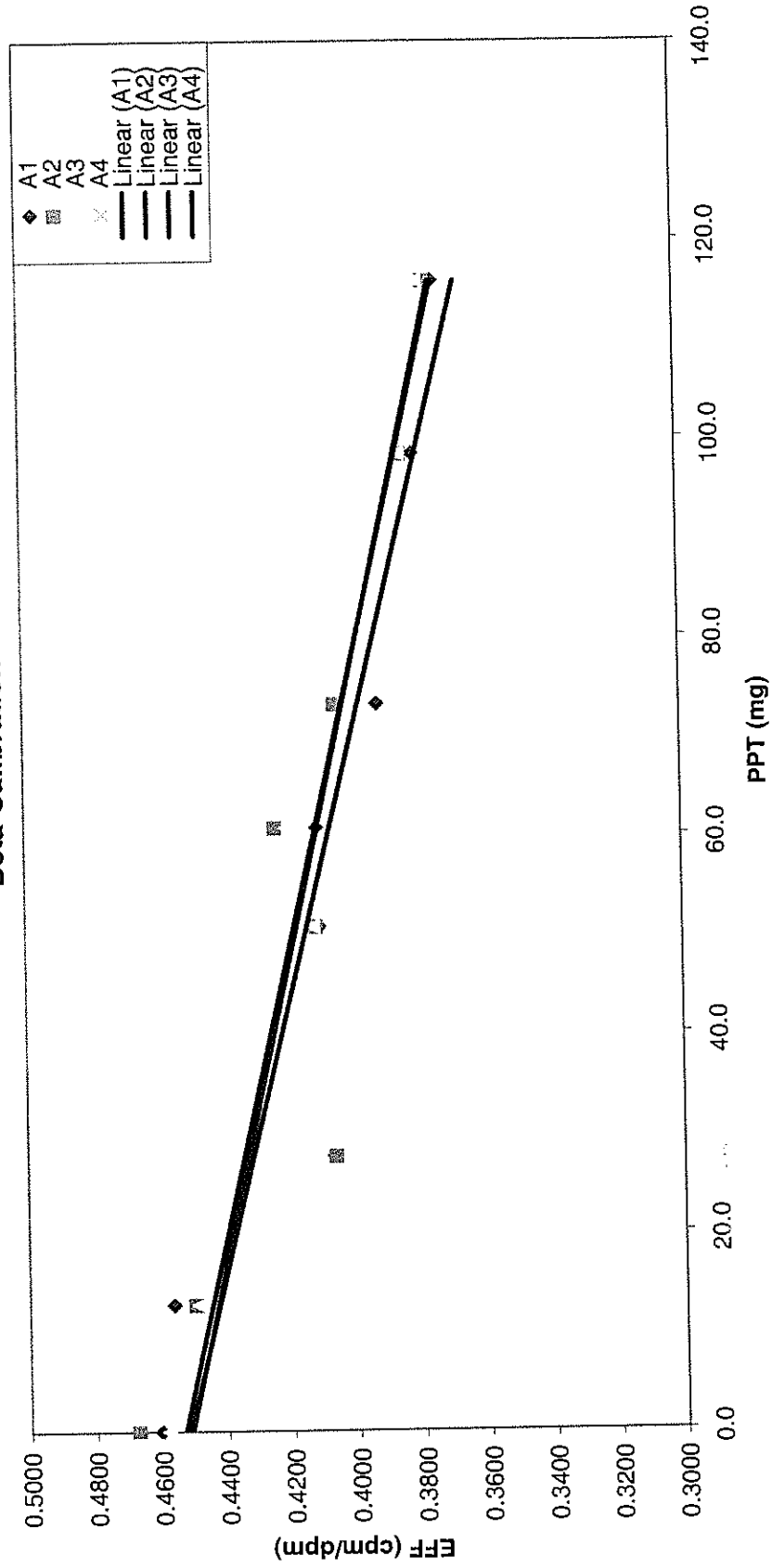
Detector (#)	Source ID (#)	Raw Count Data			Raw Beta (cpm)	Sr-90 (cpm)*	Decay Corrected Nominal (dpm)**	Sr-90	Calculated
		Start Time	Count Time (min)	Beta (counts)				Efficiency (cpm/dpm)	Efficiency (cpm/dpm)
D3	6	9/9/2013 16:43	2	16893	8446.50	8446.50	18218.25	0.4636	0.4639
D3	7	9/9/2013 16:39	2	16296	8148.00	8148.00	18218.25	0.4472	0.4449
D3	8	9/9/2013 17:15	2	15749	7874.50	7874.50	18218.22	0.4322	0.4318
D4	1	9/9/2013 17:15	2	19439	9719.50	9719.50	18218.22	0.5335	0.5244
D4	2	9/9/2013 17:06	2	18995	9497.50	9497.50	18218.23	0.5213	0.5136
D4	3	9/9/2013 17:02	2	17544	8772.00	8772.00	18218.23	0.4815	0.5011
D4	4	9/9/2013 16:58	2	17145	8572.50	8572.50	18218.24	0.4705	0.4817
D4	5	9/9/2013 16:52	2	17590	8795.00	8795.00	18218.24	0.4828	0.4732
D4	6	9/9/2013 16:47	2	16815	8407.50	8407.50	18218.24	0.4615	0.4628
D4	7	9/9/2013 16:43	2	16371	8185.50	8185.50	18218.25	0.4493	0.4416
D4	8	9/9/2013 16:39	2	15484	7742.00	7742.00	18218.25	0.4250	0.4270
E1	1	9/9/2013 14:33	2	16911	8455.50	8455.50	18218.36	0.4641	0.4496
E1	2	9/9/2013 15:01	2	16143	8071.50	8071.50	18218.33	0.4430	0.4406
E1	3	9/9/2013 14:59	2	14763	7381.50	7381.50	18218.33	0.4052	0.4301
E1	4	9/9/2013 14:53	2	14977	7488.50	7488.50	18218.34	0.4110	0.4138
E1	5	9/9/2013 14:50	2	15123	7561.50	7561.50	18218.34	0.4150	0.4067
E1	6	9/9/2013 14:47	2	14526	7263.00	7263.00	18218.34	0.3987	0.3980
E1	7	9/9/2013 14:44	2	13746	6873.00	6873.00	18218.35	0.3773	0.3802
E1	8	9/9/2013 14:39	2	13575	6787.50	6787.50	18218.35	0.3726	0.3680
E2	1	9/9/2013 14:39	2	16793	8396.50	8396.50	18218.35	0.4609	0.4488
E2	2	9/9/2013 14:34	2	16324	8162.00	8162.00	18218.36	0.4480	0.4401
E2	3	9/9/2013 15:01	2	14576	7288.00	7288.00	18218.33	0.4000	0.4301
E2	4	9/9/2013 14:59	2	14989	7494.50	7494.50	18218.33	0.4114	0.4145
E2	5	9/9/2013 14:53	2	15153	7576.50	7576.50	18218.34	0.4159	0.4077
E2	6	9/9/2013 14:50	2	14712	7356.00	7356.00	18218.34	0.4038	0.3994
E2	7	9/9/2013 14:47	2	13919	6959.50	6959.50	18218.34	0.3820	0.3823
E2	8	9/9/2013 14:44	2	13536	6768.00	6768.00	18218.35	0.3715	0.3706
E3	1	9/9/2013 14:44	2	16656	8328.00	8328.00	18218.35	0.4571	0.4486
E3	2	9/9/2013 14:39	2	16041	8020.50	8020.50	18218.35	0.4402	0.4399
E3	3	9/9/2013 14:34	2	14927	7463.50	7463.50	18218.36	0.4097	0.4299
E3	4	9/9/2013 15:01	2	15061	7530.50	7530.50	18218.33	0.4133	0.4143
E3	5	9/9/2013 14:59	2	15477	7738.50	7738.50	18218.33	0.4248	0.4075
E3	6	9/9/2013 14:53	2	14420	7210.00	7210.00	18218.34	0.3958	0.3991
E3	7	9/9/2013 14:50	2	13966	6983.00	6983.00	18218.34	0.3833	0.3821
E3	8	9/9/2013 14:47	2	13397	6698.50	6698.50	18218.34	0.3677	0.3704
E4	1	9/9/2013 14:47	2	17333	8666.50	8666.50	18218.34	0.4757	0.4625
E4	2	9/9/2013 14:44	2	16703	8351.50	8351.50	18218.35	0.4584	0.4524
E4	3	9/9/2013 14:39	2	15155	7577.50	7577.50	18218.35	0.4159	0.4407
E4	4	9/9/2013 14:34	2	15336	7668.00	7668.00	18218.36	0.4209	0.4224
E4	5	9/9/2013 15:01	2	15392	7696.00	7696.00	18218.33	0.4224	0.4146
E4	6	9/9/2013 14:59	2	14474	7237.00	7237.00	18218.33	0.3972	0.4048
E4	7	9/9/2013 14:53	2	14066	7033.00	7033.00	18218.34	0.3860	0.3849
E4	8	9/9/2013 14:50	2	13728	6864.00	6864.00	18218.34	0.3768	0.3712
F1	1	9/9/2013 14:50	2	17509	8754.50	8754.50	18218.34	0.4805	0.4735
F1	2	9/9/2013 14:47	2	17204	8602.00	8602.00	18218.34	0.4722	0.4648
F1	3	9/9/2013 14:44	2	15886	7943.00	7943.00	18218.35	0.4360	0.4547
F1	4	9/9/2013 14:39	2	15702	7851.00	7851.00	18218.35	0.4309	0.4390
F1	5	9/9/2013 14:34	2	16079	8039.50	8039.50	18218.36	0.4413	0.4322
F1	6	9/9/2013 15:01	2	15539	7769.50	7769.50	18218.33	0.4265	0.4238
F1	7	9/9/2013 14:59	2	14815	7407.50	7407.50	18218.33	0.4066	0.4067
F1	8	9/9/2013 14:53	2	14420	7210.00	7210.00	18218.34	0.3958	0.3949
F2	1	9/9/2013 14:53	2	16914	8457.00	8457.00	18218.34	0.4642	0.4582
F2	2	9/9/2013 14:50	2	16530	8265.00	8265.00	18218.34	0.4537	0.4499
F2	3	9/9/2013 14:47	2	15394	7697.00	7697.00	18218.34	0.4225	0.4403
F2	4	9/9/2013 14:44	2	15303	7651.50	7651.50	18218.35	0.4200	0.4255
F2	5	9/9/2013 14:39	2	15856	7928.00	7928.00	18218.35	0.4352	0.4190
F2	6	9/9/2013 14:34	2	15058	7529.00	7529.00	18218.36	0.4133	0.4110
F2	7	9/9/2013 15:01	2	14103	7051.50	7051.50	18218.33	0.3871	0.3948
F2	8	9/9/2013 14:59	2	14081	7040.50	7040.50	18218.33	0.3865	0.3835
F3	1	9/9/2013 14:59	2	17719	8859.50	8859.50	18218.33	0.4863	0.4699
F3	2	9/9/2013 14:53	2	16760	8380.00	8380.00	18218.34	0.4600	0.4606
F3	3	9/9/2013 14:50	2	15724	7862.00	7862.00	18218.34	0.4315	0.4497
F3	4	9/9/2013 14:47	2	15350	7675.00	7675.00	18218.34	0.4213	0.4329
F3	5	9/9/2013 14:44	2	15706	7853.00	7853.00	18218.35	0.4310	0.4256

Detector (#)	Source ID (#)	Raw Count Data			Beta (counts)	Raw Beta		Decay Corrected Nominal (dpm)**	Sr-90 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
		Start Time	Count Time (min)			(cpm)	Sr-90 (cpm)*			
F3	6	9/9/2013 14:39	2	15315	7657.50	7657.50	18218.35	0.4203	0.4166	
F3	7	9/9/2013 14:34	2	14643	7321.50	7321.50	18218.36	0.4019	0.3982	
F3	8	9/9/2013 15:01	2	14090	7045.00	7045.00	18218.33	0.3867	0.3855	
F4	1	9/9/2013 15:01	2	17974	8987.00	8987.00	18218.33	0.4933	0.4769	
F4	2	9/9/2013 14:59	2	17073	8536.50	8536.50	18218.33	0.4686	0.4672	
F4	3	9/9/2013 14:53	2	15849	7924.50	7924.50	18218.34	0.4350	0.4560	
F4	4	9/9/2013 14:50	2	15570	7785.00	7785.00	18218.34	0.4273	0.4387	
F4	5	9/9/2013 14:47	2	16112	8056.00	8056.00	18218.34	0.4422	0.4311	
F4	6	9/9/2013 14:44	2	15291	7645.50	7645.50	18218.35	0.4197	0.4218	
F4	7	9/9/2013 14:39	2	14758	7379.00	7379.00	18218.35	0.4050	0.4028	
F4	8	9/9/2013 14:34	2	14329	7164.50	7164.50	18218.36	0.3933	0.3897	
G1	1	9/26/2013 10:36	2	16899	8449.50	8449.50	18198.23	0.4643	0.4573	
G1	2	9/26/2013 10:53	2	16560	8280.00	8280.00	18198.21	0.4550	0.4481	
G1	3	9/26/2013 10:46	2	15184	7592.00	7592.00	18198.22	0.4172	0.4374	
G1	4	9/26/2013 10:40	2	15102	7551.00	7551.00	18198.22	0.4149	0.4209	
G1	5	9/26/2013 11:00	2	15399	7699.50	7699.50	18198.21	0.4231	0.4137	
G1	6	9/26/2013 11:31	2	14876	7438.00	7438.00	18198.18	0.4087	0.4048	
G1	7	9/26/2013 11:25	2	14010	7005.00	7005.00	18198.19	0.3849	0.3867	
G1	8	9/26/2013 11:03	2	13648	6824.00	6824.00	18198.20	0.3750	0.3742	
G2	1	9/26/2013 10:40	2	17663	8831.50	8831.50	18198.22	0.4853	0.4647	
G2	2	9/26/2013 10:36	2	16439	8219.50	8219.50	18198.23	0.4517	0.4558	
G2	3	9/26/2013 10:53	2	15286	7643.00	7643.00	18198.21	0.4200	0.4455	
G2	4	9/26/2013 10:46	2	15480	7740.00	7740.00	18198.22	0.4253	0.4295	
G2	5	9/26/2013 11:03	2	15617	7808.50	7808.50	18198.20	0.4291	0.4226	
G2	6	9/26/2013 11:00	2	15167	7583.50	7583.50	18198.21	0.4167	0.4141	
G2	7	9/26/2013 11:31	2	14647	7323.50	7323.50	18198.18	0.4024	0.3966	
G2	8	9/26/2013 11:25	2	13940	6970.00	6970.00	18198.19	0.3830	0.3846	
G3	1	9/26/2013 10:46	2	17971	8985.50	8985.50	18198.22	0.4938	0.4740	
G3	2	9/26/2013 10:40	2	16883	8441.50	8441.50	18198.22	0.4639	0.4650	
G3	3	9/26/2013 10:36	2	15588	7794.00	7794.00	18198.23	0.4283	0.4544	
G3	4	9/26/2013 10:53	2	15531	7765.50	7765.50	18198.21	0.4267	0.4381	
G3	5	9/26/2013 11:25	2	16104	8052.00	8052.00	18198.19	0.4425	0.4310	
G3	6	9/26/2013 11:03	2	15482	7741.00	7741.00	18198.20	0.4254	0.4222	
G3	7	9/26/2013 11:00	2	14951	7475.50	7475.50	18198.21	0.4108	0.4044	
G3	8	9/26/2013 11:31	2	14197	7098.50	7098.50	18198.18	0.3901	0.3921	
G4	1	9/26/2013 10:53	2	17172	8586.00	8586.00	18198.21	0.4718	0.4610	
G4	2	9/26/2013 10:46	2	16733	8366.50	8366.50	18198.22	0.4597	0.4517	
G4	3	9/26/2013 10:40	2	15138	7569.00	7569.00	18198.22	0.4159	0.4409	
G4	4	9/26/2013 10:36	2	15028	7514.00	7514.00	18198.23	0.4129	0.4241	
G4	5	9/26/2013 11:31	2	15641	7820.50	7820.50	18198.18	0.4297	0.4169	
G4	6	9/26/2013 11:25	2	14815	7407.50	7407.50	18198.19	0.4070	0.4079	
G4	7	9/26/2013 11:03	2	14560	7280.00	7280.00	18198.20	0.4000	0.3896	
G4	8	9/26/2013 11:00	2	13536	6768.00	6768.00	18198.21	0.3719	0.3770	
H1	1	9/26/2013 11:00	2	17027	8513.50	8513.50	18198.21	0.4678	0.4535	
H1	2	9/26/2013 11:31	2	16180	8090.00	8090.00	18198.18	0.4445	0.4453	
H1	3	9/26/2013 11:25	2	14973	7486.50	7486.50	18198.19	0.4114	0.4357	
H1	4	9/26/2013 11:03	2	15289	7644.50	7644.50	18198.20	0.4201	0.4209	
H1	5	9/26/2013 10:36	2	15413	7706.50	7706.50	18198.23	0.4235	0.4145	
H1	6	9/26/2013 10:53	2	14968	7484.00	7484.00	18198.21	0.4112	0.4066	
H1	7	9/26/2013 10:46	2	14044	7022.00	7022.00	18198.22	0.3859	0.3904	
H1	8	9/26/2013 10:40	2	13892	6946.00	6946.00	18198.22	0.3817	0.3792	
H2	1	9/26/2013 11:03	2	17194	8597.00	8597.00	18198.20	0.4724	0.4571	
H2	2	9/26/2013 11:00	2	16398	8199.00	8199.00	18198.21	0.4505	0.4488	
H2	3	9/26/2013 11:31	2	15340	7670.00	7670.00	18198.18	0.4215	0.4392	
H2	4	9/26/2013 11:25	2	15164	7582.00	7582.00	18198.19	0.4166	0.4242	
H2	5	9/26/2013 10:40	2	15245	7622.50	7622.50	18198.22	0.4189	0.4177	
H2	6	9/26/2013 10:36	2	14889	7444.50	7444.50	18198.23	0.4091	0.4097	
H2	7	9/26/2013 10:53	2	14473	7236.50	7236.50	18198.21	0.3976	0.3934	
H2	8	9/26/2013 10:46	2	14037	7018.50	7018.50	18198.22	0.3857	0.3821	
H3	1	9/26/2013 11:25	2	17552	8776.00	8776.00	18198.19	0.4822	0.4681	
H3	2	9/26/2013 11:03	2	16635	8317.50	8317.50	18198.20	0.4571	0.4592	
H3	3	9/26/2013 11:00	2	15529	7764.50	7764.50	18198.21	0.4267	0.4488	
H3	4	9/26/2013 11:31	2	15613	7806.50	7806.50	18198.18	0.4290	0.4327	
H3	5	9/26/2013 10:46	2	15953	7976.50	7976.50	18198.22	0.4383	0.4258	

Detector (#)	Source ID (#)	Raw Count Data			Raw Beta (cpm)	Sr-90 (cpm)*	Decay Corrected Nominal (dpm)**	Sr-90 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
		Start Time	Count Time (min)	Beta (counts)					
H3	6	9/26/2013 10:40	2	15329	7664.50	7664.50	18198.22	0.4212	0.4172
H3	7	9/26/2013 10:36	2	14369	7184.50	7184.50	18198.23	0.3948	0.3996
H3	8	9/26/2013 10:53	2	14185	7092.50	7092.50	18198.21	0.3897	0.3875
H4	1	9/26/2013 11:31	2	17097	8548.50	8548.50	18198.18	0.4697	0.4567
H4	2	9/26/2013 11:25	2	16376	8188.00	8188.00	18198.19	0.4499	0.4479
H4	3	9/26/2013 11:03	2	15008	7504.00	7504.00	18198.20	0.4123	0.4378
H4	4	9/26/2013 11:00	2	15103	7551.50	7551.50	18198.21	0.4150	0.4220
H4	5	9/26/2013 10:53	2	15640	7820.00	7820.00	18198.21	0.4297	0.4152
H4	6	9/26/2013 10:46	2	14911	7455.50	7455.50	18198.22	0.4097	0.4068
H4	7	9/26/2013 10:40	2	14298	7149.00	7149.00	18198.22	0.3928	0.3896
H4	8	9/26/2013 10:36	2	13628	6814.00	6814.00	18198.23	0.3744	0.3777
I1	1	9/9/2013 15:37	2	16107	8053.50	8053.50	18218.30	0.4421	0.4342
I1	2	9/9/2013 16:35	2	15780	7890.00	7890.00	18218.25	0.4331	0.4262
I1	3	9/9/2013 16:30	2	14528	7264.00	7264.00	18218.26	0.3987	0.4169
I1	4	9/9/2013 16:26	2	14324	7162.00	7162.00	18218.26	0.3931	0.4026
I1	5	9/9/2013 16:18	2	14933	7466.50	7466.50	18218.27	0.4098	0.3963
I1	6	9/9/2013 16:15	2	14042	7021.00	7021.00	18218.27	0.3854	0.3886
I1	7	9/9/2013 16:06	2	13572	6786.00	6786.00	18218.28	0.3725	0.3729
I1	8	9/9/2013 16:02	2	13304	6652.00	6652.00	18218.28	0.3651	0.3621
I2	1	9/9/2013 16:02	2	17133	8566.50	8566.50	18218.28	0.4702	0.4599
I2	2	9/9/2013 15:37	2	16766	8383.00	8383.00	18218.30	0.4601	0.4503
I2	3	9/9/2013 16:35	2	15058	7529.00	7529.00	18218.25	0.4133	0.4390
I2	4	9/9/2013 16:30	2	14984	7492.00	7492.00	18218.26	0.4112	0.4216
I2	5	9/9/2013 16:26	2	15544	7772.00	7772.00	18218.26	0.4266	0.4141
I2	6	9/9/2013 16:18	2	14785	7392.50	7392.50	18218.27	0.4058	0.4047
I2	7	9/9/2013 16:15	2	14052	7026.00	7026.00	18218.27	0.3857	0.3857
I2	8	9/9/2013 16:06	2	13662	6831.00	6831.00	18218.28	0.3750	0.3726
I3	1	9/9/2013 16:06	2	16777	8388.50	8388.50	18218.28	0.4604	0.4503
I3	2	9/9/2013 16:02	2	16493	8246.50	8246.50	18218.28	0.4526	0.4413
I3	3	9/9/2013 15:37	2	14621	7310.50	7310.50	18218.30	0.4013	0.4308
I3	4	9/9/2013 16:35	2	14775	7387.50	7387.50	18218.25	0.4055	0.4145
I3	5	9/9/2013 16:30	2	15367	7683.50	7683.50	18218.26	0.4217	0.4075
I3	6	9/9/2013 16:26	2	14583	7291.50	7291.50	18218.26	0.4002	0.3988
I3	7	9/9/2013 16:18	2	13862	6931.00	6931.00	18218.27	0.3804	0.3811
I3	8	9/9/2013 16:15	2	13509	6754.50	6754.50	18218.27	0.3708	0.3688
I4	1	9/9/2013 16:15	2	17024	8512.00	8512.00	18218.27	0.4672	0.4572
I4	2	9/9/2013 16:06	2	16421	8210.50	8210.50	18218.28	0.4507	0.4478
I4	3	9/9/2013 16:02	2	15315	7657.50	7657.50	18218.28	0.4203	0.4368
I4	4	9/9/2013 15:37	2	14962	7481.00	7481.00	18218.30	0.4106	0.4197
I4	5	9/9/2013 16:35	2	15512	7756.00	7756.00	18218.25	0.4257	0.4123
I4	6	9/9/2013 16:30	2	14499	7249.50	7249.50	18218.26	0.3979	0.4032
I4	7	9/9/2013 16:26	2	14177	7088.50	7088.50	18218.26	0.3891	0.3846
I4	8	9/9/2013 16:18	2	13548	6774.00	6774.00	18218.27	0.3718	0.3717
J1	1	9/9/2013 16:18	2	15980	7990.00	7990.00	18218.27	0.4386	0.4284
J1	2	9/9/2013 16:15	2	15477	7738.50	7738.50	18218.27	0.4248	0.4207
J1	3	9/9/2013 16:06	2	14175	7087.50	7087.50	18218.28	0.3890	0.4118
J1	4	9/9/2013 16:02	2	14437	7218.50	7218.50	18218.28	0.3962	0.3979
J1	5	9/9/2013 15:37	2	14668	7334.00	7334.00	18218.30	0.4026	0.3919
J1	6	9/9/2013 16:35	2	13906	6953.00	6953.00	18218.25	0.3817	0.3845
J1	7	9/9/2013 16:30	2	13573	6786.50	6786.50	18218.26	0.3725	0.3693
J1	8	9/9/2013 16:26	2	13047	6523.50	6523.50	18218.26	0.3581	0.3589
J2	1	9/9/2013 16:26	2	15826	7913.00	7913.00	18218.26	0.4343	0.4244
J2	2	9/9/2013 16:18	2	15410	7705.00	7705.00	18218.27	0.4229	0.4160
J2	3	9/9/2013 16:15	2	13921	6960.50	6960.50	18218.27	0.3821	0.4062
J2	4	9/9/2013 16:06	2	14028	7014.00	7014.00	18218.28	0.3850	0.3911
J2	5	9/9/2013 16:02	2	14510	7255.00	7255.00	18218.28	0.3982	0.3845
J2	6	9/9/2013 15:37	2	13767	6883.50	6883.50	18218.30	0.3778	0.3764
J2	7	9/9/2013 16:35	2	12780	6390.00	6390.00	18218.25	0.3507	0.3598
J2	8	9/9/2013 16:30	2	12959	6479.50	6479.50	18218.26	0.3557	0.3484
J3	1	9/9/2013 16:30	2	15950	7975.00	7975.00	18218.26	0.4377	0.4263
J3	2	9/9/2013 16:26	2	15398	7699.00	7699.00	18218.26	0.4226	0.4177
J3	3	9/9/2013 16:18	2	14110	7055.00	7055.00	18218.27	0.3872	0.4077
J3	4	9/9/2013 16:15	2	14013	7006.50	7006.50	18218.27	0.3846	0.3922
J3	5	9/9/2013 16:06	2	14341	7170.50	7170.50	18218.28	0.3936	0.3855

Detector (#)	Source ID (#)	Raw Count Data			Raw Beta (cpm)	Sr-90 (cpm)*	Decay Corrected Nominal (dpm)**	Sr-90	Calculated
		Start Time	Count Time (min)	Beta (counts)				Efficiency (cpm/dpm)	Efficiency (cpm/dpm)
J3	6	9/9/2013 16:02	2	13833	6916.50	6916.50	18218.28	0.3796	0.3771
J3	7	9/9/2013 15:37	2	12957	6478.50	6478.50	18218.30	0.3556	0.3602
J3	8	9/9/2013 16:35	2	12909	6454.50	6454.50	18218.25	0.3543	0.3485
J4	1	9/9/2013 16:35	2	15632	7816.00	7816.00	18218.25	0.4290	0.4200
J4	2	9/9/2013 16:30	2	15274	7637.00	7637.00	18218.26	0.4192	0.4134
J4	3	9/9/2013 16:26	2	13967	6983.50	6983.50	18218.26	0.3833	0.4058
J4	4	9/9/2013 16:18	2	14190	7095.00	7095.00	18218.27	0.3894	0.3941
J4	5	9/9/2013 16:15	2	14844	7422.00	7422.00	18218.27	0.4074	0.3889
J4	6	9/9/2013 16:06	2	13609	6804.50	6804.50	18218.28	0.3735	0.3826
J4	7	9/9/2013 16:02	2	13510	6755.00	6755.00	18218.28	0.3708	0.3698
J4	8	9/9/2013 15:37	2	13221	6610.50	6610.50	18218.30	0.3628	0.3609

### Beta Calibration



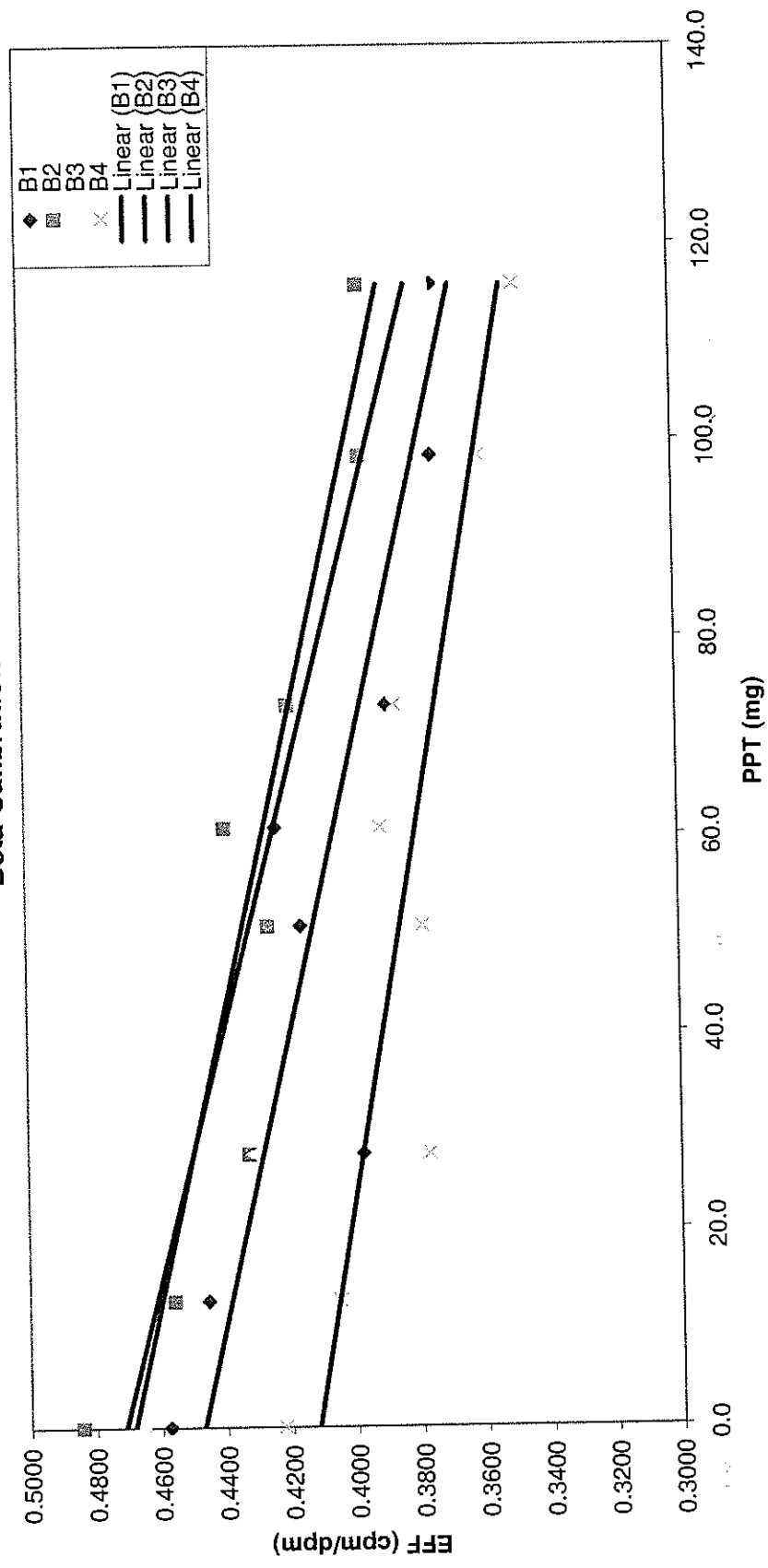
A1  $y = -7.333825E-04x + 4.517776E-01$

A2  $y = -6.868451E-04x + 4.533345E-01$

A3  $y = -6.621341E-04x + 4.512640E-01$

A4

### Beta Calibration



B1 y = -6.861698E-04x + 4.471782E-01

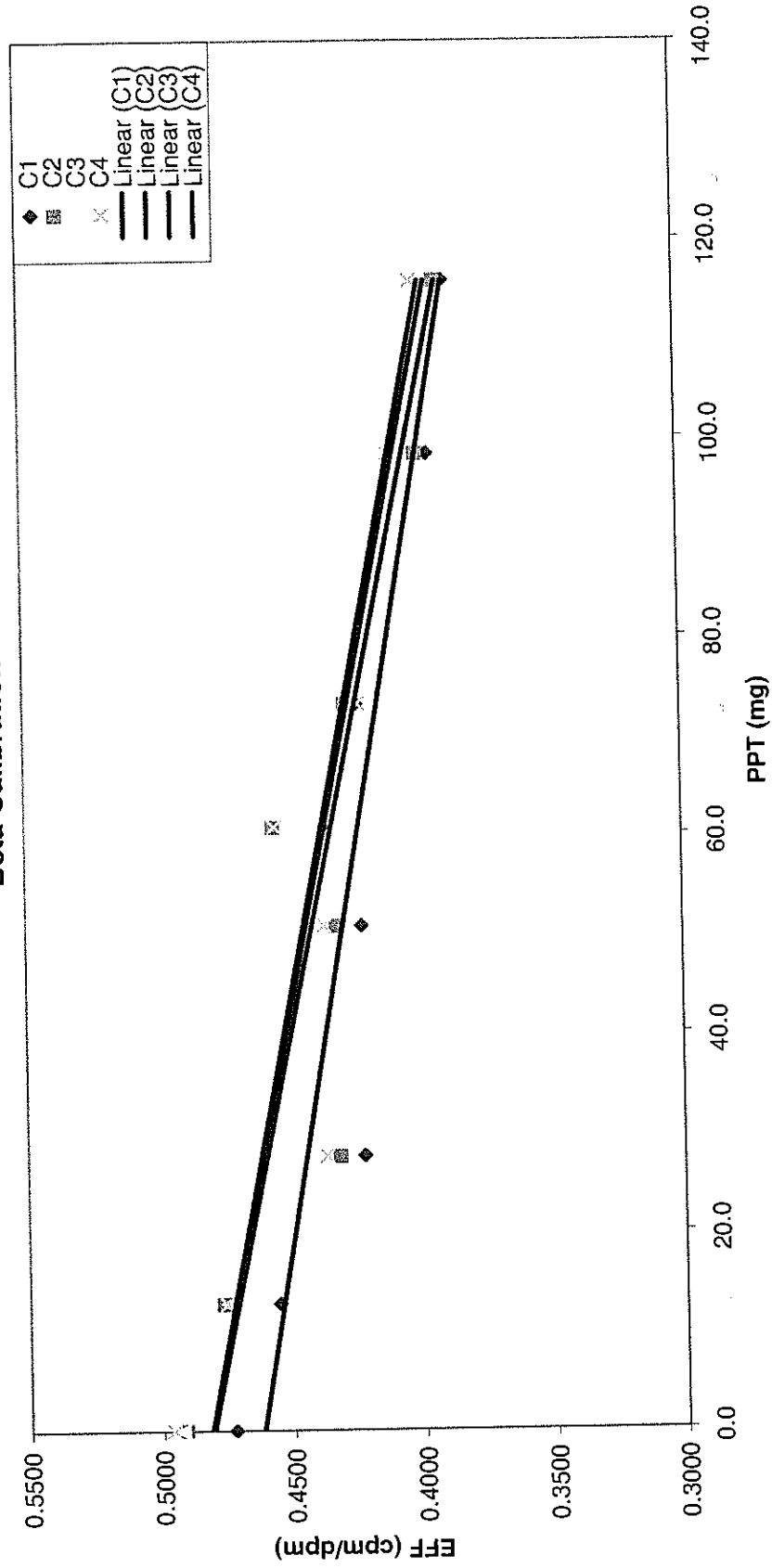
B2 y = -6.800834E-04x + 4.683737E-01

B3 y = -7.768793E-04x + 4.711931E-01

B4 y = -5.172153E-04x + 4.119467E-01



# Beta Calibration



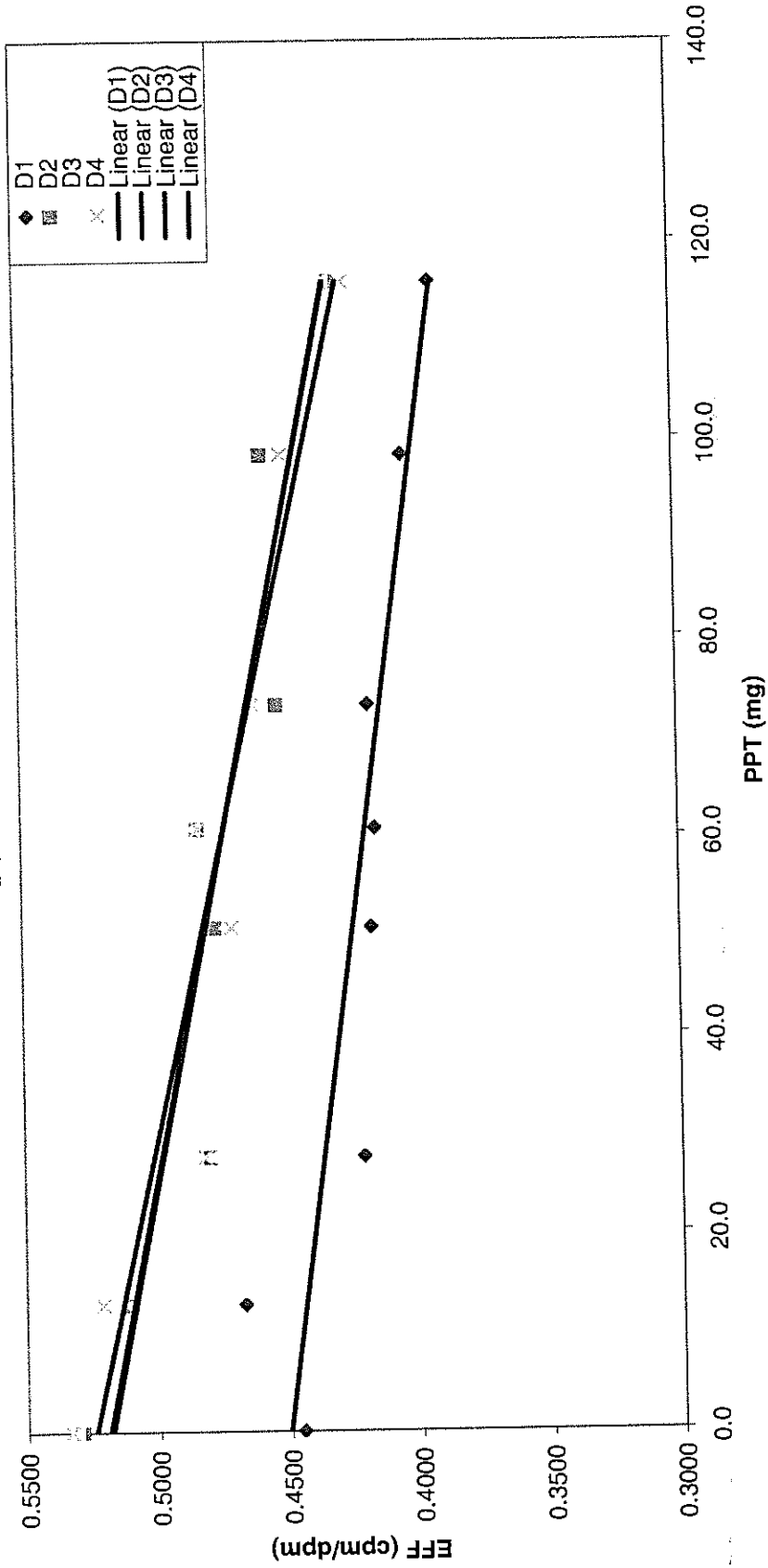
$$C1y = -6.342067E-04x + 4.618452E-01$$

$$C2y = -7.778612E-04x + 4.808455E-01$$

$$C3y = -7.480082E-04x + 4.815829E-01$$

$$C4y = -7.294338E-04x + 4.816980E-01$$

### Beta Calibration



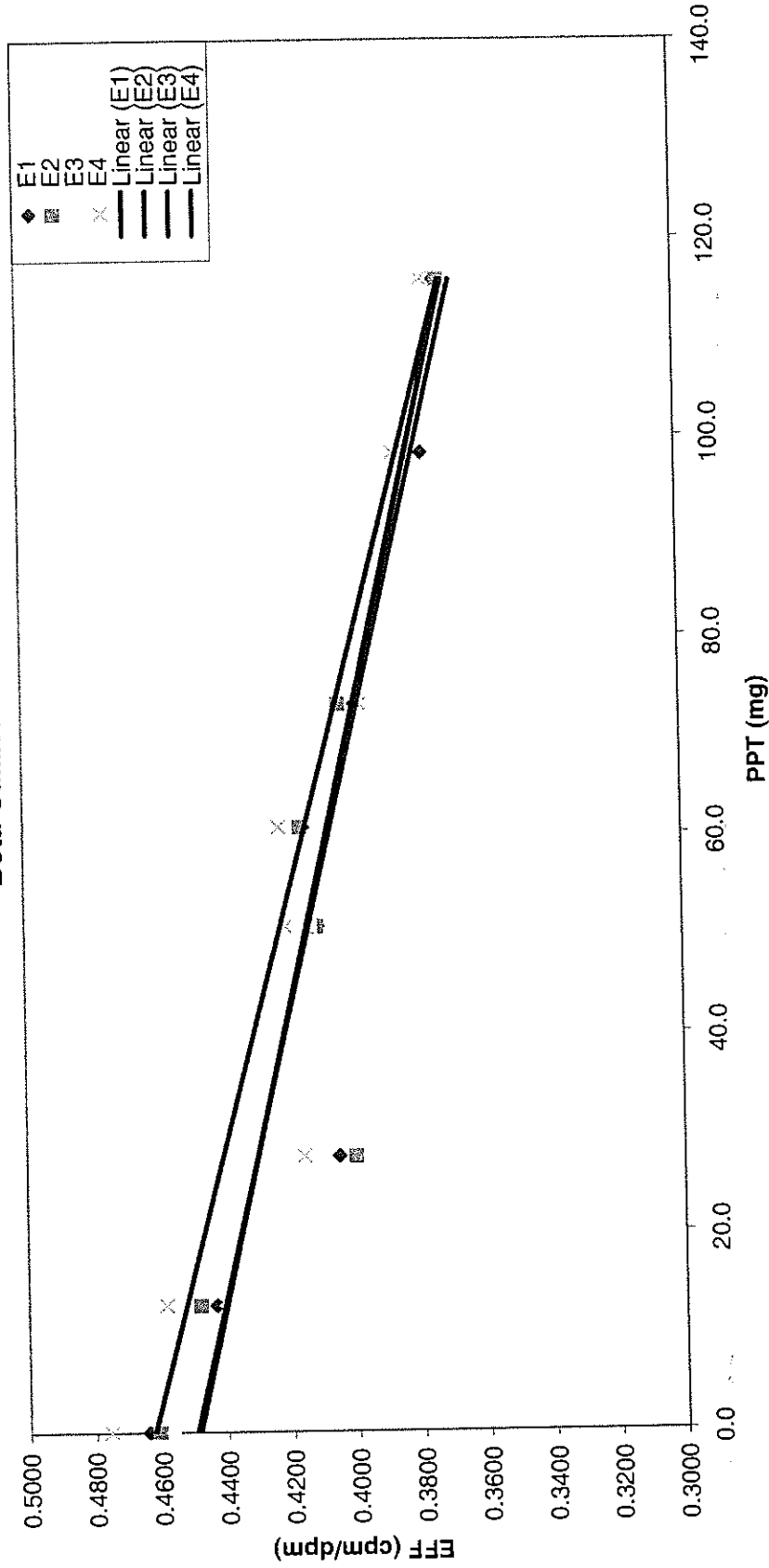
D1y = -5.129339E-04x + 4.505411E-01

D2y = -7.418491E-04x + 5.181032E-01

D3y = -7.543282E-04x + 5.191593E-01

D4y = -8.414364E-04x + 5.243977E-01

### Beta Calibration



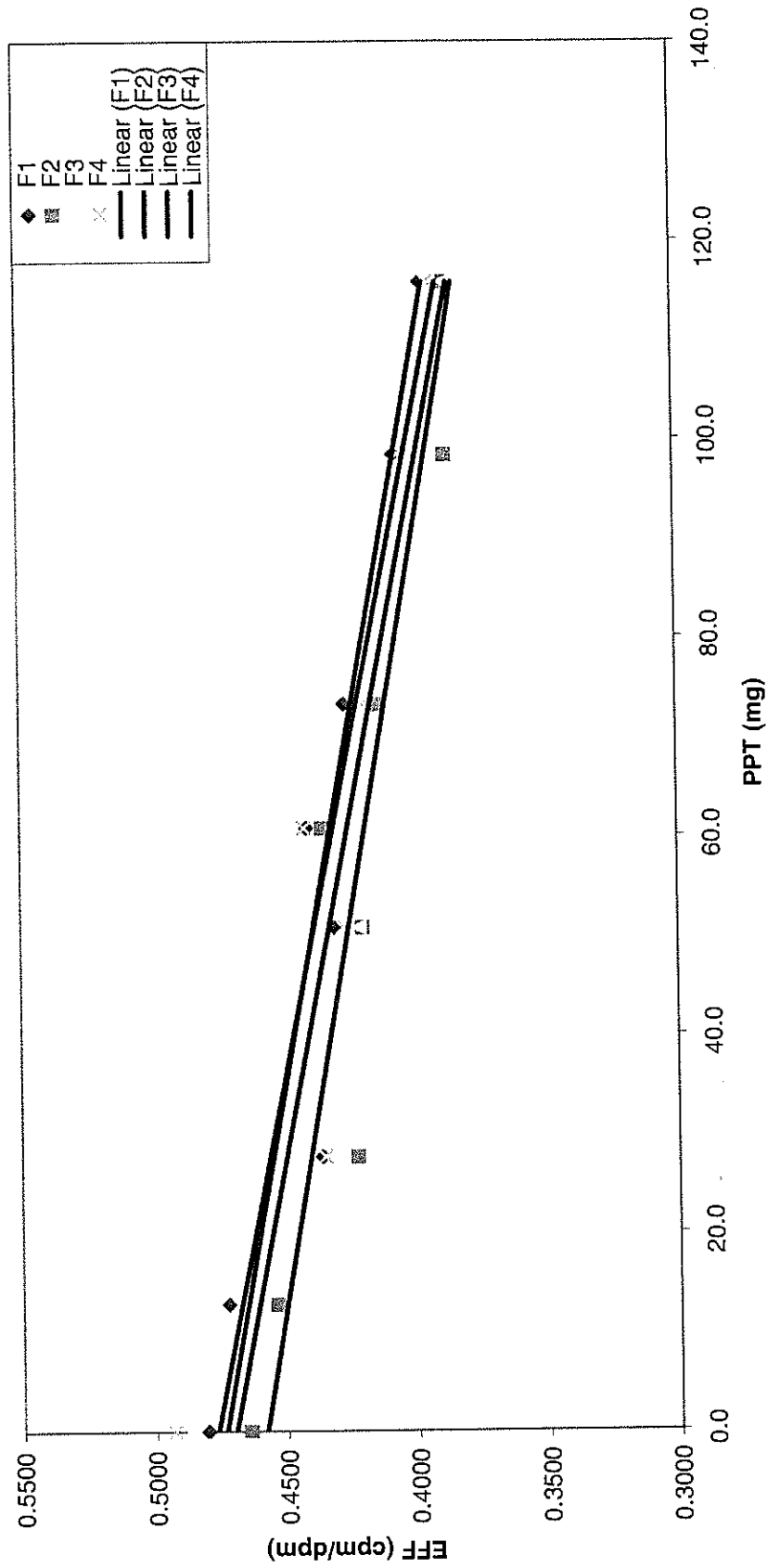
$$E1 y = -7.049993E-04x + 4.495943E-01$$

$$E2 y = -6.749213E-04x + 4.487583E-01$$

$$E3 y = -6.755336E-04x + 4.485964E-01$$

$$E4 y = -7.886521E-04x + 4.625023E-01$$

### Beta Calibration



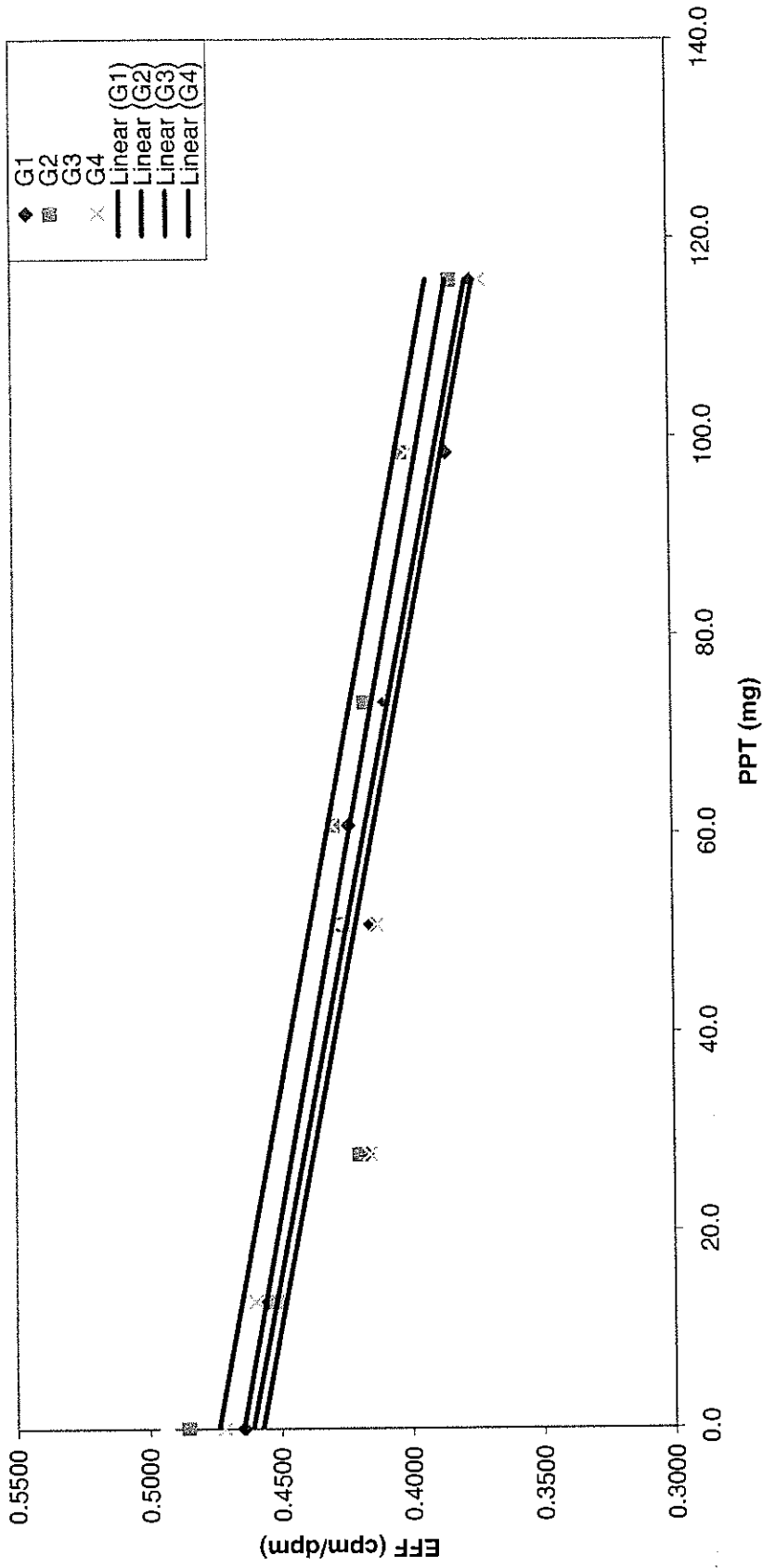
$$F1 y = -6.791416E-04x + 4.735259E-01$$

$$F2 y = -6.446490E-04x + 4.582001E-01$$

$$F3 y = -7.287168E-04x + 4.699131E-01$$

$$F4 y = -7.526203E-04x + 4.768834E-01$$

# Beta Calibration



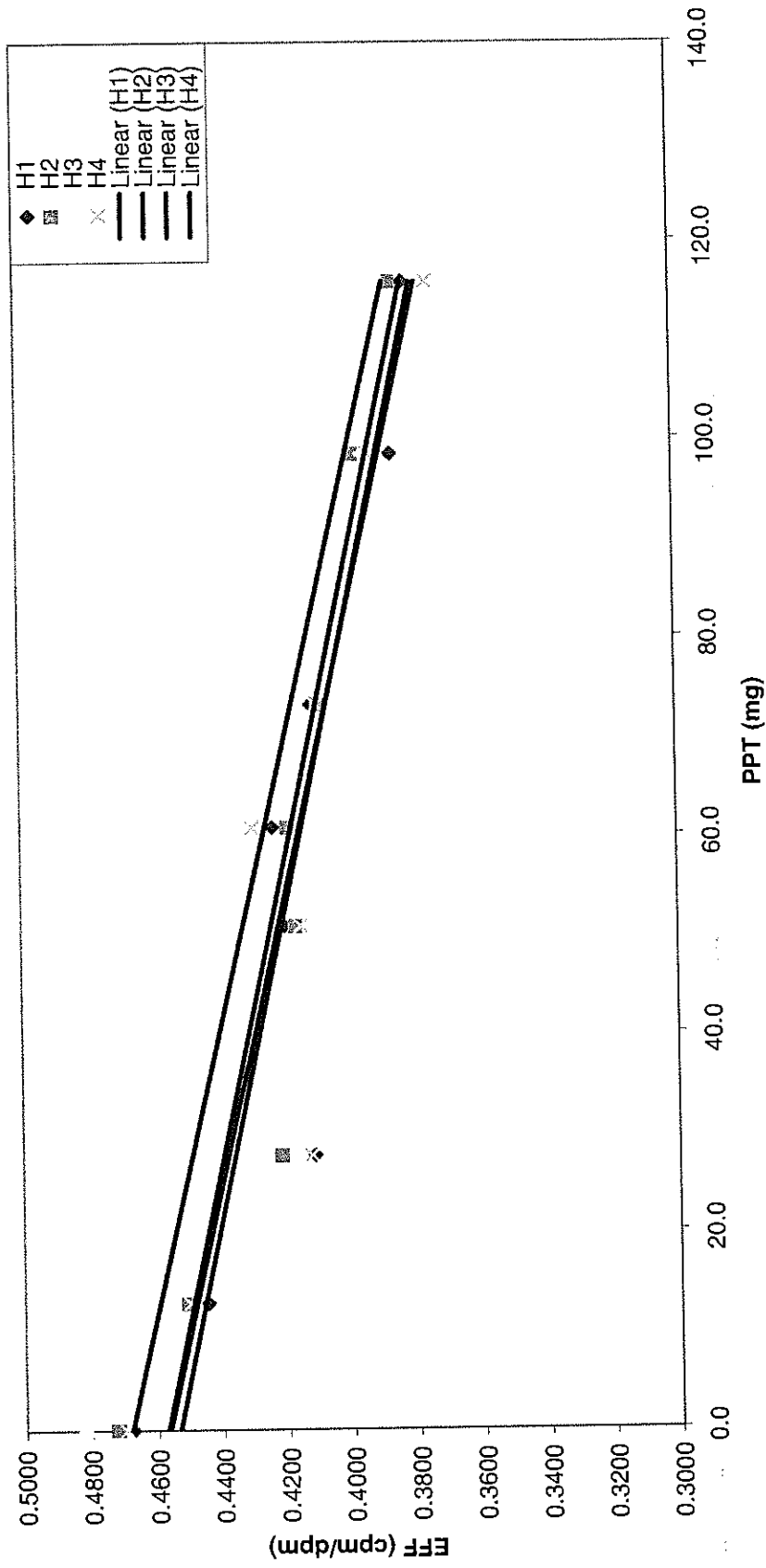
$$G1y = -7.176299E-04x + 4.573162E-01$$

$$G2y = -6.917745E-04x + 4.646913E-01$$

$$G3y = -7.075361E-04x + 4.740333E-01$$

$$G4y = -7.255933E-04x + 4.609992E-01$$

### Beta Calibration



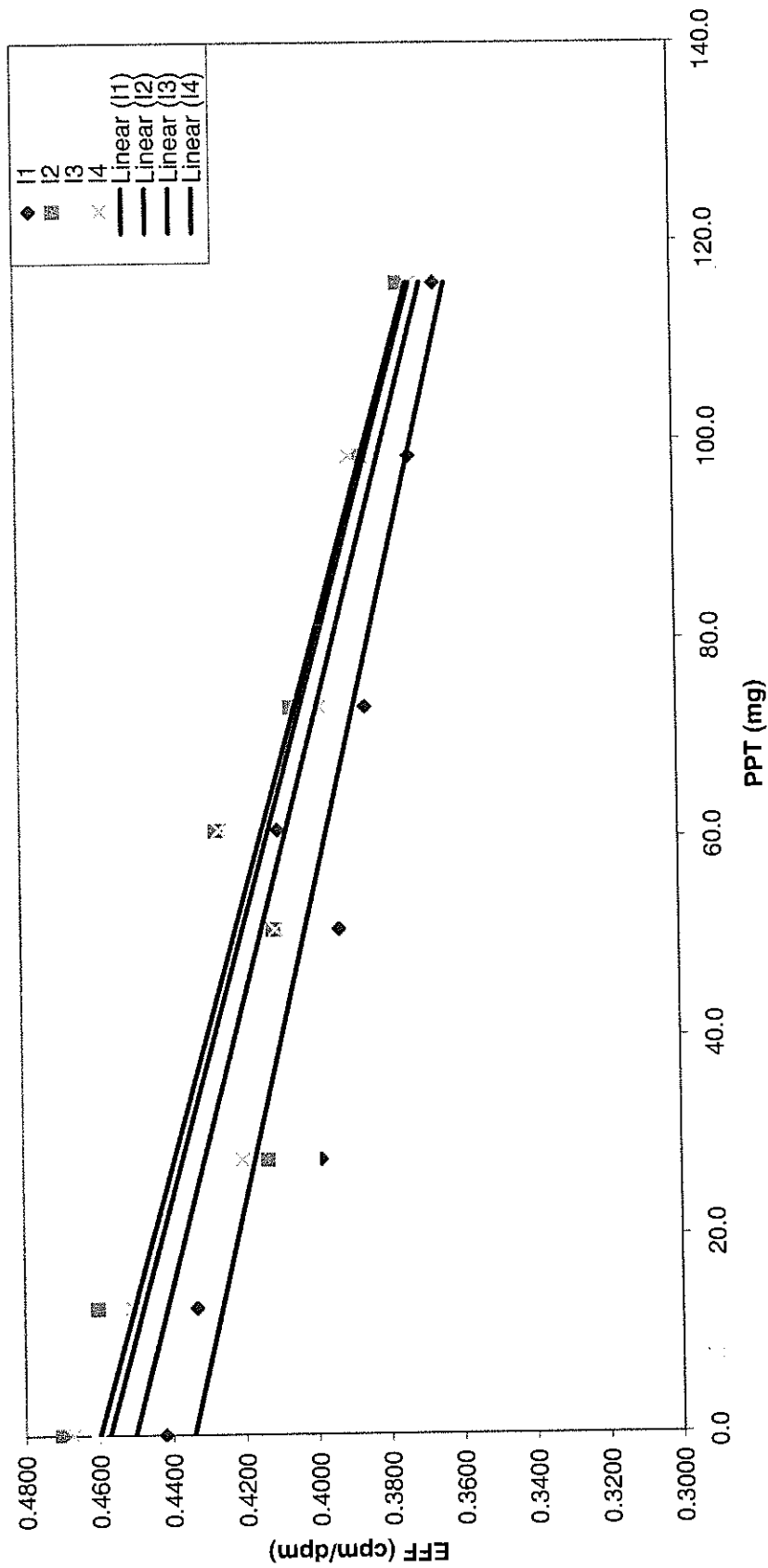
$$H1y = -6.411768E-04x + 4.534870E-01$$

$$H2y = -6.478484E-04x + 4.571300E-01$$

$$H3y = -6.955425E-04x + 4.680786E-01$$

$$H4y = -6.818099E-04x + 4.566638E-01$$

### Beta Calibration



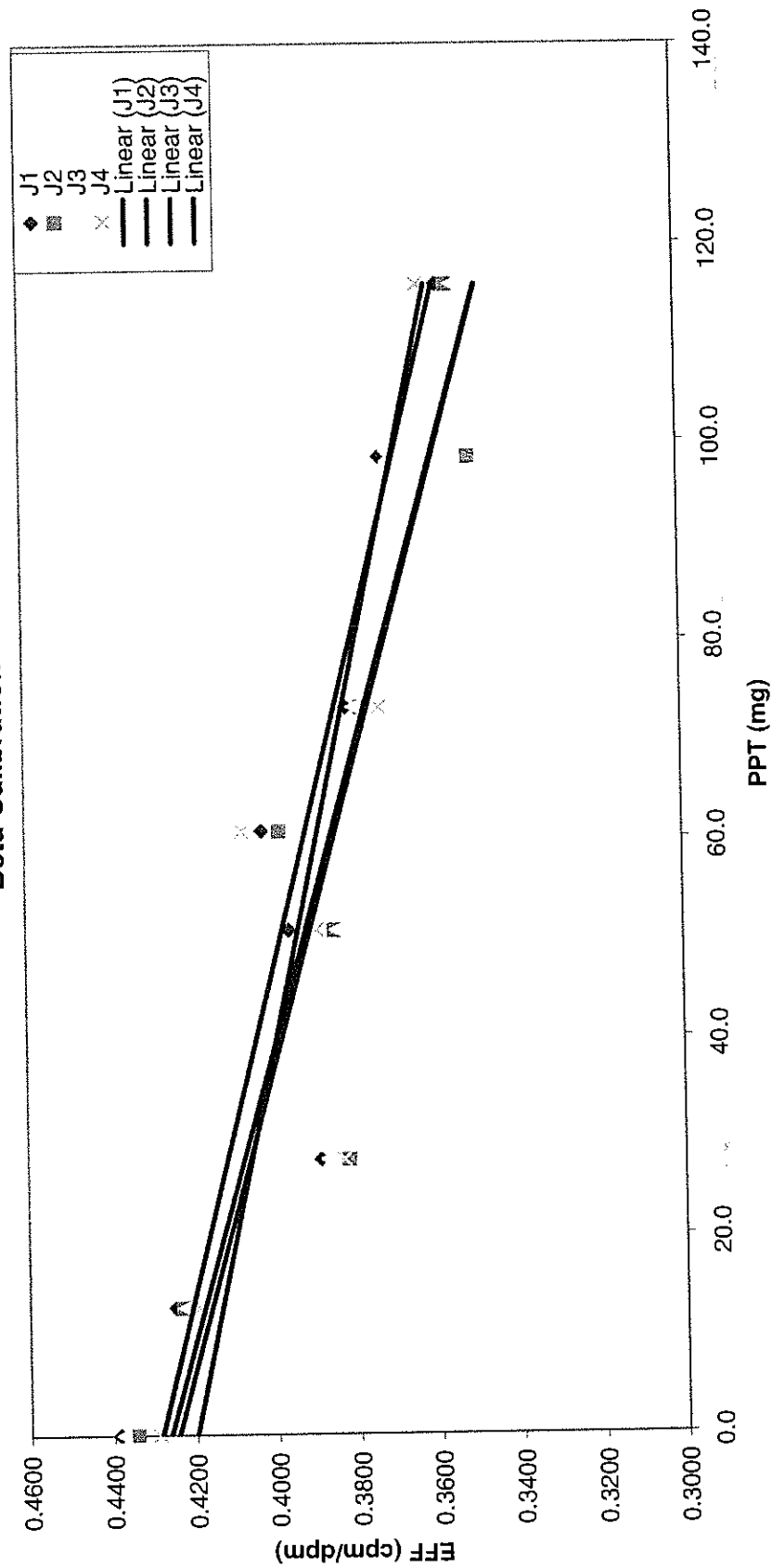
I1  $y = -6.226241E-04x + 4.341816E-01$

I2  $y = -7.543857E-04x + 4.599250E-01$

I3  $y = -7.030587E-04x + 4.502543E-01$

I4  $y = -7.384135E-04x + 4.572430E-01$

### Beta Calibration



J1  $y = -6.005571E-04x + 4.284168E-01$

J2  $y = -6.563185E-04x + 4.244063E-01$

J3  $y = -6.718829E-04x + 4.263249E-01$

J4  $y = -5.104191E-04x + 4.199794E-01$



Current Calibration - LB4100

Geometry 2 inch Planchett

Beta	Cal Date	10/1/2013	Exp Date	9/30/2014	
LB4100	A0	A1	A2	A3	A4
A1	4.517776E-01	-7.333825E-04			
A2	4.533345E-01	-6.868451E-04			
A3	4.512640E-01	-6.621341E-04			
A4	#N/A	#N/A			
B1	4.471782E-01	-6.861698E-04			
B2	4.683737E-01	-6.800834E-04			
B3	4.711931E-01	-7.768793E-04			
B4	4.119467E-01	-5.172153E-04			
C1	4.618452E-01	-6.342067E-04			
C2	4.808455E-01	-7.778612E-04			
C3	4.815829E-01	-7.480082E-04			
C4	4.816980E-01	-7.294338E-04			
D1	4.505411E-01	-5.129339E-04			
D2	5.181032E-01	-7.418491E-04			
D3	5.191593E-01	-7.543282E-04			
D4	5.243977E-01	-8.414364E-04			
E1	4.495943E-01	-7.049993E-04			
E2	4.487583E-01	-6.749213E-04			
E3	4.485964E-01	-6.755336E-04			
E4	4.625023E-01	-7.886521E-04			
F1	4.735259E-01	-6.791416E-04			
F2	4.582001E-01	-6.446490E-04			
F3	4.699131E-01	-7.287168E-04			
F4	4.768834E-01	-7.526203E-04			
G1	4.573162E-01	-7.176299E-04			
G2	4.646913E-01	-6.917745E-04			
G3	4.740333E-01	-7.075361E-04			
G4	4.609992E-01	-7.255933E-04			
H1	4.534870E-01	-6.411768E-04			
H2	4.571300E-01	-6.478484E-04			
H3	4.680786E-01	-6.955425E-04			
H4	4.566638E-01	-6.818099E-04			
I1	4.341816E-01	-6.226241E-04			
I2	4.599250E-01	-7.543857E-04			
I3	4.502543E-01	-7.030587E-04			
I4	4.572430E-01	-7.384135E-04			
J1	4.284168E-01	-6.005571E-04			
J2	4.244063E-01	-6.563185E-04			
J3	4.263249E-01	-6.718829E-04			
J4	4.199794E-01	-5.104191E-04			

LB4100\_Beta\_Sep13\_FlowData.xls

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
S1	A1	5	0	41944	9/10/2013 15:42	9/10/2013 15:47	LB4100	GABS13
S2	A1	2	2	16623	9/10/2013 16:05	9/10/2013 16:07	LB4100	GABS13
S3	A1	2	0	14820	9/10/2013 15:59	9/10/2013 16:01	LB4100	GABS13
S4	A1	2	1	14963	9/10/2013 15:54	9/10/2013 15:56	LB4100	GABS13
S5	A1	2	2	14981	9/10/2013 16:09	9/10/2013 16:11	LB4100	GABS13
S6	A1	2	3	14295	9/10/2013 16:22	9/10/2013 16:24	LB4100	GABS13
S7	A1	2	2	13861	9/10/2013 16:18	9/10/2013 16:20	LB4100	GABS13
S8	A1	2	1	13617	9/10/2013 16:15	9/10/2013 16:17	LB4100	GABS13
S1	A2	2	2	17030	9/10/2013 15:54	9/10/2013 15:56	LB4100	GABS13
S2	A2	5	7	40964	9/10/2013 15:42	9/10/2013 15:47	LB4100	GABS13
S3	A2	2	0	14806	9/10/2013 16:05	9/10/2013 16:07	LB4100	GABS13
S4	A2	2	1	14998	9/10/2013 15:59	9/10/2013 16:01	LB4100	GABS13
S5	A2	2	2	15442	9/10/2013 16:15	9/10/2013 16:17	LB4100	GABS13
S6	A2	2	5	14760	9/10/2013 16:09	9/10/2013 16:11	LB4100	GABS13
S7	A2	2	3	14003	9/10/2013 16:22	9/10/2013 16:24	LB4100	GABS13
S8	A2	2	3	13712	9/10/2013 16:18	9/10/2013 16:20	LB4100	GABS13
S1	A3	2	1	16694	9/10/2013 15:59	9/10/2013 16:01	LB4100	GABS13
S2	A3	2	0	16345	9/10/2013 15:54	9/10/2013 15:56	LB4100	GABS13
S3	A3	5	3	37987	9/10/2013 15:42	9/10/2013 15:47	LB4100	GABS13
S4	A3	2	1	15032	9/10/2013 16:05	9/10/2013 16:07	LB4100	GABS13
S5	A3	2	4	15315	9/10/2013 16:18	9/10/2013 16:20	LB4100	GABS13
S6	A3	2	3	14534	9/10/2013 16:15	9/10/2013 16:17	LB4100	GABS13
S7	A3	2	1	14016	9/10/2013 16:09	9/10/2013 16:11	LB4100	GABS13
S8	A3	2	3	13798	9/10/2013 16:22	9/10/2013 16:24	LB4100	GABS13
S1	B1	2	1	16671	9/10/2013 16:09	9/10/2013 16:11	LB4100	GABS13
S2	B1	2	3	16228	9/10/2013 16:22	9/10/2013 16:24	LB4100	GABS13
S3	B1	2	1	14481	9/10/2013 16:18	9/10/2013 16:20	LB4100	GABS13
S4	B1	2	2	15155	9/10/2013 16:15	9/10/2013 16:17	LB4100	GABS13
S5	B1	5	8	38570	9/10/2013 15:42	9/10/2013 15:47	LB4100	GABS13
S6	B1	2	1	14167	9/10/2013 16:05	9/10/2013 16:07	LB4100	GABS13
S7	B1	2	2	13625	9/10/2013 15:59	9/10/2013 16:01	LB4100	GABS13
S8	B1	2	4	13598	9/10/2013 15:54	9/10/2013 15:56	LB4100	GABS13
S1	B2	2	2	17643	9/10/2013 16:15	9/10/2013 16:17	LB4100	GABS13
S2	B2	2	1	16606	9/10/2013 16:09	9/10/2013 16:11	LB4100	GABS13
S3	B2	2	3	15755	9/10/2013 16:22	9/10/2013 16:24	LB4100	GABS13
S4	B2	2	1	15521	9/10/2013 16:18	9/10/2013 16:20	LB4100	GABS13

LB4100\_Beta\_Sep13\_RawData.xls

S5	B2	2	1	15993	9/10/2013 15:54	9/10/2013 15:56	LB4100	GABS13
S6	B2	5	9	38171	9/10/2013 15:42	9/10/2013 15:47	LB4100	GABS13
S7	B2	2	1	14422	9/10/2013 16:05	9/10/2013 16:07	LB4100	GABS13
S8	B2	2	4	14420	9/10/2013 15:59	9/10/2013 16:01	LB4100	GABS13
S1	B3	2	1	16974	9/10/2013 16:19	9/10/2013 16:21	LB4100	GABS13
S2	B3	2	2	17237	9/10/2013 16:15	9/10/2013 16:17	LB4100	GABS13
S3	B3	2	4	15708	9/10/2013 16:09	9/10/2013 16:11	LB4100	GABS13
S4	B3	2	1	15693	9/10/2013 16:22	9/10/2013 16:24	LB4100	GABS13
S5	B3	2	1	16196	9/10/2013 15:59	9/10/2013 16:01	LB4100	GABS13
S6	B3	2	1	15101	9/10/2013 15:54	9/10/2013 15:56	LB4100	GABS13
S7	B3	5	3	35723	9/10/2013 15:42	9/10/2013 15:47	LB4100	GABS13
S8	B3	2	3	13702	9/10/2013 16:05	9/10/2013 16:07	LB4100	GABS13
S1	B4	2	2	15385	9/10/2013 16:22	9/10/2013 16:24	LB4100	GABS13
S2	B4	2	5	14759	9/10/2013 16:19	9/10/2013 16:21	LB4100	GABS13
S3	B4	2	1	13746	9/10/2013 16:15	9/10/2013 16:17	LB4100	GABS13
S4	B4	2	1	13793	9/10/2013 16:09	9/10/2013 16:11	LB4100	GABS13
S5	B4	2	4	14250	9/10/2013 16:05	9/10/2013 16:07	LB4100	GABS13
S6	B4	2	0	14077	9/10/2013 16:00	9/10/2013 16:02	LB4100	GABS13
S7	B4	2	2	13103	9/10/2013 15:54	9/10/2013 15:56	LB4100	GABS13
S8	B4	5	5	31691	9/10/2013 15:42	9/10/2013 15:47	LB4100	GABS13
S1	C1	2	3	17220	9/9/2013 16:39	9/9/2013 16:41	LB4100	GABS13
S2	C1	2	2	16587	9/9/2013 17:15	9/9/2013 17:17	LB4100	GABS13
S3	C1	2	1	15382	9/9/2013 17:06	9/9/2013 17:08	LB4100	GABS13
S4	C1	2	1	15389	9/9/2013 17:02	9/9/2013 17:04	LB4100	GABS13
S5	C1	2	5	15925	9/9/2013 16:58	9/9/2013 17:00	LB4100	GABS13
S6	C1	2	3	15427	9/9/2013 16:52	9/9/2013 16:54	LB4100	GABS13
S7	C1	2	4	14394	9/9/2013 16:47	9/9/2013 16:49	LB4100	GABS13
S8	C1	2	6	14144	9/9/2013 16:43	9/9/2013 16:45	LB4100	GABS13
S1	C2	2	0	17907	9/9/2013 16:43	9/9/2013 16:45	LB4100	GABS13
S2	C2	2	4	17359	9/9/2013 16:39	9/9/2013 16:41	LB4100	GABS13
S3	C2	2	0	15716	9/9/2013 17:15	9/9/2013 17:17	LB4100	GABS13
S4	C2	2	1	15736	9/9/2013 17:06	9/9/2013 17:08	LB4100	GABS13
S5	C2	2	0	16600	9/9/2013 17:02	9/9/2013 17:04	LB4100	GABS13
S6	C2	2	2	15578	9/9/2013 16:58	9/9/2013 17:00	LB4100	GABS13
S7	C2	2	2	14551	9/9/2013 16:52	9/9/2013 16:54	LB4100	GABS13
S8	C2	2	5	14259	9/9/2013 16:47	9/9/2013 16:49	LB4100	GABS13
S1	C3	2	0	17961	9/9/2013 16:47	9/9/2013 16:49	LB4100	GABS13

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S2	C3	2	0	17295	9/9/2013 16:43	9/9/2013 16:45	LB4100	GABS13
S3	C3	2	4	16131	9/9/2013 16:39	9/9/2013 16:41	LB4100	GABS13
S4	C3	2	3	16057	9/9/2013 17:15	9/9/2013 17:17	LB4100	GABS13
S5	C3	2	1	16003	9/9/2013 17:06	9/9/2013 17:08	LB4100	GABS13
S6	C3	2	0	15550	9/9/2013 17:02	9/9/2013 17:04	LB4100	GABS13
S7	C3	2	4	14930	9/9/2013 16:58	9/9/2013 17:00	LB4100	GABS13
S8	C3	2	2	14472	9/9/2013 16:52	9/9/2013 16:54	LB4100	GABS13
S1	C4	2	0	18081	9/9/2013 16:52	9/9/2013 16:54	LB4100	GABS13
S2	C4	2	1	17321	9/9/2013 16:47	9/9/2013 16:49	LB4100	GABS13
S3	C4	2	2	15903	9/9/2013 16:43	9/9/2013 16:45	LB4100	GABS13
S4	C4	2	1	15908	9/9/2013 16:39	9/9/2013 16:41	LB4100	GABS13
S5	C4	2	2	16579	9/9/2013 17:15	9/9/2013 17:17	LB4100	GABS13
S6	C4	2	2	15400	9/9/2013 17:06	9/9/2013 17:08	LB4100	GABS13
S7	C4	2	3	14945	9/9/2013 17:02	9/9/2013 17:04	LB4100	GABS13
S8	C4	2	2	14593	9/9/2013 16:58	9/9/2013 17:00	LB4100	GABS13
S1	D1	2	1	16225	9/9/2013 16:58	9/9/2013 17:00	LB4100	GABS13
S2	D1	2	4	17018	9/9/2013 16:52	9/9/2013 16:54	LB4100	GABS13
S3	D1	2	1	15340	9/9/2013 16:47	9/9/2013 16:49	LB4100	GABS13
S4	D1	2	0	15210	9/9/2013 16:43	9/9/2013 16:45	LB4100	GABS13
S5	D1	2	1	15139	9/9/2013 16:39	9/9/2013 16:41	LB4100	GABS13
S6	D1	2	3	15215	9/9/2013 17:15	9/9/2013 17:17	LB4100	GABS13
S7	D1	2	0	14693	9/9/2013 17:06	9/9/2013 17:08	LB4100	GABS13
S8	D1	2	1	14275	9/9/2013 17:02	9/9/2013 17:04	LB4100	GABS13
S1	D2	2	2	19299	9/9/2013 17:02	9/9/2013 17:04	LB4100	GABS13
S2	D2	2	0	18598	9/9/2013 16:58	9/9/2013 17:00	LB4100	GABS13
S3	D2	2	1	17475	9/9/2013 16:52	9/9/2013 16:54	LB4100	GABS13
S4	D2	2	0	17380	9/9/2013 16:47	9/9/2013 16:49	LB4100	GABS13
S5	D2	2	1	17604	9/9/2013 16:43	9/9/2013 16:45	LB4100	GABS13
S6	D2	2	5	16484	9/9/2013 16:39	9/9/2013 16:41	LB4100	GABS13
S7	D2	2	1	16650	9/9/2013 17:15	9/9/2013 17:17	LB4100	GABS13
S8	D2	2	4	15653	9/9/2013 17:06	9/9/2013 17:08	LB4100	GABS13
S1	D3	2	1	19375	9/9/2013 17:06	9/9/2013 17:08	LB4100	GABS13
S2	D3	2	3	18612	9/9/2013 17:02	9/9/2013 17:04	LB4100	GABS13
S3	D3	2	1	17451	9/9/2013 16:58	9/9/2013 17:00	LB4100	GABS13
S4	D3	2	1	17221	9/9/2013 16:52	9/9/2013 16:54	LB4100	GABS13
S5	D3	2	1	17654	9/9/2013 16:47	9/9/2013 16:49	LB4100	GABS13
S6	D3	2	1	16893	9/9/2013 16:43	9/9/2013 16:45	LB4100	GABS13

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S7	D3	2	0	16296	9/9/2013 16:39	9/9/2013 16:41	LB4100	GABS13
S8	D3	2	4	15749	9/9/2013 17:15	9/9/2013 17:17	LB4100	GABS13
S1	D4	2	1	19439	9/9/2013 17:15	9/9/2013 17:17	LB4100	GABS13
S2	D4	2	4	18995	9/9/2013 17:06	9/9/2013 17:08	LB4100	GABS13
S3	D4	2	3	17544	9/9/2013 17:02	9/9/2013 17:04	LB4100	GABS13
S4	D4	2	1	17145	9/9/2013 16:58	9/9/2013 17:00	LB4100	GABS13
S5	D4	2	1	17590	9/9/2013 16:52	9/9/2013 16:54	LB4100	GABS13
S6	D4	2	2	16815	9/9/2013 16:47	9/9/2013 16:49	LB4100	GABS13
S7	D4	2	3	16371	9/9/2013 16:43	9/9/2013 16:45	LB4100	GABS13
S8	D4	2	3	15484	9/9/2013 16:39	9/9/2013 16:41	LB4100	GABS13
S1	E1	2	2	16911	9/9/2013 14:33	9/9/2013 14:35	LB4100	GABS13
S2	E1	2	1	16143	9/9/2013 15:01	9/9/2013 15:03	LB4100	GABS13
S3	E1	2	2	14763	9/9/2013 14:59	9/9/2013 15:01	LB4100	GABS13
S4	E1	2	1	14977	9/9/2013 14:53	9/9/2013 14:55	LB4100	GABS13
S5	E1	2	1	15123	9/9/2013 14:50	9/9/2013 14:52	LB4100	GABS13
S6	E1	2	2	14526	9/9/2013 14:47	9/9/2013 14:49	LB4100	GABS13
S7	E1	2	1	13746	9/9/2013 14:44	9/9/2013 14:46	LB4100	GABS13
S8	E1	2	0	13575	9/9/2013 14:39	9/9/2013 14:41	LB4100	GABS13
S1	E2	2	0	16793	9/9/2013 14:39	9/9/2013 14:41	LB4100	GABS13
S2	E2	2	4	16324	9/9/2013 14:34	9/9/2013 14:36	LB4100	GABS13
S3	E2	2	1	14576	9/9/2013 15:01	9/9/2013 15:03	LB4100	GABS13
S4	E2	2	1	14989	9/9/2013 14:59	9/9/2013 15:01	LB4100	GABS13
S5	E2	2	1	15153	9/9/2013 14:53	9/9/2013 14:55	LB4100	GABS13
S6	E2	2	4	14712	9/9/2013 14:50	9/9/2013 14:52	LB4100	GABS13
S7	E2	2	4	13919	9/9/2013 14:47	9/9/2013 14:49	LB4100	GABS13
S8	E2	2	6	13536	9/9/2013 14:44	9/9/2013 14:46	LB4100	GABS13
S1	E3	2	1	16656	9/9/2013 14:44	9/9/2013 14:46	LB4100	GABS13
S2	E3	2	3	16041	9/9/2013 14:39	9/9/2013 14:41	LB4100	GABS13
S3	E3	2	0	14927	9/9/2013 14:34	9/9/2013 14:36	LB4100	GABS13
S4	E3	2	1	15061	9/9/2013 15:01	9/9/2013 15:03	LB4100	GABS13
S5	E3	2	3	15477	9/9/2013 14:59	9/9/2013 15:01	LB4100	GABS13
S6	E3	2	3	14420	9/9/2013 14:53	9/9/2013 14:55	LB4100	GABS13
S7	E3	2	2	13966	9/9/2013 14:50	9/9/2013 14:52	LB4100	GABS13
S8	E3	2	2	13397	9/9/2013 14:47	9/9/2013 14:49	LB4100	GABS13
S1	E4	2	1	17333	9/9/2013 14:47	9/9/2013 14:49	LB4100	GABS13
S2	E4	2	1	16703	9/9/2013 14:44	9/9/2013 14:46	LB4100	GABS13
S3	E4	2	3	15155	9/9/2013 14:39	9/9/2013 14:41	LB4100	GABS13

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S4	E4	2	3	15336	9/9/2013 14:34	9/9/2013 14:36	LB4100	GABS13
S5	E4	2	3	15392	9/9/2013 15:01	9/9/2013 15:03	LB4100	GABS13
S6	E4	2	3	14474	9/9/2013 14:59	9/9/2013 15:01	LB4100	GABS13
S7	E4	2	0	14066	9/9/2013 14:53	9/9/2013 14:55	LB4100	GABS13
S8	E4	2	2	13728	9/9/2013 14:50	9/9/2013 14:52	LB4100	GABS13
S1	F1	2	1	17509	9/9/2013 14:50	9/9/2013 14:52	LB4100	GABS13
S2	F1	2	4	17204	9/9/2013 14:47	9/9/2013 14:49	LB4100	GABS13
S3	F1	2	0	15886	9/9/2013 14:44	9/9/2013 14:46	LB4100	GABS13
S4	F1	2	3	15702	9/9/2013 14:39	9/9/2013 14:41	LB4100	GABS13
S5	F1	2	3	16079	9/9/2013 14:34	9/9/2013 14:36	LB4100	GABS13
S6	F1	2	2	15539	9/9/2013 15:01	9/9/2013 15:03	LB4100	GABS13
S7	F1	2	5	14815	9/9/2013 14:59	9/9/2013 15:01	LB4100	GABS13
S8	F1	2	1	14420	9/9/2013 14:53	9/9/2013 14:55	LB4100	GABS13
S1	F2	2	2	16914	9/9/2013 14:53	9/9/2013 14:55	LB4100	GABS13
S2	F2	2	2	16530	9/9/2013 14:50	9/9/2013 14:52	LB4100	GABS13
S3	F2	2	1	15394	9/9/2013 14:47	9/9/2013 14:49	LB4100	GABS13
S4	F2	2	1	15303	9/9/2013 14:44	9/9/2013 14:46	LB4100	GABS13
S5	F2	2	3	15856	9/9/2013 14:39	9/9/2013 14:41	LB4100	GABS13
S6	F2	2	1	15058	9/9/2013 14:34	9/9/2013 14:36	LB4100	GABS13
S7	F2	2	1	14103	9/9/2013 15:01	9/9/2013 15:03	LB4100	GABS13
S8	F2	2	1	14081	9/9/2013 14:59	9/9/2013 15:01	LB4100	GABS13
S1	F3	2	2	17719	9/9/2013 14:59	9/9/2013 15:01	LB4100	GABS13
S2	F3	2	3	16760	9/9/2013 14:53	9/9/2013 14:55	LB4100	GABS13
S3	F3	2	1	15724	9/9/2013 14:50	9/9/2013 14:52	LB4100	GABS13
S4	F3	2	2	15350	9/9/2013 14:47	9/9/2013 14:49	LB4100	GABS13
S5	F3	2	1	15706	9/9/2013 14:44	9/9/2013 14:46	LB4100	GABS13
S6	F3	2	2	15315	9/9/2013 14:39	9/9/2013 14:41	LB4100	GABS13
S7	F3	2	1	14643	9/9/2013 14:34	9/9/2013 14:36	LB4100	GABS13
S8	F3	2	2	14090	9/9/2013 15:01	9/9/2013 15:03	LB4100	GABS13
S1	F4	2	5	17974	9/9/2013 15:01	9/9/2013 15:03	LB4100	GABS13
S2	F4	2	1	17073	9/9/2013 14:59	9/9/2013 15:01	LB4100	GABS13
S3	F4	2	2	15849	9/9/2013 14:53	9/9/2013 14:55	LB4100	GABS13
S4	F4	2	2	15570	9/9/2013 14:50	9/9/2013 14:52	LB4100	GABS13
S5	F4	2	1	16112	9/9/2013 14:47	9/9/2013 14:49	LB4100	GABS13
S6	F4	2	2	15291	9/9/2013 14:44	9/9/2013 14:46	LB4100	GABS13
S7	F4	2	1	14758	9/9/2013 14:39	9/9/2013 14:41	LB4100	GABS13
S8	F4	2	1	14329	9/9/2013 14:34	9/9/2013 14:36	LB4100	GABS13

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S1	G1	2	1	16899	9/26/2013 10:36	9/26/2013 10:38	LB4100	GABS13
S2	G1	2	0	16560	9/26/2013 10:53	9/26/2013 10:55	LB4100	GABS13
S3	G1	2	1	15184	9/26/2013 10:46	9/26/2013 10:48	LB4100	GABS13
S4	G1	2	2	15102	9/26/2013 10:40	9/26/2013 10:42	LB4100	GABS13
S5	G1	2	3	15399	9/26/2013 11:00	9/26/2013 11:02	LB4100	GABS13
S6	G1	2	1	14876	9/26/2013 11:31	9/26/2013 11:33	LB4100	GABS13
S7	G1	2	2	14010	9/26/2013 11:25	9/26/2013 11:27	LB4100	GABS13
S8	G1	2	1	13648	9/26/2013 11:03	9/26/2013 11:05	LB4100	GABS13
S1	G2	2	0	17663	9/26/2013 10:40	9/26/2013 10:42	LB4100	GABS13
S2	G2	2	1	16439	9/26/2013 10:36	9/26/2013 10:38	LB4100	GABS13
S3	G2	2	2	15286	9/26/2013 10:53	9/26/2013 10:55	LB4100	GABS13
S4	G2	2	4	15480	9/26/2013 10:46	9/26/2013 10:48	LB4100	GABS13
S5	G2	2	4	15617	9/26/2013 11:03	9/26/2013 11:05	LB4100	GABS13
S6	G2	2	1	15167	9/26/2013 11:00	9/26/2013 11:02	LB4100	GABS13
S7	G2	2	6	14647	9/26/2013 11:31	9/26/2013 11:33	LB4100	GABS13
S8	G2	2	3	13940	9/26/2013 11:25	9/26/2013 11:27	LB4100	GABS13
S1	G3	2	0	17971	9/26/2013 10:46	9/26/2013 10:48	LB4100	GABS13
S2	G3	2	1	16883	9/26/2013 10:40	9/26/2013 10:42	LB4100	GABS13
S3	G3	2	3	15588	9/26/2013 10:36	9/26/2013 10:38	LB4100	GABS13
S4	G3	2	8	15531	9/26/2013 10:53	9/26/2013 10:55	LB4100	GABS13
S5	G3	2	7	16104	9/26/2013 11:25	9/26/2013 11:27	LB4100	GABS13
S6	G3	2	2	15482	9/26/2013 11:03	9/26/2013 11:05	LB4100	GABS13
S7	G3	2	4	14951	9/26/2013 11:00	9/26/2013 11:02	LB4100	GABS13
S8	G3	2	3	14197	9/26/2013 11:31	9/26/2013 11:33	LB4100	GABS13
S1	G4	2	0	17172	9/26/2013 10:53	9/26/2013 10:55	LB4100	GABS13
S2	G4	2	4	16733	9/26/2013 10:46	9/26/2013 10:48	LB4100	GABS13
S3	G4	2	1	15138	9/26/2013 10:40	9/26/2013 10:42	LB4100	GABS13
S4	G4	2	4	15028	9/26/2013 10:36	9/26/2013 10:38	LB4100	GABS13
S5	G4	2	4	15641	9/26/2013 11:31	9/26/2013 11:33	LB4100	GABS13
S6	G4	2	3	14815	9/26/2013 11:25	9/26/2013 11:27	LB4100	GABS13
S7	G4	2	1	14560	9/26/2013 11:03	9/26/2013 11:05	LB4100	GABS13
S8	G4	2	2	13536	9/26/2013 11:00	9/26/2013 11:02	LB4100	GABS13
S1	H1	2	0	17027	9/26/2013 11:00	9/26/2013 11:02	LB4100	GABS13
S2	H1	2	0	16180	9/26/2013 11:31	9/26/2013 11:33	LB4100	GABS13
S3	H1	2	4	14973	9/26/2013 11:25	9/26/2013 11:27	LB4100	GABS13
S4	H1	2	3	15289	9/26/2013 11:03	9/26/2013 11:05	LB4100	GABS13
S5	H1	2	0	15413	9/26/2013 10:36	9/26/2013 10:38	LB4100	GABS13

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S6	H1	2	5	14968	9/26/2013 10:53	9/26/2013 10:55	LB4100	GABS13
S7	H1	2	0	14044	9/26/2013 10:46	9/26/2013 10:48	LB4100	GABS13
S8	H1	2	7	13892	9/26/2013 10:40	9/26/2013 10:42	LB4100	GABS13
S1	H2	2	1	17194	9/26/2013 11:03	9/26/2013 11:05	LB4100	GABS13
S2	H2	2	2	16398	9/26/2013 11:00	9/26/2013 11:02	LB4100	GABS13
S3	H2	2	2	15340	9/26/2013 11:31	9/26/2013 11:33	LB4100	GABS13
S4	H2	2	7	15164	9/26/2013 11:25	9/26/2013 11:27	LB4100	GABS13
S5	H2	2	2	15245	9/26/2013 10:40	9/26/2013 10:42	LB4100	GABS13
S6	H2	2	1	14889	9/26/2013 10:36	9/26/2013 10:38	LB4100	GABS13
S7	H2	2	0	14473	9/26/2013 10:53	9/26/2013 10:55	LB4100	GABS13
S8	H2	2	2	14037	9/26/2013 10:46	9/26/2013 10:48	LB4100	GABS13
S1	H3	2	1	17552	9/26/2013 11:25	9/26/2013 11:27	LB4100	GABS13
S2	H3	2	2	16635	9/26/2013 11:03	9/26/2013 11:05	LB4100	GABS13
S3	H3	2	2	15529	9/26/2013 11:00	9/26/2013 11:02	LB4100	GABS13
S4	H3	2	6	15613	9/26/2013 11:31	9/26/2013 11:33	LB4100	GABS13
S5	H3	2	5	15953	9/26/2013 10:46	9/26/2013 10:48	LB4100	GABS13
S6	H3	2	3	15329	9/26/2013 10:40	9/26/2013 10:42	LB4100	GABS13
S7	H3	2	4	14369	9/26/2013 10:36	9/26/2013 10:38	LB4100	GABS13
S8	H3	2	1	14185	9/26/2013 10:53	9/26/2013 10:55	LB4100	GABS13
S1	H4	2	0	17097	9/26/2013 11:31	9/26/2013 11:33	LB4100	GABS13
S2	H4	2	4	16376	9/26/2013 11:25	9/26/2013 11:27	LB4100	GABS13
S3	H4	2	0	15008	9/26/2013 11:03	9/26/2013 11:05	LB4100	GABS13
S4	H4	2	1	15103	9/26/2013 11:00	9/26/2013 11:02	LB4100	GABS13
S5	H4	2	1	15640	9/26/2013 10:53	9/26/2013 10:55	LB4100	GABS13
S6	H4	2	2	14911	9/26/2013 10:46	9/26/2013 10:48	LB4100	GABS13
S7	H4	2	5	14298	9/26/2013 10:40	9/26/2013 10:42	LB4100	GABS13
S8	H4	2	1	13628	9/26/2013 10:36	9/26/2013 10:38	LB4100	GABS13
S1	I1	2	0	16107	9/9/2013 15:37	9/9/2013 15:39	LB4100	GABS13
S2	I1	2	4	15780	9/9/2013 16:35	9/9/2013 16:37	LB4100	GABS13
S3	I1	2	2	14528	9/9/2013 16:30	9/9/2013 16:32	LB4100	GABS13
S4	I1	2	3	14324	9/9/2013 16:26	9/9/2013 16:28	LB4100	GABS13
S5	I1	2	3	14933	9/9/2013 16:18	9/9/2013 16:20	LB4100	GABS13
S6	I1	2	6	14042	9/9/2013 16:15	9/9/2013 16:17	LB4100	GABS13
S7	I1	2	0	13572	9/9/2013 16:06	9/9/2013 16:08	LB4100	GABS13
S8	I1	2	5	13304	9/9/2013 16:02	9/9/2013 16:04	LB4100	GABS13
S1	I2	2	1	17133	9/9/2013 16:02	9/9/2013 16:04	LB4100	GABS13
S2	I2	2	1	16766	9/9/2013 15:37	9/9/2013 15:39	LB4100	GABS13



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S3	I2	2	15058	9/9/2013 16:35	9/9/2013 16:37	LB4100	GABS13
S4	I2	2	14984	9/9/2013 16:30	9/9/2013 16:32	LB4100	GABS13
S5	I2	2	15544	9/9/2013 16:26	9/9/2013 16:28	LB4100	GABS13
S6	I2	2	14785	9/9/2013 16:18	9/9/2013 16:20	LB4100	GABS13
S7	I2	2	14052	9/9/2013 16:15	9/9/2013 16:17	LB4100	GABS13
S8	I2	2	13662	9/9/2013 16:06	9/9/2013 16:08	LB4100	GABS13
S1	I3	2	16777	9/9/2013 16:06	9/9/2013 16:08	LB4100	GABS13
S2	I3	2	16493	9/9/2013 16:02	9/9/2013 16:04	LB4100	GABS13
S3	I3	3	14621	9/9/2013 15:37	9/9/2013 15:39	LB4100	GABS13
S4	I3	3	14775	9/9/2013 16:35	9/9/2013 16:37	LB4100	GABS13
S5	I3	1	15367	9/9/2013 16:30	9/9/2013 16:32	LB4100	GABS13
S6	I3	2	14583	9/9/2013 16:26	9/9/2013 16:28	LB4100	GABS13
S7	I3	2	13862	9/9/2013 16:18	9/9/2013 16:20	LB4100	GABS13
S8	I3	1	13509	9/9/2013 16:15	9/9/2013 16:17	LB4100	GABS13
S1	I4	1	17024	9/9/2013 16:15	9/9/2013 16:17	LB4100	GABS13
S2	I4	0	16421	9/9/2013 16:06	9/9/2013 16:08	LB4100	GABS13
S3	I4	1	15315	9/9/2013 16:02	9/9/2013 16:04	LB4100	GABS13
S4	I4	2	14962	9/9/2013 15:37	9/9/2013 15:39	LB4100	GABS13
S5	I4	2	15512	9/9/2013 16:35	9/9/2013 16:37	LB4100	GABS13
S6	I4	2	14499	9/9/2013 16:30	9/9/2013 16:32	LB4100	GABS13
S7	I4	2	14177	9/9/2013 16:26	9/9/2013 16:28	LB4100	GABS13
S8	I4	2	13548	9/9/2013 16:18	9/9/2013 16:20	LB4100	GABS13
S1	J1	2	15980	9/9/2013 16:18	9/9/2013 16:20	LB4100	GABS13
S2	J1	2	15477	9/9/2013 16:15	9/9/2013 16:17	LB4100	GABS13
S3	J1	2	14175	9/9/2013 16:06	9/9/2013 16:08	LB4100	GABS13
S4	J1	2	14437	9/9/2013 16:02	9/9/2013 16:04	LB4100	GABS13
S5	J1	2	14668	9/9/2013 15:37	9/9/2013 15:39	LB4100	GABS13
S6	J1	2	13906	9/9/2013 16:35	9/9/2013 16:37	LB4100	GABS13
S7	J1	2	13573	9/9/2013 16:30	9/9/2013 16:32	LB4100	GABS13
S8	J1	2	13047	9/9/2013 16:26	9/9/2013 16:28	LB4100	GABS13
S1	J2	2	15826	9/9/2013 16:26	9/9/2013 16:28	LB4100	GABS13
S2	J2	2	15410	9/9/2013 16:18	9/9/2013 16:20	LB4100	GABS13
S3	J2	2	13921	9/9/2013 16:15	9/9/2013 16:17	LB4100	GABS13
S4	J2	2	14028	9/9/2013 16:06	9/9/2013 16:08	LB4100	GABS13
S5	J2	2	14510	9/9/2013 16:02	9/9/2013 16:04	LB4100	GABS13
S6	J2	2	13767	9/9/2013 15:37	9/9/2013 15:39	LB4100	GABS13
S7	J2	2	12780	9/9/2013 16:35	9/9/2013 16:37	LB4100	GABS13

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S8	J2	2	3	12959	9/9/2013 16:30	9/9/2013 16:32	LB4100	GABS13
S1	J3	2	3	15950	9/9/2013 16:30	9/9/2013 16:32	LB4100	GABS13
S2	J3	2	1	15398	9/9/2013 16:26	9/9/2013 16:28	LB4100	GABS13
S3	J3	2	0	14110	9/9/2013 16:18	9/9/2013 16:20	LB4100	GABS13
S4	J3	2	3	14013	9/9/2013 16:15	9/9/2013 16:17	LB4100	GABS13
S5	J3	2	1	14341	9/9/2013 16:06	9/9/2013 16:08	LB4100	GABS13
S6	J3	2	2	13833	9/9/2013 16:02	9/9/2013 16:04	LB4100	GABS13
S7	J3	2	1	12957	9/9/2013 15:37	9/9/2013 15:39	LB4100	GABS13
S8	J3	2	2	12909	9/9/2013 16:35	9/9/2013 16:37	LB4100	GABS13
S1	J4	2	1	15632	9/9/2013 16:35	9/9/2013 16:37	LB4100	GABS13
S2	J4	2	3	15274	9/9/2013 16:30	9/9/2013 16:32	LB4100	GABS13
S3	J4	2	4	13967	9/9/2013 16:26	9/9/2013 16:28	LB4100	GABS13
S4	J4	2	1	14190	9/9/2013 16:18	9/9/2013 16:20	LB4100	GABS13
S5	J4	2	2	14844	9/9/2013 16:15	9/9/2013 16:17	LB4100	GABS13
S6	J4	2	4	13609	9/9/2013 16:06	9/9/2013 16:08	LB4100	GABS13
S7	J4	2	2	13510	9/9/2013 16:02	9/9/2013 16:04	LB4100	GABS13
S8	J4	2	1	13221	9/9/2013 15:37	9/9/2013 15:39	LB4100	GABS13

Alpha Xtalk Calibration - LB4100 - Sep 2013

Standard Data	Isotope	Po-210
	Standard ID number	1673-A
	Half Life (days)	138.38
	Std. Act. (dpm/mL)	22622.4159
	Reference Date	8/1/2013
	Volume of spike (mL)	2.0
	Std. Nominal (dpm)	33668.30
	Decay Date	9/29/2013

Source Weight	
Source	Measured weight (mg)
1	0.0
2	3.3
3	6.5
4	16.4
5	32.1
6	47.6
7	65.0
8	79.5

Detector (#)	Source ID (#)	Raw Count Data				Po-210 Xtalk (Beta/Alpha)	Source Measured Weight	Calculated Xtalk (Beta/Alpha)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
A1	1	9/30/2013 20:39	3	18420	449	2.4376%	0.0	3.0202%
A1	2	9/30/2013 21:11	3	17017	699	4.1077%	3.3	3.6404%
A1	3	9/30/2013 21:07	3	14238	604	4.2422%	6.5	4.1350%
A1	4	9/30/2013 21:03	3	13822	765	5.5347%	16.4	5.0877%
A1	5	9/30/2013 20:59	3	12940	601	4.6445%	32.1	5.2892%
A1	6	9/30/2013 20:54	3	13622	643	4.7203%	47.6	4.7367%
A1	7	9/30/2013 20:49	3	11092	530	4.7782%	65.0	4.3805%
A1	8	9/30/2013 20:44	3	11112	559	5.0306%	79.5	5.2061%
A2	1	9/30/2013 20:44	3	21350	309	1.4473%	0.0	1.8687%
A2	2	9/30/2013 20:39	3	20911	516	2.4676%	3.3	2.2082%
A2	3	9/30/2013 21:11	3	16834	479	2.8454%	6.5	2.4813%
A2	4	9/30/2013 21:07	3	17395	499	2.8686%	16.4	3.0252%
A2	5	9/30/2013 21:03	3	15350	499	3.2508%	32.1	3.2211%
A2	6	9/30/2013 20:59	3	16643	462	2.7759%	47.6	3.0690%
A2	7	9/30/2013 20:54	3	12873	447	3.4724%	65.0	3.1288%
A2	8	9/30/2013 20:49	3	12744	477	3.7429%	79.5	3.8686%
A3	1	9/30/2013 20:49	3	21169	381	1.7998%	0.0	2.0645%
A3	2	9/30/2013 20:44	3	21072	531	2.5199%	3.3	2.3576%
A3	3	9/30/2013 20:39	3	16705	457	2.7357%	6.5	2.5951%
A3	4	9/30/2013 21:11	3	16784	538	3.2054%	16.4	3.0784%
A3	5	9/30/2013 21:07	3	15202	464	3.0522%	32.1	3.2803%
A3	6	9/30/2013 21:03	3	16169	504	3.1171%	47.6	3.1698%
A3	7	9/30/2013 20:59	3	12898	438	3.3959%	65.0	3.1963%
A3	8	9/30/2013 20:54	3	12720	466	3.6635%	79.5	3.7475%
A4	2	9/30/2013 20:53	0	0	78	#DIV/0!	3.3	#VALUE!
A4	3	9/30/2013 20:48	0.01	0	340	#DIV/0!	6.5	#VALUE!
A4	4	9/30/2013 20:43	0.01	0	407	#DIV/0!	16.4	#VALUE!
A4	6	9/30/2013 21:11	0	0	40	#DIV/0!	47.6	#VALUE!
A4	7	9/30/2013 21:07	0.01	0	155	#DIV/0!	65.0	#VALUE!
A4	8	9/30/2013 21:02	0	0	13	#DIV/0!	79.5	#VALUE!
B1	1	9/30/2013 20:59	3	25567	240	0.9387%	0.0	1.0018%
B1	2	9/30/2013 20:54	3	26019	284	1.0915%	3.3	1.2074%
B1	3	9/30/2013 20:49	3	21567	348	1.6136%	6.5	1.3723%
B1	4	9/30/2013 20:44	3	21292	361	1.6955%	16.4	1.6966%
B1	5	9/30/2013 20:39	3	19174	324	1.6898%	32.1	1.7965%
B1	6	9/30/2013 21:11	3	20279	343	1.6914%	47.6	1.6725%

Detector (#)	Source ID (#)	Raw Count Data				Po-210 Xtalk (Beta/Alpha)	Source Measured Weight	Calculated Xtalk (Beta/Alpha)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
B1	7	9/30/2013 21:07	3	16560	283	1.7089%	65.0	1.6565%
B1	8	9/30/2013 21:03	3	16423	332	2.0216%	79.5	2.0474%
B2	1	9/30/2013 21:03	3	21163	337	1.5924%	0.0	1.8229%
B2	2	9/30/2013 20:59	3	21588	489	2.2651%	3.3	2.1278%
B2	3	9/30/2013 20:54	3	17391	446	2.5645%	6.5	2.3850%
B2	4	9/30/2013 20:49	3	17754	521	2.9345%	16.4	2.9696%
B2	5	9/30/2013 20:44	3	15805	537	3.3977%	32.1	3.4004%
B2	6	9/30/2013 20:39	3	16842	556	3.3013%	47.6	3.4987%
B2	7	9/30/2013 21:11	3	13040	500	3.8344%	65.0	3.6004%
B2	8	9/30/2013 21:07	3	13210	514	3.8910%	79.5	3.9761%
B3	1	9/30/2013 21:07	3	20623	293	1.4207%	0.0	1.6353%
B3	2	9/30/2013 21:03	3	20881	450	2.1551%	3.3	2.0307%
B3	3	9/30/2013 20:59	3	16898	415	2.4559%	6.5	2.3488%
B3	4	9/30/2013 20:54	3	16662	518	3.1089%	16.4	2.9785%
B3	5	9/30/2013 20:49	3	15515	463	2.9842%	32.1	3.1663%
B3	6	9/30/2013 20:44	3	16644	463	2.7818%	47.6	2.8704%
B3	7	9/30/2013 20:39	3	13813	396	2.8669%	65.0	2.6603%
B3	8	9/30/2013 21:11	3	13263	404	3.0461%	79.5	3.1292%
B4	1	9/30/2013 21:11	3	20779	357	1.7181%	0.0	1.7265%
B4	2	9/30/2013 21:07	3	20600	437	2.1214%	3.3	2.0106%
B4	3	9/30/2013 21:03	3	17014	346	2.0336%	6.5	2.2493%
B4	4	9/30/2013 20:59	3	16641	494	2.9686%	16.4	2.7837%
B4	5	9/30/2013 20:54	3	14997	465	3.1006%	32.1	3.1347%
B4	6	9/30/2013 20:49	3	15880	475	2.9912%	47.6	3.1170%
B4	7	9/30/2013 20:44	3	12666	396	3.1265%	65.0	2.9927%
B4	8	9/30/2013 20:39	3	12961	391	3.0167%	79.5	3.0621%
C1	1	9/30/2013 19:17	3	24513	279	1.1382%	0.0	1.2529%
C1	2	9/30/2013 19:55	3	24409	409	1.6756%	3.3	1.4374%
C1	3	9/30/2013 19:50	3	21052	322	1.5295%	6.5	1.5913%
C1	4	9/30/2013 19:44	3	19491	345	1.7700%	16.4	1.9272%
C1	5	9/30/2013 19:39	3	17773	409	2.3012%	32.1	2.1156%
C1	6	9/30/2013 19:33	3	18187	348	1.9135%	47.6	2.0411%
C1	7	9/30/2013 19:29	3	15759	301	1.9100%	65.0	1.8640%
C1	8	9/30/2013 19:22	3	15371	277	1.8021%	79.5	1.8107%
C2	1	9/30/2013 19:22	3	20716	461	2.2253%	0.0	2.6347%
C2	2	9/30/2013 19:17	3	20160	678	3.3631%	3.3	2.8830%
C2	3	9/30/2013 19:55	3	17390	521	2.9960%	6.5	3.0964%
C2	4	9/30/2013 19:50	3	16370	636	3.8852%	16.4	3.6002%
C2	5	9/30/2013 19:44	3	14635	531	3.6283%	32.1	3.9980%
C2	6	9/30/2013 19:39	3	15254	615	4.0317%	47.6	4.0501%
C2	7	9/30/2013 19:33	3	12680	525	4.1404%	65.0	3.9043%
C2	8	9/30/2013 19:29	3	12530	460	3.6712%	79.5	3.7744%
C3	1	9/30/2013 19:29	3	17189	463	2.6936%	0.0	2.9940%
C3	2	9/30/2013 19:22	3	17465	653	3.7389%	3.3	3.3914%
C3	3	9/30/2013 19:17	3	13556	495	3.6515%	6.5	3.7232%
C3	4	9/30/2013 19:55	3	13938	642	4.6061%	16.4	4.4555%
C3	5	9/30/2013 19:50	3	12360	606	4.9029%	32.1	4.9161%
C3	6	9/30/2013 19:44	3	12886	580	4.5010%	47.6	4.8915%
C3	7	9/30/2013 19:39	3	10566	553	5.2338%	65.0	4.8053%
C3	8	9/30/2013 19:33	3	10777	532	4.9364%	79.5	5.0872%
C4	1	9/30/2013 19:34	3	14662	381	2.5986%	0.0	3.0440%
C4	2	9/30/2013 19:29	3	15327	549	3.5819%	3.3	3.4183%
C4	3	9/30/2013 19:22	3	12549	520	4.1438%	6.5	3.7383%
C4	4	9/30/2013 19:17	3	11890	547	4.6005%	16.4	4.4892%
C4	5	9/30/2013 19:55	3	11266	545	4.8376%	32.1	5.0995%

Detector (#)	Source ID (#)	Raw Count Data				Po-210 Xtalk (Beta/Alpha)	Source Measured Weight	Calculated Xtalk (Beta/Alpha)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
C4	6	9/30/2013 19:50	3	11406	575	5.0412%	47.6	5.2789%
C4	7	9/30/2013 19:44	3	9292	539	5.8007%	65.0	5.3649%
C4	8	9/30/2013 19:39	3	9588	525	5.4756%	79.5	5.6467%
D1	1	9/30/2013 19:40	3	24496	397	1.6207%	0.0	1.8018%
D1	2	9/30/2013 19:35	3	24434	570	2.3328%	3.3	2.1401%
D1	3	9/30/2013 19:30	3	19812	449	2.2663%	6.5	2.4169%
D1	4	9/30/2013 19:23	3	19694	666	3.3817%	16.4	2.9955%
D1	5	9/30/2013 19:18	3	17806	538	3.0215%	32.1	3.2749%
D1	6	9/30/2013 19:56	3	19381	573	2.9565%	47.6	3.1665%
D1	7	9/30/2013 19:51	3	15655	544	3.4749%	65.0	3.1271%
D1	8	9/30/2013 19:45	3	15526	536	3.4523%	79.5	3.5839%
D2	1	9/30/2013 19:45	3	22812	379	1.6614%	0.0	1.9831%
D2	2	9/30/2013 19:40	3	23153	562	2.4273%	3.3	2.3945%
D2	3	9/30/2013 19:35	3	18268	566	3.0983%	6.5	2.7373%
D2	4	9/30/2013 19:30	3	18126	661	3.6467%	16.4	3.4898%
D2	5	9/30/2013 19:23	3	16237	601	3.7014%	32.1	3.9533%
D2	6	9/30/2013 19:18	3	17654	653	3.6989%	47.6	3.9189%
D2	7	9/30/2013 19:56	3	13925	590	4.2370%	65.0	3.8387%
D2	8	9/30/2013 19:51	3	13969	560	4.0089%	79.5	4.1643%
D3	1	9/30/2013 19:51	3	23020	359	1.5595%	0.0	1.8330%
D3	2	9/30/2013 19:45	3	23584	539	2.2854%	3.3	2.1977%
D3	3	9/30/2013 19:40	3	18592	498	2.6786%	6.5	2.4973%
D3	4	9/30/2013 19:35	3	19060	641	3.3631%	16.4	3.1311%
D3	5	9/30/2013 19:30	3	16669	543	3.2575%	32.1	3.4662%
D3	6	9/30/2013 19:23	3	18123	564	3.1121%	47.6	3.4004%
D3	7	9/30/2013 19:18	3	14345	554	3.8620%	65.0	3.4300%
D3	8	9/30/2013 19:56	3	14213	544	3.8275%	79.5	3.9901%
D4	1	9/30/2013 19:56	3	24458	368	1.5046%	0.0	1.6875%
D4	2	9/30/2013 19:51	3	24655	567	2.2997%	3.3	2.0418%
D4	3	9/30/2013 19:45	3	20643	458	2.2187%	6.5	2.3311%
D4	4	9/30/2013 19:40	3	19610	602	3.0699%	16.4	2.9330%
D4	5	9/30/2013 19:35	3	17845	560	3.1381%	32.1	3.2256%
D4	6	9/30/2013 19:30	3	18648	562	3.0137%	47.6	3.1420%
D4	7	9/30/2013 19:23	3	15241	516	3.3856%	65.0	3.2003%
D4	8	9/30/2013 19:18	3	15410	581	3.7703%	79.5	3.8394%
E1	1	9/29/2013 19:42	3	24802	289	1.1652%	0.0	1.2650%
E1	2	9/29/2013 20:16	3	24959	390	1.5626%	3.3	1.4998%
E1	3	9/29/2013 20:12	3	20668	354	1.7128%	6.5	1.6904%
E1	4	9/29/2013 20:07	3	19734	434	2.1993%	16.4	2.0786%
E1	5	9/29/2013 20:01	3	17859	369	2.0662%	32.1	2.2311%
E1	6	9/29/2013 19:56	3	19212	408	2.1237%	47.6	2.1012%
E1	7	9/29/2013 19:52	3	15476	322	2.0806%	65.0	2.0111%
E1	8	9/29/2013 19:47	3	15532	350	2.2534%	79.5	2.2865%
E2	1	9/29/2013 19:47	3	18122	472	2.6046%	0.0	2.7882%
E2	2	9/29/2013 19:42	3	18918	633	3.3460%	3.3	3.3302%
E2	3	9/29/2013 20:16	3	14820	589	3.9744%	6.5	3.7640%
E2	4	9/29/2013 20:12	3	14849	697	4.6939%	16.4	4.6107%
E2	5	9/29/2013 20:07	3	13331	628	4.7108%	32.1	4.8353%
E2	6	9/29/2013 20:01	3	14317	612	4.2746%	47.6	4.4275%
E2	7	9/29/2013 19:56	3	11829	529	4.4721%	65.0	4.2263%
E2	8	9/29/2013 19:52	3	11569	574	4.9615%	79.5	5.0557%
E3	1	9/29/2013 19:52	3	24174	302	1.2493%	0.0	1.3377%
E3	2	9/29/2013 19:47	3	24539	371	1.5119%	3.3	1.5149%
E3	3	9/29/2013 19:42	3	19901	362	1.8190%	6.5	1.6605%
E3	4	9/29/2013 20:16	3	19870	377	1.8973%	16.4	1.9704%

Detector (#)	Source ID (#)	Raw Count Data				Po-210 Xtalk (Beta/Alpha)	Source Measured Weight	Calculated Xtalk (Beta/Alpha)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
E3	5	9/29/2013 20:12	3	17510	387	2.2102%	32.1	2.1464%
E3	6	9/29/2013 20:07	3	18837	377	2.0014%	47.6	2.1480%
E3	7	9/29/2013 20:01	3	15271	362	2.3705%	65.0	2.2361%
E3	8	9/29/2013 19:56	3	14674	376	2.5624%	79.5	2.6080%
E4	1	9/29/2013 19:56	3	23212	350	1.5078%	0.0	1.6116%
E4	2	9/29/2013 19:52	3	23389	459	1.9625%	3.3	1.8569%
E4	3	9/29/2013 19:47	3	19631	394	2.0070%	6.5	2.0618%
E4	4	9/29/2013 19:42	3	18584	499	2.6851%	16.4	2.5136%
E4	5	9/29/2013 20:16	3	16753	445	2.6562%	32.1	2.7915%
E4	6	9/29/2013 20:12	3	17284	463	2.6788%	47.6	2.7535%
E4	7	9/29/2013 20:07	3	14465	404	2.7929%	65.0	2.6431%
E4	8	9/29/2013 20:01	3	14874	398	2.6758%	79.5	2.7342%
F1	1	9/29/2013 20:01	3	24678	231	0.9361%	0.0	1.0875%
F1	2	9/29/2013 19:56	3	24892	353	1.4181%	3.3	1.3254%
F1	3	9/29/2013 19:52	3	20738	334	1.6106%	6.5	1.5246%
F1	4	9/29/2013 19:47	3	19788	396	2.0012%	16.4	1.9683%
F1	5	9/29/2013 19:42	3	18146	409	2.2539%	32.1	2.2658%
F1	6	9/29/2013 20:16	3	18935	399	2.1072%	47.6	2.2922%
F1	7	9/29/2013 20:12	3	15388	389	2.5279%	65.0	2.3150%
F1	8	9/29/2013 20:07	3	15382	384	2.4964%	79.5	2.5727%
F2	1	9/29/2013 20:07	3	20896	602	2.8809%	0.0	2.8930%
F2	2	9/29/2013 20:01	3	21440	744	3.4701%	3.3	3.3239%
F2	3	9/29/2013 19:56	3	17766	607	3.4166%	6.5	3.6684%
F2	4	9/29/2013 19:52	3	17400	786	4.5172%	16.4	4.3429%
F2	5	9/29/2013 19:47	3	15838	722	4.5587%	32.1	4.5575%
F2	6	9/29/2013 19:42	3	17070	717	4.2004%	47.6	4.3558%
F2	7	9/29/2013 20:16	3	13239	615	4.6454%	65.0	4.5005%
F2	8	9/29/2013 20:12	3	13058	725	5.5522%	79.5	5.5994%
F3	1	9/29/2013 20:12	3	20437	427	2.0893%	0.0	2.1896%
F3	2	10/1/2013 10:46	3	20456	619	3.0260%	3.3	2.6672%
F3	3	9/29/2013 20:01	3	16860	464	2.7521%	6.5	3.0606%
F3	4	9/29/2013 19:56	3	17071	665	3.8955%	16.4	3.8957%
F3	5	9/29/2013 19:52	3	14809	666	4.4973%	32.1	4.3280%
F3	6	9/29/2013 19:47	3	15850	630	3.9748%	47.6	4.1817%
F3	7	9/29/2013 19:42	3	12862	535	4.1595%	65.0	4.0396%
F3	8	9/29/2013 20:16	3	12604	562	4.4589%	79.5	4.4910%
F4	1	9/29/2013 20:16	3	16512	480	2.9070%	0.0	3.2214%
F4	2	9/29/2013 20:12	3	16861	641	3.8017%	3.3	3.7452%
F4	3	9/29/2013 20:08	3	13065	581	4.4470%	6.5	4.1834%
F4	4	9/29/2013 20:01	3	13707	743	5.4206%	16.4	5.1559%
F4	5	9/29/2013 19:56	3	11987	664	5.5393%	32.1	5.7883%
F4	6	9/29/2013 19:52	3	12508	682	5.4525%	47.6	5.7947%
F4	7	9/29/2013 19:47	3	10283	643	6.2530%	65.0	5.7382%
F4	8	9/29/2013 19:42	3	10667	637	5.9717%	79.5	6.1657%
G1	1	9/29/2013 20:20	3	22609	309	1.3667%	0.0	1.5232%
G1	2	9/29/2013 20:49	3	22199	416	1.8740%	3.3	1.7972%
G1	3	9/29/2013 20:45	3	18285	390	2.1329%	6.5	2.0235%
G1	4	9/29/2013 20:40	3	17698	448	2.5314%	16.4	2.5087%
G1	5	9/29/2013 20:36	3	15858	448	2.8251%	32.1	2.7786%
G1	6	9/29/2013 20:32	3	16854	411	2.4386%	47.6	2.7298%
G1	7	9/29/2013 20:28	3	13785	413	2.9960%	65.0	2.7023%
G1	8	9/29/2013 20:24	3	13618	397	2.9153%	79.5	3.0166%
G2	1	9/29/2013 20:24	3	19339	451	2.3321%	0.0	2.3879%
G2	2	9/29/2013 20:21	3	19925	519	2.6048%	3.3	2.7571%
G2	3	9/29/2013 20:49	3	15980	535	3.3479%	6.5	3.0677%

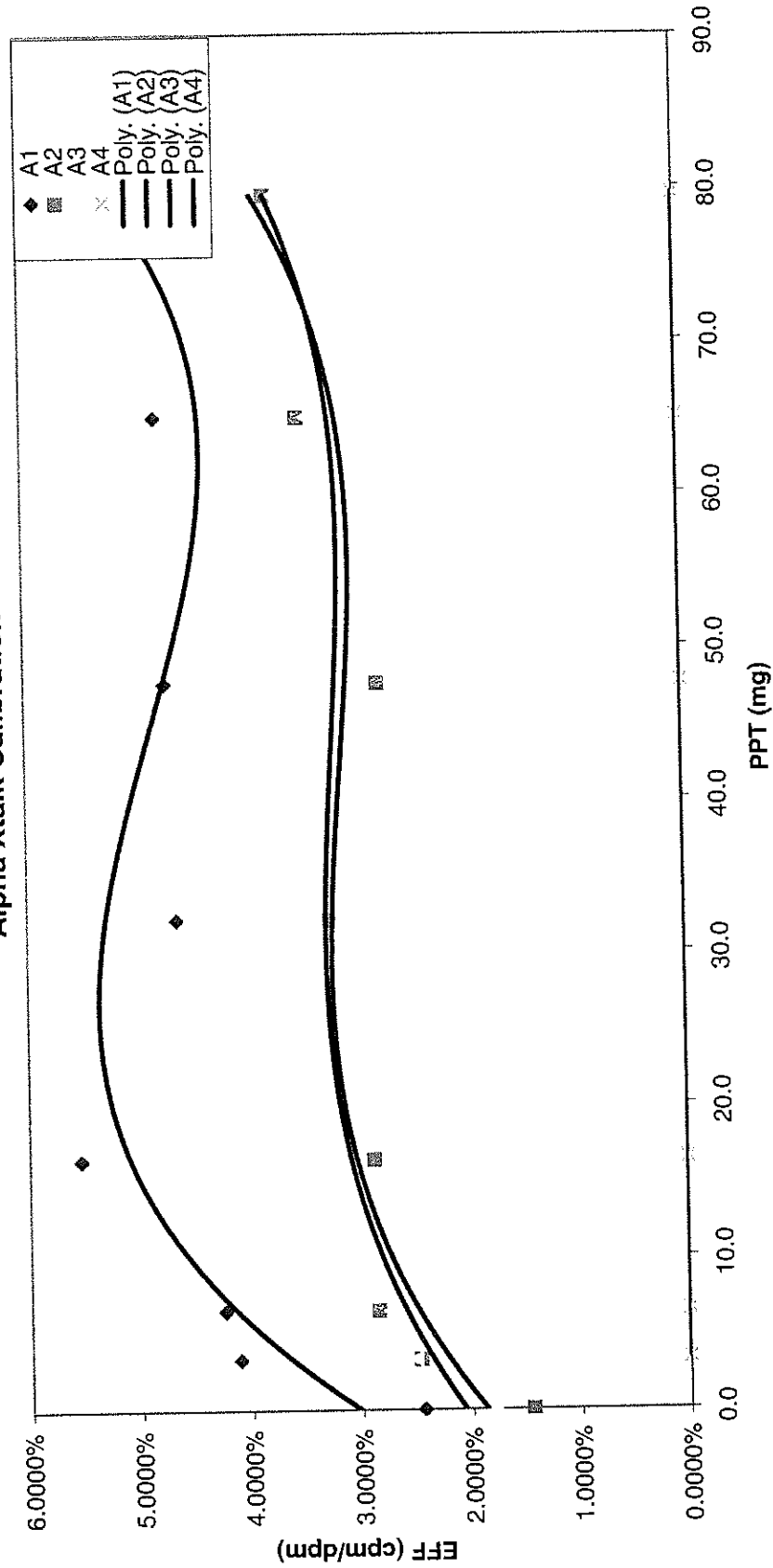
Detector (#)	Source ID (#)	Raw Count Data				Po-210 Xtalk (Beta/Alpha)	Source Measured Weight	Calculated Xtalk (Beta/Alpha)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
G2	4	9/29/2013 20:45	3	16460	610	3.7060%	16.4	3.7652%
G2	5	9/29/2013 20:40	3	14379	620	4.3118%	32.1	4.2315%
G2	6	9/29/2013 20:36	3	15254	607	3.9793%	47.6	4.2238%
G2	7	9/29/2013 20:32	3	12475	538	4.3126%	65.0	4.0839%
G2	8	9/29/2013 20:28	3	12339	508	4.1170%	79.5	4.1945%
G3	1	9/29/2013 20:28	3	19058	565	2.9646%	0.0	3.2592%
G3	2	9/29/2013 20:24	3	19428	752	3.8707%	3.3	3.8687%
G3	3	9/29/2013 20:21	3	15164	730	4.8140%	6.5	4.3620%
G3	4	9/29/2013 20:49	3	15449	825	5.3402%	16.4	5.3599%
G3	5	9/29/2013 20:45	3	14026	774	5.5183%	32.1	5.7419%
G3	6	9/29/2013 20:40	3	14956	809	5.4092%	47.6	5.4241%
G3	7	9/29/2013 20:36	3	11986	656	5.4731%	65.0	5.2946%
G3	8	9/29/2013 20:32	3	11949	731	6.1177%	79.5	6.1974%
G4	1	9/29/2013 20:32	3	21533	321	1.4907%	0.0	1.5458%
G4	2	9/29/2013 20:28	3	21842	382	1.7489%	3.3	1.8877%
G4	3	9/29/2013 20:24	3	18231	427	2.3422%	6.5	2.1678%
G4	4	9/29/2013 20:21	3	16981	498	2.9327%	16.4	2.7520%
G4	5	9/29/2013 20:49	3	15890	444	2.7942%	32.1	3.0192%
G4	6	9/29/2013 20:45	3	16735	475	2.8384%	47.6	2.8577%
G4	7	9/29/2013 20:40	3	13550	384	2.8339%	65.0	2.6887%
G4	8	9/29/2013 20:36	3	13646	396	2.9019%	79.5	2.9640%
H1	1	9/29/2013 20:36	3	23721	427	1.8001%	0.0	1.6729%
H1	2	9/29/2013 20:32	3	24473	552	2.2555%	3.3	2.1341%
H1	3	9/29/2013 20:28	3	20053	404	2.0147%	6.5	2.5076%
H1	4	9/29/2013 20:24	3	19159	680	3.5492%	16.4	3.2617%
H1	5	9/29/2013 20:20	3	17567	638	3.6318%	32.1	3.5309%
H1	6	9/29/2013 20:49	3	18331	538	2.9349%	47.6	3.2268%
H1	7	9/29/2013 20:45	3	14712	468	3.1811%	65.0	2.9737%
H1	8	9/29/2013 20:40	3	14663	495	3.3758%	79.5	3.4355%
H2	1	9/29/2013 20:40	3	20077	491	2.4456%	0.0	2.6917%
H2	2	9/29/2013 20:36	3	21256	686	3.2273%	3.3	3.1219%
H2	3	9/29/2013 20:32	3	17083	600	3.5123%	6.5	3.4665%
H2	4	9/29/2013 20:28	3	16737	766	4.5767%	16.4	4.1413%
H2	5	9/29/2013 20:24	3	15534	601	3.8689%	32.1	4.3282%
H2	6	9/29/2013 20:20	3	16007	632	3.9483%	47.6	4.0167%
H2	7	9/29/2013 20:49	3	12942	543	4.1956%	65.0	3.8730%
H2	8	9/29/2013 20:45	3	13267	585	4.4094%	79.5	4.5447%
H3	1	9/29/2013 20:45	3	22475	316	1.4060%	0.0	1.4065%
H3	2	9/29/2013 20:40	3	22897	408	1.7819%	3.3	1.7880%
H3	3	9/29/2013 20:36	3	18385	374	2.0343%	6.5	2.0985%
H3	4	9/29/2013 20:32	3	18320	530	2.8930%	16.4	2.7350%
H3	5	9/29/2013 20:28	3	16500	477	2.8909%	32.1	2.9928%
H3	6	9/29/2013 20:24	3	17771	487	2.7404%	47.6	2.7770%
H3	7	9/29/2013 20:20	3	14234	380	2.6697%	65.0	2.5857%
H3	8	9/29/2013 20:49	3	14209	414	2.9136%	79.5	2.9463%
H4	1	9/29/2013 20:49	3	18494	497	2.6874%	0.0	2.8443%
H4	2	9/29/2013 20:45	3	19070	627	3.2879%	3.3	3.2843%
H4	3	9/29/2013 20:40	3	15221	577	3.7908%	6.5	3.6419%
H4	4	9/29/2013 20:36	3	15625	712	4.5568%	16.4	4.3732%
H4	5	9/29/2013 20:32	3	14196	629	4.4308%	32.1	4.6725%
H4	6	9/29/2013 20:28	3	14885	655	4.4004%	47.6	4.4506%
H4	7	9/29/2013 20:24	3	12113	546	4.5076%	65.0	4.3141%
H4	8	9/29/2013 20:20	3	12254	586	4.7821%	79.5	4.8629%
I1	1	9/30/2013 19:59	3	24878	171	0.6874%	0.0	0.8018%
I1	2	9/30/2013 20:34	3	25470	248	0.9737%	3.3	0.9424%

Detector (#)	Source ID (#)	Raw Count Data				Po-210 Xtalk (Beta/Alpha)	Source Measured Weight	Calculated Xtalk (Beta/Alpha)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
I1	3	9/30/2013 20:30	3	20830	246	1.1810%	6.5	1.0602%
I1	4	9/30/2013 20:26	3	20405	272	1.3330%	16.4	1.3219%
I1	5	9/30/2013 20:20	3	18319	268	1.4630%	32.1	1.4884%
I1	6	9/30/2013 20:16	3	20061	272	1.3559%	47.6	1.4741%
I1	7	9/30/2013 20:09	3	16034	251	1.5654%	65.0	1.4153%
I1	8	9/30/2013 20:05	3	15965	225	1.4093%	79.5	1.4645%
I2	1	9/30/2013 20:05	3	26894	166	0.6172%	0.0	0.6180%
I2	2	9/30/2013 19:59	3	27944	194	0.6942%	3.3	0.7912%
I2	3	9/30/2013 20:34	3	22909	233	1.0171%	6.5	0.9285%
I2	4	9/30/2013 20:30	3	22071	275	1.2460%	16.4	1.1894%
I2	5	9/30/2013 20:26	3	20678	253	1.2235%	32.1	1.2475%
I2	6	9/30/2013 20:20	3	21844	227	1.0392%	47.6	1.1376%
I2	7	9/30/2013 20:16	3	17420	226	1.2974%	65.0	1.1810%
I2	8	9/30/2013 20:09	3	17335	277	1.5979%	79.5	1.6394%
I3	1	9/30/2013 20:09	3	26243	186	0.7088%	0.0	0.8246%
I3	2	9/30/2013 20:05	3	27268	287	1.0525%	3.3	0.9941%
I3	3	9/30/2013 19:59	3	22189	264	1.1898%	6.5	1.1309%
I3	4	9/30/2013 20:34	3	22053	331	1.5009%	16.4	1.4050%
I3	5	9/30/2013 20:30	3	20299	277	1.3646%	32.1	1.4964%
I3	6	9/30/2013 20:26	3	20902	282	1.3492%	47.6	1.3782%
I3	7	9/30/2013 20:20	3	17064	238	1.3947%	65.0	1.2857%
I3	8	9/30/2013 20:16	3	17235	245	1.4215%	79.5	1.4671%
I4	1	9/30/2013 20:16	3	26454	184	0.6955%	0.0	0.7239%
I4	2	9/30/2013 20:09	3	26837	244	0.9092%	3.3	0.9267%
I4	3	9/30/2013 20:05	3	21826	250	1.1454%	6.5	1.0906%
I4	4	9/30/2013 19:59	3	21595	313	1.4494%	16.4	1.4196%
I4	5	9/30/2013 20:34	3	19480	284	1.4579%	32.1	1.5345%
I4	6	9/30/2013 20:30	3	20838	302	1.4493%	47.6	1.4082%
I4	7	9/30/2013 20:26	3	16950	226	1.3333%	65.0	1.3315%
I4	8	9/30/2013 20:20	3	16725	266	1.5904%	79.5	1.5955%
J1	1	9/30/2013 20:20	3	25454	235	0.9232%	0.0	1.0384%
J1	2	9/30/2013 20:16	3	26017	292	1.1223%	3.3	1.1699%
J1	3	9/30/2013 20:09	3	20844	311	1.4920%	6.5	1.2797%
J1	4	9/30/2013 20:05	3	20690	326	1.5756%	16.4	1.5208%
J1	5	9/30/2013 19:59	3	18698	278	1.4868%	32.1	1.6634%
J1	6	9/30/2013 20:34	3	19900	331	1.6633%	47.6	1.6281%
J1	7	9/30/2013 20:30	3	15764	254	1.6113%	65.0	1.5372%
J1	8	9/30/2013 20:26	3	16056	242	1.5072%	79.5	1.5442%
J2	1	9/30/2013 20:26	3	25506	162	0.6351%	0.0	0.7299%
J2	2	9/30/2013 20:20	3	25866	264	1.0206%	3.3	0.9119%
J2	3	9/30/2013 20:16	3	21357	226	1.0582%	6.5	1.0592%
J2	4	9/30/2013 20:09	3	20990	289	1.3768%	16.4	1.3560%
J2	5	9/30/2013 20:05	3	18647	264	1.4158%	32.1	1.4638%
J2	6	9/30/2013 19:59	3	19945	268	1.3437%	47.6	1.3552%
J2	7	9/30/2013 20:34	3	16347	218	1.3336%	65.0	1.2889%
J2	8	9/30/2013 20:30	3	16292	245	1.5038%	79.5	1.5228%
J3	1	9/30/2013 20:30	3	25318	143	0.5648%	0.0	0.6533%
J3	2	9/30/2013 20:26	3	25395	201	0.7915%	3.3	0.8014%
J3	3	9/30/2013 20:20	3	20882	218	1.0440%	6.5	0.9243%
J3	4	9/30/2013 20:16	3	20240	253	1.2500%	16.4	1.1908%
J3	5	9/30/2013 20:09	3	18358	225	1.2256%	32.1	1.3434%
J3	6	9/30/2013 20:05	3	19290	251	1.3012%	47.6	1.3107%
J3	7	9/30/2013 19:59	3	15554	208	1.3373%	65.0	1.2545%
J3	8	9/30/2013 20:34	3	15855	208	1.3119%	79.5	1.3479%
J4	1	9/30/2013 20:34	3	25356	205	0.8085%	0.0	0.9264%



Detector (#)	Source ID (#)	Raw Count Data				Po-210 Xtalk (Beta/Alpha)	Source Measured Weight	Calculated Xtalk (Beta/Alpha)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
J4	2	9/30/2013 20:30	3	25416	305	1.2000%	3.3	1.1570%
J4	3	9/30/2013 20:26	3	20638	306	1.4827%	6.5	1.3430%
J4	4	9/30/2013 20:20	3	20290	341	1.6806%	16.4	1.7136%
J4	5	9/30/2013 20:16	3	18253	324	1.7751%	32.1	1.8296%
J4	6	9/30/2013 20:09	3	18969	313	1.6501%	47.6	1.6560%
J4	7	9/30/2013 20:05	3	15927	249	1.5634%	65.0	1.5113%
J4	8	9/30/2013 19:59	3	15616	268	1.7162%	79.5	1.7396%

# Alpha Xtalk Calibration



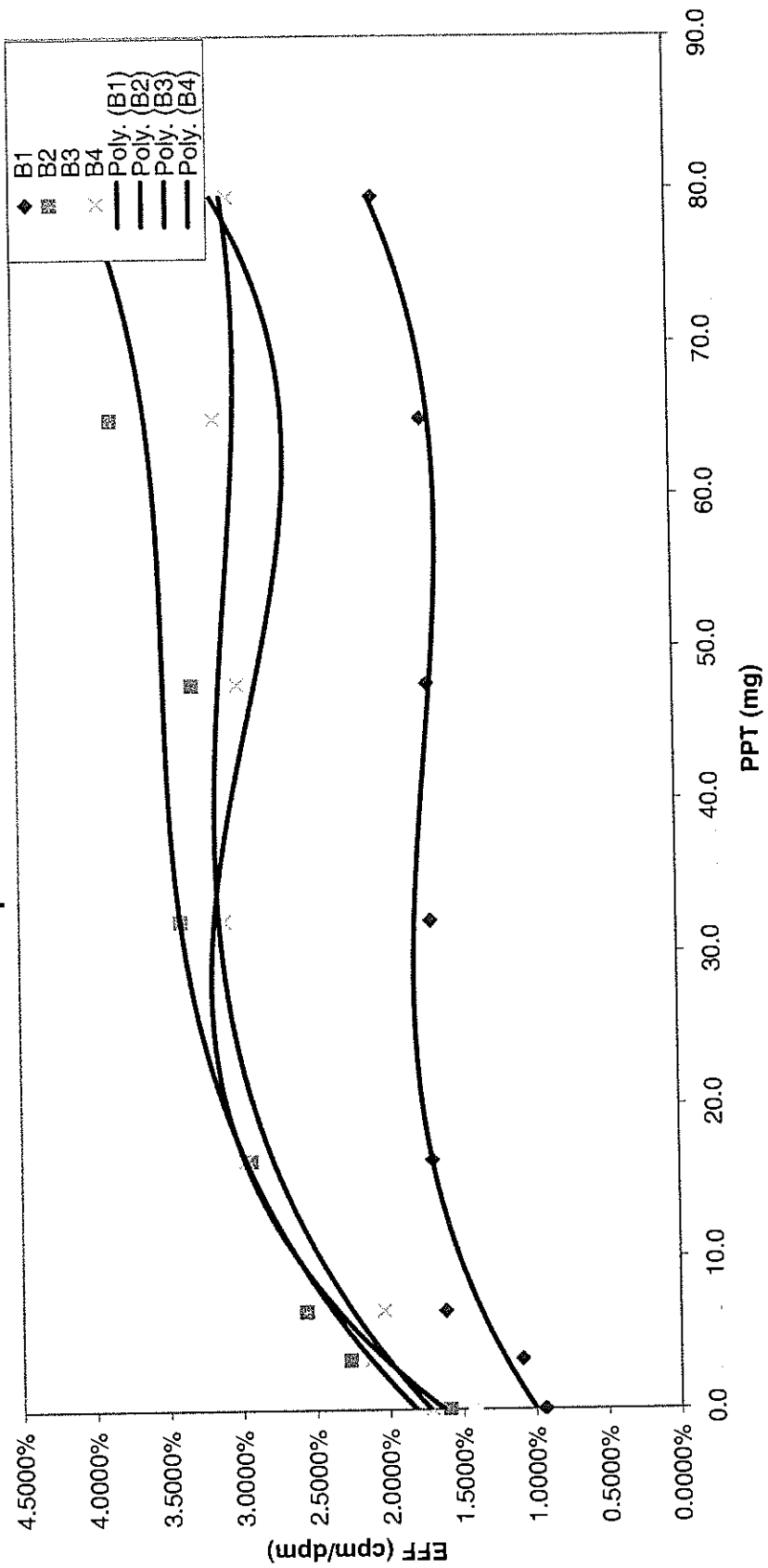
$$A1y = 4.146249E-07x^3 - 5.538381E-05x^2 + 2.057424E-03x + 3.020246E-02$$

$$A2y = 2.298098E-07x^3 - 2.922762E-05x^2 + 1.122699E-03x + 1.868747E-02$$

$$A3y = 1.858753E-07x^3 - 2.426781E-05x^2 + 9.662017E-04x + 2.064541E-02$$

$$A4y = 0.000000E+00$$

### Alpha Xtalk Calibration



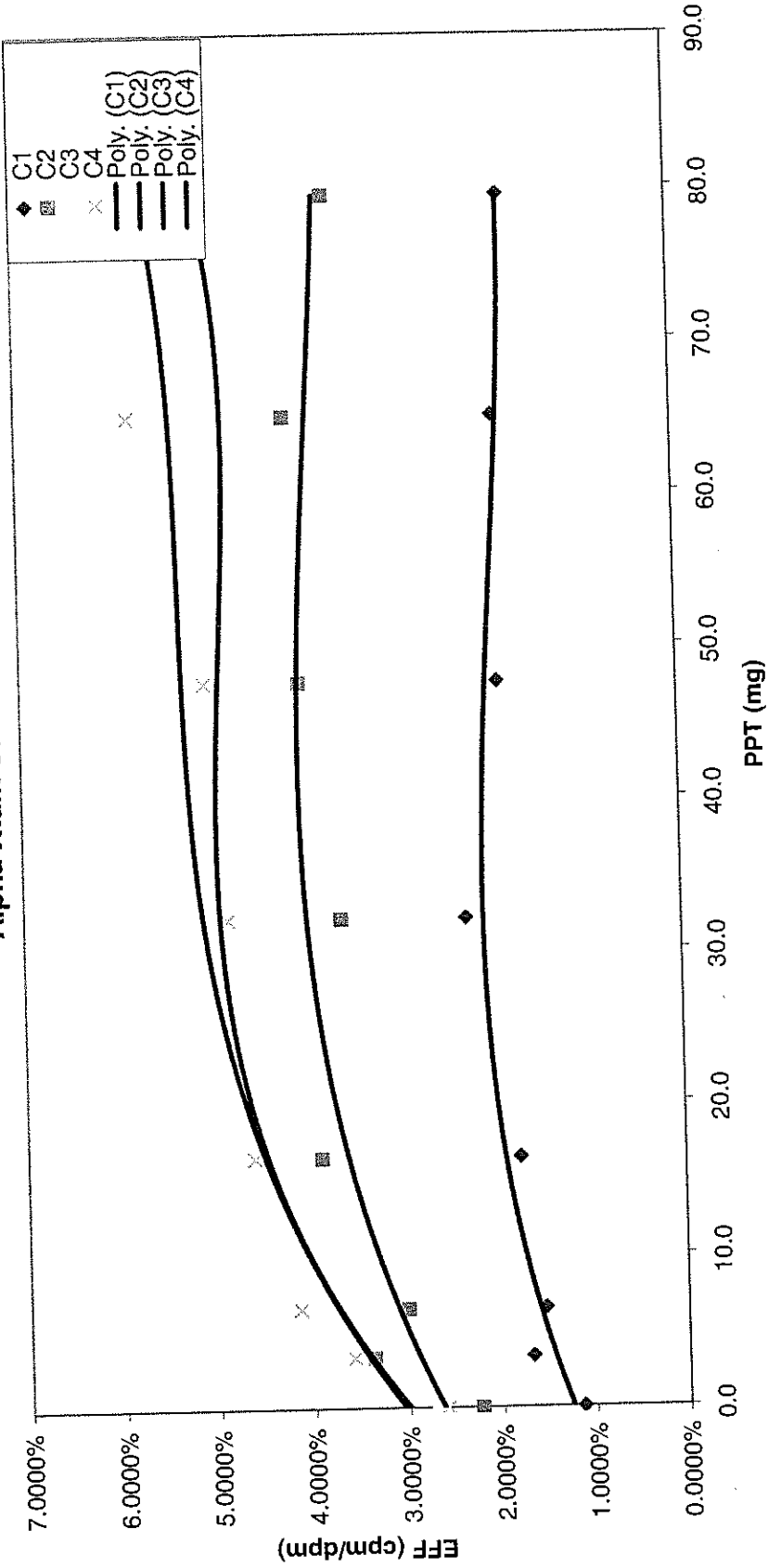
$$B1y = 1.389812E-07x^3 - 1.795847E-05x^2 + 6.808217E-04x + 1.001804E-02$$

$$B2y = 1.359602E-07x^3 - 1.982668E-05x^2 + 9.877555E-04x + 1.822949E-02$$

$$B3y = 2.486812E-07x^3 - 3.385096E-05x^2 + 1.307337E-03x + 1.635258E-02$$

$$B4y = 1.173862E-07x^3 - 1.881072E-05x^2 + 9.215377E-04x + 1.726543E-02$$

### Alpha Xtalk Calibration



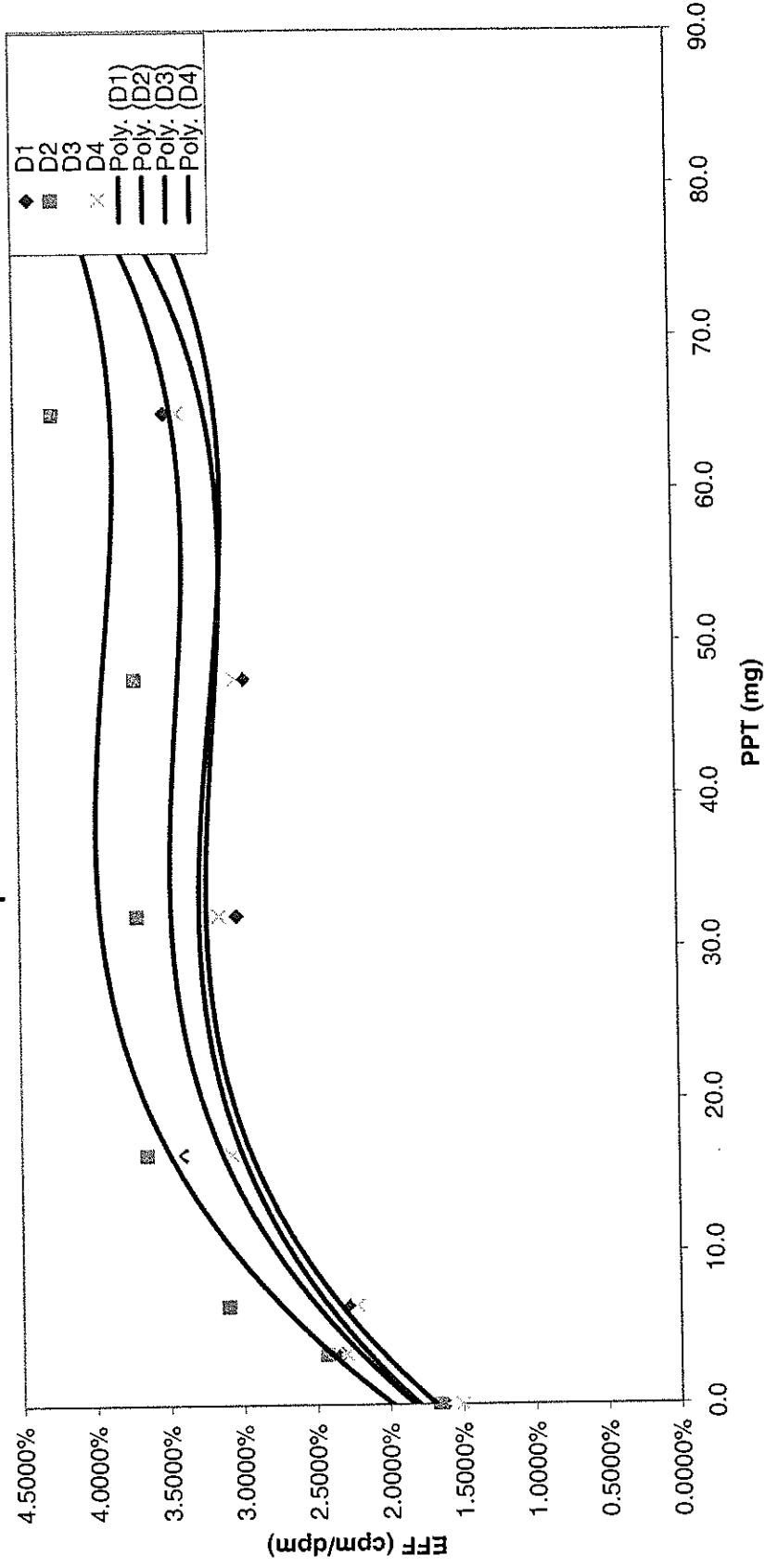
$$C1 = 7.732534E-08x^3 - 1.281928E-05x^2 + 6.005721E-04x + 1.252928E-02$$

$$C2 = 7.148270E-08x^3 - 1.391300E-05x^2 + 7.976539E-04x + 2.634707E-02$$

$$C3 = 1.829182E-07x^3 - 2.749154E-05x^2 + 1.292784E-03x + 2.994022E-02$$

$$C4 = 1.384953E-07x^3 - 2.205856E-05x^2 + 1.205724E-03x + 3.043966E-02$$

# Alpha Xtalk Calibration



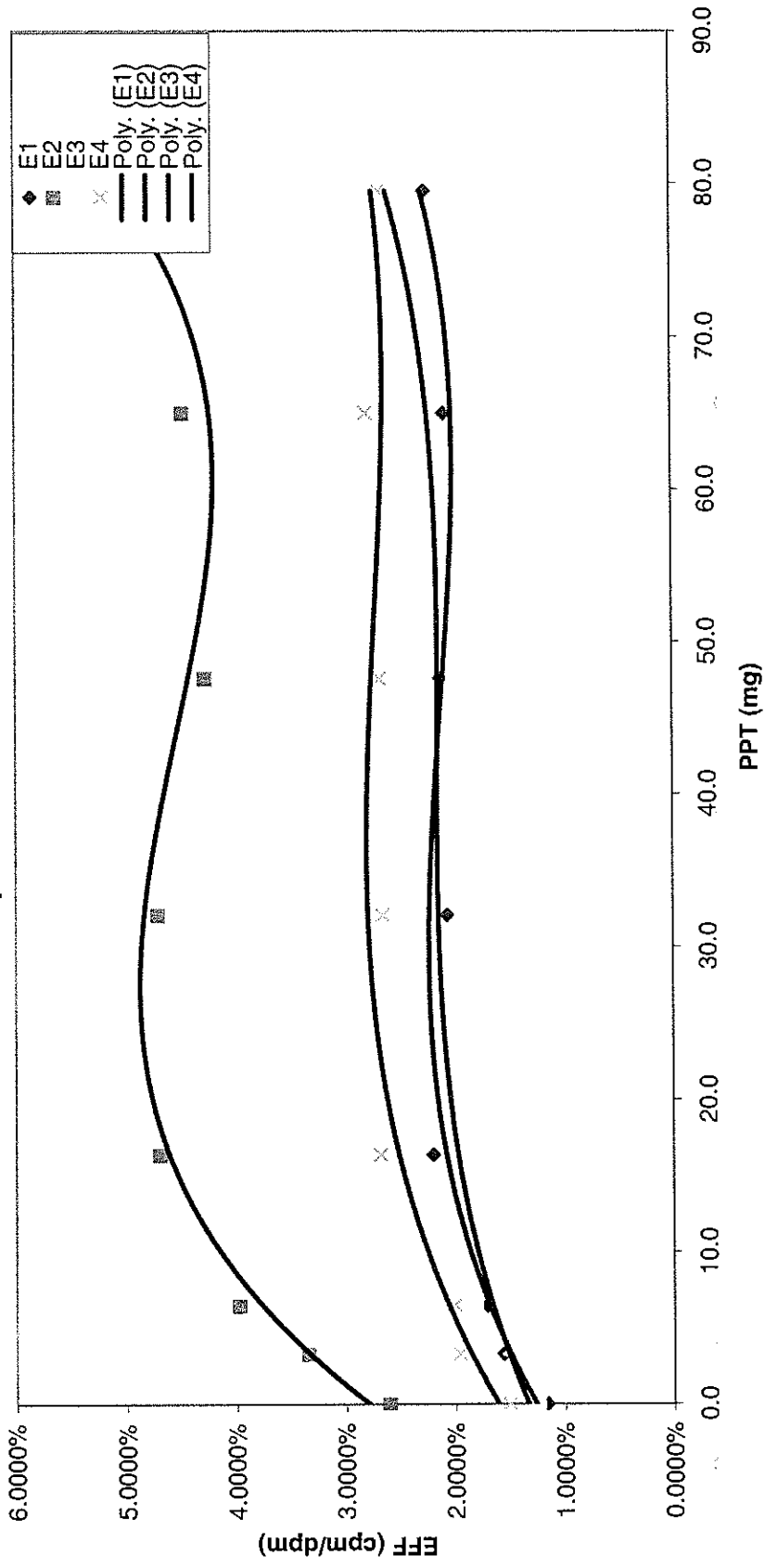
$$D1y = 1.930194E-07x^3 - 2.649339E-05x^2 + 1.110466E-03x + 1.801756E-02$$

$$D2y = 1.943577E-07x^3 - 2.885048E-05x^2 + 1.339592E-03x + 1.983118E-02$$

$$D3y = 2.059972E-07x^3 - 2.799905E-05x^2 + 1.195306E-03x + 1.832959E-02$$

$$D4y = 2.132133E-07x^3 - 2.819296E-05x^2 + 1.164466E-03x + 1.687461E-02$$

# Alpha Xtalk Calibration



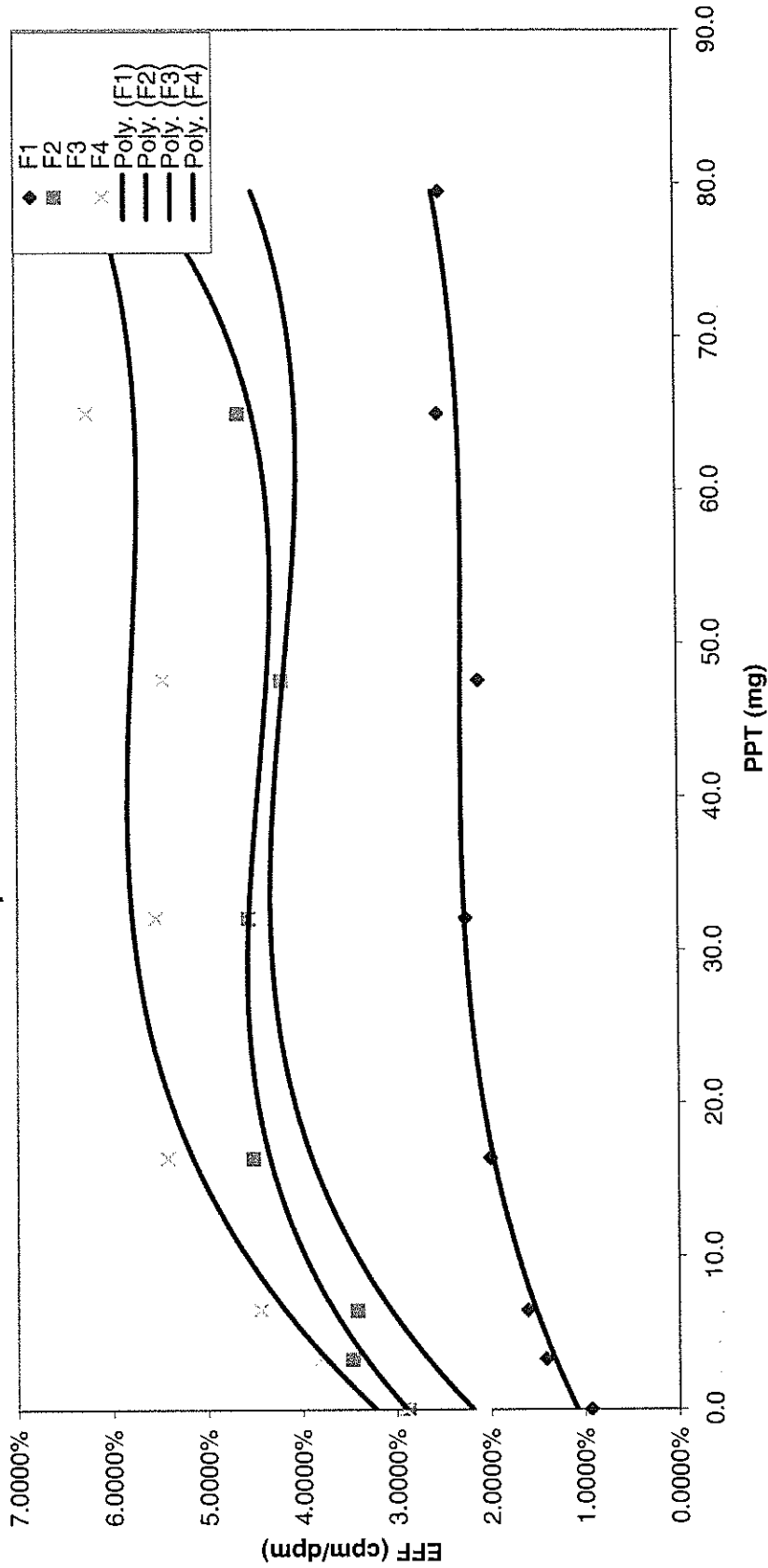
$$E_1 = 1.393228E-07x^3 - 1.918698E-05x^2 + 7.732934E-04x + 1.265028E-02$$

$$E_2 = 3.601379E-07x^3 - 4.762829E-05x^2 + 1.795500E-03x + 2.788238E-02$$

$$E_3 = 1.042964E-07x^3 - 1.358334E-05x^2 + 5.804791E-04x + 1.337715E-02$$

$$E_4 = 1.084860E-07x^3 - 1.688222E-05x^2 + 7.976867E-04x + 1.611619E-02$$

# Alpha Xtalk Calibration



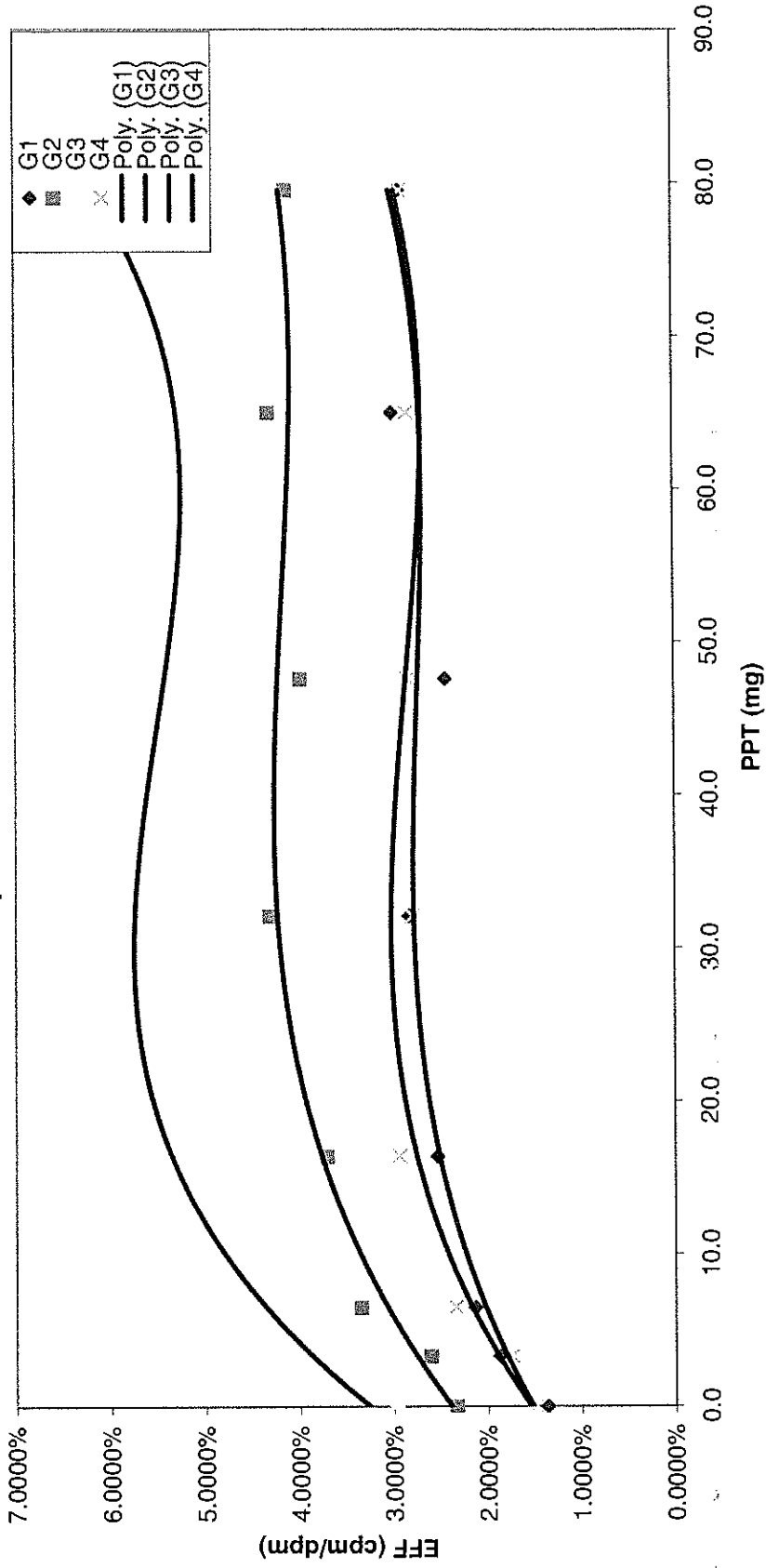
$$F1 = 1.113281E-07x^3 - 1.622696E-05x^2 + 7.732338E-04x + 1.087524E-02$$

$$F2 = 3.094140E-07x^3 - 3.828805E-05x^2 + 1.428756E-03x + 2.893018E-02$$

$$F3 = 2.517421E-07x^3 - 3.604120E-05x^2 + 1.563695E-03x + 2.189555E-02$$

$$F4 = 2.399851E-07x^3 - 3.583930E-05x^2 + 1.702814E-03x + 3.221400E-02$$

# Alpha Xtalk Calibration



$$G1 y = 1.438562E-07x^3 - 2.034207E-05x^2 + 8.958400E-04x + 1.523184E-02$$

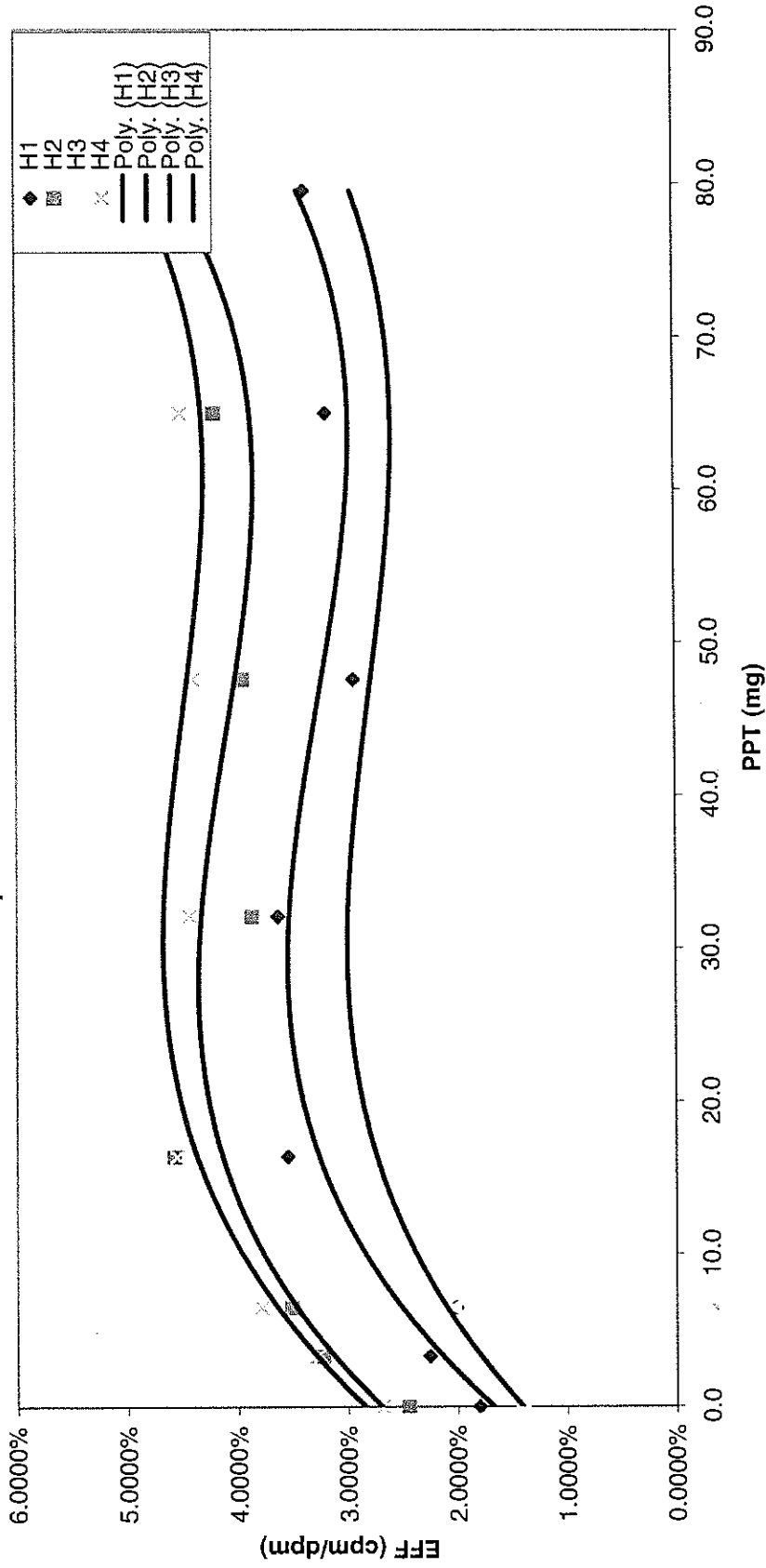
$$G2 y = 1.519606E-07x^3 - 2.428098E-05x^2 + 1.197148E-03x + 2.387930E-02$$

$$G3 y = 3.772828E-07x^3 - 5.062424E-05x^2 + 2.009683E-03x + 3.259242E-02$$

$$G4 y = 1.853068E-07x^3 - 2.660004E-05x^2 + 1.121912E-03x + 1.545808E-02$$



# Alpha Xtalk Calibration



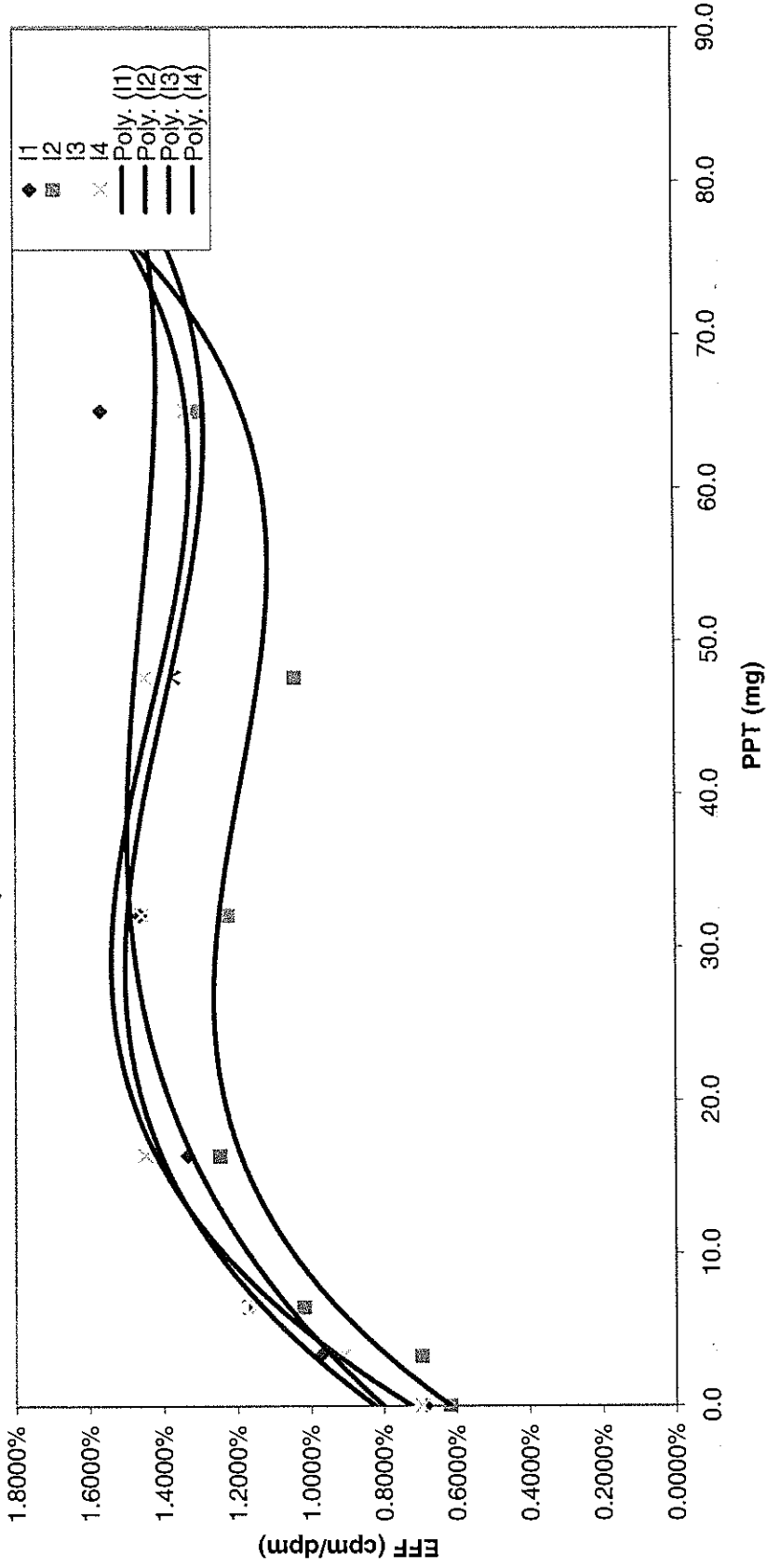
$$H1 \quad y = 2.742498E-07x^3 - 3.814038E-05x^2 + 1.520540E-03x + 1.672895E-02$$

$$H2 \quad y = 2.850803E-07x^3 - 3.765343E-05x^2 + 1.424749E-03x + 2.691706E-02$$

$$H3 \quad y = 2.184193E-07x^3 - 3.071521E-05x^2 + 1.255088E-03x + 1.406461E-02$$

$$H4 \quad y = 2.606249E-07x^3 - 3.574430E-05x^2 + 1.448361E-03x + 2.844325E-02$$

# Alpha Xtalk Calibration



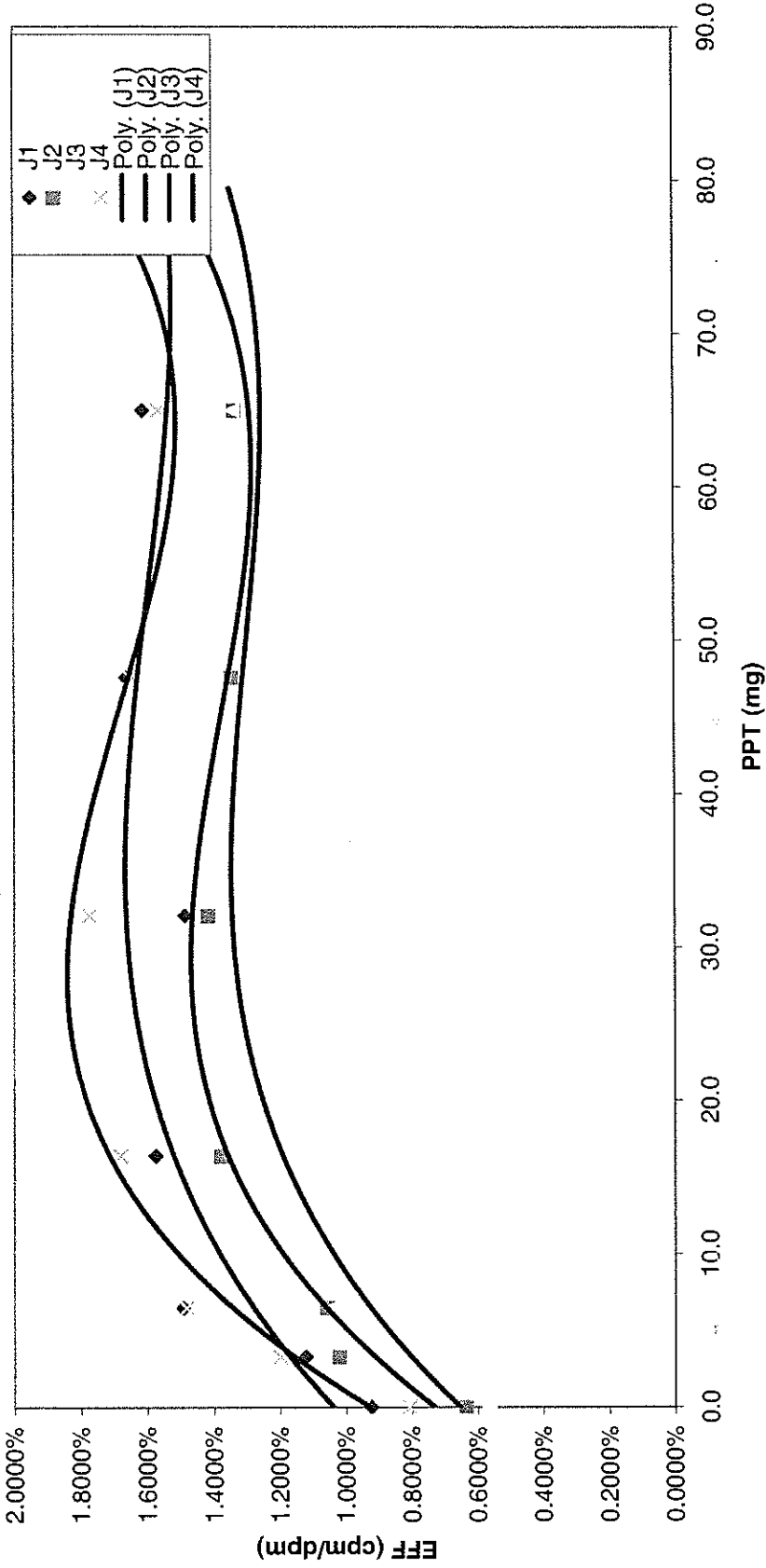
$$I1 \ y = 6.059491E-08x^3 - 9.515941E-06x^2 + 4.569027E-04x + 8.018018E-03$$

$$I2 \ y = 1.311262E-07x^3 - 1.606059E-05x^2 + 5.765432E-04x + 6.179855E-03$$

$$I3 \ y = 1.030627E-07x^3 - 1.421182E-05x^2 + 5.592711E-04x + 8.246091E-03$$

$$I4 \ y = 1.254965E-07x^3 - 1.702031E-05x^2 + 6.695838E-04x + 7.238649E-03$$

# Alpha Xtalk Calibration



$$J1y = 5.656025E-08x^3 - 9.077691E-06x^2 + 4.278239E-04x + 1.038418E-02$$

$$J2y = 1.114583E-07x^3 - 1.515810E-05x^2 + 6.003583E-04x + 7.299139E-03$$

$$J3y = 7.111799E-08x^3 - 1.062910E-05x^2 + 4.829029E-04x + 6.533284E-03$$

$$J4y = 1.406066E-07x^3 - 1.946979E-05x^2 + 7.614585E-04x + 9.264315E-03$$

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SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
1	A1	3	18420	449	9/30/2013 20:39	9/30/2013 20:42	LB4100	PO210X13
2	A1	3	17017	699	9/30/2013 21:11	9/30/2013 21:14	LB4100	PO210X13
3	A1	3	14238	604	9/30/2013 21:07	9/30/2013 21:10	LB4100	PO210X13
4	A1	3	13822	765	9/30/2013 21:03	9/30/2013 21:06	LB4100	PO210X13
5	A1	3	12940	601	9/30/2013 20:59	9/30/2013 21:02	LB4100	PO210X13
6	A1	3	13622	643	9/30/2013 20:54	9/30/2013 20:57	LB4100	PO210X13
7	A1	3	11092	530	9/30/2013 20:49	9/30/2013 20:52	LB4100	PO210X13
8	A1	3	11112	559	9/30/2013 20:44	9/30/2013 20:47	LB4100	PO210X13
1	A2	3	21350	309	9/30/2013 20:44	9/30/2013 20:47	LB4100	PO210X13
2	A2	3	20911	516	9/30/2013 20:39	9/30/2013 20:42	LB4100	PO210X13
3	A2	3	16834	479	9/30/2013 21:11	9/30/2013 21:14	LB4100	PO210X13
4	A2	3	17395	499	9/30/2013 21:07	9/30/2013 21:10	LB4100	PO210X13
5	A2	3	15350	499	9/30/2013 21:03	9/30/2013 21:06	LB4100	PO210X13
6	A2	3	16643	462	9/30/2013 20:59	9/30/2013 21:02	LB4100	PO210X13
7	A2	3	12873	447	9/30/2013 20:54	9/30/2013 20:57	LB4100	PO210X13
8	A2	3	12744	477	9/30/2013 20:49	9/30/2013 20:52	LB4100	PO210X13
1	A3	3	21169	381	9/30/2013 20:49	9/30/2013 20:52	LB4100	PO210X13
2	A3	3	21072	531	9/30/2013 20:44	9/30/2013 20:47	LB4100	PO210X13
3	A3	3	16705	457	9/30/2013 20:39	9/30/2013 20:42	LB4100	PO210X13
4	A3	3	16784	538	9/30/2013 21:11	9/30/2013 21:14	LB4100	PO210X13
5	A3	3	15202	464	9/30/2013 21:07	9/30/2013 21:10	LB4100	PO210X13
6	A3	3	16169	504	9/30/2013 21:03	9/30/2013 21:06	LB4100	PO210X13
7	A3	3	12898	438	9/30/2013 20:59	9/30/2013 21:02	LB4100	PO210X13
8	A3	3	12720	466	9/30/2013 20:54	9/30/2013 20:57	LB4100	PO210X13
1	A4	0	0	0	9/30/2013 20:58	9/30/2013 20:58	LB4100	PO210X13
2	A4	0	0	78	9/30/2013 20:53	9/30/2013 20:53	LB4100	PO210X13
3	A4	0.01	0	340	9/30/2013 20:48	9/30/2013 20:48	LB4100	PO210X13
4	A4	0.01	0	407	9/30/2013 20:43	9/30/2013 20:43	LB4100	PO210X13
5	A4	0	0	0	9/30/2013 21:15	9/30/2013 21:15	LB4100	PO210X13
6	A4	0	0	40	9/30/2013 21:11	9/30/2013 21:11	LB4100	PO210X13
7	A4	0.01	0	155	9/30/2013 21:07	9/30/2013 21:07	LB4100	PO210X13
8	A4	0	0	13	9/30/2013 21:02	9/30/2013 21:02	LB4100	PO210X13
1	B1	3	25567	240	9/30/2013 20:59	9/30/2013 21:02	LB4100	PO210X13
2	B1	3	26019	284	9/30/2013 20:54	9/30/2013 20:57	LB4100	PO210X13
3	B1	3	21567	348	9/30/2013 20:49	9/30/2013 20:52	LB4100	PO210X13
4	B1	3	21292	361	9/30/2013 20:44	9/30/2013 20:47	LB4100	PO210X13

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5	B1	3	19174	324	9/30/2013 20:39	9/30/2013 20:42	LB4100	PO210X13
6	B1	3	20279	343	9/30/2013 21:11	9/30/2013 21:14	LB4100	PO210X13
7	B1	3	16560	283	9/30/2013 21:07	9/30/2013 21:10	LB4100	PO210X13
8	B1	3	16423	332	9/30/2013 21:03	9/30/2013 21:06	LB4100	PO210X13
1	B2	3	21163	337	9/30/2013 21:03	9/30/2013 21:06	LB4100	PO210X13
2	B2	3	21588	489	9/30/2013 20:59	9/30/2013 21:02	LB4100	PO210X13
3	B2	3	17391	446	9/30/2013 20:54	9/30/2013 20:57	LB4100	PO210X13
4	B2	3	17754	521	9/30/2013 20:49	9/30/2013 20:52	LB4100	PO210X13
5	B2	3	15805	537	9/30/2013 20:44	9/30/2013 20:47	LB4100	PO210X13
6	B2	3	16842	556	9/30/2013 20:39	9/30/2013 20:42	LB4100	PO210X13
7	B2	3	13040	500	9/30/2013 21:11	9/30/2013 21:14	LB4100	PO210X13
8	B2	3	13210	514	9/30/2013 21:07	9/30/2013 21:10	LB4100	PO210X13
1	B3	3	20623	293	9/30/2013 21:07	9/30/2013 21:10	LB4100	PO210X13
2	B3	3	20881	450	9/30/2013 21:03	9/30/2013 21:06	LB4100	PO210X13
3	B3	3	16898	415	9/30/2013 20:59	9/30/2013 21:02	LB4100	PO210X13
4	B3	3	16662	518	9/30/2013 20:54	9/30/2013 20:57	LB4100	PO210X13
5	B3	3	15515	463	9/30/2013 20:49	9/30/2013 20:52	LB4100	PO210X13
6	B3	3	16644	463	9/30/2013 20:44	9/30/2013 20:47	LB4100	PO210X13
7	B3	3	13813	396	9/30/2013 20:39	9/30/2013 20:42	LB4100	PO210X13
8	B3	3	13263	404	9/30/2013 21:11	9/30/2013 21:14	LB4100	PO210X13
1	B4	3	20779	357	9/30/2013 21:11	9/30/2013 21:14	LB4100	PO210X13
2	B4	3	20600	437	9/30/2013 21:07	9/30/2013 21:10	LB4100	PO210X13
3	B4	3	17014	346	9/30/2013 21:03	9/30/2013 21:06	LB4100	PO210X13
4	B4	3	16641	494	9/30/2013 20:59	9/30/2013 21:02	LB4100	PO210X13
5	B4	3	14997	465	9/30/2013 20:54	9/30/2013 20:57	LB4100	PO210X13
6	B4	3	15880	475	9/30/2013 20:49	9/30/2013 20:52	LB4100	PO210X13
7	B4	3	12666	396	9/30/2013 20:44	9/30/2013 20:47	LB4100	PO210X13
8	B4	3	12961	391	9/30/2013 20:39	9/30/2013 20:42	LB4100	PO210X13
1	C1	3	24513	279	9/30/2013 19:17	9/30/2013 19:20	LB4100	PO210X13
2	C1	3	24409	409	9/30/2013 19:55	9/30/2013 19:58	LB4100	PO210X13
3	C1	3	21052	322	9/30/2013 19:50	9/30/2013 19:53	LB4100	PO210X13
4	C1	3	19491	345	9/30/2013 19:44	9/30/2013 19:47	LB4100	PO210X13
5	C1	3	17773	409	9/30/2013 19:39	9/30/2013 19:42	LB4100	PO210X13
6	C1	3	18187	348	9/30/2013 19:33	9/30/2013 19:36	LB4100	PO210X13
7	C1	3	15759	301	9/30/2013 19:29	9/30/2013 19:32	LB4100	PO210X13
8	C1	3	15371	277	9/30/2013 19:22	9/30/2013 19:25	LB4100	PO210X13
1	C2	3	20716	461	9/30/2013 19:22	9/30/2013 19:25	LB4100	PO210X13

Current Calibration - LB4100

Geometry					
Alpha X-talk	Cal Date	10/1/2013 Exp Date		9/30/2014	
LB4100	A0	A1	A2	A3	A4
A1	3.020246E-02	2.057424E-03	-5.538381E-05	4.146249E-07	
A2	1.868747E-02	1.122699E-03	-2.922762E-05	2.298098E-07	
A3	2.064541E-02	9.662017E-04	-2.426781E-05	1.858753E-07	
A4	#VALUE!	#VALUE!	#VALUE!	#VALUE!	
B1	1.001804E-02	6.808217E-04	-1.795847E-05	1.389812E-07	
B2	1.822949E-02	9.877555E-04	-1.982668E-05	1.359602E-07	
B3	1.635258E-02	1.307337E-03	-3.385096E-05	2.486812E-07	
B4	1.726543E-02	9.215377E-04	-1.881072E-05	1.173862E-07	
C1	1.252928E-02	6.005721E-04	-1.281928E-05	7.732534E-08	
C2	2.634707E-02	7.976539E-04	-1.391300E-05	7.148270E-08	
C3	2.994022E-02	1.292784E-03	-2.749154E-05	1.829182E-07	
C4	3.043966E-02	1.205724E-03	-2.205856E-05	1.384953E-07	
D1	1.801756E-02	1.110466E-03	-2.649339E-05	1.930194E-07	
D2	1.983118E-02	1.339592E-03	-2.885048E-05	1.943577E-07	
D3	1.832959E-02	1.195306E-03	-2.799905E-05	2.059972E-07	
D4	1.687461E-02	1.164466E-03	-2.819296E-05	2.132133E-07	
E1	1.265028E-02	7.732934E-04	-1.918698E-05	1.393228E-07	
E2	2.788238E-02	1.795500E-03	-4.762829E-05	3.601379E-07	
E3	1.337715E-02	5.804791E-04	-1.358334E-05	1.042964E-07	
E4	1.611619E-02	7.976867E-04	-1.688222E-05	1.084860E-07	
F1	1.087524E-02	7.732338E-04	-1.622696E-05	1.113281E-07	
F2	2.893018E-02	1.428756E-03	-3.828805E-05	3.094140E-07	
F3	2.189555E-02	1.563695E-03	-3.604120E-05	2.517421E-07	
F4	3.221400E-02	1.702814E-03	-3.583930E-05	2.399851E-07	
G1	1.523184E-02	8.958400E-04	-2.034207E-05	1.438562E-07	
G2	2.387930E-02	1.197148E-03	-2.428098E-05	1.519606E-07	
G3	3.259242E-02	2.009683E-03	-5.062424E-05	3.772828E-07	
G4	1.545808E-02	1.121912E-03	-2.660004E-05	1.853068E-07	
H1	1.672895E-02	1.520540E-03	-3.814038E-05	2.742498E-07	
H2	2.691706E-02	1.424749E-03	-3.765343E-05	2.850803E-07	
H3	1.406461E-02	1.255088E-03	-3.071521E-05	2.184193E-07	
H4	2.844325E-02	1.448361E-03	-3.574430E-05	2.606249E-07	
I1	8.018018E-03	4.569027E-04	-9.515941E-06	6.059491E-08	
I2	6.179855E-03	5.765432E-04	-1.606059E-05	1.311262E-07	
I3	8.246091E-03	5.592711E-04	-1.421182E-05	1.030627E-07	
I4	7.238649E-03	6.695838E-04	-1.702031E-05	1.254965E-07	
J1	1.038418E-02	4.278239E-04	-9.077691E-06	5.656025E-08	
J2	7.299139E-03	6.003583E-04	-1.515810E-05	1.114583E-07	
J3	6.533284E-03	4.829029E-04	-1.062910E-05	7.111799E-08	
J4	9.264315E-03	7.614585E-04	-1.946979E-05	1.406066E-07	

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2	C2	3	20160	678	9/30/2013 19:17	9/30/2013 19:20	LB4100	PO210X13
3	C2	3	17390	521	9/30/2013 19:55	9/30/2013 19:58	LB4100	PO210X13
4	C2	3	16370	636	9/30/2013 19:50	9/30/2013 19:53	LB4100	PO210X13
5	C2	3	14635	531	9/30/2013 19:44	9/30/2013 19:47	LB4100	PO210X13
6	C2	3	15254	615	9/30/2013 19:39	9/30/2013 19:42	LB4100	PO210X13
7	C2	3	12680	525	9/30/2013 19:33	9/30/2013 19:36	LB4100	PO210X13
8	C2	3	12530	460	9/30/2013 19:29	9/30/2013 19:32	LB4100	PO210X13
1	C3	3	17189	463	9/30/2013 19:29	9/30/2013 19:32	LB4100	PO210X13
2	C3	3	17465	653	9/30/2013 19:22	9/30/2013 19:25	LB4100	PO210X13
3	C3	3	13556	495	9/30/2013 19:17	9/30/2013 19:20	LB4100	PO210X13
4	C3	3	13938	642	9/30/2013 19:55	9/30/2013 19:58	LB4100	PO210X13
5	C3	3	12360	606	9/30/2013 19:50	9/30/2013 19:53	LB4100	PO210X13
6	C3	3	12886	580	9/30/2013 19:44	9/30/2013 19:47	LB4100	PO210X13
7	C3	3	10566	553	9/30/2013 19:39	9/30/2013 19:42	LB4100	PO210X13
8	C3	3	10777	532	9/30/2013 19:33	9/30/2013 19:36	LB4100	PO210X13
1	C4	3	14662	381	9/30/2013 19:34	9/30/2013 19:37	LB4100	PO210X13
2	C4	3	15327	549	9/30/2013 19:29	9/30/2013 19:32	LB4100	PO210X13
3	C4	3	12549	520	9/30/2013 19:22	9/30/2013 19:25	LB4100	PO210X13
4	C4	3	11890	547	9/30/2013 19:17	9/30/2013 19:20	LB4100	PO210X13
5	C4	3	11266	545	9/30/2013 19:55	9/30/2013 19:58	LB4100	PO210X13
6	C4	3	11406	575	9/30/2013 19:50	9/30/2013 19:53	LB4100	PO210X13
7	C4	3	9292	539	9/30/2013 19:44	9/30/2013 19:47	LB4100	PO210X13
8	C4	3	9588	525	9/30/2013 19:39	9/30/2013 19:42	LB4100	PO210X13
1	D1	3	24496	397	9/30/2013 19:40	9/30/2013 19:43	LB4100	PO210X13
2	D1	3	24434	570	9/30/2013 19:35	9/30/2013 19:38	LB4100	PO210X13
3	D1	3	19812	449	9/30/2013 19:30	9/30/2013 19:33	LB4100	PO210X13
4	D1	3	19694	666	9/30/2013 19:23	9/30/2013 19:26	LB4100	PO210X13
5	D1	3	17806	538	9/30/2013 19:18	9/30/2013 19:21	LB4100	PO210X13
6	D1	3	19381	573	9/30/2013 19:56	9/30/2013 19:59	LB4100	PO210X13
7	D1	3	15655	544	9/30/2013 19:51	9/30/2013 19:54	LB4100	PO210X13
8	D1	3	15526	536	9/30/2013 19:45	9/30/2013 19:48	LB4100	PO210X13
1	D2	3	22812	379	9/30/2013 19:45	9/30/2013 19:48	LB4100	PO210X13
2	D2	3	23153	562	9/30/2013 19:40	9/30/2013 19:43	LB4100	PO210X13
3	D2	3	18268	566	9/30/2013 19:35	9/30/2013 19:38	LB4100	PO210X13
4	D2	3	18126	661	9/30/2013 19:30	9/30/2013 19:33	LB4100	PO210X13
5	D2	3	16237	601	9/30/2013 19:23	9/30/2013 19:26	LB4100	PO210X13
6	D2	3	17654	653	9/30/2013 19:18	9/30/2013 19:21	LB4100	PO210X13

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7	D2	3	13925	590	9/30/2013 19:56	9/30/2013 19:59	LB4100	PO210X13
8	D2	3	13969	560	9/30/2013 19:51	9/30/2013 19:54	LB4100	PO210X13
1	D3	3	23020	359	9/30/2013 19:51	9/30/2013 19:54	LB4100	PO210X13
2	D3	3	23584	539	9/30/2013 19:45	9/30/2013 19:48	LB4100	PO210X13
3	D3	3	18592	498	9/30/2013 19:40	9/30/2013 19:43	LB4100	PO210X13
4	D3	3	19060	641	9/30/2013 19:35	9/30/2013 19:38	LB4100	PO210X13
5	D3	3	16669	543	9/30/2013 19:30	9/30/2013 19:33	LB4100	PO210X13
6	D3	3	18123	564	9/30/2013 19:23	9/30/2013 19:26	LB4100	PO210X13
7	D3	3	14345	554	9/30/2013 19:18	9/30/2013 19:21	LB4100	PO210X13
8	D3	3	14213	544	9/30/2013 19:56	9/30/2013 19:59	LB4100	PO210X13
1	D4	3	24458	368	9/30/2013 19:56	9/30/2013 19:59	LB4100	PO210X13
2	D4	3	24655	567	9/30/2013 19:51	9/30/2013 19:54	LB4100	PO210X13
3	D4	3	20643	458	9/30/2013 19:45	9/30/2013 19:48	LB4100	PO210X13
4	D4	3	19610	602	9/30/2013 19:40	9/30/2013 19:43	LB4100	PO210X13
5	D4	3	17845	560	9/30/2013 19:35	9/30/2013 19:38	LB4100	PO210X13
6	D4	3	18648	562	9/30/2013 19:30	9/30/2013 19:33	LB4100	PO210X13
7	D4	3	15241	516	9/30/2013 19:23	9/30/2013 19:26	LB4100	PO210X13
8	D4	3	15410	581	9/30/2013 19:18	9/30/2013 19:21	LB4100	PO210X13
1	E1	3	24802	289	9/29/2013 19:42	9/29/2013 19:45	LB4100	PO210X13
2	E1	3	24959	390	9/29/2013 20:16	9/29/2013 20:19	LB4100	PO210X13
3	E1	3	20668	354	9/29/2013 20:12	9/29/2013 20:15	LB4100	PO210X13
4	E1	3	19734	434	9/29/2013 20:07	9/29/2013 20:10	LB4100	PO210X13
5	E1	3	17859	369	9/29/2013 20:01	9/29/2013 20:04	LB4100	PO210X13
6	E1	3	19212	408	9/29/2013 19:56	9/29/2013 19:59	LB4100	PO210X13
7	E1	3	15476	322	9/29/2013 19:52	9/29/2013 19:55	LB4100	PO210X13
8	E1	3	15532	350	9/29/2013 19:47	9/29/2013 19:50	LB4100	PO210X13
1	E2	3	18122	472	9/29/2013 19:47	9/29/2013 19:50	LB4100	PO210X13
2	E2	3	18918	633	9/29/2013 19:42	9/29/2013 19:45	LB4100	PO210X13
3	E2	3	14820	589	9/29/2013 20:16	9/29/2013 20:19	LB4100	PO210X13
4	E2	3	14849	697	9/29/2013 20:12	9/29/2013 20:15	LB4100	PO210X13
5	E2	3	13331	628	9/29/2013 20:07	9/29/2013 20:10	LB4100	PO210X13
6	E2	3	14317	612	9/29/2013 20:01	9/29/2013 20:04	LB4100	PO210X13
7	E2	3	11829	529	9/29/2013 19:56	9/29/2013 19:59	LB4100	PO210X13
8	E2	3	11569	574	9/29/2013 19:52	9/29/2013 19:55	LB4100	PO210X13
1	E3	3	24174	302	9/29/2013 19:52	9/29/2013 19:55	LB4100	PO210X13
2	E3	3	24539	371	9/29/2013 19:47	9/29/2013 19:50	LB4100	PO210X13
3	E3	3	19901	362	9/29/2013 19:42	9/29/2013 19:45	LB4100	PO210X13



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4	E3	3	19870	377	9/29/2013 20:16	9/29/2013 20:19	LB4100	PO210X13
5	E3	3	17510	387	9/29/2013 20:12	9/29/2013 20:15	LB4100	PO210X13
6	E3	3	18837	377	9/29/2013 20:07	9/29/2013 20:10	LB4100	PO210X13
7	E3	3	15271	362	9/29/2013 20:01	9/29/2013 20:04	LB4100	PO210X13
8	E3	3	14674	376	9/29/2013 19:56	9/29/2013 19:59	LB4100	PO210X13
1	E4	3	23212	350	9/29/2013 19:56	9/29/2013 19:59	LB4100	PO210X13
2	E4	3	23389	459	9/29/2013 19:52	9/29/2013 19:55	LB4100	PO210X13
3	E4	3	19631	394	9/29/2013 19:47	9/29/2013 19:50	LB4100	PO210X13
4	E4	3	18584	499	9/29/2013 19:42	9/29/2013 19:45	LB4100	PO210X13
5	E4	3	16753	445	9/29/2013 20:16	9/29/2013 20:19	LB4100	PO210X13
6	E4	3	17284	463	9/29/2013 20:12	9/29/2013 20:15	LB4100	PO210X13
7	E4	3	14465	404	9/29/2013 20:07	9/29/2013 20:10	LB4100	PO210X13
8	E4	3	14874	398	9/29/2013 20:01	9/29/2013 20:04	LB4100	PO210X13
1	F1	3	24678	231	9/29/2013 20:01	9/29/2013 20:04	LB4100	PO210X13
2	F1	3	24892	353	9/29/2013 19:56	9/29/2013 19:59	LB4100	PO210X13
3	F1	3	20738	334	9/29/2013 19:52	9/29/2013 19:55	LB4100	PO210X13
4	F1	3	19788	396	9/29/2013 19:47	9/29/2013 19:50	LB4100	PO210X13
5	F1	3	18146	409	9/29/2013 19:42	9/29/2013 19:45	LB4100	PO210X13
6	F1	3	18935	399	9/29/2013 20:16	9/29/2013 20:19	LB4100	PO210X13
7	F1	3	15388	389	9/29/2013 20:12	9/29/2013 20:15	LB4100	PO210X13
8	F1	3	15382	384	9/29/2013 20:07	9/29/2013 20:10	LB4100	PO210X13
1	F2	3	20896	602	9/29/2013 20:07	9/29/2013 20:10	LB4100	PO210X13
2	F2	3	21440	744	9/29/2013 20:01	9/29/2013 20:04	LB4100	PO210X13
3	F2	3	17766	607	9/29/2013 19:56	9/29/2013 19:59	LB4100	PO210X13
4	F2	3	17400	786	9/29/2013 19:52	9/29/2013 19:55	LB4100	PO210X13
5	F2	3	15838	722	9/29/2013 19:47	9/29/2013 19:50	LB4100	PO210X13
6	F2	3	17070	717	9/29/2013 19:42	9/29/2013 19:45	LB4100	PO210X13
7	F2	3	13239	615	9/29/2013 20:16	9/29/2013 20:19	LB4100	PO210X13
8	F2	3	13058	725	9/29/2013 20:12	9/29/2013 20:15	LB4100	PO210X13
1	F3	3	20437	427	9/29/2013 20:12	9/29/2013 20:15	LB4100	PO210X13
2	F3	3	20456	619	10/1/2013 10:46	10/1/2013 10:49	LB4100	PO210X13
3	F3	3	16860	464	9/29/2013 20:01	9/29/2013 20:04	LB4100	PO210X13
4	F3	3	17071	665	9/29/2013 19:56	9/29/2013 19:59	LB4100	PO210X13
5	F3	3	14809	666	9/29/2013 19:52	9/29/2013 19:55	LB4100	PO210X13
6	F3	3	15850	630	9/29/2013 19:47	9/29/2013 19:50	LB4100	PO210X13
7	F3	3	12862	535	9/29/2013 19:42	9/29/2013 19:45	LB4100	PO210X13
8	F3	3	12604	562	9/29/2013 20:16	9/29/2013 20:19	LB4100	PO210X13

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1	F4	3	16512	480	9/29/2013 20:16	9/29/2013 20:19	LB4100	PO210X13
2	F4	3	16861	641	9/29/2013 20:12	9/29/2013 20:15	LB4100	PO210X13
3	F4	3	13065	581	9/29/2013 20:08	9/29/2013 20:11	LB4100	PO210X13
4	F4	3	13707	743	9/29/2013 20:01	9/29/2013 20:04	LB4100	PO210X13
5	F4	3	11987	664	9/29/2013 19:56	9/29/2013 19:59	LB4100	PO210X13
6	F4	3	12508	682	9/29/2013 19:52	9/29/2013 19:55	LB4100	PO210X13
7	F4	3	10283	643	9/29/2013 19:47	9/29/2013 19:50	LB4100	PO210X13
8	F4	3	10667	637	9/29/2013 19:42	9/29/2013 19:45	LB4100	PO210X13
1	G1	3	22609	309	9/29/2013 20:20	9/29/2013 20:23	LB4100	PO210X13
2	G1	3	22199	416	9/29/2013 20:49	9/29/2013 20:52	LB4100	PO210X13
3	G1	3	18285	390	9/29/2013 20:45	9/29/2013 20:48	LB4100	PO210X13
4	G1	3	17698	448	9/29/2013 20:40	9/29/2013 20:43	LB4100	PO210X13
5	G1	3	15858	448	9/29/2013 20:36	9/29/2013 20:39	LB4100	PO210X13
6	G1	3	16854	411	9/29/2013 20:32	9/29/2013 20:35	LB4100	PO210X13
7	G1	3	13785	413	9/29/2013 20:28	9/29/2013 20:31	LB4100	PO210X13
8	G1	3	13618	397	9/29/2013 20:24	9/29/2013 20:27	LB4100	PO210X13
1	G2	3	19339	451	9/29/2013 20:24	9/29/2013 20:27	LB4100	PO210X13
2	G2	3	19925	519	9/29/2013 20:21	9/29/2013 20:24	LB4100	PO210X13
3	G2	3	15980	535	9/29/2013 20:49	9/29/2013 20:52	LB4100	PO210X13
4	G2	3	16460	610	9/29/2013 20:45	9/29/2013 20:48	LB4100	PO210X13
5	G2	3	14379	620	9/29/2013 20:40	9/29/2013 20:43	LB4100	PO210X13
6	G2	3	15254	607	9/29/2013 20:36	9/29/2013 20:39	LB4100	PO210X13
7	G2	3	12475	538	9/29/2013 20:32	9/29/2013 20:35	LB4100	PO210X13
8	G2	3	12339	508	9/29/2013 20:28	9/29/2013 20:31	LB4100	PO210X13
1	G3	3	19058	565	9/29/2013 20:28	9/29/2013 20:31	LB4100	PO210X13
2	G3	3	19428	752	9/29/2013 20:24	9/29/2013 20:27	LB4100	PO210X13
3	G3	3	15164	730	9/29/2013 20:21	9/29/2013 20:24	LB4100	PO210X13
4	G3	3	15449	825	9/29/2013 20:49	9/29/2013 20:52	LB4100	PO210X13
5	G3	3	14026	774	9/29/2013 20:45	9/29/2013 20:48	LB4100	PO210X13
6	G3	3	14956	809	9/29/2013 20:40	9/29/2013 20:43	LB4100	PO210X13
7	G3	3	11986	656	9/29/2013 20:36	9/29/2013 20:39	LB4100	PO210X13
8	G3	3	11949	731	9/29/2013 20:32	9/29/2013 20:35	LB4100	PO210X13
1	G4	3	21533	321	9/29/2013 20:32	9/29/2013 20:35	LB4100	PO210X13
2	G4	3	21842	382	9/29/2013 20:28	9/29/2013 20:31	LB4100	PO210X13
3	G4	3	18231	427	9/29/2013 20:24	9/29/2013 20:27	LB4100	PO210X13
4	G4	3	16981	498	9/29/2013 20:21	9/29/2013 20:24	LB4100	PO210X13
5	G4	3	15890	444	9/29/2013 20:49	9/29/2013 20:52	LB4100	PO210X13

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6	G4	3	16735	475	9/29/2013 20:45	9/29/2013 20:48	LB4100	PO210X13
7	G4	3	13550	384	9/29/2013 20:40	9/29/2013 20:43	LB4100	PO210X13
8	G4	3	13646	396	9/29/2013 20:36	9/29/2013 20:39	LB4100	PO210X13
1	H1	3	23721	427	9/29/2013 20:36	9/29/2013 20:39	LB4100	PO210X13
2	H1	3	24473	552	9/29/2013 20:32	9/29/2013 20:35	LB4100	PO210X13
3	H1	3	20053	404	9/29/2013 20:28	9/29/2013 20:31	LB4100	PO210X13
4	H1	3	19159	680	9/29/2013 20:24	9/29/2013 20:27	LB4100	PO210X13
5	H1	3	17567	638	9/29/2013 20:20	9/29/2013 20:23	LB4100	PO210X13
6	H1	3	18331	538	9/29/2013 20:49	9/29/2013 20:52	LB4100	PO210X13
7	H1	3	14712	468	9/29/2013 20:45	9/29/2013 20:48	LB4100	PO210X13
8	H1	3	14663	495	9/29/2013 20:40	9/29/2013 20:43	LB4100	PO210X13
1	H2	3	20077	491	9/29/2013 20:40	9/29/2013 20:43	LB4100	PO210X13
2	H2	3	21256	686	9/29/2013 20:36	9/29/2013 20:39	LB4100	PO210X13
3	H2	3	17083	600	9/29/2013 20:32	9/29/2013 20:35	LB4100	PO210X13
4	H2	3	16737	766	9/29/2013 20:28	9/29/2013 20:31	LB4100	PO210X13
5	H2	3	15534	601	9/29/2013 20:24	9/29/2013 20:27	LB4100	PO210X13
6	H2	3	16007	632	9/29/2013 20:20	9/29/2013 20:23	LB4100	PO210X13
7	H2	3	12942	543	9/29/2013 20:49	9/29/2013 20:52	LB4100	PO210X13
8	H2	3	13267	585	9/29/2013 20:45	9/29/2013 20:48	LB4100	PO210X13
1	H3	3	22475	316	9/29/2013 20:45	9/29/2013 20:48	LB4100	PO210X13
2	H3	3	22897	408	9/29/2013 20:40	9/29/2013 20:43	LB4100	PO210X13
3	H3	3	18385	374	9/29/2013 20:36	9/29/2013 20:39	LB4100	PO210X13
4	H3	3	18320	530	9/29/2013 20:32	9/29/2013 20:35	LB4100	PO210X13
5	H3	3	16500	477	9/29/2013 20:28	9/29/2013 20:31	LB4100	PO210X13
6	H3	3	17771	487	9/29/2013 20:24	9/29/2013 20:27	LB4100	PO210X13
7	H3	3	14234	380	9/29/2013 20:20	9/29/2013 20:23	LB4100	PO210X13
8	H3	3	14209	414	9/29/2013 20:49	9/29/2013 20:52	LB4100	PO210X13
1	H4	3	18494	497	9/29/2013 20:49	9/29/2013 20:52	LB4100	PO210X13
2	H4	3	19070	627	9/29/2013 20:45	9/29/2013 20:48	LB4100	PO210X13
3	H4	3	15221	577	9/29/2013 20:40	9/29/2013 20:43	LB4100	PO210X13
4	H4	3	15625	712	9/29/2013 20:36	9/29/2013 20:39	LB4100	PO210X13
5	H4	3	14196	629	9/29/2013 20:32	9/29/2013 20:35	LB4100	PO210X13
6	H4	3	14885	655	9/29/2013 20:28	9/29/2013 20:31	LB4100	PO210X13
7	H4	3	12113	546	9/29/2013 20:24	9/29/2013 20:27	LB4100	PO210X13
8	H4	3	12254	586	9/29/2013 20:20	9/29/2013 20:23	LB4100	PO210X13
1	I1	3	24878	171	9/30/2013 19:59	9/30/2013 20:02	LB4100	PO210X13
2	I1	3	25470	248	9/30/2013 20:34	9/30/2013 20:37	LB4100	PO210X13

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3	I1	3	20830	246	9/30/2013 20:30	9/30/2013 20:33	LB4100	PO210X13
4	I1	3	20405	272	9/30/2013 20:26	9/30/2013 20:29	LB4100	PO210X13
5	I1	3	18319	268	9/30/2013 20:20	9/30/2013 20:23	LB4100	PO210X13
6	I1	3	20061	272	9/30/2013 20:16	9/30/2013 20:19	LB4100	PO210X13
7	I1	3	16034	251	9/30/2013 20:09	9/30/2013 20:12	LB4100	PO210X13
8	I1	3	15965	225	9/30/2013 20:05	9/30/2013 20:08	LB4100	PO210X13
1	I2	3	26894	166	9/30/2013 20:05	9/30/2013 20:08	LB4100	PO210X13
2	I2	3	27944	194	9/30/2013 19:59	9/30/2013 20:02	LB4100	PO210X13
3	I2	3	22909	233	9/30/2013 20:34	9/30/2013 20:37	LB4100	PO210X13
4	I2	3	22071	275	9/30/2013 20:30	9/30/2013 20:33	LB4100	PO210X13
5	I2	3	20678	253	9/30/2013 20:26	9/30/2013 20:29	LB4100	PO210X13
6	I2	3	21844	227	9/30/2013 20:20	9/30/2013 20:23	LB4100	PO210X13
7	I2	3	17420	226	9/30/2013 20:16	9/30/2013 20:19	LB4100	PO210X13
8	I2	3	17335	277	9/30/2013 20:09	9/30/2013 20:12	LB4100	PO210X13
1	I3	3	26243	186	9/30/2013 20:09	9/30/2013 20:12	LB4100	PO210X13
2	I3	3	27268	287	9/30/2013 20:05	9/30/2013 20:08	LB4100	PO210X13
3	I3	3	22189	264	9/30/2013 19:59	9/30/2013 20:02	LB4100	PO210X13
4	I3	3	22053	331	9/30/2013 20:34	9/30/2013 20:37	LB4100	PO210X13
5	I3	3	20299	277	9/30/2013 20:30	9/30/2013 20:33	LB4100	PO210X13
6	I3	3	20902	282	9/30/2013 20:26	9/30/2013 20:29	LB4100	PO210X13
7	I3	3	17064	238	9/30/2013 20:20	9/30/2013 20:23	LB4100	PO210X13
8	I3	3	17235	245	9/30/2013 20:16	9/30/2013 20:19	LB4100	PO210X13
1	I4	3	26454	184	9/30/2013 20:16	9/30/2013 20:19	LB4100	PO210X13
2	I4	3	26837	244	9/30/2013 20:09	9/30/2013 20:12	LB4100	PO210X13
3	I4	3	21826	250	9/30/2013 20:05	9/30/2013 20:08	LB4100	PO210X13
4	I4	3	21595	313	9/30/2013 19:59	9/30/2013 20:02	LB4100	PO210X13
5	I4	3	19480	284	9/30/2013 20:34	9/30/2013 20:37	LB4100	PO210X13
6	I4	3	20838	302	9/30/2013 20:30	9/30/2013 20:33	LB4100	PO210X13
7	I4	3	16950	226	9/30/2013 20:26	9/30/2013 20:29	LB4100	PO210X13
8	I4	3	16725	266	9/30/2013 20:20	9/30/2013 20:23	LB4100	PO210X13
1	J1	3	25454	235	9/30/2013 20:20	9/30/2013 20:23	LB4100	PO210X13
2	J1	3	26017	292	9/30/2013 20:16	9/30/2013 20:19	LB4100	PO210X13
3	J1	3	20844	311	9/30/2013 20:09	9/30/2013 20:12	LB4100	PO210X13
4	J1	3	20690	326	9/30/2013 20:05	9/30/2013 20:08	LB4100	PO210X13
5	J1	3	18698	278	9/30/2013 19:59	9/30/2013 20:02	LB4100	PO210X13
6	J1	3	19900	331	9/30/2013 20:34	9/30/2013 20:37	LB4100	PO210X13
7	J1	3	15764	254	9/30/2013 20:30	9/30/2013 20:33	LB4100	PO210X13

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8	J1	3	16056	242	9/30/2013 20:26	9/30/2013 20:29	LB4100	PO210X13
1	J2	3	25506	162	9/30/2013 20:26	9/30/2013 20:29	LB4100	PO210X13
2	J2	3	25866	264	9/30/2013 20:20	9/30/2013 20:23	LB4100	PO210X13
3	J2	3	21357	226	9/30/2013 20:16	9/30/2013 20:19	LB4100	PO210X13
4	J2	3	20990	289	9/30/2013 20:09	9/30/2013 20:12	LB4100	PO210X13
5	J2	3	18647	264	9/30/2013 20:05	9/30/2013 20:08	LB4100	PO210X13
6	J2	3	19945	268	9/30/2013 19:59	9/30/2013 20:02	LB4100	PO210X13
7	J2	3	16347	218	9/30/2013 20:34	9/30/2013 20:37	LB4100	PO210X13
8	J2	3	16292	245	9/30/2013 20:30	9/30/2013 20:33	LB4100	PO210X13
1	J3	3	25318	143	9/30/2013 20:30	9/30/2013 20:33	LB4100	PO210X13
2	J3	3	25395	201	9/30/2013 20:26	9/30/2013 20:29	LB4100	PO210X13
3	J3	3	20882	218	9/30/2013 20:20	9/30/2013 20:23	LB4100	PO210X13
4	J3	3	20240	253	9/30/2013 20:16	9/30/2013 20:19	LB4100	PO210X13
5	J3	3	18358	225	9/30/2013 20:09	9/30/2013 20:12	LB4100	PO210X13
6	J3	3	19290	251	9/30/2013 20:05	9/30/2013 20:08	LB4100	PO210X13
7	J3	3	15554	208	9/30/2013 19:59	9/30/2013 20:02	LB4100	PO210X13
8	J3	3	15855	208	9/30/2013 20:34	9/30/2013 20:37	LB4100	PO210X13
1	J4	3	25356	205	9/30/2013 20:34	9/30/2013 20:37	LB4100	PO210X13
2	J4	3	25416	305	9/30/2013 20:30	9/30/2013 20:33	LB4100	PO210X13
3	J4	3	20638	306	9/30/2013 20:26	9/30/2013 20:29	LB4100	PO210X13
4	J4	3	20290	341	9/30/2013 20:20	9/30/2013 20:23	LB4100	PO210X13
5	J4	3	18253	324	9/30/2013 20:16	9/30/2013 20:19	LB4100	PO210X13
6	J4	3	18969	313	9/30/2013 20:09	9/30/2013 20:12	LB4100	PO210X13
7	J4	3	15927	249	9/30/2013 20:05	9/30/2013 20:08	LB4100	PO210X13
8	J4	3	15616	268	9/30/2013 19:59	9/30/2013 20:02	LB4100	PO210X13

**Beta Xtalk Calibration - LB4100 - Sep 2013**

Standard Data	<b>Isotope</b>	<b>Sr-90</b>
	Standard ID number	0133-T
	Half Life (days)	10555.725
	Std. Act. (dpm/mL)***	55362.7
	Reference Date	4/1/1996
	Volume of spike (mL)	0.5
	Std. Nominal (dpm)	18219.08
	Decay Date	9/9/2013

\*\*\* Includes activity of Y-90, which is in equilibrium.

Source Weight	
Source	Measured weight (mg)
1	0.0
2	12.8
3	27.7
4	50.8
5	60.8
6	73.2
7	98.4
8	115.8

The following detectors were not calibrated:

A4

Detector (#)	Source ID (#)	Raw Count Data				Sr-90 Xtalk (Alpha/Beta)	Source Measured Weight	Average Xtalk (Alpha/Beta)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
A1	1	9/10/2013 15:42	5	0	41944	0.0000%	0.0	
A1	2	9/10/2013 16:05	2	2	16623	0.0120%	12.8	
A1	3	9/10/2013 15:59	2	0	14820	0.0000%	27.7	
A1	4	9/10/2013 15:54	2	1	14963	0.0067%	50.8	
A1	5	9/10/2013 16:09	2	2	14981	0.0134%	60.8	
A1	6	9/10/2013 16:22	2	3	14295	0.0210%	73.2	
A1	7	9/10/2013 16:18	2	2	13861	0.0144%	98.4	
A1	8	9/10/2013 16:15	2	1	13617	0.0073%	115.8	0.0094%
A2	1	9/10/2013 15:54	2	2	17030	0.0117%	0.0	
A2	2	9/10/2013 15:42	5	7	40964	0.0171%	12.8	
A2	3	9/10/2013 16:05	2	0	14806	0.0000%	27.7	
A2	4	9/10/2013 15:59	2	1	14998	0.0067%	50.8	
A2	5	9/10/2013 16:15	2	2	15442	0.0130%	60.8	
A2	6	9/10/2013 16:09	2	5	14760	0.0339%	73.2	
A2	7	9/10/2013 16:22	2	3	14003	0.0214%	98.4	
A2	8	9/10/2013 16:18	2	3	13712	0.0219%	115.8	0.0157%
A3	1	9/10/2013 15:59	2	1	16694	0.0060%	0.0	
A3	2	9/10/2013 15:54	2	0	16345	0.0000%	12.8	
A3	3	9/10/2013 15:42	5	3	37987	0.0079%	27.7	
A3	4	9/10/2013 16:05	2	1	15032	0.0067%	50.8	
A3	5	9/10/2013 16:18	2	4	15315	0.0261%	60.8	
A3	6	9/10/2013 16:15	2	3	14534	0.0206%	73.2	
A3	7	9/10/2013 16:09	2	1	14016	0.0071%	98.4	
A3	8	9/10/2013 16:22	2	3	13798	0.0217%	115.8	0.0120%
B1	1	9/10/2013 16:09	2	1	16671	0.0060%	0.0	
B1	2	9/10/2013 16:22	2	3	16228	0.0185%	12.8	
B1	3	9/10/2013 16:18	2	1	14481	0.0069%	27.7	
B1	4	9/10/2013 16:15	2	2	15155	0.0132%	50.8	
B1	5	9/10/2013 15:42	5	8	38570	0.0207%	60.8	
B1	6	9/10/2013 16:05	2	1	14167	0.0071%	73.2	
B1	7	9/10/2013 15:59	2	2	13625	0.0147%	98.4	
B1	8	9/10/2013 15:54	2	4	13598	0.0294%	115.8	0.0146%
B2	1	9/10/2013 16:15	2	2	17643	0.0113%	0.0	
B2	2	9/10/2013 16:09	2	1	16606	0.0060%	12.8	
B2	3	9/10/2013 16:22	2	3	15755	0.0190%	27.7	
B2	4	9/10/2013 16:18	2	1	15521	0.0064%	50.8	
B2	5	9/10/2013 15:54	2	1	15993	0.0063%	60.8	
B2	6	9/10/2013 15:42	5	9	38171	0.0236%	73.2	

Detector (#)	Source ID (#)	Raw Count Data				Sr-90 Xtalk (Alpha/Beta)	Source Measured Weight	Average Xtalk (Alpha/Beta)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
B2	7	9/10/2013 16:05	2	1	14422	0.0069%	98.4	
B2	8	9/10/2013 15:59	2	4	14420	0.0277%	115.8	0.0134%
B3	1	9/10/2013 16:19	2	1	16974	0.0059%	0.0	
B3	2	9/10/2013 16:15	2	2	17237	0.0116%	12.8	
B3	3	9/10/2013 16:09	2	4	15708	0.0255%	27.7	
B3	4	9/10/2013 16:22	2	1	15693	0.0064%	50.8	
B3	5	9/10/2013 15:59	2	1	16196	0.0062%	60.8	
B3	6	9/10/2013 15:54	2	1	15101	0.0066%	73.2	
B3	7	9/10/2013 15:42	5	3	35723	0.0084%	98.4	
B3	8	9/10/2013 16:05	2	3	13702	0.0219%	115.8	0.0116%
B4	1	9/10/2013 16:22	2	2	15385	0.0130%	0.0	
B4	2	9/10/2013 16:19	2	5	14759	0.0339%	12.8	
B4	3	9/10/2013 16:15	2	1	13746	0.0073%	27.7	
B4	4	9/10/2013 16:09	2	1	13793	0.0073%	50.8	
B4	5	9/10/2013 16:05	2	4	14250	0.0281%	60.8	
B4	6	9/10/2013 16:00	2	0	14077	0.0000%	73.2	
B4	7	9/10/2013 15:54	2	2	13103	0.0153%	98.4	
B4	8	9/10/2013 15:42	5	5	31691	0.0158%	115.8	0.0151%
C1	1	9/9/2013 16:39	2	3	17220	0.0174%	0.0	
C1	2	9/9/2013 17:15	2	2	16587	0.0121%	12.8	
C1	3	9/9/2013 17:06	2	1	15382	0.0065%	27.7	
C1	4	9/9/2013 17:02	2	1	15389	0.0065%	50.8	
C1	5	9/9/2013 16:58	2	5	15925	0.0314%	60.8	
C1	6	9/9/2013 16:52	2	3	15427	0.0194%	73.2	
C1	7	9/9/2013 16:47	2	4	14394	0.0278%	98.4	
C1	8	9/9/2013 16:43	2	6	14144	0.0424%	115.8	0.0204%
C2	1	9/9/2013 16:43	2	0	17907	0.0000%	0.0	
C2	2	9/9/2013 16:39	2	4	17359	0.0230%	12.8	
C2	3	9/9/2013 17:15	2	0	15716	0.0000%	27.7	
C2	4	9/9/2013 17:06	2	1	15736	0.0064%	50.8	
C2	5	9/9/2013 17:02	2	0	16600	0.0000%	60.8	
C2	6	9/9/2013 16:58	2	2	15578	0.0128%	73.2	
C2	7	9/9/2013 16:52	2	2	14551	0.0137%	98.4	
C2	8	9/9/2013 16:47	2	5	14259	0.0351%	115.8	0.0114%
C3	1	9/9/2013 16:47	2	0	17961	0.0000%	0.0	
C3	2	9/9/2013 16:43	2	0	17295	0.0000%	12.8	
C3	3	9/9/2013 16:39	2	4	16131	0.0248%	27.7	
C3	4	9/9/2013 17:15	2	3	16057	0.0187%	50.8	
C3	5	9/9/2013 17:06	2	1	16003	0.0062%	60.8	
C3	6	9/9/2013 17:02	2	0	15550	0.0000%	73.2	
C3	7	9/9/2013 16:58	2	4	14930	0.0268%	98.4	
C3	8	9/9/2013 16:52	2	2	14472	0.0138%	115.8	0.0113%
C4	1	9/9/2013 16:52	2	0	18081	0.0000%	0.0	
C4	2	9/9/2013 16:47	2	1	17321	0.0058%	12.8	
C4	3	9/9/2013 16:43	2	2	15903	0.0126%	27.7	
C4	4	9/9/2013 16:39	2	1	15908	0.0063%	50.8	
C4	5	9/9/2013 17:15	2	2	16579	0.0121%	60.8	
C4	6	9/9/2013 17:06	2	2	15400	0.0130%	73.2	
C4	7	9/9/2013 17:02	2	3	14945	0.0201%	98.4	
C4	8	9/9/2013 16:58	2	2	14593	0.0137%	115.8	0.0104%
D1	1	9/9/2013 16:58	2	1	16225	0.0062%	0.0	
D1	2	9/9/2013 16:52	2	4	17018	0.0235%	12.8	
D1	3	9/9/2013 16:47	2	1	15340	0.0065%	27.7	
D1	4	9/9/2013 16:43	2	0	15210	0.0000%	50.8	
D1	5	9/9/2013 16:39	2	1	15139	0.0066%	60.8	
D1	6	9/9/2013 17:15	2	3	15215	0.0197%	73.2	

Detector (#)	Source ID (#)	Raw Count Data				Sr-90 Xtalk (Alpha/Beta)	Source Measured Weight	Average Xtalk (Alpha/Beta)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
D1	7	9/9/2013 17:06	2	0	14693	0.0000%	98.4	
D1	8	9/9/2013 17:02	2	1	14275	0.0070%	115.8	0.0087%
D2	1	9/9/2013 17:02	2	2	19299	0.0104%	0.0	
D2	2	9/9/2013 16:58	2	0	18598	0.0000%	12.8	
D2	3	9/9/2013 16:52	2	1	17475	0.0057%	27.7	
D2	4	9/9/2013 16:47	2	0	17380	0.0000%	50.8	
D2	5	9/9/2013 16:43	2	1	17604	0.0057%	60.8	
D2	6	9/9/2013 16:39	2	5	16484	0.0303%	73.2	
D2	7	9/9/2013 17:15	2	1	16650	0.0060%	98.4	
D2	8	9/9/2013 17:06	2	4	15653	0.0256%	115.8	0.0105%
D3	1	9/9/2013 17:06	2	1	19375	0.0052%	0.0	
D3	2	9/9/2013 17:02	2	3	18612	0.0161%	12.8	
D3	3	9/9/2013 16:58	2	1	17451	0.0057%	27.7	
D3	4	9/9/2013 16:52	2	1	17221	0.0058%	50.8	
D3	5	9/9/2013 16:47	2	1	17654	0.0057%	60.8	
D3	6	9/9/2013 16:43	2	1	16893	0.0059%	73.2	
D3	7	9/9/2013 16:39	2	0	16296	0.0000%	98.4	
D3	8	9/9/2013 17:15	2	4	15749	0.0254%	115.8	0.0087%
D4	1	9/9/2013 17:15	2	1	19439	0.0051%	0.0	
D4	2	9/9/2013 17:06	2	4	18995	0.0211%	12.8	
D4	3	9/9/2013 17:02	2	3	17544	0.0171%	27.7	
D4	4	9/9/2013 16:58	2	1	17145	0.0058%	50.8	
D4	5	9/9/2013 16:52	2	1	17590	0.0057%	60.8	
D4	6	9/9/2013 16:47	2	2	16815	0.0119%	73.2	
D4	7	9/9/2013 16:43	2	3	16371	0.0183%	98.4	
D4	8	9/9/2013 16:39	2	3	15484	0.0194%	115.8	0.0131%
E1	1	9/9/2013 14:33	2	2	16911	0.0118%	0.0	
E1	2	9/9/2013 15:01	2	1	16143	0.0062%	12.8	
E1	3	9/9/2013 14:59	2	2	14763	0.0135%	27.7	
E1	4	9/9/2013 14:53	2	1	14977	0.0067%	50.8	
E1	5	9/9/2013 14:50	2	1	15123	0.0066%	60.8	
E1	6	9/9/2013 14:47	2	2	14526	0.0138%	73.2	
E1	7	9/9/2013 14:44	2	1	13746	0.0073%	98.4	
E1	8	9/9/2013 14:39	2	0	13575	0.0000%	115.8	0.0082%
E2	1	9/9/2013 14:39	2	0	16793	0.0000%	0.0	
E2	2	9/9/2013 14:34	2	4	16324	0.0245%	12.8	
E2	3	9/9/2013 15:01	2	1	14576	0.0069%	27.7	
E2	4	9/9/2013 14:59	2	1	14989	0.0067%	50.8	
E2	5	9/9/2013 14:53	2	1	15153	0.0066%	60.8	
E2	6	9/9/2013 14:50	2	4	14712	0.0272%	73.2	
E2	7	9/9/2013 14:47	2	4	13919	0.0287%	98.4	
E2	8	9/9/2013 14:44	2	6	13536	0.0443%	115.8	0.0181%
E3	1	9/9/2013 14:44	2	1	16656	0.0060%	0.0	
E3	2	9/9/2013 14:39	2	3	16041	0.0187%	12.8	
E3	3	9/9/2013 14:34	2	0	14927	0.0000%	27.7	
E3	4	9/9/2013 15:01	2	1	15061	0.0066%	50.8	
E3	5	9/9/2013 14:59	2	3	15477	0.0194%	60.8	
E3	6	9/9/2013 14:53	2	3	14420	0.0208%	73.2	
E3	7	9/9/2013 14:50	2	2	13966	0.0143%	98.4	
E3	8	9/9/2013 14:47	2	2	13397	0.0149%	115.8	0.0126%
E4	1	9/9/2013 14:47	2	1	17333	0.0058%	0.0	
E4	2	9/9/2013 14:44	2	1	16703	0.0060%	12.8	
E4	3	9/9/2013 14:39	2	3	15155	0.0198%	27.7	
E4	4	9/9/2013 14:34	2	3	15336	0.0196%	50.8	
E4	5	9/9/2013 15:01	2	3	15392	0.0195%	60.8	
E4	6	9/9/2013 14:59	2	3	14474	0.0207%	73.2	



Detector (#)	Source ID (#)	Raw Count Data				Sr-90 Xtalk (Alpha/Beta)	Source Measured Weight	Average Xtalk (Alpha/Beta)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
E4	7	9/9/2013 14:53	2	0	14066	0.0000%	98.4	
E4	8	9/9/2013 14:50	2	2	13728	0.0146%	115.8	0.0132%
F1	1	9/9/2013 14:50	2	1	17509	0.0057%	0.0	
F1	2	9/9/2013 14:47	2	4	17204	0.0233%	12.8	
F1	3	9/9/2013 14:44	2	0	15886	0.0000%	27.7	
F1	4	9/9/2013 14:39	2	3	15702	0.0191%	50.8	
F1	5	9/9/2013 14:34	2	3	16079	0.0187%	60.8	
F1	6	9/9/2013 15:01	2	2	15539	0.0129%	73.2	
F1	7	9/9/2013 14:59	2	5	14815	0.0337%	98.4	
F1	8	9/9/2013 14:53	2	1	14420	0.0069%	115.8	0.0150%
F2	1	9/9/2013 14:53	2	2	16914	0.0118%	0.0	
F2	2	9/9/2013 14:50	2	2	16530	0.0121%	12.8	
F2	3	9/9/2013 14:47	2	1	15394	0.0065%	27.7	
F2	4	9/9/2013 14:44	2	1	15303	0.0065%	50.8	
F2	5	9/9/2013 14:39	2	3	15856	0.0189%	60.8	
F2	6	9/9/2013 14:34	2	1	15058	0.0066%	73.2	
F2	7	9/9/2013 15:01	2	1	14103	0.0071%	98.4	
F2	8	9/9/2013 14:59	2	1	14081	0.0071%	115.8	0.0096%
F3	1	9/9/2013 14:59	2	2	17719	0.0113%	0.0	
F3	2	9/9/2013 14:53	2	3	16760	0.0179%	12.8	
F3	3	9/9/2013 14:50	2	1	15724	0.0064%	27.7	
F3	4	9/9/2013 14:47	2	2	15350	0.0130%	50.8	
F3	5	9/9/2013 14:44	2	1	15706	0.0064%	60.8	
F3	6	9/9/2013 14:39	2	2	15315	0.0131%	73.2	
F3	7	9/9/2013 14:34	2	1	14643	0.0068%	98.4	
F3	8	9/9/2013 15:01	2	2	14090	0.0142%	115.8	0.0111%
F4	1	9/9/2013 15:01	2	5	17974	0.0278%	0.0	
F4	2	9/9/2013 14:59	2	1	17073	0.0059%	12.8	
F4	3	9/9/2013 14:53	2	2	15849	0.0126%	27.7	
F4	4	9/9/2013 14:50	2	2	15570	0.0128%	50.8	
F4	5	9/9/2013 14:47	2	1	16112	0.0062%	60.8	
F4	6	9/9/2013 14:44	2	2	15291	0.0131%	73.2	
F4	7	9/9/2013 14:39	2	1	14758	0.0068%	98.4	
F4	8	9/9/2013 14:34	2	1	14329	0.0070%	115.8	0.0115%
G1	1	9/26/2013 10:36	2	1	16899	0.0059%	0.0	
G1	2	9/26/2013 10:53	2	0	16560	0.0000%	12.8	
G1	3	9/26/2013 10:46	2	1	15184	0.0066%	27.7	
G1	4	9/26/2013 10:40	2	2	15102	0.0132%	50.8	
G1	5	9/26/2013 11:00	2	3	15399	0.0195%	60.8	
G1	6	9/26/2013 11:31	2	1	14876	0.0067%	73.2	
G1	7	9/26/2013 11:25	2	2	14010	0.0143%	98.4	
G1	8	9/26/2013 11:03	2	1	13648	0.0073%	115.8	0.0092%
G2	1	9/26/2013 10:40	2	0	17663	0.0000%	0.0	
G2	2	9/26/2013 10:36	2	1	16439	0.0061%	12.8	
G2	3	9/26/2013 10:53	2	2	15286	0.0131%	27.7	
G2	4	9/26/2013 10:46	2	4	15480	0.0258%	50.8	
G2	5	9/26/2013 11:03	2	4	15617	0.0256%	60.8	
G2	6	9/26/2013 11:00	2	1	15167	0.0066%	73.2	
G2	7	9/26/2013 11:31	2	6	14647	0.0410%	98.4	
G2	8	9/26/2013 11:25	2	3	13940	0.0215%	115.8	0.0175%
G3	1	9/26/2013 10:46	2	0	17971	0.0000%	0.0	
G3	2	9/26/2013 10:40	2	1	16883	0.0059%	12.8	
G3	3	9/26/2013 10:36	2	3	15588	0.0192%	27.7	
G3	4	9/26/2013 10:53	2	8	15531	0.0515%	50.8	
G3	5	9/26/2013 11:25	2	7	16104	0.0435%	60.8	
G3	6	9/26/2013 11:03	2	2	15482	0.0129%	73.2	

Detector (#)	Source ID (#)	Raw Count Data				Sr-90 Xtalk (Alpha/Beta)	Source Measured Weight	Average Xtalk (Alpha/Beta)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
G3	7	9/26/2013 11:00	2	4	14951	0.0268%	98.4	
G3	8	9/26/2013 11:31	2	3	14197	0.0211%	115.8	0.0226%
G4	1	9/26/2013 10:53	2	0	17172	0.0000%	0.0	
G4	2	9/26/2013 10:46	2	4	16733	0.0239%	12.8	
G4	3	9/26/2013 10:40	2	1	15138	0.0066%	27.7	
G4	4	9/26/2013 10:36	2	4	15028	0.0266%	50.8	
G4	5	9/26/2013 11:31	2	4	15641	0.0256%	60.8	
G4	6	9/26/2013 11:25	2	3	14815	0.0202%	73.2	
G4	7	9/26/2013 11:03	2	1	14560	0.0069%	98.4	
G4	8	9/26/2013 11:00	2	2	13536	0.0148%	115.8	0.0156%
H1	1	9/26/2013 11:00	2	0	17027	0.0000%	0.0	
H1	2	9/26/2013 11:31	2	0	16180	0.0000%	12.8	
H1	3	9/26/2013 11:25	2	4	14973	0.0267%	27.7	
H1	4	9/26/2013 11:03	2	3	15289	0.0196%	50.8	
H1	5	9/26/2013 10:36	2	0	15413	0.0000%	60.8	
H1	6	9/26/2013 10:53	2	5	14968	0.0334%	73.2	
H1	7	9/26/2013 10:46	2	0	14044	0.0000%	98.4	
H1	8	9/26/2013 10:40	2	7	13892	0.0504%	115.8	0.0163%
H2	1	9/26/2013 11:03	2	1	17194	0.0058%	0.0	
H2	2	9/26/2013 11:00	2	2	16398	0.0122%	12.8	
H2	3	9/26/2013 11:31	2	2	15340	0.0130%	27.7	
H2	4	9/26/2013 11:25	2	7	15164	0.0462%	50.8	
H2	5	9/26/2013 10:40	2	2	15245	0.0131%	60.8	
H2	6	9/26/2013 10:36	2	1	14889	0.0067%	73.2	
H2	7	9/26/2013 10:53	2	0	14473	0.0000%	98.4	
H2	8	9/26/2013 10:46	2	2	14037	0.0142%	115.8	0.0139%
H3	1	9/26/2013 11:25	2	1	17552	0.0057%	0.0	
H3	2	9/26/2013 11:03	2	2	16635	0.0120%	12.8	
H3	3	9/26/2013 11:00	2	2	15529	0.0129%	27.7	
H3	4	9/26/2013 11:31	2	6	15613	0.0384%	50.8	
H3	5	9/26/2013 10:46	2	5	15953	0.0313%	60.8	
H3	6	9/26/2013 10:40	2	3	15329	0.0196%	73.2	
H3	7	9/26/2013 10:36	2	4	14369	0.0278%	98.4	
H3	8	9/26/2013 10:53	2	1	14185	0.0070%	115.8	0.0194%
H4	1	9/26/2013 11:31	2	0	17097	0.0000%	0.0	
H4	2	9/26/2013 11:25	2	4	16376	0.0244%	12.8	
H4	3	9/26/2013 11:03	2	0	15008	0.0000%	27.7	
H4	4	9/26/2013 11:00	2	1	15103	0.0066%	50.8	
H4	5	9/26/2013 10:53	2	1	15640	0.0064%	60.8	
H4	6	9/26/2013 10:46	2	2	14911	0.0134%	73.2	
H4	7	9/26/2013 10:40	2	5	14298	0.0350%	98.4	
H4	8	9/26/2013 10:36	2	1	13628	0.0073%	115.8	0.0116%
I1	1	9/9/2013 15:37	2	0	16107	0.0000%	0.0	
I1	2	9/9/2013 16:35	2	4	15780	0.0253%	12.8	
I1	3	9/9/2013 16:30	2	2	14528	0.0138%	27.7	
I1	4	9/9/2013 16:26	2	3	14324	0.0209%	50.8	
I1	5	9/9/2013 16:18	2	3	14933	0.0201%	60.8	
I1	6	9/9/2013 16:15	2	6	14042	0.0427%	73.2	
I1	7	9/9/2013 16:06	2	0	13572	0.0000%	98.4	
I1	8	9/9/2013 16:02	2	5	13304	0.0376%	115.8	0.0201%
I2	1	9/9/2013 16:02	2	1	17133	0.0058%	0.0	
I2	2	9/9/2013 15:37	2	1	16766	0.0060%	12.8	
I2	3	9/9/2013 16:35	2	2	15058	0.0133%	27.7	
I2	4	9/9/2013 16:30	2	1	14984	0.0067%	50.8	
I2	5	9/9/2013 16:26	2	1	15544	0.0064%	60.8	
I2	6	9/9/2013 16:18	2	2	14785	0.0135%	73.2	

Detector (#)	Source ID (#)	Raw Count Data				Sr-90 Xtalk (Alpha/Beta)	Source Measured Weight	Average Xtalk (Alpha/Beta)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
I2	7	9/9/2013 16:15	2	1	14052	0.0071%	98.4	
I2	8	9/9/2013 16:06	2	3	13662	0.0220%	115.8	0.0101%
I3	1	9/9/2013 16:06	2	3	16777	0.0179%	0.0	
I3	2	9/9/2013 16:02	2	2	16493	0.0121%	12.8	
I3	3	9/9/2013 15:37	2	3	14621	0.0205%	27.7	
I3	4	9/9/2013 16:35	2	3	14775	0.0203%	50.8	
I3	5	9/9/2013 16:30	2	1	15367	0.0065%	60.8	
I3	6	9/9/2013 16:26	2	2	14583	0.0137%	73.2	
I3	7	9/9/2013 16:18	2	2	13862	0.0144%	98.4	
I3	8	9/9/2013 16:15	2	1	13509	0.0074%	115.8	0.0141%
I4	1	9/9/2013 16:15	2	1	17024	0.0059%	0.0	
I4	2	9/9/2013 16:06	2	0	16421	0.0000%	12.8	
I4	3	9/9/2013 16:02	2	1	15315	0.0065%	27.7	
I4	4	9/9/2013 15:37	2	2	14962	0.0134%	50.8	
I4	5	9/9/2013 16:35	2	2	15512	0.0129%	60.8	
I4	6	9/9/2013 16:30	2	3	14499	0.0207%	73.2	
I4	7	9/9/2013 16:26	2	2	14177	0.0141%	98.4	
I4	8	9/9/2013 16:18	2	3	13548	0.0221%	115.8	0.0120%
J1	1	9/9/2013 16:18	2	3	15980	0.0188%	0.0	
J1	2	9/9/2013 16:15	2	3	15477	0.0194%	12.8	
J1	3	9/9/2013 16:06	2	2	14175	0.0141%	27.7	
J1	4	9/9/2013 16:02	2	2	14437	0.0139%	50.8	
J1	5	9/9/2013 15:37	2	0	14668	0.0000%	60.8	
J1	6	9/9/2013 16:35	2	2	13906	0.0144%	73.2	
J1	7	9/9/2013 16:30	2	4	13573	0.0295%	98.4	
J1	8	9/9/2013 16:26	2	2	13047	0.0153%	115.8	0.0157%
J2	1	9/9/2013 16:26	2	5	15826	0.0316%	0.0	
J2	2	9/9/2013 16:18	2	0	15410	0.0000%	12.8	
J2	3	9/9/2013 16:15	2	4	13921	0.0287%	27.7	
J2	4	9/9/2013 16:06	2	3	14028	0.0214%	50.8	
J2	5	9/9/2013 16:02	2	5	14510	0.0345%	60.8	
J2	6	9/9/2013 15:37	2	4	13767	0.0291%	73.2	
J2	7	9/9/2013 16:35	2	2	12780	0.0156%	98.4	
J2	8	9/9/2013 16:30	2	3	12959	0.0231%	115.8	0.0230%
J3	1	9/9/2013 16:30	2	3	15950	0.0188%	0.0	
J3	2	9/9/2013 16:26	2	1	15398	0.0065%	12.8	
J3	3	9/9/2013 16:18	2	0	14110	0.0000%	27.7	
J3	4	9/9/2013 16:15	2	3	14013	0.0214%	50.8	
J3	5	9/9/2013 16:06	2	1	14341	0.0070%	60.8	
J3	6	9/9/2013 16:02	2	2	13833	0.0145%	73.2	
J3	7	9/9/2013 15:37	2	1	12957	0.0077%	98.4	
J3	8	9/9/2013 16:35	2	2	12909	0.0155%	115.8	0.0114%
J4	1	9/9/2013 16:35	2	1	15632	0.0064%	0.0	
J4	2	9/9/2013 16:30	2	3	15274	0.0196%	12.8	
J4	3	9/9/2013 16:26	2	4	13967	0.0286%	27.7	
J4	4	9/9/2013 16:18	2	1	14190	0.0070%	50.8	
J4	5	9/9/2013 16:15	2	2	14844	0.0135%	60.8	
J4	6	9/9/2013 16:06	2	4	13609	0.0294%	73.2	
J4	7	9/9/2013 16:02	2	2	13510	0.0148%	98.4	
J4	8	9/9/2013 15:37	2	1	13221	0.0076%	115.8	0.0159%

Current Calibration - LB4100

Geometry	Cal Date	10/1/2013	Exp Date	9/30/2014	
Beta X-talk	A0	A1	A2	A3	A4
LB4100	A0				
A1	9.353001E-05				
A2	1.570367E-04				
A3	1.202206E-04				
A4	#N/A				
B1	1.456034E-04				
B2	1.341828E-04				
B3	1.155254E-04				
B4	1.506418E-04				
C1	2.044153E-04				
C2	1.138083E-04				
C3	1.129259E-04				
C4	1.043312E-04				
D1	8.689356E-05				
D2	1.045736E-04				
D3	8.724951E-05				
D4	1.305176E-04				
E1	8.237656E-05				
E2	1.811099E-04				
E3	1.259785E-04				
E4	1.323747E-04				
F1	1.503509E-04				
F2	9.588521E-05				
F3	1.112823E-04				
F4	1.152256E-04				
G1	9.194161E-05				
G2	1.746224E-04				
G3	2.261869E-04				
G4	1.557435E-04				
H1	1.626625E-04				
H2	1.391198E-04				
H3	1.935363E-04				
H4	1.164522E-04				
I1	2.005754E-04				
I2	1.009908E-04				
I3	1.411043E-04				
I4	1.195075E-04				
J1	1.566268E-04				
J2	2.300329E-04				
J3	1.141924E-04				
J4	1.586973E-04				

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SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
S1	A1	5	0	41944	9/10/2013 15:42	9/10/2013 15:47	LB4100	GABS13
S2	A1	2	2	16623	9/10/2013 16:05	9/10/2013 16:07	LB4100	GABS13
S3	A1	2	0	14820	9/10/2013 15:59	9/10/2013 16:01	LB4100	GABS13
S4	A1	2	1	14963	9/10/2013 15:54	9/10/2013 15:56	LB4100	GABS13
S5	A1	2	2	14981	9/10/2013 16:09	9/10/2013 16:11	LB4100	GABS13
S6	A1	2	3	14295	9/10/2013 16:22	9/10/2013 16:24	LB4100	GABS13
S7	A1	2	2	13861	9/10/2013 16:18	9/10/2013 16:20	LB4100	GABS13
S8	A1	2	1	13617	9/10/2013 16:15	9/10/2013 16:17	LB4100	GABS13
S1	A2	2	2	17030	9/10/2013 15:54	9/10/2013 15:56	LB4100	GABS13
S2	A2	5	7	40964	9/10/2013 15:42	9/10/2013 15:47	LB4100	GABS13
S3	A2	2	0	14806	9/10/2013 16:05	9/10/2013 16:07	LB4100	GABS13
S4	A2	2	1	14998	9/10/2013 15:59	9/10/2013 16:01	LB4100	GABS13
S5	A2	2	2	15442	9/10/2013 16:15	9/10/2013 16:17	LB4100	GABS13
S6	A2	2	5	14760	9/10/2013 16:09	9/10/2013 16:11	LB4100	GABS13
S7	A2	2	3	14003	9/10/2013 16:22	9/10/2013 16:24	LB4100	GABS13
S8	A2	2	3	13712	9/10/2013 16:18	9/10/2013 16:20	LB4100	GABS13
S1	A3	2	1	16694	9/10/2013 15:59	9/10/2013 16:01	LB4100	GABS13
S2	A3	2	0	16345	9/10/2013 15:54	9/10/2013 15:56	LB4100	GABS13
S3	A3	5	3	37987	9/10/2013 15:42	9/10/2013 15:47	LB4100	GABS13
S4	A3	2	1	15032	9/10/2013 16:05	9/10/2013 16:07	LB4100	GABS13
S5	A3	2	4	15315	9/10/2013 16:18	9/10/2013 16:20	LB4100	GABS13
S6	A3	2	3	14534	9/10/2013 16:15	9/10/2013 16:17	LB4100	GABS13
S7	A3	2	1	14016	9/10/2013 16:09	9/10/2013 16:11	LB4100	GABS13
S8	A3	2	3	13798	9/10/2013 16:22	9/10/2013 16:24	LB4100	GABS13
S1	B1	2	1	16671	9/10/2013 16:09	9/10/2013 16:11	LB4100	GABS13
S2	B1	2	3	16228	9/10/2013 16:22	9/10/2013 16:24	LB4100	GABS13
S3	B1	2	1	14481	9/10/2013 16:18	9/10/2013 16:20	LB4100	GABS13
S4	B1	2	2	15155	9/10/2013 16:15	9/10/2013 16:17	LB4100	GABS13
S5	B1	5	8	38570	9/10/2013 15:42	9/10/2013 15:47	LB4100	GABS13
S6	B1	2	1	14167	9/10/2013 16:05	9/10/2013 16:07	LB4100	GABS13
S7	B1	2	2	13625	9/10/2013 15:59	9/10/2013 16:01	LB4100	GABS13
S8	B1	2	4	13598	9/10/2013 15:54	9/10/2013 15:56	LB4100	GABS13
S1	B2	2	2	17643	9/10/2013 16:15	9/10/2013 16:17	LB4100	GABS13
S2	B2	2	1	16606	9/10/2013 16:09	9/10/2013 16:11	LB4100	GABS13
S3	B2	2	3	15755	9/10/2013 16:22	9/10/2013 16:24	LB4100	GABS13
S4	B2	2	1	15521	9/10/2013 16:18	9/10/2013 16:20	LB4100	GABS13

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S5	B2	2	1	15993	9/10/2013 15:54	9/10/2013 15:56	LB4100	GABS13
S6	B2	5	9	38171	9/10/2013 15:42	9/10/2013 15:47	LB4100	GABS13
S7	B2	2	1	14422	9/10/2013 16:05	9/10/2013 16:07	LB4100	GABS13
S8	B2	2	4	14420	9/10/2013 15:59	9/10/2013 16:01	LB4100	GABS13
S1	B3	2	1	16974	9/10/2013 16:19	9/10/2013 16:21	LB4100	GABS13
S2	B3	2	2	17237	9/10/2013 16:15	9/10/2013 16:17	LB4100	GABS13
S3	B3	2	4	15708	9/10/2013 16:09	9/10/2013 16:11	LB4100	GABS13
S4	B3	2	1	15693	9/10/2013 16:22	9/10/2013 16:24	LB4100	GABS13
S5	B3	2	1	16196	9/10/2013 15:59	9/10/2013 16:01	LB4100	GABS13
S6	B3	2	1	15101	9/10/2013 15:54	9/10/2013 15:56	LB4100	GABS13
S7	B3	5	3	35723	9/10/2013 15:42	9/10/2013 15:47	LB4100	GABS13
S8	B3	2	3	13702	9/10/2013 16:05	9/10/2013 16:07	LB4100	GABS13
S1	B4	2	2	15385	9/10/2013 16:22	9/10/2013 16:24	LB4100	GABS13
S2	B4	2	5	14759	9/10/2013 16:19	9/10/2013 16:21	LB4100	GABS13
S3	B4	2	1	13746	9/10/2013 16:15	9/10/2013 16:17	LB4100	GABS13
S4	B4	2	1	13793	9/10/2013 16:09	9/10/2013 16:11	LB4100	GABS13
S5	B4	2	4	14250	9/10/2013 16:05	9/10/2013 16:07	LB4100	GABS13
S6	B4	2	0	14077	9/10/2013 16:00	9/10/2013 16:02	LB4100	GABS13
S7	B4	2	2	13103	9/10/2013 15:54	9/10/2013 15:56	LB4100	GABS13
S8	B4	5	5	31691	9/10/2013 15:42	9/10/2013 15:47	LB4100	GABS13
S1	C1	2	3	17220	9/9/2013 16:39	9/9/2013 16:41	LB4100	GABS13
S2	C1	2	2	16587	9/9/2013 17:15	9/9/2013 17:17	LB4100	GABS13
S3	C1	2	1	15382	9/9/2013 17:06	9/9/2013 17:08	LB4100	GABS13
S4	C1	2	1	15389	9/9/2013 17:02	9/9/2013 17:04	LB4100	GABS13
S5	C1	2	5	15925	9/9/2013 16:58	9/9/2013 17:00	LB4100	GABS13
S6	C1	2	3	15427	9/9/2013 16:52	9/9/2013 16:54	LB4100	GABS13
S7	C1	2	4	14394	9/9/2013 16:47	9/9/2013 16:49	LB4100	GABS13
S8	C1	2	6	14144	9/9/2013 16:43	9/9/2013 16:45	LB4100	GABS13
S1	C2	2	0	17907	9/9/2013 16:43	9/9/2013 16:45	LB4100	GABS13
S2	C2	2	4	17359	9/9/2013 16:39	9/9/2013 16:41	LB4100	GABS13
S3	C2	2	0	15716	9/9/2013 17:15	9/9/2013 17:17	LB4100	GABS13
S4	C2	2	1	15736	9/9/2013 17:06	9/9/2013 17:08	LB4100	GABS13
S5	C2	2	0	16600	9/9/2013 17:02	9/9/2013 17:04	LB4100	GABS13
S6	C2	2	2	15578	9/9/2013 16:58	9/9/2013 17:00	LB4100	GABS13
S7	C2	2	2	14551	9/9/2013 16:52	9/9/2013 16:54	LB4100	GABS13
S8	C2	2	5	14259	9/9/2013 16:47	9/9/2013 16:49	LB4100	GABS13
S1	C3	2	0	17961	9/9/2013 16:47	9/9/2013 16:49	LB4100	GABS13

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S2	C3	2	0	17295	9/9/2013 16:43	9/9/2013 16:45	LB4100	GABS13
S3	C3	2	4	16131	9/9/2013 16:39	9/9/2013 16:41	LB4100	GABS13
S4	C3	2	3	16057	9/9/2013 17:15	9/9/2013 17:17	LB4100	GABS13
S5	C3	2	1	16003	9/9/2013 17:06	9/9/2013 17:08	LB4100	GABS13
S6	C3	2	0	15550	9/9/2013 17:02	9/9/2013 17:04	LB4100	GABS13
S7	C3	2	4	14930	9/9/2013 16:58	9/9/2013 17:00	LB4100	GABS13
S8	C3	2	2	14472	9/9/2013 16:52	9/9/2013 16:54	LB4100	GABS13
S1	C4	2	0	18081	9/9/2013 16:52	9/9/2013 16:54	LB4100	GABS13
S2	C4	2	1	17321	9/9/2013 16:47	9/9/2013 16:49	LB4100	GABS13
S3	C4	2	2	15903	9/9/2013 16:43	9/9/2013 16:45	LB4100	GABS13
S4	C4	2	1	15908	9/9/2013 16:39	9/9/2013 16:41	LB4100	GABS13
S5	C4	2	2	16579	9/9/2013 17:15	9/9/2013 17:17	LB4100	GABS13
S6	C4	2	2	15400	9/9/2013 17:06	9/9/2013 17:08	LB4100	GABS13
S7	C4	2	3	14945	9/9/2013 17:02	9/9/2013 17:04	LB4100	GABS13
S8	C4	2	2	14593	9/9/2013 16:58	9/9/2013 17:00	LB4100	GABS13
S1	D1	2	1	16225	9/9/2013 16:58	9/9/2013 17:00	LB4100	GABS13
S2	D1	2	4	17018	9/9/2013 16:52	9/9/2013 16:54	LB4100	GABS13
S3	D1	2	1	15340	9/9/2013 16:47	9/9/2013 16:49	LB4100	GABS13
S4	D1	2	0	15210	9/9/2013 16:43	9/9/2013 16:45	LB4100	GABS13
S5	D1	2	1	15139	9/9/2013 16:39	9/9/2013 16:41	LB4100	GABS13
S6	D1	2	3	15215	9/9/2013 17:15	9/9/2013 17:17	LB4100	GABS13
S7	D1	2	0	14693	9/9/2013 17:06	9/9/2013 17:08	LB4100	GABS13
S8	D1	2	1	14275	9/9/2013 17:02	9/9/2013 17:04	LB4100	GABS13
S1	D2	2	2	19299	9/9/2013 17:02	9/9/2013 17:04	LB4100	GABS13
S2	D2	2	0	18598	9/9/2013 16:58	9/9/2013 17:00	LB4100	GABS13
S3	D2	2	1	17475	9/9/2013 16:52	9/9/2013 16:54	LB4100	GABS13
S4	D2	2	0	17380	9/9/2013 16:47	9/9/2013 16:49	LB4100	GABS13
S5	D2	2	1	17604	9/9/2013 16:43	9/9/2013 16:45	LB4100	GABS13
S6	D2	2	5	16484	9/9/2013 16:39	9/9/2013 16:41	LB4100	GABS13
S7	D2	2	1	16650	9/9/2013 17:15	9/9/2013 17:17	LB4100	GABS13
S8	D2	2	4	15653	9/9/2013 17:06	9/9/2013 17:08	LB4100	GABS13
S1	D3	2	1	19375	9/9/2013 17:06	9/9/2013 17:08	LB4100	GABS13
S2	D3	2	3	18612	9/9/2013 17:02	9/9/2013 17:04	LB4100	GABS13
S3	D3	2	1	17451	9/9/2013 16:58	9/9/2013 17:00	LB4100	GABS13
S4	D3	2	1	17221	9/9/2013 16:52	9/9/2013 16:54	LB4100	GABS13
S5	D3	2	1	17654	9/9/2013 16:47	9/9/2013 16:49	LB4100	GABS13
S6	D3	2	1	16893	9/9/2013 16:43	9/9/2013 16:45	LB4100	GABS13

S7	D3	2	0	16296	9/9/2013 16:39	9/9/2013 16:41	LB4100	GABS13
S8	D3	2	4	15749	9/9/2013 17:15	9/9/2013 17:17	LB4100	GABS13
S1	D4	2	1	19439	9/9/2013 17:15	9/9/2013 17:17	LB4100	GABS13
S2	D4	2	4	18995	9/9/2013 17:06	9/9/2013 17:08	LB4100	GABS13
S3	D4	2	3	17544	9/9/2013 17:02	9/9/2013 17:04	LB4100	GABS13
S4	D4	2	1	17145	9/9/2013 16:58	9/9/2013 17:00	LB4100	GABS13
S5	D4	2	1	17590	9/9/2013 16:52	9/9/2013 16:54	LB4100	GABS13
S6	D4	2	2	16815	9/9/2013 16:47	9/9/2013 16:49	LB4100	GABS13
S7	D4	2	3	16371	9/9/2013 16:43	9/9/2013 16:45	LB4100	GABS13
S8	D4	2	3	15484	9/9/2013 16:39	9/9/2013 16:41	LB4100	GABS13
S1	E1	2	2	16911	9/9/2013 14:33	9/9/2013 14:35	LB4100	GABS13
S2	E1	2	1	16143	9/9/2013 15:01	9/9/2013 15:03	LB4100	GABS13
S3	E1	2	2	14763	9/9/2013 14:59	9/9/2013 15:01	LB4100	GABS13
S4	E1	2	1	14977	9/9/2013 14:53	9/9/2013 14:55	LB4100	GABS13
S5	E1	2	1	15123	9/9/2013 14:50	9/9/2013 14:52	LB4100	GABS13
S6	E1	2	2	14526	9/9/2013 14:47	9/9/2013 14:49	LB4100	GABS13
S7	E1	2	1	13746	9/9/2013 14:44	9/9/2013 14:46	LB4100	GABS13
S8	E1	2	0	13575	9/9/2013 14:39	9/9/2013 14:41	LB4100	GABS13
S1	E2	2	0	16793	9/9/2013 14:39	9/9/2013 14:41	LB4100	GABS13
S2	E2	2	4	16324	9/9/2013 14:34	9/9/2013 14:36	LB4100	GABS13
S3	E2	2	1	14576	9/9/2013 15:01	9/9/2013 15:03	LB4100	GABS13
S4	E2	2	1	14989	9/9/2013 14:59	9/9/2013 15:01	LB4100	GABS13
S5	E2	2	1	15153	9/9/2013 14:53	9/9/2013 14:55	LB4100	GABS13
S6	E2	2	4	14712	9/9/2013 14:50	9/9/2013 14:52	LB4100	GABS13
S7	E2	2	4	13919	9/9/2013 14:47	9/9/2013 14:49	LB4100	GABS13
S8	E2	2	6	13536	9/9/2013 14:44	9/9/2013 14:46	LB4100	GABS13
S1	E3	2	1	16656	9/9/2013 14:44	9/9/2013 14:46	LB4100	GABS13
S2	E3	2	3	16041	9/9/2013 14:39	9/9/2013 14:41	LB4100	GABS13
S3	E3	2	0	14927	9/9/2013 14:34	9/9/2013 14:36	LB4100	GABS13
S4	E3	2	1	15061	9/9/2013 15:01	9/9/2013 15:03	LB4100	GABS13
S5	E3	2	3	15477	9/9/2013 14:59	9/9/2013 15:01	LB4100	GABS13
S6	E3	2	3	14420	9/9/2013 14:53	9/9/2013 14:55	LB4100	GABS13
S7	E3	2	2	13966	9/9/2013 14:50	9/9/2013 14:52	LB4100	GABS13
S8	E3	2	2	13397	9/9/2013 14:47	9/9/2013 14:49	LB4100	GABS13
S1	E4	2	1	17333	9/9/2013 14:47	9/9/2013 14:49	LB4100	GABS13
S2	E4	2	1	16703	9/9/2013 14:44	9/9/2013 14:46	LB4100	GABS13
S3	E4	2	3	15155	9/9/2013 14:39	9/9/2013 14:41	LB4100	GABS13



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S4	E4	2	3	15336	9/9/2013 14:34	9/9/2013 14:36	LB4100	GABS13
S5	E4	2	3	15392	9/9/2013 15:01	9/9/2013 15:03	LB4100	GABS13
S6	E4	2	3	14474	9/9/2013 14:59	9/9/2013 15:01	LB4100	GABS13
S7	E4	2	0	14066	9/9/2013 14:53	9/9/2013 14:55	LB4100	GABS13
S8	E4	2	2	13728	9/9/2013 14:50	9/9/2013 14:52	LB4100	GABS13
S1	F1	2	1	17509	9/9/2013 14:50	9/9/2013 14:52	LB4100	GABS13
S2	F1	2	4	17204	9/9/2013 14:47	9/9/2013 14:49	LB4100	GABS13
S3	F1	2	0	15886	9/9/2013 14:44	9/9/2013 14:46	LB4100	GABS13
S4	F1	2	3	15702	9/9/2013 14:39	9/9/2013 14:41	LB4100	GABS13
S5	F1	2	3	16079	9/9/2013 14:34	9/9/2013 14:36	LB4100	GABS13
S6	F1	2	2	15539	9/9/2013 15:01	9/9/2013 15:03	LB4100	GABS13
S7	F1	2	5	14815	9/9/2013 14:59	9/9/2013 15:01	LB4100	GABS13
S8	F1	2	1	14420	9/9/2013 14:53	9/9/2013 14:55	LB4100	GABS13
S1	F2	2	2	16914	9/9/2013 14:53	9/9/2013 14:55	LB4100	GABS13
S2	F2	2	2	16530	9/9/2013 14:50	9/9/2013 14:52	LB4100	GABS13
S3	F2	2	1	15394	9/9/2013 14:47	9/9/2013 14:49	LB4100	GABS13
S4	F2	2	1	15303	9/9/2013 14:44	9/9/2013 14:46	LB4100	GABS13
S5	F2	2	3	15856	9/9/2013 14:39	9/9/2013 14:41	LB4100	GABS13
S6	F2	2	1	15058	9/9/2013 14:34	9/9/2013 14:36	LB4100	GABS13
S7	F2	2	1	14103	9/9/2013 15:01	9/9/2013 15:03	LB4100	GABS13
S8	F2	2	1	14081	9/9/2013 14:59	9/9/2013 15:01	LB4100	GABS13
S1	F3	2	2	17719	9/9/2013 14:59	9/9/2013 15:01	LB4100	GABS13
S2	F3	2	3	16760	9/9/2013 14:53	9/9/2013 14:55	LB4100	GABS13
S3	F3	2	1	15724	9/9/2013 14:50	9/9/2013 14:52	LB4100	GABS13
S4	F3	2	2	15350	9/9/2013 14:47	9/9/2013 14:49	LB4100	GABS13
S5	F3	2	1	15706	9/9/2013 14:44	9/9/2013 14:46	LB4100	GABS13
S6	F3	2	2	15315	9/9/2013 14:39	9/9/2013 14:41	LB4100	GABS13
S7	F3	2	1	14643	9/9/2013 14:34	9/9/2013 14:36	LB4100	GABS13
S8	F3	2	2	14090	9/9/2013 15:01	9/9/2013 15:03	LB4100	GABS13
S1	F4	2	5	17974	9/9/2013 15:01	9/9/2013 15:03	LB4100	GABS13
S2	F4	2	1	17073	9/9/2013 14:59	9/9/2013 15:01	LB4100	GABS13
S3	F4	2	2	15849	9/9/2013 14:53	9/9/2013 14:55	LB4100	GABS13
S4	F4	2	2	15570	9/9/2013 14:50	9/9/2013 14:52	LB4100	GABS13
S5	F4	2	1	16112	9/9/2013 14:47	9/9/2013 14:49	LB4100	GABS13
S6	F4	2	2	15291	9/9/2013 14:44	9/9/2013 14:46	LB4100	GABS13
S7	F4	2	1	14758	9/9/2013 14:39	9/9/2013 14:41	LB4100	GABS13
S8	F4	2	1	14329	9/9/2013 14:34	9/9/2013 14:36	LB4100	GABS13

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S1	G1	2	1	16899	9/26/2013 10:36	9/26/2013 10:38	LB4100	GABS13
S2	G1	2	0	16560	9/26/2013 10:53	9/26/2013 10:55	LB4100	GABS13
S3	G1	2	1	15184	9/26/2013 10:46	9/26/2013 10:48	LB4100	GABS13
S4	G1	2	2	15102	9/26/2013 10:40	9/26/2013 10:42	LB4100	GABS13
S5	G1	2	3	15399	9/26/2013 11:00	9/26/2013 11:02	LB4100	GABS13
S6	G1	2	1	14876	9/26/2013 11:31	9/26/2013 11:33	LB4100	GABS13
S7	G1	2	2	14010	9/26/2013 11:25	9/26/2013 11:27	LB4100	GABS13
S8	G1	2	1	13648	9/26/2013 11:03	9/26/2013 11:05	LB4100	GABS13
S1	G2	2	0	17663	9/26/2013 10:40	9/26/2013 10:42	LB4100	GABS13
S2	G2	2	1	16439	9/26/2013 10:36	9/26/2013 10:38	LB4100	GABS13
S3	G2	2	2	15286	9/26/2013 10:53	9/26/2013 10:55	LB4100	GABS13
S4	G2	2	4	15480	9/26/2013 10:46	9/26/2013 10:48	LB4100	GABS13
S5	G2	2	4	15617	9/26/2013 11:03	9/26/2013 11:05	LB4100	GABS13
S6	G2	2	1	15167	9/26/2013 11:00	9/26/2013 11:02	LB4100	GABS13
S7	G2	2	6	14647	9/26/2013 11:31	9/26/2013 11:33	LB4100	GABS13
S8	G2	2	3	13940	9/26/2013 11:25	9/26/2013 11:27	LB4100	GABS13
S1	G3	2	0	17971	9/26/2013 10:46	9/26/2013 10:48	LB4100	GABS13
S2	G3	2	1	16883	9/26/2013 10:40	9/26/2013 10:42	LB4100	GABS13
S3	G3	2	3	15588	9/26/2013 10:36	9/26/2013 10:38	LB4100	GABS13
S4	G3	2	8	15531	9/26/2013 10:53	9/26/2013 10:55	LB4100	GABS13
S5	G3	2	7	16104	9/26/2013 11:25	9/26/2013 11:27	LB4100	GABS13
S6	G3	2	2	15482	9/26/2013 11:03	9/26/2013 11:05	LB4100	GABS13
S7	G3	2	4	14951	9/26/2013 11:00	9/26/2013 11:02	LB4100	GABS13
S8	G3	2	3	14197	9/26/2013 11:31	9/26/2013 11:33	LB4100	GABS13
S1	G4	2	0	17172	9/26/2013 10:53	9/26/2013 10:55	LB4100	GABS13
S2	G4	2	4	16733	9/26/2013 10:46	9/26/2013 10:48	LB4100	GABS13
S3	G4	2	1	15138	9/26/2013 10:40	9/26/2013 10:42	LB4100	GABS13
S4	G4	2	4	15028	9/26/2013 10:36	9/26/2013 10:38	LB4100	GABS13
S5	G4	2	4	15641	9/26/2013 11:31	9/26/2013 11:33	LB4100	GABS13
S6	G4	2	3	14815	9/26/2013 11:25	9/26/2013 11:27	LB4100	GABS13
S7	G4	2	1	14560	9/26/2013 11:03	9/26/2013 11:05	LB4100	GABS13
S8	G4	2	2	13536	9/26/2013 11:00	9/26/2013 11:02	LB4100	GABS13
S1	H1	2	0	17027	9/26/2013 11:00	9/26/2013 11:02	LB4100	GABS13
S2	H1	2	0	16180	9/26/2013 11:31	9/26/2013 11:33	LB4100	GABS13
S3	H1	2	4	14973	9/26/2013 11:25	9/26/2013 11:27	LB4100	GABS13
S4	H1	2	3	15289	9/26/2013 11:03	9/26/2013 11:05	LB4100	GABS13
S5	H1	2	0	15413	9/26/2013 10:36	9/26/2013 10:38	LB4100	GABS13

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S6	H1	2	5	14968	9/26/2013 10:53	9/26/2013 10:55	LB4100	GABS13
S7	H1	2	0	14044	9/26/2013 10:46	9/26/2013 10:48	LB4100	GABS13
S8	H1	2	7	13892	9/26/2013 10:40	9/26/2013 10:42	LB4100	GABS13
S1	H2	2	1	17194	9/26/2013 11:03	9/26/2013 11:05	LB4100	GABS13
S2	H2	2	2	16398	9/26/2013 11:00	9/26/2013 11:02	LB4100	GABS13
S3	H2	2	2	15340	9/26/2013 11:31	9/26/2013 11:33	LB4100	GABS13
S4	H2	2	7	15164	9/26/2013 11:25	9/26/2013 11:27	LB4100	GABS13
S5	H2	2	2	15245	9/26/2013 10:40	9/26/2013 10:42	LB4100	GABS13
S6	H2	2	1	14889	9/26/2013 10:36	9/26/2013 10:38	LB4100	GABS13
S7	H2	2	0	14473	9/26/2013 10:53	9/26/2013 10:55	LB4100	GABS13
S8	H2	2	2	14037	9/26/2013 10:46	9/26/2013 10:48	LB4100	GABS13
S1	H3	2	1	17552	9/26/2013 11:25	9/26/2013 11:27	LB4100	GABS13
S2	H3	2	2	16635	9/26/2013 11:03	9/26/2013 11:05	LB4100	GABS13
S3	H3	2	2	15529	9/26/2013 11:00	9/26/2013 11:02	LB4100	GABS13
S4	H3	2	6	15613	9/26/2013 11:31	9/26/2013 11:33	LB4100	GABS13
S5	H3	2	5	15953	9/26/2013 10:46	9/26/2013 10:48	LB4100	GABS13
S6	H3	2	3	15329	9/26/2013 10:40	9/26/2013 10:42	LB4100	GABS13
S7	H3	2	4	14369	9/26/2013 10:36	9/26/2013 10:38	LB4100	GABS13
S8	H3	2	1	14185	9/26/2013 10:53	9/26/2013 10:55	LB4100	GABS13
S1	H4	2	0	17097	9/26/2013 11:31	9/26/2013 11:33	LB4100	GABS13
S2	H4	2	4	16376	9/26/2013 11:25	9/26/2013 11:27	LB4100	GABS13
S3	H4	2	0	15008	9/26/2013 11:03	9/26/2013 11:05	LB4100	GABS13
S4	H4	2	1	15103	9/26/2013 11:00	9/26/2013 11:02	LB4100	GABS13
S5	H4	2	1	15640	9/26/2013 10:53	9/26/2013 10:55	LB4100	GABS13
S6	H4	2	2	14911	9/26/2013 10:46	9/26/2013 10:48	LB4100	GABS13
S7	H4	2	5	14298	9/26/2013 10:40	9/26/2013 10:42	LB4100	GABS13
S8	H4	2	1	13628	9/26/2013 10:36	9/26/2013 10:38	LB4100	GABS13
S1	I1	2	0	16107	9/9/2013 15:37	9/9/2013 15:39	LB4100	GABS13
S2	I1	2	4	15780	9/9/2013 16:35	9/9/2013 16:37	LB4100	GABS13
S3	I1	2	2	14528	9/9/2013 16:30	9/9/2013 16:32	LB4100	GABS13
S4	I1	2	3	14324	9/9/2013 16:26	9/9/2013 16:28	LB4100	GABS13
S5	I1	2	3	14933	9/9/2013 16:18	9/9/2013 16:20	LB4100	GABS13
S6	I1	2	6	14042	9/9/2013 16:15	9/9/2013 16:17	LB4100	GABS13
S7	I1	2	0	13572	9/9/2013 16:06	9/9/2013 16:08	LB4100	GABS13
S8	I1	2	5	13304	9/9/2013 16:02	9/9/2013 16:04	LB4100	GABS13
S1	I2	2	1	17133	9/9/2013 16:02	9/9/2013 16:04	LB4100	GABS13
S2	I2	2	1	16766	9/9/2013 15:37	9/9/2013 15:39	LB4100	GABS13

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S3	I2	2	2	15058	9/9/2013 16:35	9/9/2013 16:37	LB4100	GABS13
S4	I2	2	1	14984	9/9/2013 16:30	9/9/2013 16:32	LB4100	GABS13
S5	I2	2	1	15544	9/9/2013 16:26	9/9/2013 16:28	LB4100	GABS13
S6	I2	2	2	14785	9/9/2013 16:18	9/9/2013 16:20	LB4100	GABS13
S7	I2	2	1	14052	9/9/2013 16:15	9/9/2013 16:17	LB4100	GABS13
S8	I2	2	3	13662	9/9/2013 16:06	9/9/2013 16:08	LB4100	GABS13
S1	I3	2	3	16777	9/9/2013 16:06	9/9/2013 16:08	LB4100	GABS13
S2	I3	2	2	16493	9/9/2013 16:02	9/9/2013 16:04	LB4100	GABS13
S3	I3	2	3	14621	9/9/2013 15:37	9/9/2013 15:39	LB4100	GABS13
S4	I3	2	3	14775	9/9/2013 16:35	9/9/2013 16:37	LB4100	GABS13
S5	I3	2	1	15367	9/9/2013 16:30	9/9/2013 16:32	LB4100	GABS13
S6	I3	2	2	14583	9/9/2013 16:26	9/9/2013 16:28	LB4100	GABS13
S7	I3	2	2	13862	9/9/2013 16:18	9/9/2013 16:20	LB4100	GABS13
S8	I3	2	1	13509	9/9/2013 16:15	9/9/2013 16:17	LB4100	GABS13
S1	I4	2	1	17024	9/9/2013 16:15	9/9/2013 16:17	LB4100	GABS13
S2	I4	2	0	16421	9/9/2013 16:06	9/9/2013 16:08	LB4100	GABS13
S3	I4	2	1	15315	9/9/2013 16:02	9/9/2013 16:04	LB4100	GABS13
S4	I4	2	2	14962	9/9/2013 15:37	9/9/2013 15:39	LB4100	GABS13
S5	I4	2	2	15512	9/9/2013 16:35	9/9/2013 16:37	LB4100	GABS13
S6	I4	2	3	14499	9/9/2013 16:30	9/9/2013 16:32	LB4100	GABS13
S7	I4	2	2	14177	9/9/2013 16:26	9/9/2013 16:28	LB4100	GABS13
S8	I4	2	3	13548	9/9/2013 16:18	9/9/2013 16:20	LB4100	GABS13
S1	J1	2	3	15980	9/9/2013 16:18	9/9/2013 16:20	LB4100	GABS13
S2	J1	2	3	15477	9/9/2013 16:15	9/9/2013 16:17	LB4100	GABS13
S3	J1	2	2	14175	9/9/2013 16:06	9/9/2013 16:08	LB4100	GABS13
S4	J1	2	2	14437	9/9/2013 16:02	9/9/2013 16:04	LB4100	GABS13
S5	J1	2	0	14668	9/9/2013 15:37	9/9/2013 15:39	LB4100	GABS13
S6	J1	2	2	13906	9/9/2013 16:35	9/9/2013 16:37	LB4100	GABS13
S7	J1	2	4	13573	9/9/2013 16:30	9/9/2013 16:32	LB4100	GABS13
S8	J1	2	2	13047	9/9/2013 16:26	9/9/2013 16:28	LB4100	GABS13
S1	J2	2	5	15826	9/9/2013 16:26	9/9/2013 16:28	LB4100	GABS13
S2	J2	2	0	15410	9/9/2013 16:18	9/9/2013 16:20	LB4100	GABS13
S3	J2	2	4	13921	9/9/2013 16:15	9/9/2013 16:17	LB4100	GABS13
S4	J2	2	3	14028	9/9/2013 16:06	9/9/2013 16:08	LB4100	GABS13
S5	J2	2	5	14510	9/9/2013 16:02	9/9/2013 16:04	LB4100	GABS13
S6	J2	2	4	13767	9/9/2013 15:37	9/9/2013 15:39	LB4100	GABS13
S7	J2	2	2	12780	9/9/2013 16:35	9/9/2013 16:37	LB4100	GABS13

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S8	J2	2	3	12959	9/9/2013 16:30	9/9/2013 16:32	LB4100	GABS13
S1	J3	2	3	15950	9/9/2013 16:30	9/9/2013 16:32	LB4100	GABS13
S2	J3	2	1	15398	9/9/2013 16:26	9/9/2013 16:28	LB4100	GABS13
S3	J3	2	0	14110	9/9/2013 16:18	9/9/2013 16:20	LB4100	GABS13
S4	J3	2	3	14013	9/9/2013 16:15	9/9/2013 16:17	LB4100	GABS13
S5	J3	2	1	14341	9/9/2013 16:06	9/9/2013 16:08	LB4100	GABS13
S6	J3	2	2	13833	9/9/2013 16:02	9/9/2013 16:04	LB4100	GABS13
S7	J3	2	1	12957	9/9/2013 15:37	9/9/2013 15:39	LB4100	GABS13
S8	J3	2	2	12909	9/9/2013 16:35	9/9/2013 16:37	LB4100	GABS13
S1	J4	2	1	15632	9/9/2013 16:35	9/9/2013 16:37	LB4100	GABS13
S2	J4	2	3	15274	9/9/2013 16:30	9/9/2013 16:32	LB4100	GABS13
S3	J4	2	4	13967	9/9/2013 16:26	9/9/2013 16:28	LB4100	GABS13
S4	J4	2	1	14190	9/9/2013 16:18	9/9/2013 16:20	LB4100	GABS13
S5	J4	2	2	14844	9/9/2013 16:15	9/9/2013 16:17	LB4100	GABS13
S6	J4	2	4	13609	9/9/2013 16:06	9/9/2013 16:08	LB4100	GABS13
S7	J4	2	2	13510	9/9/2013 16:02	9/9/2013 16:04	LB4100	GABS13
S8	J4	2	1	13221	9/9/2013 15:37	9/9/2013 15:39	LB4100	GABS13

Gross Alpha/Beta Liquid

Filename : GAB.XLS  
File type : Excel  
Version # : 1.3.8

Alpha Spike S/N : N/A  
Alpha Spike Exp Date : N/A  
Alpha Spike Activity (dpm/ml) : N/A  
Alpha Spike Volume Added: N/A  
Alpha Spike Nuclide: N/A

Batch : 1082959  
Analyst : NX1.1  
Prep Date : 8/29/2011

Beta Spike S/N : N/A  
Beta Spike Exp Date : 9/27/2013  
Beta Spike Activity (dpm/ml) : N/A  
Beta Spike Volume Added: N/A  
Beta Spike Nuclide: N/A

Alpha LCS S/N : 1243-A  
Alpha LCS Exp Date : 6/22/2013  
Alpha LCS Activity (dpm/ml) : 23216.97  
Alpha LCS Volume Added: 2.00  
Alpha LCS Nuclide: Th-230

Alpha Method Uncertainty : 0.0829  
Beta Method Uncertainty : 0.0821

Beta LCS S/N : 1243-A  
Beta LCS Exp Date : 9/27/2013  
Beta LCS Activity (dpm/ml) : 211654.13  
Beta LCS Volume Added: 0.10  
Beta LCS Nuclide: Sr-90

Geometry: 2 inch Planchett

Procedure Code : GFCSANBL  
Parmname1 : Alpha  
Parmname2 : Beta  
Required Alpha MDA : 1 pCi/L  
Required Beta MDA : 1 pCi/L

Pos.	Sample Characteristics				Sample Aliquot L	Sample Residue Wt. (mg)	Sample Aliquot SIDev. L	Sample Date/Time	Count Raw Data				Detector ID	Counting Time (min.)	Gross Counts		Count Start Date/Time
	Sample ID	Sample Aliquot L	Sample Residue Wt. (mg)	Sample Aliquot SIDev. L					Alpha	Beta	Alpha	Beta					
1	1202347886.1	1.0000	0	2.0399E-05	8/29/2011 0:00	A1	2	16513	44973	9/10/2013 16:30							
2	1202347887.1	1.0000	10.4	2.0399E-05	8/29/2011 0:00	A2	2	15888	43408	9/10/2013 16:30							
3	1202347888.1	1.0000	23.8	2.0399E-05	8/29/2011 0:00	A3	2	11746	38149	9/10/2013 16:30							
4	1202347889.1	1.0000	44.2	2.0399E-05	8/29/2011 0:00	A4	0	0	44	9/10/2013 16:30							
5	1202347890.1	1.0000	54.7	2.0399E-05	8/29/2011 0:00	B1	2	12155	35144	9/10/2013 16:30							
6	1202347891.1	1.0000	73.9	2.0399E-05	8/29/2011 0:00	B2	2	10068	35761	9/10/2013 16:30							
7	1202347892.1	1.0000	95.2	2.0399E-05	8/29/2011 0:00	B3	2	7692	35097	9/10/2013 16:30							
8	1202347893.1	1.0000	103	2.0399E-05	8/29/2011 0:00	B4	2	5739	29375	9/10/2013 16:30							
9	1202347894.1	1.0000	0	2.0399E-05	8/29/2011 0:00	C1	2	25411	43254	9/10/2013 16:13							
10	1202347895.1	1.0000	10.4	2.0399E-05	8/29/2011 0:00	C2	2	17105	43464	9/10/2013 16:13							
11	1202347896.1	1.0000	23.8	2.0399E-05	8/29/2011 0:00	C3	2	11304	39792	9/10/2013 16:13							
12	1202347897.1	1.0000	44.2	2.0399E-05	8/29/2011 0:00	C4	2	9327	38329	9/10/2013 16:13							
13	1202347898.1	1.0000	54.7	2.0399E-05	8/29/2011 0:00	D1	2	11489	37565	9/10/2013 16:14							
14	1202347899.1	1.0000	73.9	2.0399E-05	8/29/2011 0:00	D2	2	9427	38787	9/10/2013 16:14							
15	1202347900.1	1.0000	95.2	2.0399E-05	8/29/2011 0:00	D3	2	7685	36749	9/10/2013 16:14							
16	1202347901.1	1.0000	103	2.0399E-05	8/29/2011 0:00	D4	2	7158	36274	9/10/2013 16:14							
17	1202347902.1	1.0000	0	2.0399E-05	8/29/2011 0:00	E1	2	24039	43760	9/10/2013 16:19							
18	1202347903.1	1.0000	10.4	2.0399E-05	8/29/2011 0:00	E2	2	13802	42045	9/10/2013 16:19							
19	1202347904.1	1.0000	23.8	2.0399E-05	8/29/2011 0:00	E3	2	14247	38189	9/10/2013 16:19							
20	1202347905.1	1.0000	44.2	2.0399E-05	8/29/2011 0:00	E4	2	11944	36749	9/10/2013 16:19							
21	1202347906.1	1.0000	54.7	2.0399E-05	8/29/2011 0:00	F1	2	11826	37339	9/10/2013 16:19							
22	1202347907.1	1.0000	73.9	2.0399E-05	8/29/2011 0:00	F2	2	9819	34836	9/10/2013 16:19							
23	1202347908.1	1.0000	95.2	2.0399E-05	8/29/2011 0:00	F3	2	6815	33602	9/10/2013 16:19							
24	1202347909.1	1.0000	103	2.0399E-05	8/29/2011 0:00	F4	2	4739	32374	9/10/2013 16:19							
25	1202347910.1	1.0000	0	2.0399E-05	8/29/2011 0:00	G1	2	20687	44993	9/10/2013 16:19							
26	1202347911.1	1.0000	10.4	2.0399E-05	8/29/2011 0:00	G2	2	15474	44309	9/10/2013 16:24							
27	1202347912.1	1.0000	23.8	2.0399E-05	8/29/2011 0:00	G3	2	11286	40119	9/10/2013 16:24							
28	1202347913.1	1.0000	44.2	2.0399E-05	8/29/2011 0:00	G4	2	11176	36978	9/10/2013 16:24							
29	1202347914.1	1.0000	54.7	2.0399E-05	8/29/2011 0:00	H1	2	11734	36612	9/10/2013 16:24							
30	1202347915.1	1.0000	73.9	2.0399E-05	8/29/2011 0:00	H2	2	9042	35178	9/10/2013 16:24							
31	1202347916.1	1.0000	95.2	2.0399E-05	8/29/2011 0:00	H3	2	7905	33170	9/10/2013 16:24							
32	1202347917.1	1.0000	103	2.0399E-05	8/29/2011 0:00	H4	2	5830	32212	9/10/2013 16:24							
33	1202347918.1	1.0000	0	2.0399E-05	8/29/2011 0:00	I1	2	24148	42138	9/10/2013 16:06							
34	1202347919.1	1.0000	10.4	2.0399E-05	8/29/2011 0:00	I2	2	15956	36724	9/10/2013 16:06							
35	1202347920.1	1.0000	23.8	2.0399E-05	8/29/2011 0:00	I3	2	14162	36277	9/10/2013 16:06							
36	1202347921.1	1.0000	44.2	2.0399E-05	8/29/2011 0:00	I4	2	12118	33583	9/10/2013 16:06							
37	1202347922.1	1.0000	54.7	2.0399E-05	8/29/2011 0:00	J1	2	11099	31462	9/10/2013 16:06							
38	1202347923.1	1.0000	73.9	2.0399E-05	8/29/2011 0:00	J2	2	8618	29319	9/10/2013 16:06							
39	1202347924.1	1.0000	95.2	2.0399E-05	8/29/2011 0:00	J3	2	7259	29668	9/10/2013 16:06							
40	1202347925.1	1.0000	103	2.0399E-05	8/29/2011 0:00	J4	2										

Analytical SOP: GL-RAD-A-001  
Instrument SOP: GL-RAD-I-006

Pos.	Calibration Data				Alpha				Beta				Weekly Background					
	Counted on	Calibration Date	Calibration Due Date	Calibration Source Used	Det. Eff. Error (cpm/dpm)	Detector Efficiency (cpm/dpm)	Calibration Date	Calibration Due Date	Calibration Source Used	Calibration Date	Calibration Due Date	Calibration Source Used	Det. Eff. Error (cpm/dpm)	X-Talk	X-Talk	Alpha	Beta	Count Start Date/Time
1	LB4100	10/1/2012	9/30/2016	Th230	0.1780	0.02769	10/1/2012	9/30/2016	Sr90	0.4518	0.02044	0.00009	0.128	1.326	9/8/2013 13:54	500		
2	LB4100	10/1/2012	9/30/2016	Th230	0.1678	0.02957	10/1/2012	9/30/2016	Sr90	0.4462	0.02268	0.00016	0.138	1.102	9/7/2013 17:27	500		
3	LB4100	10/1/2012	9/30/2016	Th230	0.1321	0.02881	10/1/2012	9/30/2016	Sr90	0.4355	0.01784	0.00012	0.112	1.188	9/7/2013 17:27	500		
4	LB4100	10/1/2012	9/30/2016	Th230	0.1222	0.03000	10/1/2012	9/30/2016	Sr90	0.4096	0.00999	0.00009	FAIL	FAIL	42:00:00-AM	0		
5	LB4100	10/1/2012	9/30/2016	Th230	0.1089	0.03002	10/1/2012	9/30/2016	Sr90	0.4181	0.01796	0.00015	0.404	1.124	9/8/2013 19:24	500		
6	LB4100	10/1/2012	9/30/2016	Th230	0.0854	0.03025	10/1/2012	9/30/2016	Sr90	0.3972	0.01320	0.00013	0.076	5.710	9/8/2013 19:24	500		
7	LB4100	10/1/2012	9/30/2016	Th230	0.0679	0.02555	10/1/2012	9/30/2016	Sr90	0.3587	0.00972	0.00015	0.062	16.104	9/8/2013 19:24	500		
8	LB4100	10/1/2012	9/30/2016	Th230	0.2626	0.02356	10/1/2012	9/30/2016	Sr90	0.4618	0.01816	0.00020	0.136	1.494	9/8/2013 20:04	500		
9	LB4100	10/1/2012	9/30/2016	Th230	0.1926	0.02436	10/1/2012	9/30/2016	Sr90	0.4728	0.02351	0.00011	0.234	1.352	9/7/2013 17:52	500		
10	LB4100	10/1/2012	9/30/2016	Th230	0.1436	0.02695	10/1/2012	9/30/2016	Sr90	0.4638	0.02568	0.00011	0.142	1.282	9/7/2013 17:53	500		
11	LB4100	10/1/2012	9/30/2016	Th230	0.0992	0.03542	10/1/2012	9/30/2016	Sr90	0.4495	0.02683	0.00010	0.184	1.714	9/8/2013 20:04	500		
12	LB4100	10/1/2012	9/30/2016	Th230	0.1266	0.03038	10/1/2012	9/30/2016	Sr90	0.4225	0.02033	0.00009	0.146	1.008	9/8/2013 21:41	500		
13	LB4100	10/1/2012	9/30/2016	Th230	0.1040	0.03665	10/1/2012	9/30/2016	Sr90	0.4633	0.01910	0.00010	0.162	1.142	9/8/2013 21:41	500		
14	LB4100	10/1/2012	9/30/2016	Th230	0.0870	0.04268	10/1/2012	9/30/2016	Sr90	0.4377	0.02356	0.00009	0.120	0.998	9/8/2013 21:41	500		
15	LB4100	10/1/2012	9/30/2016	Th230	0.0650	0.03190	10/1/2012	9/30/2016	Sr90	0.4496	0.02254	0.00008	0.048	1.208	9/7/2013 17:20	500		
16	LB4100	10/1/2012	9/30/2016	Th230	0.2461	0.01842	10/1/2012	9/30/2016	Sr90	0.4417	0.01894	0.00018	0.054	1.088	9/8/2013 19:26	500		
17	LB4100	10/1/2012	9/30/2016	Th230	0.1564	0.03047	10/1/2012	9/30/2016	Sr90	0.4325	0.01897	0.00013	0.166	1.132	9/7/2013 17:20	500		
18	LB4100	10/1/2012	9/30/2016	Th230	0.1564	0.02055	10/1/2012	9/30/2016	Sr90	0.4276	0.02127	0.00013	0.136	1.164	9/8/2013 19:26	500		
19	LB4100	10/1/2012	9/30/2016	Th230	0.1141	0.00769	10/1/2012	9/30/2016	Sr90	0.4364	0.00772	0.00015	0.074	1.442	9/7/2013 17:21	500		
20	LB4100	10/1/2012	9/30/2016	Th230	0.1134	0.01144	10/1/2012	9/30/2016	Sr90	0.4106	0.01365	0.00010	0.106	0.952	9/8/2013 19:27	500		
21	LB4100	10/1/2012	9/30/2016	Th230	0.0957	0.03128	10/1/2012	9/30/2016	Sr90	0.4005	0.00991	0.00011	0.096	0.992	9/7/2013 17:21	500		
22	LB4100	10/1/2012	9/30/2016	Th230	0.0792	0.02244	10/1/2012	9/30/2016	Sr90	0.3994	0.00850	0.00012	0.176	2.136	9/8/2013 19:27	500		
23	LB4100	10/1/2012	9/30/2016	Th230	0.0589	0.02882	10/1/2012	9/30/2016	Sr90	0.4573	0.01543	0.00009	0.118	0.978	9/7/2013 17:30	500		
24	LB4100	10/1/2012	9/30/2016	Th230	0.2192	0.03411	10/1/2012	9/30/2016	Sr90	0.4575	0.01349	0.00017	0.102	0.948	9/8/2013 19:36	500		
25	LB4100	10/1/2012	9/30/2016	Th230	0.1719	0.01976	10/1/2012	9/30/2016	Sr90	0.4572	0.01089	0.00023	0.192	1.504	9/7/2013 17:30	500		
26	LB4100	10/1/2012	9/30/2016	Th230	0.1298	0.02238	10/1/2012	9/30/2016	Sr90	0.4289	0.00955	0.00016	0.126	1.112	9/7/2013 17:30	500		
27	LB4100	10/1/2012	9/30/2016	Th230	0.1071	0.02077	10/1/2012	9/30/2016	Sr90	0.4184	0.00955	0.00014	0.178	1.090	9/8/2013 19:15	500		
28	LB4100	10/1/2012	9/30/2016	Th230	0.1116	0.01393	10/1/2012	9/30/2016	Sr90	0.4093	0.00824	0.00014	0.124	1.304	9/8/2013 19:15	500		
29	LB4100	10/1/2012	9/30/2016	Th230	0.0909	0.01701	10/1/2012	9/30/2016	Sr90	0.4019	0.00824	0.00019	0.124	1.304	9/8/2013 19:15	500		
30	LB4100	10/1/2012	9/30/2016	Th230	0.0846	0.01513	10/1/2012	9/30/2016	Sr90	0.3864	0.00628	0.00012	0.120	0.992	9/7/2013 17:20	500		
31	LB4100	10/1/2012	9/30/2016	Th230	0.0664	0.02054	10/1/2012	9/30/2016	Sr90	0.3432	0.01079	0.00020	0.112	0.744	9/7/2013 17:20	500		
32	LB4100	10/1/2012	9/30/2016	Th230	0.2365	0.00598	10/1/2012	9/30/2016	Sr90	0.4621	0.00589	0.00010	0.104	3.108	9/8/2013 18:10	500		
33	LB4100	10/1/2012	9/30/2016	Th230	0.2152	0.00564	10/1/2012	9/30/2016	Sr90	0.4246	0.01267	0.00012	0.062	1.876	9/7/2013 17:20	500		
34	LB4100	10/1/2012	9/30/2016	Th230	0.1774	0.01009	10/1/2012	9/30/2016	Sr90	0.4335	0.01087	0.00014	0.124	1.184	9/8/2013 18:10	500		
35	LB4100	10/1/2012	9/30/2016	Th230	0.1351	0.00692	10/1/2012	9/30/2016	Sr90	0.4246	0.01267	0.00012	0.062	1.876	9/7/2013 17:20	500		
36	LB4100	10/1/2012	9/30/2016	Th230	0.1155	0.01256	10/1/2012	9/30/2016	Sr90	0.3956	0.01589	0.00016	0.068	1.008	9/8/2013 18:10	500		
37	LB4100	10/1/2012	9/30/2016	Th230	0.1110	0.00765	10/1/2012	9/30/2016	Sr90	0.3759	0.01035	0.00023	0.046	1.006	9/8/2013 18:10	500		
38	LB4100	10/1/2012	9/30/2016	Th230	0.0881	0.01198	10/1/2012	9/30/2016	Sr90	0.3624	0.01579	0.00011	0.134	0.856	9/8/2013 18:10	500		
39	LB4100	10/1/2012	9/30/2016	Th230	0.0811	0.01086	10/1/2012	9/30/2016	Sr90	0.3674	0.01072	0.00016	0.086	0.978	9/7/2013 17:20	500		
40	LB4100	10/1/2012	9/30/2016	Th230	0.0816	0.01086	10/1/2012	9/30/2016	Sr90	0.3674	0.01072	0.00016	0.086	0.978	9/7/2013 17:20	500		

Notes:

1 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date

Pos.	Alpha Results		Critical Level	Required MDA	MDA	Sample Act. Conc.	Sample Act. Error	Net Count Rate	Net Count Rate Error	Counting Uncertainty	2 SIGMA		Sample Type	RPD	RER	Nominal	Recovery
	Decision Level	pCi/L									Total Prop. Uncertainty	pCi/L					
1	1.4948	1.0553	1	5.9070	20890.4135	0.0288	8256.3720	64.2515	318.7187	3593.7126	LCS				20916.1917	99.9%	
2	1.6459	1.1620	1	6.3497	21310.6049	0.0306	7943.8620	63.0238	331.5211	3692.7710	LCS				20916.1917	101.9%	
3	1.8846	1.3305	1	7.7778	20025.4153	0.0303	5872.8880	54.1895	362.3018	3465.0291	LCS				20916.1917	95.7%	
4	#DIV/0!	#DIV/0!	4	#DIV/0!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	LCS				20916.1917	#VALUE!	
5	3.8692	2.7317	1	10.9946	23399.5637	0.0167	6077.0960	55.1249	398.4098	3714.5107	LCS				20916.1917	107.1%	
6	1.8824	1.3290	1	8.8622	20811.0271	0.0316	5033.9240	50.1697	406.7163	3620.9356	LCS				20916.1917	99.5%	
7	2.1681	1.5307	1	10.3728	20274.6234	0.0323	3845.9380	43.8520	453.3276	3537.6979	LCS				20916.1917	91.0%	
8	1.8972	1.3395	1	12.6316	19024.6013	0.0244	2869.4700	37.8781	492.5985	3225.0699	LCS				20916.1917	104.2%	
9	1.0444	0.7373	1	4.0478	21787.5660	0.0244	12705.3640	79.7041	267.9845	3691.3506	LCS				20916.1917	104.2%	
10	1.8680	1.3188	1	6.1463	19999.1565	0.0255	8552.2660	65.3930	299.8084	3401.1485	LCS				20916.1917	84.7%	
11	1.9514	1.3777	1	7.4608	17722.3395	0.0285	5651.8580	53.1601	326.8471	3046.7510	LCS				20916.1917	101.2%	
12	3.2146	2.2695	1	11.3482	21159.9419	0.0369	4663.3160	48.2882	429.6383	3765.1036	LCS				20916.1917	97.7%	
13	2.2452	1.5851	1	9.5092	20440.0804	0.0318	5744.3540	53.9334	373.8799	3557.8162	LCS				20916.1917	97.6%	
14	2.8787	2.0324	1	10.5636	20411.7452	0.0361	4713.3380	48.5464	412.2411	3651.2078	LCS				20916.1917	97.5%	
15	2.9593	2.0893	1	11.9409	20392.8596	0.0441	3942.3900	44.3988	450.3221	3755.4554	LCS				20916.1917	90.6%	
16	4.4261	3.1249	1	14.1983	18951.2570	0.0340	3576.7440	42.3025	439.3562	3330.6509	LCS				20916.1917	105.2%	
17	0.6619	-0.4673	1	3.6798	21993.5641	0.0195	12019.4520	77.5226	278.0740	3671.8180	LCS				20916.1917	94.9%	
18	1.1046	0.7798	1	5.8785	19858.6851	0.0316	6900.9460	58.7410	331.4963	3455.5973	LCS				20916.1917	98.1%	
19	1.9372	1.3677	1	7.0556	20508.4654	0.0222	7123.3340	59.6804	336.9035	3450.9403	LCS				20916.1917	112.6%	
20	2.4026	1.6953	1	9.3121	23557.8968	0.0120	5971.8640	54.6443	422.6730	3868.9493	LCS				20916.1917	112.3%	
21	1.7845	1.2599	1	8.4803	23485.1509	0.0147	5912.9260	54.3737	423.4890	3877.1585	LCS				20916.1917	109.3%	
22	2.5043	1.7680	1	10.5250	22866.5456	0.0329	4909.3940	49.5454	452.4600	3998.1265	LCS				20916.1917	94.0%	
23	2.9095	2.0541	1	12.8405	19655.7446	0.0255	3457.4040	41.5792	463.5499	3342.8009	LCS				20916.1917	86.6%	
24	2.9265	3.7394	1	18.9501	18105.3624	0.0321	2369.3240	34.4202	515.9342	3157.1145	LCS				20916.1917	102.5%	
25	1.1653	0.8227	1	4.7277	21434.8374	0.0348	10433.3820	72.2271	290.8957	3778.0440	LCS				20916.1917	96.9%	
26	1.3812	0.9752	1	5.8800	20258.7424	0.0213	7736.8980	62.1973	319.3671	3400.6629	LCS				20916.1917	93.5%	
27	2.5094	1.7717	1	8.7470	19559.6519	0.0243	5642.8090	53.1178	361.1697	3314.2994	LCS				20916.1917	112.3%	
28	2.4648	1.7402	1	9.7897	23491.6656	0.0228	5587.8740	52.8583	435.7730	3923.3704	LCS				20916.1917	113.1%	
29	2.3829	1.6823	1	9.4165	23657.9608	0.0167	5866.8720	54.1618	428.2923	3623.3704	LCS				20916.1917	107.0%	
30	3.0939	2.4363	1	12.3042	22386.0230	0.0200	4520.8220	47.5447	461.6927	3743.7589	LCS				20916.1917	100.5%	
31	3.8821	2.7408	1	15.5644	19774.9259	0.0244	2914.8800	38.1772	507.9654	3351.1203	LCS				20916.1917	94.5%	
32	1.0523	0.7429	1	4.3430	22989.2554	0.0089	10368.3950	72.0711	295.7344	3554.3033	LCS				20916.1917	104.0%	
33	1.1145	0.7869	1	4.7141	21744.2193	0.0089	10368.3950	72.0711	295.7344	3554.3033	LCS				20916.1917	96.8%	
34	1.4764	1.0423	1	5.8941	20254.5240	0.0128	7977.8760	63.1585	314.3865	3331.2769	LCS				20916.1917	112.8%	
35	1.3704	0.9675	1	6.9357	23598.2335	0.0108	7980.9360	59.5021	388.8020	3668.5962	LCS				20916.1917	113.0%	
36	1.6796	1.1858	1	8.2238	23628.7802	0.0155	6066.9320	55.0409	420.8953	3907.4991	LCS				20916.1917	107.6%	
37	1.4372	1.0146	1	8.1178	22510.4315	0.0122	5549.4540	52.6759	419.0683	3689.3385	LCS				20916.1917	105.2%	
38	3.0882	2.1803	1	12.0260	22010.9883	0.0161	4308.8660	46.4166	464.9162	3644.7706	LCS				20916.1917	95.7%	
39	2.6723	1.8867	1	12.0533	20021.1899	0.0160	3629.4140	42.5989	460.8925	3315.2614	LCS				20916.1917	95.7%	



Notes:  
1 - Reference date for Spike Activity (dpm/mt) is the batch Prep Date

Pos.	Beta Results Decision Level	Critical Level	Required MDA	MDA pCi/L	Sample Act. Conc.	Sample Act. Error	Net Count Rate	Net Count Error	2 SIGMA		Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery
									Counting Uncertainty	Total Prop. Uncertainty						
	PC/L	PC/L	PC/L	PC/L	PC/L	PC/L	CPM	CPM	PC/L	PC/L						
1	1.8954	1.3382	1	4.1719	22170.4874	0.0210	22485.1740	106.0342	207.2165	3723.4739	LCS	LCS			19068.8403	116.3%
2	1.7495	1.2352	1	3.9847	21689.8318	0.0232	21702.8980	104.1729	206.1280	3663.5351	LCS	LCS			19068.8403	113.7%
3	1.8611	1.3140	1	4.1794	19531.0306	0.0186	19073.3120	97.6589	197.9600	3254.6526	LCS	LCS			19068.8403	102.4%
4	#DNV/QI	#DNV/QI	4	#DNV/QI	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	LCS	LCS			#VALUE!	#VALUE!
5	1.9246	1.3588	1	4.3669	19212.4092	0.0187	17570.8760	93.7337	202.0186	3189.0189	LCS	LCS			19068.8403	100.8%
6	4.2499	3.0005	1	7.6169	19952.0328	0.0151	17874.7900	94.5530	199.6558	3150.7758	LCS	LCS			19068.8403	99.9%
7	7.5123	5.3038	1	12.3085	18935.3165	0.0143	16532.3960	90.9631	202.1723	3082.1490	LCS	LCS			19068.8403	97.2%
8	2.1606	1.5254	1	4.9346	18296.9902	0.0113	14686.4140	85.6957	210.9419	2996.1568	LCS	LCS			19068.8403	96.0%
9	1.9680	1.3895	1	4.2419	20936.6954	0.0188	21625.5060	103.9880	198.7679	3481.7703	LCS	LCS			19068.8403	109.8%
10	1.8290	1.2913	1	4.0118	20434.6681	0.0240	21730.6480	104.2401	194.6709	3471.1662	LCS	LCS			19068.8403	100.0%
11	1.8155	1.2817	1	4.0203	19061.5938	0.0264	18994.7180	99.7397	189.8710	3285.7653	LCS	LCS			19068.8403	107.2%
12	2.1661	1.5293	1	4.5618	18959.3098	0.0273	19182.7860	97.8190	192.2865	3256.9403	LCS	LCS			19068.8403	99.4%
13	1.7672	1.2476	1	4.0946	18945.0563	0.0210	18791.4920	96.9343	202.5678	3327.5289	LCS	LCS			19068.8403	104.1%
14	1.7153	1.2110	1	3.8805	18673.3237	0.0198	19392.3590	96.4721	187.6602	3120.8246	LCS	LCS			19068.8403	97.9%
15	1.6606	1.1724	1	3.8553	18276.2439	0.0256	18373.5020	95.8502	189.1695	3118.3523	LCS	LCS			19068.8403	95.9%
16	2.6989	1.9055	1	5.3545	18401.0898	0.0241	18134.4760	95.2287	192.0724	3130.0345	LCS	LCS			19068.8403	96.5%
17	1.6179	1.2834	1	-4.0697	21768.1768	0.0230	21878.7920	104.5945	205.3956	3663.5658	LCS	LCS			19068.8403	114.2%
18	1.7559	1.2397	1	4.0090	21141.7481	0.0196	21021.4120	102.5244	204.9106	3545.9530	LCS	LCS			19068.8403	110.9%
19	1.8293	1.2915	1	4.1451	19729.8696	0.0196	19093.3680	97.7100	199.4515	3290.1366	LCS	LCS			19068.8403	103.5%
20	1.8761	1.3245	1	4.2290	19176.5755	0.0219	18373.3360	95.8602	197.8854	3223.1404	LCS	LCS			19068.8403	100.6%
21	2.0463	1.4447	1	4.4378	19130.7168	0.0093	18668.0580	96.6165	195.4757	3120.6953	LCS	LCS			19068.8403	100.3%
22	1.7672	1.2477	1	4.1411	18838.3899	0.0147	17417.0480	93.3220	200.6928	3123.6276	LCS	LCS			19068.8403	98.8%
23	1.8491	1.3055	1	4.2979	18655.0233	0.0112	16800.0080	91.6543	202.0276	3068.5633	LCS	LCS			19068.8403	97.8%
24	2.7214	1.9213	1	5.5345	18015.7196	0.0102	16184.8640	89.9639	199.8855	2959.9538	LCS	LCS			19068.8403	94.5%
25	1.6081	1.1353	1	3.7481	22001.2575	0.0161	22495.5220	106.0578	204.7524	3633.7397	LCS	LCS			19068.8403	115.4%
26	1.5826	1.1773	1	3.7116	21554.2930	0.0143	22153.5520	105.2485	203.1089	3562.8054	LCS	LCS			19068.8403	113.0%
27	1.9947	1.4063	1	4.2944	19446.1642	0.0120	20057.9960	100.1487	193.3961	3213.7090	LCS	LCS			19068.8403	102.0%
28	1.8282	1.2907	1	4.1567	19244.9009	0.0107	18487.8880	96.1483	197.9067	3150.8278	LCS	LCS			19068.8403	100.9%
29	1.8555	1.3100	1	4.2348	19512.7105	0.0110	18304.9100	95.6713	201.8729	3199.2981	LCS	LCS			19068.8403	102.3%
30	1.8866	1.3319	1	4.3149	19151.2278	0.0109	17587.9220	93.7790	202.3099	3142.2782	LCS	LCS			19068.8403	100.4%
31	2.1131	1.4919	1	4.6651	18395.4688	0.0099	16593.6960	91.0632	200.0635	3012.9186	LCS	LCS			19068.8403	96.5%
32	1.9166	1.3591	1	4.4547	18490.0728	0.0084	16105.0080	89.7385	205.0232	3036.5893	LCS	LCS			19068.8403	97.0%
33	1.4773	1.0430	1	3.6422	21757.2502	0.0118	21069.2560	102.6377	208.7078	3553.6144	LCS	LCS			19068.8403	114.1%
34	2.8999	2.0473	1	5.9893	20905.8156	0.0076	21091.3920	102.6999	200.5664	3366.3262	LCS	LCS			19068.8403	109.6%
35	1.8665	1.3177	1	4.1941	18954.3226	0.0119	18360.8160	95.8175	195.1361	3101.8831	LCS	LCS			19068.8403	99.4%
36	1.6392	1.1573	1	3.9058	19133.3242	0.0138	18137.6240	95.2326	198.0175	3139.9636	LCS	LCS			19068.8403	100.3%
37	1.8874	1.3325	1	4.3732	18982.0918	0.0168	16765.4920	91.5601	204.3572	3135.8619	LCS	LCS			19068.8403	99.5%
38	1.9842	1.4008	1	4.5991	18757.2155	0.0118	17229.9940	88.6877	206.2998	3064.2865	LCS	LCS			19068.8403	98.4%
39	1.8987	1.3405	1	4.5456	18128.1857	0.0168	14658.6440	85.6140	208.5958	2993.2727	LCS	LCS			19068.8403	95.1%
40	2.0016	1.4131	1	4.6653	18030.9201	0.0122	14833.0220	86.1220	206.9525	2958.4581	LCS	LCS			19068.8403	94.6%

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
V1	A1	2	16513	44973	9/10/2013 16:30	9/10/2013 16:32	LB4100	GABV13
V2	A2	2	15888	43408	9/10/2013 16:30	9/10/2013 16:32	LB4100	GABV13
V3	A3	2	11746	38149	9/10/2013 16:30	9/10/2013 16:32	LB4100	GABV13
V4	A4	0.01	0	14	9/10/2013 16:32	9/10/2013 16:32	LB4100	GABV13
V5	B1	2	12155	35144	9/10/2013 16:30	9/10/2013 16:32	LB4100	GABV13
V6	B2	2	10068	35761	9/10/2013 16:30	9/10/2013 16:32	LB4100	GABV13
V7	B3	2	7692	33097	9/10/2013 16:30	9/10/2013 16:32	LB4100	GABV13
V8	B4	2	5739	29375	9/10/2013 16:30	9/10/2013 16:32	LB4100	GABV13
V1	C1	2	25411	43254	9/10/2013 16:13	9/10/2013 16:15	LB4100	GABV13
V2	C2	2	17105	43464	9/10/2013 16:13	9/10/2013 16:15	LB4100	GABV13
V3	C3	2	11304	39792	9/10/2013 16:13	9/10/2013 16:15	LB4100	GABV13
V4	C4	2	9327	38329	9/10/2013 16:13	9/10/2013 16:15	LB4100	GABV13
V5	D1	2	11489	37585	9/10/2013 16:14	9/10/2013 16:16	LB4100	GABV13
V6	D2	2	9427	38787	9/10/2013 16:14	9/10/2013 16:16	LB4100	GABV13
V7	D3	2	7885	36749	9/10/2013 16:14	9/10/2013 16:16	LB4100	GABV13
V8	D4	2	7158	36274	9/10/2013 16:14	9/10/2013 16:16	LB4100	GABV13
V1	E1	2	24039	43760	9/10/2013 16:19	9/10/2013 16:21	LB4100	GABV13
V2	E2	2	13802	42045	9/10/2013 16:19	9/10/2013 16:21	LB4100	GABV13
V3	E3	2	14247	38189	9/10/2013 16:19	9/10/2013 16:21	LB4100	GABV13
V4	E4	2	11944	36749	9/10/2013 16:19	9/10/2013 16:21	LB4100	GABV13
V5	F1	2	11826	37339	9/10/2013 16:19	9/10/2013 16:21	LB4100	GABV13
V6	F2	2	9819	34836	9/10/2013 16:19	9/10/2013 16:21	LB4100	GABV13
V7	F3	2	6915	33602	9/10/2013 16:19	9/10/2013 16:21	LB4100	GABV13
V8	F4	2	4739	32374	9/10/2013 16:19	9/10/2013 16:21	LB4100	GABV13
V1	G1	2	20867	44993	9/10/2013 16:24	9/10/2013 16:26	LB4100	GABV13
V2	G2	2	15474	44309	9/10/2013 16:24	9/10/2013 16:26	LB4100	GABV13
V3	G3	2	11286	40119	9/10/2013 16:24	9/10/2013 16:26	LB4100	GABV13
V4	G4	2	11176	36978	9/10/2013 16:24	9/10/2013 16:26	LB4100	GABV13
V5	H1	2	11734	36612	9/10/2013 16:24	9/10/2013 16:26	LB4100	GABV13
V6	H2	2	9042	35178	9/10/2013 16:24	9/10/2013 16:26	LB4100	GABV13
V7	H3	2	7905	33170	9/10/2013 16:24	9/10/2013 16:26	LB4100	GABV13
V8	H4	2	5830	32212	9/10/2013 16:24	9/10/2013 16:26	LB4100	GABV13
V1	I1	2	24148	42138	9/10/2013 16:06	9/10/2013 16:08	LB4100	GABV13
V2	I2	2	20777	42189	9/10/2013 16:06	9/10/2013 16:08	LB4100	GABV13
V3	I3	2	15956	36724	9/10/2013 16:06	9/10/2013 16:08	LB4100	GABV13
V4	I4	2	14162	36277	9/10/2013 16:06	9/10/2013 16:08	LB4100	GABV13

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V5	J1	2	12118	33533	9/10/2013 16:06	9/10/2013 16:08	LB4100	GABV13
V6	J2	2	11099	31462	9/10/2013 16:06	9/10/2013 16:08	LB4100	GABV13
V7	J3	2	8618	29319	9/10/2013 16:06	9/10/2013 16:08	LB4100	GABV13
V8	J4	2	7259	29668	9/10/2013 16:06	9/10/2013 16:08	LB4100	GABV13

Detector #	Sample I.D.	Pgm time (min)	Total (counts)	Voltage	%slope/100V	Date/Time
A1	Sr-90'	0.11	1	750	1.2	7/1/2009 15:09
A1	Sr-90'	0.12	1	780	2.2	7/1/2009 15:09
A1	Sr-90'	0.5	71	810	3.6	7/1/2009 15:10
A1	Sr-90'	0.5	197	840	6.3	7/1/2009 15:11
A1	Sr-90'	0.5	436	870	9.1	7/1/2009 15:11
A1	Sr-90'	0.5	768	900	11.7	7/1/2009 15:12
A1	Sr-90'	0.5	1146	930	14.3	7/1/2009 15:12
A1	Sr-90'	0.5	1601	960	17.2	7/1/2009 15:13
A1	Sr-90'	0.5	2167	990	20.3	7/1/2009 15:14
A1	Sr-90'	0.5	2839	1020	23.6	7/1/2009 15:14
A1	Sr-90'	0.5	3575	1050	27.3	7/1/2009 15:15
A1	Sr-90'	0.5	4430	1080	33.0	7/1/2009 15:16
A1	Sr-90'	0.5	5461	1110	38.9	7/1/2009 15:16
A1	Sr-90'	0.5	6850	1140	44.3	7/1/2009 15:17
A1	Sr-90'	0.5	8198	1170	46.9	7/1/2009 15:18
A1	Sr-90'	0.5	9713	1200	44.5	7/1/2009 15:18
A1	Sr-90'	0.5	11070	1230	40.2	7/1/2009 15:19
A1	Sr-90'	0.5	12096	1260	32.3	7/1/2009 15:20
A1	Sr-90'	0.5	13036	1290	23.4	7/1/2009 15:20
A1	Sr-90'	0.5	13569	1320	14.3	7/1/2009 15:21
A1	Sr-90'	0.5	13839	1350	7.0	7/1/2009 15:21
A1	Sr-90'	0.5	13834	1380	5.3	7/1/2009 15:22
A1	Sr-90'	0.5	13947	1410	3.7	7/1/2009 15:23
A1	Sr-90'	0.5	14310	1440	4.9	7/1/2009 15:23
A1	Sr-90'	0.5	14159	1470	1.6	7/1/2009 15:24
A1	Sr-90'	0.5	14463	1500	-0.7	7/1/2009 15:25
A1	Sr-90'	0.5	14107	1530	0.8	7/1/2009 15:25
A1	Sr-90'	0.5	14237	1560	-1.5	7/1/2009 15:53
A1	Sr-90'	0.5	14392	1590	0.1	7/1/2009 15:53
A1	Sr-90'	0.5	14095	1620	16.5	7/1/2009 15:54
A1	Sr-90'	0.5	14197	1650	16.6	7/1/2009 15:55
A2	Sr-90'	0.11	5	750	16.4	7/1/2009 15:09
A2	Sr-90'	0.5	52	780	16.3	7/1/2009 15:09
A2	Sr-90'	0.5	164	810	5.3	7/1/2009 15:10
A2	Sr-90'	0.5	362	840	8.4	7/1/2009 15:11
A2	Sr-90'	0.5	643	870	11.5	7/1/2009 15:11
A2	Sr-90'	0.5	1065	900	15.3	7/1/2009 15:12
A2	Sr-90'	0.5	1537	930	19.4	7/1/2009 15:12
A2	Sr-90'	0.5	2206	960	23.9	7/1/2009 15:13
A2	Sr-90'	0.5	2982	990	29.1	7/1/2009 15:14
A2	Sr-90'	0.5	3922	1020	32.4	7/1/2009 15:14
A2	Sr-90'	0.5	5045	1050	38.2	7/1/2009 15:15
A2	Sr-90'	0.5	6034	1080	44.5	7/1/2009 15:16
A2	Sr-90'	0.5	7649	1110	49.6	7/1/2009 15:16
A2	Sr-90'	0.5	9297	1140	57.5	7/1/2009 15:17
A2	Sr-90'	0.5	10846	1170	55.5	7/1/2009 15:18
A2	Sr-90'	0.5	13066	1200	52.9	7/1/2009 15:18
A2	Sr-90'	0.5	14085	1230	46.3	7/1/2009 15:19
A2	Sr-90'	0.5	15618	1260	35.4	7/1/2009 15:20
A2	Sr-90'	0.5	16518	1290	29.3	7/1/2009 15:20
A2	Sr-90'	0.5	17153	1320	18.3	7/1/2009 15:21
A2	Sr-90'	0.5	17712	1350	9.3	7/1/2009 15:21
A2	Sr-90'	0.5	17772	1380	1.8	7/1/2009 15:22
A2	Sr-90'	0.5	17602	1410	-1.3	7/1/2009 15:23
A2	Sr-90'	0.5	17483	1440	-1.1	7/1/2009 15:23
A2	Sr-90'	0.5	17666	1470	1.0	7/1/2009 15:24
A2	Sr-90'	0.5	17571	1500	2.6	7/1/2009 15:25
A2	Sr-90'	0.5	17710	1530	2.0	7/1/2009 15:25
A2	Sr-90'	0.5	17851	1560	1.0	7/1/2009 15:53
A2	Sr-90'	0.5	17830	1590	-1.5	7/1/2009 15:53
A2	Sr-90'	0.5	17655	1620	20.6	7/1/2009 15:54
A2	Sr-90'	0.5	17586	1650	20.6	7/1/2009 15:55
A3	Sr-90'	0.12	2	750	20.5	7/1/2009 15:09
A3	Sr-90'	0.11	10	780	20.3	7/1/2009 15:09
A3	Sr-90'	0.5	158	810	6.3	7/1/2009 15:10
A3	Sr-90'	0.5	412	840	9.8	7/1/2009 15:11
A3	Sr-90'	0.5	752	870	13.1	7/1/2009 15:11
A3	Sr-90'	0.5	1186	900	16.1	7/1/2009 15:12

A3	Sr-90'	0.5	1743	930	20.3	7/1/2009 15:12
A3	Sr-90'	0.5	2332	960	24.4	7/1/2009 15:13
A3	Sr-90'	0.5	3228	990	28.2	7/1/2009 15:14
A3	Sr-90'	0.5	4102	1020	33.6	7/1/2009 15:14
A3	Sr-90'	0.5	5082	1050	38.9	7/1/2009 15:15
A3	Sr-90'	0.5	6439	1080	47.4	7/1/2009 15:16
A3	Sr-90'	0.5	7892	1110	54.0	7/1/2009 15:16
A3	Sr-90'	0.5	9804	1140	56.5	7/1/2009 15:17
A3	Sr-90'	0.5	11495	1170	55.1	7/1/2009 15:18
A3	Sr-90'	0.5	13109	1200	49.0	7/1/2009 15:18
A3	Sr-90'	0.5	14504	1230	41.8	7/1/2009 15:19
A3	Sr-90'	0.5	15649	1260	31.8	7/1/2009 15:20
A3	Sr-90'	0.5	16497	1290	21.3	7/1/2009 15:20
A3	Sr-90'	0.5	16882	1320	11.8	7/1/2009 15:21
A3	Sr-90'	0.5	17082	1350	6.1	7/1/2009 15:21
A3	Sr-90'	0.5	17120	1380	5.1	7/1/2009 15:22
A3	Sr-90'	0.5	17292	1410	4.4	7/1/2009 15:23
A3	Sr-90'	0.5	17541	1440	3.6	7/1/2009 15:23
A3	Sr-90'	0.5	17524	1470	1.1	7/1/2009 15:24
A3	Sr-90'	0.5	17542	1500	-0.5	7/1/2009 15:25
A3	Sr-90'	0.5	17462	1530	-0.2	7/1/2009 15:25
A3	Sr-90'	0.5	17501	1560	-0.4	7/1/2009 15:53
A3	Sr-90'	0.5	17517	1590	0.0	7/1/2009 15:53
A3	Sr-90'	0.5	17449	1620	-0.4	7/1/2009 15:54
A3	Sr-90'	0.5	17488	1650	-0.5	7/1/2009 15:55
A4	Sr-90'	0.12	0		1.3	7/1/2009 15:09
A4	Sr-90'	0.11	0		#DIV/0!	7/1/2009 15:09
A4	Sr-90'	0.12	0		#DIV/0!	7/1/2009 15:10
A4	Sr-90'	0.12	0		#DIV/0!	7/1/2009 15:11
A4	Sr-90'	0.12	0		#DIV/0!	7/1/2009 15:11
A4	Sr-90'	0.12	0		#DIV/0!	7/1/2009 15:12
A4	Sr-90'	0.12	0		#DIV/0!	7/1/2009 15:12
A4	Sr-90'	0.12	0		#DIV/0!	7/1/2009 15:13
A4	Sr-90'	0.11	0		#DIV/0!	7/1/2009 15:14
A4	Sr-90'	0.11	0		#DIV/0!	7/1/2009 15:14
A4	Sr-90'	0.11	0		#DIV/0!	7/1/2009 15:15
A4	Sr-90'	0.11	0		#DIV/0!	7/1/2009 15:16
A4	Sr-90'	0.11	0		#DIV/0!	7/1/2009 15:16
A4	Sr-90'	0.11	0		#DIV/0!	7/1/2009 15:17
A4	Sr-90'	0.11	0		#DIV/0!	7/1/2009 15:18
A4	Sr-90'	0.11	0		#DIV/0!	7/1/2009 15:18
A4	Sr-90'	0.11	0		#DIV/0!	7/1/2009 15:19
A4	Sr-90'	0.11	0		#DIV/0!	7/1/2009 15:20
A4	Sr-90'	0.12	0		#DIV/0!	7/1/2009 15:20
A4	Sr-90'	0.11	0		#DIV/0!	7/1/2009 15:21
A4	Sr-90'	0.11	0		#DIV/0!	7/1/2009 15:21
A4	Sr-90'	0.12	0		#DIV/0!	7/1/2009 15:22
A4	Sr-90'	0.12	0		#DIV/0!	7/1/2009 15:23
A4	Sr-90'	0.12	0		#DIV/0!	7/1/2009 15:23
A4	Sr-90'	0.12	0		#DIV/0!	7/1/2009 15:24
A4	Sr-90'	0.13	0		#DIV/0!	7/1/2009 15:25
A4	Sr-90'	0.12	0		#DIV/0!	7/1/2009 15:25
A4	Sr-90'	0.12	0		#DIV/0!	7/1/2009 15:26
A4	Sr-90'	0.12	0		#DIV/0!	7/1/2009 15:53
A4	Sr-90'	0.12	0		#DIV/0!	7/1/2009 15:54
A4	Sr-90'	0.12	0		0.1	7/1/2009 15:55
B1	Sr-90'	0.11	2	750	1.2	7/1/2009 15:09
B1	Sr-90'	0.12	5	780	2.8	7/1/2009 15:09
B1	Sr-90'	0.5	74	810	4.9	7/1/2009 15:10
B1	Sr-90'	0.5	259	840	8.8	7/1/2009 15:10
B1	Sr-90'	0.5	604	870	12.3	7/1/2009 15:11
B1	Sr-90'	0.5	1066	900	16.1	7/1/2009 15:12
B1	Sr-90'	0.5	1521	930	20.5	7/1/2009 15:12
B1	Sr-90'	0.5	2215	960	24.7	7/1/2009 15:13
B1	Sr-90'	0.5	3106	990	29.4	7/1/2009 15:14
B1	Sr-90'	0.5	3985	1020	34.3	7/1/2009 15:14
B1	Sr-90'	0.5	5047	1050	39.2	7/1/2009 15:15
B1	Sr-90'	0.5	6386	1080	46.0	7/1/2009 15:16
B1	Sr-90'	0.5	7782	1110	53.3	7/1/2009 15:16
B1	Sr-90'	0.5	9521	1140	58.8	7/1/2009 15:17

B1	Sr-90'	0.5	11467	1170	61.3	7/1/2009 15:18
B1	Sr-90'	0.5	13368	1200	60.4	7/1/2009 15:18
B1	Sr-90'	0.5	15059	1230	52.4	7/1/2009 15:19
B1	Sr-90'	0.5	16782	1260	40.4	7/1/2009 15:20
B1	Sr-90'	0.5	17615	1290	27.3	7/1/2009 15:20
B1	Sr-90'	0.5	18143	1320	17.5	7/1/2009 15:21
B1	Sr-90'	0.5	18471	1350	17.1	7/1/2009 15:22
B1	Sr-90'	0.5	18973	1380	14.4	7/1/2009 15:22
B1	Sr-90'	0.5	19758	1410	12.4	7/1/2009 15:23
B1	Sr-90'	0.5	19657	1440	11.1	7/1/2009 15:24
B1	Sr-90'	0.5	19984	1470	5.9	7/1/2009 15:25
B1	Sr-90'	0.49	20518	1500	4.2	7/1/2009 15:26
B1	Sr-90'	0.47	20211	1530	1.5	7/1/2009 15:54
B1	Sr-90'	0.43	20172	1560	0.2	7/1/2009 15:55
B1	Sr-90'	0.41	20383	1590	1.5	7/1/2009 15:57
B1	Sr-90'	0.4	20465	1620		7/1/2009 15:58
B1	Sr-90'	0.39	20290	1650		7/1/2009 16:00
B2	Sr-90'	0.11	0	750		7/1/2009 15:09
B2	Sr-90'	0.11	9	780		7/1/2009 15:09
B2	Sr-90'	0.5	109	810	5.8	7/1/2009 15:10
B2	Sr-90'	0.5	325	840	9.8	7/1/2009 15:10
B2	Sr-90'	0.5	717	870	13.6	7/1/2009 15:11
B2	Sr-90'	0.5	1181	900	17.1	7/1/2009 15:12
B2	Sr-90'	0.5	1714	930	21.6	7/1/2009 15:12
B2	Sr-90'	0.5	2393	960	26.7	7/1/2009 15:13
B2	Sr-90'	0.5	3345	990	34.1	7/1/2009 15:14
B2	Sr-90'	0.5	4370	1020	41.0	7/1/2009 15:14
B2	Sr-90'	0.5	5845	1050	47.3	7/1/2009 15:15
B2	Sr-90'	0.5	7288	1080	53.3	7/1/2009 15:16
B2	Sr-90'	0.5	8981	1110	59.1	7/1/2009 15:16
B2	Sr-90'	0.5	10794	1140	66.4	7/1/2009 15:17
B2	Sr-90'	0.5	12959	1170	70.8	7/1/2009 15:18
B2	Sr-90'	0.5	15256	1200	68.7	7/1/2009 15:18
B2	Sr-90'	0.5	17372	1230	55.6	7/1/2009 15:19
B2	Sr-90'	0.5	18895	1260	39.3	7/1/2009 15:20
B2	Sr-90'	0.5	19482	1290	27.6	7/1/2009 15:20
B2	Sr-90'	0.49	20099	1320	15.3	7/1/2009 15:21
B2	Sr-90'	0.5	20913	1350	7.7	7/1/2009 15:22
B2	Sr-90'	0.48	20468	1380	0.8	7/1/2009 15:22
B2	Sr-90'	0.46	20449	1410	-1.9	7/1/2009 15:23
B2	Sr-90'	0.46	20458	1440	1.9	7/1/2009 15:24
B2	Sr-90'	0.45	20631	1470	-0.2	7/1/2009 15:25
B2	Sr-90'	0.43	20659	1500	-0.4	7/1/2009 15:26
B2	Sr-90'	0.4	20326	1530	-4.0	7/1/2009 15:54
B2	Sr-90'	0.37	20546	1560	-1.6	7/1/2009 15:55
B2	Sr-90'	0.35	20090	1590	1.1	7/1/2009 15:57
B2	Sr-90'	0.34	20530	1620		7/1/2009 15:58
B2	Sr-90'	0.33	20505	1650		7/1/2009 16:00
B3	Sr-90'	0.16	4	750		7/1/2009 15:09
B3	Sr-90'	0.11	7	780		7/1/2009 15:09
B3	Sr-90'	0.5	123	810	5.1	7/1/2009 15:10
B3	Sr-90'	0.5	351	840	8.9	7/1/2009 15:10
B3	Sr-90'	0.5	602	870	12.1	7/1/2009 15:11
B3	Sr-90'	0.5	1104	900	16.3	7/1/2009 15:12
B3	Sr-90'	0.5	1561	930	20.0	7/1/2009 15:12
B3	Sr-90'	0.5	2320	960	23.4	7/1/2009 15:13
B3	Sr-90'	0.5	3001	990	28.5	7/1/2009 15:14
B3	Sr-90'	0.5	3889	1020	32.8	7/1/2009 15:14
B3	Sr-90'	0.5	5051	1050	39.8	7/1/2009 15:15
B3	Sr-90'	0.5	6217	1080	46.0	7/1/2009 15:16
B3	Sr-90'	0.5	7803	1110	53.0	7/1/2009 15:16
B3	Sr-90'	0.5	9410	1140	58.7	7/1/2009 15:17
B3	Sr-90'	0.5	11403	1170	61.2	7/1/2009 15:18
B3	Sr-90'	0.5	13228	1200	58.5	7/1/2009 15:18
B3	Sr-90'	0.5	15074	1230	47.7	7/1/2009 15:19
B3	Sr-90'	0.5	16346	1260	34.9	7/1/2009 15:20
B3	Sr-90'	0.5	17002	1290	21.9	7/1/2009 15:20
B3	Sr-90'	0.5	17498	1320	17.0	7/1/2009 15:21
B3	Sr-90'	0.5	17784	1350	19.0	7/1/2009 15:22
B3	Sr-90'	0.5	18505	1380	19.3	7/1/2009 15:22

B3	Sr-90'	0.5	19344	1410	19.5	7/1/2009 15:23
B3	Sr-90'	0.5	19614	1440	14.7	7/1/2009 15:24
B3	Sr-90'	0.5	20160	1470	8.1	7/1/2009 15:25
B3	Sr-90'	0.49	20302	1500	4.3	7/1/2009 15:26
B3	Sr-90'	0.46	20220	1530	0.7	7/1/2009 15:54
B3	Sr-90'	0.42	20225	1560	1.2	7/1/2009 15:55
B3	Sr-90'	0.4	20304	1590	1.4	7/1/2009 15:57
B3	Sr-90'	0.39	20442	1620		7/1/2009 15:58
B3	Sr-90'	0.38	20327	1650		7/1/2009 16:00
B4	Sr-90'	0.12	0	750		7/1/2009 15:09
B4	Sr-90'	0.11	6	780		7/1/2009 15:09
B4	Sr-90'	0.5	96	810	5.1	7/1/2009 15:10
B4	Sr-90'	0.5	302	840	8.3	7/1/2009 15:10
B4	Sr-90'	0.5	616	870	11.7	7/1/2009 15:11
B4	Sr-90'	0.5	992	900	15.1	7/1/2009 15:12
B4	Sr-90'	0.5	1511	930	18.6	7/1/2009 15:12
B4	Sr-90'	0.5	2118	960	22.1	7/1/2009 15:13
B4	Sr-90'	0.5	2837	990	26.1	7/1/2009 15:14
B4	Sr-90'	0.5	3650	1020	32.3	7/1/2009 15:14
B4	Sr-90'	0.5	4667	1050	38.3	7/1/2009 15:15
B4	Sr-90'	0.5	6052	1080	44.6	7/1/2009 15:16
B4	Sr-90'	0.5	7378	1110	51.6	7/1/2009 15:16
B4	Sr-90'	0.5	8977	1140	54.8	7/1/2009 15:17
B4	Sr-90'	0.5	10948	1170	57.4	7/1/2009 15:18
B4	Sr-90'	0.5	12490	1200	54.0	7/1/2009 15:18
B4	Sr-90'	0.5	14225	1230	42.7	7/1/2009 15:19
B4	Sr-90'	0.5	15436	1260	31.5	7/1/2009 15:20
B4	Sr-90'	0.5	15887	1290	20.5	7/1/2009 15:20
B4	Sr-90'	0.5	16380	1320	16.2	7/1/2009 15:21
B4	Sr-90'	0.5	16833	1350	18.5	7/1/2009 15:22
B4	Sr-90'	0.5	17391	1380	17.3	7/1/2009 15:22
B4	Sr-90'	0.5	18163	1410	16.2	7/1/2009 15:23
B4	Sr-90'	0.5	18306	1440	15.9	7/1/2009 15:24
B4	Sr-90'	0.5	18799	1470	17.1	7/1/2009 15:25
B4	Sr-90'	0.5	19464	1500	16.9	7/1/2009 15:53
B4	Sr-90'	0.48	20148	1530	13.5	7/1/2009 15:54
B4	Sr-90'	0.45	20170	1560	7.4	7/1/2009 15:55
B4	Sr-90'	0.43	20474	1590	1.8	7/1/2009 15:57
B4	Sr-90'	0.42	20404	1620	23.6	7/1/2009 15:58
B4	Sr-90'	0.4	20306	1650	23.8	7/1/2009 16:00
C1	Sr-90'	0.11	3	750	23.7	7/1/2009 15:09
C1	Sr-90'	0.12	8	780	23.5	7/1/2009 15:09
C1	Sr-90'	0.5	135	810	5.9	7/1/2009 15:10
C1	Sr-90'	0.5	353	840	9.2	7/1/2009 15:10
C1	Sr-90'	0.5	711	870	12.0	7/1/2009 15:11
C1	Sr-90'	0.5	1103	900	14.8	7/1/2009 15:11
C1	Sr-90'	0.5	1565	930	18.4	7/1/2009 15:12
C1	Sr-90'	0.5	2153	960	22.0	7/1/2009 15:13
C1	Sr-90'	0.5	2943	990	26.8	7/1/2009 15:13
C1	Sr-90'	0.5	3707	1020	31.9	7/1/2009 15:14
C1	Sr-90'	0.5	4809	1050	37.8	7/1/2009 15:15
C1	Sr-90'	0.5	6002	1080	44.8	7/1/2009 15:15
C1	Sr-90'	0.5	7464	1110	49.4	7/1/2009 15:16
C1	Sr-90'	0.5	9096	1140	54.5	7/1/2009 15:16
C1	Sr-90'	0.5	10669	1170	56.4	7/1/2009 15:17
C1	Sr-90'	0.5	12567	1200	51.0	7/1/2009 15:18
C1	Sr-90'	0.5	14181	1230	44.2	7/1/2009 15:18
C1	Sr-90'	0.5	14993	1260	33.0	7/1/2009 15:19
C1	Sr-90'	0.5	16093	1290	22.2	7/1/2009 15:20
C1	Sr-90'	0.5	16566	1320	14.2	7/1/2009 15:20
C1	Sr-90'	0.5	16722	1350	6.5	7/1/2009 15:21
C1	Sr-90'	0.5	16806	1380	5.5	7/1/2009 15:22
C1	Sr-90'	0.5	16948	1410	4.8	7/1/2009 15:22
C1	Sr-90'	0.5	17275	1440	1.1	7/1/2009 15:23
C1	Sr-90'	0.5	17203	1470	-0.4	7/1/2009 15:23
C1	Sr-90'	0.5	16846	1500	-1.1	7/1/2009 15:24
C1	Sr-90'	0.5	17103	1530	-1.1	7/1/2009 15:25
C1	Sr-90'	0.5	17160	1560	0.7	7/1/2009 15:25
C1	Sr-90'	0.5	16887	1590	-1.3	7/1/2009 15:26
C1	Sr-90'	0.5	17065	1620		7/1/2009 15:27

C1	Sr-90'	0.5	16958	1650		7/1/2009 15:21
C2	Sr-90'	0.11	0	750		7/1/2009 15:09
C2	Sr-90'	0.12	1	780		7/1/2009 15:09
C2	Sr-90'	0.5	47	810	3.2	7/1/2009 15:10
C2	Sr-90'	0.5	176	840	5.8	7/1/2009 15:10
C2	Sr-90'	0.5	397	870	9.0	7/1/2009 15:11
C2	Sr-90'	0.5	700	900	12.3	7/1/2009 15:11
C2	Sr-90'	0.5	1129	930	15.6	7/1/2009 15:12
C2	Sr-90'	0.5	1653	960	19.5	7/1/2009 15:13
C2	Sr-90'	0.5	2258	990	24.3	7/1/2009 15:13
C2	Sr-90'	0.5	3063	1020	28.9	7/1/2009 15:14
C2	Sr-90'	0.5	4071	1050	33.8	7/1/2009 15:15
C2	Sr-90'	0.5	5074	1080	39.0	7/1/2009 15:15
C2	Sr-90'	0.5	6319	1110	46.0	7/1/2009 15:16
C2	Sr-90'	0.5	7785	1140	53.8	7/1/2009 15:17
C2	Sr-90'	0.5	9615	1170	56.3	7/1/2009 15:17
C2	Sr-90'	0.5	11493	1200	55.4	7/1/2009 15:18
C2	Sr-90'	0.5	12903	1230	51.4	7/1/2009 15:18
C2	Sr-90'	0.5	14448	1260	43.4	7/1/2009 15:19
C2	Sr-90'	0.5	15845	1290	36.3	7/1/2009 15:20
C2	Sr-90'	0.5	16538	1320	26.0	7/1/2009 15:20
C2	Sr-90'	0.5	17303	1350	16.2	7/1/2009 15:21
C2	Sr-90'	0.5	17622	1380	8.3	7/1/2009 15:22
C2	Sr-90'	0.5	17729	1410	1.2	7/1/2009 15:22
C2	Sr-90'	0.5	17572	1440	-0.5	7/1/2009 15:23
C2	Sr-90'	0.5	17507	1470	0.5	7/1/2009 15:23
C2	Sr-90'	0.5	17657	1500	2.7	7/1/2009 15:24
C2	Sr-90'	0.5	17758	1530	1.4	7/1/2009 15:25
C2	Sr-90'	0.5	17852	1560	1.7	7/1/2009 15:25
C2	Sr-90'	0.5	17621	1590	0.7	7/1/2009 15:26
C2	Sr-90'	0.5	17984	1620		7/1/2009 15:27
C2	Sr-90'	0.5	17797	1650		7/1/2009 15:27
C3	Sr-90'	0.11	0	750		7/1/2009 15:09
C3	Sr-90'	0.11	1	780		7/1/2009 15:09
C3	Sr-90'	0.11	5	810	3.3	7/1/2009 15:10
C3	Sr-90'	0.5	146	840	6.5	7/1/2009 15:10
C3	Sr-90'	0.5	419	870	10.9	7/1/2009 15:11
C3	Sr-90'	0.5	776	900	14.3	7/1/2009 15:11
C3	Sr-90'	0.5	1319	930	17.7	7/1/2009 15:12
C3	Sr-90'	0.5	1837	960	21.7	7/1/2009 15:13
C3	Sr-90'	0.5	2548	990	25.2	7/1/2009 15:13
C3	Sr-90'	0.5	3420	1020	31.1	7/1/2009 15:14
C3	Sr-90'	0.5	4313	1050	36.7	7/1/2009 15:15
C3	Sr-90'	0.5	5621	1080	42.8	7/1/2009 15:15
C3	Sr-90'	0.5	6946	1110	51.9	7/1/2009 15:16
C3	Sr-90'	0.5	8517	1140	58.5	7/1/2009 15:17
C3	Sr-90'	0.5	10649	1170	64.5	7/1/2009 15:17
C3	Sr-90'	0.5	12537	1200	67.2	7/1/2009 15:18
C3	Sr-90'	0.5	14612	1230	64.4	7/1/2009 15:18
C3	Sr-90'	0.5	16617	1260	56.7	7/1/2009 15:19
C3	Sr-90'	0.5	18266	1290	44.5	7/1/2009 15:20
C3	Sr-90'	0.5	19218	1320	30.5	7/1/2009 15:20
C3	Sr-90'	0.5	19990	1350	17.2	7/1/2009 15:21
C3	Sr-90'	0.5	20330	1380	9.3	7/1/2009 15:22
C3	Sr-90'	0.5	20293	1410	3.9	7/1/2009 15:22
C3	Sr-90'	0.5	20457	1440	1.2	7/1/2009 15:23
C3	Sr-90'	0.49	20504	1470	2.9	7/1/2009 15:23
C3	Sr-90'	0.49	20402	1500	-0.1	7/1/2009 15:24
C3	Sr-90'	0.5	20751	1530	-0.7	7/1/2009 15:25
C3	Sr-90'	0.49	20326	1560	1.1	7/1/2009 15:25
C3	Sr-90'	0.49	20435	1590	1.3	7/1/2009 15:26
C3	Sr-90'	0.5	20730	1620		7/1/2009 15:27
C3	Sr-90'	0.5	20748	1650		7/1/2009 15:27
C4	Sr-90'	0.12	0	750		7/1/2009 15:09
C4	Sr-90'	0.11	0	780		7/1/2009 15:09
C4	Sr-90'	0.11	2	810	2.1	7/1/2009 15:10
C4	Sr-90'	0.5	103	840	4.3	7/1/2009 15:10
C4	Sr-90'	0.5	259	870	6.9	7/1/2009 15:11
C4	Sr-90'	0.5	521	900	9.3	7/1/2009 15:11
C4	Sr-90'	0.5	831	930	11.9	7/1/2009 15:12



C4	Sr-90'	0.5	1210	990	17.4	7/1/2009 15:10
C4	Sr-90'	0.5	1699	990	17.6	7/1/2009 15:13
C4	Sr-90'	0.5	2244	1020	21.6	7/1/2009 15:14
C4	Sr-90'	0.5	2955	1050	25.8	7/1/2009 15:15
C4	Sr-90'	0.5	3821	1080	31.0	7/1/2009 15:15
C4	Sr-90'	0.5	4783	1110	35.5	7/1/2009 15:16
C4	Sr-90'	0.5	5977	1140	38.8	7/1/2009 15:17
C4	Sr-90'	0.5	7204	1170	43.3	7/1/2009 15:17
C4	Sr-90'	0.5	8425	1200	44.9	7/1/2009 15:18
C4	Sr-90'	0.5	10053	1230	42.6	7/1/2009 15:18
C4	Sr-90'	0.5	11280	1260	36.6	7/1/2009 15:19
C4	Sr-90'	0.5	12165	1290	28.3	7/1/2009 15:20
C4	Sr-90'	0.5	12855	1320	20.1	7/1/2009 15:20
C4	Sr-90'	0.5	13515	1350	13.9	7/1/2009 15:21
C4	Sr-90'	0.5	13616	1380	8.4	7/1/2009 15:22
C4	Sr-90'	0.5	13872	1410	4.0	7/1/2009 15:22
C4	Sr-90'	0.5	13942	1440	3.0	7/1/2009 15:23
C4	Sr-90'	0.5	13948	1470	1.3	7/1/2009 15:23
C4	Sr-90'	0.5	14027	1500	3.1	7/1/2009 15:24
C4	Sr-90'	0.5	14021	1530	2.0	7/1/2009 15:25
C4	Sr-90'	0.5	14373	1560	0.9	7/1/2009 15:25
C4	Sr-90'	0.5	14078	1590	0.1	7/1/2009 15:26
C4	Sr-90'	0.5	14134	1620		7/1/2009 15:27
C4	Sr-90'	0.5	14161	1650		7/1/2009 15:27
D1	Sr-90'	0.11	0	750		7/1/2009 15:09
D1	Sr-90'	0.11	1	780		7/1/2009 15:09
D1	Sr-90'	0.5	72	810	5.0	7/1/2009 15:10
D1	Sr-90'	0.5	270	840	8.8	7/1/2009 15:11
D1	Sr-90'	0.5	615	870	13.4	7/1/2009 15:11
D1	Sr-90'	0.5	1053	900	17.1	7/1/2009 15:12
D1	Sr-90'	0.5	1693	930	20.6	7/1/2009 15:13
D1	Sr-90'	0.5	2291	960	23.8	7/1/2009 15:14
D1	Sr-90'	0.5	3080	990	28.2	7/1/2009 15:15
D1	Sr-90'	0.5	3936	1020	34.8	7/1/2009 15:15
D1	Sr-90'	0.5	5093	1050	40.1	7/1/2009 15:16
D1	Sr-90'	0.5	6502	1080	48.6	7/1/2009 15:17
D1	Sr-90'	0.5	7816	1110	56.3	7/1/2009 15:18
D1	Sr-90'	0.5	9861	1140	62.6	7/1/2009 15:19
D1	Sr-90'	0.5	11853	1170	66.5	7/1/2009 15:19
D1	Sr-90'	0.5	13871	1200	63.1	7/1/2009 15:20
D1	Sr-90'	0.5	15783	1230	56.3	7/1/2009 15:21
D1	Sr-90'	0.5	17367	1260	45.6	7/1/2009 15:22
D1	Sr-90'	0.5	18552	1290	32.7	7/1/2009 15:22
D1	Sr-90'	0.5	19322	1320	19.4	7/1/2009 15:23
D1	Sr-90'	0.5	19713	1350	10.4	7/1/2009 15:24
D1	Sr-90'	0.5	19695	1380	5.3	7/1/2009 15:25
D1	Sr-90'	0.5	19923	1410	2.4	7/1/2009 15:26
D1	Sr-90'	0.5	20015	1440	-0.9	7/1/2009 15:26
D1	Sr-90'	0.5	19909	1470	-2.8	7/1/2009 15:27
D1	Sr-90'	0.5	19560	1500	-3.0	7/1/2009 15:28
D1	Sr-90'	0.5	19731	1530	-0.4	7/1/2009 15:29
D1	Sr-90'	0.5	19656	1560	1.3	7/1/2009 15:30
D1	Sr-90'	0.5	19805	1590	0.8	7/1/2009 15:30
D1	Sr-90'	0.5	19711	1620		7/1/2009 15:31
D1	Sr-90'	0.5	19827	1650		7/1/2009 15:32
D2	Sr-90'	0.11	2	750		7/1/2009 15:09
D2	Sr-90'	0.11	0	780		7/1/2009 15:09
D2	Sr-90'	0.12	8	810	3.7	7/1/2009 15:10
D2	Sr-90'	0.5	183	840	7.3	7/1/2009 15:11
D2	Sr-90'	0.5	461	870	11.1	7/1/2009 15:11
D2	Sr-90'	0.5	873	900	14.3	7/1/2009 15:12
D2	Sr-90'	0.5	1331	930	17.1	7/1/2009 15:13
D2	Sr-90'	0.5	1899	960	20.1	7/1/2009 15:14
D2	Sr-90'	0.5	2520	990	24.9	7/1/2009 15:15
D2	Sr-90'	0.5	3298	1020	30.4	7/1/2009 15:15
D2	Sr-90'	0.5	4359	1050	36.7	7/1/2009 15:16
D2	Sr-90'	0.5	5534	1080	42.9	7/1/2009 15:17
D2	Sr-90'	0.5	6912	1110	48.8	7/1/2009 15:18
D2	Sr-90'	0.5	8458	1140	55.7	7/1/2009 15:19
D2	Sr-90'	0.5	10221	1170	60.7	7/1/2009 15:19

D2	Sr-90'	0.5	12229	1200	59.3	7/1/2009 15:20
D2	Sr-90'	0.5	14132	1230	54.2	7/1/2009 15:21
D2	Sr-90'	0.5	15397	1260	44.8	7/1/2009 15:22
D2	Sr-90'	0.5	16761	1290	32.3	7/1/2009 15:22
D2	Sr-90'	0.5	17632	1320	23.4	7/1/2009 15:23
D2	Sr-90'	0.5	17862	1350	14.5	7/1/2009 15:24
D2	Sr-90'	0.5	18357	1380	8.4	7/1/2009 15:25
D2	Sr-90'	0.5	18569	1410	4.9	7/1/2009 15:26
D2	Sr-90'	0.5	18543	1440	-2.0	7/1/2009 15:26
D2	Sr-90'	0.5	18507	1470	-1.9	7/1/2009 15:27
D2	Sr-90'	0.5	18087	1500	-0.4	7/1/2009 15:28
D2	Sr-90'	0.5	18508	1530	1.2	7/1/2009 15:29
D2	Sr-90'	0.5	18487	1560	2.0	7/1/2009 15:30
D2	Sr-90'	0.5	18483	1590		7/1/2009 15:30
D2	Sr-90'	0.5	18406	1620		7/1/2009 15:31
D2	Sr-90'	0.5	18558	1650		7/1/2009 15:32
D3	Sr-90'	0.11	0	750		7/1/2009 15:09
D3	Sr-90'	0.11	2	780		7/1/2009 15:09
D3	Sr-90'	0.11	13	810	3.5	7/1/2009 15:10
D3	Sr-90'	0.5	180	840	7.3	7/1/2009 15:11
D3	Sr-90'	0.5	443	870	11.9	7/1/2009 15:11
D3	Sr-90'	0.5	889	900	16.7	7/1/2009 15:12
D3	Sr-90'	0.5	1450	930	21.0	7/1/2009 15:13
D3	Sr-90'	0.5	2177	960	24.5	7/1/2009 15:14
D3	Sr-90'	0.5	2948	990	29.5	7/1/2009 15:15
D3	Sr-90'	0.5	3811	1020	35.9	7/1/2009 15:15
D3	Sr-90'	0.5	5065	1050	43.8	7/1/2009 15:16
D3	Sr-90'	0.5	6499	1080	51.6	7/1/2009 15:17
D3	Sr-90'	0.5	8172	1110	58.7	7/1/2009 15:18
D3	Sr-90'	0.5	10000	1140	67.5	7/1/2009 15:19
D3	Sr-90'	0.5	12119	1170	72.7	7/1/2009 15:19
D3	Sr-90'	0.5	14648	1200	75.0	7/1/2009 15:20
D3	Sr-90'	0.5	16756	1230	69.6	7/1/2009 15:21
D3	Sr-90'	0.5	18932	1260	50.7	7/1/2009 15:22
D3	Sr-90'	0.49	20419	1290	28.7	7/1/2009 15:22
D3	Sr-90'	0.47	20417	1320	7.9	7/1/2009 15:23
D3	Sr-90'	0.45	20316	1350	1.1	7/1/2009 15:24
D3	Sr-90'	0.44	20172	1380	-0.5	7/1/2009 15:25
D3	Sr-90'	0.45	20699	1410	3.2	7/1/2009 15:26
D3	Sr-90'	0.44	20157	1440	0.3	7/1/2009 15:26
D3	Sr-90'	0.45	20796	1470	-3.9	7/1/2009 15:27
D3	Sr-90'	0.44	20171	1500	-0.2	7/1/2009 15:28
D3	Sr-90'	0.44	20106	1530	0.5	7/1/2009 15:29
D3	Sr-90'	0.44	20476	1560	4.9	7/1/2009 15:30
D3	Sr-90'	0.45	20713	1590	3.7	7/1/2009 15:30
D3	Sr-90'	0.45	20599	1620		7/1/2009 15:31
D3	Sr-90'	0.45	20602	1650		7/1/2009 15:32
D4	Sr-90'	0.11	1	750		7/1/2009 15:09
D4	Sr-90'	0.11	1	780		7/1/2009 15:09
D4	Sr-90'	0.11	7	810	3.2	7/1/2009 15:10
D4	Sr-90'	0.5	147	840	7.0	7/1/2009 15:11
D4	Sr-90'	0.5	404	870	11.2	7/1/2009 15:11
D4	Sr-90'	0.5	853	900	15.0	7/1/2009 15:12
D4	Sr-90'	0.5	1327	930	17.8	7/1/2009 15:13
D4	Sr-90'	0.5	1936	960	20.5	7/1/2009 15:14
D4	Sr-90'	0.5	2527	990	24.2	7/1/2009 15:15
D4	Sr-90'	0.5	3323	1020	29.1	7/1/2009 15:15
D4	Sr-90'	0.5	4264	1050	36.1	7/1/2009 15:16
D4	Sr-90'	0.5	5435	1080	42.7	7/1/2009 15:17
D4	Sr-90'	0.5	6888	1110	51.1	7/1/2009 15:18
D4	Sr-90'	0.5	8412	1140	56.9	7/1/2009 15:19
D4	Sr-90'	0.5	10493	1170	59.9	7/1/2009 15:19
D4	Sr-90'	0.5	12204	1200	61.4	7/1/2009 15:20
D4	Sr-90'	0.5	13978	1230	56.9	7/1/2009 15:21
D4	Sr-90'	0.5	15844	1260	49.4	7/1/2009 15:22
D4	Sr-90'	0.5	17152	1290	38.6	7/1/2009 15:22
D4	Sr-90'	0.5	18022	1320	24.6	7/1/2009 15:23
D4	Sr-90'	0.5	18681	1350	14.6	7/1/2009 15:24
D4	Sr-90'	0.5	18775	1380	10.1	7/1/2009 15:25
D4	Sr-90'	0.5	18959	1410	5.8	7/1/2009 15:26

D4	Sr-90'	0.5	19392	1440	2.8	7/1/2009 15:26
D4	Sr-90'	0.5	19243	1470	-2.5	7/1/2009 15:27
D4	Sr-90'	0.5	19058	1500	-4.4	7/1/2009 15:28
D4	Sr-90'	0.5	18753	1530	-2.5	7/1/2009 15:29
D4	Sr-90'	0.5	18970	1560	2.3	7/1/2009 15:30
D4	Sr-90'	0.5	18909	1590	2.7	7/1/2009 15:30
D4	Sr-90'	0.5	19318	1620		7/1/2009 15:31
D4	Sr-90'	0.5	18979	1650		7/1/2009 15:32
E1	Sr-90'	0.11	2	750		7/1/2009 16:53
E1	Sr-90'	0.11	5	780		7/1/2009 16:54
E1	Sr-90'	0.5	105	810	4.8	7/1/2009 16:54
E1	Sr-90'	0.5	272	840	7.7	7/1/2009 16:55
E1	Sr-90'	0.5	586	870	10.2	7/1/2009 16:55
E1	Sr-90'	0.5	917	900	12.7	7/1/2009 16:56
E1	Sr-90'	0.5	1310	930	15.1	7/1/2009 16:57
E1	Sr-90'	0.5	1822	960	17.8	7/1/2009 16:57
E1	Sr-90'	0.5	2394	990	21.9	7/1/2009 16:58
E1	Sr-90'	0.5	3047	1020	26.4	7/1/2009 16:59
E1	Sr-90'	0.5	3979	1050	30.7	7/1/2009 16:59
E1	Sr-90'	0.5	4991	1080	36.2	7/1/2009 17:00
E1	Sr-90'	0.5	6025	1110	40.8	7/1/2009 17:00
E1	Sr-90'	0.5	7460	1140	44.7	7/1/2009 17:01
E1	Sr-90'	0.5	8857	1170	46.7	7/1/2009 17:02
E1	Sr-90'	0.5	10283	1200	42.6	7/1/2009 17:02
E1	Sr-90'	0.5	11614	1230	36.4	7/1/2009 17:03
E1	Sr-90'	0.5	12474	1260	28.4	7/1/2009 17:04
E1	Sr-90'	0.5	13226	1290	20.6	7/1/2009 17:04
E1	Sr-90'	0.5	13737	1320	14.1	7/1/2009 17:05
E1	Sr-90'	0.5	14075	1350	7.7	7/1/2009 17:05
E1	Sr-90'	0.5	14159	1380	3.5	7/1/2009 17:06
E1	Sr-90'	0.5	14167	1410	2.0	7/1/2009 17:07
E1	Sr-90'	0.5	14219	1440	3.8	7/1/2009 17:07
E1	Sr-90'	0.5	14348	1470	3.2	7/1/2009 17:08
E1	Sr-90'	0.5	14643	1500	0.4	7/1/2009 17:09
E1	Sr-90'	0.5	14432	1530	-0.1	7/1/2009 17:09
E1	Sr-90'	0.5	14241	1560	-0.1	7/1/2009 17:10
E1	Sr-90'	0.5	14536	1590	2.5	7/1/2009 17:10
E1	Sr-90'	0.5	14569	1620		7/1/2009 17:11
E1	Sr-90'	0.5	14650	1650		7/1/2009 17:12
E2	Sr-90'	0.11	1	750		7/1/2009 16:53
E2	Sr-90'	0.11	3	780		7/1/2009 16:54
E2	Sr-90'	0.5	81	810	4.5	7/1/2009 16:54
E2	Sr-90'	0.5	238	840	7.9	7/1/2009 16:55
E2	Sr-90'	0.5	551	870	11.3	7/1/2009 16:55
E2	Sr-90'	0.5	958	900	15.1	7/1/2009 16:56
E2	Sr-90'	0.5	1416	930	18.1	7/1/2009 16:57
E2	Sr-90'	0.5	2066	960	21.2	7/1/2009 16:57
E2	Sr-90'	0.5	2713	990	25.8	7/1/2009 16:58
E2	Sr-90'	0.5	3496	1020	30.6	7/1/2009 16:59
E2	Sr-90'	0.5	4569	1050	37.2	7/1/2009 16:59
E2	Sr-90'	0.5	5734	1080	44.5	7/1/2009 17:00
E2	Sr-90'	0.5	7168	1110	50.7	7/1/2009 17:00
E2	Sr-90'	0.5	8866	1140	56.4	7/1/2009 17:01
E2	Sr-90'	0.5	10605	1170	58.5	7/1/2009 17:02
E2	Sr-90'	0.5	12472	1200	55.9	7/1/2009 17:02
E2	Sr-90'	0.5	14141	1230	48.8	7/1/2009 17:03
E2	Sr-90'	0.5	15488	1260	37.9	7/1/2009 17:04
E2	Sr-90'	0.5	16420	1290	27.4	7/1/2009 17:04
E2	Sr-90'	0.5	17015	1320	19.0	7/1/2009 17:05
E2	Sr-90'	0.5	17485	1350	12.1	7/1/2009 17:05
E2	Sr-90'	0.5	17805	1380	6.0	7/1/2009 17:06
E2	Sr-90'	0.5	17843	1410	2.5	7/1/2009 17:07
E2	Sr-90'	0.5	17729	1440	0.6	7/1/2009 17:07
E2	Sr-90'	0.5	17899	1470	0.2	7/1/2009 17:08
E2	Sr-90'	0.5	17869	1500	1.8	7/1/2009 17:09
E2	Sr-90'	0.5	17806	1530	0.0	7/1/2009 17:09
E2	Sr-90'	0.5	18040	1560	2.2	7/1/2009 17:10
E2	Sr-90'	0.5	17819	1590	1.9	7/1/2009 17:10
E2	Sr-90'	0.5	18188	1620		7/1/2009 17:11
E2	Sr-90'	0.5	18023	1650		7/1/2009 17:12

E3	Sr-90'	0.11	6	750		7/1/2009 16:53
E3	Sr-90'	0.5	100	780		7/1/2009 16:54
E3	Sr-90'	0.5	299	810	8.2	7/1/2009 16:54
E3	Sr-90'	0.5	562	840	12.0	7/1/2009 16:55
E3	Sr-90'	0.5	998	870	15.3	7/1/2009 16:55
E3	Sr-90'	0.5	1557	900	18.2	7/1/2009 16:56
E3	Sr-90'	0.5	2103	930	21.5	7/1/2009 16:57
E3	Sr-90'	0.5	2734	960	25.7	7/1/2009 16:57
E3	Sr-90'	0.5	3637	990	32.2	7/1/2009 16:58
E3	Sr-90'	0.5	4648	1020	38.0	7/1/2009 16:59
E3	Sr-90'	0.5	5981	1050	43.0	7/1/2009 16:59
E3	Sr-90'	0.5	7264	1080	48.2	7/1/2009 17:00
E3	Sr-90'	0.5	8773	1110	52.4	7/1/2009 17:00
E3	Sr-90'	0.5	10478	1140	56.1	7/1/2009 17:01
E3	Sr-90'	0.5	12239	1170	54.1	7/1/2009 17:02
E3	Sr-90'	0.5	13953	1200	47.1	7/1/2009 17:02
E3	Sr-90'	0.5	15145	1230	37.8	7/1/2009 17:03
E3	Sr-90'	0.5	16088	1260	27.2	7/1/2009 17:04
E3	Sr-90'	0.5	16835	1290	18.2	7/1/2009 17:04
E3	Sr-90'	0.5	17187	1320	9.6	7/1/2009 17:05
E3	Sr-90'	0.5	17323	1350	4.3	7/1/2009 17:05
E3	Sr-90'	0.5	17281	1380	4.2	7/1/2009 17:06
E3	Sr-90'	0.5	17438	1410	2.2	7/1/2009 17:07
E3	Sr-90'	0.5	17763	1440	1.7	7/1/2009 17:07
E3	Sr-90'	0.5	17411	1470	-0.9	7/1/2009 17:08
E3	Sr-90'	0.5	17545	1500	-0.4	7/1/2009 17:09
E3	Sr-90'	0.5	17408	1530	2.9	7/1/2009 17:09
E3	Sr-90'	0.5	17704	1560	1.8	7/1/2009 17:10
E3	Sr-90'	0.5	17768	1590	0.6	7/1/2009 17:10
E3	Sr-90'	0.5	17641	1620		7/1/2009 17:11
E3	Sr-90'	0.5	17535	1650		7/1/2009 17:12
E4	Sr-90'	0.12	0	750		7/1/2009 16:53
E4	Sr-90'	0.12	1	780		7/1/2009 16:54
E4	Sr-90'	0.5	62	810	3.5	7/1/2009 16:54
E4	Sr-90'	0.5	205	840	6.0	7/1/2009 16:55
E4	Sr-90'	0.5	428	870	8.7	7/1/2009 16:55
E4	Sr-90'	0.5	712	900	12.1	7/1/2009 16:56
E4	Sr-90'	0.5	1114	930	15.5	7/1/2009 16:57
E4	Sr-90'	0.5	1670	960	17.6	7/1/2009 16:57
E4	Sr-90'	0.5	2269	990	21.0	7/1/2009 16:58
E4	Sr-90'	0.5	2774	1020	25.3	7/1/2009 16:59
E4	Sr-90'	0.5	3713	1050	30.9	7/1/2009 16:59
E4	Sr-90'	0.5	4742	1080	38.0	7/1/2009 17:00
E4	Sr-90'	0.5	5922	1110	41.9	7/1/2009 17:00
E4	Sr-90'	0.5	7364	1140	46.6	7/1/2009 17:01
E4	Sr-90'	0.5	8687	1170	48.0	7/1/2009 17:02
E4	Sr-90'	0.5	10345	1200	46.5	7/1/2009 17:02
E4	Sr-90'	0.5	11633	1230	42.6	7/1/2009 17:03
E4	Sr-90'	0.5	12867	1260	35.1	7/1/2009 17:04
E4	Sr-90'	0.5	13814	1290	27.5	7/1/2009 17:04
E4	Sr-90'	0.5	14521	1320	17.8	7/1/2009 17:05
E4	Sr-90'	0.5	14937	1350	11.4	7/1/2009 17:05
E4	Sr-90'	0.5	14976	1380	6.8	7/1/2009 17:06
E4	Sr-90'	0.5	15298	1410	4.0	7/1/2009 17:07
E4	Sr-90'	0.5	15356	1440	3.4	7/1/2009 17:07
E4	Sr-90'	0.5	15348	1470	2.5	7/1/2009 17:08
E4	Sr-90'	0.5	15467	1500	1.5	7/1/2009 17:09
E4	Sr-90'	0.5	15614	1530	-0.3	7/1/2009 17:09
E4	Sr-90'	0.5	15441	1560	-2.2	7/1/2009 17:10
E4	Sr-90'	0.5	15310	1590	-0.7	7/1/2009 17:10
E4	Sr-90'	0.5	15285	1620		7/1/2009 17:11
E4	Sr-90'	0.5	15594	1650		7/1/2009 17:12
F1	Sr-90'	0.11	1	750		7/1/2009 16:53
F1	Sr-90'	0.5	41	780		7/1/2009 16:54
F1	Sr-90'	0.5	140	810	5.8	7/1/2009 16:54
F1	Sr-90'	0.5	386	840	9.6	7/1/2009 16:55
F1	Sr-90'	0.5	692	870	13.4	7/1/2009 16:55
F1	Sr-90'	0.5	1203	900	17.5	7/1/2009 16:56
F1	Sr-90'	0.5	1739	930	22.0	7/1/2009 16:57
F1	Sr-90'	0.5	2486	960	24.4	7/1/2009 16:57

F1	Sr-90'	0.5	3345	990	28.5	7/1/2009 16:55
F1	Sr-90'	0.5	4063	1020	33.4	7/1/2009 16:59
F1	Sr-90'	0.5	5218	1050	39.9	7/1/2009 16:59
F1	Sr-90'	0.5	6559	1080	49.9	7/1/2009 17:00
F1	Sr-90'	0.5	8089	1110	56.9	7/1/2009 17:00
F1	Sr-90'	0.5	10105	1140	63.2	7/1/2009 17:01
F1	Sr-90'	0.5	11973	1170	63.6	7/1/2009 17:02
F1	Sr-90'	0.5	14100	1200	60.5	7/1/2009 17:02
F1	Sr-90'	0.5	15625	1230	51.4	7/1/2009 17:03
F1	Sr-90'	0.5	17349	1260	40.8	7/1/2009 17:04
F1	Sr-90'	0.5	18058	1290	29.0	7/1/2009 17:04
F1	Sr-90'	0.5	19007	1320	16.9	7/1/2009 17:05
F1	Sr-90'	0.5	19153	1350	11.1	7/1/2009 17:05
F1	Sr-90'	0.5	19337	1380	4.5	7/1/2009 17:06
F1	Sr-90'	0.5	19560	1410	4.6	7/1/2009 17:07
F1	Sr-90'	0.5	19474	1440	2.9	7/1/2009 17:07
F1	Sr-90'	0.5	19777	1470	2.2	7/1/2009 17:08
F1	Sr-90'	0.5	19660	1500	2.0	7/1/2009 17:09
F1	Sr-90'	0.5	19795	1530	1.4	7/1/2009 17:09
F1	Sr-90'	0.5	19765	1560	1.5	7/1/2009 17:10
F1	Sr-90'	0.5	19927	1590	-0.9	7/1/2009 17:10
F1	Sr-90'	0.5	19825	1620		7/1/2009 17:11
F1	Sr-90'	0.5	19634	1650		7/1/2009 17:12
F2	Sr-90'	0.11	3	750		7/1/2009 16:53
F2	Sr-90'	0.5	75	780		7/1/2009 16:54
F2	Sr-90'	0.5	255	810	8.6	7/1/2009 16:54
F2	Sr-90'	0.5	549	840	12.8	7/1/2009 16:55
F2	Sr-90'	0.5	1053	870	16.1	7/1/2009 16:56
F2	Sr-90'	0.5	1600	900	20.7	7/1/2009 16:56
F2	Sr-90'	0.5	2150	930	24.4	7/1/2009 16:57
F2	Sr-90'	0.5	3108	960	30.2	7/1/2009 16:57
F2	Sr-90'	0.5	3956	990	37.2	7/1/2009 16:58
F2	Sr-90'	0.5	5225	1020	43.1	7/1/2009 16:59
F2	Sr-90'	0.5	6673	1050	52.0	7/1/2009 16:59
F2	Sr-90'	0.5	8221	1080	57.9	7/1/2009 17:00
F2	Sr-90'	0.5	10263	1110	65.3	7/1/2009 17:00
F2	Sr-90'	0.5	12122	1140	70.5	7/1/2009 17:01
F2	Sr-90'	0.5	14514	1170	70.5	7/1/2009 17:02
F2	Sr-90'	0.5	16669	1200	64.7	7/1/2009 17:02
F2	Sr-90'	0.5	18558	1230	50.8	7/1/2009 17:03
F2	Sr-90'	0.5	19798	1260	30.8	7/1/2009 17:04
F2	Sr-90'	0.5	20571	1290	14.2	7/1/2009 17:04
F2	Sr-90'	0.48	20276	1320	4.2	7/1/2009 17:05
F2	Sr-90'	0.48	20444	1350	-2.3	7/1/2009 17:05
F2	Sr-90'	0.48	20498	1380	-0.7	7/1/2009 17:06
F2	Sr-90'	0.47	20110	1410	0.6	7/1/2009 17:07
F2	Sr-90'	0.47	20341	1440	0.6	7/1/2009 17:07
F2	Sr-90'	0.48	20608	1470	2.6	7/1/2009 17:08
F2	Sr-90'	0.47	20343	1500	1.8	7/1/2009 17:09
F2	Sr-90'	0.48	20506	1530	-0.2	7/1/2009 17:09
F2	Sr-90'	0.48	20655	1560	1.8	7/1/2009 17:10
F2	Sr-90'	0.47	20420	1590	-0.3	7/1/2009 17:10
F2	Sr-90'	0.48	20663	1620		7/1/2009 17:11
F2	Sr-90'	0.47	20459	1650		7/1/2009 17:12
F3	Sr-90'	0.11	4	750		7/1/2009 16:53
F3	Sr-90'	0.5	50	780		7/1/2009 16:54
F3	Sr-90'	0.5	177	810	6.3	7/1/2009 16:54
F3	Sr-90'	0.5	380	840	10.6	7/1/2009 16:55
F3	Sr-90'	0.5	779	870	14.1	7/1/2009 16:56
F3	Sr-90'	0.5	1332	900	17.5	7/1/2009 16:56
F3	Sr-90'	0.5	1821	930	21.0	7/1/2009 16:57
F3	Sr-90'	0.5	2490	960	24.7	7/1/2009 16:57
F3	Sr-90'	0.5	3348	990	30.7	7/1/2009 16:58
F3	Sr-90'	0.5	4268	1020	37.1	7/1/2009 16:59
F3	Sr-90'	0.5	5535	1050	43.6	7/1/2009 16:59
F3	Sr-90'	0.5	6954	1080	49.9	7/1/2009 17:00
F3	Sr-90'	0.5	8548	1110	54.8	7/1/2009 17:00
F3	Sr-90'	0.5	10239	1140	59.6	7/1/2009 17:01
F3	Sr-90'	0.5	12114	1170	60.8	7/1/2009 17:02
F3	Sr-90'	0.5	14106	1200	57.4	7/1/2009 17:02

F3	Sr-90'	0.5	15735	1230	48.0	7/1/2009 17:03
F3	Sr-90'	0.5	17035	1260	35.4	7/1/2009 17:04
F3	Sr-90'	0.5	17852	1290	25.4	7/1/2009 17:04
F3	Sr-90'	0.5	18355	1320	15.1	7/1/2009 17:05
F3	Sr-90'	0.5	18889	1350	7.9	7/1/2009 17:05
F3	Sr-90'	0.5	18778	1380	4.9	7/1/2009 17:06
F3	Sr-90'	0.5	18827	1410	2.1	7/1/2009 17:07
F3	Sr-90'	0.5	19124	1440	2.7	7/1/2009 17:07
F3	Sr-90'	0.5	19026	1470	1.2	7/1/2009 17:08
F3	Sr-90'	0.5	19090	1500	-0.3	7/1/2009 17:09
F3	Sr-90'	0.5	19021	1530	0.7	7/1/2009 17:09
F3	Sr-90'	0.5	19089	1560	1.2	7/1/2009 17:10
F3	Sr-90'	0.5	19128	1590	2.1	7/1/2009 17:10
F3	Sr-90'	0.5	19221	1620		7/1/2009 17:11
F3	Sr-90'	0.5	19274	1650		7/1/2009 17:12
F4	Sr-90'	0.12	0	750		7/1/2009 16:53
F4	Sr-90'	0.11	0	780		7/1/2009 16:54
F4	Sr-90'	0.5	125	810	5.6	7/1/2009 16:54
F4	Sr-90'	0.5	346	840	9.4	7/1/2009 16:55
F4	Sr-90'	0.5	671	870	13.3	7/1/2009 16:56
F4	Sr-90'	0.5	1133	900	16.8	7/1/2009 16:56
F4	Sr-90'	0.5	1726	930	20.4	7/1/2009 16:57
F4	Sr-90'	0.5	2343	960	24.5	7/1/2009 16:57
F4	Sr-90'	0.5	3123	990	28.7	7/1/2009 16:58
F4	Sr-90'	0.5	4105	1020	34.6	7/1/2009 16:59
F4	Sr-90'	0.5	5144	1050	40.7	7/1/2009 16:59
F4	Sr-90'	0.5	6524	1080	46.8	7/1/2009 17:00
F4	Sr-90'	0.5	8020	1110	53.6	7/1/2009 17:00
F4	Sr-90'	0.5	9687	1140	59.4	7/1/2009 17:01
F4	Sr-90'	0.5	11603	1170	59.9	7/1/2009 17:02
F4	Sr-90'	0.5	13644	1200	58.2	7/1/2009 17:02
F4	Sr-90'	0.5	15027	1230	50.3	7/1/2009 17:03
F4	Sr-90'	0.5	16711	1260	38.9	7/1/2009 17:04
F4	Sr-90'	0.5	17608	1290	27.3	7/1/2009 17:04
F4	Sr-90'	0.5	18185	1320	15.4	7/1/2009 17:05
F4	Sr-90'	0.5	18391	1350	9.8	7/1/2009 17:05
F4	Sr-90'	0.5	18626	1380	5.6	7/1/2009 17:06
F4	Sr-90'	0.5	18863	1410	3.4	7/1/2009 17:07
F4	Sr-90'	0.5	18792	1440	2.1	7/1/2009 17:07
F4	Sr-90'	0.5	18816	1470	-0.5	7/1/2009 17:08
F4	Sr-90'	0.5	18962	1500	1.5	7/1/2009 17:09
F4	Sr-90'	0.5	18700	1530	1.6	7/1/2009 17:09
F4	Sr-90'	0.5	19073	1560	0.5	7/1/2009 17:10
F4	Sr-90'	0.5	18996	1590	1.6	7/1/2009 17:10
F4	Sr-90'	0.5	18893	1620		7/1/2009 17:11
F4	Sr-90'	0.5	19035	1650		7/1/2009 17:12
G1	Sr-90'	0.11	2	750		7/1/2009 16:53
G1	Sr-90'	0.11	8	780		7/1/2009 16:54
G1	Sr-90'	0.5	142	810	5.3	7/1/2009 16:54
G1	Sr-90'	0.5	309	840	8.5	7/1/2009 16:54
G1	Sr-90'	0.5	643	870	11.6	7/1/2009 16:55
G1	Sr-90'	0.5	1029	900	14.5	7/1/2009 16:56
G1	Sr-90'	0.5	1529	930	17.1	7/1/2009 16:56
G1	Sr-90'	0.5	2045	960	20.8	7/1/2009 16:57
G1	Sr-90'	0.5	2698	990	24.9	7/1/2009 16:58
G1	Sr-90'	0.5	3567	1020	30.5	7/1/2009 16:58
G1	Sr-90'	0.5	4501	1050	34.9	7/1/2009 16:59
G1	Sr-90'	0.5	5717	1080	42.1	7/1/2009 16:59
G1	Sr-90'	0.5	6865	1110	49.7	7/1/2009 17:00
G1	Sr-90'	0.5	8707	1140	54.5	7/1/2009 17:01
G1	Sr-90'	0.5	10467	1170	57.3	7/1/2009 17:01
G1	Sr-90'	0.5	12095	1200	52.8	7/1/2009 17:02
G1	Sr-90'	0.5	13759	1230	47.4	7/1/2009 17:03
G1	Sr-90'	0.5	14976	1260	37.0	7/1/2009 17:03
G1	Sr-90'	0.5	16137	1290	25.1	7/1/2009 17:04
G1	Sr-90'	0.5	16455	1320	16.0	7/1/2009 17:04
G1	Sr-90'	0.5	16791	1350	8.1	7/1/2009 17:05
G1	Sr-90'	0.5	17045	1380	5.8	7/1/2009 17:06
G1	Sr-90'	0.5	17060	1410	2.2	7/1/2009 17:06
G1	Sr-90'	0.5	17183	1440	0.5	7/1/2009 17:07

G1	Sr-90'	0.5	17051	1470	-0.1	7/1/2009 17:08
G1	Sr-90'	0.5	17124	1500	0.2	7/1/2009 17:08
G1	Sr-90'	0.5	17071	1530	1.3	7/1/2009 17:09
G1	Sr-90'	0.5	17202	1560	0.7	7/1/2009 17:09
G1	Sr-90'	0.5	17214	1590	1.5	7/1/2009 17:10
G1	Sr-90'	0.5	17159	1620		7/1/2009 17:11
G1	Sr-90'	0.5	17321	1650		7/1/2009 17:11
G2	Sr-90'	0.11	2	750		7/1/2009 16:53
G2	Sr-90'	0.11	8	780		7/1/2009 16:54
G2	Sr-90'	0.5	148	810	5.7	7/1/2009 16:54
G2	Sr-90'	0.5	324	840	9.1	7/1/2009 16:54
G2	Sr-90'	0.5	700	870	12.3	7/1/2009 16:55
G2	Sr-90'	0.5	1101	900	15.5	7/1/2009 16:56
G2	Sr-90'	0.5	1601	930	18.8	7/1/2009 16:56
G2	Sr-90'	0.5	2197	960	23.0	7/1/2009 16:57
G2	Sr-90'	0.5	2979	990	28.0	7/1/2009 16:58
G2	Sr-90'	0.5	3866	1020	33.2	7/1/2009 16:58
G2	Sr-90'	0.5	4971	1050	38.4	7/1/2009 16:59
G2	Sr-90'	0.5	6177	1080	44.0	7/1/2009 16:59
G2	Sr-90'	0.5	7579	1110	50.4	7/1/2009 17:00
G2	Sr-90'	0.5	9156	1140	56.2	7/1/2009 17:01
G2	Sr-90'	0.5	11042	1170	59.0	7/1/2009 17:01
G2	Sr-90'	0.5	12872	1200	58.2	7/1/2009 17:02
G2	Sr-90'	0.5	14577	1230	50.9	7/1/2009 17:03
G2	Sr-90'	0.5	16124	1260	38.8	7/1/2009 17:03
G2	Sr-90'	0.5	17054	1290	26.4	7/1/2009 17:04
G2	Sr-90'	0.5	17456	1320	16.4	7/1/2009 17:04
G2	Sr-90'	0.5	17867	1350	9.5	7/1/2009 17:05
G2	Sr-90'	0.5	18172	1380	5.6	7/1/2009 17:06
G2	Sr-90'	0.5	18119	1410	3.2	7/1/2009 17:06
G2	Sr-90'	0.5	18174	1440	2.4	7/1/2009 17:07
G2	Sr-90'	0.5	18347	1470	2.6	7/1/2009 17:08
G2	Sr-90'	0.5	18411	1500	2.6	7/1/2009 17:08
G2	Sr-90'	0.5	18383	1530	0.5	7/1/2009 17:09
G2	Sr-90'	0.5	18551	1560	0.4	7/1/2009 17:09
G2	Sr-90'	0.5	18352	1590	-1.0	7/1/2009 17:10
G2	Sr-90'	0.5	18482	1620		7/1/2009 17:11
G2	Sr-90'	0.5	18274	1650		7/1/2009 17:11
G3	Sr-90'	0.11	1	750		7/1/2009 16:53
G3	Sr-90'	0.12	0	780		7/1/2009 16:54
G3	Sr-90'	0.5	43	810	2.8	7/1/2009 16:54
G3	Sr-90'	0.5	140	840	6.1	7/1/2009 16:54
G3	Sr-90'	0.5	346	870	10.0	7/1/2009 16:55
G3	Sr-90'	0.5	770	900	13.8	7/1/2009 16:56
G3	Sr-90'	0.5	1233	930	17.3	7/1/2009 16:56
G3	Sr-90'	0.5	1759	960	21.4	7/1/2009 16:57
G3	Sr-90'	0.5	2451	990	25.6	7/1/2009 16:58
G3	Sr-90'	0.5	3366	1020	31.4	7/1/2009 16:58
G3	Sr-90'	0.5	4276	1050	35.9	7/1/2009 16:59
G3	Sr-90'	0.5	5558	1080	42.3	7/1/2009 16:59
G3	Sr-90'	0.5	6744	1110	49.0	7/1/2009 17:00
G3	Sr-90'	0.5	8480	1140	55.9	7/1/2009 17:01
G3	Sr-90'	0.5	10165	1170	63.6	7/1/2009 17:01
G3	Sr-90'	0.5	12235	1200	67.0	7/1/2009 17:02
G3	Sr-90'	0.5	14404	1230	67.4	7/1/2009 17:03
G3	Sr-90'	0.5	16407	1260	59.3	7/1/2009 17:03
G3	Sr-90'	0.5	18185	1290	47.6	7/1/2009 17:04
G3	Sr-90'	0.5	19233	1320	33.5	7/1/2009 17:04
G3	Sr-90'	0.5	20131	1350	19.1	7/1/2009 17:05
G3	Sr-90'	0.5	20459	1380	9.5	7/1/2009 17:06
G3	Sr-90'	0.49	20432	1410	3.7	7/1/2009 17:06
G3	Sr-90'	0.49	20500	1440	1.6	7/1/2009 17:07
G3	Sr-90'	0.49	20665	1470	-0.3	7/1/2009 17:08
G3	Sr-90'	0.49	20578	1500	-1.6	7/1/2009 17:08
G3	Sr-90'	0.48	20348	1530	-1.6	7/1/2009 17:09
G3	Sr-90'	0.48	20420	1560	1.5	7/1/2009 17:09
G3	Sr-90'	0.48	20503	1590	3.3	7/1/2009 17:10
G3	Sr-90'	0.48	20725	1620		7/1/2009 17:11
G3	Sr-90'	0.48	20692	1650		7/1/2009 17:11
G4	Sr-90'	0.12	0	750		7/1/2009 16:53

G4	Sr-90'	0.12	2	780		7/1/2009 16:54
G4	Sr-90'	0.12	10	810	2.1	7/1/2009 16:54
G4	Sr-90'	0.5	96	840	4.3	7/1/2009 16:54
G4	Sr-90'	0.5	266	870	7.1	7/1/2009 16:55
G4	Sr-90'	0.5	522	900	9.6	7/1/2009 16:56
G4	Sr-90'	0.5	858	930	11.1	7/1/2009 16:56
G4	Sr-90'	0.5	1238	960	13.8	7/1/2009 16:57
G4	Sr-90'	0.5	1580	990	16.0	7/1/2009 16:58
G4	Sr-90'	0.5	2232	1020	19.4	7/1/2009 16:58
G4	Sr-90'	0.5	2756	1050	24.6	7/1/2009 16:59
G4	Sr-90'	0.5	3567	1080	28.0	7/1/2009 16:59
G4	Sr-90'	0.5	4603	1110	33.4	7/1/2009 17:00
G4	Sr-90'	0.5	5501	1140	38.6	7/1/2009 17:01
G4	Sr-90'	0.5	6802	1170	41.7	7/1/2009 17:01
G4	Sr-90'	0.5	8262	1200	44.3	7/1/2009 17:02
G4	Sr-90'	0.5	9472	1230	42.5	7/1/2009 17:03
G4	Sr-90'	0.5	10818	1260	38.5	7/1/2009 17:03
G4	Sr-90'	0.5	11904	1290	32.4	7/1/2009 17:04
G4	Sr-90'	0.5	12821	1320	23.7	7/1/2009 17:04
G4	Sr-90'	0.5	13335	1350	16.3	7/1/2009 17:05
G4	Sr-90'	0.5	13662	1380	8.9	7/1/2009 17:06
G4	Sr-90'	0.5	13925	1410	5.9	7/1/2009 17:06
G4	Sr-90'	0.5	13865	1440	2.8	7/1/2009 17:07
G4	Sr-90'	0.5	14125	1470	0.9	7/1/2009 17:08
G4	Sr-90'	0.5	13975	1500	2.0	7/1/2009 17:08
G4	Sr-90'	0.5	14009	1530	2.4	7/1/2009 17:09
G4	Sr-90'	0.5	14226	1560	3.7	7/1/2009 17:09
G4	Sr-90'	0.5	14366	1590	2.1	7/1/2009 17:10
G4	Sr-90'	0.5	14354	1620		7/1/2009 17:11
G4	Sr-90'	0.5	14254	1650		7/1/2009 17:11
H1	Sr-90'	0.11	3	750		7/1/2009 16:53
H1	Sr-90'	0.12	4	780		7/1/2009 16:54
H1	Sr-90'	0.5	120	810	5.0	7/1/2009 16:54
H1	Sr-90'	0.5	277	840	8.3	7/1/2009 16:55
H1	Sr-90'	0.5	613	870	11.3	7/1/2009 16:55
H1	Sr-90'	0.5	1000	900	15.1	7/1/2009 16:56
H1	Sr-90'	0.5	1459	930	18.3	7/1/2009 16:56
H1	Sr-90'	0.5	2112	960	22.4	7/1/2009 16:57
H1	Sr-90'	0.5	2797	990	26.1	7/1/2009 16:58
H1	Sr-90'	0.5	3684	1020	31.3	7/1/2009 16:58
H1	Sr-90'	0.5	4585	1050	36.5	7/1/2009 16:59
H1	Sr-90'	0.5	5908	1080	43.0	7/1/2009 17:00
H1	Sr-90'	0.5	7164	1110	49.9	7/1/2009 17:00
H1	Sr-90'	0.5	8847	1140	54.0	7/1/2009 17:01
H1	Sr-90'	0.5	10607	1170	56.0	7/1/2009 17:01
H1	Sr-90'	0.5	12293	1200	52.8	7/1/2009 17:02
H1	Sr-90'	0.5	13845	1230	45.0	7/1/2009 17:03
H1	Sr-90'	0.5	15147	1260	35.9	7/1/2009 17:03
H1	Sr-90'	0.5	15927	1290	24.6	7/1/2009 17:04
H1	Sr-90'	0.5	16632	1320	15.7	7/1/2009 17:05
H1	Sr-90'	0.5	16799	1350	10.3	7/1/2009 17:05
H1	Sr-90'	0.5	17067	1380	6.6	7/1/2009 17:06
H1	Sr-90'	0.5	17254	1410	5.4	7/1/2009 17:06
H1	Sr-90'	0.5	17390	1440	2.6	7/1/2009 17:07
H1	Sr-90'	0.5	17444	1470	-1.0	7/1/2009 17:08
H1	Sr-90'	0.5	17357	1500	-0.5	7/1/2009 17:08
H1	Sr-90'	0.5	17121	1530	1.8	7/1/2009 17:09
H1	Sr-90'	0.5	17478	1560	3.5	7/1/2009 17:10
H1	Sr-90'	0.5	17655	1590	2.8	7/1/2009 17:10
H1	Sr-90'	0.5	17621	1620	20.4	7/1/2009 17:11
H1	Sr-90'	0.5	17476	1650		7/1/2009 17:11
H2	Sr-90'	0.11	0	750		7/1/2009 16:53
H2	Sr-90'	0.11	2	780		7/1/2009 16:54
H2	Sr-90'	0.11	9	810	3.0	7/1/2009 16:54
H2	Sr-90'	0.5	130	840	5.7	7/1/2009 16:55
H2	Sr-90'	0.5	386	870	8.8	7/1/2009 16:55
H2	Sr-90'	0.5	671	900	11.9	7/1/2009 16:56
H2	Sr-90'	0.5	1065	930	14.0	7/1/2009 16:56
H2	Sr-90'	0.5	1570	960	18.0	7/1/2009 16:57
H2	Sr-90'	0.5	2032	990	22.2	7/1/2009 16:58



H2	Sr-90'	0.5	2889	1020	26.1	7/1/2009 16:58
H2	Sr-90'	0.5	3732	1050	31.4	7/1/2009 16:59
H2	Sr-90'	0.5	4634	1080	34.9	7/1/2009 17:00
H2	Sr-90'	0.5	5875	1110	40.7	7/1/2009 17:00
H2	Sr-90'	0.5	7057	1140	46.8	7/1/2009 17:01
H2	Sr-90'	0.5	8628	1170	52.3	7/1/2009 17:01
H2	Sr-90'	0.5	10272	1200	54.8	7/1/2009 17:02
H2	Sr-90'	0.5	12110	1230	50.3	7/1/2009 17:03
H2	Sr-90'	0.5	13536	1260	42.6	7/1/2009 17:03
H2	Sr-90'	0.5	14535	1290	31.4	7/1/2009 17:04
H2	Sr-90'	0.5	15451	1320	21.6	7/1/2009 17:05
H2	Sr-90'	0.5	15866	1350	13.4	7/1/2009 17:05
H2	Sr-90'	0.5	16110	1380	7.8	7/1/2009 17:06
H2	Sr-90'	0.5	16214	1410	5.3	7/1/2009 17:06
H2	Sr-90'	0.5	16443	1440	2.9	7/1/2009 17:07
H2	Sr-90'	0.5	16489	1470	1.2	7/1/2009 17:08
H2	Sr-90'	0.5	16408	1500	0.0	7/1/2009 17:08
H2	Sr-90'	0.5	16413	1530	1.6	7/1/2009 17:09
H2	Sr-90'	0.5	16476	1560	0.9	7/1/2009 17:10
H2	Sr-90'	0.5	16689	1590	0.2	7/1/2009 17:10
H2	Sr-90'	0.5	16407	1620		7/1/2009 17:11
H2	Sr-90'	0.5	16470	1650		7/1/2009 17:11
H3	Sr-90'	0.11	0	750		7/1/2009 16:55
H3	Sr-90'	0.11	2	780		7/1/2009 16:54
H3	Sr-90'	0.11	10	810	2.2	7/1/2009 16:54
H3	Sr-90'	0.5	107	840	5.0	7/1/2009 16:55
H3	Sr-90'	0.5	281	870	8.6	7/1/2009 16:55
H3	Sr-90'	0.5	620	900	12.4	7/1/2009 16:56
H3	Sr-90'	0.5	1041	930	16.8	7/1/2009 16:56
H3	Sr-90'	0.5	1590	960	20.0	7/1/2009 16:57
H3	Sr-90'	0.5	2316	990	24.3	7/1/2009 16:58
H3	Sr-90'	0.5	2989	1020	29.6	7/1/2009 16:58
H3	Sr-90'	0.5	3989	1050	35.8	7/1/2009 16:59
H3	Sr-90'	0.5	5187	1080	42.4	7/1/2009 17:00
H3	Sr-90'	0.5	6593	1110	48.1	7/1/2009 17:00
H3	Sr-90'	0.5	8042	1140	56.1	7/1/2009 17:01
H3	Sr-90'	0.5	9778	1170	62.8	7/1/2009 17:01
H3	Sr-90'	0.5	12005	1200	68.0	7/1/2009 17:02
H3	Sr-90'	0.5	14024	1230	67.5	7/1/2009 17:03
H3	Sr-90'	0.5	16121	1260	59.0	7/1/2009 17:03
H3	Sr-90'	0.5	17840	1290	49.1	7/1/2009 17:04
H3	Sr-90'	0.5	18952	1320	33.9	7/1/2009 17:05
H3	Sr-90'	0.5	19970	1350	20.2	7/1/2009 17:05
H3	Sr-90'	0.5	20148	1380	11.3	7/1/2009 17:06
H3	Sr-90'	0.5	20279	1410	3.1	7/1/2009 17:06
H3	Sr-90'	0.5	20488	1440	1.9	7/1/2009 17:07
H3	Sr-90'	0.49	20260	1470	1.2	7/1/2009 17:08
H3	Sr-90'	0.5	20448	1500	0.3	7/1/2009 17:08
H3	Sr-90'	0.49	20478	1530	0.5	7/1/2009 17:09
H3	Sr-90'	0.49	20420	1560	-1.7	7/1/2009 17:10
H3	Sr-90'	0.49	20351	1590	-1.3	7/1/2009 17:10
H3	Sr-90'	0.49	20252	1620		7/1/2009 17:11
H3	Sr-90'	0.49	20370	1650		7/1/2009 17:11
H4	Sr-90'	0.12	1	750		7/1/2009 16:53
H4	Sr-90'	0.11	3	780		7/1/2009 16:54
H4	Sr-90'	0.11	6	810	2.6	7/1/2009 16:54
H4	Sr-90'	0.5	150	840	5.2	7/1/2009 16:55
H4	Sr-90'	0.5	313	870	8.6	7/1/2009 16:55
H4	Sr-90'	0.5	632	900	11.7	7/1/2009 16:56
H4	Sr-90'	0.5	1050	930	16.1	7/1/2009 16:56
H4	Sr-90'	0.5	1541	960	19.0	7/1/2009 16:57
H4	Sr-90'	0.5	2266	990	21.7	7/1/2009 16:58
H4	Sr-90'	0.5	2881	1020	26.3	7/1/2009 16:58
H4	Sr-90'	0.5	3633	1050	31.4	7/1/2009 16:59
H4	Sr-90'	0.5	4798	1080	36.1	7/1/2009 17:00
H4	Sr-90'	0.5	6014	1110	42.2	7/1/2009 17:00
H4	Sr-90'	0.5	7109	1140	46.2	7/1/2009 17:01
H4	Sr-90'	0.5	8810	1170	50.5	7/1/2009 17:01
H4	Sr-90'	0.5	10328	1200	53.0	7/1/2009 17:02
H4	Sr-90'	0.5	11973	1230	48.7	7/1/2009 17:03

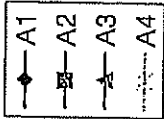
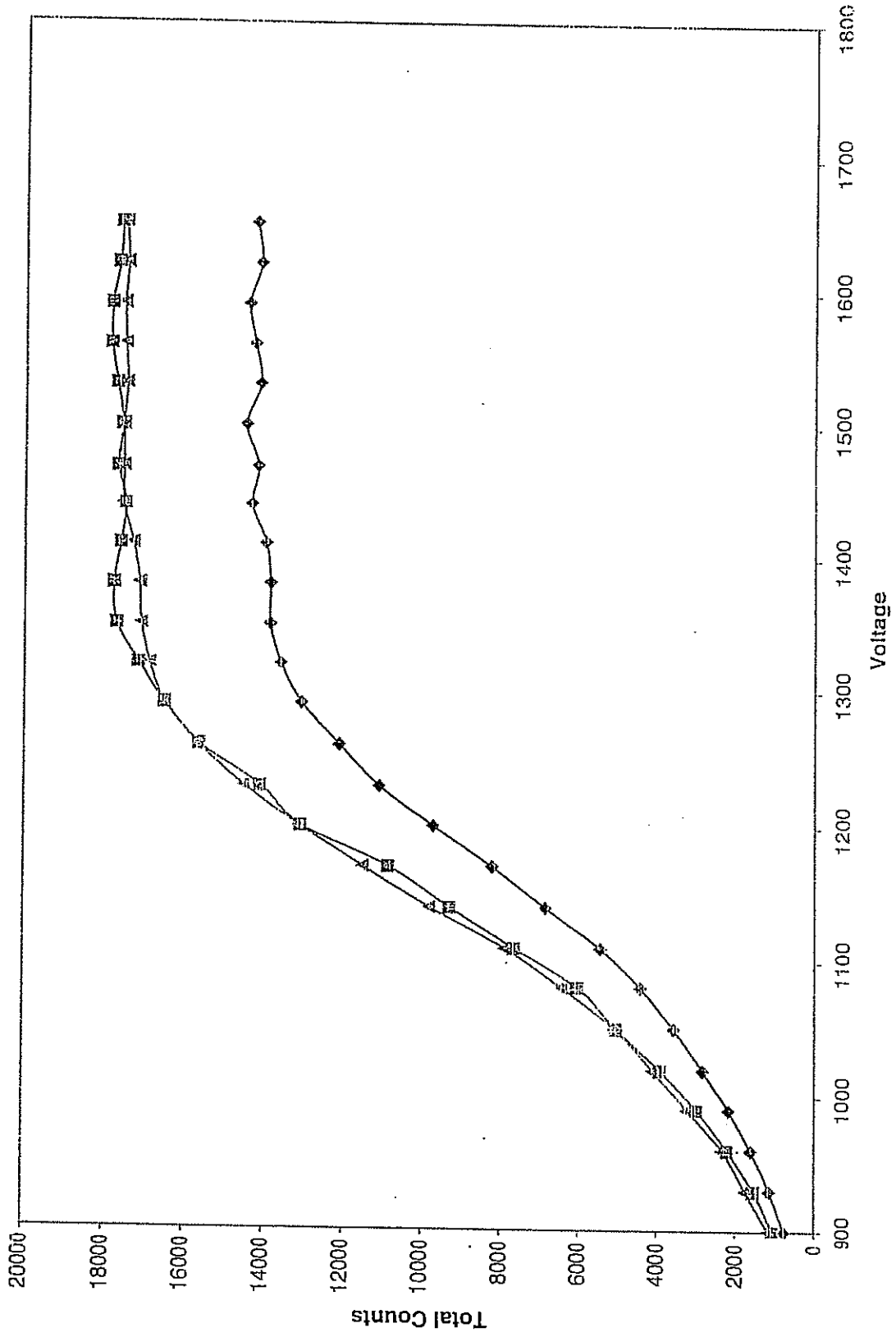
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H4	Sr-90'	0.5	15574	1320	21.0	7/1/2009 17:05
H4	Sr-90'	0.5	15946	1350	13.2	7/1/2009 17:05
H4	Sr-90'	0.5	15928	1380	8.1	7/1/2009 17:06
H4	Sr-90'	0.5	16344	1410	7.2	7/1/2009 17:06
H4	Sr-90'	0.5	16589	1440	5.8	7/1/2009 17:07
H4	Sr-90'	0.5	16693	1470	1.0	7/1/2009 17:08
H4	Sr-90'	0.5	16624	1500	0.0	7/1/2009 17:08
H4	Sr-90'	0.5	16474	1530	-1.0	7/1/2009 17:09
H4	Sr-90'	0.5	16692	1560	-0.1	7/1/2009 17:10
H4	Sr-90'	0.5	16507	1590	-0.7	7/1/2009 17:10
H4	Sr-90'	0.5	16597	1620		7/1/2009 17:11
H4	Sr-90'	0.5	16414	1650		7/1/2009 17:11
I1	Sr-90	0.5	123	750	18.9	1/27/2011 10:01
I1	Sr-90	0.5	268	780	18.6	1/27/2011 10:01
I1	Sr-90	0.5	584	810	9.6	1/27/2011 10:02
I1	Sr-90	0.5	867	840	12.4	1/27/2011 10:03
I1	Sr-90	0.5	1256	870	15.1	1/27/2011 10:03
I1	Sr-90	0.5	1797	900	17.5	1/27/2011 10:04
I1	Sr-90	0.5	2382	930	20.8	1/27/2011 10:05
I1	Sr-90	0.5	2927	960	24.5	1/27/2011 10:05
I1	Sr-90	0.5	3808	990	29.9	1/27/2011 10:06
I1	Sr-90	0.5	4757	1020	34.4	1/27/2011 10:07
I1	Sr-90	0.5	5949	1050	39.8	1/27/2011 10:07
I1	Sr-90	0.5	7017	1080	42.7	1/27/2011 10:08
I1	Sr-90	0.5	8641	1110	43.8	1/27/2011 10:08
I1	Sr-90	0.5	9823	1140	43.7	1/27/2011 10:09
I1	Sr-90	0.5	11116	1170	36.7	1/27/2011 10:10
I1	Sr-90	0.5	12334	1200	28.5	1/27/2011 10:10
I1	Sr-90	0.5	12896	1230	18.7	1/27/2011 10:11
I1	Sr-90	0.5	13215	1260	9.7	1/27/2011 10:12
I1	Sr-90	0.5	13483	1290	6.5	1/27/2011 10:12
I1	Sr-90	0.5	13490	1320	4.5	1/27/2011 10:13
I1	Sr-90	0.5	13739	1350	2.2	1/27/2011 10:13
I1	Sr-90	0.5	13768	1380	1.8	1/27/2011 10:14
I1	Sr-90	0.5	13669	1410	0.0	1/27/2011 10:15
I1	Sr-90	0.5	13797	1440	0.7	1/27/2011 10:15
I1	Sr-90	0.5	13731	1470	0.1	1/27/2011 10:16
I1	Sr-90	0.5	13846	1500	-0.1	1/27/2011 10:17
I1	Sr-90	0.5	13654	1530	1.1	1/27/2011 10:17
I1	Sr-90	0.5	13826	1560	1.5	1/27/2011 10:18
I1	Sr-90	0.5	13901	1590	3.2	1/27/2011 10:18
I1	Sr-90	0.5	13942	1620	16.1	1/27/2011 10:19
I1	Sr-90	0.5	14075	1650	16.2	1/27/2011 10:20
I2	Sr-90	0.5	59	750	16.1	1/27/2011 10:01
I2	Sr-90	0.5	171	780	16.0	1/27/2011 10:01
I2	Sr-90	0.5	413	810	10.2	1/27/2011 10:02
I2	Sr-90	0.5	765	840	14.7	1/27/2011 10:03
I2	Sr-90	0.5	1299	870	18.6	1/27/2011 10:03
I2	Sr-90	0.5	1931	900	22.6	1/27/2011 10:04
I2	Sr-90	0.5	2626	930	26.9	1/27/2011 10:05
I2	Sr-90	0.5	3495	960	32.0	1/27/2011 10:05
I2	Sr-90	0.5	4556	990	36.2	1/27/2011 10:06
I2	Sr-90	0.5	5768	1020	42.1	1/27/2011 10:07
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I2	Sr-90	0.5	10708	1110	64.5	1/27/2011 10:08
I2	Sr-90	0.5	12783	1140	63.6	1/27/2011 10:09
I2	Sr-90	0.5	14516	1170	56.5	1/27/2011 10:10
I2	Sr-90	0.5	16266	1200	43.1	1/27/2011 10:10
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I2	Sr-90	0.5	17789	1260	16.6	1/27/2011 10:12
I2	Sr-90	0.5	18087	1290	10.0	1/27/2011 10:12
I2	Sr-90	0.5	18433	1320	5.9	1/27/2011 10:13
I2	Sr-90	0.5	18610	1350	2.4	1/27/2011 10:13
I2	Sr-90	0.5	18415	1380	0.5	1/27/2011 10:14
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I2	Sr-90	0.5	18578	1440	-2.3	1/27/2011 10:15
I2	Sr-90	0.5	18346	1470	-1.8	1/27/2011 10:16

12	Sr-90	0.5	18133	1500	-0.7	1/27/2011 10:17
12	Sr-90	0.5	18411	1530	1.6	1/27/2011 10:17
12	Sr-90	0.5	18435	1560	3.5	1/27/2011 10:18
12	Sr-90	0.5	18432	1590	-0.2	1/27/2011 10:18
12	Sr-90	0.5	18646	1620	21.2	1/27/2011 10:19
12	Sr-90	0.5	18270	1650	21.2	1/27/2011 10:20
13	Sr-90	0.5	154	750	21.1	1/27/2011 10:01
13	Sr-90	0.5	362	780	20.6	1/27/2011 10:01
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13	Sr-90	0.5	1845	870	22.1	1/27/2011 10:03
13	Sr-90	0.5	2619	900	26.4	1/27/2011 10:04
13	Sr-90	0.5	3329	930	31.0	1/27/2011 10:05
13	Sr-90	0.5	4448	960	38.6	1/27/2011 10:05
13	Sr-90	0.5	5579	990	45.8	1/27/2011 10:06
13	Sr-90	0.5	7283	1020	53.0	1/27/2011 10:07
13	Sr-90	0.5	8786	1050	61.6	1/27/2011 10:07
13	Sr-90	0.5	10788	1080	66.6	1/27/2011 10:08
13	Sr-90	0.5	13064	1110	66.9	1/27/2011 10:08
13	Sr-90	0.5	15140	1140	60.2	1/27/2011 10:09
13	Sr-90	0.5	16644	1170	46.6	1/27/2011 10:10
13	Sr-90	0.5	18029	1200	34.2	1/27/2011 10:10
13	Sr-90	0.5	18614	1230	23.1	1/27/2011 10:11
13	Sr-90	0.5	19281	1260	10.6	1/27/2011 10:12
13	Sr-90	0.5	19484	1290	6.5	1/27/2011 10:12
13	Sr-90	0.5	19183	1320	0.8	1/27/2011 10:13
13	Sr-90	0.5	19645	1350	1.1	1/27/2011 10:13
13	Sr-90	0.5	19325	1380	2.4	1/27/2011 10:14
13	Sr-90	0.5	19574	1410	-1.1	1/27/2011 10:15
13	Sr-90	0.5	19575	1440	-1.2	1/27/2011 10:15
13	Sr-90	0.5	19349	1470	-2.3	1/27/2011 10:16
13	Sr-90	0.5	19263	1500	-0.8	1/27/2011 10:17
13	Sr-90	0.5	19381	1530	0.7	1/27/2011 10:17
13	Sr-90	0.5	19438	1560	2.1	1/27/2011 10:18
13	Sr-90	0.5	19369	1590	0.5	1/27/2011 10:18
13	Sr-90	0.5	19577	1620	22.6	1/27/2011 10:19
13	Sr-90	0.5	19380	1650	22.6	1/27/2011 10:20
14	Sr-90	0.11	7	750	22.5	1/27/2011 10:00
14	Sr-90	0.5	130	780	22.2	1/27/2011 10:01
14	Sr-90	0.5	348	810	8.9	1/27/2011 10:02
14	Sr-90	0.5	686	840	11.9	1/27/2011 10:03
14	Sr-90	0.5	1062	870	15.7	1/27/2011 10:03
14	Sr-90	0.5	1562	900	19.2	1/27/2011 10:04
14	Sr-90	0.5	2268	930	23.3	1/27/2011 10:05
14	Sr-90	0.5	2966	960	28.2	1/27/2011 10:05
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14	Sr-90	0.5	11190	1140	54.7	1/27/2011 10:09
14	Sr-90	0.5	12811	1170	48.6	1/27/2011 10:10
14	Sr-90	0.5	14166	1200	37.6	1/27/2011 10:10
14	Sr-90	0.5	15132	1230	24.1	1/27/2011 10:11
14	Sr-90	0.5	15674	1260	13.8	1/27/2011 10:12
14	Sr-90	0.5	15676	1290	6.6	1/27/2011 10:12
14	Sr-90	0.5	15961	1320	3.5	1/27/2011 10:13
14	Sr-90	0.5	15975	1350	4.1	1/27/2011 10:13
14	Sr-90	0.5	16050	1380	1.2	1/27/2011 10:14
14	Sr-90	0.5	16239	1410	2.5	1/27/2011 10:15
14	Sr-90	0.5	16010	1440	1.1	1/27/2011 10:15
14	Sr-90	0.5	16371	1470	0.1	1/27/2011 10:16
14	Sr-90	0.5	16155	1500	0.4	1/27/2011 10:17
14	Sr-90	0.5	16176	1530	0.2	1/27/2011 10:17
14	Sr-90	0.5	16160	1560	0.4	1/27/2011 10:18
14	Sr-90	0.5	16393	1590	-0.8	1/27/2011 10:18
14	Sr-90	0.5	16100	1620	18.8	1/27/2011 10:19
14	Sr-90	0.5	16079	1650	18.8	1/27/2011 10:20
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J1	Sr-90	0.5	119	780	18.4	1/27/2011 10:01

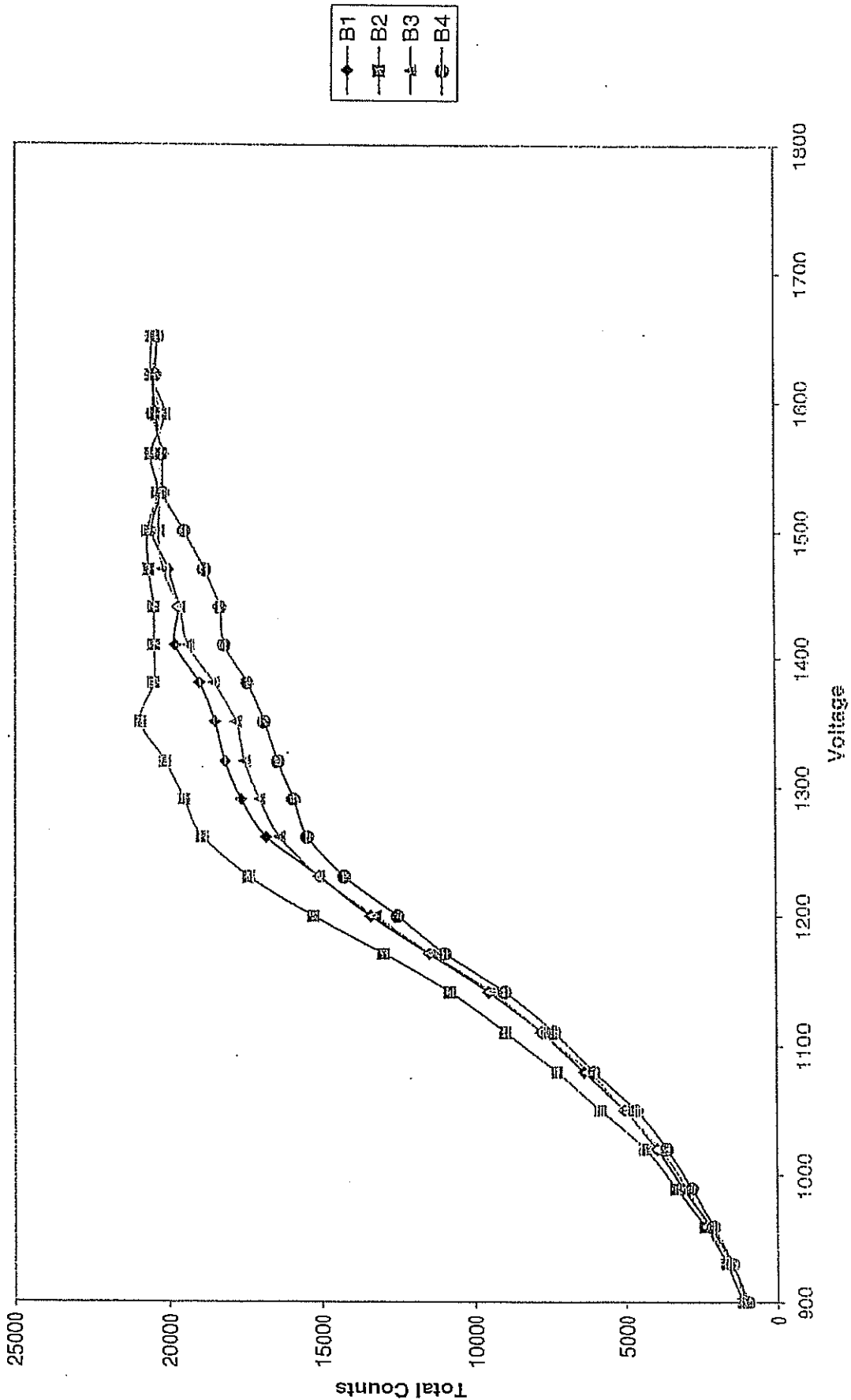
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J1	Sr-90	0.5	15007	1200	48.1	1/27/2011 10:10
J1	Sr-90	0.5	16406	1230	38.0	1/27/2011 10:10
J1	Sr-90	0.5	17006	1260	27.4	1/27/2011 10:11
J1	Sr-90	0.5	17784	1290	17.1	1/27/2011 10:11
J1	Sr-90	0.5	18433	1320	10.7	1/27/2011 10:12
J1	Sr-90	0.5	18263	1350	4.1	1/27/2011 10:13
J1	Sr-90	0.5	18375	1380	1.6	1/27/2011 10:13
J1	Sr-90	0.5	18431	1410	2.0	1/27/2011 10:14
J1	Sr-90	0.5	18585	1440	2.8	1/27/2011 10:15
J1	Sr-90	0.5	18462	1470	3.2	1/27/2011 10:15
J1	Sr-90	0.5	18776	1500	1.2	1/27/2011 10:16
J1	Sr-90	0.5	18813	1530	0.4	1/27/2011 10:16
J1	Sr-90	0.5	18590	1560	-1.2	1/27/2011 10:17
J1	Sr-90	0.5	18619	1590	-0.3	1/27/2011 10:18
J1	Sr-90	0.5	18698	1620		1/27/2011 10:18
J1	Sr-90	0.5	18719	1650		1/27/2011 10:19
J2	Sr-90	0.11	7	750		1/27/2011 10:00
J2	Sr-90	0.5	151	780		1/27/2011 10:01
J2	Sr-90	0.5	376	810	10.4	1/27/2011 10:01
J2	Sr-90	0.5	774	840	14.1	1/27/2011 10:02
J2	Sr-90	0.5	1253	870	18.2	1/27/2011 10:03
J2	Sr-90	0.5	1832	900	21.4	1/27/2011 10:03
J2	Sr-90	0.5	2579	930	25.4	1/27/2011 10:04
J2	Sr-90	0.5	3318	960	31.3	1/27/2011 10:05
J2	Sr-90	0.5	4327	990	36.3	1/27/2011 10:05
J2	Sr-90	0.5	5659	1020	44.2	1/27/2011 10:06
J2	Sr-90	0.5	6856	1050	52.5	1/27/2011 10:06
J2	Sr-90	0.5	8683	1080	60.2	1/27/2011 10:07
J2	Sr-90	0.5	10687	1110	66.9	1/27/2011 10:08
J2	Sr-90	0.5	12771	1140	66.8	1/27/2011 10:08
J2	Sr-90	0.5	14852	1170	62.4	1/27/2011 10:09
J2	Sr-90	0.5	16623	1200	52.8	1/27/2011 10:10
J2	Sr-90	0.5	18114	1230	40.3	1/27/2011 10:10
J2	Sr-90	0.5	19058	1260	29.0	1/27/2011 10:11
J2	Sr-90	0.5	19679	1290	15.5	1/27/2011 10:11
J2	Sr-90	0.5	20190	1320	8.0	1/27/2011 10:12
J2	Sr-90	0.5	19875	1350	5.8	1/27/2011 10:13
J2	Sr-90	0.5	20157	1380	5.4	1/27/2011 10:13
J2	Sr-90	0.5	20567	1410	5.1	1/27/2011 10:14
J2	Sr-90	0.5	20653	1440	1.2	1/27/2011 10:15
J2	Sr-90	0.5	20388	1470	-3.0	1/27/2011 10:15
J2	Sr-90	0.5	20423	1500	-0.6	1/27/2011 10:16
J2	Sr-90	0.5	20233	1530	2.6	1/27/2011 10:16
J2	Sr-90	0.5	20634	1560	2.0	1/27/2011 10:17
J2	Sr-90	0.5	20666	1590	-0.5	1/27/2011 10:18
J2	Sr-90	0.5	20509	1620		1/27/2011 10:18
J2	Sr-90	0.49	20221	1650		1/27/2011 10:19
J3	Sr-90	0.12	4	750		1/27/2011 10:00
J3	Sr-90	0.5	71	780		1/27/2011 10:01
J3	Sr-90	0.5	221	810	7.7	1/27/2011 10:01
J3	Sr-90	0.5	519	840	11.8	1/27/2011 10:02
J3	Sr-90	0.5	931	870	14.8	1/27/2011 10:03
J3	Sr-90	0.5	1493	900	18.2	1/27/2011 10:03
J3	Sr-90	0.5	1958	930	21.6	1/27/2011 10:04
J3	Sr-90	0.5	2731	960	26.1	1/27/2011 10:05
J3	Sr-90	0.5	3550	990	31.0	1/27/2011 10:05
J3	Sr-90	0.5	4617	1020	37.8	1/27/2011 10:06

J3	Sr-90	0.5	5670	1050	46.7	1/27/2011 10:06
J3	Sr-90	0.5	7343	1080	51.9	1/27/2011 10:07
J3	Sr-90	0.5	9190	1110	57.7	1/27/2011 10:08
J3	Sr-90	0.5	10644	1140	60.1	1/27/2011 10:08
J3	Sr-90	0.5	12673	1170	58.4	1/27/2011 10:09
J3	Sr-90	0.5	14621	1200	51.6	1/27/2011 10:10
J3	Sr-90	0.5	15968	1230	39.6	1/27/2011 10:10
J3	Sr-90	0.5	16732	1260	27.0	1/27/2011 10:11
J3	Sr-90	0.5	17556	1290	18.2	1/27/2011 10:11
J3	Sr-90	0.5	17875	1320	12.6	1/27/2011 10:12
J3	Sr-90	0.5	18126	1350	6.3	1/27/2011 10:13
J3	Sr-90	0.5	18337	1380	4.4	1/27/2011 10:13
J3	Sr-90	0.5	18271	1410	1.5	1/27/2011 10:14
J3	Sr-90	0.5	18460	1440	0.5	1/27/2011 10:15
J3	Sr-90	0.5	18291	1470	-0.4	1/27/2011 10:15
J3	Sr-90	0.5	18399	1500	-0.1	1/27/2011 10:16
J3	Sr-90	0.5	18247	1530	0.5	1/27/2011 10:16
J3	Sr-90	0.5	18472	1560	1.1	1/27/2011 10:17
J3	Sr-90	0.5	18335	1590	1.3	1/27/2011 10:18
J3	Sr-90	0.5	18525	1620		1/27/2011 10:18
J3	Sr-90	0.5	18422	1650		1/27/2011 10:19
J4	Sr-90	0.11	1	750		1/27/2011 10:00
J4	Sr-90	0.5	49	780		1/27/2011 10:01
J4	Sr-90	0.5	166	810	6.8	1/27/2011 10:01
J4	Sr-90	0.5	433	840	10.9	1/27/2011 10:02
J4	Sr-90	0.5	836	870	14.1	1/27/2011 10:03
J4	Sr-90	0.5	1347	900	17.4	1/27/2011 10:03
J4	Sr-90	0.5	1829	930	20.3	1/27/2011 10:04
J4	Sr-90	0.5	2543	960	23.8	1/27/2011 10:05
J4	Sr-90	0.5	3284	990	29.9	1/27/2011 10:05
J4	Sr-90	0.5	4184	1020	36.4	1/27/2011 10:06
J4	Sr-90	0.5	5494	1050	42.5	1/27/2011 10:06
J4	Sr-90	0.5	6895	1080	48.2	1/27/2011 10:07
J4	Sr-90	0.5	8310	1110	54.0	1/27/2011 10:08
J4	Sr-90	0.5	10001	1140	58.7	1/27/2011 10:08
J4	Sr-90	0.5	12034	1170	59.7	1/27/2011 10:09
J4	Sr-90	0.5	13840	1200	53.3	1/27/2011 10:10
J4	Sr-90	0.5	15343	1230	44.8	1/27/2011 10:10
J4	Sr-90	0.5	16337	1260	31.9	1/27/2011 10:11
J4	Sr-90	0.5	17505	1290	20.0	1/27/2011 10:11
J4	Sr-90	0.5	17549	1320	9.7	1/27/2011 10:12
J4	Sr-90	0.5	17735	1350	1.4	1/27/2011 10:13
J4	Sr-90	0.5	17679	1380	2.4	1/27/2011 10:13
J4	Sr-90	0.5	17657	1410	1.5	1/27/2011 10:14
J4	Sr-90	0.5	17945	1440	2.6	1/27/2011 10:15
J4	Sr-90	0.5	17829	1470	2.9	1/27/2011 10:15
J4	Sr-90	0.5	17979	1500	-0.3	1/27/2011 10:16
J4	Sr-90	0.5	18069	1530	1.1	1/27/2011 10:17
J4	Sr-90	0.5	17773	1560	2.5	1/27/2011 10:17
J4	Sr-90	0.5	18094	1590	2.2	1/27/2011 10:18
J4	Sr-90	0.5	18340	1620	4.2	1/27/2011 10:18
J4	Sr-90	0.5	18112	1650	0.3	1/27/2011 10:19

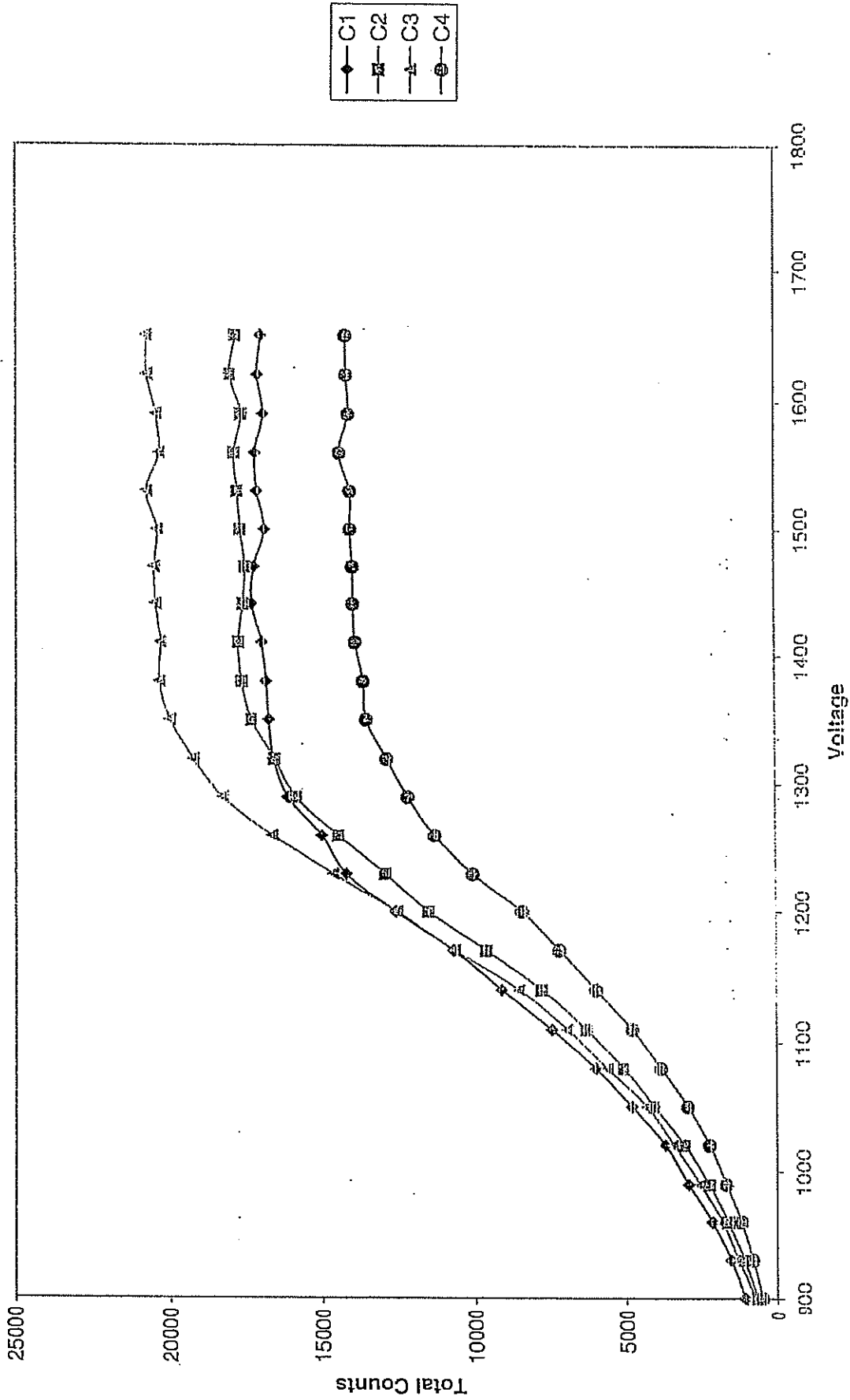
LB4100 Plateau - A Drawer



LB4100 Plateau - B Drawer

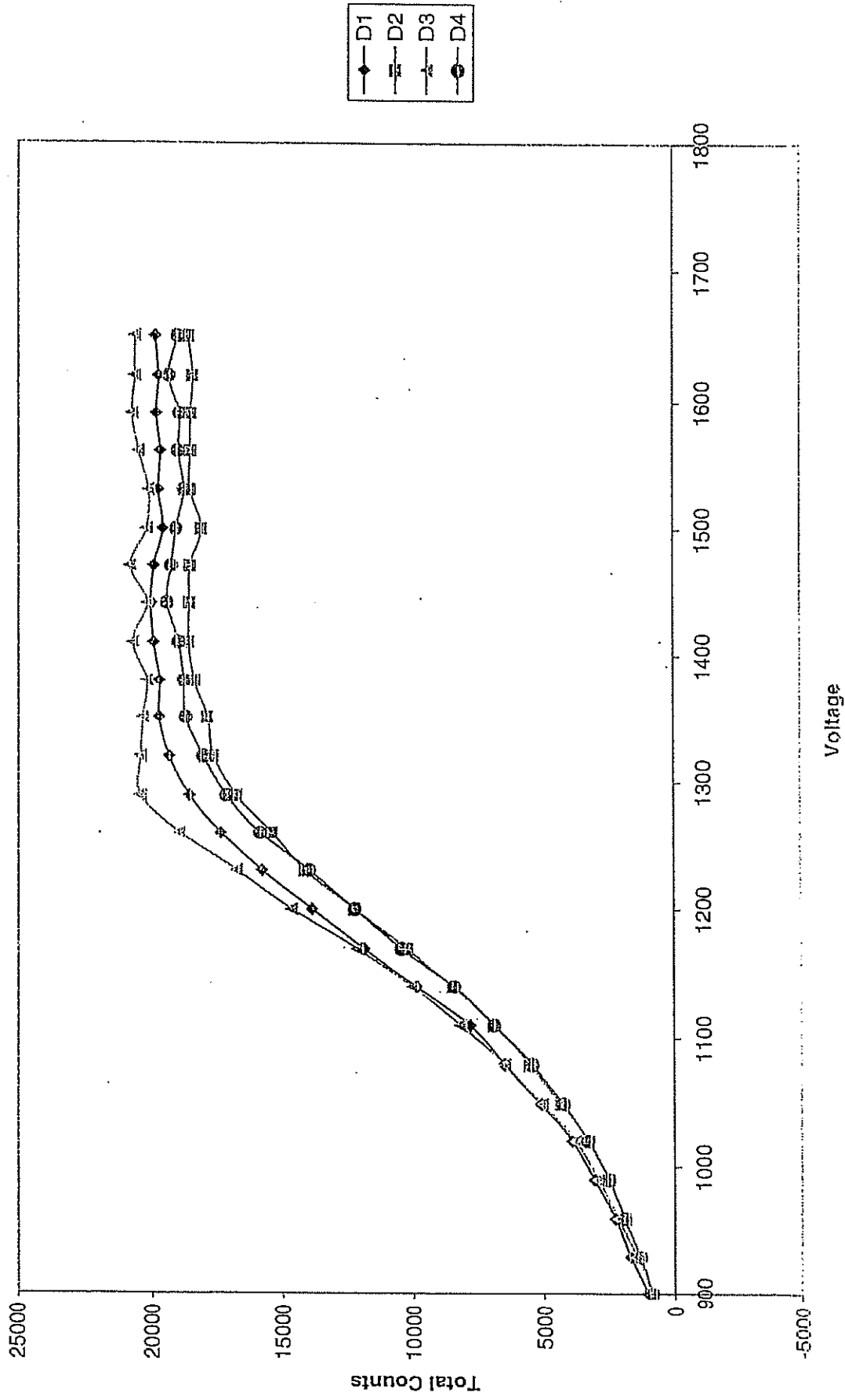


# LB4100 Plateau - C Drawer

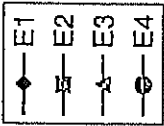
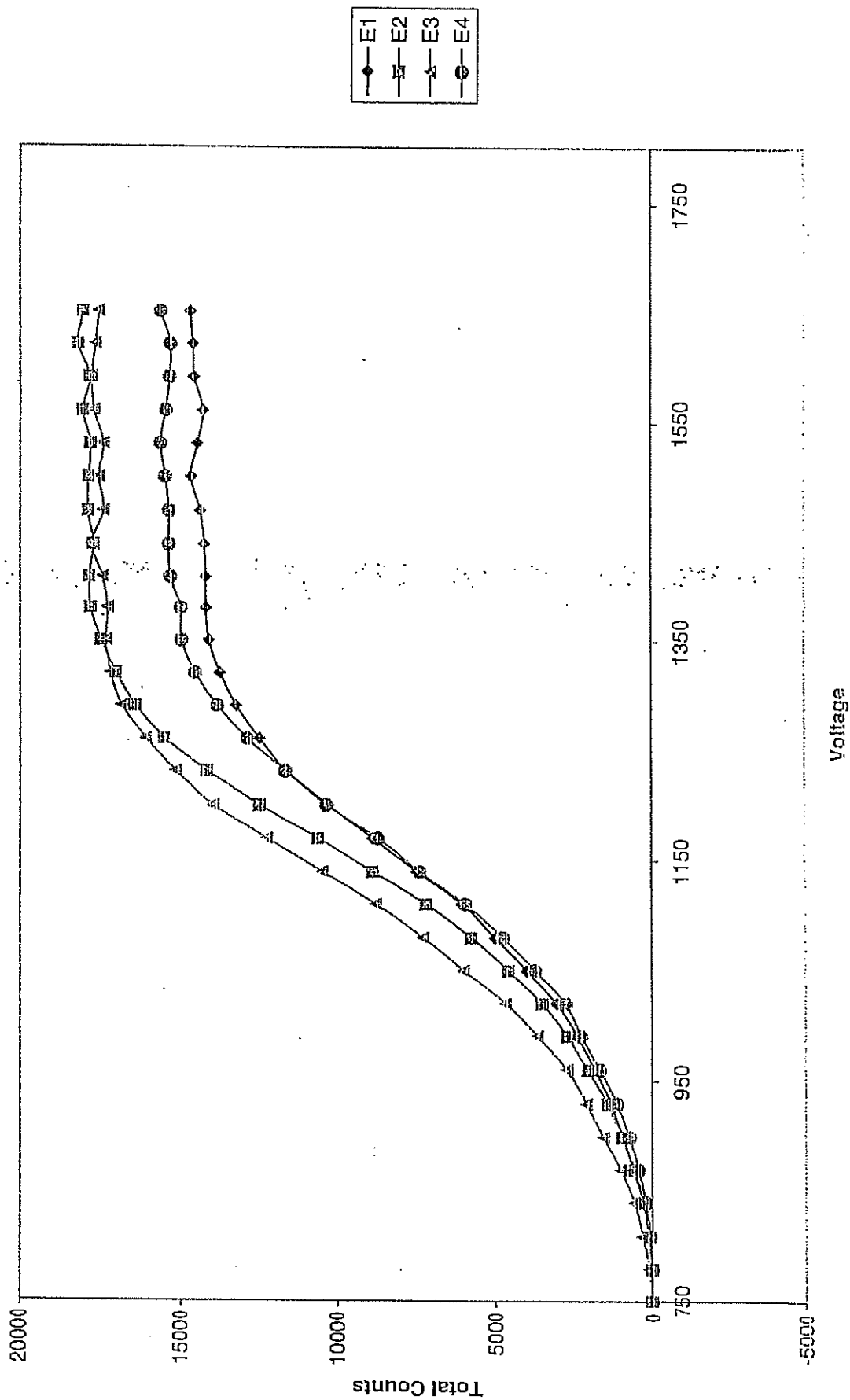




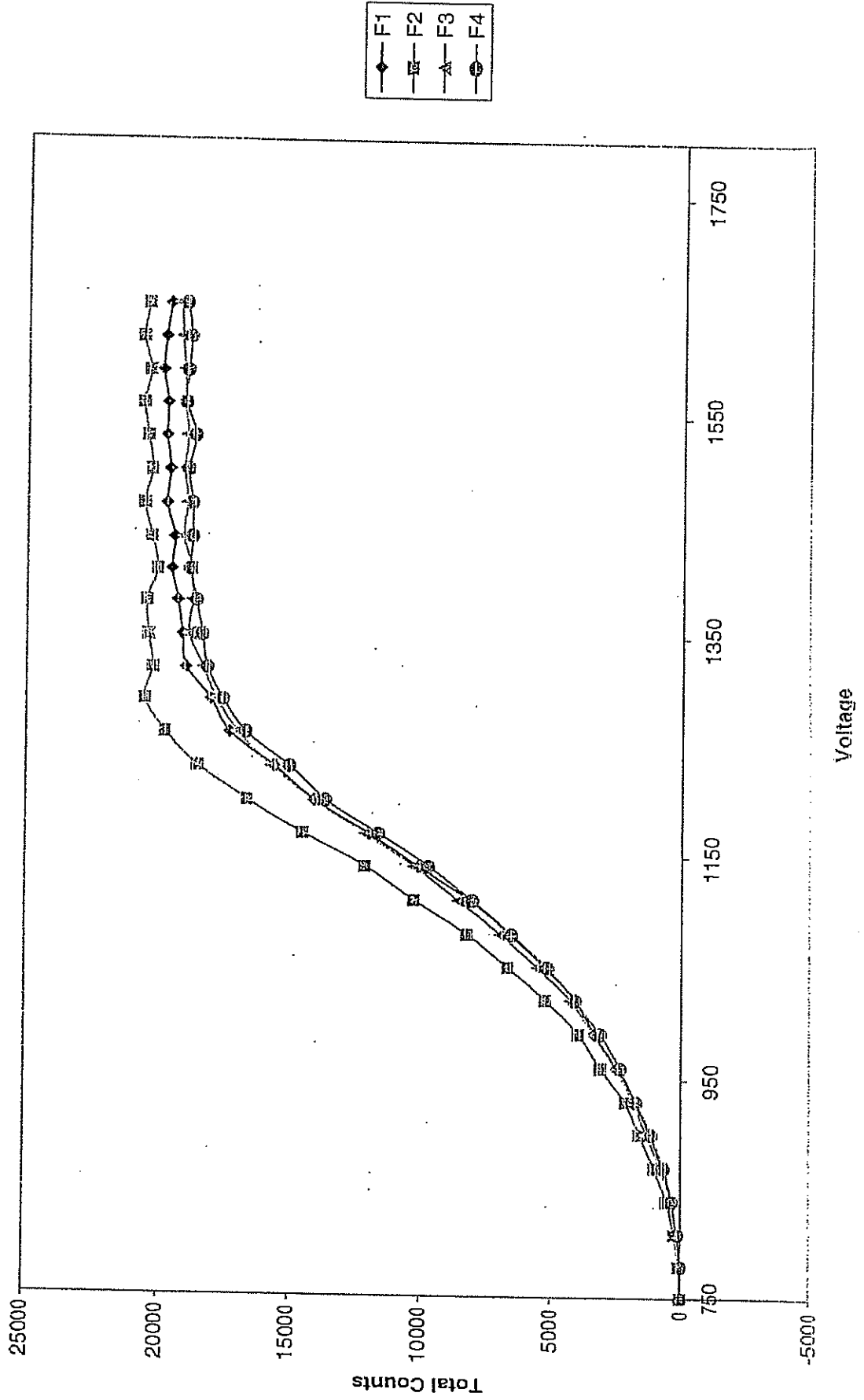
LB4100 Plateau - D Drawer



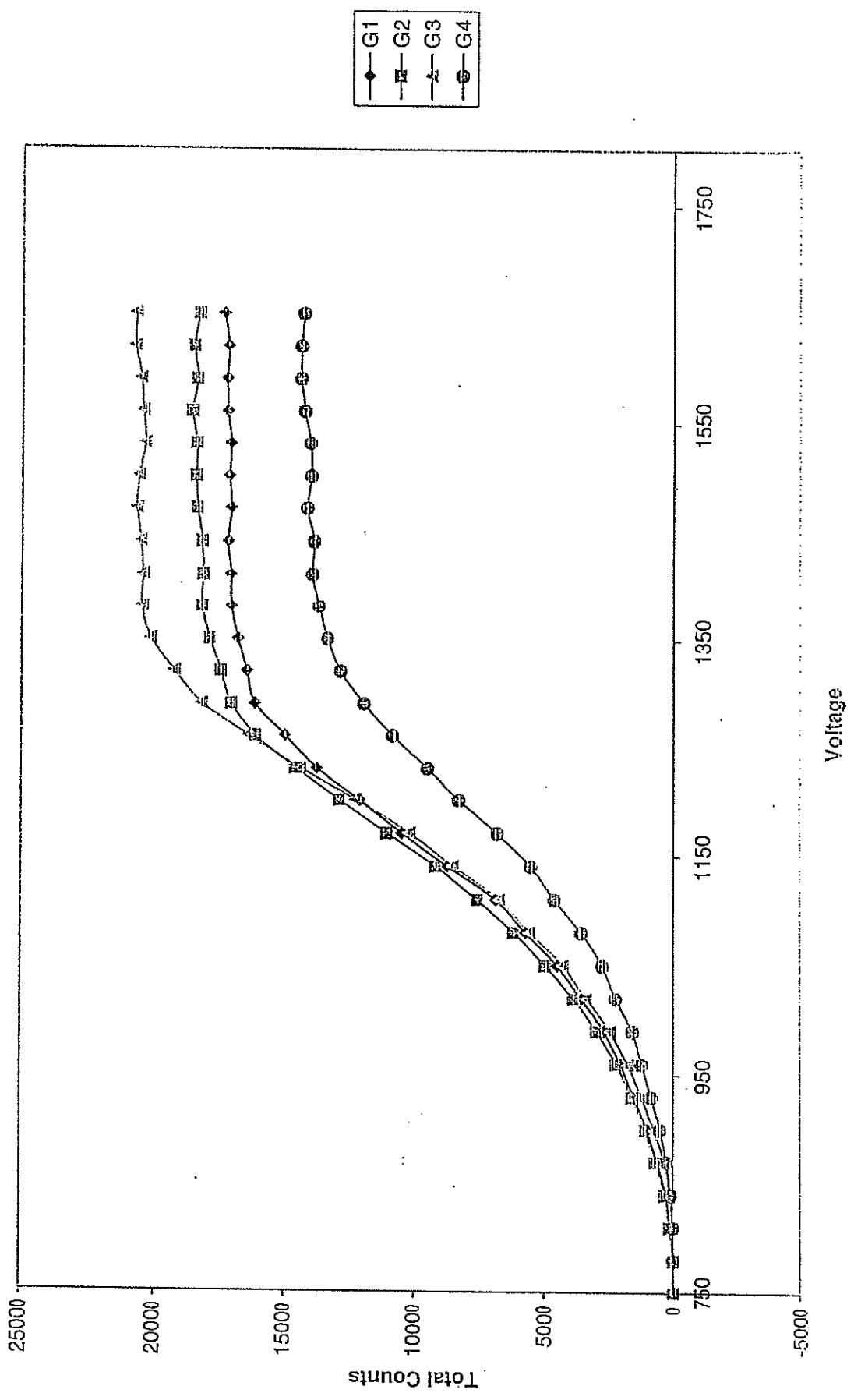
# LB4100 Plateau - E Drawer



# LB4100 Plateau - F Drawer

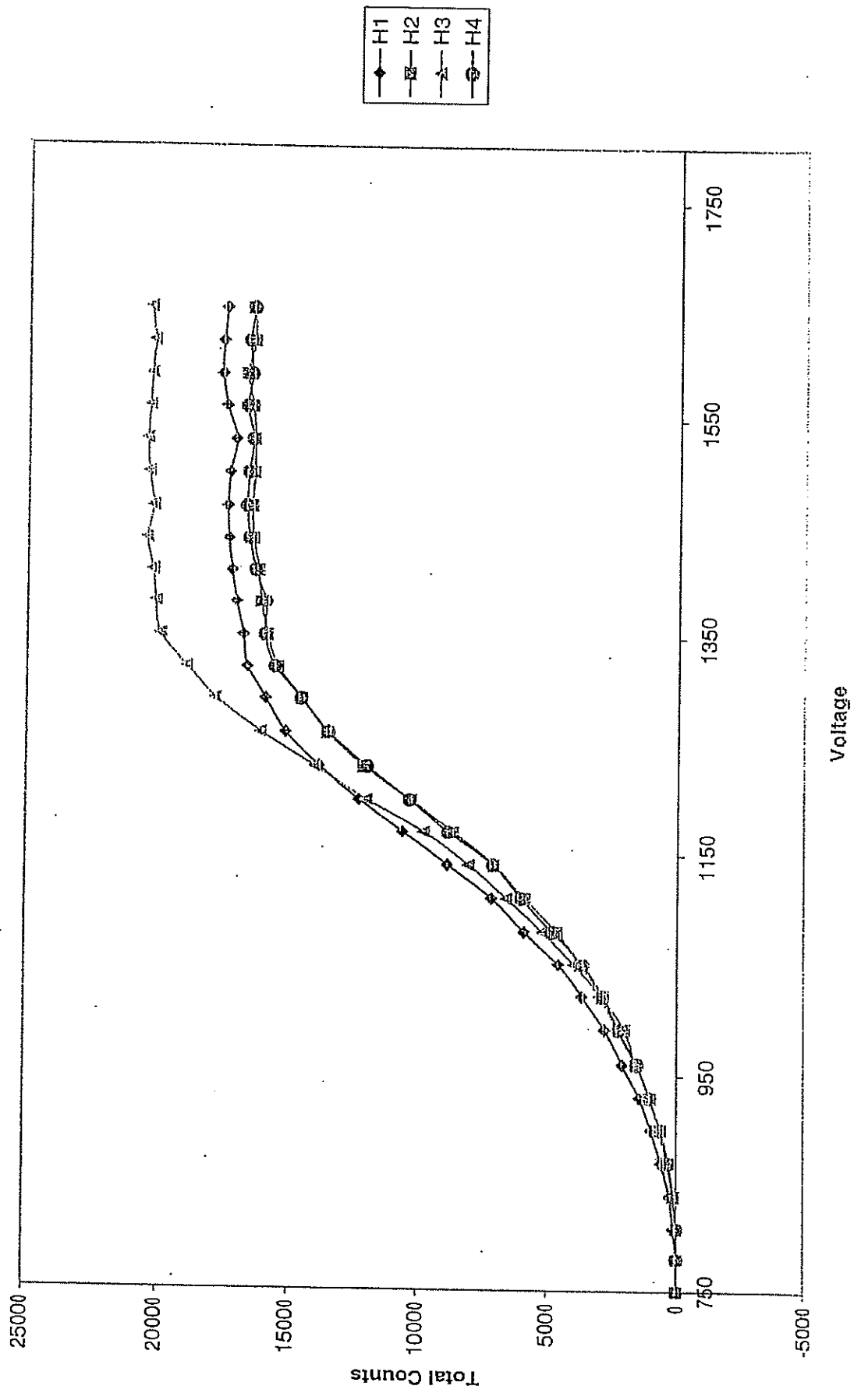


# LB4100 Plateau - G Drawer



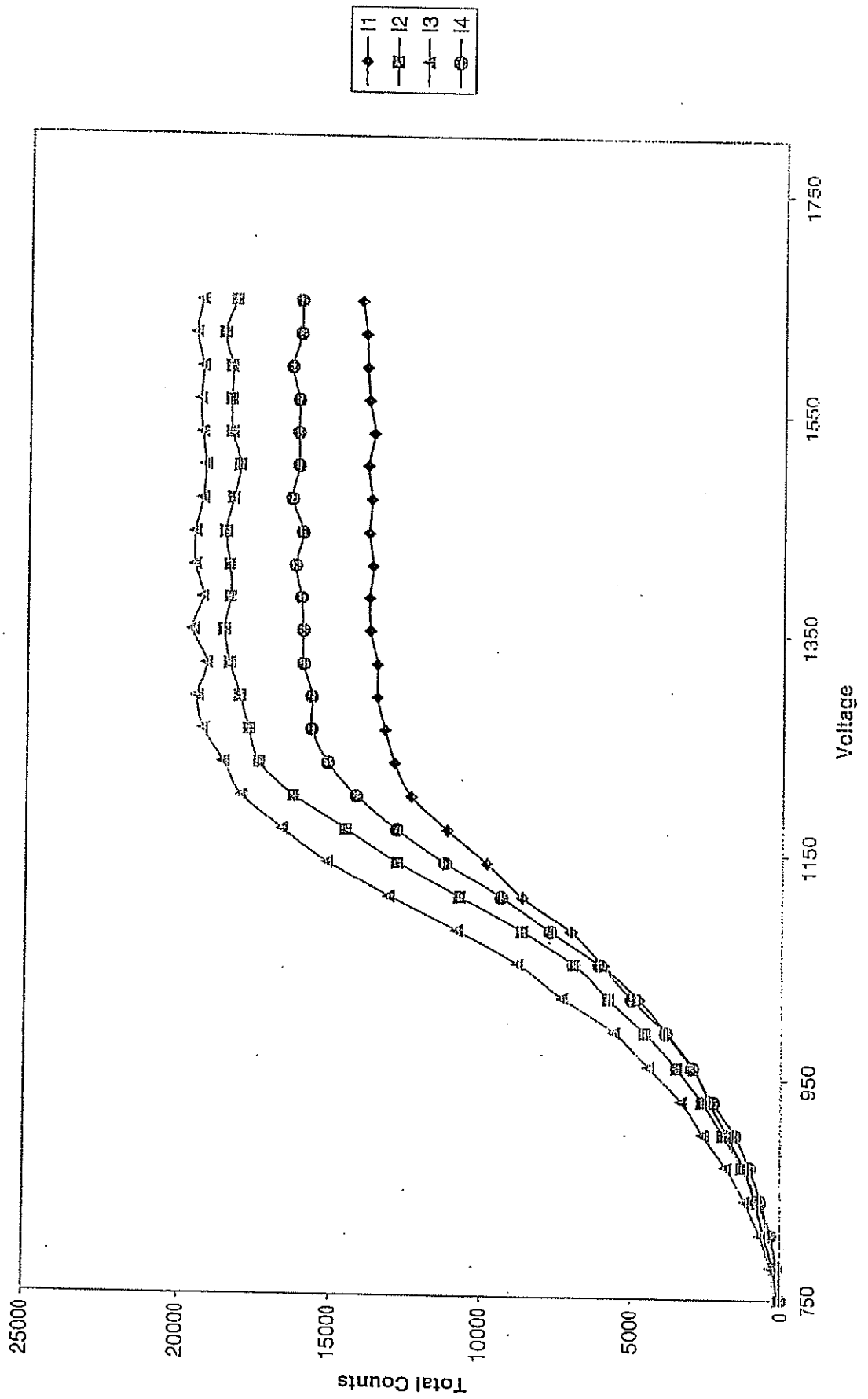
Legend:  
G1: Diamond marker  
G2: Square marker  
G3: Triangle marker  
G4: Circle marker

# LB4100 Plateau - H Drawer



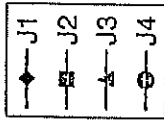
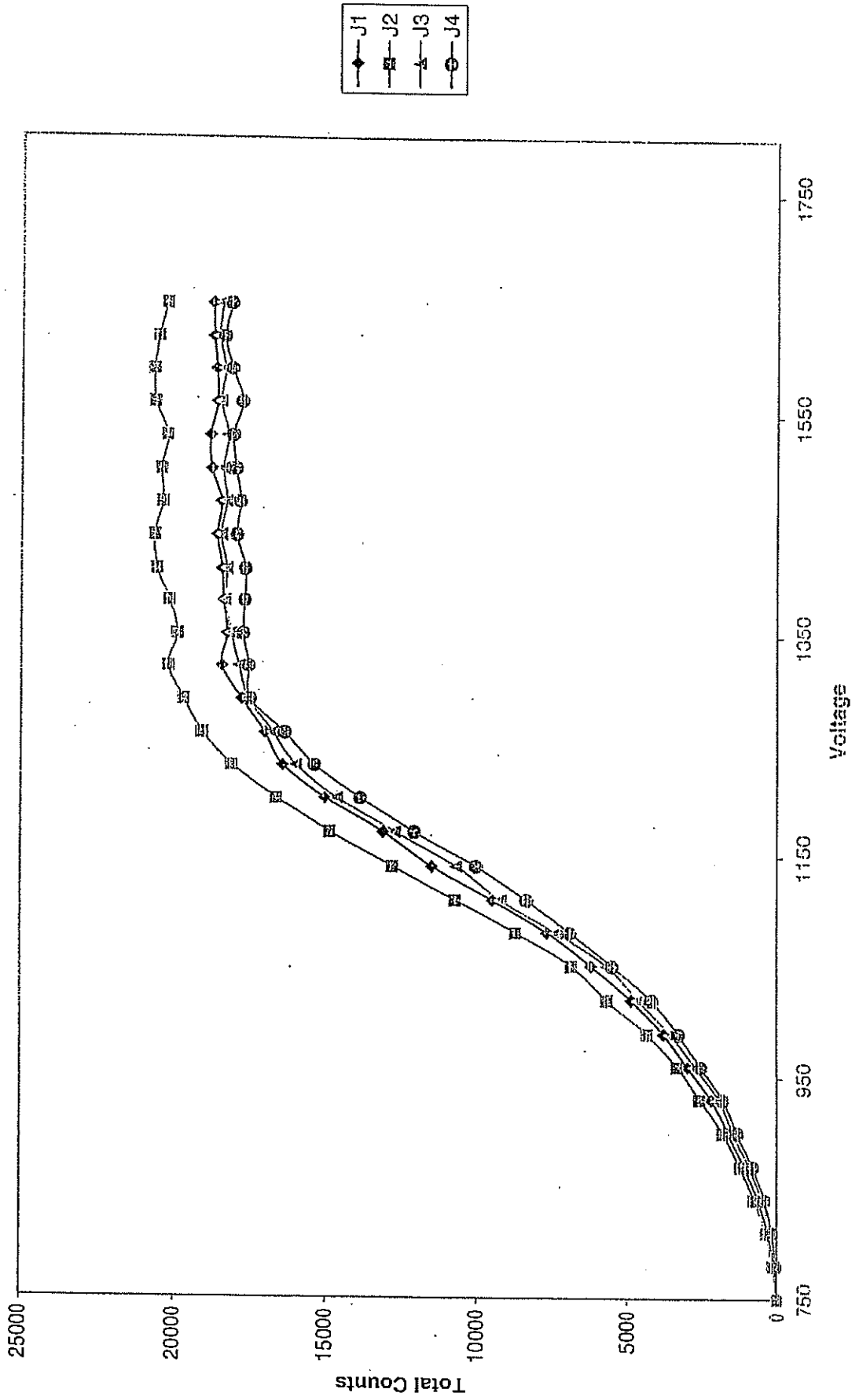
H1  
H2  
H3  
H4

# LB4100 Plateau - i Drawer



Legend:  
11: Diamond marker  
12: Square marker  
13: Triangle marker  
14: Circle marker

LB4100 Plateau - J Drawer





Eckert & Ziegler

Analytics

1380 Seaboard Industrial Blvd.  
Atlanta, Georgia 30318  
Tel 404-352-8677  
Fax 404-352-2837  
www.analyticsinc.com

CERTIFICATE OF CALIBRATION  
Standard Radionuclide Source

1105

75251-278

Th-230 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked with germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Th-230
ACTIVITY (Bq):	3.832 E4
HALF-LIFE:	7.538 E4 years
CALIBRATION DATE:	June 14, 2007 12:00 EST
RELATIVE EXPANDED UNCERTAINTY (k=2):	2.0%

Impurities:  $\gamma$ -impurities <0.1%,  $\alpha$ -impurities <0.01%

5.09604 grams 0.5M HNO<sub>3</sub> solution.

P O NUMBER 2744RD, Item 3

SOURCE PREPARED BY: T. Kierman for  
M. D. Dimitrova, Radiochemist

Q A APPROVED:

[Signature]

RECEIVED  
6/25/07

RC-5-045-146



# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	1105	Isotope:	Thorium-230
Prepared By:	Daniel Roy	Prepared By:	Daniel Roy
Carrier Conc:	0.5M HNO3	Prep Date:	07/23/2008
Reference Date:	06/14/2007	Verification Date:	01/09/2013
Ampoule Mass (g):	5.09604 g	Expiration Date:	01/08/2014
Uncertainty:	+/- 2 %	Primary Code:	1105-A
LogBook No:	RC-S-045-146	Dilution(mL):	100 mL
		Mass of Parent(g):	4.8933 g
		Density(g/mL):	1.0137
		Balance ID:	38080204

### Calculations Converting parent activity to dpm/mL|dpm/g

$(\text{Mass of parent(g)} * (\text{Parent Activity (Bq)}) * (\text{conversion dpm to Bq}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parent Activity (Bq)}) * (\text{conversion dpm to Bq}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(4.8933 \text{ g}) * (38320 \text{ Bq}) * (60 \text{ dpm/Bq}) / (5.09604 \text{ g} * 100 \text{ mL}) = 22077.2901 \text{ dpm/mL}$
$(4.8933 \text{ g}) * (38320 \text{ Bq}) * (60 \text{ dpm/Bq}) / (1.0137 \text{ g/mL}) / (5.09604 \text{ g} * 100 \text{ mL}) = 21779.7999 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
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GEL Laboratories LLC  
Version 1.0 9/18/2000

# Verification for Th-230 Standard 1105-A

v1.02

Instrument	Silver
Analyst	BF1
Verification Prep Date	1/8/2013

Standard Information	
Isotope	Th-230
Serial Number	1105-A
Isotope Half-life	7.5380E+04 Y
Reference Date	6/14/2007
Ref. Act. (DPM/mL)	22077.2901
Amount of Std. (mL)	0.1
Standard Prep Date	7/23/2008

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	1/9/2013	89.40	2285.68	46.20
2	1/9/2013	91.40	2290.23	46.20
3	1/9/2013	92.60	2305.98	46.20

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	2239.48	1.011815	22183.30	2213.33
2	2244.03	1.011815	22178.26	2217.83
3	2259.78	1.011815	22333.93	2233.39

Mean Value = 22215.16  
 Stdev = 105.2811441  
 Certificate Value\* = 22076.2  
 Two sigma = 210.562  
 10 % of Mean = 2221.516  
 Rule A (Pass/Fail) Pass  
 % Recovery 100.63%  
 Rule B (Pass/Fail) Pass  
 Expiration Date 1/8/2014

### Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.  
 Rule B = The determined mean value shall be within 5% of the certificate value.

\* Certificate Value is decay corrected to Count Date.

The analyst prepared three standard verification sources for Th-230 source 1105-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecocint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecocint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCSilver for Th-230 source standard verification. The Th-230 efficiency calibration which was used for verification calculations was performed on 1/9/2013 using Th-230 source 1242-A.

Standard results for each verification source was calculated as follows:

$$\text{Source dpm/mL} = (A - B)/(C)(D)$$

where:

- A = Ver. source cpm,
- B = BKG cpm,
- C = System efficiency (cpm/dpm), and
- D = volume used for standard verification.

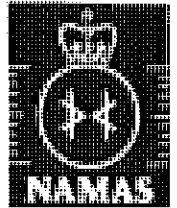
RAD-M-001

*[Signature]* 1/13

*Amanda J. Feltner*  
1125113



0133



CALIBRATION  
No. 0146

ISSUED BY: Nycomed Amersham plc  
Radiation & Radioactivity  
Calibration Laboratory  
Amersham Laboratories  
White Lion Road  
Amersham  
Buckinghamshire  
HP7 9LL

ISSUED FOR: AEA Technology plc  
Isotrak  
Amersham Laboratories  
White Lion Road  
Amersham  
Buckinghamshire  
HP7 9LL

Description Principal radionuclide: Strontium-90

Product code: SIZ64  
Solution number: S6/7/19

Measurement Reference time: 1200 GMT on 1 April 1996

Nuclear data Nuclear data quoted on this certificate are taken from the Joint European File, Version 2.2.

Expression of uncertainties The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k = 2.00$ , which for a  $t$ -distribution with  $\nu_{\text{eff}} = \infty$  effective degrees of freedom corresponds to a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Unless indicated, all other uncertainties are expressed at the confidence level associated with one standard uncertainty.

The format used for the uncertainties in the values of radionuclidic purity is illustrated by the following examples;

6.5(21)	=	$6.5 \pm 2.1$
6.54(21)	=	$6.54 \pm 0.21$
6.543(21)	=	$6.543 \pm 0.021$

Approved  
Signatory

*W. F. Case*

Date of  
issue

11. May 1999

LC-S-023-0607

**Nycomed  
Amersham**

0133

UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

Measurement Reference time for solution number S6/7/19: 1200 GMT on 1 April 1996

Radioactive concentration of strontium-90: 477.1 kilobecquerels per gram of solution  
 which is equivalent to: 12.89 microcuries per gram of solution

Mass of solution: 5.0669 grams

Total activity of strontium-90: 2.417 megabecquerels  
 which is equivalent to: 65.3 microcuries

Method of measurement used (see page 3 of the certificate): K

Calibration dates: 25 March 1996 to 27 March 1996

The calibration date is provided for added information only, and must not be confused with the reference date on pages 1 and 2 of the certificate. It is the reference date that must be used in all calculations relating to the values of activity.

Accuracy Expanded uncertainty in the radioactive concentration quoted above:  $\pm 0.80\%$

Combined Type A uncertainty :  $\pm 0.05\%$

Combined Type B uncertainty :  $\pm 0.40\%$

Radionuclidic purity The estimated activities of any radioactive impurities found by high-resolution gamma ray spectrometry, or in any other examination of the solution, are listed below expressed as percentages of the activity of the principal radionuclide at the reference time.

Other radionuclides 0.0005(3) %

Chemical composition 0.1 M HCl containing 100 micrograms of strontium and 100 micrograms of yttrium per ml.

Physical data Recommended half life:  $29.12 \pm 0.24$  years (1 year = 365.25 days)

Strontium-90: 100% beta particle emission.

Yttrium-90: 100% beta particle emission. Half life  $64.1 \pm 0.1$  hours.

The activity of the yttrium-90 is equal to the activity of the strontium-90.

Remarks This product meets the quality assurance requirements for achieving traceability to NIST as defined in ANSI N42.22-1995.

Tests made over a period of 2 years on standardised solutions of strontium-90 stored in glass ampoules have shown that loss of strontium-90 from solution is negligible other than by radioactive decay.

21-5-073-000909  
Page 357 of 909

UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

Methods of measurement The measurement techniques listed below are currently in use at Nycomed Amersham for the absolute standardisation of radioactive solutions. The methods used for this standardisation are indicated on page 2 of the certificate.

Using a gas flow proportional counter

- A 4 pi beta counting
- B 4 pi alpha counting
- C 4 pi internal conversion electron counting
- D 4 pi coincidence counting
- E 4 pi anticoincidence counting
- F 4 pi coincidence and anticoincidence counting

Using a liquid scintillation counter

- G 4 pi coincidence counting
- H 4 pi anticoincidence counting
- J 4 pi coincidence and anticoincidence counting
- K 4 pi efficiency tracing

SI unit of radioactivity

The S.I. unit of radioactivity is the becquerel

- 1 becquerel (Bq) = 1 nuclear transformation per second, therefore
- 1 curie (Ci) =  $3.7 \times 10^{10}$  becquerels exactly

Useful conversion factors are:

- 1 microcurie ( $\mu\text{Ci}$ ) =  $3.7 \times 10^4$  Bq = 37 kilobecquerels (kBq)
- 1 millicurie (mCi) =  $3.7 \times 10^7$  Bq = 37 megabecquerels (MBq)
- 1 kilobecquerel (kBq) = 27.027 nanocuries (nCi)
- 1 megabecquerel (MBq) = 27.027 microcuries ( $\mu\text{Ci}$ )



# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0133	Isotope:	Strontium-90
Prepared By:	Joe Davis	Prepared By:	Aadli Abdul-Kareem
Carrier Conc:	0.1 M HCL	Prep Date:	09/25/1999
Reference Date:	04/01/1996	Verification Date:	08/13/2013
Ampoule Mass (g):	5.0669 g	Expiration Date:	08/13/2014
Uncertainty:	+/- .8 %	Primary Code:	0133-A
LogBook No:	RC S 023 060	Dilution(mL):	100 mL
		Mass of Parent(g):	4.8374 g
		Density(g/mL):	1.0041
		Balance ID:	38080204

### Calculations Converting parent activity to dpm/mL|dpm/g

$(\text{Mass of parent(g)}) * (\text{Parm Activity (uCi/g)}) * (\text{conversion dpm to uCi}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parm Activity (uCi/g)}) * (\text{conversion dpm to uCi}) / \text{Density (g/mL)} / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$
$(4.8374 \text{ g}) * (12.89 \text{ uCi/g}) * (2220000 \text{ dpm/uCi}) / (100 \text{ mL}) = 1384260.7092 \text{ dpm/mL}$
$(4.8374 \text{ g}) * (12.89 \text{ uCi/g}) * (2220000 \text{ dpm/uCi}) / (1.0041 \text{ g/mL}) / (100 \text{ mL}) = 1378622.1492 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
08/13/2013	Christina Kimball	.0050588	100	0133-BB	69.7424 dpm/mL	08/13/2013	08/13/2014
04/18/2003	Lonnie Morris	.3247	1000	0133-M	447.6386 dpm/mL	04/16/2004	04/16/2005
05/25/2004	Amanda Fehr	.361	1000	0133-N	497.6826 dpm/mL	05/24/2005	05/24/2006
07/22/2005	Brenda Burke	.098	500	0133-O	270.2099 dpm/mL	09/21/2006	09/21/2007
08/15/2005	Amanda Fehr	.1582	500	0133-P	436.196 dpm/mL	08/15/2005	08/15/2006
12/20/2005	Amanda Fehr	.3248	1000	0133-Q	447.78 dpm/mL	12/20/2005	12/20/2006
10/27/2006	Julie Strock	.000924958	100	0133-R	12.7516809 dpm/mL	10/27/2006	10/27/2007
11/17/2006	Amanda Fehr	.289	1000	0133-S	398.42 dpm/mL	11/17/2006	11/17/2007

11/17/2006	Angela Johnson	2.0079	100	0133-T	27681.35 dpm/mL	09/27/2012	09/27/2013
12/19/2006	Amanda Fehr	.35	1000	0133-U	482.52 dpm/mL	07/26/2007	12/19/2007
05/08/2007	Julie Strock	.010019421	100	0133-V	138.202 dpm/mL	04/29/2008	04/29/2009
07/11/2007	Daniel Roy	.3527	1000	0133-W	486.24 dpm/ml	07/11/2008	07/11/2009
04/29/2009	Tina Schoneman	.0100581	100	0133-X	138.666 dpm/mL	04/29/2010	04/29/2011
04/18/2011	Christina Kimball	.010141	100	0133-Y	139.8124 dpm/mL	04/11/2012	04/11/2013
07/31/2012	Christina Kimball	.01013	100	0133-Z	139.6486 dpm/mL	07/26/2013	07/26/2014

GEL Laboratories LLC  
Version 1.0 9/18/2000



# Verification for Sr-90 Standard 0133-T

v1.0.1

Instrument	Red
Analyst	BXF1
Verification Prep Date	9/27/2012

Standard Information	
Isotope	Sr-90
Serial Number	0133-T
Isotope Half-life	28.9000 Y
Reference Date	4/1/1996
Ref. Act. (DPM/mL)	27681.35
Amount of Std. (mL)	1.0
Standard Prep Date	9/27/2012

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	9/27/2012	97.90	38626.66	37.60
2	9/27/2012	97.70	38200.00	37.60
3	9/27/2012	97.80	38330.00	37.60

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	38589.06	2.042732	18890.91	18890.91
2	38162.40	2.042732	18682.04	18682.04
3	38292.40	2.042732	18745.68	18745.68

dpm/mL  
 Mean Value = 18772.88  
 Stdev = 107.0564993  
 Certificate Value\* = 18639.0  
 Two sigma = 214.113  
 10 % of Mean = 1877.288  
 Rule A (Pass/Fail) Pass  
 % Recovery 100.72%  
 Rule B (Pass/Fail) Pass  
 Expiration Date 9/27/2013

### Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.  
 Rule B = The determined mean value shall be within 5% of the certificate value.

\* Certificate Value is decay corrected to Count Date.

The analyst prepared three standard verification sources for Sr-90 source 0133-T by transferring 1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecocint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecocint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCFied for Sr-90 source standard verification. The Sr-90 efficiency calibration which was used for verification calculations was performed on 9/27/2012 using Sr-90 source 1243-A.

Standard results for each verification source was calculated as follows:

$$\text{Source dpm/mL} = (A - B)/(C)(D)$$

where:

- A = Ver. source cpm,
- B = BKG cpm,
- C = System efficiency (cpm/dpm), and
- D = volume used for standard verification.

RAD-M-001

*Amenda L. Schu 11/2/12*



**General Engineering Laboratories**  
**GFC Calibration Source Preparation Sheet**  
 Alpha Cross-talk

Applicable SOP Number AL-RAD-A-001

Isotope Po-210

Date Standards Prepared 9/27/13

Standard ID 1673-A

Matrix of Planchet/Filter 47 mm Concentricring  
S.S. planchette

Amount Used (g or ml) 2.0

Standard Activity (DPM/g or ml) 22622.4159

Residue/Carrier Agent tap water

Reference Date 8/1/13

Pipette ID Used 1608405

Expiration Date 8/26/14

Balance ID Used F30560

Standard Number	Residue Volume (mL) (tap water)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
P1	0	7.6765	7.6765	0.0
P2	5	7.6486	7.6519	3.3
P3	10	7.6430	<del>7.6480</del> 7.6495	6.5
P4	15	7.7009	7.7173	16.4
P5	20	7.6602	7.6923	32.1
P6	25	7.6423	7.6899	47.6
P7	30	7.6766	7.7416	65.0
P8	35	7.6391	7.7186	79.5

AS + 9/27/13

Prepared By: Amanda L. Fisher

Date 9/27/13

Reviewed By: [Signature]

Date 10/1/13



**Eckert & Ziegler**

**Isotope Products**

24937 Avenue Tibbitts  
Valencia, California 91355

Tel 661-309-1010

Fax 661-257-8303

1673

# CERTIFICATE OF CALIBRATION ALPHA STANDARD SOLUTION

<b>Radionuclide:</b> Po-210	<b>Customer:</b> GENERAL ENGINEERING LABS.
<b>Half-life:</b> 138.376 ± 0.002 days	<b>P.O. No.:</b> GEL1304374
<b>Catalog No.:</b> 7310	<b>Reference Date:</b> 1-Aug-13 12:00 PST
<b>Source No.:</b> 1686-39	<b>Contained Radioactivity:</b> 1.050 μCi 38.85 kBq

**Physical Description:**

- A. Mass of solution: 5.19741 g in 5 mL flame-sealed ampoule
- B. Chemical form: PoCl<sub>4</sub> in 2M HCl
- C. Carrier content: None
- D. Density: 1.033 g/mL @ 20°C

**Radioimpurities:**

None detected

**Radionuclide Concentration:** 0.2020 μCi/g, 7.474 kBq/g

**Method of Calibration:**

This source was prepared from a weighed aliquot of solution whose activity in μCi/g was determined using a liquid scintillation counter.

**Uncertainty of Measurement:**

- A. Type A (random) uncertainty: ± 0.5 %
- B. Type B (systematic) uncertainty: ± 3.0 %
- C. Uncertainty in aliquot weighing: ± 0.0 %
- D. Total uncertainty at the 99% confidence level: ± 3.0 %

**Notes:**

- See reverse side for leak test(s) performed on this source.
- EZIP participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (as in NRC Regulatory Guide 4.15).
- Nuclear data was taken from NCRP Report No. 58, 1985.
- This source has a working life of 9 months.

RECEIVED  
7/16/13

Daniel James Van Dalen  
Quality Control

1-Jul-13  
Date

EZIP Ref. No.: 1686-39

RC-S-065-02

ISO 9001 CERTIFIED

**Medical Imaging Laboratory**  
24937 Avenue Tibbitts Valencia, California 91355

**Industrial Gauging Laboratory**  
1800 North Keystone Street Burbank, California 91504

# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	1673	Isotope:	Polonium-210
Prepared By:	Gregory Ramsay	Prepared By:	Tim Chandler
Carrier Conc:	2M HCl	Prep Date:	07/29/2013
Reference Date:	08/01/2013	Verification Date:	08/26/2013
Ampoule Mass (g):	5.19741 g	Expiration Date:	08/26/2014
Uncertainty:	+/- 1.172 %	Primary Code:	1673-A
LogBook No:	RC-S-065-102	Dilution(mL):	100 mL
		Mass of Parent(g):	5.0441 g
		Density(g/mL):	1.0315
		Balance ID:	38080204

### Calculations Converting parent activity to dpm/mL|dpm/g

$(\text{Mass of parent(g)} * (\text{Parm Activity (kbq)}) * (\text{conversion dpm to kbq}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parm Activity (kbq)}) * (\text{conversion dpm to kbq}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(5.0441 \text{ g}) * (38.85 \text{ kbq}) * (60000 \text{ dpm/kbq}) / (5.19741 \text{ g} * 100 \text{ mL}) = 22622.4160 \text{ dpm/mL}$
$(5.0441 \text{ g}) * (38.85 \text{ kbq}) * (60000 \text{ dpm/kbq}) / (1.0315 \text{ g/mL}) / (5.19741 \text{ g} * 100 \text{ mL}) = 21932.2093 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
07/31/2013	Tim Chandler	2.8134	100	1673-B	617.040778 dpm/mL	08/07/2013	08/07/2014
08/21/2013	Christina Kimball	.3091	100	1673-C	67.79246 dpm/mL	08/26/2013	08/26/2014

GEL Laboratories LLC  
Version 1.0 9/18/2000

# Verification for Po-210 Standard 1673-A

v1.0

Analyst	TC1
Verification Prep Date	7/30/2013

Tracer Information	
Isotope	Po-209
Serial Number	1423-F
Amount of Std. (mL)	0.1
Expiration Date	8/2/2013

Standard Information	
Isotope	Po-210
Serial Number	1673-A
Isotope Half-life	138.3800 D
Reference Date	8/1/2013
Ref. Act. (dpm/mL)	22622.4159
Amount of Std. (mL)	0.0001
Standard Prep Date	7/29/2013

Std #	Count Date	Activity pCi	Standard dpm/mL
1	7/30/2013	1.040	23088.00
2	7/30/2013	1.120	24864.00
3	7/30/2013	1.020	22644.00

Mean Value = 1.060 23532.000  
 Stdev = 0.052915026 1174.713582

pCi  
 Certificate Value\* = 1.0293  
 Two sigma = 0.1058  
 10 % of Mean = 0.1060  
 Rule A (Pass/Fail) Pass  
 % Recovery 102.98%  
 Rule B (Pass/Fail) Pass  
 Expiration Date 7/30/2014

dpm/mL  
 22850.1868  
 2349.4272  
 2353.2000  
 Pass  
 102.98%  
 Pass

## Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.

Rule B = The determined mean value shall be within 5% of the certificate value.

\* Certificate Value is decay corrected to Verification Prep Date.

The analyst prepared three standard verification sources for Po-210 standard 1673-A using 0.0001 mL for each source. Each standard was combined with 0.1 mL of Po-209 standard 1423-F and was diluted in a plastic cup containing 2 grams of ascorbic acid and 75 mL of 1M HCl. The polonium was plated onto a nickel disc by spinning with a stir bar in the solution for 4 hours. The samples were prepared for counting following routine procedures for alpha spectroscopy source preparation. Each source was counted using routine alpha spec procedures. DPM values for Po-210 were calculated by comparison to Po-209 certified values.

*Ashe JQC 7/31/13*

*ASD 7-31-13*

GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER : 1318659  
 SAMPLE ID : S1202916178\_PO  
 SAMPLE QTY : 1.000 L  
 SAMPLE DATE : 30-Jul-2013 00:00:00  
 ANALYST : TC1  
 % YIELD : 0.8 +/-48.240 %

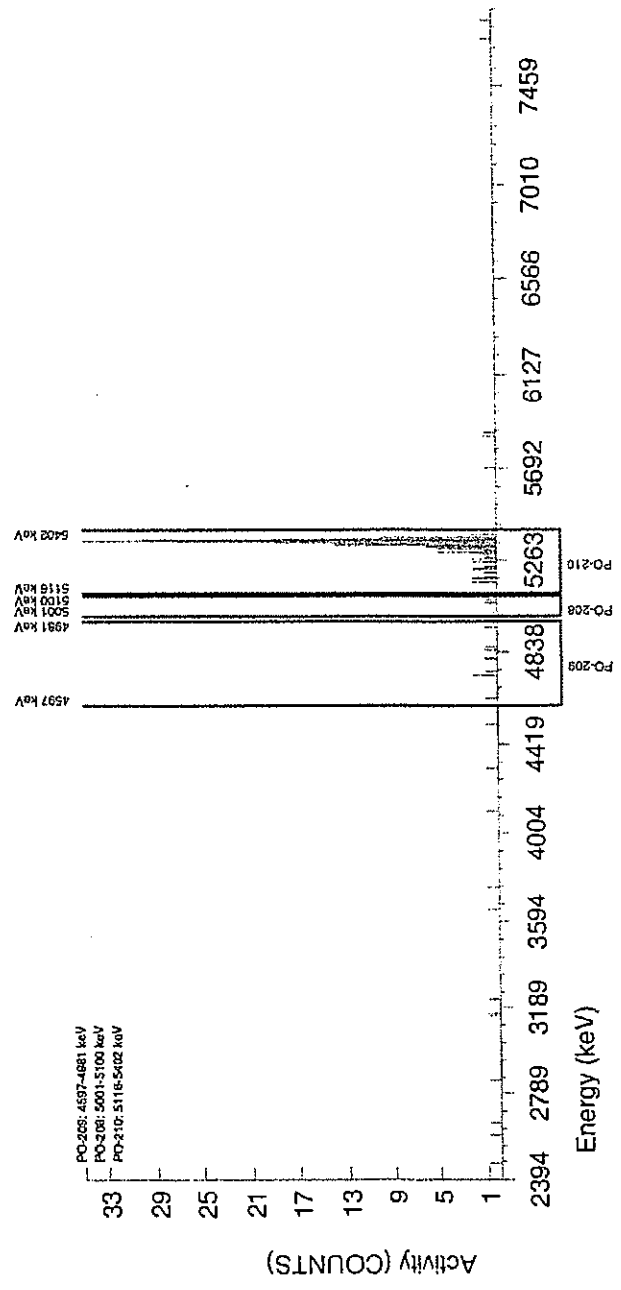
CHAMBER : 069  
 DETECTOR S/N : 78795  
 AVERAGE %EFFICIENCY : 33.2166  
 AVERAGE %EFF ERROR : 0.6386  
 COUNT DATE : 30-Jul-2013 17:47:46  
 ELAPSED LIVE TIME(SEC) : 30300.00

LIB FILE : PO  
 BKG FILE : B069.CNF;1481  
 BKG DATE : 27-Jul-2013  
 BKG LIVE TIME(SEC) : 60000.00  
 EFF FILE : W069.CNF;410  
 CAL DATE : 08-Jul-2013

TRACER  
 ID : 1423-F  
 NUCLIDE : PO-209  
 NOMINAL : 5.2508E+00 dpm  
 RESULTS : 4.1720E-02 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG SDev	%ABUN	ACTIVITY pCi/L	1.96-sigma TPU pCi/L	MDA pCi/L	Lc pCi/L	1.96-sigma cnt Unc pCi/L
PO-208	5080.00	5035.21	0.000	5.000	5.000	0.000	0.0000	100.000	1.69E+00	2.30E+00	1.01E+00	0.00E+00	1.66E+00
PO-209	4882.00	4792.13	4.908	9.000	6.980	2.020	1.4213	99.740	2.37E+00	3.16E+00	2.96E+00	9.72E-01	2.23E+00
PO-210	5304.38	5333.72	21.922	220.000	219.495	0.505	0.7106	100.000	7.45E+01	7.12E+01	1.99E+00	4.87E-01	9.90E+00



GEL Laboratories LLC  
 ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-r-009  
 Analytical SOP:

BATCH NUMBER : 1318659  
 SAMPLE ID : S1202918179\_PO  
 SAMPLE QTY : 1.000 L +/-0.500 %  
 SAMPLE DATE : 30-Jul-2013 00:00:00  
 ANALYST : TC1  
 % YIELD : 73.2 +/-5.273 %

CHAMBER : 070  
 DETECTOR S/N : 78262  
 AVERAGE %EFFICIENCY : 34.5949  
 AVERAGE %EFF ERROR : 0.6645  
 COUNT DATE : 30-Jul-2013 17:47:46  
 ELAPSED LIVE TIME(SEC) : 30300.00

LIB FILE : PO  
 BKG FILE : B070.CNF;1483  
 BKG DATE : 27-Jul-2013  
 BKG LIVE TIME(SEC) : 60000.00  
 EFF FILE : W070.CNF;400  
 CAL DATE : 08-Jul-2013

TRACER

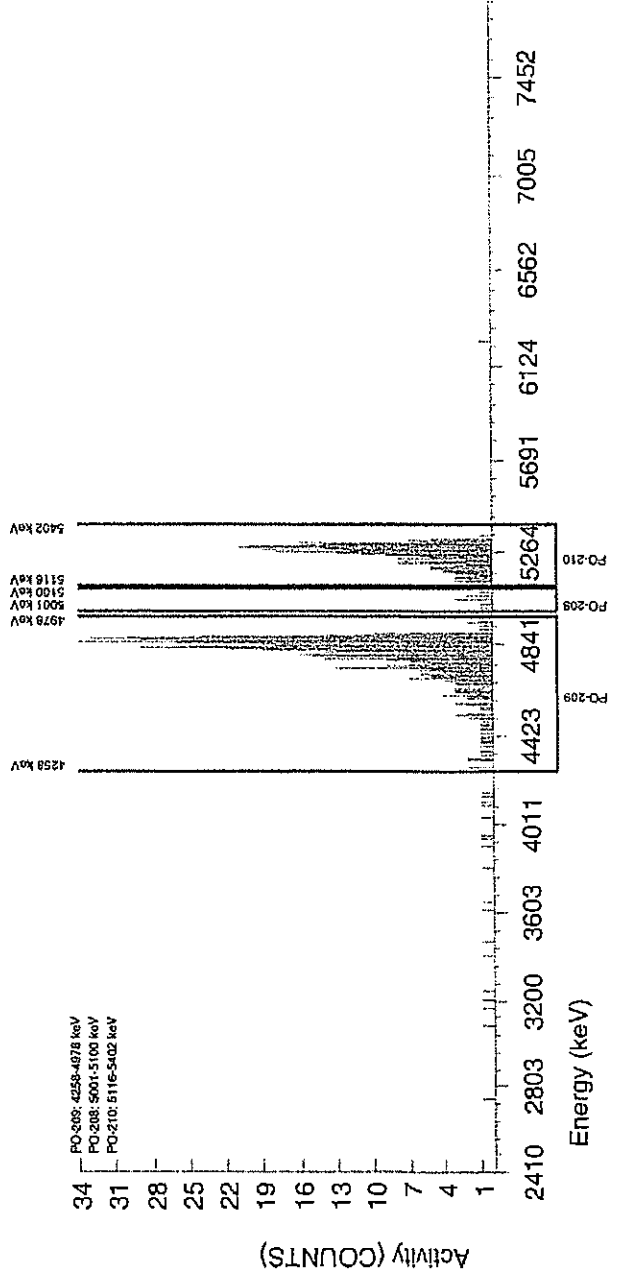
ID : 1423-F  
 NUCLIDE : PO-209  
 NOMINAL : 5.2508E+00 dpm  
 RESULTS : 3.8451E+00 dpm

LCS

ID  
 NUCLIDE  
 NOMINAL (pCi/L)  
 % RECOVERY

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/L	1.96-sigma TPU pCi/L	MDA pCi/L	Lc pCi/L	1.96-sigma cnt Unc pCi/L
PO-208	5080.00	5057.08	0.000	11.000	11.000	0.000	0.0000	100.000	3.88E-02	2.45E-02	1.06E-02	0.00E+00	2.42E-02
PO-209	4882.00	4787.03	63.543	671.000	669.990	1.010	1.0050	99.740	2.37E+00	3.17E-01	2.49E-02	7.16E-03	1.79E-01
PO-210	5304.38	5260.28	52.655	296.000	294.990	1.010	1.0050	100.000	1.04E+00	1.66E-01	2.50E-02	7.17E-03	1.20E-01





GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

LIB FILE : PO  
BKG FILE : B071.CNF;1476  
BKG DATE : 27-Jul-2013  
BKG LIVE TIME(SEC) : 59999.99  
EFF FILE : W071.CNF;382  
CAL DATE : 08-Jul-2013

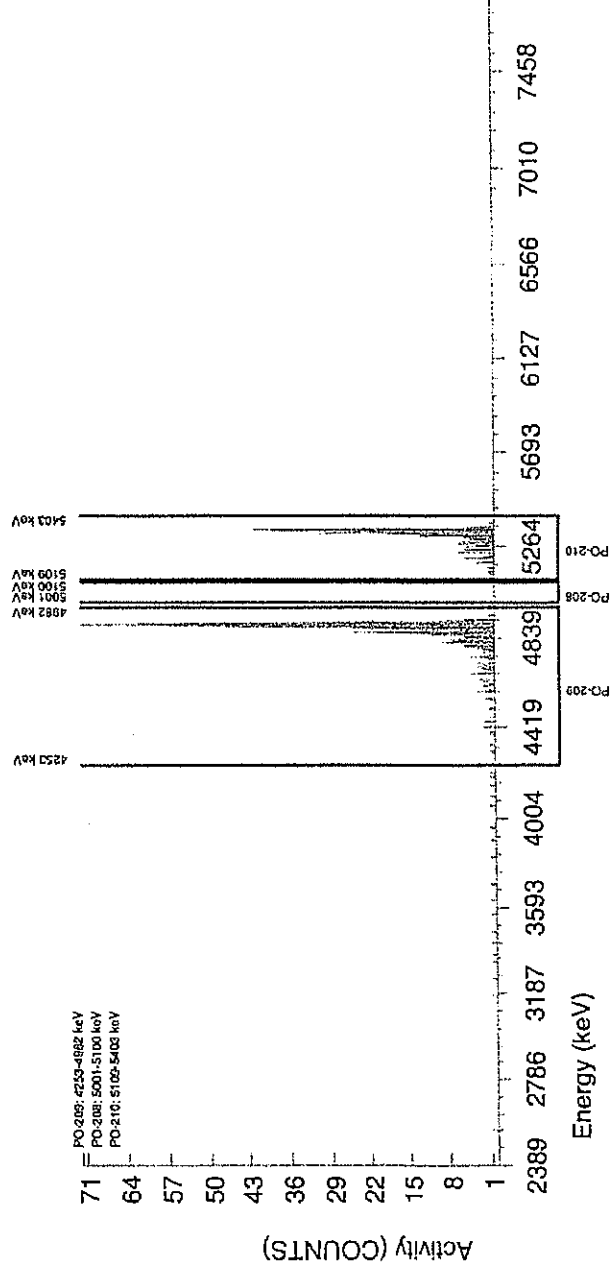
CHAMBER : 071  
DETECTOR S/N : 80020  
AVERAGE %EFFICIENCY : 32.2871  
AVERAGE %EFF ERROR : 0.6210  
COUNT DATE : 30-Jul-2013 17:47:47  
ELAPSED LIVE TIME(SEC) : 30299.99

BATCH NUMBER : 1318659  
SAMPLE ID : S1202918180\_PO  
SAMPLE QTY : 1.000 L +/-0.500 %  
SAMPLE DATE : 30-Jul-2013 00:00:00  
ANALYST : TC1  
% YIELD : 72.0 +/-5.403 %

LCS  
TRACER ID : 1423-F  
NUCLIDE : PO-209  
NOMINAL : 5.2508E+00 dpm  
RESULTS : 3.7786E+00 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG StDev	%ABUN	ACTIVITY pCi/L	1.96-sigma TPU pCi/L	MDA pCi/L	Lc pCi/L	1.96-sigma cnt Unc pCi/L
PO-208	5080.00	5050.46	0.000	0.000	-0.505	0.505	0.7106	100.000	-1.94E-03	9.26E-03	2.25E-02	5.51E-03	9.25E-03
PO-209	4882.00	4849.53	25.915	616.000	614.485	1.515	1.2309	99.740	2.37E+00	3.26E-01	3.07E-02	9.56E-03	1.88E-01
PO-210	5304.38	5305.73	24.591	291.000	291.000	0.000	0.0000	100.000	1.12E+00	1.81E-01	1.16E-02	0.00E+00	1.29E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER : 1318659  
 SAMPLE ID : S1202918181\_PO  
 SAMPLE QTY : 1.000 L +/-0.500 %  
 SAMPLE DATE : 30-Jul-2013 00:00:00  
 ANALYST : TC1  
 % YIELD : 70.6 +/-5.438 %

CHAMBER : 072  
 DETECTOR S/N : 67584  
 AVERAGE %EFFICIENCY : 32.3134  
 AVERAGE %EFF ERROR : 0.6215  
 COUNT DATE : 30-Jul-2013 17:47:45  
 ELAPSED LIVE TIME(SEC) : 30299.99

LIB FILE : PO  
 BKG FILE : B072.CNF,1483  
 BKG DATE : 27-Jul-2013  
 BKG LIVE TIME(SEC) : 59999.99  
 EFF FILE : W072.CNF,388  
 CAL DATE : 08-Jul-2013

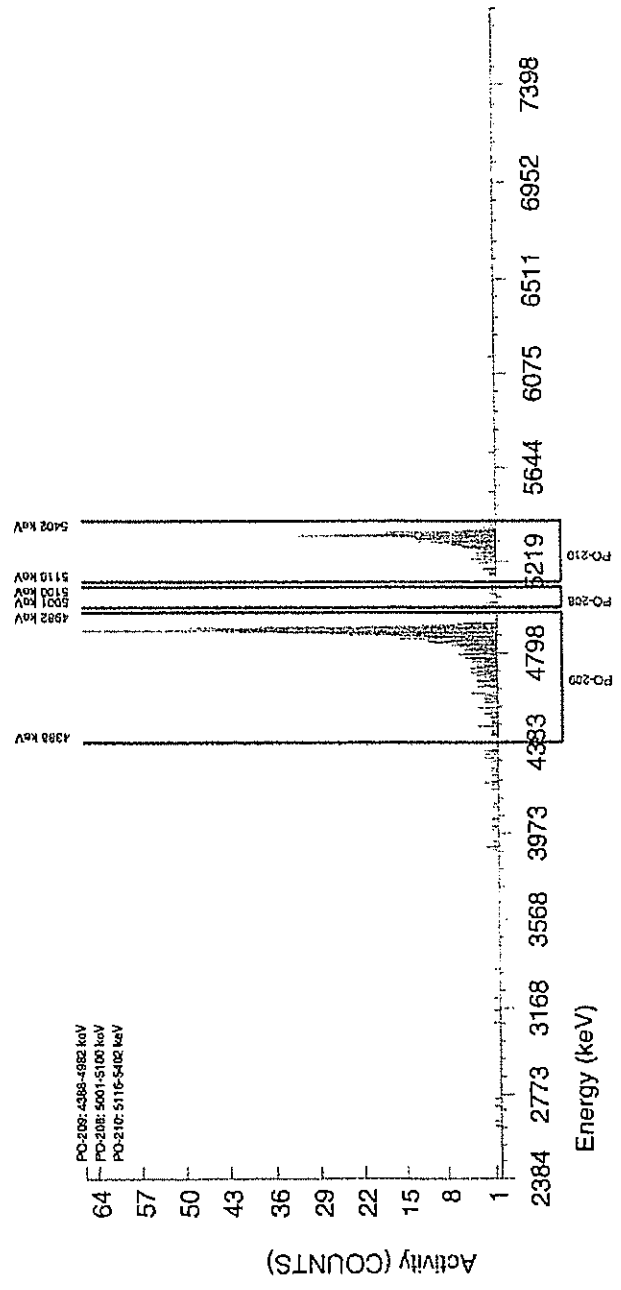
LCS

TRACER ID : 1423-F  
 NUCLEIDE ID : PO-209  
 NOMINAL : 5.2508E+00 dpm  
 RESULTS : 3.7078E+00 dpm

NUCLIDE ID  
 NUCLEIDE  
 NOMINAL (pCi/L)  
 % RECOVERY

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	8K Dev	%ABUN	ACTIVITY pCi/L	1.96-sigma TPU pCi/L	MDA pCi/L	Lc pCi/L	1.96-sigma cnt Unc pCi/L
PO-208	5080.00	5045.35	16.930	10.000	10.000	0.000	0.0000	100.000	3.91E-02	2.61E-02	1.17E-02	0.00E+00	2.57E-02
PO-209	4882.00	4846.67	26.817	607.000	603.465	3.535	1.8802	99.740	2.37E+00	3.29E-01	4.15E-02	1.49E-02	1.90E-01
PO-210	5304.38	5309.14	26.139	261.000	260.495	0.505	0.7106	100.000	1.02E+00	1.70E-01	2.30E-02	5.63E-03	1.25E-01

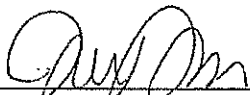


STANDARDS DATABASE PARAMETERS for 1673-A

TRACER IDENTIFICATION : 1673-A  
PARENT ACTIVITY : 22622.416  
PARENT ACTIVITY ERROR : 678.6725  
SECONDARY ACTIVITY : 0  
WT OF PARENT USED TO CREATE NEW SOURCE : 5.0441  
INITIAL WT OF STOCK RECEIVED : 5.19741  
INITIAL WT ERROR : 1.92403524062947E-03  
PRIMARY DILUTION : 100  
SECONDARY DILUTION : 0  
HALFLIFE IN DAYS : per Nuclide Library  
DENSITY (G/mL) : 1.0315  
STANDARD REFERENCE DATE : 01-Aug-2013 00:00:00  
STANDARD EXPIRATION DATE : 30-Jul-2014 00:00:00  
STANDARD PURIFICATION DATE :  
ISOTOPE NAME : PO-210  
TRACEABLE TO NIST (Y/N) : Y  
CONTAMINATION ISO1 :  
CONTAMINATION ISO1 (VALUE) : 0  
CONTAMINATION ISO1 (ERROR) : 0  
CONTAMINATION ISO2 :  
CONTAMINATION ISO2 (VALUE) : 0  
CONTAMINATION ISO2 (ERROR) : 0  
CONTAMINATION ISO3 :  
CONTAMINATION ISO3 (VALUE) : 0  
CONTAMINATION ISO3 (ERROR) : 0  
CONTAMINATION ISO4 :  
CONTAMINATION ISO4 (VALUE) : 0  
CONTAMINATION ISO4 (ERROR) : 0  
IS A SOLID REFERENCE MATERIAL (Y/N) : N  
USE CONTAMINANTS AS MIXED SPIKE (Y/N) : N

Report generated at 31-Jul-2013 11:12:23

PROCEDURE # GL-RAD-M-001

DATA ENTERED BY:  APPROVAL DATE: 7/31/13

SECOND REVIEW BY:  REVIEW DATE: 7-31-13

# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	1673	Isotope:	Polonium-210
Prepared By:	Gregory Ramsay	Prepared By:	Tim Chandler
Carrier Conc:	2M HCl	Prep Date:	07/29/2013
Reference Date:	08/01/2013	Verification Date:	07/30/2013
Ampoule Mass (g):	5.19741 g	Expiration Date:	07/30/2014
Uncertainty:	+/- 3 %	Primary Code:	1673-A
LogBook No:	RC-S-065-102	Dilution(mL):	100 mL
		Mass of Parent(g):	5.0441 g
		Density(g/mL):	1.0315
		Balance ID:	38080204

### Calculations Converting parent activity to dpm/mL|dpm/g

$(\text{Mass of parent(g)}) * (\text{Parent Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parent Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / \text{Density (g/mL)} / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$
$(5.0441 \text{ g}) * (7.47487691 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (100 \text{ mL}) = 22622.4160 \text{ dpm/mL}$
$(5.0441 \text{ g}) * (7.47487691 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (1.0315 \text{ g/mL}) / (100 \text{ mL}) = 21932.2093 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date

GEL Laboratories LLC  
Version 1.0 9/18/2000

419  
7/31/13

Tim  
7-31-13

# Polonium Queue Sheet

30-JUL-13

Verification of Po-210 1673-A

Batch #: 1318659    Analyst:TC1    First Client Due Date:    Internal Due Date:16-AUG-13  
 Tracer Isotope: Po-209    Tracer Code: 1423-F    Expiration Date: 8-2-13    Vol: 0.1  
 LCS Isotope: Po-210    LCS Code: 1673-A    Expiration Date: ~~7-30-13~~ <sup>Jul-13-13</sup>    Vol: 0.0001  
 Spike Isotope: Po-210    Spike Code: ~~NA~~    Expiration Date: ~~NA~~    Vol: ~~NA~~  
 Prep Date: 7-30-13    Initials: JTC    Pipet ID: 1340022    Balance ID: 1113021018    Witness: M/A

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/Dry Aliquot (g/l/f)	Po Det #
1202918178-1	MB for batch 1318659	MB		.05 pCVL	WATER	QC ACCOUNT	25-JUL-13	1	1	1.0	69
1202918179-1	LCS for batch 1318659	LCS		.05 pCVL	WATER	QC ACCOUNT	25-JUL-13	2	2	1.0	70
1202918180-1	LCS for batch 1318659	LCS		.05 pCVL	WATER	QC ACCOUNT	25-JUL-13	3	3	1.0	71
1202918181-1	LCS for batch 1318659	LCS		.05 pCVL	WATER	QC ACCOUNT	25-JUL-13	4	4	1.0	72

MB = spiked with Po-210 1673-A 0.1mL only

took 0.1mL diluted up to 100mL then took 0.1mL for aliquot = 0.0001mL

Solid Sample Dissolution by: LEACH or DIGESTION

Data Reviewed By: TJL 7-31-13

**General Engineering Laboratories  
GFC Verification Source Preparation Sheet**

Applicable SOP Number GL-RAD-A-001

Isotope Th-230 / Sr-90

Date Standards Prepared 8-29-11

Standard ID 1242-A / 1243-A

Matrix of Vial/Planchett 47mm concentric ring  
55 planchette

Amount Used (g or ml) 2.0 / 0.1

Standard Activity (DPM/g or ml) 23217.6149 / 226951.763

Residue/Carrier Agent USGS cal solution B

Reference Date 8-25-08 / 10-1-08

Pipette ID Used 10183201 / 1795419

Expiration Date ~~7-5-12~~ <sup>10/11/12</sup> / ~~7-5-12~~ <sup>10/11/12</sup>  
6/22/13 11/31/13

Balance ID Used 1113021018

	Standard Number	Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
	V <sub>1</sub>	0	7.5843	7.5840	0
	V <sub>2</sub>	2.5	7.5812	7.5916	10.4
	V <sub>3</sub>	5	7.5944	7.6182	23.8
	V <sub>4</sub>	10	7.6239	7.6681	44.2
	V <sub>5</sub>	12	7.5984	7.6531	54.7
	V <sub>6</sub>	15	7.6059	7.6798	73.9
	V <sub>7</sub>	20	7.6178	7.7130	95.2
	V <sub>8</sub>	25	7.5955	7.6985	103

wt ✓

8/29/11

Prepared By: [Signature] Date 8-29-11  
 Reviewed By: [Signature] Date 9/15/11



**Eckert & Ziegler**  
 Analytics

1380 Seaboard Industrial Blvd.  
 Atlanta, Georgia 30318  
 Tel 404-352-8677  
 Fax 404-352-2837  
 www.analytinc.com

**CERTIFICATE OF CALIBRATION**  
 Standard Radionuclide Source

1242

78148-278

Th-230 5 mL Liquid in Flame Sealed Vial

**Customer:** General Engineerings Labs  
**P.O. No.:** 7311RD, Item 1

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

Isotope:	Th-230
Activity (Bq):	4.021 E4
Half-Life:	7.538 E4 years
Calibration Date:	August 25, 2008 12:00 EST
Relative Expanded Uncertainty (k=2):	2.0%

**Comments:**

Impurities:  $\gamma$ -impurities <0.1%,  $\alpha$ -impurities <0.04%  
 5.07467 grams 0.5M HNO3 solution.

Source Prepared By: M. I. Taskaeva  
 M. I. Taskaeva, Radiochemist

QA Approved: D. M. Montgomery  
 D. M. Montgomery, QA Manager

Date: 9-4-08

End of Certificate

Corporate Office

RECEIVED  
 9/17/08

RC-5-048-123  
 Laboratory

# Standard Traceability Log Rad

Source Material Info	
Parent Code:	1242
Prepared By:	Daniel Roy
Carrier Conc:	0.5M HNO3
Reference Date:	08/25/2008
Ampoule Mass (g):	5.07467 g
Uncertainty:	+/- 2 %
LogBook No:	RC-S-048-123

A Solution Material Info	
Isotope:	Thorium-230
Prepared By:	Ashley Drochter
Prep Date:	11/10/2009
Verification Date:	01/09/2023
Expiration Date:	01/08/2014
Primary Code:	1242-A
Dilution(mL):	100 mL
Mass of Parent(g):	4.8836 g
Density(g/mL):	1.0597
Balance ID:	38080204

### Calculations Converting parent activity to dpm/mL|dpm/g

$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(4.8836 \text{ g}) * (40210 \text{ Bq}) * (60 \text{ dpm/Bq}) / (5.07467 \text{ g} * 100 \text{ mL}) = 23217.6149 \text{ dpm/mL}$
$(4.8836 \text{ g}) * (40210 \text{ Bq}) * (60 \text{ dpm/Bq}) / (1.0597 \text{ g/mL}) / (5.07467 \text{ g} * 100 \text{ mL}) = 21908.6601 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
12/01/2009	Bethany Fiem	6.3855	500	1242-B	279.79548 dpm/mL	12/02/2009	12/02/2010
08/03/2010	Gregory Ramsay	12.8745	1000	1242-C	282.063 dpm/mL	07/30/2013	07/30/2014
07/05/2011	Bethany Fiem	12.1975	1000	1242-D	267.2309 dpm/mL	06/22/2012	06/22/2013
01/12/2012	Christina Kimball	.105	500	1242-E	4.6008 dpm/mL	01/14/2013	01/14/2014
01/08/2013	Bethany Fiem	12.5093	1000	1242-F	274.062 dpm/mL	01/09/2013	01/08/2014
08/26/2013	Christina Kimball	.012512	100	1242-G	2.74129 dpm/mL	08/29/2013	08/29/2014

GEL Laboratories LLC  
Version 1.0 9/18/2000



# Verification for Th-230 Standard 1242-A

v1.0.2

Instrument	Silver
Analyst	BF1
Verification Prep Date	1/8/2013

Standard Information	
Isotope	Th-230
Serial Number	1242-A
Isotope Half-life	7.5380E+04 Y
Reference Date	8/25/2008
Ref. Act. (DPM/mL)	23217.6149
Amount of Std. (mL)	0.1
Standard Prep Date	11/10/2009

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	1/9/2013	94.90	2359.06	44.40
2	1/9/2013	95.00	2395.24	44.40
3	1/9/2013	94.90	2439.04	44.40

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	2314.66	1.025255	22576.43	2257.64
2	2350.84	1.025255	22929.32	2292.93
3	2394.64	1.025255	23356.53	2335.65

Mean Value = 22954.09  
 Stdev = 390.6368834  
 Certificate Value\* = 23216.7  
 Two sigma = 781.278  
 10 % of Mean = 2295.409  
 Rule A (Pass/Fail) Pass  
 % Recovery 98.87%  
 Rule B (Pass/Fail) Pass  
 Expiration Date 1/8/2014

### Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.  
 Rule B = The determined mean value shall be within 5% of the certificate value.

\* Certificate Value is decay corrected to Count Date.

The analyst prepared three standard verification sources for Th-230 source 1242-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCSilver for Th-230 source standard verification. The Th-230 efficiency calibration which was used for verification calculations was performed on 1/9/2013 using Th-230 source 1105-A.

Standard results for each verification source was calculated as follows:

$$\text{Source dpm/mL} = (A - B)/(C)(D)$$

where:

- A = Ver. source cpm,
- B = BKG cpm,
- C = System efficiency (cpm/dpm), and
- D = volume used for standard verification.

RAD-M-001

*Amanda J. Decker*  
11-2-11-13



Eckert & Ziegler

Analytics

1380 Seaboard Industrial Blvd.  
Atlanta, Georgia 30318  
Tel 404-352-8677  
Fax 404-352-2837  
www.analyticsinc.com

CERTIFICATE OF CALIBRATION  
Standard Radionuclide Source

1243

78352-278

Sr-90 10 mL Liquid in Flame Sealed Vial

Customer: General Engineering Labs/Charleston, SC  
P.O. No.: 7312 RD, Item 3

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

Isotope:	Sr-90
Activity (Bq):	3.856 E5
Half-Life:	28.79 years
Calibration Date:	October 1, 2008 12:00 EST
Relative Expanded Uncertainty (k=2):	1.7%

Comments:

Impurities:  $\gamma$ -impurities <0.1%  
10.41484 grams 0.1M HCl solution with 30  $\mu$ g/g Sr carrier.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta emission rate for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

Source Prepared By: W. Mao  
W. Mao, Radiochemist

QA Approved: D. M. Montgomery  
D. M. Montgomery, QA Manager

Date: 10/3/08

RECEIVED  
10/3/08

# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	1243	Isotope:	Strontium-90
Prepared By:	Daniel Roy	Prepared By:	Daniel Roy
Carrier Conc:	0.1M HCL	Prep Date:	12/19/2008
Reference Date:	10/01/2008	Verification Date:	02/12/2013
Ampoule Mass (g):	10.41484 g	Expiration Date:	02/12/2014
Uncertainty:	+/- 1.7 %	Primary Code:	1243-A
LogBook No:	RC-S-048-124	Dilution(mL):	100 mL
		Mass of Parent(g):	10.2164 g
		Density(g/mL):	0.9991
		Balance ID:	38080204

### Calculations Converting parent activity to dpm/mL|dpm/g

$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(10.2164 \text{ g}) * (385600 \text{ Bq}) * (60 \text{ dpm/Bq}) / (10.41484 \text{ g} * 100 \text{ mL}) = 226951.7634 \text{ dpm/mL}$
$(10.2164 \text{ g}) * (385600 \text{ Bq}) * (60 \text{ dpm/Bq}) / (0.9991 \text{ g/mL}) / (10.41484 \text{ g} * 100 \text{ mL}) = 227146.2010 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
01/21/2010	Bethany Fiem	2.2467	1000	1243-B	510.329369 dpm/mL	01/21/2010	01/21/2011
08/03/2010	Bethany Fiem	2.5604	1000	1243-C	581.5851 dpm/mL	08/03/2010	08/03/2011
01/12/2011	Bethany Fiem	2.4946	1000	1243-D	566.6389 dpm/mL	01/12/2011	01/12/2012
08/12/2011	Tim Chandler	3.3115	100	1243-G	18.7877 dpm/mL	08/11/2011	08/11/2012
08/17/2011	Tim Chandler	2.5541	100	1243-H	14.49064 dpm/mL	08/18/2011	08/16/2012
06/21/2011	Tim Chandler	.0235	100	1243-E	53.37936 dpm/mL	06/25/2012	06/20/2013
07/05/2011	Bethany Fiem	2.6072	1000	1243-F	592.2156 dpm/mL	07/05/2011	07/05/2012

01/31/2012	Gregory Ramsay	2.6792	1000	1243-I	608.5701 dpm/ml	01/31/2012	01/31/2013
08/29/2012	Bethany Fiem	2.6799	1000	1243-J	608.729104 dpm/mL	09/14/2012	09/11/2013
02/12/2013	Gregory Ramsay	2.6526	1000	1243-K	602.528 dpm/ml	02/12/2013	02/12/2014

GEL Laboratories LLC  
Version 1.0 9/18/2000

# Verification for Sr-90 Standard 1243-A

v1.0.2

Instrument	GOLD
Analyst	BF
Verification Prep Date	2/12/2013

Standard Information	
Isotope	Sr-90
Serial Number	1243-A
Isotope Half-life	28,9000 Y
Reference Date	10/1/2008
Ref. Act. (DPM/mL)	228951.7634
Amount of Std. (mL)	0.1
Standard Prep Date	12/19/2008

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	2/12/2013	55.70	41976.00	38.20
2	2/12/2013	56.10	41080.00	38.20
3	2/12/2013	56.00	42256.00	38.20

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	41937.80	1.986325	211132.62	21113.26
2	41041.80	1.986325	206621.78	20662.18
3	42217.80	1.986325	212542.26	21254.23

dpm/mL  
 210098.89  
 3092.649469  
 Mean Value =  
 Stdev =  
 Certificate Value\* = 204384.1  
 Two sigma = 6185.299  
 10 % of Mean = 21009.889  
 Rule A (Pass/Fail) Pass  
 % Recovery 102.80%  
 Rule B (Pass/Fail) Pass  
 Expiration Date 2/12/2014

### Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.  
 Rule B = The determined mean value shall be within 5% of the certificate value.

\* Certificate Value is decay corrected to Count Date.

The analyst prepared three standard verification sources for Sr-90 source 1243-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecocint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecocint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCGOLD for Sr-90 source standard verification. The Sr-90 efficiency calibration which was used for verification calculations was performed on 2/12/2013 using Sr-90 source 1244-A.

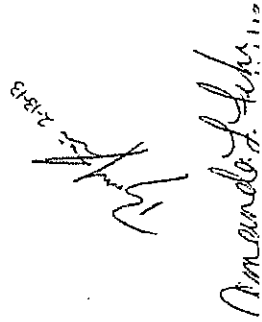
Standard results for each verification source was calculated as follows:

$$\text{Source dpm/mL} = (A - B)/(C)(D)$$

where:

- A = Ver. source cpm,
- B = BKG cpm,
- C = System efficiency (cpm/dpm), and
- D = volume used for standard verification.

RAD-M-001

  
 2/12/2013  
 Amanda J. Adams, L.S.

# Gas Flow Proportional Counter Calibration Package

Method: Strontium 89/90

Instrument (circle one): LB4100 / Protean

Included/ Acceptable	Comments
✓	
✓	
✓	
✓	
✓	
✓	

## Part 1: Efficiency determination

- 1 Efficiency spreadsheet (eff pts, graphs, trendline equation)
- 2 Applicable portion of GFPC\_Machines.XLS
- 3 Raw Data for Calibration standards
- 4 Verification Spreadsheet and Raw Data (recoveries 75%-125%)
- 5 Plateau graph and raw data
- 6 Standardization of Carrier (if applicable)

## Part 2. Documentation for Calibration Source

- 1 Vendor Certificate
- 2 Standard Traceability Log (from LIMS)
- 3 Current Verification of Source
- 4 Source preparation sheet

✓	
✓	
✓	
✓	

## Part 3. Documentation for Verification Source

- 1 Vendor Certificate
- 2 Standard Traceability Log (from LIMS)
- 3 Current Verification of Source
- 4 Source preparation sheet

✓	
✓	
✓	
✓	

## Part 4. Enter into LIMS

- 1 Alpha LIMS instrument calibration updated

✓	
---	--

Primary Review of Package

*William King IV*

Secondary Review of Package

*Amanda L. Fehr*

Effective Date:

3/1/13

exp date 2/28/14









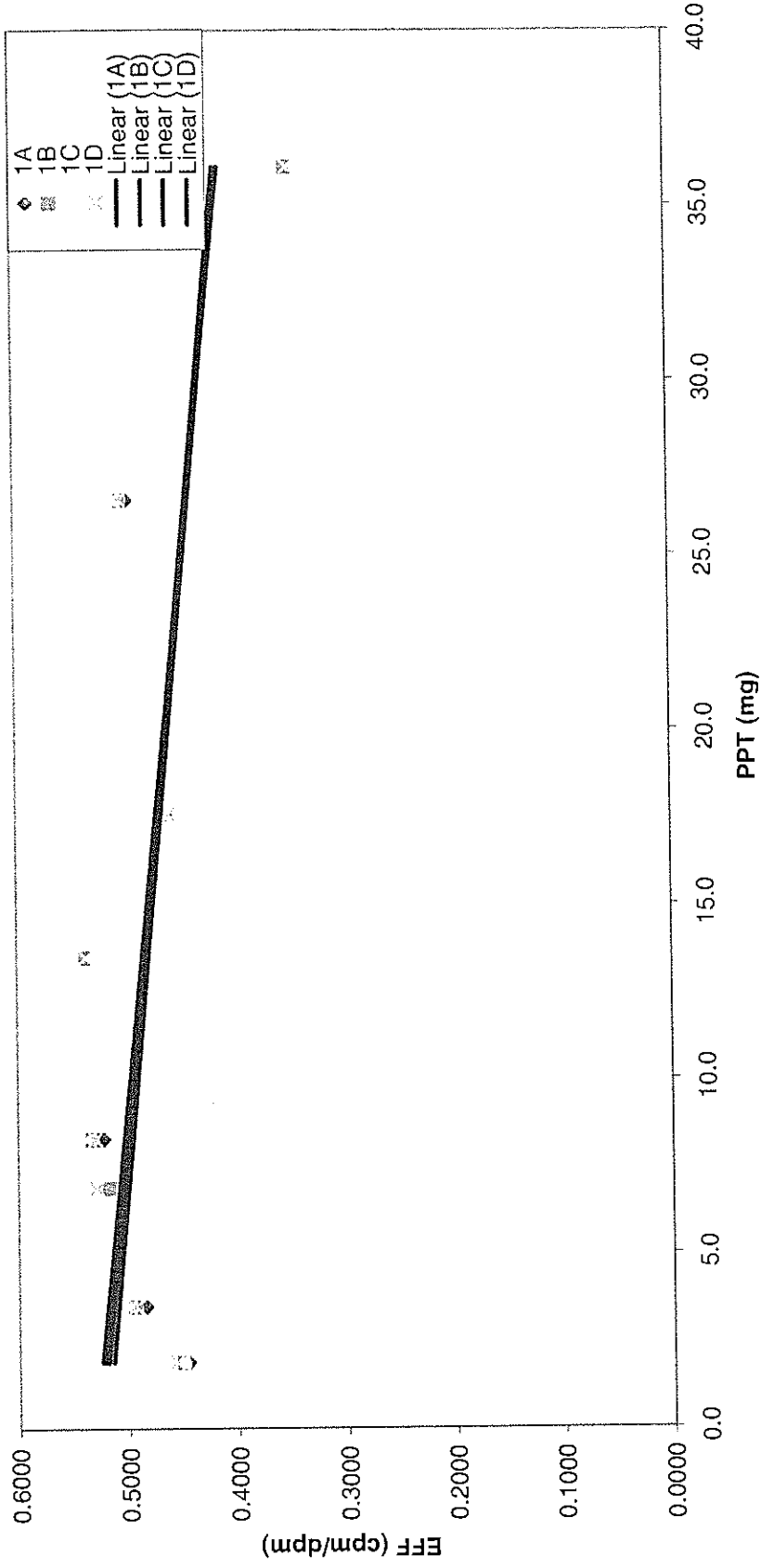






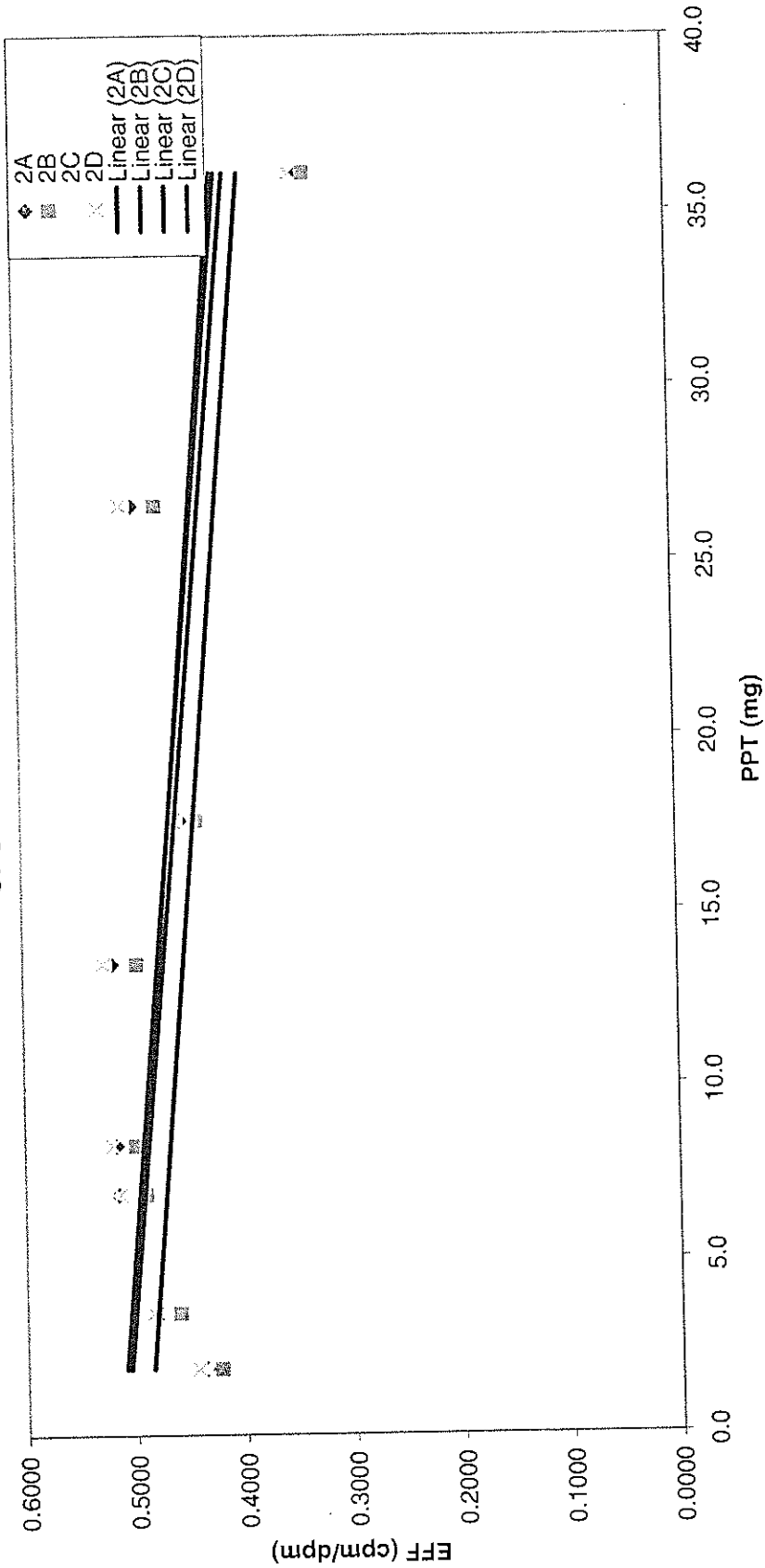
Detector (#)	Source ID (#)	Raw Count Data			Raw Beta (cpm)	Recovery (%)	Yield Corrected Sr-89 (cpm)*	Decay Corrected Nominal (dpm)**	Sr-89 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
		Start Time	Count Time (min)	Beta (counts)						
14D	6	2/15/2013 11:48	1	23452	23452.00	99.3%	23625.23	51025.59	0.4630	0.4839
14D	7	2/15/2013 11:45	1	25637	25637.00	100.0%	25637.00	51026.68	0.5024	0.4806
14D	8	2/15/2013 11:40	1	22338	22338.00	97.0%	23039.08	51029.54	0.4515	0.4772

# Sr-89 Calibration



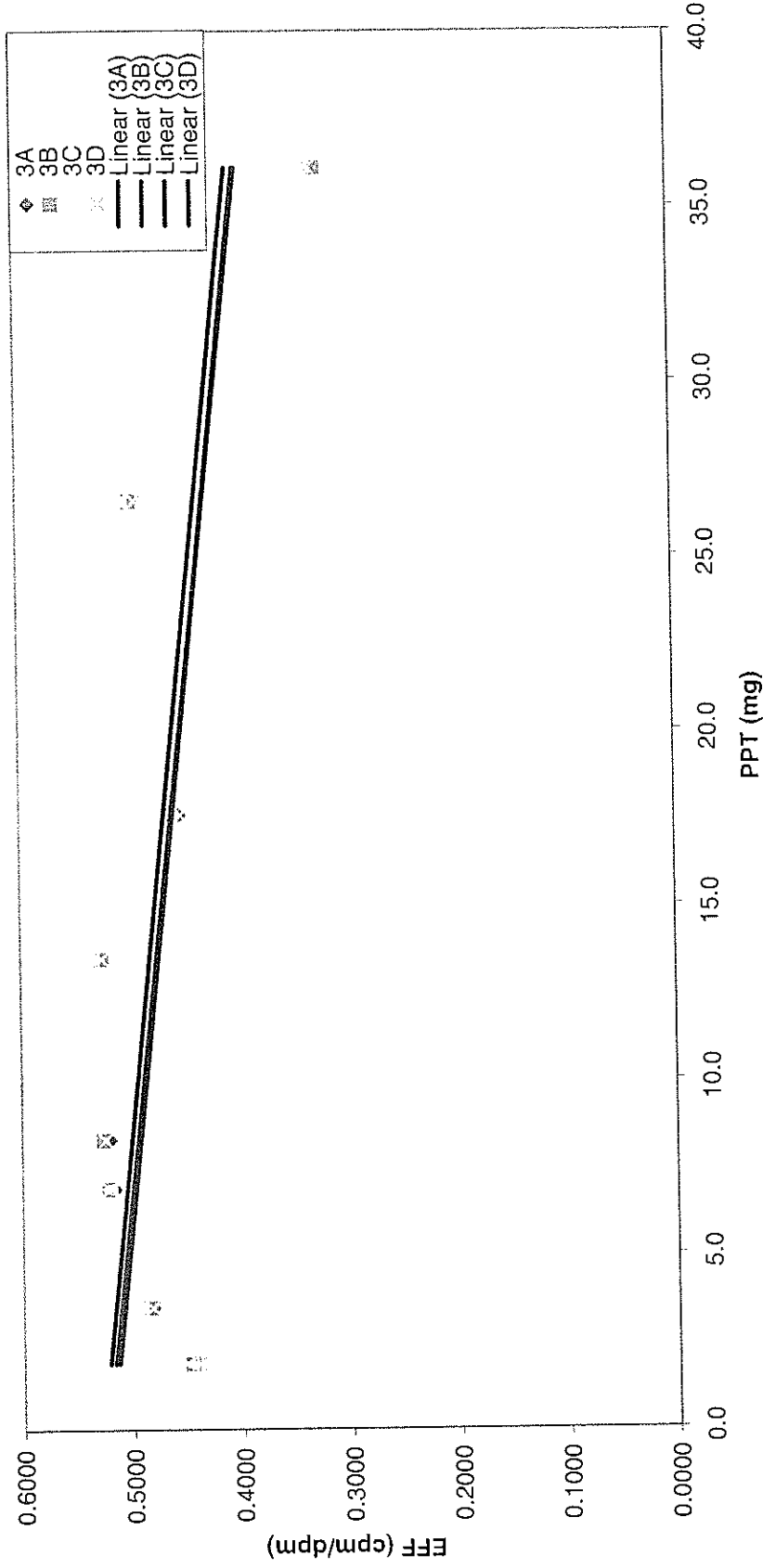
- 1A  $y = -3.005961E-03x + 5.200147E-01$
- 1B  $y = -3.080004E-03x + 5.249165E-01$
- 1C  $y = -3.366481E-03x + 5.309699E-01$
- 1D  $y = -3.264044E-03x + 5.286987E-01$

# Sr-89 Calibration



- 2A  $y = -2.928324E-03x + 5.108792E-01$
- 2B  $y = -2.726292E-03x + 4.901900E-01$
- 2C  $y = -2.610435E-03x + 5.110680E-01$
- 2D  $y = -2.840738E-03x + 5.152130E-01$

# Sr-89 Calibration



3A  $y = -3.397329E-03x + 5.200735E-01$

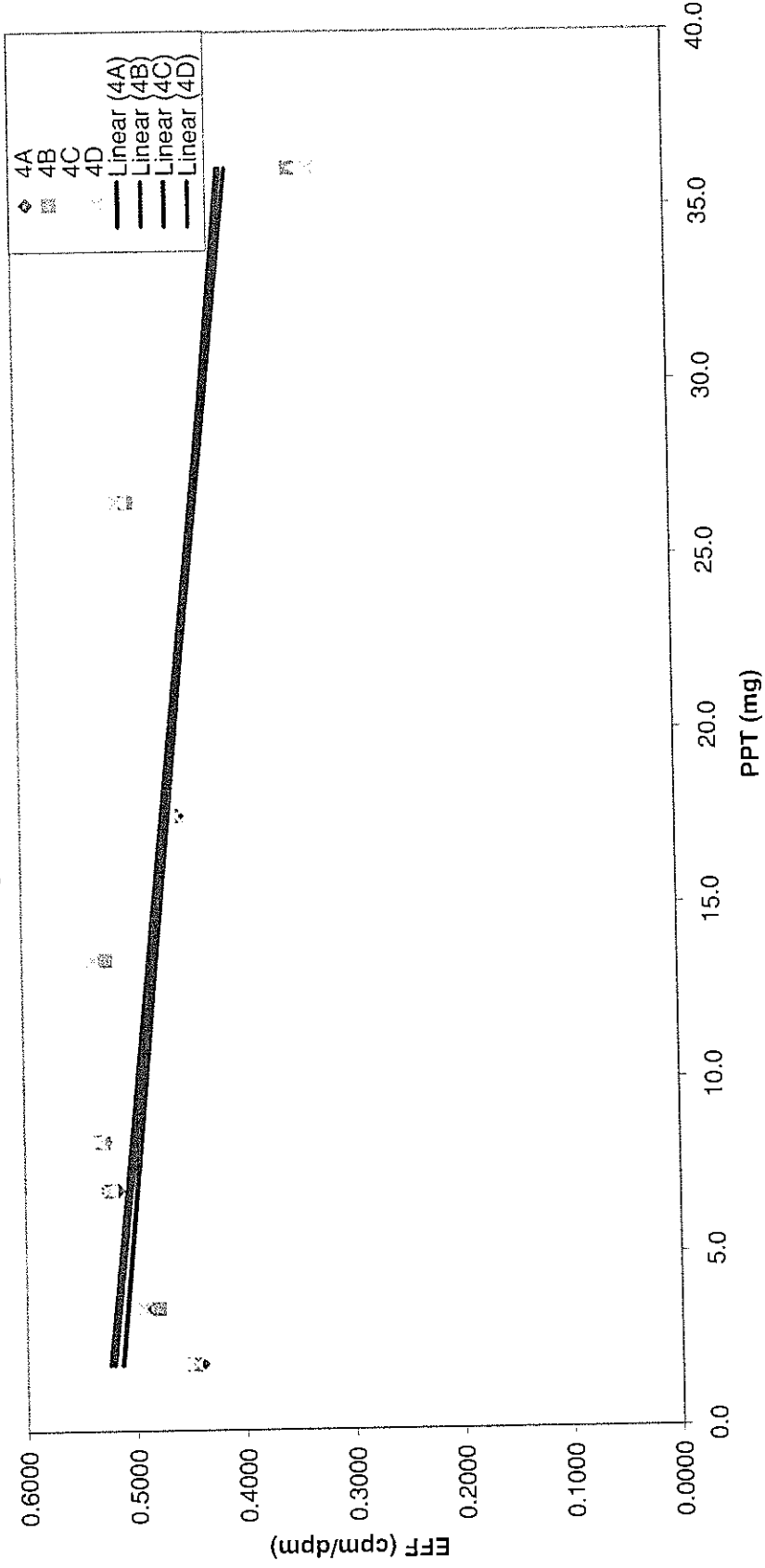
3B  $y = -3.549394E-03x + 5.235380E-01$

3C  $y = -3.425019E-03x + 5.282955E-01$

3D  $y = -3.418573E-03x + 5.198403E-01$



# Sr-89 Calibration



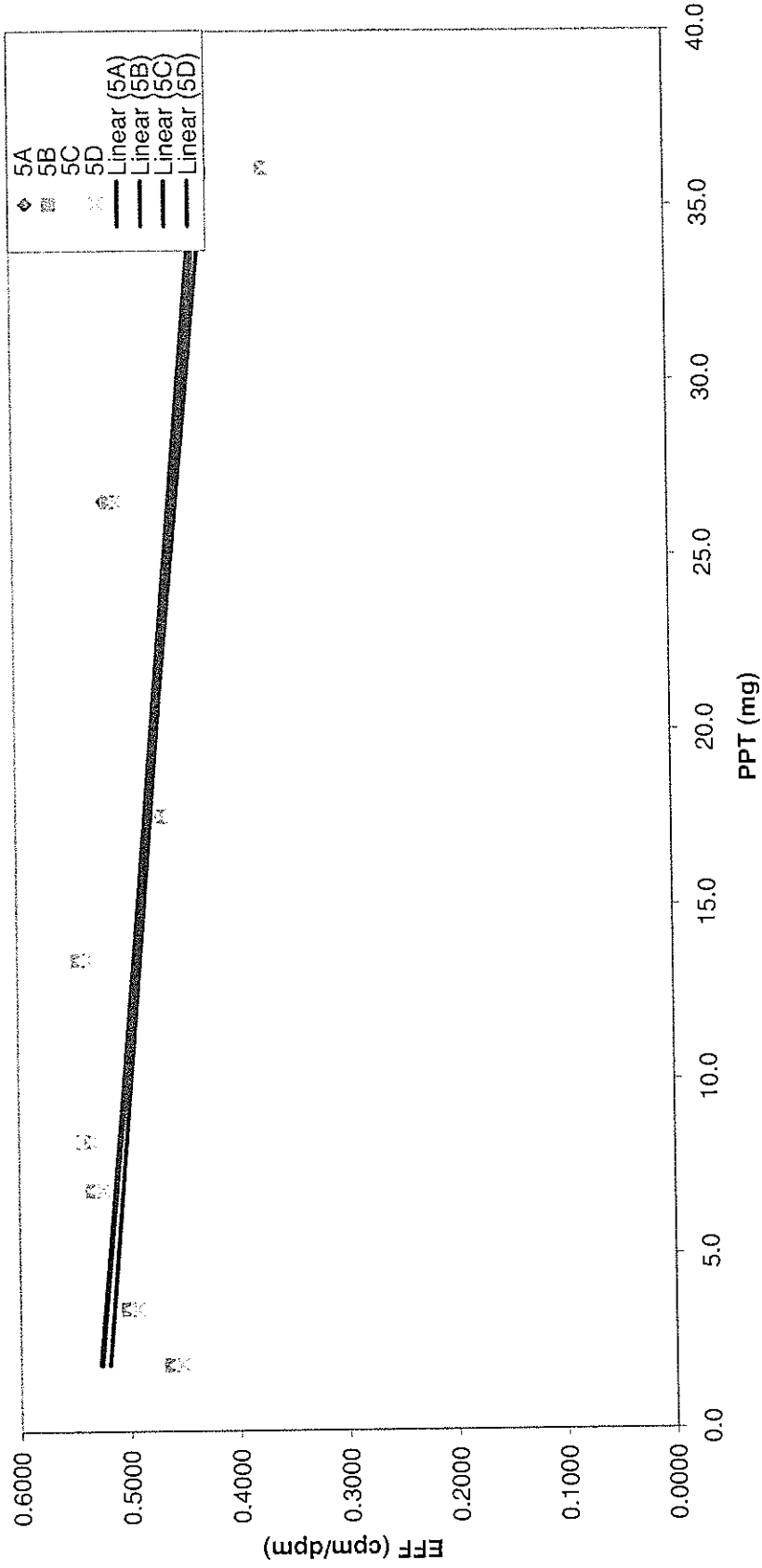
4A  $y = -3.075203E-03x + 5.186287E-01$

4B  $y = -3.030756E-03x + 5.191729E-01$

4C  $y = -3.419356E-03x + 5.308582E-01$

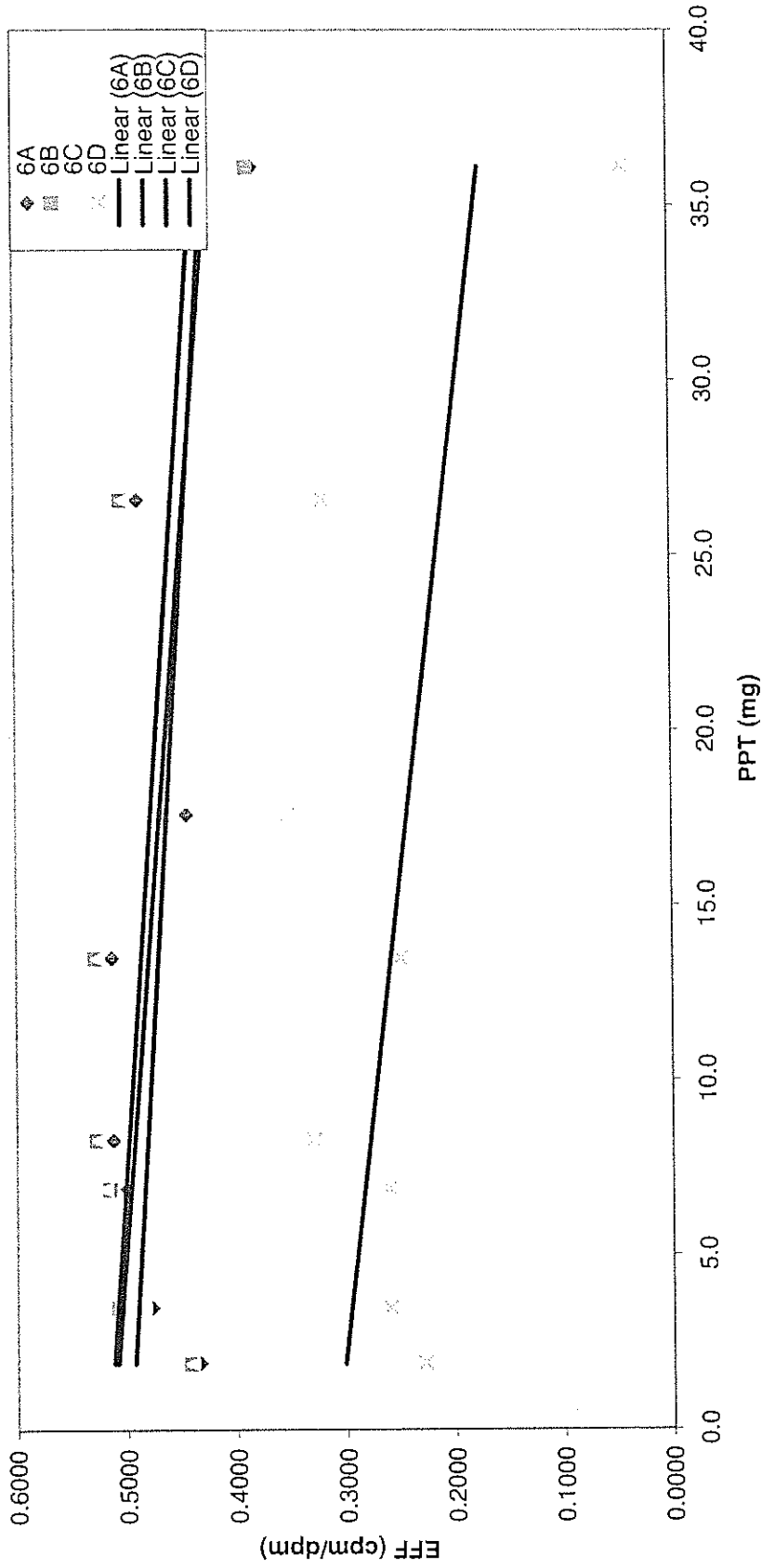
4D  $y = -3.451883E-03x + 5.270219E-01$

# Sr-89 Calibration



- 5A  $y = -2.786676E-03x + 5.316072E-01$
- 5B  $y = -2.907347E-03x + 5.328835E-01$
- 5C  $y = -3.085316E-03x + 5.324992E-01$
- 5D  $y = -2.688295E-03x + 5.241561E-01$

# Sr-89 Calibration



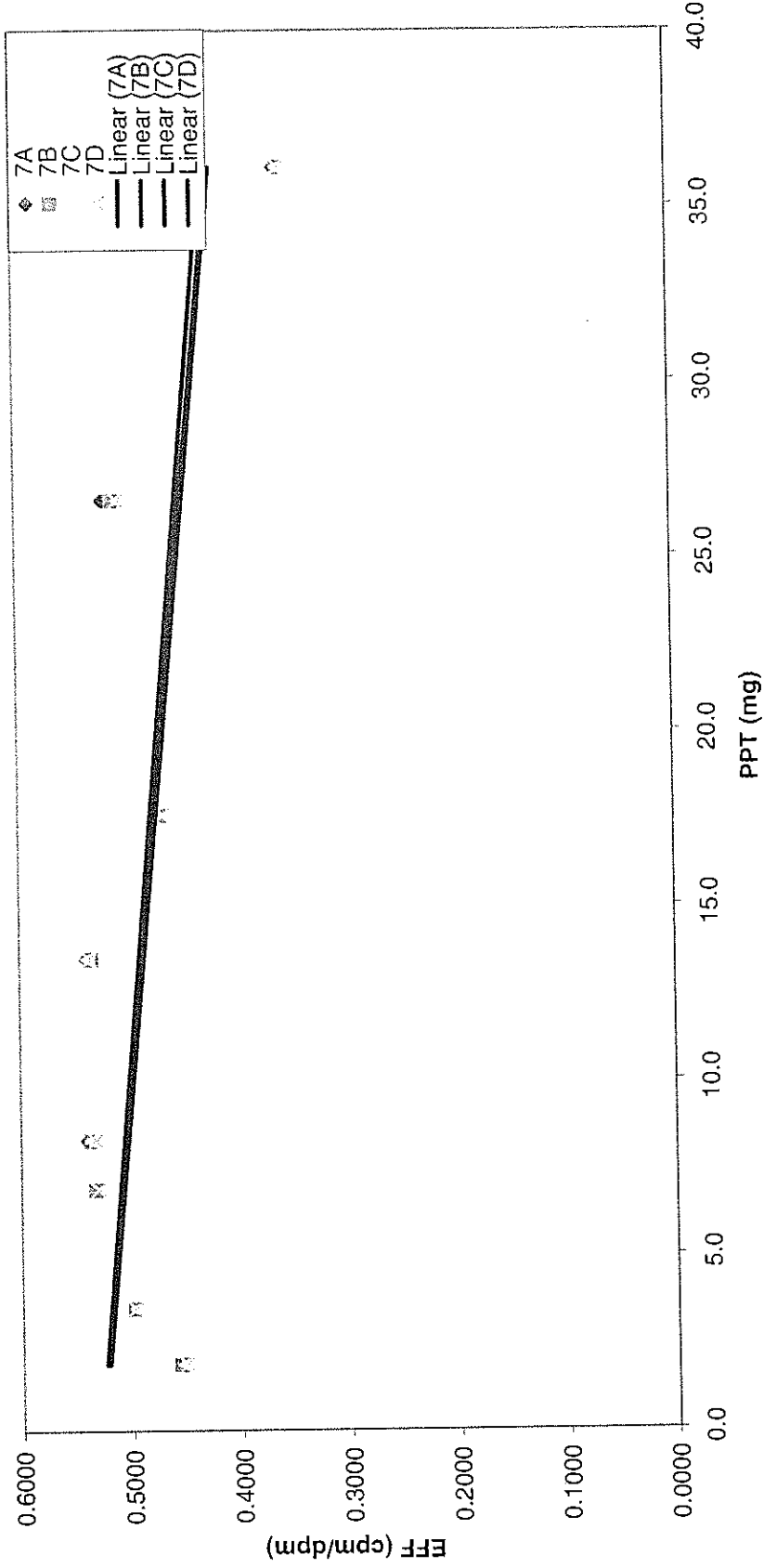
6A  $y = -1.958586E-03x + 4.970023E-01$

6B  $y = -2.245183E-03x + 5.168520E-01$

6C  $y = -2.542606E-03x + 5.139116E-01$

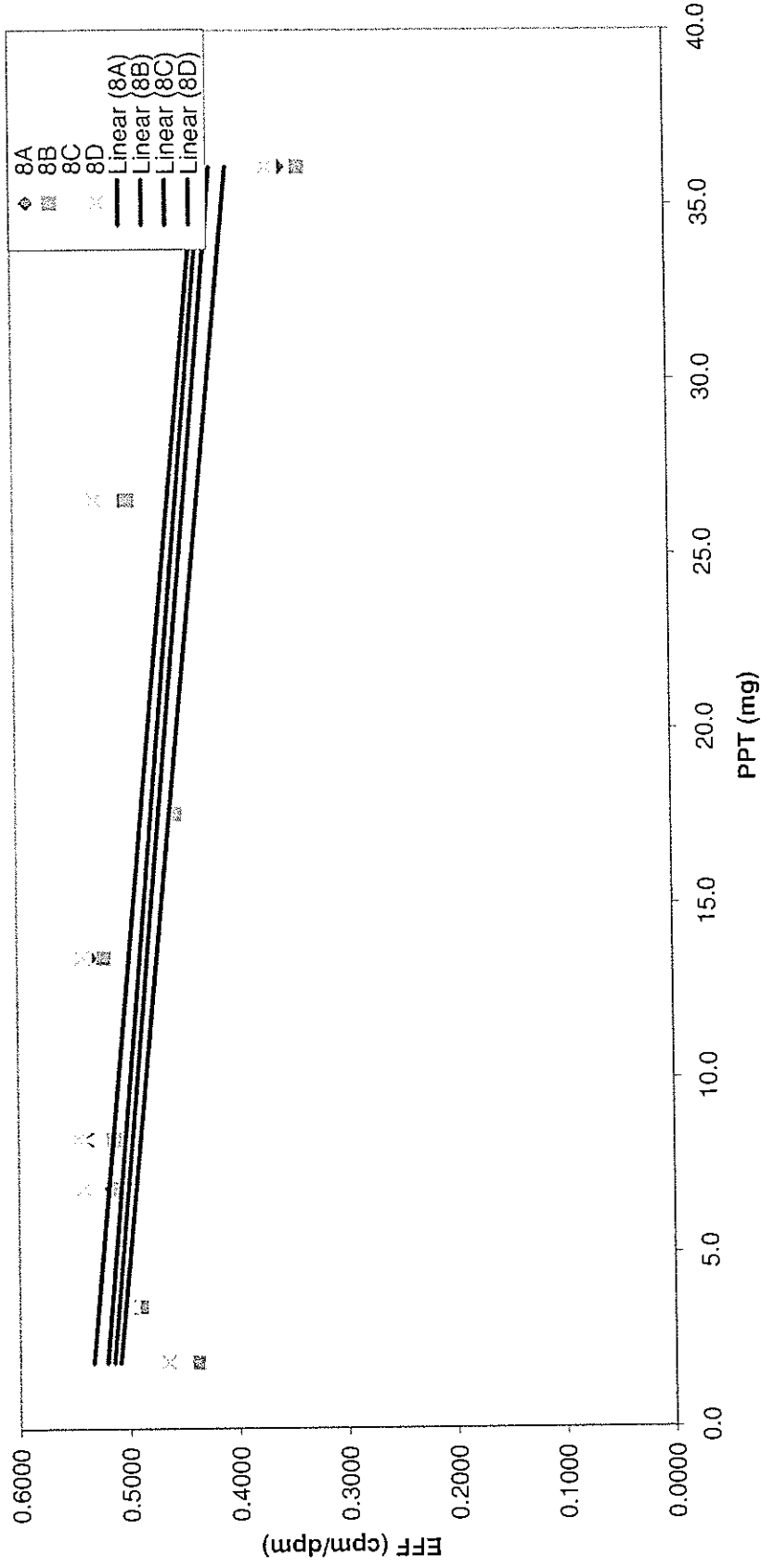
6D  $y = -3.741354E-03x + 3.0866324E-01$

# Sr-89 Calibration



- 7A  $y = -2.837544E-03x + 5.293261E-01$
- 7B  $y = -3.027427E-03x + 5.298861E-01$
- 7C  $y = -3.010349E-03x + 5.270355E-01$
- 7D  $y = -2.984826E-03x + 5.272911E-01$

# Sr-89 Calibration



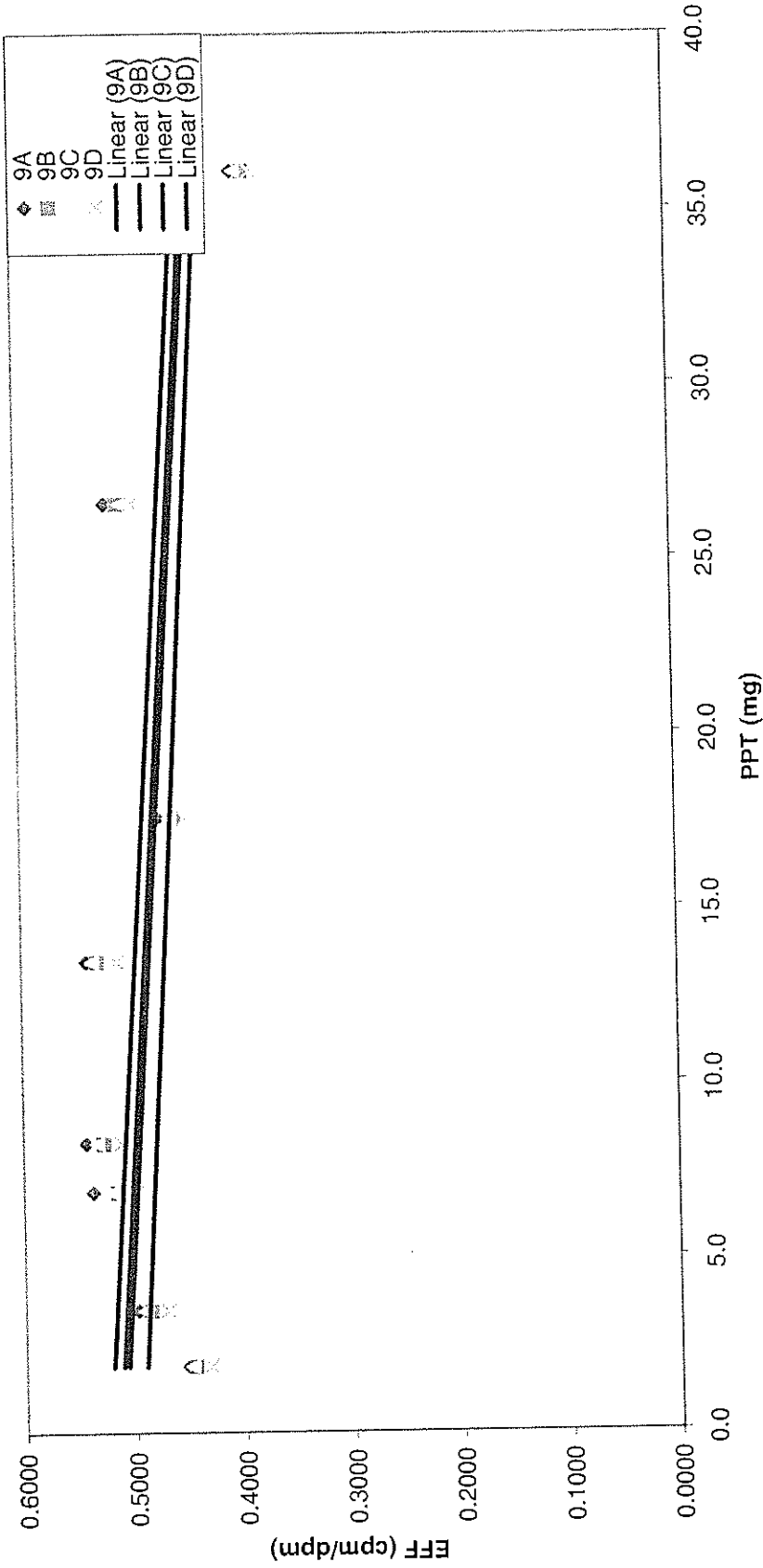
8A  $y = -2.835923E-03x + 5.197323E-01$

8B  $y = -3.101285E-03x + 5.145438E-01$

8C  $y = -2.803963E-03x + 5.261718E-01$

8D  $y = -3.013335E-03x + 5.389462E-01$

# Sr-89 Calibration



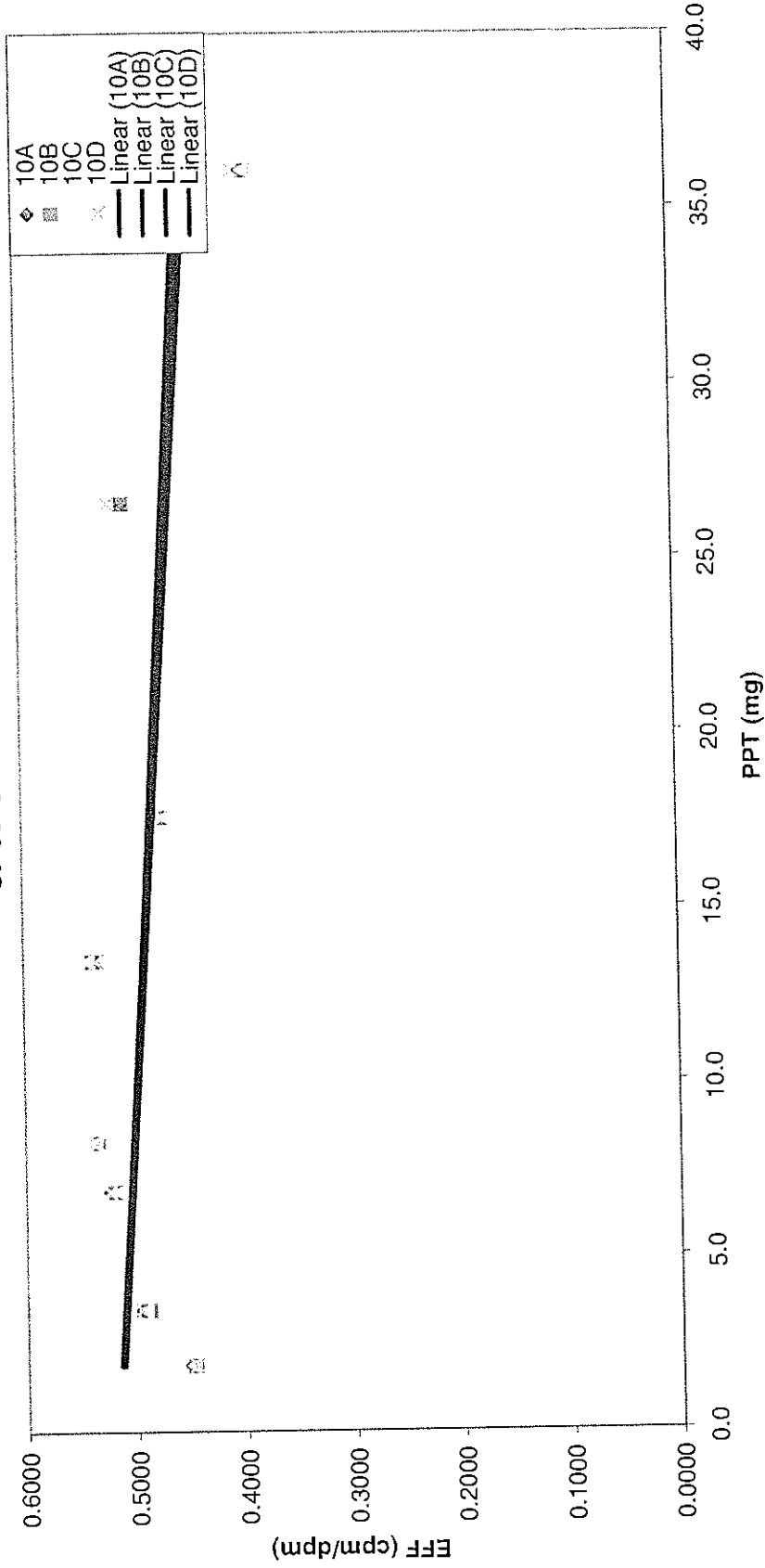
9A  $y = -2.054823E-03x + 5.244978E-01$

9B  $y = -1.999215E-03x + 5.108739E-01$

9C  $y = -2.037484E-03x + 5.155334E-01$

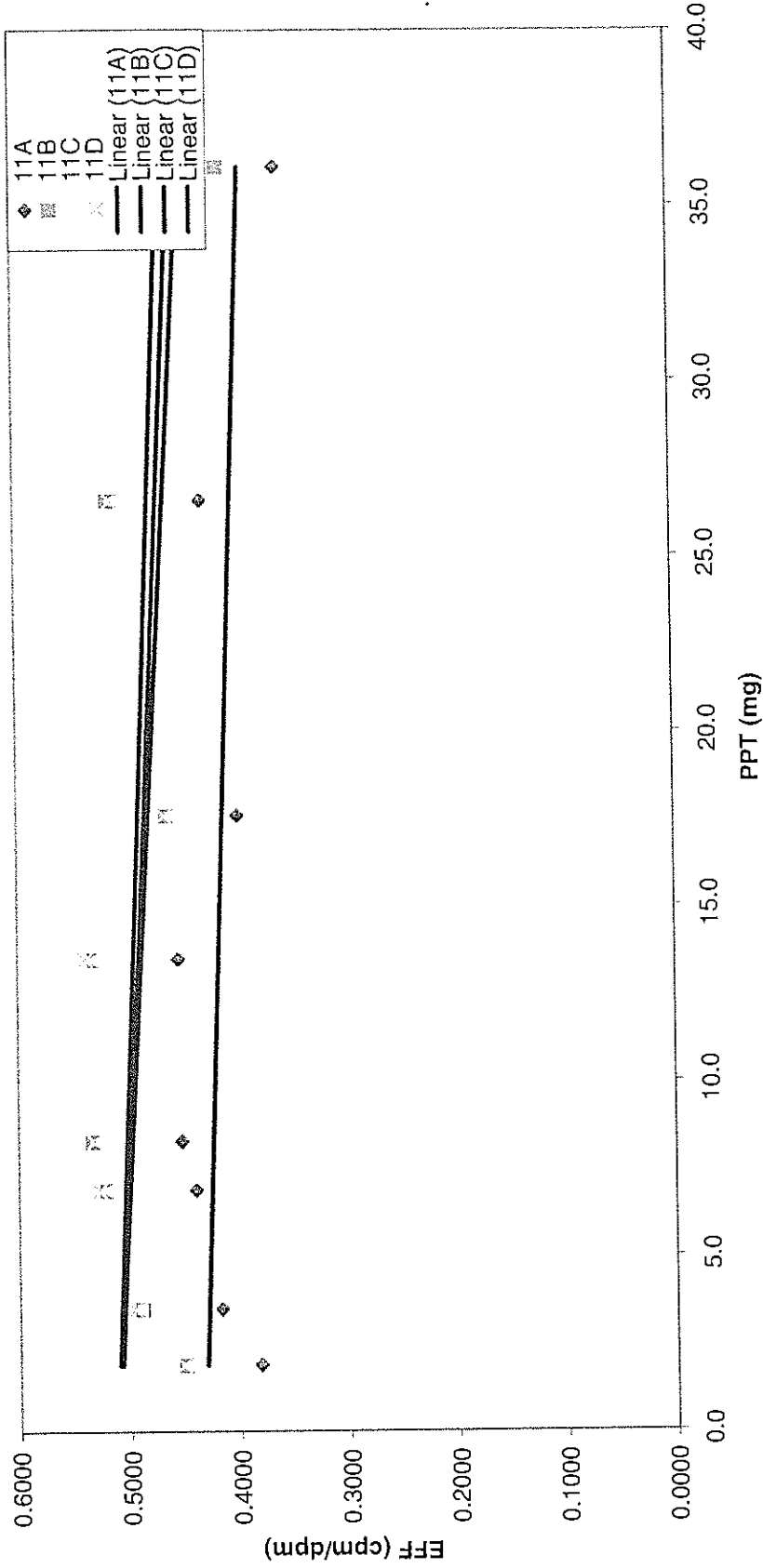
9D  $y = -1.771991E-03x + 4.936228E-01$

# Sr-89 Calibration



- 10A  $y = -2.004084E-03x + 5.193880E-01$
- 10B  $y = -2.073233E-03x + 5.162797E-01$
- 10C  $y = -1.966967E-03x + 5.173243E-01$
- 10D  $y = -1.780592E-03x + 5.159685E-01$

# Sr-89 Calibration



11A  $y = -1.120388E-03x + 4.325664E-01$

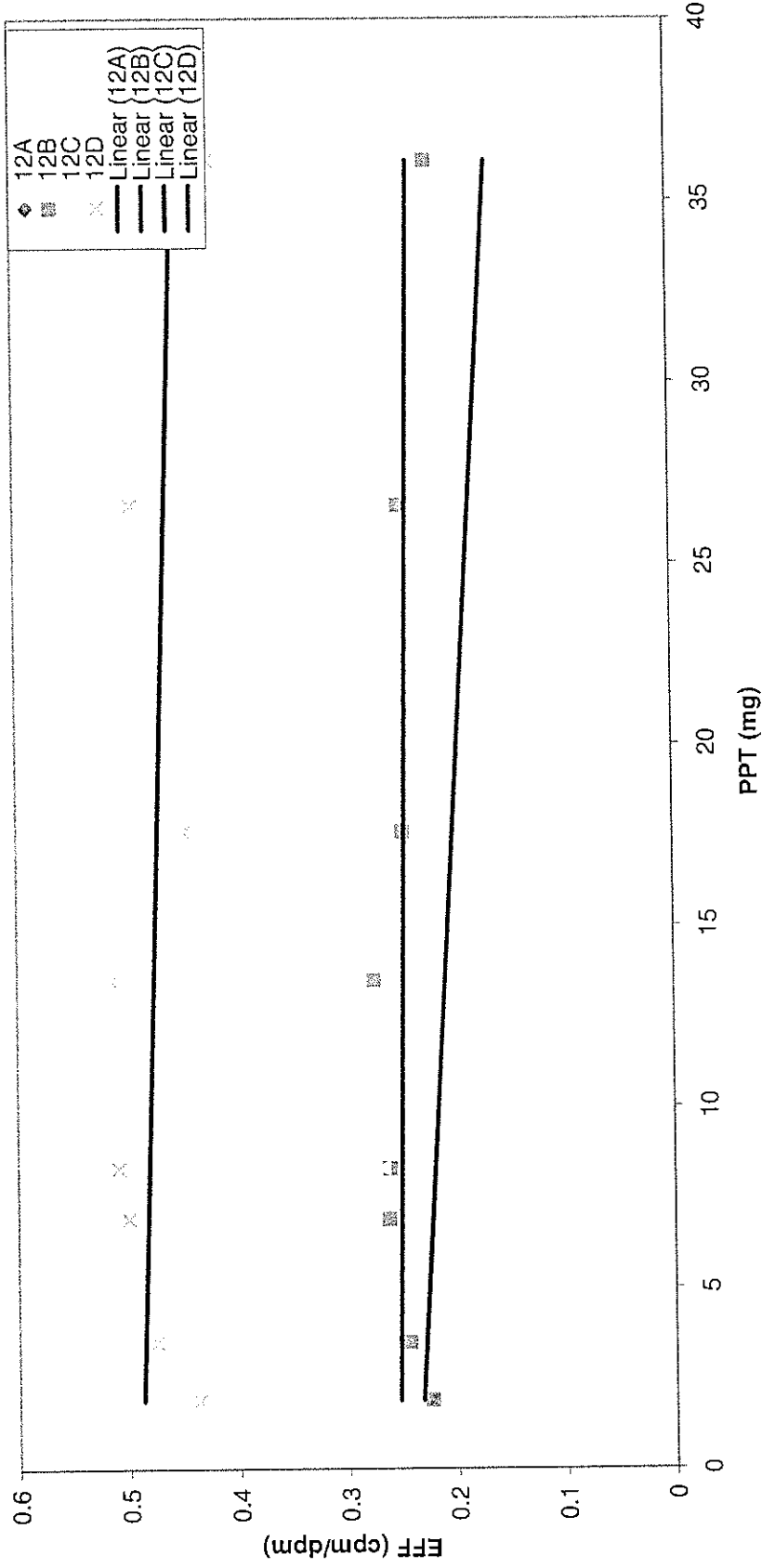
11B  $y = -1.508069E-03x + 5.106068E-01$

11C  $y = -1.789395E-03x + 5.117872E-01$

11D  $y = -1.280551E-03x + 5.124197E-01$



# Sr-89 Calibration



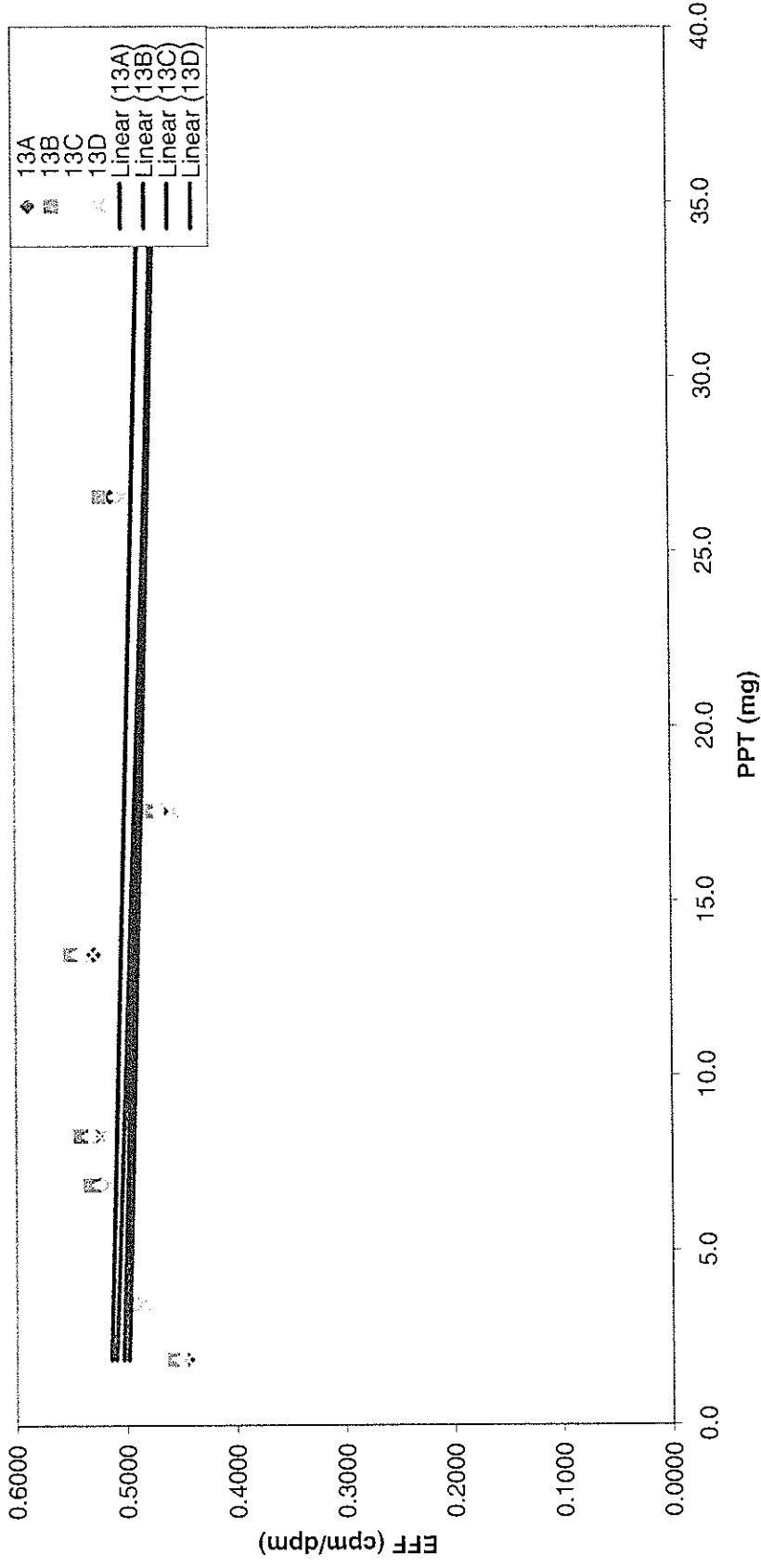
12A

12B  $y = -4.613917E-04x + 2.543237E-01$

12C  $y = -1.955441E-03x + 2.361321E-01$

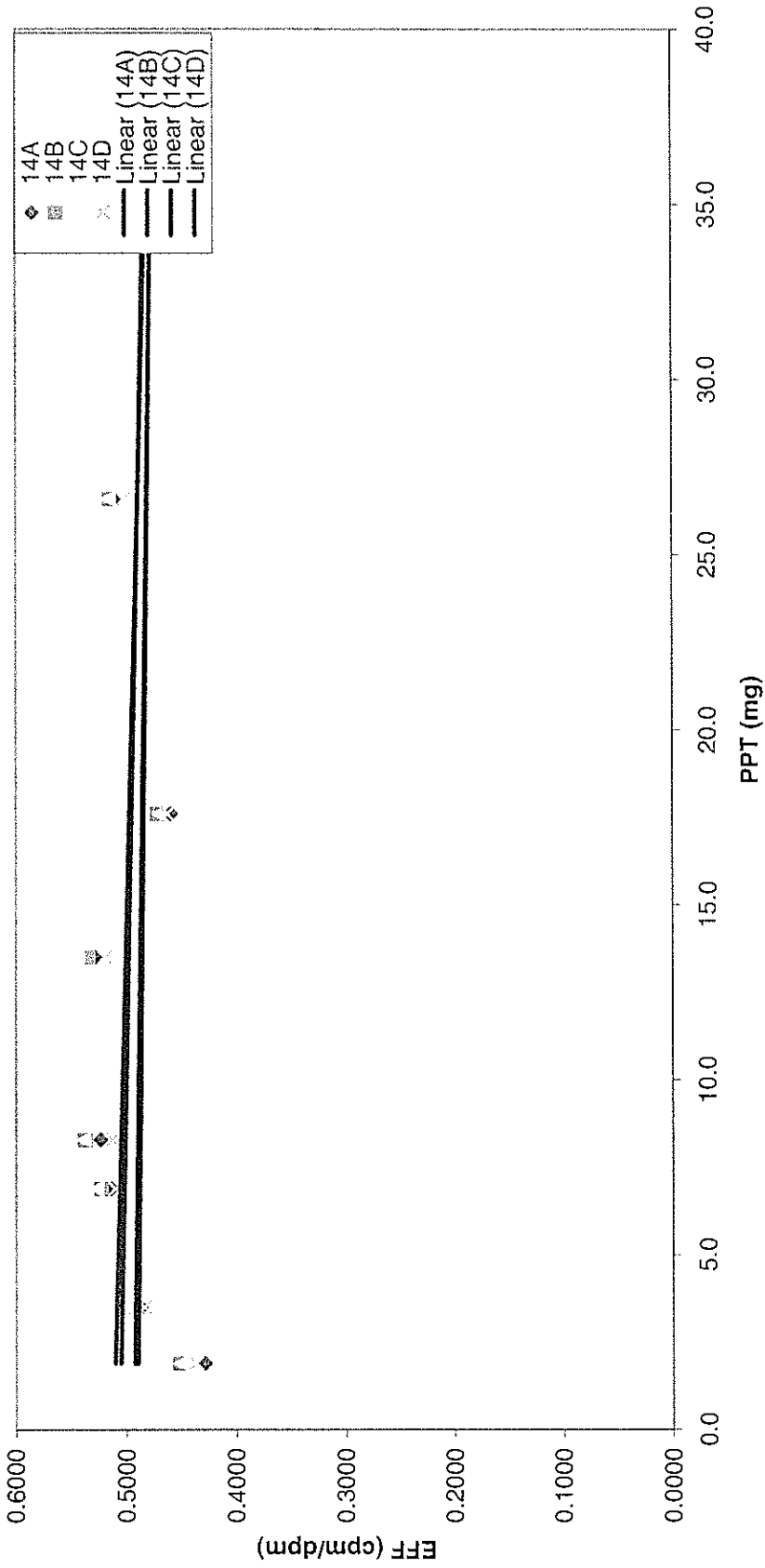
12D  $y = -1.008951E-03x + 4.892691E-01$

# Sr-89 Calibration



13A  $y = -9.030103E-04x + 5.050504E-01$   
 13B  $y = -8.773138E-04x + 5.160069E-01$   
 13C  $y = -1.160236E-03x + 5.121285E-01$   
 13D  $y = -8.242116E-04x + 4.998858E-01$

# Sr-89 Calibration



14A  $y = -4.660381E-04x + 4.934923E-01$

14B  $y = -6.436680E-04x + 5.064001E-01$

14C  $y = -8.515606E-04x + 5.120459E-01$

14D  $y = -3.6222979E-04x + 4.902315E-01$

Current Calibration - PIC

Geometry	Tuffryn Filter		3/1/2013 Exp Date		2/28/2014	
Sr-89	Cal Date	A0	A1	A2	A3	A4
Protean						
1A	5.200147E-01	-3.005961E-03				
1B	5.249165E-01	-3.080004E-03				
1C	5.309699E-01	-3.366481E-03				
1D	5.286987E-01	-3.264044E-03				
2A	5.108792E-01	-2.928324E-03				
2B	4.901900E-01	-2.726292E-03				
2C	5.110680E-01	-2.610435E-03				
2D	5.152130E-01	-2.840738E-03				
3A	5.200735E-01	-3.397329E-03				
3B	5.235380E-01	-3.549394E-03				
3C	5.282955E-01	-3.425019E-03				
3D	5.198403E-01	-3.418573E-03				
4A	5.186287E-01	-3.075203E-03				
4B	5.191729E-01	-3.030756E-03				
4C	5.308582E-01	-3.419356E-03				
4D	5.270219E-01	-3.451883E-03				
5A	5.316072E-01	-2.786676E-03				
5B	5.328835E-01	-2.907347E-03				
5C	5.324992E-01	-3.085316E-03				
5D	5.241561E-01	-2.688295E-03				
6A	4.970023E-01	-1.958586E-03				
6B	5.168520E-01	-2.245183E-03				
6C	5.139116E-01	-2.542606E-03				
6D	3.086324E-01	-3.741354E-03				
7A	5.293261E-01	-2.837544E-03				
7B	5.298861E-01	-3.027427E-03				
7C	5.270355E-01	-3.010349E-03				
7D	5.272911E-01	-2.984826E-03				
8A	5.197323E-01	-2.835923E-03				
8B	5.145438E-01	-3.101285E-03				
8C	5.261718E-01	-2.803963E-03				
8D	5.389462E-01	-3.013335E-03				
9A	5.244978E-01	-2.054823E-03				
9B	5.108739E-01	-1.999215E-03				
9C	5.155334E-01	-2.037484E-03				
9D	4.936228E-01	-1.771991E-03				
10A	5.193880E-01	-2.004084E-03				
10B	5.162797E-01	-2.073233E-03				
10C	5.173243E-01	-1.966967E-03				
10D	5.159685E-01	-1.780592E-03				
11A	4.325664E-01	-1.120388E-03				
11B	5.106068E-01	-1.508069E-03				
11C	5.117872E-01	-1.789395E-03				
11D	5.124197E-01	-1.280551E-03				
12A	#N/A	#N/A				
12B	2.543237E-01	-4.613917E-04				
12C	2.361321E-01	-1.955441E-03				
12D	4.892691E-01	-1.008951E-03				
13A	5.050504E-01	-9.030103E-04				
13B	5.160069E-01	-8.773138E-04				
13C	5.121285E-01	-1.160236E-03				
13D	4.998858E-01	-8.242116E-04				
14A	4.934923E-01	-4.660381E-04				
14B	5.064001E-01	-6.436680E-04				
14C	5.120459E-01	-8.515606E-04				
14D	4.902315E-01	-3.622979E-04				

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
C1	1A	1	3	22671	2/15/2013 16:21	2/15/2013 16:22	PIC	SR89C13
C2	1A	1	3	24304	2/15/2013 16:30	2/15/2013 16:31	PIC	SR89C13
C3	1A	1	3	25873	2/15/2013 16:28	2/15/2013 16:29	PIC	SR89C13
C4	1A	1	5	24881	2/15/2013 16:24	2/15/2013 16:25	PIC	SR89C13
C5	1A	1	5	25969	2/15/2013 16:33	2/15/2013 16:34	PIC	SR89C13
C6	1A	1	4	23419	2/15/2013 16:39	2/15/2013 16:40	PIC	SR89C13
C7	1A	1	6	25270	2/15/2013 16:37	2/15/2013 16:38	PIC	SR89C13
C8	1A	1	6	17057	2/15/2013 16:35	2/15/2013 16:36	PIC	SR89C13
C1	1B	1	14	22892	2/15/2013 16:24	2/15/2013 16:25	PIC	SR89C13
C2	1B	1	22	24815	2/15/2013 16:22	2/15/2013 16:23	PIC	SR89C13
C3	1B	1	22	25632	2/15/2013 16:30	2/15/2013 16:31	PIC	SR89C13
C4	1B	1	17	25351	2/15/2013 16:28	2/15/2013 16:29	PIC	SR89C13
C5	1B	1	31	26005	2/15/2013 16:35	2/15/2013 16:36	PIC	SR89C13
C6	1B	1	14	23585	2/15/2013 16:33	2/15/2013 16:34	PIC	SR89C13
C7	1B	1	23	25562	2/15/2013 16:39	2/15/2013 16:40	PIC	SR89C13
C8	1B	1	22	17129	2/15/2013 16:37	2/15/2013 16:38	PIC	SR89C13
C1	1C	1	252	23030	2/15/2013 16:28	2/15/2013 16:29	PIC	SR89C13
C2	1C	1	277	25093	2/15/2013 16:25	2/15/2013 16:26	PIC	SR89C13
C3	1C	1	288	26245	2/15/2013 16:22	2/15/2013 16:23	PIC	SR89C13
C4	1C	1	311	25504	2/15/2013 16:31	2/15/2013 16:32	PIC	SR89C13
C5	1C	1	309	25732	2/15/2013 16:37	2/15/2013 16:38	PIC	SR89C13
C6	1C	1	299	23516	2/15/2013 16:35	2/15/2013 16:36	PIC	SR89C13
C7	1C	1	318	25862	2/15/2013 16:33	2/15/2013 16:34	PIC	SR89C13
C8	1C	1	174	16780	2/15/2013 16:39	2/15/2013 16:40	PIC	SR89C13
C1	1D	1	216	23237	2/15/2013 16:31	2/15/2013 16:32	PIC	SR89C13
C2	1D	1	223	24810	2/15/2013 16:28	2/15/2013 16:29	PIC	SR89C13
C3	1D	1	247	26179	2/15/2013 16:25	2/15/2013 16:26	PIC	SR89C13
C4	1D	1	248	25241	2/15/2013 16:22	2/15/2013 16:23	PIC	SR89C13
C5	1D	1	218	26012	2/15/2013 16:39	2/15/2013 16:40	PIC	SR89C13
C6	1D	1	220	23271	2/15/2013 16:37	2/15/2013 16:38	PIC	SR89C13
C7	1D	1	261	25607	2/15/2013 16:35	2/15/2013 16:36	PIC	SR89C13
C8	1D	1	154	17078	2/15/2013 16:33	2/15/2013 16:34	PIC	SR89C13
C1	2A	1	8	22234	2/15/2013 16:33	2/15/2013 16:34	PIC	SR89C13
C2	2A	1	11	23993	2/15/2013 16:39	2/15/2013 16:40	PIC	SR89C13
C3	2A	1	8	25476	2/15/2013 16:37	2/15/2013 16:38	PIC	SR89C13
C4	2A	1	7	24595	2/15/2013 16:35	2/15/2013 16:36	PIC	SR89C13

C5	2A	1	2	25135	2/15/2013 16:22	2/15/2013 16:23	PIC	SR89C13
C6	2A	1	8	22948	2/15/2013 16:31	2/15/2013 16:32	PIC	SR89C13
C7	2A	1	11	25149	2/15/2013 16:28	2/15/2013 16:29	PIC	SR89C13
C8	2A	1	7	16736	2/15/2013 16:25	2/15/2013 16:26	PIC	SR89C13
C1	2B	1	0	21501	2/15/2013 16:35	2/15/2013 16:36	PIC	SR89C13
C2	2B	1	0	23103	2/15/2013 16:33	2/15/2013 16:34	PIC	SR89C13
C3	2B	1	0	24238	2/15/2013 16:39	2/15/2013 16:40	PIC	SR89C13
C4	2B	1	0	23758	2/15/2013 16:37	2/15/2013 16:38	PIC	SR89C13
C5	2B	1	1	23999	2/15/2013 16:25	2/15/2013 16:26	PIC	SR89C13
C6	2B	1	0	22186	2/15/2013 16:22	2/15/2013 16:23	PIC	SR89C13
C7	2B	1	0	24035	2/15/2013 16:31	2/15/2013 16:32	PIC	SR89C13
C8	2B	1	0	16377	2/15/2013 16:28	2/15/2013 16:29	PIC	SR89C13
C1	2C	1	67	22296	2/15/2013 16:37	2/15/2013 16:38	PIC	SR89C13
C2	2C	1	84	23951	2/15/2013 16:36	2/15/2013 16:37	PIC	SR89C13
C3	2C	1	89	25463	2/15/2013 16:33	2/15/2013 16:34	PIC	SR89C13
C4	2C	1	87	24962	2/15/2013 16:39	2/15/2013 16:40	PIC	SR89C13
C5	2C	1	98	25437	2/15/2013 16:28	2/15/2013 16:29	PIC	SR89C13
C6	2C	1	108	23144	2/15/2013 16:25	2/15/2013 16:26	PIC	SR89C13
C7	2C	1	99	25548	2/15/2013 16:22	2/15/2013 16:23	PIC	SR89C13
C8	2C	1	61	17333	2/15/2013 16:31	2/15/2013 16:32	PIC	SR89C13
C1	2D	1	42	22601	2/15/2013 16:39	2/15/2013 16:40	PIC	SR89C13
C2	2D	1	41	24333	2/15/2013 16:38	2/15/2013 16:39	PIC	SR89C13
C3	2D	1	43	25432	2/15/2013 16:36	2/15/2013 16:37	PIC	SR89C13
C4	2D	1	56	24784	2/15/2013 16:34	2/15/2013 16:35	PIC	SR89C13
C5	2D	1	32	25497	2/15/2013 16:31	2/15/2013 16:32	PIC	SR89C13
C6	2D	1	40	23111	2/15/2013 16:28	2/15/2013 16:29	PIC	SR89C13
C7	2D	1	58	25715	2/15/2013 16:25	2/15/2013 16:26	PIC	SR89C13
C8	2D	1	37	17022	2/15/2013 16:22	2/15/2013 16:23	PIC	SR89C13
C1	3A	1	389	22713	2/15/2013 17:08	2/15/2013 17:09	PIC	SR89C13
C2	3A	1	405	24219	2/15/2013 17:16	2/15/2013 17:17	PIC	SR89C13
C3	3A	1	428	25568	2/15/2013 17:13	2/15/2013 17:14	PIC	SR89C13
C4	3A	1	397	24790	2/15/2013 17:11	2/15/2013 17:12	PIC	SR89C13
C5	3A	1	436	25636	2/15/2013 17:20	2/15/2013 17:21	PIC	SR89C13
C6	3A	1	429	22922	2/15/2013 17:28	2/15/2013 17:29	PIC	SR89C13
C7	3A	1	385	25188	2/15/2013 17:26	2/15/2013 17:27	PIC	SR89C13
C8	3A	1	237	16133	2/15/2013 17:23	2/15/2013 17:24	PIC	SR89C13
C1	3B	1	370	22710	2/15/2013 17:11	2/15/2013 17:12	PIC	SR89C13

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C2	3B	1	373	24287	2/15/2013 17:08	2/15/2013 17:09	PIC	SR89C13
C3	3B	1	412	25785	2/15/2013 17:16	2/15/2013 17:17	PIC	SR89C13
C4	3B	1	396	25095	2/15/2013 17:13	2/15/2013 17:14	PIC	SR89C13
C5	3B	1	375	25479	2/15/2013 17:23	2/15/2013 17:24	PIC	SR89C13
C6	3B	1	360	23180	2/15/2013 17:20	2/15/2013 17:21	PIC	SR89C13
C7	3B	1	384	25229	2/15/2013 17:28	2/15/2013 17:29	PIC	SR89C13
C8	3B	1	259	15914	2/15/2013 17:26	2/15/2013 17:27	PIC	SR89C13
C1	3C	1	157	22789	2/15/2013 17:13	2/15/2013 17:14	PIC	SR89C13
C2	3C	1	179	24757	2/15/2013 17:11	2/15/2013 17:12	PIC	SR89C13
C3	3C	1	159	25765	2/15/2013 17:08	2/15/2013 17:09	PIC	SR89C13
C4	3C	1	176	25700	2/15/2013 17:16	2/15/2013 17:17	PIC	SR89C13
C5	3C	1	163	25884	2/15/2013 17:26	2/15/2013 17:27	PIC	SR89C13
C6	3C	1	162	23317	2/15/2013 17:23	2/15/2013 17:24	PIC	SR89C13
C7	3C	1	156	25638	2/15/2013 17:20	2/15/2013 17:21	PIC	SR89C13
C8	3C	1	115	16405	2/15/2013 17:28	2/15/2013 17:29	PIC	SR89C13
C1	3D	1	140	22440	2/15/2013 17:16	2/15/2013 17:17	PIC	SR89C13
C2	3D	1	176	24241	2/15/2013 17:13	2/15/2013 17:14	PIC	SR89C13
C3	3D	1	170	25787	2/15/2013 17:11	2/15/2013 17:12	PIC	SR89C13
C4	3D	1	163	24974	2/15/2013 17:09	2/15/2013 17:10	PIC	SR89C13
C5	3D	1	150	25471	2/15/2013 17:28	2/15/2013 17:29	PIC	SR89C13
C6	3D	1	163	22855	2/15/2013 17:26	2/15/2013 17:27	PIC	SR89C13
C7	3D	1	147	24979	2/15/2013 17:23	2/15/2013 17:24	PIC	SR89C13
C8	3D	1	104	16191	2/15/2013 17:20	2/15/2013 17:21	PIC	SR89C13
C1	4A	1	156	22414	2/15/2013 17:20	2/15/2013 17:21	PIC	SR89C13
C2	4A	1	140	24462	2/15/2013 17:28	2/15/2013 17:29	PIC	SR89C13
C3	4A	1	132	25519	2/15/2013 17:27	2/15/2013 17:28	PIC	SR89C13
C4	4A	1	149	25109	2/15/2013 17:23	2/15/2013 17:24	PIC	SR89C13
C5	4A	1	147	25709	2/15/2013 17:09	2/15/2013 17:10	PIC	SR89C13
C6	4A	1	134	23050	2/15/2013 17:16	2/15/2013 17:17	PIC	SR89C13
C7	4A	1	143	25348	2/15/2013 17:13	2/15/2013 17:14	PIC	SR89C13
C8	4A	1	111	16794	2/15/2013 17:11	2/15/2013 17:12	PIC	SR89C13
C1	4B	1	0	22758	2/15/2013 17:24	2/15/2013 17:25	PIC	SR89C13
C2	4B	1	0	24066	2/15/2013 17:20	2/15/2013 17:21	PIC	SR89C13
C3	4B	1	0	25905	2/15/2013 17:29	2/15/2013 17:30	PIC	SR89C13
C4	4B	1	0	25162	2/15/2013 17:27	2/15/2013 17:28	PIC	SR89C13
C5	4B	1	0	25354	2/15/2013 17:11	2/15/2013 17:12	PIC	SR89C13
C6	4B	1	0	23302	2/15/2013 17:09	2/15/2013 17:10	PIC	SR89C13

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C7	4B	1	0	25359	2/15/2013 17:16	2/15/2013 17:17	PIC	SR89C13
C8	4B	1	0	16980	2/15/2013 17:13	2/15/2013 17:14	PIC	SR89C13
C1	4C	1	92	23173	2/15/2013 17:27	2/15/2013 17:28	PIC	SR89C13
C2	4C	1	95	25035	2/15/2013 17:24	2/15/2013 17:25	PIC	SR89C13
C3	4C	1	112	25859	2/15/2013 17:21	2/15/2013 17:22	PIC	SR89C13
C4	4C	1	107	25412	2/15/2013 17:29	2/15/2013 17:30	PIC	SR89C13
C5	4C	1	105	26023	2/15/2013 17:13	2/15/2013 17:14	PIC	SR89C13
C6	4C	1	87	23478	2/15/2013 17:11	2/15/2013 17:12	PIC	SR89C13
C7	4C	1	97	25643	2/15/2013 17:09	2/15/2013 17:10	PIC	SR89C13
C8	4C	1	71	16702	2/15/2013 17:16	2/15/2013 17:17	PIC	SR89C13
C1	4D	1	286	22653	2/15/2013 17:29	2/15/2013 17:30	PIC	SR89C13
C2	4D	1	296	24739	2/15/2013 17:27	2/15/2013 17:28	PIC	SR89C13
C3	4D	1	336	25941	2/15/2013 17:24	2/15/2013 17:25	PIC	SR89C13
C4	4D	1	268	25276	2/15/2013 17:21	2/15/2013 17:22	PIC	SR89C13
C5	4D	1	303	25947	2/15/2013 17:16	2/15/2013 17:17	PIC	SR89C13
C6	4D	1	262	23091	2/15/2013 17:13	2/15/2013 17:14	PIC	SR89C13
C7	4D	1	277	25813	2/15/2013 17:11	2/15/2013 17:12	PIC	SR89C13
C8	4D	1	173	16149	2/15/2013 17:09	2/15/2013 17:10	PIC	SR89C13
C1	5A	1	95	23403	2/15/2013 13:38	2/15/2013 13:39	PIC	SR89C13
C2	5A	1	79	25086	2/15/2013 14:12	2/15/2013 14:13	PIC	SR89C13
C3	5A	1	94	26469	2/15/2013 13:48	2/15/2013 13:49	PIC	SR89C13
C4	5A	1	67	25794	2/15/2013 13:45	2/15/2013 13:46	PIC	SR89C13
C5	5A	1	56	26347	2/15/2013 14:15	2/15/2013 14:16	PIC	SR89C13
C6	5A	1	82	24007	2/15/2013 14:30	2/15/2013 14:31	PIC	SR89C13
C7	5A	1	80	26340	2/15/2013 14:27	2/15/2013 14:28	PIC	SR89C13
C8	5A	1	56	18123	2/15/2013 14:25	2/15/2013 14:26	PIC	SR89C13
C1	5B	1	82	23574	2/15/2013 13:45	2/15/2013 13:46	PIC	SR89C13
C2	5B	1	93	25221	2/15/2013 13:38	2/15/2013 13:39	PIC	SR89C13
C3	5B	1	106	26417	2/15/2013 14:12	2/15/2013 14:13	PIC	SR89C13
C4	5B	1	81	25811	2/15/2013 13:48	2/15/2013 13:49	PIC	SR89C13
C5	5B	1	86	26405	2/15/2013 14:25	2/15/2013 14:26	PIC	SR89C13
C6	5B	1	95	23663	2/15/2013 14:15	2/15/2013 14:16	PIC	SR89C13
C7	5B	1	88	26124	2/15/2013 14:31	2/15/2013 14:32	PIC	SR89C13
C8	5B	1	66	18167	2/15/2013 14:27	2/15/2013 14:28	PIC	SR89C13
C1	5C	1	76	23369	2/15/2013 13:48	2/15/2013 13:49	PIC	SR89C13
C2	5C	1	106	25051	2/15/2013 13:45	2/15/2013 13:46	PIC	SR89C13
C3	5C	1	83	26297	2/15/2013 13:38	2/15/2013 13:39	PIC	SR89C13



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C4	5C	1	86	26150	2/15/2013 14:12	2/15/2013 14:13	PIC	SR89C13
C5	5C	1	93	26199	2/15/2013 14:28	2/15/2013 14:29	PIC	SR89C13
C6	5C	1	90	23488	2/15/2013 14:25	2/15/2013 14:26	PIC	SR89C13
C7	5C	1	85	25842	2/15/2013 14:16	2/15/2013 14:17	PIC	SR89C13
C8	5C	1	60	17798	2/15/2013 14:31	2/15/2013 14:32	PIC	SR89C13
C1	5D	1	82	23109	2/15/2013 14:12	2/15/2013 14:13	PIC	SR89C13
C2	5D	1	114	24806	2/15/2013 13:48	2/15/2013 13:49	PIC	SR89C13
C3	5D	1	99	26008	2/15/2013 13:45	2/15/2013 13:46	PIC	SR89C13
C4	5D	1	92	25558	2/15/2013 13:38	2/15/2013 13:39	PIC	SR89C13
C5	5D	1	94	26045	2/15/2013 14:31	2/15/2013 14:32	PIC	SR89C13
C6	5D	1	105	23651	2/15/2013 14:28	2/15/2013 14:29	PIC	SR89C13
C7	5D	1	106	25829	2/15/2013 14:25	2/15/2013 14:26	PIC	SR89C13
C8	5D	1	79	18148	2/15/2013 14:16	2/15/2013 14:17	PIC	SR89C13
C1	6A	1	1	22130	2/15/2013 14:16	2/15/2013 14:17	PIC	SR89C13
C2	6A	1	2	24034	2/15/2013 14:31	2/15/2013 14:32	PIC	SR89C13
C3	6A	1	1	24798	2/15/2013 14:28	2/15/2013 14:29	PIC	SR89C13
C4	6A	1	0	24454	2/15/2013 14:26	2/15/2013 14:27	PIC	SR89C13
C5	6A	1	1	24903	2/15/2013 13:38	2/15/2013 13:39	PIC	SR89C13
C6	6A	1	0	22477	2/15/2013 14:13	2/15/2013 14:14	PIC	SR89C13
C7	6A	1	5	24857	2/15/2013 13:48	2/15/2013 13:49	PIC	SR89C13
C8	6A	1	3	18846	2/15/2013 13:45	2/15/2013 13:46	PIC	SR89C13
C1	6B	1	57	22530	2/15/2013 14:26	2/15/2013 14:27	PIC	SR89C13
C2	6B	1	68	25573	2/15/2013 14:16	2/15/2013 14:17	PIC	SR89C13
C3	6B	1	68	25565	2/15/2013 14:31	2/15/2013 14:32	PIC	SR89C13
C4	6B	1	69	25190	2/15/2013 14:28	2/15/2013 14:29	PIC	SR89C13
C5	6B	1	68	25651	2/15/2013 13:46	2/15/2013 13:47	PIC	SR89C13
C6	6B	1	66	23552	2/15/2013 13:41	2/15/2013 13:42	PIC	SR89C13
C7	6B	1	83	25638	2/15/2013 14:13	2/15/2013 14:14	PIC	SR89C13
C8	6B	1	56	19075	2/15/2013 13:49	2/15/2013 13:50	PIC	SR89C13
C1	6C	1	13	22479	2/15/2013 14:28	2/15/2013 14:29	PIC	SR89C13
C2	6C	1	10	24382	2/15/2013 14:26	2/15/2013 14:27	PIC	SR89C13
C3	6C	1	10	25764	2/15/2013 14:17	2/15/2013 14:18	PIC	SR89C13
C4	6C	1	6	25070	2/15/2013 14:31	2/15/2013 14:32	PIC	SR89C13
C5	6C	1	18	25538	2/15/2013 13:49	2/15/2013 13:50	PIC	SR89C13
C6	6C	1	16	23213	2/15/2013 13:46	2/15/2013 13:47	PIC	SR89C13
C7	6C	1	7	25525	2/15/2013 13:38	2/15/2013 13:39	PIC	SR89C13
C8	6C	1	6	17935	2/15/2013 14:13	2/15/2013 14:14	PIC	SR89C13

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C1	6D	1	0	11648	2/15/2013 14:32	2/15/2013 14:33	PIC	SR89C13
C2	6D	1	0	13066	2/15/2013 14:29	2/15/2013 14:30	PIC	SR89C13
C3	6D	1	0	12930	2/15/2013 14:26	2/15/2013 14:27	PIC	SR89C13
C4	6D	1	0	15725	2/15/2013 14:17	2/15/2013 14:18	PIC	SR89C13
C5	6D	1	0	12091	2/15/2013 14:13	2/15/2013 14:14	PIC	SR89C13
C6	6D	1	0	17778	2/15/2013 13:50	2/15/2013 13:51	PIC	SR89C13
C7	6D	1	0	16245	2/15/2013 13:46	2/15/2013 13:47	PIC	SR89C13
C8	6D	1	1	2109	2/15/2013 13:38	2/15/2013 13:39	PIC	SR89C13
C1	7A	1	131	23154	2/15/2013 14:40	2/15/2013 14:41	PIC	SR89C13
C2	7A	1	141	24947	2/15/2013 14:57	2/15/2013 14:58	PIC	SR89C13
C3	7A	1	185	26400	2/15/2013 14:54	2/15/2013 14:55	PIC	SR89C13
C4	7A	1	154	25726	2/15/2013 14:51	2/15/2013 14:52	PIC	SR89C13
C5	7A	1	172	26121	2/15/2013 15:00	2/15/2013 15:01	PIC	SR89C13
C6	7A	1	120	23722	2/15/2013 15:13	2/15/2013 15:14	PIC	SR89C13
C7	7A	1	173	26485	2/15/2013 15:09	2/15/2013 15:10	PIC	SR89C13
C8	7A	1	121	17724	2/15/2013 15:05	2/15/2013 15:06	PIC	SR89C13
C1	7B	1	167	23235	2/15/2013 14:51	2/15/2013 14:52	PIC	SR89C13
C2	7B	1	184	25027	2/15/2013 14:40	2/15/2013 14:41	PIC	SR89C13
C3	7B	1	191	26374	2/15/2013 14:57	2/15/2013 14:58	PIC	SR89C13
C4	7B	1	181	25565	2/15/2013 14:54	2/15/2013 14:55	PIC	SR89C13
C5	7B	1	200	25913	2/15/2013 15:06	2/15/2013 15:07	PIC	SR89C13
C6	7B	1	161	23710	2/15/2013 15:00	2/15/2013 15:01	PIC	SR89C13
C7	7B	1	160	26047	2/15/2013 15:13	2/15/2013 15:14	PIC	SR89C13
C8	7B	1	136	17556	2/15/2013 15:09	2/15/2013 15:10	PIC	SR89C13
C1	7C	1	59	23070	2/15/2013 14:54	2/15/2013 14:55	PIC	SR89C13
C2	7C	1	59	24941	2/15/2013 14:52	2/15/2013 14:53	PIC	SR89C13
C3	7C	1	79	25992	2/15/2013 14:41	2/15/2013 14:42	PIC	SR89C13
C4	7C	1	83	25550	2/15/2013 14:57	2/15/2013 14:58	PIC	SR89C13
C5	7C	1	68	26073	2/15/2013 15:09	2/15/2013 15:10	PIC	SR89C13
C6	7C	1	60	23471	2/15/2013 15:06	2/15/2013 15:07	PIC	SR89C13
C7	7C	1	67	25731	2/15/2013 15:00	2/15/2013 15:01	PIC	SR89C13
C8	7C	1	46	17544	2/15/2013 15:13	2/15/2013 15:14	PIC	SR89C13
C1	7D	1	96	22969	2/15/2013 14:57	2/15/2013 14:58	PIC	SR89C13
C2	7D	1	94	25017	2/15/2013 14:54	2/15/2013 14:55	PIC	SR89C13
C3	7D	1	138	26248	2/15/2013 14:52	2/15/2013 14:53	PIC	SR89C13
C4	7D	1	90	25375	2/15/2013 14:41	2/15/2013 14:42	PIC	SR89C13
C5	7D	1	127	25995	2/15/2013 15:14	2/15/2013 15:15	PIC	SR89C13

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C6	7D	1	106	23670	2/15/2013 15:09	2/15/2013 15:10	PIC	SR89C13
C7	7D	1	120	25810	2/15/2013 15:06	2/15/2013 15:07	PIC	SR89C13
C8	7D	1	55	17546	2/15/2013 15:00	2/15/2013 15:01	PIC	SR89C13
C1	8A	1	5	22652	2/15/2013 15:00	2/15/2013 15:01	PIC	SR89C13
C2	8A	1	13	24637	2/15/2013 15:14	2/15/2013 15:15	PIC	SR89C13
C3	8A	1	21	25565	2/15/2013 15:09	2/15/2013 15:10	PIC	SR89C13
C4	8A	1	21	25423	2/15/2013 15:07	2/15/2013 15:08	PIC	SR89C13
C5	8A	1	17	25896	2/15/2013 14:45	2/15/2013 14:46	PIC	SR89C13
C6	8A	1	11	23169	2/15/2013 14:57	2/15/2013 14:58	PIC	SR89C13
C7	8A	1	21	25611	2/15/2013 14:55	2/15/2013 14:56	PIC	SR89C13
C8	8A	1	18	17494	2/15/2013 14:52	2/15/2013 14:53	PIC	SR89C13
C1	8B	1	1	22319	2/15/2013 15:07	2/15/2013 15:08	PIC	SR89C13
C2	8B	1	0	24615	2/15/2013 15:00	2/15/2013 15:01	PIC	SR89C13
C3	8B	1	1	25451	2/15/2013 15:14	2/15/2013 15:15	PIC	SR89C13
C4	8B	1	0	24461	2/15/2013 15:09	2/15/2013 15:10	PIC	SR89C13
C5	8B	1	0	25258	2/15/2013 14:52	2/15/2013 14:53	PIC	SR89C13
C6	8B	1	0	22990	2/15/2013 14:45	2/15/2013 14:46	PIC	SR89C13
C7	8B	1	0	25222	2/15/2013 14:57	2/15/2013 14:58	PIC	SR89C13
C8	8B	1	0	16601	2/15/2013 14:55	2/15/2013 14:56	PIC	SR89C13
C1	8C	1	22	22927	2/15/2013 15:10	2/15/2013 15:11	PIC	SR89C13
C2	8C	1	23	25010	2/15/2013 15:07	2/15/2013 15:08	PIC	SR89C13
C3	8C	1	17	26237	2/15/2013 15:00	2/15/2013 15:01	PIC	SR89C13
C4	8C	1	18	25433	2/15/2013 15:14	2/15/2013 15:15	PIC	SR89C13
C5	8C	1	21	26120	2/15/2013 14:55	2/15/2013 14:56	PIC	SR89C13
C6	8C	1	24	23608	2/15/2013 14:52	2/15/2013 14:53	PIC	SR89C13
C7	8C	1	14	26024	2/15/2013 14:45	2/15/2013 14:46	PIC	SR89C13
C8	8C	1	13	17848	2/15/2013 14:57	2/15/2013 14:58	PIC	SR89C13
C1	8D	1	31	23697	2/15/2013 15:14	2/15/2013 15:15	PIC	SR89C13
C2	8D	1	37	25697	2/15/2013 15:10	2/15/2013 15:11	PIC	SR89C13
C3	8D	1	57	26831	2/15/2013 15:07	2/15/2013 15:08	PIC	SR89C13
C4	8D	1	37	26060	2/15/2013 15:00	2/15/2013 15:01	PIC	SR89C13
C5	8D	1	49	26234	2/15/2013 14:57	2/15/2013 14:58	PIC	SR89C13
C6	8D	1	34	23718	2/15/2013 14:55	2/15/2013 14:56	PIC	SR89C13
C7	8D	1	43	26787	2/15/2013 14:52	2/15/2013 14:53	PIC	SR89C13
C8	8D	1	21	18085	2/15/2013 14:45	2/15/2013 14:46	PIC	SR89C13
C1	9A	1	42	23046	2/15/2013 12:54	2/15/2013 12:55	PIC	SR89C13
C2	9A	1	33	25056	2/15/2013 13:04	2/15/2013 13:05	PIC	SR89C13

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C3	9A	1	49	26656	2/15/2013 13:00	2/15/2013 13:01	PIC	SR89C13
C4	9A	1	37	25929	2/15/2013 12:57	2/15/2013 12:58	PIC	SR89C13
C5	9A	1	48	26267	2/15/2013 13:07	2/15/2013 13:08	PIC	SR89C13
C6	9A	1	30	23993	2/15/2013 13:17	2/15/2013 13:18	PIC	SR89C13
C7	9A	1	47	26420	2/15/2013 13:14	2/15/2013 13:15	PIC	SR89C13
C8	9A	1	32	19631	2/15/2013 13:10	2/15/2013 13:11	PIC	SR89C13
C1	9B	1	22	22752	2/15/2013 12:57	2/15/2013 12:58	PIC	SR89C13
C2	9B	1	29	24464	2/15/2013 12:54	2/15/2013 12:55	PIC	SR89C13
C3	9B	1	27	25548	2/15/2013 13:04	2/15/2013 13:05	PIC	SR89C13
C4	9B	1	17	25161	2/15/2013 13:00	2/15/2013 13:01	PIC	SR89C13
C5	9B	1	24	25785	2/15/2013 13:10	2/15/2013 13:11	PIC	SR89C13
C6	9B	1	16	23221	2/15/2013 13:07	2/15/2013 13:08	PIC	SR89C13
C7	9B	1	25	25852	2/15/2013 13:17	2/15/2013 13:18	PIC	SR89C13
C8	9B	1	16	19119	2/15/2013 13:14	2/15/2013 13:15	PIC	SR89C13
C1	9C	1	40	22898	2/15/2013 13:00	2/15/2013 13:01	PIC	SR89C13
C2	9C	1	43	24745	2/15/2013 12:57	2/15/2013 12:58	PIC	SR89C13
C3	9C	1	47	25810	2/15/2013 12:54	2/15/2013 12:55	PIC	SR89C13
C4	9C	1	39	25450	2/15/2013 13:04	2/15/2013 13:05	PIC	SR89C13
C5	9C	1	33	26012	2/15/2013 13:14	2/15/2013 13:15	PIC	SR89C13
C6	9C	1	45	23438	2/15/2013 13:10	2/15/2013 13:11	PIC	SR89C13
C7	9C	1	35	25678	2/15/2013 13:07	2/15/2013 13:08	PIC	SR89C13
C8	9C	1	36	19493	2/15/2013 13:17	2/15/2013 13:18	PIC	SR89C13
C1	9D	1	0	22005	2/15/2013 13:04	2/15/2013 13:05	PIC	SR89C13
C2	9D	1	0	23660	2/15/2013 13:00	2/15/2013 13:01	PIC	SR89C13
C3	9D	1	0	24728	2/15/2013 12:58	2/15/2013 12:59	PIC	SR89C13
C4	9D	1	1	24408	2/15/2013 12:54	2/15/2013 12:55	PIC	SR89C13
C5	9D	1	1	24915	2/15/2013 13:18	2/15/2013 13:19	PIC	SR89C13
C6	9D	1	1	22693	2/15/2013 13:15	2/15/2013 13:16	PIC	SR89C13
C7	9D	1	2	25159	2/15/2013 13:10	2/15/2013 13:11	PIC	SR89C13
C8	9D	1	0	18766	2/15/2013 13:07	2/15/2013 13:08	PIC	SR89C13
C1	10A	1	10	22993	2/15/2013 13:07	2/15/2013 13:08	PIC	SR89C13
C2	10A	1	25	24908	2/15/2013 13:18	2/15/2013 13:19	PIC	SR89C13
C3	10A	1	16	25972	2/15/2013 13:15	2/15/2013 13:16	PIC	SR89C13
C4	10A	1	22	25551	2/15/2013 13:11	2/15/2013 13:12	PIC	SR89C13
C5	10A	1	17	26172	2/15/2013 12:54	2/15/2013 12:55	PIC	SR89C13
C6	10A	1	19	24100	2/15/2013 13:04	2/15/2013 13:05	PIC	SR89C13
C7	10A	1	14	26093	2/15/2013 13:00	2/15/2013 13:01	PIC	SR89C13

C8	10A	1	6	19475	2/15/2013 12:58	2/15/2013 12:59	PIC	SR89C13
C1	10B	1	41	22828	2/15/2013 13:11	2/15/2013 13:12	PIC	SR89C13
C2	10B	1	48	24594	2/15/2013 13:07	2/15/2013 13:08	PIC	SR89C13
C3	10B	1	42	25749	2/15/2013 13:18	2/15/2013 13:19	PIC	SR89C13
C4	10B	1	30	25497	2/15/2013 13:15	2/15/2013 13:16	PIC	SR89C13
C5	10B	1	51	26074	2/15/2013 12:58	2/15/2013 12:59	PIC	SR89C13
C6	10B	1	35	23956	2/15/2013 12:54	2/15/2013 12:55	PIC	SR89C13
C7	10B	1	37	25717	2/15/2013 13:05	2/15/2013 13:06	PIC	SR89C13
C8	10B	1	24	19206	2/15/2013 13:00	2/15/2013 13:01	PIC	SR89C13
C1	10C	1	36	22920	2/15/2013 13:15	2/15/2013 13:16	PIC	SR89C13
C2	10C	1	50	24784	2/15/2013 13:11	2/15/2013 13:12	PIC	SR89C13
C3	10C	1	53	25610	2/15/2013 13:08	2/15/2013 13:09	PIC	SR89C13
C4	10C	1	49	25623	2/15/2013 13:18	2/15/2013 13:19	PIC	SR89C13
C5	10C	1	55	26296	2/15/2013 13:01	2/15/2013 13:02	PIC	SR89C13
C6	10C	1	42	23777	2/15/2013 12:58	2/15/2013 12:59	PIC	SR89C13
C7	10C	1	38	26396	2/15/2013 12:54	2/15/2013 12:55	PIC	SR89C13
C8	10C	1	29	19243	2/15/2013 13:05	2/15/2013 13:06	PIC	SR89C13
C1	10D	1	25	22791	2/15/2013 13:18	2/15/2013 13:19	PIC	SR89C13
C2	10D	1	27	24951	2/15/2013 13:15	2/15/2013 13:16	PIC	SR89C13
C3	10D	1	25	26000	2/15/2013 13:11	2/15/2013 13:12	PIC	SR89C13
C4	10D	1	18	25540	2/15/2013 13:08	2/15/2013 13:09	PIC	SR89C13
C5	10D	1	25	25889	2/15/2013 13:05	2/15/2013 13:06	PIC	SR89C13
C6	10D	1	21	23854	2/15/2013 13:01	2/15/2013 13:02	PIC	SR89C13
C7	10D	1	21	26394	2/15/2013 12:58	2/15/2013 12:59	PIC	SR89C13
C8	10D	1	19	19760	2/15/2013 12:54	2/15/2013 12:55	PIC	SR89C13
C1	11A	1	0	19465	2/15/2013 12:26	2/15/2013 12:27	PIC	SR89C13
C2	11A	1	0	20978	2/15/2013 12:37	2/15/2013 12:38	PIC	SR89C13
C3	11A	1	0	21798	2/15/2013 12:34	2/15/2013 12:35	PIC	SR89C13
C4	11A	1	0	21585	2/15/2013 12:30	2/15/2013 12:31	PIC	SR89C13
C5	11A	1	1	22052	2/15/2013 12:39	2/15/2013 12:40	PIC	SR89C13
C6	11A	1	0	20207	2/15/2013 12:48	2/15/2013 12:49	PIC	SR89C13
C7	11A	1	0	21925	2/15/2013 12:45	2/15/2013 12:46	PIC	SR89C13
C8	11A	1	0	17769	2/15/2013 12:43	2/15/2013 12:44	PIC	SR89C13
C1	11B	1	0	22955	2/15/2013 12:30	2/15/2013 12:31	PIC	SR89C13
C2	11B	1	0	24624	2/15/2013 12:26	2/15/2013 12:27	PIC	SR89C13
C3	11B	1	1	25818	2/15/2013 12:37	2/15/2013 12:38	PIC	SR89C13
C4	11B	1	1	25455	2/15/2013 12:34	2/15/2013 12:35	PIC	SR89C13

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C5	11B	1	2	25722	2/15/2013 12:43	2/15/2013 12:44	PIC	SR89C13
C6	11B	1	1	23486	2/15/2013 12:39	2/15/2013 12:40	PIC	SR89C13
C7	11B	1	0	26243	2/15/2013 12:48	2/15/2013 12:49	PIC	SR89C13
C8	11B	1	1	20341	2/15/2013 12:45	2/15/2013 12:46	PIC	SR89C13
C1	11C	1	0	22849	2/15/2013 12:34	2/15/2013 12:35	PIC	SR89C13
C2	11C	1	0	24747	2/15/2013 12:30	2/15/2013 12:31	PIC	SR89C13
C3	11C	1	0	25794	2/15/2013 12:26	2/15/2013 12:27	PIC	SR89C13
C4	11C	1	0	25259	2/15/2013 12:37	2/15/2013 12:38	PIC	SR89C13
C5	11C	1	0	25754	2/15/2013 12:46	2/15/2013 12:47	PIC	SR89C13
C6	11C	1	0	23292	2/15/2013 12:43	2/15/2013 12:44	PIC	SR89C13
C7	11C	1	0	26032	2/15/2013 12:39	2/15/2013 12:40	PIC	SR89C13
C8	11C	1	1	19787	2/15/2013 12:48	2/15/2013 12:49	PIC	SR89C13
C1	11D	1	0	23032	2/15/2013 12:37	2/15/2013 12:38	PIC	SR89C13
C2	11D	1	0	24975	2/15/2013 12:34	2/15/2013 12:35	PIC	SR89C13
C3	11D	1	0	26164	2/15/2013 12:31	2/15/2013 12:32	PIC	SR89C13
C4	11D	1	0	25392	2/15/2013 12:26	2/15/2013 12:27	PIC	SR89C13
C5	11D	1	0	26139	2/15/2013 12:48	2/15/2013 12:49	PIC	SR89C13
C6	11D	1	0	23587	2/15/2013 12:46	2/15/2013 12:47	PIC	SR89C13
C7	11D	1	0	26126	2/15/2013 12:43	2/15/2013 12:44	PIC	SR89C13
C8	11D	1	0	21236	2/15/2013 12:40	2/15/2013 12:41	PIC	SR89C13
C1	12A	1	0	0	2/15/2013 12:40	2/15/2013 12:41	PIC	SR89C13
C2	12A	1	0	0	2/15/2013 12:48	2/15/2013 12:49	PIC	SR89C13
C3	12A	1	0	0	2/15/2013 12:46	2/15/2013 12:47	PIC	SR89C13
C4	12A	1	0	0	2/15/2013 12:43	2/15/2013 12:44	PIC	SR89C13
C5	12A	1	0	0	2/15/2013 12:26	2/15/2013 12:27	PIC	SR89C13
C6	12A	1	0	0	2/15/2013 12:37	2/15/2013 12:38	PIC	SR89C13
C7	12A	1	0	0	2/15/2013 12:34	2/15/2013 12:35	PIC	SR89C13
C8	12A	1	0	0	2/15/2013 12:31	2/15/2013 12:32	PIC	SR89C13
C1	12B	1	0	11423	2/15/2013 12:43	2/15/2013 12:44	PIC	SR89C13
C2	12B	1	0	12283	2/15/2013 12:40	2/15/2013 12:41	PIC	SR89C13
C3	12B	1	0	13000	2/15/2013 12:48	2/15/2013 12:49	PIC	SR89C13
C4	12B	1	0	12474	2/15/2013 12:46	2/15/2013 12:47	PIC	SR89C13
C5	12B	1	0	13323	2/15/2013 12:31	2/15/2013 12:32	PIC	SR89C13
C6	12B	1	0	12524	2/15/2013 12:26	2/15/2013 12:27	PIC	SR89C13
C7	12B	1	0	12656	2/15/2013 12:37	2/15/2013 12:38	PIC	SR89C13
C8	12B	1	0	10909	2/15/2013 12:35	2/15/2013 12:36	PIC	SR89C13
C1	12C	1	0	10621	2/15/2013 12:46	2/15/2013 12:47	PIC	SR89C13

C2	12C	1	0	10886	2/15/2013 12:43	2/15/2013 12:44	PIC	SR89C13
C3	12C	1	0	10093	2/15/2013 12:40	2/15/2013 12:41	PIC	SR89C13
C4	12C	1	0	12768	2/15/2013 12:48	2/15/2013 12:49	PIC	SR89C13
C5	12C	1	0	11356	2/15/2013 12:35	2/15/2013 12:36	PIC	SR89C13
C6	12C	1	0	10436	2/15/2013 12:31	2/15/2013 12:32	PIC	SR89C13
C7	12C	1	0	8655	2/15/2013 12:26	2/15/2013 12:27	PIC	SR89C13
C8	12C	1	0	7925	2/15/2013 12:37	2/15/2013 12:38	PIC	SR89C13
C1	12D	1	0	22275	2/15/2013 12:48	2/15/2013 12:49	PIC	SR89C13
C2	12D	1	0	23929	2/15/2013 12:46	2/15/2013 12:47	PIC	SR89C13
C3	12D	1	2	24816	2/15/2013 12:43	2/15/2013 12:44	PIC	SR89C13
C4	12D	1	0	24308	2/15/2013 12:40	2/15/2013 12:41	PIC	SR89C13
C5	12D	1	0	25022	2/15/2013 12:37	2/15/2013 12:38	PIC	SR89C13
C6	12D	1	0	22695	2/15/2013 12:35	2/15/2013 12:36	PIC	SR89C13
C7	12D	1	0	25156	2/15/2013 12:31	2/15/2013 12:32	PIC	SR89C13
C8	12D	1	1	20790	2/15/2013 12:27	2/15/2013 12:28	PIC	SR89C13
C1	13A	1	0	22743	2/15/2013 11:39	2/15/2013 11:40	PIC	SR89C13
C2	13A	1	0	24809	2/15/2013 11:49	2/15/2013 11:50	PIC	SR89C13
C3	13A	1	0	26030	2/15/2013 11:47	2/15/2013 11:48	PIC	SR89C13
C4	13A	1	0	25231	2/15/2013 11:45	2/15/2013 11:46	PIC	SR89C13
C5	13A	1	0	25679	2/15/2013 12:12	2/15/2013 12:13	PIC	SR89C13
C6	13A	1	0	23601	2/15/2013 12:22	2/15/2013 12:23	PIC	SR89C13
C7	13A	1	0	26108	2/15/2013 12:19	2/15/2013 12:20	PIC	SR89C13
C8	13A	1	0	21741	2/15/2013 12:16	2/15/2013 12:17	PIC	SR89C13
C1	13B	1	3	23326	2/15/2013 11:45	2/15/2013 11:46	PIC	SR89C13
C2	13B	1	0	25000	2/15/2013 11:39	2/15/2013 11:40	PIC	SR89C13
C3	13B	1	0	26432	2/15/2013 11:49	2/15/2013 11:50	PIC	SR89C13
C4	13B	1	0	25874	2/15/2013 11:47	2/15/2013 11:48	PIC	SR89C13
C5	13B	1	0	26690	2/15/2013 12:16	2/15/2013 12:17	PIC	SR89C13
C6	13B	1	0	24326	2/15/2013 12:12	2/15/2013 12:13	PIC	SR89C13
C7	13B	1	0	26586	2/15/2013 12:22	2/15/2013 12:23	PIC	SR89C13
C8	13B	1	1	22201	2/15/2013 12:19	2/15/2013 12:20	PIC	SR89C13
C1	13C	1	0	23080	2/15/2013 11:47	2/15/2013 11:48	PIC	SR89C13
C2	13C	1	0	24850	2/15/2013 11:45	2/15/2013 11:46	PIC	SR89C13
C3	13C	1	0	26077	2/15/2013 11:39	2/15/2013 11:40	PIC	SR89C13
C4	13C	1	0	25534	2/15/2013 11:49	2/15/2013 11:50	PIC	SR89C13
C5	13C	1	0	26440	2/15/2013 12:19	2/15/2013 12:20	PIC	SR89C13
C6	13C	1	0	23843	2/15/2013 12:16	2/15/2013 12:17	PIC	SR89C13

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C7	13C	1	25844	2/15/2013 12:12	2/15/2013 12:13	PIC	SR89C13
C8	13C	0	21603	2/15/2013 12:22	2/15/2013 12:23	PIC	SR89C13
C1	13D	0	22759	2/15/2013 11:49	2/15/2013 11:50	PIC	SR89C13
C2	13D	0	24457	2/15/2013 11:47	2/15/2013 11:48	PIC	SR89C13
C3	13D	1	25628	2/15/2013 11:45	2/15/2013 11:46	PIC	SR89C13
C4	13D	0	25066	2/15/2013 11:39	2/15/2013 11:40	PIC	SR89C13
C5	13D	0	25723	2/15/2013 12:22	2/15/2013 12:23	PIC	SR89C13
C6	13D	0	23187	2/15/2013 12:19	2/15/2013 12:20	PIC	SR89C13
C7	13D	0	25552	2/15/2013 12:16	2/15/2013 12:17	PIC	SR89C13
C8	13D	0	21943	2/15/2013 12:12	2/15/2013 12:13	PIC	SR89C13
C1	14A	1	21875	2/15/2013 12:12	2/15/2013 12:13	PIC	SR89C13
C2	14A	1	24524	2/15/2013 12:22	2/15/2013 12:23	PIC	SR89C13
C3	14A	1	25512	2/15/2013 12:18	2/15/2013 12:19	PIC	SR89C13
C4	14A	1	24999	2/15/2013 12:16	2/15/2013 12:17	PIC	SR89C13
C5	14A	0	25660	2/15/2013 11:39	2/15/2013 11:40	PIC	SR89C13
C6	14A	0	23262	2/15/2013 11:50	2/15/2013 11:51	PIC	SR89C13
C7	14A	0	25922	2/15/2013 11:47	2/15/2013 11:48	PIC	SR89C13
C8	14A	0	22048	2/15/2013 11:45	2/15/2013 11:46	PIC	SR89C13
C1	14B	1	23056	2/15/2013 12:16	2/15/2013 12:17	PIC	SR89C13
C2	14B	1	24712	2/15/2013 12:12	2/15/2013 12:13	PIC	SR89C13
C3	14B	0	25936	2/15/2013 12:22	2/15/2013 12:23	PIC	SR89C13
C4	14B	0	25683	2/15/2013 12:19	2/15/2013 12:20	PIC	SR89C13
C5	14B	1	25954	2/15/2013 11:45	2/15/2013 11:46	PIC	SR89C13
C6	14B	0	23872	2/15/2013 11:39	2/15/2013 11:40	PIC	SR89C13
C7	14B	0	26271	2/15/2013 11:50	2/15/2013 11:51	PIC	SR89C13
C8	14B	1	22456	2/15/2013 11:48	2/15/2013 11:49	PIC	SR89C13
C1	14C	0	22999	2/15/2013 12:19	2/15/2013 12:20	PIC	SR89C13
C2	14C	0	25216	2/15/2013 12:16	2/15/2013 12:17	PIC	SR89C13
C3	14C	0	26170	2/15/2013 12:12	2/15/2013 12:13	PIC	SR89C13
C4	14C	0	25729	2/15/2013 12:22	2/15/2013 12:23	PIC	SR89C13
C5	14C	0	26457	2/15/2013 11:48	2/15/2013 11:49	PIC	SR89C13
C6	14C	0	23806	2/15/2013 11:45	2/15/2013 11:46	PIC	SR89C13
C7	14C	0	26330	2/15/2013 11:39	2/15/2013 11:40	PIC	SR89C13
C8	14C	0	22288	2/15/2013 11:50	2/15/2013 11:51	PIC	SR89C13
C1	14D	0	22297	2/15/2013 12:22	2/15/2013 12:23	PIC	SR89C13
C2	14D	0	24355	2/15/2013 12:19	2/15/2013 12:20	PIC	SR89C13
C3	14D	0	25319	2/15/2013 12:17	2/15/2013 12:18	PIC	SR89C13



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C4	14D	1	0	24492	2/15/2013 12:12	2/15/2013 12:13	PIC	SR89C13
C5	14D	1	0	25239	2/15/2013 11:50	2/15/2013 11:51	PIC	SR89C13
C6	14D	1	0	23452	2/15/2013 11:48	2/15/2013 11:49	PIC	SR89C13
C7	14D	1	0	25637	2/15/2013 11:45	2/15/2013 11:46	PIC	SR89C13
C8	14D	1	0	22338	2/15/2013 11:40	2/15/2013 11:41	PIC	SR89C13



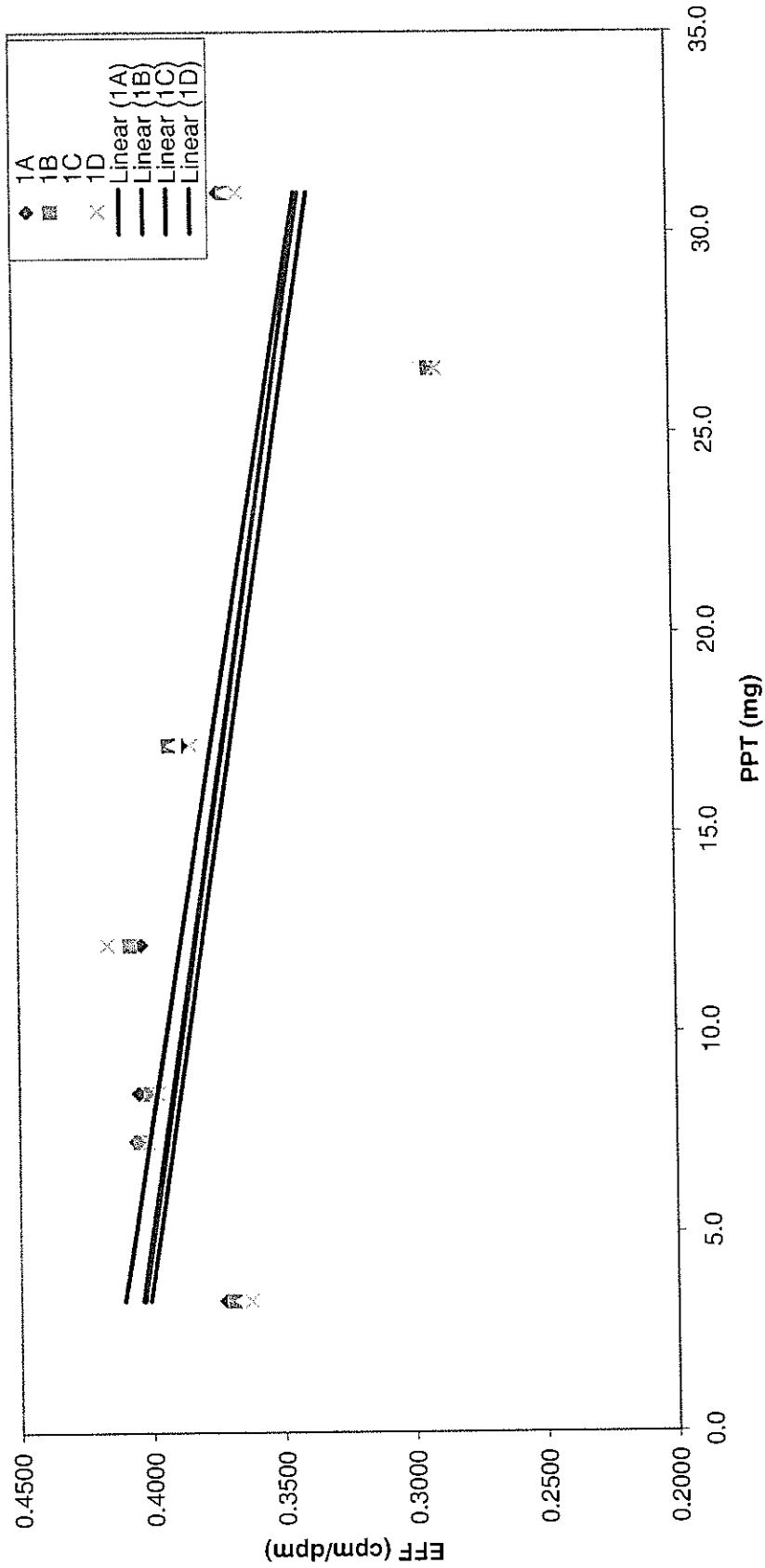






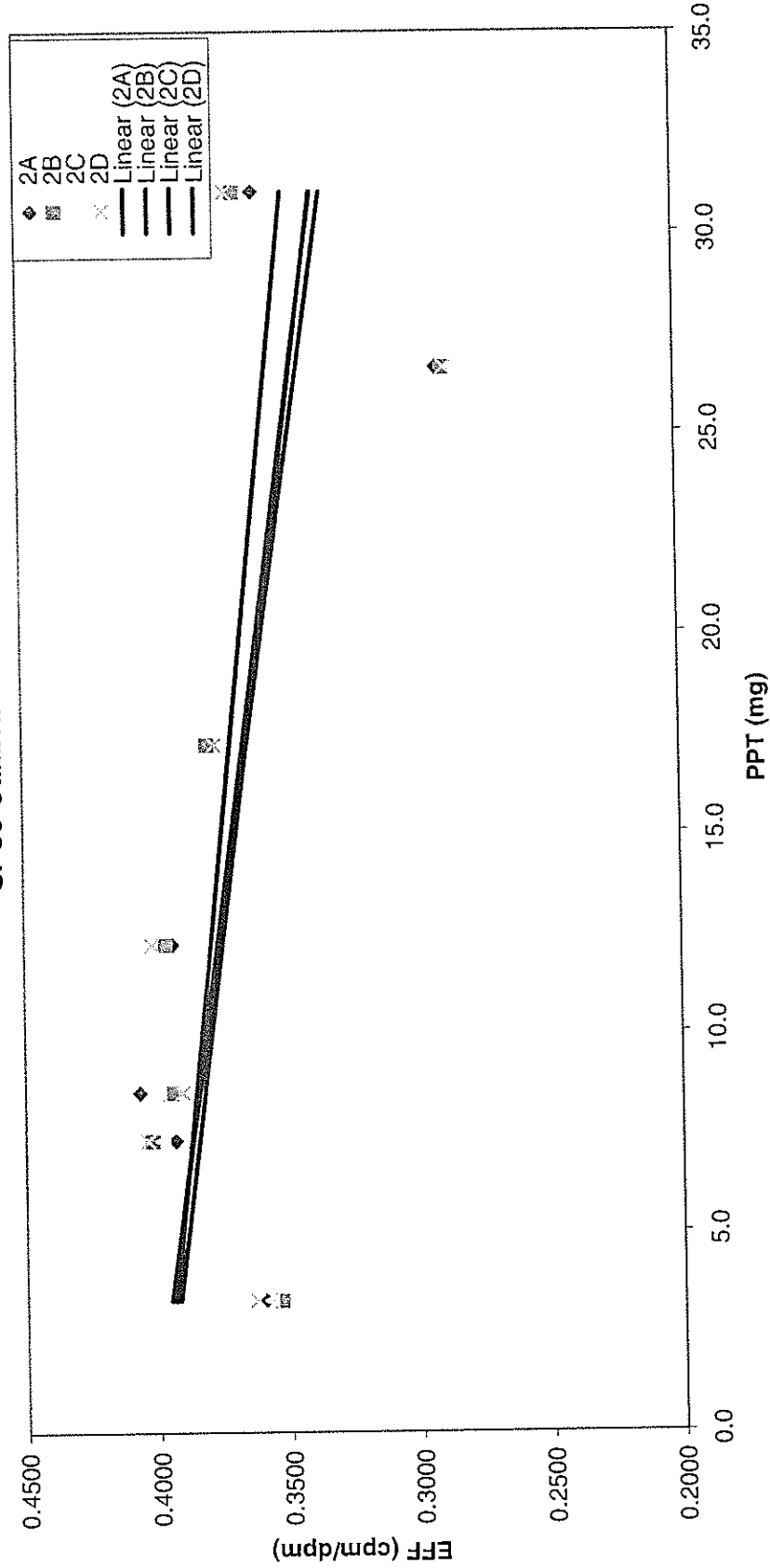
Detector (#)	Source ID (#)	Raw Count Data			Beta (counts)	Raw Beta (cpm)	Recovery (%)	Yttrium Efficiency (cpm/dpm)	Y-90 Ingrowth	Corrected Sr-90 (cpm)*	Decay Corrected Nominal (dpm)**	Sr-90 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
		Start Time	Count Time (min)										
14A	3	3/30/2013 14:45	3	14874	4958.00	99.4%	0.49881	0.23380	3834.57	9576.92	0.4004	0.3886	
14A	4	3/30/2013 14:38	3	15344	5114.67	100.0%	0.49881	0.23285	4002.34	9576.92	0.4179	0.3711	
14A	5	3/30/2013 14:31	3	14151	4717.00	100.0%	0.49881	0.23189	3609.23	9576.92	0.3769	0.3462	
14A	6	3/30/2013 15:24	3	10357	3452.33	100.0%	0.49881	0.23929	2309.23	9576.90	0.2411	0.2993	
14A	7	3/30/2013 15:16	3	11816	3938.67	100.0%	0.49881	0.23816	2800.94	9576.90	0.2925	0.2773	
14B	1	3/30/2013 15:09	3	14442	4814.00	96.5%	0.52166	0.23715	3586.15	9576.90	0.3745	0.4137	
14B	2	3/30/2013 14:59	3	15221	5073.57	100.0%	0.52166	0.23585	3895.37	9576.91	0.4067	0.3971	
14B	3	3/30/2013 14:52	3	14787	4929.00	99.4%	0.52166	0.23488	3748.66	9576.91	0.3914	0.3922	
14B	4	3/30/2013 14:45	3	15252	5084.00	100.0%	0.52166	0.23380	3915.99	9576.92	0.4089	0.3768	
14B	5	3/30/2013 14:38	3	14644	4881.33	100.0%	0.52166	0.23285	3718.06	9576.92	0.3882	0.3561	
14B	6	3/30/2013 14:31	3	11477	3825.67	100.0%	0.52166	0.23189	2667.19	9576.92	0.2785	0.3171	
14B	7	3/30/2013 15:24	3	12308	4102.67	100.0%	0.52166	0.23929	2907.21	9576.90	0.3036	0.2988	
14C	1	3/30/2013 15:16	3	14188	4729.33	96.5%	0.52711	0.23916	3483.34	9576.90	0.3637	0.4031	
14C	2	3/30/2013 15:09	3	15087	5029.00	100.0%	0.52711	0.23715	3831.85	9576.90	0.4001	0.3911	
14C	3	3/30/2013 14:59	3	14907	4969.00	99.4%	0.52711	0.23585	3771.38	9576.91	0.3938	0.3875	
14C	4	3/30/2013 14:52	3	15149	5049.67	100.0%	0.52711	0.23488	3863.96	9576.91	0.4036	0.3765	
14C	5	3/30/2013 14:45	3	14790	4930.00	100.0%	0.52711	0.23379	3749.78	9576.92	0.3915	0.3616	
14C	6	3/30/2013 14:38	3	11904	3958.00	100.0%	0.52711	0.23284	2792.58	9576.92	0.2916	0.3335	
14C	7	3/30/2013 14:31	3	12979	4326.33	100.0%	0.52711	0.23189	3155.73	9576.92	0.3295	0.3204	
14D	1	3/30/2013 15:24	3	13129	4376.33	96.5%	0.47151	0.23929	3256.50	9576.90	0.3400	0.3850	
14D	2	3/30/2013 15:16	3	14162	4720.67	100.0%	0.47151	0.23816	3645.22	9576.90	0.3806	0.3723	
14D	3	3/30/2013 15:09	3	14253	4751.00	99.4%	0.47151	0.23715	3673.84	9576.90	0.3836	0.3685	
14D	4	3/30/2013 14:59	3	14346	4782.00	100.0%	0.47151	0.23585	3716.98	9576.91	0.3881	0.3667	
14D	5	3/30/2013 14:52	3	13660	4553.33	100.0%	0.47151	0.23488	3492.70	9576.91	0.3647	0.3409	
14D	6	3/30/2013 14:45	3	10732	3577.33	100.0%	0.47151	0.23379	2521.62	9576.92	0.2633	0.3110	
14D	7	3/30/2013 14:38	3	12093	4031.00	100.0%	0.47151	0.23284	2979.57	9576.92	0.3111	0.2971	

# Sr-90 Calibration



- 1A  $y = -2.279414E-03x + 4.114385E-01$
- 1B  $y = -2.242680E-03x + 4.104277E-01$
- 1C  $y = -2.472545E-03x + 4.188951E-01$
- 1D  $y = -2.290631E-03x + 4.084494E-01$

# Sr-90 Calibration



$$2A y = -2.217073E-03x + 4.028435E-01$$

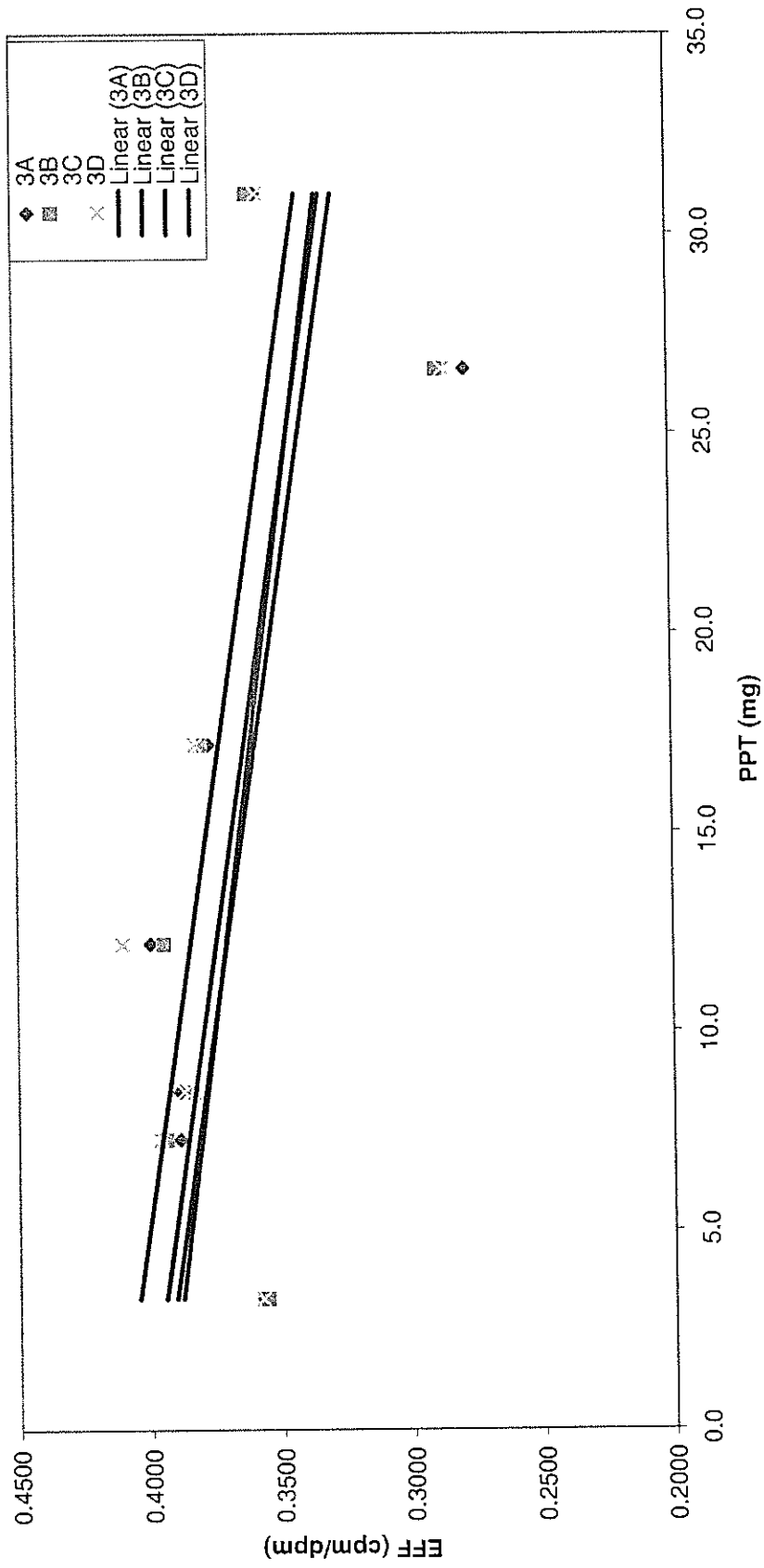
$$2B y = -1.958094E-03x + 3.986039E-01$$

$$2C y = -1.615998E-03x + 3.990307E-01$$

$$2D y = -2.080413E-03x + 4.022292E-01$$



### Sr-90 Calibration



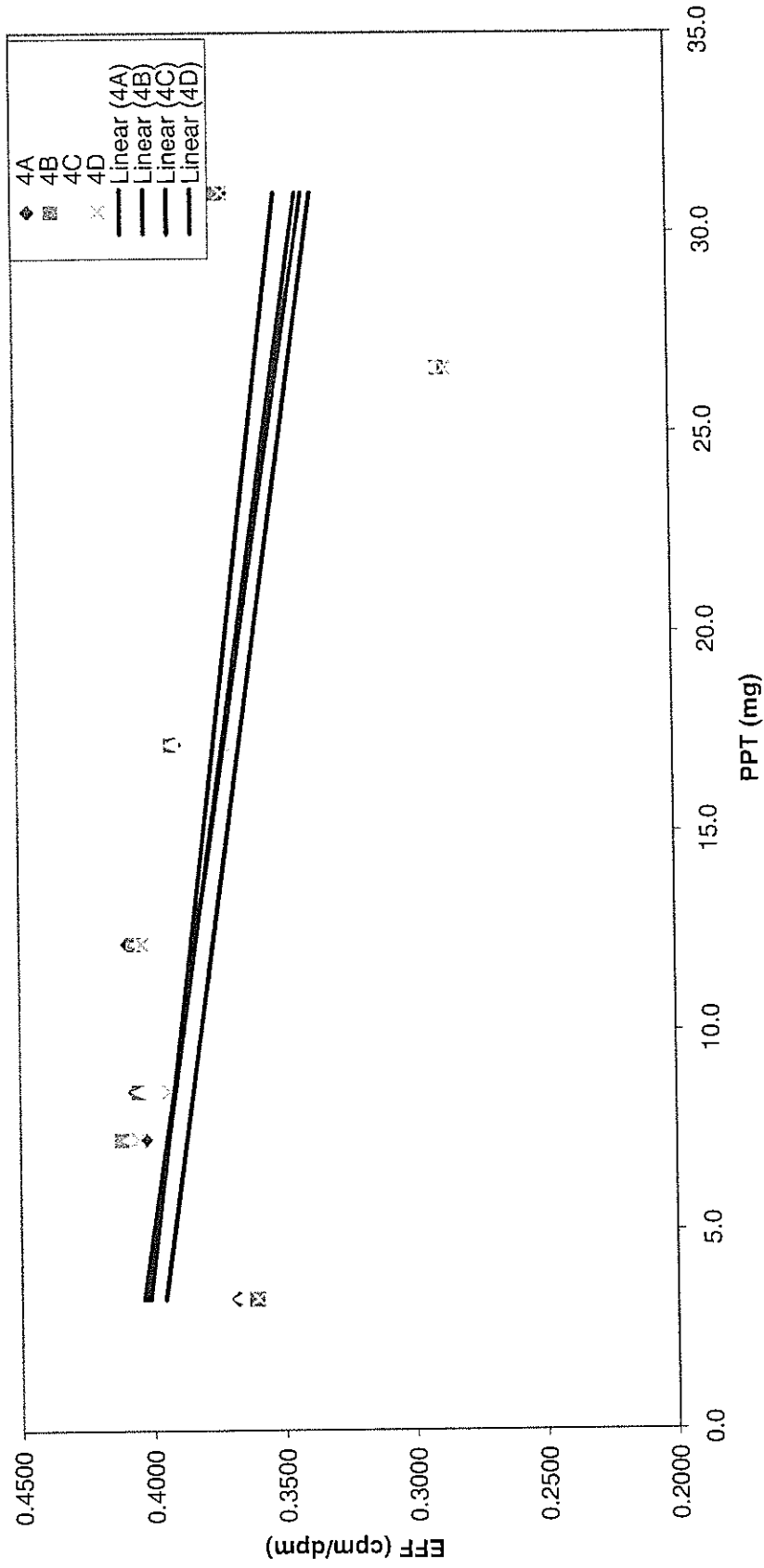
$$3A\ Y = -2.259677E-03x + 3.982176E-01$$

$$3B\ Y = -1.939291E-03x + 3.946777E-01$$

$$3C\ Y = -2.259665E-03x + 4.121296E-01$$

$$3D\ Y = -2.234962E-03x + 4.020361E-01$$

### Sr-90 Calibration



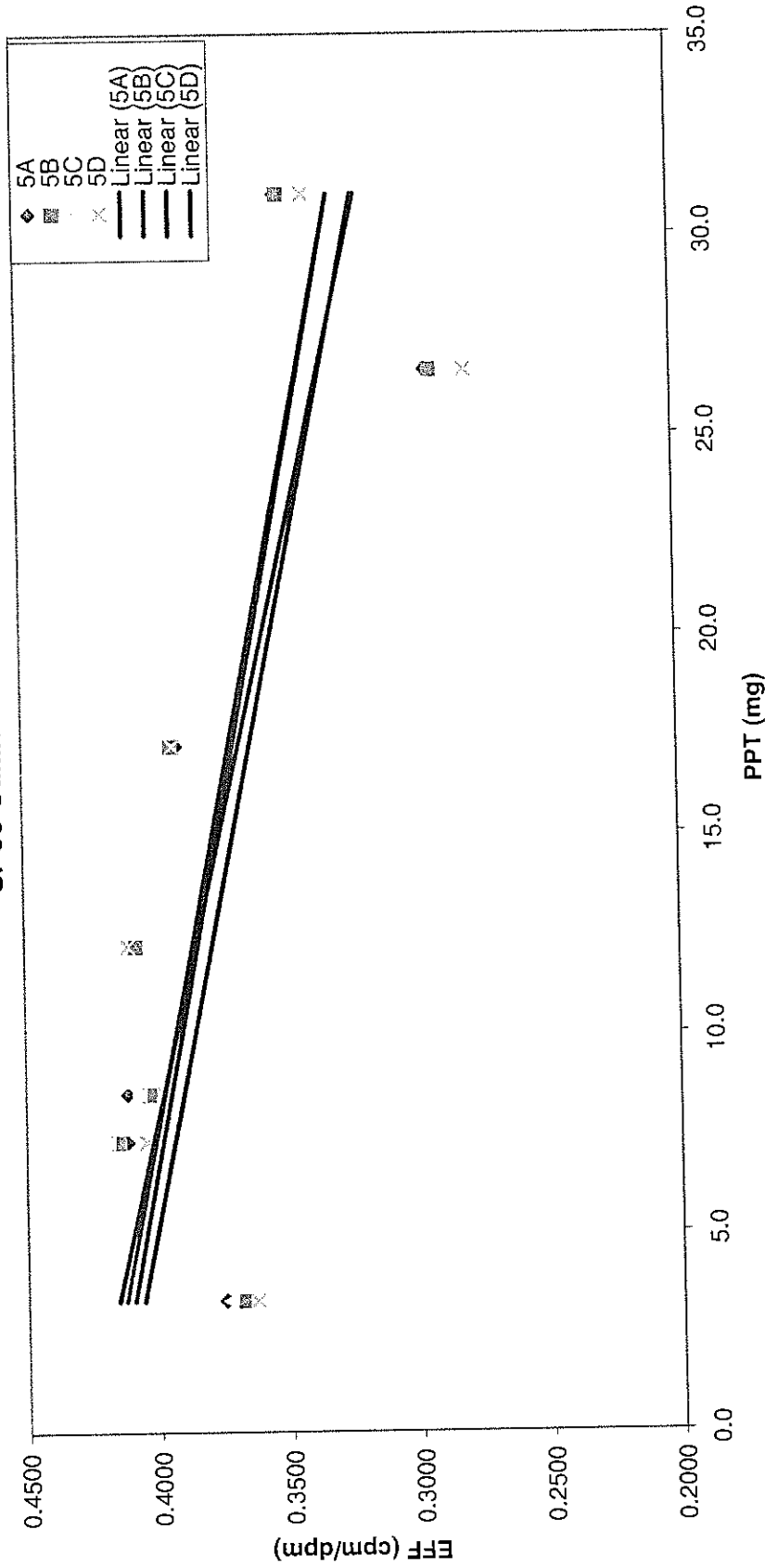
$$4A y = -2.314786E-03x + 4.114242E-01$$

$$4B y = -2.186682E-03x + 4.098489E-01$$

$$4C y = -1.846963E-03x + 4.073528E-01$$

$$4D y = -2.140852E-03x + 4.026301E-01$$

# Sr-90 Calibration



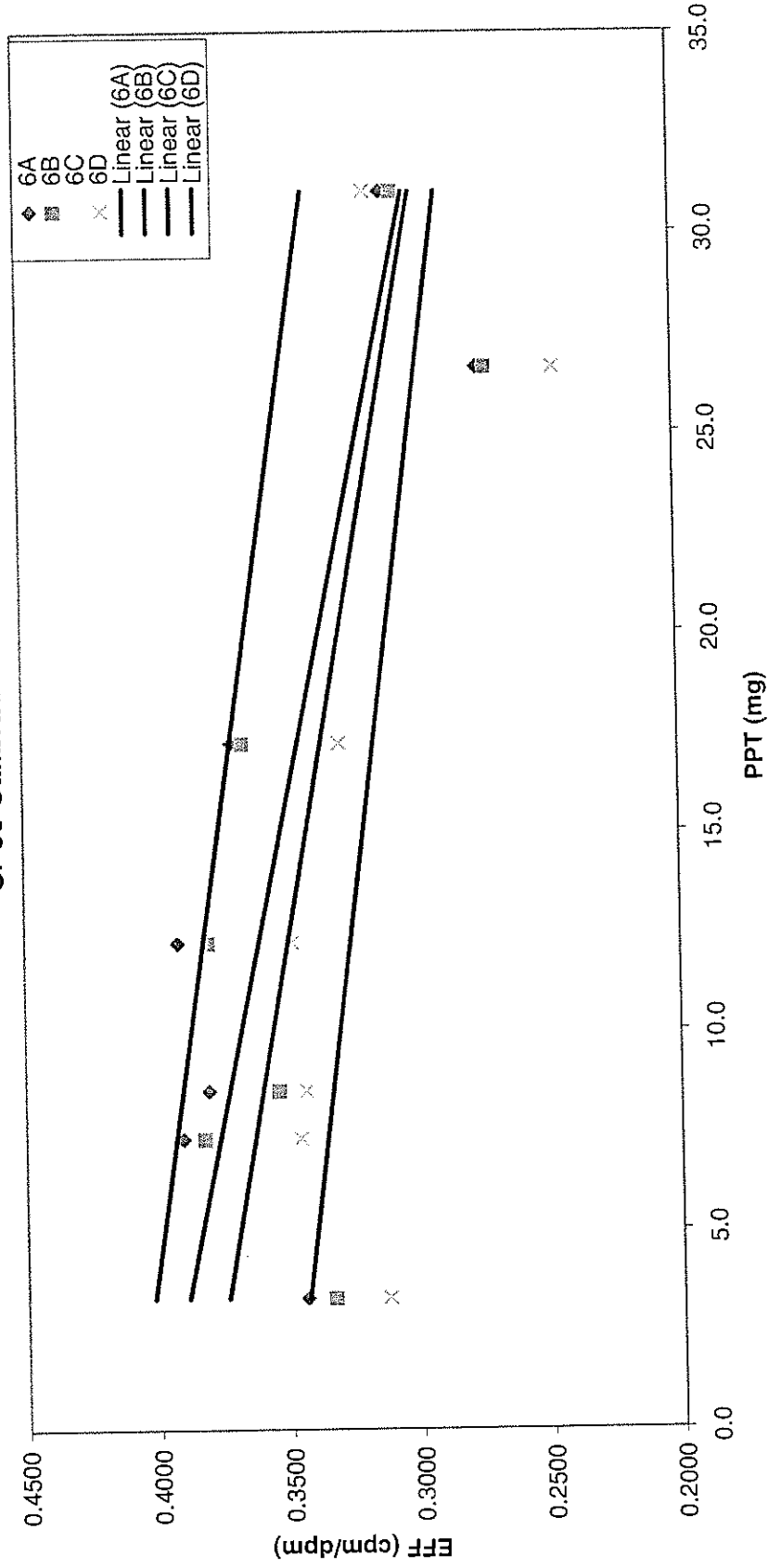
$$5A y = -2.984003E-03x + 4.227495E-01$$

$$5B y = -2.863352E-03x + 4.190820E-01$$

$$5C y = -3.460598E-03x + 4.271818E-01$$

$$5D y = -3.068168E-03x + 4.161972E-01$$

# Sr-90 Calibration



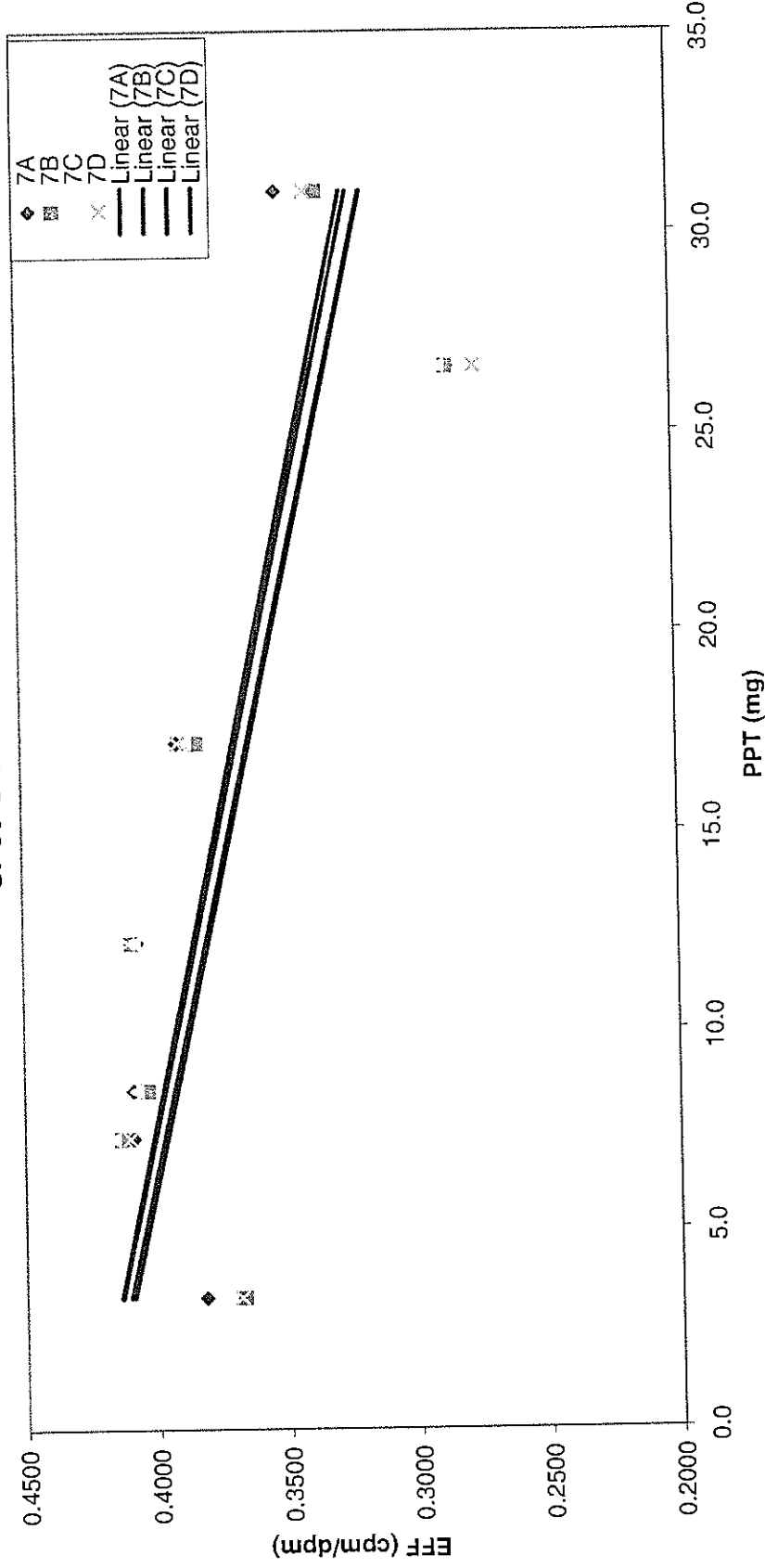
$$6A y = -3.144071E-03x + 3.995459E-01$$

$$6B y = -2.693844E-03x + 3.828880E-01$$

$$6C y = -2.212101E-03x + 4.093105E-01$$

$$6D y = -1.934101E-03x + 3.496389E-01$$

# Sr-90 Calibration



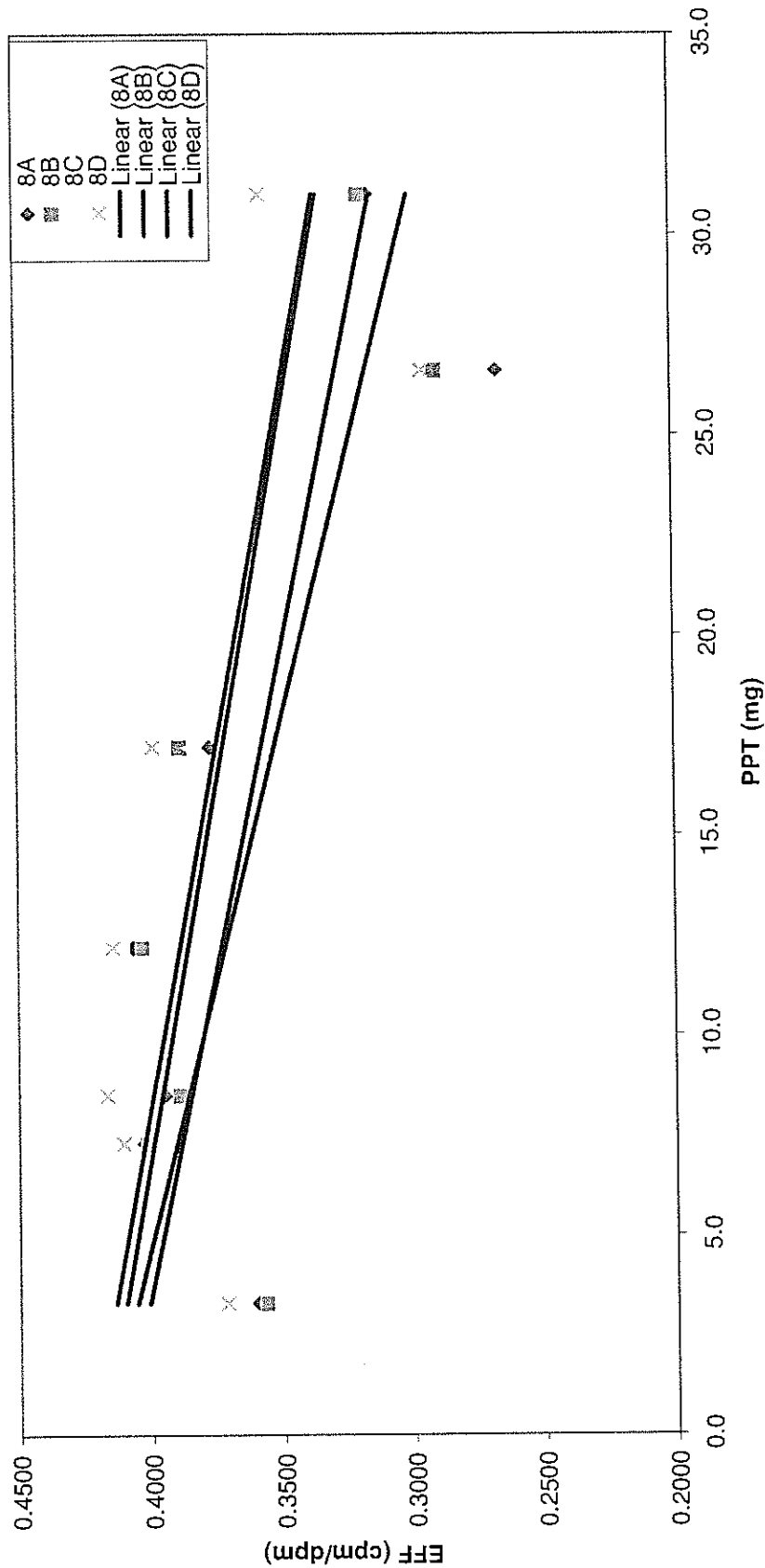
$$7A y = -3.200040E-03x + 4.246974E-01$$

$$7B y = -3.340259E-03x + 4.215895E-01$$

$$7C y = -3.267580E-03x + 4.244522E-01$$

$$7D y = -3.305734E-03x + 4.200945E-01$$

# Sr-90 Calibration



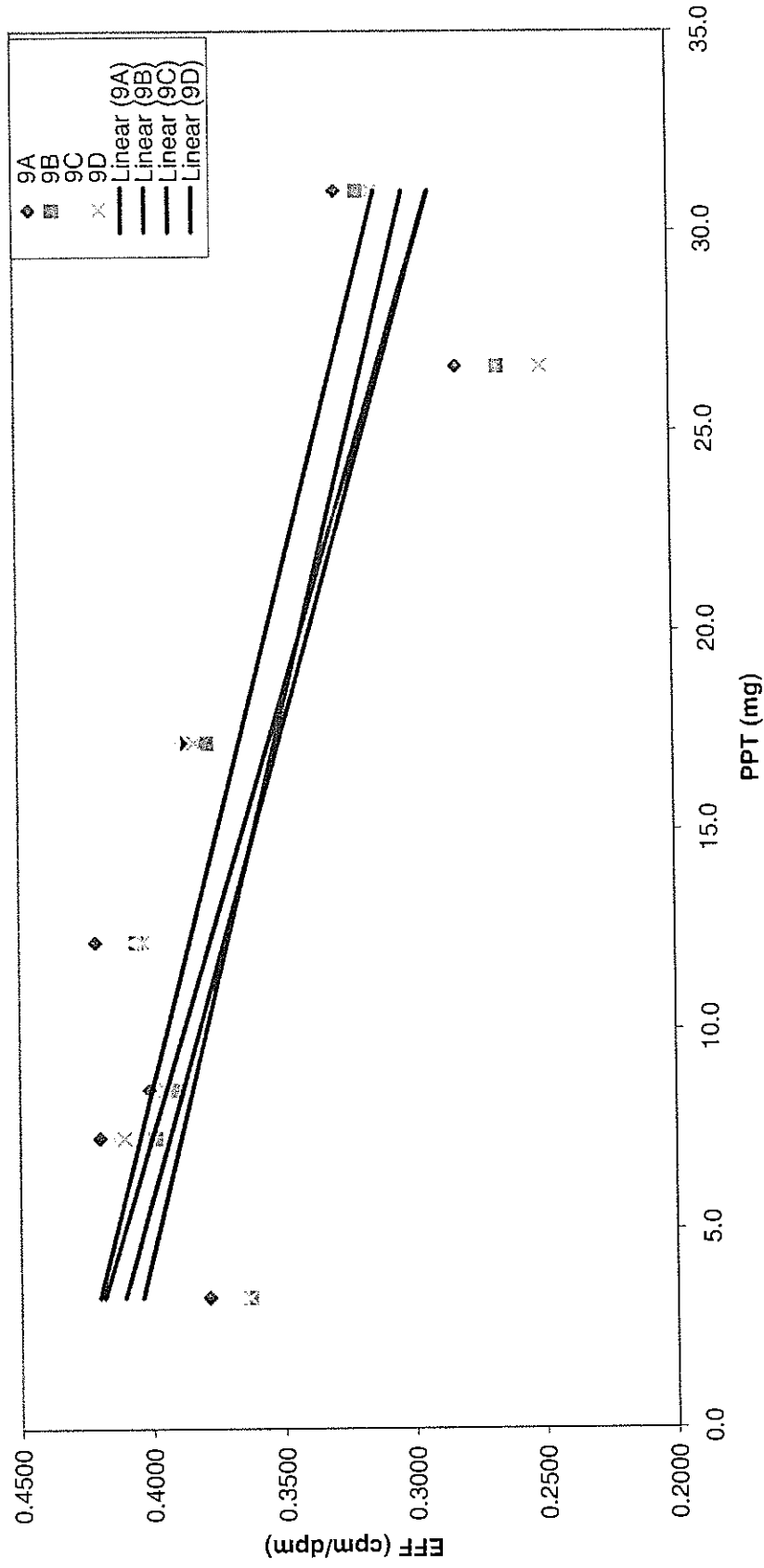
$$8A y = -3.815539E-03x + 4.183121E-01$$

$$8B y = -3.124360E-03x + 4.113619E-01$$

$$8C y = -2.707227E-03x + 4.188353E-01$$

$$8D y = -2.796572E-03x + 4.229571E-01$$

### Sr-90 Calibration



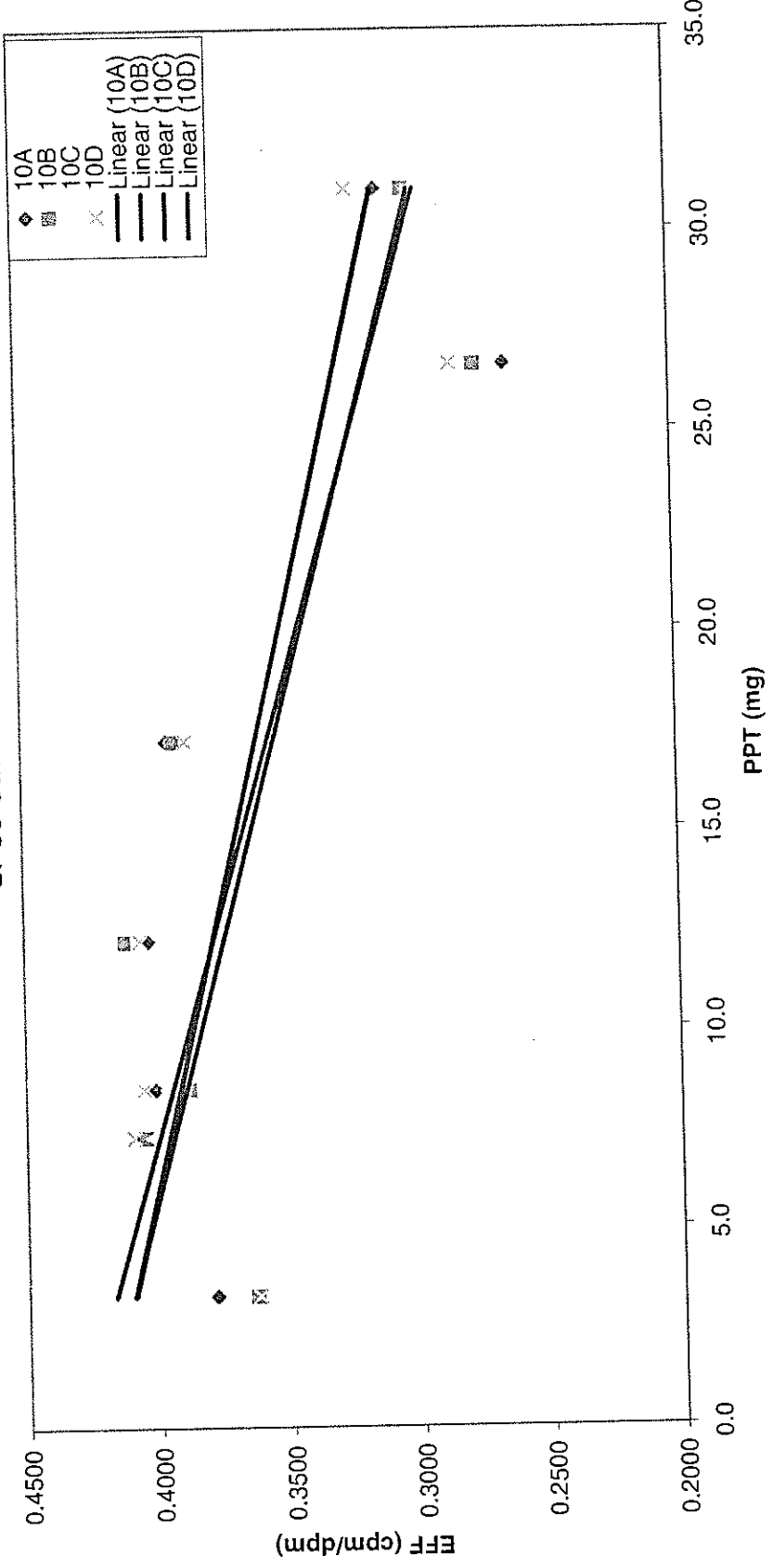
$$9A y = -3.891363E-03x + 4.329295E-01$$

$$9B y = -3.688512E-03x + 4.159108E-01$$

$$9C y = -4.563783E-03x + 4.332722E-01$$

$$9D y = -4.290468E-03x + 4.246685E-01$$

# Sr-90 Calibration



10A  $y = -4.347820E-03x + 4.312815E-01$

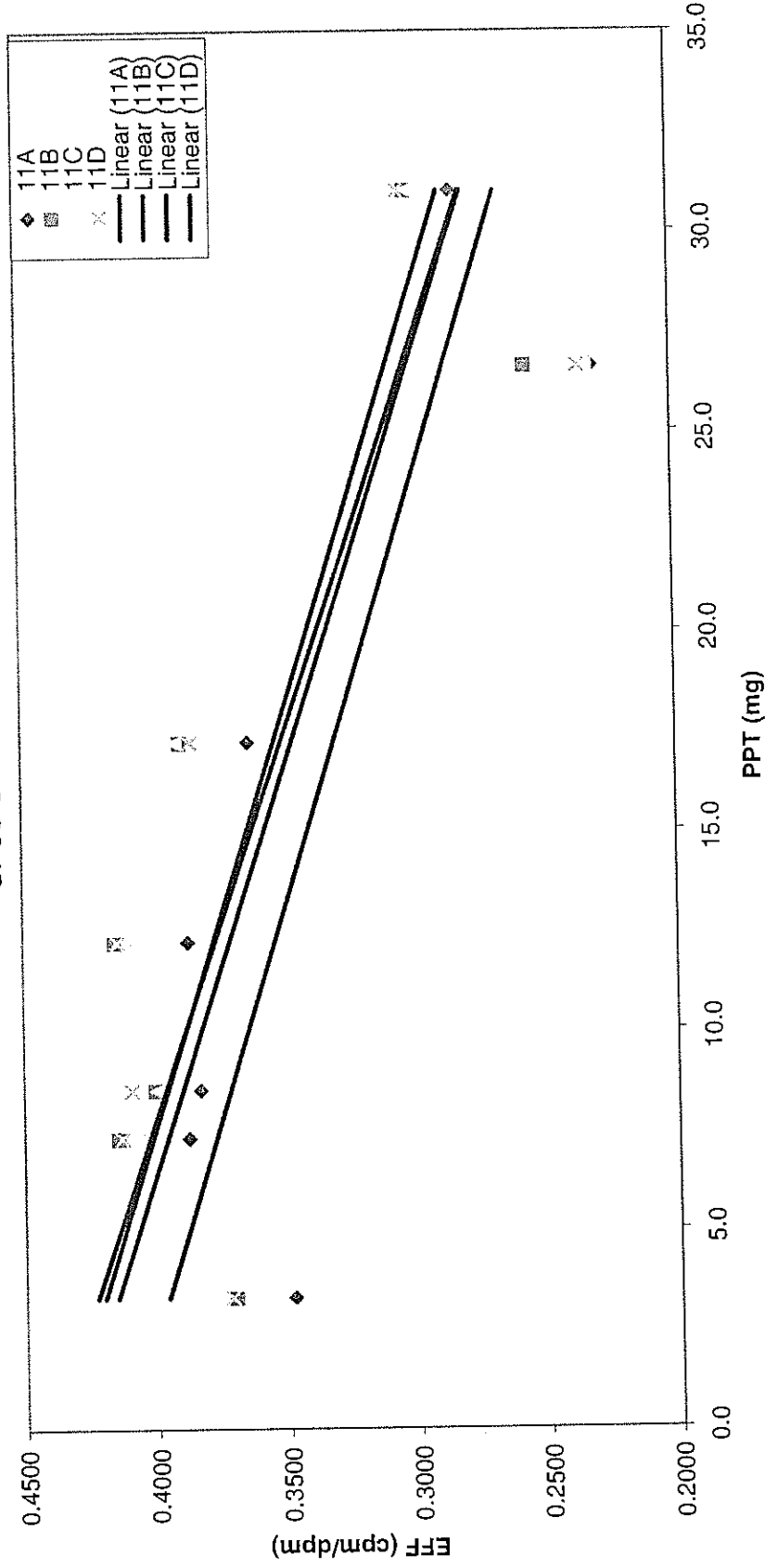
10B  $y = -4.022619E-03x + 4.233487E-01$

10C  $y = -3.484999E-03x + 4.208936E-01$

10D  $y = -3.519529E-03x + 4.215478E-01$



### Sr-90 Calibration



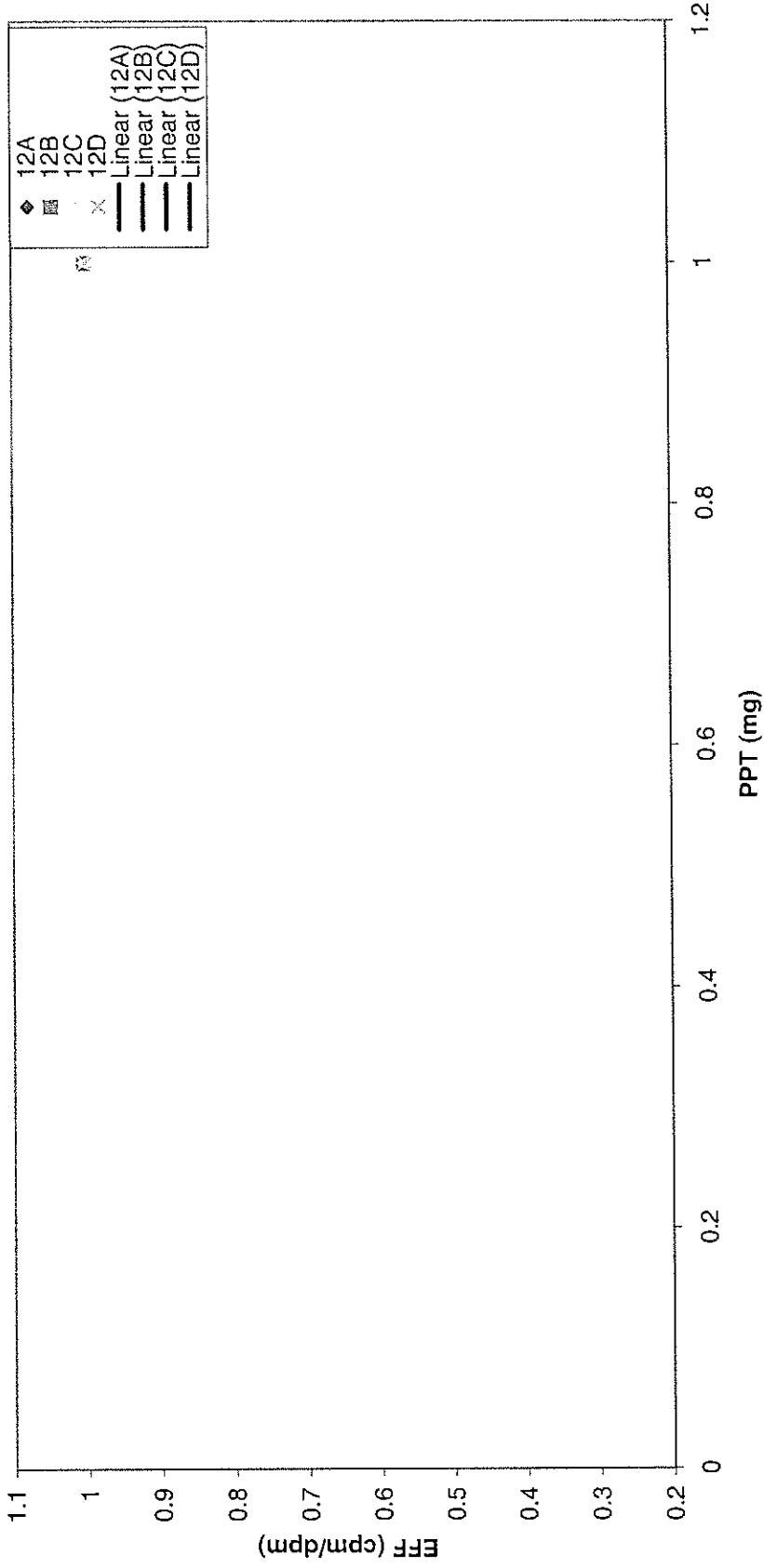
11A  $y = -4.676337E-03x + 4.113641E-01$

11B  $y = -4.763146E-03x + 4.358297E-01$

11C  $y = -4.907925E-03x + 4.314356E-01$

11D  $y = -5.162403E-03x + 4.400233E-01$

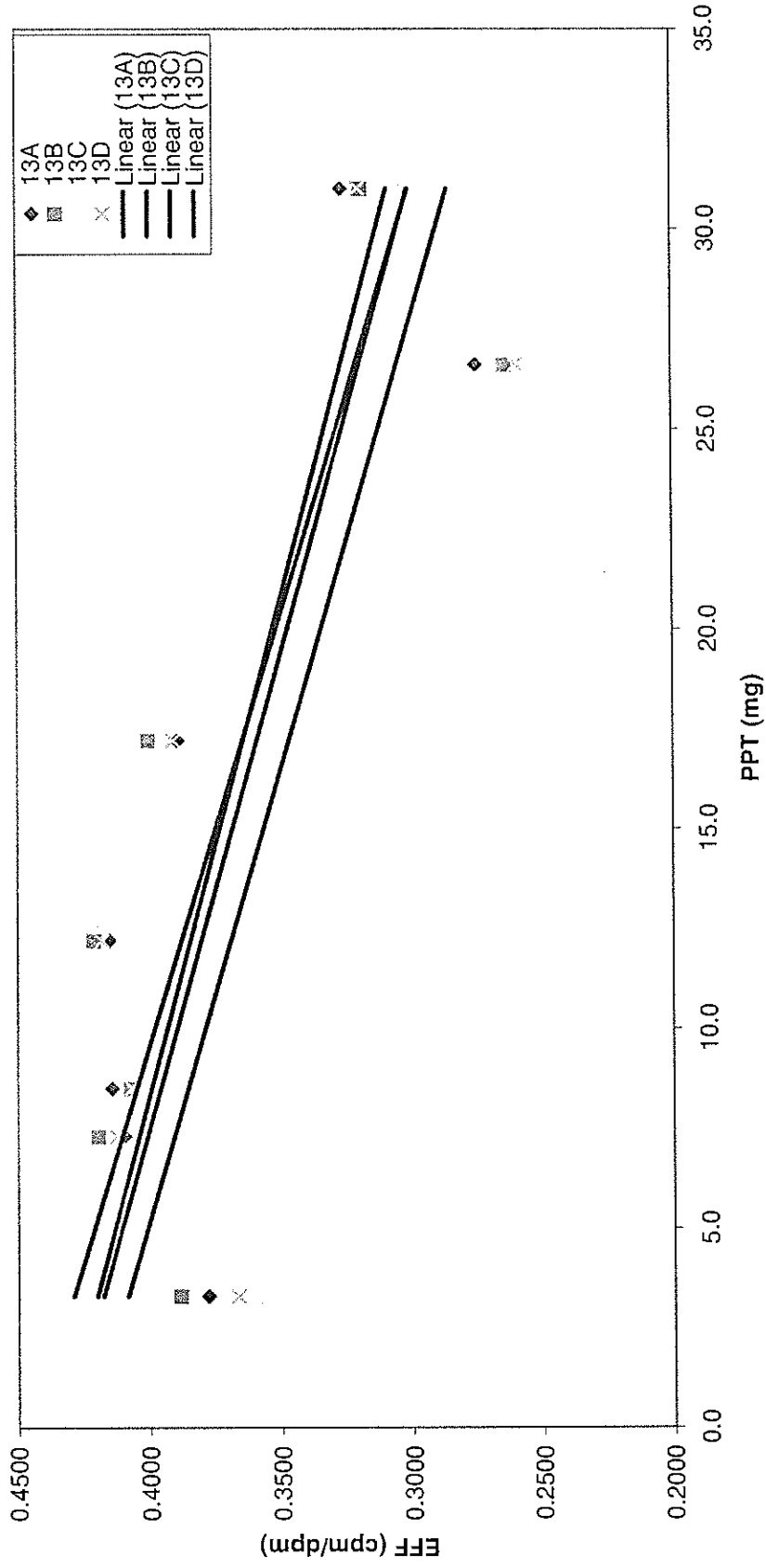
# Sr-90 Calibration



12A  
12B  
12C  
12D

\*Detectors not used in this calibration cycle. *AP*

# Sr-90 Calibration



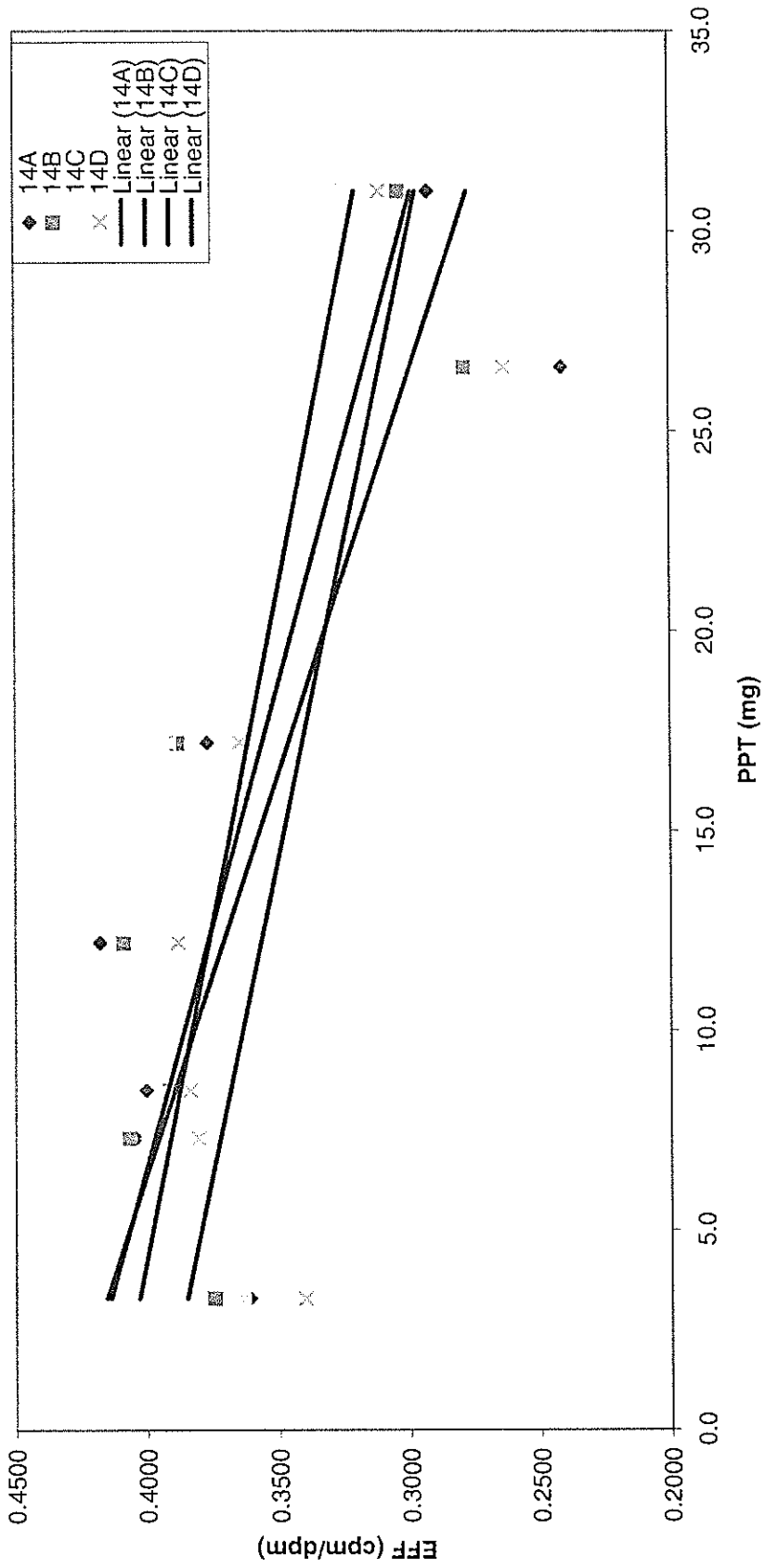
13A  $y = -4.016750E-03x + 4.334086E-01$

13B  $y = -4.631961E-03x + 4.443149E-01$

13C  $y = -4.427953E-03x + 4.230399E-01$

13D  $y = -4.215610E-03x + 4.316464E-01$

### Sr-90 Calibration



14A  $y = -4.987729E-03x + 4.319463E-01$

14B  $y = -4.148939E-03x + 4.274329E-01$

14C  $y = -2.983884E-03x + 4.129063E-01$

14D  $y = -3.175399E-03x + 3.954898E-01$

**Current Calibration - PIC**

Geometry	Tuffryn Filter		3/1/2013 Exp Date		2/28/2014	
Sr-90	Cal Date	A0	A1	A2	A3	A4
Protean						
1A	4.114385E-01	-2.279414E-03				
1B	4.104277E-01	-2.242680E-03				
1C	4.188951E-01	-2.472545E-03				
1D	4.084494E-01	-2.290631E-03				
2A	4.028435E-01	-2.217073E-03				
2B	3.986039E-01	-1.958094E-03				
2C	3.990307E-01	-1.615998E-03				
2D	4.022292E-01	-2.080413E-03				
3A	3.982176E-01	-2.259677E-03				
3B	3.946777E-01	-1.939291E-03				
3C	4.121296E-01	-2.259665E-03				
3D	4.020361E-01	-2.234962E-03				
4A	4.114242E-01	-2.314786E-03				
4B	4.098489E-01	-2.186682E-03				
4C	4.073528E-01	-1.846963E-03				
4D	4.026301E-01	-2.140852E-03				
5A	4.227495E-01	-2.984003E-03				
5B	4.190820E-01	-2.863352E-03				
5C	4.271818E-01	-3.460598E-03				
5D	4.161972E-01	-3.068168E-03				
6A	3.995459E-01	-3.144071E-03				
6B	3.828880E-01	-2.693844E-03				
6C	4.093105E-01	-2.212101E-03				
6D	3.496389E-01	-1.934101E-03				
7A	4.246974E-01	-3.200040E-03				
7B	4.215895E-01	-3.340259E-03				
7C	4.244522E-01	-3.267580E-03				
7D	4.200945E-01	-3.305734E-03				
8A	4.183121E-01	-3.815539E-03				
8B	4.113619E-01	-3.124360E-03				
8C	4.188353E-01	-2.707227E-03				
8D	4.229571E-01	-2.796572E-03				
9A	4.329295E-01	-3.891363E-03				
9B	4.159108E-01	-3.688512E-03				
9C	4.332722E-01	-4.563783E-03				
9D	4.246685E-01	-4.290468E-03				
10A	4.312815E-01	-4.347820E-03				
10B	4.233487E-01	-4.022619E-03				
10C	4.208936E-01	-3.484999E-03				
10D	4.215478E-01	-3.519529E-03				
11A	4.113641E-01	-4.676337E-03				
11B	4.358297E-01	-4.763146E-03				
11C	4.314356E-01	-4.907925E-03				
11D	4.400233E-01	-5.162403E-03				
12A	#N/A	#N/A				
12B	#N/A	#N/A				
12C	#N/A	#N/A				
12D	#N/A	#N/A				
13A	4.334086E-01	-4.016750E-03				
13B	4.443149E-01	-4.631961E-03				
13C	4.230399E-01	-4.427953E-03				
13D	4.316464E-01	-4.215610E-03				
14A	4.319463E-01	-4.987729E-03				
14B	4.274329E-01	-4.148939E-03				
14C	4.129063E-01	-2.983884E-03				
14D	3.954898E-01	-3.175399E-03				

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SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
S1	1A	3	9	14094	3/30/2013 12:17	3/30/2013 12:20	PIC	Sr90S13
S2	1A	3	13	15073	3/30/2013 13:18	3/30/2013 13:21	PIC	Sr90S13
S3	1A	3	10	15044	3/30/2013 13:10	3/30/2013 13:13	PIC	Sr90S13
S4	1A	3	9	14969	3/30/2013 13:02	3/30/2013 13:05	PIC	Sr90S13
S5	1A	3	21	14480	3/30/2013 12:55	3/30/2013 12:58	PIC	Sr90S13
S6	1A	3	18	11753	3/30/2013 12:41	3/30/2013 12:44	PIC	Sr90S13
S7	1A	3	11	13985	3/30/2013 12:33	3/30/2013 12:36	PIC	Sr90S13
S1	1B	3	21	14015	3/30/2013 12:25	3/30/2013 12:28	PIC	Sr90S13
S2	1B	3	21	14889	3/30/2013 12:17	3/30/2013 12:20	PIC	Sr90S13
S3	1B	3	28	14916	3/30/2013 13:18	3/30/2013 13:21	PIC	Sr90S13
S4	1B	3	19	15096	3/30/2013 13:10	3/30/2013 13:13	PIC	Sr90S13
S5	1B	3	32	14632	3/30/2013 13:02	3/30/2013 13:05	PIC	Sr90S13
S6	1B	3	26	11749	3/30/2013 12:55	3/30/2013 12:58	PIC	Sr90S13
S7	1B	3	27	13913	3/30/2013 12:41	3/30/2013 12:44	PIC	Sr90S13
S1	1C	3	290	13961	3/30/2013 12:33	3/30/2013 12:36	PIC	Sr90S13
S2	1C	3	258	15401	3/30/2013 12:25	3/30/2013 12:28	PIC	Sr90S13
S3	1C	3	242	15175	3/30/2013 12:18	3/30/2013 12:21	PIC	Sr90S13
S4	1C	3	290	15289	3/30/2013 13:18	3/30/2013 13:21	PIC	Sr90S13
S5	1C	3	283	14609	3/30/2013 13:10	3/30/2013 13:13	PIC	Sr90S13
S6	1C	3	199	11924	3/30/2013 13:02	3/30/2013 13:05	PIC	Sr90S13
S7	1C	3	266	13954	3/30/2013 12:55	3/30/2013 12:58	PIC	Sr90S13
S1	1D	3	206	13844	3/30/2013 12:41	3/30/2013 12:44	PIC	Sr90S13
S2	1D	3	183	14825	3/30/2013 12:33	3/30/2013 12:36	PIC	Sr90S13
S3	1D	3	193	14718	3/30/2013 12:25	3/30/2013 12:28	PIC	Sr90S13
S4	1D	3	197	15215	3/30/2013 12:18	3/30/2013 12:21	PIC	Sr90S13
S5	1D	3	185	14413	3/30/2013 13:18	3/30/2013 13:21	PIC	Sr90S13
S6	1D	3	142	11672	3/30/2013 13:10	3/30/2013 13:13	PIC	Sr90S13
S7	1D	3	191	13819	3/30/2013 13:02	3/30/2013 13:05	PIC	Sr90S13
S1	2A	3	4	13666	3/30/2013 12:55	3/30/2013 12:58	PIC	Sr90S13
S2	2A	3	2	14488	3/30/2013 12:41	3/30/2013 12:44	PIC	Sr90S13
S3	2A	3	0	14873	3/30/2013 12:33	3/30/2013 12:36	PIC	Sr90S13
S4	2A	3	2	14469	3/30/2013 12:25	3/30/2013 12:28	PIC	Sr90S13
S5	2A	3	6	14051	3/30/2013 12:18	3/30/2013 12:21	PIC	Sr90S13
S6	2A	3	1	11610	3/30/2013 13:18	3/30/2013 13:21	PIC	Sr90S13
S7	2A	3	2	13591	3/30/2013 13:10	3/30/2013 13:13	PIC	Sr90S13
S1	2B	3	0	13529	3/30/2013 13:02	3/30/2013 13:05	PIC	Sr90S13

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S2	2B	3	2	14792	3/30/2013 12:55	3/30/2013 12:58	PIC	Sr90S13
S3	2B	3	0	14576	3/30/2013 12:41	3/30/2013 12:44	PIC	Sr90S13
S4	2B	3	1	14582	3/30/2013 12:33	3/30/2013 12:36	PIC	Sr90S13
S5	2B	3	0	14089	3/30/2013 12:25	3/30/2013 12:28	PIC	Sr90S13
S6	2B	3	2	11449	3/30/2013 12:18	3/30/2013 12:21	PIC	Sr90S13
S7	2B	3	1	13840	3/30/2013 13:18	3/30/2013 13:21	PIC	Sr90S13
S1	2C	3	22	13679	3/30/2013 13:10	3/30/2013 13:13	PIC	Sr90S13
S2	2C	3	38	14707	3/30/2013 13:02	3/30/2013 13:05	PIC	Sr90S13
S3	2C	3	27	14753	3/30/2013 12:55	3/30/2013 12:58	PIC	Sr90S13
S4	2C	3	31	14853	3/30/2013 12:41	3/30/2013 12:44	PIC	Sr90S13
S5	2C	3	31	14390	3/30/2013 12:33	3/30/2013 12:36	PIC	Sr90S13
S6	2C	3	30	11397	3/30/2013 12:25	3/30/2013 12:28	PIC	Sr90S13
S7	2C	3	19	14284	3/30/2013 12:18	3/30/2013 12:21	PIC	Sr90S13
S1	2D	3	7	13865	3/30/2013 13:18	3/30/2013 13:21	PIC	Sr90S13
S2	2D	3	17	14898	3/30/2013 13:10	3/30/2013 13:13	PIC	Sr90S13
S3	2D	3	17	14524	3/30/2013 13:02	3/30/2013 13:05	PIC	Sr90S13
S4	2D	3	16	14804	3/30/2013 12:55	3/30/2013 12:58	PIC	Sr90S13
S5	2D	3	15	14073	3/30/2013 12:41	3/30/2013 12:44	PIC	Sr90S13
S6	2D	3	13	11483	3/30/2013 12:33	3/30/2013 12:36	PIC	Sr90S13
S7	2D	3	15	13847	3/30/2013 12:25	3/30/2013 12:28	PIC	Sr90S13
S1	3A	3	441	13645	3/30/2013 12:21	3/30/2013 12:24	PIC	Sr90S13
S2	3A	3	405	14564	3/30/2013 13:21	3/30/2013 13:24	PIC	Sr90S13
S3	3A	3	425	14572	3/30/2013 13:14	3/30/2013 13:17	PIC	Sr90S13
S4	3A	3	446	14839	3/30/2013 13:06	3/30/2013 13:09	PIC	Sr90S13
S5	3A	3	402	14177	3/30/2013 12:58	3/30/2013 13:01	PIC	Sr90S13
S6	3A	3	305	11303	3/30/2013 12:51	3/30/2013 12:54	PIC	Sr90S13
S7	3A	3	410	13572	3/30/2013 12:37	3/30/2013 12:40	PIC	Sr90S13
S1	3B	3	359	13621	3/30/2013 12:29	3/30/2013 12:32	PIC	Sr90S13
S2	3B	3	365	14585	3/30/2013 12:21	3/30/2013 12:24	PIC	Sr90S13
S3	3B	3	376	14415	3/30/2013 13:21	3/30/2013 13:24	PIC	Sr90S13
S4	3B	3	365	14709	3/30/2013 13:14	3/30/2013 13:17	PIC	Sr90S13
S5	3B	3	338	14272	3/30/2013 13:06	3/30/2013 13:09	PIC	Sr90S13
S6	3B	3	265	11627	3/30/2013 12:58	3/30/2013 13:01	PIC	Sr90S13
S7	3B	3	337	13684	3/30/2013 12:51	3/30/2013 12:54	PIC	Sr90S13
S1	3C	3	144	14011	3/30/2013 12:37	3/30/2013 12:40	PIC	Sr90S13
S2	3C	3	155	15274	3/30/2013 12:29	3/30/2013 12:32	PIC	Sr90S13
S3	3C	3	165	14723	3/30/2013 12:21	3/30/2013 12:24	PIC	Sr90S13

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S4	3C	3	170	15163	3/30/2013 13:21	3/30/2013 13:24	PIC	Sr90S13
S5	3C	3	159	14420	3/30/2013 13:14	3/30/2013 13:17	PIC	Sr90S13
S6	3C	3	143	11833	3/30/2013 13:06	3/30/2013 13:09	PIC	Sr90S13
S7	3C	3	175	14051	3/30/2013 12:58	3/30/2013 13:01	PIC	Sr90S13
S1	3D	3	135	13662	3/30/2013 12:51	3/30/2013 12:54	PIC	Sr90S13
S2	3D	3	152	14617	3/30/2013 12:37	3/30/2013 12:40	PIC	Sr90S13
S3	3D	3	150	14360	3/30/2013 12:29	3/30/2013 12:32	PIC	Sr90S13
S4	3D	3	160	14989	3/30/2013 12:21	3/30/2013 12:24	PIC	Sr90S13
S5	3D	3	152	14309	3/30/2013 13:21	3/30/2013 13:24	PIC	Sr90S13
S6	3D	3	111	11533	3/30/2013 13:14	3/30/2013 13:17	PIC	Sr90S13
S7	3D	3	135	13555	3/30/2013 13:06	3/30/2013 13:09	PIC	Sr90S13
S1	4A	3	128	14023	3/30/2013 12:58	3/30/2013 13:01	PIC	Sr90S13
S2	4A	3	128	14894	3/30/2013 12:51	3/30/2013 12:54	PIC	Sr90S13
S3	4A	3	131	14985	3/30/2013 12:37	3/30/2013 12:40	PIC	Sr90S13
S4	4A	3	113	15019	3/30/2013 12:30	3/30/2013 12:33	PIC	Sr90S13
S5	4A	3	115	14476	3/30/2013 12:21	3/30/2013 12:24	PIC	Sr90S13
S6	4A	3	88	11639	3/30/2013 13:21	3/30/2013 13:24	PIC	Sr90S13
S7	4A	3	114	14014	3/30/2013 13:14	3/30/2013 13:17	PIC	Sr90S13
S1	4B	3	2	13871	3/30/2013 13:06	3/30/2013 13:09	PIC	Sr90S13
S2	4B	3	0	15191	3/30/2013 12:58	3/30/2013 13:01	PIC	Sr90S13
S3	4B	3	0	15008	3/30/2013 12:51	3/30/2013 12:54	PIC	Sr90S13
S4	4B	3	0	15000	3/30/2013 12:37	3/30/2013 12:40	PIC	Sr90S13
S5	4B	3	1	14550	3/30/2013 12:30	3/30/2013 12:33	PIC	Sr90S13
S6	4B	3	0	11562	3/30/2013 12:21	3/30/2013 12:24	PIC	Sr90S13
S7	4B	3	0	14136	3/30/2013 13:21	3/30/2013 13:24	PIC	Sr90S13
S1	4C	3	108	14091	3/30/2013 13:14	3/30/2013 13:17	PIC	Sr90S13
S2	4C	3	104	15137	3/30/2013 13:06	3/30/2013 13:09	PIC	Sr90S13
S3	4C	3	104	15020	3/30/2013 12:58	3/30/2013 13:01	PIC	Sr90S13
S4	4C	3	105	15005	3/30/2013 12:51	3/30/2013 12:54	PIC	Sr90S13
S5	4C	3	105	14581	3/30/2013 12:37	3/30/2013 12:40	PIC	Sr90S13
S6	4C	3	74	11676	3/30/2013 12:30	3/30/2013 12:33	PIC	Sr90S13
S7	4C	3	130	14439	3/30/2013 12:21	3/30/2013 12:24	PIC	Sr90S13
S1	4D	3	287	13872	3/30/2013 13:21	3/30/2013 13:24	PIC	Sr90S13
S2	4D	3	308	15024	3/30/2013 13:14	3/30/2013 13:17	PIC	Sr90S13
S3	4D	3	344	14688	3/30/2013 13:06	3/30/2013 13:09	PIC	Sr90S13
S4	4D	3	324	14941	3/30/2013 12:58	3/30/2013 13:01	PIC	Sr90S13
S5	4D	3	305	14023	3/30/2013 12:51	3/30/2013 12:54	PIC	Sr90S13



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S6	4D	3	11509	3/30/2013 12:37	3/30/2013 12:40	PIC	Sr90S13
S7	4D	292	13924	3/30/2013 12:30	3/30/2013 12:33	PIC	Sr90S13
S1	5A	57	14335	3/30/2013 13:25	3/30/2013 13:28	PIC	Sr90S13
S2	5A	72	15370	3/30/2013 14:15	3/30/2013 14:18	PIC	Sr90S13
S3	5A	93	15373	3/30/2013 14:07	3/30/2013 14:10	PIC	Sr90S13
S4	5A	92	15258	3/30/2013 14:00	3/30/2013 14:03	PIC	Sr90S13
S5	5A	66	14748	3/30/2013 13:53	3/30/2013 13:56	PIC	Sr90S13
S6	5A	65	11926	3/30/2013 13:47	3/30/2013 13:50	PIC	Sr90S13
S7	5A	71	13537	3/30/2013 13:40	3/30/2013 13:43	PIC	Sr90S13
S1	5B	63	14174	3/30/2013 13:32	3/30/2013 13:35	PIC	Sr90S13
S2	5B	69	15365	3/30/2013 13:25	3/30/2013 13:28	PIC	Sr90S13
S3	5B	79	15151	3/30/2013 14:15	3/30/2013 14:18	PIC	Sr90S13
S4	5B	82	15253	3/30/2013 14:07	3/30/2013 14:10	PIC	Sr90S13
S5	5B	65	14820	3/30/2013 14:00	3/30/2013 14:03	PIC	Sr90S13
S6	5B	49	11897	3/30/2013 13:53	3/30/2013 13:56	PIC	Sr90S13
S7	5B	76	13533	3/30/2013 13:47	3/30/2013 13:50	PIC	Sr90S13
S1	5C	76	14333	3/30/2013 13:39	3/30/2013 13:42	PIC	Sr90S13
S2	5C	88	15507	3/30/2013 13:32	3/30/2013 13:35	PIC	Sr90S13
S3	5C	87	15162	3/30/2013 13:25	3/30/2013 13:28	PIC	Sr90S13
S4	5C	76	15436	3/30/2013 14:15	3/30/2013 14:18	PIC	Sr90S13
S5	5C	75	14618	3/30/2013 14:07	3/30/2013 14:10	PIC	Sr90S13
S6	5C	50	11698	3/30/2013 14:00	3/30/2013 14:03	PIC	Sr90S13
S7	5C	60	13285	3/30/2013 13:54	3/30/2013 13:57	PIC	Sr90S13
S1	5D	71	14052	3/30/2013 13:47	3/30/2013 13:50	PIC	Sr90S13
S2	5D	93	15099	3/30/2013 13:39	3/30/2013 13:42	PIC	Sr90S13
S3	5D	110	14907	3/30/2013 13:32	3/30/2013 13:35	PIC	Sr90S13
S4	5D	82	15249	3/30/2013 13:25	3/30/2013 13:28	PIC	Sr90S13
S5	5D	76	14837	3/30/2013 14:15	3/30/2013 14:18	PIC	Sr90S13
S6	5D	84	11545	3/30/2013 14:07	3/30/2013 14:10	PIC	Sr90S13
S7	5D	78	13288	3/30/2013 14:00	3/30/2013 14:03	PIC	Sr90S13
S1	6A	0	13113	3/30/2013 13:54	3/30/2013 13:57	PIC	Sr90S13
S2	6A	0	14330	3/30/2013 13:47	3/30/2013 13:50	PIC	Sr90S13
S3	6A	0	14044	3/30/2013 13:39	3/30/2013 13:42	PIC	Sr90S13
S4	6A	0	14336	3/30/2013 13:32	3/30/2013 13:35	PIC	Sr90S13
S5	6A	0	13718	3/30/2013 13:25	3/30/2013 13:28	PIC	Sr90S13
S6	6A	1	11049	3/30/2013 14:15	3/30/2013 14:18	PIC	Sr90S13
S7	6A	0	12072	3/30/2013 14:07	3/30/2013 14:10	PIC	Sr90S13

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S1	6B	3	1	12617	3/30/2013 14:00	3/30/2013 14:03	PIC	Sr90S13
S2	6B	3	0	13913	3/30/2013 13:54	3/30/2013 13:57	PIC	Sr90S13
S3	6B	3	0	13094	3/30/2013 13:46	3/30/2013 13:49	PIC	Sr90S13
S4	6B	3	0	13831	3/30/2013 13:39	3/30/2013 13:42	PIC	Sr90S13
S5	6B	3	0	13414	3/30/2013 13:32	3/30/2013 13:35	PIC	Sr90S13
S6	6B	3	0	10672	3/30/2013 13:25	3/30/2013 13:28	PIC	Sr90S13
S7	6B	3	0	11765	3/30/2013 14:15	3/30/2013 14:18	PIC	Sr90S13
S1	6C	3	2	14081	3/30/2013 14:07	3/30/2013 14:10	PIC	Sr90S13
S2	6C	3	3	14961	3/30/2013 14:00	3/30/2013 14:03	PIC	Sr90S13
S3	6C	3	3	15089	3/30/2013 13:53	3/30/2013 13:56	PIC	Sr90S13
S4	6C	3	1	14784	3/30/2013 13:46	3/30/2013 13:49	PIC	Sr90S13
S5	6C	3	0	14305	3/30/2013 13:39	3/30/2013 13:42	PIC	Sr90S13
S6	6C	3	3	11626	3/30/2013 13:32	3/30/2013 13:35	PIC	Sr90S13
S7	6C	3	1	14025	3/30/2013 13:25	3/30/2013 13:28	PIC	Sr90S13
S1	6D	3	17	12095	3/30/2013 14:15	3/30/2013 14:18	PIC	Sr90S13
S2	6D	3	16	12930	3/30/2013 14:07	3/30/2013 14:10	PIC	Sr90S13
S3	6D	3	22	12868	3/30/2013 14:00	3/30/2013 14:03	PIC	Sr90S13
S4	6D	3	17	12981	3/30/2013 13:53	3/30/2013 13:56	PIC	Sr90S13
S5	6D	3	18	12417	3/30/2013 13:46	3/30/2013 13:49	PIC	Sr90S13
S6	6D	3	13	9991	3/30/2013 13:39	3/30/2013 13:42	PIC	Sr90S13
S7	6D	3	25	12032	3/30/2013 13:32	3/30/2013 13:35	PIC	Sr90S13
S1	7A	3	137	14545	3/30/2013 13:28	3/30/2013 13:31	PIC	Sr90S13
S2	7A	3	148	15303	3/30/2013 14:18	3/30/2013 14:21	PIC	Sr90S13
S3	7A	3	143	15303	3/30/2013 14:11	3/30/2013 14:14	PIC	Sr90S13
S4	7A	3	150	15216	3/30/2013 14:04	3/30/2013 14:07	PIC	Sr90S13
S5	7A	3	129	14738	3/30/2013 13:57	3/30/2013 14:00	PIC	Sr90S13
S6	7A	3	102	11695	3/30/2013 13:50	3/30/2013 13:53	PIC	Sr90S13
S7	7A	3	112	13540	3/30/2013 13:43	3/30/2013 13:46	PIC	Sr90S13
S1	7B	3	156	14155	3/30/2013 13:36	3/30/2013 13:39	PIC	Sr90S13
S2	7B	3	155	15340	3/30/2013 13:28	3/30/2013 13:31	PIC	Sr90S13
S3	7B	3	151	15172	3/30/2013 14:18	3/30/2013 14:21	PIC	Sr90S13
S4	7B	3	152	15304	3/30/2013 14:11	3/30/2013 14:14	PIC	Sr90S13
S5	7B	3	143	14547	3/30/2013 14:03	3/30/2013 14:06	PIC	Sr90S13
S6	7B	3	104	11731	3/30/2013 13:57	3/30/2013 14:00	PIC	Sr90S13
S7	7B	3	128	13123	3/30/2013 13:50	3/30/2013 13:53	PIC	Sr90S13
S1	7C	3	52	14289	3/30/2013 13:43	3/30/2013 13:46	PIC	Sr90S13
S2	7C	3	55	15396	3/30/2013 13:36	3/30/2013 13:39	PIC	Sr90S13

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S3	7C	3	67	15144	3/30/2013 13:28	3/30/2013 13:31	PIC	Sr90S13
S4	7C	3	45	15243	3/30/2013 14:18	3/30/2013 14:21	PIC	Sr90S13
S5	7C	3	47	14647	3/30/2013 14:11	3/30/2013 14:14	PIC	Sr90S13
S6	7C	3	34	11785	3/30/2013 14:03	3/30/2013 14:06	PIC	Sr90S13
S7	7C	3	44	13310	3/30/2013 13:57	3/30/2013 14:00	PIC	Sr90S13
S1	7D	3	86	14208	3/30/2013 13:50	3/30/2013 13:53	PIC	Sr90S13
S2	7D	3	82	15261	3/30/2013 13:43	3/30/2013 13:46	PIC	Sr90S13
S3	7D	3	100	14845	3/30/2013 13:36	3/30/2013 13:39	PIC	Sr90S13
S4	7D	3	107	15230	3/30/2013 13:28	3/30/2013 13:31	PIC	Sr90S13
S5	7D	3	83	14768	3/30/2013 14:18	3/30/2013 14:21	PIC	Sr90S13
S6	7D	3	53	11438	3/30/2013 14:11	3/30/2013 14:14	PIC	Sr90S13
S7	7D	3	74	13266	3/30/2013 14:03	3/30/2013 14:06	PIC	Sr90S13
S1	8A	3	7	13895	3/30/2013 13:57	3/30/2013 14:00	PIC	Sr90S13
S2	8A	3	4	14992	3/30/2013 13:50	3/30/2013 13:53	PIC	Sr90S13
S3	8A	3	3	14765	3/30/2013 13:43	3/30/2013 13:46	PIC	Sr90S13
S4	8A	3	6	15068	3/30/2013 13:36	3/30/2013 13:39	PIC	Sr90S13
S5	8A	3	5	14209	3/30/2013 13:28	3/30/2013 13:31	PIC	Sr90S13
S6	8A	3	4	11132	3/30/2013 14:18	3/30/2013 14:21	PIC	Sr90S13
S7	8A	3	2	12521	3/30/2013 14:12	3/30/2013 14:15	PIC	Sr90S13
S1	8B	3	1	13736	3/30/2013 14:04	3/30/2013 14:07	PIC	Sr90S13
S2	8B	3	1	14887	3/30/2013 13:57	3/30/2013 14:00	PIC	Sr90S13
S3	8B	3	0	14532	3/30/2013 13:50	3/30/2013 13:53	PIC	Sr90S13
S4	8B	3	0	14897	3/30/2013 13:43	3/30/2013 13:46	PIC	Sr90S13
S5	8B	3	0	14465	3/30/2013 13:36	3/30/2013 13:39	PIC	Sr90S13
S6	8B	3	0	11620	3/30/2013 13:28	3/30/2013 13:31	PIC	Sr90S13
S7	8B	3	0	12555	3/30/2013 14:18	3/30/2013 14:21	PIC	Sr90S13
S1	8C	3	13	14553	3/30/2013 14:12	3/30/2013 14:15	PIC	Sr90S13
S2	8C	3	10	15356	3/30/2013 14:04	3/30/2013 14:07	PIC	Sr90S13
S3	8C	3	17	14984	3/30/2013 13:57	3/30/2013 14:00	PIC	Sr90S13
S4	8C	3	18	15283	3/30/2013 13:50	3/30/2013 13:53	PIC	Sr90S13
S5	8C	3	6	14518	3/30/2013 13:43	3/30/2013 13:46	PIC	Sr90S13
S6	8C	3	16	12272	3/30/2013 13:36	3/30/2013 13:39	PIC	Sr90S13
S7	8C	3	13	13541	3/30/2013 13:28	3/30/2013 13:31	PIC	Sr90S13
S1	8D	3	27	14393	3/30/2013 14:18	3/30/2013 14:21	PIC	Sr90S13
S2	8D	3	24	15368	3/30/2013 14:12	3/30/2013 14:15	PIC	Sr90S13
S3	8D	3	32	15551	3/30/2013 14:04	3/30/2013 14:07	PIC	Sr90S13
S4	8D	3	19	15442	3/30/2013 13:57	3/30/2013 14:00	PIC	Sr90S13

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S5	8D	3	14977	3/30/2013 13:50	3/30/2013 13:53	PIC	Sr90S13
S6	8D	3	11985	3/30/2013 13:43	3/30/2013 13:46	PIC	Sr90S13
S7	8D	3	13737	3/30/2013 13:36	3/30/2013 13:39	PIC	Sr90S13
S1	9A	3	14571	3/30/2013 14:22	3/30/2013 14:25	PIC	Sr90S13
S2	9A	3	15738	3/30/2013 15:14	3/30/2013 15:17	PIC	Sr90S13
S3	9A	3	15197	3/30/2013 15:07	3/30/2013 15:10	PIC	Sr90S13
S4	9A	3	15737	3/30/2013 14:57	3/30/2013 15:00	PIC	Sr90S13
S5	9A	3	14772	3/30/2013 14:50	3/30/2013 14:53	PIC	Sr90S13
S6	9A	3	11700	3/30/2013 14:42	3/30/2013 14:45	PIC	Sr90S13
S7	9A	3	13004	3/30/2013 14:35	3/30/2013 14:38	PIC	Sr90S13
S1	9B	3	14063	3/30/2013 14:28	3/30/2013 14:31	PIC	Sr90S13
S2	9B	3	14946	3/30/2013 14:22	3/30/2013 14:25	PIC	Sr90S13
S3	9B	3	14825	3/30/2013 15:15	3/30/2013 15:18	PIC	Sr90S13
S4	9B	3	15236	3/30/2013 15:07	3/30/2013 15:10	PIC	Sr90S13
S5	9B	3	14428	3/30/2013 14:57	3/30/2013 15:00	PIC	Sr90S13
S6	9B	3	11183	3/30/2013 14:50	3/30/2013 14:53	PIC	Sr90S13
S7	9B	3	12700	3/30/2013 14:43	3/30/2013 14:46	PIC	Sr90S13
S1	9C	3	14218	3/30/2013 14:35	3/30/2013 14:38	PIC	Sr90S13
S2	9C	3	15402	3/30/2013 14:28	3/30/2013 14:31	PIC	Sr90S13
S3	9C	3	15296	3/30/2013 14:21	3/30/2013 14:24	PIC	Sr90S13
S4	9C	3	15315	3/30/2013 15:15	3/30/2013 15:18	PIC	Sr90S13
S5	9C	3	14853	3/30/2013 15:07	3/30/2013 15:10	PIC	Sr90S13
S6	9C	3	10978	3/30/2013 14:57	3/30/2013 15:00	PIC	Sr90S13
S7	9C	3	12385	3/30/2013 14:50	3/30/2013 14:53	PIC	Sr90S13
S1	9D	3	13987	3/30/2013 14:43	3/30/2013 14:46	PIC	Sr90S13
S2	9D	3	15196	3/30/2013 14:35	3/30/2013 14:38	PIC	Sr90S13
S3	9D	3	14760	3/30/2013 14:28	3/30/2013 14:31	PIC	Sr90S13
S4	9D	3	14958	3/30/2013 14:21	3/30/2013 14:24	PIC	Sr90S13
S5	9D	3	14493	3/30/2013 15:15	3/30/2013 15:18	PIC	Sr90S13
S6	9D	3	10632	3/30/2013 15:07	3/30/2013 15:10	PIC	Sr90S13
S7	9D	3	12459	3/30/2013 14:57	3/30/2013 15:00	PIC	Sr90S13
S1	10A	3	14585	3/30/2013 14:50	3/30/2013 14:53	PIC	Sr90S13
S2	10A	3	15225	3/30/2013 14:43	3/30/2013 14:46	PIC	Sr90S13
S3	10A	3	15080	3/30/2013 14:35	3/30/2013 14:38	PIC	Sr90S13
S4	10A	3	15107	3/30/2013 14:28	3/30/2013 14:31	PIC	Sr90S13
S5	10A	3	14855	3/30/2013 14:21	3/30/2013 14:24	PIC	Sr90S13
S6	10A	3	11188	3/30/2013 15:15	3/30/2013 15:18	PIC	Sr90S13

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S7	10A	3	9	12557	3/30/2013 15:07	3/30/2013 15:10	PIC	Sr90S13
S1	10B	3	32	14134	3/30/2013 14:57	3/30/2013 15:00	PIC	Sr90S13
S2	10B	3	32	15177	3/30/2013 14:50	3/30/2013 14:53	PIC	Sr90S13
S3	10B	3	34	14709	3/30/2013 14:43	3/30/2013 14:46	PIC	Sr90S13
S4	10B	3	38	15366	3/30/2013 14:35	3/30/2013 14:38	PIC	Sr90S13
S5	10B	3	38	14785	3/30/2013 14:29	3/30/2013 14:32	PIC	Sr90S13
S6	10B	3	31	11381	3/30/2013 14:22	3/30/2013 14:25	PIC	Sr90S13
S7	10B	3	28	12244	3/30/2013 15:14	3/30/2013 15:17	PIC	Sr90S13
S1	10C	3	34	14391	3/30/2013 15:07	3/30/2013 15:10	PIC	Sr90S13
S2	10C	3	48	15140	3/30/2013 14:57	3/30/2013 15:00	PIC	Sr90S13
S3	10C	3	26	14971	3/30/2013 14:50	3/30/2013 14:53	PIC	Sr90S13
S4	10C	3	40	15541	3/30/2013 14:42	3/30/2013 14:45	PIC	Sr90S13
S5	10C	3	39	14457	3/30/2013 14:36	3/30/2013 14:39	PIC	Sr90S13
S6	10C	3	28	11591	3/30/2013 14:29	3/30/2013 14:32	PIC	Sr90S13
S7	10C	3	30	12946	3/30/2013 14:22	3/30/2013 14:25	PIC	Sr90S13
S1	10D	3	20	14192	3/30/2013 15:14	3/30/2013 15:17	PIC	Sr90S13
S2	10D	3	26	15388	3/30/2013 15:07	3/30/2013 15:10	PIC	Sr90S13
S3	10D	3	13	15273	3/30/2013 14:57	3/30/2013 15:00	PIC	Sr90S13
S4	10D	3	19	15258	3/30/2013 14:50	3/30/2013 14:53	PIC	Sr90S13
S5	10D	3	29	14721	3/30/2013 14:42	3/30/2013 14:45	PIC	Sr90S13
S6	10D	3	22	11720	3/30/2013 14:36	3/30/2013 14:39	PIC	Sr90S13
S7	10D	3	20	12821	3/30/2013 14:29	3/30/2013 14:32	PIC	Sr90S13
S1	11A	3	2	13341	3/30/2013 15:28	3/30/2013 15:31	PIC	Sr90S13
S2	11A	3	0	14364	3/30/2013 15:31	3/30/2013 15:34	PIC	Sr90S13
S3	11A	3	0	14259	3/30/2013 15:35	3/30/2013 15:38	PIC	Sr90S13
S4	11A	3	1	14370	3/30/2013 15:38	3/30/2013 15:41	PIC	Sr90S13
S5	11A	3	0	13698	3/30/2013 15:43	3/30/2013 15:46	PIC	Sr90S13
S6	11A	3	0	9866	3/30/2013 15:47	3/30/2013 15:50	PIC	Sr90S13
S7	11A	3	2	11413	3/30/2013 15:51	3/30/2013 15:54	PIC	Sr90S13
S1	11B	3	0	14495	3/30/2013 15:54	3/30/2013 15:57	PIC	Sr90S13
S2	11B	3	0	15572	3/30/2013 15:28	3/30/2013 15:31	PIC	Sr90S13
S3	11B	3	0	15188	3/30/2013 15:31	3/30/2013 15:34	PIC	Sr90S13
S4	11B	3	0	15612	3/30/2013 15:35	3/30/2013 15:38	PIC	Sr90S13
S5	11B	3	0	14881	3/30/2013 15:39	3/30/2013 15:42	PIC	Sr90S13
S6	11B	3	0	11037	3/30/2013 15:43	3/30/2013 15:46	PIC	Sr90S13
S7	11B	3	0	12343	3/30/2013 15:47	3/30/2013 15:50	PIC	Sr90S13
S1	11C	3	1	14267	3/30/2013 15:51	3/30/2013 15:54	PIC	Sr90S13

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S2	11C	3	0	15354	3/30/2013 15:55	3/30/2013 15:58	PIC	Sr90S13
S3	11C	3	0	15138	3/30/2013 15:28	3/30/2013 15:31	PIC	Sr90S13
S4	11C	3	0	15373	3/30/2013 15:31	3/30/2013 15:34	PIC	Sr90S13
S5	11C	3	1	14902	3/30/2013 15:35	3/30/2013 15:38	PIC	Sr90S13
S6	11C	3	1	10342	3/30/2013 15:39	3/30/2013 15:42	PIC	Sr90S13
S7	11C	3	0	12297	3/30/2013 15:43	3/30/2013 15:46	PIC	Sr90S13
S1	11D	3	1	14538	3/30/2013 15:47	3/30/2013 15:50	PIC	Sr90S13
S2	11D	3	0	15591	3/30/2013 15:51	3/30/2013 15:54	PIC	Sr90S13
S3	11D	3	0	15511	3/30/2013 15:55	3/30/2013 15:58	PIC	Sr90S13
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S5	11D	3	0	14769	3/30/2013 15:32	3/30/2013 15:35	PIC	Sr90S13
S6	11D	3	0	10450	3/30/2013 15:35	3/30/2013 15:38	PIC	Sr90S13
S7	11D	3	0	12426	3/30/2013 15:39	3/30/2013 15:42	PIC	Sr90S13
S1	13A	3	0	14517	3/30/2013 14:31	3/30/2013 14:34	PIC	Sr90S13
S2	13A	3	0	15416	3/30/2013 15:25	3/30/2013 15:28	PIC	Sr90S13
S3	13A	3	1	15553	3/30/2013 15:16	3/30/2013 15:19	PIC	Sr90S13
S4	13A	3	1	15547	3/30/2013 15:09	3/30/2013 15:12	PIC	Sr90S13
S5	13A	3	0	14769	3/30/2013 14:59	3/30/2013 15:02	PIC	Sr90S13
S6	13A	3	0	11476	3/30/2013 14:53	3/30/2013 14:56	PIC	Sr90S13
S7	13A	3	0	12935	3/30/2013 14:44	3/30/2013 14:47	PIC	Sr90S13
S1	13B	3	2	14929	3/30/2013 14:37	3/30/2013 14:40	PIC	Sr90S13
S2	13B	3	0	15677	3/30/2013 14:31	3/30/2013 14:34	PIC	Sr90S13
S3	13B	3	0	15456	3/30/2013 15:25	3/30/2013 15:28	PIC	Sr90S13
S4	13B	3	1	15818	3/30/2013 15:16	3/30/2013 15:19	PIC	Sr90S13
S5	13B	3	0	15205	3/30/2013 15:09	3/30/2013 15:12	PIC	Sr90S13
S6	13B	3	1	11264	3/30/2013 14:59	3/30/2013 15:02	PIC	Sr90S13
S7	13B	3	0	12827	3/30/2013 14:53	3/30/2013 14:56	PIC	Sr90S13
S1	13C	3	1	13771	3/30/2013 14:44	3/30/2013 14:47	PIC	Sr90S13
S2	13C	3	0	14798	3/30/2013 14:37	3/30/2013 14:40	PIC	Sr90S13
S3	13C	3	0	14645	3/30/2013 14:31	3/30/2013 14:34	PIC	Sr90S13
S4	13C	3	1	15000	3/30/2013 15:25	3/30/2013 15:28	PIC	Sr90S13
S5	13C	3	0	14263	3/30/2013 15:16	3/30/2013 15:19	PIC	Sr90S13
S6	13C	3	1	10434	3/30/2013 15:09	3/30/2013 15:12	PIC	Sr90S13
S7	13C	3	1	12050	3/30/2013 14:59	3/30/2013 15:02	PIC	Sr90S13
S1	13D	3	0	14215	3/30/2013 14:53	3/30/2013 14:56	PIC	Sr90S13
S2	13D	3	1	15393	3/30/2013 14:44	3/30/2013 14:47	PIC	Sr90S13
S3	13D	3	0	15231	3/30/2013 14:37	3/30/2013 14:40	PIC	Sr90S13

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S4	13D	3	0	15518	3/30/2013 14:31	3/30/2013 14:34	PIC	Sr90S13
S5	13D	3	0	14852	3/30/2013 15:25	3/30/2013 15:28	PIC	Sr90S13
S6	13D	3	1	11056	3/30/2013 15:16	3/30/2013 15:19	PIC	Sr90S13
S7	13D	3	1	12768	3/30/2013 15:09	3/30/2013 15:12	PIC	Sr90S13
S1	14A	3	0	13882	3/30/2013 14:59	3/30/2013 15:02	PIC	Sr90S13
S2	14A	3	1	14985	3/30/2013 14:52	3/30/2013 14:55	PIC	Sr90S13
S3	14A	3	0	14874	3/30/2013 14:45	3/30/2013 14:48	PIC	Sr90S13
S4	14A	3	0	15344	3/30/2013 14:38	3/30/2013 14:41	PIC	Sr90S13
S5	14A	3	1	14151	3/30/2013 14:31	3/30/2013 14:34	PIC	Sr90S13
S6	14A	3	1	10357	3/30/2013 15:24	3/30/2013 15:27	PIC	Sr90S13
S7	14A	3	0	11816	3/30/2013 15:16	3/30/2013 15:19	PIC	Sr90S13
S1	14B	3	0	14442	3/30/2013 15:09	3/30/2013 15:12	PIC	Sr90S13
S2	14B	3	0	15221	3/30/2013 14:59	3/30/2013 15:02	PIC	Sr90S13
S3	14B	3	1	14787	3/30/2013 14:52	3/30/2013 14:55	PIC	Sr90S13
S4	14B	3	0	15252	3/30/2013 14:45	3/30/2013 14:48	PIC	Sr90S13
S5	14B	3	0	14644	3/30/2013 14:38	3/30/2013 14:41	PIC	Sr90S13
S6	14B	3	0	11477	3/30/2013 14:31	3/30/2013 14:34	PIC	Sr90S13
S7	14B	3	1	12308	3/30/2013 15:24	3/30/2013 15:27	PIC	Sr90S13
S1	14C	3	1	14188	3/30/2013 15:16	3/30/2013 15:19	PIC	Sr90S13
S2	14C	3	1	15087	3/30/2013 15:09	3/30/2013 15:12	PIC	Sr90S13
S3	14C	3	0	14907	3/30/2013 14:59	3/30/2013 15:02	PIC	Sr90S13
S4	14C	3	0	15149	3/30/2013 14:52	3/30/2013 14:55	PIC	Sr90S13
S5	14C	3	0	14790	3/30/2013 14:45	3/30/2013 14:48	PIC	Sr90S13
S6	14C	3	1	11904	3/30/2013 14:38	3/30/2013 14:41	PIC	Sr90S13
S7	14C	3	0	12979	3/30/2013 14:31	3/30/2013 14:34	PIC	Sr90S13
S1	14D	3	0	13129	3/30/2013 15:24	3/30/2013 15:27	PIC	Sr90S13
S2	14D	3	0	14162	3/30/2013 15:16	3/30/2013 15:19	PIC	Sr90S13
S3	14D	3	0	14253	3/30/2013 15:09	3/30/2013 15:12	PIC	Sr90S13
S4	14D	3	0	14346	3/30/2013 14:59	3/30/2013 15:02	PIC	Sr90S13
S5	14D	3	0	13660	3/30/2013 14:52	3/30/2013 14:55	PIC	Sr90S13
S6	14D	3	0	10732	3/30/2013 14:45	3/30/2013 14:48	PIC	Sr90S13
S7	14D	3	0	12093	3/30/2013 14:38	3/30/2013 14:41	PIC	Sr90S13













Detector (#)	Source ID (#)	Raw Count Data			Raw Beta (cpm)	Recovery (%)	Y-90 Decay	Corrected Sr-90 (cpm)*	Decay Corrected Nominal (dpm)**	Sr-90 Efficiency (cpm/dpm)	Average Efficiency (cpm/dpm)
		Start Time	Count Time (min)	Beta (counts)							
14A	3	3/30/2013 17:59	3	10445	3481.67	100.0%	0.73117	4761.81	9576.83	0.4972	
14A	4	3/30/2013 17:50	3	10843	3614.33	100.0%	0.73235	4935.26	9576.83	0.5153	
14A	5	3/30/2013 17:42	3	10518	3506.00	100.0%	0.73342	4780.36	9576.84	0.4992	
14A	6	3/30/2013 18:52	3	9358	3119.33	100.0%	0.72421	4307.20	9576.81	0.4498	
14A	7	3/30/2013 18:42	3	10784	3594.67	99.8%	0.72553	4962.36	9576.81	0.5182	
14A	8	3/30/2013 18:32	3	10628	3542.67	100.0%	0.72683	4874.13	9576.82	0.5090	0.4988
14B	1	3/30/2013 18:32	3	11086	3695.33	99.8%	0.72683	5092.17	9576.82	0.5317	
14B	2	3/30/2013 18:16	3	11179	3726.33	100.0%	0.72899	5111.61	9576.82	0.5337	
14B	3	3/30/2013 18:08	3	10895	3631.67	100.0%	0.73003	4974.65	9576.83	0.5194	
14B	4	3/30/2013 17:59	3	11247	3749.00	100.0%	0.73117	5127.40	9576.83	0.5354	
14B	5	3/30/2013 17:50	3	10884	3628.00	100.0%	0.73235	4953.93	9576.83	0.5173	
14B	6	3/30/2013 17:42	3	10007	3335.67	100.0%	0.73342	4548.12	9576.84	0.4749	
14B	7	3/30/2013 18:52	3	11217	3739.00	99.8%	0.72421	5170.98	9576.81	0.5399	
14B	8	3/30/2013 18:42	3	10856	3618.67	100.0%	0.72553	4987.65	9576.81	0.5208	0.5217
14C	1	3/30/2013 18:42	3	11122	3707.33	99.8%	0.72553	5117.90	9576.82	0.5344	
14C	2	3/30/2013 18:32	3	11162	3720.67	100.0%	0.72683	5119.03	9576.82	0.5345	
14C	3	3/30/2013 18:16	3	11091	3697.00	100.0%	0.72899	5071.37	9576.82	0.5295	
14C	4	3/30/2013 18:08	3	11118	3706.00	100.0%	0.73003	5076.48	9576.83	0.5301	
14C	5	3/30/2013 17:59	3	11059	3686.33	100.0%	0.73117	5041.69	9576.83	0.5264	
14C	6	3/30/2013 17:50	3	9894	3298.00	100.0%	0.73235	4503.32	9576.83	0.4702	
14C	7	3/30/2013 17:42	3	11536	3845.33	99.8%	0.73342	5251.28	9576.84	0.5483	
14C	8	3/30/2013 17:42	3	11305	3768.33	100.0%	0.72421	5203.36	9576.81	0.5433	0.5271
14D	1	3/30/2013 18:52	3	9871	3290.33	99.8%	0.72421	4550.48	9576.81	0.4752	
14D	2	3/30/2013 18:42	3	10046	3348.67	100.0%	0.72553	4615.51	9576.81	0.4819	
14D	3	3/30/2013 18:32	3	9868	3289.33	100.0%	0.72683	4525.58	9576.82	0.4726	
14D	4	3/30/2013 18:16	3	10294	3431.33	100.0%	0.72899	4706.94	9576.82	0.4915	
14D	5	3/30/2013 18:08	3	9934	3311.33	100.0%	0.73003	4535.86	9576.83	0.4736	
14D	6	3/30/2013 17:59	3	8873	2957.67	100.0%	0.73117	4045.13	9576.83	0.4224	
14D	7	3/30/2013 17:50	3	10119	3373.00	99.8%	0.73235	4612.99	9576.83	0.4817	
14D	8	3/30/2013 17:42	3	9971	3323.67	100.0%	0.73342	4531.76	9576.84	0.4732	0.4715

Current Calibration - PIC

Geometry	Tuffryn Filter	3/1/2013	Exp Date	2/28/2014	
Y-90	Cal Date	A1	A2	A3	A4
Protean	A0				
1A	5.353041E-01				
1B	5.335355E-01				
1C	5.361905E-01				
1D	5.309386E-01				
2A	5.117578E-01				
2B	5.160091E-01				
2C	5.181153E-01				
2D	5.198782E-01				
3A	5.307887E-01				
3B	5.306288E-01				
3C	5.319471E-01				
3D	5.210413E-01				
4A	5.300209E-01				
4B	5.348062E-01				
4C	5.373425E-01				
4D	5.316186E-01				
5A	5.371844E-01				
5B	5.378783E-01				
5C	5.390942E-01				
5D	5.383112E-01				
6A	4.787655E-01				
6B	4.488744E-01				
6C	5.101166E-01				
6D	4.554777E-01				
7A	5.373508E-01				
7B	5.395290E-01				
7C	5.321346E-01				
7D	5.366649E-01				
8A	5.255350E-01				
8B	5.128248E-01				
8C	5.358420E-01				
8D	5.419739E-01				
9A	5.377399E-01				
9B	5.267472E-01				
9C	5.322234E-01				
9D	5.100714E-01				
10A	5.305456E-01				
10B	5.268003E-01				
10C	5.291475E-01				
10D	5.333235E-01				
11A	4.677546E-01				
11B	5.323064E-01				
11C	5.294515E-01				
11D	5.340554E-01				
12A	#N/A				
12B	#N/A				
12C	#N/A				
12D	#N/A				
13A	5.300233E-01				
13B	5.438454E-01				
13C	4.905428E-01				
13D	5.263644E-01				
14A	4.988124E-01				
14B	5.216565E-01				
14C	5.271115E-01				
14D	4.715060E-01				

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SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
Y1	1A	3	10	11551	3/30/2013 14:46	3/30/2013 14:49	PIC	Sr90Y13
Y2	1A	3	5	11713	3/30/2013 15:50	3/30/2013 15:53	PIC	Sr90Y13
Y3	1A	3	10	11569	3/30/2013 15:42	3/30/2013 15:45	PIC	Sr90Y13
Y4	1A	3	5	11605	3/30/2013 15:34	3/30/2013 15:37	PIC	Sr90Y13
Y5	1A	3	13	11518	3/30/2013 15:24	3/30/2013 15:27	PIC	Sr90Y13
Y6	1A	3	6	10892	3/30/2013 15:14	3/30/2013 15:17	PIC	Sr90Y13
Y7	1A	3	6	11867	3/30/2013 15:06	3/30/2013 15:09	PIC	Sr90Y13
Y8	1A	3	5	11847	3/30/2013 14:56	3/30/2013 14:59	PIC	Sr90Y13
Y1	1B	3	12	11717	3/30/2013 14:56	3/30/2013 14:59	PIC	Sr90Y13
Y2	1B	3	8	11796	3/30/2013 14:46	3/30/2013 14:49	PIC	Sr90Y13
Y3	1B	3	10	11430	3/30/2013 15:49	3/30/2013 15:52	PIC	Sr90Y13
Y4	1B	3	12	11535	3/30/2013 15:42	3/30/2013 15:45	PIC	Sr90Y13
Y5	1B	3	9	11451	3/30/2013 15:33	3/30/2013 15:36	PIC	Sr90Y13
Y6	1B	3	8	10732	3/30/2013 15:24	3/30/2013 15:27	PIC	Sr90Y13
Y7	1B	3	14	11951	3/30/2013 15:14	3/30/2013 15:17	PIC	Sr90Y13
Y8	1B	3	16	11648	3/30/2013 15:07	3/30/2013 15:10	PIC	Sr90Y13
Y1	1C	3	96	11759	3/30/2013 15:07	3/30/2013 15:10	PIC	Sr90Y13
Y2	1C	3	104	11847	3/30/2013 14:56	3/30/2013 14:59	PIC	Sr90Y13
Y3	1C	3	98	11562	3/30/2013 14:47	3/30/2013 14:50	PIC	Sr90Y13
Y4	1C	3	91	11823	3/30/2013 15:49	3/30/2013 15:52	PIC	Sr90Y13
Y5	1C	3	106	11680	3/30/2013 15:42	3/30/2013 15:45	PIC	Sr90Y13
Y6	1C	3	88	10544	3/30/2013 15:33	3/30/2013 15:36	PIC	Sr90Y13
Y7	1C	3	100	11779	3/30/2013 15:24	3/30/2013 15:27	PIC	Sr90Y13
Y8	1C	3	89	11722	3/30/2013 15:14	3/30/2013 15:17	PIC	Sr90Y13
Y1	1D	3	68	11522	3/30/2013 15:14	3/30/2013 15:17	PIC	Sr90Y13
Y2	1D	3	83	11771	3/30/2013 15:07	3/30/2013 15:10	PIC	Sr90Y13
Y3	1D	3	75	11535	3/30/2013 14:56	3/30/2013 14:59	PIC	Sr90Y13
Y4	1D	3	73	11874	3/30/2013 14:48	3/30/2013 14:51	PIC	Sr90Y13
Y5	1D	3	66	11432	3/30/2013 15:49	3/30/2013 15:52	PIC	Sr90Y13
Y6	1D	3	79	10327	3/30/2013 15:42	3/30/2013 15:45	PIC	Sr90Y13
Y7	1D	3	79	11718	3/30/2013 15:33	3/30/2013 15:36	PIC	Sr90Y13
Y8	1D	3	91	11631	3/30/2013 15:24	3/30/2013 15:27	PIC	Sr90Y13
Y1	2A	3	2	11102	3/30/2013 15:24	3/30/2013 15:27	PIC	Sr90Y13
Y2	2A	3	0	11053	3/30/2013 15:14	3/30/2013 15:17	PIC	Sr90Y13
Y3	2A	3	1	11160	3/30/2013 15:07	3/30/2013 15:10	PIC	Sr90Y13
Y4	2A	3	2	11334	3/30/2013 14:56	3/30/2013 14:59	PIC	Sr90Y13

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Y5	2A	3	0	11092	3/30/2013 14:49	3/30/2013 14:52	PIC	Sr90Y13
Y6	2A	3	2	10202	3/30/2013 15:50	3/30/2013 15:53	PIC	Sr90Y13
Y7	2A	3	0	11309	3/30/2013 15:42	3/30/2013 15:45	PIC	Sr90Y13
Y8	2A	3	0	11236	3/30/2013 15:33	3/30/2013 15:36	PIC	Sr90Y13
Y1	2B	3	0	11237	3/30/2013 15:34	3/30/2013 15:37	PIC	Sr90Y13
Y2	2B	3	1	11258	3/30/2013 15:23	3/30/2013 15:26	PIC	Sr90Y13
Y3	2B	3	2	11080	3/30/2013 15:14	3/30/2013 15:17	PIC	Sr90Y13
Y4	2B	3	0	11228	3/30/2013 15:06	3/30/2013 15:09	PIC	Sr90Y13
Y5	2B	3	1	11031	3/30/2013 14:56	3/30/2013 14:59	PIC	Sr90Y13
Y6	2B	3	0	10699	3/30/2013 14:49	3/30/2013 14:52	PIC	Sr90Y13
Y7	2B	3	0	11366	3/30/2013 15:50	3/30/2013 15:53	PIC	Sr90Y13
Y8	2B	3	0	11316	3/30/2013 15:42	3/30/2013 15:45	PIC	Sr90Y13
Y1	2C	3	8	11254	3/30/2013 15:42	3/30/2013 15:45	PIC	Sr90Y13
Y2	2C	3	8	11196	3/30/2013 15:34	3/30/2013 15:37	PIC	Sr90Y13
Y3	2C	3	8	11123	3/30/2013 15:23	3/30/2013 15:26	PIC	Sr90Y13
Y4	2C	3	12	11257	3/30/2013 15:14	3/30/2013 15:17	PIC	Sr90Y13
Y5	2C	3	9	11037	3/30/2013 15:06	3/30/2013 15:09	PIC	Sr90Y13
Y6	2C	3	19	10818	3/30/2013 14:56	3/30/2013 14:59	PIC	Sr90Y13
Y7	2C	3	7	11625	3/30/2013 14:49	3/30/2013 14:52	PIC	Sr90Y13
Y8	2C	3	13	11273	3/30/2013 15:50	3/30/2013 15:53	PIC	Sr90Y13
Y1	2D	3	5	11170	3/30/2013 15:50	3/30/2013 15:53	PIC	Sr90Y13
Y2	2D	3	3	11062	3/30/2013 15:42	3/30/2013 15:45	PIC	Sr90Y13
Y3	2D	3	6	11193	3/30/2013 15:34	3/30/2013 15:37	PIC	Sr90Y13
Y4	2D	3	7	11423	3/30/2013 15:23	3/30/2013 15:26	PIC	Sr90Y13
Y5	2D	3	5	11240	3/30/2013 15:14	3/30/2013 15:17	PIC	Sr90Y13
Y6	2D	3	4	10285	3/30/2013 15:06	3/30/2013 15:09	PIC	Sr90Y13
Y7	2D	3	8	11687	3/30/2013 14:56	3/30/2013 14:59	PIC	Sr90Y13
Y8	2D	3	9	11832	3/30/2013 14:49	3/30/2013 14:52	PIC	Sr90Y13
Y1	3A	3	168	11701	3/30/2013 14:53	3/30/2013 14:56	PIC	Sr90Y13
Y2	3A	3	156	11614	3/30/2013 16:22	3/30/2013 16:25	PIC	Sr90Y13
Y3	3A	3	144	11501	3/30/2013 15:46	3/30/2013 15:49	PIC	Sr90Y13
Y4	3A	3	161	11680	3/30/2013 15:38	3/30/2013 15:41	PIC	Sr90Y13
Y5	3A	3	140	11179	3/30/2013 15:28	3/30/2013 15:31	PIC	Sr90Y13
Y6	3A	3	125	10626	3/30/2013 15:19	3/30/2013 15:22	PIC	Sr90Y13
Y7	3A	3	148	11829	3/30/2013 15:10	3/30/2013 15:13	PIC	Sr90Y13
Y8	3A	3	152	11508	3/30/2013 15:03	3/30/2013 15:06	PIC	Sr90Y13
Y1	3B	3	142	11658	3/30/2013 15:03	3/30/2013 15:06	PIC	Sr90Y13



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Y2	3B	3	130	11625	3/30/2013 14:53	3/30/2013 14:56	PIC	Sr90Y13
Y3	3B	3	124	11173	3/30/2013 16:22	3/30/2013 16:25	PIC	Sr90Y13
Y4	3B	3	111	11497	3/30/2013 15:46	3/30/2013 15:49	PIC	Sr90Y13
Y5	3B	3	125	11424	3/30/2013 15:38	3/30/2013 15:41	PIC	Sr90Y13
Y6	3B	3	114	10607	3/30/2013 15:28	3/30/2013 15:31	PIC	Sr90Y13
Y7	3B	3	141	11866	3/30/2013 15:19	3/30/2013 15:22	PIC	Sr90Y13
Y8	3B	3	141	11767	3/30/2013 15:10	3/30/2013 15:13	PIC	Sr90Y13
Y1	3C	3	63	11610	3/30/2013 15:10	3/30/2013 15:13	PIC	Sr90Y13
Y2	3C	3	60	11528	3/30/2013 15:03	3/30/2013 15:06	PIC	Sr90Y13
Y3	3C	3	47	11751	3/30/2013 14:53	3/30/2013 14:56	PIC	Sr90Y13
Y4	3C	3	74	11509	3/30/2013 16:22	3/30/2013 16:25	PIC	Sr90Y13
Y5	3C	3	64	11490	3/30/2013 15:46	3/30/2013 15:49	PIC	Sr90Y13
Y6	3C	3	48	10363	3/30/2013 15:38	3/30/2013 15:41	PIC	Sr90Y13
Y7	3C	3	57	11782	3/30/2013 15:28	3/30/2013 15:31	PIC	Sr90Y13
Y8	3C	3	67	11810	3/30/2013 15:19	3/30/2013 15:22	PIC	Sr90Y13
Y1	3D	3	62	11458	3/30/2013 15:19	3/30/2013 15:22	PIC	Sr90Y13
Y2	3D	3	54	11260	3/30/2013 15:10	3/30/2013 15:13	PIC	Sr90Y13
Y3	3D	3	50	11499	3/30/2013 15:03	3/30/2013 15:06	PIC	Sr90Y13
Y4	3D	3	45	11444	3/30/2013 14:53	3/30/2013 14:56	PIC	Sr90Y13
Y5	3D	3	56	11039	3/30/2013 16:22	3/30/2013 16:25	PIC	Sr90Y13
Y6	3D	3	42	10203	3/30/2013 15:46	3/30/2013 15:49	PIC	Sr90Y13
Y7	3D	3	70	11594	3/30/2013 15:38	3/30/2013 15:41	PIC	Sr90Y13
Y8	3D	3	61	11466	3/30/2013 15:28	3/30/2013 15:31	PIC	Sr90Y13
Y1	4A	3	48	11533	3/30/2013 15:28	3/30/2013 15:31	PIC	Sr90Y13
Y2	4A	3	53	11688	3/30/2013 15:19	3/30/2013 15:22	PIC	Sr90Y13
Y3	4A	3	58	11649	3/30/2013 15:10	3/30/2013 15:13	PIC	Sr90Y13
Y4	4A	3	51	11603	3/30/2013 15:03	3/30/2013 15:06	PIC	Sr90Y13
Y5	4A	3	36	11409	3/30/2013 14:53	3/30/2013 14:56	PIC	Sr90Y13
Y6	4A	3	50	10217	3/30/2013 16:21	3/30/2013 16:24	PIC	Sr90Y13
Y7	4A	3	47	11782	3/30/2013 15:46	3/30/2013 15:49	PIC	Sr90Y13
Y8	4A	3	53	11639	3/30/2013 15:38	3/30/2013 15:41	PIC	Sr90Y13
Y1	4B	3	0	11605	3/30/2013 15:38	3/30/2013 15:41	PIC	Sr90Y13
Y2	4B	3	1	11505	3/30/2013 15:28	3/30/2013 15:31	PIC	Sr90Y13
Y3	4B	3	0	11446	3/30/2013 15:19	3/30/2013 15:22	PIC	Sr90Y13
Y4	4B	3	0	11555	3/30/2013 15:10	3/30/2013 15:13	PIC	Sr90Y13
Y5	4B	3	2	11501	3/30/2013 15:03	3/30/2013 15:06	PIC	Sr90Y13
Y6	4B	3	0	11310	3/30/2013 14:53	3/30/2013 14:56	PIC	Sr90Y13

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Y7	4B	3	1	11770	3/30/2013 16:21	3/30/2013 16:24	PIC	Sr90Y13
Y8	4B	3	1	11638	3/30/2013 15:46	3/30/2013 15:49	PIC	Sr90Y13
Y1	4C	3	39	11691	3/30/2013 15:46	3/30/2013 15:49	PIC	Sr90Y13
Y2	4C	3	59	11555	3/30/2013 15:38	3/30/2013 15:41	PIC	Sr90Y13
Y3	4C	3	39	11702	3/30/2013 15:28	3/30/2013 15:31	PIC	Sr90Y13
Y4	4C	3	39	11727	3/30/2013 15:19	3/30/2013 15:22	PIC	Sr90Y13
Y5	4C	3	49	11434	3/30/2013 15:10	3/30/2013 15:13	PIC	Sr90Y13
Y6	4C	3	39	10920	3/30/2013 15:03	3/30/2013 15:06	PIC	Sr90Y13
Y7	4C	3	46	12089	3/30/2013 14:53	3/30/2013 14:56	PIC	Sr90Y13
Y8	4C	3	43	11653	3/30/2013 16:21	3/30/2013 16:24	PIC	Sr90Y13
Y1	4D	3	122	11486	3/30/2013 16:21	3/30/2013 16:24	PIC	Sr90Y13
Y2	4D	3	123	11498	3/30/2013 15:46	3/30/2013 15:49	PIC	Sr90Y13
Y3	4D	3	114	11268	3/30/2013 15:38	3/30/2013 15:41	PIC	Sr90Y13
Y4	4D	3	115	11646	3/30/2013 15:28	3/30/2013 15:31	PIC	Sr90Y13
Y5	4D	3	125	11638	3/30/2013 15:19	3/30/2013 15:22	PIC	Sr90Y13
Y6	4D	3	107	10716	3/30/2013 15:10	3/30/2013 15:13	PIC	Sr90Y13
Y7	4D	3	133	11892	3/30/2013 15:03	3/30/2013 15:06	PIC	Sr90Y13
Y8	4D	3	137	11641	3/30/2013 14:53	3/30/2013 14:56	PIC	Sr90Y13
Y1	5A	3	28	11655	3/30/2013 16:26	3/30/2013 16:29	PIC	Sr90Y13
Y2	5A	3	27	11486	3/30/2013 17:24	3/30/2013 17:27	PIC	Sr90Y13
Y3	5A	3	28	11067	3/30/2013 17:16	3/30/2013 17:19	PIC	Sr90Y13
Y4	5A	3	28	11784	3/30/2013 17:08	3/30/2013 17:11	PIC	Sr90Y13
Y5	5A	3	27	11476	3/30/2013 16:59	3/30/2013 17:02	PIC	Sr90Y13
Y6	5A	3	26	10191	3/30/2013 16:51	3/30/2013 16:54	PIC	Sr90Y13
Y7	5A	3	23	11950	3/30/2013 16:43	3/30/2013 16:46	PIC	Sr90Y13
Y8	5A	3	29	11683	3/30/2013 16:34	3/30/2013 16:37	PIC	Sr90Y13
Y1	5B	3	30	11610	3/30/2013 16:34	3/30/2013 16:37	PIC	Sr90Y13
Y2	5B	3	15	11459	3/30/2013 16:26	3/30/2013 16:29	PIC	Sr90Y13
Y3	5B	3	24	11519	3/30/2013 17:24	3/30/2013 17:27	PIC	Sr90Y13
Y4	5B	3	25	11560	3/30/2013 17:15	3/30/2013 17:18	PIC	Sr90Y13
Y5	5B	3	33	11373	3/30/2013 17:08	3/30/2013 17:11	PIC	Sr90Y13
Y6	5B	3	36	10226	3/30/2013 16:59	3/30/2013 17:02	PIC	Sr90Y13
Y7	5B	3	28	11833	3/30/2013 16:51	3/30/2013 16:54	PIC	Sr90Y13
Y8	5B	3	30	11831	3/30/2013 16:42	3/30/2013 16:45	PIC	Sr90Y13
Y1	5C	3	38	11633	3/30/2013 16:42	3/30/2013 16:45	PIC	Sr90Y13
Y2	5C	3	19	11756	3/30/2013 16:34	3/30/2013 16:37	PIC	Sr90Y13
Y3	5C	3	36	11398	3/30/2013 16:26	3/30/2013 16:29	PIC	Sr90Y13

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Y4	5C	3	11733	3/30/2013 17:24	3/30/2013 17:27	PIC	Sr90Y13
Y5	5C	3	11330	3/30/2013 17:15	3/30/2013 17:18	PIC	Sr90Y13
Y6	5C	3	10272	3/30/2013 17:08	3/30/2013 17:11	PIC	Sr90Y13
Y7	5C	3	11798	3/30/2013 16:59	3/30/2013 17:02	PIC	Sr90Y13
Y8	5C	3	11698	3/30/2013 16:51	3/30/2013 16:54	PIC	Sr90Y13
Y1	5D	3	11647	3/30/2013 16:51	3/30/2013 16:54	PIC	Sr90Y13
Y2	5D	3	11618	3/30/2013 16:42	3/30/2013 16:45	PIC	Sr90Y13
Y3	5D	3	11265	3/30/2013 16:34	3/30/2013 16:37	PIC	Sr90Y13
Y4	5D	3	11705	3/30/2013 16:26	3/30/2013 16:29	PIC	Sr90Y13
Y5	5D	3	11262	3/30/2013 17:24	3/30/2013 17:27	PIC	Sr90Y13
Y6	5D	3	10373	3/30/2013 17:15	3/30/2013 17:18	PIC	Sr90Y13
Y7	5D	3	11696	3/30/2013 17:08	3/30/2013 17:11	PIC	Sr90Y13
Y8	5D	3	11921	3/30/2013 16:59	3/30/2013 17:02	PIC	Sr90Y13
Y1	6A	3	10267	3/30/2013 16:59	3/30/2013 17:02	PIC	Sr90Y13
Y2	6A	3	10393	3/30/2013 16:51	3/30/2013 16:54	PIC	Sr90Y13
Y3	6A	3	10000	3/30/2013 16:42	3/30/2013 16:45	PIC	Sr90Y13
Y4	6A	3	10268	3/30/2013 16:34	3/30/2013 16:37	PIC	Sr90Y13
Y5	6A	3	10193	3/30/2013 16:26	3/30/2013 16:29	PIC	Sr90Y13
Y6	6A	3	9216	3/30/2013 17:24	3/30/2013 17:27	PIC	Sr90Y13
Y7	6A	3	10341	3/30/2013 17:15	3/30/2013 17:18	PIC	Sr90Y13
Y8	6A	3	10688	3/30/2013 17:08	3/30/2013 17:11	PIC	Sr90Y13
Y1	6B	3	9650	3/30/2013 17:07	3/30/2013 17:10	PIC	Sr90Y13
Y2	6B	3	9600	3/30/2013 16:59	3/30/2013 17:02	PIC	Sr90Y13
Y3	6B	3	9488	3/30/2013 16:50	3/30/2013 16:53	PIC	Sr90Y13
Y4	6B	3	9316	3/30/2013 16:42	3/30/2013 16:45	PIC	Sr90Y13
Y5	6B	3	9565	3/30/2013 16:34	3/30/2013 16:37	PIC	Sr90Y13
Y6	6B	3	8925	3/30/2013 16:26	3/30/2013 16:29	PIC	Sr90Y13
Y7	6B	3	9759	3/30/2013 17:23	3/30/2013 17:26	PIC	Sr90Y13
Y8	6B	3	9976	3/30/2013 17:15	3/30/2013 17:18	PIC	Sr90Y13
Y1	6C	3	11087	3/30/2013 17:15	3/30/2013 17:18	PIC	Sr90Y13
Y2	6C	3	10791	3/30/2013 17:07	3/30/2013 17:10	PIC	Sr90Y13
Y3	6C	3	10739	3/30/2013 16:59	3/30/2013 17:02	PIC	Sr90Y13
Y4	6C	3	11188	3/30/2013 16:50	3/30/2013 16:53	PIC	Sr90Y13
Y5	6C	3	10825	3/30/2013 16:42	3/30/2013 16:45	PIC	Sr90Y13
Y6	6C	3	9783	3/30/2013 16:34	3/30/2013 16:37	PIC	Sr90Y13
Y7	6C	3	11152	3/30/2013 16:26	3/30/2013 16:29	PIC	Sr90Y13
Y8	6C	3	11124	3/30/2013 17:23	3/30/2013 17:26	PIC	Sr90Y13

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Y1	6D	3	15	9649	3/30/2013 17:23	3/30/2013 17:26	PIC	Sf90Y13
Y2	6D	3	12	9827	3/30/2013 17:15	3/30/2013 17:18	PIC	Sf90Y13
Y3	6D	3	14	9547	3/30/2013 17:07	3/30/2013 17:10	PIC	Sf90Y13
Y4	6D	3	20	9754	3/30/2013 16:59	3/30/2013 17:02	PIC	Sf90Y13
Y5	6D	3	19	9554	3/30/2013 16:50	3/30/2013 16:53	PIC	Sf90Y13
Y6	6D	3	6	8807	3/30/2013 16:42	3/30/2013 16:45	PIC	Sf90Y13
Y7	6D	3	17	9897	3/30/2013 16:34	3/30/2013 16:37	PIC	Sf90Y13
Y8	6D	3	20	10375	3/30/2013 16:26	3/30/2013 16:29	PIC	Sf90Y13
Y1	7A	3	54	11560	3/30/2013 16:30	3/30/2013 16:33	PIC	Sf90Y13
Y2	7A	3	51	11626	3/30/2013 17:27	3/30/2013 17:30	PIC	Sf90Y13
Y3	7A	3	43	11273	3/30/2013 17:19	3/30/2013 17:22	PIC	Sf90Y13
Y4	7A	3	61	11725	3/30/2013 17:11	3/30/2013 17:14	PIC	Sf90Y13
Y5	7A	3	53	11401	3/30/2013 17:03	3/30/2013 17:06	PIC	Sf90Y13
Y6	7A	3	50	10164	3/30/2013 16:55	3/30/2013 16:58	PIC	Sf90Y13
Y7	7A	3	43	11939	3/30/2013 16:47	3/30/2013 16:50	PIC	Sf90Y13
Y8	7A	3	53	11566	3/30/2013 16:38	3/30/2013 16:41	PIC	Sf90Y13
Y1	7B	3	58	11760	3/30/2013 16:38	3/30/2013 16:41	PIC	Sf90Y13
Y2	7B	3	58	11681	3/30/2013 16:30	3/30/2013 16:33	PIC	Sf90Y13
Y3	7B	3	79	11371	3/30/2013 17:27	3/30/2013 17:30	PIC	Sf90Y13
Y4	7B	3	53	11697	3/30/2013 17:19	3/30/2013 17:22	PIC	Sf90Y13
Y5	7B	3	65	11369	3/30/2013 17:11	3/30/2013 17:14	PIC	Sf90Y13
Y6	7B	3	52	10315	3/30/2013 17:03	3/30/2013 17:06	PIC	Sf90Y13
Y7	7B	3	65	11866	3/30/2013 16:55	3/30/2013 16:58	PIC	Sf90Y13
Y8	7B	3	45	11568	3/30/2013 16:46	3/30/2013 16:49	PIC	Sf90Y13
Y1	7C	3	20	11611	3/30/2013 16:47	3/30/2013 16:50	PIC	Sf90Y13
Y2	7C	3	22	11340	3/30/2013 16:38	3/30/2013 16:41	PIC	Sf90Y13
Y3	7C	3	33	11305	3/30/2013 16:30	3/30/2013 16:33	PIC	Sf90Y13
Y4	7C	3	26	11354	3/30/2013 17:27	3/30/2013 17:30	PIC	Sf90Y13
Y5	7C	3	18	11424	3/30/2013 17:19	3/30/2013 17:22	PIC	Sf90Y13
Y6	7C	3	17	10295	3/30/2013 17:11	3/30/2013 17:14	PIC	Sf90Y13
Y7	7C	3	28	11620	3/30/2013 17:03	3/30/2013 17:06	PIC	Sf90Y13
Y8	7C	3	19	11421	3/30/2013 16:55	3/30/2013 16:58	PIC	Sf90Y13
Y1	7D	3	52	11688	3/30/2013 16:55	3/30/2013 16:58	PIC	Sf90Y13
Y2	7D	3	42	11681	3/30/2013 16:47	3/30/2013 16:50	PIC	Sf90Y13
Y3	7D	3	28	11287	3/30/2013 16:38	3/30/2013 16:41	PIC	Sf90Y13
Y4	7D	3	39	11695	3/30/2013 16:30	3/30/2013 16:33	PIC	Sf90Y13
Y5	7D	3	27	11332	3/30/2013 17:27	3/30/2013 17:30	PIC	Sf90Y13

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Y6	7D	3	31	10278	3/30/2013 17:19	3/30/2013 17:22	PIC	Sf90Y13
Y7	7D	3	27	11645	3/30/2013 17:11	3/30/2013 17:14	PIC	Sf90Y13
Y8	7D	3	31	11537	3/30/2013 17:03	3/30/2013 17:06	PIC	Sf90Y13
Y1	8A	3	1	11089	3/30/2013 17:03	3/30/2013 17:06	PIC	Sf90Y13
Y2	8A	3	4	11355	3/30/2013 16:55	3/30/2013 16:58	PIC	Sf90Y13
Y3	8A	3	0	11121	3/30/2013 16:46	3/30/2013 16:49	PIC	Sf90Y13
Y4	8A	3	5	11478	3/30/2013 16:38	3/30/2013 16:41	PIC	Sf90Y13
Y5	8A	3	0	11256	3/30/2013 16:30	3/30/2013 16:33	PIC	Sf90Y13
Y6	8A	3	3	10002	3/30/2013 17:27	3/30/2013 17:30	PIC	Sf90Y13
Y7	8A	3	1	11411	3/30/2013 17:19	3/30/2013 17:22	PIC	Sf90Y13
Y8	8A	3	3	11544	3/30/2013 17:11	3/30/2013 17:14	PIC	Sf90Y13
Y1	8B	3	0	11077	3/30/2013 17:11	3/30/2013 17:14	PIC	Sf90Y13
Y2	8B	3	0	11109	3/30/2013 17:03	3/30/2013 17:06	PIC	Sf90Y13
Y3	8B	3	0	11001	3/30/2013 16:55	3/30/2013 16:58	PIC	Sf90Y13
Y4	8B	3	0	11116	3/30/2013 16:46	3/30/2013 16:49	PIC	Sf90Y13
Y5	8B	3	1	10804	3/30/2013 16:38	3/30/2013 16:41	PIC	Sf90Y13
Y6	8B	3	0	9694	3/30/2013 16:30	3/30/2013 16:33	PIC	Sf90Y13
Y7	8B	3	0	11250	3/30/2013 17:27	3/30/2013 17:30	PIC	Sf90Y13
Y8	8B	3	0	11031	3/30/2013 17:19	3/30/2013 17:22	PIC	Sf90Y13
Y1	8C	3	6	11611	3/30/2013 17:19	3/30/2013 17:22	PIC	Sf90Y13
Y2	8C	3	4	11556	3/30/2013 17:11	3/30/2013 17:14	PIC	Sf90Y13
Y3	8C	3	7	11315	3/30/2013 17:03	3/30/2013 17:06	PIC	Sf90Y13
Y4	8C	3	6	11562	3/30/2013 16:55	3/30/2013 16:58	PIC	Sf90Y13
Y5	8C	3	4	11426	3/30/2013 16:46	3/30/2013 16:49	PIC	Sf90Y13
Y6	8C	3	12	10288	3/30/2013 16:38	3/30/2013 16:41	PIC	Sf90Y13
Y7	8C	3	9	11706	3/30/2013 16:30	3/30/2013 16:33	PIC	Sf90Y13
Y8	8C	3	3	11532	3/30/2013 17:27	3/30/2013 17:30	PIC	Sf90Y13
Y1	8D	3	12	11532	3/30/2013 17:27	3/30/2013 17:30	PIC	Sf90Y13
Y2	8D	3	10	11838	3/30/2013 17:19	3/30/2013 17:22	PIC	Sf90Y13
Y3	8D	3	11	11402	3/30/2013 17:11	3/30/2013 17:14	PIC	Sf90Y13
Y4	8D	3	20	11541	3/30/2013 17:03	3/30/2013 17:06	PIC	Sf90Y13
Y5	8D	3	15	11561	3/30/2013 16:55	3/30/2013 16:58	PIC	Sf90Y13
Y6	8D	3	12	10407	3/30/2013 16:46	3/30/2013 16:49	PIC	Sf90Y13
Y7	8D	3	15	11975	3/30/2013 16:38	3/30/2013 16:41	PIC	Sf90Y13
Y8	8D	3	12	11785	3/30/2013 16:30	3/30/2013 16:33	PIC	Sf90Y13
Y1	9A	3	10	11659	3/30/2013 17:32	3/30/2013 17:35	PIC	Sf90Y13
Y2	9A	3	15	11487	3/30/2013 18:41	3/30/2013 18:44	PIC	Sf90Y13

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Y3	9A	3	12	11268	3/30/2013 18:30	3/30/2013 18:33	PIC	Sr90Y13
Y4	9A	3	12	11367	3/30/2013 18:17	3/30/2013 18:20	PIC	Sr90Y13
Y5	9A	3	12	11199	3/30/2013 18:07	3/30/2013 18:10	PIC	Sr90Y13
Y6	9A	3	12	10112	3/30/2013 17:58	3/30/2013 18:01	PIC	Sr90Y13
Y7	9A	3	9	11654	3/30/2013 17:49	3/30/2013 17:52	PIC	Sr90Y13
Y8	9A	3	9	11504	3/30/2013 17:40	3/30/2013 17:43	PIC	Sr90Y13
Y1	9B	3	7	11269	3/30/2013 17:40	3/30/2013 17:43	PIC	Sr90Y13
Y2	9B	3	8	11252	3/30/2013 17:32	3/30/2013 17:35	PIC	Sr90Y13
Y3	9B	3	13	10930	3/30/2013 18:41	3/30/2013 18:44	PIC	Sr90Y13
Y4	9B	3	8	11070	3/30/2013 18:30	3/30/2013 18:33	PIC	Sr90Y13
Y5	9B	3	13	10957	3/30/2013 18:17	3/30/2013 18:20	PIC	Sr90Y13
Y6	9B	3	6	9962	3/30/2013 18:06	3/30/2013 18:09	PIC	Sr90Y13
Y7	9B	3	8	11504	3/30/2013 17:58	3/30/2013 18:01	PIC	Sr90Y13
Y8	9B	3	7	11466	3/30/2013 17:49	3/30/2013 17:52	PIC	Sr90Y13
Y1	9C	3	14	11302	3/30/2013 17:49	3/30/2013 17:52	PIC	Sr90Y13
Y2	9C	3	16	11541	3/30/2013 17:40	3/30/2013 17:43	PIC	Sr90Y13
Y3	9C	3	17	11133	3/30/2013 17:32	3/30/2013 17:35	PIC	Sr90Y13
Y4	9C	3	21	11241	3/30/2013 18:41	3/30/2013 18:44	PIC	Sr90Y13
Y5	9C	3	14	11355	3/30/2013 18:30	3/30/2013 18:33	PIC	Sr90Y13
Y6	9C	3	10	9940	3/30/2013 18:17	3/30/2013 18:20	PIC	Sr90Y13
Y7	9C	3	17	11315	3/30/2013 18:06	3/30/2013 18:09	PIC	Sr90Y13
Y8	9C	3	20	11501	3/30/2013 17:58	3/30/2013 18:01	PIC	Sr90Y13
Y1	9D	3	0	10904	3/30/2013 17:58	3/30/2013 18:01	PIC	Sr90Y13
Y2	9D	3	2	10843	3/30/2013 17:49	3/30/2013 17:52	PIC	Sr90Y13
Y3	9D	3	0	10806	3/30/2013 17:40	3/30/2013 17:43	PIC	Sr90Y13
Y4	9D	3	0	11058	3/30/2013 17:32	3/30/2013 17:35	PIC	Sr90Y13
Y5	9D	3	0	10540	3/30/2013 18:41	3/30/2013 18:44	PIC	Sr90Y13
Y6	9D	3	2	9592	3/30/2013 18:30	3/30/2013 18:33	PIC	Sr90Y13
Y7	9D	3	0	10852	3/30/2013 18:17	3/30/2013 18:20	PIC	Sr90Y13
Y8	9D	3	0	11020	3/30/2013 18:06	3/30/2013 18:09	PIC	Sr90Y13
Y1	10A	3	4	11136	3/30/2013 18:07	3/30/2013 18:10	PIC	Sr90Y13
Y2	10A	3	4	11627	3/30/2013 17:58	3/30/2013 18:01	PIC	Sr90Y13
Y3	10A	3	6	11376	3/30/2013 17:49	3/30/2013 17:52	PIC	Sr90Y13
Y4	10A	3	9	11242	3/30/2013 17:40	3/30/2013 17:43	PIC	Sr90Y13
Y5	10A	3	4	11144	3/30/2013 17:32	3/30/2013 17:35	PIC	Sr90Y13
Y6	10A	3	3	10013	3/30/2013 18:41	3/30/2013 18:44	PIC	Sr90Y13
Y7	10A	3	8	11308	3/30/2013 18:30	3/30/2013 18:33	PIC	Sr90Y13

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Y8	10A	3	6	11203	3/30/2013 18:17	3/30/2013 18:20	PIC	Sr90Y13
Y1	10B	3	11	11287	3/30/2013 18:17	3/30/2013 18:20	PIC	Sr90Y13
Y2	10B	3	14	11442	3/30/2013 18:06	3/30/2013 18:09	PIC	Sr90Y13
Y3	10B	3	14	11205	3/30/2013 17:57	3/30/2013 18:00	PIC	Sr90Y13
Y4	10B	3	19	11271	3/30/2013 17:49	3/30/2013 17:52	PIC	Sr90Y13
Y5	10B	3	10	10906	3/30/2013 17:40	3/30/2013 17:43	PIC	Sr90Y13
Y6	10B	3	11	10051	3/30/2013 17:32	3/30/2013 17:35	PIC	Sr90Y13
Y7	10B	3	17	11185	3/30/2013 18:41	3/30/2013 18:44	PIC	Sr90Y13
Y8	10B	3	18	11060	3/30/2013 18:30	3/30/2013 18:33	PIC	Sr90Y13
Y1	10C	3	7	11164	3/30/2013 18:30	3/30/2013 18:33	PIC	Sr90Y13
Y2	10C	3	10	11215	3/30/2013 18:17	3/30/2013 18:20	PIC	Sr90Y13
Y3	10C	3	13	11291	3/30/2013 18:06	3/30/2013 18:09	PIC	Sr90Y13
Y4	10C	3	14	11187	3/30/2013 17:57	3/30/2013 18:00	PIC	Sr90Y13
Y5	10C	3	17	11206	3/30/2013 17:49	3/30/2013 17:52	PIC	Sr90Y13
Y6	10C	3	7	9876	3/30/2013 17:40	3/30/2013 17:43	PIC	Sr90Y13
Y7	10C	3	22	11580	3/30/2013 17:32	3/30/2013 17:35	PIC	Sr90Y13
Y8	10C	3	16	11286	3/30/2013 18:41	3/30/2013 18:44	PIC	Sr90Y13
Y1	10D	3	6	11152	3/30/2013 18:41	3/30/2013 18:44	PIC	Sr90Y13
Y2	10D	3	11	11354	3/30/2013 18:30	3/30/2013 18:33	PIC	Sr90Y13
Y3	10D	3	15	11090	3/30/2013 18:17	3/30/2013 18:20	PIC	Sr90Y13
Y4	10D	3	11	11325	3/30/2013 18:06	3/30/2013 18:09	PIC	Sr90Y13
Y5	10D	3	9	11230	3/30/2013 17:57	3/30/2013 18:00	PIC	Sr90Y13
Y6	10D	3	6	10120	3/30/2013 17:49	3/30/2013 17:52	PIC	Sr90Y13
Y7	10D	3	6	11635	3/30/2013 17:40	3/30/2013 17:43	PIC	Sr90Y13
Y8	10D	3	10	11605	3/30/2013 17:32	3/30/2013 17:35	PIC	Sr90Y13
Y1	11A	3	1	9741	3/30/2013 18:56	3/30/2013 18:59	PIC	Sr90Y13
Y2	11A	3	1	9916	3/30/2013 18:59	3/30/2013 19:02	PIC	Sr90Y13
Y3	11A	3	0	9726	3/30/2013 19:03	3/30/2013 19:06	PIC	Sr90Y13
Y4	11A	3	0	9922	3/30/2013 19:06	3/30/2013 19:09	PIC	Sr90Y13
Y5	11A	3	0	9559	3/30/2013 19:10	3/30/2013 19:13	PIC	Sr90Y13
Y6	11A	3	1	8701	3/30/2013 19:14	3/30/2013 19:17	PIC	Sr90Y13
Y7	11A	3	1	9858	3/30/2013 19:17	3/30/2013 19:20	PIC	Sr90Y13
Y8	11A	3	0	10182	3/30/2013 19:21	3/30/2013 19:24	PIC	Sr90Y13
Y1	11B	3	0	11084	3/30/2013 19:21	3/30/2013 19:24	PIC	Sr90Y13
Y2	11B	3	0	11264	3/30/2013 18:55	3/30/2013 18:58	PIC	Sr90Y13
Y3	11B	3	1	11176	3/30/2013 18:59	3/30/2013 19:02	PIC	Sr90Y13
Y4	11B	3	0	11078	3/30/2013 19:03	3/30/2013 19:06	PIC	Sr90Y13

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Y5	11B	3	0	11235	3/30/2013 19:06	3/30/2013 19:09	PIC	Sf90Y13
Y6	11B	3	0	9954	3/30/2013 19:10	3/30/2013 19:13	PIC	Sf90Y13
Y7	11B	3	0	11315	3/30/2013 19:14	3/30/2013 19:17	PIC	Sf90Y13
Y8	11B	3	0	11208	3/30/2013 19:17	3/30/2013 19:20	PIC	Sf90Y13
Y1	11C	3	1	11241	3/30/2013 19:17	3/30/2013 19:20	PIC	Sf90Y13
Y2	11C	3	0	11141	3/30/2013 19:21	3/30/2013 19:24	PIC	Sf90Y13
Y3	11C	3	0	10818	3/30/2013 18:55	3/30/2013 18:58	PIC	Sf90Y13
Y4	11C	3	0	11117	3/30/2013 18:59	3/30/2013 19:02	PIC	Sf90Y13
Y5	11C	3	0	10902	3/30/2013 19:03	3/30/2013 19:06	PIC	Sf90Y13
Y6	11C	3	0	9885	3/30/2013 19:06	3/30/2013 19:09	PIC	Sf90Y13
Y7	11C	3	0	11500	3/30/2013 19:10	3/30/2013 19:13	PIC	Sf90Y13
Y8	11C	3	0	11232	3/30/2013 19:14	3/30/2013 19:17	PIC	Sf90Y13
Y1	11D	3	0	11225	3/30/2013 19:14	3/30/2013 19:17	PIC	Sf90Y13
Y2	11D	3	0	11169	3/30/2013 19:17	3/30/2013 19:20	PIC	Sf90Y13
Y3	11D	3	0	11003	3/30/2013 19:21	3/30/2013 19:24	PIC	Sf90Y13
Y4	11D	3	1	11450	3/30/2013 18:55	3/30/2013 18:58	PIC	Sf90Y13
Y5	11D	3	0	11115	3/30/2013 18:59	3/30/2013 19:02	PIC	Sf90Y13
Y6	11D	3	0	10052	3/30/2013 19:03	3/30/2013 19:06	PIC	Sf90Y13
Y7	11D	3	0	11275	3/30/2013 19:06	3/30/2013 19:09	PIC	Sf90Y13
Y8	11D	3	0	11312	3/30/2013 19:10	3/30/2013 19:13	PIC	Sf90Y13
Y1	13A	3	0	11235	3/30/2013 17:42	3/30/2013 17:45	PIC	Sf90Y13
Y2	13A	3	1	11208	3/30/2013 18:52	3/30/2013 18:55	PIC	Sf90Y13
Y3	13A	3	0	11169	3/30/2013 18:42	3/30/2013 18:45	PIC	Sf90Y13
Y4	13A	3	0	11398	3/30/2013 18:32	3/30/2013 18:35	PIC	Sf90Y13
Y5	13A	3	0	10869	3/30/2013 18:16	3/30/2013 18:19	PIC	Sf90Y13
Y6	13A	3	2	9992	3/30/2013 18:08	3/30/2013 18:11	PIC	Sf90Y13
Y7	13A	3	0	11451	3/30/2013 17:59	3/30/2013 18:02	PIC	Sf90Y13
Y8	13A	3	0	11458	3/30/2013 17:50	3/30/2013 17:53	PIC	Sf90Y13
Y1	13B	3	0	11616	3/30/2013 17:50	3/30/2013 17:53	PIC	Sf90Y13
Y2	13B	3	0	11784	3/30/2013 17:42	3/30/2013 17:45	PIC	Sf90Y13
Y3	13B	3	1	11414	3/30/2013 18:52	3/30/2013 18:55	PIC	Sf90Y13
Y4	13B	3	0	11721	3/30/2013 18:42	3/30/2013 18:45	PIC	Sf90Y13
Y5	13B	3	0	11341	3/30/2013 18:32	3/30/2013 18:35	PIC	Sf90Y13
Y6	13B	3	0	10020	3/30/2013 18:16	3/30/2013 18:19	PIC	Sf90Y13
Y7	13B	3	3	11591	3/30/2013 18:08	3/30/2013 18:11	PIC	Sf90Y13
Y8	13B	3	0	11611	3/30/2013 17:59	3/30/2013 18:02	PIC	Sf90Y13
Y1	13C	3	0	10571	3/30/2013 17:59	3/30/2013 18:02	PIC	Sf90Y13



PIC\_Y-90\_Mar13\_RawData.xls

Y2	13C	3	0	10471	3/30/2013 17:50	3/30/2013 17:53	PIC	Sr90Y13
Y3	13C	3	0	10006	3/30/2013 17:42	3/30/2013 17:45	PIC	Sr90Y13
Y4	13C	3	0	10545	3/30/2013 18:52	3/30/2013 18:55	PIC	Sr90Y13
Y5	13C	3	0	10119	3/30/2013 18:42	3/30/2013 18:45	PIC	Sr90Y13
Y6	13C	3	0	9281	3/30/2013 18:32	3/30/2013 18:35	PIC	Sr90Y13
Y7	13C	3	0	10583	3/30/2013 18:16	3/30/2013 18:19	PIC	Sr90Y13
Y8	13C	3	0	10593	3/30/2013 18:08	3/30/2013 18:11	PIC	Sr90Y13
Y1	13D	3	0	11247	3/30/2013 18:08	3/30/2013 18:11	PIC	Sr90Y13
Y2	13D	3	0	11383	3/30/2013 17:59	3/30/2013 18:02	PIC	Sr90Y13
Y3	13D	3	0	11166	3/30/2013 17:50	3/30/2013 17:53	PIC	Sr90Y13
Y4	13D	3	1	11081	3/30/2013 17:42	3/30/2013 17:45	PIC	Sr90Y13
Y5	13D	3	1	10857	3/30/2013 18:52	3/30/2013 18:55	PIC	Sr90Y13
Y6	13D	3	0	9916	3/30/2013 18:42	3/30/2013 18:45	PIC	Sr90Y13
Y7	13D	3	2	11472	3/30/2013 18:32	3/30/2013 18:35	PIC	Sr90Y13
Y8	13D	3	0	11052	3/30/2013 18:16	3/30/2013 18:19	PIC	Sr90Y13
Y1	14A	3	0	10482	3/30/2013 18:16	3/30/2013 18:19	PIC	Sr90Y13
Y2	14A	3	0	10501	3/30/2013 18:08	3/30/2013 18:11	PIC	Sr90Y13
Y3	14A	3	0	10445	3/30/2013 17:59	3/30/2013 18:02	PIC	Sr90Y13
Y4	14A	3	0	10843	3/30/2013 17:50	3/30/2013 17:53	PIC	Sr90Y13
Y5	14A	3	0	10518	3/30/2013 17:42	3/30/2013 17:45	PIC	Sr90Y13
Y6	14A	3	0	9358	3/30/2013 18:52	3/30/2013 18:55	PIC	Sr90Y13
Y7	14A	3	0	10784	3/30/2013 18:42	3/30/2013 18:45	PIC	Sr90Y13
Y8	14A	3	0	10628	3/30/2013 18:32	3/30/2013 18:35	PIC	Sr90Y13
Y1	14B	3	2	11086	3/30/2013 18:32	3/30/2013 18:35	PIC	Sr90Y13
Y2	14B	3	0	11179	3/30/2013 18:16	3/30/2013 18:19	PIC	Sr90Y13
Y3	14B	3	0	10895	3/30/2013 18:08	3/30/2013 18:11	PIC	Sr90Y13
Y4	14B	3	0	11247	3/30/2013 17:59	3/30/2013 18:02	PIC	Sr90Y13
Y5	14B	3	0	10884	3/30/2013 17:50	3/30/2013 17:53	PIC	Sr90Y13
Y6	14B	3	1	10007	3/30/2013 17:42	3/30/2013 17:45	PIC	Sr90Y13
Y7	14B	3	0	11217	3/30/2013 18:52	3/30/2013 18:55	PIC	Sr90Y13
Y8	14B	3	1	10856	3/30/2013 18:42	3/30/2013 18:45	PIC	Sr90Y13
Y1	14C	3	0	11122	3/30/2013 18:42	3/30/2013 18:45	PIC	Sr90Y13
Y2	14C	3	0	11162	3/30/2013 18:32	3/30/2013 18:35	PIC	Sr90Y13
Y3	14C	3	0	11091	3/30/2013 18:16	3/30/2013 18:19	PIC	Sr90Y13
Y4	14C	3	0	11118	3/30/2013 18:08	3/30/2013 18:11	PIC	Sr90Y13
Y5	14C	3	0	11059	3/30/2013 17:59	3/30/2013 18:02	PIC	Sr90Y13
Y6	14C	3	2	9894	3/30/2013 17:50	3/30/2013 17:53	PIC	Sr90Y13

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Y7	14C	3	1	11536	3/30/2013 17:42	3/30/2013 17:45	PIC	Sf90Y13
Y8	14C	3	0	11305	3/30/2013 18:52	3/30/2013 18:55	PIC	Sf90Y13
Y1	14D	3	0	9871	3/30/2013 18:52	3/30/2013 18:55	PIC	Sf90Y13
Y2	14D	3	0	10046	3/30/2013 18:42	3/30/2013 18:45	PIC	Sf90Y13
Y3	14D	3	0	9868	3/30/2013 18:32	3/30/2013 18:35	PIC	Sf90Y13
Y4	14D	3	0	10294	3/30/2013 18:16	3/30/2013 18:19	PIC	Sf90Y13
Y5	14D	3	1	9934	3/30/2013 18:08	3/30/2013 18:11	PIC	Sf90Y13
Y6	14D	3	0	8873	3/30/2013 17:59	3/30/2013 18:02	PIC	Sf90Y13
Y7	14D	3	0	10119	3/30/2013 17:50	3/30/2013 17:53	PIC	Sf90Y13
Y8	14D	3	0	9971	3/30/2013 17:42	3/30/2013 17:45	PIC	Sf90Y13

# Strontium-89 & 90 Liquid

**Filename:** SR890.XLS  
**File type:** Excel  
**Version #:** 1.3.8  
**Batch:** 1082959  
**Analyst:** BXF1  
**Prep Date:** 2/14/2013  
**Sr-89 Abundance:** 1  
**Sr-90 Abundance:** 1  
**Sr-89 Method Uncertainty:** 0.0829  
**Sr-90 Method Uncertainty:** 0.0821

**File Name:** SR890.XLS  
**File Type:** Excel  
**Version #:** 1.3.8  
**Batch:** 1082959  
**Analyst:** BXF1  
**Prep Date:** 2/14/2013  
**Sr-89 Abundance:** 1  
**Sr-90 Abundance:** 1  
**Sr-89 Method Uncertainty:** 0.0829  
**Sr-90 Method Uncertainty:** 0.0821

**File Name:** SR890.XLS  
**File Type:** Excel  
**Version #:** 1.3.8  
**Batch:** 1082959  
**Analyst:** BXF1  
**Prep Date:** 2/14/2013  
**Sr-89 Abundance:** 1  
**Sr-90 Abundance:** 1  
**Sr-89 Method Uncertainty:** 0.0829  
**Sr-90 Method Uncertainty:** 0.0821

**File Name:** SR890.XLS  
**File Type:** Excel  
**Version #:** 1.3.8  
**Batch:** 1082959  
**Analyst:** BXF1  
**Prep Date:** 2/14/2013  
**Sr-89 Abundance:** 1  
**Sr-90 Abundance:** 1  
**Sr-89 Method Uncertainty:** 0.0829  
**Sr-90 Method Uncertainty:** 0.0821

Pos.	Sample ID	Sample Aliquot L	Sample Aliquot L	Sample Aliquot L	Sample Date/Time	Carrier Calculations				Carrier Aliquot			
						Net Weight (mg) Sr	Net Weight StDev (mg) Y	Carrier Volume (ml) Sr	Carrier Volume StDev (ml) Y	Carrier Aliquot (mL) Sr	Carrier Aliquot (mL) Y	Carrier Aliquot StDev (mL) Sr	Carrier Aliquot StDev (mL) Y
1	4202347886.4	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	15.6	0.0460666	0.0743379	0.0743379	0.1	0.5	0.000200	0.001000
2	1202347888.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	15.4	0.020654	0.073519	0.073519	0.2	0.5	0.000200	0.001000
3	1202347888.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	15.3	0.03978	0.073089	0.073089	0.4	0.5	0.000200	0.001000
4	1202347889.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	15.5	0.039565	0.068362	0.068362	0.5	0.5	0.000200	0.001000
5	1202347890.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	11.9	0.058476	0.073949	0.073949	0.8	0.5	0.000200	0.001000
6	1202347891.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	12.3	0.060195	0.076528	0.076528	1.0	0.5	0.000200	0.001000
7	1202347892.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	12.9	0.062774	0.073519	0.073519	1.5	0.5	0.000200	0.001000
8	1202347893.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	14.6	0.070081	0.074809	0.074809	2.1	0.5	0.000200	0.001000
9	4202347894.4	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	15.4	0.0460666	0.0743379	0.0743379	0.1	0.5	0.000200	0.001000
10	1202347895.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	15.3	0.03978	0.073089	0.073089	0.2	0.5	0.000200	0.001000
11	1202347896.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	6.2	0.039565	0.068362	0.068362	0.4	0.5	0.000200	0.001000
12	1202347897.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	7.5	0.058476	0.073949	0.073949	0.8	0.5	0.000200	0.001000
13	1202347898.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	11.9	0.060195	0.076528	0.076528	1.0	0.5	0.000200	0.001000
14	1202347898.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	12.3	0.062774	0.073519	0.073519	1.5	0.5	0.000200	0.001000
15	1202347900.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	12.9	0.070081	0.074809	0.074809	2.1	0.5	0.000200	0.001000
16	1202347901.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	14.6	0.0460666	0.0743379	0.0743379	0.1	0.5	0.000200	0.001000
17	1202347902.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	15.4	0.020654	0.073519	0.073519	0.2	0.5	0.000200	0.001000
18	1202347903.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	3.1	0.03978	0.073089	0.073089	0.4	0.5	0.000200	0.001000
19	1202347904.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	6.2	0.039565	0.068362	0.068362	0.5	0.5	0.000200	0.001000
20	1202347905.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	7.5	0.058476	0.073949	0.073949	0.8	0.5	0.000200	0.001000
21	1202347906.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	11.9	0.060195	0.076528	0.076528	1.0	0.5	0.000200	0.001000
22	1202347907.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	12.3	0.062774	0.073519	0.073519	1.5	0.5	0.000200	0.001000
23	1202347908.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	12.9	0.070081	0.074809	0.074809	2.1	0.5	0.000200	0.001000
24	4202347909.4	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	14.6	0.0460666	0.0743379	0.0743379	0.1	0.5	0.000200	0.001000
25	1202347910.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	15.4	0.020654	0.073519	0.073519	0.2	0.5	0.000200	0.001000
26	1202347911.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	3.1	0.03978	0.073089	0.073089	0.4	0.5	0.000200	0.001000
27	1202347912.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	6.2	0.039565	0.068362	0.068362	0.5	0.5	0.000200	0.001000
28	1202347913.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	7.5	0.058476	0.073949	0.073949	0.8	0.5	0.000200	0.001000
29	1202347914.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	11.9	0.060195	0.076528	0.076528	1.0	0.5	0.000200	0.001000
30	1202347915.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	12.3	0.062774	0.073519	0.073519	1.5	0.5	0.000200	0.001000
31	1202347916.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	12.9	0.070081	0.074809	0.074809	2.1	0.5	0.000200	0.001000
32	1202347917.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	14.6	0.0460666	0.0743379	0.0743379	0.1	0.5	0.000200	0.001000
33	4202347918.4	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	15.4	0.020654	0.073519	0.073519	0.2	0.5	0.000200	0.001000
34	1202347919.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	3.1	0.03978	0.073089	0.073089	0.4	0.5	0.000200	0.001000
35	1202347920.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	6.2	0.039565	0.068362	0.068362	0.5	0.5	0.000200	0.001000
36	1202347921.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	7.5	0.058476	0.073949	0.073949	0.8	0.5	0.000200	0.001000
37	1202347922.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	11.9	0.060195	0.076528	0.076528	1.0	0.5	0.000200	0.001000
38	1202347923.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	12.3	0.062774	0.073519	0.073519	1.5	0.5	0.000200	0.001000
39	1202347924.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	12.9	0.070081	0.074809	0.074809	2.1	0.5	0.000200	0.001000
40	1202347925.1	0.2000	1.6007E-05	1.6007E-05	2/14/2013 0:00	14.6	0.0460666	0.0743379	0.0743379	0.1	0.5	0.000200	0.001000

Analytical SOP: GL-RAD-A-001  
Instrument SOP: GL-RAD-I-016

1st Count Raw Data										1st Count Calibration Data					Detector					Weekly Bkg				
Pos.	Detector ID	Counting Time (min.)	Gross Counts Alpha	Gross Counts Beta	Gross Beta CPM	Count Start Date/Time	Counted on	Calibration Date	Calibration Due Date	Detector Efficiency Sr-89	Detector Efficiency Sr-90	Detector Error (cpm/dpm)	Alpha X-Talk	Weekly Bkg CPM	Weekly Bkg Count Start Date/Time	Weekly Bkg Count Time (min.)								
1	1A	5	11539	2367.626	245/2013 16:43	PIC	3/1/2012	2/28/2014	0.5146	0.4073	0.00738	0.07843	0.368	2/9/2013 19:30	600									
2	1B	5	12023	2404.226	2/15/2013 16:43	PIC	3/1/2012	2/28/2014	0.5154	0.4035	0.00547	0.08127	0.542	2/9/2013 19:12	500									
3	1C	5	12868	2572.478	2/15/2013 16:43	PIC	3/1/2012	2/28/2014	0.5101	0.4036	0.00847	0.03171	0.534	2/9/2013 19:12	500									
4	1D	5	134	2434.025	2/15/2013 16:44	PIC	3/1/2012	2/28/2014	0.5042	0.3913	0.00692	0.04386	0.408	2/9/2013 19:29	500									
5	2A	5	11390	2277.927	2/15/2013 16:44	PIC	3/1/2012	2/28/2014	0.4760	0.3765	0.01298	0.07295	1.022	2/10/2013 10:44	500									
6	2B	5	9428	1885.567	2/15/2013 16:44	PIC	3/1/2012	2/28/2014	0.4567	0.3745	0.02111	0.16702	1.002	2/9/2013 19:12	500									
7	2C	5	5596	1118.863	2/15/2013 16:44	PIC	3/1/2012	2/28/2014	0.4774	0.3782	0.01213	0.05103	0.580	2/9/2013 19:12	500									
8	2D	5	5246	1049.027	2/15/2013 16:44	PIC	3/1/2012	2/28/2014	0.4737	0.3719	0.00583	0.05766	0.824	2/9/2013 19:12	500									
9	3A	6	44328	2264.384	2/15/2013 17:32	PIC	3/1/2012	2/28/2014	0.5125	0.3887	0.01614	0.02602	0.436	2/9/2013 19:29	500									
10	3B	5	11579	2314.666	2/15/2013 17:32	PIC	3/1/2012	2/28/2014	0.5071	0.3981	0.00988	0.03401	0.872	2/9/2013 19:49	500									
11	3C	5	12957	2590.652	2/15/2013 17:32	PIC	3/1/2012	2/28/2014	0.4942	0.3953	0.02297	0.03844	1.054	2/9/2013 19:12	500									
12	3D	5	74	11927	2384.831	2/15/2013 17:32	PIC	3/1/2012	2/28/2014	0.4820	0.3839	0.01123	0.03987	0.800	2/9/2013 19:12	500								
13	4A	5	11609	2321.242	2/15/2013 17:33	PIC	3/1/2012	2/28/2014	0.4819	0.3830	0.01519	0.15454	0.682	2/9/2013 19:50	500									
14	4B	5	0	9816	1963.200	2/15/2013 17:33	PIC	3/1/2012	2/28/2014	0.4867	0.3835	0.01100	0.04767	0.434	2/9/2013 19:12	500								
15	4C	5	5723	1144.304	2/15/2013 17:33	PIC	3/1/2012	2/28/2014	0.4766	0.3714	0.00773	0.03601	4.470	2/10/2013 10:44	500									
16	4D	5	105	5299	1056.844	2/15/2013 17:33	PIC	3/1/2012	2/28/2014	0.5266	0.4174	0.00681	0.04053	0.534	2/9/2013 19:12	500								
17	5A	5	11680	2335.651	2/15/2013 14:37	PIC	3/1/2012	2/28/2014	0.5239	0.4102	0.00426	0.03536	0.528	2/9/2013 19:12	500									
18	5B	5	11945	2388.689	2/15/2013 14:37	PIC	3/1/2012	2/28/2014	0.5134	0.4057	0.01256	0.04104	0.498	2/9/2013 19:12	500									
19	5C	5	52	13232	2645.973	2/15/2013 14:37	PIC	3/1/2012	2/28/2014	0.5040	0.3832	0.01000	0.03830	0.480	2/9/2013 19:12	500								
20	5D	5	77	12105	2420.410	2/15/2013 14:36	PIC	3/1/2012	2/28/2014	0.4737	0.3621	0.01264	0.08158	0.590	2/9/2013 19:12	500								
21	6A	5	11524	2304.718	2/15/2013 14:36	PIC	3/1/2012	2/28/2014	0.4892	0.3498	0.00946	0.03820	1.268	2/9/2013 19:12	500									
22	6B	5	9725	1944.756	2/15/2013 14:37	PIC	3/1/2012	2/28/2014	0.4811	0.3808	0.01207	0.03198	0.816	2/9/2013 19:12	500									
23	6C	5	6296	1259.181	2/15/2013 14:37	PIC	3/1/2012	2/28/2014	0.4611	0.3640	0.00594	0.04332	4.684	2/10/2013 10:44	500									
24	6D	5	3530	705.090	2/15/2013 14:37	PIC	3/1/2012	2/28/2014	0.5242	0.4189	0.00334	0.04032	0.444	2/9/2013 19:12	500									
25	7A	5	11400	2279.444	2/15/2013 15:21	PIC	3/1/2012	2/28/2014	0.5205	0.4112	0.00627	0.03338	0.316	2/9/2013 19:12	500									
26	7B	5	96	11768	2352.959	2/15/2013 15:21	PIC	3/1/2012	2/28/2014	0.5084	0.4042	0.00691	0.04919	0.294	2/9/2013 19:12	500								
27	7C	5	52	12908	2581.088	2/15/2013 15:21	PIC	3/1/2012	2/28/2014	0.5049	0.3953	0.01113	0.04330	0.342	2/9/2013 19:12	500								
28	7D	5	47	12327	2464.993	2/15/2013 15:21	PIC	3/1/2012	2/28/2014	0.4860	0.3729	0.01157	0.05705	1.076	2/9/2013 19:12	500								
29	8A	5	14	11693	2338.440	2/15/2013 15:21	PIC	3/1/2012	2/28/2014	0.4764	0.3729	0.01858	0.13207	0.758	2/9/2013 19:12	500								
30	8B	5	0	9651	1930.200	2/15/2013 15:21	PIC	3/1/2012	2/28/2014	0.4950	0.3839	0.01100	0.04516	0.362	2/9/2013 19:12	500								
31	8C	5	6	5870	1173.946	2/15/2013 15:21	PIC	3/1/2012	2/28/2014	0.4800	0.3821	0.00609	0.04880	0.905	2/9/2013 19:12	500								
32	8D	5	10	5434	1086.702	2/15/2013 15:21	PIC	3/1/2012	2/28/2014	0.6208	0.4259	0.00756	0.07644	0.782	2/9/2013 19:12	500								
33	9A	5	23	41588	2317.239	2/15/2013 13:25	PIC	3/1/2012	2/28/2014	0.5047	0.4045	0.00754	0.05532	0.332	2/9/2013 19:12	500								
34	9B	5	12	11689	2337.660	2/15/2013 13:25	PIC	3/1/2012	2/28/2014	0.5029	0.4050	0.00491	0.06217	0.818	2/9/2013 19:12	500								
35	9C	5	36	12772	2553.962	2/15/2013 13:25	PIC	3/1/2012	2/28/2014	0.4803	0.3825	0.01680	0.15986	1.064	2/11/2013 10:17	500								
36	9D	5	1	11934	2386.768	2/15/2013 13:25	PIC	3/1/2012	2/28/2014	0.4955	0.3795	0.01166	0.07329	0.368	2/9/2013 19:12	500								
37	10A	5	10	11674	2374.653	2/15/2013 13:26	PIC	3/1/2012	2/28/2014	0.4908	0.3739	0.00985	0.06325	0.714	2/9/2013 19:12	500								
38	10B	5	19	9704	1940.560	2/15/2013 13:26	PIC	3/1/2012	2/28/2014	0.4920	0.3759	0.00610	0.06671	0.326	2/9/2013 19:12	500								
39	10C	5	16	6518	1303.387	2/15/2013 13:26	PIC	3/1/2012	2/28/2014	0.4900	0.3702	0.00557	0.07211	1.210	2/9/2013 19:12	500								
40	10D	5	4	5639	1127.742	2/15/2013 13:26	PIC	3/1/2012	2/28/2014	0.4900	0.3702	0.00557	0.07211	1.210	2/9/2013 19:12	500								

2nd Count Raw Data				2nd Count Calibration Data				Detector				Weekly Bkg			
Pos.	Detector ID	Counting Time (min.)	Gross Alpha	Gross Beta	Gross CPM	Count Start Date/Time	Count End Date/Time	Calibration Due Date	Detector Y-90 (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Alpha X-Talk	Weekly CPM	Weekly Start Date/Time	Weekly Count	Weekly Time (min.)
1	1A	20	2096	404.792	104.792	2/27/2013 18:01	2/27/2013 18:01	2/28/2014	0.65353	0.00738	0.07843	0.414	2/23/2013 18:35	600	600
2	1B	20	2181	109.022	109.022	2/27/2013 18:01	2/27/2013 18:01	2/28/2014	0.5335	0.00547	0.08127	0.462	2/23/2013 19:35	500	500
3	1C	20	2458	122.870	122.870	2/27/2013 18:01	2/27/2013 18:01	2/28/2014	0.5362	0.00847	0.03171	0.698	2/23/2013 19:35	500	500
4	1D	20	2243	112.117	112.117	2/27/2013 18:01	2/27/2013 18:01	2/28/2014	0.5309	0.00692	0.04386	0.432	2/23/2013 19:35	500	500
5	2A	20	2165	108.250	108.250	2/27/2013 18:01	2/27/2013 18:01	2/28/2014	0.5118	0.01298	0.07295	1.014	2/23/2013 19:35	500	500
6	2B	20	1643	82.150	82.150	2/27/2013 18:01	2/27/2013 18:01	2/28/2014	0.5160	0.02111	0.16702	1.106	2/25/2013 7:21	500	500
7	2C	20	1184	59.177	59.177	2/27/2013 18:01	2/27/2013 18:01	2/28/2014	0.5181	0.01213	0.05103	0.620	2/23/2013 19:35	500	500
8	2D	20	1000	49.991	49.991	2/27/2013 18:01	2/27/2013 18:01	2/28/2014	0.5308	0.04404	0.02448	0.922	2/23/2013 19:35	500	500
9	3A	20	2422	406.664	406.664	2/27/2013 17:39	2/27/2013 17:39	2/28/2014	0.5306	0.01614	0.02602	0.654	2/23/2013 19:36	600	600
10	3B	20	2213	110.603	110.603	2/27/2013 17:39	2/27/2013 17:39	2/28/2014	0.5319	0.00988	0.03401	0.836	2/23/2013 19:36	500	500
11	3C	20	2398	119.871	119.871	2/27/2013 17:39	2/27/2013 17:39	2/28/2014	0.5210	0.02297	0.03844	0.908	2/23/2013 19:36	500	500
12	3D	20	2195	109.727	109.727	2/27/2013 17:39	2/27/2013 17:39	2/28/2014	0.5300	0.01123	0.03987	0.866	2/23/2013 19:36	500	500
13	4A	20	2142	107.080	107.080	2/27/2013 17:40	2/27/2013 17:40	2/28/2014	0.5346	0.01519	0.15454	0.666	2/23/2013 19:36	500	500
14	4B	20	1637	91.835	91.835	2/27/2013 17:40	2/27/2013 17:40	2/28/2014	0.5373	0.01100	0.04767	0.570	2/23/2013 19:36	500	500
15	4C	20	1200	59.959	59.959	2/27/2013 17:40	2/27/2013 17:40	2/28/2014	0.5316	0.00773	0.03601	4.494	2/25/2013 7:21	500	500
16	4D	20	1000	49.960	49.960	2/27/2013 17:40	2/27/2013 17:40	2/28/2014	0.5372	0.00851	0.04053	0.586	2/23/2013 19:36	500	500
17	5A	20	2187	109.330	109.330	2/27/2013 17:16	2/27/2013 17:16	2/28/2014	0.5379	0.0426	0.03536	0.544	2/23/2013 19:36	500	500
18	5B	20	2249	112.445	112.445	2/27/2013 17:16	2/27/2013 17:16	2/28/2014	0.5391	0.01299	0.04104	0.508	2/23/2013 19:36	500	500
19	5C	20	2431	121.521	121.521	2/27/2013 17:16	2/27/2013 17:16	2/28/2014	0.5383	0.01000	0.03830	0.808	2/23/2013 19:37	500	500
20	5D	20	2156	113.829	113.829	2/27/2013 17:16	2/27/2013 17:16	2/28/2014	0.4788	0.01264	0.08158	1.254	2/23/2013 19:37	500	500
21	6A	20	2156	107.792	107.792	2/27/2013 17:17	2/27/2013 17:17	2/28/2014	0.4489	0.00946	0.03820	0.666	2/23/2013 19:37	500	500
22	6B	20	1803	90.135	90.135	2/27/2013 17:17	2/27/2013 17:17	2/28/2014	0.5101	0.01207	0.03198	0.850	2/23/2013 19:37	500	500
23	6C	20	1199	59.892	59.892	2/27/2013 17:17	2/27/2013 17:17	2/28/2014	0.4656	0.04844	0.06664	29.246	2/25/2013 7:21	600	600
24	6D	20	862	42.615	42.615	2/27/2013 16:53	2/27/2013 16:53	2/28/2014	0.5374	0.00594	0.04032	0.466	2/23/2013 19:37	500	500
25	7A	20	2237	111.828	111.828	2/27/2013 16:53	2/27/2013 16:53	2/28/2014	0.5395	0.00627	0.03338	0.328	2/23/2013 19:37	500	500
26	7B	20	2183	109.125	109.125	2/27/2013 16:53	2/27/2013 16:53	2/28/2014	0.5321	0.00681	0.04919	0.364	2/23/2013 19:37	500	500
27	7C	20	2301	115.033	115.033	2/27/2013 16:54	2/27/2013 16:54	2/28/2014	0.5367	0.01113	0.04330	0.364	2/23/2013 19:37	500	500
28	7D	20	2245	112.233	112.233	2/27/2013 16:54	2/27/2013 16:54	2/28/2014	0.5255	0.01157	0.05705	1.178	2/23/2013 19:37	500	500
29	8A	20	2236	111.791	111.791	2/27/2013 16:54	2/27/2013 16:54	2/28/2014	0.5128	0.01858	0.13207	0.848	2/23/2013 19:37	500	500
30	8B	20	1766	88.293	88.293	2/27/2013 16:54	2/27/2013 16:54	2/28/2014	0.5358	0.01100	0.04516	0.374	2/23/2013 19:37	500	500
31	8C	20	1182	59.098	59.098	2/27/2013 16:54	2/27/2013 16:54	2/28/2014	0.5420	0.00608	0.04880	1.126	2/23/2013 19:37	500	500
32	8D	20	991	49.540	49.540	2/27/2013 16:54	2/27/2013 16:54	2/28/2014	0.6372	0.00758	0.07844	0.764	2/23/2013 19:38	600	600
33	9A	20	2174	108.680	108.680	2/27/2013 16:18	2/27/2013 16:18	2/28/2014	0.5267	0.00754	0.05832	0.586	2/23/2013 19:38	500	500
34	9B	20	2100	104.994	104.994	2/27/2013 16:18	2/27/2013 16:18	2/28/2014	0.5322	0.00491	0.06217	0.962	2/23/2013 19:38	500	500
35	9C	20	2420	120.988	120.988	2/27/2013 16:18	2/27/2013 16:18	2/28/2014	0.5101	0.01680	0.15986	0.998	2/23/2013 19:38	500	500
36	9D	20	2104	105.176	105.176	2/27/2013 16:18	2/27/2013 16:18	2/28/2014	0.5305	0.01166	0.07329	0.392	2/23/2013 19:38	500	500
37	10A	20	2249	112.443	112.443	2/27/2013 16:18	2/27/2013 16:18	2/28/2014	0.5286	0.00685	0.06325	0.754	2/23/2013 19:38	500	500
38	10B	20	1864	93.184	93.184	2/27/2013 16:18	2/27/2013 16:18	2/28/2014	0.5291	0.00610	0.06671	0.362	2/23/2013 19:38	500	500
39	10C	20	1191	59.537	59.537	2/27/2013 16:18	2/27/2013 16:18	2/28/2014	0.5333	0.00557	0.07211	2.104	2/24/2013 12:21	500	500
40	10D	20	1043	52.136	52.136	2/27/2013 16:18	2/27/2013 16:18	2/28/2014							

Pos.	Correction Factors		Separation Date/Time	Yttrium (Sr-90 calc)	Yttrium ingrowth (Sr-90 calc)	Yttrium Decay	Decay from Sample Date		Net Count Rate Y-90 Sr-90	Gross CPM Sr-89	Calculated Sample Recovery %		Sample Recovery % Error	
	Strontium	Yttrium					Sr-89	Sr-90			Sr	Y	Sr	Y
1	2/14/2013 14:00	0.2616	0.9656	0.9488	0.9770	0.9999	27.2330	86.7019	2483.74963	405%	100%	1.25%	1.14%	
2	2/14/2013 14:00	0.2515	0.9656	0.9488	0.9770	0.9999	32.8631	90.7806	2280.56242	90.6%	98.7%	1.06%	1.14%	
3	2/14/2013 14:00	0.2516	0.9656	0.9488	0.9770	0.9999	37.0087	102.3450	2433.12393	90.6%	98.1%	0.91%	1.14%	
4	2/14/2013 14:00	0.2516	0.9656	0.9488	0.9770	0.9999	34.9632	98.7031	2300.35835	87.7%	91.0%	0.90%	1.14%	
5	2/14/2013 14:00	0.2516	0.9656	0.9488	0.9770	0.9999	33.8575	86.6679	2157.40163	87.0%	89.4%	0.84%	1.14%	
6	2/14/2013 14:00	0.2516	0.9656	0.9488	0.9770	0.9999	30.9468	82.2168	1792.40296	71.9%	103%	0.86%	1.14%	
7	2/14/2013 14:00	0.2516	0.9656	0.9488	0.9770	0.9999	31.9822	47.2641	1039.6169	50.3%	98.7%	0.83%	1.14%	
8	2/14/2013 14:00	0.2581	0.9656	0.9488	0.9770	0.9999	33.1560	97.801348	2455.02966	40.7%	101%	0.82%	1.14%	
9	2/14/2013 14:00	0.2581	0.9656	0.9488	0.9770	0.9999	28.0926	86.0996	2454.40296	405%	400%	1.25%	1.14%	
10	2/14/2013 14:00	0.2581	0.9656	0.9488	0.9770	0.9999	34.0926	88.8501	2191.72282	90.6%	98.7%	1.06%	1.14%	
11	2/14/2013 14:00	0.2581	0.9656	0.9488	0.9770	0.9999	36.6525	98.7696	2455.02966	90.6%	98.1%	0.91%	1.14%	
12	2/14/2013 14:00	0.2581	0.9656	0.9488	0.9770	0.9999	34.8155	96.1210	2253.89457	87.7%	91.0%	0.90%	1.14%	
13	2/14/2013 14:00	0.2581	0.9656	0.9488	0.9770	0.9999	34.2716	84.1929	2202.77731	87.0%	99.4%	0.84%	1.14%	
14	2/14/2013 14:00	0.2582	0.9656	0.9488	0.9770	0.9999	35.1540	88.7864	1858.63458	71.9%	103%	0.85%	1.14%	
15	2/14/2013 14:00	0.2582	0.9656	0.9488	0.9770	0.9999	33.5400	46.6956	1064.45476	50.3%	98.7%	0.83%	1.14%	
16	2/14/2013 14:00	0.2582	0.9656	0.9488	0.9770	0.9999	31.4001	34.3210	983.122635	40.7%	101%	0.82%	1.14%	
17	2/14/2013 14:00	0.2343	0.9656	0.9488	0.9770	0.9999	26.2039	91.4962	2217.95135	105%	100%	1.29%	1.14%	
18	2/14/2013 14:00	0.2343	0.9656	0.9488	0.9770	0.9999	31.3210	93.6150	2263.75265	90.6%	98.7%	1.06%	1.14%	
19	2/14/2013 14:00	0.2343	0.9656	0.9488	0.9770	0.9999	33.8744	100.5594	2511.53938	90.6%	98.1%	0.91%	1.14%	
20	2/14/2013 14:00	0.2343	0.9656	0.9488	0.9770	0.9999	32.6938	98.2066	2289.50781	87.7%	91.0%	0.90%	1.14%	
21	2/14/2013 14:00	0.2342	0.9656	0.9488	0.9770	0.9999	31.0636	87.8369	2185.8179	87.0%	99.4%	0.84%	1.14%	
22	2/14/2013 14:00	0.2342	0.9656	0.9488	0.9770	0.9999	73.1550	73.1550	1840.05037	71.9%	103%	0.86%	1.14%	
23	2/14/2013 14:00	0.2342	0.9656	0.9488	0.9770	0.9999	29.7605	48.3504	1181.04992	50.3%	98.7%	0.83%	1.14%	
24	2/14/2013 14:00	0.2342	0.9656	0.9488	0.9770	0.9999	8.2766	40.0766	687.644765	40.7%	400%	1.25%	1.14%	
25	2/14/2013 14:00	0.2403	0.9656	0.9488	0.9770	0.9999	27.4087	93.6224	2158.41246	105%	100%	1.29%	1.14%	
26	2/14/2013 14:00	0.2403	0.9656	0.9488	0.9770	0.9999	31.1006	90.5895	2231.26899	90.6%	98.7%	1.06%	1.14%	
27	2/14/2013 14:00	0.2403	0.9656	0.9488	0.9770	0.9999	32.7631	95.7752	2432.53004	90.6%	98.1%	0.91%	1.14%	
28	2/14/2013 14:00	0.2403	0.9656	0.9488	0.9770	0.9999	33.0531	97.6316	2334.30828	87.0%	91.0%	0.90%	1.14%	
29	2/14/2013 14:00	0.2403	0.9656	0.9488	0.9770	0.9999	32.9609	85.1885	2220.28081	87.0%	99.4%	0.84%	1.14%	
30	2/14/2013 14:00	0.2404	0.9656	0.9488	0.9770	0.9999	31.5153	66.4570	1832.22778	71.9%	103%	0.86%	1.14%	
31	2/14/2013 14:00	0.2404	0.9656	0.9488	0.9770	0.9999	30.8762	45.9979	1097.70196	50.3%	98.7%	0.83%	1.14%	
32	2/14/2013 14:00	0.2404	0.9656	0.9488	0.9770	0.9999	36.5844	1019.24178	40.7%	40.7%	101%	0.82%	1.14%	
33	2/14/2013 14:00	0.2242	0.9656	0.9488	0.9770	0.9999	24.6582	94.6864	2204.02426	405%	400%	1.25%	1.14%	
34	2/14/2013 14:00	0.2242	0.9656	0.9488	0.9770	0.9999	27.6730	87.0186	2222.96847	90.6%	98.7%	1.06%	1.14%	
35	2/14/2013 14:00	0.2243	0.9656	0.9488	0.9770	0.9999	31.8200	99.7762	2422.35613	90.6%	98.1%	0.91%	1.14%	
36	2/14/2013 14:00	0.2243	0.9656	0.9488	0.9770	0.9999	28.5441	84.3613	2263.86268	87.7%	91.0%	0.90%	1.14%	
37	2/14/2013 14:00	0.2243	0.9656	0.9488	0.9770	0.9999	30.9677	86.4524	2257.23332	87.0%	99.4%	0.84%	1.14%	
38	2/14/2013 14:00	0.2244	0.9656	0.9488	0.9770	0.9999	28.2508	45.6363	1229.45932	50.3%	98.7%	0.83%	1.14%	
39	2/14/2013 14:00	0.2244	0.9656	0.9488	0.9770	0.9999	28.2508	45.6363	1229.45932	50.3%	98.7%	0.83%	1.14%	
40	2/14/2013 14:00	0.2244	0.9656	0.9488	0.9770	0.9999	29.5936	36.9746	1061.17416	40.7%	101%	0.82%	1.14%	

- Notes:  
 1 - Results are decay corrected to Sample Date/Time  
 2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date  
 3 - Spike Nominals are decay corrected to Sample Date/Time

Pos.	Decision Level		Critical Level	Required MDA	MDA	Sample Act.		Sample Act. Error	Net Count Rate	Net Count Rate Error	2 SIGMA Counting Uncertainty		2 SIGMA Total Prop. Uncertainty		Sample Type	RPD	RER	Nominal pCi/L	Recovery
	pCi/L	MDA				Conc.	pCi/L				pCi/L	pCi/L	pCi/L	pCi/L					
1	2.7936	4.8088	1	6.3741	8334.7294	0.0477	2163.3846	20.9464	174.7240	4566.7553	LCS	11729.9057	79.6%						
2	3.8047	2.8861	1	8.3932	11251.8264	0.0151	2280.0204	21.3568	206.5746	1862.5489	LCS	11729.9057	95.9%						
3	3.8155	2.6938	1	8.3791	12128.8094	0.0154	2432.5999	22.0596	215.5772	2014.5321	LCS	11729.9057	103.4%						
4	3.4865	2.4615	1	8.0503	11987.9135	0.0147	2299.9503	21.4493	219.1262	1985.0969	LCS	11729.9057	102.2%						
5	5.8939	4.1611	1	11.6626	12005.1651	0.0182	2156.3796	20.7722	226.6629	2020.5266	LCS	11729.9057	102.3%						
6	7.3571	5.1942	1	14.5994	12572.8758	0.0251	1791.4010	18.9336	260.4545	2197.2364	LCS	11729.9057	107.2%						
7	7.6579	5.4065	1	16.5742	9976.9453	0.0202	1039.0359	14.4196	271.3759	1685.7285	LCS	11729.9057	85.1%						
8	11.3779	8.0329	1	23.2473	11693.8654	0.0175	976.9773	13.9943	328.0684	1946.9411	LCS	11729.9057	99.7%						
9	3.1665	2.2243	1	7.0966	8168.8340	0.0248	2160.7099	20.9472	173.8489	1868.9426	LCS	11729.9057	79.2%						
10	3.4329	2.4236	1	7.8260	10878.7604	0.0215	2191.2869	20.9367	203.7251	1856.5278	LCS	11729.9057	92.7%						
11	4.9072	3.4645	1	9.9400	12315.3547	0.0162	2454.1577	22.1587	217.9439	2052.7559	LCS	11729.9057	105.0%						
12	5.7200	4.0383	1	11.2689	11985.9327	0.0264	2252.8406	21.2316	221.4013	2114.2144	LCS	11729.9057	102.2%						
13	5.1520	3.6374	1	10.5751	12111.9824	0.0169	2201.9773	20.9895	226.2870	2026.4780	LCS	11729.9057	103.3%						
14	5.7545	4.0627	1	12.1178	12364.0753	0.0203	1858.1526	19.2813	251.4621	2101.0494	LCS	11729.9057	105.4%						
15	6.5000	4.5690	1	14.8312	10025.0289	0.0195	1064.0208	14.5908	269.4456	1687.3502	LCS	11729.9057	85.5%						
16	26.3521	18.6048	1	44.3509	11767.2000	0.0182	988.6526	14.0937	328.7848	1965.9133	LCS	11729.9057	100.3%						
17	3.1788	2.2443	1	6.9809	9211.0977	0.0181	2217.4173	21.0616	171.4792	1539.6224	LCS	11729.9057	78.5%						
18	3.6888	2.6050	1	8.1195	10974.4689	0.0148	2263.2249	21.2780	202.2263	1813.7258	LCS	11729.9057	93.6%						
19	3.7788	2.6678	1	8.4606	11921.9493	0.0164	2289.0278	21.3987	216.4433	1986.1091	LCS	11729.9057	105.8%						
20	3.7788	2.6678	1	8.4606	12210.9575	0.0179	2185.2279	20.9085	228.9980	2052.5269	LCS	11729.9057	104.1%						
21	4.4948	3.1734	1	9.6995	12031.3919	0.0165	1838.7824	19.1837	246.0214	2005.8769	LCS	11729.9057	102.6%						
22	7.7157	5.4474	1	14.8206	11231.3848	0.0196	1180.2339	15.3692	286.6632	1894.3078	LCS	11729.9057	95.8%						
23	9.0021	6.3555	1	18.4208	11231.3848	0.0196	686.0608	44.7874	612.4646	2640.4617	LCS	11729.9057	130.4%						
24	29.3658	20.2466	1	64.8709	15296.4685	0.0294	1157.9685	20.7770	169.9985	1498.5165	LCS	11729.9057	76.8%						
25	2.9129	2.0566	1	6.6178	9008.4779	0.0171	2157.9685	20.7770	202.1556	1805.6996	LCS	11729.9057	92.9%						
26	2.8742	2.0292	1	6.9879	10892.5304	0.0155	2230.9530	21.1247	202.1556	1805.6996	LCS	11729.9057	104.5%						
27	2.8365	2.0040	1	7.0073	12258.6239	0.0145	2252.2360	22.1474	216.9991	2028.7846	LCS	11729.9057	103.5%						
28	3.1652	2.2488	1	7.6182	12139.1059	0.0171	2333.9663	21.6070	220.2635	2031.2588	LCS	11729.9057	103.1%						
29	5.9190	4.1789	1	11.6272	12092.3685	0.0172	2219.2048	21.0727	225.0557	2025.2610	LCS	11729.9057	105.0%						
30	6.1289	4.3271	1	12.6876	12311.7238	0.0230	1831.4698	19.1428	252.2207	2123.9990	LCS	11729.9057	87.4%						
31	5.8896	4.1581	1	13.9248	10257.4918	0.0193	1037.3400	14.8169	271.4651	1725.7728	LCS	11729.9057	99.4%						
32	11.4102	8.0557	1	22.9798	11657.0873	0.0174	1018.3358	14.2776	320.3996	1940.5279	LCS	11729.9057	78.7%						
33	3.8669	2.7442	1	8.0067	9235.0535	0.0177	2200.2428	20.9844	172.8049	1857.8770	LCS	11729.9057	95.3%						
34	3.0351	2.1428	1	7.3036	11179.8473	0.0161	2222.6365	21.0854	207.8765	1857.8770	LCS	11729.9057	104.2%						
35	4.7809	3.3753	1	9.7793	12223.3646	0.0137	2421.5381	22.0107	217.7661	2016.8090	LCS	11729.9057	105.3%						
36	5.8991	4.1648	1	11.6063	12357.3997	0.0213	2282.7987	21.2785	227.7604	2112.6135	LCS	11729.9057	102.7%						
37	3.3911	2.3941	1	7.9911	12047.2057	0.0172	2256.8653	21.2473	222.3004	2018.0783	LCS	11729.9057	102.3%						
38	5.7677	4.0721	1	12.0550	11998.8932	0.0151	1840.8405	19.1915	245.1824	1988.6442	LCS	11729.9057	97.5%						
39	5.5608	3.9260	1	13.4321	11431.3081	0.0164	1229.1333	15.6810	285.8418	1896.6406	LCS	11729.9057	104.4%						
40	13.3057	9.3939	1	25.7184	12243.4677	0.0170	1059.9642	14.5684	329.8224	2035.3384	LCS	11729.9057	104.4%						

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 2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date  
 3 - Spike Nominals are decay corrected to Sample Date/Time

Pos.	SR-90 Results		Critical Level	Required MDA	MDA pCi/L	Sample Act. Conc. pCi/L	Sample Act. Error pCi/L	Net Count Rate CPM	Net Count Rate Error CPM	2 SIGMA Counting Uncertainty		2 SIGMA Total Prop. Uncertainty		Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery
	Decision Level pCi/L	Level pCi/L								pCi/L	pCi/L	pCi/L	pCi/L						
1	1.4916	1.0634	1	1	2.7607	455.4252	0.0268	104.3782	2.2892	17.8384	17.8384	76.8181	LCS				617.2592	75.8%	
2	1.8598	1.3130	1	1	3.3985	559.0587	0.0250	108.5596	2.3350	21.5926	21.5926	94.0251	LCS				617.2592	90.6%	
3	2.2895	1.6164	1	1	4.0065	630.1357	0.0248	122.1719	2.4789	22.9592	22.9592	105.9134	LCS				617.2592	102.1%	
4	2.0253	1.4299	1	1	3.7296	647.7037	0.0251	111.6651	2.3679	24.6588	24.6588	108.9752	LCS				617.2592	104.9%	
5	2.9739	2.0986	1	1	5.0330	596.0672	0.0277	107.2360	2.3269	23.2257	23.2257	101.2433	LCS				617.2592	96.6%	
6	3.5664	2.5320	1	1	6.0288	520.1695	0.0347	81.0440	2.0272	23.3647	23.3647	90.8539	LCS				617.2592	84.3%	
7	3.9987	2.8231	1	1	7.0789	559.6835	0.0336	58.5570	1.7205	29.5290	29.5290	97.3847	LCS				617.2592	90.7%	
8	5.8965	4.1630	1	1	10.0597	567.1325	0.0347	49.0694	1.5816	32.8246	32.8246	99.0695	LCS				617.2592	91.9%	
9	1.8633	1.3292	1	1	3.3985	461.8649	0.0284	106.4904	2.4030	18.4684	18.4684	76.6446	LCS				617.2592	74.8%	
10	1.8627	1.3292	1	1	3.3985	568.0190	0.0291	110.1312	2.3518	21.8678	21.8678	96.9738	LCS				617.2592	92.0%	
11	2.5158	1.7762	1	1	4.3292	616.4404	0.0255	119.0351	2.4485	22.8589	22.8589	103.8736	LCS				617.2592	99.9%	
12	2.9603	2.1042	1	1	5.0913	640.5763	0.0335	108.8189	2.3427	24.8602	24.8602	111.3283	LCS				617.2592	103.8%	
13	2.6435	1.8663	1	1	4.5346	567.8557	0.0270	106.2141	2.3142	22.3034	22.3034	95.2041	LCS				617.2592	92.0%	
14	2.6749	1.8885	1	1	4.7024	562.4254	0.0302	91.1685	2.1431	23.8323	23.8323	95.4393	LCS				617.2592	91.1%	
15	3.6828	2.6001	1	1	6.5773	545.2493	0.0332	59.3895	1.7318	28.6595	28.6595	94.6369	LCS				617.2592	88.3%	
16	12.6827	8.9541	1	1	19.5972	511.9513	0.0374	45.4664	1.5834	32.1357	32.1357	90.5466	LCS				617.2592	82.9%	
17	1.7543	1.2386	1	1	3.1242	469.0442	0.0258	108.7437	2.3383	18.2586	18.2586	79.1112	LCS				617.2592	76.0%	
18	1.9859	1.4020	1	1	3.5642	567.0548	0.0244	111.9007	2.3714	21.7520	21.7520	95.2059	LCS				617.2592	91.9%	
19	1.9272	1.3606	1	1	3.4846	615.6448	0.0265	121.0133	2.4652	22.7091	22.7091	104.1417	LCS				617.2592	99.8%	
20	2.7101	1.9133	1	1	4.6778	641.3178	0.0260	113.0209	2.3860	24.5075	24.5075	108.2538	LCS				617.2592	103.9%	
21	3.5073	2.4762	1	1	5.6365	628.0103	0.0277	106.5378	2.3221	24.7746	24.7746	106.6363	LCS				617.2592	101.7%	
22	3.1740	2.2409	1	1	5.5798	654.9223	0.0280	89.4687	2.1232	28.1306	28.1306	111.3364	LCS				617.2592	106.1%	
23	4.7175	3.3309	1	1	8.1065	568.6524	0.0337	59.0420	1.7310	30.1748	30.1748	98.9126	LCS				617.2592	92.1%	
24	37.6067	26.5506	1	1	55.0645	473.6620	0.1187	43.2688	1.4779	35.0087	35.0087	47.4683	LCS				617.2592	28.1%	
25	1.5573	1.0995	1	1	2.8431	478.1581	0.0248	111.3618	2.3648	18.4579	18.4579	80.3837	LCS				617.2592	77.5%	
26	1.5309	1.0808	1	1	2.9163	547.3559	0.0251	108.7970	2.3360	21.3622	21.3622	92.1056	LCS				617.2592	86.7%	
27	1.6459	1.1620	1	1	3.0942	588.7698	0.0248	114.6688	2.3984	22.3831	22.3831	98.9635	LCS				617.2592	95.4%	
28	1.8171	1.2829	1	1	3.4161	634.1380	0.0265	111.8687	2.3690	24.4079	24.4079	107.2347	LCS				617.2592	102.7%	
29	3.0840	2.1773	1	1	5.1588	591.5445	0.0289	110.6134	2.3647	22.9843	22.9843	100.1507	LCS				617.2592	95.8%	
30	3.1220	2.2042	1	1	5.3655	557.9798	0.0324	87.4454	2.1015	24.3710	24.3710	96.5446	LCS				617.2592	90.4%	
31	2.9671	2.0948	1	1	5.5593	536.2317	0.0333	58.7237	1.7192	28.5306	28.5306	93.1117	LCS				617.2592	86.9%	
32	6.1762	4.3605	1	1	10.3641	530.3565	0.0350	48.4142	1.5746	31.3466	31.3466	92.7730	LCS				617.2592	85.9%	
33	1.8600	1.3979	1	1	3.4352	460.0853	0.0256	107.9164	2.3314	18.4640	18.4640	77.6460	LCS				617.2592	74.6%	
34	2.0824	1.4702	1	1	3.7084	534.5645	0.0259	104.4082	2.2915	21.4635	21.4635	90.1853	LCS				617.2592	86.6%	
35	2.6580	1.8765	1	1	4.5182	612.1787	0.0240	120.0256	2.4599	22.9533	22.9533	102.6208	LCS				617.2592	99.2%	
36	3.1451	2.2205	1	1	5.3297	617.2870	0.0300	104.1780	2.2936	24.8630	24.8630	105.7410	LCS				617.2592	100.0%	
37	1.7509	1.2361	1	1	3.2618	589.7568	0.0267	112.0507	2.3713	22.8301	22.8301	99.8010	LCS				617.2592	95.5%	
38	2.8473	2.0102	1	1	4.9462	570.4358	0.0269	92.4302	2.1589	24.3718	24.3718	96.5850	LCS				617.2592	92.4%	
39	2.9369	2.0735	1	1	5.5250	543.6379	0.0319	59.1747	1.7256	26.9983	26.9983	93.8522	LCS				617.2592	88.1%	
40	8.5237	6.0178	1	1	13.6945	553.3376	0.0347	50.0316	1.6159	32.6901	32.6901	96.6672	LCS				617.2592	85.6%	



# Strontium-89 & 90 Liquid

Filename : SR8990.XLS  
 File type : Excel  
 Version # : 1.3.8

Pipet, 0.1 ml Stdev : +/- 0.000200 ml  
 Pipet, 0.5 ml Stdev : +/- 0.001000 ml  
 Pipet, 1 ml Stdev : +/- 0.002000 ml  
 Pipet, 5 ml Stdev : +/- 0.010000 ml

Sr-89 Spike S/N : N/A  
 Spike Exp Date : N/A  
 Spike Activity (dpm/ml) : N/A  
 Spike Volume Added : N/A

Sr-90 Spike S/N : N/A  
 Spike Exp Date : N/A  
 Spike Activity (dpm/ml) : N/A  
 Spike Volume Added : N/A

Batch : 1082959  
 Analyst : BXF1  
 Prep Date : 2/14/2013  
 Sr-89 Abundance : 1  
 Sr-90 Abundance : 1  
 Sr-89 Method Uncertainty : 0.0829  
 Sr-90 Method Uncertainty : 0.0821

Procedure Code : GFGBANBL  
 Parmname1 : Strontium-89  
 Parmname2 : Strontium-90  
 Required MDA Sr-89 : 1 pCi/L  
 Required MDA Sr-90 : 1 pCi/L  
 Half-life of Sr-89 : 50.53 days  
 Half-life of Sr-90 : 28.9 years  
 Half-life of Y-90 : 64.053 hours

Sr-89 LCS S/N : 1633-A  
 LCS Exp Date : 8/22/2013  
 LCS Activity (dpm/ml) : 52080.78  
 LCS Volume Added : 0.10

Sr-90 LCS S/N : 1243-J  
 LCS Exp Date : 9/11/2013  
 LCS Activity (dpm/ml) : 548.13  
 LCS Volume Added : 0.50

Sr Carrier S/N : 1858443  
 Carrier Exp Date : 12/11/2013  
 Carrier Volume Added : 0.50  
 Carrier Weight (mg/ml) : 17.10  
 Carrier Weight StDev : 0.08

Y Carrier S/N : 1840837  
 Carrier Exp Date : 10/25/2013  
 Carrier Volume Added : 0.50  
 Carrier Weight (mg/ml) : 31.20  
 Carrier Weight StDev : 0.28

Geometry:  
 Tuifryn Filter

Pos.	Sample Characteristics		Sample		Sample		Carrier Calculations		Net Weight (mg)		Net Weight StDev. (mg)		Carrier Aliquot (mL)		Carrier Aliquot StDev. (mL)	
	Sample ID	Sample Aliquot L	Sample Aliquot L	Sample Date/Time	Sr	Y	Sr	Y	Sr	Y	Sr	Y	Sr	Y	Sr	Y
1	1202347886.1	0.2000	1.6007E-05	2/14/2013 0:00	1.8	15.6	0.015066	0.074379	0.1	0.5	0.000200	0.001000				
2	1202347887.1	0.2000	1.6007E-05	2/14/2013 0:00	3.2	15.4	0.021084	0.073519	0.2	0.5	0.000200	0.001000				
3	1202347888.1	0.2000	1.6007E-05	2/14/2013 0:00	6.7	15.3	0.036127	0.073089	0.4	0.5	0.000200	0.001000				
4	1202347889.1	0.2000	1.6007E-05	2/14/2013 0:00	7.5	14.2	0.039565	0.068362	0.5	0.5	0.001000	0.001000				
5	1202347890.1	0.2000	1.6007E-05	2/14/2013 0:00	11.9	15.5	0.058476	0.073949	0.8	0.5	0.000200	0.001000				
6	1202347891.1	0.2000	1.6007E-05	2/14/2013 0:00	12.3	16.1	0.060195	0.076528	1.0	0.5	0.002000	0.001000				
7	1202347892.1	0.2000	1.6007E-05	2/14/2013 0:00	12.9	15.4	0.062774	0.073519	1.5	0.5	0.000200	0.001000				
8	1202347893.1	0.2000	1.6007E-05	2/14/2013 0:00	14.6	15.7	0.070081	0.074809	2.1	0.5	0.000200	0.001000				
9	1202347894.1	0.2000	1.6007E-05	2/14/2013 0:00	1.8	15.6	0.015066	0.074379	0.1	0.5	0.000200	0.001000				
10	1202347895.1	0.2000	1.6007E-05	2/14/2013 0:00	3.2	15.4	0.021084	0.073519	0.2	0.5	0.000200	0.001000				
11	1202347896.1	0.2000	1.6007E-05	2/14/2013 0:00	6.7	15.3	0.036127	0.073089	0.4	0.5	0.000200	0.001000				
12	1202347897.1	0.2000	1.6007E-05	2/14/2013 0:00	7.5	14.2	0.039565	0.068362	0.5	0.5	0.001000	0.001000				
13	1202347898.1	0.2000	1.6007E-05	2/14/2013 0:00	11.9	15.5	0.058476	0.073949	0.8	0.5	0.000200	0.001000				
14	1202347899.1	0.2000	1.6007E-05	2/14/2013 0:00	12.3	16.1	0.060195	0.076528	1.0	0.5	0.002000	0.001000				
15	1202347900.1	0.2000	1.6007E-05	2/14/2013 0:00	12.9	15.4	0.062774	0.073519	1.5	0.5	0.000200	0.001000				
16	1202347901.1	0.2000	1.6007E-05	2/14/2013 0:00	14.6	15.7	0.070081	0.074809	2.1	0.5	0.000200	0.001000				

Analytical SOP: GL-RAD-A-001  
Instrument SOP: GL-RAD-I-016

1st Count Raw Data		1st Count Calibration Data										Weekly Bkg Count				
Pos.	Detector ID	Counting Time (min.)	Gross Counts Alpha	Gross Counts Beta	Gross Beta CPM	Count Start Date/Time	Counted on	Calibration Date	Calibration Due Date	Detector Efficiency Sr-89	Detector Efficiency Sr-90	Detector Error (cpm/dpm)	Alpha X-Talk	Weekly Bkg CPM	Weekly Bkg Count Start Date/Time	Weekly Bkg Count Time (min.)
1	11A	5	3	9750	1949.800	2/15/2013 12:53	PIC	3/1/2012	2/28/2014	0.4305	0.4029	0.02269	0.33281	1.124	2/9/2013 19:15	500
2	11B	5	0	11608	2321.600	2/15/2013 12:53	PIC	3/1/2012	2/28/2014	0.5058	0.4206	0.00734	0.07609	1.538	2/9/2013 19:16	500
3	11C	5	2	12896	2579.162	2/15/2013 12:54	PIC	3/1/2012	2/28/2014	0.4998	0.3986	0.00829	0.09475	0.594	2/9/2013 19:16	500
4	11D	5	1	11999	2399.783	2/15/2013 12:54	PIC	3/1/2012	2/28/2014	0.5028	0.4013	0.00724	0.08632	0.562	2/9/2013 19:16	500
5	12A	5	0	0	0.000	2/15/2013 12:54	PIC	3/1/2012	2/28/2014	0.0000	0.0000	0.01964	11.15571	0.000	2/9/2013 19:16	500
6	12B	5	0	5022	1004.400	2/15/2013 12:54	PIC	3/1/2012	2/28/2014	0.2486	0.0000	0.01114	0.69146	0.496	2/9/2013 19:16	500
7	12C	5	0	3683	736.600	2/15/2013 12:54	PIC	3/1/2012	2/28/2014	0.2109	0.0000	0.01666	0.17003	0.420	2/9/2013 19:16	500
8	12D	5	0	5315	1063.000	2/15/2013 12:28	PIC	3/1/2012	2/28/2014	0.4745	0.0000	0.01845	0.40270	2.772	2/10/2013 11:05	500
9	13A	5	0	11506	2301.200	2/15/2013 12:28	PIC	3/1/2012	2/28/2014	0.5034	0.4262	0.00885	0.06762	0.474	2/9/2013 18:46	1000
10	13B	5	0	11953	2390.600	2/15/2013 12:28	PIC	3/1/2012	2/28/2014	0.5132	0.4295	0.00624	0.07806	0.493	2/9/2013 18:47	1000
11	13C	5	0	12865	2573.000	2/15/2013 12:28	PIC	3/1/2012	2/28/2014	0.5044	0.3934	0.00716	0.09301	1.353	2/9/2013 18:47	1000
12	13D	5	0	11812	2362.400	2/15/2013 12:29	PIC	3/1/2012	2/28/2014	0.4937	0.4000	0.00984	0.07020	0.665	2/9/2013 18:47	1000
13	14A	5	1	11760	2351.961	2/15/2013 12:29	PIC	3/1/2012	2/28/2014	0.4879	0.3726	0.01051	0.19700	1.010	2/9/2013 18:47	1000
14	14B	5	0	9860	1972.000	2/15/2013 12:29	PIC	3/1/2012	2/28/2014	0.4985	0.3764	0.00986	0.12011	1.040	2/9/2013 18:47	1000
15	14C	5	0	6712	1342.400	2/15/2013 12:29	PIC	3/1/2012	2/28/2014	0.5011	0.3744	0.01170	0.36817	0.291	2/9/2013 18:47	1000
16	14D	5	0	5270	1054.000	2/15/2013 12:29	PIC	3/1/2012	2/28/2014	0.4849	0.3491	0.00738	0.31706	0.827	2/9/2013 18:47	1000

2nd Count Raw Data				2nd Count Calibration Data				Detector Efficiency				Weekly Bkg Count			
Pos.	Detector ID	Counting Time (min.)	Gross Alpha	Gross Beta	Gross CPM	Count Start Date/Time	Counted on	Calibration Date	Calibration Due Date	Efficiency Y-90 (cpm/dpm)	Efficiency Error (cpm/dpm)	Alpha X-Talk	Weekly Bkg CPM	Weekly Bkg Count Start Date/Time	Weekly Bkg Count Time (min.)
1	11A	20	2	1964	98.167	2/27/2013 16:00	PIC	3/1/2012	2/28/2014	0.4678	0.02269	0.33281	1.142	2/24/2013 12:25	500
2	11B	20	3	2225	111.239	2/27/2013 16:00	PIC	3/1/2012	2/28/2014	0.5323	0.00734	0.07609	1.512	2/23/2013 19:43	500
3	11C	20	2	2433	121.641	2/27/2013 16:00	PIC	3/1/2012	2/28/2014	0.5295	0.00829	0.09475	0.720	2/23/2013 19:43	500
4	11D	20	1	2313	115.646	2/27/2013 16:01	PIC	3/1/2012	2/28/2014	0.5341	0.00724	0.08632	0.642	2/23/2013 19:43	500
5	12A	20	0	0	0.000	2/27/2013 16:01	PIC	3/1/2012	2/28/2014	0.0000	0.01964	11.15571	0.000	2/23/2013 19:43	500
6	12B	20	1	806	40.265	2/27/2013 16:01	PIC	3/1/2012	2/28/2014	0.0000	0.01114	0.69146	0.362	2/23/2013 19:43	500
7	12C	20	29	1158	57.653	2/27/2013 16:01	PIC	3/1/2012	2/28/2014	0.0000	0.01666	0.17003	0.590	2/23/2013 19:43	500
8	12D	20	21	1107	54.927	2/27/2013 16:01	PIC	3/1/2012	2/28/2014	0.0000	0.01845	0.40270	3.264	2/25/2013 7:26	500
9	13A	20	1	2189	109.447	2/27/2013 15:35	PIC	3/1/2012	2/28/2014	0.5900	0.00885	0.06762	1.035	2/23/2013 15:58	1000
10	13B	20	1	2204	110.196	2/27/2013 15:35	PIC	3/1/2012	2/28/2014	0.5438	0.00624	0.07806	0.610	2/23/2013 15:58	1000
11	13C	20	3	2635	131.738	2/27/2013 15:35	PIC	3/1/2012	2/28/2014	0.4905	0.00716	0.08301	3.945	2/25/2013 7:28	1000
12	13D	20	2	2263	113.143	2/27/2013 15:35	PIC	3/1/2012	2/28/2014	0.5264	0.00984	0.07020	1.181	2/23/2013 15:59	1000
13	14A	20	0	2055	102.750	2/27/2013 15:35	PIC	3/1/2012	2/28/2014	0.4988	0.01051	0.19700	1.493	2/25/2013 7:28	1000
14	14B	20	2	1920	95.988	2/27/2013 15:35	PIC	3/1/2012	2/28/2014	0.5217	0.00986	0.12011	1.363	2/23/2013 15:59	1000
15	14C	20	1	1272	63.582	2/27/2013 15:35	PIC	3/1/2012	2/28/2014	0.5271	0.01170	0.36817	0.437	2/23/2013 15:59	1000
16	14D	20	0	1048	52.400	2/27/2013 15:36	PIC	3/1/2012	2/28/2014	0.4715	0.00738	0.31706	1.168	2/23/2013 15:59	1000

Pos.	Correction Factors		Separation Date/Time	Yttrium	Yttrium Ingrowth (Sr-89 calc) (Sr-90 calc)	Yttrium Decay	Decay from		Net Count Rate	Gross CPM	Calculated		Sample Recovery	
	Strontium	Yttrium					Sample Date	Yr-90			Sr-89	Sr	Yr	Sr
1	2/14/2013 14:00	2/27/2013 13:20	0.2198	0.9656	0.9697	0.9791	0.9999	21.6404	89.2720	1838.8879	105%	100%	1.29%	1.14%
2	2/14/2013 14:00	2/27/2013 13:20	0.2198	0.9656	0.9697	0.9791	0.9999	27.5360	93.8080	2200.25595	93.6%	98.7%	1.05%	1.14%
3	2/14/2013 14:00	2/27/2013 13:20	0.2199	0.9656	0.9697	0.9791	0.9999	28.9900	99.1356	2451.03643	98.0%	98.1%	0.90%	1.14%
4	2/14/2013 14:00	2/27/2013 13:20	0.2199	0.9656	0.9696	0.9791	0.9999	30.7923	101.4145	2267.57594	87.7%	91.0%	0.90%	1.14%
5	2/14/2013 14:00	2/27/2013 13:20	0.2199	0.9656	0.9696	0.9791	0.9999	#DIV/0!	#DIV/0!	#DIV/0!	87.0%	99.4%	0.84%	1.14%
6	2/14/2013 14:00	2/27/2013 13:20	0.2199	0.9656	0.9696	0.9791	0.9999	#DIV/0!	#DIV/0!	#DIV/0!	71.9%	103%	0.86%	1.14%
7	2/14/2013 14:00	2/27/2013 13:20	0.2199	0.9656	0.9695	0.9791	0.9999	#DIV/0!	#DIV/0!	#DIV/0!	50.3%	98.7%	0.83%	1.14%
8	2/14/2013 14:00	2/27/2013 13:20	0.2199	0.9656	0.9695	0.9791	0.9999	#DIV/0!	#DIV/0!	#DIV/0!	40.7%	101%	0.82%	1.14%
9	2/14/2013 14:00	2/27/2013 13:20	0.2163	0.9656	0.9741	0.9793	0.9999	23.6823	92.6844	2184.83328	105%	100%	1.29%	1.14%
10	2/14/2013 14:00	2/27/2013 13:20	0.2163	0.9656	0.9742	0.9793	0.9999	26.9332	93.2099	2270.45693	93.6%	98.7%	1.05%	1.14%
11	2/14/2013 14:00	2/27/2013 13:20	0.2163	0.9656	0.9741	0.9793	0.9999	30.0050	111.0981	2431.89685	98.0%	98.1%	0.90%	1.14%
12	2/14/2013 14:00	2/27/2013 13:20	0.2163	0.9656	0.9741	0.9793	0.9999	29.3590	99.3947	2233.64682	87.7%	91.0%	0.90%	1.14%
13	2/14/2013 14:00	2/27/2013 13:20	0.2164	0.9656	0.9741	0.9793	0.9999	26.7792	80.9434	2244.23803	87.0%	99.4%	0.84%	1.14%
14	2/14/2013 14:00	2/27/2013 13:20	0.2164	0.9656	0.9740	0.9793	0.9999	30.2690	70.3476	1871.36341	71.9%	103%	0.86%	1.14%
15	2/14/2013 14:00	2/27/2013 13:20	0.2164	0.9656	0.9740	0.9793	0.9999	28.8926	48.3145	1265.19288	50.3%	98.7%	0.83%	1.14%
16	2/14/2013 14:00	2/27/2013 13:20	0.2165	0.9656	0.9740	0.9793	0.9999	29.0044	40.0835	984.912058	40.7%	101%	0.82%	1.14%

Notes:

- 1 - Results are decay corrected to Sample Date/Time
- 2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
- 3 - Spike Nominals are decay corrected to Sample Date/Time

Pos.	Decision Level		Critical Level	Required MDA		Sample Act. Conc.	Sample Act. Error	Net Count Rate	Net Count Rate Error	2 SIGMA Counting Uncertainty		2 SIGMA Total Prop. Uncertainty		Sample Type	Sample QC	Nominal pCi/L	Recovery
	pCi/L	pCi/L		MDA pCi/L	MDA pCi/L					pCi/L	pCi/L	pCi/L	pCi/L				
1	5.6351	3.9784	1	11.0022	9327.7327	0.0281	1837.7639	19.1776	190.7816	1653.3479	LCS	11729.9057	79.5%				
2	6.3126	4.4568	1	11.8300	10687.3395	0.0160	2198.7180	20.9775	199.8524	1775.2003	LCS	11729.9057	91.1%				
3	3.7923	2.6774	1	8.1739	11513.7874	0.0152	2450.4424	22.1407	203.9014	1911.2479	LCS	11729.9057	98.2%				
4	4.0943	2.8906	1	8.9105	11823.2795	0.0149	2267.0139	21.2959	217.6889	1959.2548	LCS	11729.9057	100.8%				
5	#DIV/0!	#DIV/0!	1	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	LCS	11729.9057	#DIV/0!				
6	9.4856	6.6969	1	21.1108	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	LCS	11729.9057	#DIV/0!				
7	14.7181	10.3911	1	33.7944	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	LCS	11729.9057	#DIV/0!				
8	20.7878	14.6764	1	36.5065	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	LCS	11729.9057	#DIV/0!				
9	3.1211	2.2036	1	7.0110	9479.7079	0.0183	2184.3593	20.9038	177.8080	1586.1872	LCS	11729.9057	80.8%				
10	3.5128	2.4800	1	7.8337	10871.5513	0.0154	2269.9639	21.3094	200.0325	1801.6887	LCS	11729.9057	92.7%				
11	5.6563	3.9934	1	10.7798	11314.4013	0.0146	2430.5439	22.0540	201.2206	1873.6887	LCS	11729.9057	96.5%				
12	4.5236	3.1937	1	9.5736	11857.8764	0.0164	2232.9813	21.1360	219.9887	1977.3186	LCS	11729.9057	101.1%				
13	5.6881	4.0158	1	11.2826	12154.1593	0.0164	2243.2280	21.1860	224.9870	2028.8976	LCS	11729.9057	103.6%				
14	6.8328	4.8240	1	13.4964	11996.3030	0.0167	1870.3434	19.3463	243.2087	2001.8951	LCS	11729.9057	102.3%				
15	5.1427	3.6308	1	12.7374	11543.8359	0.0191	1264.9019	15.9072	284.5398	1943.1691	LCS	11729.9057	98.4%				
16	11.0807	7.8231	1	22.6447	11478.7035	0.0181	984.0851	14.0351	320.8713	1916.3855	LCS	11729.9057	97.9%				

- Notes:  
 1 - Results are decay corrected to Sample Date/Time  
 2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date  
 3 - Spike Nominals are decay corrected to Sample Date/Time

SR-90 Results																
Pos.	Decision Level		Critical Level		Required MDA		Sample Act. Conc.		Sample Act. Error		Net Count Rate		Net Count Rate Error		Sample Type	
	pCi/L	pCi/L	pCi/L	MDA	MDA	pCi/L	pCi/L	pCi/L	pCi/L	CPM	CPM	CPM	CPM	QC	RER	Recovery
1	2.7741	1.9585	1	4.6499	474.0327	0.0342	97.0247	2.2160	19.8697	82.6163	LCS	617.2592	76.8%			
2	3.1967	2.2569	1	5.2477	536.8793	0.0254	109.7266	2.3590	21.1820	90.4387	LCS	617.2592	87.0%			
3	2.1324	1.5055	1	3.7204	571.9296	0.0248	120.9205	2.4665	21.4082	96.1392	LCS	617.2592	92.7%			
4	2.4019	1.6958	1	4.2379	648.8540	0.0249	115.0037	2.4049	24.8983	109.1118	LCS	617.2592	105.1%			
5	#DIV/0!	#DIV/0!	1	#DIV/0!	#DIV/0!	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	LCS	617.2592	#DIV/0!			
6	#DIV/0!	#DIV/0!	1	#DIV/0!	#DIV/0!	0.0390	39.9034	1.4192	#DIV/0!	#DIV/0!	LCS	617.2592	#DIV/0!			
7	#DIV/0!	#DIV/0!	1	#DIV/0!	#DIV/0!	0.0360	57.0635	1.6982	#DIV/0!	#DIV/0!	LCS	617.2592	#DIV/0!			
8	#DIV/0!	#DIV/0!	1	#DIV/0!	#DIV/0!	0.0388	51.6632	1.6592	#DIV/0!	#DIV/0!	LCS	617.2592	#DIV/0!			
9	2.2977	1.6222	1	3.8882	465.3242	0.0260	108.4116	2.3395	18.5128	78.5332	LCS	617.2592	75.4%			
10	1.9591	1.3831	1	3.4813	522.3955	0.0251	109.5861	2.3474	20.6307	87.8905	LCS	617.2592	84.6%			
11	5.3108	3.7495	1	8.2612	649.3829	0.0242	127.7925	2.5673	24.0505	108.9367	LCS	617.2592	105.2%			
12	3.2583	2.3004	1	5.4555	637.9599	0.0261	111.9620	2.3787	24.9871	107.7047	LCS	617.2592	103.4%			
13	3.5715	2.5215	1	5.8762	562.4757	0.0272	101.2570	2.2669	23.2140	95.3612	LCS	617.2592	91.1%			
14	3.7992	2.6823	1	6.2922	585.2030	0.0276	94.6250	2.1911	24.9791	99.3561	LCS	617.2592	94.8%			
15	3.1834	2.2475	1	5.8677	577.8831	0.0326	63.1446	1.7831	30.0813	100.0647	LCS	617.2592	93.6%			
16	7.0596	4.9841	1	11.8304	636.0033	0.0344	51.2320	1.6190	37.0480	110.9620	LCS	617.2592	103.0%			

Sr 89/90 1st Count

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
V1	1A	5	8	11539	2/15/2013 16:43	2/15/2013 16:48	PIC	SR89V13
V2	1B	5	23	12023	2/15/2013 16:43	2/15/2013 16:48	PIC	SR89V13
V3	1C	5	177	12868	2/15/2013 16:43	2/15/2013 16:48	PIC	SR89V13
V4	1D	5	134	12176	2/15/2013 16:44	2/15/2013 16:49	PIC	SR89V13
V5	2A	5	5	11390	2/15/2013 16:44	2/15/2013 16:49	PIC	SR89V13
V6	2B	5	1	9428	2/15/2013 16:44	2/15/2013 16:49	PIC	SR89V13
V7	2C	5	33	5596	2/15/2013 16:44	2/15/2013 16:49	PIC	SR89V13
V8	2D	5	15	5246	2/15/2013 16:44	2/15/2013 16:49	PIC	SR89V13
V1	3A	5	250	11328	2/15/2013 17:32	2/15/2013 17:37	PIC	SR89V13
V2	3B	5	218	11579	2/15/2013 17:32	2/15/2013 17:37	PIC	SR89V13
V3	3C	5	110	12957	2/15/2013 17:32	2/15/2013 17:37	PIC	SR89V13
V4	3D	5	74	11927	2/15/2013 17:32	2/15/2013 17:37	PIC	SR89V13
V5	4A	5	70	11609	2/15/2013 17:32	2/15/2013 17:37	PIC	SR89V13
V6	4B	5	0	9816	2/15/2013 17:33	2/15/2013 17:38	PIC	SR89V13
V7	4C	5	31	5723	2/15/2013 17:33	2/15/2013 17:38	PIC	SR89V13
V8	4D	5	105	5298	2/15/2013 17:33	2/15/2013 17:38	PIC	SR89V13
V1	5A	5	43	11680	2/15/2013 14:37	2/15/2013 14:42	PIC	SR89V13
V2	5B	5	44	11945	2/15/2013 14:37	2/15/2013 14:42	PIC	SR89V13
V3	5C	5	52	13232	2/15/2013 14:37	2/15/2013 14:42	PIC	SR89V13
V4	5D	5	77	12105	2/15/2013 14:37	2/15/2013 14:42	PIC	SR89V13
V5	6A	5	5	11524	2/15/2013 14:36	2/15/2013 14:41	PIC	SR89V13
V6	6B	5	32	9725	2/15/2013 14:37	2/15/2013 14:42	PIC	SR89V13
V7	6C	5	3	6296	2/15/2013 14:37	2/15/2013 14:42	PIC	SR89V13
V8	6D	5	0	3530	2/15/2013 14:37	2/15/2013 14:42	PIC	SR89V13
V1	7A	5	69	11400	2/15/2013 15:21	2/15/2013 15:26	PIC	SR89V13
V2	7B	5	96	11768	2/15/2013 15:21	2/15/2013 15:26	PIC	SR89V13
V3	7C	5	52	12908	2/15/2013 15:21	2/15/2013 15:26	PIC	SR89V13
V4	7D	5	47	12327	2/15/2013 15:21	2/15/2013 15:26	PIC	SR89V13
V5	8A	5	14	11693	2/15/2013 15:21	2/15/2013 15:26	PIC	SR89V13
V6	8B	5	0	9651	2/15/2013 15:21	2/15/2013 15:26	PIC	SR89V13
V7	8C	5	6	5870	2/15/2013 15:21	2/15/2013 15:26	PIC	SR89V13
V8	8D	5	10	5434	2/15/2013 15:21	2/15/2013 15:26	PIC	SR89V13
V1	9A	5	23	11588	2/15/2013 13:25	2/15/2013 13:30	PIC	SR89V13
V2	9B	5	12	11689	2/15/2013 13:25	2/15/2013 13:30	PIC	SR89V13
V3	9C	5	36	12772	2/15/2013 13:25	2/15/2013 13:30	PIC	SR89V13
V4	9D	5	1	11934	2/15/2013 13:25	2/15/2013 13:30	PIC	SR89V13

Sr 89/90 1st Count

V5	10A	5	10	11874	2/15/2013 13:26	2/15/2013 13:31	PIC	SR89V13
V6	10B	5	19	9704	2/15/2013 13:26	2/15/2013 13:31	PIC	SR89V13
V7	10C	5	16	6518	2/15/2013 13:26	2/15/2013 13:31	PIC	SR89V13
V8	10D	5	4	5639	2/15/2013 13:26	2/15/2013 13:31	PIC	SR89V13
V1	11A	5	3	9750	2/15/2013 12:53	2/15/2013 12:58	PIC	SR89V13
V2	11B	5	0	11608	2/15/2013 12:53	2/15/2013 12:58	PIC	SR89V13
V3	11C	5	2	12896	2/15/2013 12:54	2/15/2013 12:59	PIC	SR89V13
V4	11D	5	1	11999	2/15/2013 12:54	2/15/2013 12:59	PIC	SR89V13
V5	12A	5	0	0	2/15/2013 12:54	2/15/2013 12:59	PIC	SR89V13
V6	12B	5	0	5022	2/15/2013 12:54	2/15/2013 12:59	PIC	SR89V13
V7	12C	5	0	3683	2/15/2013 12:54	2/15/2013 12:59	PIC	SR89V13
V8	12D	5	0	5315	2/15/2013 12:54	2/15/2013 12:59	PIC	SR89V13
V1	13A	5	0	11506	2/15/2013 12:28	2/15/2013 12:33	PIC	SR89V13
V2	13B	5	0	11953	2/15/2013 12:28	2/15/2013 12:33	PIC	SR89V13
V3	13C	5	0	12865	2/15/2013 12:28	2/15/2013 12:33	PIC	SR89V13
V4	13D	5	0	11812	2/15/2013 12:29	2/15/2013 12:34	PIC	SR89V13
V5	14A	5	1	11760	2/15/2013 12:29	2/15/2013 12:34	PIC	SR89V13
V6	14B	5	0	9860	2/15/2013 12:29	2/15/2013 12:34	PIC	SR89V13
V7	14C	5	0	6712	2/15/2013 12:29	2/15/2013 12:34	PIC	SR89V13
V8	14D	5	0	5270	2/15/2013 12:29	2/15/2013 12:34	PIC	SR89V13



Sr 89/90 2nd Count

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
V1	1A	20	2	2096	2/27/2013 18:01	2/27/2013 18:21	PIC	SR8990V13
V2	1B	20	7	2181	2/27/2013 18:01	2/27/2013 18:21	PIC	SR8990V13
V3	1C	20	19	2458	2/27/2013 18:01	2/27/2013 18:21	PIC	SR8990V13
V4	1D	20	15	2243	2/27/2013 18:01	2/27/2013 18:21	PIC	SR8990V13
V5	2A	20	0	2165	2/27/2013 18:01	2/27/2013 18:21	PIC	SR8990V13
V6	2B	20	0	1643	2/27/2013 18:01	2/27/2013 18:21	PIC	SR8990V13
V7	2C	20	9	1184	2/27/2013 18:01	2/27/2013 18:21	PIC	SR8990V13
V8	2D	20	3	1000	2/27/2013 18:01	2/27/2013 18:21	PIC	SR8990V13
V1	3A	20	38	2122	2/27/2013 17:39	2/27/2013 17:59	PIC	SR8990V13
V2	3B	20	36	2213	2/27/2013 17:39	2/27/2013 17:59	PIC	SR8990V13
V3	3C	20	17	2398	2/27/2013 17:39	2/27/2013 17:59	PIC	SR8990V13
V4	3D	20	12	2195	2/27/2013 17:39	2/27/2013 17:59	PIC	SR8990V13
V5	4A	20	10	2142	2/27/2013 17:39	2/27/2013 17:59	PIC	SR8990V13
V6	4B	20	2	1837	2/27/2013 17:40	2/27/2013 18:00	PIC	SR8990V13
V7	4C	20	17	1200	2/27/2013 17:40	2/27/2013 18:00	PIC	SR8990V13
V8	4D	20	22	1000	2/27/2013 17:40	2/27/2013 18:00	PIC	SR8990V13
V1	5A	20	10	2187	2/27/2013 17:16	2/27/2013 17:36	PIC	SR8990V13
V2	5B	20	3	2249	2/27/2013 17:16	2/27/2013 17:36	PIC	SR8990V13
V3	5C	20	14	2431	2/27/2013 17:16	2/27/2013 17:36	PIC	SR8990V13
V4	5D	20	11	2277	2/27/2013 17:16	2/27/2013 17:36	PIC	SR8990V13
V5	6A	20	2	2156	2/27/2013 17:17	2/27/2013 17:37	PIC	SR8990V13
V6	6B	20	8	1803	2/27/2013 17:17	2/27/2013 17:37	PIC	SR8990V13
V7	6C	20	5	1198	2/27/2013 17:17	2/27/2013 17:37	PIC	SR8990V13
V8	6D	20	184	862	2/27/2013 17:17	2/27/2013 17:37	PIC	SR8990V13
V1	7A	20	11	2237	2/27/2013 16:53	2/27/2013 17:13	PIC	SR8990V13
V2	7B	20	15	2183	2/27/2013 16:53	2/27/2013 17:13	PIC	SR8990V13
V3	7C	20	7	2301	2/27/2013 16:54	2/27/2013 17:14	PIC	SR8990V13
V4	7D	20	8	2245	2/27/2013 16:54	2/27/2013 17:14	PIC	SR8990V13
V5	8A	20	3	2236	2/27/2013 16:54	2/27/2013 17:14	PIC	SR8990V13
V6	8B	20	1	1766	2/27/2013 16:54	2/27/2013 17:14	PIC	SR8990V13
V7	8C	20	1	1182	2/27/2013 16:54	2/27/2013 17:14	PIC	SR8990V13
V8	8D	20	4	991	2/27/2013 16:54	2/27/2013 17:14	PIC	SR8990V13
V1	9A	20	5	2174	2/27/2013 16:18	2/27/2013 16:38	PIC	SR8990V13
V2	9B	20	2	2100	2/27/2013 16:18	2/27/2013 16:38	PIC	SR8990V13
V3	9C	20	4	2420	2/27/2013 16:18	2/27/2013 16:38	PIC	SR8990V13
V4	9D	20	3	2104	2/27/2013 16:18	2/27/2013 16:38	PIC	SR8990V13

Sr 89/90 2nd Count

V5	10A	20	2	2249	2/27/2013 16:18	2/27/2013 16:38	PIC	SR8990V13
V6	10B	20	5	1864	2/27/2013 16:18	2/27/2013 16:38	PIC	SR8990V13
V7	10C	20	4	1191	2/27/2013 16:18	2/27/2013 16:38	PIC	SR8990V13
V8	10D	20	4	1043	2/27/2013 16:18	2/27/2013 16:38	PIC	SR8990V13
V1	11A	20	2	1964	2/27/2013 16:00	2/27/2013 16:20	PIC	SR8990V13
V2	11B	20	3	2225	2/27/2013 16:00	2/27/2013 16:20	PIC	SR8990V13
V3	11C	20	2	2433	2/27/2013 16:00	2/27/2013 16:20	PIC	SR8990V13
V4	11D	20	1	2313	2/27/2013 16:01	2/27/2013 16:21	PIC	SR8990V13
V5	12A	20	0	0	2/27/2013 16:01	2/27/2013 16:21	PIC	SR8990V13
V6	12B	20	1	806	2/27/2013 16:01	2/27/2013 16:21	PIC	SR8990V13
V7	12C	20	29	1158	2/27/2013 16:01	2/27/2013 16:21	PIC	SR8990V13
V8	12D	20	21	1107	2/27/2013 16:01	2/27/2013 16:21	PIC	SR8990V13
V1	13A	20	1	2189	2/27/2013 15:35	2/27/2013 15:55	PIC	SR8990V13
V2	13B	20	1	2204	2/27/2013 15:35	2/27/2013 15:55	PIC	SR8990V13
V3	13C	20	3	2635	2/27/2013 15:35	2/27/2013 15:55	PIC	SR8990V13
V4	13D	20	2	2263	2/27/2013 15:35	2/27/2013 15:55	PIC	SR8990V13
V5	14A	20	0	2055	2/27/2013 15:35	2/27/2013 15:55	PIC	SR8990V13
V6	14B	20	2	1920	2/27/2013 15:35	2/27/2013 15:55	PIC	SR8990V13
V7	14C	20	1	1272	2/27/2013 15:35	2/27/2013 15:55	PIC	SR8990V13
V8	14D	20	0	1048	2/27/2013 15:36	2/27/2013 15:56	PIC	SR8990V13

### Strontium-90 Liquid

Filename : SR90.XLS  
 File type : Excel  
 Version # : 1.3.8

Spike Volume Added: N/A  
 Spike Activity (dpm/ml): N/A  
 Spike Exp Date : N/A  
 Spike Volume Added: N/A

Batch : 1082959  
 Analyst : BXF1  
 Prep Date : 2/14/2013

LCS Volume Added: 1.00  
 LCS Activity (dpm/ml): 548.13  
 LCS Exp Date : 9/11/2013

Pipet, 0.1 ml Sidev : +/-  
 Pipet, 0.5 ml Sidev : +/-  
 Pipet, 1 ml Sidev : +/-

0.000200 ml  
 0.001000 ml  
 0.002000 ml

Sr-90 Abundance : 1  
 Method Uncertainty : 0.0829

Procedure Code : GFCGANBL  
 Parname : Strontium-90

Carrier Volume Added: 0.50  
 Carrier Weight (mg/ml): 17.10  
 Carrier Weight Sidev.: 0.08  
 Required MDA : 1  
 Half-life of Sr-90 : 28.90 years  
 Half-life of Y-90 : 64.053 hours

Sample Characteristics			Carrier Calculations			Carrier			
Pos.	Sample ID	Sample Aliquot L	Sample Aliquot L	Sample Date/Time	Carrier Weight (Standard)	Net Weight (Sample)	Net Weight Sidev. (mg)	Carrier Aliquot (mL)	Carrier Aliquot Sidev. (mL)
1	1202347886.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	1.70	0.014637	0.1	0.000200
2	1202347887.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	3.90	0.024092	0.2	0.000200
3	1202347888.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	6.60	0.035697	0.4	0.000200
4	1202347889.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	7.30	0.038705	0.5	0.001000
5	1202347890.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	11.30	0.055897	0.8	0.000200
6	1202347891.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	3.90	0.024092	0.2	0.000200
7	1202347892.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	15.00	0.071800	1.5	0.000200
8	1202347893.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	15.80	0.075238	2.1	0.000200
9	1202347894.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	1.70	0.014637	0.1	0.000200
10	1202347895.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	3.90	0.024092	0.2	0.000200
11	1202347896.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	6.60	0.035697	0.4	0.000200
12	1202347897.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	7.30	0.038705	0.5	0.001000
13	1202347898.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	11.30	0.055897	0.8	0.000200
14	1202347899.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	6.60	0.035697	0.4	0.000200
15	1202347900.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	7.30	0.038705	0.5	0.001000
16	1202347901.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	15.80	0.075238	2.1	0.000200
17	1202347902.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	1.70	0.014637	0.1	0.000200
18	1202347903.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	3.90	0.024092	0.2	0.000200
19	1202347904.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	6.60	0.035697	0.4	0.000200
20	1202347905.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	7.30	0.038705	0.5	0.001000
21	1202347906.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	11.30	0.055897	0.8	0.000200
22	1202347907.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	7.30	0.038705	0.5	0.001000
23	1202347908.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	3.90	0.024092	0.2	0.000200
24	1202347909.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	6.60	0.035697	0.4	0.000200
25	1202347910.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	1.70	0.014637	0.1	0.000200
26	1202347911.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	3.90	0.024092	0.2	0.000200
27	1202347912.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	6.60	0.035697	0.4	0.000200
28	1202347913.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	7.30	0.038705	0.5	0.001000
29	1202347914.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	11.30	0.055897	0.8	0.000200
30	1202347915.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	13.80	0.066442	1.0	0.000200
31	1202347916.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	15.00	0.071800	1.5	0.000200
32	1202347917.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	15.80	0.075238	2.1	0.000200
33	1202347918.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	1.70	0.014637	0.1	0.000200
34	1202347919.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	3.90	0.024092	0.2	0.000200
35	1202347920.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	6.60	0.035697	0.4	0.000200
36	1202347921.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	7.30	0.038705	0.5	0.001000
37	1202347922.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	11.30	0.055897	0.8	0.000200
38	1202347923.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	13.80	0.066442	1.0	0.000200
39	1202347924.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	15.00	0.071800	1.5	0.000200
40	1202347925.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	15.80	0.075238	2.1	0.000200

Analytical SOP: GL-RAD-A-001  
Instrument SOP: GL-RAD-I-016

Pos.	Detector ID	Counting Time (min.)		Gross Counts		Gross Beta CPM	Count Start Date/Time	Strontium Separation Date/Time	Yttrium Ingrowth	Sr-90 Decay	Calculated Sample Recovery %	Sample Recovery Error %
		Alpha	Beta	Alpha	Beta							
1	1A	15	8	3665	244,292	2/15/2013 17:09	2/14/2013 14:00	0.256	1.000	99.4%	1.32%	
2	1B	15	20	4314	287,491	2/15/2013 17:09	2/14/2013 14:00	0.256	1.000	114%	1.00%	
3	1C	15	94	4119	274,400	2/15/2013 17:09	2/14/2013 14:00	0.256	1.000	96.5%	0.90%	
4	1D	15	69	3759	250,399	2/15/2013 17:09	2/14/2013 14:00	0.256	1.000	85.4%	0.91%	
5	2A	15	8	2884	192,228	2/15/2013 17:10	2/14/2013 14:00	0.256	1.000	82.6%	0.84%	
6	2B	20	1	8539	426,943	2/27/2013 11:04	2/14/2013 14:00	0.965	0.999	114%	1.00%	
7	2C	15	20	2326	154,996	2/15/2013 17:10	2/14/2013 14:00	0.256	1.000	58.5%	0.82%	
8	2D	15	18	1700	113,263	2/15/2013 17:10	2/14/2013 14:00	0.256	1.000	44.0%	0.82%	
9	3A	15	171	3538	236,592	2/15/2013 17:42	2/14/2013 14:00	0.260	1.000	99.4%	1.32%	
10	3B	15	99	4153	276,691	2/15/2013 17:42	2/14/2013 14:00	0.260	1.000	114%	1.00%	
11	3C	15	64	4112	273,986	2/15/2013 17:42	2/14/2013 14:00	0.260	1.000	96.5%	0.90%	
12	3D	15	63	3551	235,239	2/15/2013 17:42	2/14/2013 14:00	0.260	1.000	85.4%	0.91%	
13	4A	15	42	2778	185,090	2/15/2013 11:04	2/14/2013 14:00	0.260	1.000	82.6%	0.84%	
14	4B	20	1	9044	452,193	2/27/2013 11:04	2/14/2013 14:00	0.965	0.999	96.5%	0.90%	
15	4C	20	85	7920	395,825	2/27/2013 11:15	2/14/2013 14:00	0.965	0.999	85.4%	0.91%	
16	4D	15	68	1725	114,833	2/15/2013 17:43	2/14/2013 14:00	0.260	1.000	44.0%	0.82%	
17	5A	15	32	3633	242,114	2/15/2013 14:49	2/14/2013 14:00	0.237	1.000	99.4%	1.32%	
18	5B	15	34	4202	280,051	2/15/2013 14:49	2/14/2013 14:00	0.237	1.000	114%	1.00%	
19	5C	15	27	4209	280,526	2/15/2013 14:49	2/14/2013 14:00	0.237	1.000	96.5%	0.90%	
20	5D	15	33	3695	246,249	2/15/2013 14:49	2/14/2013 14:00	0.237	1.000	85.4%	0.91%	
21	6A	15	5	3097	206,440	2/15/2013 14:50	2/14/2013 14:00	0.237	1.000	82.6%	0.84%	
22	6B	20	56	8085	404,152	2/27/2013 12:14	2/14/2013 14:00	0.965	0.999	85.4%	0.91%	
23	6C	20	35	9193	459,606	2/27/2013 11:27	2/14/2013 14:00	0.965	0.999	114%	1.00%	
24	6D	20	2408	7026	344,569	2/27/2013 11:28	2/14/2013 14:00	0.965	0.999	96.5%	0.90%	
25	7A	15	50	3577	236,333	2/15/2013 15:29	2/14/2013 14:00	0.242	1.000	99.4%	1.32%	
26	7B	15	54	4173	278,077	2/15/2013 15:29	2/14/2013 14:00	0.242	1.000	114%	1.00%	
27	7C	15	15	3894	266,217	2/15/2013 15:28	2/14/2013 14:00	0.242	1.000	96.5%	0.90%	
28	7D	15	22	3645	242,937	2/15/2013 15:29	2/14/2013 14:00	0.242	1.000	85.4%	0.91%	
29	8A	15	5	2890	192,648	2/15/2013 15:29	2/14/2013 14:00	0.242	1.000	82.6%	0.84%	
30	8B	15	0	3409	227,267	2/15/2013 15:29	2/14/2013 14:00	0.242	1.000	80.7%	0.85%	
31	8C	15	2	2382	158,794	2/15/2013 15:29	2/14/2013 14:00	0.242	1.000	58.5%	0.82%	
32	8D	15	2	1777	118,460	2/15/2013 15:30	2/14/2013 14:00	0.242	1.000	44.0%	0.82%	
33	9A	15	10	3602	240,081	2/15/2013 13:43	2/14/2013 14:00	0.227	1.000	99.4%	1.32%	
34	9B	15	13	4030	268,515	2/15/2013 13:43	2/14/2013 14:00	0.227	1.000	114%	1.00%	
35	9C	15	11	3988	265,821	2/15/2013 13:43	2/14/2013 14:00	0.227	1.000	96.5%	0.90%	
36	9D	15	1	3459	230,589	2/15/2013 13:43	2/14/2013 14:00	0.228	1.000	85.4%	0.91%	
37	10A	15	3	3167	211,119	2/15/2013 13:43	2/14/2013 14:00	0.228	1.000	82.6%	0.84%	
38	10B	15	11	3356	223,686	2/15/2013 13:44	2/14/2013 14:00	0.228	1.000	80.7%	0.85%	
39	10C	15	7	2329	155,235	2/15/2013 13:44	2/14/2013 14:00	0.228	1.000	58.5%	0.82%	
40	10D	15	4	1724	114,914	2/15/2013 13:44	2/14/2013 14:00	0.228	1.000	44.0%	0.82%	

Pos.	Calibration Data		Calibration		Detector Efficiency (cpm/dpm)		Detector Error (cpm/dpm)		Alpha X-Talk		Weekly Bkg Count		Weekly Bkg Count Time (min.)	
	Counted on	Calibration Date	Due Date	Sr-90	Y-90	Sr-90	Y-90	Alpha	Weekly Bkg CPM	Weekly Bkg Count Start Date/Time	Weekly Bkg Count Start Date/Time	Weekly Bkg Count Time (min.)		
1	PIC	3/1/2012	2/28/2014	0.4076	0.5353	0.00738	0.07826	0.368	2/9/2013 19:30	2/9/2013 19:30	500			
2	PIC	3/1/2012	2/28/2014	0.4017	0.5335	0.00547	0.08195	0.542	2/9/2013 19:30	2/9/2013 19:30	500			
3	PIC	3/1/2012	2/28/2014	0.4026	0.5362	0.00847	0.03198	0.534	2/9/2013 19:12	2/9/2013 19:12	500			
4	PIC	3/1/2012	2/28/2014	0.3917	0.5309	0.00692	0.04364	0.408	2/9/2013 19:29	2/9/2013 19:29	500			
5	PIC	3/1/2012	2/28/2014	0.3778	0.5118	0.01298	0.07244	1.022	2/9/2013 19:12	2/9/2013 19:12	500			
6	PIC	3/1/2012	2/28/2014	0.3910	0.5160	0.02111	0.14840	1.106	2/25/2013 7:21	2/25/2013 7:21	500			
7	PIC	3/1/2012	2/28/2014	0.3748	0.5181	0.01213	0.05333	0.580	2/9/2013 19:12	2/9/2013 19:12	500			
8	PIC	3/1/2012	2/28/2014	0.3694	0.5199	0.00583	0.05856	0.824	2/9/2013 19:12	2/9/2013 19:12	500			
9	PIC	3/1/2012	2/28/2014	0.3944	0.5308	0.01401	0.02411	0.498	2/9/2013 19:12	2/9/2013 19:12	500			
10	PIC	3/1/2012	2/28/2014	0.3871	0.5306	0.01614	0.02666	0.436	2/9/2013 19:29	2/9/2013 19:29	500			
11	PIC	3/1/2012	2/28/2014	0.3972	0.5319	0.00988	0.03442	0.872	2/9/2013 19:49	2/9/2013 19:49	500			
12	PIC	3/1/2012	2/28/2014	0.3857	0.5210	0.02297	0.08821	1.054	2/9/2013 19:12	2/9/2013 19:12	500			
13	PIC	3/1/2012	2/28/2014	0.3853	0.5300	0.01123	0.03926	0.900	2/9/2013 19:12	2/9/2013 19:12	500			
14	PIC	3/1/2012	2/28/2014	0.3954	0.5348	0.01519	0.13907	0.666	2/23/2013 19:36	2/23/2013 19:36	500			
15	PIC	3/1/2012	2/28/2014	0.3939	0.5373	0.01100	0.04119	0.570	2/23/2013 19:36	2/23/2013 19:36	500			
16	PIC	3/1/2012	2/28/2014	0.3688	0.5316	0.00773	0.03680	0.470	2/10/2013 10:44	2/10/2013 10:44	500			
17	PIC	3/1/2012	2/28/2014	0.4177	0.5372	0.00851	0.04048	0.534	2/9/2013 19:12	2/9/2013 19:12	500			
18	PIC	3/1/2012	2/28/2014	0.4079	0.5379	0.00426	0.03628	0.528	2/9/2013 19:12	2/9/2013 19:12	500			
19	PIC	3/1/2012	2/28/2014	0.4043	0.5391	0.01258	0.04138	0.498	2/9/2013 19:12	2/9/2013 19:12	500			
20	PIC	3/1/2012	2/28/2014	0.3938	0.5383	0.01000	0.03814	0.480	2/9/2013 19:12	2/9/2013 19:12	500			
21	PIC	3/1/2012	2/28/2014	0.3640	0.4788	0.01264	0.08088	0.590	2/9/2013 19:12	2/9/2013 19:12	500			
22	PIC	3/1/2012	2/28/2014	0.3632	0.4489	0.00946	0.03510	0.666	2/23/2013 19:37	2/23/2013 19:37	500			
23	PIC	3/1/2012	2/28/2014	0.4007	0.5101	0.01207	0.02523	0.850	2/23/2013 19:37	2/23/2013 19:37	500			
24	PIC	3/1/2012	2/28/2014	0.3369	0.4555	0.01311	0.05591	29.246	2/25/2013 7:21	2/25/2013 7:21	500			
25	PIC	3/1/2012	2/28/2014	0.4193	0.5374	0.00594	0.04017	0.444	2/9/2013 19:12	2/9/2013 19:12	500			
26	PIC	3/1/2012	2/28/2014	0.4086	0.5395	0.00627	0.03418	0.315	2/9/2013 19:12	2/9/2013 19:12	500			
27	PIC	3/1/2012	2/28/2014	0.4029	0.5321	0.00681	0.04975	0.294	2/9/2013 19:12	2/9/2013 19:12	500			
28	PIC	3/1/2012	2/28/2014	0.3960	0.5367	0.01113	0.04317	0.342	2/9/2013 19:12	2/9/2013 19:12	500			
29	PIC	3/1/2012	2/28/2014	0.3752	0.5255	0.01157	0.05860	1.075	2/9/2013 19:12	2/9/2013 19:12	500			
30	PIC	3/1/2012	2/28/2014	0.3682	0.5128	0.01858	0.13429	0.758	2/9/2013 19:12	2/9/2013 19:12	500			
31	PIC	3/1/2012	2/28/2014	0.3782	0.5358	0.01100	0.04650	0.362	2/9/2013 19:12	2/9/2013 19:12	500			
32	PIC	3/1/2012	2/28/2014	0.3788	0.5420	0.00609	0.04868	0.906	2/9/2013 19:12	2/9/2013 19:12	500			
33	PIC	3/1/2012	2/28/2014	0.4263	0.5377	0.00758	0.07823	0.782	2/9/2013 19:12	2/9/2013 19:12	500			
34	PIC	3/1/2012	2/28/2014	0.4015	0.5267	0.00754	0.05937	0.332	2/9/2013 19:12	2/9/2013 19:12	500			
35	PIC	3/1/2012	2/28/2014	0.4032	0.5322	0.00491	0.06260	0.818	2/9/2013 19:12	2/9/2013 19:12	500			
36	PIC	3/1/2012	2/28/2014	0.3933	0.5101	0.01680	0.15949	1.064	2/9/2013 19:12	2/9/2013 19:12	500			
37	PIC	3/1/2012	2/28/2014	0.3922	0.5305	0.01166	0.07263	0.368	2/11/2013 10:17	2/11/2013 10:17	500			
38	PIC	3/1/2012	2/28/2014	0.3678	0.5268	0.00685	0.06429	0.714	2/9/2013 19:12	2/9/2013 19:12	500			
39	PIC	3/1/2012	2/28/2014	0.3686	0.5291	0.00610	0.06876	0.326	2/9/2013 19:12	2/9/2013 19:12	500			
40	PIC	3/1/2012	2/28/2014	0.3659	0.5333	0.00557	0.07183	1.210	2/9/2013 19:12	2/9/2013 19:12	500			

- Notes:  
 1 - Results are decay corrected to Sample Date/Time  
 2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date  
 3 - Spike Nominals are decay corrected to Sample Date/Time

Results Pos.	Decision Level pCi/L	Critical Level pCi/L	Required MDA pCi/L	Sample Act. MDA pCi/L	Sample Act. Conc. pCi/L	Sample Act. Error pCi/L	Net Count Rate CPM	Net Count Rate Error CPM	2 SIGMA Counting Uncertainty		2 SIGMA Total Prop. Uncertainty		Sample QC Type	Sample RER	Nominal pCi/L	Recovery
									pCi/L	CPM	pCi/L	CPM				
1	0.3083	0.2177	1	0.6018	203.0302	0.0224	243.9236	4.0357	6.5839	34.2998	34.2998	LCS	246.9037	82.2%		
2	0.3900	0.2330	1	0.6128	210.6703	0.0190	286.9487	4.3780	6.2999	35.1930	35.1930	LCS	246.9037	85.3%		
3	0.3860	0.2725	1	0.7180	236.9251	0.0199	273.8656	4.2772	7.2525	39.7855	39.7855	LCS	246.9037	96.0%		
4	0.3901	0.2754	1	0.7509	250.0620	0.0199	249.9912	4.0858	8.0105	41.9260	41.9260	LCS	246.9037	101.3%		
5	0.6618	0.4672	1	1.1489	205.0118	0.0243	191.2060	3.5801	7.5237	35.1012	35.1012	LCS	246.9037	83.0%		
6	0.2486	0.1755	1	0.4177	189.4211	0.0257	455.8366	4.6205	4.0284	33.1660	33.1660	LCS	246.9037	76.7%		
7	0.7061	0.4985	1	1.3007	234.4869	0.0255	154.4156	3.2147	9.5680	40.2454	40.2454	LCS	246.9037	95.0%		
8	1.1297	0.7976	1	2.0028	229.1651	0.0264	112.4391	2.7482	10.9792	39.1737	39.1737	LCS	246.9037	92.8%		
9	0.3667	0.2589	1	0.6881	200.0974	0.0256	235.0938	3.9632	6.6116	34.4669	34.4669	LCS	246.9037	81.0%		
10	0.3033	0.2141	1	0.5787	207.8347	0.0245	276.2547	4.2950	6.3332	35.8248	35.8248	LCS	246.9037	84.2%		
11	0.4970	0.3509	1	0.8762	238.0920	0.0206	273.1145	4.2741	7.3029	40.1246	40.1246	LCS	246.9037	96.4%		
12	0.6345	0.4480	1	1.0984	237.0633	0.0299	234.1855	3.9804	7.8578	42.3205	42.3205	LCS	246.9037	96.0%		
13	0.5693	0.4020	1	1.0124	192.1320	0.0237	184.2901	3.5130	7.1784	32.7405	32.7405	LCS	246.9037	77.6%		
14	0.2223	0.1589	1	0.3808	231.4846	0.0206	451.5270	4.7551	4.7781	39.8595	39.8595	LCS	246.9037	93.8%		
15	0.2322	0.1639	1	0.4147	228.7707	0.0182	395.2549	4.4489	5.0469	38.3714	38.3714	LCS	246.9037	92.7%		
16	2.6064	1.8401	1	4.0841	222.8322	0.0275	110.3632	2.7685	10.9560	36.2957	36.2957	LCS	246.9037	90.3%		
17	0.3711	0.2620	1	0.6904	200.9502	0.0229	241.5796	4.0177	6.5503	34.0365	34.0365	LCS	246.9037	81.4%		
18	0.3275	0.2312	1	0.6101	206.3330	0.0189	278.5231	4.3210	6.2516	34.4272	34.4272	LCS	246.9037	83.6%		
19	0.3782	0.2670	1	0.7096	245.7924	0.0218	280.0275	4.3247	7.4401	41.7433	41.7433	LCS	246.9037	99.5%		
20	0.4282	0.3023	1	0.8072	248.8101	0.0213	245.7694	4.0519	8.0399	42.0253	42.0253	LCS	246.9037	100.8%		
21	0.5358	0.3783	1	0.9851	235.1825	0.0236	205.8497	3.7100	8.3077	40.1523	40.1523	LCS	246.9037	95.3%		
22	0.2875	0.2030	1	0.5054	267.4996	0.0172	403.4857	4.4954	5.8415	44.6662	44.6662	LCS	246.9037	108.3%		
23	0.2169	0.1531	1	0.3727	203.1256	0.0188	458.7558	4.7940	4.1604	34.1841	34.1841	LCS	246.9037	82.3%		
24	1.7293	1.2209	1	2.5320	189.7680	0.0207	315.3227	4.1578	4.9044	34.1489	34.1489	LCS	246.9037	76.9%		
25	0.3556	0.2369	1	0.6388	196.2321	0.0221	237.8888	3.9662	6.4448	33.0812	33.0812	LCS	246.9037	79.5%		
26	0.2515	0.1775	1	0.5016	203.5134	0.0195	277.7610	4.3057	7.1633	34.0590	34.0590	LCS	246.9037	82.4%		
27	0.2907	0.2052	1	0.5861	233.4949	0.0194	285.9229	4.2129	7.2503	39.0927	39.0927	LCS	246.9037	94.6%		
28	0.3582	0.2529	1	0.7065	243.3965	0.0219	242.5947	4.0245	7.9141	41.2527	41.2527	LCS	246.9037	98.6%		
29	0.6875	0.4854	1	1.1878	207.9426	0.0236	191.5718	3.5840	7.6250	35.4399	35.4399	LCS	246.9037	84.2%		
30	0.6026	0.4254	1	1.0776	256.7768	0.0267	226.5087	3.8926	8.6491	41.8203	41.8203	LCS	246.9037	104.0%		
31	0.5571	0.3933	1	1.0899	240.2585	0.0247	158.4318	3.2538	9.6712	41.0631	41.0631	LCS	246.9037	97.3%		
32	1.1657	0.8237	1	2.0489	235.9914	0.0260	117.5540	2.8105	11.0587	40.2849	40.2849	LCS	246.9037	95.6%		
33	0.4460	0.3148	1	0.7949	197.6525	0.0226	239.2992	4.0009	6.4770	33.4178	33.4178	LCS	246.9037	80.1%		
34	0.2666	0.1882	1	0.5280	203.2911	0.0201	288.2832	4.2018	6.2850	34.1228	34.1228	LCS	246.9037	82.3%		
35	0.4918	0.3472	1	0.8726	236.0122	0.0189	265.0028	4.2099	7.3487	39.3977	39.3977	LCS	246.9037	95.6%		
36	0.6523	0.4606	1	1.1283	237.7451	0.0256	229.5254	3.9211	7.9605	41.1833	41.1833	LCS	246.9037	96.3%		
37	0.4017	0.2836	1	0.7841	228.5693	0.0229	210.7508	3.7517	7.9751	38.8811	38.8811	LCS	246.9037	92.6%		
38	0.5905	0.4159	1	1.0627	255.1987	0.0205	222.9722	3.8618	8.6632	42.8498	42.8498	LCS	246.9037	103.4%		
39	0.5491	0.3877	1	1.0604	244.0075	0.0232	154.9086	3.2171	9.9322	41.2686	41.2686	LCS	246.9037	98.8%		
40	1.4110	0.9962	1	2.4126	238.8886	0.0263	113.7042	2.7683	11.3995	40.8038	40.8038	LCS	246.9037	96.8%		

# Strontium-90 Liquid

Filename : SR90.XLS  
 File type : Excel  
 Version # : 1.3.8

Spike S/N : N/A  
 Spike Exp Date : N/A  
 Spike Activity (dpm/ml) : N/A  
 Spike Volume Added: N/A

Batch : 1082959  
 Analyst : BXF1  
 Prep Date : 2/14/2013

LCS S/N : 1243-J  
 LCS Exp Date : 9/11/2013  
 LCS Activity (dpm/ml): 548.13  
 LCS Volume Added: 1.00

Pipet, 0.1 ml Stdev : +/- 0.000200 ml  
 Pipet, 0.5 ml Stdev : +/- 0.001000 ml  
 Pipet, 1 ml Stdev : +/- 0.002000 ml

Sr-90 Abundance : 1  
 Method Uncertainty : 0.0829

Procedure Code : GFCGANBL  
 Parname : Strontium-90  
 Required MDA : 1 pCi/L  
 Halflife of Sr-90 : 28.90 years  
 Halflife of Y-90 : 64.053 hours

Geometry: Tuffryn Filter

Pos.	Sample Characteristics		Sample Aliquot L	Sample Aliquot StDev. L	Sample Date/Time	Carrier Calculations			Carrier Aliquot (mL)	Carrier Aliquot StDev. (mL)
	Sample ID	Sample L				Carrier Weight (mg) (Standard)	Net Weight (mg) (Sample)	Net Weight StDev. (mg)		
1	1202347886.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	1.70	0.014637	0.1	0.000200	
2	1202347887.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	3.90	0.024092	0.2	0.000200	
3	1202347888.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	6.60	0.035697	0.4	0.000200	
4	1202347889.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	7.30	0.036705	0.5	0.001000	
5	1202347890.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	11.30	0.055897	0.8	0.000200	
6	1202347891.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	6.60	0.035697	0.4	0.000200	
7	1202347892.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	3.90	0.024092	0.2	0.000200	
8	1202347893.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	1.70	0.014637	0.1	0.000200	
9	1202347894.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	3.90	0.024092	0.2	0.000200	
10	1202347895.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	6.60	0.035697	0.4	0.000200	
11	1202347896.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	7.30	0.036705	0.5	0.001000	
12	1202347897.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	11.30	0.055897	0.8	0.000200	
13	1202347898.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	7.30	0.036705	0.5	0.001000	
14	1202347899.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	7.30	0.036705	0.5	0.001000	
15	1202347900.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	7.30	0.036705	0.5	0.001000	
16	1202347901.1	1.0000	2.0399E-05	2/14/2013 0:00	17.10	15.80	0.075238	2.1	0.000200	

Analytical SOP: GL-RAD-A-001  
Instrument SOP: GL-RAD-I-016

Count Raw Data		Counting				Gross Counts		Gross Beta	Count		Strontium	Yttrium	Sr-90	Calculated	Sample
Pos.	Detector ID	Time (min.)	Alpha	Beta	CPM	Start Date/Time	Separation Date/Time	Decay	Recovery %	Error %	Recovery %	Recovery Error %	Recovery %	Recovery Error %	
1	11A	15	2	3201	213.356	2/15/2013 13:18	2/14/2013 14:00	1.000	99.4%	1.32%	1.000	0.224	1.000	99.4%	1.32%
2	11B	15	3	4037	269.118	2/15/2013 13:18	2/14/2013 14:00	1.000	114%	1.00%	1.000	0.224	1.000	114%	1.00%
3	11C	15	1	3959	263.927	2/15/2013 13:19	2/14/2013 14:00	1.000	96.5%	0.90%	1.000	0.224	1.000	96.5%	0.90%
4	11D	15	0	3590	239.333	2/15/2013 13:19	2/14/2013 14:00	1.000	85.4%	0.91%	1.000	0.224	1.000	85.4%	0.91%
5	12A	15	0	0	0.000	2/15/2013 13:19	2/14/2013 14:00	1.000	82.6%	0.84%	1.000	0.224	1.000	82.6%	0.84%
6	12B	20	4	6246	342.266	2/27/2013 10:39	2/14/2013 14:00	0.999	96.5%	0.90%	0.999	0.966	0.999	96.5%	0.90%
7	12C	20	301	8124	403.736	2/27/2013 10:47	2/14/2013 14:00	0.999	114%	1.00%	0.999	0.966	0.999	114%	1.00%
8	12D	15	3	4742	144.052	2/15/2013 13:20	2/14/2013 14:00	1.000	44.0%	0.82%	1.000	0.224	1.000	44.0%	0.82%
9	13A	15	2	4103	273.524	2/16/2013 14:59	2/14/2013 14:00	1.000	99.4%	1.32%	1.000	0.412	1.000	99.4%	1.32%
10	13B	15	1	4879	325.261	2/16/2013 14:59	2/14/2013 14:00	1.000	114%	1.00%	1.000	0.412	1.000	114%	1.00%
11	13C	15	0	4687	312.467	2/16/2013 14:59	2/14/2013 14:00	1.000	96.5%	0.90%	1.000	0.412	1.000	96.5%	0.90%
12	13D	15	1	4189	279.262	2/16/2013 14:59	2/14/2013 14:00	1.000	85.4%	0.91%	1.000	0.412	1.000	85.4%	0.91%
13	14A	15	0	3018	201.200	2/16/2013 14:59	2/14/2013 14:00	1.000	82.6%	0.84%	1.000	0.965	1.000	82.6%	0.84%
14	14B	20	4	7988	399.378	2/27/2013 10:35	2/14/2013 14:00	0.999	85.4%	0.91%	0.999	0.965	0.999	85.4%	0.91%
15	14C	20	1	7951	397.532	2/27/2013 10:57	2/14/2013 14:00	1.000	85.4%	0.91%	1.000	0.965	1.000	85.4%	0.91%
16	14D	15	0	2018	134.533	2/16/2013 15:00	2/14/2013 14:00	1.000	44.0%	0.82%	1.000	0.412	1.000	44.0%	0.82%



Calibration Data												
Pos.	Counted on	Calibration Date	Calibration Due Date	Detector Efficiency Sr-90	Detector Efficiency Y-90	Detector Error (cpm/dpm)	Alpha X-Talk	Weekly Bkg CPM	Weekly Bkg Count Start Date/Time	Weekly Bkg Count Time (min.)		
1	PIC	3/1/2012	2/28/2014	0.4034	0.4678	0.02269	0.33248	1.124	2/9/2013 19:15	500		
2	PIC	3/1/2012	2/28/2014	0.4173	0.5323	0.00734	0.07737	1.538	2/9/2013 19:16	500		
3	PIC	3/1/2012	2/28/2014	0.3990	0.5295	0.00829	0.09457	0.594	2/9/2013 19:16	500		
4	PIC	3/1/2012	2/28/2014	0.4023	0.5341	0.00724	0.08604	0.562	2/9/2013 19:16	500		
5	PIC	3/1/2012	2/28/2014	0.0000	0.0000	0.01864	11.10536	0.000	2/23/2013 19:43	500		
6	PIC	3/1/2012	2/28/2014	0.0000	0.0000	0.01114	0.67606	0.362	2/23/2013 19:43	500		
7	PIC	3/1/2012	2/28/2014	0.0000	0.0000	0.01666	0.15378	0.599	2/23/2013 19:43	500		
8	PIC	3/1/2012	2/28/2014	0.0000	0.0000	0.01845	0.40529	2.772	2/23/2013 19:43	500		
9	PIC	3/1/2012	2/28/2014	0.4266	0.5300	0.00885	0.06743	0.474	2/9/2013 18:46	1000		
10	PIC	3/1/2012	2/28/2014	0.4263	0.5438	0.00624	0.07945	0.493	2/9/2013 18:47	1000		
11	PIC	3/1/2012	2/28/2014	0.3938	0.4905	0.00716	0.08286	1.353	2/9/2013 18:47	1000		
12	PIC	3/1/2012	2/28/2014	0.4009	0.5264	0.00984	0.06983	0.665	2/9/2013 18:47	1000		
13	PIC	3/1/2012	2/28/2014	0.3756	0.4988	0.01051	0.19523	1.010	2/9/2013 18:47	1000		
14	PIC	3/1/2012	2/28/2014	0.3971	0.5217	0.00986	0.11059	1.363	2/23/2013 15:59	1000		
15	PIC	3/1/2012	2/28/2014	0.3911	0.5271	0.01170	0.35063	0.437	2/23/2013 15:59	1000		
16	PIC	3/1/2012	2/28/2014	0.3453	0.4715	0.00738	0.32002	0.827	2/9/2013 18:47	1000		

Notes:

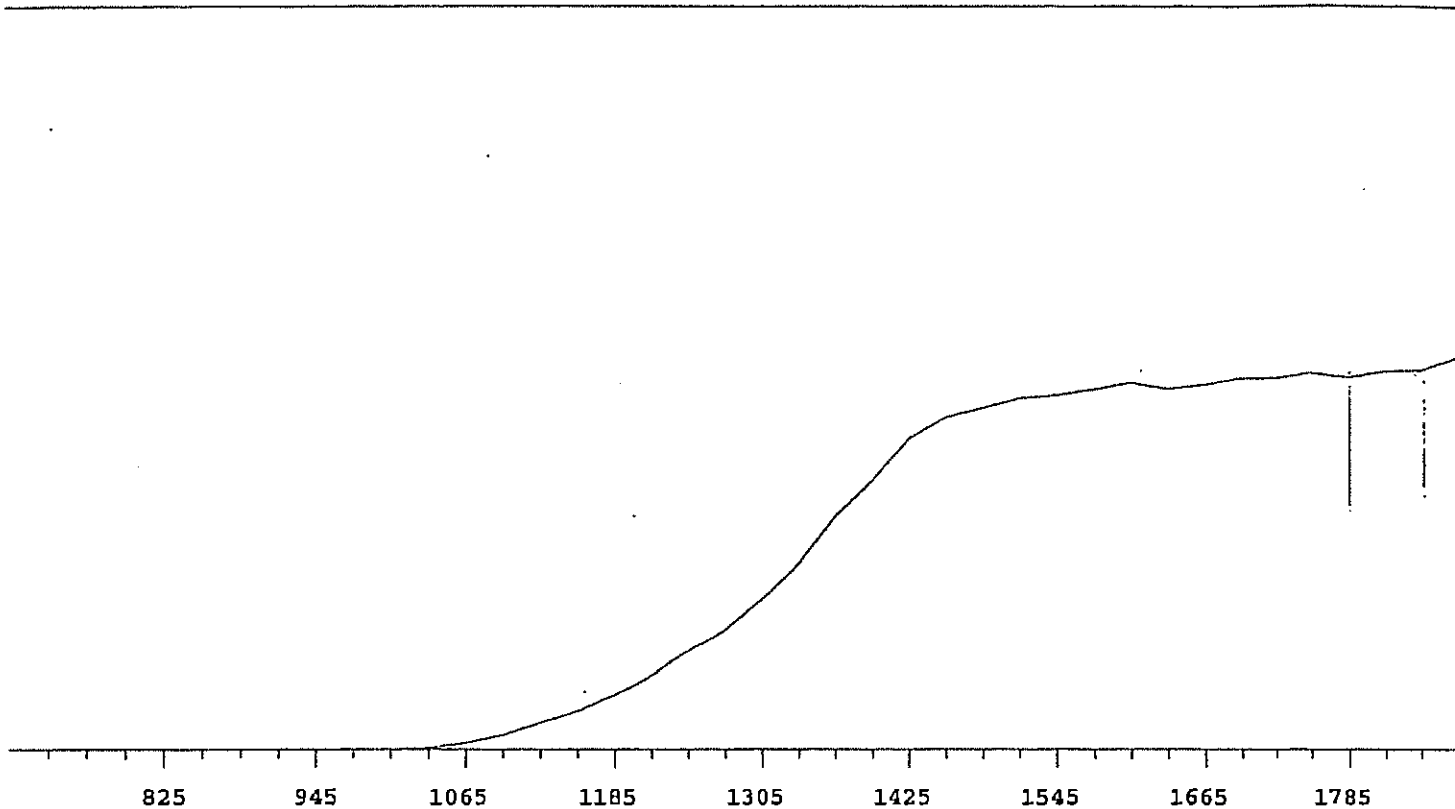
- 1 - Results are decay corrected to Sample Date/Time
- 2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date
- 3 - Spike Nominals are decay corrected to Sample Date/Time

Pos.	Decision Level pCi/L	Critical Level pCi/L	Required MDA pCi/L	Sample Act. Conc. pCi/L	Sample Act. Error pCi/L	Net Count Rate CPM	Net Count Rate Error CPM	2 SIGMA Counting Uncertainty		2 SIGMA Total Prop. Uncertainty		Sample Type	Sample OC	Nominal pCi/L	Recovery
								pCi/L	RER	pCi/L	RER				
1	0.5772	0.4075	1	0.8933	189.2404	0.0317	212.2317	3.7717	6.5917	33.9782	LCS		246.9037	76.6%	
2	0.5575	0.3936	1	0.9345	197.0268	0.0201	267.5799	4.2361	6.1135	33.0621	LCS		246.9037	79.8%	
3	0.4244	0.2996	1	0.7796	237.4927	0.0201	263.3330	4.1948	7.4150	39.8913	LCS		246.9037	96.2%	
4	0.4626	0.3266	1	0.8554	241.3425	0.0204	238.7713	3.9946	7.9137	40.5243	LCS		246.9037	97.7%	
5	#DIV/0!	#DIV/0!	1	#DIV/0!	#DIV/0!	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	LCS		246.9037	#DIV/0!	
6	#DIV/0!	#DIV/0!	1	#DIV/0!	#DIV/0!	0.0101	311.9042	3.5515	#DIV/0!	#DIV/0!	LCS		246.9037	#DIV/0!	
7	#DIV/0!	#DIV/0!	1	#DIV/0!	#DIV/0!	0.0224	403.1456	4.4834	#DIV/0!	#DIV/0!	LCS		246.9037	#DIV/0!	
8	#DIV/0!	#DIV/0!	1	#DIV/0!	#DIV/0!	0.0320	111.2803	2.7584	#DIV/0!	#DIV/0!	LCS		246.9037	#DIV/0!	
9	0.2931	0.2070	1	0.5544	191.8210	0.0223	273.0503	4.2703	5.8799	32.4467	LCS		246.9037	77.7%	
10	0.2585	0.1825	1	0.4865	197.2585	0.0185	324.7684	4.6567	5.5436	32.9319	LCS		246.9037	79.9%	
11	0.5523	0.3899	1	0.9365	243.7047	0.0186	311.1137	4.5643	7.0076	40.7298	LCS		246.9037	98.7%	
12	0.4221	0.2980	1	0.7868	237.9192	0.0205	278.5970	4.3149	7.2223	40.0816	LCS		246.9037	96.4%	
13	0.5716	0.4035	1	0.9947	187.8478	0.0227	200.1900	3.6626	6.7360	31.8830	LCS		246.9037	76.1%	
14	0.3603	0.2544	1	0.5967	233.4360	0.0175	398.0149	4.4688	5.1371	39.0247	LCS		246.9037	94.5%	
15	0.2042	0.1441	1	0.3763	233.0745	0.0186	397.0955	4.4584	5.1290	39.1768	LCS		246.9037	94.4%	
16	1.0456	0.7382	1	1.8558	253.6476	0.0250	133.7063	2.9949	11.1359	43.1988	LCS		246.9037	102.7%	

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
V1	1A	15	8	3665	2/15/2013 17:09	2/15/2013 17:24	PIC	SR90V13
V2	1B	15	20	4314	2/15/2013 17:09	2/15/2013 17:24	PIC	SR90V13
V3	1C	15	94	4119	2/15/2013 17:09	2/15/2013 17:24	PIC	SR90V13
V4	1D	15	69	3759	2/15/2013 17:09	2/15/2013 17:24	PIC	SR90V13
V5	2A	15	8	2884	2/15/2013 17:10	2/15/2013 17:25	PIC	SR90V13
V2	2B	20	1	8539	2/27/2013 11:04	2/27/2013 11:24	PIC	SRREVER
V7	2C	15	20	2326	2/15/2013 17:10	2/15/2013 17:25	PIC	SR90V13
V8	2D	15	18	1700	2/15/2013 17:10	2/15/2013 17:25	PIC	SR90V13
V1	3A	15	171	3538	2/15/2013 17:42	2/15/2013 17:57	PIC	SR90V13
V2	3B	15	99	4153	2/15/2013 17:42	2/15/2013 17:57	PIC	SR90V13
V3	3C	15	64	4112	2/15/2013 17:42	2/15/2013 17:57	PIC	SR90V13
V4	3D	15	63	3531	2/15/2013 17:42	2/15/2013 17:57	PIC	SR90V13
V5	4A	15	42	2778	2/15/2013 17:42	2/15/2013 17:57	PIC	SR90V13
V3	4B	20	1	9044	2/27/2013 11:04	2/27/2013 11:24	PIC	SRREVER
V4	4C	20	85	7920	2/27/2013 11:15	2/27/2013 11:35	PIC	SRREVER
V8	4D	15	68	1725	2/15/2013 17:43	2/15/2013 17:58	PIC	SR90V13
V1	5A	15	32	3633	2/15/2013 14:49	2/15/2013 15:04	PIC	SR90V13
V2	5B	15	34	4202	2/15/2013 14:49	2/15/2013 15:04	PIC	SR90V13
V3	5C	15	27	4209	2/15/2013 14:49	2/15/2013 15:04	PIC	SR90V13
V4	5D	15	33	3695	2/15/2013 14:49	2/15/2013 15:04	PIC	SR90V13
V5	6A	15	5	3097	2/15/2013 14:50	2/15/2013 15:05	PIC	SR90V13
V4	6B	20	56	8085	2/27/2013 12:14	2/27/2013 12:34	PIC	SRREVER
V2	6C	20	35	9193	2/27/2013 11:27	2/27/2013 11:47	PIC	SRREVER
V3	6D	20	2408	7026	2/27/2013 11:28	2/27/2013 11:48	PIC	SRREVER
V1	7A	15	50	3577	2/15/2013 15:29	2/15/2013 15:44	PIC	SR90V13
V2	7B	15	54	4173	2/15/2013 15:29	2/15/2013 15:44	PIC	SR90V13
V3	7C	15	15	3994	2/15/2013 15:29	2/15/2013 15:44	PIC	SR90V13
V4	7D	15	22	3645	2/15/2013 15:29	2/15/2013 15:44	PIC	SR90V13
V5	8A	15	5	2890	2/15/2013 15:29	2/15/2013 15:44	PIC	SR90V13
V6	8B	15	0	3409	2/15/2013 15:29	2/15/2013 15:44	PIC	SR90V13
V7	8C	15	2	2382	2/15/2013 15:29	2/15/2013 15:44	PIC	SR90V13
V8	8D	15	2	1777	2/15/2013 15:30	2/15/2013 15:45	PIC	SR90V13
V1	9A	15	10	3602	2/15/2013 13:43	2/15/2013 13:58	PIC	SR90V13
V2	9B	15	13	4030	2/15/2013 13:43	2/15/2013 13:58	PIC	SR90V13
V3	9C	15	11	3988	2/15/2013 13:43	2/15/2013 13:58	PIC	SR90V13
V4	9D	15	1	3459	2/15/2013 13:43	2/15/2013 13:58	PIC	SR90V13

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V5	10A	15	3	3167	2/15/2013 13:43	2/15/2013 13:58	PIC	SR90V13
V6	10B	15	11	3356	2/15/2013 13:44	2/15/2013 13:59	PIC	SR90V13
V7	10C	15	7	2329	2/15/2013 13:44	2/15/2013 13:59	PIC	SR90V13
V8	10D	15	4	1724	2/15/2013 13:44	2/15/2013 13:59	PIC	SR90V13
V1	11A	15	2	3201	2/15/2013 13:18	2/15/2013 13:33	PIC	SR90V13
V2	11B	15	3	4037	2/15/2013 13:18	2/15/2013 13:33	PIC	SR90V13
V3	11C	15	1	3959	2/15/2013 13:19	2/15/2013 13:34	PIC	SR90V13
V4	11D	15	0	3590	2/15/2013 13:19	2/15/2013 13:34	PIC	SR90V13
V5	12A	15	0	0	2/15/2013 13:19	2/15/2013 13:34	PIC	SR90V13
V3	12B	20	1	6246	2/27/2013 13:39	2/27/2013 13:59	PIC	SRREVER
V2	12C	20	301	8121	2/27/2013 10:47	2/27/2013 11:07	PIC	SRREVER
V8	12D	15	3	1712	2/15/2013 13:20	2/15/2013 13:35	PIC	SR90V13
V1	13A	15	2	4103	2/16/2013 14:59	2/16/2013 15:14	PIC	SR90V13
V2	13B	15	1	4879	2/16/2013 14:59	2/16/2013 15:14	PIC	SR90V13
V3	13C	15	0	4687	2/16/2013 14:59	2/16/2013 15:14	PIC	SR90V13
V4	13D	15	1	4189	2/16/2013 14:59	2/16/2013 15:14	PIC	SR90V13
V5	14A	15	0	3018	2/16/2013 14:59	2/16/2013 15:14	PIC	SR90V13
V4	14B	20	4	7988	2/27/2013 10:35	2/27/2013 10:55	PIC	SRREVER
V4	14C	20	1	7951	2/27/2013 10:57	2/27/2013 11:17	PIC	SRREVER
V8	14D	15	0	2018	2/16/2013 15:00	2/16/2013 15:15	PIC	SR90V13

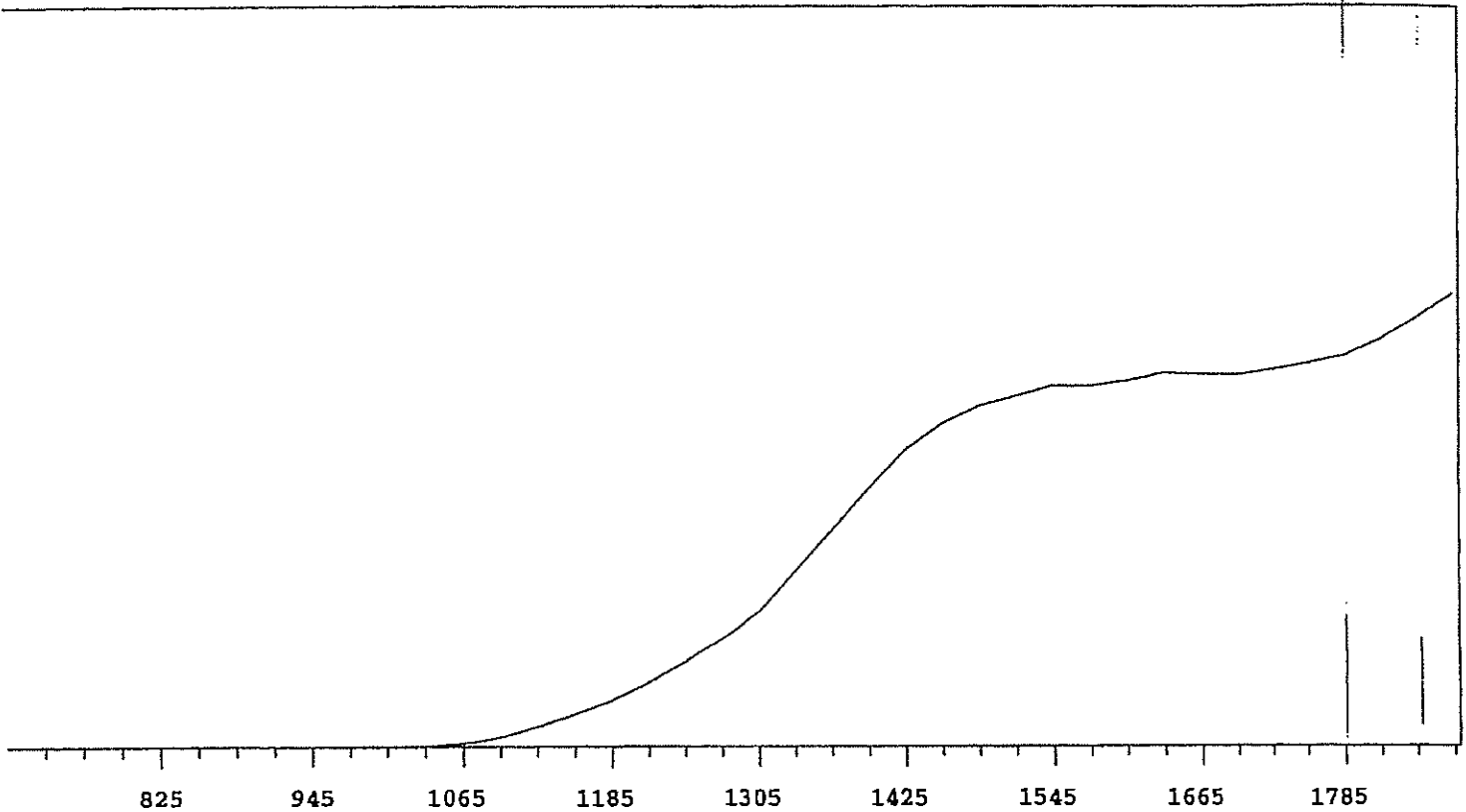


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	11640	+69.78
735	1		1335	14241	+62.88
765	0		1365	17534	+55.91
795	0	+0.00	1395	20127	+45.04
825	0	>100	1425	23254	+31.29
855	1	>100	1455	24902	+20.41
885	0	+55.56	1485	25605	+10.49
915	2	+66.67	1515	26310	+6.44
945	0	>100	1545	26535	+5.31
975	2	>100	1575	26953	+2.79
1005	42	>100	1605	27399	+1.83
1035	145	>100	1635	27000	+1.71
1065	544	>100	1665	27255	+1.62
1095	1136	>100	1695	27723	+3.14
1125	1967	>100	1725	27705	+1.56
1155	2845	>100	1755	28072	+1.15
1185	4078	>100	1785	27729	+1.43
1215	5483	+93.18	1815	28194	+3.24
1245	7400	+83.35	1845	28243	
1275	9328	+75.40	1875	29191	

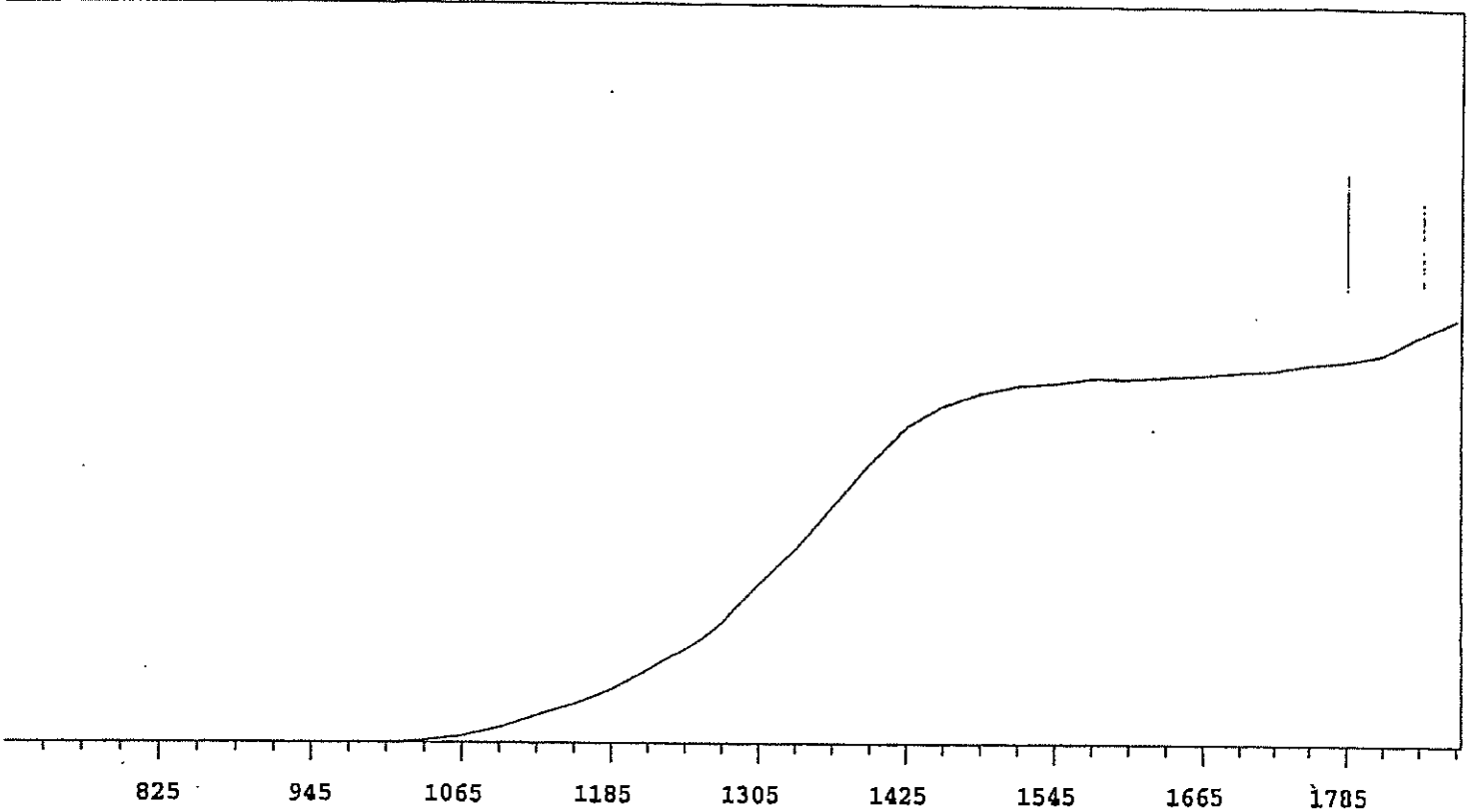
*8*  
*9/1/09*

*over 19510*

MPC 9600 Plateau      Instrument 1 MPC 9604 Detector B      7/1/2009  
 Alpha Volts: 1575      Beta Volts: 1575

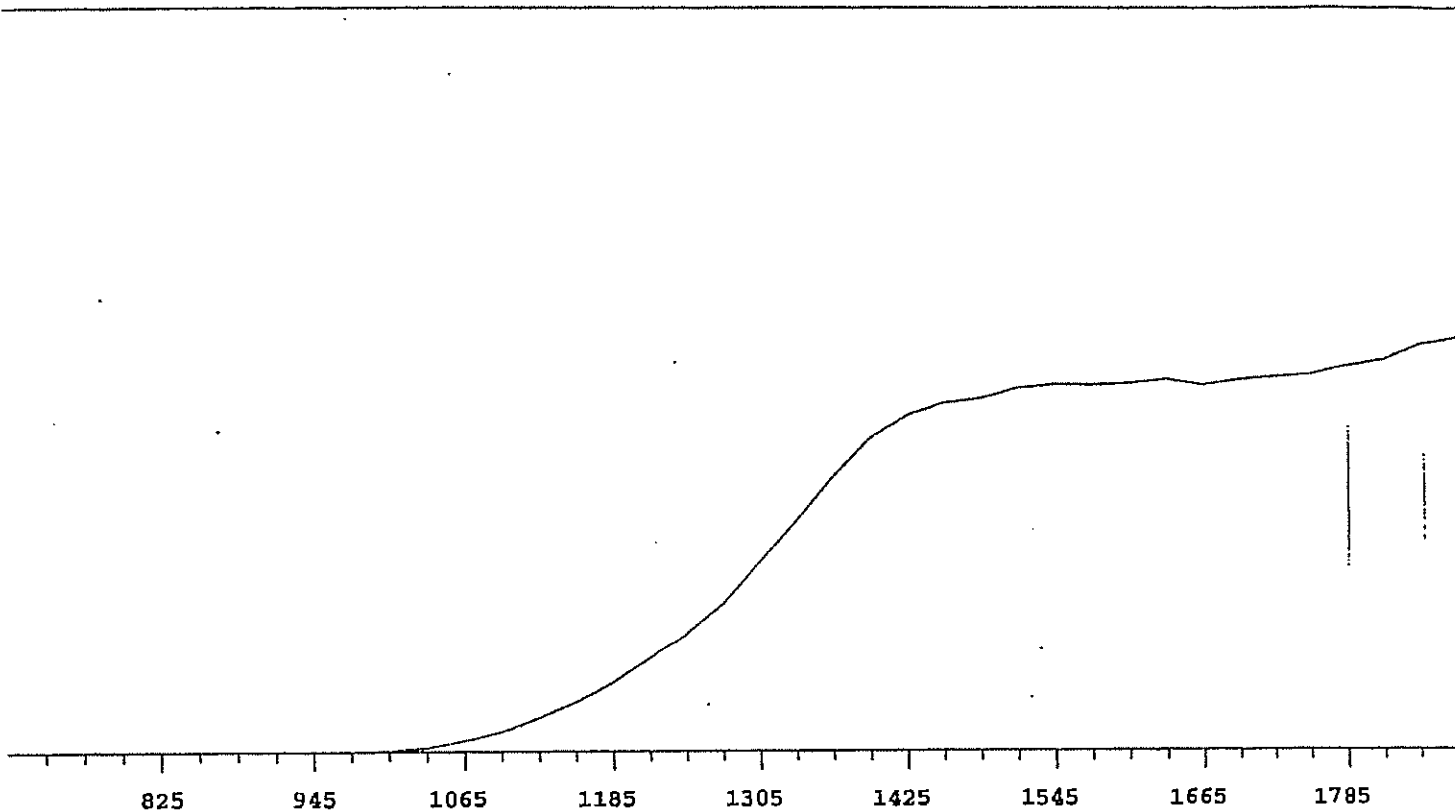


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	13188	+75.92
735	0		1335	16818	+67.60
765	0	+55.56	1365	20420	+59.86
795	1	+83.33	1395	24341	+47.85
825	1	+55.56	1425	27854	+35.51
855	0	>100	1455	30288	+23.26
885	1	+0.00	1485	31798	+14.54
915	0	+0.00	1515	32622	+8.32
945	1	>100	1545	33496	+5.11
975	0	>100	1575	33475	+4.43
1005	4	>100	1605	33903	+3.09
1035	56	>100	1635	34654	+2.46
1065	292	>100	1665	34485	+1.74
1095	890	>100	1695	34445	+1.84
1125	1841	>100	1725	34908	+3.91
1155	2936	>100	1755	35401	+6.80
1185	4179	>100	1785	36062	+10.27
1215	5837	>100	1815	37505	+14.30
1245	7821	+91.28	1845	39508	
1275	10638	+83.88	1875	41843	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	14817	+71.06
735	0		1335	17823	+63.34
765	1	+0.00	1365	21704	+53.63
795	0	>100	1395	25422	+42.55
825	1	-55.56	1425	28424	+29.21
855	1	+55.56	1455	30244	+18.11
885	0	>100	1485	31305	+10.10
915	1	>100	1515	31989	+6.07
945	0	>100	1545	32223	+3.43
975	4	>100	1575	32671	+2.15
1005	32	>100	1605	32621	+1.68
1035	206	>100	1635	32837	+1.52
1065	639	>100	1665	32961	+2.01
1095	1416	>100	1695	33249	+2.64
1125	2551	>100	1725	33409	+3.21
1155	3619	>100	1755	33931	+4.07
1185	5037	+98.68	1785	34234	+7.20
1215	6875	+91.19	1815	34909	+10.28
1245	8915	+85.53	1845	36660	
1275	11519	+77.28	1875	38205	

MPC 9600 Plateau Instrument 1 MPC 9604 Detector D 7/1/2009  
 Alpha Volts: 1575 Beta Volts: 1575



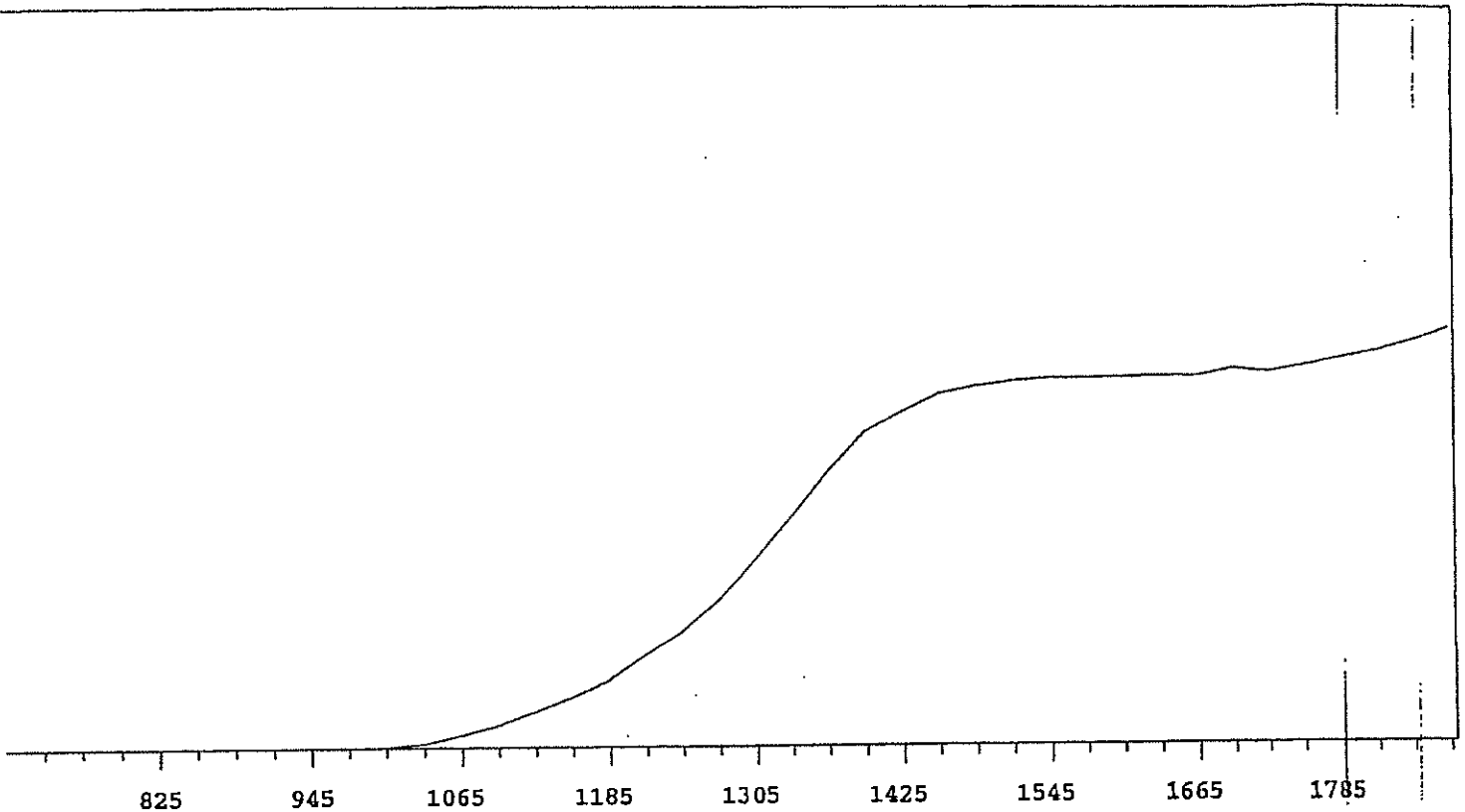
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	15202	+66.36
735	1		1335	18216	+57.86
765	0	+0.00	1365	21597	+45.58
795	1	+0.00	1395	24648	+32.96
825	0	+0.00	1425	26505	+19.92
855	1	>100	1455	27475	+11.42
885	0	>100	1485	27836	+7.08
915	0	>100	1515	28609	+4.51
945	0	>100	1545	28896	+2.93
975	8	>100	1575	28862	+1.66
1005	75	>100	1605	28969	+0.36
1035	303	>100	1635	29292	+0.80
1065	872	>100	1665	28836	+1.06
1095	1656	>100	1695	29279	+1.48
1125	2729	>100	1725	29439	+3.59
1155	3862	>100	1755	29642	+4.07
1185	5425	+98.19	1785	30243	+6.51
1215	7256	+88.82	1815	30699	+7.79
1245	9510	+81.89	1845	31876	
1275	11944	+74.07	1875	32444	



MPC 9600 Plateau  
 Alpha Volts: 705

Instrument 2 MPC 9604 Detector A  
 Beta Volts: 1575

7/1/2009

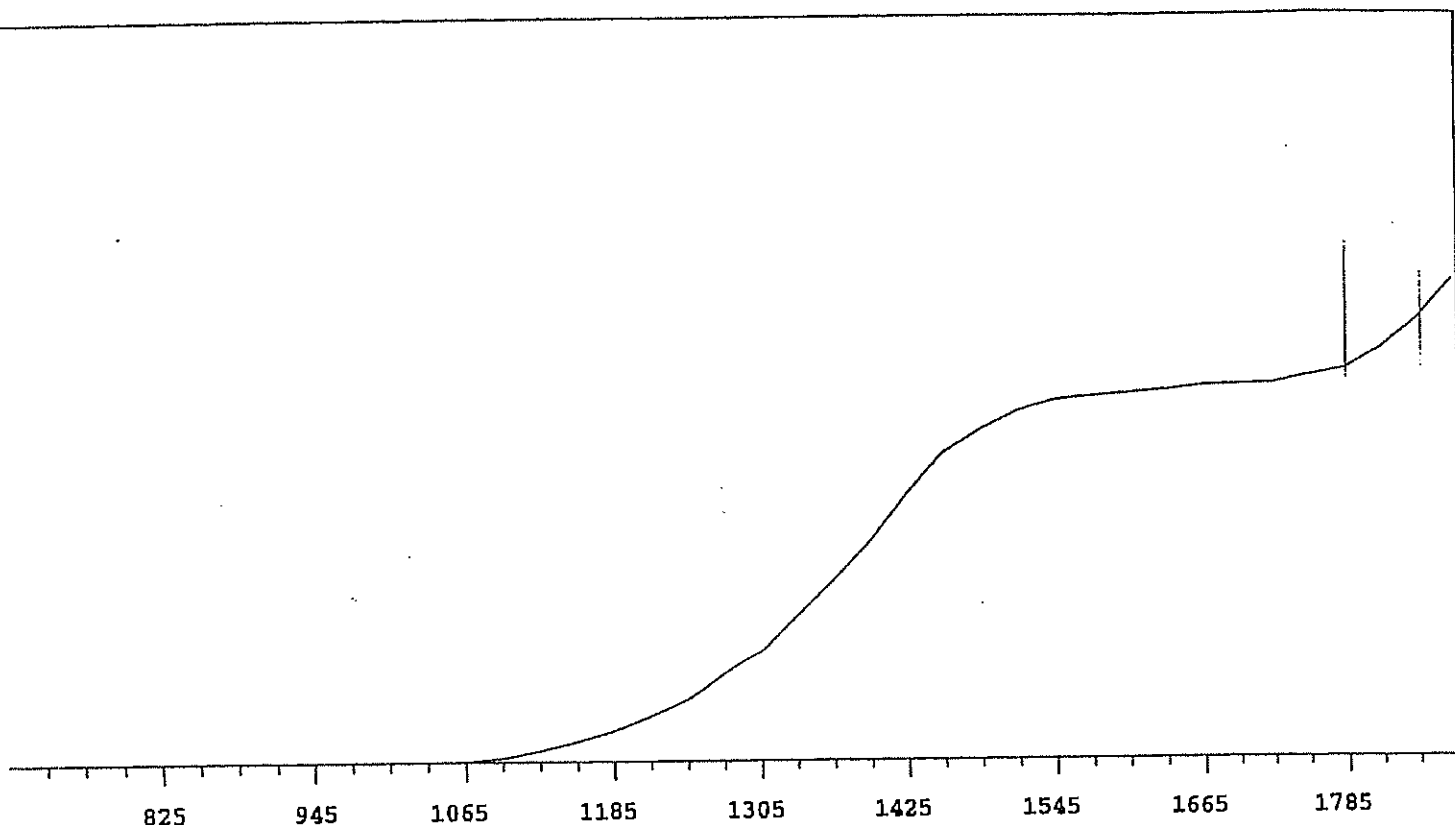


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19017	+67.45
735	1		1335	23157	+59.23
765	0	+83.33	1365	27625	+45.78
795	0	-83.33	1395	31465	+32.72
825	1	>100	1425	33352	+20.41
855	0	>100	1455	35084	+11.74
885	1	+100.00	1485	35819	+7.11
915	1	>100	1515	36292	+3.35
945	2	>100	1545	36527	+1.63
975	12	>100	1575	36540	+0.87
1005	91	>100	1605	36585	+0.48
1035	421	>100	1635	36742	+1.76
1065	1239	>100	1665	36691	+1.53
1095	2155	>100	1695	37461	+1.89
1125	3527	>100	1725	37073	+3.07
1155	4974	>100	1755	37603	+4.02
1185	6647	+97.44	1785	38346	+6.58
1215	9250	+89.00	1815	39111	+7.95
1245	12041	+82.15	1845	40115	
1275	15094	+73.81	1875	41409	

MPC 9600 Plateau  
 Alpha Volts: 705

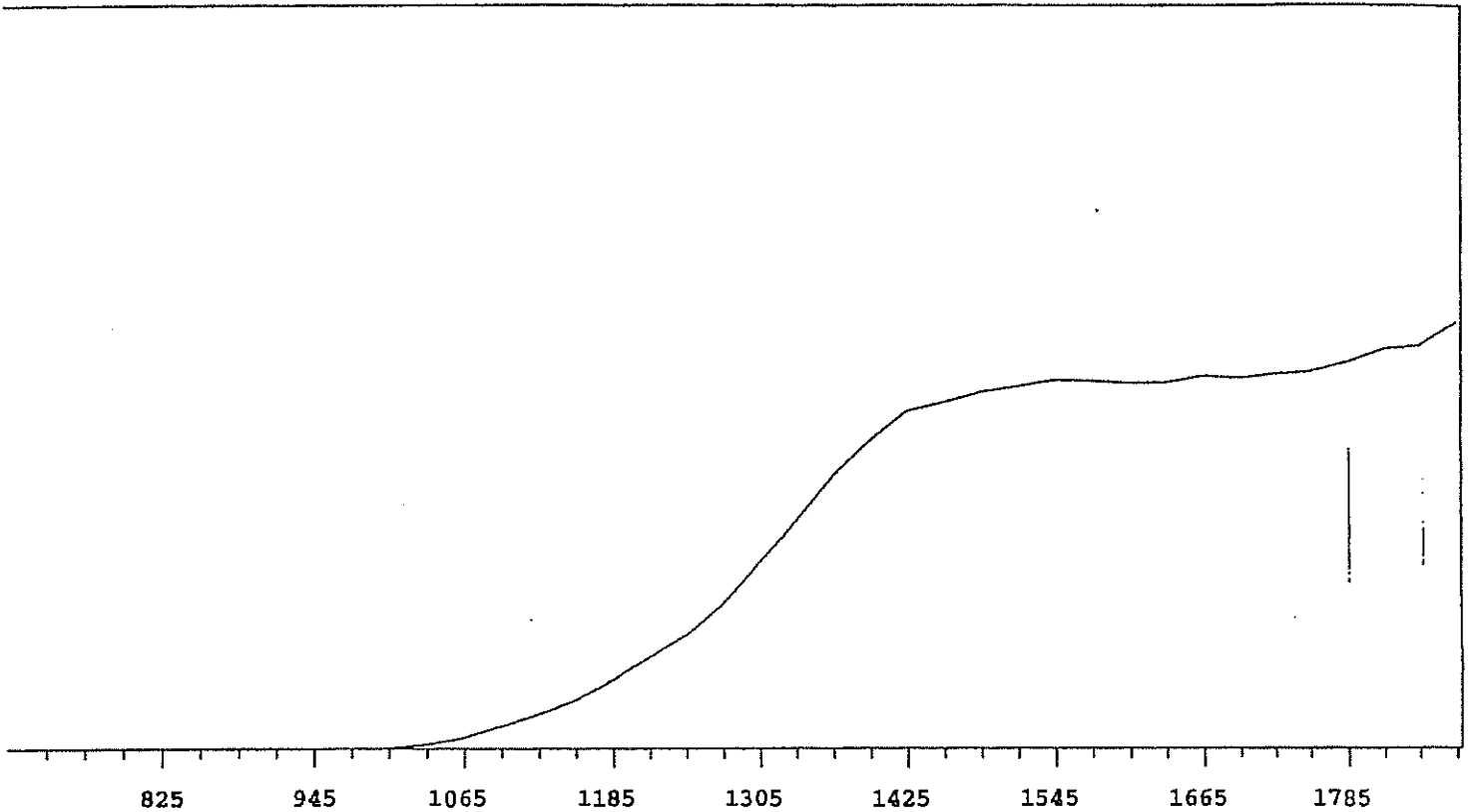
Instrument 2 MPC 9604 Detector B  
 Beta Volts: 1575

7/1/2009



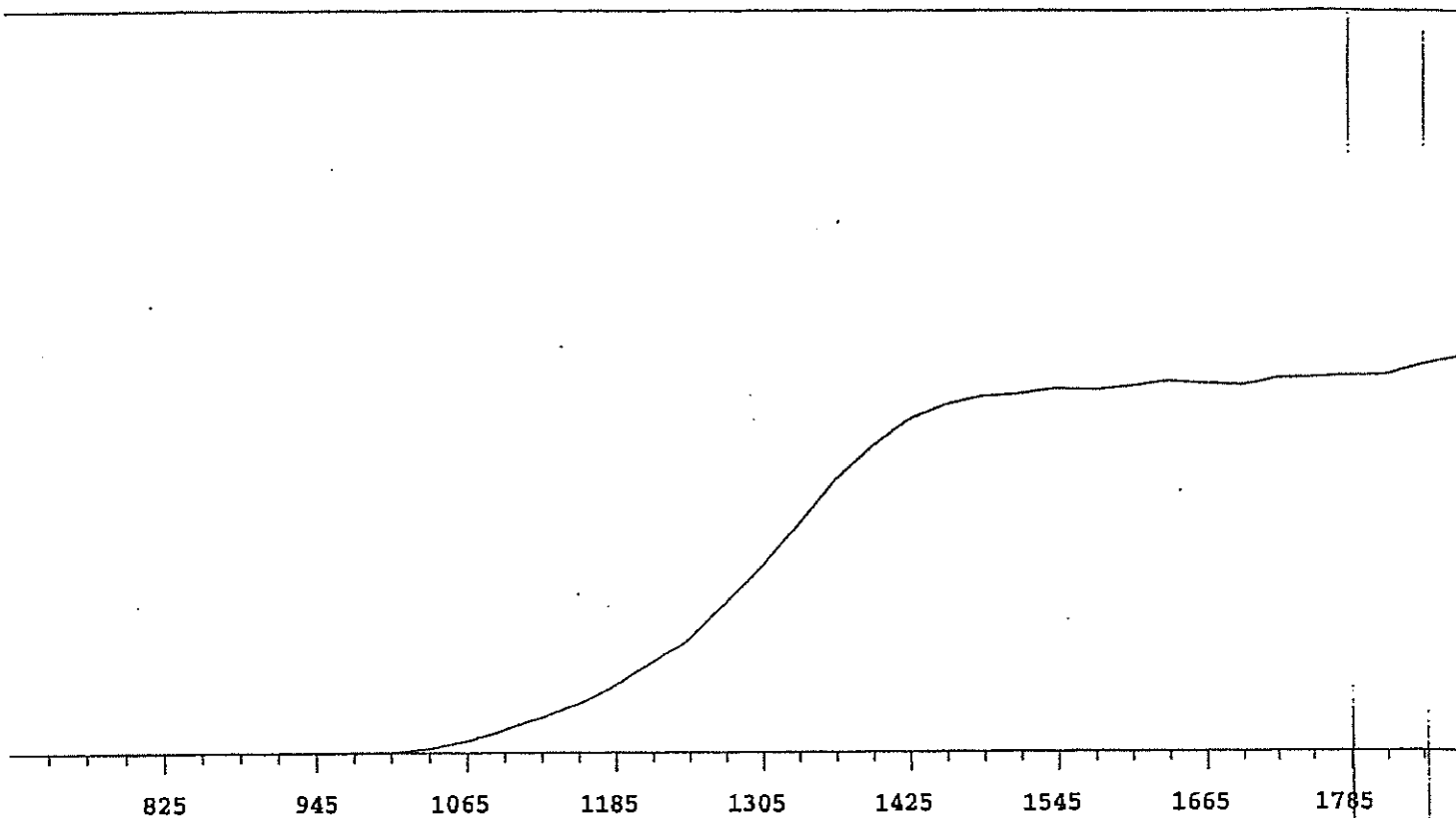
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	12541	+83.18
735	1		1335	16192	+74.48
765	0		1365	20083	+67.17
795	0	>100	1395	24273	+58.43
825	0	>100	1425	29090	+46.86
855	0	>100	1455	33223	+34.56
885	0	>100	1485	35608	+22.67
915	0	>100	1515	37581	+13.63
945	1	>100	1545	38762	+8.18
975	2	>100	1575	39185	+4.42
1005	3	>100	1605	39484	+3.06
1035	14	>100	1635	39806	+2.61
1065	127	>100	1665	40264	+2.03
1095	500	>100	1695	40353	+2.32
1125	1332	>100	1725	40431	+3.28
1155	2373	>100	1755	41127	+7.09
1185	3614	>100	1785	41882	+12.40
1215	5227	>100	1815	44049	+18.52
1245	7060	+97.33	1845	46950	
1275	9574	+90.30	1875	51097	

MPC 9600 Plateau      Instrument 2   MPC 9604 Detector C    7/1/2009  
 Alpha Volts: 705      Beta Volts: 1575



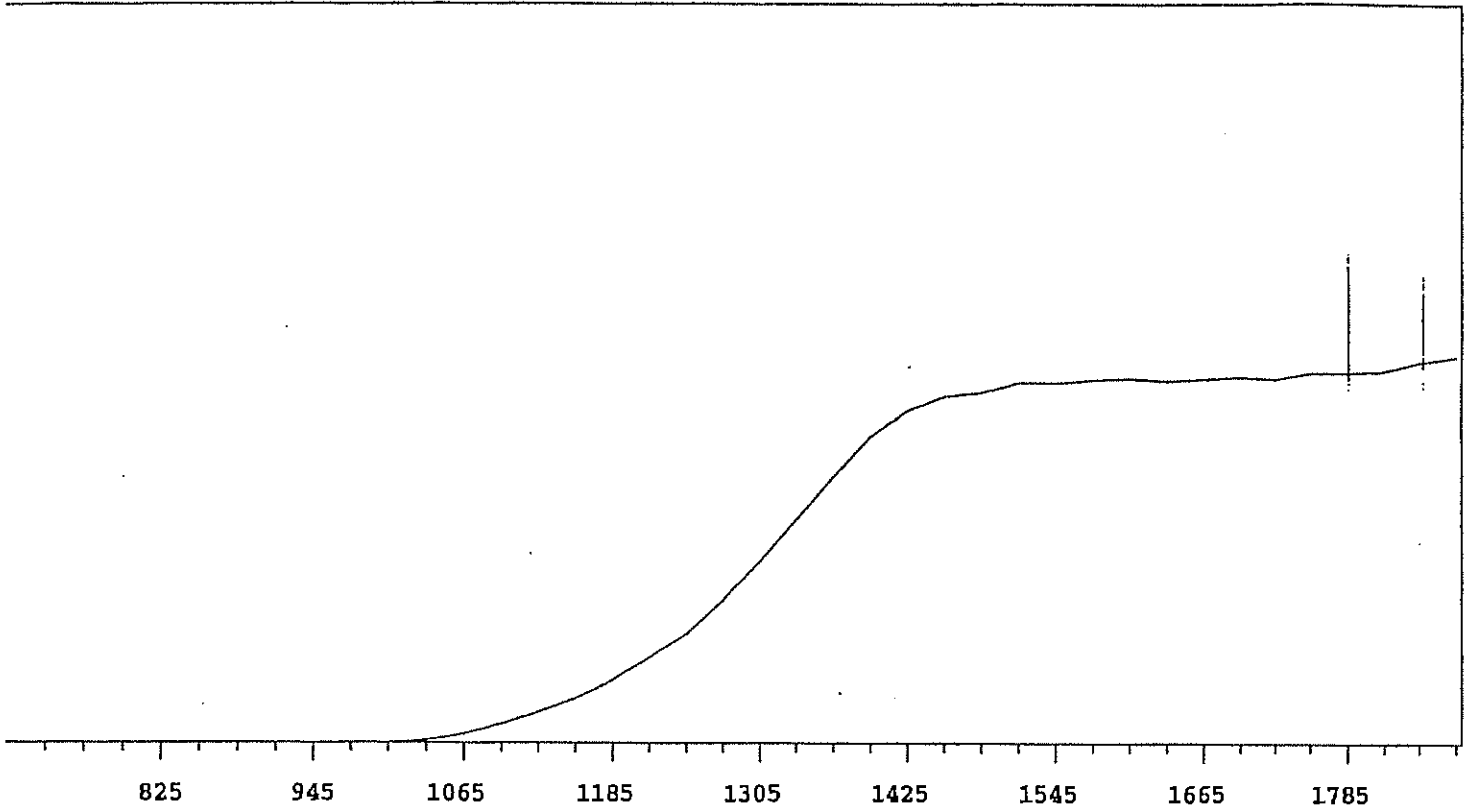
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18216	+67.74
735	0		1335	21995	+58.11
765	0		1365	26173	+46.11
795	0	>100	1395	29479	+32.75
825	0	>100	1425	32186	+20.62
855	0	>100	1455	33022	+12.13
885	0	>100	1485	33981	+7.22
915	1	>100	1515	34520	+4.95
945	0	>100	1545	35095	+2.07
975	17	>100	1575	35014	+0.38
1005	87	>100	1605	34812	+0.55
1035	438	>100	1635	34859	+1.11
1065	1055	>100	1665	35460	+1.94
1095	2114	>100	1695	35273	+1.95
1125	3282	>100	1725	35629	+2.73
1155	4625	>100	1755	35811	+5.77
1185	6554	+97.66	1785	36656	+6.44
1215	8743	+88.09	1815	37896	+9.21
1245	11345	+81.31	1845	38145	
1275	14261	+74.60	1875	40283	

MPC 9600 Plateau      Instrument 2   MPC 9604 Detector D      7/1/2009  
 Alpha Volts: 705      Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18675	+65.94
735	0		1335	22620	+55.69
765	0	+83.33	1365	26869	+44.63
795	2	+55.56	1395	29957	+32.08
825	1	>100	1425	32494	+20.49
855	0	>100	1455	33836	+11.98
885	0	>100	1485	34627	+6.45
915	0	>100	1515	34849	+3.22
945	2	>100	1545	35298	+1.98
975	9	>100	1575	35180	+2.37
1005	89	>100	1605	35503	+1.57
1035	439	>100	1635	36006	+0.99
1065	1198	>100	1665	35722	+0.89
1095	2164	>100	1695	35597	+0.93
1125	3436	>100	1725	36188	+1.86
1155	4917	>100	1755	36272	+1.90
1185	6762	+96.59	1785	36389	+2.55
1215	9006	+89.14	1815	36529	+4.39
1245	11800	+81.34	1845	37459	
1275	15132	+73.59	1875	38170	

MPC 9600 Plateau      Instrument 3   MPC 9604 Detector A   7/1/2009  
 Alpha Volts: 705    Beta Volts: 1575

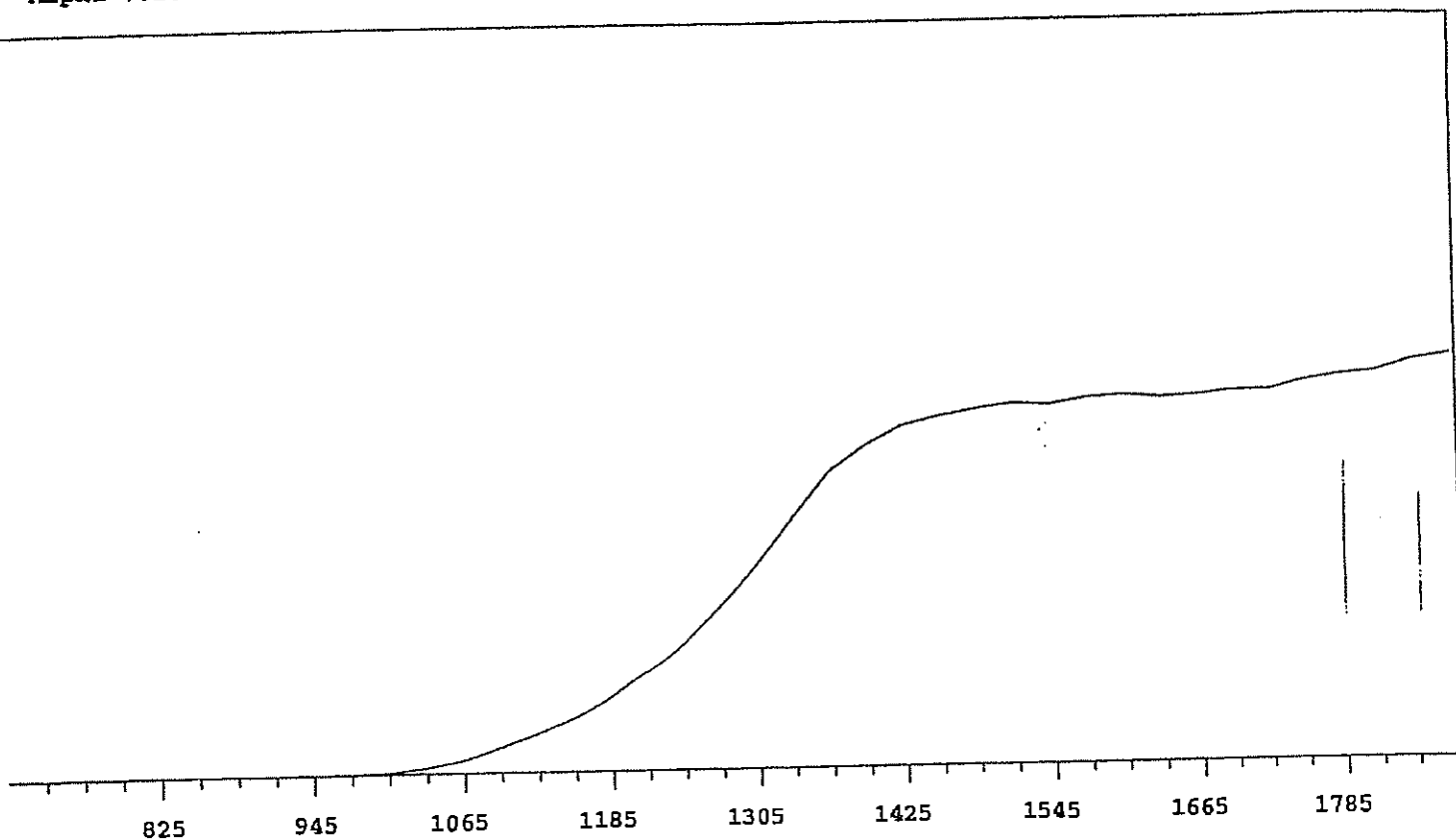


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	16654	+68.57
735	0		1335	20416	+59.26
765	0	+55.56	1365	24191	+47.28
795	1	>100	1395	27643	+34.04
825	1	+0.00	1425	29891	+21.08
855	1	>100	1455	31183	+12.30
885	0	>100	1485	31558	+6.67
915	0	>100	1515	32444	+4.05
945	0	>100	1545	32413	+2.90
975	9	>100	1575	32704	+0.81
1005	53	>100	1605	32837	+0.71
1035	302	>100	1635	32629	+0.49
1065	878	>100	1665	32797	+0.16
1095	1805	>100	1695	32964	+1.32
1125	2887	>100	1725	32746	+1.40
1155	4163	>100	1755	33308	+1.56
1185	5842	+99.81	1785	33318	+3.21
1215	7959	+90.90	1815	33456	+3.92
1245	10323	+83.03	1845	34283	
1275	13250	+75.91	1875	34815	

MPC 9600 Plateau  
 Alpha Volts: 705

Instrument 3 MPC 9604 Detector B  
 Beta Volts: 1575

7/1/2009

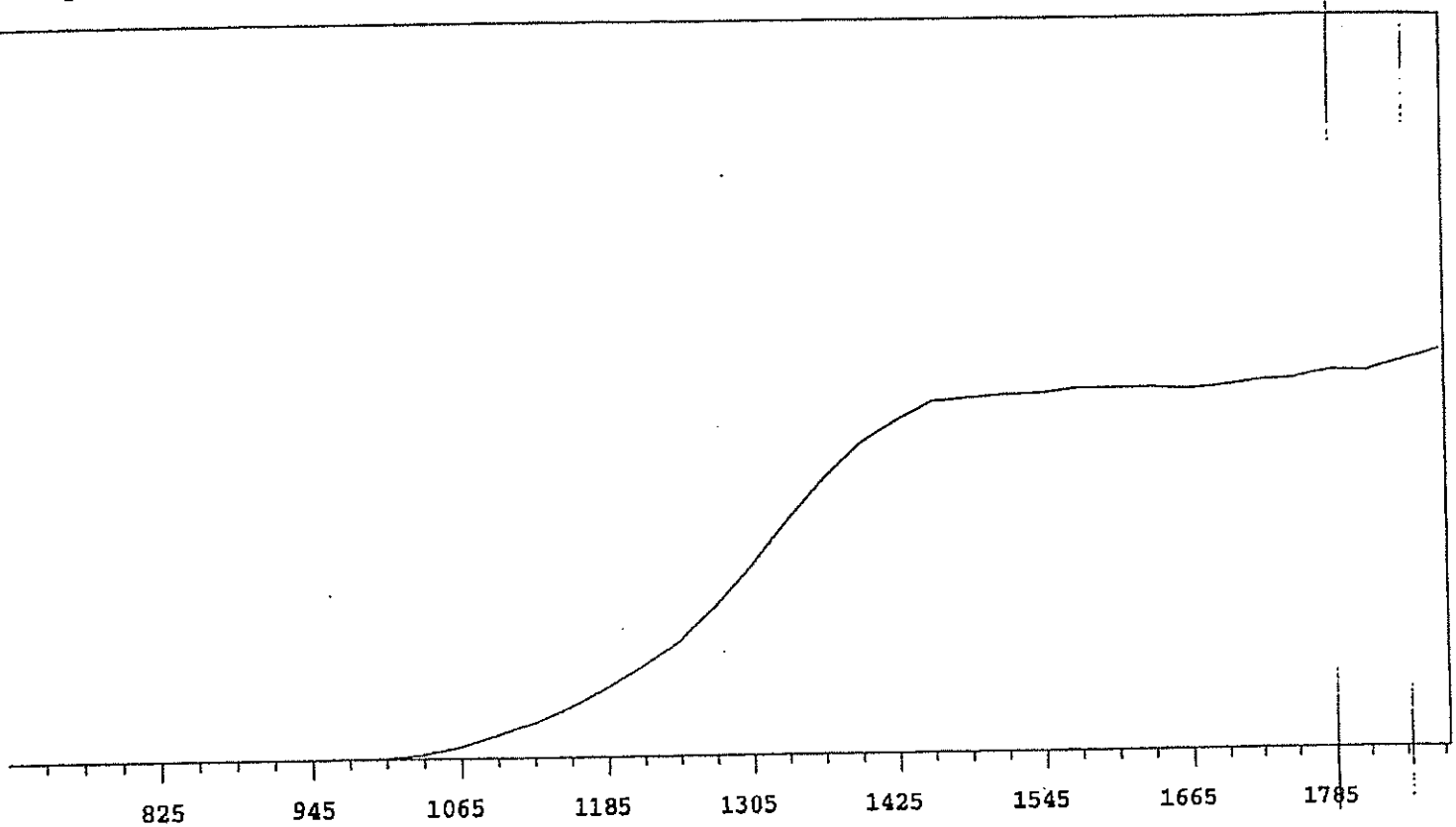


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	19810	+64.73
735	1		1335	23962	+52.62
765	0	-55.56	1365	28091	+39.27
795	0	>100	1395	30594	+25.61
825	1	>100	1425	32381	+14.86
855	3	+33.33	1455	33206	+8.91
885	0	+0.00	1485	33832	+4.41
915	1	>100	1515	34260	+3.01
945	2	>100	1545	34071	+2.33
975	29	>100	1575	34623	+1.34
1005	165	>100	1605	34848	+1.22
1035	613	>100	1635	34564	+0.89
1065	1394	>100	1665	34733	+1.01
1095	2558	>100	1695	35144	+2.76
1125	3702	>100	1725	35084	+3.66
1155	5222	>100	1755	35839	+3.97
1185	7161	+96.06	1785	36332	+5.39
1215	9507	+89.18	1815	36654	+5.35
1245	12552	+81.52	1845	37609	
1275	16030	+73.64	1875	38164	

MPC 9600 Plateau  
 Alpha Volts: 705

Instrument 3 MPC 9604 Detector C  
 Beta Volts: 1575

7/1/2009

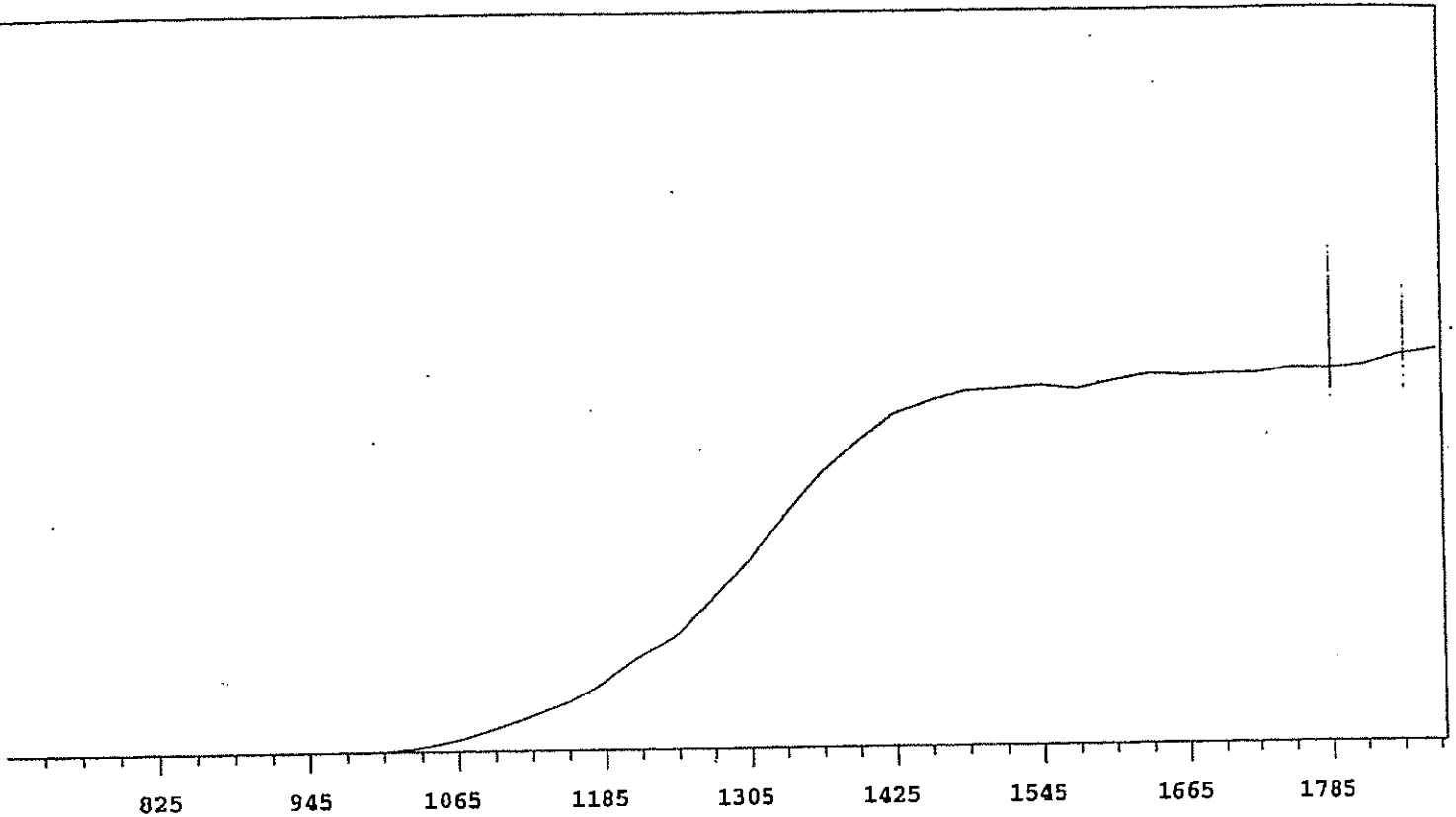


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	21412	+66.80
735	1		1335	26262	+56.32
765	1		1365	30679	+43.71
795	0	>100	1395	34466	+31.61
825	0	+0.00	1425	36949	+20.14
855	0	>100	1455	38998	+11.16
885	1	>100	1485	39313	+5.34
915	1	>100	1515	39625	+2.44
945	1	>100	1545	39751	+2.04
975	17	>100	1575	40227	+1.45
1005	122	>100	1605	40228	+0.56
1035	533	>100	1635	40255	+0.13
1065	1287	>100	1665	40075	+1.22
1095	2493	>100	1695	40384	+1.95
1125	3753	>100	1725	40900	+3.50
1155	5482	>100	1755	41028	+3.05
1185	7538	+99.39	1785	41899	+3.71
1215	10305	+90.31	1815	41767	+5.64
1245	13415	+82.57	1845	42852	
1275	17141	+75.13	1875	44132	

MPC 9600 Plateau  
 Alpha Volts: 705

Instrument 3 MPC 9604 Detector D  
 Beta Volts: 1575

7/1/2009



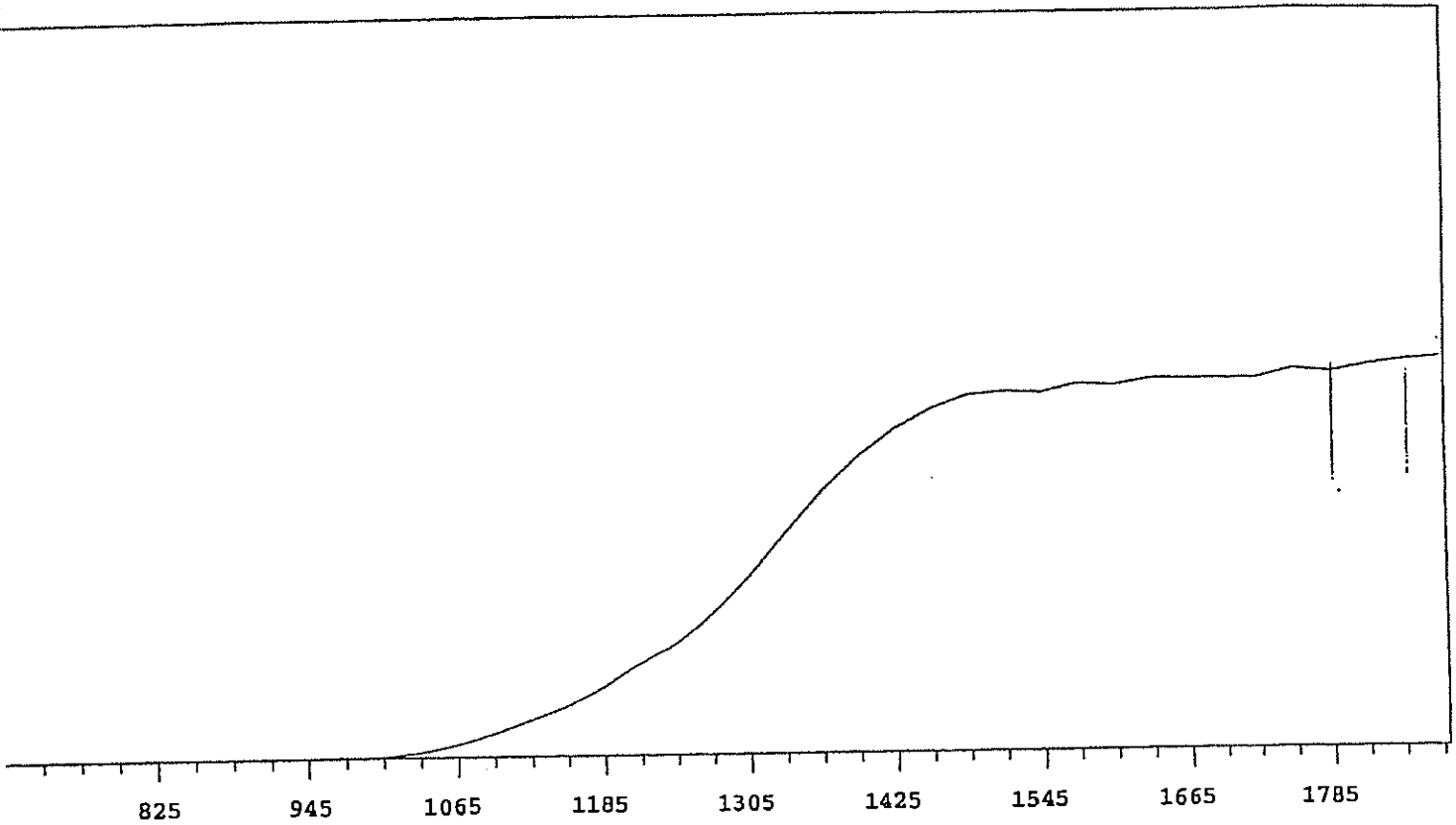
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	14171	+66.45
735	1		1335	17362	+54.90
765	0	+0.00	1365	20310	+43.83
795	1	>100	1395	22647	+30.82
825	0	+83.33	1425	24551	+20.19
855	0	-83.33	1455	25440	+11.69
885	1	>100	1485	26124	+5.90
915	0	>100	1515	26245	+2.21
945	1	>100	1545	26428	+1.39
975	12	>100	1575	26151	+2.69
1005	51	>100	1605	26721	+2.72
1035	298	>100	1635	27168	+2.80
1065	848	>100	1665	27007	+0.87
1095	1649	>100	1695	27135	+0.70
1125	2535	>100	1725	27089	+1.24
1155	3602	>100	1755	27414	+1.43
1185	5036	+98.31	1785	27373	+3.21
1215	6880	+91.37	1815	27581	+4.34
1245	8822	+82.29	1845	28332	
1275	11546	+74.61	1875	28750	



MPC 9600 Plateau  
 Alpha Volts: 705

Instrument 4 MPC 9604 Detector A  
 Beta Volts: 1575

7/1/2009

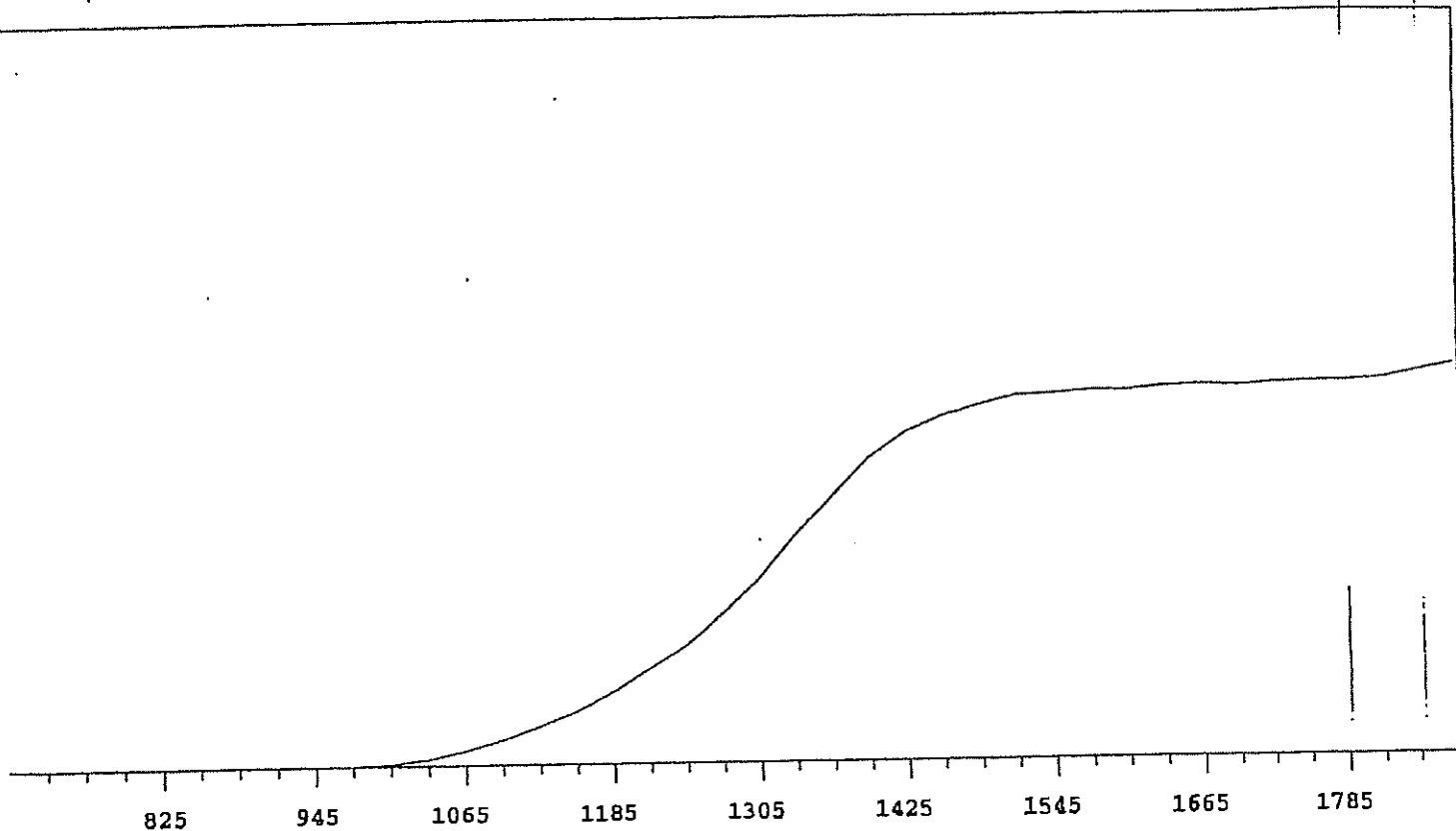


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16442	+66.24
735	0		1335	20146	+57.40
765	0		1365	23769	+46.40
795	0	>100	1395	26926	+34.68
825	2	+55.56	1425	29276	+24.40
855	1	>100	1455	31037	+15.28
885	0	-55.56	1485	32197	+7.91
915	3	>100	1515	32425	+4.33
945	0	>100	1545	32314	+2.14
975	16	>100	1575	33071	+2.66
1005	114	>100	1605	32918	+2.52
1035	451	>100	1635	33435	+1.02
1065	1100	>100	1665	33382	+0.73
1095	2068	>100	1695	33349	+1.07
1125	3189	>100	1725	33324	+1.28
1155	4386	>100	1755	34001	+2.26
1185	6094	+94.81	1785	33701	+3.08
1215	8184	+87.09	1815	34304	+2.97
1245	10489	+78.88	1845	34744	
1275	13273	+72.66	1875	35012	

MPC 9600 Plateau  
 Alpha Volts: 705

Instrument 4 MPC 9604 Detector B  
 Beta Volts: 1575

7/1/2009

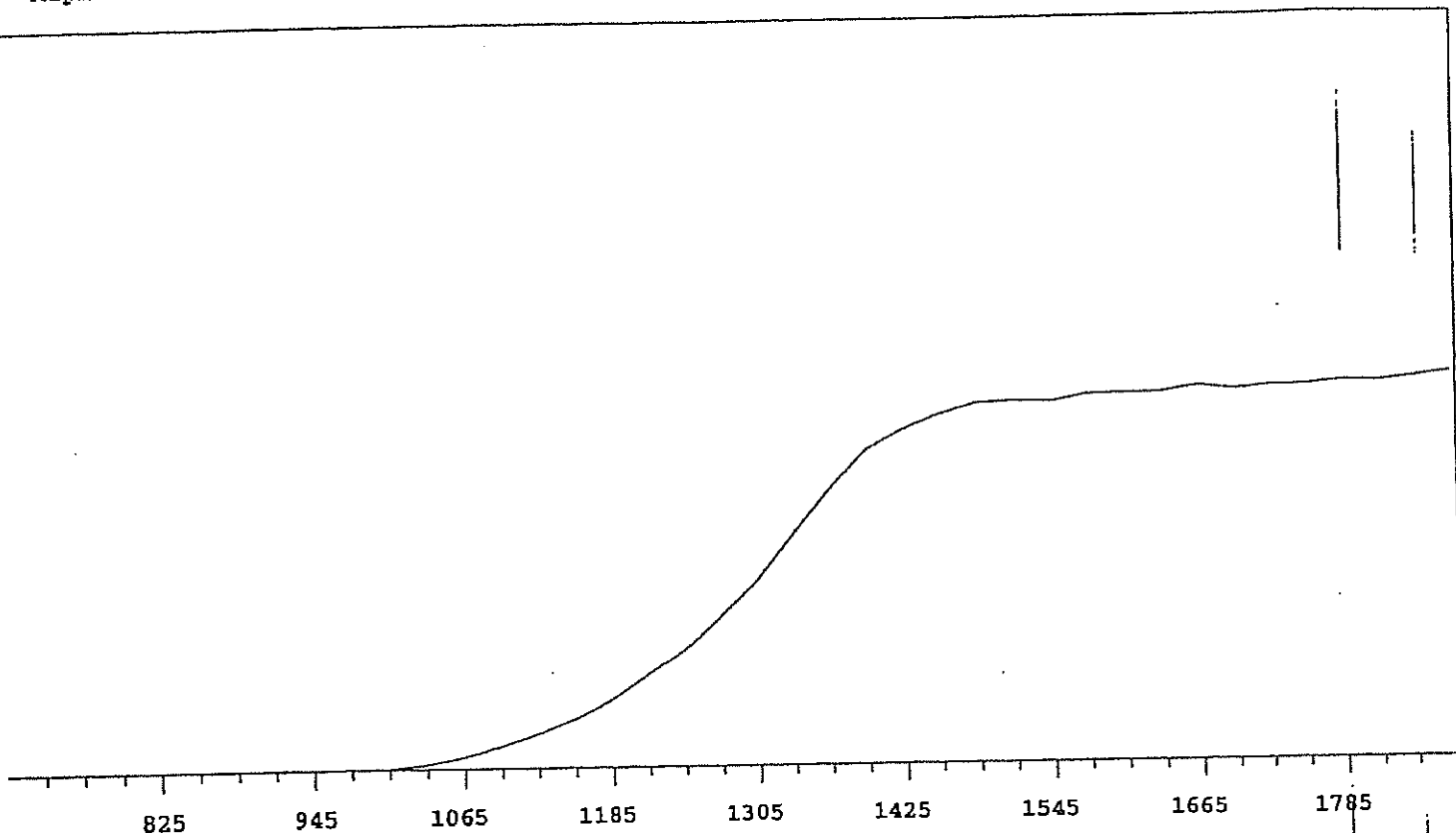


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	15747	+62.38
735	1		1335	19230	+54.19
765	0	+0.00	1365	22255	+44.46
795	1	>100	1395	25299	+32.45
825	0	>100	1425	27370	+22.24
855	0	>100	1455	28625	+14.10
885	0	>100	1485	29467	+8.56
915	0	>100	1515	30213	+5.29
945	2	>100	1545	30326	+2.77
975	31	>100	1575	30564	+1.57
1005	176	>100	1605	30548	+1.52
1035	550	>100	1635	30820	+0.85
1065	1218	>100	1665	30898	+0.79
1095	2114	>100	1695	30779	+0.44
1125	3212	>100	1725	30934	+0.45
1155	4416	>100	1755	31008	+0.96
1185	6066	+92.28	1785	30991	+2.01
1215	7936	+85.60	1815	31196	+3.80
1245	10288	+76.79	1845	31781	
1275	13020	+70.59	1875	32406	

MPC 9600 Plateau  
Alpha Volts: 705

Instrument 4 MPC 9604 Detector C  
Beta Volts: 1575

7/1/2009



VOLTS    COUNTS    %/100 Volts

VOLTS    COUNTS    %/100 Volts

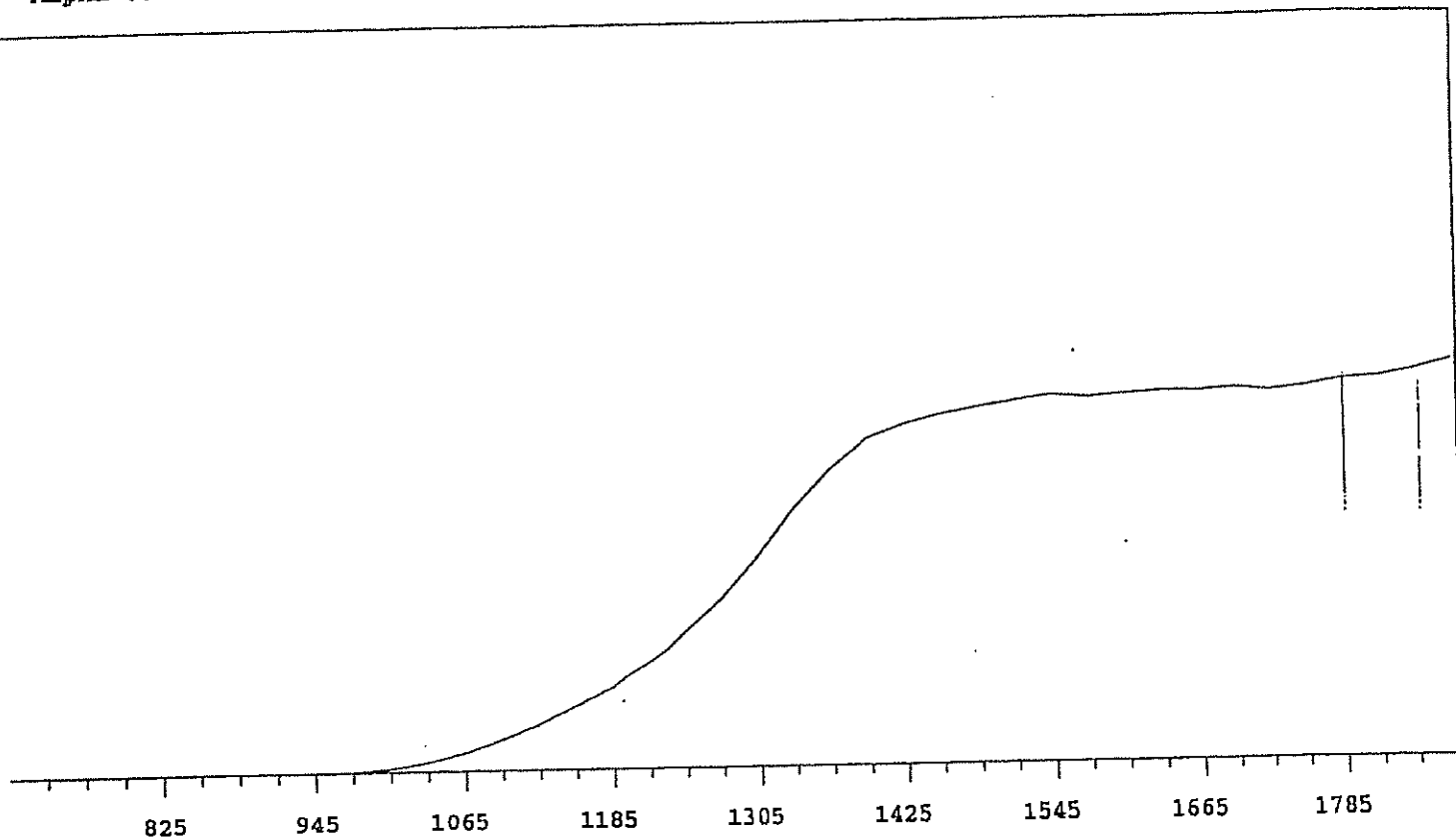
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735        1  
765        0    +55.56  
795        2    +0.00  
825        0    -55.56  
855        1    >100  
885        0    >100  
915        0    >100  
945        2    >100  
975        24   >100  
1005       134   >100  
1035       558   >100  
1065       1361   >100  
1095       2511   >100  
1125       3762   >100  
1155       5246   >100  
1185       7268   +96.29  
1215       9733   +88.98  
1245       12701   +79.94  
1275       16176   +73.13

1305       19796   +65.77  
1335       24338   +57.55  
1365       28686   +45.86  
1395       32750   +32.27  
1425       34919   +20.83  
1455       36434   +11.45  
1485       37487   +5.80  
1515       37623   +3.32  
1545       37528   +2.07  
1575       38277   +2.12  
1605       38338   +2.70  
1635       38426   +1.12  
1665       39007   +1.06  
1695       38592   +0.64  
1725       38870   +0.63  
1755       38868   +1.30  
1785       39238   +1.45  
1815       39169   +2.34  
1845       39570  
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MPC 9600 Plateau  
 Alpha Volts: 705

Instrument 4 MPC 9604 Detector D  
 Beta Volts: 1575

7/1/2009

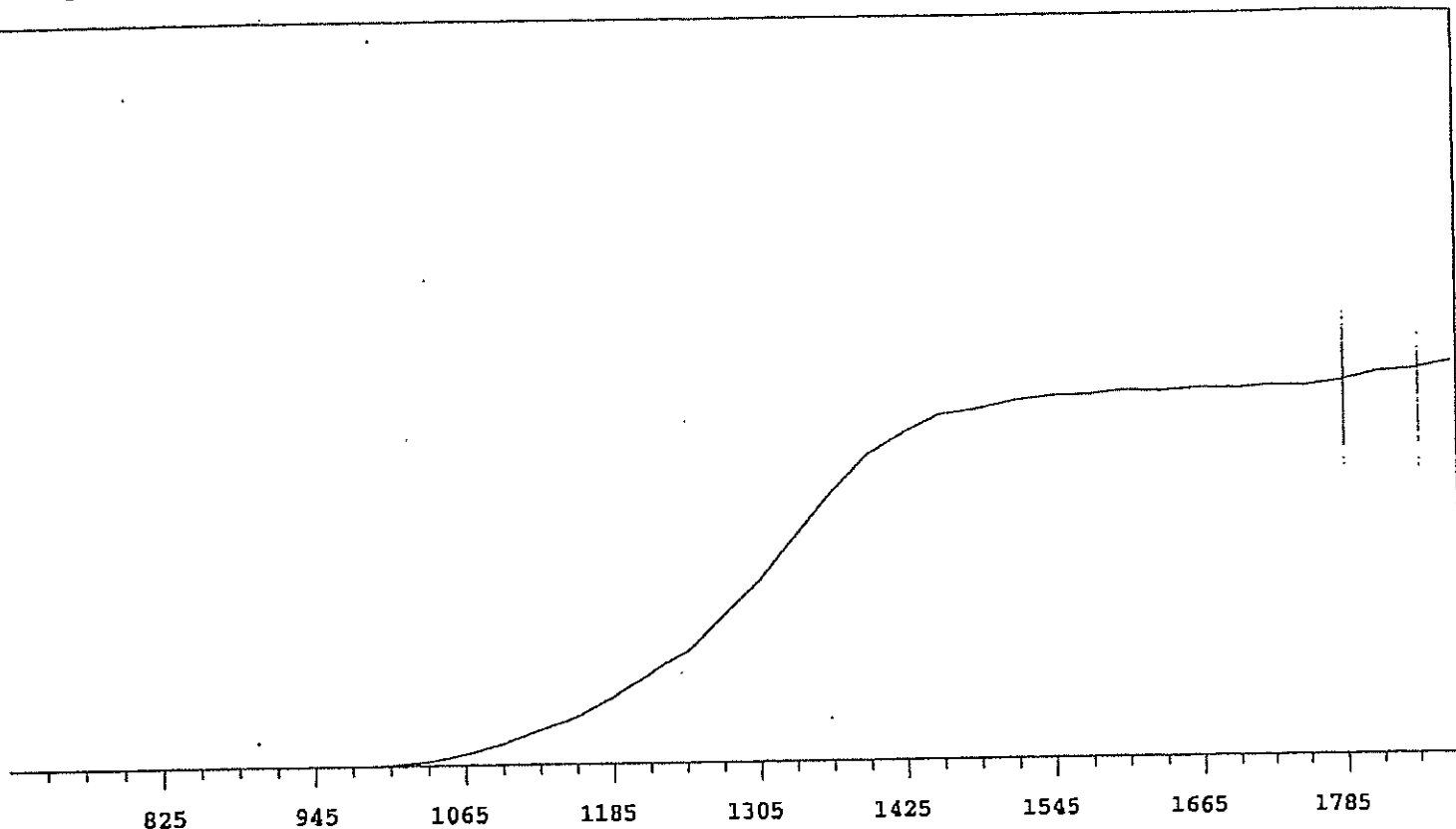


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18491	+61.09
735	0		1335	22444	+51.56
765	0	+0.00	1365	25756	+37.44
795	0	>100	1395	28379	+23.82
825	1	+83.33	1425	29517	+14.00
855	1	+55.56	1455	30309	+8.08
885	0	+0.00	1485	30874	+6.03
915	1	>100	1515	31345	+3.66
945	1	>100	1545	31782	+2.17
975	60	>100	1575	31567	+1.31
1005	297	>100	1605	31789	+0.78
1035	855	>100	1635	31963	+1.34
1065	1647	>100	1665	31956	+0.29
1095	2700	>100	1695	32123	+0.20
1125	3921	>100	1725	31850	+1.46
1155	5471	+96.54	1755	32114	+2.39
1185	7042	+90.21	1785	32665	+3.95
1215	9405	+82.23	1815	32876	+4.96
1245	12266	+76.33	1845	33399	
1275	14989	+69.38	1875	34206	

MPC 9600 Plateau  
Alpha Volts: 705

Instrument 5 MPC 9604 Detector A  
Beta Volts: 1575

7/1/2009

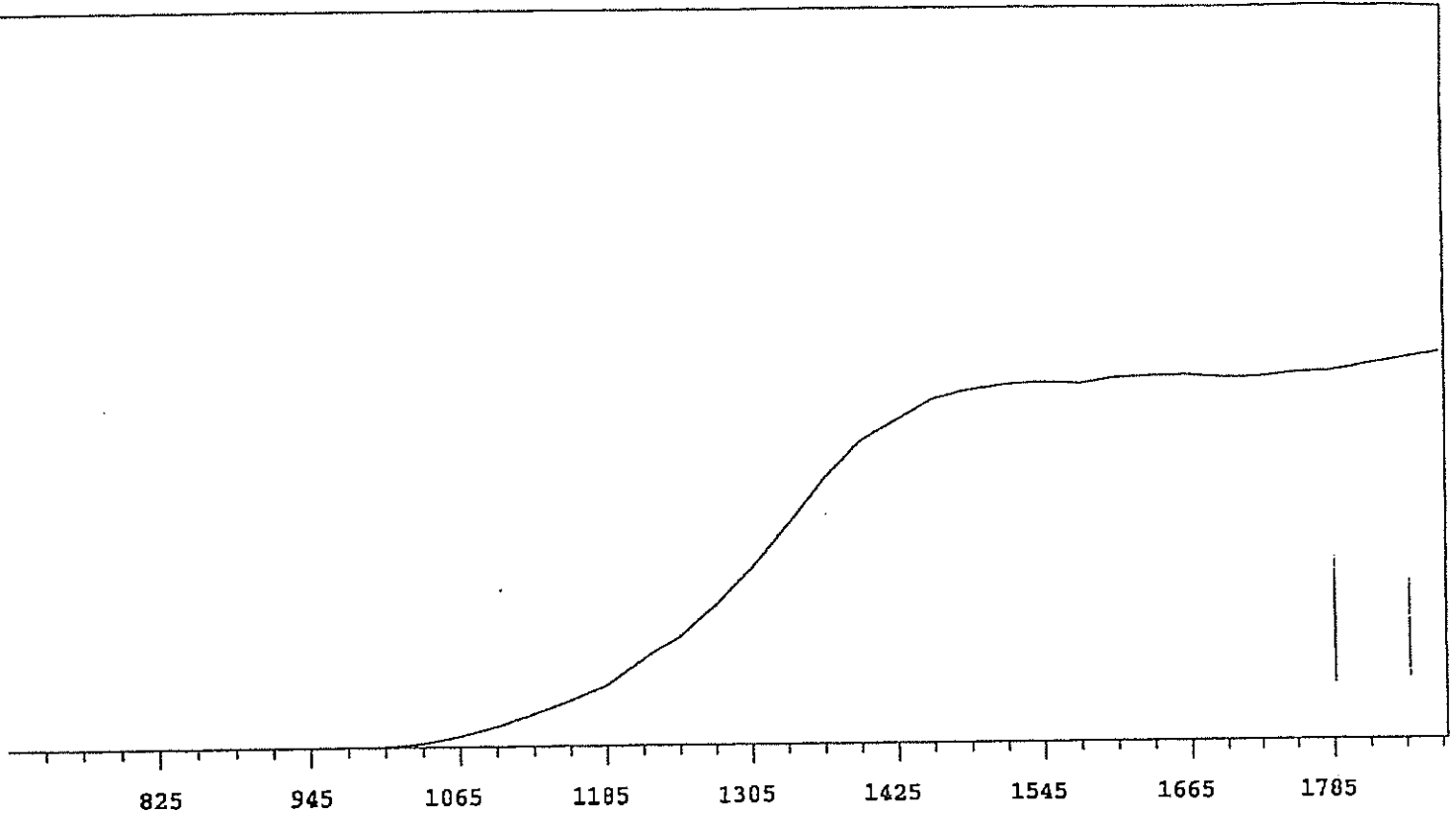


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	13974	+68.00
735	0		1335	17170	+58.62
765	1		1365	20456	+47.04
795	1	+83.33	1395	23332	+33.83
825	1	-83.33	1425	24996	+21.10
855	1	>100	1455	26290	+12.40
885	0	-55.56	1485	26683	+7.74
915	0	>100	1515	27270	+4.43
945	1	>100	1545	27590	+3.48
975	9	>100	1575	27635	+1.71
1005	76	>100	1605	27932	+1.20
1035	308	>100	1635	27807	+0.88
1065	814	>100	1665	28006	+0.62
1095	1600	>100	1695	27964	+0.63
1125	2598	>100	1725	28112	+0.98
1155	3596	>100	1755	28020	+2.84
1185	5065	+96.05	1785	28392	+3.76
1215	6773	+90.23	1815	29028	+5.17
1245	8717	+81.43	1845	29220	
1275	11391	+74.83	1875	29849	

MPC 9600 Plateau  
Alpha Volts: 705

Instrument 5 MPC 9604 Detector B  
Beta Volts: 1575

7/1/2009

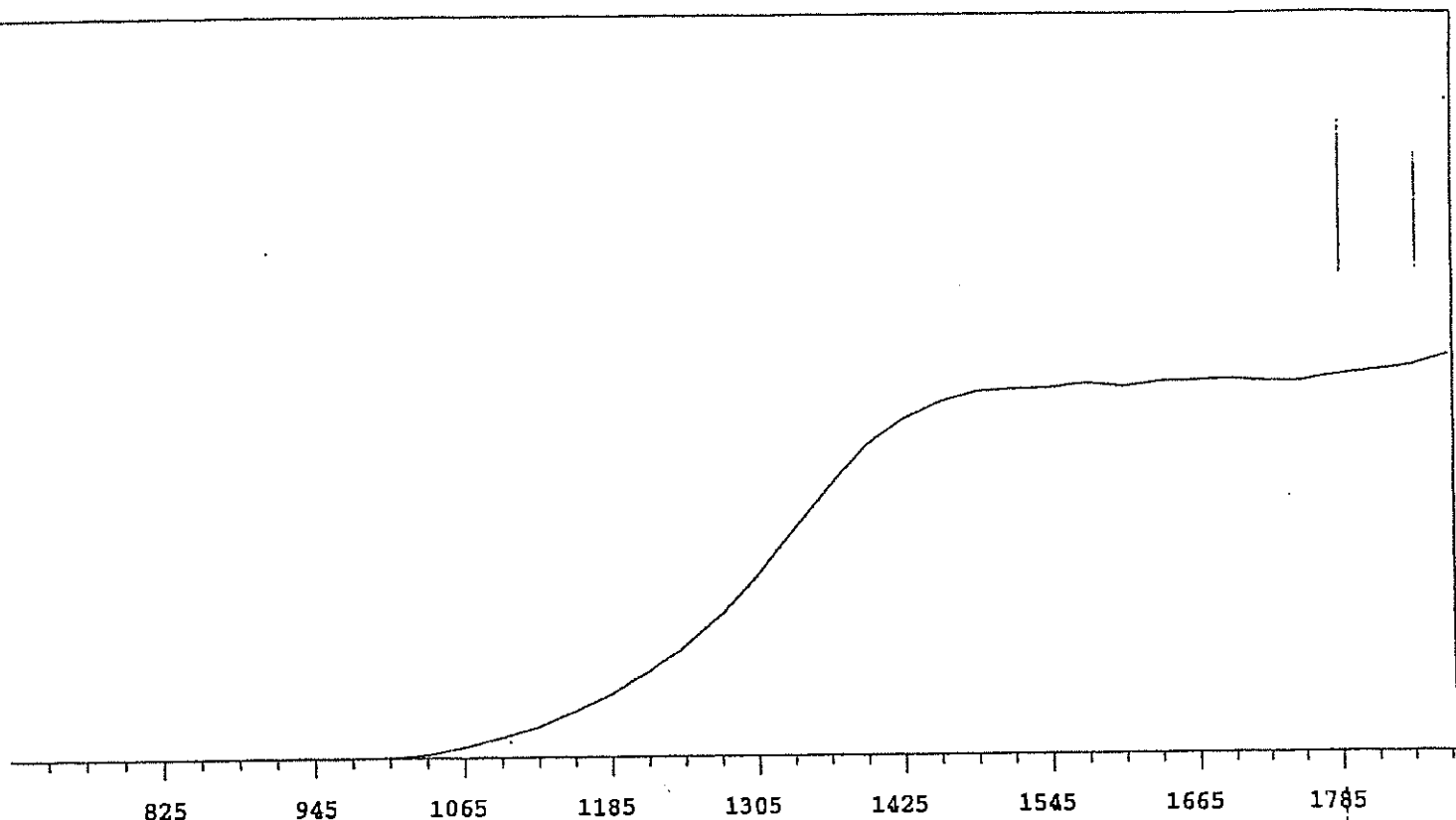


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17414	+68.46
735	0		1335	21540	+59.98
765	0		1365	25854	+46.75
795	0	>100	1395	29222	+33.38
825	1	>100	1425	31128	+21.52
855	1	+41.67	1455	32995	+13.26
885	2	-33.33	1485	33846	+8.09
915	0	>100	1515	34289	+3.25
945	1	>100	1545	34528	+2.00
975	17	>100	1575	34311	+1.78
1005	87	>100	1605	34866	+1.78
1035	336	>100	1635	35046	+1.14
1065	1010	>100	1665	35087	-0.26
1095	1955	>100	1695	34795	+0.11
1125	3124	>100	1725	34857	+0.93
1155	4486	>100	1755	35220	+2.81
1185	6017	>100	1785	35363	+3.98
1215	8507	+91.20	1815	36028	+4.79
1245	11148	+82.59	1845	36577	
1275	14003	+74.21	1875	37207	

MPC 9600 Plateau  
 Alpha Volts: 705

Instrument 5 MPC 9604 Detector C  
 Beta Volts: 1575

7/1/2009

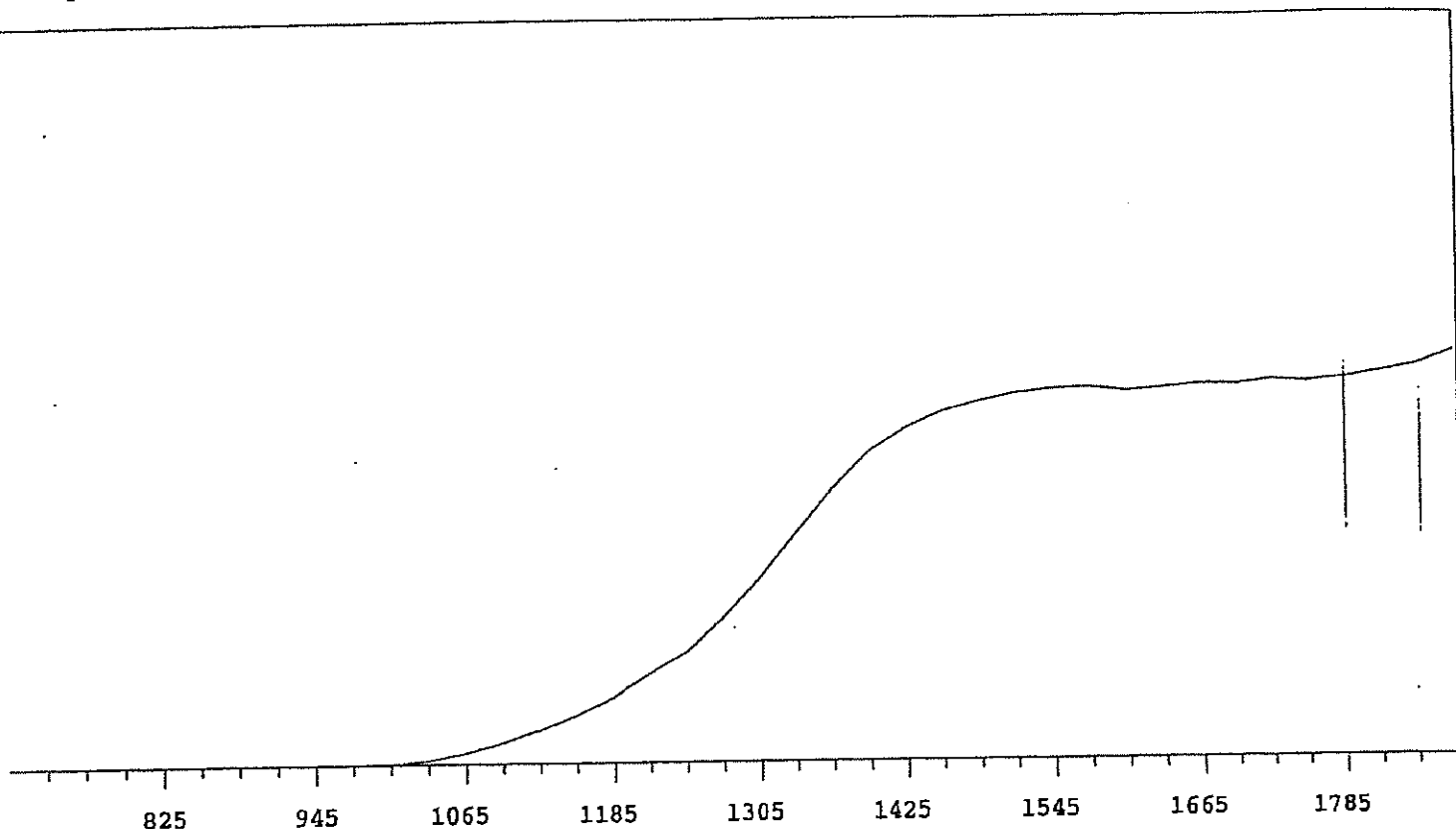


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17085	+68.24
735	0		1335	21135	+59.99
765	0		1365	25066	+47.39
795	0	>100	1395	28530	+33.93
825	0	>100	1425	30823	+22.30
855	1	>100	1455	32287	+12.93
885	0	>100	1485	33217	+6.71
915	1	>100	1515	33474	+3.57
945	2	>100	1545	33517	+1.17
975	7	>100	1575	33921	+1.13
1005	56	>100	1605	33584	+1.27
1035	305	>100	1635	34014	+1.12
1065	982	>100	1665	34116	+0.98
1095	1874	>100	1695	34225	-0.22
1125	2890	>100	1725	33980	+0.58
1155	4260	>100	1755	33971	+1.96
1185	6001	>100	1785	34541	+3.64
1215	8050	+91.54	1815	34954	+5.38
1245	10895	+82.98	1845	35375	
1275	13556	+76.26	1875	36304	

MPC 9600 Plateau  
 Alpha Volts: 705

Instrument 5 MPC 9604 Detector D  
 Beta Volts: 1575

7/1/2009



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	15025	+68.87
735	0		1335	18640	+58.97
765	0		1365	22048	+45.84
795	0	>100	1395	24877	+32.08
825	0	>100	1425	26653	+20.83
855	0	>100	1455	27899	+13.08
885	0	>100	1485	28670	+8.43
915	0	>100	1515	29257	+5.13
945	0	>100	1545	29568	+2.06
975	6	>100	1575	29683	+0.52
1005	81	>100	1605	29362	+0.57
1035	318	>100	1635	29589	+0.80
1065	897	>100	1665	29870	+1.82
1095	1710	>100	1695	29783	+0.90
1125	2714	>100	1725	30077	+0.75
1155	3925	>100	1755	29889	+2.02
1185	5395	+97.31	1785	30152	+3.33
1215	7282	+88.49	1815	30656	+6.54
1245	9426	+81.36	1845	31211	
1275	12007	+75.65	1875	32389	

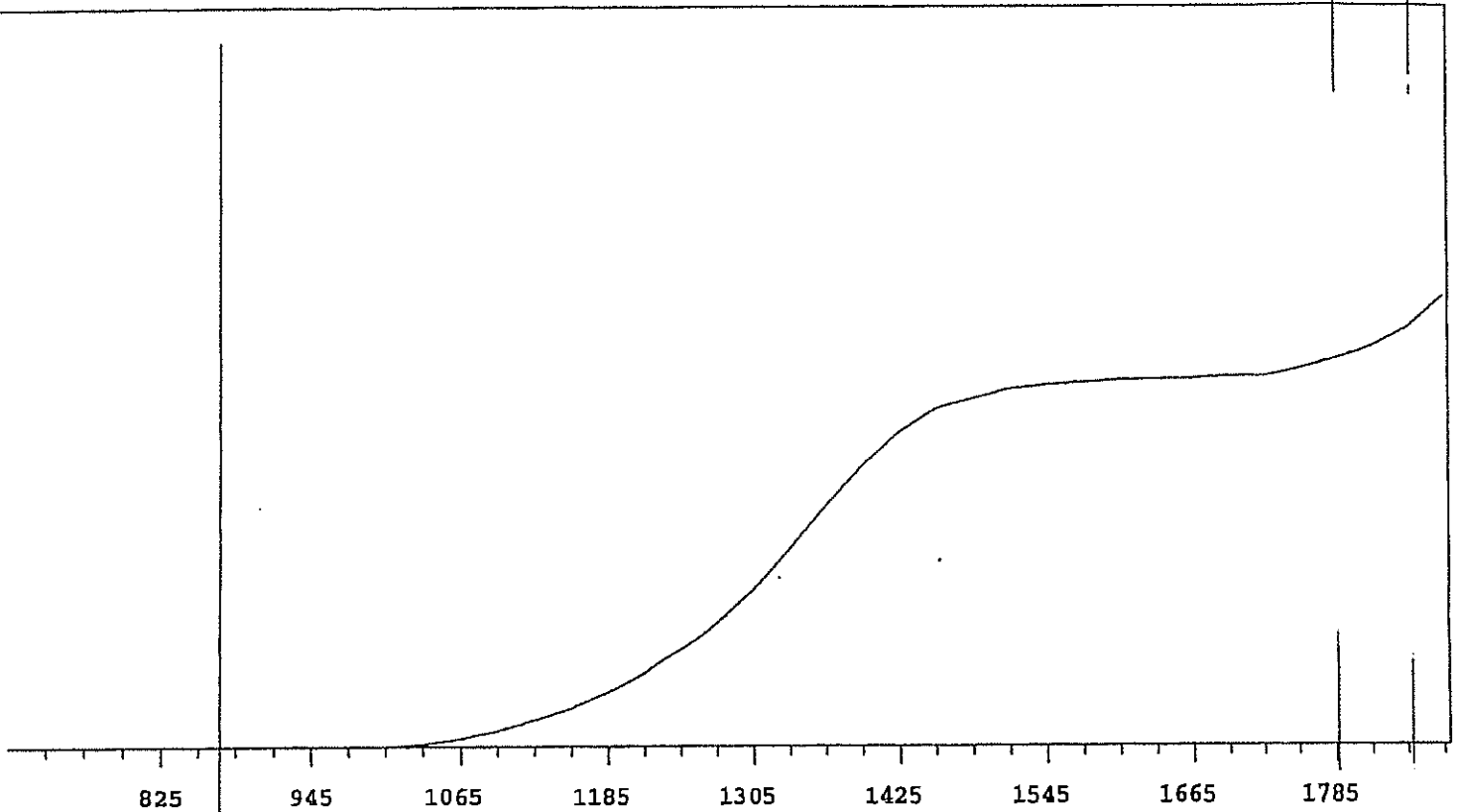


MPC 9600 Plateau  
Alpha Volts: 705

Instrument 6 MPC 9604 Detector A

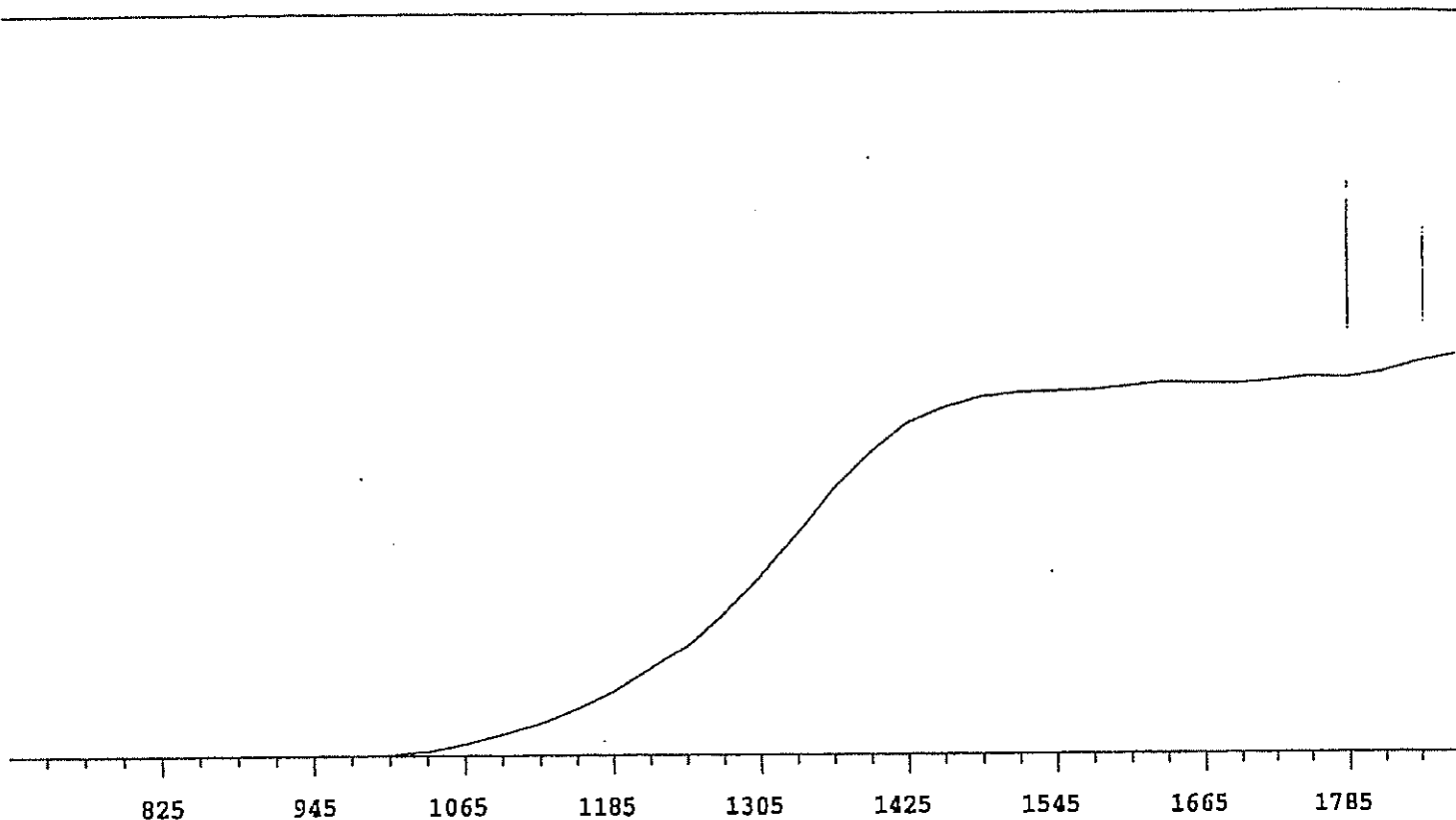
7/1/2009

Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16217	+71.57
735	0		1335	20184	+63.76
765	0		1365	24605	+53.98
795	0	>100	1395	28528	+41.40
825	0	>100	1425	31675	+28.02
855	0	>100	1455	33899	+17.93
885	0	>100	1485	34826	+10.65
915	0	>100	1515	35815	+6.13
945	0	>100	1545	36225	+4.15
975	7	>100	1575	36456	+2.28
1005	31	>100	1605	36747	+1.47
1035	238	>100	1635	36801	+1.26
1065	810	>100	1665	36859	+0.85
1095	1637	>100	1695	37095	+1.85
1125	2743	>100	1725	37072	+4.01
1155	3932	>100	1755	37724	+6.65
1185	5579	>100	1785	38802	+10.33
1215	7602	+94.41	1815	40036	+14.71
1245	10078	+84.86	1845	41975	
1275	13091	+77.67	1875	45123	

MPC 9600 Plateau      Instrument 6   MPC 9604 Detector B    7/1/2009  
 Alpha Volts: 705    Beta Volts: 1575

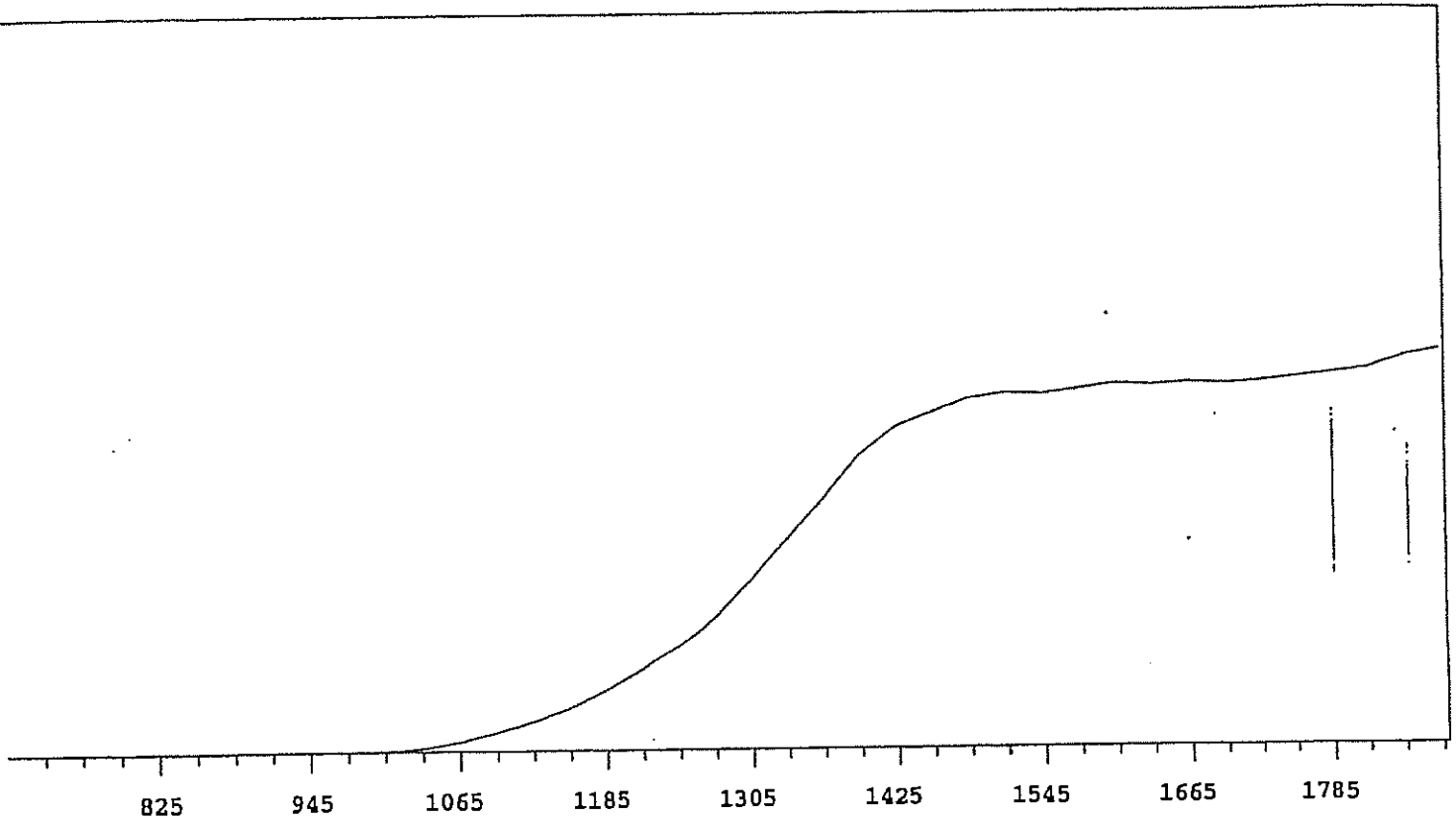


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	20094	+68.67
735	0		1335	24665	+59.40
765	0		1365	29591	+47.86
795	0	>100	1395	33376	+34.51
825	1	+83.33	1425	36440	+22.50
855	1	-83.33	1455	38024	+13.58
885	0	>100	1485	39187	+7.04
915	0	>100	1515	39608	+3.63
945	5	>100	1545	39722	+2.10
975	18	>100	1575	39894	+2.32
1005	125	>100	1605	40298	+2.09
1035	482	>100	1635	40711	+1.41
1065	1255	>100	1665	40574	+0.80
1095	2318	>100	1695	40608	+1.02
1125	3540	>100	1725	40839	+1.28
1155	5288	>100	1755	41201	+1.97
1185	7168	+98.51	1785	41065	+3.74
1215	9760	+88.48	1815	41711	+5.42
1245	12656	+81.52	1845	42917	
1275	16065	+74.58	1875	43699	

MPC 9600 Plateau  
 Alpha Volts: 705

Instrument 6 MPC 9604 Detector C  
 Beta Volts: 1575

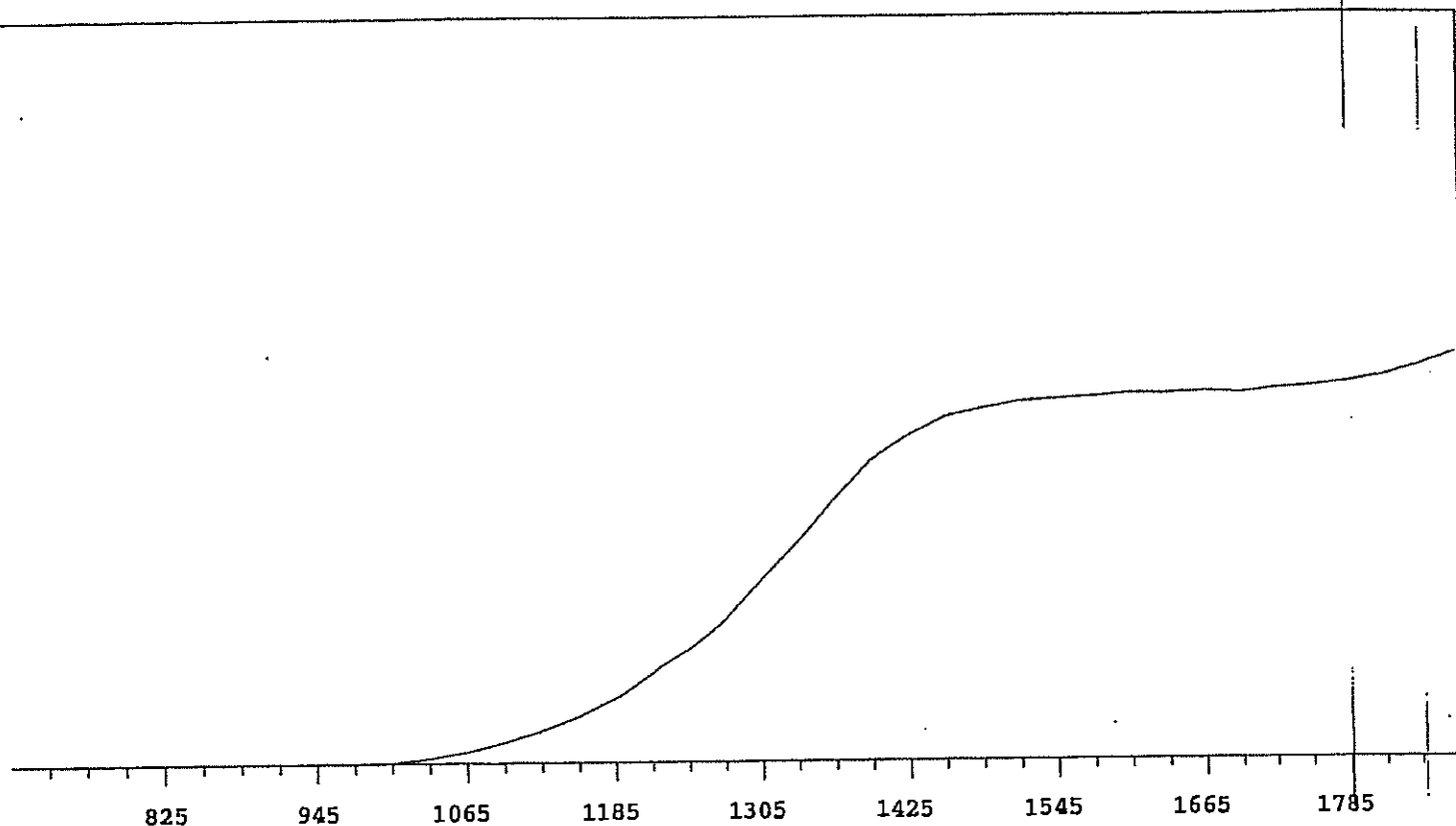
7/1/2009



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17350	+67.80
735	0		1335	21371	+60.27
765	1	+0.00	1365	25084	+49.32
795	0	>100	1395	29177	+36.15
825	0	+0.00	1425	31927	+24.86
855	0	>100	1455	33217	+14.70
885	1	>100	1485	34545	+7.74
915	1	>100	1515	35097	+4.64
945	2	>100	1545	34927	+2.96
975	8	>100	1575	35439	+2.21
1005	70	>100	1605	35939	+2.41
1035	353	>100	1635	35763	+0.94
1065	990	>100	1665	36053	+0.35
1095	1956	>100	1695	35886	+1.15
1125	3024	>100	1725	36066	+1.77
1155	4400	>100	1755	36379	+3.03
1185	6173	+99.75	1785	36768	+4.80
1215	8230	+89.85	1815	37193	+6.14
1245	10904	+82.36	1845	38320	
1275	13747	+76.18	1875	39061	

MPC 9600 Plateau  
Alpha Volts: 705

Instrument 6 MPC 9604 Detector D 7/1/2009  
Beta Volts: 1575

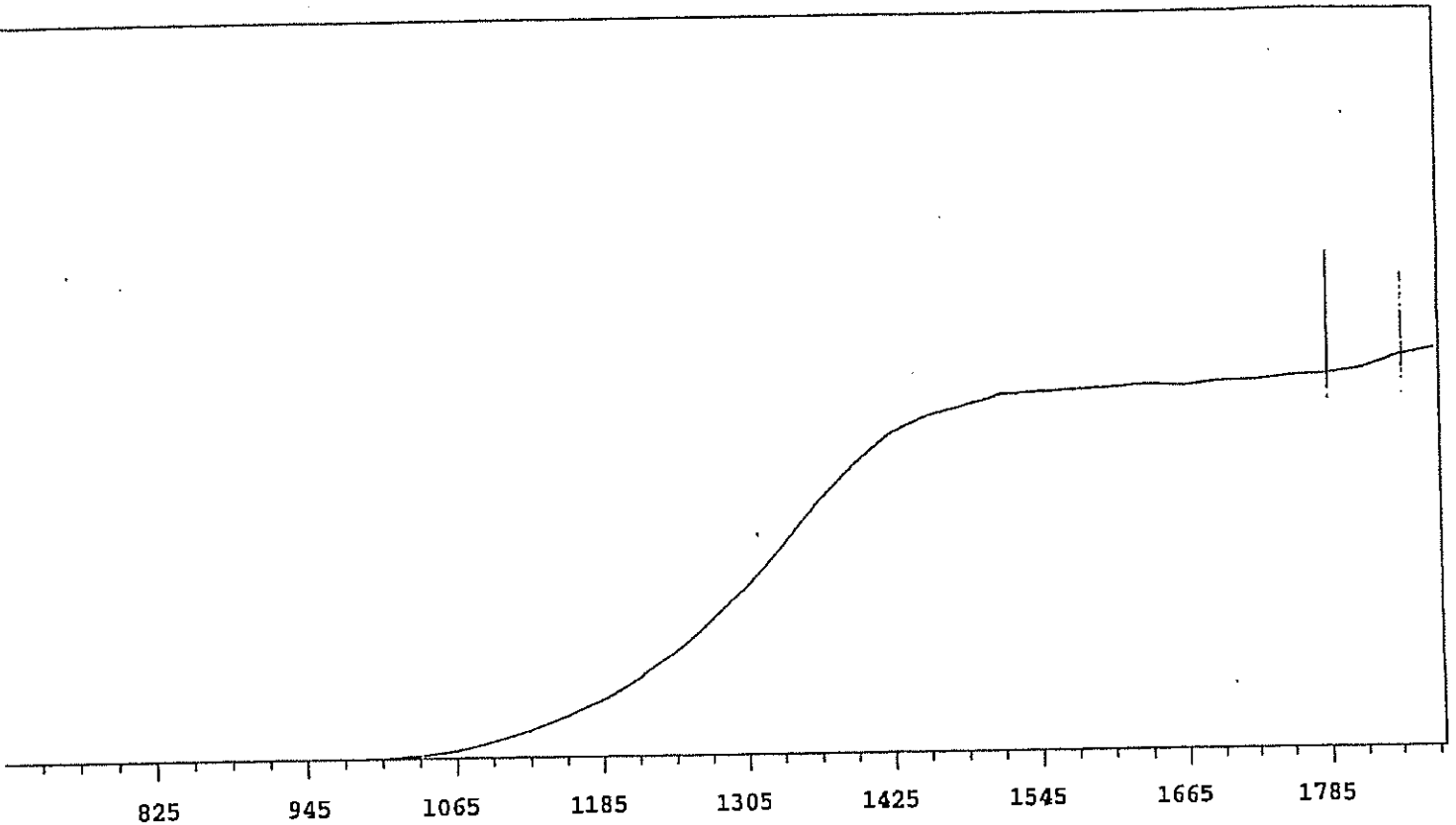


.VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17954	+65.82
735	0		1335	21482	+57.64
765	0		1365	25373	+45.78
795	1	+0.00	1395	29042	+34.80
825	0	>100	1425	31373	+23.29
855	0	+0.00	1455	33143	+14.25
885	0	>100	1485	34006	+8.49
915	1	>100	1515	34662	+4.71
945	0	>100	1545	34892	+3.14
975	14	>100	1575	35129	+1.86
1005	109	>100	1605	35411	+1.49
1035	481	>100	1635	35380	+0.62
1065	1177	>100	1665	35554	+0.65
1095	2133	>100	1695	35385	+1.18
1125	3243	>100	1725	35755	+1.89
1155	4554	>100	1755	35907	+3.26
1185	6285	+98.38	1785	36305	+4.62
1215	8468	+89.75	1815	36870	+6.98
1245	11266	+83.13	1845	37807	
1275	14088	+74.43	1875	39047	

MPC 9600 Plateau  
Alpha Volts: 705

Instrument 7 MPC 9604 Detector A  
Beta Volts: 1575

7/1/2009



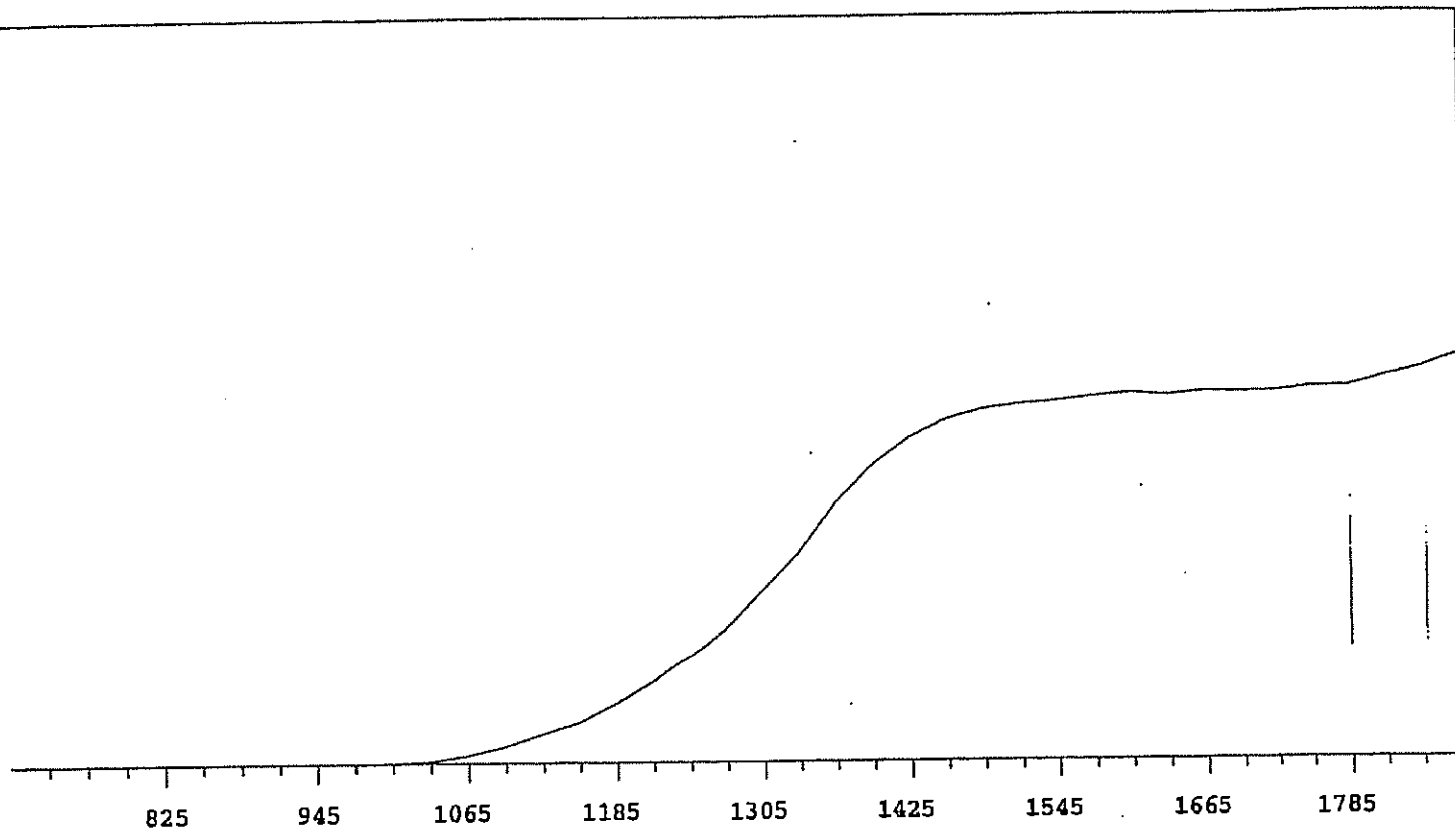
VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	1	+83.33
855	1	-83.33
885	0	-55.56
915	0	>100
945	1	>100
975	3	>100
1005	42	>100
1035	242	>100
1065	613	>100
1095	1353	>100
1125	2213	>100
1155	3256	>100
1185	4474	>100
1215	5932	+94.10
1245	8072	+87.32
1275	10579	+79.61

VOLTS	COUNTS	%/100 Volts
1305	13228	+70.36
1335	16271	+60.12
1365	19506	+49.19
1395	22188	+36.46
1425	24373	+24.43
1455	25649	+15.99
1485	26433	+9.58
1515	27195	+5.74
1545	27367	+3.24
1575	27490	+1.86
1605	27608	+1.22
1635	27841	+1.33
1665	27695	+1.11
1695	27999	+1.42
1725	27992	+2.04
1755	28289	+2.52
1785	28408	+4.56
1815	28863	+5.70
1845	29664	
1875	30148	

MPC 9600 Plateau  
 Alpha Volts: 705

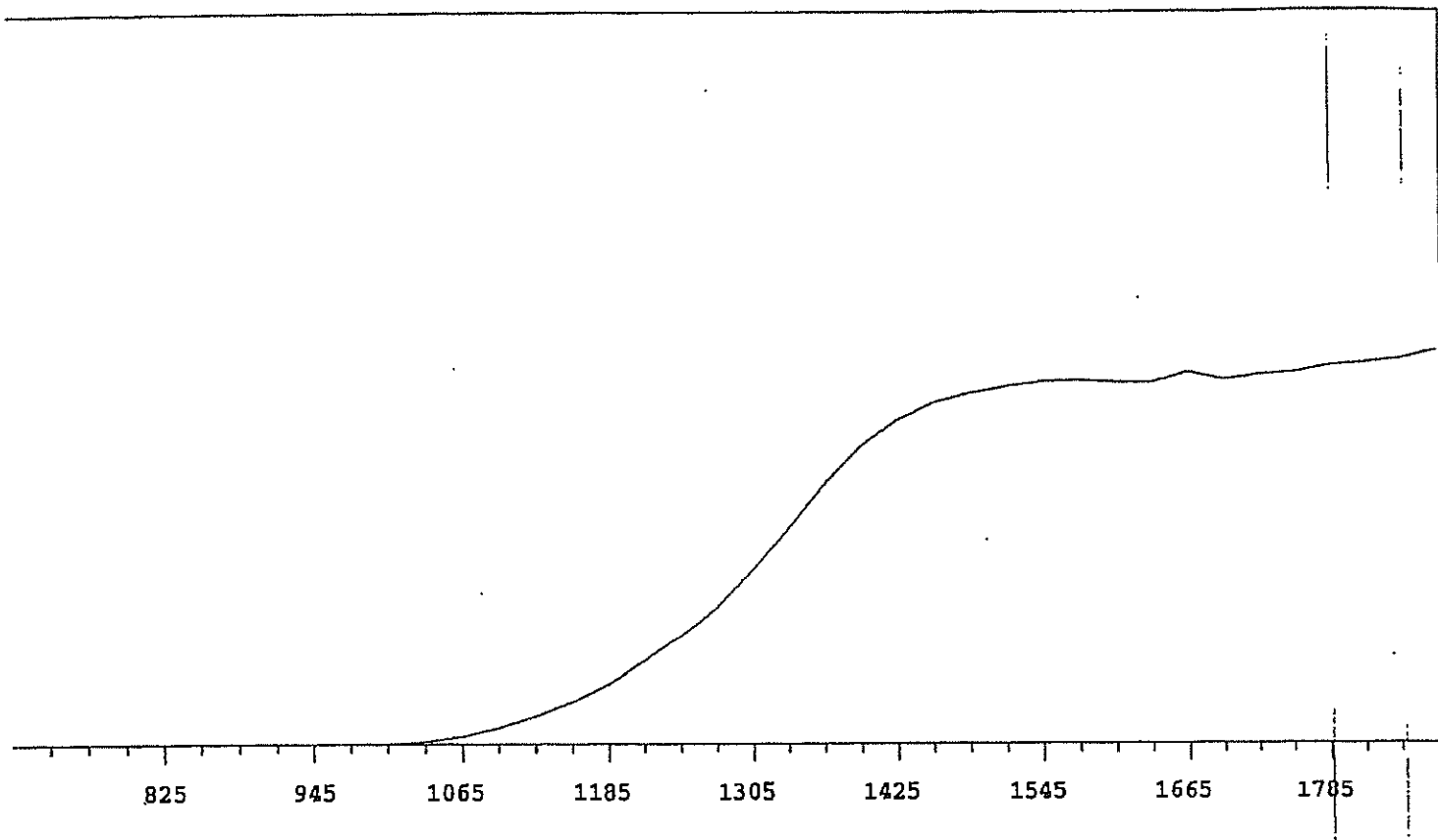
Instrument 7 MPC 9604 Detector B  
 Beta Volts: 1575

7/1/2009



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16978	+70.97
735	0		1335	20569	+61.39
765	0		1365	24989	+48.97
795	0	>100	1395	28389	+36.69
825	0	>100	1425	30977	+24.05
855	0	>100	1455	32727	+14.93
885	0	>100	1485	33697	+8.42
915	1	>100	1515	34195	+4.89
945	1	>100	1545	34437	+3.49
975	3	>100	1575	34850	+2.11
1005	34	>100	1605	35174	+1.62
1035	221	>100	1635	34923	+0.68
1065	825	>100	1665	35250	+0.35
1095	1709	>100	1695	35171	+1.24
1125	2873	>100	1725	35237	+1.02
1155	4078	>100	1755	35584	+2.79
1185	5858	>100	1785	35587	+4.59
1215	7809	+91.82	1815	36485	+6.74
1245	10336	+85.02	1845	37270	
1275	13215	+77.79	1875	38453	

MPC 9600 Plateau      Instrument 7 MPC 9604 Detector C      7/1/2009  
 Alpha Volts: 705      Beta Volts: 1575

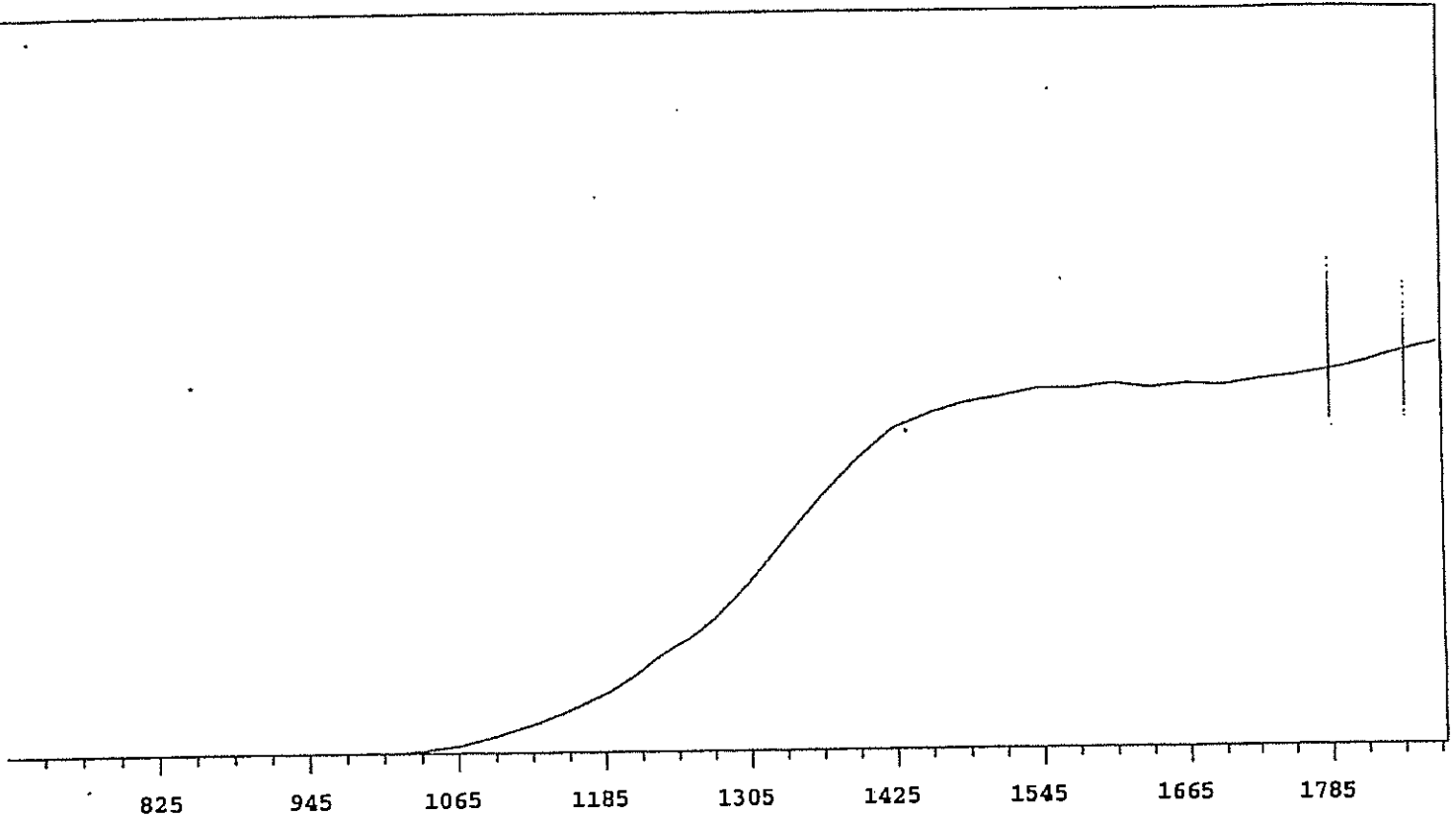


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16543	+70.03
735	0		1335	20257	+60.71
765	0		1365	24245	+48.17
795	0	>100	1395	27602	+35.50
825	0	>100	1425	30019	+23.48
855	0	>100	1455	31614	+14.53
885	0	>100	1485	32522	+8.91
915	0	>100	1515	33103	+5.28
945	0	>100	1545	33572	+2.60
975	4	>100	1575	33695	+0.70
1005	57	>100	1605	33525	+1.48
1035	277	>100	1635	33477	+0.99
1065	817	>100	1665	34432	+1.49
1095	1666	>100	1695	33745	+1.43
1125	2766	>100	1725	34149	+1.60
1155	4077	>100	1755	34350	+3.69
1185	5667	>100	1785	34955	+3.62
1215	7694	+91.50	1815	35251	+4.44
1245	10209	+84.83	1845	35592	
1275	12950	+77.50	1875	36382	

MPC 9600 Plateau  
 Alpha Volts: 705

Instrument 7 MPC 9604 Detector D  
 Beta Volts: 1575

7/1/2009



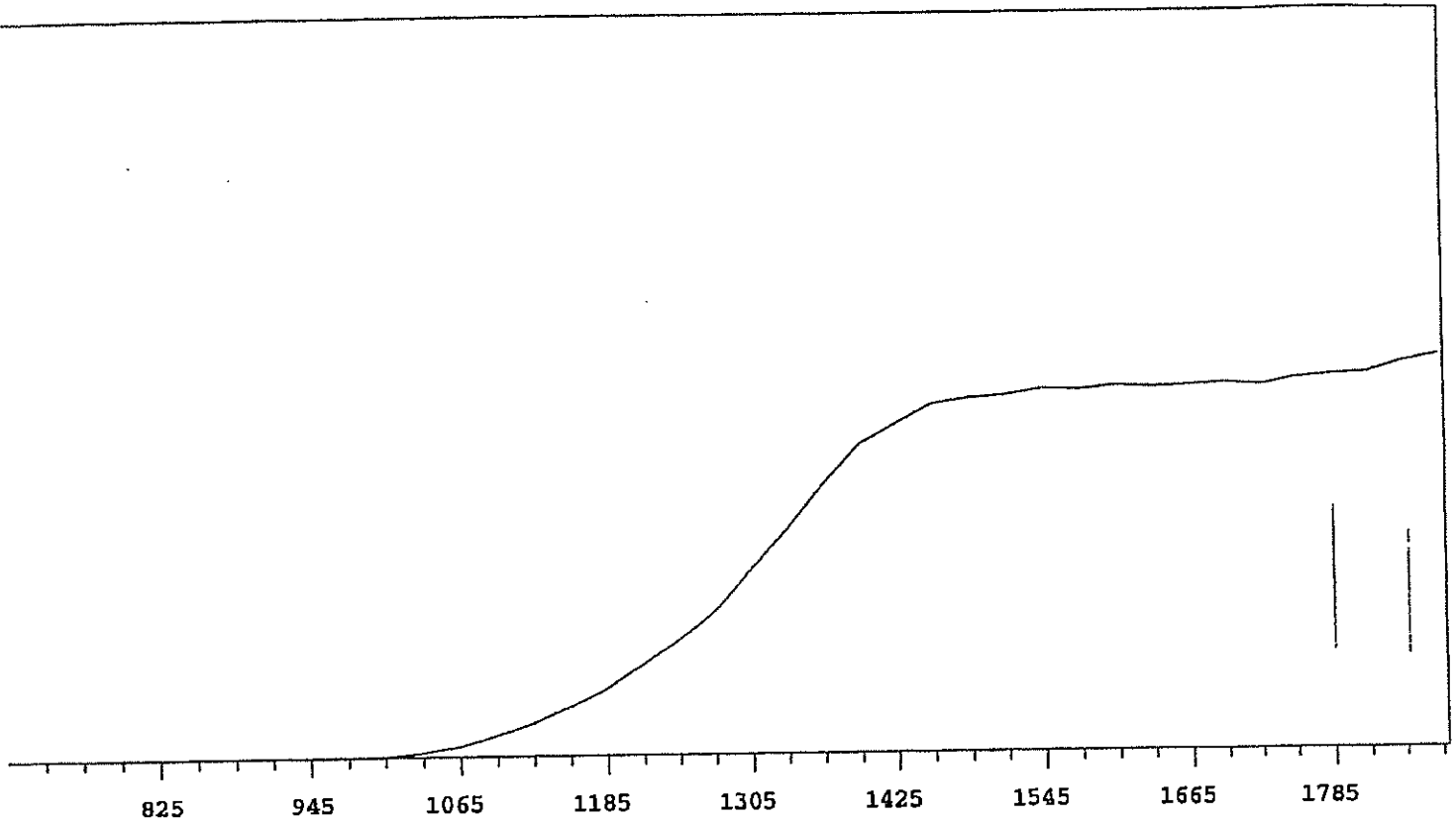
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	14016	+71.42
735	0		1335	17436	+62.21
765	0		1365	20814	+50.32
795	0	>100	1395	23760	+36.91
825	0	>100	1425	26302	+24.91
855	0	>100	1455	27519	+15.17
885	0	>100	1485	28410	+8.91
915	0	>100	1515	28843	+5.41
945	0	>100	1545	29396	+3.58
975	5	>100	1575	29357	+1.54
1005	29	>100	1605	29719	+0.51
1035	204	>100	1635	29358	+0.23
1065	609	>100	1665	29623	+0.57
1095	1354	>100	1695	29509	+2.12
1125	2316	>100	1725	29896	+2.84
1155	3418	>100	1755	30165	+4.42
1185	4654	>100	1785	30570	+5.65
1215	6455	+92.99	1815	31180	+6.95
1245	8669	+86.45	1845	31995	
1275	10931	+79.15	1875	32717	



MPC 9600 Plateau  
Alpha Volts: 705

Instrument 8 MPC 9604 Detector A  
Beta Volts: 1575

7/1/2009



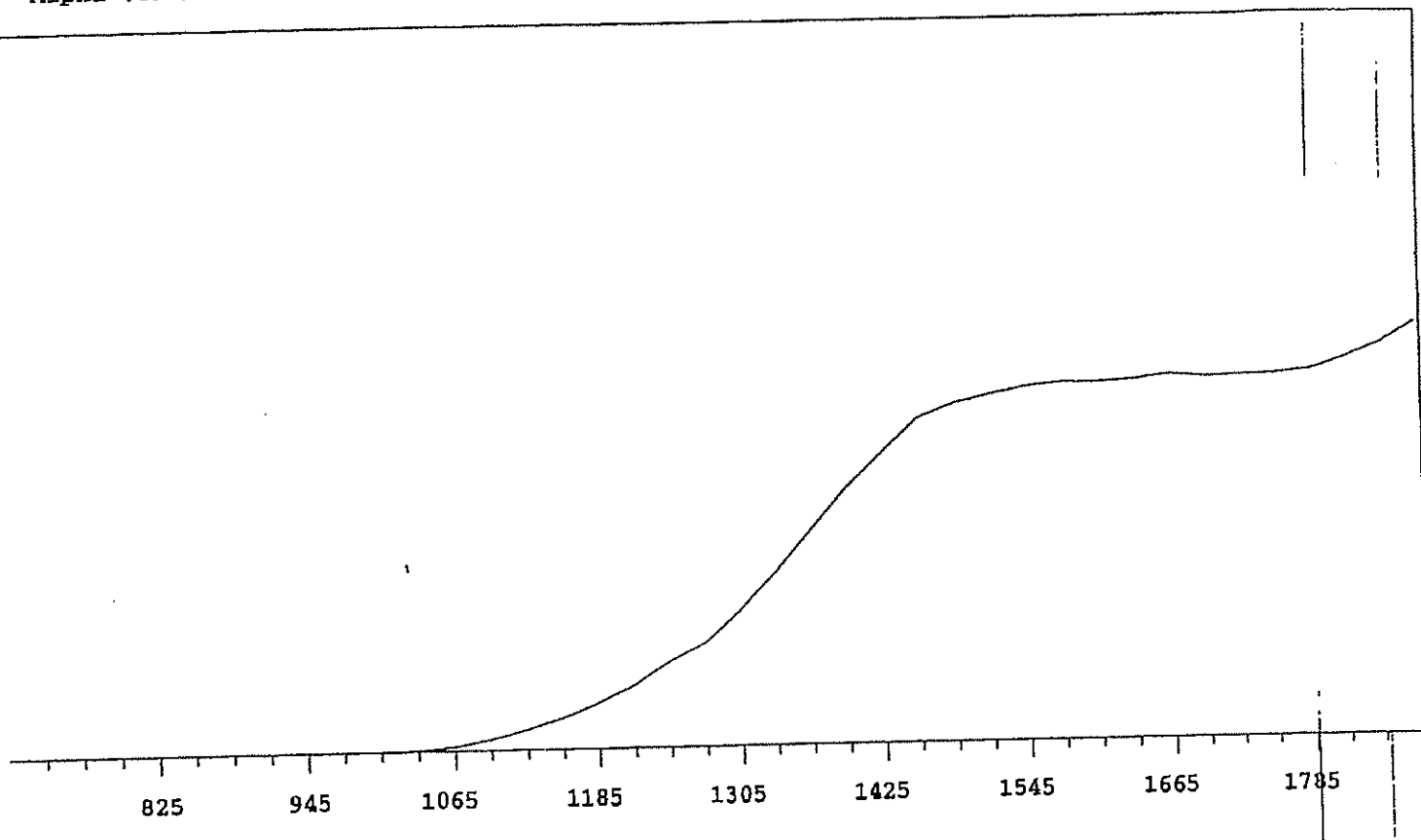
VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	1	>100
975	9	>100
1005	96	>100
1035	468	>100
1065	1084	>100
1095	2286	>100
1125	3479	>100
1155	4912	>100
1185	6819	+98.23
1215	9153	+89.05
1245	12105	+83.21
1275	15122	+75.24

VOLTS	COUNTS	%/100 Volts
1305	19482	+67.45
1335	23344	+59.35
1365	27793	+45.86
1395	31916	+34.29
1425	33979	+21.61
1455	35993	+11.71
1485	36530	+7.04
1515	36796	+3.11
1545	37393	+2.44
1575	37279	+1.41
1605	37650	+0.49
1635	37458	+0.91
1665	37579	+0.12
1695	37828	+1.10
1725	37535	+1.72
1755	38104	+2.18
1785	38416	+4.12
1815	38633	+4.92
1845	39649	
1875	40366	

MPC 9600 Plateau  
 Alpha Volts: 705

Instrument 8 MPC 9604 Detector B  
 Beta Volts: 1575

7/1/2009

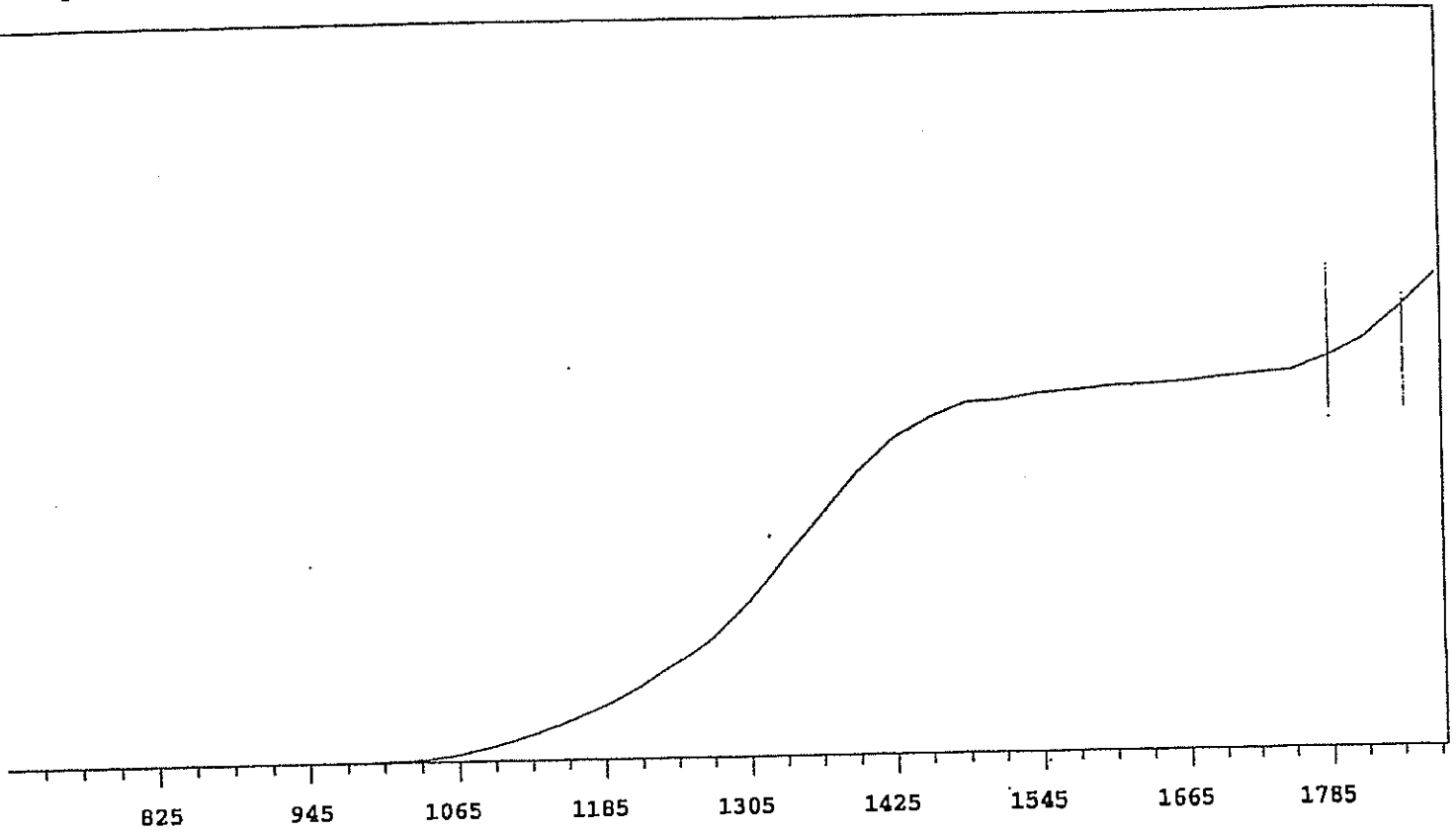


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16337	+74.91
735	0		1335	20471	+68.07
765	0		1365	25012	+57.86
795	0	>100	1395	29694	+47.48
825	0	>100	1425	33409	+35.17
855	0	>100	1455	37013	+23.27
885	0	>100	1485	38629	+14.35
915	0	>100	1515	39529	+7.69
945	0	>100	1545	40284	+4.34
975	0	>100	1575	40711	+2.52
1005	20	>100	1605	40642	+1.97
1035	122	>100	1635	40879	+1.11
1065	511	>100	1665	41405	+0.98
1095	1263	>100	1695	41011	+0.30
1125	2390	>100	1725	41182	+0.41
1155	3641	>100	1755	41178	+3.28
1185	5246	>100	1785	41573	+6.47
1215	7212	+98.32	1815	42858	+10.82
1245	9897	+89.80	1845	44440	
1275	12742	+82.40	1875	46780	

MPC 9600 Plateau  
 Alpha Volts: 705

Instrument 8 MPC 9604 Detector C  
 Beta Volts: 1575

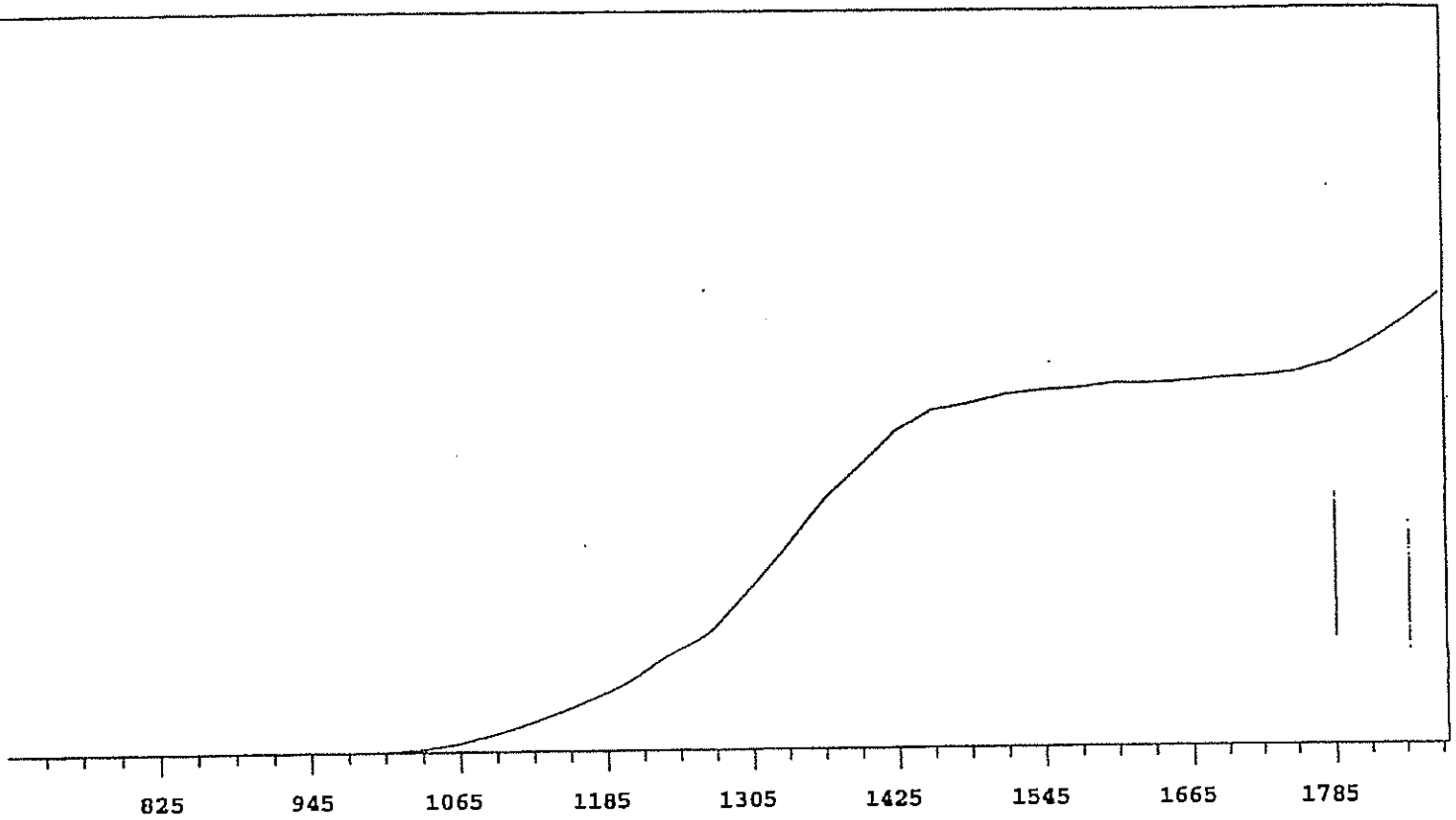
7/1/2009



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16303	+72.82
735	0		1335	20309	+64.32
765	0		1365	24364	+53.82
795	0	>100	1395	28527	+40.95
825	0	>100	1425	31774	+28.74
855	0	>100	1455	33631	+16.87
885	0	>100	1485	35030	+9.25
915	0	>100	1515	35208	+5.21
945	0	>100	1545	35741	+3.27
975	4	>100	1575	36019	+2.95
1005	46	>100	1605	36373	+2.21
1035	202	>100	1635	36484	+2.27
1065	697	>100	1665	36713	+2.28
1095	1532	>100	1695	37093	+2.46
1125	2614	>100	1725	37325	+4.17
1155	3953	>100	1755	37543	+7.52
1185	5474	>100	1785	38833	+13.43
1215	7466	+93.09	1815	40656	+19.49
1245	9842	+86.73	1845	43753	
1275	12814	+80.29	1875	47246	

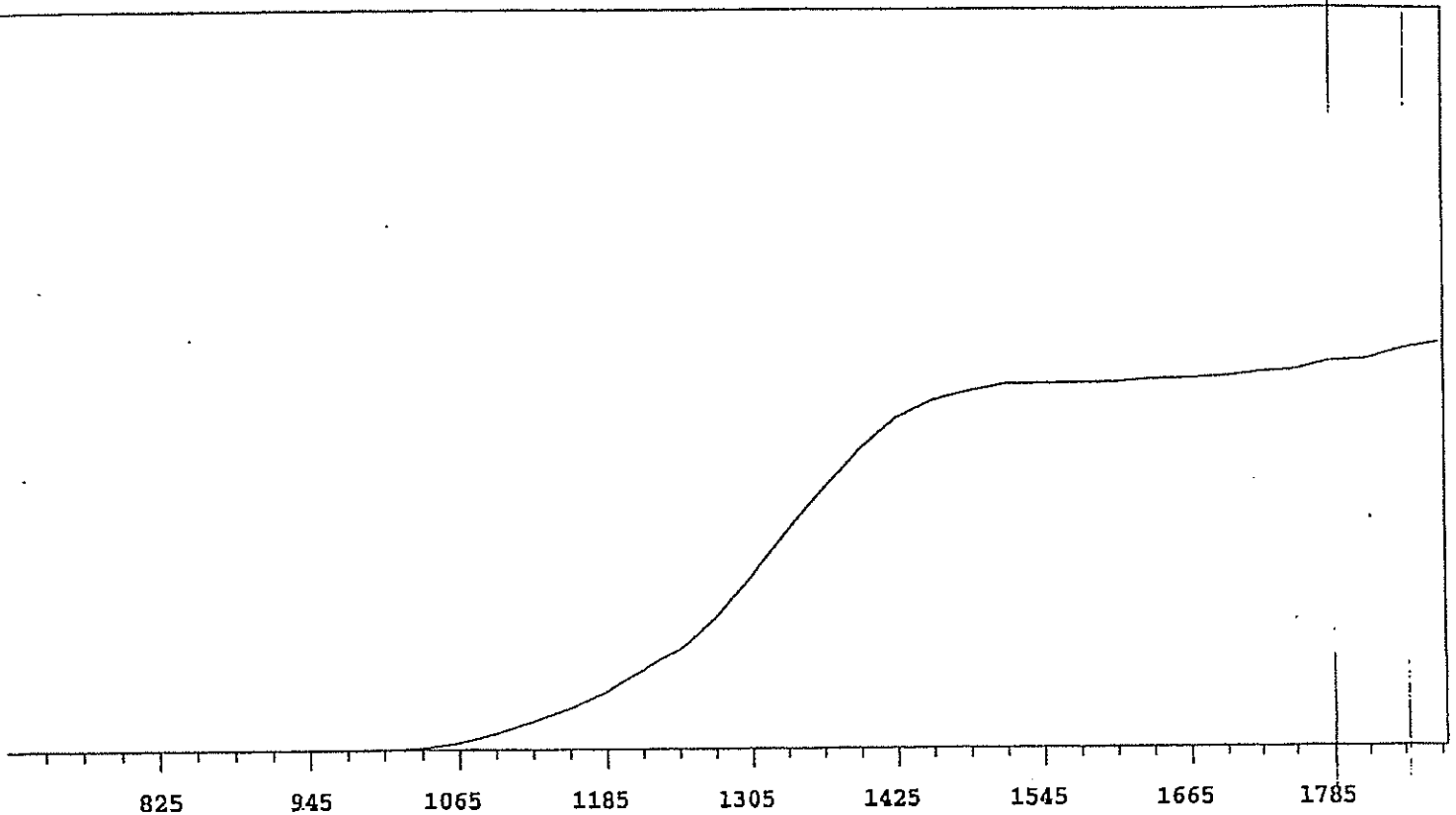
MPC 9600 Plateau  
 Alpha Volts: 705

Instrument 8 MPC 9604 Detector D 7/1/2009  
 Beta Volts: 1575



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16889	+70.18
735	0		1335	20600	+61.29
765	1	+0.00	1365	24824	+50.40
795	0	>100	1395	28208	+38.85
825	0	>100	1425	31539	+25.79
855	0	>100	1455	33391	+16.06
885	0	>100	1485	33991	+8.60
915	0	>100	1515	34782	+5.01
945	0	>100	1545	35201	+4.10
975	5	>100	1575	35380	+2.50
1005	47	>100	1605	35849	+1.87
1035	243	>100	1635	35784	+1.79
1065	792	>100	1665	36000	+1.43
1095	1744	>100	1695	36269	+2.10
1125	2933	>100	1725	36381	+3.46
1155	4123	>100	1755	36733	+6.86
1185	5780	>100	1785	37669	+11.78
1215	7791	+91.58	1815	39465	+16.64
1245	10478	+84.93	1845	41803	
1275	13118	+77.50	1875	44665	

MPC 9600 Plateau      Instrument 9   MPC 9604 Detector A   7/1/2009  
 Alpha Volts: 870      Beta Volts: 1530

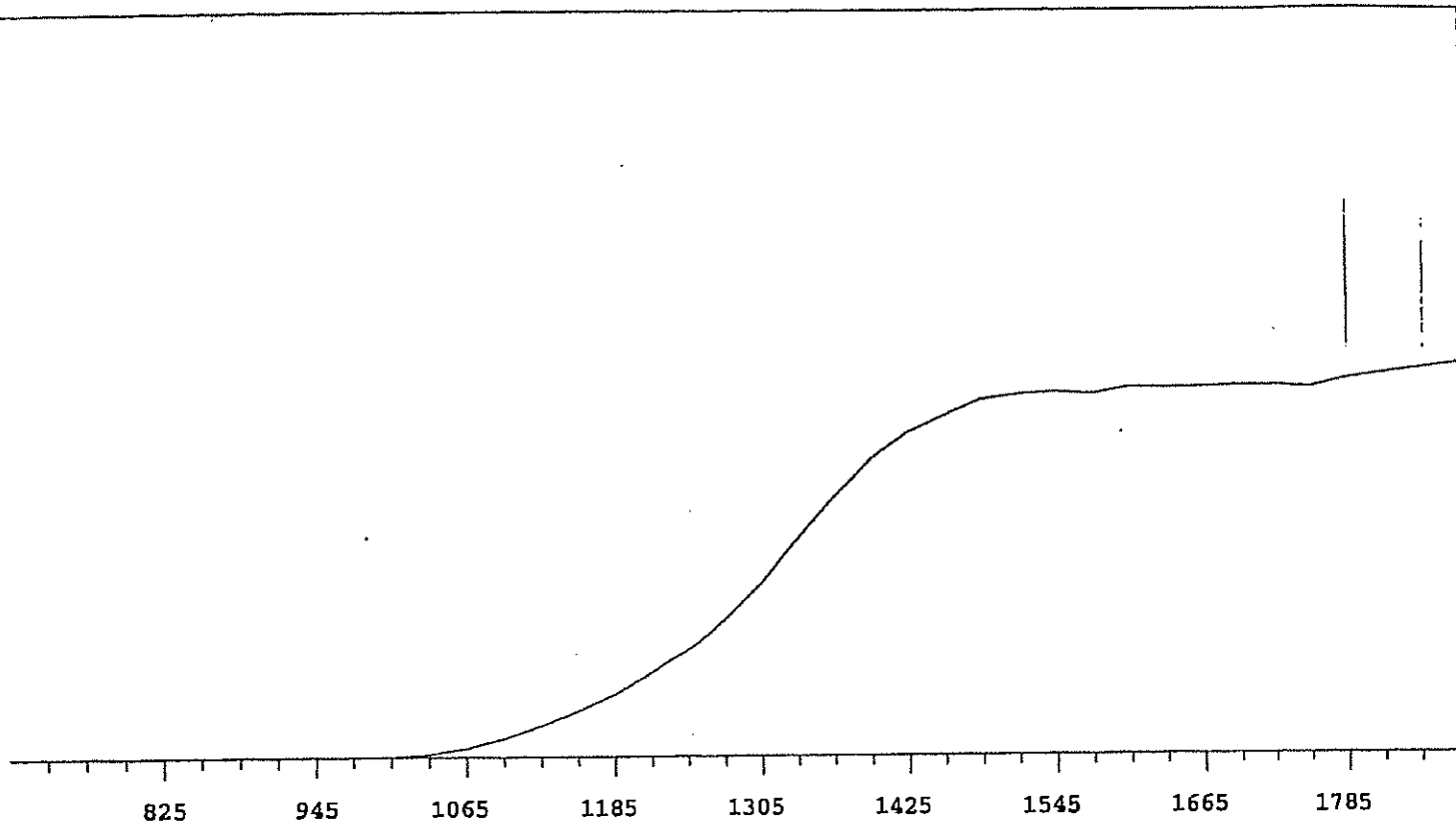


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16226	+71.71
735	0		1335	20083	+61.95
765	1	+0.00	1365	23913	+49.99
795	0	>100	1395	27526	+36.97
825	0	>100	1425	30193	+24.54
855	0	>100	1455	31747	+14.71
885	0	>100	1485	32544	+7.71
915	0	>100	1515	33198	+3.66
945	0	>100	1545	33188	+1.51
975	2	>100	1575	33227	+0.73
1005	33	>100	1605	33278	+1.04
1035	203	>100	1635	33518	+1.38
1065	668	>100	1665	33565	+1.95
1095	1403	>100	1695	33774	+1.99
1125	2545	>100	1725	34135	+3.30
1155	3800	>100	1755	34244	+3.67
1185	5363	>100	1785	35022	+4.84
1215	7355	+95.00	1815	35229	+5.93
1245	9807	+87.69	1845	36179	
1275	12700	+80.28	1875	36821	

MPC 9600 Plateau  
 Alpha Volts: 870

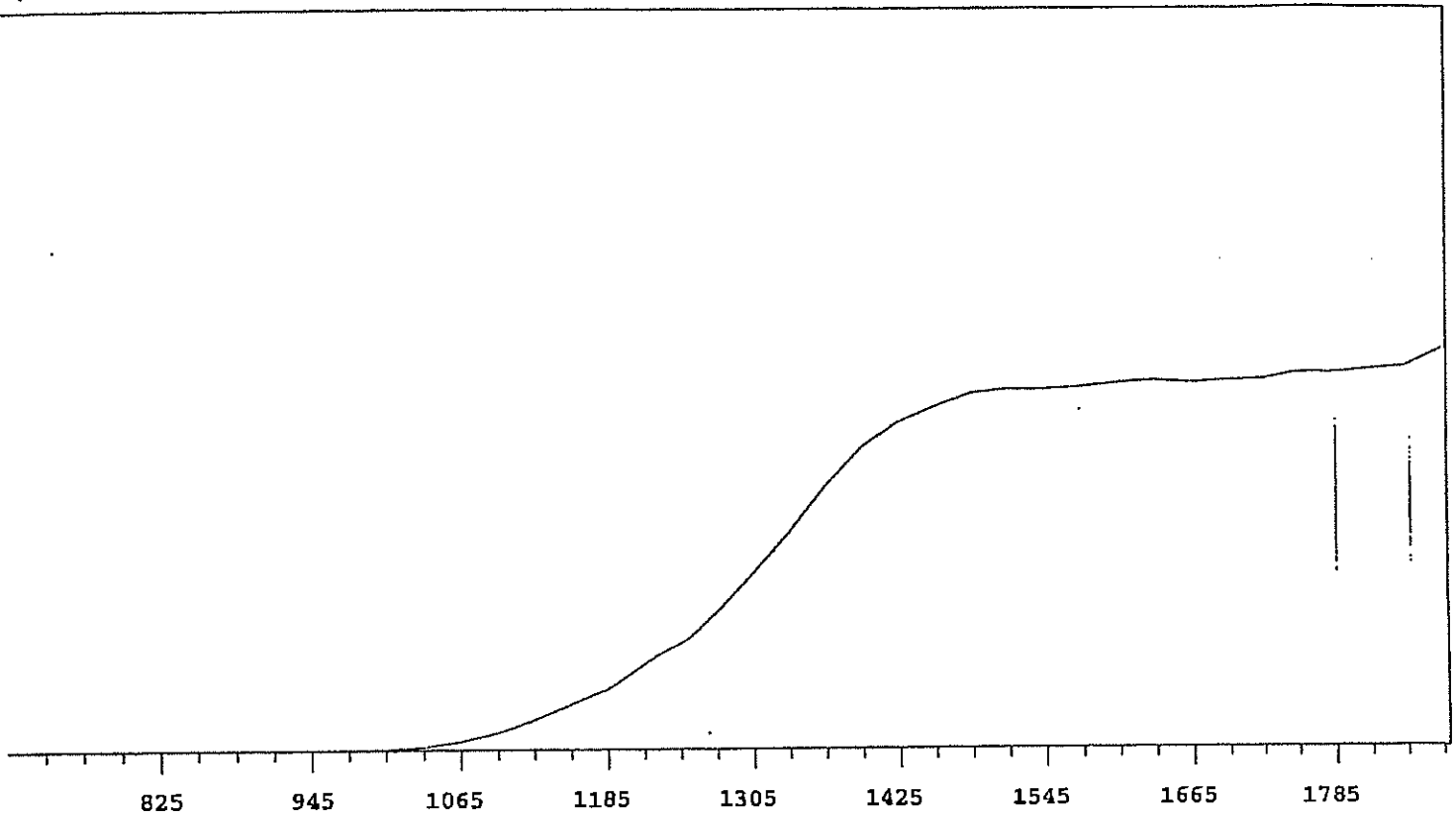
Instrument 9 MPC 9604 Detector B  
 Beta Volts: 1530

7/1/2009



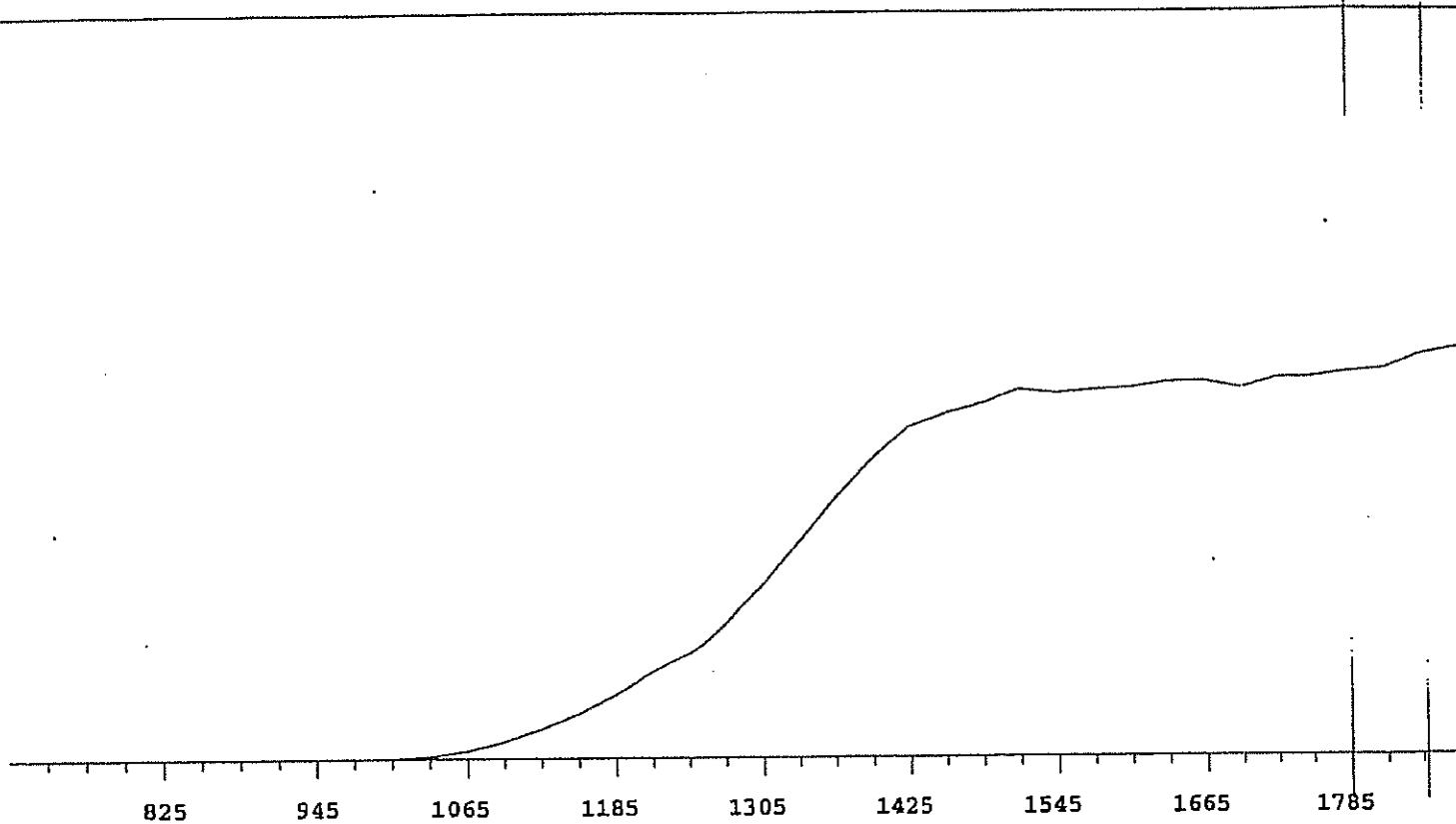
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16723	+68.78
735	0		1335	20749	+60.55
765	0		1365	24686	+48.78
795	0	>100	1395	28343	+35.24
825	0	>100	1425	30657	+24.31
855	0	>100	1455	32208	+15.22
885	0	>100	1485	33662	+9.32
915	0	>100	1515	34098	+4.47
945	0	>100	1545	34326	+2.17
975	4	>100	1575	34133	+1.60
1005	45	>100	1605	34758	+1.41
1035	300	>100	1635	34706	+1.35
1065	836	>100	1665	34769	+0.30
1095	1742	>100	1695	34830	-0.10
1125	2896	>100	1725	34850	+0.90
1155	4198	>100	1755	34613	+2.41
1185	5849	>100	1785	35351	+3.87
1215	7887	+92.20	1815	35849	+4.97
1245	10561	+83.55	1845	36285	
1275	13442	+76.62	1875	36814	

MPC 9600 Plateau Instrument 9 MPC 9604 Detector C 7/1/2009  
 Alpha Volts: 870 Beta Volts: 1530



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	20192	+70.39
735	0		1335	24524	+60.97
765	0		1365	29650	+48.44
795	0	>100	1395	33904	+35.09
825	0	>100	1425	36549	+22.73
855	0	>100	1455	38217	+13.58
885	1	>100	1485	39628	+7.51
915	1	>100	1515	40035	+3.73
945	2	>100	1545	40020	+1.92
975	3	>100	1575	40236	+2.06
1005	64	>100	1605	40680	+1.62
1035	349	>100	1635	40953	+1.03
1065	970	>100	1665	40643	+0.43
1095	1982	>100	1695	40882	+1.41
1125	3328	>100	1725	40979	+2.18
1155	5012	>100	1755	41654	+2.20
1185	6669	>100	1785	41602	+2.27
1215	9448	+92.67	1815	41935	+4.50
1245	12293	+86.58	1845	42259	
1275	15917	+76.99	1875	44183	

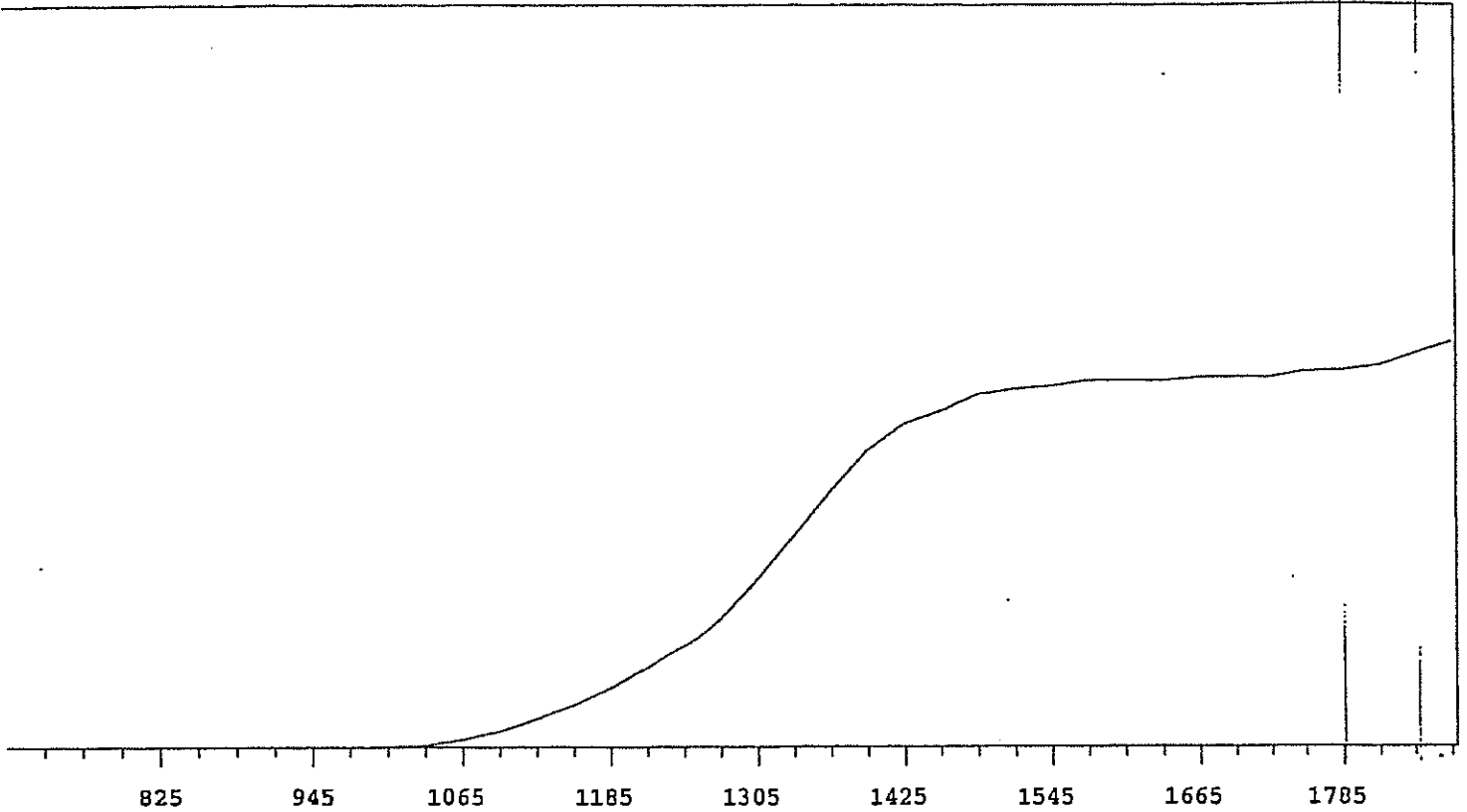
MPC 9600 Plateau      Instrument 9   MPC 9604 Detector D      7/1/2009  
 Alpha Volts: 870      Beta Volts: 1530



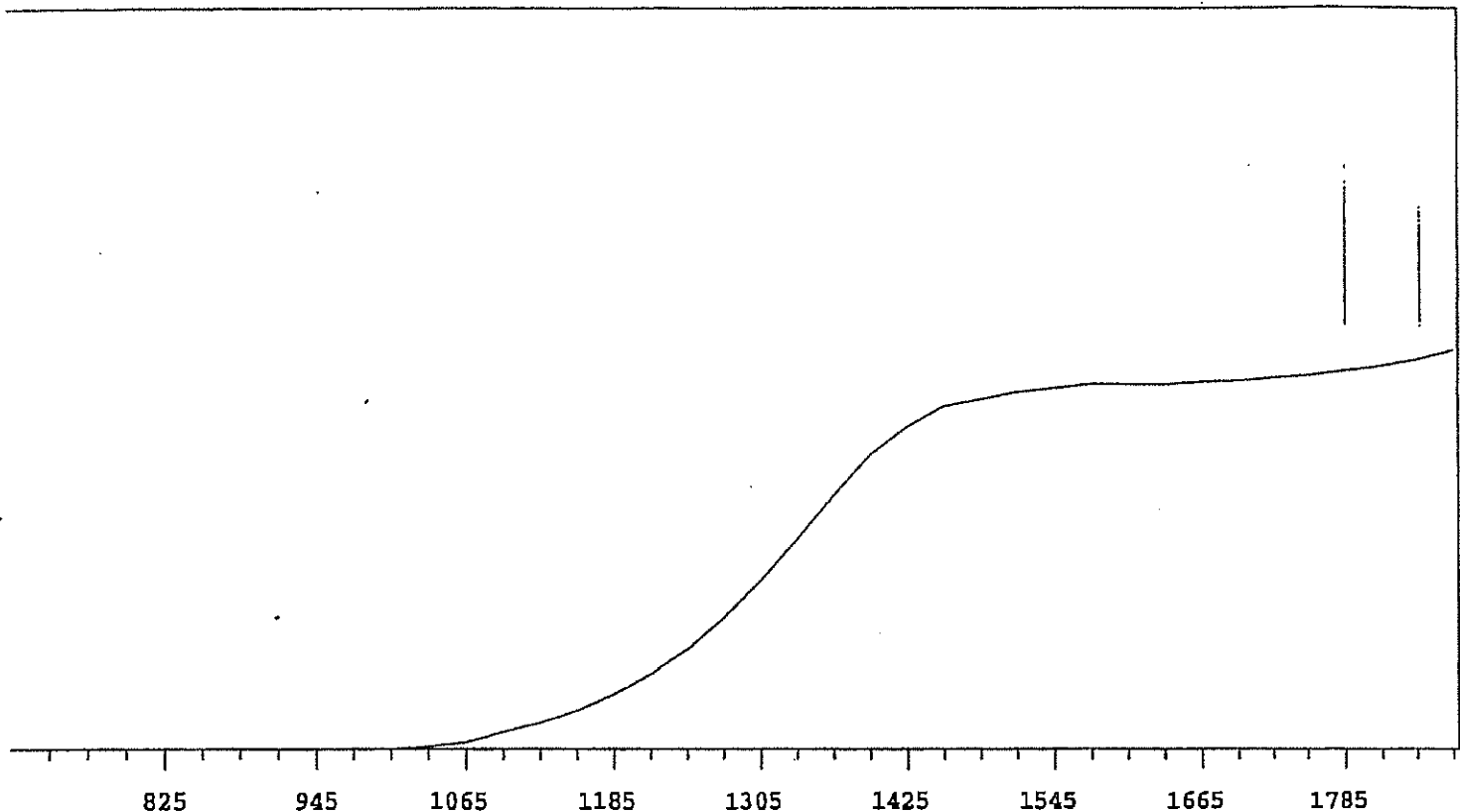
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	13319	+70.94
735	0		1335	16319	+61.35
765	0		1365	19577	+50.27
795	0	>100	1395	22498	+36.85
825	0	>100	1425	24782	+23.90
855	0	>100	1455	25761	+15.37
885	0	>100	1485	26486	+8.38
915	1	>100	1515	27503	+5.11
945	0	>100	1545	27223	+2.67
975	5	>100	1575	27453	+1.71
1005	35	>100	1605	27604	+2.70
1035	186	>100	1635	28021	+0.78
1065	618	>100	1665	28059	+1.05
1095	1280	>100	1695	27548	+0.90
1125	2141	>100	1725	28280	+2.16
1155	3268	>100	1755	28290	+3.51
1185	4659	>100	1785	28600	+4.46
1215	6343	+90.68	1815	28879	+6.35
1245	8064	+83.46	1845	29913	
1275	10497	+77.03	1875	30417	



MPC 9600 Plateau Instrument 10 MPC 9604 Detector A 7/1/2009  
 Alpha Volts: 870 Beta Volts: 1552

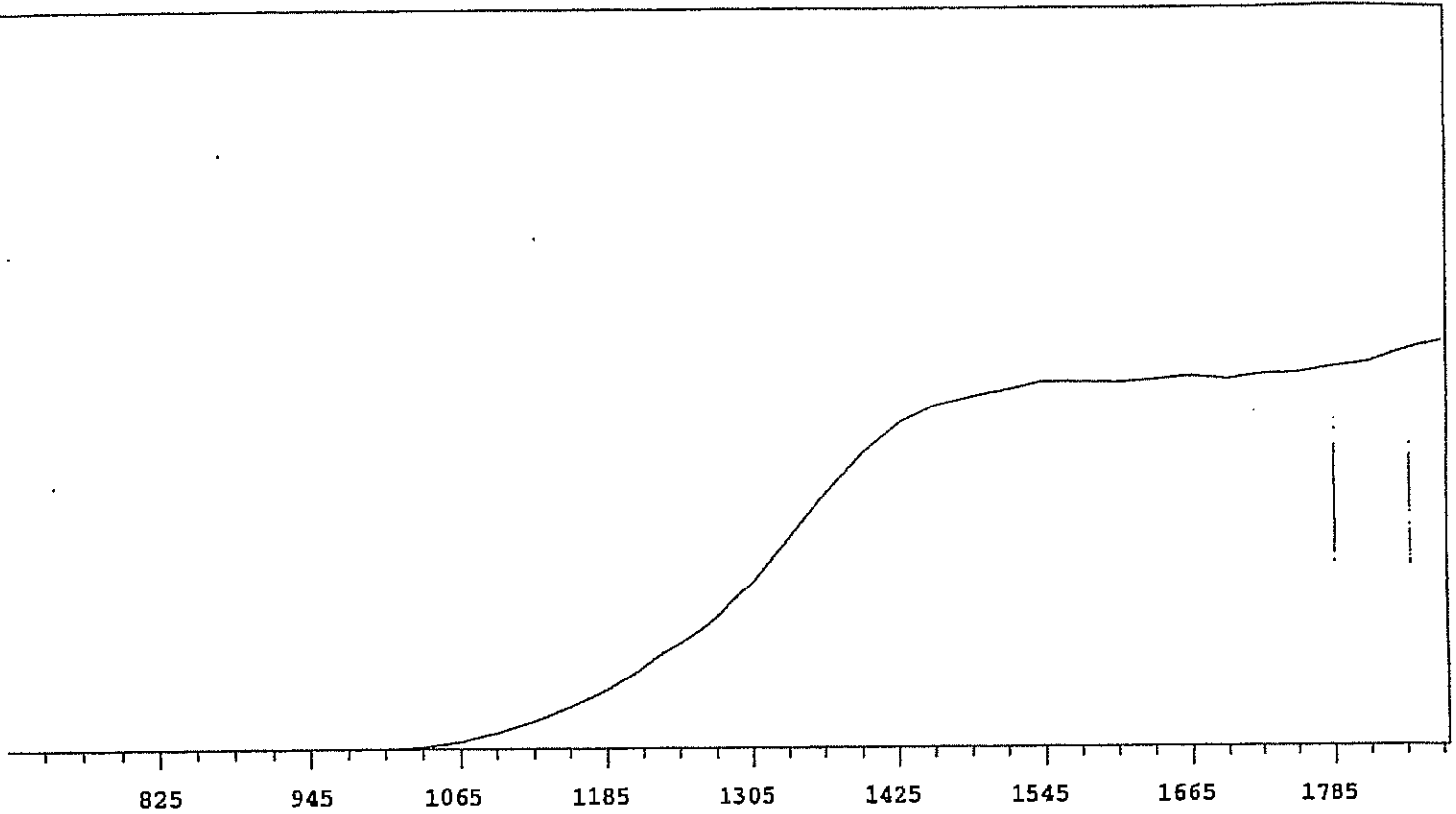


VOLTS	COUNTS	%/100.Volts	VOLTS	COUNTS	%/100.Volts
705	0		1305	16076	+72.76
735	1		1335	19985	+63.85
765	0		1365	24102	+50.95
795	0	>100	1395	27819	+36.01
825	0	>100	1425	30228	+23.86
855	0	>100	1455	31343	+14.40
885	0	>100	1485	32811	+8.77
915	0	>100	1515	33243	+6.10
945	0	>100	1545	33518	+3.25
975	1	>100	1575	34010	+1.98
1005	37	>100	1605	34061	+1.59
1035	198	>100	1635	33973	+0.97
1065	687	>100	1665	34346	+0.93
1095	1491	>100	1695	34366	+1.72
1125	2580	>100	1725	34341	+1.54
1155	3920	>100	1755	34860	+2.47
1185	5588	>100	1785	34897	+4.50
1215	7384	+91.32	1815	35377	+6.60
1245	9794	+84.81	1845	36458	
1275	12572	+79.73	1875	37630	



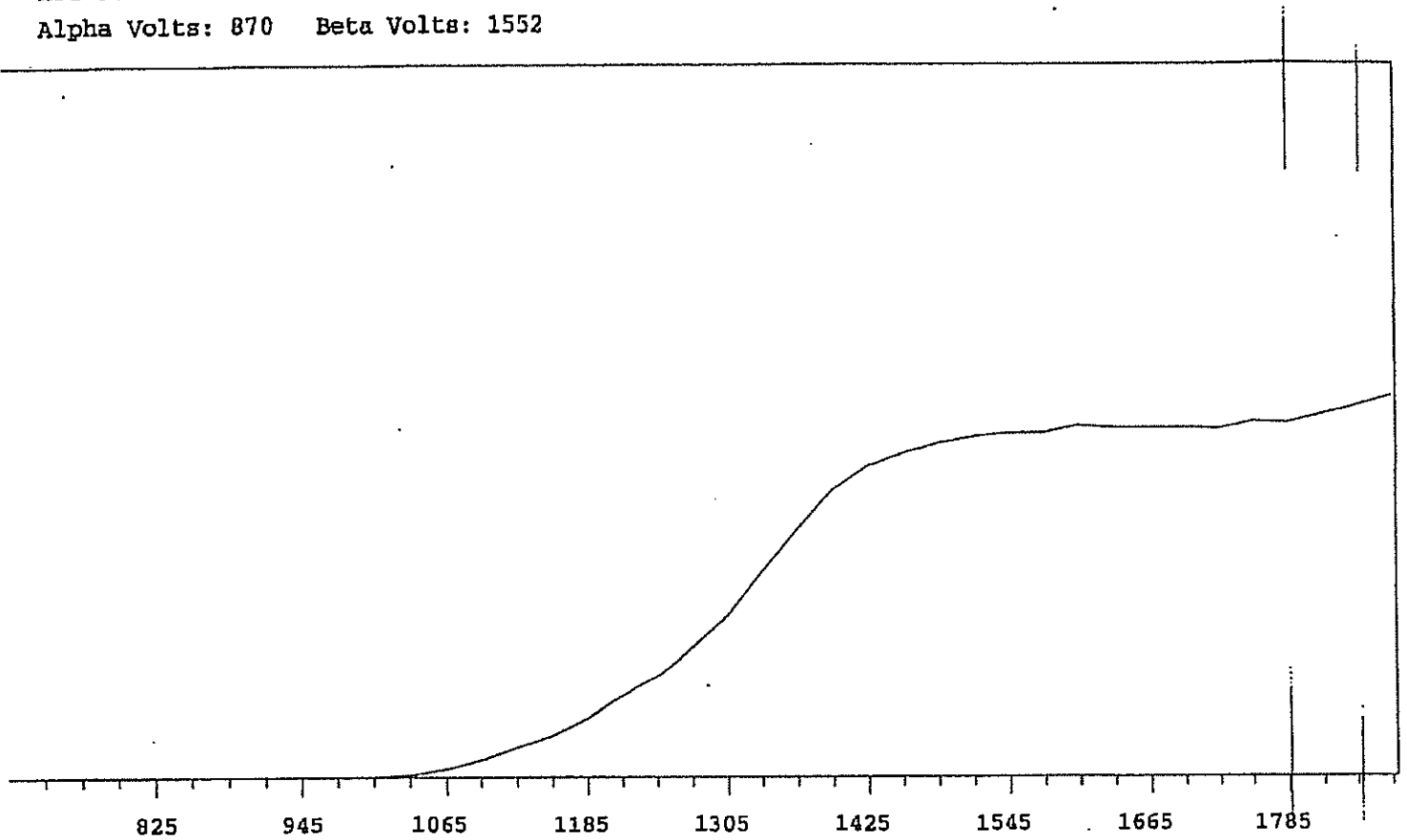
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	14469	+71.08
735	0		1335	17904	+63.07
765	0		1365	21677	+51.20
795	0	>100	1395	25027	+38.06
825	0	>100	1425	27237	+24.55
855	0	>100	1455	28914	+14.61
885	0	>100	1485	29480	+8.48
915	0	>100	1515	30075	+5.06
945	1	>100	1545	30374	+3.42
975	7	>100	1575	30738	+1.68
1005	28	>100	1605	30703	+1.08
1035	190	>100	1635	30679	+0.77
1065	597	>100	1665	30902	+1.46
1095	1474	>100	1695	30992	+1.89
1125	2383	>100	1725	31224	+2.40
1155	3680	>100	1755	31397	+3.27
1185	5131	>100	1785	31826	+4.13
1215	6808	+89.95	1815	32236	+5.59
1245	8990	+83.03	1845	32782	
1275	11493	+77.30	1875	33632	

MPC 9600 Plateau      Instrument 10   MPC 9604 Detector C    7/1/2009  
 Alpha Volts: 870      Beta Volts: 1552



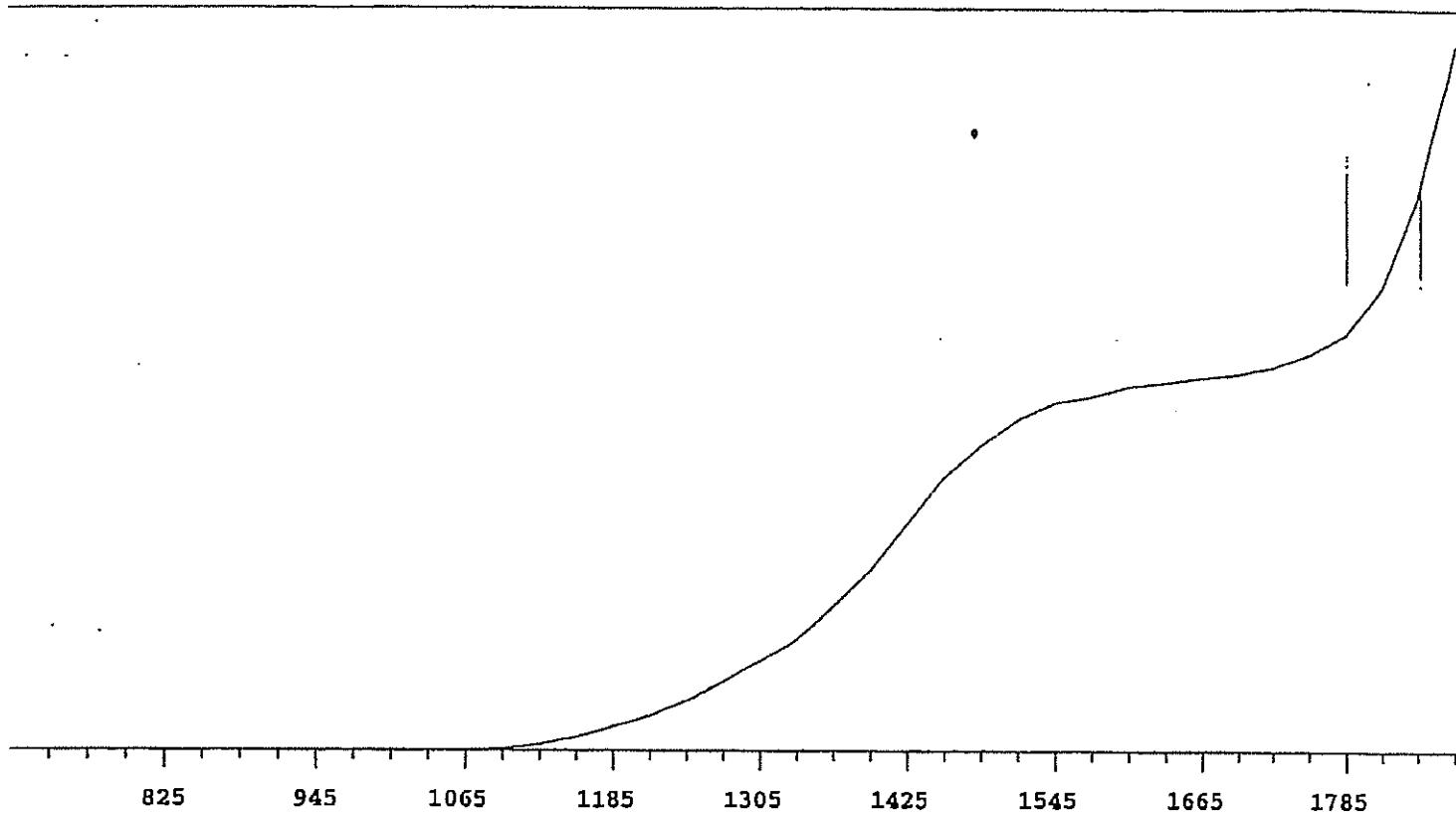
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18051	+71.16
735	0		1335	22586	+62.34
765	0		1365	26973	+51.47
795	0	>100	1395	31137	+38.24
825	0	>100	1425	34321	+25.70
855	0	>100	1455	36267	+15.37
885	1	>100	1485	37197	+9.21
915	0	>100	1515	37851	+5.38
945	2	>100	1545	38622	+3.00
975	2	>100	1575	38600	+1.55
1005	36	>100	1605	38538	+1.03
1035	220	>100	1635	38786	+0.91
1065	780	>100	1665	39129	+1.38
1095	1712	>100	1695	38832	+1.20
1125	2926	>100	1725	39323	+2.00
1155	4297	>100	1755	39390	+3.35
1185	6097	>100	1785	40031	+4.86
1215	8397	+95.11	1815	40466	+6.64
1245	11155	+85.84	1845	41713	
1275	14430	+78.79	1875	42620	

MPC 9600 Plateau      Instrument 10   MPC 9604 Detector D    7/1/2009  
 Alpha Volts: 870    Beta Volts: 1552



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	15430	+69.87
735	0		1335	19258	+61.49
765	0		1365	23018	+50.06
795	0	>100	1395	26562	+35.34
825	0	>100	1425	28750	+22.67
855	0	>100	1455	29911	+13.20
885	0	>100	1485	30798	+8.01
915	0	>100	1515	31375	+4.83
945	0	>100	1545	31684	+3.74
975	3	>100	1575	31721	+2.38
1005	49	>100	1605	32398	+1.44
1035	244	>100	1635	32154	+0.64
1065	764	>100	1665	32157	-0.77
1095	1584	>100	1695	32152	+0.99
1125	2677	>100	1725	32029	+1.41
1155	3763	>100	1755	32699	+3.00
1185	5395	>100	1785	32566	+4.71
1215	7350	+93.71	1815	33351	+5.92
1245	9655	+83.52	1845	34031	
1275	12504	+76.82	1875	34941	

Plateau 7/1/09      Instrument 11 MPC 9604 Detector A      7/1/2009  
 Alpha Volts: 1515    Beta Volts: 1515

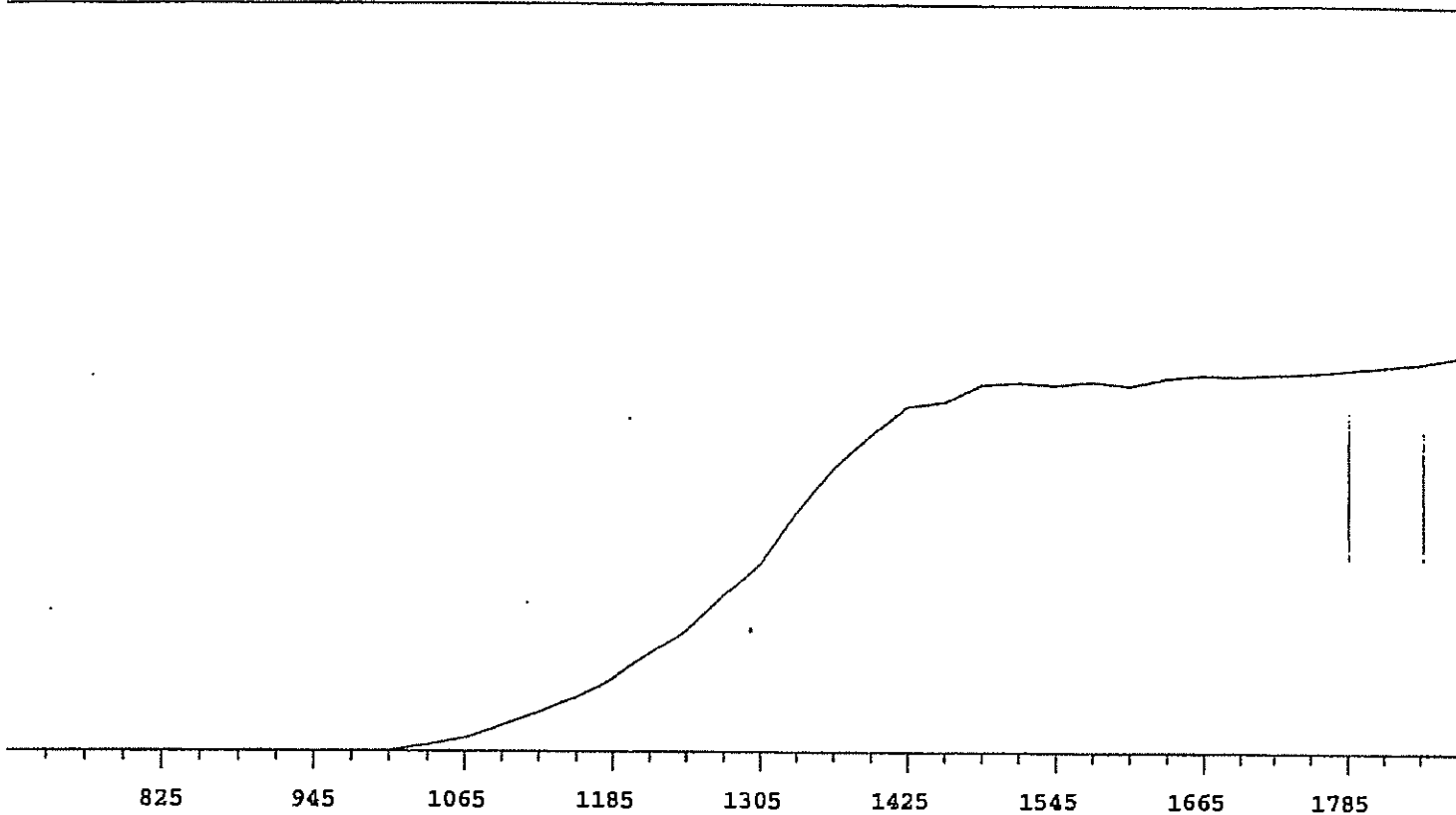


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	3225	+87.64
735	1		1335	4189	+80.15
765	0		1365	5428	+75.12
795	0	>100	1395	6662	+68.60
825	0	>100	1425	8241	+58.14
855	0	>100	1455	9857	+46.65
885	0	>100	1485	11018	+33.24
915	0	>100	1515	11953	+21.01
945	1	+0.00	1545	12538	+13.57
975	0	>100	1575	12760	+8.35
1005	0	>100	1605	13114	+5.84
1035	2	>100	1635	13258	+4.78
1065	9	>100	1665	13430	+3.99
1095	61	>100	1695	13551	+5.46
1125	248	>100	1725	13771	+8.65
1155	528	>100	1755	14204	+16.44
1185	882	>100	1785	14916	+30.03
1215	1270	>100	1815	16579	+48.74
1245	1786	>100	1845	19717	
1275	2478	+93.67	1875	25029	

Plateau 7/1/09

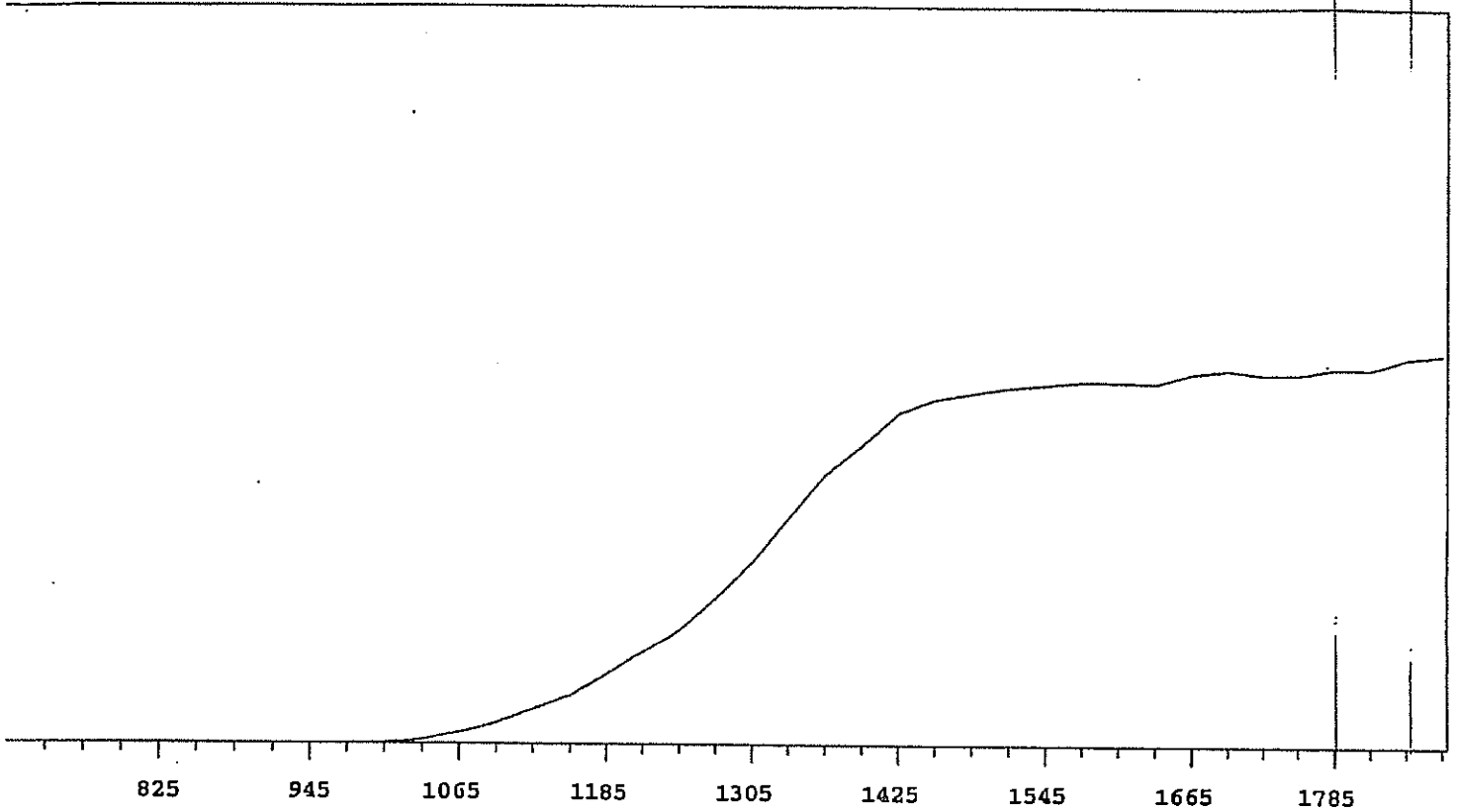
Instrument 11 MPC 9604 Detector B 7/1/2009

Alpha Volts: 1515 Beta Volts: 1515



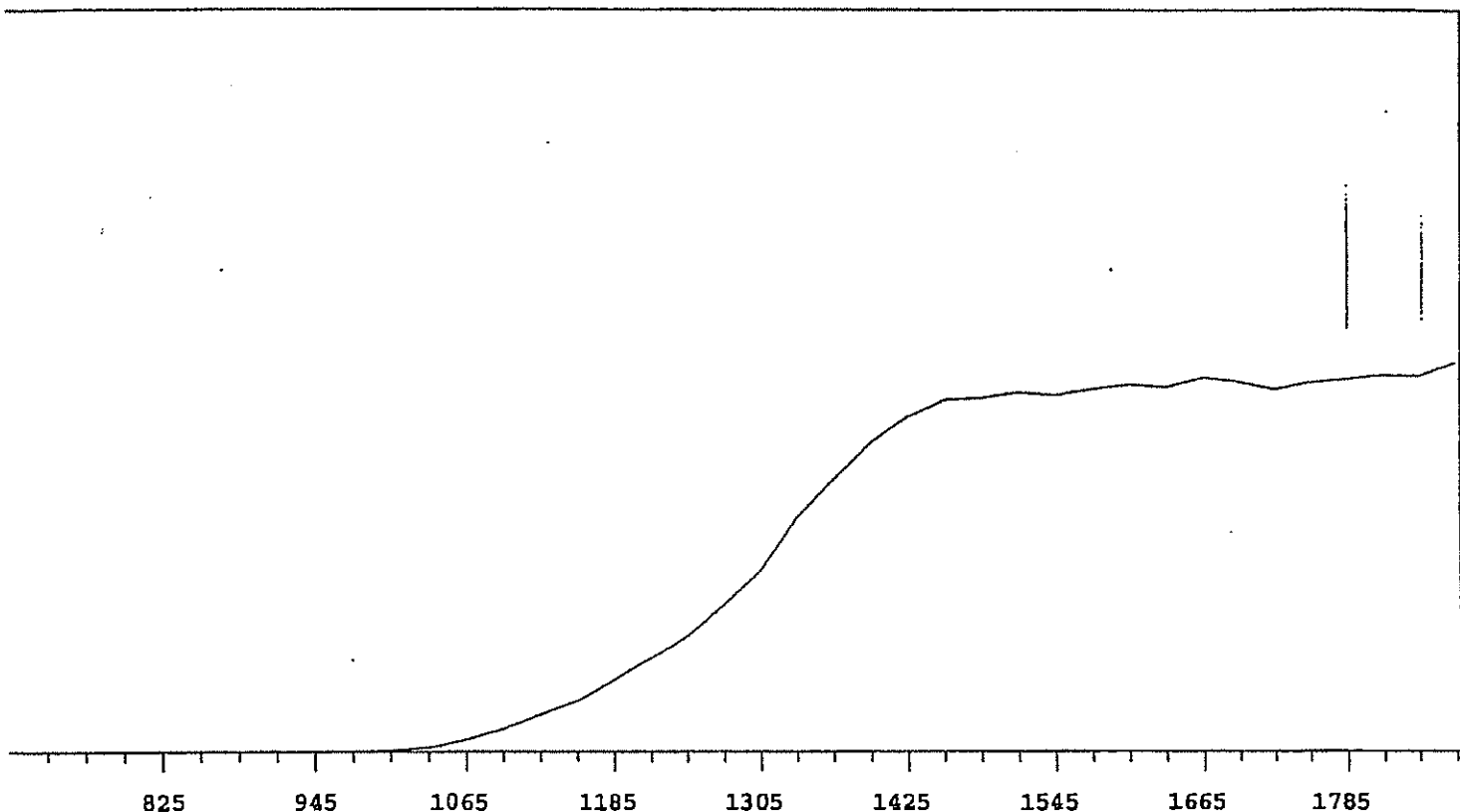
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8947	+65.63
735	0		1335	11238	+56.58
765	0		1365	13246	+46.66
795	0	>100	1395	14838	+30.69
825	0	>100	1425	16166	+20.11
855	0	>100	1455	16396	+11.95
885	0	>100	1485	17161	+5.61
915	1	>100	1515	17274	+3.59
945	0	>100	1545	17144	-0.00
975	11	>100	1575	17323	+0.80
1005	47	>100	1605	17136	+2.21
1035	280	>100	1635	17484	+1.94
1065	610	>100	1665	17638	+2.16
1095	1192	>100	1695	17580	+0.85
1125	1789	>100	1725	17655	+1.05
1155	2466	>100	1755	17700	+1.98
1185	3337	+94.91	1785	17857	+2.38
1215	4526	+88.85	1815	18006	+3.36
1245	5885	+78.40	1845	18140	
1275	7518	+72.09	1875	18468	

Plateau 7/1/09      Instrument 11    MPC 9604 Detector C    7/1/2009  
 Alpha Volts: 1515    Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	8636	+66.44
735	0		1335	10593	+56.56
765	0	+0.00	1365	12582	+46.23
795	0	>100	1395	13957	+33.45
825	1	+0.00	1425	15443	+21.49
855	0	>100	1455	16048	+13.14
885	0	+0.00	1485	16331	+6.45
915	0	>100	1515	16603	+4.19
945	1	>100	1545	16736	+2.73
975	7	>100	1575	16884	+1.11
1005	46	>100	1605	16875	+1.91
1035	191	>100	1635	16813	+2.86
1065	540	>100	1665	17257	+2.60
1095	957	>100	1695	17425	+1.58
1125	1597	>100	1725	17238	+0.49
1155	2217	>100	1755	17230	+0.63
1185	3154	+98.74	1785	17482	+3.27
1215	4239	+89.75	1815	17468	+4.46
1245	5550	+79.98	1845	17977	
1275	6980	+73.12	1875	18163	

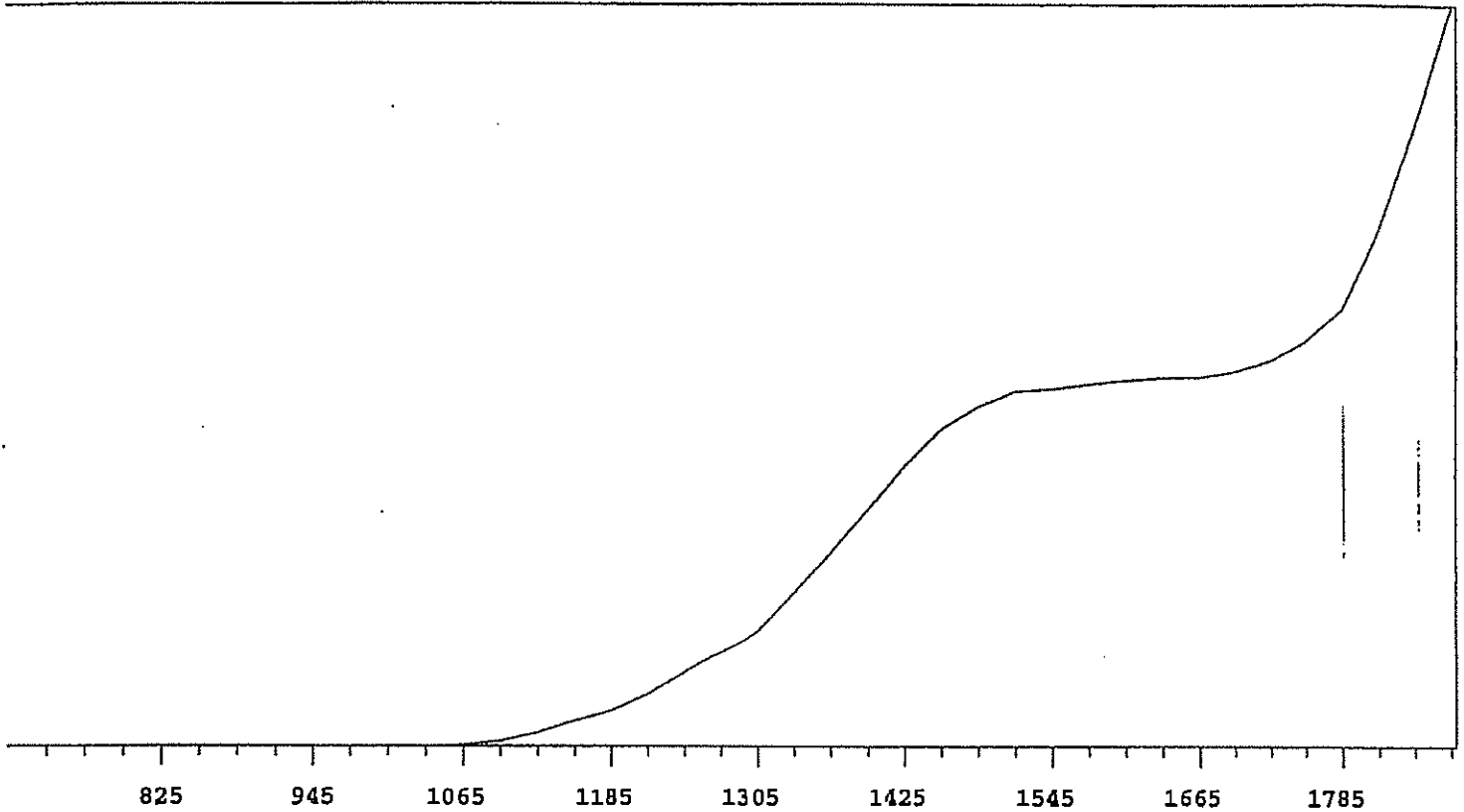
Plateau 7/1/09      Instrument 11   MPC 9604 Detector D    7/1/2009  
 Alpha Volts: 1515    Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	7679	+65.97
735	0		1335	9737	+57.57
765	0		1365	11301	+45.87
795	0	>100	1395	12767	+31.71
825	0	>100	1425	13767	+19.90
855	1	+83.33	1455	14399	+10.72
885	1	+55.56	1485	14467	+4.38
915	0	>100	1515	14671	+2.12
945	1	>100	1545	14576	+2.61
975	9	>100	1575	14808	+1.80
1005	60	>100	1605	14974	+3.15
1035	173	>100	1635	14872	+1.76
1065	480	>100	1665	15248	-0.41
1095	911	>100	1695	15067	-0.27
1125	1508	>100	1725	14784	-0.43
1155	2024	>100	1755	15044	+2.01
1185	2872	+97.38	1785	15163	+2.82
1215	3858	+89.30	1815	15333	+3.61
1245	5070	+78.02	1845	15278	
1275	6322	+73.30	1875	15817	



Plateau 7/1/09                      Instrument 12 MPC 9604 Detector A    7/1/2009  
 Alpha Volts: 705    Beta Volts: 1515



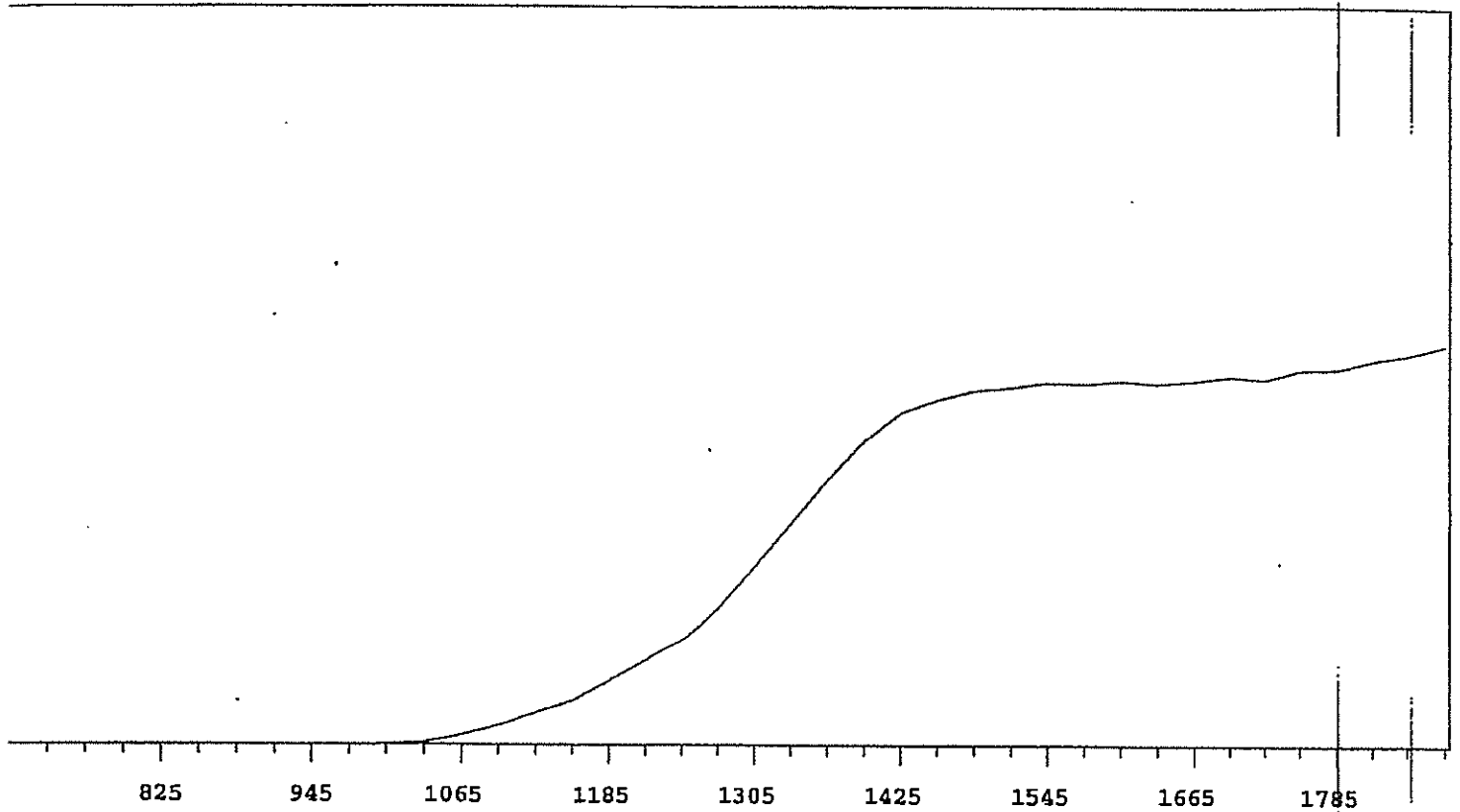
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	6302	+80.03
735	1		1335	8191	+73.78
765	0		1365	10140	+66.18
795	0	>100	1395	12247	+55.83
825	0	>100	1425	14468	+43.92
855	0	>100	1455	16303	+31.28
885	0	>100	1485	17411	+18.64
915	0	>100	1515	18150	+9.87
945	0	>100	1545	18275	+5.30
975	1	>100	1575	18496	+3.16
1005	3	>100	1605	18685	+2.66
1035	17	>100	1635	18820	+2.63
1065	84	>100	1665	18855	+4.16
1095	267	>100	1695	19152	+7.70
1125	709	>100	1725	19706	+13.90
1155	1299	>100	1755	20640	+26.51
1185	1813	>100	1785	22308	+40.92
1215	2638	>100	1815	26460	+51.46
1245	3777	+96.47	1845	31616	
1275	4915	+87.98	1875	37348	

Plateau 7/1/09

Instrument 12 MPC 9604 Detector B

7/1/2009

Alpha Volts: 705 . Beta Volts: 1515

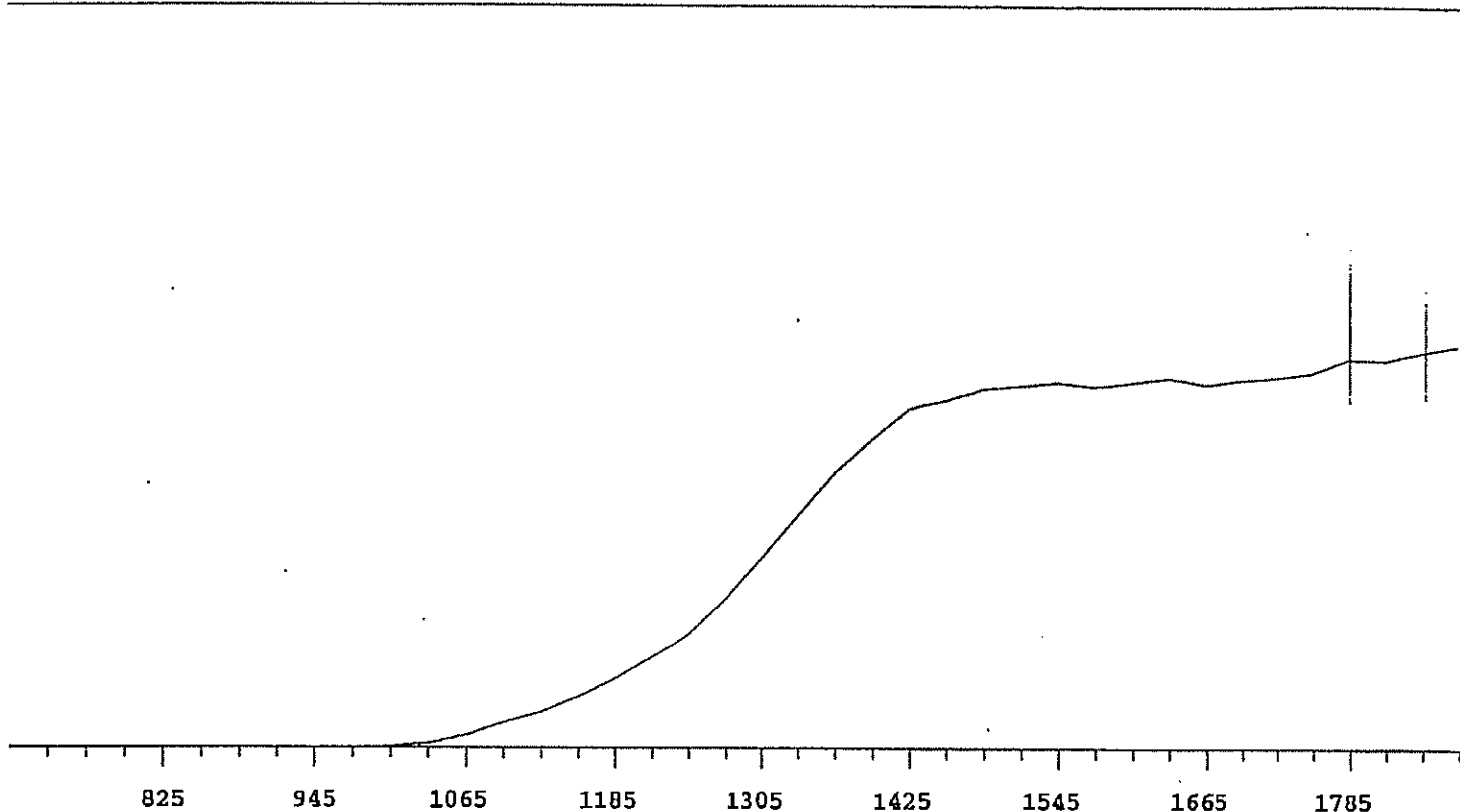


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	10207	+70.42
735	0		1335	12473	+60.75
765	0		1365	14900	+48.87
795	0	>100	1395	17101	+35.36
825	0	>100	1425	18643	+22.53
855	1	+83.33	1455	19350	+12.34
885	1	-83.33	1485	19848	+6.68
915	0	-55.56	1515	20014	+3.51
945	0	>100	1545	20278	+2.03
975	1	>100	1575	20186	+0.80
1005	43	>100	1605	20375	+0.32
1035	165	>100	1635	20209	+1.36
1065	557	>100	1665	20364	+0.83
1095	1055	>100	1695	20607	+2.43
1125	1775	>100	1725	20429	+2.51
1155	2470	>100	1755	20924	+3.64
1185	3617	+98.46	1785	20984	+5.11
1215	4757	+90.95	1815	21470	+5.63
1245	6186	+83.59	1845	21773	
1275	8021	+77.85	1875	22346	

Plateau 7/1/09

Instrument 12 MPC 9604 Detector C 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

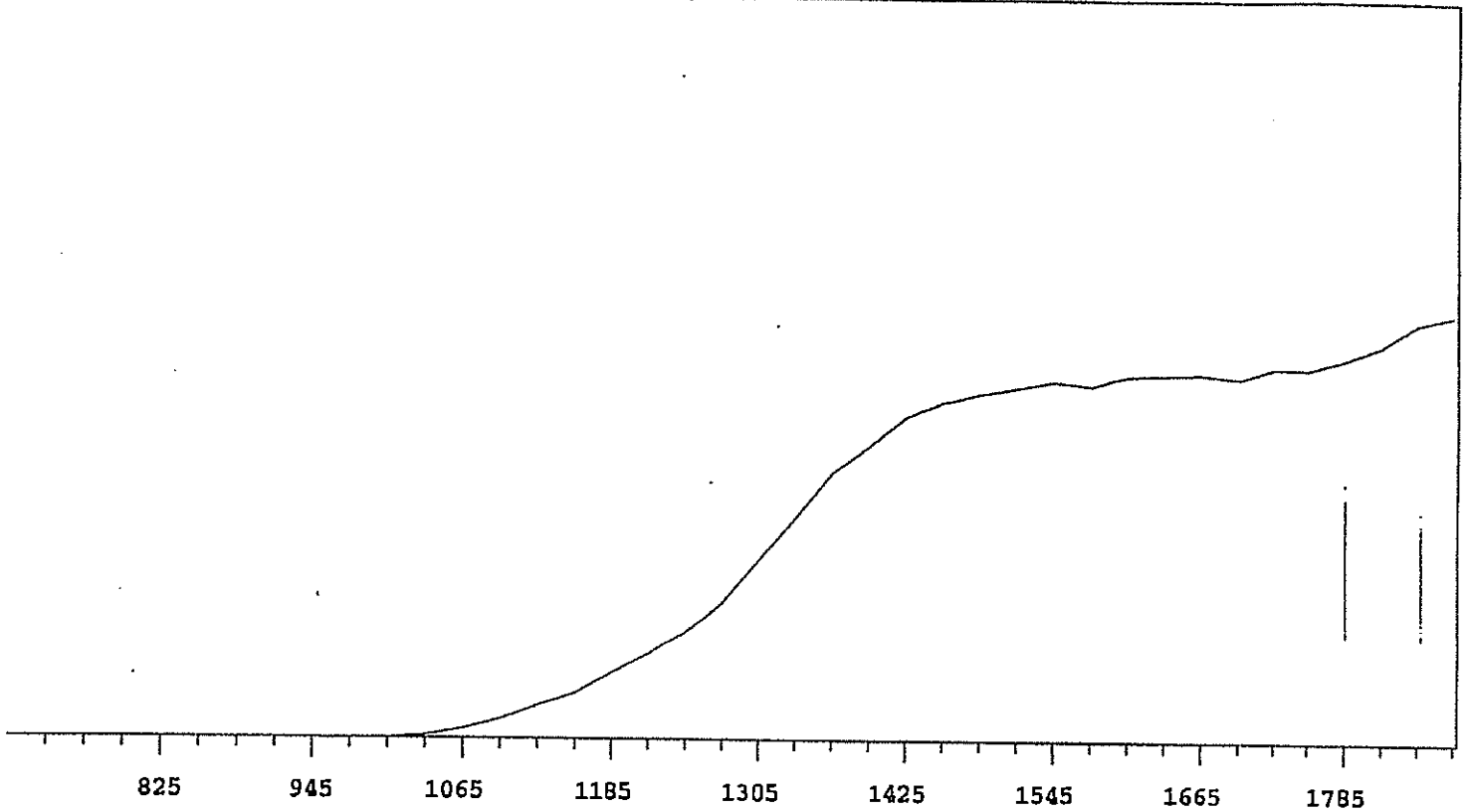


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	9543	+67.01
735	0		1335	11617	+56.47
765	0		1365	13791	+45.47
795	0	>100	1395	15387	+31.66
825	0	>100	1425	16819	+20.02
855	0	>100	1455	17210	+11.63
885	1	+0.00	1485	17742	+6.05
915	0	>100	1515	17892	+3.04
945	0	>100	1545	18070	+1.09
975	7	>100	1575	17856	+1.43
1005	52	>100	1605	18054	+0.42
1035	214	>100	1635	18287	+1.06
1065	590	>100	1665	17969	+0.78
1095	1201	>100	1695	18187	+1.48
1125	1759	>100	1725	18317	+4.89
1155	2569	>100	1755	18518	+4.76
1185	3440	+95.13	1785	19156	+5.18
1215	4583	+87.74	1815	19100	+5.18
1245	5985	+81.67	1845	19496	
1275	7682	+74.54	1875	19842	

Plateau 7/1/09

Instrument 12 MPC 9604 Detector D 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

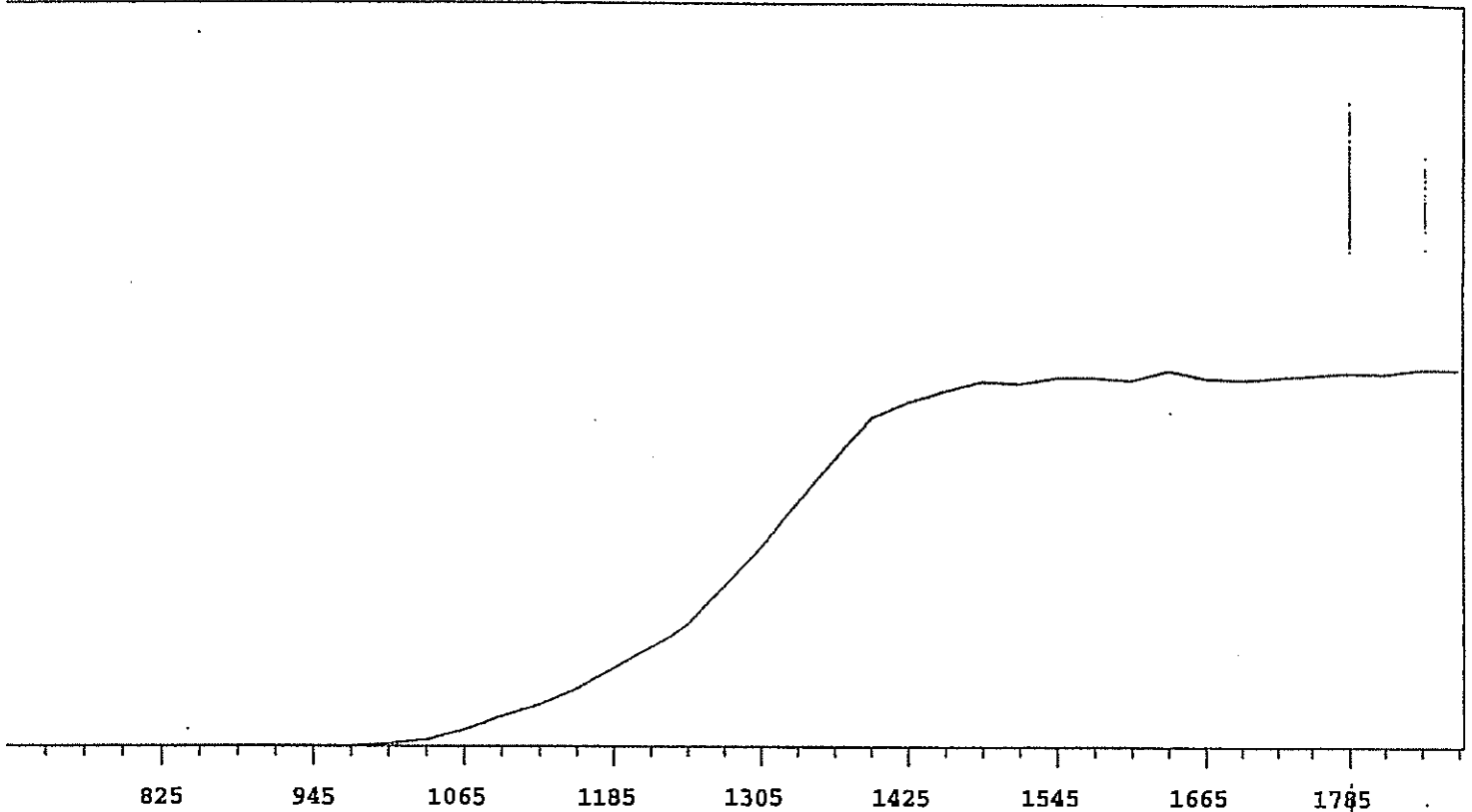


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	9144	+69.92
735	0		1335	11120	+58.43
765	0		1365	13399	+45.40
795	0	>100	1395	14711	+32.57
825	0	>100	1425	16134	+20.69
855	0	>100	1455	16805	+13.46
885	0	>100	1485	17209	+7.90
915	0	>100	1515	17500	+4.31
945	0	>100	1545	17812	+3.48
975	4	>100	1575	17629	+2.80
1005	26	>100	1605	18066	+2.23
1035	169	>100	1635	18122	+1.44
1065	483	>100	1665	18166	+1.20
1095	955	>100	1695	17967	+1.60
1125	1639	>100	1725	18469	+3.41
1155	2233	>100	1755	18409	+6.35
1185	3262	+98.61	1785	18884	+9.47
1215	4306	+89.77	1815	19535	+11.98
1245	5662	+82.36	1845	20630	
1275	7113	+76.36	1875	21076	

Plateau 7/1/09

Instrument 13 MPC 9604 Detector A 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

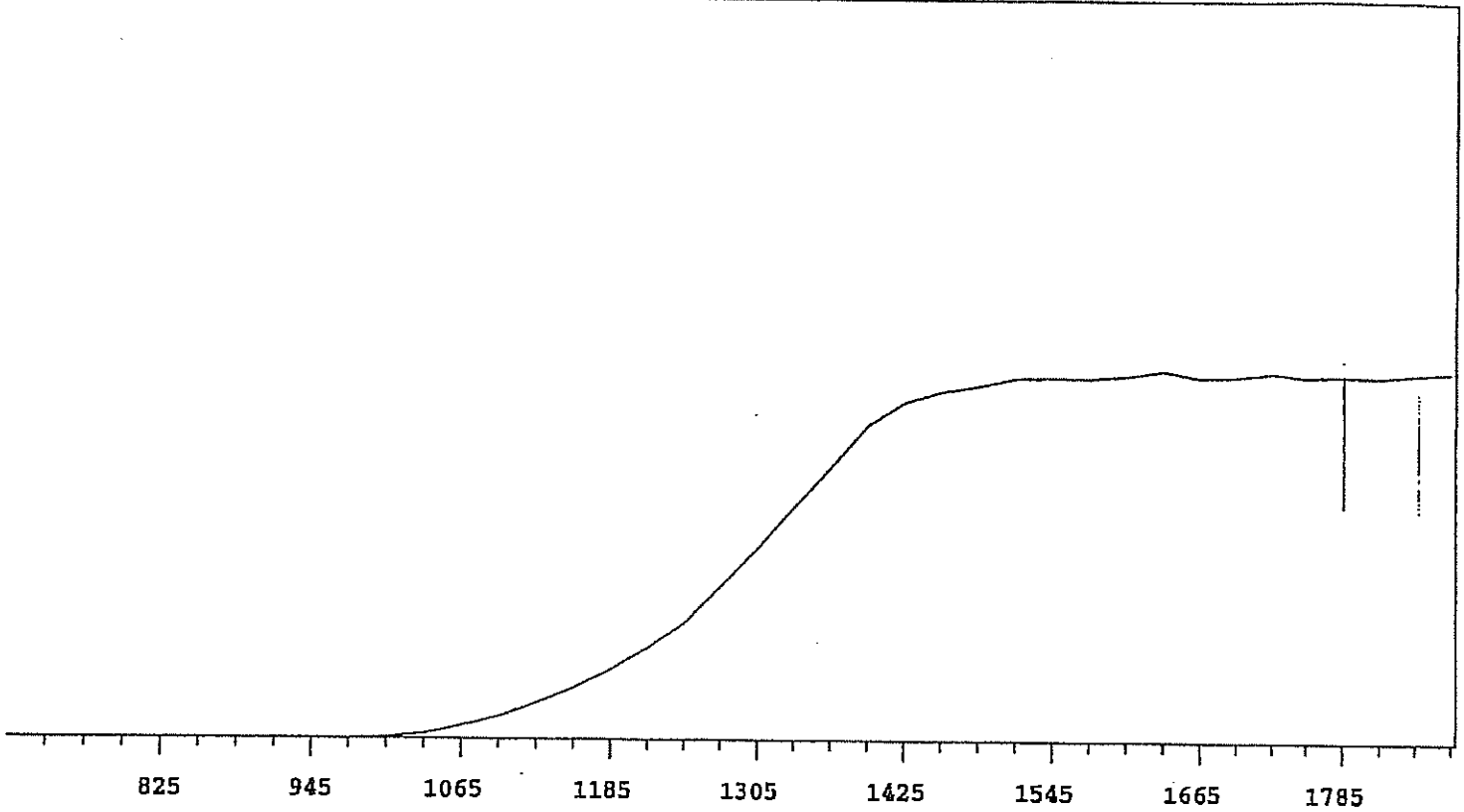


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	9209	+64.55
735	1		1335	11200	+55.94
765	0	+55.56	1365	13123	+43.27
795	2	>100	1395	14957	+29.04
825	0	+0.00	1425	15658	+17.41
855	0	>100	1455	16123	+8.01
885	1	>100	1485	16530	+4.92
915	0	>100	1515	16437	+2.71
945	1	>100	1545	16704	+0.83
975	14	>100	1575	16707	+2.14
1005	104	>100	1605	16602	+0.55
1035	281	>100	1635	17024	-0.28
1065	720	>100	1665	16684	-0.42
1095	1302	>100	1695	16597	-0.85
1125	1834	>100	1725	16711	+1.27
1155	2544	>100	1755	16796	+1.51
1185	3485	+92.28	1785	16903	+1.57
1215	4624	+85.50	1815	16880	+1.46
1245	5878	+77.82	1845	17066	
1275	7515	+71.49	1875	17085	

Plateau 7/1/09

Instrument 13 MPC 9604 Detector B 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

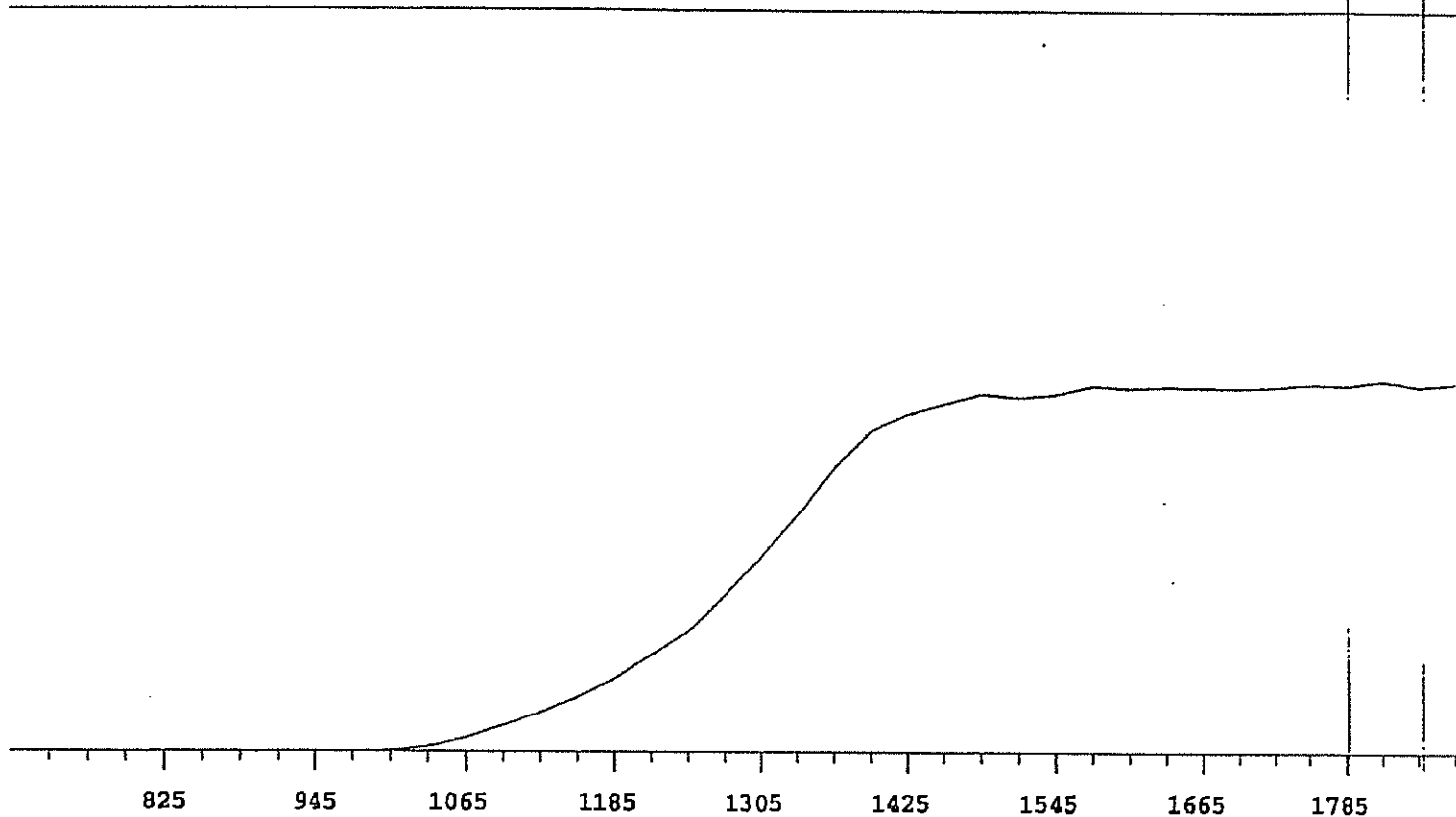


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	9666	+64.39
735	0		1335	11722	+55.91
765	0		1365	13680	+44.91
795	0	>100	1395	15677	+31.56
825	0	>100	1425	16786	+19.46
855	0	>100	1455	17283	+10.57
885	0	>100	1485	17608	+5.95
915	1	>100	1515	17972	+3.32
945	0	>100	1545	18006	+1.84
975	4	>100	1575	17970	+1.58
1005	70	>100	1605	18104	+0.74
1035	257	>100	1635	18351	+0.24
1065	648	>100	1665	18016	+0.16
1095	1116	>100	1695	18080	-0.63
1125	1784	>100	1725	18283	+0.29
1155	2560	>100	1755	18047	-0.47
1185	3531	+96.11	1785	18110	-0.32
1215	4568	+89.22	1815	18040	+1.17
1245	6137	+81.65	1845	18200	
1275	7855	+74.42	1875	18320	

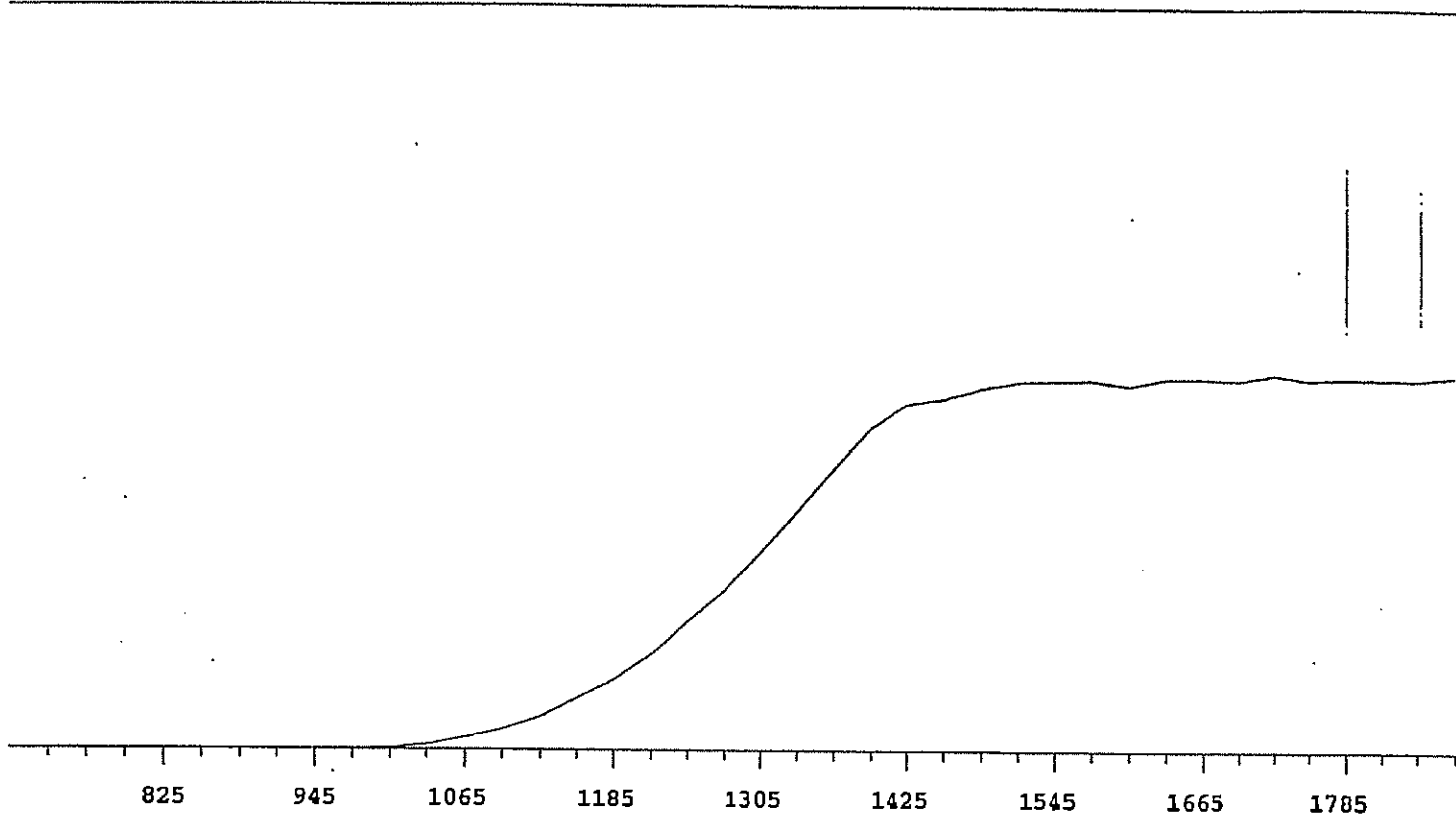
Plateau 7/1/09

Instrument 13 MPC 9604 Detector C 7/1/2009

Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	11573	+64.95
735	0		1335	13929	+56.47
765	0		1365	16726	+43.82
795	0	>100	1395	18834	+29.38
825	0	>100	1425	19743	+16.84
855	0	>100	1455	20314	+7.95
885	0	>100	1485	20860	+4.16
915	0	>100	1515	20670	+3.23
945	0	>100	1545	20844	+2.09
975	9	>100	1575	21330	+2.48
1005	93	>100	1605	21188	+1.16
1035	325	>100	1635	21280	-0.32
1065	834	>100	1665	21237	+0.08
1095	1525	>100	1695	21202	+0.42
1125	2318	>100	1725	21254	+0.60
1155	3233	>100	1755	21406	+1.41
1185	4357	+92.07	1785	21326	+0.42
1215	5755	+85.64	1815	21619	+0.16
1245	7438	+78.35	1845	21282	
1275	9463	+70.89	1875	21478	



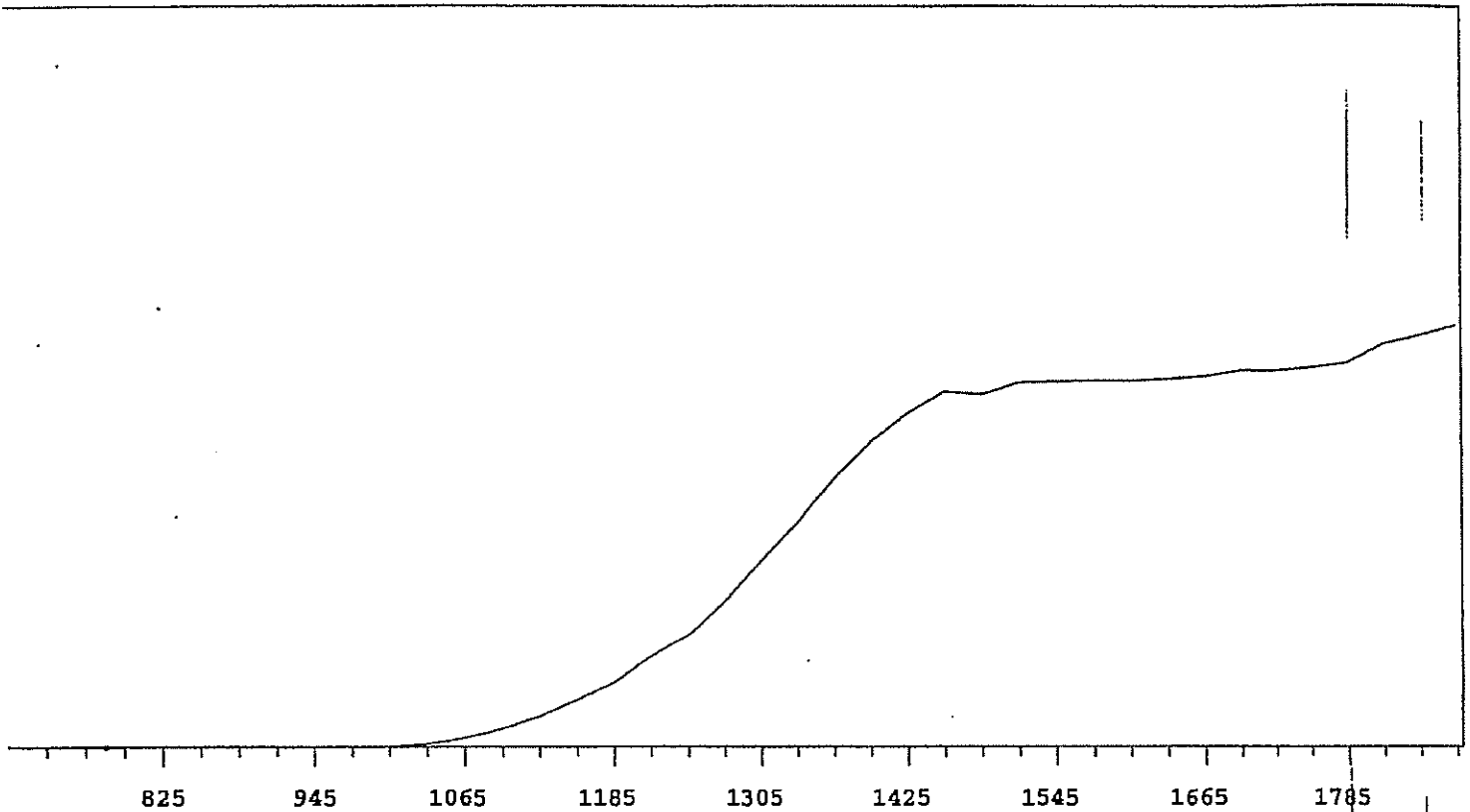
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	7524	+61.93
735	0		1335	9002	+55.36
765	0		1365	10542	+44.70
795	0	>100	1395	12064	+31.21
825	0	>100	1425	12981	+19.20
855	0	>100	1455	13192	+10.41
885	0	>100	1485	13570	+5.93
915	0	>100	1515	13820	+4.08
945	0	>100	1545	13866	+0.75
975	9	>100	1575	13880	+0.21
1005	58	>100	1605	13695	+0.59
1035	228	>100	1635	13950	+0.77
1065	544	>100	1665	13954	+1.92
1095	936	>100	1695	13911	+0.19
1125	1468	>100	1725	14116	+0.02
1155	2110	>100	1755	13908	-0.24
1185	2770	+94.71	1785	13960	-0.81
1215	3670	+85.91	1815	13939	+0.71
1245	4937	+79.46	1845	13931	
1275	6066	+70.79	1875	14071	



Plateau 7/1/09

Instrument 14 MPC 9604 Detector A 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

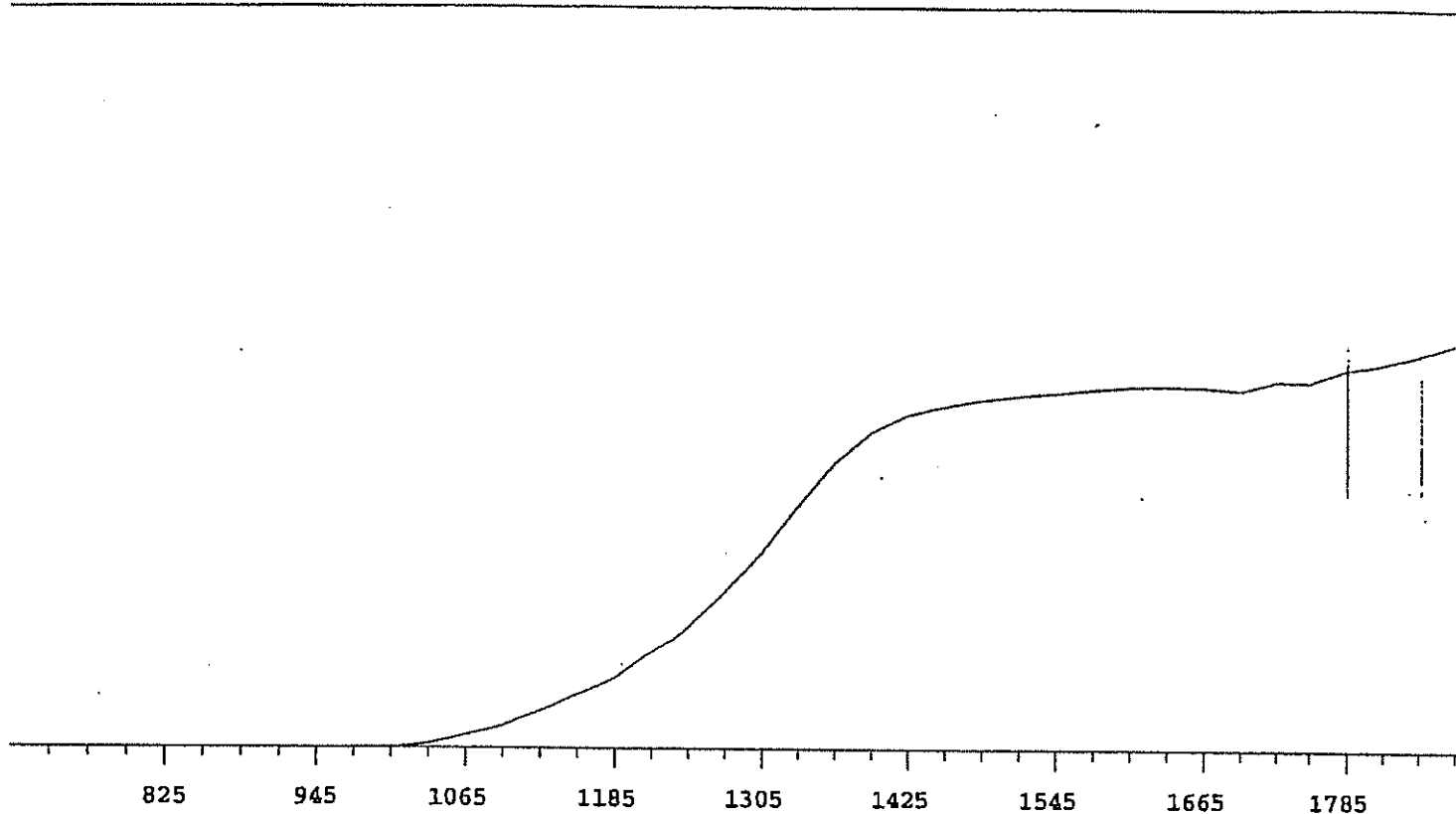


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8778	+67.49
735	0		1335	10502	+57.68
765	0		1365	12516	+46.36
795	0	>100	1395	14215	+35.88
825	0	>100	1425	15472	+22.01
855	0	>100	1455	16469	+12.99
885	1	+0.00	1485	16342	+6.70
915	0	>100	1515	16874	+3.07
945	0	>100	1545	16918	+2.53
975	0	>100	1575	16950	+0.58
1005	18	>100	1605	16943	+0.95
1035	137	>100	1635	17008	+2.13
1065	430	>100	1665	17130	+2.45
1095	865	>100	1695	17403	+2.43
1125	1444	>100	1725	17377	+2.43
1155	2151	>100	1755	17515	+4.88
1185	2981	>100	1785	17710	+7.54
1215	4168	+92.14	1815	18533	+9.04
1245	5377	+84.73	1845	18905	
1275	6924	+74.92	1875	19415	

Plateau 7/1/09

Instrument 14 MPC 9604 Detector B 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

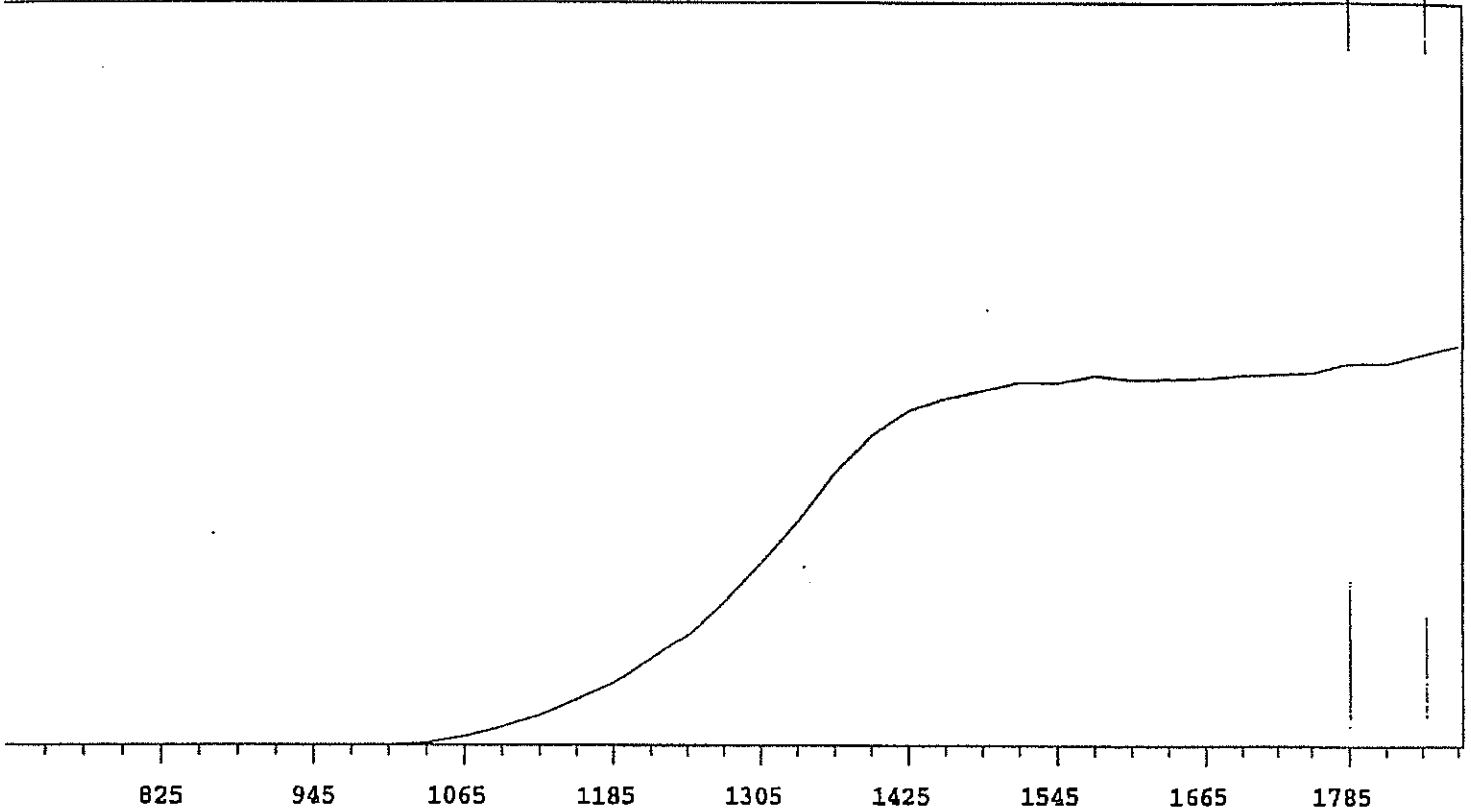


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8797	+65.44
735	0		1335	10726	+54.47
765	0		1365	12570	+41.11
795	0	>100	1395	13917	+26.79
825	0	>100	1425	14687	+15.44
855	1	+0.00	1455	15048	+8.47
885	0	>100	1485	15318	+5.00
915	0	>100	1515	15494	+3.76
945	0	>100	1545	15606	+3.04
975	3	>100	1575	15776	+2.35
1005	40	>100	1605	15889	+1.44
1035	210	>100	1635	15907	-0.16
1065	590	>100	1665	15881	+0.64
1095	983	>100	1695	15741	+1.21
1125	1645	>100	1725	16124	+3.63
1155	2342	>100	1755	16076	+5.41
1185	3045	+96.43	1785	16588	+5.79
1215	4201	+90.42	1815	16830	+7.53
1245	5579	+83.64	1845	17185	
1275	7121	+74.44	1875	17682	

Plateau 7/1/09

Instrument 14 MPC 9604 Detector C 7/1/2009

Alpha Volts: 705 Beta Volts: 1515

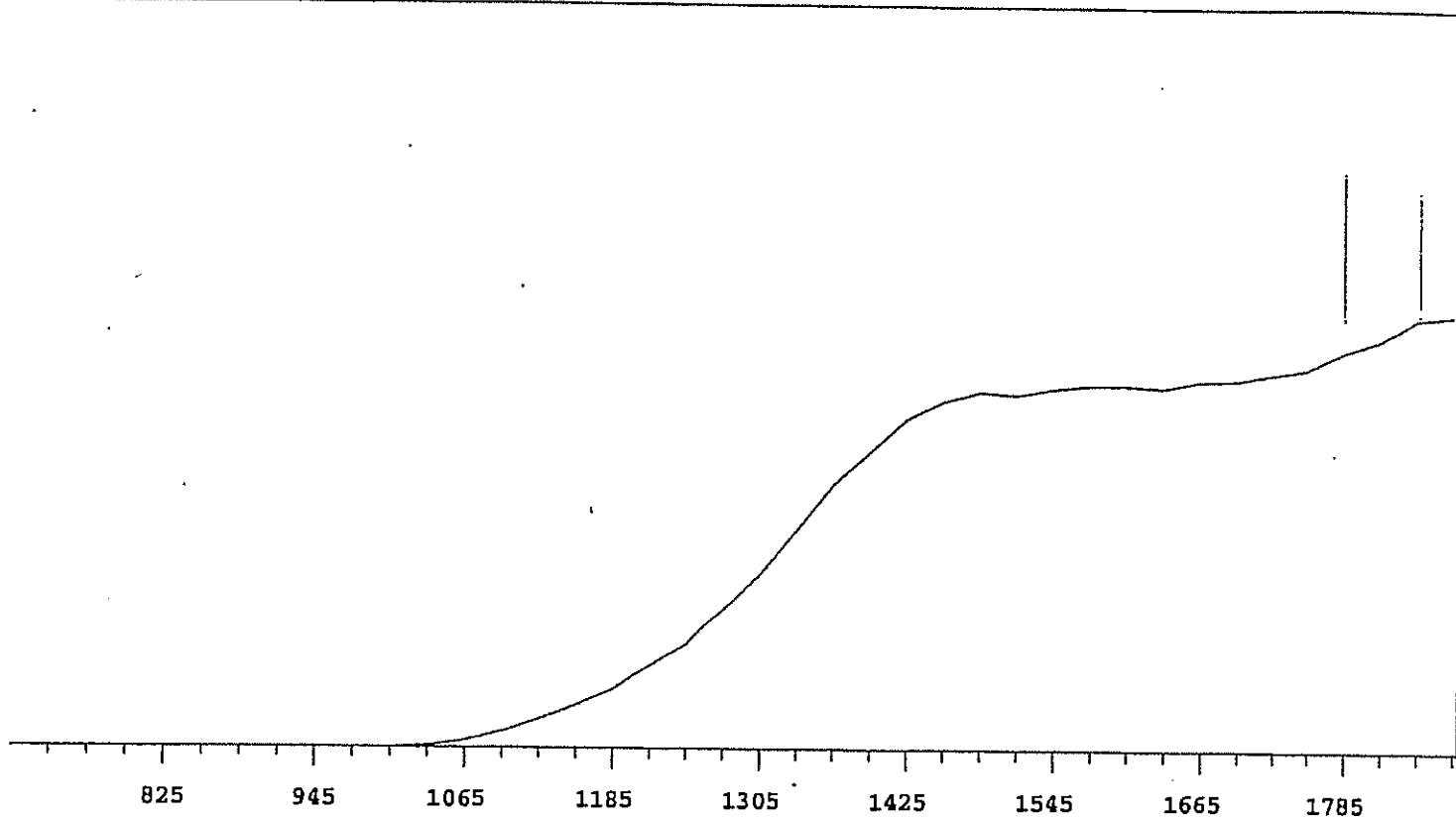


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	10118	+69.76
735	0		1335	12269	+59.65
765	0		1365	14810	+47.35
795	0	>100	1395	16773	+33.46
825	0	>100	1425	18104	+20.13
855	0	>100	1455	18720	+11.98
885	1	+0.00	1485	19122	+6.50
915	0	>100	1515	19580	+4.77
945	0	>100	1545	19527	+2.48
975	2	>100	1575	19902	+0.81
1005	21	>100	1605	19690	+0.53
1035	132	>100	1635	19739	+0.23
1065	491	>100	1665	19765	+1.29
1095	1036	>100	1695	19932	+1.40
1125	1698	>100	1725	19976	+2.72
1155	2517	>100	1755	20051	+2.92
1185	3468	>100	1785	20523	+4.26
1215	4721	+91.83	1815	20542	+5.57
1245	6175	+85.13	1845	21035	
1275	8025	+76.82	1875	21528	

Plateau 7/1/09

Instrument 14 MPC 9604 Detector D 7/1/2009

Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8095	+71.16
735	0		1335	10052	+58.38
765	0		1365	11990	+47.92
795	0	>100	1395	13400	+35.01
825	0	>100	1425	14808	+23.58
855	0	>100	1455	15554	+13.45
885	0	>100	1485	15987	+6.39
915	0	>100	1515	15861	+3.45
945	0	>100	1545	16156	+2.18
975	1	>100	1575	16297	+1.72
1005	14	>100	1605	16297	+1.33
1035	130	>100	1635	16208	+1.62
1065	363	>100	1665	16526	+2.92
1095	785	>100	1695	16581	+3.94
1125	1357	>100	1725	16832	+5.91
1155	1996	>100	1755	17039	+8.68
1185	2735	+99.45	1785	17800	+11.53
1215	3785	+94.20	1815	18351	+11.46
1245	4857	+86.43	1845	19265	
1275	6571	+78.80	1875	19468	

# Standardization of Strontium Carrier 1858443

v1.2

Analyst	VXC2
---------	------

Standard Information	
Isotope	Strontium
Serial Number	1858443
Amount of Std. (mL)	1.0
Standard Prepared	12/11/2012

Parent Information	
Parent Serial #	1747929
Parent Exp. Date	3/5/2014

Std #	Weight of carrier added (g)	Weight of crucible or filter (g)	Weight of crucible or filter + ppt. (g)	Weight of ppt. (g)	mg Strontium/mL	mg Strontium/g
1	1.0326	0.0248	0.0426	0.0178	17.80	17.24
2	1.0306	0.0248	0.0423	0.0175	17.50	16.98
3	1.0299	0.0248	0.0426	0.0178	17.80	17.28
4	1.0299	0.0248	0.0426	0.0178	17.80	17.28

Mean Value (mg/mL) = 17.73  
 Stdev (mg/mL) = ± 0.15  
 1.0% of Mean Value = 0.177250

Pass

Expiration Date 12/11/2013

Mean Value (mg/1.0mL) = 17.73

**Standardization Rule**  
 A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.

*V. C. [Signature]*  
 12/11/12

# Standardization of Yttrium Carrier 1892786

v1.2

Analyst	JXR1
---------	------

Standard Information	
Isotope	Yttrium
Serial Number	1892786
Amount of Std. (mL)	1.0
Standard Prepared	3/15/2013

Parent Information	
Parent Serial #	1731870.1
Parent Exp. Date	1/26/2014

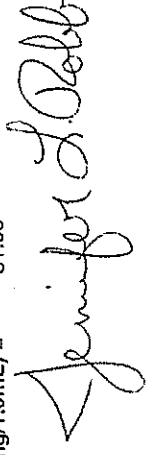
Std #	Weight of carrier added (g)	Weight of crucible or filter (g)	Weight of crucible or filter + ppt. (g)	Weight of ppt. (g)	mg Yttrium/mL	mg Yttrium/g
1	1.0100	0.0242	0.0560	0.0318	31.80	31.49
2	1.0200	0.0242	0.0562	0.0320	32.00	31.37
3	1.0100	0.0242	0.0559	0.0317	31.70	31.39
4	1.0100	0.0242	0.0561	0.0319	31.90	31.58

Mean Value (mg/mL) = 31.85  
 Stdev (mg/mL) = ± 0.13  
 1.0% of Mean Value = 0.318500

Expiration Date 1/26/2014  
 Pass

**Standardization Rule**  
 A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.

Mean Value (mg/1.0mL) = 31.85



# Standardization of Yttrium Carrier 1840837

v1.2

Analyst	JXR1
---------	------

Standard Information	
Isotope	Yttrium
Serial Number	1840837
Amount of Std. (mL)	0.5
Standard Prepared	10/25/2012

Parent Information	
Parent Serial #	17318701
Parent Exp. Date	1/26/2014

Std #	Weight of carrier added (g)	Weight of crucible or filter (g)	Weight of crucible or filter + ppt. (g)	Weight of ppt. (g)	mg Yttrium/mL	mg Yttrium/g
1	0.5000	0.0241	0.0399	0.0156	31.60	31.60
2	0.5000	0.0246	0.0401	0.0155	31.00	31.00
3	0.5000	0.0244	0.0400	0.0156	31.20	31.20
4	0.5000	0.0246	0.0401	0.0155	31.00	31.00

Mean Value (mg/mL) = 31.20  
 Stdev (mg/mL) = ± 0.28  
 1.0% of Mean Value = 0.312000

Expiration Date 10/25/2013  
 Pass

Mean Value (mg/0.5mL) = 15.60

**Standardization Rule**

A satisfactory standardization is obtained when results give a standard deviation of less than 1.0% of the mean value.

*Jennifer S. Robb*



# Eckert & Ziegler

## Analytics

1380 Seaboard Industrial Blvd.  
Atlanta, Georgia 30318  
Tel 404-352-8677  
Fax 404-352-2837  
www.analyticinc.com

### CERTIFICATE OF CALIBRATION Standard Radionuclide Source

92552

Sr-89 5 mL Liquid in Flame Sealed Vial

1633

**Customer:** General Engineering Labs  
**P.O. No.:** GEL1202747, Item 6      **Product Code:** 8089

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty*, %			Reference Date (12:00 PM EST)
			$u_A$	$u_B$	U	
Sr-89	5.053E+01	2.121E+05	0.1	0.9	1.8	12/13/2012

\*Uncertainty: U - Relative expanded uncertainty, k = 2. See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

**Comments:**

Impurities:  $\gamma$ -impurities < 0.1%.  
5.07181 g 0.1M HCl solution with approximately 30  $\mu$ g/g Sr carrier.

Source Prepared by:   
K. Eardley, Radiochemist

QA Approved:   
J.D. McCorvey, Counting Room Manager

Date: 11 DEC 12

RECEIVED  
R. 12/14/12  
J.M.



Single Isotope Certificate Rev 3, 23 August 2012

RC-S-065-062

**Corporate Office**  
24937 Avenue Tibbitts    Valencia, California 91355

**Laboratory**  
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318



# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	1633	Isotope:	Strontium-89
Prepared By:	Ashley Drochter	Prepared By:	Bethany Fiem
Carrier Conc:	0.1M HCl	Prep Date:	01/08/2013
Reference Date:	12/13/2012	Verification Date:	01/09/2013
Ampoule Mass (g):	5.07181 g	Expiration Date:	08/22/2013
Uncertainty:	+/- 1.8 %	Primary Code:	1633-A
LogBook No:	RC-S-065-062	Dilution(mL):	100 mL
		Mass of Parent(g):	4.9257 g
		Density(g/mL):	0.9986
		Balance ID:	38080204

### Calculations Converting parent activity to dpm/mL|dpm/g

$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(4.9257 \text{ g}) * (212100 \text{ Bq}) * (60 \text{ dpm/Bq}) / (5.07181 \text{ g} * 100 \text{ mL}) = 123593.8614 \text{ dpm/mL}$
$(4.9257 \text{ g}) * (212100 \text{ Bq}) * (60 \text{ dpm/Bq}) / (0.9986 \text{ g/mL}) / (5.07181 \text{ g} * 100 \text{ mL}) = 123767.0118 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
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GEL Laboratories LLC  
Version 1.0 9/18/2000

# Verification for Sr-89 Standard 1633-A

v1.0.2

Instrument	Silver
Analyst	BF1
Verification Prep Date	1/8/2013

Standard Information	
Isotope	Sr-89
Serial Number	1633-A
Isotope Half-life	50.5300 D
Reference Date	12/19/2012
Ref. Act. (DPM/mL)	123593.8614
Amount of Std. (mL)	0.1
Standard Prep Date	1/8/2013

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	1/9/2013	89.20	8539.17	44.60
2	1/9/2013	88.90	8565.00	44.60
3	1/9/2013	88.90	8571.67	44.60

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	8494.57	1.011371	8390.64	8399.06
2	8520.40	1.011371	84246.04	8424.60
3	8527.07	1.011371	84311.99	8431.20

dpm/mL  
84182.89  
169.7251269

Mean Value =  
Stdev =

Certificate Value\* = 85338.6  
Two sigma = 339.450  
10 % of Mean = 8418.289

Rule A (Pass/Fail) Pass  
% Recovery 99.65%  
Rule B (Pass/Fail) Pass  
Expiration Date 8/22/2013

### Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.  
Rule B = The determined mean value shall be within 5% of the certificate value.

\* Certificate Value is decay corrected to Count Date.

The analyst prepared three standard verification sources for Sr-89 source 1633-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSC Silver for Sr-89 source standard verification. The Sr-89 efficiency calibration which was used for verification calculations was performed on 1/9/2013 using Sr-89 source 1618-A.

Standard results for each verification source was calculated as follows:

$$\text{Source dpm/mL} = (A - B)/(C)(D)$$

where:  
A = Var. source cpm,  
B = BKG cpm,  
C = System efficiency (cpm/dpm), and  
D = volume used for standard verification.

FRAD-M-001

*BF1*  
*Amundson*  
*11/11/13*

## General Engineering Laboratories GFC Calibration Source Preparation Sheet

Applicable SOP Number GL-RAD-A-004

Isotope Sr-89

Date Standards Prepared 2-14-13

Standard ID 1633-A

Matrix of Planchet/Filter Sr Carbamate ppt on 25mm  
0.45um filter

Amount Used (g or ml) 1.0

Standard Activity (DPM/g or mL) 123593.861 \*

Residue/Carrier Agent Sr Carrier 1858443 exp 12-11-1

Reference Date 12-13-12

Pipette ID Used 404326A

Expiration Date 8-22-13

Balance ID Used 113021018

\*Not decay corrected

	Standard Number	Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
	C <sub>1</sub>	0.1	0.0246	0.0265	1.9
	C <sub>2</sub>	0.2	0.0241	0.0276	3.5
	C <sub>3</sub>	0.4	0.0246	0.0315	6.9
	C <sub>4</sub>	0.5	0.0242	0.0325	8.3
	C <sub>5</sub>	0.8	0.0236	0.0371	13.5
	C <sub>6</sub>	1.0	0.0236	0.0412	17.6
	C <sub>7</sub>	1.5	0.0236	0.0502	26.6
	C <sub>8</sub>	2.1	0.0238	0.0599	36.1

wt ✓ NL 2/25/13

2/14/13

Prepared By: [Signature] Date 2-14-13

Reviewed By: [Signature] Date 2/25/13

# Eckert & Ziegler Analytics

1380 Seaboard Industrial Blvd.  
Atlanta, Georgia 30318  
Tel 404-352-8677  
Fax 404-352-2837  
www.analyticsinc.com

## CERTIFICATE OF CALIBRATION Standard Radionuclide Source

1244

78351-278

Sr-90 5 mL Liquid in Flame Sealed Vial

**Customer:** General Engineering Labs/Charleston, SC  
**P.O. No.:** 7312 RD, Item 2

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

Isotope:	Sr-90
Activity (Bq):	3.691 E4
Half-Life:	28.79 years
Calibration Date:	October 1, 2008 12:00 EST
Relative Expanded Uncertainty (k=2):	1.7%

**Comments:**  
Impurities:  $\gamma$ -impurities <0.1%  
5.01862 grams 0.1M HCl solution with 30  $\mu$ g/g Sr carrier.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta emission rate for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

Source Prepared By: W. Mao  
W. Mao, Radiochemist

QA Approved: D. M. Montgomery **QA MGT**  
D. M. Montgomery, QA Manager

Date: 10/3/08

End of Certificate

RECEIVED  
10/2/08  
RC-S-048-125

Corporate Office

Laboratory

24037 Avenida Tiburcio, Valencia, California 91355 1380 Seaboard Industrial Blvd., Atlanta, Georgia, 30318



# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	1244	Isotope:	Strontium-90
Prepared By:	Daniel Roy	Prepared By:	Gregory Ramsay
Carrier Conc:	0.1M HCL	Prep Date:	02/12/2013
Reference Date:	10/01/2008	Verification Date:	02/12/2013
Ampoule Mass (g):	5.01862 g	Expiration Date:	02/12/2014
Uncertainty:	+/- 1.7 %	Primary Code:	1244-A
LogBook No:	RC-S-048-125	Dilution(mL):	100 mL
		Mass of Parent(g):	4.8346 g
		Density(g/mL):	0.9984
		Balance ID:	38080204

### Calculations Converting parent activity to dpm/mL|dpm/g

$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(4.8346 \text{ g}) * (36910 \text{ Bq}) * (60 \text{ dpm/Bq}) / (5.01862 \text{ g} * 100 \text{ mL}) = 21333.9626 \text{ dpm/mL}$
$(4.8346 \text{ g}) * (36910 \text{ Bq}) * (60 \text{ dpm/Bq}) / (0.9984 \text{ g/mL}) / (5.01862 \text{ g} * 100 \text{ mL}) = 21367.7236 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
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GEL Laboratories LLC  
Version 1.0 9/18/2000

# Verification for Sr-90 Standard 1244-A

v1.0.2

Instrument	GOLD
Analyst	BF
Verification Prep Date	2/12/2013

Standard Information	
Isotope	Sr-90
Serial Number	1244-A
Isotope Half-life	28,9000 Y
Reference Date	10/1/2008
Ref. Act. (DPM/mL)	21333.9626
Amount of Std. (mL)	0.1
Standard Prep Date	2/12/2013

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	2/12/2013	57.70	3807.92	38.20
2	2/12/2013	55.70	3846.92	38.20
3	2/12/2013	56.20	3861.54	38.20

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	3769.72	2.046222	18422.83	1842.28
2	3808.72	2.046222	18613.42	1861.34
3	3823.34	2.046222	18684.87	1868.49

dpm/mL  
18573.71  
135.4612019

Mean Value =  
Stdev =

Certificate Value\* = 19212.6  
Two sigma = 270.922  
10 % of Mean = 1857.371  
Rule A (Pass/Fail) Pass  
% Recovery 96.67%  
Rule B (Pass/Fail) Pass  
Expiration Date 2/12/2014

### Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.  
Rule B = The determined mean value shall be within 5% of the certificate value.

\* Certificate Value is decay corrected to Count Date.

The analyst prepared three standard verification sources for Sr-90 source 1244-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecocint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecocint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCGOLD for Sr-90 source standard verification. The Sr-90 efficiency calibration which was used for verification calculations was performed on 2/12/2013 using Sr-90 source 1243-A.

Standard results for each verification source was calculated as follows:

$$\text{Source dpm/mL} = (A - B) / (C \times D)$$

where:

- A = Ver. source cpm.
- B = BKG cpm.
- C = System efficiency (cpm/dpm), and
- D = volume used for standard verification.

RAD-14-001

*Handwritten:* Sr-90  
A  
Amanda Lehn  
2/14/13

**General Engineering Laboratories**  
**GFC Calibration Source Preparation Sheet**  
 Sr-90 (Sr portion)

Applicable SOP Number GL-RAD-A-004

Isotope Sr-90

Date Standards Prepared 3/29/13

Standard ID 1244-A

Matrix of Planchet/Filter Sr carbonate ppt on 25 mm 0.45 µm filter

Amount Used (g or ml) 0.5

Standard Activity (DPM/g or ml) ~~21333.9629~~ <sup>AP 3/29/13</sup> 21333.9626

Residue/Carrier Agent Sr carrier 1858443

Reference Date 10/1/08

Pipette ID Used 1795419 / 2154115 / 4043267 / 11518634

Expiration Date 2/12/14

Balance ID Used 11302108

std carrier wt. 171 µg/L

Prep Date/Time: 3-29-13/1410

Standard Number	Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
S1	0.2	0.0239	0.0272	3.3
S2	0.4	0.0241	0.0314	7.3
S3	0.5	0.0243	0.0328	8.5
S4	0.7	0.0243	0.0365	12.2
S5	1.0	0.0245	0.0417	17.2
S6	1.5	0.0246	0.0512	26.6
S7	1.8	0.0246	0.0556	31.0
S8	2.1	0.0247	0.0608	36.1

AP 3/29/13

AP 3/29/13

AP 3/29/13

AP 4/1/13

Prepared By: [Signature] Date 3-29-13

Reviewed By: [Signature] Date 4/1/13

**General Engineering Laboratories**  
**GFC Calibration Source Preparation Sheet**  
 Sr-90 Yttrium Portion

Applicable SOP Number GL-RAD-A-004

Isotope Sr-90 (Y-90)

Date Standards Prepared 3/29/13

Standard ID 1244-A

Matrix of Planchet/Filter Yttrium oxalate ppt  
on 25 mm 0.45 μm  
Filter

Amount Used (g or mL) 0.5

Standard Activity (DPM/g or mL) 21333.9626

Residue/Carrier Agent Yttrium carrier 1892786

Reference Date 10/1/08

Pipette ID Used 2154115

Expiration Date 2/12/14

Balance ID Used 3-2-13  
1113021018

std carrier wt. 31.86 μg/mL

Sep date/time: 3/29/13 1305

Standard Number	Residue Volume (mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
Y <sub>1</sub>	0.5	0.0239	0.0398	15.9
Y <sub>2</sub>	0.5	0.0240	0.0401	16.1
Y <sub>3</sub>	0.5	0.0242	0.0402	16.0
Y <sub>4</sub>	0.5	0.0242	0.0403	16.1
Y <sub>5</sub>	0.5	0.0244	0.0404	16.0
Y <sub>6</sub>	0.5	0.0245	0.0407	16.2
Y <sub>7</sub>	0.5	0.0245	0.0404	15.9
Y <sub>8</sub>	0.5	0.0249	0.0413	16.4

wt ✓

AP 3/29/13

Prepared By: [Signature] Date 3-29-13  
 Reviewed By: [Signature] Date 4/1/13





# Eckert & Ziegler

## Analytics

1380 Seaboard Industrial Blvd.  
Atlanta, Georgia 30318  
Tel 404-352-8677  
Fax 404-352-2837  
www.analyticinc.com

### CERTIFICATE OF CALIBRATION Standard Radionuclide Source

92552

Sr-89 5 mL Liquid in Flame Sealed Vial

1633

**Customer:** General Engineering Labs  
**P.O. No.:** GEL1202747, Item 6      **Product Code:** 8089

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty*, %			Reference Date (12:00 PM EST)
			$u_A$	$u_B$	U	
Sr-89	5.053E+01	2.121E+05	0.1	0.9	1.8	12/13/2012

\*Uncertainty: U - Relative expanded uncertainty,  $k = 2$ . See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

**Comments:**

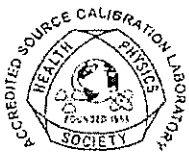
Impurities:  $\gamma$ -impurities < 0.1%.  
5.07181 g 0.1M HCl solution with approximately 30  $\mu$ g/g Sr carrier.

Source Prepared by: K. Eardley  
K. Eardley, Radiochemist

QA Approved: J.D. McCorvey  
J.D. McCorvey, Counting Room Manager

Date: 11 DEC 12

RECEIVED  
12/14/12  
AWB



Single Isotope Certificate Rev 3, 23 August 2012

RC-S-065-062

**Corporate Office**  
24937 Avenue Tibbitts    Valencia, California 91355

**Laboratory**  
1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318



# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	1633	Isotope:	Strontium-89
Prepared By:	Ashley Drochter	Prepared By:	Bethany Fiem
Carrier Conc:	0.1M HCl	Prep Date:	01/08/2013
Reference Date:	12/13/2012	Verification Date:	01/09/2013
Ampoule Mass (g):	5.07181 g	Expiration Date:	08/22/2013
Uncertainty:	+/- 1.8 %	Primary Code:	1633-A
LogBook No:	RC-S-065-062	Dilution(mL):	100 mL
		Mass of Parent(g):	4.9257 g
		Density(g/mL):	0.9986
		Balance ID:	38080204

### Calculations Converting parent activity to dpm/mL|dpm/g

$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(4.9257 \text{ g}) * (212100 \text{ Bq}) * (60 \text{ dpm/Bq}) / (5.07181 \text{ g} * 100 \text{ mL}) = 123593.8614 \text{ dpm/mL}$
$(4.9257 \text{ g}) * (212100 \text{ Bq}) * (60 \text{ dpm/Bq}) / (0.9986 \text{ g/mL}) / (5.07181 \text{ g} * 100 \text{ mL}) = 123767.0118 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
-----------	----------	--------------	---------------	------	-------------	-------------------	-----------------

GEL Laboratories LLC

Version 1.0 9/18/2000

# Verification for Sr-89 Standard 1633-A

v1.0.2

Instrument	Silver
Analyst	BF1
Verification Prep Date	1/8/2013

Standard Information	
Isotope	Sr-89
Serial Number	1633-A
Isotope Half-life	50.5300 D
Reference Date	12/13/2012
Ref. Act. (DPM/mL)	123593.8614
Amount of Std. (mL)	0.1
Standard Prep Date	1/8/2013

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	1/9/2013	89.20	8539.17	44.60
2	1/9/2013	88.90	8565.00	44.60
3	1/9/2013	88.90	8571.67	44.60

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	8494.57	1.011371	8390.64	8399.06
2	8520.40	1.011371	8424.04	8424.60
3	8527.07	1.011371	8431.99	8431.20

dpm/mL  
84182.89  
169.7251209

Mean Value =  
Stddev =

Certificate Value\* = 85338.6  
Two sigma = 339.450

10 % of Mean = 9418.289  
Rule A (Pass/Fail) Pass  
% Recovery 98.65%  
Rule B (Pass/Fail) Pass  
Expiration Date 8/22/2013

**Verification Rules**

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.  
Rule B = The determined mean value shall be within 5% of the certificate value.

\* Certificate Value is decay corrected to Count Date.

The analyst prepared three standard verification sources for Sr-89 source 1633-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecocint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecocint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCSilver for Sr-89 source standard verification. The Sr-89 efficiency calibration which was used for verification calculations was performed on 1/9/2013 using Sr-89 source 1618-A.

Standard results for each verification source was calculated as follows:

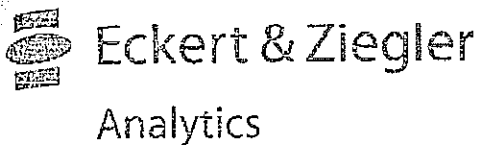
$$\text{Source dpm/mL} = (A - B)/(C)(D)$$

where:

A = Ver. source cpm,  
B = BKG cpm,  
C = System efficiency (cpm/dpm), and  
D = volume used for standard verification.

RAD-M-001

*BF1*  
*1/11/13*  
*Demetrius D. L...*



1380 Seaboard Industrial Blvd.  
Atlanta, Georgia 30318  
Tel 404-352-8677  
Fax 404-352-2837  
www.analytiscinc.com

CERTIFICATE OF CALIBRATION  
Standard Radionuclide Source

1243

78352-278

Sr-90 10 mL Liquid in Flame Sealed Vial

Customer: General Engineering Labs/Charleston, SC  
P.O. No.: 7312 RD, Item 3

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

Isotope:	Sr-90
Activity (Bq):	3.856 E5
Half-Life:	28.79 years
Calibration Date:	October 1, 2008 12:00 EST
Relative Expanded Uncertainty (k=2):	1.7%

Comments:

Impurities:  $\gamma$ -impurities <0.1%  
10.41484 grams 0.1M HCl solution with 30  $\mu$ g/g Sr carrier.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta emission rate for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

Source Prepared By: W. Mao  
W. Mao, Radiochemist

QA Approved: D. M. Montgomery  
D. M. Montgomery, QA Manager

Date: 10/3/08



# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	1243	Isotope:	Strontium-90
Prepared By:	Daniel Roy	Prepared By:	Daniel Roy
Carrier Conc:	0.1M HCL	Prep Date:	12/19/2008
Reference Date:	10/01/2008	Verification Date:	02/12/2013
Ampoule Mass (g):	10.41484 g	Expiration Date:	02/12/2014
Uncertainty:	+/- 1.7 %	Primary Code:	1243-A
LogBook No:	RC-S-048-124	Dilution(mL):	100 mL
		Mass of Parent(g):	10.2164 g
		Density(g/mL):	0.9991
		Balance ID:	38080204

## Calculations Converting parent activity to dpm/mL|dpm/g

$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(10.2164 \text{ g}) * (385600 \text{ Bq}) * (60 \text{ dpm/Bq}) / (10.41484 \text{ g} * 100 \text{ mL}) = 226951.7634 \text{ dpm/mL}$
$(10.2164 \text{ g}) * (385600 \text{ Bq}) * (60 \text{ dpm/Bq}) / (0.9991 \text{ g/mL}) / (10.41484 \text{ g} * 100 \text{ mL}) = 227146.2010 \text{ dpm/g}$

## Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
01/21/2010	Bethany Fiem	2.2467	1000	1243-B	510.329369 dpm/mL	01/21/2010	01/21/2011
08/03/2010	Bethany Fiem	2.5604	1000	1243-C	581.5851 dpm/mL	08/03/2010	08/03/2011
01/12/2011	Bethany Fiem	2.4946	1000	1243-D	566.6389 dpm/mL	01/12/2011	01/12/2012
08/12/2011	Tim Chandler	3.3115	100	1243-G	18.7877 dpm/mL	08/11/2011	08/11/2012
08/17/2011	Tim Chandler	2.5541	100	1243-H	14.49064 dpm/mL	08/18/2011	08/16/2012
06/21/2011	Tim Chandler	.0235	100	1243-E	53.37936 dpm/mL	06/25/2012	06/20/2013
07/05/2011	Bethany Fiem	2.6072	1000	1243-F	592.2156 dpm/mL	07/05/2011	07/05/2012

01/31/2012	Gregory Ramsay	2.6792	1000	1243-I	608.5701 dpm/ml	01/31/2012	01/31/2013
08/29/2012	Bethany Fiem	2.6799	1000	1243-J	608.729104 dpm/mL	09/14/2012	09/11/2013
02/12/2013	Gregory Ramsay	2.6526	1000	1243-K	602.528 dpm/ml	02/12/2014	02/12/2014

GEL Laboratories LLC  
Version 1.0 9/18/2000

# Verification for Sr-90 Standard 1243-J

v1.0.1

Instrument	RED
Analyst	BF1
Verification Prep Date	9/11/2012

Standard Information	
Isotope	Sr-90
Serial Number	1243-J
Isotope Half-life	28.9000 Y
Reference Date	10/1/2008
Ref. Act. (DPM/mL)	608.729104
Amount of Std. (mL)	1.0
Standard Prep Date	8/29/2012

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	9/11/2012	90.00	1130.20	43.00
2	9/11/2012	90.00	1161.00	43.00
3	9/11/2012	89.10	1179.60	43.00

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	1087.20	2.057405	528.43	528.43
2	1118.00	2.057405	543.40	543.40
3	1136.60	2.057405	552.44	552.44

dpm/mL  
 Mean Value = 541.43  
 Stdev = 12.12683505  
 Certificate Value\* = 553.8  
 Two sigma = 24.254  
 10 % of Mean = 54.143  
 Rule A (Pass/Fail) Pass  
 % Recovery 97.77%  
 Rule B (Pass/Fail) Pass  
 Expiration Date 9/11/2013

### Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.  
 Rule B = The determined mean value shall be within 5% of the certificate value.

\* Certificate Value is decay corrected to Count Date.

The analyst prepared three standard verification sources for Sr-90 source 1243-J by transferring 1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecocint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecocint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCHED for Sr-90 source standard verification. The Sr-90 efficiency calibration which was used for verification calculations was performed on 9/27/2012 using Sr-90 source 0133-T.

Standard results for each verification source was calculated as follows:

$$\text{Source dpm/mL} = (A - B) / (C \times D)$$

where:

- A = Ver. source cpm,
- B = BKG cpm,
- C = System efficiency (cpm/gpm), and
- D = volume used for standard verification.

RAD-M-001

*Amanda J. Fisher 10/24/12*

# Strontium 89/90 Queue Sheet

02/11/13

Sr 89/90

Sr 89/90 / 2<sup>nd</sup> sep

Sr 89/90 Verification

Sr 89/90

Internal Due Date: 03/01/2013

Comments

Batch #: 1281897 Analyst: BXF1 First Client Due Date: Expiration Date: 12/31/13

Sr-89/90 Spike Code(s): 1633-A / 1243-3 Expiration Date: 3-22-13 / 7-11-13 Vol(s): 0.1 / 0.5

Sr-89/90 LCS Code(s): 1853443 Exp Date: 12-11-13 Vol: \* Sdt Wt: 3.36 Y Carrier Code: 1240337 Exp Date: 10-25-13 Vol: 0.5 Sdt Wt: 15.60

Sr Carrier Code: 1853443 Exp Date: 12-11-13 Pipet ID: 173307 / 254015 Balance #: 512.04843 Analytical Scale #: 103221018 Witness: WO 2/14/13

Prop Date: 2-14-13 Initials: BF

Carrier Job #

Sample ID	Client Description	Type *	RDL	Carrier	Date Collected	Matrix	Client	Rad	Pos #	Wet/Dry Aliquot (µL) or (g)	Det # 1 & 2	Initial Sr wt (g)	Final Sr wt (g)	Net Sr wt (mg)	Initial Y wt (g)	Final Y wt (g)	Net Y wt (mg)
1202826509-1	LCS for batch 1281897	LCS	0.1	2 pCh/g	FEB-07-13 01:25 PM	MISC SOLID	QC ACCOUNT		89 V1	200		0.0242	0.0246	1.3	0.0246	0.0402	15.6
1202826510-1	LCS for batch 1281897	LCS	0.2	2 pCh/g	FEB-07-13 01:25 PM	MISC SOLID	QC ACCOUNT		89 V2	200		0.0244	0.0244	3.1	0.0244	0.0398	15.4
1202826511-1	LCS for batch 1281897	LCS	0.4	2 pCh/g	FEB-07-13 01:25 PM	MISC SOLID	QC ACCOUNT		89 V3	200		0.0240	0.0240	6.2	0.0238	0.0391	15.3
1202826512-1	LCS for batch 1281897	LCS	0.5	2 pCh/g	FEB-07-13 01:25 PM	MISC SOLID	QC ACCOUNT		89 V4	200		0.0236	0.0231	7.5	0.0252	0.0394	14.2
1202826513-1	LCS for batch 1281897	LCS	0.8	2 pCh/g	FEB-07-13 01:25 PM	MISC SOLID	QC ACCOUNT		89 V5	200		0.0232	0.0251	11.9	0.0243	0.0398	15.5
1202826514-1	LCS for batch 1281897	LCS	1.0	2 pCh/g	FEB-07-13 01:25 PM	MISC SOLID	QC ACCOUNT		89 V6	200		0.0238	0.0261	12.3	0.0247	0.0408	16.1
1202826515-1	LCS for batch 1281897	LCS	1.5	2 pCh/g	FEB-07-13 01:25 PM	MISC SOLID	QC ACCOUNT		89 V7	200		0.0236	0.0265	12.9	0.0247	0.0401	15.4
1202826516-1	LCS for batch 1281897	LCS	2.1	2 pCh/g	FEB-07-13 01:25 PM	MISC SOLID	QC ACCOUNT		89 V8	200		0.0242	0.0288	14.6	0.0243	0.0400	15.7

WAV ✓

Solid Sample Dissolution by: LEACH OF DIGESTION Circle/One

Data Reviewed By: Michael J. III



## General Engineering Laboratories GFC Verification Source Preparation Sheet

Applicable SOP Number GL-RAD-A-004

Isotope Sr-90

Date Standards Prepared 2-14-13

Standard ID 1243-J

Matrix of Vial/Planchett Sr carbonate set on

25um 0.45um filter

Amount Used (g or ml) 1.0

Standard Activity (DPM/g or mL) 608,729,104

Residue/Carrier Agent Sr Carrier 1858443 exp 12-11-13

Reference Date 10-1-08

Pipette ID Used 404326A

Expiration Date 9-11-13

Balance ID Used 1130210:8

See Date/Time: 2-14-13/1400

Standard Number	Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
90 V <sub>1</sub>	0.1	0.0236	0.0253	1.7
90 V <sub>2</sub>	0.2	0.0234	0.0273	3.9
90 V <sub>3</sub>	0.4	0.0234	0.0300	6.6
90 V <sub>4</sub>	0.5	0.0232	0.0305	7.3
90 V <sub>5</sub>	0.8	0.0228	0.0341	11.3
90 V <sub>6</sub>	1.0	0.0238	<del>0.0372</del> 0.0376	<del>13.4</del> 13.8
90 V <sub>7</sub>	1.5	0.0241	<del>0.0383</del> 0.0391	<del>14.2</del> 15.0
90 V <sub>8</sub>	2.1	0.0234	<del>0.0374</del> 0.0392	<del>14.5</del> 15.8

LHV

AP 2/14/13

Prepared By: [Signature] Date 2-14-13

Reviewed By: [Signature] Date 2/25/13

# Gas Flow Proportional Counter Calibration Package

Method: Gross Alpha Beta

Instrument (circle one): LB4100 / Protean

Included/  
Acceptable

Comments

Included/ Acceptable	Comments
✓	
✓	
✓	
✓	
✓	
	NA

## Part 1: Efficiency determination

- 1 Efficiency spreadsheet (eff pts, graphs, trendline equation)
- 2 Applicable portion of GFPC\_Machines.XLS
- 3 Raw Data for Calibration standards
- 4 Verification Spreadsheet and Raw Data (recoveries 75%-125%)
- 5 Plateau graph and raw data
- 6 Standardization of Carrier (if applicable)

## Part 2. Documentation for Calibration Source

- 1 Vendor Certificate
- 2 Standard Traceability Log (from LIMS)
- 3 Current Verification of Source
- 4 Source preparation sheet

✓	
✓	
✓	
✓	

## Part 3. Documentation for Verification Source

- 1 Vendor Certificate
- 2 Standard Traceability Log (from LIMS)
- 3 Current Verification of Source
- 4 Source preparation sheet

✓	
✓	
✓	
✓	

## Part 4. Enter into LIMS

- 1 Alpha LIMS instrument calibration updated

✓	
---	--

Primary Review of Package

[Signature]

Secondary Review of Package

Amanda J. Lehu

Effective Date:

10/1/13

Exp 9/30/14

GEL Laboratories

2040 Savage Road, Charleston, SC 29407

(843)556-8171

Rev 7 SSC 8/3/09

Alpha Calibration - PIC - Sep 2013

Standard Data	Isotope	Th-230
	Standard ID number	1105-A
	Half Life (days)	27532545
	Std. Act. (dpm/mL)	22077.2901
	Reference Date	6/14/2007
	Volume of spike (mL)	2.0
	Std. Nominal (dpm)	44152.03
	Decay Date	9/21/2013

Source Weight	
Source	Measured weight (mg)
1	1.0
2	13.3
3	24.0
4	49.8
5	46.9
6	73.4
7	84.9
8	109.4

The following detectors were not calibrated:

6D

\*Background is considered negligible.

\*\*Decay corrected to mid-point of count

Detector (#)	Source ID (#)	Raw Count Data			Raw Alpha (cpm)	Th-230 (cpm)*	Decay Corrected Nominal (dpm)**	Th-230 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
		Start Time	Count Time (min)	Alpha (counts)					
1A	1	9/21/2013 11:55	3	32784	10928	10928.00	44152.03	0.2475	0.2414
1A	2	9/21/2013 12:11	3	22813	7604.333333	7604.33	44152.03	0.1722	0.1918
1A	3	9/21/2013 12:06	3	23639	7879.666667	7879.67	44152.03	0.1785	0.1606
1A	4	9/21/2013 12:01	3	17546	5848.666667	5848.67	44152.03	0.1325	0.1194
1A	5	9/21/2013 12:17	3	13712	4570.666667	4570.67	44152.03	0.1035	0.1222
1A	6	9/21/2013 13:10	3	14898	4966	4966.00	44152.03	0.1125	0.1049
1A	7	9/21/2013 12:30	3	12120	4040	4040.00	44152.03	0.0915	0.0993
1A	8	9/21/2013 12:25	3	10340	3446.666667	3446.67	44152.03	0.0781	0.0766
1B	1	9/21/2013 12:01	3	32860	10953.333333	10953.33	44152.03	0.2481	0.2409
1B	2	9/21/2013 11:55	3	22231	7410.333333	7410.33	44152.03	0.1678	0.1904
1B	3	9/21/2013 12:11	3	23731	7910.333333	7910.33	44152.03	0.1792	0.1591
1B	4	9/21/2013 12:06	3	17337	5779	5779.00	44152.03	0.1309	0.1189
1B	5	9/21/2013 12:25	3	13715	4571.666667	4571.67	44152.03	0.1035	0.1216
1B	6	9/21/2013 12:17	3	15109	5036.333333	5036.33	44152.03	0.1141	0.1058
1B	7	9/21/2013 13:10	3	12212	4070.666667	4070.67	44152.03	0.0922	0.1007
1B	8	9/21/2013 12:30	3	10447	3482.333333	3482.33	44152.03	0.0789	0.0773
1C	1	9/21/2013 12:06	3	35697	11899	11899.00	44152.03	0.2695	0.2641
1C	2	9/21/2013 12:01	3	25411	8470.333333	8470.33	44152.03	0.1918	0.2114
1C	3	9/21/2013 11:55	3	26429	8809.666667	8809.67	44152.03	0.1995	0.1786
1C	4	9/21/2013 12:11	3	20030	6676.666667	6676.67	44152.03	0.1512	0.1359
1C	5	9/21/2013 12:30	3	15082	5027.333333	5027.33	44152.03	0.1139	0.1388
1C	6	9/21/2013 12:25	3	17451	5817	5817.00	44152.03	0.1317	0.1212
1C	7	9/21/2013 12:17	3	14082	4694	4694.00	44152.03	0.1063	0.1152
1C	8	9/21/2013 13:10	3	12006	4002	4002.00	44152.03	0.0906	0.0893
1D	1	9/21/2013 12:12	3	34323	11441	11441.00	44152.03	0.2591	0.2529
1D	2	9/21/2013 12:06	3	23855	7951.666667	7951.67	44152.03	0.1801	0.2006
1D	3	9/21/2013 12:01	3	24855	8285	8285.00	44152.03	0.1876	0.1681
1D	4	9/21/2013 11:55	3	18421	6140.333333	6140.33	44152.03	0.1391	0.1257
1D	5	9/21/2013 13:11	3	14280	4760	4760.00	44152.03	0.1078	0.1285
1D	6	9/21/2013 12:30	3	15997	5332.333333	5332.33	44152.03	0.1208	0.1111
1D	7	9/21/2013 12:25	3	12740	4246.666667	4246.67	44152.03	0.0962	0.1053
1D	8	9/21/2013 12:17	3	10833	3611	3611.00	44152.03	0.0818	0.0802
2A	1	9/21/2013 12:17	3	29700	9900	9900.00	44152.03	0.2242	0.2191
2A	2	9/21/2013 13:14	3	20776	6925.333333	6925.33	44152.03	0.1569	0.1730
2A	3	9/21/2013 12:30	3	21048	7016	7016.00	44152.03	0.1589	0.1441
2A	4	9/21/2013 12:25	3	15649	5216.333333	5216.33	44152.03	0.1181	0.1062
2A	5	9/21/2013 11:55	3	12134	4044.666667	4044.67	44152.03	0.0916	0.1087
2A	6	9/21/2013 12:12	3	13418	4472.666667	4472.67	44152.03	0.1013	0.0936
2A	7	9/21/2013 12:06	3	10757	3585.666667	3585.67	44152.03	0.0812	0.0890
2A	8	9/21/2013 12:01	3	9446	3148.666667	3148.67	44152.03	0.0713	0.0699
2B	1	9/21/2013 12:25	3	29286	9762	9762.00	44152.03	0.2211	0.2143
2B	2	9/21/2013 12:17	3	19486	6495.333333	6495.33	44152.03	0.1471	0.1688
2B	3	9/21/2013 13:11	3	21112	7037.333333	7037.33	44152.03	0.1594	0.1403
2B	4	9/21/2013 12:31	3	15045	5015	5015.00	44152.03	0.1136	0.1026
2B	5	9/21/2013 12:01	3	11888	3962.666667	3962.67	44152.03	0.0898	0.1052

Detector (#)	Source ID (#)	Raw Count Data			Raw Alpha (cpm)	Th-230 (cpm)*	Decay Corrected Nominal (dpm)**	Th-230	Calculated
		Start Time	Count Time (min)	Alpha (counts)				Efficiency (cpm/dpm) i	Efficiency (cpm/dpm)
2B	6	9/21/2013 11:55	3	12365	4121.666667	4121.67	44152.03	0.0934	0.0897
2B	7	9/21/2013 12:12	3	10660	3553.333333	3553.33	44152.03	0.0805	0.0849
2B	8	9/21/2013 12:06	3	8758	2919.333333	2919.33	44152.03	0.0661	0.0651
2C	1	9/21/2013 12:31	3	31828	10609.333333	10609.33	44152.03	0.2403	0.2320
2C	2	9/21/2013 12:25	3	21276	7092	7092.00	44152.03	0.1606	0.1829
2C	3	9/21/2013 12:17	3	22293	7431	7431.00	44152.03	0.1683	0.1527
2C	4	9/21/2013 13:11	3	17820	5940	5940.00	44152.03	0.1345	0.1142
2C	5	9/21/2013 12:06	3	12796	4265.333333	4265.33	44152.03	0.0966	0.1168
2C	6	9/21/2013 12:01	3	14098	4699.333333	4699.33	44152.03	0.1064	0.1016
2C	7	9/21/2013 11:55	3	11561	3853.666667	3853.67	44152.03	0.0873	0.0961
2C	8	9/21/2013 12:12	3	9707	3235.666667	3235.67	44152.03	0.0733	0.0711
2D	1	9/21/2013 13:11	3	30217	10072.333333	10072.33	44152.03	0.2281	0.2215
2D	2	9/21/2013 12:31	3	20065	6688.333333	6688.33	44152.03	0.1515	0.1717
2D	3	9/21/2013 12:26	3	20977	6992.333333	6992.33	44152.03	0.1584	0.1412
2D	4	9/21/2013 12:17	3	15157	5052.333333	5052.33	44152.03	0.1144	0.1031
2D	5	9/21/2013 12:12	3	11944	3981.333333	3981.33	44152.03	0.0902	0.1055
2D	6	9/21/2013 12:06	3	13034	4344.666667	4344.67	44152.03	0.0984	0.0924
2D	7	9/21/2013 12:01	3	10808	3602.666667	3602.67	44152.03	0.0816	0.0885
2D	8	9/21/2013 11:55	3	9209	3069.666667	3069.67	44152.03	0.0695	0.0681
3A	1	9/21/2013 13:37	3	32867	10955.666667	10955.67	44152.03	0.2481	0.2418
3A	2	9/21/2013 13:58	3	22729	7576.333333	7576.33	44152.03	0.1716	0.1929
3A	3	9/21/2013 13:54	3	24233	8077.666667	8077.67	44152.03	0.1830	0.1624
3A	4	9/21/2013 13:42	3	18027	6009	6009.00	44152.03	0.1361	0.1227
3A	5	9/21/2013 14:04	3	13893	4631	4631.00	44152.03	0.1049	0.1254
3A	6	9/21/2013 14:27	3	15397	5132.333333	5132.33	44152.03	0.1162	0.1089
3A	7	9/21/2013 14:21	3	12762	4254	4254.00	44152.03	0.0963	0.1032
3A	8	9/21/2013 14:08	3	10584	3528	3528.00	44152.03	0.0799	0.0787
3B	1	9/21/2013 13:42	3	34650	11550	11550.00	44152.03	0.2616	0.2547
3B	2	9/21/2013 13:37	3	23720	7906.666667	7906.67	44152.03	0.1791	0.2019
3B	3	9/21/2013 13:59	3	25293	8431	8431.00	44152.03	0.1910	0.1693
3B	4	9/21/2013 13:54	3	18818	6272.666667	6272.67	44152.03	0.1421	0.1276
3B	5	9/21/2013 14:08	3	14380	4793.333333	4793.33	44152.03	0.1086	0.1303
3B	6	9/21/2013 14:04	3	16136	5378.666667	5378.67	44152.03	0.1218	0.1138
3B	7	9/21/2013 14:27	3	13297	4432.333333	4432.33	44152.03	0.1004	0.1082
3B	8	9/21/2013 14:21	3	11074	3691.333333	3691.33	44152.03	0.0836	0.0822
3C	1	9/21/2013 13:54	3	34481	11493.666667	11493.67	44152.03	0.2603	0.2535
3C	2	9/21/2013 13:42	3	23638	7879.333333	7879.33	44152.03	0.1785	0.1997
3C	3	9/21/2013 13:37	3	24524	8174.666667	8174.67	44152.03	0.1851	0.1663
3C	4	9/21/2013 13:59	3	18286	6095.333333	6095.33	44152.03	0.1381	0.1236
3C	5	9/21/2013 14:21	3	14081	4693.666667	4693.67	44152.03	0.1063	0.1265
3C	6	9/21/2013 14:08	3	15773	5257.666667	5257.67	44152.03	0.1191	0.1101
3C	7	9/21/2013 14:04	3	12628	4209.333333	4209.33	44152.03	0.0953	0.1048
3C	8	9/21/2013 14:27	3	10960	3653.333333	3653.33	44152.03	0.0827	0.0810
3D	1	9/21/2013 13:59	3	34102	11367.333333	11367.33	44152.03	0.2575	0.2521
3D	2	9/21/2013 13:54	3	24222	8074	8074.00	44152.03	0.1829	0.2014
3D	3	9/21/2013 13:42	3	24963	8321	8321.00	44152.03	0.1885	0.1698
3D	4	9/21/2013 13:37	3	18801	6267	6267.00	44152.03	0.1419	0.1285
3D	5	9/21/2013 14:27	3	14569	4856.333333	4856.33	44152.03	0.1100	0.1313
3D	6	9/21/2013 14:21	3	16343	5447.666667	5447.67	44152.03	0.1234	0.1137
3D	7	9/21/2013 14:08	3	13062	4354	4354.00	44152.03	0.0986	0.1073
3D	8	9/21/2013 14:04	3	10888	3629.333333	3629.33	44152.03	0.0822	0.0808
4A	1	9/21/2013 14:04	3	32181	10727	10727.00	44152.03	0.2430	0.2377
4A	2	9/21/2013 14:28	3	22446	7482	7482.00	44152.03	0.1695	0.1888
4A	3	9/21/2013 14:21	3	23793	7931	7931.00	44152.03	0.1796	0.1591
4A	4	9/21/2013 14:08	3	18037	6012.333333	6012.33	44152.03	0.1362	0.1223
4A	5	9/21/2013 13:37	3	13477	4492.333333	4492.33	44152.03	0.1017	0.1247
4A	6	9/21/2013 13:59	3	15862	5287.333333	5287.33	44152.03	0.1198	0.1108
4A	7	9/21/2013 13:54	3	12967	4322.333333	4322.33	44152.03	0.0979	0.1053
4A	8	9/21/2013 13:42	3	10525	3508.333333	3508.33	44152.03	0.0795	0.0784
4B	1	9/21/2013 14:08	3	29911	9970.333333	9970.33	44152.03	0.2258	0.2200
4B	2	9/21/2013 14:04	3	20651	6883.666667	6883.67	44152.03	0.1559	0.1754
4B	3	9/21/2013 14:28	3	21933	7311	7311.00	44152.03	0.1656	0.1471
4B	4	9/21/2013 14:21	3	16141	5380.333333	5380.33	44152.03	0.1219	0.1087
4B	5	9/21/2013 13:42	3	12225	4075	4075.00	44152.03	0.0923	0.1114

Raw Count Data								Th-230	Calculated
Detector (#)	Source ID (#)	Start Time	Count Time (min)	Alpha (counts)	Raw Alpha (cpm)	Th-230 (cpm)*	Decay Corrected Nominal (dpm)**	Efficiency (cpm/dpm)	Efficiency (cpm/dpm)
4B	6	9/21/2013 13:37	3	13296	4432	4432.00	44152.03	0.1004	0.0943
4B	7	9/21/2013 13:59	3	10976	3658.666667	3658.67	44152.03	0.0829	0.0889
4B	8	9/21/2013 13:54	3	9260	3086.666667	3086.67	44152.03	0.0699	0.0688
4C	1	9/21/2013 14:21	3	32449	10816.333333	10816.33	44152.03	0.2450	0.2391
4C	2	9/21/2013 14:08	3	22946	7648.666667	7648.67	44152.03	0.1732	0.1914
4C	3	9/21/2013 14:04	3	23536	7845.333333	7845.33	44152.03	0.1777	0.1616
4C	4	9/21/2013 14:28	3	18146	6048.666667	6048.67	44152.03	0.1370	0.1223
4C	5	9/21/2013 13:55	3	13940	4646.666667	4646.67	44152.03	0.1052	0.1250
4C	6	9/21/2013 13:42	3	15454	5151.333333	5151.33	44152.03	0.1167	0.1081
4C	7	9/21/2013 13:38	3	12326	4108.666667	4108.67	44152.03	0.0931	0.1021
4C	8	9/21/2013 13:59	3	10498	3499.333333	3499.33	44152.03	0.0793	0.0776
4D	1	9/21/2013 14:28	3	33901	11300.333333	11300.33	44152.03	0.2559	0.2504
4D	2	9/21/2013 14:21	3	24021	8007	8007.00	44152.03	0.1814	0.2012
4D	3	9/21/2013 14:08	3	25284	8428	8428.00	44152.03	0.1909	0.1702
4D	4	9/21/2013 14:04	3	18749	6249.666667	6249.67	44152.03	0.1415	0.1288
4D	5	9/21/2013 13:59	3	14533	4844.333333	4844.33	44152.03	0.1097	0.1317
4D	6	9/21/2013 13:55	3	16344	5448	5448.00	44152.03	0.1234	0.1137
4D	7	9/21/2013 13:42	3	13203	4401	4401.00	44152.03	0.0997	0.1077
4D	8	9/21/2013 13:38	3	11301	3767	3767.00	44152.03	0.0853	0.0841
5A	1	9/21/2013 15:24	3	35298	11766	11766.00	44152.03	0.2665	0.2601
5A	2	9/21/2013 15:36	3	24641	8213.666667	8213.67	44152.03	0.1860	0.2068
5A	3	9/21/2013 15:32	3	25653	8551	8551.00	44152.03	0.1937	0.1738
5A	4	9/21/2013 15:28	3	19290	6430	6430.00	44152.03	0.1456	0.1314
5A	5	9/21/2013 15:42	3	14891	4963.666667	4963.67	44152.03	0.1124	0.1342
5A	6	9/21/2013 15:55	3	16850	5616.666667	5616.67	44152.03	0.1272	0.1169
5A	7	9/21/2013 15:50	3	13374	4458	4458.00	44152.03	0.1010	0.1108
5A	8	9/21/2013 15:46	3	11292	3764	3764.00	44152.03	0.0853	0.0836
5B	1	9/21/2013 15:28	3	34606	11535.333333	11535.33	44152.03	0.2613	0.2546
5B	2	9/21/2013 15:24	3	24023	8007.666667	8007.67	44152.03	0.1814	0.2027
5B	3	9/21/2013 15:36	3	25151	8383.666667	8383.67	44152.03	0.1899	0.1703
5B	4	9/21/2013 15:32	3	19220	6406.666667	6406.67	44152.03	0.1451	0.1281
5B	5	9/21/2013 15:46	3	14241	4747	4747.00	44152.03	0.1075	0.1310
5B	6	9/21/2013 15:42	3	16270	5423.333333	5423.33	44152.03	0.1228	0.1135
5B	7	9/21/2013 15:55	3	12984	4328	4328.00	44152.03	0.0980	0.1077
5B	8	9/21/2013 15:51	3	11198	3732.666667	3732.67	44152.03	0.0845	0.0828
5C	1	9/21/2013 15:32	3	34487	11495.666667	11495.67	44152.03	0.2604	0.2550
5C	2	9/21/2013 15:28	3	24200	8066.666667	8066.67	44152.03	0.1827	0.2019
5C	3	9/21/2013 15:24	3	25025	8341.666667	8341.67	44152.03	0.1889	0.1689
5C	4	9/21/2013 15:36	3	18566	6188.666667	6188.67	44152.03	0.1402	0.1260
5C	5	9/21/2013 15:51	3	14028	4676	4676.00	44152.03	0.1059	0.1289
5C	6	9/21/2013 15:47	3	16102	5367.333333	5367.33	44152.03	0.1216	0.1119
5C	7	9/21/2013 15:43	3	12997	4332.333333	4332.33	44152.03	0.0981	0.1064
5C	8	9/21/2013 15:55	3	11072	3690.666667	3690.67	44152.03	0.0836	0.0823
5D	1	9/21/2013 15:37	3	35093	11697.666667	11697.67	44152.03	0.2649	0.2594
5D	2	9/21/2013 15:32	3	24961	8320.333333	8320.33	44152.03	0.1884	0.2087
5D	3	9/21/2013 15:28	3	26253	8751	8751.00	44152.03	0.1982	0.1768
5D	4	9/21/2013 15:24	3	19810	6603.333333	6603.33	44152.03	0.1496	0.1342
5D	5	9/21/2013 15:55	3	14883	4961	4961.00	44152.03	0.1124	0.1372
5D	6	9/21/2013 15:51	3	16996	5665.333333	5665.33	44152.03	0.1283	0.1184
5D	7	9/21/2013 15:47	3	13693	4564.333333	4564.33	44152.03	0.1034	0.1118
5D	8	9/21/2013 15:43	3	11533	3844.333333	3844.33	44152.03	0.0871	0.0858
6A	1	9/21/2013 15:43	3	34640	11546.666667	11546.67	44152.03	0.2615	0.2559
6A	2	9/21/2013 15:55	3	24443	8147.666667	8147.67	44152.03	0.1845	0.2042
6A	3	9/21/2013 15:51	3	25419	8473	8473.00	44152.03	0.1919	0.1719
6A	4	9/21/2013 15:47	3	19138	6379.333333	6379.33	44152.03	0.1445	0.1300
6A	5	9/21/2013 15:24	3	14561	4853.666667	4853.67	44152.03	0.1099	0.1328
6A	6	9/21/2013 15:37	3	16553	5517.666667	5517.67	44152.03	0.1250	0.1156
6A	7	9/21/2013 15:33	3	13454	4484.666667	4484.67	44152.03	0.1016	0.1099
6A	8	9/21/2013 15:28	3	11480	3826.666667	3826.67	44152.03	0.0867	0.0854
6B	1	9/21/2013 15:47	3.01	35103	11662.12625	11662.13	44152.03	0.2641	0.2586
6B	2	9/21/2013 15:43	3	24931	8310.333333	8310.33	44152.03	0.1882	0.2075
6B	3	9/21/2013 15:55	3	25892	8630.666667	8630.67	44152.03	0.1955	0.1757
6B	4	9/21/2013 15:51	3	19672	6557.333333	6557.33	44152.03	0.1485	0.1337
6B	5	9/21/2013 15:29	3	14964	4988	4988.00	44152.03	0.1130	0.1366

Detector (#)	Source ID (#)	Raw Count Data			Raw Alpha (cpm)	Th-230 (cpm)*	Decay Corrected Nominal (dpm)**	Th-230	Calculated
		Start Time	Count Time (min)	Alpha (counts)				Efficiency (cpm/dpm)	Efficiency (cpm/dpm)
6B	6	9/21/2013 15:24	3	17201	5733.666667	5733.67	44152.03	0.1299	0.1186
6B	7	9/21/2013 15:38	3	13552	4517.333333	4517.33	44152.03	0.1023	0.1123
6B	8	9/21/2013 15:33	3	11614	3871.333333	3871.33	44152.03	0.0877	0.0861
6C	1	9/21/2013 15:51	3	34522	11507.333333	11507.33	44152.03	0.2606	0.2554
6C	2	9/21/2013 15:47	3	24738	8246	8246.00	44152.03	0.1868	0.2049
6C	3	9/21/2013 15:43	3	25354	8451.333333	8451.33	44152.03	0.1914	0.1730
6C	4	9/21/2013 15:55	3	19155	6385	6385.00	44152.03	0.1446	0.1303
6C	5	9/21/2013 15:33	3	14724	4908	4908.00	44152.03	0.1112	0.1333
6C	6	9/21/2013 15:29	3	16503	5501	5501.00	44152.03	0.1246	0.1149
6C	7	9/21/2013 15:24	3	13310	4436.666667	4436.67	44152.03	0.1005	0.1092
6C	8	9/21/2013 15:38	3	11686	3895.333333	3895.33	44152.03	0.0882	0.0868
7A	1	9/21/2013 14:32	3	34511	11503.666667	11503.67	44152.03	0.2605	0.2547
7A	2	9/21/2013 15:01	3	24026	8008.666667	8008.67	44152.03	0.1814	0.2012
7A	3	9/21/2013 14:47	3	24877	8292.333333	8292.33	44152.03	0.1878	0.1684
7A	4	9/21/2013 14:40	3	18816	6272	6272.00	44152.03	0.1421	0.1269
7A	5	9/21/2013 15:06	3	14162	4720.666667	4720.67	44152.03	0.1069	0.1296
7A	6	9/21/2013 15:19	3	16266	5422	5422.00	44152.03	0.1228	0.1136
7A	7	9/21/2013 15:15	3	13146	4382	4382.00	44152.03	0.0992	0.1079
7A	8	9/21/2013 15:10	3	10895	3631.666667	3631.67	44152.03	0.0823	0.0808
7B	1	9/21/2013 14:40	3	34525	11508.333333	11508.33	44152.03	0.2607	0.2552
7B	2	9/21/2013 14:32	3	24246	8082	8082.00	44152.03	0.1830	0.2027
7B	3	9/21/2013 15:01	3	25236	8412	8412.00	44152.03	0.1905	0.1700
7B	4	9/21/2013 14:47	3	18582	6194	6194.00	44152.03	0.1403	0.1273
7B	5	9/21/2013 15:10	3	14332	4777.333333	4777.33	44152.03	0.1082	0.1302
7B	6	9/21/2013 15:06	3	16250	5416.666667	5416.67	44152.03	0.1227	0.1128
7B	7	9/21/2013 15:19	3	13092	4364	4364.00	44152.03	0.0988	0.1072
7B	8	9/21/2013 15:15	3	11162	3720.666667	3720.67	44152.03	0.0843	0.0830
7C	1	9/21/2013 14:47	3	33244	11081.333333	11081.33	44152.03	0.2510	0.2447
7C	2	9/21/2013 14:40	3	22887	7629	7629.00	44152.03	0.1728	0.1939
7C	3	9/21/2013 14:32	3	24232	8077.333333	8077.33	44152.03	0.1829	0.1626
7C	4	9/21/2013 15:01	3	18072	6024	6024.00	44152.03	0.1364	0.1228
7C	5	9/21/2013 15:15	3	13832	4610.666667	4610.67	44152.03	0.1044	0.1254
7C	6	9/21/2013 15:10	3	15615	5205	5205.00	44152.03	0.1179	0.1095
7C	7	9/21/2013 15:06	3	12686	4228.666667	4228.67	44152.03	0.0958	0.1037
7C	8	9/21/2013 15:19	3	10423	3474.333333	3474.33	44152.03	0.0787	0.0773
7D	1	9/21/2013 15:01	3	33954	11318	11318.00	44152.03	0.2563	0.2505
7D	2	9/21/2013 14:47	3	23537	7845.666667	7845.67	44152.03	0.1777	0.1969
7D	3	9/21/2013 14:40	3	24153	8051	8051.00	44152.03	0.1823	0.1639
7D	4	9/21/2013 14:35	3	18055	6018.333333	6018.33	44152.03	0.1363	0.1225
7D	5	9/21/2013 15:19	3	13819	4606.333333	4606.33	44152.03	0.1043	0.1252
7D	6	9/21/2013 15:15	3	15810	5270	5270.00	44152.03	0.1194	0.1097
7D	7	9/21/2013 15:10	3	12625	4208.333333	4208.33	44152.03	0.0953	0.1045
7D	8	9/21/2013 15:06	3	10656	3552	3552.00	44152.03	0.0804	0.0789
8A	1	9/21/2013 15:06	3	31018	10339.333333	10339.33	44152.03	0.2342	0.2279
8A	2	9/21/2013 15:20	3	20343	6781	6781.00	44152.03	0.1536	0.1729
8A	3	9/21/2013 15:15	3	20884	6961.333333	6961.33	44152.03	0.1577	0.1404
8A	4	9/21/2013 15:11	3	15866	5288.666667	5288.67	44152.03	0.1198	0.1039
8A	5	9/21/2013 14:33	3	11157	3719	3719.00	44152.03	0.0842	0.1059
8A	6	9/21/2013 15:01	3	14292	4764	4764.00	44152.03	0.1079	0.0972
8A	7	9/21/2013 14:47	3	11017	3672.333333	3672.33	44152.03	0.0832	0.0943
8A	8	9/21/2013 14:40	3	9518	3172.666667	3172.67	44152.03	0.0719	0.0698
8B	1	9/21/2013 15:11	3	28600	9533.333333	9533.33	44152.03	0.2159	0.2105
8B	2	9/21/2013 15:06	3	19779	6593	6593.00	44152.03	0.1493	0.1652
8B	3	9/21/2013 15:20	3	19917	6639	6639.00	44152.03	0.1504	0.1375
8B	4	9/21/2013 15:15	3	15271	5090.333333	5090.33	44152.03	0.1153	0.1026
8B	5	9/21/2013 14:41	3	11870	3956.666667	3956.67	44152.03	0.0896	0.1048
8B	6	9/21/2013 14:33	3	12916	4305.333333	4305.33	44152.03	0.0975	0.0921
8B	7	9/21/2013 15:01	3	10742	3580.666667	3580.67	44152.03	0.0811	0.0879
8B	8	9/21/2013 14:47	3	9109	3036.333333	3036.33	44152.03	0.0688	0.0673
8C	1	9/21/2013 15:15	3	28210	9403.333333	9403.33	44152.03	0.2130	0.2069
8C	2	9/21/2013 15:11	3	19081	6360.333333	6360.33	44152.03	0.1441	0.1619
8C	3	9/21/2013 15:06	3	19710	6570	6570.00	44152.03	0.1488	0.1342
8C	4	9/21/2013 15:20	3	14764	4921.333333	4921.33	44152.03	0.1115	0.0998
8C	5	9/21/2013 14:47	3	11487	3829	3829.00	44152.03	0.0867	0.1020

Detector (#)	Source ID (#)	Raw Count Data			Raw Alpha		Decay Corrected Nominal (dpm)**	Th-230	Calculated
		Start Time	Count Time (min)	Alpha (counts)	(cpm)	Th-230 (cpm)*		Efficiency (cpm/dpm) i	Efficiency (cpm/dpm)
8C	6	9/21/2013 14:41	3	12906	4302	4302.00	44152.03	0.0974	0.0897
8C	7	9/21/2013 14:33	3	10203	3401	3401.00	44152.03	0.0770	0.0858
8C	8	9/21/2013 15:02	3	8954	2984.666667	2984.67	44152.03	0.0676	0.0659
8D	1	9/21/2013 15:20	3	36410	12136.66667	12136.67	44152.03	0.2749	0.2672
8D	2	9/21/2013 15:15	3	24895	8298.333333	8298.33	44152.03	0.1879	0.2116
8D	3	9/21/2013 15:11	3	26284	8761.333333	8761.33	44152.03	0.1984	0.1776
8D	4	9/21/2013 15:06	3	19836	6612	6612.00	44152.03	0.1498	0.1351
8D	5	9/21/2013 15:02	3	15467	5155.666667	5155.67	44152.03	0.1168	0.1379
8D	6	9/21/2013 14:48	3	17495	5831.666667	5831.67	44152.03	0.1321	0.1214
8D	7	9/21/2013 14:41	3	13775	4591.666667	4591.67	44152.03	0.1040	0.1151
8D	8	9/21/2013 14:33	3	11499	3833	3833.00	44152.03	0.0868	0.0848
9A	1	9/21/2013 16:00	3	33021	11007	11007.00	44152.03	0.2493	0.2443
9A	2	9/21/2013 16:16	3	23032	7677.333333	7677.33	44152.03	0.1739	0.1923
9A	3	9/21/2013 16:11	3	23881	7960.333333	7960.33	44152.03	0.1803	0.1606
9A	4	9/21/2013 16:06	3	17779	5926.333333	5926.33	44152.03	0.1342	0.1214
9A	5	9/21/2013 16:22	3	13532	4510.666667	4510.67	44152.03	0.1022	0.1239
9A	6	9/21/2013 16:55	3	15658	5219.333333	5219.33	44152.03	0.1182	0.1097
9A	7	9/21/2013 16:44	3	12938	4312.666667	4312.67	44152.03	0.0977	0.1046
9A	8	9/21/2013 16:26	3	10528	3509.333333	3509.33	44152.03	0.0795	0.0785
9B	1	9/21/2013 16:06	3	33850	11283.33333	11283.33	44152.03	0.2556	0.2504
9B	2	9/21/2013 16:00	3	23703	7901	7901.00	44152.03	0.1789	0.1981
9B	3	9/21/2013 16:16	3	24689	8229.666667	8229.67	44152.03	0.1864	0.1658
9B	4	9/21/2013 16:11	3	18446	6148.666667	6148.67	44152.03	0.1393	0.1250
9B	5	9/21/2013 16:26	3	13872	4624	4624.00	44152.03	0.1047	0.1277
9B	6	9/21/2013 16:22	3	15785	5261.666667	5261.67	44152.03	0.1192	0.1121
9B	7	9/21/2013 16:55	3	13389	4463	4463.00	44152.03	0.1011	0.1068
9B	8	9/21/2013 16:44	3	10887	3629	3629.00	44152.03	0.0822	0.0814
9C	1	9/21/2013 16:11	3	32916	10972	10972.00	44152.03	0.2485	0.2426
9C	2	9/21/2013 16:06	3	22817	7605.666667	7605.67	44152.03	0.1723	0.1921
9C	3	9/21/2013 16:00	3	23769	7923	7923.00	44152.03	0.1794	0.1605
9C	4	9/21/2013 16:16	3	17607	5869	5869.00	44152.03	0.1329	0.1189
9C	5	9/21/2013 16:44	3	13402	4467.333333	4467.33	44152.03	0.1012	0.1218
9C	6	9/21/2013 16:26	3	14862	4954	4954.00	44152.03	0.1122	0.1048
9C	7	9/21/2013 16:22	3	12234	4078	4078.00	44152.03	0.0924	0.0995
9C	8	9/21/2013 16:55	3	10433	3477.666667	3477.67	44152.03	0.0788	0.0775
9D	1	9/21/2013 16:16	3	33282	11094	11094.00	44152.03	0.2513	0.2446
9D	2	9/21/2013 16:11	3	22766	7588.666667	7588.67	44152.03	0.1719	0.1921
9D	3	9/21/2013 16:06	3	23521	7840.333333	7840.33	44152.03	0.1776	0.1601
9D	4	9/21/2013 16:00	3	17565	5855	5855.00	44152.03	0.1326	0.1208
9D	5	9/21/2013 16:55	3	14061	4687	4687.00	44152.03	0.1062	0.1233
9D	6	9/21/2013 16:44	3	15713	5237.666667	5237.67	44152.03	0.1186	0.1091
9D	7	9/21/2013 16:26	3	12463	4154.333333	4154.33	44152.03	0.0941	0.1040
9D	8	9/21/2013 16:22	3	10479	3493	3493.00	44152.03	0.0791	0.0773
10A	1	9/21/2013 16:22	3	31737	10579	10579.00	44152.03	0.2396	0.2333
10A	2	9/21/2013 16:55	3	21436	7145.333333	7145.33	44152.03	0.1618	0.1824
10A	3	9/21/2013 16:44	3	22591	7530.333333	7530.33	44152.03	0.1706	0.1512
10A	4	9/21/2013 16:27	3	16666	5555.333333	5555.33	44152.03	0.1258	0.1120
10A	5	9/21/2013 16:00	3	12482	4160.666667	4160.67	44152.03	0.0942	0.1145
10A	6	9/21/2013 16:17	3	14269	4756.333333	4756.33	44152.03	0.1077	0.1001
10A	7	9/21/2013 16:12	3	11635	3878.333333	3878.33	44152.03	0.0878	0.0954
10A	8	9/21/2013 16:06	3	9699	3233	3233.00	44152.03	0.0732	0.0719
10B	1	9/21/2013 16:27	3	33745	11248.33333	11248.33	44152.03	0.2548	0.2498
10B	2	9/21/2013 16:22	3	23835	7945	7945.00	44152.03	0.1799	0.1992
10B	3	9/21/2013 16:55	3	25067	8355.666667	8355.67	44152.03	0.1892	0.1675
10B	4	9/21/2013 16:44	3	18512	6170.666667	6170.67	44152.03	0.1398	0.1254
10B	5	9/21/2013 16:06	3	13721	4573.666667	4573.67	44152.03	0.1036	0.1283
10B	6	9/21/2013 16:01	3	15717	5239	5239.00	44152.03	0.1187	0.1100
10B	7	9/21/2013 16:17	3	12891	4297	4297.00	44152.03	0.0973	0.1038
10B	8	9/21/2013 16:12	3	10561	3520.333333	3520.33	44152.03	0.0797	0.0789
10C	1	9/21/2013 16:45	3	33380	11126.66667	11126.67	44152.03	0.2520	0.2456
10C	2	9/21/2013 16:27	3	23219	7739.666667	7739.67	44152.03	0.1753	0.1961
10C	3	9/21/2013 16:23	3	24431	8143.666667	8143.67	44152.03	0.1844	0.1647
10C	4	9/21/2013 16:55	3	18197	6065.666667	6065.67	44152.03	0.1374	0.1218
10C	5	9/21/2013 16:12	3	13536	4512	4512.00	44152.03	0.1022	0.1249

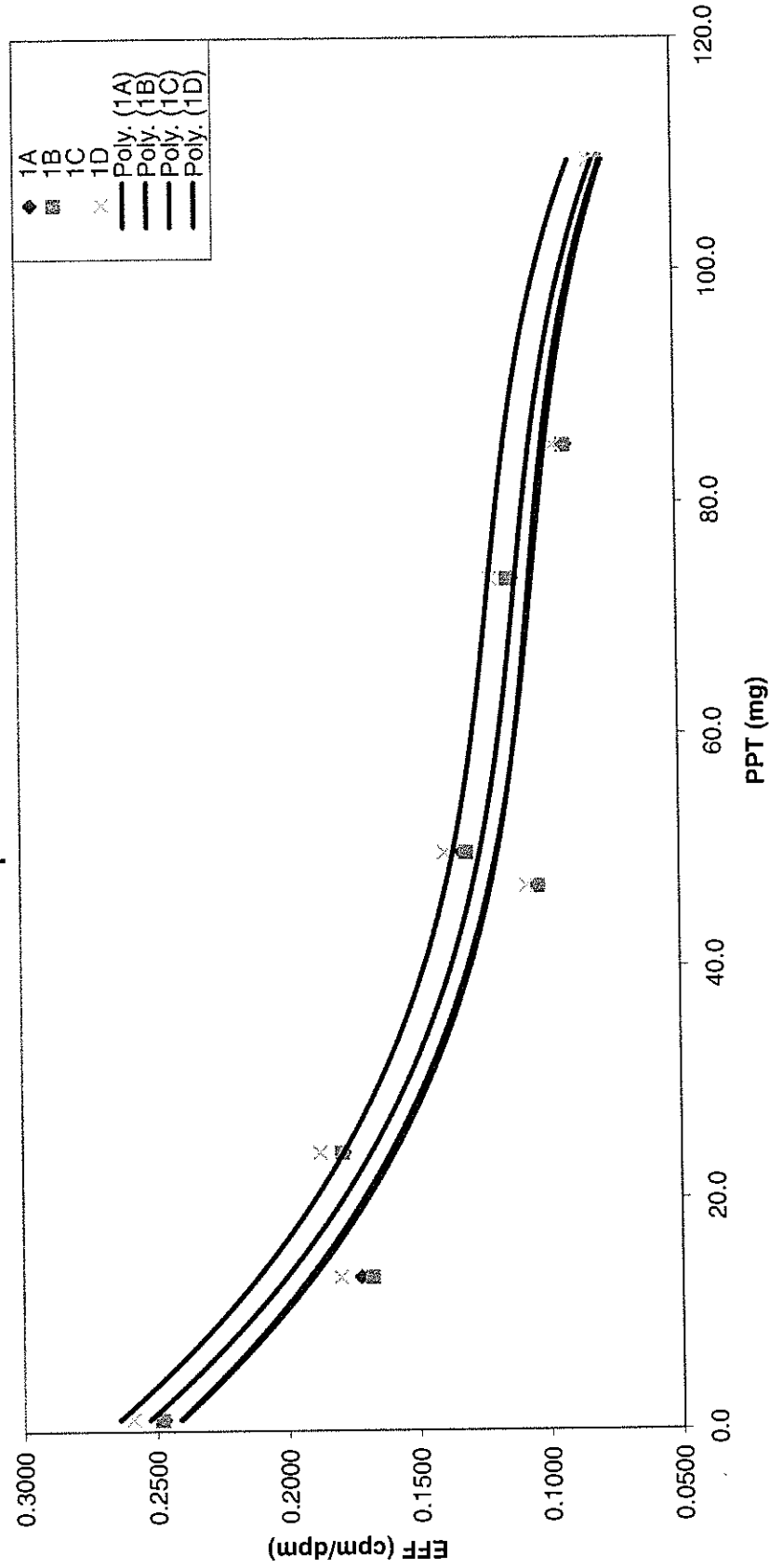
Detector (#)	Source ID (#)	Raw Count Data			Alpha (counts)	Raw Alpha		Decay Corrected Nominal (dpm)**	Th-230 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
		Start Time	Count Time (min)	Count		(cpm)	Th-230 (cpm)*			
10C	6	9/21/2013 16:06	3	15298	5099.333333	5099.33	44152.03	0.1155	0.1055	
10C	7	9/21/2013 16:01	3	11866	3955.333333	3955.33	44152.03	0.0896	0.0993	
10C	8	9/21/2013 16:17	3	10358	3452.666667	3452.67	44152.03	0.0782	0.0765	
10D	1	9/21/2013 16:55	3	33428	11142.66667	11142.67	44152.03	0.2524	0.2458	
10D	2	9/21/2013 16:45	3	23124	7708	7708.00	44152.03	0.1746	0.1953	
10D	3	9/21/2013 16:27	3	24189	8063	8063.00	44152.03	0.1826	0.1638	
10D	4	9/21/2013 16:23	3	17799	5933	5933.00	44152.03	0.1344	0.1225	
10D	5	9/21/2013 16:17	3	14233	4744.333333	4744.33	44152.03	0.1075	0.1253	
10D	6	9/21/2013 16:12	3	15356	5118.666667	5118.67	44152.03	0.1159	0.1079	
10D	7	9/21/2013 16:06	3	12444	4148	4148.00	44152.03	0.0939	0.1020	
10D	8	9/21/2013 16:01	3	10444	3481.333333	3481.33	44152.03	0.0788	0.0774	
11A	1	9/21/2013 17:14	3	31536	10512	10512.00	44152.03	0.2381	0.2320	
11A	2	9/21/2013 17:30	3	21515	7171.666667	7171.67	44152.03	0.1624	0.1820	
11A	3	9/21/2013 17:26	3	22447	7482.333333	7482.33	44152.03	0.1695	0.1515	
11A	4	9/21/2013 17:20	3	16858	5619.333333	5619.33	44152.03	0.1273	0.1137	
11A	5	9/21/2013 17:38	3	12786	4262	4262.00	44152.03	0.0965	0.1161	
11A	6	9/21/2013 17:54	3	14688	4896	4896.00	44152.03	0.1109	0.1025	
11A	7	9/21/2013 17:48	3	11809	3936.333333	3936.33	44152.03	0.0892	0.0976	
11A	8	9/21/2013 17:43	3	9872	3290.666667	3290.67	44152.03	0.0745	0.0730	
11B	1	9/21/2013 17:20	3	33943	11314.33333	11314.33	44152.03	0.2563	0.2502	
11B	2	9/21/2013 17:15	3	23643	7881	7881.00	44152.03	0.1785	0.1992	
11B	3	9/21/2013 17:30	3	24928	8309.333333	8309.33	44152.03	0.1882	0.1677	
11B	4	9/21/2013 17:26	3	18744	6248	6248.00	44152.03	0.1415	0.1274	
11B	5	9/21/2013 17:43	3	14300	4766.666667	4766.67	44152.03	0.1080	0.1300	
11B	6	9/21/2013 17:38	3	16255	5418.333333	5418.33	44152.03	0.1227	0.1138	
11B	7	9/21/2013 17:54	3	13220	4406.666667	4406.67	44152.03	0.0998	0.1080	
11B	8	9/21/2013 17:48	3	11032	3677.333333	3677.33	44152.03	0.0833	0.0819	
11C	1	9/21/2013 17:26	3	33630	11210	11210.00	44152.03	0.2539	0.2484	
11C	2	9/21/2013 17:20	3	23494	7831.333333	7831.33	44152.03	0.1774	0.1966	
11C	3	9/21/2013 17:15	3	24413	8137.666667	8137.67	44152.03	0.1843	0.1647	
11C	4	9/21/2013 17:30	3	18215	6071.666667	6071.67	44152.03	0.1375	0.1246	
11C	5	9/21/2013 17:48	3	13995	4665	4665.00	44152.03	0.1057	0.1272	
11C	6	9/21/2013 17:43	3	16148	5382.666667	5382.67	44152.03	0.1219	0.1120	
11C	7	9/21/2013 17:38	3	12997	4332.333333	4332.33	44152.03	0.0981	0.1067	
11C	8	9/21/2013 17:54	3	10971	3657	3657.00	44152.03	0.0828	0.0815	
11D	1	9/21/2013 17:30	3	33907	11302.33333	11302.33	44152.03	0.2560	0.2498	
11D	2	9/21/2013 17:26	3	23489	7829.666667	7829.67	44152.03	0.1773	0.1984	
11D	3	9/21/2013 17:20	3	24821	8273.666667	8273.67	44152.03	0.1874	0.1666	
11D	4	9/21/2013 17:15	3	18451	6150.333333	6150.33	44152.03	0.1393	0.1258	
11D	5	9/21/2013 17:55	3	14157	4719	4719.00	44152.03	0.1069	0.1285	
11D	6	9/21/2013 17:48	3	16092	5364	5364.00	44152.03	0.1215	0.1123	
11D	7	9/21/2013 17:43	3	13040	4346.666667	4346.67	44152.03	0.0984	0.1067	
11D	8	9/21/2013 17:38	3	10935	3645	3645.00	44152.03	0.0826	0.0812	
12A	1	9/21/2013 17:38	3	32456	10818.66667	10818.67	44152.03	0.2450	0.2383	
12A	2	9/21/2013 17:55	3	21802	7267.333333	7267.33	44152.03	0.1646	0.1859	
12A	3	9/21/2013 17:48	3	22934	7644.666667	7644.67	44152.03	0.1731	0.1541	
12A	4	9/21/2013 17:43	3	17262	5754	5754.00	44152.03	0.1303	0.1153	
12A	5	9/21/2013 17:15	3	12852	4284	4284.00	44152.03	0.0970	0.1177	
12A	6	9/21/2013 17:30	3	14907	4969	4969.00	44152.03	0.1125	0.1045	
12A	7	9/21/2013 17:26	3	12083	4027.666667	4027.67	44152.03	0.0912	0.0998	
12A	8	9/21/2013 17:20	3	10056	3352	3352.00	44152.03	0.0759	0.0743	
12B	1	9/21/2013 17:43	3	30251	10083.66667	10083.67	44152.03	0.2284	0.2225	
12B	2	9/21/2013 17:38	3	20781	6927	6927.00	44152.03	0.1569	0.1750	
12B	3	9/21/2013 17:55	3	21415	7138.333333	7138.33	44152.03	0.1617	0.1457	
12B	4	9/21/2013 17:48	3	16066	5355.333333	5355.33	44152.03	0.1213	0.1085	
12B	5	9/21/2013 17:20	3	12378	4126	4126.00	44152.03	0.0934	0.1110	
12B	6	9/21/2013 17:15	3	13821	4607	4607.00	44152.03	0.1043	0.0968	
12B	7	9/21/2013 17:30	3	11134	3711.333333	3711.33	44152.03	0.0841	0.0921	
12B	8	9/21/2013 17:26	3	9428	3142.666667	3142.67	44152.03	0.0712	0.0697	
12C	1	9/21/2013 17:49	3	34746	11582	11582.00	44152.03	0.2623	0.2571	
12C	2	9/21/2013 17:43	3	24831	8277	8277.00	44152.03	0.1875	0.2069	
12C	3	9/21/2013 17:38	3	26089	8696.333333	8696.33	44152.03	0.1970	0.1758	
12C	4	9/21/2013 17:55	3	19901	6633.666667	6633.67	44152.03	0.1502	0.1353	
12C	5	9/21/2013 17:26	3	14946	4982	4982.00	44152.03	0.1128	0.1380	



Detector (#)	Source ID (#)	Raw Count Data			Alpha (counts)	Raw Alpha		Decay Corrected Nominal (dpm)**	Th-230 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
		Start Time	Count Time (min)	Count		(cpm)	Th-230 (cpm)*			
12C	6	9/21/2013 17:20	3	17435	5811.666667	5811.67	44152.03	0.1316	0.1206	
12C	7	9/21/2013 17:15	3	13919	4639.666667	4639.67	44152.03	0.1051	0.1141	
12C	8	9/21/2013 17:30	3	11590	3863.333333	3863.33	44152.03	0.0875	0.0862	
12D	1	9/21/2013 17:58	3	35190	11730	11730.00	44152.03	0.2657	0.2600	
12D	2	9/21/2013 17:50	3	24798	8266	8266.00	44152.03	0.1872	0.2080	
12D	3	9/21/2013 17:43	3	26193	8731	8731.00	44152.03	0.1977	0.1757	
12D	4	9/21/2013 17:39	3	19472	6490.666667	6490.67	44152.03	0.1470	0.1338	
12D	5	9/21/2013 17:34	3	15034	5011.333333	5011.33	44152.03	0.1135	0.1366	
12D	6	9/21/2013 17:26	3	17055	5685	5685.00	44152.03	0.1288	0.1191	
12D	7	9/21/2013 17:21	3	13912	4637.333333	4637.33	44152.03	0.1050	0.1129	
12D	8	9/21/2013 17:15	3	11547	3849	3849.00	44152.03	0.0872	0.0860	
13A	1	9/24/2013 13:17	3	33152	11050.666667	11050.67	44152.03	0.2503	0.2446	
13A	2	9/24/2013 14:41	3	23078	7692.666667	7692.67	44152.03	0.1742	0.1947	
13A	3	9/24/2013 13:46	3	24520	8173.333333	8173.33	44152.03	0.1851	0.1635	
13A	4	9/24/2013 13:32	3	18174	6058	6058.00	44152.03	0.1372	0.1227	
13A	5	9/24/2013 14:46	3	13415	4471.666667	4471.67	44152.03	0.1013	0.1255	
13A	6	9/24/2013 15:07	3	15671	5223.666667	5223.67	44152.03	0.1183	0.1080	
13A	7	9/24/2013 15:02	3	12323	4107.666667	4107.67	44152.03	0.0930	0.1017	
13A	8	9/24/2013 14:56	3	10175	3391.666667	3391.67	44152.03	0.0768	0.0755	
13B	1	9/24/2013 13:32	3	34830	11610	11610.00	44152.03	0.2630	0.2565	
13B	2	9/24/2013 13:17	3	23984	7994.666667	7994.67	44152.03	0.1811	0.2023	
13B	3	9/24/2013 14:41	3	25002	8334	8334.00	44152.03	0.1888	0.1688	
13B	4	9/24/2013 13:46	3	18646	6215.333333	6215.33	44152.03	0.1408	0.1258	
13B	5	9/24/2013 14:56	3	14129	4709.666667	4709.67	44152.03	0.1067	0.1287	
13B	6	9/24/2013 14:46	3	16053	5351	5351.00	44152.03	0.1212	0.1119	
13B	7	9/24/2013 15:07	3	12891	4297	4297.00	44152.03	0.0973	0.1064	
13B	8	9/24/2013 15:02	3	10937	3645.666667	3645.67	44152.03	0.0826	0.0810	
13C	1	9/24/2013 13:46	3	31485	10495	10495.00	44152.03	0.2377	0.2330	
13C	2	9/24/2013 13:32	3	21633	7211	7211.00	44152.03	0.1633	0.1793	
13C	3	9/24/2013 13:17	3	21567	7189	7189.00	44152.03	0.1628	0.1467	
13C	4	9/24/2013 14:41	3	15140	5046.666667	5046.67	44152.03	0.1143	0.1071	
13C	5	9/24/2013 15:03	3	12481	4160.333333	4160.33	44152.03	0.0942	0.1095	
13C	6	9/24/2013 14:57	3	14384	4794.666667	4794.67	44152.03	0.1086	0.0967	
13C	7	9/24/2013 14:46	3	10915	3638.333333	3638.33	44152.03	0.0824	0.0926	
13C	8	9/24/2013 15:07	3	9343	3114.333333	3114.33	44152.03	0.0705	0.0690	
13D	1	9/24/2013 14:41	3	34076	11358.666667	11358.67	44152.03	0.2573	0.2515	
13D	2	9/24/2013 13:47	3	23732	7910.666667	7910.67	44152.03	0.1792	0.2000	
13D	3	9/24/2013 13:32	3	25098	8366	8366.00	44152.03	0.1895	0.1679	
13D	4	9/24/2013 13:17	3	18359	6119.666667	6119.67	44152.03	0.1386	0.1258	
13D	5	9/24/2013 15:07	3	14132	4710.666667	4710.67	44152.03	0.1067	0.1287	
13D	6	9/24/2013 15:03	3	15861	5287	5287.00	44152.03	0.1197	0.1106	
13D	7	9/24/2013 14:57	3	12758	4252.666667	4252.67	44152.03	0.0963	0.1040	
13D	8	9/24/2013 14:47	3	10278	3426	3426.00	44152.03	0.0776	0.0765	
14A	1	9/24/2013 14:47	3	29322	9774	9774.00	44152.03	0.2214	0.2153	
14A	2	9/24/2013 15:07	3	19626	6542	6542.00	44152.03	0.1482	0.1668	
14A	3	9/24/2013 15:03	3	20310	6770	6770.00	44152.03	0.1533	0.1371	
14A	4	9/24/2013 14:57	3	14784	4928	4928.00	44152.03	0.1116	0.0999	
14A	5	9/24/2013 13:18	3	11427	3809	3809.00	44152.03	0.0863	0.1023	
14A	6	9/24/2013 14:41	3	12612	4204	4204.00	44152.03	0.0952	0.0890	
14A	7	9/24/2013 13:47	3	10306	3435.333333	3435.33	44152.03	0.0778	0.0847	
14A	8	9/24/2013 13:32	3	8525	2841.666667	2841.67	44152.03	0.0644	0.0630	
14B	1	9/24/2013 14:57	3	33858	11286	11286.00	44152.03	0.2556	0.2474	
14B	2	9/24/2013 14:47	3	22912	7637.333333	7637.33	44152.03	0.1730	0.1962	
14B	3	9/24/2013 15:07	3	24110	8036.666667	8036.67	44152.03	0.1820	0.1641	
14B	4	9/24/2013 15:03	3	18154	6051.333333	6051.33	44152.03	0.1371	0.1218	
14B	5	9/24/2013 13:32	3	14018	4672.666667	4672.67	44152.03	0.1058	0.1247	
14B	6	9/24/2013 13:19	3	15566	5188.666667	5188.67	44152.03	0.1175	0.1071	
14B	7	9/24/2013 14:41	3	11797	3932.333333	3932.33	44152.03	0.0891	0.1014	
14B	8	9/24/2013 13:47	3	10722	3574	3574.00	44152.03	0.0809	0.0784	
14C	1	9/24/2013 15:03	3	28799	9599.666667	9599.67	44152.03	0.2174	0.2122	
14C	2	9/24/2013 14:57	3	19866	6622	6622.00	44152.03	0.1500	0.1652	
14C	3	9/24/2013 14:47	3	19804	6601.333333	6601.33	44152.03	0.1495	0.1368	
14C	4	9/24/2013 15:07	3	15117	5039	5039.00	44152.03	0.1141	0.1025	
14C	5	9/24/2013 13:47	3	11851	3950.333333	3950.33	44152.03	0.0895	0.1046	

Detector (#)	Source ID (#)	Raw Count Data			Raw Alpha (cpm)	Th-230 (cpm)*	Decay Corrected Nominal (dpm)**	Th-230 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
		Start Time	Count Time (min)	Alpha (counts)					
14C	6	9/24/2013 13:32	3	13162	4387.333333	4387.33	44152.03	0.0994	0.0917
14C	7	9/24/2013 13:19	3	10263	3421	3421.00	44152.03	0.0775	0.0860
14C	8	9/24/2013 14:41	3	7765	2588.333333	2588.33	44152.03	0.0586	0.0570
14D	1	9/24/2013 15:08	3	29961	9987	9987.00	44152.03	0.2262	0.2205
14D	2	9/24/2013 15:03	3	20083	6694.333333	6694.33	44152.03	0.1516	0.1701
14D	3	9/24/2013 14:57	3	20800	6933.333333	6933.33	44152.03	0.1570	0.1397
14D	4	9/24/2013 14:47	3	15303	5101	5101.00	44152.03	0.1155	0.1033
14D	5	9/24/2013 14:41	3	11530	3843.333333	3843.33	44152.03	0.0870	0.1055
14D	6	9/24/2013 13:47	3	13494	4498	4498.00	44152.03	0.1019	0.0935
14D	7	9/24/2013 13:32	3	10713	3571	3571.00	44152.03	0.0809	0.0890
14D	8	9/24/2013 13:19	3	8595	2865	2865.00	44152.03	0.0649	0.0635

# Alpha Calibration



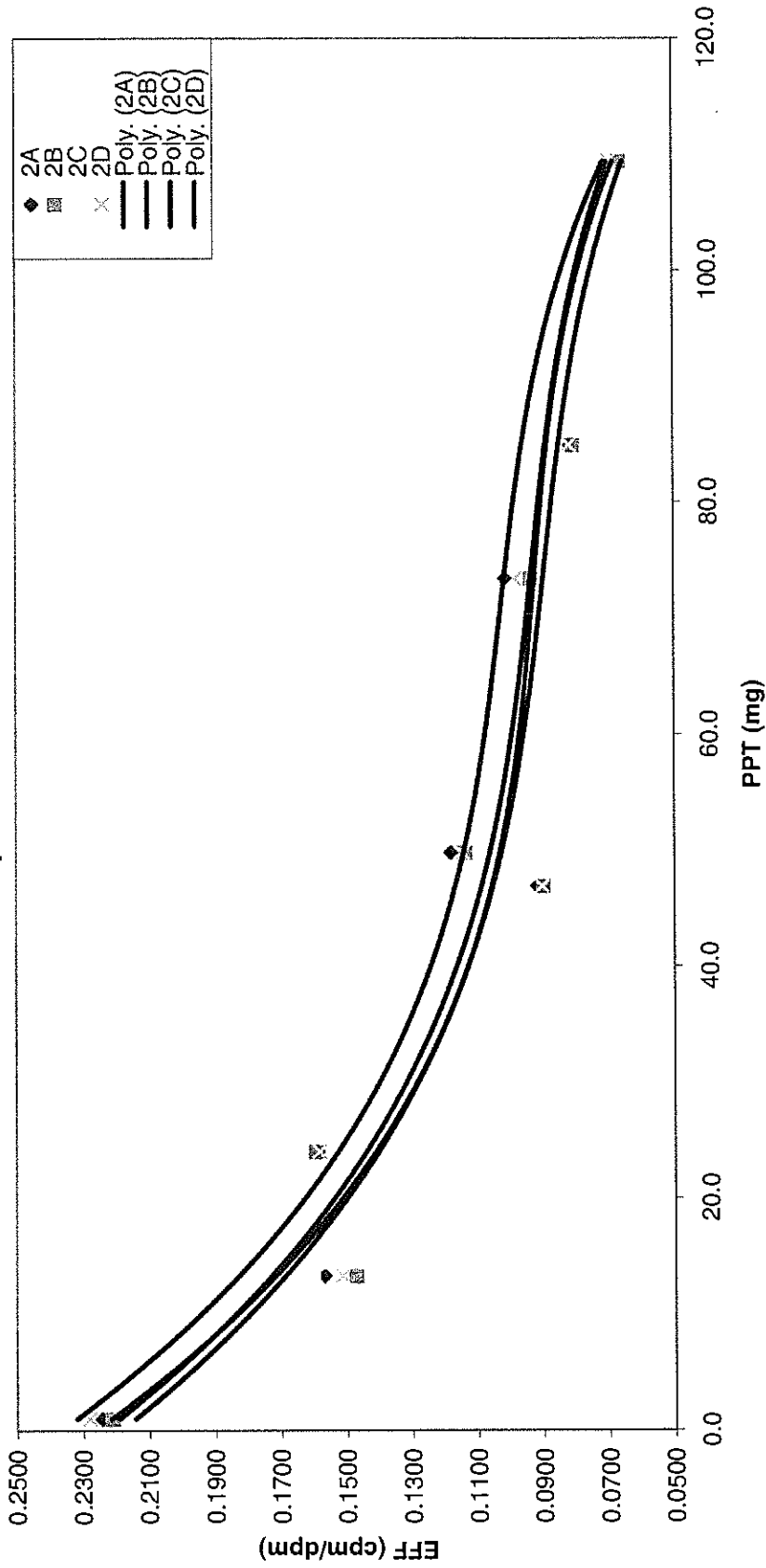
$$1A_y = -2.664039E-07x^3 + 5.911765E-05x^2 - 4.828693E-03x + 2.461567E-01$$

$$1B_y = -2.853570E-07x^3 + 6.234190E-05x^2 - 4.945475E-03x + 2.458112E-01$$

$$1C_y = -2.957531E-07x^3 + 6.440061E-05x^2 - 5.149981E-03x + 2.692142E-01$$

$$1D_y = -2.913983E-07x^3 + 6.369762E-05x^2 - 5.105374E-03x + 2.579401E-01$$

# Alpha Calibration



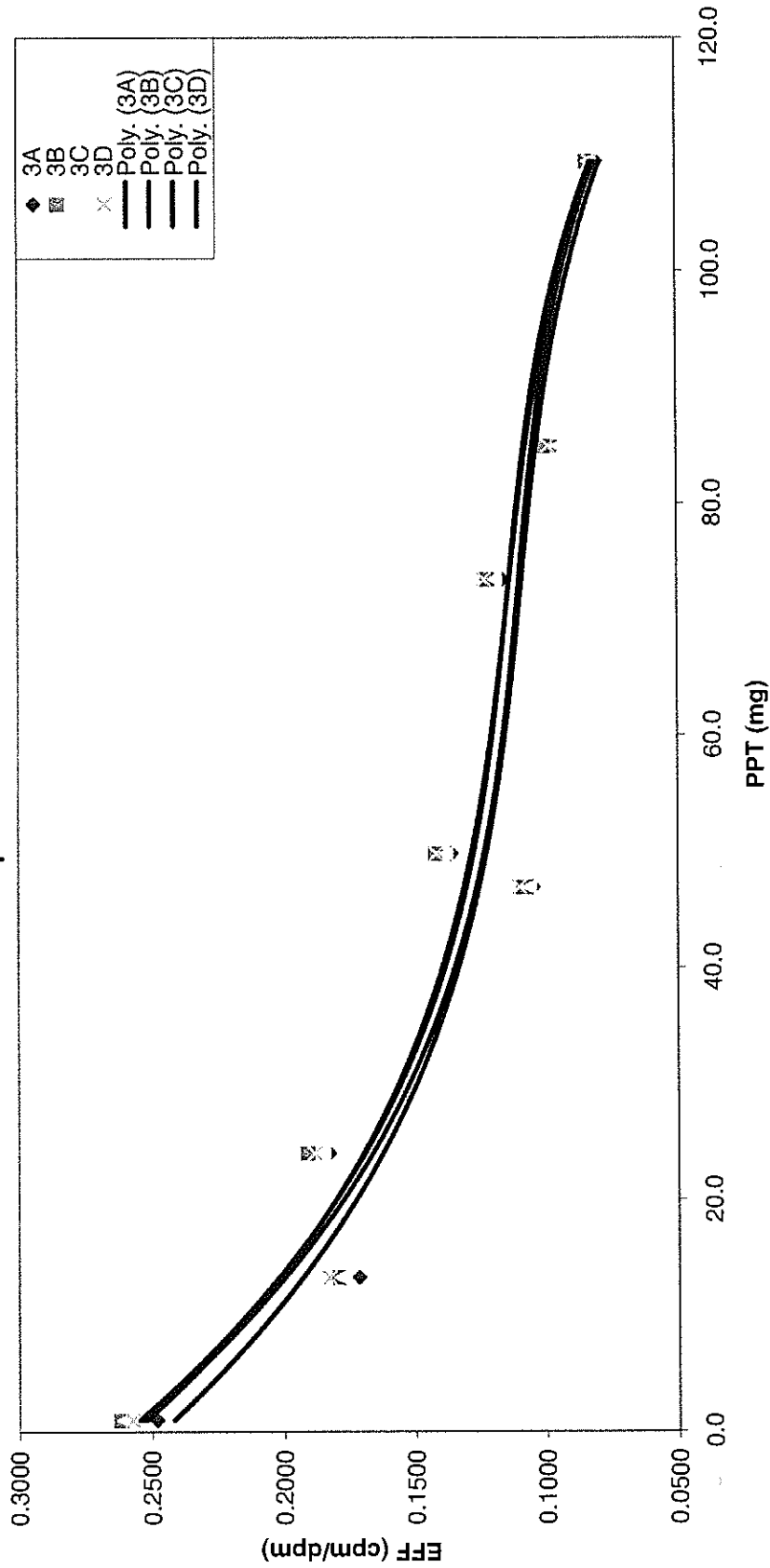
$$2A) = -2.460395E-07x^3 + 5.516754E-05x^2 - 4.495309E-03x + 2.235872E-01$$

$$2B) = -2.428927E-07x^3 + 5.422406E-05x^2 - 4.428481E-03x + 2.186698E-01$$

$$2C) = -2.870015E-07x^3 + 6.155325E-05x^2 - 4.813190E-03x + 2.367252E-01$$

$$2D) = -2.854058E-07x^3 + 6.267482E-05x^2 - 4.887012E-03x + 2.263182E-01$$

# Alpha Calibration



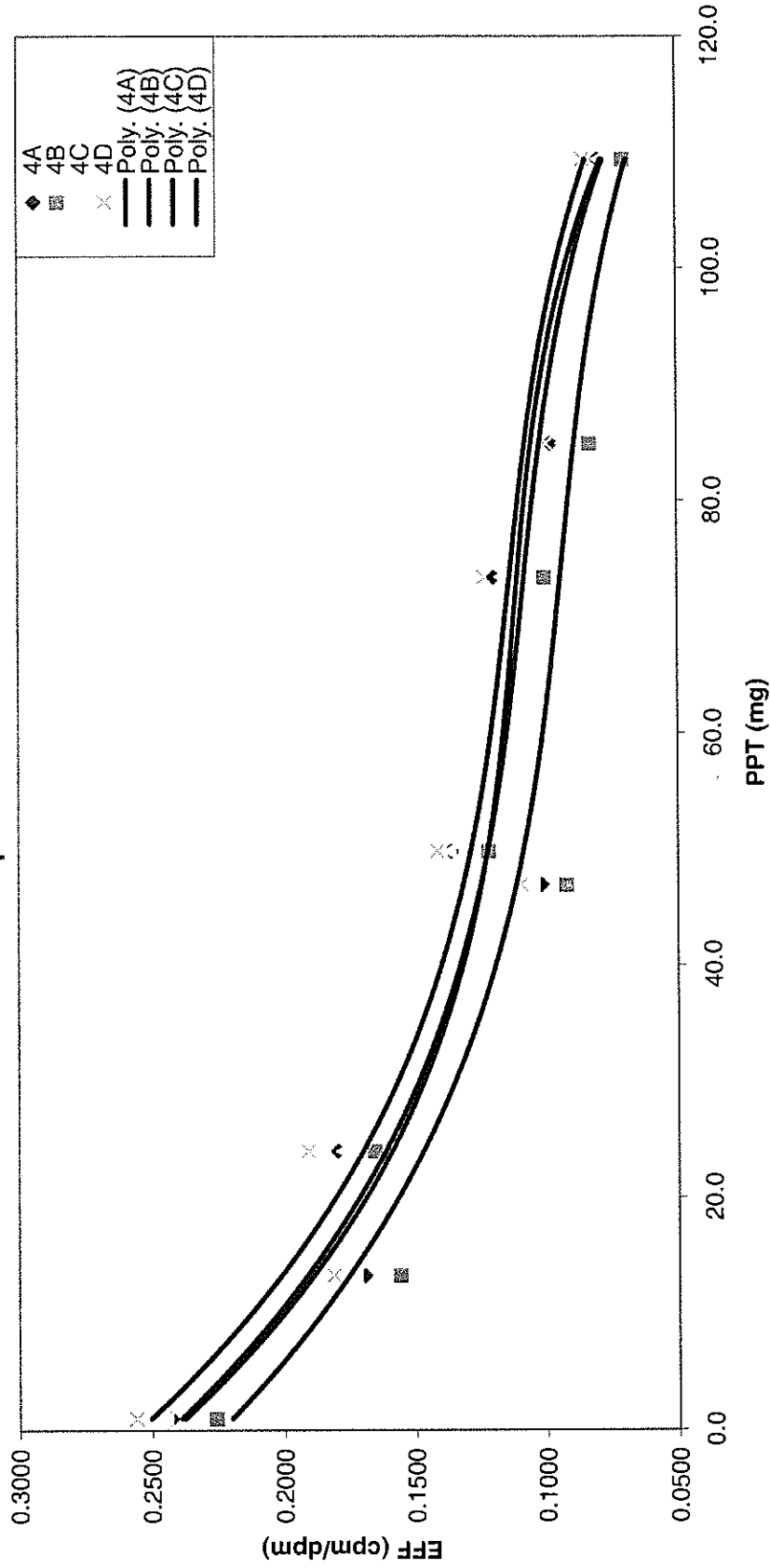
$$3A) = -2.759509E-07x^3 + 5.990523E-05x^2 - 4.785168E-03x + 2.465586E-01$$

$$3B) = -3.036794E-07x^3 + 6.565928E-05x^2 - 5.171842E-03x + 2.598075E-01$$

$$3C) = -3.017244E-07x^3 + 6.627880E-05x^2 - 5.264249E-03x + 2.586823E-01$$

$$3D) = -2.865536E-07x^3 + 6.188443E-05x^2 - 4.950744E-03x + 2.569587E-01$$

# Alpha Calibration



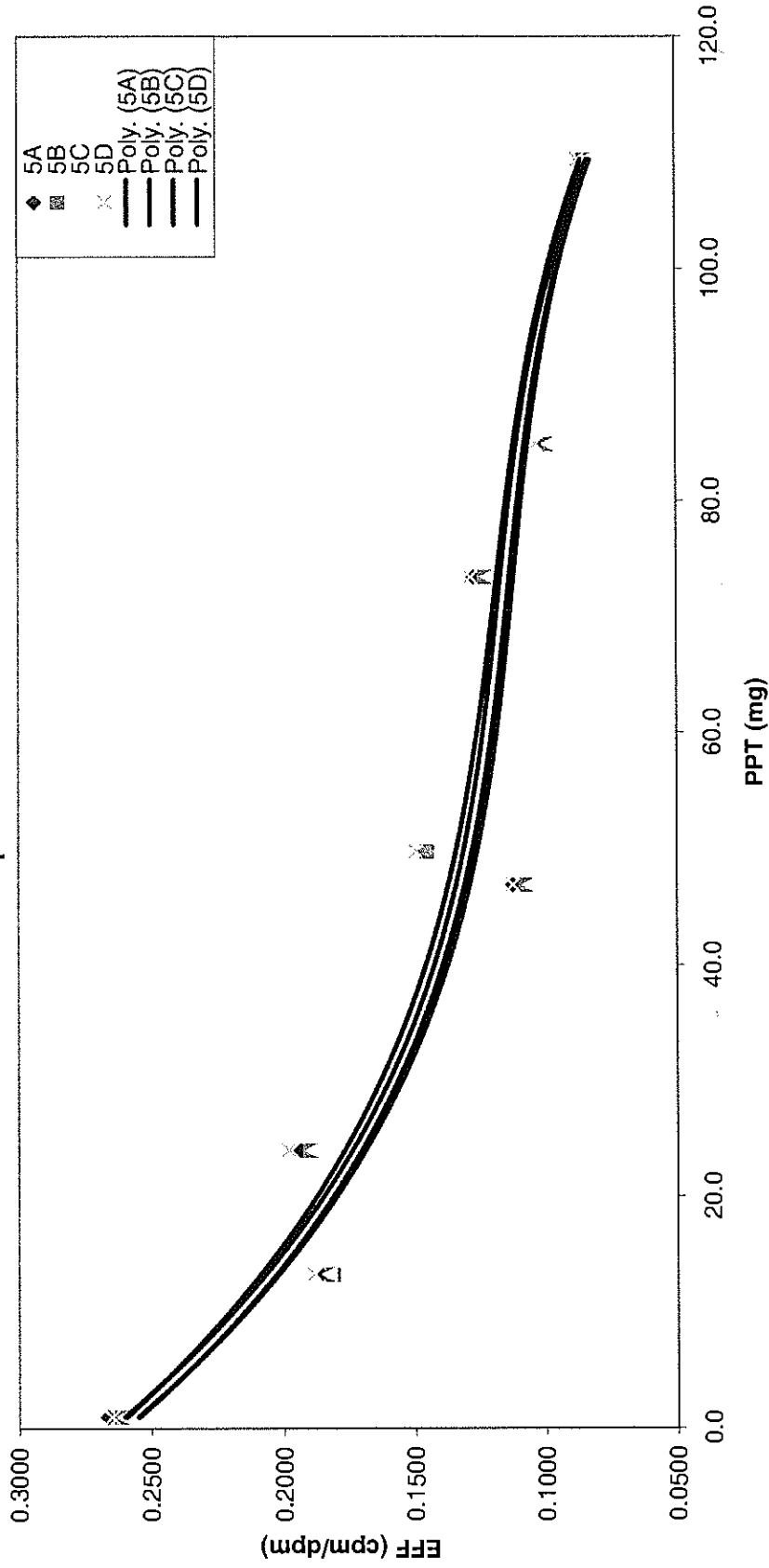
$$4A_y = -3.021688E-07x^3 + 6.340226E-05x^2 - 4.819213E-03x + 2.424117E-01$$

$$4B_y = -2.284188E-07x^3 + 5.145036E-05x^2 - 4.315405E-03x + 2.242144E-01$$

$$4C_y = -2.665324E-07x^3 + 5.785644E-05x^2 - 4.658210E-03x + 2.437071E-01$$

$$4D_y = -2.645337E-07x^3 + 5.846024E-05x^2 - 4.793104E-03x + 2.551821E-01$$

# Alpha Calibration



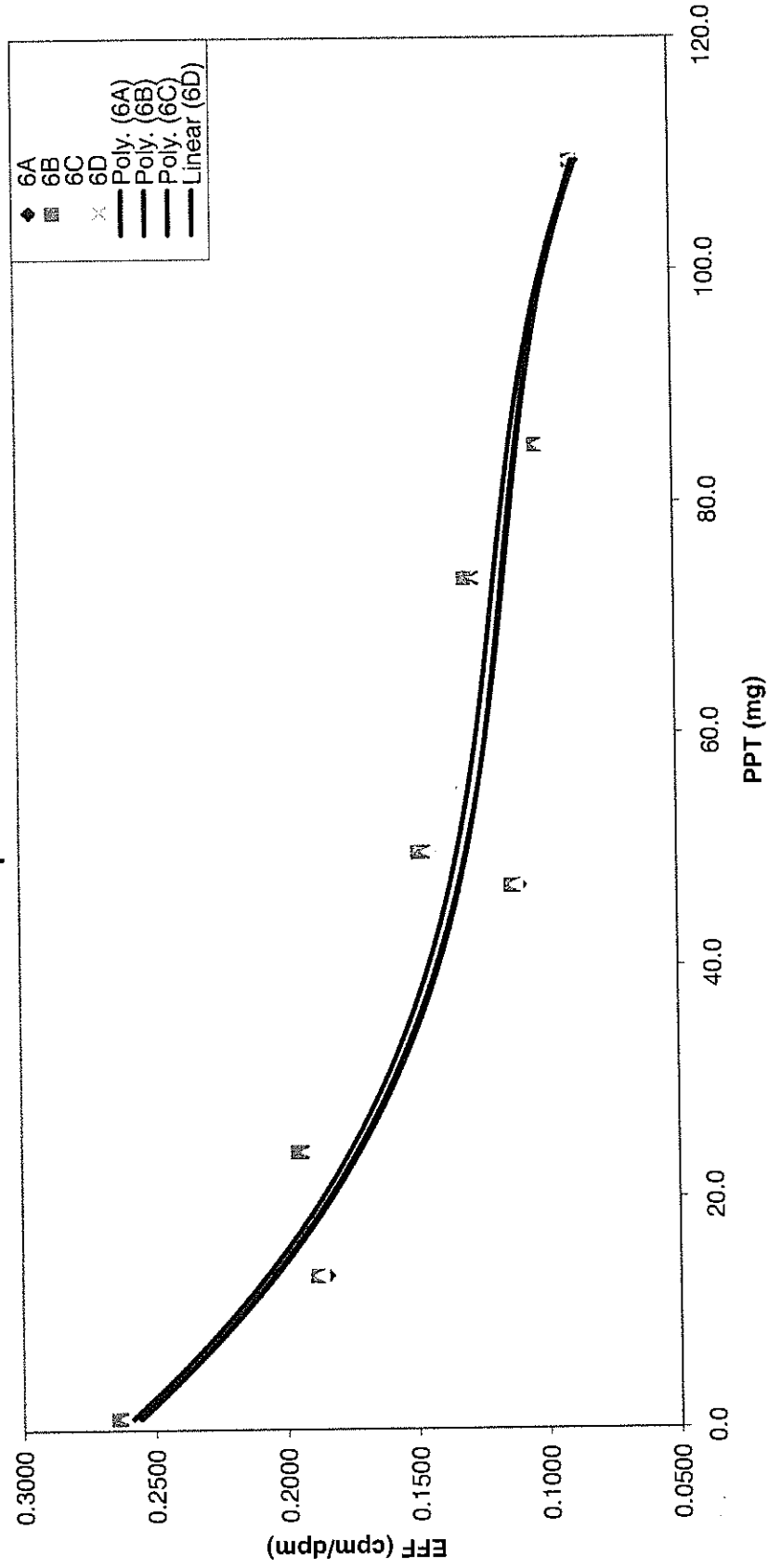
$$5A) = -3.067529E-07x^3 + 6.608809E-05x^2 - 5.219761E-03x + 2.652953E-01$$

$$5B) = -2.881994E-07x^3 + 6.306604E-05x^2 - 5.066104E-03x + 2.595626E-01$$

$$5C) = -2.944088E-07x^3 + 6.477653E-05x^2 - 5.188095E-03x + 2.601287E-01$$

$$5D) = -2.765175E-07x^3 + 6.045534E-05x^2 - 4.935300E-03x + 2.642477E-01$$

# Alpha Calibration



6A  $y = -2.875027E-07x^3 + 6.296286E-05x^2 - 5.051686E-03x + 2.608836E-01$

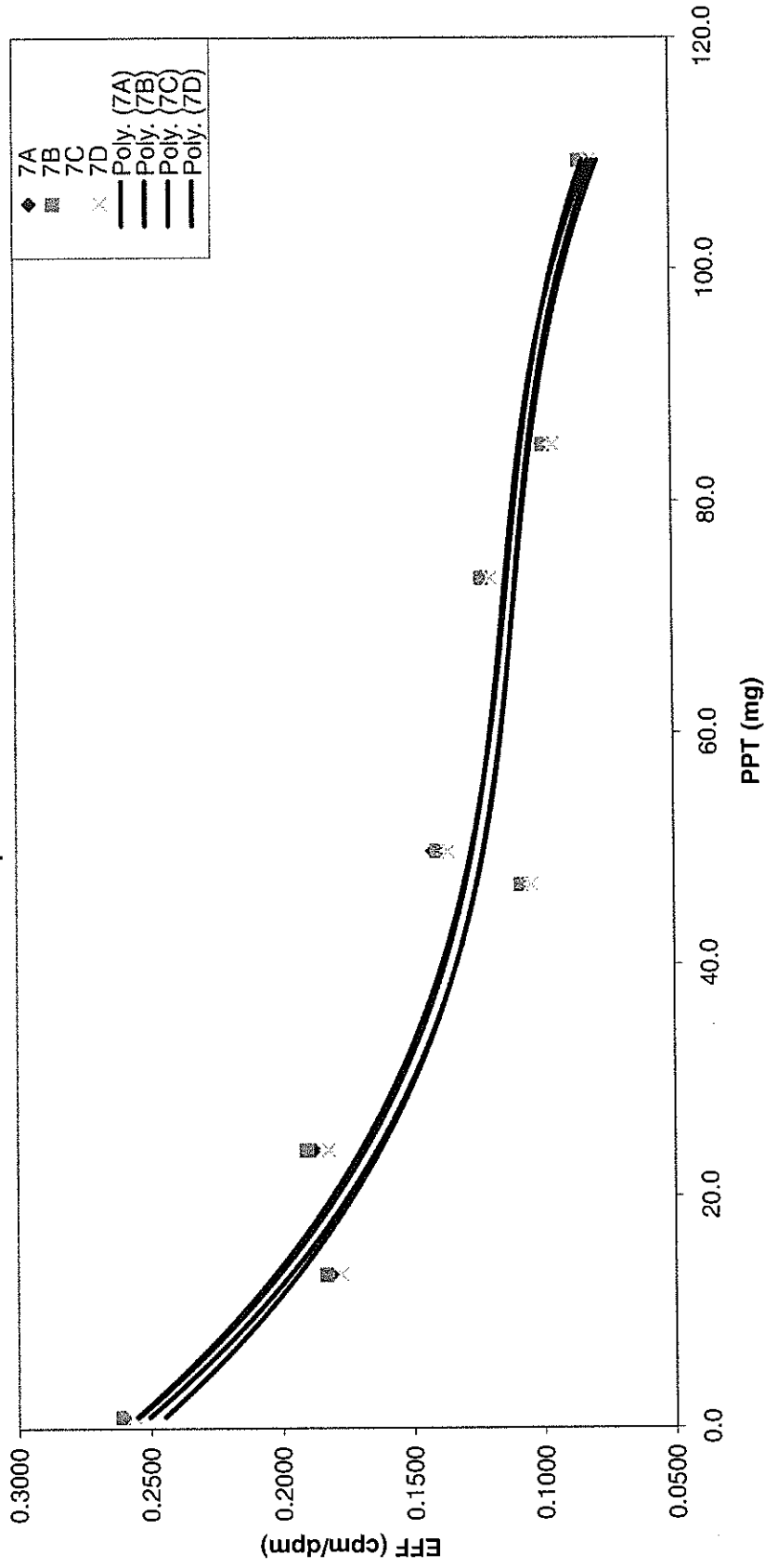
6B  $y = -2.846922E-07x^3 + 6.183626E-05x^2 - 4.978844E-03x + 2.634906E-01$

6C  $y = -2.636623E-07x^3 + 5.915044E-05x^2 - 4.900282E-03x + 2.602168E-01$

6D



# Alpha Calibration



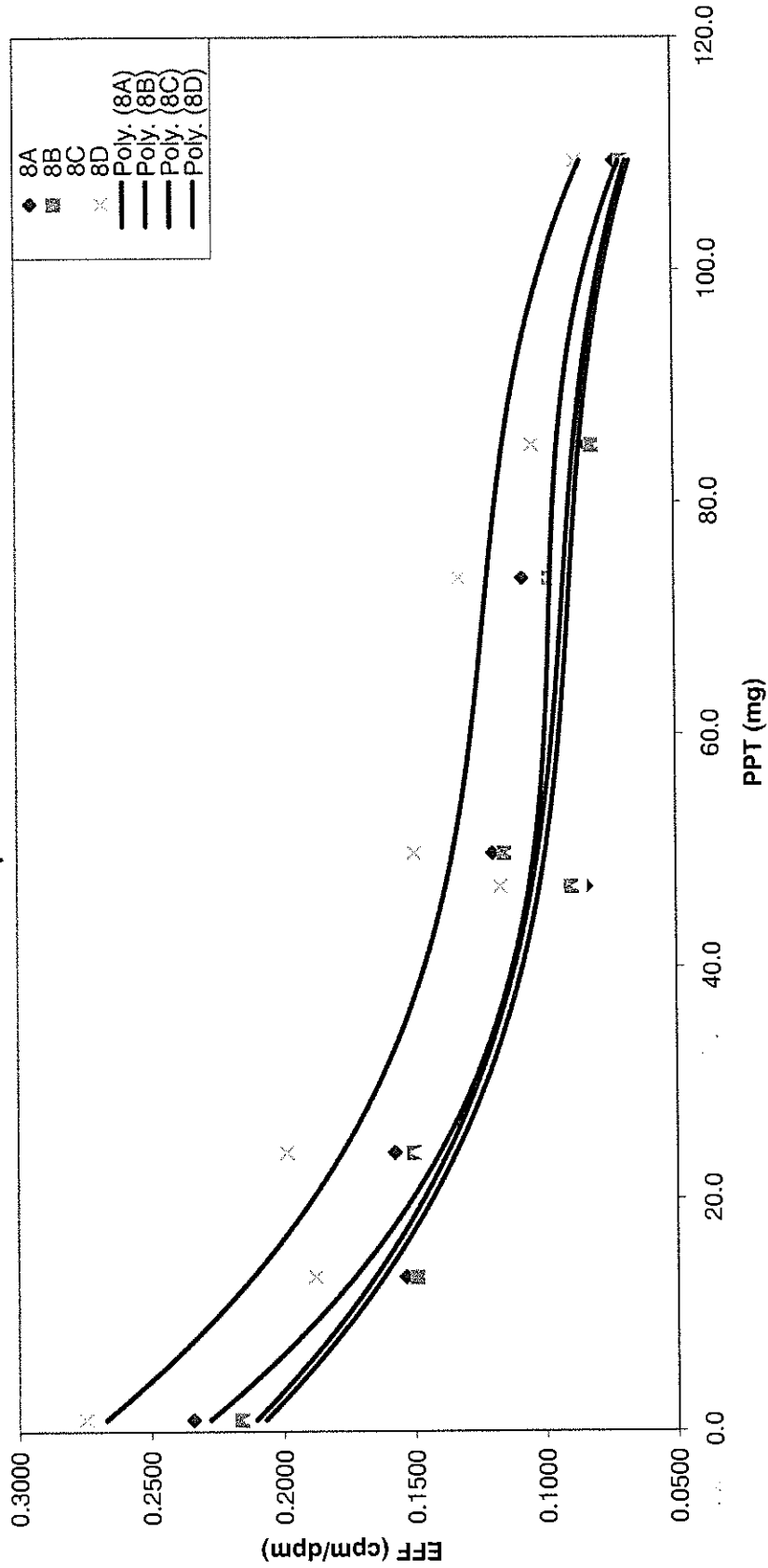
$$7A_y = -3.155866E-07x^3 + 6.757336E-05x^2 - 5.252047E-03x + 2.598460E-01$$

$$7B_y = -2.882892E-07x^3 + 6.348472E-05x^2 - 5.114432E-03x + 2.602013E-01$$

$$7C_y = -2.976395E-07x^3 + 6.368638E-05x^2 - 4.979532E-03x + 2.495744E-01$$

$$7D_y = -3.138330E-07x^3 + 6.771888E-05x^2 - 5.268667E-03x + 2.557161E-01$$

# Alpha Calibration



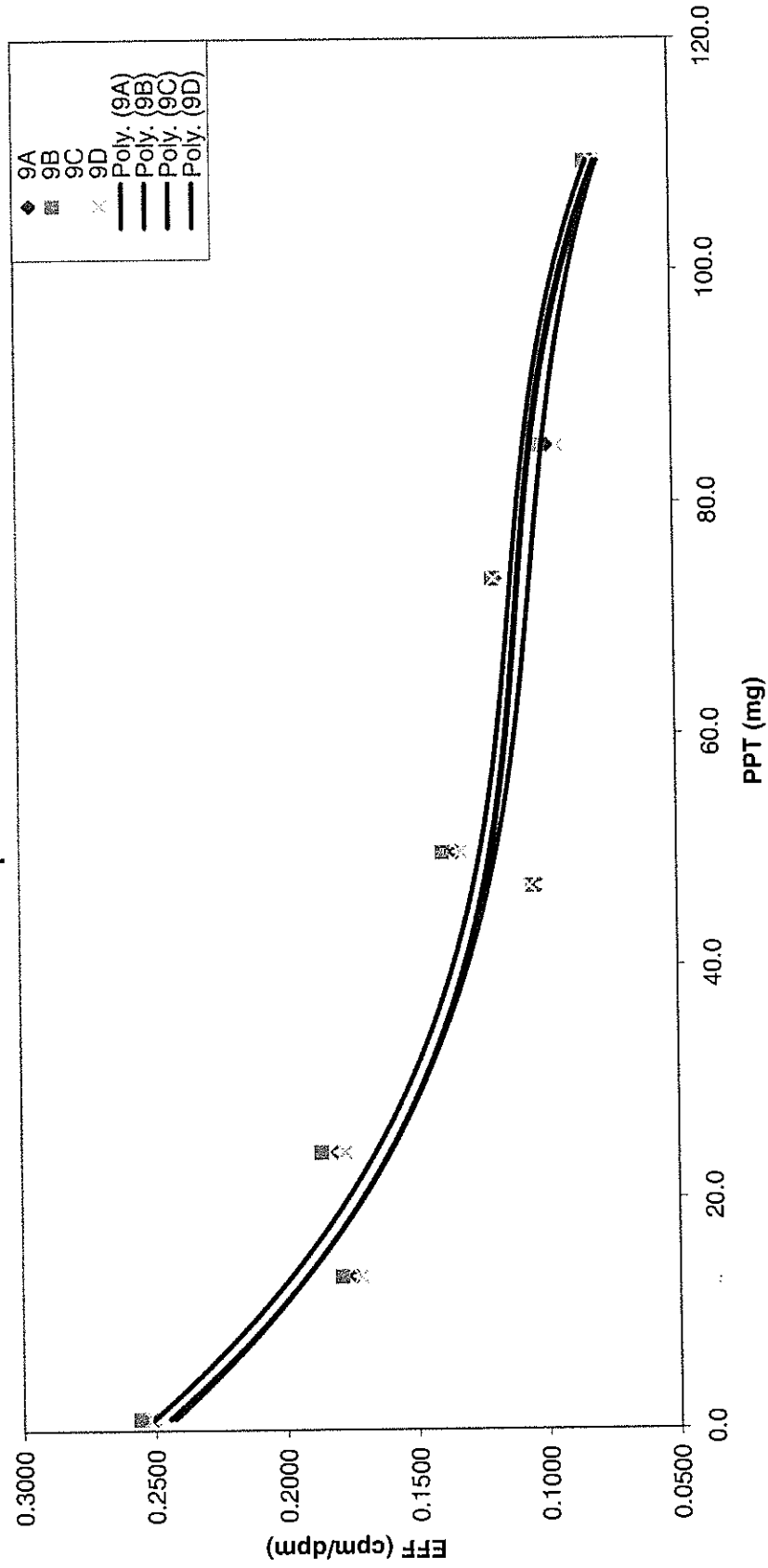
$$8A_y = -3.604285E-07x^3 + 7.588707E-05x^2 - 5.482177E-03x + 2.332719E-01$$

$$8B_y = -2.625815E-07x^3 + 5.700169E-05x^2 - 4.441782E-03x + 2.148498E-01$$

$$8C_y = -2.618601E-07x^3 + 5.695287E-05x^2 - 4.425708E-03x + 2.112666E-01$$

$$8D_y = -3.381777E-07x^3 + 7.135158E-05x^2 - 5.475670E-03x + 2.726210E-01$$

# Alpha Calibration



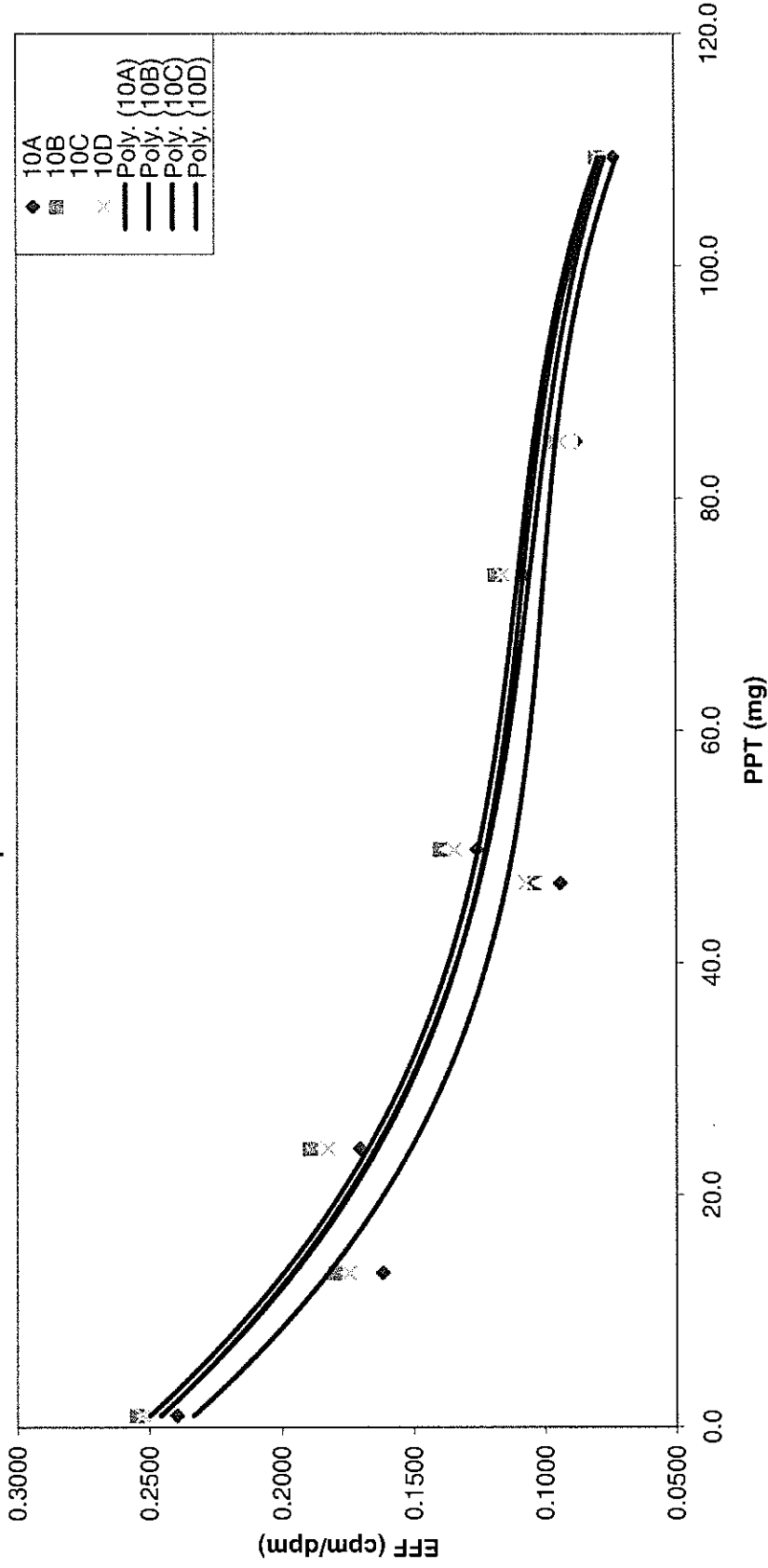
$$9A_y = -3.151259E-07x^3 + 6.708001E-05x^2 - 5.129044E-03x + 2.4938831E-01$$

$$9B_y = -3.047880E-07x^3 + 6.577583E-05x^2 - 5.139659E-03x + 2.555128E-01$$

$$9C_y = -2.715113E-07x^3 + 6.045223E-05x^2 - 4.917011E-03x + 2.474097E-01$$

$$9D_y = -3.208690E-07x^3 + 6.807174E-05x^2 - 5.183355E-03x + 2.497461E-01$$

# Alpha Calibration



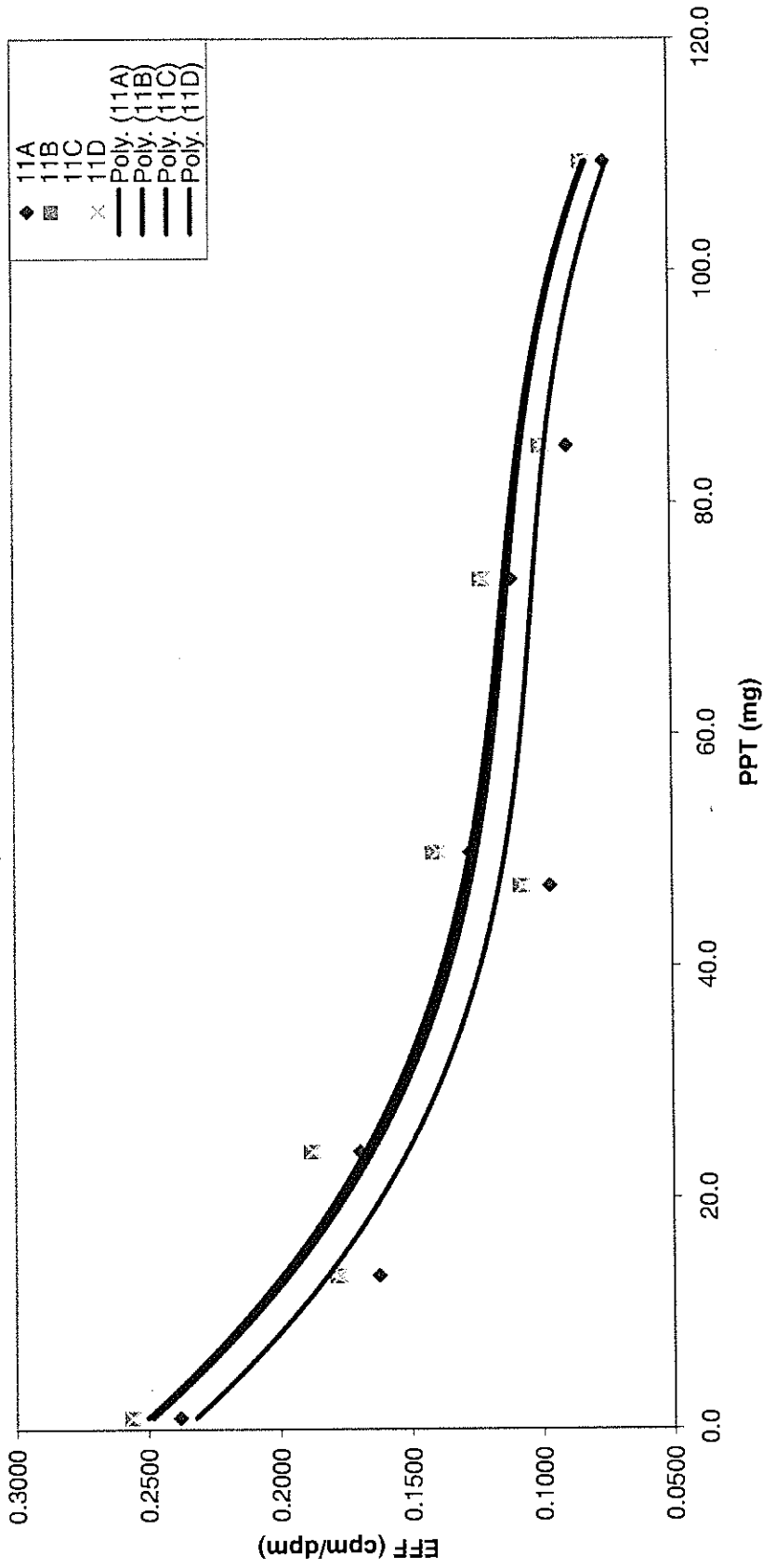
10A  $y = -2.964325E-07x^3 + 6.421068E-05x^2 - 4.997674E-03x + 2.382492E-01$

10B  $y = -2.753037E-07x^3 + 6.044307E-05x^2 - 4.924385E-03x + 2.546994E-01$

10C  $y = -2.529662E-07x^3 + 5.690026E-05x^2 - 4.786185E-03x + 2.503282E-01$

10D  $y = -2.797946E-07x^3 + 6.116318E-05x^2 - 4.927171E-03x + 2.507149E-01$

# Alpha Calibration



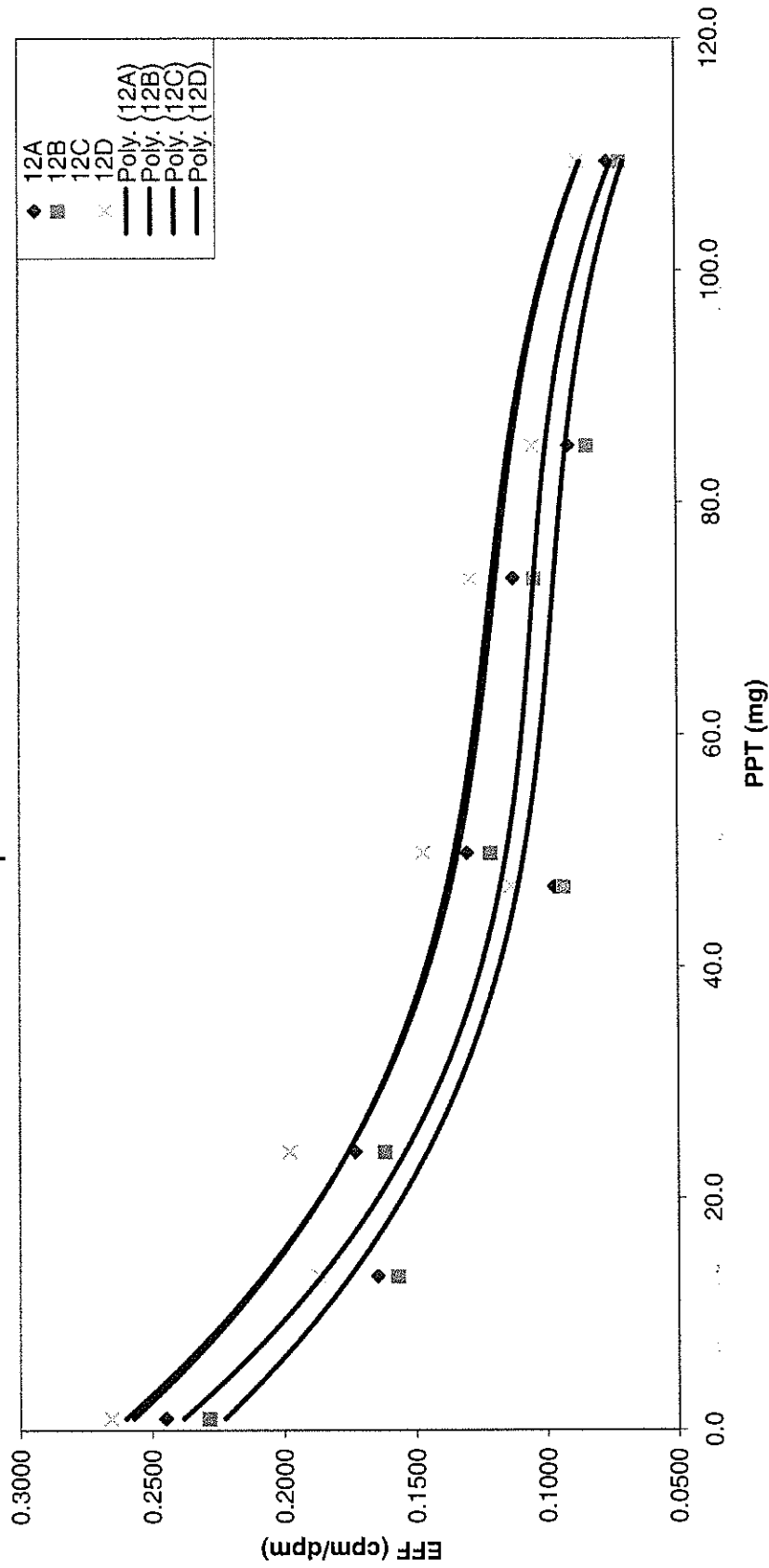
$$11A \quad y = -3.008748E-07x^3 + 6.425159E-05x^2 - 4.925764E-03x + 2.368372E-01$$

$$11B \quad y = -2.952243E-07x^3 + 6.348283E-05x^2 - 4.994627E-03x + 2.551131E-01$$

$$11C \quad y = -3.042670E-07x^3 + 6.549221E-05x^2 - 5.095094E-03x + 2.534510E-01$$

$$11D \quad y = -2.962615E-07x^3 + 6.399789E-05x^2 - 5.042522E-03x + 2.548176E-01$$

# Alpha Calibration



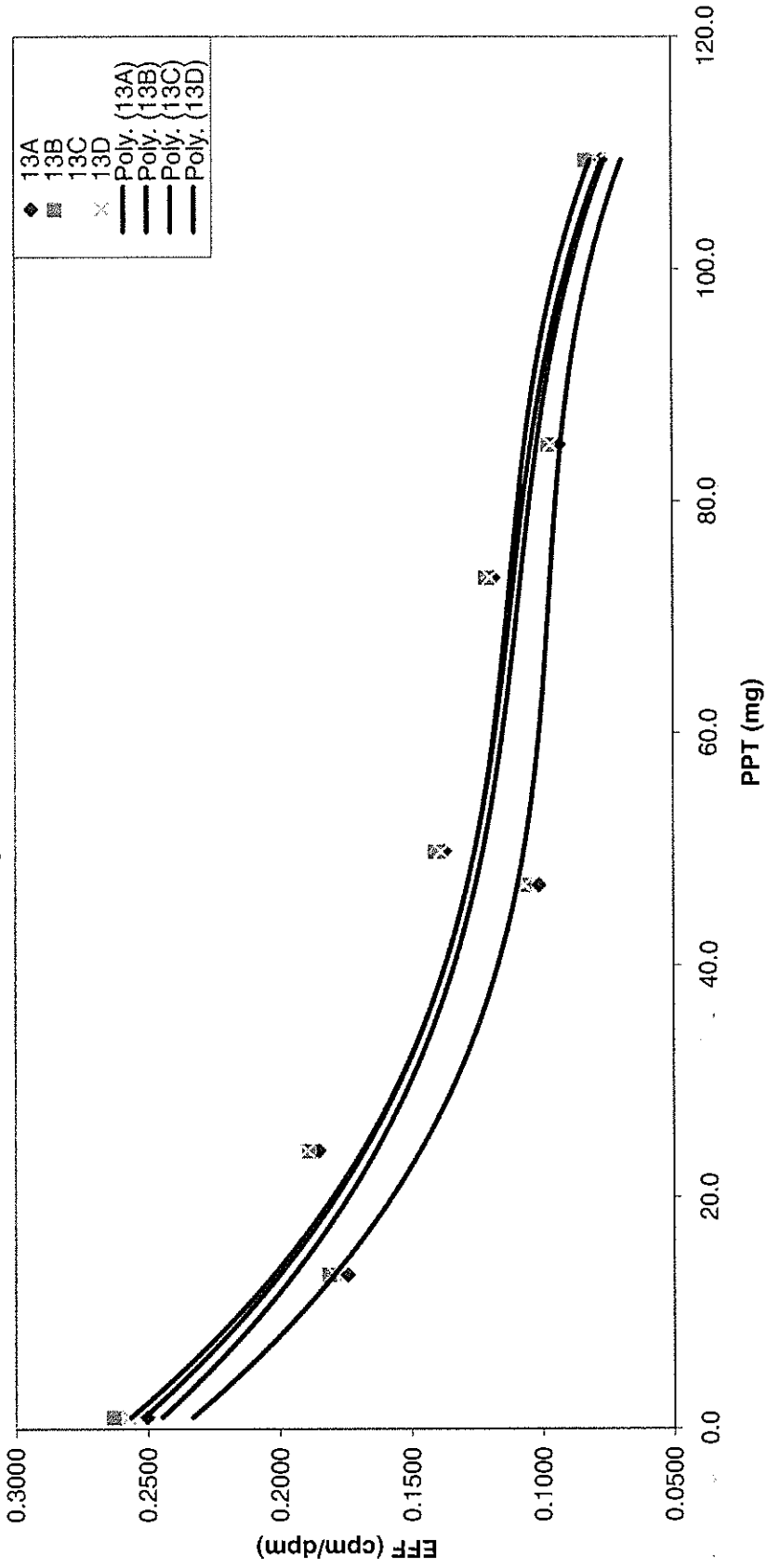
$$12A \quad y = -3.208477E-07x^3 + 6.828761E-05x^2 - 5.176202E-03x + 2.433812E-01$$

$$12B \quad y = -2.744088E-07x^3 + 5.949425E-05x^2 - 4.663972E-03x + 2.271441E-01$$

$$12C \quad y = -2.909677E-07x^3 + 6.204861E-05x^2 - 4.911957E-03x + 2.619436E-01$$

$$12D \quad y = -2.963796E-07x^3 + 6.395867E-05x^2 - 5.085884E-03x + 2.650265E-01$$

# Alpha Calibration



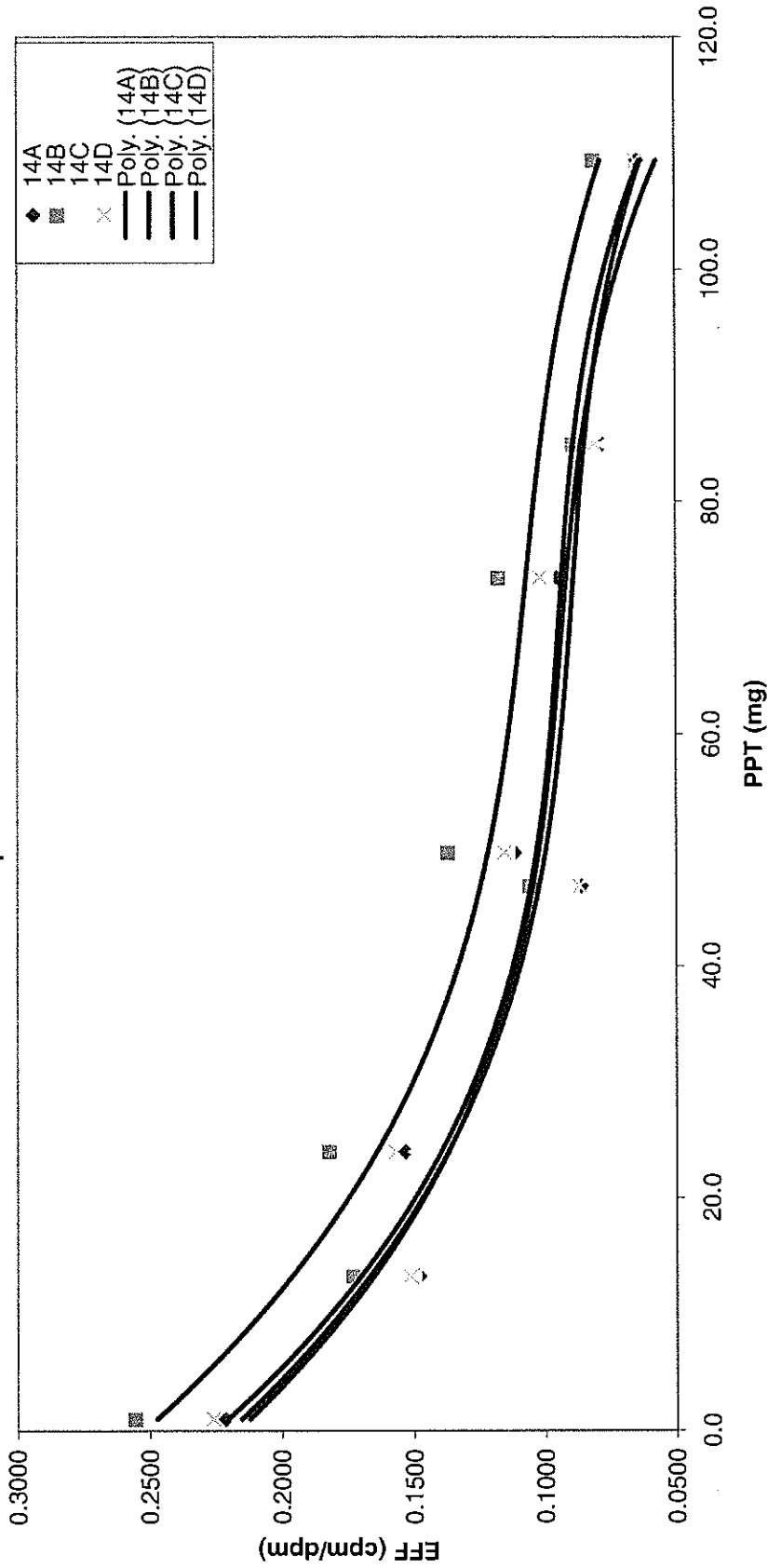
13A  $y = -2.817775E-07x^3 + 6.089057E-05x^2 - 4.878783E-03x + 2.494555E-01$

13B  $y = -3.080031E-07x^3 + 6.708965E-05x^2 - 5.305198E-03x + 2.616947E-01$

13C  $y = -3.229161E-07x^3 + 6.963577E-05x^2 - 5.300503E-03x + 2.382577E-01$

13D  $y = -2.920696E-07x^3 + 6.289923E-05x^2 - 5.030800E-03x + 2.564416E-01$

# Alpha Calibration



14A  $y = -2.824098E-07x^3 + 6.134606E-05x^2 - 4.766814E-03x + 2.200459E-01$

14B  $y = -2.753075E-07x^3 + 6.114246E-05x^2 - 4.983358E-03x + 2.522986E-01$

14C  $y = -3.064315E-07x^3 + 6.280312E-05x^2 - 4.664398E-03x + 2.168437E-01$

14D  $y = -3.177157E-07x^3 + 6.688939E-05x^2 - 4.995778E-03x + 2.254479E-01$



**Current Calibration - PIC**

Geometry 2 inch Planchett

Alpha	Cal Date	10/1/2013 Exp Date			9/30/2014	A4
Protean	A0	A1	A2	A3		
1A	2.461567E-01	-4.828693E-03	5.911765E-05	-2.664039E-07		
1B	2.458112E-01	-4.945475E-03	6.234190E-05	-2.853570E-07		
1C	2.692142E-01	-5.149981E-03	6.440061E-05	-2.957531E-07		
1D	2.579401E-01	-5.105374E-03	6.369762E-05	-2.913983E-07		
2A	2.235872E-01	-4.495309E-03	5.516754E-05	-2.460395E-07		
2B	2.186698E-01	-4.428481E-03	5.422406E-05	-2.428927E-07		
2C	2.367252E-01	-4.813190E-03	6.155325E-05	-2.870015E-07		
2D	2.263182E-01	-4.887012E-03	6.267482E-05	-2.854058E-07		
3A	2.465586E-01	-4.785168E-03	5.990523E-05	-2.759509E-07		
3B	2.598075E-01	-5.171842E-03	6.565928E-05	-3.036794E-07		
3C	2.586823E-01	-5.264249E-03	6.627880E-05	-3.017244E-07		
3D	2.569587E-01	-4.950744E-03	6.188443E-05	-2.865536E-07		
4A	2.424117E-01	-4.819213E-03	6.340226E-05	-3.021688E-07		
4B	2.242144E-01	-4.315405E-03	5.145036E-05	-2.284188E-07		
4C	2.437071E-01	-4.658210E-03	5.785644E-05	-2.665324E-07		
4D	2.551821E-01	-4.793104E-03	5.846024E-05	-2.845337E-07		
5A	2.652953E-01	-5.219761E-03	6.608809E-05	-3.067529E-07		
5B	2.595626E-01	-5.066104E-03	6.306604E-05	-2.881994E-07		
5C	2.601287E-01	-5.188095E-03	6.477653E-05	-2.944088E-07		
5D	2.642477E-01	-4.935300E-03	6.045534E-05	-2.765175E-07		
6A	2.608836E-01	-5.051686E-03	6.296286E-05	-2.875027E-07		
6B	2.634906E-01	-4.978844E-03	6.183626E-05	-2.846922E-07		
6C	2.602168E-01	-4.900282E-03	5.915044E-05	-2.636623E-07		
6D	#N/A	#N/A	#N/A	#N/A		
7A	2.598460E-01	-5.252047E-03	6.757336E-05	-3.155866E-07		
7B	2.602013E-01	-5.114432E-03	6.348472E-05	-2.882892E-07		
7C	2.495744E-01	-4.979532E-03	6.368638E-05	-2.976395E-07		
7D	2.557161E-01	-5.268667E-03	6.771888E-05	-3.138330E-07		
8A	2.332719E-01	-5.482177E-03	7.588707E-05	-3.604285E-07		
8B	2.148498E-01	-4.441782E-03	5.700169E-05	-2.625815E-07		
8C	2.112666E-01	-4.425708E-03	5.695287E-05	-2.618601E-07		
8D	2.726210E-01	-5.475670E-03	7.135158E-05	-3.381777E-07		
9A	2.493831E-01	-5.129044E-03	6.708001E-05	-3.151259E-07		
9B	2.555128E-01	-5.139659E-03	6.577583E-05	-3.047880E-07		
9C	2.474097E-01	-4.917011E-03	6.045223E-05	-2.715113E-07		
9D	2.497461E-01	-5.183355E-03	6.807174E-05	-3.208690E-07		
10A	2.382492E-01	-4.997674E-03	6.421068E-05	-2.964325E-07		
10B	2.546994E-01	-4.924385E-03	6.044307E-05	-2.753037E-07		
10C	2.503282E-01	-4.786185E-03	5.690026E-05	-2.529662E-07		
10D	2.507149E-01	-4.927171E-03	6.116318E-05	-2.797946E-07		
11A	2.368372E-01	-4.925764E-03	6.425159E-05	-3.008748E-07		
11B	2.551131E-01	-4.994627E-03	6.348283E-05	-2.952243E-07		
11C	2.534510E-01	-5.095094E-03	6.549221E-05	-3.042670E-07		
11D	2.548176E-01	-5.042522E-03	6.399789E-05	-2.962615E-07		
12A	2.433812E-01	-5.176202E-03	6.828761E-05	-3.208477E-07		
12B	2.271441E-01	-4.663972E-03	5.949425E-05	-2.744088E-07		
12C	2.619436E-01	-4.911957E-03	6.204861E-05	-2.909677E-07		
12D	2.650265E-01	-5.085884E-03	6.395867E-05	-2.963796E-07		
13A	2.494555E-01	-4.878783E-03	6.089057E-05	-2.817775E-07		
13B	2.616947E-01	-5.305198E-03	6.708965E-05	-3.080031E-07		
13C	2.382577E-01	-5.300503E-03	6.963577E-05	-3.229161E-07		
13D	2.564416E-01	-5.030800E-03	6.289923E-05	-2.920696E-07		
14A	2.200459E-01	-4.766814E-03	6.134606E-05	-2.824098E-07		
14B	2.522986E-01	-4.983358E-03	6.114246E-05	-2.753075E-07		
14C	2.168437E-01	-4.664398E-03	6.280312E-05	-3.064315E-07		
14D	2.254479E-01	-4.995778E-03	6.688939E-05	-3.177157E-07		

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
T1	10A	3	31737	13715	9/21/2013 16:22	9/21/2013 16:25	PIC	GABT13
T2	10A	3	21436	10212	9/21/2013 16:55	9/21/2013 16:58	PIC	GABT13
T3	10A	3	22591	10728	9/21/2013 16:44	9/21/2013 16:47	PIC	GABT13
T4	10A	3	16666	8336	9/21/2013 16:27	9/21/2013 16:30	PIC	GABT13
T5	10A	3	12482	6394	9/21/2013 16:00	9/21/2013 16:03	PIC	GABT13
T6	10A	3	14269	7749	9/21/2013 16:17	9/21/2013 16:20	PIC	GABT13
T7	10A	3	11635	6112	9/21/2013 16:12	9/21/2013 16:15	PIC	GABT13
T8	10A	3	9699	5595	9/21/2013 16:06	9/21/2013 16:09	PIC	GABT13
T1	10B	3	33745	11392	9/21/2013 16:27	9/21/2013 16:30	PIC	GABT13
T2	10B	3	23835	8611	9/21/2013 16:22	9/21/2013 16:25	PIC	GABT13
T3	10B	3	25067	8665	9/21/2013 16:55	9/21/2013 16:58	PIC	GABT13
T4	10B	3	18512	6943	9/21/2013 16:44	9/21/2013 16:47	PIC	GABT13
T5	10B	3	13721	5076	9/21/2013 16:06	9/21/2013 16:09	PIC	GABT13
T6	10B	3	15717	6304	9/21/2013 16:01	9/21/2013 16:04	PIC	GABT13
T7	10B	3	12891	5141	9/21/2013 16:17	9/21/2013 16:20	PIC	GABT13
T8	10B	3	10561	4474	9/21/2013 16:12	9/21/2013 16:15	PIC	GABT13
T1	10C	3	33380	11774	9/21/2013 16:45	9/21/2013 16:48	PIC	GABT13
T2	10C	3	23219	9039	9/21/2013 16:27	9/21/2013 16:30	PIC	GABT13
T3	10C	3	24431	9446	9/21/2013 16:23	9/21/2013 16:26	PIC	GABT13
T4	10C	3	18197	7173	9/21/2013 16:55	9/21/2013 16:58	PIC	GABT13
T5	10C	3	13536	5691	9/21/2013 16:12	9/21/2013 16:15	PIC	GABT13
T6	10C	3	15298	6795	9/21/2013 16:06	9/21/2013 16:09	PIC	GABT13
T7	10C	3	11866	5272	9/21/2013 16:01	9/21/2013 16:04	PIC	GABT13
T8	10C	3	10358	4886	9/21/2013 16:17	9/21/2013 16:20	PIC	GABT13
T1	10D	3	33428	12324	9/21/2013 16:55	9/21/2013 16:58	PIC	GABT13
T2	10D	3	23124	9522	9/21/2013 16:45	9/21/2013 16:48	PIC	GABT13
T3	10D	3	24189	9889	9/21/2013 16:27	9/21/2013 16:30	PIC	GABT13
T4	10D	3	17799	7701	9/21/2013 16:23	9/21/2013 16:26	PIC	GABT13
T5	10D	3	14233	5882	9/21/2013 16:17	9/21/2013 16:20	PIC	GABT13
T6	10D	3	15356	6981	9/21/2013 16:12	9/21/2013 16:15	PIC	GABT13
T7	10D	3	12444	5741	9/21/2013 16:06	9/21/2013 16:09	PIC	GABT13
T8	10D	3	10444	5123	9/21/2013 16:01	9/21/2013 16:04	PIC	GABT13
T1	11A	3	31536	14355	9/21/2013 17:14	9/21/2013 17:17	PIC	GABT13
T2	11A	3	21515	11385	9/21/2013 17:30	9/21/2013 17:33	PIC	GABT13
T3	11A	3	22447	11910	9/21/2013 17:26	9/21/2013 17:29	PIC	GABT13
T4	11A	3	16858	9111	9/21/2013 17:20	9/21/2013 17:23	PIC	GABT13

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T5	11A	3	12786	6886	9/21/2013 17:38	9/21/2013 17:41	PIC	GABT13
T6	11A	3	14688	8463	9/21/2013 17:54	9/21/2013 17:57	PIC	GABT13
T7	11A	3	11809	6589	9/21/2013 17:48	9/21/2013 17:51	PIC	GABT13
T8	11A	3	9872	5974	9/21/2013 17:43	9/21/2013 17:46	PIC	GABT13
T1	11B	3	33943	13019	9/21/2013 17:20	9/21/2013 17:23	PIC	GABT13
T2	11B	3	23643	10047	9/21/2013 17:15	9/21/2013 17:18	PIC	GABT13
T3	11B	3	24928	10312	9/21/2013 17:30	9/21/2013 17:33	PIC	GABT13
T4	11B	3	18744	8268	9/21/2013 17:26	9/21/2013 17:29	PIC	GABT13
T5	11B	3	14300	6218	9/21/2013 17:43	9/21/2013 17:46	PIC	GABT13
T6	11B	3	16255	7667	9/21/2013 17:38	9/21/2013 17:41	PIC	GABT13
T7	11B	3	13220	6175	9/21/2013 17:54	9/21/2013 17:57	PIC	GABT13
T8	11B	3	11032	5489	9/21/2013 17:48	9/21/2013 17:51	PIC	GABT13
T1	11C	3	33630	13546	9/21/2013 17:26	9/21/2013 17:29	PIC	GABT13
T2	11C	3	23494	10489	9/21/2013 17:20	9/21/2013 17:23	PIC	GABT13
T3	11C	3	24413	10772	9/21/2013 17:15	9/21/2013 17:18	PIC	GABT13
T4	11C	3	18215	8621	9/21/2013 17:30	9/21/2013 17:33	PIC	GABT13
T5	11C	3	13995	6642	9/21/2013 17:48	9/21/2013 17:51	PIC	GABT13
T6	11C	3	16148	7920	9/21/2013 17:43	9/21/2013 17:46	PIC	GABT13
T7	11C	3	12997	6441	9/21/2013 17:38	9/21/2013 17:41	PIC	GABT13
T8	11C	3	10971	5853	9/21/2013 17:54	9/21/2013 17:57	PIC	GABT13
T1	11D	3	33907	12985	9/21/2013 17:30	9/21/2013 17:33	PIC	GABT13
T2	11D	3	23489	9879	9/21/2013 17:26	9/21/2013 17:29	PIC	GABT13
T3	11D	3	24821	10029	9/21/2013 17:20	9/21/2013 17:23	PIC	GABT13
T4	11D	3	18451	7846	9/21/2013 17:15	9/21/2013 17:18	PIC	GABT13
T5	11D	3	14157	6075	9/21/2013 17:55	9/21/2013 17:58	PIC	GABT13
T6	11D	3	16092	7484	9/21/2013 17:48	9/21/2013 17:51	PIC	GABT13
T7	11D	3	13040	5859	9/21/2013 17:43	9/21/2013 17:46	PIC	GABT13
T8	11D	3	10935	5307	9/21/2013 17:38	9/21/2013 17:41	PIC	GABT13
T1	12A	3	32456	14229	9/21/2013 17:38	9/21/2013 17:41	PIC	GABT13
T2	12A	3	21802	11140	9/21/2013 17:55	9/21/2013 17:58	PIC	GABT13
T3	12A	3	22934	11653	9/21/2013 17:48	9/21/2013 17:51	PIC	GABT13
T4	12A	3	17262	9018	9/21/2013 17:43	9/21/2013 17:46	PIC	GABT13
T5	12A	3	12852	6998	9/21/2013 17:15	9/21/2013 17:18	PIC	GABT13
T6	12A	3	14907	8494	9/21/2013 17:30	9/21/2013 17:33	PIC	GABT13
T7	12A	3	12083	6777	9/21/2013 17:26	9/21/2013 17:29	PIC	GABT13
T8	12A	3	10056	5938	9/21/2013 17:20	9/21/2013 17:23	PIC	GABT13
T1	12B	3	30251	16273	9/21/2013 17:43	9/21/2013 17:46	PIC	GABT13

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T2	12B	3	20781	12570	9/21/2013 17:38	9/21/2013 17:41	PIC	GABT13
T3	12B	3	21415	13057	9/21/2013 17:55	9/21/2013 17:58	PIC	GABT13
T4	12B	3	16066	10218	9/21/2013 17:48	9/21/2013 17:51	PIC	GABT13
T5	12B	3	12378	7671	9/21/2013 17:20	9/21/2013 17:23	PIC	GABT13
T6	12B	3	13821	9756	9/21/2013 17:15	9/21/2013 17:18	PIC	GABT13
T7	12B	3	11134	7625	9/21/2013 17:30	9/21/2013 17:33	PIC	GABT13
T8	12B	3	9428	6696	9/21/2013 17:26	9/21/2013 17:29	PIC	GABT13
T1	12C	3	34746	11919	9/21/2013 17:49	9/21/2013 17:52	PIC	GABT13
T2	12C	3	24831	8898	9/21/2013 17:43	9/21/2013 17:46	PIC	GABT13
T3	12C	3	26089	9310	9/21/2013 17:38	9/21/2013 17:41	PIC	GABT13
T4	12C	3	19901	7297	9/21/2013 17:55	9/21/2013 17:58	PIC	GABT13
T5	12C	3	14946	5616	9/21/2013 17:26	9/21/2013 17:29	PIC	GABT13
T6	12C	3	17435	6847	9/21/2013 17:20	9/21/2013 17:23	PIC	GABT13
T7	12C	3	13919	5533	9/21/2013 17:15	9/21/2013 17:18	PIC	GABT13
T8	12C	3	11590	4773	9/21/2013 17:30	9/21/2013 17:33	PIC	GABT13
T1	12D	3	35190	13006	9/21/2013 17:58	9/21/2013 18:01	PIC	GABT13
T2	12D	3	24798	9783	9/21/2013 17:50	9/21/2013 17:53	PIC	GABT13
T3	12D	3	26193	10078	9/21/2013 17:43	9/21/2013 17:46	PIC	GABT13
T4	12D	3	19472	8191	9/21/2013 17:39	9/21/2013 17:42	PIC	GABT13
T5	12D	3	15034	6319	9/21/2013 17:34	9/21/2013 17:37	PIC	GABT13
T6	12D	3	17055	7465	9/21/2013 17:26	9/21/2013 17:29	PIC	GABT13
T7	12D	3	13912	6228	9/21/2013 17:21	9/21/2013 17:24	PIC	GABT13
T8	12D	3	11547	5459	9/21/2013 17:15	9/21/2013 17:18	PIC	GABT13
T1	13A	3	33152	12661	9/24/2013 13:17	9/24/2013 13:20	PIC	GABT13
T2	13A	3	23078	9408	9/24/2013 14:41	9/24/2013 14:44	PIC	GABT13
T3	13A	3	24520	9885	9/24/2013 13:46	9/24/2013 13:49	PIC	GABT13
T4	13A	3	18174	7729	9/24/2013 13:32	9/24/2013 13:35	PIC	GABT13
T5	13A	3	13415	5743	9/24/2013 14:46	9/24/2013 14:49	PIC	GABT13
T6	13A	3	15671	7087	9/24/2013 15:07	9/24/2013 15:10	PIC	GABT13
T7	13A	3	12323	5710	9/24/2013 15:02	9/24/2013 15:05	PIC	GABT13
T8	13A	3	10175	4956	9/24/2013 14:56	9/24/2013 14:59	PIC	GABT13
T1	13B	3	34830	13320	9/24/2013 13:32	9/24/2013 13:35	PIC	GABT13
T2	13B	3	23984	10328	9/24/2013 13:17	9/24/2013 13:20	PIC	GABT13
T3	13B	3	25002	10593	9/24/2013 14:41	9/24/2013 14:44	PIC	GABT13
T4	13B	3	18646	8130	9/24/2013 13:46	9/24/2013 13:49	PIC	GABT13
T5	13B	3	14129	6130	9/24/2013 14:56	9/24/2013 14:59	PIC	GABT13
T6	13B	3	16053	7603	9/24/2013 14:46	9/24/2013 14:49	PIC	GABT13

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T7	13B	3	12891	6230	9/24/2013 15:07	9/24/2013 15:10	PIC	GABT13
T8	13B	3	10937	5393	9/24/2013 15:02	9/24/2013 15:05	PIC	GABT13
T1	13C	3	31485	15284	9/24/2013 13:46	9/24/2013 13:49	PIC	GABT13
T2	13C	3	21633	12020	9/24/2013 13:32	9/24/2013 13:35	PIC	GABT13
T3	13C	3	21567	13069	9/24/2013 13:17	9/24/2013 13:20	PIC	GABT13
T4	13C	3	15140	11076	9/24/2013 14:41	9/24/2013 14:44	PIC	GABT13
T5	13C	3	12481	7312	9/24/2013 15:03	9/24/2013 15:06	PIC	GABT13
T6	13C	3	14384	9025	9/24/2013 14:57	9/24/2013 15:00	PIC	GABT13
T7	13C	3	10915	7310	9/24/2013 14:46	9/24/2013 14:49	PIC	GABT13
T8	13C	3	9343	6579	9/24/2013 15:07	9/24/2013 15:10	PIC	GABT13
T1	13D	3	34076	12507	9/24/2013 14:41	9/24/2013 14:44	PIC	GABT13
T2	13D	3	23732	9224	9/24/2013 13:47	9/24/2013 13:50	PIC	GABT13
T3	13D	3	25098	9613	9/24/2013 13:32	9/24/2013 13:35	PIC	GABT13
T4	13D	3	18359	7606	9/24/2013 13:17	9/24/2013 13:20	PIC	GABT13
T5	13D	3	14132	5861	9/24/2013 15:07	9/24/2013 15:10	PIC	GABT13
T6	13D	3	15861	7075	9/24/2013 15:03	9/24/2013 15:06	PIC	GABT13
T7	13D	3	12758	5485	9/24/2013 14:57	9/24/2013 15:00	PIC	GABT13
T8	13D	3	10278	4917	9/24/2013 14:47	9/24/2013 14:50	PIC	GABT13
T1	14A	3	29322	17551	9/24/2013 14:47	9/24/2013 14:50	PIC	GABT13
T2	14A	3	19626	13996	9/24/2013 15:07	9/24/2013 15:10	PIC	GABT13
T3	14A	3	20310	14143	9/24/2013 15:03	9/24/2013 15:06	PIC	GABT13
T4	14A	3	14784	11401	9/24/2013 14:57	9/24/2013 15:00	PIC	GABT13
T5	14A	3	11427	8589	9/24/2013 13:18	9/24/2013 13:21	PIC	GABT13
T6	14A	3	12612	10618	9/24/2013 14:41	9/24/2013 14:44	PIC	GABT13
T7	14A	3	10306	8267	9/24/2013 13:47	9/24/2013 13:50	PIC	GABT13
T8	14A	3	8525	7226	9/24/2013 13:32	9/24/2013 13:35	PIC	GABT13
T1	14B	3	33858	16145	9/24/2013 14:57	9/24/2013 15:00	PIC	GABT13
T2	14B	3	22912	13397	9/24/2013 14:47	9/24/2013 14:50	PIC	GABT13
T3	14B	3	24110	13525	9/24/2013 15:07	9/24/2013 15:10	PIC	GABT13
T4	14B	3	18154	10733	9/24/2013 15:03	9/24/2013 15:06	PIC	GABT13
T5	14B	3	14018	7795	9/24/2013 13:32	9/24/2013 13:35	PIC	GABT13
T6	14B	3	15566	10147	9/24/2013 13:19	9/24/2013 13:22	PIC	GABT13
T7	14B	3	11797	8270	9/24/2013 14:41	9/24/2013 14:44	PIC	GABT13
T8	14B	3	10722	6999	9/24/2013 13:47	9/24/2013 13:50	PIC	GABT13
T1	14C	3	28799	17946	9/24/2013 15:03	9/24/2013 15:06	PIC	GABT13
T2	14C	3	19866	13907	9/24/2013 14:57	9/24/2013 15:00	PIC	GABT13
T3	14C	3	19804	14810	9/24/2013 14:47	9/24/2013 14:50	PIC	GABT13

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T4	14C	3	15117	11753	9/24/2013 15:07	9/24/2013 15:10	PIC	GABT13
T5	14C	3	11851	8546	9/24/2013 13:47	9/24/2013 13:50	PIC	GABT13
T6	14C	3	13162	10561	9/24/2013 13:32	9/24/2013 13:35	PIC	GABT13
T7	14C	3	10263	8385	9/24/2013 13:19	9/24/2013 13:22	PIC	GABT13
T8	14C	3	7765	7763	9/24/2013 14:41	9/24/2013 14:44	PIC	GABT13
T1	14D	3	29961	17438	9/24/2013 15:08	9/24/2013 15:11	PIC	GABT13
T2	14D	3	20083	13691	9/24/2013 15:03	9/24/2013 15:06	PIC	GABT13
T3	14D	3	20800	14595	9/24/2013 14:57	9/24/2013 15:00	PIC	GABT13
T4	14D	3	15303	11252	9/24/2013 14:47	9/24/2013 14:50	PIC	GABT13
T5	14D	3	11530	8561	9/24/2013 14:41	9/24/2013 14:44	PIC	GABT13
T6	14D	3	13494	10958	9/24/2013 13:47	9/24/2013 13:50	PIC	GABT13
T7	14D	3	10713	8356	9/24/2013 13:32	9/24/2013 13:35	PIC	GABT13
T8	14D	3	8595	7590	9/24/2013 13:19	9/24/2013 13:22	PIC	GABT13
T1	1A	3	32784	12352	9/21/2013 11:55	9/21/2013 11:58	PIC	GABT13
T2	1A	3	22813	9418	9/21/2013 12:11	9/21/2013 12:14	PIC	GABT13
T3	1A	3	23639	9640	9/21/2013 12:06	9/21/2013 12:09	PIC	GABT13
T4	1A	3	17546	7827	9/21/2013 12:01	9/21/2013 12:04	PIC	GABT13
T5	1A	3	13712	5896	9/21/2013 12:17	9/21/2013 12:20	PIC	GABT13
T6	1A	3	14898	7151	9/21/2013 13:10	9/21/2013 13:13	PIC	GABT13
T7	1A	3	12120	5691	9/21/2013 12:30	9/21/2013 12:33	PIC	GABT13
T8	1A	3	10340	4981	9/21/2013 12:25	9/21/2013 12:28	PIC	GABT13
T1	1B	3	32860	12710	9/21/2013 12:01	9/21/2013 12:04	PIC	GABT13
T2	1B	3	22231	9503	9/21/2013 11:55	9/21/2013 11:58	PIC	GABT13
T3	1B	3	23731	9690	9/21/2013 12:11	9/21/2013 12:14	PIC	GABT13
T4	1B	3	17337	7744	9/21/2013 12:06	9/21/2013 12:09	PIC	GABT13
T5	1B	3	13715	5908	9/21/2013 12:25	9/21/2013 12:28	PIC	GABT13
T6	1B	3	15109	7009	9/21/2013 12:17	9/21/2013 12:20	PIC	GABT13
T7	1B	3	12212	5572	9/21/2013 13:10	9/21/2013 13:13	PIC	GABT13
T8	1B	3	10447	5013	9/21/2013 12:30	9/21/2013 12:33	PIC	GABT13
T1	1C	3	35697	11255	9/21/2013 12:06	9/21/2013 12:09	PIC	GABT13
T2	1C	3	25411	8099	9/21/2013 12:01	9/21/2013 12:04	PIC	GABT13
T3	1C	3	26429	8423	9/21/2013 11:55	9/21/2013 11:58	PIC	GABT13
T4	1C	3	20030	6606	9/21/2013 12:11	9/21/2013 12:14	PIC	GABT13
T5	1C	3	15082	5178	9/21/2013 12:30	9/21/2013 12:33	PIC	GABT13
T6	1C	3	17451	6016	9/21/2013 12:25	9/21/2013 12:28	PIC	GABT13
T7	1C	3	14082	4941	9/21/2013 12:17	9/21/2013 12:20	PIC	GABT13
T8	1C	3	12006	4365	9/21/2013 13:10	9/21/2013 13:13	PIC	GABT13

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T1	1D	3	34323	11007	9/21/2013 12:12	9/21/2013 12:15	PIC	GABT13
T2	1D	3	23855	8119	9/21/2013 12:06	9/21/2013 12:09	PIC	GABT13
T3	1D	3	24855	8337	9/21/2013 12:01	9/21/2013 12:04	PIC	GABT13
T4	1D	3	18421	6409	9/21/2013 11:55	9/21/2013 11:58	PIC	GABT13
T5	1D	3	14280	5123	9/21/2013 13:11	9/21/2013 13:14	PIC	GABT13
T6	1D	3	15997	5950	9/21/2013 12:30	9/21/2013 12:33	PIC	GABT13
T7	1D	3	12740	4744	9/21/2013 12:25	9/21/2013 12:28	PIC	GABT13
T8	1D	3	10833	4189	9/21/2013 12:17	9/21/2013 12:20	PIC	GABT13
T1	2A	3	29700	14885	9/21/2013 12:17	9/21/2013 12:20	PIC	GABT13
T2	2A	3	20776	10901	9/21/2013 13:14	9/21/2013 13:17	PIC	GABT13
T3	2A	3	21048	11469	9/21/2013 12:30	9/21/2013 12:33	PIC	GABT13
T4	2A	3	15649	9030	9/21/2013 12:25	9/21/2013 12:28	PIC	GABT13
T5	2A	3	12134	7056	9/21/2013 11:55	9/21/2013 11:58	PIC	GABT13
T6	2A	3	13418	8351	9/21/2013 12:12	9/21/2013 12:15	PIC	GABT13
T7	2A	3	10757	6817	9/21/2013 12:06	9/21/2013 12:09	PIC	GABT13
T8	2A	3	9446	5721	9/21/2013 12:01	9/21/2013 12:04	PIC	GABT13
T1	2B	3	29286	15511	9/21/2013 12:25	9/21/2013 12:28	PIC	GABT13
T2	2B	3	19486	12142	9/21/2013 12:17	9/21/2013 12:20	PIC	GABT13
T3	2B	3	21112	12186	9/21/2013 13:11	9/21/2013 13:14	PIC	GABT13
T4	2B	3	15045	9703	9/21/2013 12:31	9/21/2013 12:34	PIC	GABT13
T5	2B	3	11888	7426	9/21/2013 12:01	9/21/2013 12:04	PIC	GABT13
T6	2B	3	12365	8823	9/21/2013 11:55	9/21/2013 11:58	PIC	GABT13
T7	2B	3	10660	7037	9/21/2013 12:12	9/21/2013 12:15	PIC	GABT13
T8	2B	3	8758	6246	9/21/2013 12:06	9/21/2013 12:09	PIC	GABT13
T1	2C	3	31828	10844	9/21/2013 12:31	9/21/2013 12:34	PIC	GABT13
T2	2C	3	21276	7924	9/21/2013 12:25	9/21/2013 12:28	PIC	GABT13
T3	2C	3	22293	8467	9/21/2013 12:17	9/21/2013 12:20	PIC	GABT13
T4	2C	3	17820	6476	9/21/2013 13:11	9/21/2013 13:14	PIC	GABT13
T5	2C	3	12796	5191	9/21/2013 12:06	9/21/2013 12:09	PIC	GABT13
T6	2C	3	14098	5718	9/21/2013 12:01	9/21/2013 12:04	PIC	GABT13
T7	2C	3	11561	4871	9/21/2013 11:55	9/21/2013 11:58	PIC	GABT13
T8	2C	3	9707	4250	9/21/2013 12:12	9/21/2013 12:15	PIC	GABT13
T1	2D	3	30217	14558	9/21/2013 13:11	9/21/2013 13:14	PIC	GABT13
T2	2D	3	20065	11482	9/21/2013 12:31	9/21/2013 12:34	PIC	GABT13
T3	2D	3	20977	11960	9/21/2013 12:26	9/21/2013 12:29	PIC	GABT13
T4	2D	3	15157	9227	9/21/2013 12:17	9/21/2013 12:20	PIC	GABT13
T5	2D	3	11944	7145	9/21/2013 12:12	9/21/2013 12:15	PIC	GABT13

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T6	2D	3	13034	8197	9/21/2013 12:06	9/21/2013 12:09	PIC	GABT13
T7	2D	3	10808	6605	9/21/2013 12:01	9/21/2013 12:04	PIC	GABT13
T8	2D	3	9209	5698	9/21/2013 11:55	9/21/2013 11:58	PIC	GABT13
T1	3A	3	32867	11079	9/21/2013 13:37	9/21/2013 13:40	PIC	GABT13
T2	3A	3	22729	7716	9/21/2013 13:58	9/21/2013 14:01	PIC	GABT13
T3	3A	3	24233	8128	9/21/2013 13:54	9/21/2013 13:57	PIC	GABT13
T4	3A	3	18027	6393	9/21/2013 13:42	9/21/2013 13:45	PIC	GABT13
T5	3A	3	13893	4996	9/21/2013 14:04	9/21/2013 14:07	PIC	GABT13
T6	3A	3	15397	5822	9/21/2013 14:27	9/21/2013 14:30	PIC	GABT13
T7	3A	3	12762	4784	9/21/2013 14:21	9/21/2013 14:24	PIC	GABT13
T8	3A	3	10584	4181	9/21/2013 14:08	9/21/2013 14:11	PIC	GABT13
T1	3B	3	34650	10474	9/21/2013 13:42	9/21/2013 13:45	PIC	GABT13
T2	3B	3	23720	7555	9/21/2013 13:37	9/21/2013 13:40	PIC	GABT13
T3	3B	3	25293	7862	9/21/2013 13:59	9/21/2013 14:02	PIC	GABT13
T4	3B	3	18818	6313	9/21/2013 13:54	9/21/2013 13:57	PIC	GABT13
T5	3B	3	14380	4869	9/21/2013 14:08	9/21/2013 14:11	PIC	GABT13
T6	3B	3	16136	5602	9/21/2013 14:04	9/21/2013 14:07	PIC	GABT13
T7	3B	3	13297	4447	9/21/2013 14:27	9/21/2013 14:30	PIC	GABT13
T8	3B	3	11074	4174	9/21/2013 14:21	9/21/2013 14:24	PIC	GABT13
T1	3C	3	34481	11160	9/21/2013 13:54	9/21/2013 13:57	PIC	GABT13
T2	3C	3	23638	7994	9/21/2013 13:42	9/21/2013 13:45	PIC	GABT13
T3	3C	3	24524	8552	9/21/2013 13:37	9/21/2013 13:40	PIC	GABT13
T4	3C	3	18286	6650	9/21/2013 13:59	9/21/2013 14:02	PIC	GABT13
T5	3C	3	14081	5194	9/21/2013 14:21	9/21/2013 14:24	PIC	GABT13
T6	3C	3	15773	5891	9/21/2013 14:08	9/21/2013 14:11	PIC	GABT13
T7	3C	3	12628	4951	9/21/2013 14:04	9/21/2013 14:07	PIC	GABT13
T8	3C	3	10960	4310	9/21/2013 14:27	9/21/2013 14:30	PIC	GABT13
T1	3D	3	34102	10925	9/21/2013 13:59	9/21/2013 14:02	PIC	GABT13
T2	3D	3	24222	7950	9/21/2013 13:54	9/21/2013 13:57	PIC	GABT13
T3	3D	3	24963	8229	9/21/2013 13:42	9/21/2013 13:45	PIC	GABT13
T4	3D	3	18801	6416	9/21/2013 13:37	9/21/2013 13:40	PIC	GABT13
T5	3D	3	14569	5036	9/21/2013 14:27	9/21/2013 14:30	PIC	GABT13
T6	3D	3	16343	5822	9/21/2013 14:21	9/21/2013 14:24	PIC	GABT13
T7	3D	3	13062	4719	9/21/2013 14:08	9/21/2013 14:11	PIC	GABT13
T8	3D	3	10888	4269	9/21/2013 14:04	9/21/2013 14:07	PIC	GABT13
T1	4A	3	32181	10442	9/21/2013 14:04	9/21/2013 14:07	PIC	GABT13
T2	4A	3	22446	7505	9/21/2013 14:28	9/21/2013 14:31	PIC	GABT13



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T3	4A	3	23793	8225	9/21/2013 14:21	9/21/2013 14:24	PIC	GABT13
T4	4A	3	18037	6512	9/21/2013 14:08	9/21/2013 14:11	PIC	GABT13
T5	4A	3	13477	5085	9/21/2013 13:37	9/21/2013 13:40	PIC	GABT13
T6	4A	3	15862	5916	9/21/2013 13:59	9/21/2013 14:02	PIC	GABT13
T7	4A	3	12967	4811	9/21/2013 13:54	9/21/2013 13:57	PIC	GABT13
T8	4A	3	10525	4272	9/21/2013 13:42	9/21/2013 13:45	PIC	GABT13
T1	4B	3	29911	14055	9/21/2013 14:08	9/21/2013 14:11	PIC	GABT13
T2	4B	3	20651	11106	9/21/2013 14:04	9/21/2013 14:07	PIC	GABT13
T3	4B	3	21933	11364	9/21/2013 14:28	9/21/2013 14:31	PIC	GABT13
T4	4B	3	16141	9000	9/21/2013 14:21	9/21/2013 14:24	PIC	GABT13
T5	4B	3	12225	6949	9/21/2013 13:42	9/21/2013 13:45	PIC	GABT13
T6	4B	3	13296	8498	9/21/2013 13:37	9/21/2013 13:40	PIC	GABT13
T7	4B	3	10976	6617	9/21/2013 13:59	9/21/2013 14:02	PIC	GABT13
T8	4B	3	9260	5925	9/21/2013 13:54	9/21/2013 13:57	PIC	GABT13
T1	4C	3	32449	10840	9/21/2013 14:21	9/21/2013 14:24	PIC	GABT13
T2	4C	3	22946	8045	9/21/2013 14:08	9/21/2013 14:11	PIC	GABT13
T3	4C	3	23536	8406	9/21/2013 14:04	9/21/2013 14:07	PIC	GABT13
T4	4C	3	18146	6588	9/21/2013 14:28	9/21/2013 14:31	PIC	GABT13
T5	4C	3	13940	5242	9/21/2013 13:55	9/21/2013 13:58	PIC	GABT13
T6	4C	3	15454	5981	9/21/2013 13:42	9/21/2013 13:45	PIC	GABT13
T7	4C	3	12326	4812	9/21/2013 13:38	9/21/2013 13:41	PIC	GABT13
T8	4C	3	10498	4329	9/21/2013 13:59	9/21/2013 14:02	PIC	GABT13
T1	4D	3	33901	10685	9/21/2013 14:28	9/21/2013 14:31	PIC	GABT13
T2	4D	3	24021	7554	9/21/2013 14:21	9/21/2013 14:24	PIC	GABT13
T3	4D	3	25284	8023	9/21/2013 14:08	9/21/2013 14:11	PIC	GABT13
T4	4D	3	18749	6136	9/21/2013 14:04	9/21/2013 14:07	PIC	GABT13
T5	4D	3	14533	4800	9/21/2013 13:59	9/21/2013 14:02	PIC	GABT13
T6	4D	3	16344	5688	9/21/2013 13:55	9/21/2013 13:58	PIC	GABT13
T7	4D	3	13203	4574	9/21/2013 13:42	9/21/2013 13:45	PIC	GABT13
T8	4D	3	11301	4020	9/21/2013 13:38	9/21/2013 13:41	PIC	GABT13
T1	5A	3	35298	11386	9/21/2013 15:24	9/21/2013 15:27	PIC	GABT13
T2	5A	3	24641	8391	9/21/2013 15:36	9/21/2013 15:39	PIC	GABT13
T3	5A	3	25653	8662	9/21/2013 15:32	9/21/2013 15:35	PIC	GABT13
T4	5A	3	19290	6964	9/21/2013 15:28	9/21/2013 15:31	PIC	GABT13
T5	5A	3	14891	5270	9/21/2013 15:42	9/21/2013 15:45	PIC	GABT13
T6	5A	3	16850	6329	9/21/2013 15:55	9/21/2013 15:58	PIC	GABT13
T7	5A	3	13374	5188	9/21/2013 15:50	9/21/2013 15:53	PIC	GABT13

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T8	5A	3	11292	4501	9/21/2013 15:46	9/21/2013 15:49	PIC	GABT13
T1	5B	3	34606	11270	9/21/2013 15:28	9/21/2013 15:31	PIC	GABT13
T2	5B	3	24023	8309	9/21/2013 15:24	9/21/2013 15:27	PIC	GABT13
T3	5B	3	25151	8616	9/21/2013 15:36	9/21/2013 15:39	PIC	GABT13
T4	5B	3	19220	6654	9/21/2013 15:32	9/21/2013 15:35	PIC	GABT13
T5	5B	3	14241	5189	9/21/2013 15:46	9/21/2013 15:49	PIC	GABT13
T6	5B	3	16270	6040	9/21/2013 15:42	9/21/2013 15:45	PIC	GABT13
T7	5B	3	12984	4913	9/21/2013 15:55	9/21/2013 15:58	PIC	GABT13
T8	5B	3	11198	4377	9/21/2013 15:51	9/21/2013 15:54	PIC	GABT13
T1	5C	3	34487	11506	9/21/2013 15:32	9/21/2013 15:35	PIC	GABT13
T2	5C	3	24200	8337	9/21/2013 15:28	9/21/2013 15:31	PIC	GABT13
T3	5C	3	25025	8766	9/21/2013 15:24	9/21/2013 15:27	PIC	GABT13
T4	5C	3	18566	6829	9/21/2013 15:36	9/21/2013 15:39	PIC	GABT13
T5	5C	3	14028	5259	9/21/2013 15:51	9/21/2013 15:54	PIC	GABT13
T6	5C	3	16102	6152	9/21/2013 15:47	9/21/2013 15:50	PIC	GABT13
T7	5C	3	12997	4861	9/21/2013 15:43	9/21/2013 15:46	PIC	GABT13
T8	5C	3	11072	4440	9/21/2013 15:55	9/21/2013 15:58	PIC	GABT13
T1	5D	3	35093	10453	9/21/2013 15:37	9/21/2013 15:40	PIC	GABT13
T2	5D	3	24961	7474	9/21/2013 15:32	9/21/2013 15:35	PIC	GABT13
T3	5D	3	26253	7872	9/21/2013 15:28	9/21/2013 15:31	PIC	GABT13
T4	5D	3	19810	6057	9/21/2013 15:24	9/21/2013 15:27	PIC	GABT13
T5	5D	3	14883	4796	9/21/2013 15:55	9/21/2013 15:58	PIC	GABT13
T6	5D	3	16996	5558	9/21/2013 15:51	9/21/2013 15:54	PIC	GABT13
T7	5D	3	13693	4503	9/21/2013 15:47	9/21/2013 15:50	PIC	GABT13
T8	5D	3	11533	4110	9/21/2013 15:43	9/21/2013 15:46	PIC	GABT13
T1	6A	3	34640	10809	9/21/2013 15:43	9/21/2013 15:46	PIC	GABT13
T2	6A	3	24443	7792	9/21/2013 15:55	9/21/2013 15:58	PIC	GABT13
T3	6A	3	25419	8002	9/21/2013 15:51	9/21/2013 15:54	PIC	GABT13
T4	6A	3	19138	6254	9/21/2013 15:47	9/21/2013 15:50	PIC	GABT13
T5	6A	3	14561	4892	9/21/2013 15:24	9/21/2013 15:27	PIC	GABT13
T6	6A	3	16553	5736	9/21/2013 15:37	9/21/2013 15:40	PIC	GABT13
T7	6A	3	13454	4753	9/21/2013 15:33	9/21/2013 15:36	PIC	GABT13
T8	6A	3	11480	4052	9/21/2013 15:28	9/21/2013 15:31	PIC	GABT13
T1	6B	3.01	35103	11056	9/21/2013 15:47	9/21/2013 15:50	PIC	GABT13
T2	6B	3	24931	7856	9/21/2013 15:43	9/21/2013 15:46	PIC	GABT13
T3	6B	3	25892	8220	9/21/2013 15:55	9/21/2013 15:58	PIC	GABT13
T4	6B	3	19672	6530	9/21/2013 15:51	9/21/2013 15:54	PIC	GABT13

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T5	6B	3	14964	5099	9/21/2013 15:29	9/21/2013 15:32	PIC	GABT13
T6	6B	3	17201	6184	9/21/2013 15:24	9/21/2013 15:27	PIC	GABT13
T7	6B	3	13552	4906	9/21/2013 15:38	9/21/2013 15:41	PIC	GABT13
T8	6B	3	11614	4281	9/21/2013 15:33	9/21/2013 15:36	PIC	GABT13
T1	6C	3	34522	10905	9/21/2013 15:51	9/21/2013 15:54	PIC	GABT13
T2	6C	3	24738	7921	9/21/2013 15:47	9/21/2013 15:50	PIC	GABT13
T3	6C	3	25354	8213	9/21/2013 15:43	9/21/2013 15:46	PIC	GABT13
T4	6C	3	19155	6228	9/21/2013 15:55	9/21/2013 15:58	PIC	GABT13
T5	6C	3	14724	4897	9/21/2013 15:33	9/21/2013 15:36	PIC	GABT13
T6	6C	3	16503	5718	9/21/2013 15:29	9/21/2013 15:32	PIC	GABT13
T7	6C	3	13310	4686	9/21/2013 15:24	9/21/2013 15:27	PIC	GABT13
T8	6C	3	11686	4010	9/21/2013 15:38	9/21/2013 15:41	PIC	GABT13
T1	7A	3	34511	12043	9/21/2013 14:32	9/21/2013 14:35	PIC	GABT13
T2	7A	3	24026	9145	9/21/2013 15:01	9/21/2013 15:04	PIC	GABT13
T3	7A	3	24877	9216	9/21/2013 14:47	9/21/2013 14:50	PIC	GABT13
T4	7A	3	18816	7304	9/21/2013 14:40	9/21/2013 14:43	PIC	GABT13
T5	7A	3	14162	5734	9/21/2013 15:06	9/21/2013 15:09	PIC	GABT13
T6	7A	3	16266	6547	9/21/2013 15:19	9/21/2013 15:22	PIC	GABT13
T7	7A	3	13146	5473	9/21/2013 15:15	9/21/2013 15:18	PIC	GABT13
T8	7A	3	10895	4811	9/21/2013 15:10	9/21/2013 15:13	PIC	GABT13
T1	7B	3	34525	11539	9/21/2013 14:40	9/21/2013 14:43	PIC	GABT13
T2	7B	3	24246	8491	9/21/2013 14:32	9/21/2013 14:35	PIC	GABT13
T3	7B	3	25236	8729	9/21/2013 15:01	9/21/2013 15:04	PIC	GABT13
T4	7B	3	18582	6833	9/21/2013 14:47	9/21/2013 14:50	PIC	GABT13
T5	7B	3	14332	5407	9/21/2013 15:10	9/21/2013 15:13	PIC	GABT13
T6	7B	3	16250	6236	9/21/2013 15:06	9/21/2013 15:09	PIC	GABT13
T7	7B	3	13092	5120	9/21/2013 15:19	9/21/2013 15:22	PIC	GABT13
T8	7B	3	11162	4558	9/21/2013 15:15	9/21/2013 15:18	PIC	GABT13
T1	7C	3	33244	12198	9/21/2013 14:47	9/21/2013 14:50	PIC	GABT13
T2	7C	3	22887	9301	9/21/2013 14:40	9/21/2013 14:43	PIC	GABT13
T3	7C	3	24232	9667	9/21/2013 14:32	9/21/2013 14:35	PIC	GABT13
T4	7C	3	18072	7621	9/21/2013 15:01	9/21/2013 15:04	PIC	GABT13
T5	7C	3	13832	5834	9/21/2013 15:15	9/21/2013 15:18	PIC	GABT13
T6	7C	3	15615	6970	9/21/2013 15:10	9/21/2013 15:13	PIC	GABT13
T7	7C	3	12686	5643	9/21/2013 15:06	9/21/2013 15:09	PIC	GABT13
T8	7C	3	10423	5047	9/21/2013 15:19	9/21/2013 15:22	PIC	GABT13
T1	7D	3	33954	11457	9/21/2013 15:01	9/21/2013 15:04	PIC	GABT13

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T2	7D	3	23537	8640	9/21/2013 14:47	9/21/2013 14:50	PIC	GABT13
T3	7D	3	24153	8987	9/21/2013 14:40	9/21/2013 14:43	PIC	GABT13
T4	7D	3	18055	7352	9/21/2013 14:35	9/21/2013 14:38	PIC	GABT13
T5	7D	3	13819	5470	9/21/2013 15:19	9/21/2013 15:22	PIC	GABT13
T6	7D	3	15810	6495	9/21/2013 15:15	9/21/2013 15:18	PIC	GABT13
T7	7D	3	12625	5313	9/21/2013 15:10	9/21/2013 15:13	PIC	GABT13
T8	7D	3	10656	4717	9/21/2013 15:06	9/21/2013 15:09	PIC	GABT13
T1	8A	3	31018	14612	9/21/2013 15:06	9/21/2013 15:09	PIC	GABT13
T2	8A	3	20343	12274	9/21/2013 15:20	9/21/2013 15:23	PIC	GABT13
T3	8A	3	20884	12693	9/21/2013 15:15	9/21/2013 15:18	PIC	GABT13
T4	8A	3	15866	9739	9/21/2013 15:11	9/21/2013 15:14	PIC	GABT13
T5	8A	3	11157	8318	9/21/2013 14:33	9/21/2013 14:36	PIC	GABT13
T6	8A	3	14292	8293	9/21/2013 15:01	9/21/2013 15:04	PIC	GABT13
T7	8A	3	11017	7106	9/21/2013 14:47	9/21/2013 14:50	PIC	GABT13
T8	8A	3	9518	6071	9/21/2013 14:40	9/21/2013 14:43	PIC	GABT13
T1	8B	3	28600	17256	9/21/2013 15:11	9/21/2013 15:14	PIC	GABT13
T2	8B	3	19779	13177	9/21/2013 15:06	9/21/2013 15:09	PIC	GABT13
T3	8B	3	19917	14162	9/21/2013 15:20	9/21/2013 15:23	PIC	GABT13
T4	8B	3	15271	10887	9/21/2013 15:15	9/21/2013 15:18	PIC	GABT13
T5	8B	3	11870	8125	9/21/2013 14:41	9/21/2013 14:44	PIC	GABT13
T6	8B	3	12916	9645	9/21/2013 14:33	9/21/2013 14:36	PIC	GABT13
T7	8B	3	10742	7823	9/21/2013 15:01	9/21/2013 15:04	PIC	GABT13
T8	8B	3	9109	6918	9/21/2013 14:47	9/21/2013 14:50	PIC	GABT13
T1	8C	3	28210	17064	9/21/2013 15:15	9/21/2013 15:18	PIC	GABT13
T2	8C	3	19081	13394	9/21/2013 15:11	9/21/2013 15:14	PIC	GABT13
T3	8C	3	19710	13759	9/21/2013 15:06	9/21/2013 15:09	PIC	GABT13
T4	8C	3	14764	10763	9/21/2013 15:20	9/21/2013 15:23	PIC	GABT13
T5	8C	3	11487	8101	9/21/2013 14:47	9/21/2013 14:50	PIC	GABT13
T6	8C	3	12906	9825	9/21/2013 14:41	9/21/2013 14:44	PIC	GABT13
T7	8C	3	10203	7909	9/21/2013 14:33	9/21/2013 14:36	PIC	GABT13
T8	8C	3	8954	6818	9/21/2013 15:02	9/21/2013 15:05	PIC	GABT13
T1	8D	3	36410	12037	9/21/2013 15:20	9/21/2013 15:23	PIC	GABT13
T2	8D	3	24895	8761	9/21/2013 15:15	9/21/2013 15:18	PIC	GABT13
T3	8D	3	26284	9029	9/21/2013 15:11	9/21/2013 15:14	PIC	GABT13
T4	8D	3	19836	7087	9/21/2013 15:06	9/21/2013 15:09	PIC	GABT13
T5	8D	3	15467	5654	9/21/2013 15:02	9/21/2013 15:05	PIC	GABT13
T6	8D	3	17495	6388	9/21/2013 14:48	9/21/2013 14:51	PIC	GABT13

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T7	8D	3	13775	5376	9/21/2013 14:41	9/21/2013 14:44	PIC	GABT13
T8	8D	3	11499	4760	9/21/2013 14:33	9/21/2013 14:36	PIC	GABT13
T1	9A	3	33021	12504	9/21/2013 16:00	9/21/2013 16:03	PIC	GABT13
T2	9A	3	23032	9558	9/21/2013 16:16	9/21/2013 16:19	PIC	GABT13
T3	9A	3	23881	9695	9/21/2013 16:11	9/21/2013 16:14	PIC	GABT13
T4	9A	3	17779	7715	9/21/2013 16:06	9/21/2013 16:09	PIC	GABT13
T5	9A	3	13532	5898	9/21/2013 16:22	9/21/2013 16:25	PIC	GABT13
T6	9A	3	15658	7108	9/21/2013 16:55	9/21/2013 16:58	PIC	GABT13
T7	9A	3	12938	5858	9/21/2013 16:44	9/21/2013 16:47	PIC	GABT13
T8	9A	3	10528	5068	9/21/2013 16:26	9/21/2013 16:29	PIC	GABT13
T1	9B	3	33850	12109	9/21/2013 16:06	9/21/2013 16:09	PIC	GABT13
T2	9B	3	23703	8896	9/21/2013 16:00	9/21/2013 16:03	PIC	GABT13
T3	9B	3	24689	9121	9/21/2013 16:16	9/21/2013 16:19	PIC	GABT13
T4	9B	3	18446	7298	9/21/2013 16:11	9/21/2013 16:14	PIC	GABT13
T5	9B	3	13872	5468	9/21/2013 16:26	9/21/2013 16:29	PIC	GABT13
T6	9B	3	15785	6655	9/21/2013 16:22	9/21/2013 16:25	PIC	GABT13
T7	9B	3	13389	5403	9/21/2013 16:55	9/21/2013 16:58	PIC	GABT13
T8	9B	3	10887	4752	9/21/2013 16:44	9/21/2013 16:47	PIC	GABT13
T1	9C	3	32916	11976	9/21/2013 16:11	9/21/2013 16:14	PIC	GABT13
T2	9C	3	22817	8984	9/21/2013 16:06	9/21/2013 16:09	PIC	GABT13
T3	9C	3	23769	9049	9/21/2013 16:00	9/21/2013 16:03	PIC	GABT13
T4	9C	3	17607	7373	9/21/2013 16:16	9/21/2013 16:19	PIC	GABT13
T5	9C	3	13402	5503	9/21/2013 16:44	9/21/2013 16:47	PIC	GABT13
T6	9C	3	14862	6649	9/21/2013 16:26	9/21/2013 16:29	PIC	GABT13
T7	9C	3	12234	5360	9/21/2013 16:22	9/21/2013 16:25	PIC	GABT13
T8	9C	3	10433	4760	9/21/2013 16:55	9/21/2013 16:58	PIC	GABT13
T1	9D	3	33282	11666	9/21/2013 16:16	9/21/2013 16:19	PIC	GABT13
T2	9D	3	22766	8684	9/21/2013 16:11	9/21/2013 16:14	PIC	GABT13
T3	9D	3	23521	9264	9/21/2013 16:06	9/21/2013 16:09	PIC	GABT13
T4	9D	3	17565	7204	9/21/2013 16:00	9/21/2013 16:03	PIC	GABT13
T5	9D	3	14061	5043	9/21/2013 16:55	9/21/2013 16:58	PIC	GABT13
T6	9D	3	15713	6373	9/21/2013 16:44	9/21/2013 16:47	PIC	GABT13
T7	9D	3	12463	5122	9/21/2013 16:26	9/21/2013 16:29	PIC	GABT13
T8	9D	3	10479	4493	9/21/2013 16:22	9/21/2013 16:25	PIC	GABT13

Beta Calibration - PIC - Sep 2013

Standard Data	Isotope	Sr-90
	Standard ID number	0133-T
	Half Life (days)	10555.725
	Std. Act. (dpm/mL)**	55362.7
	Reference Date	4/1/1996
	Volume of spike (mL)	0.5
	Std. Nominal (dpm)	18204.73
	Decay Date	9/21/2013

\*\*\* Includes activity of Y-90, which is in equilibrium.

Source Weight	
Source	Measured weight (mg)
1	0.0
2	12.8
3	27.7
4	50.8
5	60.8
6	73.2
7	98.4
8	115.8

The following detectors were not calibrated:

6D

\*Background is considered negligible.

\*\*Decay corrected to mid-point of count

Detector (#)	Source ID (#)	Raw Count Data			Raw Beta (cpm)	Sr-90 (cpm)*	Decay Corrected Nominal (dpm)**	Sr-90 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
		Start Time	Count Time (min)	Beta (counts)					
1A	1	9/21/2013 13:30	3	25625	8541.67	8541.67	18204.06	0.4692	0.4570
1A	2	9/21/2013 13:53	3	25019	8339.67	8339.67	18204.04	0.4581	0.4481
1A	3	9/21/2013 13:40	3	22593	7531.00	7531.00	18204.05	0.4137	0.4378
1A	4	9/21/2013 13:36	3	22383	7461.00	7461.00	18204.05	0.4099	0.4218
1A	5	9/21/2013 13:57	3	23109	7703.00	7703.00	18204.03	0.4231	0.4149
1A	6	9/21/2013 14:20	3	22120	7373.33	7373.33	18204.02	0.4050	0.4063
1A	7	9/21/2013 14:06	3	21380	7126.67	7126.67	18204.03	0.3915	0.3888
1A	8	9/21/2013 14:02	3	20797	6932.33	6932.33	18204.03	0.3808	0.3768
1B	1	9/21/2013 13:36	3	25604	8534.67	8534.67	18204.05	0.4688	0.4518
1B	2	9/21/2013 13:30	3	24236	8078.67	8078.67	18204.06	0.4438	0.4435
1B	3	9/21/2013 13:53	3	22325	7441.67	7441.67	18204.04	0.4088	0.4338
1B	4	9/21/2013 13:40	3	22268	7422.67	7422.67	18204.05	0.4077	0.4188
1B	5	9/21/2013 14:02	3	23291	7763.67	7763.67	18204.03	0.4265	0.4123
1B	6	9/21/2013 13:57	3	22223	7407.67	7407.67	18204.03	0.4069	0.4043
1B	7	9/21/2013 14:20	3	21257	7085.67	7085.67	18204.02	0.3892	0.3879
1B	8	9/21/2013 14:07	3	20600	6866.67	6866.67	18204.03	0.3772	0.3766
1C	1	9/21/2013 13:41	3	26407	8802.33	8802.33	18204.05	0.4835	0.4644
1C	2	9/21/2013 13:36	3	24969	8323.00	8323.00	18204.05	0.4572	0.4549
1C	3	9/21/2013 13:30	3	22919	7639.67	7639.67	18204.06	0.4197	0.4439
1C	4	9/21/2013 13:53	3	22445	7481.67	7481.67	18204.04	0.4110	0.4268
1C	5	9/21/2013 14:07	3	23570	7856.67	7856.67	18204.03	0.4316	0.4194
1C	6	9/21/2013 14:02	3	22340	7446.67	7446.67	18204.03	0.4091	0.4102
1C	7	9/21/2013 13:57	3	21628	7209.33	7209.33	18204.03	0.3960	0.3916
1C	8	9/21/2013 14:20	3	20846	6948.67	6948.67	18204.02	0.3817	0.3787
1D	1	9/21/2013 13:53	3	25634	8544.67	8544.67	18204.04	0.4694	0.4539
1D	2	9/21/2013 13:41	3	24501	8167.00	8167.00	18204.05	0.4486	0.4449
1D	3	9/21/2013 13:36	3	22573	7524.33	7524.33	18204.05	0.4133	0.4344
1D	4	9/21/2013 13:30	3	22099	7366.33	7366.33	18204.06	0.4047	0.4182
1D	5	9/21/2013 14:20	3	22891	7630.33	7630.33	18204.02	0.4192	0.4112
1D	6	9/21/2013 14:07	3	22081	7360.33	7360.33	18204.03	0.4043	0.4024
1D	7	9/21/2013 14:02	3	21132	7044.00	7044.00	18204.03	0.3869	0.3847
1D	8	9/21/2013 13:58	3	20524	6841.33	6841.33	18204.03	0.3758	0.3725
2A	1	9/21/2013 13:58	3	23125	7708.33	7708.33	18204.03	0.4234	0.4147
2A	2	9/21/2013 14:20	3	22846	7615.33	7615.33	18204.02	0.4183	0.4069
2A	3	9/21/2013 14:07	3	20461	6820.33	6820.33	18204.03	0.3747	0.3977
2A	4	9/21/2013 14:02	3	20333	6777.67	6777.67	18204.03	0.3723	0.3836
2A	5	9/21/2013 13:31	3	21066	7022.00	7022.00	18204.06	0.3857	0.3775
2A	6	9/21/2013 13:53	3	20302	6767.33	6767.33	18204.04	0.3717	0.3699
2A	7	9/21/2013 13:41	3	19482	6494.00	6494.00	18204.05	0.3567	0.3544
2A	8	9/21/2013 13:36	3	18865	6288.33	6288.33	18204.05	0.3454	0.3438
2B	1	9/21/2013 14:02	3	22785	7595.00	7595.00	18204.03	0.4172	0.4082
2B	2	9/21/2013 13:58	3	22179	7393.00	7393.00	18204.03	0.4061	0.4003
2B	3	9/21/2013 14:20	3	20359	6786.33	6786.33	18204.02	0.3728	0.3911
2B	4	9/21/2013 14:07	3	19835	6611.67	6611.67	18204.03	0.3632	0.3769
2B	5	9/21/2013 13:36	3	21151	7050.33	7050.33	18204.05	0.3873	0.3707

Raw Count Data								Sr-90	Calculated
Detector (#)	Source ID (#)	Start Time	Count Time (min)	Beta (counts)	Raw Beta (cpm)	Sr-90 (cpm)*	Decay Corrected Nominal (dpm)**	Efficiency (cpm/dpm)	Efficiency (cpm/dpm)
2B	6	9/21/2013 13:31	3	19660	6553.33	6553.33	18204.06	0.3600	0.3631
2B	7	9/21/2013 13:53	3	19215	6405.00	6405.00	18204.04	0.3518	0.3475
2B	8	9/21/2013 13:41	3	18355	6118.33	6118.33	18204.05	0.3361	0.3368
2C	1	9/21/2013 14:07	3	23809	7936.33	7936.33	18204.03	0.4360	0.4199
2C	2	9/21/2013 14:02	3	22311	7437.00	7437.00	18204.03	0.4085	0.4129
2C	3	9/21/2013 13:58	3	21118	7039.33	7039.33	18204.03	0.3867	0.4047
2C	4	9/21/2013 14:20	3	20958	6986.00	6986.00	18204.02	0.3838	0.3921
2C	5	9/21/2013 13:41	3	21668	7222.67	7222.67	18204.05	0.3968	0.3866
2C	6	9/21/2013 13:37	3	20769	6923.00	6923.00	18204.05	0.3803	0.3798
2C	7	9/21/2013 13:31	3	20374	6791.33	6791.33	18204.06	0.3731	0.3660
2C	8	9/21/2013 13:53	3	19290	6430.00	6430.00	18204.04	0.3532	0.3565
2D	1	9/21/2013 14:20	3	23028	7676.00	7676.00	18204.02	0.4217	0.4058
2D	2	9/21/2013 14:07	3	21788	7262.67	7262.67	18204.03	0.3990	0.3981
2D	3	9/21/2013 14:03	3	19932	6644.00	6644.00	18204.03	0.3650	0.3892
2D	4	9/21/2013 13:58	3	20266	6755.33	6755.33	18204.03	0.3711	0.3753
2D	5	9/21/2013 13:53	3	20864	6954.67	6954.67	18204.04	0.3820	0.3693
2D	6	9/21/2013 13:41	3	19378	6459.33	6459.33	18204.05	0.3548	0.3618
2D	7	9/21/2013 13:37	3	19163	6387.67	6387.67	18204.05	0.3509	0.3466
2D	8	9/21/2013 13:31	3	18448	6149.33	6149.33	18204.06	0.3378	0.3362
3A	1	9/21/2013 12:02	3	24286	8095.33	8095.33	18204.13	0.4447	0.4313
3A	2	9/21/2013 12:18	3	23428	7809.33	7809.33	18204.12	0.4290	0.4232
3A	3	9/21/2013 12:13	3	21194	7064.67	7064.67	18204.12	0.3881	0.4139
3A	4	9/21/2013 12:07	3	21238	7079.33	7079.33	18204.13	0.3889	0.3994
3A	5	9/21/2013 12:26	3	22086	7362.00	7362.00	18204.11	0.4044	0.3932
3A	6	9/21/2013 13:24	3	21312	7104.00	7104.00	18204.06	0.3902	0.3854
3A	7	9/21/2013 13:19	3	20136	6712.00	6712.00	18204.07	0.3687	0.3696
3A	8	9/21/2013 13:12	3	19693	6564.33	6564.33	18204.07	0.3606	0.3587
3B	1	9/21/2013 12:07	3	25317	8439.00	8439.00	18204.13	0.4636	0.4488
3B	2	9/21/2013 12:02	3	24358	8119.33	8119.33	18204.13	0.4460	0.4405
3B	3	9/21/2013 12:18	3	22204	7401.33	7401.33	18204.12	0.4066	0.4307
3B	4	9/21/2013 12:13	3	22090	7363.33	7363.33	18204.12	0.4045	0.4156
3B	5	9/21/2013 13:12	3	22953	7651.00	7651.00	18204.07	0.4203	0.4091
3B	6	9/21/2013 12:27	3	21791	7263.67	7263.67	18204.11	0.3990	0.4010
3B	7	9/21/2013 13:24	3	21142	7047.33	7047.33	18204.06	0.3871	0.3845
3B	8	9/21/2013 13:19	3	20555	6851.67	6851.67	18204.07	0.3764	0.3732
3C	1	9/21/2013 12:13	3	25442	8480.67	8480.67	18204.12	0.4659	0.4525
3C	2	9/21/2013 12:07	3	24503	8167.67	8167.67	18204.13	0.4487	0.4435
3C	3	9/21/2013 12:02	3	22403	7467.67	7467.67	18204.13	0.4102	0.4331
3C	4	9/21/2013 12:18	3	22022	7340.67	7340.67	18204.12	0.4032	0.4168
3C	5	9/21/2013 13:20	3	23164	7721.33	7721.33	18204.07	0.4242	0.4098
3C	6	9/21/2013 13:12	3	21951	7317.00	7317.00	18204.07	0.4019	0.4011
3C	7	9/21/2013 12:27	3	20923	6974.33	6974.33	18204.11	0.3831	0.3833
3C	8	9/21/2013 13:24	3	20428	6809.33	6809.33	18204.06	0.3741	0.3711
3D	1	9/21/2013 12:18	3	24704	8234.67	8234.67	18204.12	0.4524	0.4423
3D	2	9/21/2013 12:13	3	23963	7987.67	7987.67	18204.12	0.4388	0.4343
3D	3	9/21/2013 12:07	3	22298	7432.67	7432.67	18204.13	0.4083	0.4250
3D	4	9/21/2013 12:02	3	21817	7272.33	7272.33	18204.13	0.3995	0.4107
3D	5	9/21/2013 13:24	3	22704	7568.00	7568.00	18204.06	0.4157	0.4045
3D	6	9/21/2013 13:20	3	21537	7179.00	7179.00	18204.07	0.3944	0.3968
3D	7	9/21/2013 13:12	3	20982	6994.00	6994.00	18204.07	0.3842	0.3811
3D	8	9/21/2013 12:27	3	20298	6766.00	6766.00	18204.11	0.3717	0.3703
4A	1	9/21/2013 12:27	3	24165	8055.00	8055.00	18204.11	0.4425	0.4375
4A	2	9/21/2013 13:24	3	23633	7877.67	7877.67	18204.06	0.4327	0.4297
4A	3	9/21/2013 13:20	3	22390	7463.33	7463.33	18204.07	0.4100	0.4207
4A	4	9/21/2013 13:12	3	21559	7186.33	7186.33	18204.07	0.3948	0.4066
4A	5	9/21/2013 12:03	3	22516	7505.33	7505.33	18204.13	0.4123	0.4005
4A	6	9/21/2013 12:19	3	21729	7243.00	7243.00	18204.12	0.3979	0.3930
4A	7	9/21/2013 12:13	3	20553	6851.00	6851.00	18204.12	0.3763	0.3777
4A	8	9/21/2013 12:07	3	20009	6669.67	6669.67	18204.13	0.3664	0.3671
4B	1	9/21/2013 13:12	3	25102	8367.33	8367.33	18204.07	0.4596	0.4460
4B	2	9/21/2013 12:27	3	24143	8047.67	8047.67	18204.11	0.4421	0.4374
4B	3	9/21/2013 13:25	3	21901	7300.33	7300.33	18204.06	0.4010	0.4275
4B	4	9/21/2013 13:20	3	22047	7349.00	7349.00	18204.07	0.4037	0.4121
4B	5	9/21/2013 12:08	3	22736	7578.67	7578.67	18204.13	0.4163	0.4055

Detector (#)	Source ID (#)	Raw Count Data			Raw Beta (cpm)	Sr-90 (cpm)*	Decay Corrected Nominal (dpm)**	Sr-90 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
		Start Time	Count Time (min)	Beta (counts)					
4B	6	9/21/2013 12:03	3	21870	7290.00	7290.00	18204.13	0.4005	0.3972
4B	7	9/21/2013 12:19	3	21039	7013.00	7013.00	18204.12	0.3852	0.3804
4B	8	9/21/2013 12:13	3	20015	6671.67	6671.67	18204.12	0.3665	0.3688
4C	1	9/21/2013 13:20	3	24607	8202.33	8202.33	18204.07	0.4506	0.4329
4C	2	9/21/2013 13:12	3	23130	7710.00	7710.00	18204.07	0.4235	0.4260
4C	3	9/21/2013 12:27	3	21352	7117.33	7117.33	18204.11	0.3910	0.4179
4C	4	9/21/2013 13:25	3	22152	7384.00	7384.00	18204.06	0.4056	0.4053
4C	5	9/21/2013 12:13	3	22261	7420.33	7420.33	18204.12	0.4076	0.3999
4C	6	9/21/2013 12:08	3	21527	7175.67	7175.67	18204.13	0.3942	0.3932
4C	7	9/21/2013 12:03	3	20985	6995.00	6995.00	18204.13	0.3843	0.3795
4C	8	9/21/2013 12:19	3	20088	6696.00	6696.00	18204.12	0.3678	0.3700
4D	1	9/21/2013 13:25	3	25199	8399.67	8399.67	18204.06	0.4614	0.4453
4D	2	9/21/2013 13:20	3	23618	7872.67	7872.67	18204.07	0.4325	0.4362
4D	3	9/21/2013 13:13	3	22248	7416.00	7416.00	18204.07	0.4074	0.4256
4D	4	9/21/2013 12:27	3	21918	7306.00	7306.00	18204.11	0.4013	0.4092
4D	5	9/21/2013 12:19	3	22494	7498.00	7498.00	18204.12	0.4119	0.4021
4D	6	9/21/2013 12:13	3	21560	7186.67	7186.67	18204.12	0.3948	0.3933
4D	7	9/21/2013 12:08	3	20559	6853.00	6853.00	18204.13	0.3765	0.3754
4D	8	9/21/2013 12:03	3	19888	6629.33	6629.33	18204.13	0.3642	0.3630
5A	1	9/21/2013 14:24	3	26044	8681.33	8681.33	18204.01	0.4769	0.4628
5A	2	9/21/2013 14:45	3	24973	8324.33	8324.33	18204.00	0.4573	0.4535
5A	3	9/21/2013 14:38	3	22977	7659.00	7659.00	18204.00	0.4207	0.4428
5A	4	9/21/2013 14:34	3	22672	7557.33	7557.33	18204.00	0.4151	0.4260
5A	5	9/21/2013 15:00	3	23532	7844.00	7844.00	18203.98	0.4309	0.4188
5A	6	9/21/2013 15:13	3	22258	7419.33	7419.33	18203.97	0.4076	0.4099
5A	7	9/21/2013 15:09	3	21577	7192.33	7192.33	18203.98	0.3951	0.3916
5A	8	9/21/2013 15:04	3	20799	6933.00	6933.00	18203.98	0.3809	0.3791
5B	1	9/21/2013 14:34	3	25846	8615.33	8615.33	18204.00	0.4733	0.4590
5B	2	9/21/2013 14:24	3	24804	8268.00	8268.00	18204.01	0.4542	0.4499
5B	3	9/21/2013 14:45	3	22810	7603.33	7603.33	18204.00	0.4177	0.4393
5B	4	9/21/2013 14:38	3	22478	7492.67	7492.67	18204.00	0.4116	0.4228
5B	5	9/21/2013 15:04	3	23360	7786.67	7786.67	18203.98	0.4277	0.4157
5B	6	9/21/2013 15:00	3	22017	7339.00	7339.00	18203.98	0.4032	0.4069
5B	7	9/21/2013 15:13	3	21376	7125.33	7125.33	18203.97	0.3914	0.3889
5B	8	9/21/2013 15:09	3	20752	6917.33	6917.33	18203.98	0.3800	0.3765
5C	1	9/21/2013 14:39	3	25881	8627.00	8627.00	18204.00	0.4739	0.4606
5C	2	9/21/2013 14:34	3	25038	8346.00	8346.00	18204.00	0.4585	0.4510
5C	3	9/21/2013 14:24	3	22892	7630.67	7630.67	18204.01	0.4192	0.4398
5C	4	9/21/2013 14:45	3	22178	7392.67	7392.67	18204.00	0.4061	0.4225
5C	5	9/21/2013 15:09	3	23120	7706.67	7706.67	18203.98	0.4234	0.4150
5C	6	9/21/2013 15:04	3	22262	7420.67	7420.67	18203.98	0.4076	0.4056
5C	7	9/21/2013 15:00	3	21171	7057.00	7057.00	18203.98	0.3877	0.3867
5C	8	9/21/2013 15:13	3	20671	6890.33	6890.33	18203.97	0.3785	0.3737
5D	1	9/21/2013 14:45	3	25415	8471.67	8471.67	18204.00	0.4654	0.4552
5D	2	9/21/2013 14:39	3	24521	8173.67	8173.67	18204.00	0.4490	0.4464
5D	3	9/21/2013 14:34	3	22700	7566.67	7566.67	18204.00	0.4157	0.4363
5D	4	9/21/2013 14:24	3	22605	7535.00	7535.00	18204.01	0.4139	0.4206
5D	5	9/21/2013 15:13	3	23311	7770.33	7770.33	18203.97	0.4268	0.4138
5D	6	9/21/2013 15:09	3	22277	7425.67	7425.67	18203.98	0.4079	0.4053
5D	7	9/21/2013 15:04	3	21113	7037.67	7037.67	18203.98	0.3866	0.3882
5D	8	9/21/2013 15:00	3	20574	6858.00	6858.00	18203.98	0.3767	0.3763
6A	1	9/21/2013 15:00	3	25444	8481.33	8481.33	18203.98	0.4659	0.4515
6A	2	9/21/2013 15:14	3	24148	8049.33	8049.33	18203.97	0.4422	0.4427
6A	3	9/21/2013 15:09	3	22561	7520.33	7520.33	18203.98	0.4131	0.4324
6A	4	9/21/2013 15:04	3	22213	7404.33	7404.33	18203.98	0.4067	0.4165
6A	5	9/21/2013 14:26	3	23089	7696.33	7696.33	18204.01	0.4228	0.4096
6A	6	9/21/2013 14:46	3	21889	7296.33	7296.33	18203.99	0.4008	0.4011
6A	7	9/21/2013 14:39	3	21003	7001.00	7001.00	18204.00	0.3846	0.3837
6A	8	9/21/2013 14:35	3	20384	6794.67	6794.67	18204.00	0.3733	0.3717
6B	1	9/21/2013 15:05	3	25842	8614.00	8614.00	18203.98	0.4732	0.4606
6B	2	9/21/2013 15:00	3	24756	8252.00	8252.00	18203.98	0.4533	0.4511
6B	3	9/21/2013 15:14	3	22966	7655.33	7655.33	18203.97	0.4205	0.4402
6B	4	9/21/2013 15:10	3	22553	7517.67	7517.67	18203.98	0.4130	0.4232
6B	5	9/21/2013 14:35	3	23518	7839.33	7839.33	18204.00	0.4306	0.4158



Detector (#)	Source ID (#)	Raw Count Data			Beta (counts)	Raw Beta		Decay Corrected Nominal (dpm)**	Sr-90 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
		Start Time	Count Time (min)	Count		(cpm)	Sr-90 (cpm)*			
6B	6	9/21/2013 14:28	3	21991	7330.33	7330.33	18204.01	0.4027	0.4067	
6B	7	9/21/2013 14:46	3	21384	7128.00	7128.00	18203.99	0.3916	0.3881	
6B	8	9/21/2013 14:39	3	20538	6846.00	6846.00	18204.00	0.3761	0.3753	
6C	1	9/21/2013 15:10	3	25095	8365.00	8365.00	18203.98	0.4595	0.4481	
6C	2	9/21/2013 15:05	3	24324	8108.00	8108.00	18203.98	0.4454	0.4397	
6C	3	9/21/2013 15:00	3	22361	7453.67	7453.67	18203.98	0.4095	0.4298	
6C	4	9/21/2013 15:14	3	22007	7335.67	7335.67	18203.97	0.4030	0.4145	
6C	5	9/21/2013 14:39	3	23024	7674.67	7674.67	18204.00	0.4216	0.4079	
6C	6	9/21/2013 14:35	3	21525	7175.00	7175.00	18204.00	0.3941	0.3997	
6C	7	9/21/2013 14:28	3	21308	7102.67	7102.67	18204.01	0.3902	0.3830	
6C	8	9/21/2013 14:46	3	20267	6755.67	6755.67	18203.99	0.3711	0.3715	
7A	1	9/21/2013 15:24	3	25836	8612.00	8612.00	18203.96	0.4731	0.4576	
7A	2	9/21/2013 15:38	3	24812	8270.67	8270.67	18203.95	0.4543	0.4487	
7A	3	9/21/2013 15:33	3	22637	7545.67	7545.67	18203.96	0.4145	0.4383	
7A	4	9/21/2013 15:29	3	22367	7455.67	7455.67	18203.96	0.4096	0.4222	
7A	5	9/21/2013 15:44	3	23254	7751.33	7751.33	18203.95	0.4258	0.4153	
7A	6	9/21/2013 15:57	3	22113	7371.00	7371.00	18203.94	0.4049	0.4066	
7A	7	9/21/2013 15:52	3	21394	7131.33	7131.33	18203.94	0.3917	0.3890	
7A	8	9/21/2013 15:48	3	20794	6931.33	6931.33	18203.94	0.3808	0.3769	
7B	1	9/21/2013 15:29	3	25947	8649.00	8649.00	18203.96	0.4751	0.4600	
7B	2	9/21/2013 15:25	3	24962	8320.67	8320.67	18203.96	0.4571	0.4510	
7B	3	9/21/2013 15:38	3	22788	7596.00	7596.00	18203.95	0.4173	0.4405	
7B	4	9/21/2013 15:33	3	22297	7432.33	7432.33	18203.96	0.4083	0.4243	
7B	5	9/21/2013 15:48	3	23465	7821.67	7821.67	18203.94	0.4297	0.4173	
7B	6	9/21/2013 15:44	3	22274	7424.67	7424.67	18203.95	0.4079	0.4085	
7B	7	9/21/2013 15:57	3	21551	7183.67	7183.67	18203.94	0.3946	0.3908	
7B	8	9/21/2013 15:52	3	20819	6939.67	6939.67	18203.94	0.3812	0.3786	
7C	1	9/21/2013 15:34	3	24857	8285.67	8285.67	18203.96	0.4552	0.4437	
7C	2	9/21/2013 15:29	3	24176	8058.67	8058.67	18203.96	0.4427	0.4354	
7C	3	9/21/2013 15:25	3	22112	7370.67	7370.67	18203.96	0.4049	0.4257	
7C	4	9/21/2013 15:38	3	21602	7200.67	7200.67	18203.95	0.3956	0.4108	
7C	5	9/21/2013 15:53	3	22837	7612.33	7612.33	18203.94	0.4182	0.4043	
7C	6	9/21/2013 15:48	3	21615	7205.00	7205.00	18203.94	0.3958	0.3963	
7C	7	9/21/2013 15:44	3	20772	6924.00	6924.00	18203.95	0.3804	0.3800	
7C	8	9/21/2013 15:57	3	20339	6779.67	6779.67	18203.94	0.3724	0.3688	
7D	1	9/21/2013 15:39	3	25491	8497.00	8497.00	18203.95	0.4668	0.4544	
7D	2	9/21/2013 15:34	3	24470	8156.67	8156.67	18203.96	0.4481	0.4453	
7D	3	9/21/2013 15:29	3	22692	7564.00	7564.00	18203.96	0.4155	0.4348	
7D	4	9/21/2013 15:25	3	22394	7464.67	7464.67	18203.96	0.4101	0.4186	
7D	5	9/21/2013 15:57	3	22949	7649.67	7649.67	18203.94	0.4202	0.4115	
7D	6	9/21/2013 15:53	3	22151	7383.67	7383.67	18203.94	0.4056	0.4028	
7D	7	9/21/2013 15:48	3	20830	6943.33	6943.33	18203.94	0.3814	0.3850	
7D	8	9/21/2013 15:44	3	20618	6872.67	6872.67	18203.95	0.3775	0.3728	
8A	1	9/21/2013 15:44	3	22437	7479.00	7479.00	18203.95	0.4108	0.4006	
8A	2	9/21/2013 15:57	3	21492	7164.00	7164.00	18203.94	0.3935	0.3924	
8A	3	9/21/2013 15:53	3	20337	6779.00	6779.00	18203.94	0.3724	0.3828	
8A	4	9/21/2013 15:48	3	19590	6530.00	6530.00	18203.94	0.3587	0.3681	
8A	5	9/21/2013 15:25	3	19913	6637.67	6637.67	18203.96	0.3646	0.3617	
8A	6	9/21/2013 15:39	3	19463	6487.67	6487.67	18203.95	0.3564	0.3537	
8A	7	9/21/2013 15:34	3	18241	6080.33	6080.33	18203.95	0.3340	0.3376	
8A	8	9/21/2013 15:30	3	18172	6057.33	6057.33	18203.96	0.3327	0.3265	
8B	1	9/21/2013 15:48	3	22367	7455.67	7455.67	18203.94	0.4096	0.4014	
8B	2	9/21/2013 15:44	3	21728	7242.67	7242.67	18203.95	0.3979	0.3940	
8B	3	9/21/2013 15:57	3	20205	6735.00	6735.00	18203.94	0.3700	0.3855	
8B	4	9/21/2013 15:53	3	19767	6589.00	6589.00	18203.94	0.3620	0.3723	
8B	5	9/21/2013 15:30	3	20729	6909.67	6909.67	18203.96	0.3796	0.3666	
8B	6	9/21/2013 15:25	3	19567	6522.33	6522.33	18203.96	0.3583	0.3595	
8B	7	9/21/2013 15:39	3	18959	6319.67	6319.67	18203.95	0.3472	0.3451	
8B	8	9/21/2013 15:34	3	18303	6101.00	6101.00	18203.95	0.3351	0.3351	
8C	1	9/21/2013 15:53	3	21830	7276.67	7276.67	18203.94	0.3997	0.3922	
8C	2	9/21/2013 15:48	3	21368	7122.67	7122.67	18203.94	0.3913	0.3847	
8C	3	9/21/2013 15:44	3	19704	6568.00	6568.00	18203.95	0.3608	0.3760	
8C	4	9/21/2013 15:57	3	19401	6467.00	6467.00	18203.94	0.3553	0.3626	
8C	5	9/21/2013 15:34	3	19818	6606.00	6606.00	18203.95	0.3629	0.3568	

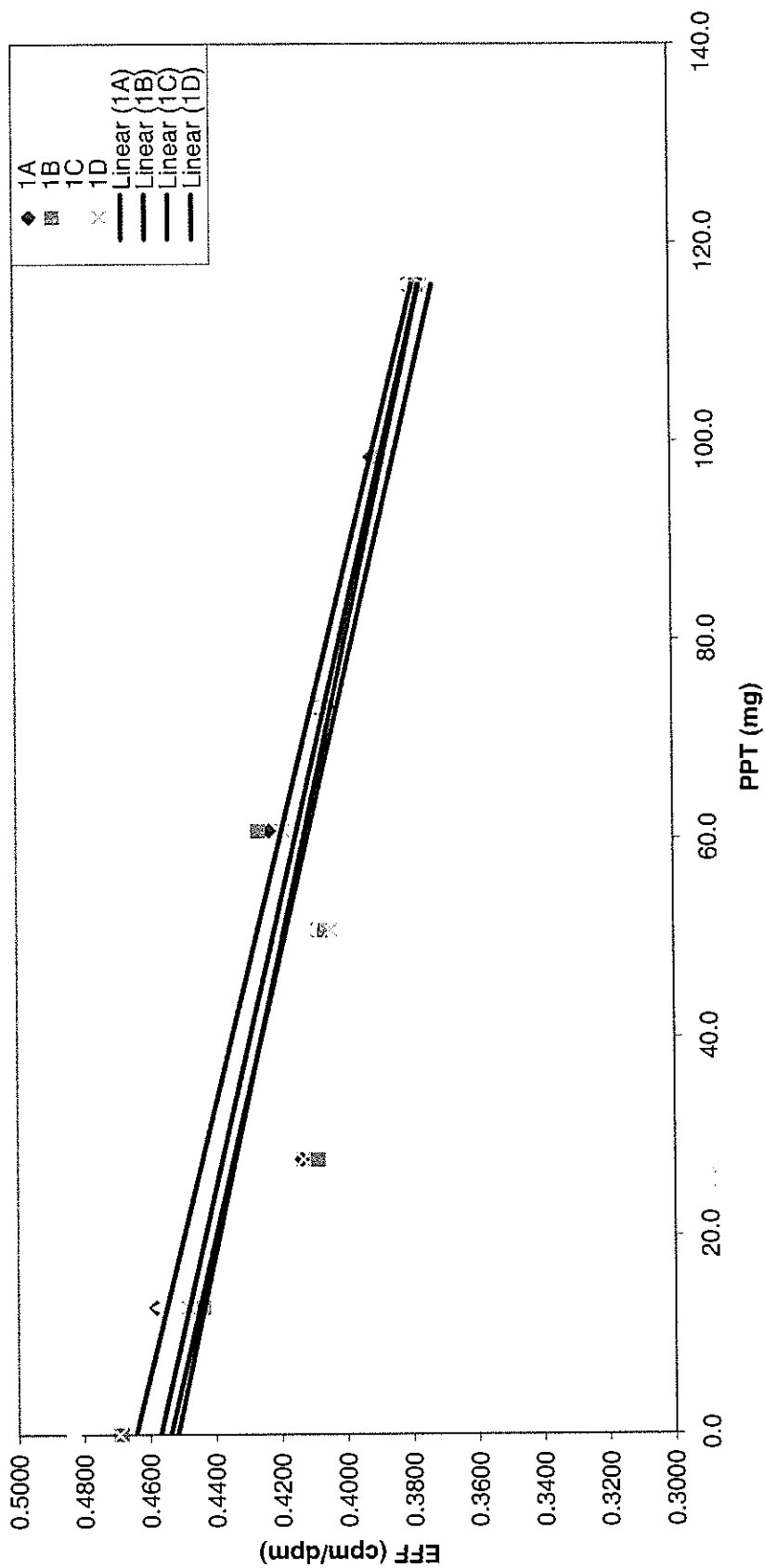
Detector (#)	Source ID (#)	Raw Count Data			Beta (counts)	Raw Beta (cpm)	Sr-90 (cpm)*	Decay Corrected Nominal (dpm)**	Sr-90	Calculated
		Start Time	Count Time (min)	Efficiency (cpm/dpm)					Efficiency (cpm/dpm)	
8C	6	9/21/2013 15:30	3	19029	6343.00	6343.00	18203.96	0.3484	0.3495	
8C	7	9/21/2013 15:25	3	18223	6074.33	6074.33	18203.96	0.3337	0.3348	
8C	8	9/21/2013 15:39	3	17983	5994.33	5994.33	18203.95	0.3293	0.3247	
8D	1	9/21/2013 15:57	3	25811	8603.67	8603.67	18203.94	0.4726	0.4600	
8D	2	9/21/2013 15:53	3	24854	8284.67	8284.67	18203.94	0.4551	0.4510	
8D	3	9/21/2013 15:48	3	22758	7586.00	7586.00	18203.94	0.4167	0.4406	
8D	4	9/21/2013 15:44	3	22505	7501.67	7501.67	18203.95	0.4121	0.4244	
8D	5	9/21/2013 15:39	3	23615	7871.67	7871.67	18203.95	0.4324	0.4174	
8D	6	9/21/2013 15:34	3	22557	7519.00	7519.00	18203.95	0.4130	0.4087	
8D	7	9/21/2013 15:30	3	21368	7122.67	7122.67	18203.96	0.3913	0.3910	
8D	8	9/21/2013 15:25	3	20679	6893.00	6893.00	18203.96	0.3787	0.3788	
9A	1	9/21/2013 17:01	3	26109	8703.00	8703.00	18203.88	0.4781	0.4646	
9A	2	9/21/2013 17:16	3	25227	8409.00	8409.00	18203.87	0.4619	0.4548	
9A	3	9/21/2013 17:11	3	22999	7666.33	7666.33	18203.87	0.4211	0.4433	
9A	4	9/21/2013 17:07	3	22512	7504.00	7504.00	18203.88	0.4122	0.4255	
9A	5	9/21/2013 17:21	3	23507	7835.67	7835.67	18203.87	0.4304	0.4177	
9A	6	9/21/2013 17:37	3	21945	7315.00	7315.00	18203.85	0.4018	0.4082	
9A	7	9/21/2013 17:31	3	21492	7164.00	7164.00	18203.86	0.3935	0.3887	
9A	8	9/21/2013 17:27	3	20691	6897.00	6897.00	18203.86	0.3789	0.3753	
9B	1	9/21/2013 17:07	3	25990	8663.33	8663.33	18203.88	0.4759	0.4607	
9B	2	9/21/2013 17:01	3	24930	8310.00	8310.00	18203.88	0.4565	0.4516	
9B	3	9/21/2013 17:16	3	22796	7598.67	7598.67	18203.87	0.4174	0.4411	
9B	4	9/21/2013 17:11	3	22590	7530.00	7530.00	18203.87	0.4136	0.4247	
9B	5	9/21/2013 17:27	3	23152	7717.33	7717.33	18203.86	0.4239	0.4176	
9B	6	9/21/2013 17:21	3	22396	7465.33	7465.33	18203.87	0.4101	0.4088	
9B	7	9/21/2013 17:37	3	21751	7250.33	7250.33	18203.85	0.3983	0.3909	
9B	8	9/21/2013 17:32	3	20646	6882.00	6882.00	18203.86	0.3781	0.3786	
9C	1	9/21/2013 17:12	3	25465	8488.33	8488.33	18203.87	0.4663	0.4530	
9C	2	9/21/2013 17:07	3	24707	8235.67	8235.67	18203.88	0.4524	0.4442	
9C	3	9/21/2013 17:01	3	22353	7451.00	7451.00	18203.88	0.4093	0.4340	
9C	4	9/21/2013 17:16	3	22173	7391.00	7391.00	18203.87	0.4060	0.4181	
9C	5	9/21/2013 17:32	3	22883	7627.67	7627.67	18203.86	0.4190	0.4113	
9C	6	9/21/2013 17:27	3	22218	7406.00	7406.00	18203.86	0.4068	0.4028	
9C	7	9/21/2013 17:21	3	20983	6994.33	6994.33	18203.87	0.3842	0.3855	
9C	8	9/21/2013 17:37	3	20661	6887.00	6887.00	18203.85	0.3783	0.3736	
9D	1	9/21/2013 17:16	3	24913	8304.33	8304.33	18203.87	0.4562	0.4414	
9D	2	9/21/2013 17:12	3	23917	7972.33	7972.33	18203.87	0.4379	0.4327	
9D	3	9/21/2013 17:07	3	21731	7243.67	7243.67	18203.88	0.3979	0.4226	
9D	4	9/21/2013 17:01	3	21652	7217.33	7217.33	18203.88	0.3965	0.4069	
9D	5	9/21/2013 17:37	3	22477	7492.33	7492.33	18203.85	0.4116	0.4001	
9D	6	9/21/2013 17:32	3	21347	7115.67	7115.67	18203.86	0.3909	0.3917	
9D	7	9/21/2013 17:28	3	20518	6839.33	6839.33	18203.86	0.3757	0.3746	
9D	8	9/21/2013 17:21	3	20002	6667.33	6667.33	18203.87	0.3663	0.3628	
10A	1	9/21/2013 17:21	3	25003	8334.33	8334.33	18203.87	0.4578	0.4457	
10A	2	9/21/2013 17:37	3	24350	8116.67	8116.67	18203.85	0.4459	0.4372	
10A	3	9/21/2013 17:32	3	22013	7337.67	7337.67	18203.86	0.4031	0.4274	
10A	4	9/21/2013 17:28	3	21667	7222.33	7222.33	18203.86	0.3967	0.4121	
10A	5	9/21/2013 17:02	3	22954	7651.33	7651.33	18203.88	0.4203	0.4055	
10A	6	9/21/2013 17:17	3	21760	7253.33	7253.33	18203.87	0.3985	0.3973	
10A	7	9/21/2013 17:12	3	20689	6896.33	6896.33	18203.87	0.3788	0.3806	
10A	8	9/21/2013 17:07	3	20403	6801.00	6801.00	18203.88	0.3736	0.3691	
10B	1	9/21/2013 17:28	3	25413	8471.00	8471.00	18203.86	0.4653	0.4513	
10B	2	9/21/2013 17:21	3	24409	8136.33	8136.33	18203.87	0.4470	0.4430	
10B	3	9/21/2013 17:37	3	22490	7496.67	7496.67	18203.85	0.4118	0.4333	
10B	4	9/21/2013 17:32	3	22490	7496.67	7496.67	18203.86	0.4118	0.4183	
10B	5	9/21/2013 17:07	3	22772	7590.67	7590.67	18203.88	0.4170	0.4118	
10B	6	9/21/2013 17:02	3	21996	7332.00	7332.00	18203.88	0.4028	0.4037	
10B	7	9/21/2013 17:17	3	21251	7083.67	7083.67	18203.87	0.3891	0.3873	
10B	8	9/21/2013 17:12	3	20748	6916.00	6916.00	18203.87	0.3799	0.3760	
10C	1	9/21/2013 17:32	3	25627	8542.33	8542.33	18203.86	0.4693	0.4562	
10C	2	9/21/2013 17:28	3	24800	8266.67	8266.67	18203.86	0.4541	0.4472	
10C	3	9/21/2013 17:21	3	22496	7498.67	7498.67	18203.87	0.4119	0.4366	
10C	4	9/21/2013 17:37	3	22381	7460.33	7460.33	18203.85	0.4098	0.4203	
10C	5	9/21/2013 17:12	3	23254	7751.33	7751.33	18203.87	0.4258	0.4132	

Detector (#)	Source ID (#)	Raw Count Data			Raw Beta (cpm)	Sr-90 (cpm)*	Decay Corrected Nominal (dpm)**	Sr-90 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
		Start Time	Count Time (min)	Beta (counts)					
10C	6	9/21/2013 17:07	3	21971	7323.67	7323.67	18203.88	0.4023	0.4045
10C	7	9/21/2013 17:02	3	21225	7075.00	7075.00	18203.88	0.3887	0.3867
10C	8	9/21/2013 17:17	3	20600	6866.67	6866.67	18203.87	0.3772	0.3744
10D	1	9/21/2013 17:37	3	25707	8569.00	8569.00	18203.85	0.4707	0.4571
10D	2	9/21/2013 17:32	3	24666	8222.00	8222.00	18203.86	0.4517	0.4487
10D	3	9/21/2013 17:28	3	22551	7517.00	7517.00	18203.86	0.4129	0.4389
10D	4	9/21/2013 17:21	3	22518	7506.00	7506.00	18203.87	0.4123	0.4237
10D	5	9/21/2013 17:17	3	23963	7987.67	7987.67	18203.87	0.4388	0.4171
10D	6	9/21/2013 17:12	3	22285	7428.33	7428.33	18203.87	0.4081	0.4090
10D	7	9/21/2013 17:07	3	21399	7133.00	7133.00	18203.88	0.3918	0.3924
10D	8	9/21/2013 17:02	3	20830	6943.33	6943.33	18203.88	0.3814	0.3809
11A	1	9/21/2013 16:16	3	23343	7781.00	7781.00	18203.92	0.4274	0.4187
11A	2	9/21/2013 16:30	3	23076	7692.00	7692.00	18203.91	0.4225	0.4119
11A	3	9/21/2013 16:25	3	20922	6974.00	6974.00	18203.91	0.3831	0.4041
11A	4	9/21/2013 16:21	3	20687	6895.67	6895.67	18203.92	0.3788	0.3918
11A	5	9/21/2013 16:36	3	21368	7122.67	7122.67	18203.90	0.3913	0.3866
11A	6	9/21/2013 17:08	3	21140	7046.67	7046.67	18203.88	0.3871	0.3800
11A	7	9/21/2013 16:57	3	20106	6702.00	6702.00	18203.89	0.3682	0.3667
11A	8	9/21/2013 16:40	3	19597	6532.33	6532.33	18203.90	0.3588	0.3575
11B	1	9/21/2013 16:21	3	25687	8562.33	8562.33	18203.92	0.4704	0.4568
11B	2	9/21/2013 16:16	3	24716	8238.67	8238.67	18203.92	0.4526	0.4478
11B	3	9/21/2013 16:30	3	22599	7533.00	7533.00	18203.91	0.4138	0.4372
11B	4	9/21/2013 16:25	3	22423	7474.33	7474.33	18203.91	0.4106	0.4208
11B	5	9/21/2013 16:40	3	23148	7716.00	7716.00	18203.90	0.4239	0.4137
11B	6	9/21/2013 16:36	3	22238	7412.67	7412.67	18203.90	0.4072	0.4049
11B	7	9/21/2013 17:08	3	21184	7061.33	7061.33	18203.88	0.3879	0.3871
11B	8	9/21/2013 16:57	3	20581	6860.33	6860.33	18203.89	0.3769	0.3747
11C	1	9/21/2013 16:25	3	25944	8648.00	8648.00	18203.91	0.4751	0.4586
11C	2	9/21/2013 16:21	3	24751	8250.33	8250.33	18203.92	0.4532	0.4497
11C	3	9/21/2013 16:16	3	22621	7540.33	7540.33	18203.92	0.4142	0.4394
11C	4	9/21/2013 16:30	3	22444	7481.33	7481.33	18203.91	0.4110	0.4234
11C	5	9/21/2013 16:57	3	23360	7786.67	7786.67	18203.89	0.4277	0.4164
11C	6	9/21/2013 16:40	3	22361	7453.67	7453.67	18203.90	0.4095	0.4078
11C	7	9/21/2013 16:36	3	21503	7167.67	7167.67	18203.90	0.3937	0.3903
11C	8	9/21/2013 17:08	3	20724	6908.00	6908.00	18203.88	0.3795	0.3783
11D	1	9/21/2013 16:30	3	25789	8596.33	8596.33	18203.91	0.4722	0.4597
11D	2	9/21/2013 16:26	3	24851	8283.67	8283.67	18203.91	0.4550	0.4501
11D	3	9/21/2013 16:21	3	22574	7524.67	7524.67	18203.92	0.4134	0.4389
11D	4	9/21/2013 16:17	3	22497	7499.00	7499.00	18203.92	0.4119	0.4215
11D	5	9/21/2013 17:08	3	23408	7802.67	7802.67	18203.88	0.4286	0.4139
11D	6	9/21/2013 16:58	3	22214	7404.67	7404.67	18203.89	0.4068	0.4046
11D	7	9/21/2013 16:40	3	21079	7026.33	7026.33	18203.90	0.3860	0.3856
11D	8	9/21/2013 16:36	3	20358	6786.00	6786.00	18203.90	0.3728	0.3725
12A	1	9/21/2013 16:36	3	25088	8362.67	8362.67	18203.90	0.4594	0.4453
12A	2	9/21/2013 17:08	3	24334	8111.33	8111.33	18203.88	0.4456	0.4370
12A	3	9/21/2013 16:58	3	22035	7345.00	7345.00	18203.89	0.4035	0.4273
12A	4	9/21/2013 16:40	3	21621	7207.00	7207.00	18203.90	0.3959	0.4123
12A	5	9/21/2013 16:17	3	22780	7593.33	7593.33	18203.92	0.4171	0.4059
12A	6	9/21/2013 16:30	3	21800	7266.67	7266.67	18203.91	0.3992	0.3978
12A	7	9/21/2013 16:26	3	20729	6909.67	6909.67	18203.91	0.3796	0.3815
12A	8	9/21/2013 16:21	3	20591	6863.67	6863.67	18203.92	0.3770	0.3702
12B	1	9/21/2013 16:40	3	23678	7892.67	7892.67	18203.90	0.4336	0.4180
12B	2	9/21/2013 16:36	3	22544	7514.67	7514.67	18203.90	0.4128	0.4090
12B	3	9/21/2013 17:09	3	20388	6796.00	6796.00	18203.88	0.3733	0.3985
12B	4	9/21/2013 16:58	3	20391	6797.00	6797.00	18203.89	0.3734	0.3823
12B	5	9/21/2013 16:21	3	21250	7083.33	7083.33	18203.92	0.3891	0.3753
12B	6	9/21/2013 16:17	3	19693	6564.33	6564.33	18203.92	0.3606	0.3666
12B	7	9/21/2013 16:30	3	19347	6449.00	6449.00	18203.91	0.3543	0.3489
12B	8	9/21/2013 16:26	3	18471	6157.00	6157.00	18203.91	0.3382	0.3367
12C	1	9/21/2013 16:58	3	25849	8616.33	8616.33	18203.89	0.4733	0.4600
12C	2	9/21/2013 16:40	3	24804	8268.00	8268.00	18203.90	0.4542	0.4509
12C	3	9/21/2013 16:36	3	22706	7568.67	7568.67	18203.90	0.4158	0.4404
12C	4	9/21/2013 17:09	3	22573	7524.33	7524.33	18203.88	0.4133	0.4241
12C	5	9/21/2013 16:26	3	23680	7893.33	7893.33	18203.91	0.4336	0.4170

Detector (#)	Source ID (#)	Raw Count Data			Raw Beta		Decay Corrected Nominal (dpm)**	Sr-90 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
		Start Time	Count Time (min)	Beta (counts)	(cpm)	Sr-90 (cpm)*			
12C	6	9/21/2013 16:22	3	22297	7432.33	7432.33	18203.92	0.4083	0.4083
12C	7	9/21/2013 16:17	3	21578	7192.67	7192.67	18203.92	0.3951	0.3905
12C	8	9/21/2013 16:31	3	20526	6842.00	6842.00	18203.91	0.3759	0.3782
12D	1	9/21/2013 17:09	3	26384	8794.67	8794.67	18203.88	0.4831	0.4684
12D	2	9/21/2013 17:03	3	25368	8456.00	8456.00	18203.88	0.4645	0.4598
12D	3	9/21/2013 16:41	3	23293	7764.33	7764.33	18203.90	0.4265	0.4496
12D	4	9/21/2013 16:36	3	22898	7632.67	7632.67	18203.90	0.4193	0.4339
12D	5	9/21/2013 16:31	3	23905	7968.33	7968.33	18203.91	0.4377	0.4271
12D	6	9/21/2013 16:26	3	23037	7679.00	7679.00	18203.91	0.4218	0.4187
12D	7	9/21/2013 16:22	3	22185	7395.00	7395.00	18203.92	0.4062	0.4016
12D	8	9/21/2013 16:17	3	21281	7093.67	7093.67	18203.92	0.3897	0.3898
13A	1	9/24/2013 15:16	3	25299	8433.00	8433.00	18200.38	0.4633	0.4495
13A	2	9/24/2013 16:07	3	24154	8051.33	8051.33	18200.34	0.4424	0.4413
13A	3	9/24/2013 16:02	3	22411	7470.33	7470.33	18200.35	0.4105	0.4319
13A	4	9/24/2013 15:46	3	22123	7374.33	7374.33	18200.36	0.4052	0.4171
13A	5	9/24/2013 16:12	3	23299	7766.33	7766.33	18200.34	0.4267	0.4108
13A	6	9/24/2013 17:06	3	21941	7313.67	7313.67	18200.29	0.4018	0.4029
13A	7	9/24/2013 16:28	3	21501	7167.00	7167.00	18200.32	0.3938	0.3868
13A	8	9/24/2013 16:21	3	20330	6776.67	6776.67	18200.33	0.3723	0.3757
13B	1	9/24/2013 15:46	3	25707	8569.00	8569.00	18200.36	0.4708	0.4592
13B	2	9/24/2013 15:16	3	25003	8334.33	8334.33	18200.38	0.4579	0.4505
13B	3	9/24/2013 16:07	3	22716	7572.00	7572.00	18200.34	0.4160	0.4402
13B	4	9/24/2013 16:02	3	22665	7555.00	7555.00	18200.35	0.4151	0.4244
13B	5	9/24/2013 16:21	3	23407	7802.33	7802.33	18200.33	0.4287	0.4176
13B	6	9/24/2013 16:12	3	22288	7429.33	7429.33	18200.34	0.4082	0.4091
13B	7	9/24/2013 17:06	3	21552	7184.00	7184.00	18200.29	0.3947	0.3918
13B	8	9/24/2013 16:28	3	20809	6936.33	6936.33	18200.32	0.3811	0.3799
13C	1	9/24/2013 16:02	3	24439	8146.33	8146.33	18200.35	0.4476	0.4301
13C	2	9/24/2013 15:46	3	23471	7823.67	7823.67	18200.36	0.4299	0.4216
13C	3	9/24/2013 15:16	3	20847	6949.00	6949.00	18200.38	0.3818	0.4118
13C	4	9/24/2013 16:07	3	21047	7015.67	7015.67	18200.34	0.3855	0.3964
13C	5	9/24/2013 16:28	3	21798	7266.00	7266.00	18200.32	0.3992	0.3898
13C	6	9/24/2013 16:21	3	20780	6926.67	6926.67	18200.33	0.3806	0.3816
13C	7	9/24/2013 16:12	3	19932	6644.00	6644.00	18200.34	0.3650	0.3648
13C	8	9/24/2013 17:06	3	19649	6549.67	6549.67	18200.29	0.3599	0.3533
13D	1	9/24/2013 16:08	3	25369	8456.33	8456.33	18200.34	0.4646	0.4500
13D	2	9/24/2013 16:02	3	24423	8141.00	8141.00	18200.35	0.4473	0.4411
13D	3	9/24/2013 15:46	3	22268	7422.67	7422.67	18200.36	0.4078	0.4308
13D	4	9/24/2013 15:16	3	22067	7355.67	7355.67	18200.38	0.4041	0.4148
13D	5	9/24/2013 17:06	3	22700	7566.67	7566.67	18200.29	0.4157	0.4079
13D	6	9/24/2013 16:28	3	21712	7237.33	7237.33	18200.32	0.3976	0.3993
13D	7	9/24/2013 16:22	3	20958	6986.00	6986.00	18200.33	0.3838	0.3819
13D	8	9/24/2013 16:12	3	20458	6819.33	6819.33	18200.34	0.3747	0.3699
14A	1	9/24/2013 16:12	3	25239	8413.00	8413.00	18200.34	0.4622	0.4448
14A	2	9/24/2013 17:06	3	23924	7974.67	7974.67	18200.29	0.4382	0.4358
14A	3	9/24/2013 16:29	3	21860	7286.67	7286.67	18200.32	0.4004	0.4254
14A	4	9/24/2013 16:22	3	22077	7359.00	7359.00	18200.33	0.4043	0.4092
14A	5	9/24/2013 15:16	3	22308	7436.00	7436.00	18200.38	0.4086	0.4022
14A	6	9/24/2013 16:08	3	21266	7088.67	7088.67	18200.34	0.3895	0.3936
14A	7	9/24/2013 16:02	3	20788	6929.33	6929.33	18200.35	0.3807	0.3759
14A	8	9/24/2013 15:46	3	20028	6676.00	6676.00	18200.36	0.3668	0.3638
14B	1	9/24/2013 16:22	3	26392	8797.33	8797.33	18200.33	0.4834	0.4701
14B	2	9/24/2013 16:12	3	25423	8474.33	8474.33	18200.34	0.4656	0.4606
14B	3	9/24/2013 17:06	3	23499	7833.00	7833.00	18200.29	0.4304	0.4495
14B	4	9/24/2013 16:29	3	22910	7636.67	7636.67	18200.32	0.4196	0.4324
14B	5	9/24/2013 15:46	3	23778	7926.00	7926.00	18200.36	0.4355	0.4250
14B	6	9/24/2013 15:17	3	22469	7489.67	7489.67	18200.38	0.4115	0.4158
14B	7	9/24/2013 16:08	3	21921	7307.00	7307.00	18200.34	0.4015	0.3972
14B	8	9/24/2013 16:02	3	21162	7054.00	7054.00	18200.35	0.3876	0.3843
14C	1	9/24/2013 16:29	3	24820	8273.33	8273.33	18200.32	0.4546	0.4411
14C	2	9/24/2013 16:22	3	24032	8010.67	8010.67	18200.33	0.4401	0.4329
14C	3	9/24/2013 16:12	3	21582	7194.00	7194.00	18200.34	0.3953	0.4234
14C	4	9/24/2013 17:06	3	21926	7308.67	7308.67	18200.29	0.4016	0.4087
14C	5	9/24/2013 16:02	3	22686	7562.00	7562.00	18200.35	0.4155	0.4024

Detector (#)	Source ID (#)	Raw Count Data			Raw Beta (cpm)	Sr-90 (cpm)*	Decay Corrected Nominal (dpm)**	Sr-90 Efficiency (cpm/dpm)	Calculated Efficiency (cpm/dpm)
		Start Time	Count Time (min)	Beta (counts)					
14C	6	9/24/2013 15:47	3	21331	7110.33	7110.33	18200.36	0.3907	0.3945
14C	7	9/24/2013 15:17	3	20928	6976.00	6976.00	18200.38	0.3833	0.3784
14C	8	9/24/2013 16:08	3	20079	6693.00	6693.00	18200.34	0.3677	0.3673
14D	1	9/24/2013 17:06	3	25905	8635.00	8635.00	18200.29	0.4744	0.4627
14D	2	9/24/2013 16:29	3	25199	8399.67	8399.67	18200.32	0.4615	0.4535
14D	3	9/24/2013 16:22	3	23027	7675.67	7675.67	18200.33	0.4217	0.4428
14D	4	9/24/2013 16:12	3	22602	7534.00	7534.00	18200.34	0.4139	0.4263
14D	5	9/24/2013 16:08	3	23468	7822.67	7822.67	18200.34	0.4298	0.4192
14D	6	9/24/2013 16:02	3	22259	7419.67	7419.67	18200.35	0.4077	0.4103
14D	7	9/24/2013 15:47	3	21431	7143.67	7143.67	18200.36	0.3925	0.3923
14D	8	9/24/2013 15:17	3	21039	7013.00	7013.00	18200.38	0.3853	0.3798

### Beta Calibration



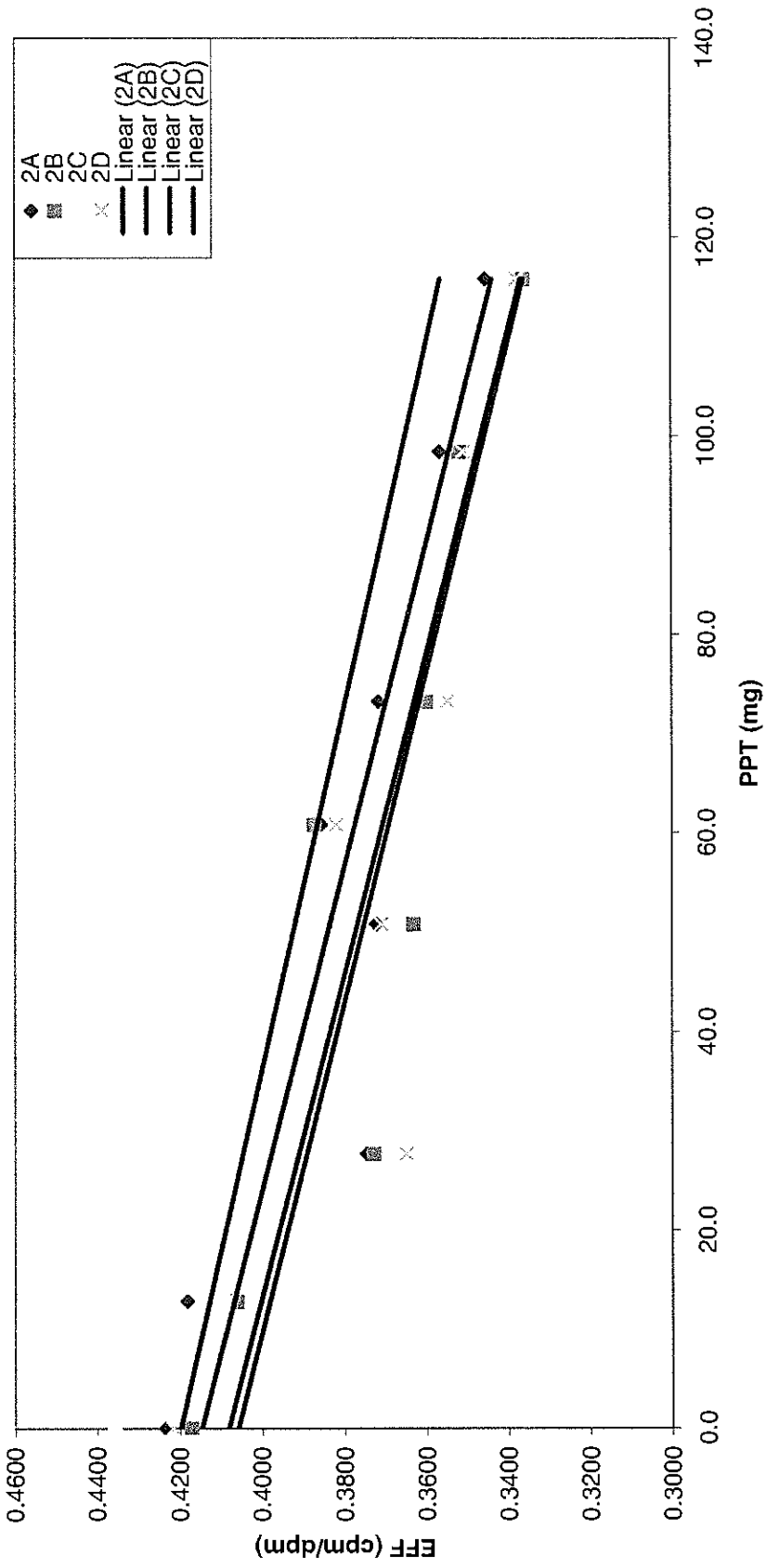
$$1A y = -6.927004E-04x + 4.569778E-01$$

$$1B y = -6.489090E-04x + 4.517750E-01$$

$$1C y = -7.396285E-04x + 4.643580E-01$$

$$1D y = -7.027723E-04x + 4.538896E-01$$

### Beta Calibration



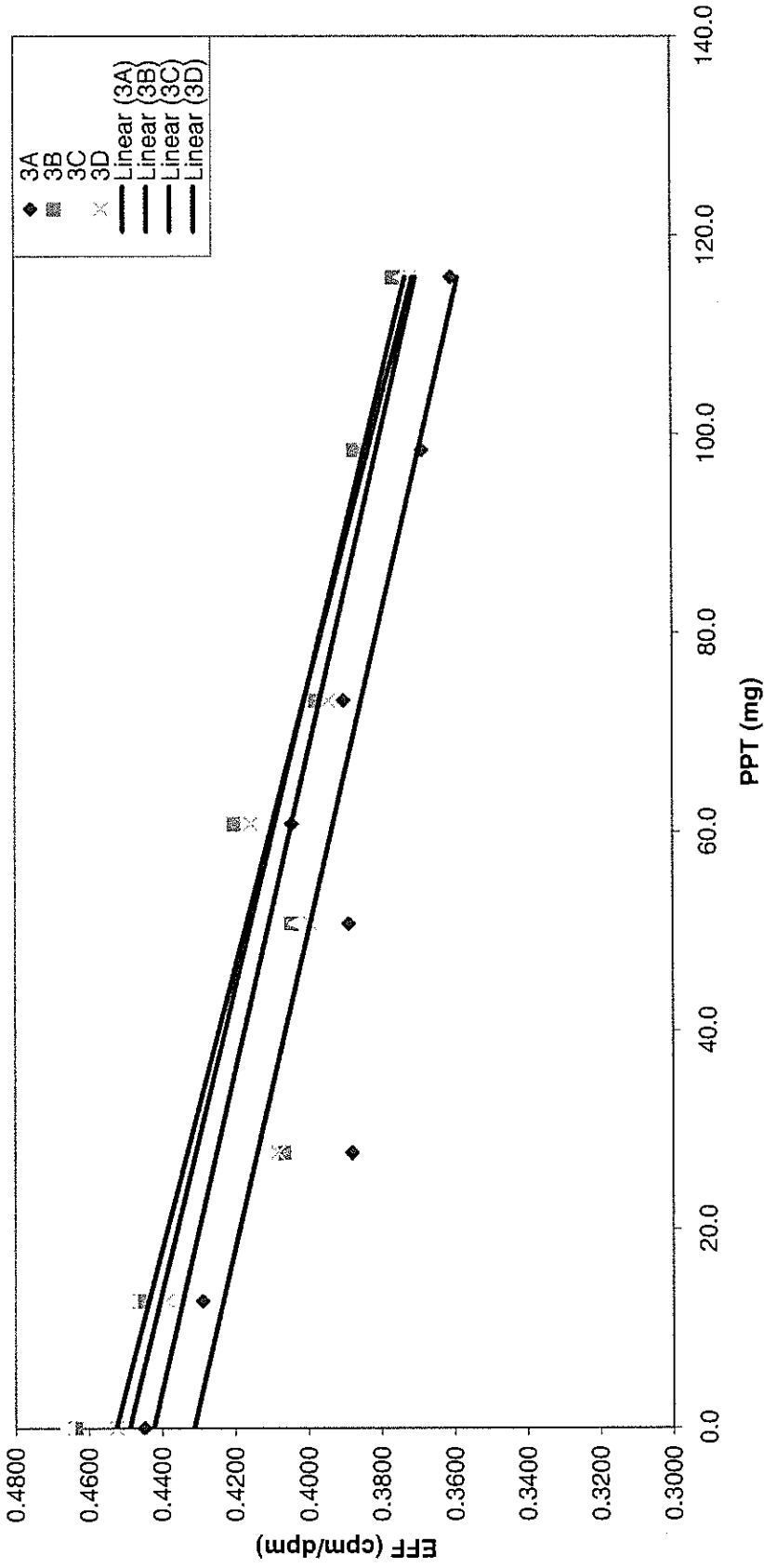
$$2A y = -6.128691E-04x + 4.147205E-01$$

$$2B y = -6.164420E-04x + 4.081852E-01$$

$$2C y = -5.473804E-04x + 4.198593E-01$$

$$2D y = -6.012719E-04x + 4.058137E-01$$

# Beta Calibration



$3A y = -6.268001E-04x + 4.312616E-01$

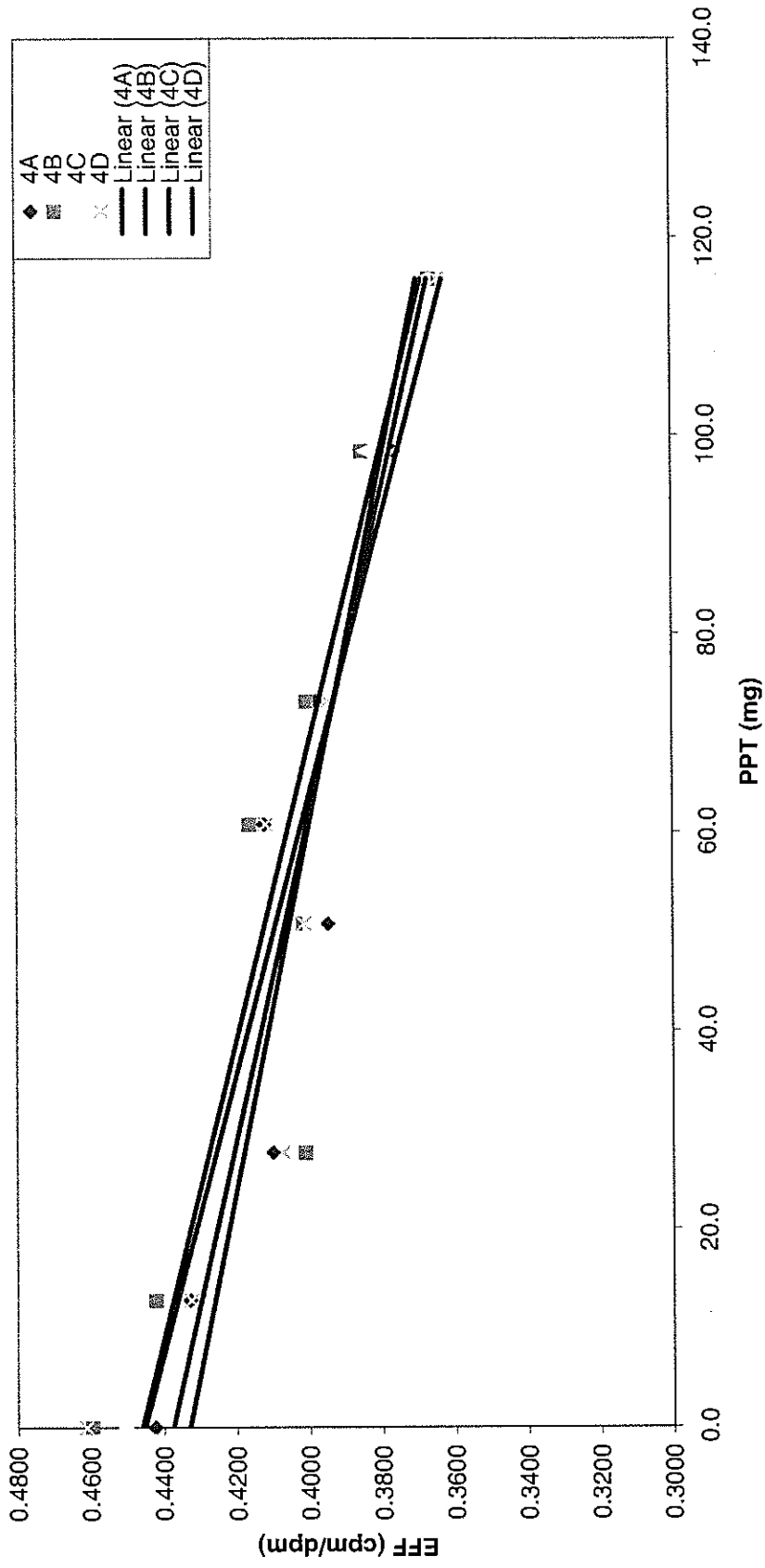
$3B y = -6.535905E-04x + 4.488401E-01$

$3C y = -7.032192E-04x + 4.525416E-01$

$3D y = -6.214772E-04x + 4.422533E-01$

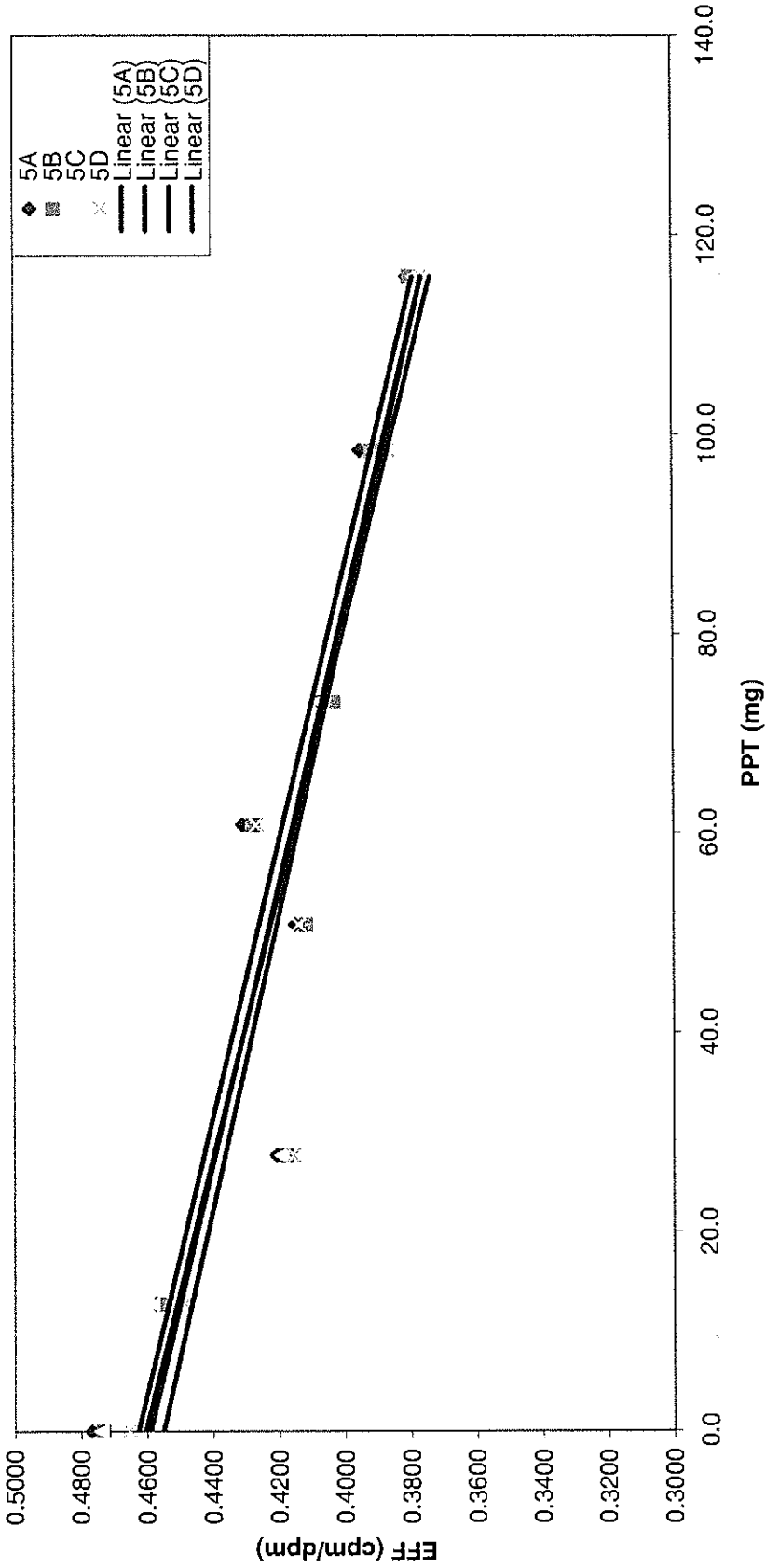


# Beta Calibration



- 4Ay = -6.083781E-04x + 4.375305E-01
- 4By = -6.661295E-04x + 4.459653E-01
- 4Cy = -5.429665E-04x + 4.329024E-01
- 4Dy = -7.103401E-04x + 4.452607E-01

# Beta Calibration



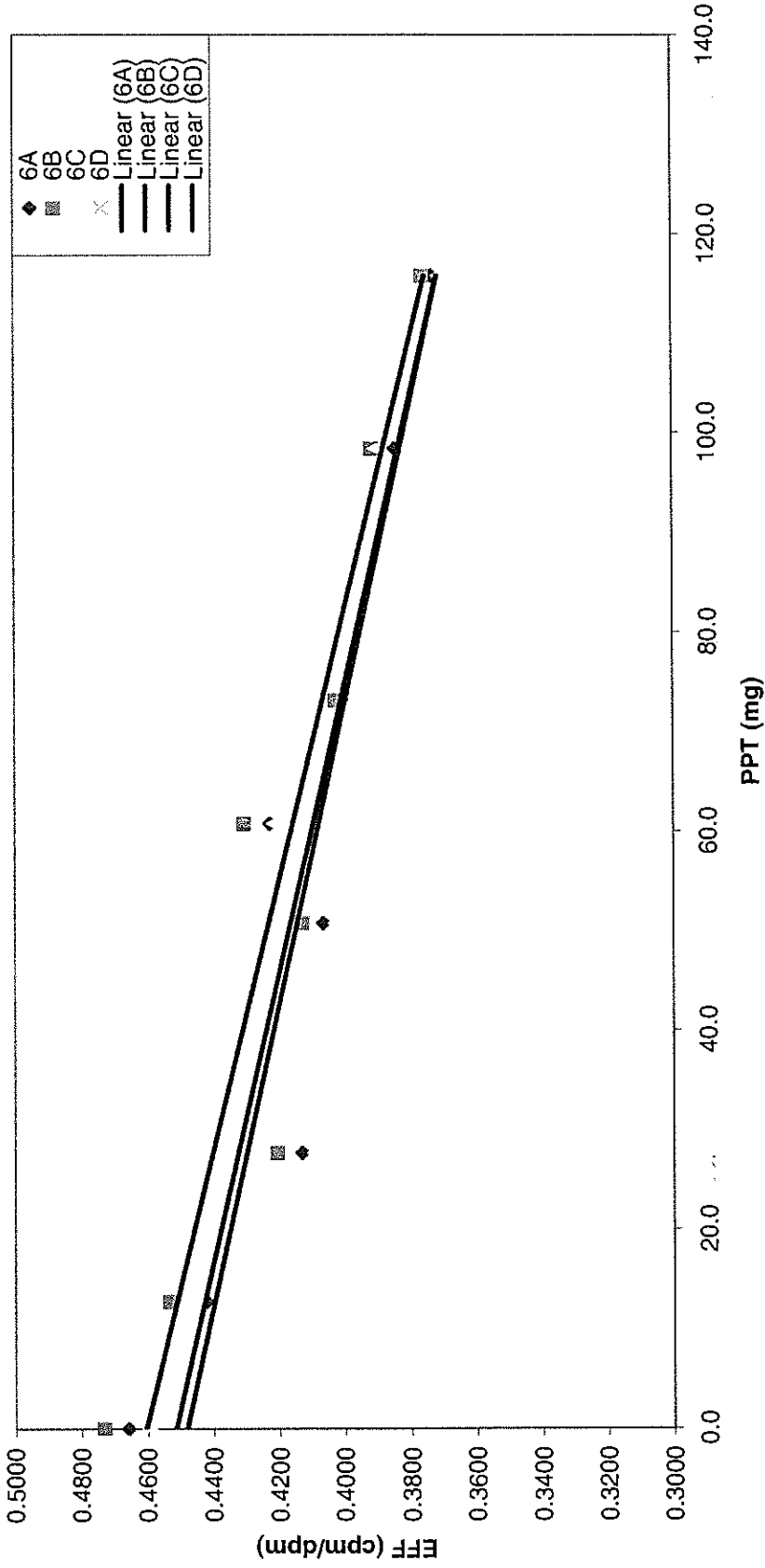
$$5A y = -7.229994E-04x + 4.627772E-01$$

$$5B y = -7.129095E-04x + 4.590436E-01$$

$$5C y = -7.503590E-04x + 4.605746E-01$$

$$5D y = -6.806751E-04x + 4.551510E-01$$

# Beta Calibration



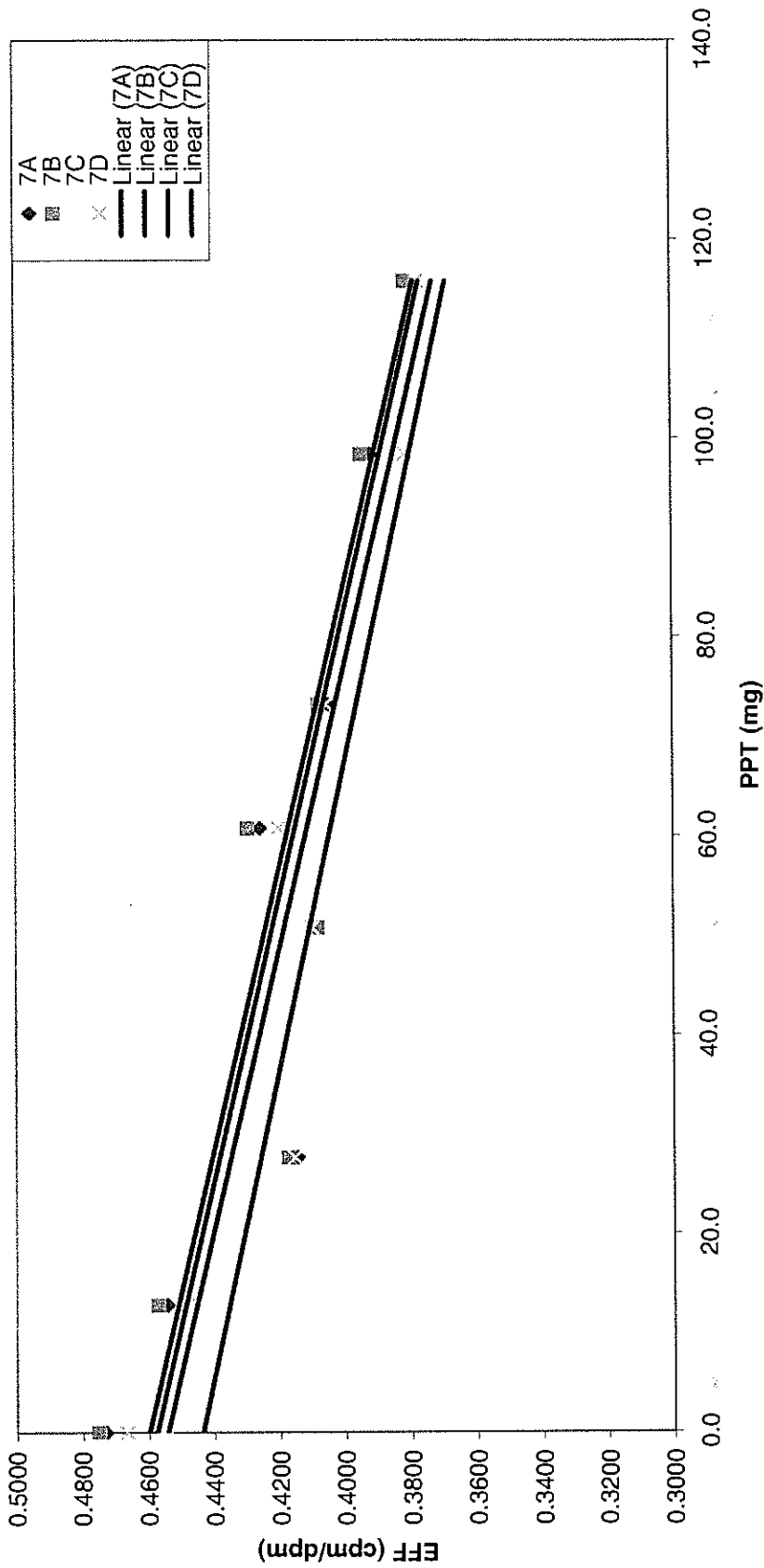
6A  $y = -6.889561E-04x + 4.515203E-01$

6B  $y = -7.360502E-04x + 4.605553E-01$

6C  $y = -6.616602E-04x + 4.481439E-01$

6D

# Beta Calibration



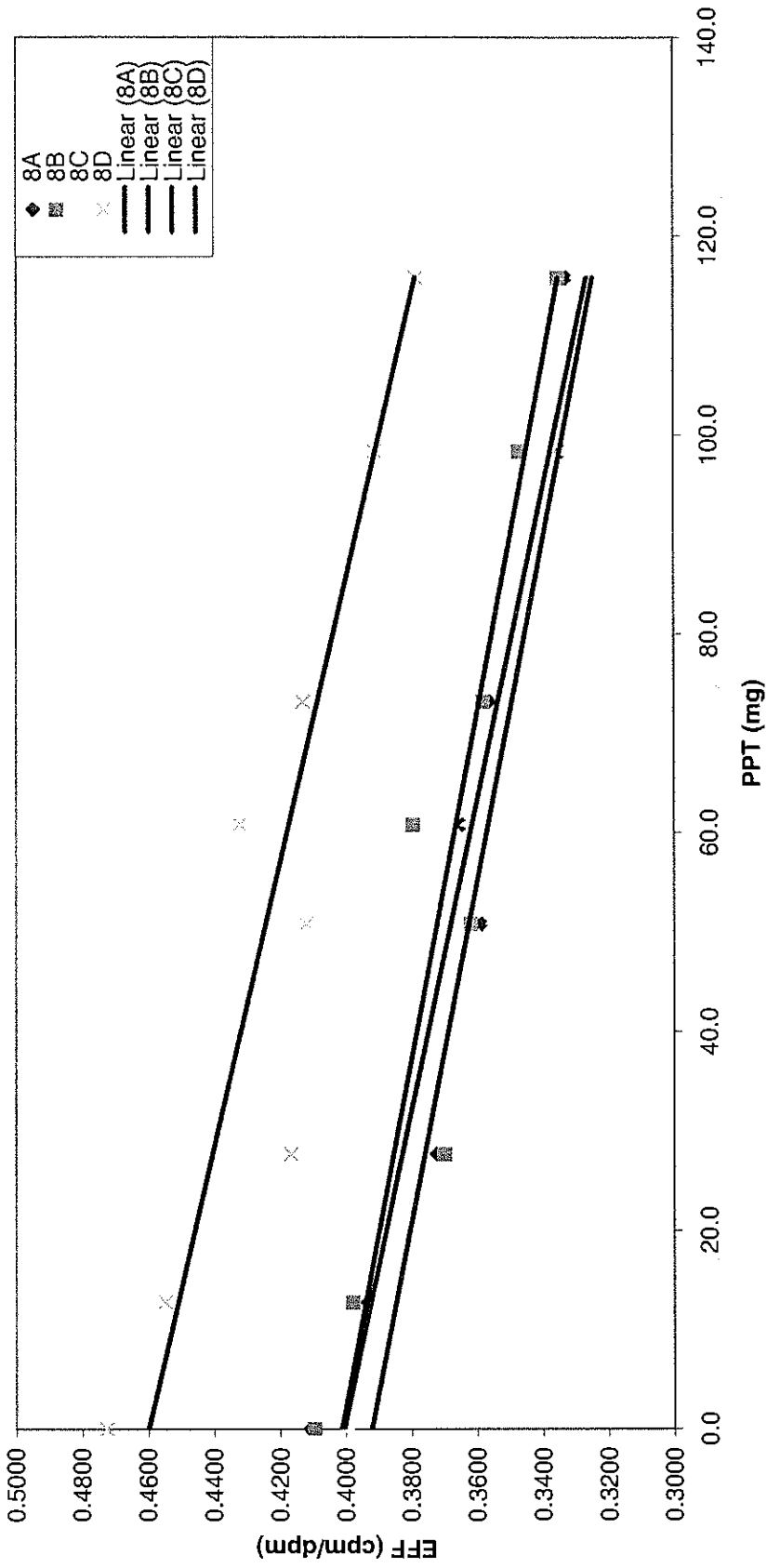
$$7A y = -6.972433E-04x + 4.576437E-01$$

$$7B y = -7.031579E-04x + 4.600195E-01$$

$$7C y = -6.466976E-04x + 4.436582E-01$$

$$7D y = -7.045032E-04x + 4.543529E-01$$

# Beta Calibration



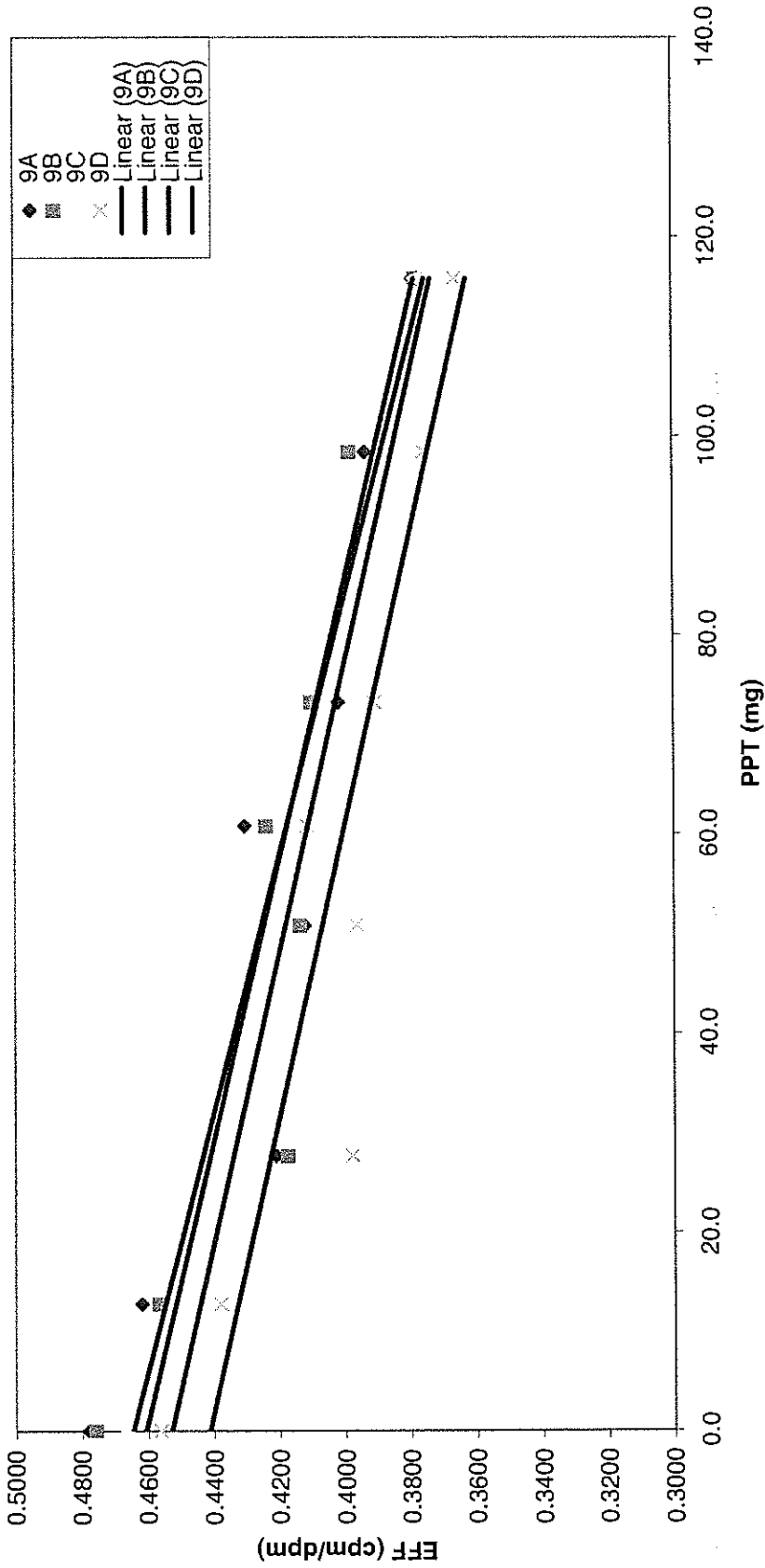
$$8A y = -6.397370E-04x + 4.005539E-01$$

$$8B y = -5.719455E-04x + 4.013616E-01$$

$$8C y = -5.827588E-04x + 3.921844E-01$$

$$8D y = -7.006997E-04x + 4.599852E-01$$

### Beta Calibration



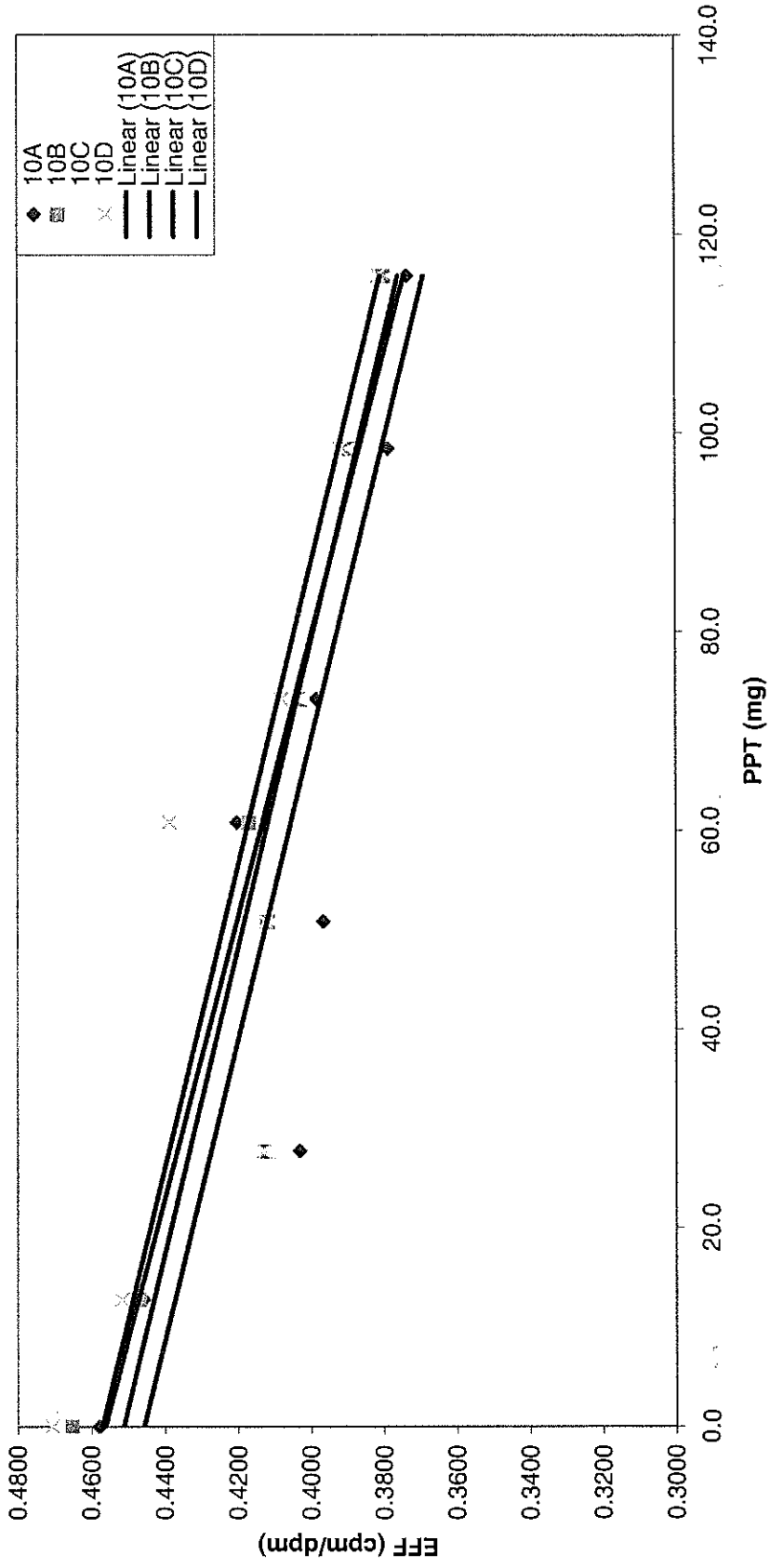
$$9A y = -7.712603E-04x + 4.646303E-01$$

$$9B y = -7.093436E-04x + 4.607000E-01$$

$$9C y = -6.859081E-04x + 4.529853E-01$$

$$9D y = -6.793796E-04x + 4.414431E-01$$

### Beta Calibration



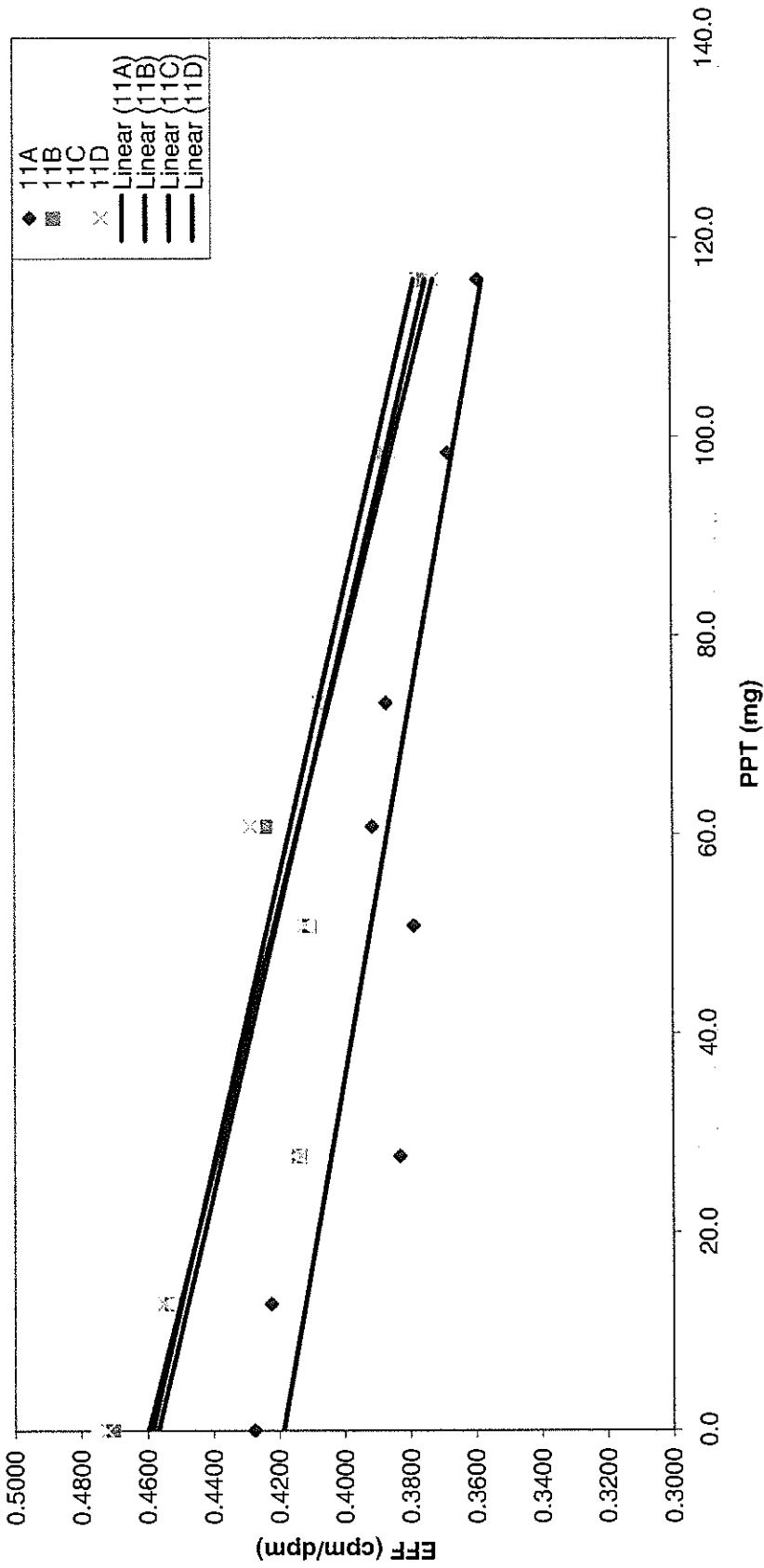
10A  $y = -6.615045E-04x + 4.456844E-01$

10B  $y = -6.499602E-04x + 4.512988E-01$

10C  $y = -7.067580E-04x + 4.562159E-01$

10D  $y = -6.580339E-04x + 4.571213E-01$

# Beta Calibration



11A  $y = -5.284830E-04x + 4.186913E-01$

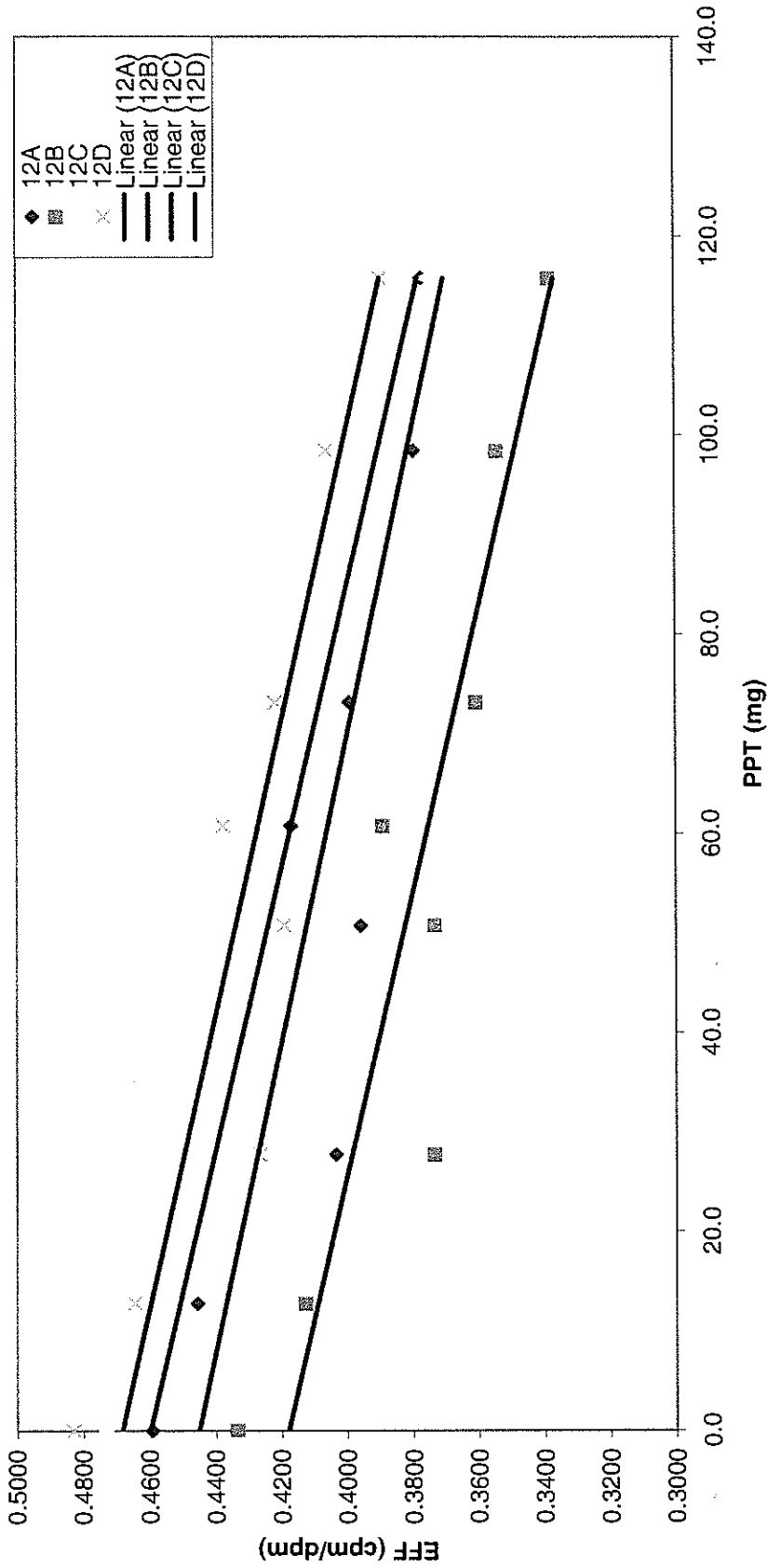
11B  $y = -7.090028E-04x + 4.568466E-01$

11C  $y = -6.934547E-04x + 4.585834E-01$

11D  $y = -7.534850E-04x + 4.597344E-01$



### Beta Calibration



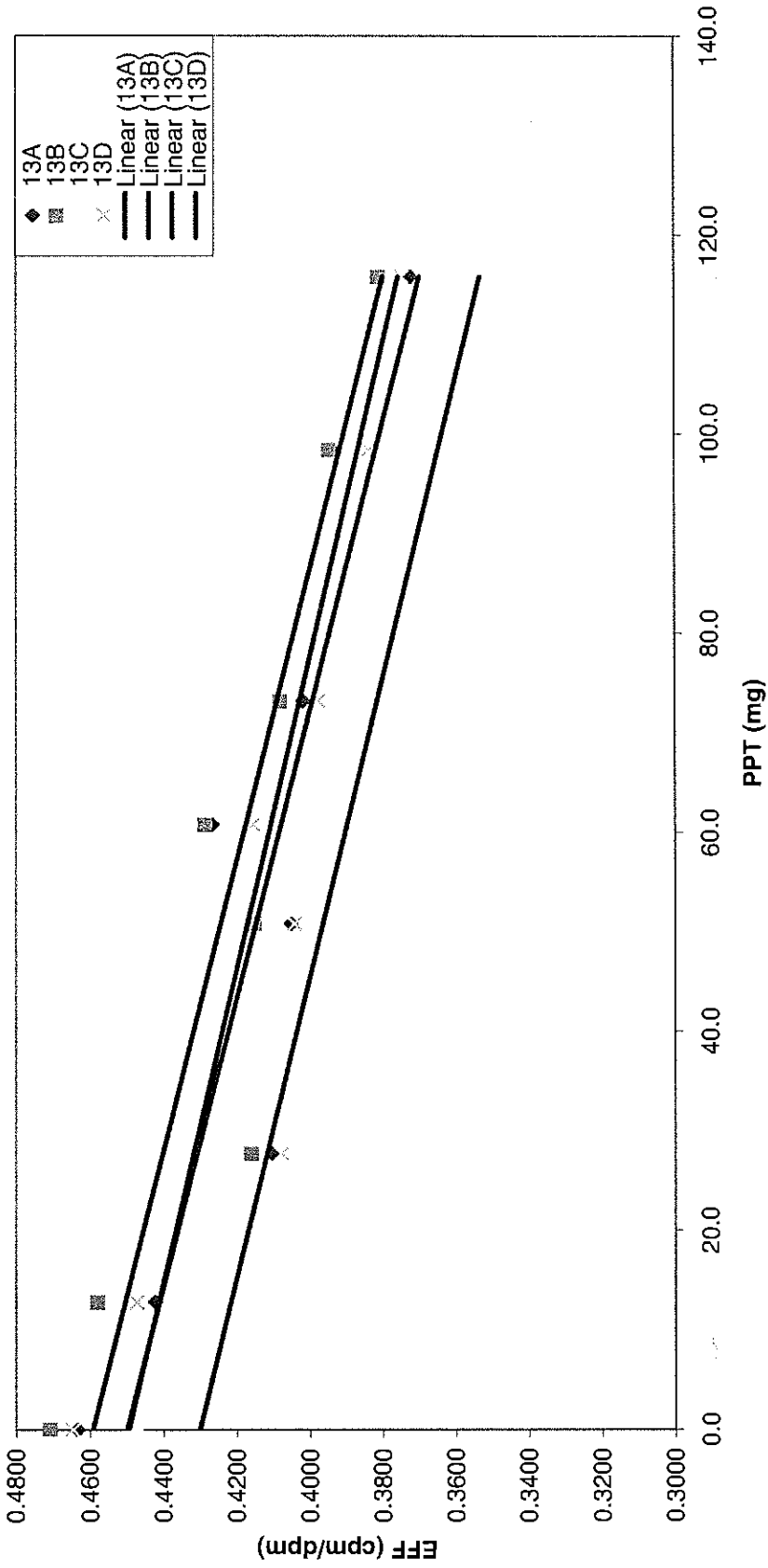
12A  $y = -6.480081E-04x + 4.452603E-01$

12B  $y = -7.016092E-04x + 4.179551E-01$

12C  $y = -7.061049E-04x + 4.599765E-01$

12D  $y = -6.795877E-04x + 4.684490E-01$

# Beta Calibration



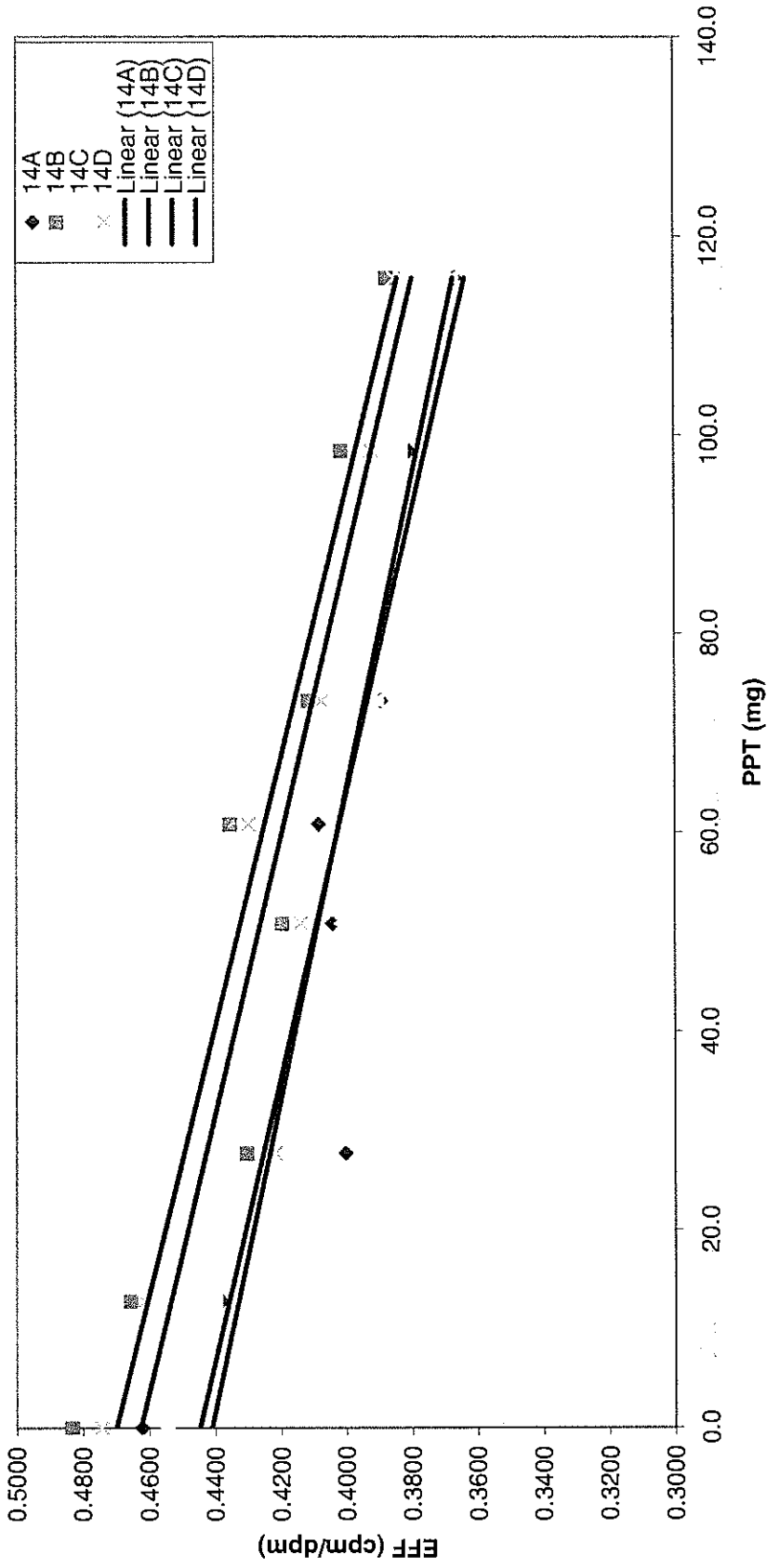
13A  $y = -6.370479E-04x + 4.495001E-01$

13B  $y = -6.854007E-04x + 4.592283E-01$

13C  $y = -6.633969E-04x + 4.301262E-01$

13D  $y = -6.920231E-04x + 4.499952E-01$

### Beta Calibration



14A  $y = -6.996115E-04x + 4.447689E-01$

14B  $y = -7.405652E-04x + 4.700587E-01$

14C  $y = -6.371666E-04x + 4.410957E-01$

14D  $y = -7.152994E-04x + 4.626635E-01$

**Current Calibration - PIC**

Geometry 2 inch Planchett

Beta Protean	Cal Date A0	10/1/2013 Exp Date			9/30/2014	
		A1	A2	A3	A4	
1A	4.569778E-01	-6.927004E-04				
1B	4.517750E-01	-6.489090E-04				
1C	4.643580E-01	-7.396285E-04				
1D	4.538896E-01	-7.027723E-04				
2A	4.147205E-01	-6.128691E-04				
2B	4.081852E-01	-6.164420E-04				
2C	4.198593E-01	-5.473804E-04				
2D	4.058137E-01	-6.012719E-04				
3A	4.312616E-01	-6.268001E-04				
3B	4.488401E-01	-6.535905E-04				
3C	4.525416E-01	-7.032192E-04				
3D	4.422533E-01	-6.214772E-04				
4A	4.375305E-01	-6.083781E-04				
4B	4.459653E-01	-6.661295E-04				
4C	4.329024E-01	-5.429665E-04				
4D	4.452607E-01	-7.103401E-04				
5A	4.627772E-01	-7.229994E-04				
5B	4.590436E-01	-7.129095E-04				
5C	4.605746E-01	-7.503590E-04				
5D	4.551510E-01	-6.806751E-04				
6A	4.515203E-01	-6.889561E-04				
6B	4.605553E-01	-7.360502E-04				
6C	4.481439E-01	-6.616602E-04				
6D	#N/A	#N/A				
7A	4.576437E-01	-6.972433E-04				
7B	4.600195E-01	-7.031579E-04				
7C	4.436582E-01	-6.466976E-04				
7D	4.543529E-01	-7.045032E-04				
8A	4.005539E-01	-6.397370E-04				
8B	4.013616E-01	-5.719455E-04				
8C	3.921844E-01	-5.827588E-04				
8D	4.599852E-01	-7.006997E-04				
9A	4.646303E-01	-7.712603E-04				
9B	4.607000E-01	-7.093436E-04				
9C	4.529853E-01	-6.859081E-04				
9D	4.414431E-01	-6.793796E-04				
10A	4.456844E-01	-6.615045E-04				
10B	4.512988E-01	-6.499602E-04				
10C	4.562159E-01	-7.067580E-04				
10D	4.571213E-01	-6.580339E-04				
11A	4.186913E-01	-5.284830E-04				
11B	4.568466E-01	-7.090028E-04				
11C	4.585834E-01	-6.934547E-04				
11D	4.597344E-01	-7.534850E-04				
12A	4.452603E-01	-6.480081E-04				
12B	4.179551E-01	-7.016092E-04				
12C	4.599765E-01	-7.061049E-04				
12D	4.684490E-01	-6.795877E-04				
13A	4.495001E-01	-6.370479E-04				
13B	4.592283E-01	-6.854007E-04				
13C	4.301262E-01	-6.633969E-04				
13D	4.499952E-01	-6.920231E-04				
14A	4.447689E-01	-6.996115E-04				
14B	4.700587E-01	-7.405652E-04				
14C	4.410957E-01	-6.371666E-04				
14D	4.626635E-01	-7.152994E-04				

PIC\_Beta\_Sep13\_RawData.xls

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
S1	10A	3	16	25003	9/21/2013 17:21	9/21/2013 17:24	PIC	GABS13
S2	10A	3	17	24350	9/21/2013 17:37	9/21/2013 17:40	PIC	GABS13
S3	10A	3	9	22013	9/21/2013 17:32	9/21/2013 17:35	PIC	GABS13
S4	10A	3	22	21667	9/21/2013 17:28	9/21/2013 17:31	PIC	GABS13
S5	10A	3	13	22954	9/21/2013 17:02	9/21/2013 17:05	PIC	GABS13
S6	10A	3	16	21760	9/21/2013 17:17	9/21/2013 17:20	PIC	GABS13
S7	10A	3	12	20689	9/21/2013 17:12	9/21/2013 17:15	PIC	GABS13
S8	10A	3	15	20403	9/21/2013 17:07	9/21/2013 17:10	PIC	GABS13
S1	10B	3	89	25413	9/21/2013 17:28	9/21/2013 17:31	PIC	GABS13
S2	10B	3	84	24409	9/21/2013 17:21	9/21/2013 17:24	PIC	GABS13
S3	10B	3	84	22490	9/21/2013 17:37	9/21/2013 17:40	PIC	GABS13
S4	10B	3	65	22490	9/21/2013 17:32	9/21/2013 17:35	PIC	GABS13
S5	10B	3	86	22772	9/21/2013 17:07	9/21/2013 17:10	PIC	GABS13
S6	10B	3	63	21996	9/21/2013 17:02	9/21/2013 17:05	PIC	GABS13
S7	10B	3	56	21251	9/21/2013 17:17	9/21/2013 17:20	PIC	GABS13
S8	10B	3	61	20748	9/21/2013 17:12	9/21/2013 17:15	PIC	GABS13
S1	10C	3	85	25627	9/21/2013 17:32	9/21/2013 17:35	PIC	GABS13
S2	10C	3	61	24800	9/21/2013 17:28	9/21/2013 17:31	PIC	GABS13
S3	10C	3	65	22496	9/21/2013 17:21	9/21/2013 17:24	PIC	GABS13
S4	10C	3	62	22381	9/21/2013 17:37	9/21/2013 17:40	PIC	GABS13
S5	10C	3	76	23254	9/21/2013 17:12	9/21/2013 17:15	PIC	GABS13
S6	10C	3	74	21971	9/21/2013 17:07	9/21/2013 17:10	PIC	GABS13
S7	10C	3	47	21225	9/21/2013 17:02	9/21/2013 17:05	PIC	GABS13
S8	10C	3	68	20600	9/21/2013 17:17	9/21/2013 17:20	PIC	GABS13
S1	10D	3	54	25707	9/21/2013 17:37	9/21/2013 17:40	PIC	GABS13
S2	10D	3	58	24666	9/21/2013 17:32	9/21/2013 17:35	PIC	GABS13
S3	10D	3	47	22551	9/21/2013 17:28	9/21/2013 17:31	PIC	GABS13
S4	10D	3	53	22518	9/21/2013 17:21	9/21/2013 17:24	PIC	GABS13
S5	10D	3	43	23963	9/21/2013 17:17	9/21/2013 17:20	PIC	GABS13
S6	10D	3	57	22285	9/21/2013 17:12	9/21/2013 17:15	PIC	GABS13
S7	10D	3	40	21399	9/21/2013 17:07	9/21/2013 17:10	PIC	GABS13
S8	10D	3	31	20830	9/21/2013 17:02	9/21/2013 17:05	PIC	GABS13
S1	11A	3	0	23343	9/21/2013 16:16	9/21/2013 16:19	PIC	GABS13
S2	11A	3	8	23076	9/21/2013 16:30	9/21/2013 16:33	PIC	GABS13
S3	11A	3	3	20922	9/21/2013 16:25	9/21/2013 16:28	PIC	GABS13
S4	11A	3	7	20687	9/21/2013 16:21	9/21/2013 16:24	PIC	GABS13

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S5	11A	3	3	21368	9/21/2013 16:36	9/21/2013 16:39	PIC	GABS13
S6	11A	3	5	21140	9/21/2013 17:08	9/21/2013 17:11	PIC	GABS13
S7	11A	3	1	20106	9/21/2013 16:57	9/21/2013 17:00	PIC	GABS13
S8	11A	3	5	19597	9/21/2013 16:40	9/21/2013 16:43	PIC	GABS13
S1	11B	3	1	25687	9/21/2013 16:21	9/21/2013 16:24	PIC	GABS13
S2	11B	3	5	24716	9/21/2013 16:16	9/21/2013 16:19	PIC	GABS13
S3	11B	3	5	22599	9/21/2013 16:30	9/21/2013 16:33	PIC	GABS13
S4	11B	3	9	22423	9/21/2013 16:25	9/21/2013 16:28	PIC	GABS13
S5	11B	3	5	23148	9/21/2013 16:40	9/21/2013 16:43	PIC	GABS13
S6	11B	3	2	22238	9/21/2013 16:36	9/21/2013 16:39	PIC	GABS13
S7	11B	3	2	21184	9/21/2013 17:08	9/21/2013 17:11	PIC	GABS13
S8	11B	3	2	20581	9/21/2013 16:57	9/21/2013 17:00	PIC	GABS13
S1	11C	3	2	25944	9/21/2013 16:25	9/21/2013 16:28	PIC	GABS13
S2	11C	3	5	24751	9/21/2013 16:21	9/21/2013 16:24	PIC	GABS13
S3	11C	3	7	22621	9/21/2013 16:16	9/21/2013 16:19	PIC	GABS13
S4	11C	3	14	22444	9/21/2013 16:30	9/21/2013 16:33	PIC	GABS13
S5	11C	3	3	23360	9/21/2013 16:57	9/21/2013 17:00	PIC	GABS13
S6	11C	3	3	22361	9/21/2013 16:40	9/21/2013 16:43	PIC	GABS13
S7	11C	3	8	21503	9/21/2013 16:36	9/21/2013 16:39	PIC	GABS13
S8	11C	3	5	20724	9/21/2013 17:08	9/21/2013 17:11	PIC	GABS13
S1	11D	3	1	25789	9/21/2013 16:30	9/21/2013 16:33	PIC	GABS13
S2	11D	3	5	24851	9/21/2013 16:26	9/21/2013 16:29	PIC	GABS13
S3	11D	3	4	22574	9/21/2013 16:21	9/21/2013 16:24	PIC	GABS13
S4	11D	3	5	22497	9/21/2013 16:17	9/21/2013 16:20	PIC	GABS13
S5	11D	3	2	23408	9/21/2013 17:08	9/21/2013 17:11	PIC	GABS13
S6	11D	3	3	22214	9/21/2013 16:58	9/21/2013 17:01	PIC	GABS13
S7	11D	3	4	21079	9/21/2013 16:40	9/21/2013 16:43	PIC	GABS13
S8	11D	3	4	20358	9/21/2013 16:36	9/21/2013 16:39	PIC	GABS13
S1	12A	3	2	25088	9/21/2013 16:36	9/21/2013 16:39	PIC	GABS13
S2	12A	3	1	24334	9/21/2013 17:08	9/21/2013 17:11	PIC	GABS13
S3	12A	3	3	22035	9/21/2013 16:58	9/21/2013 17:01	PIC	GABS13
S4	12A	3	2	21621	9/21/2013 16:40	9/21/2013 16:43	PIC	GABS13
S5	12A	3	3	22780	9/21/2013 16:17	9/21/2013 16:20	PIC	GABS13
S6	12A	3	2	21800	9/21/2013 16:30	9/21/2013 16:33	PIC	GABS13
S7	12A	3	2	20729	9/21/2013 16:26	9/21/2013 16:29	PIC	GABS13
S8	12A	3	2	20591	9/21/2013 16:21	9/21/2013 16:24	PIC	GABS13
S1	12B	3	1	23678	9/21/2013 16:40	9/21/2013 16:43	PIC	GABS13

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S2	12B	3	4	22544	9/21/2013 16:36	9/21/2013 16:39	PIC	GABS13
S3	12B	3	5	20388	9/21/2013 17:09	9/21/2013 17:12	PIC	GABS13
S4	12B	3	7	20391	9/21/2013 16:58	9/21/2013 17:01	PIC	GABS13
S5	12B	3	3	21250	9/21/2013 16:21	9/21/2013 16:24	PIC	GABS13
S6	12B	3	6	19693	9/21/2013 16:17	9/21/2013 16:20	PIC	GABS13
S7	12B	3	5	19347	9/21/2013 16:30	9/21/2013 16:33	PIC	GABS13
S8	12B	3	4	18471	9/21/2013 16:26	9/21/2013 16:29	PIC	GABS13
S1	12C	3	12	25849	9/21/2013 16:58	9/21/2013 17:01	PIC	GABS13
S2	12C	3	14	24804	9/21/2013 16:40	9/21/2013 16:43	PIC	GABS13
S3	12C	3	9	22706	9/21/2013 16:36	9/21/2013 16:39	PIC	GABS13
S4	12C	3	11	22573	9/21/2013 17:09	9/21/2013 17:12	PIC	GABS13
S5	12C	3	11	23680	9/21/2013 16:26	9/21/2013 16:29	PIC	GABS13
S6	12C	3	12	22297	9/21/2013 16:22	9/21/2013 16:25	PIC	GABS13
S7	12C	3	14	21578	9/21/2013 16:17	9/21/2013 16:20	PIC	GABS13
S8	12C	3	13	20526	9/21/2013 16:31	9/21/2013 16:34	PIC	GABS13
S1	12D	3	3	26384	9/21/2013 17:09	9/21/2013 17:12	PIC	GABS13
S2	12D	3	11	25368	9/21/2013 17:03	9/21/2013 17:06	PIC	GABS13
S3	12D	3	8	23293	9/21/2013 16:41	9/21/2013 16:44	PIC	GABS13
S4	12D	3	11	22898	9/21/2013 16:36	9/21/2013 16:39	PIC	GABS13
S5	12D	3	2	23905	9/21/2013 16:31	9/21/2013 16:34	PIC	GABS13
S6	12D	3	4	23037	9/21/2013 16:26	9/21/2013 16:29	PIC	GABS13
S7	12D	3	8	22185	9/21/2013 16:22	9/21/2013 16:25	PIC	GABS13
S8	12D	3	6	21281	9/21/2013 16:17	9/21/2013 16:20	PIC	GABS13
S1	13A	3	6	25299	9/24/2013 15:16	9/24/2013 15:19	PIC	GABS13
S2	13A	3	2	24154	9/24/2013 16:07	9/24/2013 16:10	PIC	GABS13
S3	13A	3	6	22411	9/24/2013 16:02	9/24/2013 16:05	PIC	GABS13
S4	13A	3	10	22123	9/24/2013 15:46	9/24/2013 15:49	PIC	GABS13
S5	13A	3	1	23299	9/24/2013 16:12	9/24/2013 16:15	PIC	GABS13
S6	13A	3	4	21941	9/24/2013 17:06	9/24/2013 17:09	PIC	GABS13
S7	13A	3	3	21501	9/24/2013 16:28	9/24/2013 16:31	PIC	GABS13
S8	13A	3	2	20330	9/24/2013 16:21	9/24/2013 16:24	PIC	GABS13
S1	13B	3	3	25707	9/24/2013 15:46	9/24/2013 15:49	PIC	GABS13
S2	13B	3	2	25003	9/24/2013 15:16	9/24/2013 15:19	PIC	GABS13
S3	13B	3	7	22716	9/24/2013 16:07	9/24/2013 16:10	PIC	GABS13
S4	13B	3	6	22665	9/24/2013 16:02	9/24/2013 16:05	PIC	GABS13
S5	13B	3	3	23407	9/24/2013 16:21	9/24/2013 16:24	PIC	GABS13
S6	13B	3	1	22288	9/24/2013 16:12	9/24/2013 16:15	PIC	GABS13

S7	13B	3	3	21552	9/24/2013 17:06	9/24/2013 17:09	PIC	GABS13
S8	13B	3	6	20809	9/24/2013 16:28	9/24/2013 16:31	PIC	GABS13
S1	13C	3	1	24439	9/24/2013 16:02	9/24/2013 16:05	PIC	GABS13
S2	13C	3	6	23471	9/24/2013 15:46	9/24/2013 15:49	PIC	GABS13
S3	13C	3	2	20847	9/24/2013 15:16	9/24/2013 15:19	PIC	GABS13
S4	13C	3	6	21047	9/24/2013 16:07	9/24/2013 16:10	PIC	GABS13
S5	13C	3	3	21798	9/24/2013 16:28	9/24/2013 16:31	PIC	GABS13
S6	13C	3	6	20780	9/24/2013 16:21	9/24/2013 16:24	PIC	GABS13
S7	13C	3	4	19932	9/24/2013 16:12	9/24/2013 16:15	PIC	GABS13
S8	13C	3	4	19649	9/24/2013 17:06	9/24/2013 17:09	PIC	GABS13
S1	13D	3	7	25369	9/24/2013 16:08	9/24/2013 16:11	PIC	GABS13
S2	13D	3	0	24423	9/24/2013 16:02	9/24/2013 16:05	PIC	GABS13
S3	13D	3	5	22268	9/24/2013 15:46	9/24/2013 15:49	PIC	GABS13
S4	13D	3	7	22067	9/24/2013 15:16	9/24/2013 15:19	PIC	GABS13
S5	13D	3	7	22700	9/24/2013 17:06	9/24/2013 17:09	PIC	GABS13
S6	13D	3	6	21712	9/24/2013 16:28	9/24/2013 16:31	PIC	GABS13
S7	13D	3	4	20958	9/24/2013 16:22	9/24/2013 16:25	PIC	GABS13
S8	13D	3	5	20458	9/24/2013 16:12	9/24/2013 16:15	PIC	GABS13
S1	14A	3	3	25239	9/24/2013 16:12	9/24/2013 16:15	PIC	GABS13
S2	14A	3	3	23924	9/24/2013 17:06	9/24/2013 17:09	PIC	GABS13
S3	14A	3	2	21860	9/24/2013 16:29	9/24/2013 16:32	PIC	GABS13
S4	14A	3	7	22077	9/24/2013 16:22	9/24/2013 16:25	PIC	GABS13
S5	14A	3	5	22308	9/24/2013 15:16	9/24/2013 15:19	PIC	GABS13
S6	14A	3	1	21266	9/24/2013 16:08	9/24/2013 16:11	PIC	GABS13
S7	14A	3	6	20788	9/24/2013 16:02	9/24/2013 16:05	PIC	GABS13
S8	14A	3	4	20028	9/24/2013 15:46	9/24/2013 15:49	PIC	GABS13
S1	14B	3	1	26392	9/24/2013 16:22	9/24/2013 16:25	PIC	GABS13
S2	14B	3	3	25423	9/24/2013 16:12	9/24/2013 16:15	PIC	GABS13
S3	14B	3	5	23499	9/24/2013 17:06	9/24/2013 17:09	PIC	GABS13
S4	14B	3	12	22910	9/24/2013 16:29	9/24/2013 16:32	PIC	GABS13
S5	14B	3	7	23778	9/24/2013 15:46	9/24/2013 15:49	PIC	GABS13
S6	14B	3	4	22469	9/24/2013 15:17	9/24/2013 15:20	PIC	GABS13
S7	14B	3	0	21921	9/24/2013 16:08	9/24/2013 16:11	PIC	GABS13
S8	14B	3	6	21162	9/24/2013 16:02	9/24/2013 16:05	PIC	GABS13
S1	14C	3	0	24820	9/24/2013 16:29	9/24/2013 16:32	PIC	GABS13
S2	14C	3	5	24032	9/24/2013 16:22	9/24/2013 16:25	PIC	GABS13
S3	14C	3	2	21582	9/24/2013 16:12	9/24/2013 16:15	PIC	GABS13



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S4	14C	3	7	21926	9/24/2013 17:06	9/24/2013 17:09	PIC	GABS13
S5	14C	3	3	22686	9/24/2013 16:02	9/24/2013 16:05	PIC	GABS13
S6	14C	3	6	21331	9/24/2013 15:47	9/24/2013 15:50	PIC	GABS13
S7	14C	3	4	20928	9/24/2013 15:17	9/24/2013 15:20	PIC	GABS13
S8	14C	3	4	20079	9/24/2013 16:08	9/24/2013 16:11	PIC	GABS13
S1	14D	3	2	25905	9/24/2013 17:06	9/24/2013 17:09	PIC	GABS13
S2	14D	3	4	25199	9/24/2013 16:29	9/24/2013 16:32	PIC	GABS13
S3	14D	3	5	23027	9/24/2013 16:22	9/24/2013 16:25	PIC	GABS13
S4	14D	3	7	22602	9/24/2013 16:12	9/24/2013 16:15	PIC	GABS13
S5	14D	3	2	23468	9/24/2013 16:08	9/24/2013 16:11	PIC	GABS13
S6	14D	3	5	22259	9/24/2013 16:02	9/24/2013 16:05	PIC	GABS13
S7	14D	3	7	21431	9/24/2013 15:47	9/24/2013 15:50	PIC	GABS13
S8	14D	3	2	21039	9/24/2013 15:17	9/24/2013 15:20	PIC	GABS13
S1	1A	3	20	25625	9/21/2013 13:30	9/21/2013 13:33	PIC	GABS13
S2	1A	3	18	25019	9/21/2013 13:53	9/21/2013 13:56	PIC	GABS13
S3	1A	3	21	22593	9/21/2013 13:40	9/21/2013 13:43	PIC	GABS13
S4	1A	3	28	22383	9/21/2013 13:36	9/21/2013 13:39	PIC	GABS13
S5	1A	3	23	23109	9/21/2013 13:57	9/21/2013 14:00	PIC	GABS13
S6	1A	3	24	22120	9/21/2013 14:20	9/21/2013 14:23	PIC	GABS13
S7	1A	3	27	21380	9/21/2013 14:06	9/21/2013 14:09	PIC	GABS13
S8	1A	3	24	20797	9/21/2013 14:02	9/21/2013 14:05	PIC	GABS13
S1	1B	3	63	25604	9/21/2013 13:36	9/21/2013 13:39	PIC	GABS13
S2	1B	3	54	24236	9/21/2013 13:30	9/21/2013 13:33	PIC	GABS13
S3	1B	3	50	22325	9/21/2013 13:53	9/21/2013 13:56	PIC	GABS13
S4	1B	3	59	22268	9/21/2013 13:40	9/21/2013 13:43	PIC	GABS13
S5	1B	3	48	23291	9/21/2013 14:02	9/21/2013 14:05	PIC	GABS13
S6	1B	3	33	22223	9/21/2013 13:57	9/21/2013 14:00	PIC	GABS13
S7	1B	3	45	21257	9/21/2013 14:20	9/21/2013 14:23	PIC	GABS13
S8	1B	3	53	20600	9/21/2013 14:07	9/21/2013 14:10	PIC	GABS13
S1	1C	3	442	26407	9/21/2013 13:41	9/21/2013 13:44	PIC	GABS13
S2	1C	3	422	24969	9/21/2013 13:36	9/21/2013 13:39	PIC	GABS13
S3	1C	3	435	22919	9/21/2013 13:30	9/21/2013 13:33	PIC	GABS13
S4	1C	3	414	22445	9/21/2013 13:53	9/21/2013 13:56	PIC	GABS13
S5	1C	3	404	23570	9/21/2013 14:07	9/21/2013 14:10	PIC	GABS13
S6	1C	3	360	22340	9/21/2013 14:02	9/21/2013 14:05	PIC	GABS13
S7	1C	3	348	21628	9/21/2013 13:57	9/21/2013 14:00	PIC	GABS13
S8	1C	3	320	20846	9/21/2013 14:20	9/21/2013 14:23	PIC	GABS13

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S1	1D	3	357	25634	9/21/2013 13:53	9/21/2013 13:56	PIC	GABS13
S2	1D	3	286	24501	9/21/2013 13:41	9/21/2013 13:44	PIC	GABS13
S3	1D	3	286	22573	9/21/2013 13:36	9/21/2013 13:39	PIC	GABS13
S4	1D	3	313	22099	9/21/2013 13:30	9/21/2013 13:33	PIC	GABS13
S5	1D	3	284	22891	9/21/2013 14:20	9/21/2013 14:23	PIC	GABS13
S6	1D	3	258	22081	9/21/2013 14:07	9/21/2013 14:10	PIC	GABS13
S7	1D	3	240	21132	9/21/2013 14:02	9/21/2013 14:05	PIC	GABS13
S8	1D	3	254	20524	9/21/2013 13:58	9/21/2013 14:01	PIC	GABS13
S1	2A	3	2	23125	9/21/2013 13:58	9/21/2013 14:01	PIC	GABS13
S2	2A	3	6	22846	9/21/2013 14:20	9/21/2013 14:23	PIC	GABS13
S3	2A	3	1	20461	9/21/2013 14:07	9/21/2013 14:10	PIC	GABS13
S4	2A	3	6	20333	9/21/2013 14:02	9/21/2013 14:05	PIC	GABS13
S5	2A	3	5	21066	9/21/2013 13:31	9/21/2013 13:34	PIC	GABS13
S6	2A	3	3	20302	9/21/2013 13:53	9/21/2013 13:56	PIC	GABS13
S7	2A	3	3	19482	9/21/2013 13:41	9/21/2013 13:44	PIC	GABS13
S8	2A	3	3	18865	9/21/2013 13:36	9/21/2013 13:39	PIC	GABS13
S1	2B	3	3	22785	9/21/2013 14:02	9/21/2013 14:05	PIC	GABS13
S2	2B	3	4	22179	9/21/2013 13:58	9/21/2013 14:01	PIC	GABS13
S3	2B	3	4	20359	9/21/2013 14:20	9/21/2013 14:23	PIC	GABS13
S4	2B	3	4	19835	9/21/2013 14:07	9/21/2013 14:10	PIC	GABS13
S5	2B	3	0	21151	9/21/2013 13:36	9/21/2013 13:39	PIC	GABS13
S6	2B	3	3	19660	9/21/2013 13:31	9/21/2013 13:34	PIC	GABS13
S7	2B	3	2	19215	9/21/2013 13:53	9/21/2013 13:56	PIC	GABS13
S8	2B	3	4	18355	9/21/2013 13:41	9/21/2013 13:44	PIC	GABS13
S1	2C	3	48	23809	9/21/2013 14:07	9/21/2013 14:10	PIC	GABS13
S2	2C	3	44	22311	9/21/2013 14:02	9/21/2013 14:05	PIC	GABS13
S3	2C	3	36	21118	9/21/2013 13:58	9/21/2013 14:01	PIC	GABS13
S4	2C	3	60	20958	9/21/2013 14:20	9/21/2013 14:23	PIC	GABS13
S5	2C	3	38	21668	9/21/2013 13:41	9/21/2013 13:44	PIC	GABS13
S6	2C	3	47	20769	9/21/2013 13:37	9/21/2013 13:40	PIC	GABS13
S7	2C	3	45	20374	9/21/2013 13:31	9/21/2013 13:34	PIC	GABS13
S8	2C	3	49	19290	9/21/2013 13:53	9/21/2013 13:56	PIC	GABS13
S1	2D	3	4	23028	9/21/2013 14:20	9/21/2013 14:23	PIC	GABS13
S2	2D	3	3	21788	9/21/2013 14:07	9/21/2013 14:10	PIC	GABS13
S3	2D	3	4	19932	9/21/2013 14:03	9/21/2013 14:06	PIC	GABS13
S4	2D	3	8	20266	9/21/2013 13:58	9/21/2013 14:01	PIC	GABS13
S5	2D	3	10	20864	9/21/2013 13:53	9/21/2013 13:56	PIC	GABS13

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S6	2D	3	2	19378	9/21/2013 13:41	9/21/2013 13:44	PIC	GABS13
S7	2D	3	6	19163	9/21/2013 13:37	9/21/2013 13:40	PIC	GABS13
S8	2D	3	3	18448	9/21/2013 13:31	9/21/2013 13:34	PIC	GABS13
S1	3A	3	271	24286	9/21/2013 12:02	9/21/2013 12:05	PIC	GABS13
S2	3A	3	279	23428	9/21/2013 12:18	9/21/2013 12:21	PIC	GABS13
S3	3A	3	251	21194	9/21/2013 12:13	9/21/2013 12:16	PIC	GABS13
S4	3A	3	218	21238	9/21/2013 12:07	9/21/2013 12:10	PIC	GABS13
S5	3A	3	273	22086	9/21/2013 12:26	9/21/2013 12:29	PIC	GABS13
S6	3A	3	262	21312	9/21/2013 13:24	9/21/2013 13:27	PIC	GABS13
S7	3A	3	226	20136	9/21/2013 13:19	9/21/2013 13:22	PIC	GABS13
S8	3A	3	258	19693	9/21/2013 13:12	9/21/2013 13:15	PIC	GABS13
S1	3B	3	508	25317	9/21/2013 12:07	9/21/2013 12:10	PIC	GABS13
S2	3B	3	475	24358	9/21/2013 12:02	9/21/2013 12:05	PIC	GABS13
S3	3B	3	449	22204	9/21/2013 12:18	9/21/2013 12:21	PIC	GABS13
S4	3B	3	396	22090	9/21/2013 12:13	9/21/2013 12:16	PIC	GABS13
S5	3B	3	467	22953	9/21/2013 13:12	9/21/2013 13:15	PIC	GABS13
S6	3B	3	434	21791	9/21/2013 12:27	9/21/2013 12:30	PIC	GABS13
S7	3B	3	402	21142	9/21/2013 13:24	9/21/2013 13:27	PIC	GABS13
S8	3B	3	374	20555	9/21/2013 13:19	9/21/2013 13:22	PIC	GABS13
S1	3C	3	218	25442	9/21/2013 12:13	9/21/2013 12:16	PIC	GABS13
S2	3C	3	256	24503	9/21/2013 12:07	9/21/2013 12:10	PIC	GABS13
S3	3C	3	181	22403	9/21/2013 12:02	9/21/2013 12:05	PIC	GABS13
S4	3C	3	164	22022	9/21/2013 12:18	9/21/2013 12:21	PIC	GABS13
S5	3C	3	182	23164	9/21/2013 13:20	9/21/2013 13:23	PIC	GABS13
S6	3C	3	193	21951	9/21/2013 13:12	9/21/2013 13:15	PIC	GABS13
S7	3C	3	202	20923	9/21/2013 12:27	9/21/2013 12:30	PIC	GABS13
S8	3C	3	185	20428	9/21/2013 13:24	9/21/2013 13:27	PIC	GABS13
S1	3D	3	181	24704	9/21/2013 12:18	9/21/2013 12:21	PIC	GABS13
S2	3D	3	184	23963	9/21/2013 12:13	9/21/2013 12:16	PIC	GABS13
S3	3D	3	156	22298	9/21/2013 12:07	9/21/2013 12:10	PIC	GABS13
S4	3D	3	138	21817	9/21/2013 12:02	9/21/2013 12:05	PIC	GABS13
S5	3D	3	189	22704	9/21/2013 13:24	9/21/2013 13:27	PIC	GABS13
S6	3D	3	163	21537	9/21/2013 13:20	9/21/2013 13:23	PIC	GABS13
S7	3D	3	157	20982	9/21/2013 13:12	9/21/2013 13:15	PIC	GABS13
S8	3D	3	131	20298	9/21/2013 12:27	9/21/2013 12:30	PIC	GABS13
S1	4A	3	202	24165	9/21/2013 12:27	9/21/2013 12:30	PIC	GABS13
S2	4A	3	192	23633	9/21/2013 13:24	9/21/2013 13:27	PIC	GABS13

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S3	4A	3	144	22390	9/21/2013 13:20	9/21/2013 13:23	PIC	GABS13
S4	4A	3	160	21559	9/21/2013 13:12	9/21/2013 13:15	PIC	GABS13
S5	4A	3	163	22516	9/21/2013 12:03	9/21/2013 12:06	PIC	GABS13
S6	4A	3	129	21729	9/21/2013 12:19	9/21/2013 12:22	PIC	GABS13
S7	4A	3	140	20553	9/21/2013 12:13	9/21/2013 12:16	PIC	GABS13
S8	4A	3	108	20009	9/21/2013 12:07	9/21/2013 12:10	PIC	GABS13
S1	4B	3	3	25102	9/21/2013 13:12	9/21/2013 13:15	PIC	GABS13
S2	4B	3	7	24143	9/21/2013 12:27	9/21/2013 12:30	PIC	GABS13
S3	4B	3	3	21901	9/21/2013 13:25	9/21/2013 13:28	PIC	GABS13
S4	4B	3	7	22047	9/21/2013 13:20	9/21/2013 13:23	PIC	GABS13
S5	4B	3	5	22736	9/21/2013 12:08	9/21/2013 12:11	PIC	GABS13
S6	4B	3	1	21870	9/21/2013 12:03	9/21/2013 12:06	PIC	GABS13
S7	4B	3	5	21039	9/21/2013 12:19	9/21/2013 12:22	PIC	GABS13
S8	4B	3	4	20015	9/21/2013 12:13	9/21/2013 12:16	PIC	GABS13
S1	4C	3	74	24607	9/21/2013 13:20	9/21/2013 13:23	PIC	GABS13
S2	4C	3	67	23130	9/21/2013 13:12	9/21/2013 13:15	PIC	GABS13
S3	4C	3	49	21352	9/21/2013 12:27	9/21/2013 12:30	PIC	GABS13
S4	4C	3	56	22152	9/21/2013 13:25	9/21/2013 13:28	PIC	GABS13
S5	4C	3	76	22261	9/21/2013 12:13	9/21/2013 12:16	PIC	GABS13
S6	4C	3	65	21527	9/21/2013 12:08	9/21/2013 12:11	PIC	GABS13
S7	4C	3	43	20985	9/21/2013 12:03	9/21/2013 12:06	PIC	GABS13
S8	4C	3	62	20088	9/21/2013 12:19	9/21/2013 12:22	PIC	GABS13
S1	4D	3	491	25199	9/21/2013 13:25	9/21/2013 13:28	PIC	GABS13
S2	4D	3	420	23618	9/21/2013 13:20	9/21/2013 13:23	PIC	GABS13
S3	4D	3	374	22248	9/21/2013 13:13	9/21/2013 13:16	PIC	GABS13
S4	4D	3	418	21918	9/21/2013 12:27	9/21/2013 12:30	PIC	GABS13
S5	4D	3	391	22494	9/21/2013 12:19	9/21/2013 12:22	PIC	GABS13
S6	4D	3	373	21560	9/21/2013 12:13	9/21/2013 12:16	PIC	GABS13
S7	4D	3	363	20559	9/21/2013 12:08	9/21/2013 12:11	PIC	GABS13
S8	4D	3	346	19888	9/21/2013 12:03	9/21/2013 12:06	PIC	GABS13
S1	5A	3	128	26044	9/21/2013 14:24	9/21/2013 14:27	PIC	GABS13
S2	5A	3	131	24973	9/21/2013 14:45	9/21/2013 14:48	PIC	GABS13
S3	5A	3	131	22977	9/21/2013 14:38	9/21/2013 14:41	PIC	GABS13
S4	5A	3	136	22672	9/21/2013 14:34	9/21/2013 14:37	PIC	GABS13
S5	5A	3	129	23532	9/21/2013 15:00	9/21/2013 15:03	PIC	GABS13
S6	5A	3	119	22258	9/21/2013 15:13	9/21/2013 15:16	PIC	GABS13
S7	5A	3	101	21577	9/21/2013 15:09	9/21/2013 15:12	PIC	GABS13

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S8	5A	3	104	20799	9/21/2013 15:04	9/21/2013 15:07	PIC	GABS13
S1	5B	3	100	25846	9/21/2013 14:34	9/21/2013 14:37	PIC	GABS13
S2	5B	3	126	24804	9/21/2013 14:24	9/21/2013 14:27	PIC	GABS13
S3	5B	3	94	22810	9/21/2013 14:45	9/21/2013 14:48	PIC	GABS13
S4	5B	3	104	22478	9/21/2013 14:38	9/21/2013 14:41	PIC	GABS13
S5	5B	3	108	23360	9/21/2013 15:04	9/21/2013 15:07	PIC	GABS13
S6	5B	3	95	22017	9/21/2013 15:00	9/21/2013 15:03	PIC	GABS13
S7	5B	3	97	21376	9/21/2013 15:13	9/21/2013 15:16	PIC	GABS13
S8	5B	3	75	20752	9/21/2013 15:09	9/21/2013 15:12	PIC	GABS13
S1	5C	3	93	25881	9/21/2013 14:39	9/21/2013 14:42	PIC	GABS13
S2	5C	3	105	25038	9/21/2013 14:34	9/21/2013 14:37	PIC	GABS13
S3	5C	3	93	22892	9/21/2013 14:24	9/21/2013 14:27	PIC	GABS13
S4	5C	3	91	22178	9/21/2013 14:45	9/21/2013 14:48	PIC	GABS13
S5	5C	3	83	23120	9/21/2013 15:09	9/21/2013 15:12	PIC	GABS13
S6	5C	3	84	22262	9/21/2013 15:04	9/21/2013 15:07	PIC	GABS13
S7	5C	3	79	21171	9/21/2013 15:00	9/21/2013 15:03	PIC	GABS13
S8	5C	3	87	20671	9/21/2013 15:13	9/21/2013 15:16	PIC	GABS13
S1	5D	3	160	25415	9/21/2013 14:45	9/21/2013 14:48	PIC	GABS13
S2	5D	3	150	24521	9/21/2013 14:39	9/21/2013 14:42	PIC	GABS13
S3	5D	3	150	22700	9/21/2013 14:34	9/21/2013 14:37	PIC	GABS13
S4	5D	3	145	22605	9/21/2013 14:24	9/21/2013 14:27	PIC	GABS13
S5	5D	3	133	23311	9/21/2013 15:13	9/21/2013 15:16	PIC	GABS13
S6	5D	3	151	22277	9/21/2013 15:09	9/21/2013 15:12	PIC	GABS13
S7	5D	3	145	21113	9/21/2013 15:04	9/21/2013 15:07	PIC	GABS13
S8	5D	3	143	20574	9/21/2013 15:00	9/21/2013 15:03	PIC	GABS13
S1	6A	3	133	25444	9/21/2013 15:00	9/21/2013 15:03	PIC	GABS13
S2	6A	3	112	24148	9/21/2013 15:14	9/21/2013 15:17	PIC	GABS13
S3	6A	3	86	22561	9/21/2013 15:09	9/21/2013 15:12	PIC	GABS13
S4	6A	3	113	22213	9/21/2013 15:04	9/21/2013 15:07	PIC	GABS13
S5	6A	3	85	23089	9/21/2013 14:26	9/21/2013 14:29	PIC	GABS13
S6	6A	3	92	21889	9/21/2013 14:46	9/21/2013 14:49	PIC	GABS13
S7	6A	3	83	21003	9/21/2013 14:39	9/21/2013 14:42	PIC	GABS13
S8	6A	3	96	20384	9/21/2013 14:35	9/21/2013 14:38	PIC	GABS13
S1	6B	3	271	25842	9/21/2013 15:05	9/21/2013 15:08	PIC	GABS13
S2	6B	3	204	24756	9/21/2013 15:00	9/21/2013 15:03	PIC	GABS13
S3	6B	3	183	22966	9/21/2013 15:14	9/21/2013 15:17	PIC	GABS13
S4	6B	3	191	22553	9/21/2013 15:10	9/21/2013 15:13	PIC	GABS13

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S5	6B	3	207	23518	9/21/2013 14:35	9/21/2013 14:38	PIC	GABS13
S6	6B	3	192	21991	9/21/2013 14:28	9/21/2013 14:31	PIC	GABS13
S7	6B	3	169	21384	9/21/2013 14:46	9/21/2013 14:49	PIC	GABS13
S8	6B	3	192	20538	9/21/2013 14:39	9/21/2013 14:42	PIC	GABS13
S1	6C	3	211	25095	9/21/2013 15:10	9/21/2013 15:13	PIC	GABS13
S2	6C	3	188	24324	9/21/2013 15:05	9/21/2013 15:08	PIC	GABS13
S3	6C	3	166	22361	9/21/2013 15:00	9/21/2013 15:03	PIC	GABS13
S4	6C	3	188	22007	9/21/2013 15:14	9/21/2013 15:17	PIC	GABS13
S5	6C	3	191	23024	9/21/2013 14:39	9/21/2013 14:42	PIC	GABS13
S6	6C	3	157	21525	9/21/2013 14:35	9/21/2013 14:38	PIC	GABS13
S7	6C	3	154	21308	9/21/2013 14:28	9/21/2013 14:31	PIC	GABS13
S8	6C	3	152	20267	9/21/2013 14:46	9/21/2013 14:49	PIC	GABS13
S1	7A	3	26	25836	9/21/2013 15:24	9/21/2013 15:27	PIC	GABS13
S2	7A	3	29	24812	9/21/2013 15:38	9/21/2013 15:41	PIC	GABS13
S3	7A	3	31	22637	9/21/2013 15:33	9/21/2013 15:36	PIC	GABS13
S4	7A	3	25	22367	9/21/2013 15:29	9/21/2013 15:32	PIC	GABS13
S5	7A	3	25	23254	9/21/2013 15:44	9/21/2013 15:47	PIC	GABS13
S6	7A	3	28	22113	9/21/2013 15:57	9/21/2013 16:00	PIC	GABS13
S7	7A	3	30	21394	9/21/2013 15:52	9/21/2013 15:55	PIC	GABS13
S8	7A	3	23	20794	9/21/2013 15:48	9/21/2013 15:51	PIC	GABS13
S1	7B	3	45	25947	9/21/2013 15:29	9/21/2013 15:32	PIC	GABS13
S2	7B	3	57	24962	9/21/2013 15:25	9/21/2013 15:28	PIC	GABS13
S3	7B	3	56	22788	9/21/2013 15:38	9/21/2013 15:41	PIC	GABS13
S4	7B	3	55	22297	9/21/2013 15:33	9/21/2013 15:36	PIC	GABS13
S5	7B	3	51	23465	9/21/2013 15:48	9/21/2013 15:51	PIC	GABS13
S6	7B	3	42	22274	9/21/2013 15:44	9/21/2013 15:47	PIC	GABS13
S7	7B	3	45	21551	9/21/2013 15:57	9/21/2013 16:00	PIC	GABS13
S8	7B	3	35	20819	9/21/2013 15:52	9/21/2013 15:55	PIC	GABS13
S1	7C	3	8	24857	9/21/2013 15:34	9/21/2013 15:37	PIC	GABS13
S2	7C	3	8	24176	9/21/2013 15:29	9/21/2013 15:32	PIC	GABS13
S3	7C	3	7	22112	9/21/2013 15:25	9/21/2013 15:28	PIC	GABS13
S4	7C	3	14	21602	9/21/2013 15:38	9/21/2013 15:41	PIC	GABS13
S5	7C	3	18	22837	9/21/2013 15:53	9/21/2013 15:56	PIC	GABS13
S6	7C	3	11	21615	9/21/2013 15:48	9/21/2013 15:51	PIC	GABS13
S7	7C	3	16	20772	9/21/2013 15:44	9/21/2013 15:47	PIC	GABS13
S8	7C	3	5	20339	9/21/2013 15:57	9/21/2013 16:00	PIC	GABS13
S1	7D	3	21	25491	9/21/2013 15:39	9/21/2013 15:42	PIC	GABS13

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S2	7D	3	26	24470	9/21/2013 15:34	9/21/2013 15:37	PIC	GABS13
S3	7D	3	18	22692	9/21/2013 15:29	9/21/2013 15:32	PIC	GABS13
S4	7D	3	18	22394	9/21/2013 15:25	9/21/2013 15:28	PIC	GABS13
S5	7D	3	25	22949	9/21/2013 15:57	9/21/2013 16:00	PIC	GABS13
S6	7D	3	19	22151	9/21/2013 15:53	9/21/2013 15:56	PIC	GABS13
S7	7D	3	15	20830	9/21/2013 15:48	9/21/2013 15:51	PIC	GABS13
S8	7D	3	16	20618	9/21/2013 15:44	9/21/2013 15:47	PIC	GABS13
S1	8A	3	3	22437	9/21/2013 15:44	9/21/2013 15:47	PIC	GABS13
S2	8A	3	2	21492	9/21/2013 15:57	9/21/2013 16:00	PIC	GABS13
S3	8A	3	5	20337	9/21/2013 15:53	9/21/2013 15:56	PIC	GABS13
S4	8A	3	7	19590	9/21/2013 15:48	9/21/2013 15:51	PIC	GABS13
S5	8A	3	6	19913	9/21/2013 15:25	9/21/2013 15:28	PIC	GABS13
S6	8A	3	5	19463	9/21/2013 15:39	9/21/2013 15:42	PIC	GABS13
S7	8A	3	1	18241	9/21/2013 15:34	9/21/2013 15:37	PIC	GABS13
S8	8A	3	3	18172	9/21/2013 15:30	9/21/2013 15:33	PIC	GABS13
S1	8B	3	3	22367	9/21/2013 15:48	9/21/2013 15:51	PIC	GABS13
S2	8B	3	1	21728	9/21/2013 15:44	9/21/2013 15:47	PIC	GABS13
S3	8B	3	3	20205	9/21/2013 15:57	9/21/2013 16:00	PIC	GABS13
S4	8B	3	7	19767	9/21/2013 15:53	9/21/2013 15:56	PIC	GABS13
S5	8B	3	4	20729	9/21/2013 15:30	9/21/2013 15:33	PIC	GABS13
S6	8B	3	3	19567	9/21/2013 15:25	9/21/2013 15:28	PIC	GABS13
S7	8B	3	1	18959	9/21/2013 15:39	9/21/2013 15:42	PIC	GABS13
S8	8B	3	2	18303	9/21/2013 15:34	9/21/2013 15:37	PIC	GABS13
S1	8C	3	2	21830	9/21/2013 15:53	9/21/2013 15:56	PIC	GABS13
S2	8C	3	6	21368	9/21/2013 15:48	9/21/2013 15:51	PIC	GABS13
S3	8C	3	0	19704	9/21/2013 15:44	9/21/2013 15:47	PIC	GABS13
S4	8C	3	5	19401	9/21/2013 15:57	9/21/2013 16:00	PIC	GABS13
S5	8C	3	6	19818	9/21/2013 15:34	9/21/2013 15:37	PIC	GABS13
S6	8C	3	5	19029	9/21/2013 15:30	9/21/2013 15:33	PIC	GABS13
S7	8C	3	1	18223	9/21/2013 15:25	9/21/2013 15:28	PIC	GABS13
S8	8C	3	2	17983	9/21/2013 15:39	9/21/2013 15:42	PIC	GABS13
S1	8D	3	40	25811	9/21/2013 15:57	9/21/2013 16:00	PIC	GABS13
S2	8D	3	34	24854	9/21/2013 15:53	9/21/2013 15:56	PIC	GABS13
S3	8D	3	27	22758	9/21/2013 15:48	9/21/2013 15:51	PIC	GABS13
S4	8D	3	40	22505	9/21/2013 15:44	9/21/2013 15:47	PIC	GABS13
S5	8D	3	38	23615	9/21/2013 15:39	9/21/2013 15:42	PIC	GABS13
S6	8D	3	30	22557	9/21/2013 15:34	9/21/2013 15:37	PIC	GABS13

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S7	8D	3	29	21368	9/21/2013 15:30	9/21/2013 15:33	PIC	GABS13
S8	8D	3	37	20679	9/21/2013 15:25	9/21/2013 15:28	PIC	GABS13
S1	9A	3	54	26109	9/21/2013 17:01	9/21/2013 17:04	PIC	GABS13
S2	9A	3	47	25227	9/21/2013 17:16	9/21/2013 17:19	PIC	GABS13
S3	9A	3	51	22999	9/21/2013 17:11	9/21/2013 17:14	PIC	GABS13
S4	9A	3	60	22512	9/21/2013 17:07	9/21/2013 17:10	PIC	GABS13
S5	9A	3	50	23507	9/21/2013 17:21	9/21/2013 17:24	PIC	GABS13
S6	9A	3	48	21945	9/21/2013 17:37	9/21/2013 17:40	PIC	GABS13
S7	9A	3	39	21492	9/21/2013 17:31	9/21/2013 17:34	PIC	GABS13
S8	9A	3	46	20691	9/21/2013 17:27	9/21/2013 17:30	PIC	GABS13
S1	9B	3	60	25990	9/21/2013 17:07	9/21/2013 17:10	PIC	GABS13
S2	9B	3	59	24930	9/21/2013 17:01	9/21/2013 17:04	PIC	GABS13
S3	9B	3	54	22796	9/21/2013 17:16	9/21/2013 17:19	PIC	GABS13
S4	9B	3	58	22590	9/21/2013 17:11	9/21/2013 17:14	PIC	GABS13
S5	9B	3	69	23152	9/21/2013 17:27	9/21/2013 17:30	PIC	GABS13
S6	9B	3	59	22396	9/21/2013 17:21	9/21/2013 17:24	PIC	GABS13
S7	9B	3	54	21751	9/21/2013 17:37	9/21/2013 17:40	PIC	GABS13
S8	9B	3	51	20646	9/21/2013 17:32	9/21/2013 17:35	PIC	GABS13
S1	9C	3	62	25465	9/21/2013 17:12	9/21/2013 17:15	PIC	GABS13
S2	9C	3	50	24707	9/21/2013 17:07	9/21/2013 17:10	PIC	GABS13
S3	9C	3	69	22353	9/21/2013 17:01	9/21/2013 17:04	PIC	GABS13
S4	9C	3	53	22173	9/21/2013 17:16	9/21/2013 17:19	PIC	GABS13
S5	9C	3	68	22883	9/21/2013 17:32	9/21/2013 17:35	PIC	GABS13
S6	9C	3	55	22218	9/21/2013 17:27	9/21/2013 17:30	PIC	GABS13
S7	9C	3	65	20983	9/21/2013 17:21	9/21/2013 17:24	PIC	GABS13
S8	9C	3	52	20661	9/21/2013 17:37	9/21/2013 17:40	PIC	GABS13
S1	9D	3	59	24913	9/21/2013 17:16	9/21/2013 17:19	PIC	GABS13
S2	9D	3	72	23917	9/21/2013 17:12	9/21/2013 17:15	PIC	GABS13
S3	9D	3	46	21731	9/21/2013 17:07	9/21/2013 17:10	PIC	GABS13
S4	9D	3	64	21652	9/21/2013 17:01	9/21/2013 17:04	PIC	GABS13
S5	9D	3	57	22477	9/21/2013 17:37	9/21/2013 17:40	PIC	GABS13
S6	9D	3	73	21347	9/21/2013 17:32	9/21/2013 17:35	PIC	GABS13
S7	9D	3	53	20518	9/21/2013 17:28	9/21/2013 17:31	PIC	GABS13
S8	9D	3	42	20002	9/21/2013 17:21	9/21/2013 17:24	PIC	GABS13



### Alpha Xtalk Calibration - PIC - Sep 2013

Standard Data	Isotope	Po-210
	Standard ID number	1673-A
	Half Life (days)	138.38
	Std. Act. (dpm/mL)	22622.4159
	Reference Date	8/1/2013
	Volume of spike (mL)	2.0
	Std. Nominal (dpm)	33837.37
	Decay Date	9/28/2013

Source Weight	
Source	Measured weight (mg)
1	0.0
2	3.3
3	6.5
4	16.4
5	32.1
6	47.6
7	65.0
8	79.5

The following detectors were not calibrated:

6D

Detector (#)	Source ID (#)	Raw Count Data				Po-210 Xtalk (Beta/Alpha)	Source Measured Weight	Calculated Xtalk (Beta/Alpha)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
1A	1	9/28/2013 10:34	3	24383	1661	6.8121%	0.0	7.8272%
1A	2	9/28/2013 10:49	3	24805	2203	8.8813%	3.3	9.0145%
1A	3	9/28/2013 10:43	3	20231	2291	11.3242%	6.5	9.9667%
1A	4	9/28/2013 10:39	3	19233	2414	12.5513%	16.4	11.8324%
1A	5	9/28/2013 10:54	3	18031	2001	11.0976%	32.1	12.3232%
1A	6	9/28/2013 11:11	3	18807	2060	10.9534%	47.6	11.3478%
1A	7	9/28/2013 11:06	3	15185	1794	11.8143%	65.0	10.6375%
1A	8	9/28/2013 11:01	3	15065	1738	11.5367%	79.5	12.0216%
1B	1	9/28/2013 10:39	3	24552	1834	7.4699%	0.0	8.1970%
1B	2	9/28/2013 10:34	3	24776	2434	9.8240%	3.3	9.3565%
1B	3	9/28/2013 10:49	3	20578	2130	10.3509%	6.5	10.2932%
1B	4	9/28/2013 10:44	3	19206	2532	13.1834%	16.4	12.1671%
1B	5	9/28/2013 11:01	3	17964	2100	11.6900%	32.1	12.7611%
1B	6	9/28/2013 10:54	3	18540	2153	11.6127%	47.6	11.8531%
1B	7	9/28/2013 11:12	3	15291	1808	11.8239%	65.0	10.9772%
1B	8	9/28/2013 11:06	3	15112	1741	11.5206%	79.5	11.8703%
1C	1	9/28/2013 10:44	3	26155	706	2.6993%	0.0	2.8926%
1C	2	9/28/2013 10:39	3	27237	947	3.4769%	3.3	3.3348%
1C	3	9/28/2013 10:34	3	22120	823	3.7206%	6.5	3.6954%
1C	4	9/28/2013 10:49	3	21824	1011	4.6325%	16.4	4.4386%
1C	5	9/28/2013 11:06	3	20082	912	4.5414%	32.1	4.7498%
1C	6	9/28/2013 11:02	3	20813	920	4.4203%	47.6	4.5046%
1C	7	9/28/2013 10:54	3	17039	762	4.4721%	65.0	4.2635%
1C	8	9/28/2013 11:12	3	16753	762	4.5484%	79.5	4.6324%
1D	1	9/28/2013 10:49	3	25215	890	3.5296%	0.0	3.7078%
1D	2	9/28/2013 10:44	3	26170	1103	4.2147%	3.3	4.1935%
1D	3	9/28/2013 10:39	3	21375	993	4.6456%	6.5	4.5900%
1D	4	9/28/2013 10:34	3	20570	1198	5.8240%	16.4	5.4082%
1D	5	9/28/2013 11:12	3	18973	1010	5.3234%	32.1	5.7434%
1D	6	9/28/2013 11:06	3	19898	1069	5.3724%	47.6	5.4389%
1D	7	9/28/2013 11:02	3	16180	869	5.3708%	65.0	5.0757%
1D	8	9/28/2013 10:54	3	16030	835	5.2090%	79.5	5.3320%
2A	1	9/28/2013 10:55	3	22128	3791	17.1321%	0.0	17.3424%
2A	2	9/28/2013 11:12	3	22805	4285	18.7897%	3.3	18.6402%
2A	3	9/28/2013 11:06	3	18493	3487	18.8558%	6.5	19.7136%
2A	4	9/28/2013 11:02	3	17586	4245	24.1385%	16.4	22.0042%
2A	5	9/28/2013 10:34	3	16304	3546	21.7493%	32.1	23.1166%
2A	6	9/28/2013 10:49	3	16892	3662	21.6789%	47.6	22.3374%

Detector (#)	Source ID (#)	Raw Count Data				Po-210 Xtalk (Beta/Alpha)	Source Measured Weight	Calculated Xtalk (Beta/Alpha)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
2A	7	9/28/2013 10:44	3	13827	3066	22.1740%	65.0	20.8570%
2A	8	9/28/2013 10:39	3	13979	2782	19.9013%	79.5	20.4080%
2B	1	9/28/2013 11:02	3	21823	4499	20.6159%	0.0	21.8896%
2B	2	9/28/2013 10:55	3	21515	5370	24.9593%	3.3	23.7889%
2B	3	9/28/2013 11:12	3	17951	4396	24.4889%	6.5	25.3250%
2B	4	9/28/2013 11:06	3	16474	5189	31.4981%	16.4	28.3992%
2B	5	9/28/2013 10:39	3	15897	4133	25.9986%	32.1	29.3176%
2B	6	9/28/2013 10:35	3	16154	4552	28.1788%	47.6	27.5984%
2B	7	9/28/2013 10:49	3	13337	3558	26.6777%	65.0	25.5487%
2B	8	9/28/2013 10:44	3	13300	3398	25.5489%	79.5	26.0989%
2C	1	9/28/2013 11:06	3	23795	1386	5.8248%	0.0	6.0131%
2C	2	9/28/2013 11:02	3	24158	1672	6.9211%	3.3	6.7428%
2C	3	9/28/2013 10:55	3	20717	1461	7.0522%	6.5	7.3374%
2C	4	9/28/2013 11:12	3	18926	1752	9.2571%	16.4	8.5575%
2C	5	9/28/2013 10:44	3	17182	1498	8.7184%	32.1	9.0365%
2C	6	9/28/2013 10:40	3	17756	1424	8.0198%	47.6	8.5540%
2C	7	9/28/2013 10:35	3	14968	1302	8.6986%	65.0	7.9966%
2C	8	9/28/2013 10:49	3	14465	1178	8.1438%	79.5	8.3979%
2D	1	9/28/2013 11:12	3	22067	4223	19.1372%	0.0	19.7326%
2D	2	9/28/2013 11:06	3	21959	4924	22.4236%	3.3	21.5182%
2D	3	9/28/2013 11:02	3	18527	3944	21.2879%	6.5	22.9655%
2D	4	9/28/2013 10:55	3	16990	4963	29.2113%	16.4	25.8754%
2D	5	9/28/2013 10:49	3	16296	3907	23.9752%	32.1	26.7410%
2D	6	9/28/2013 10:44	3	16646	4180	25.1111%	47.6	24.9902%
2D	7	9/28/2013 10:40	3	13729	3270	23.8182%	65.0	22.6079%
2D	8	9/28/2013 10:35	3	13993	3058	21.8538%	79.5	22.3876%
3A	1	9/28/2013 11:17	3	24316	1007	4.1413%	0.0	4.2876%
3A	2	9/28/2013 12:00	3	25057	1175	4.6893%	3.3	4.8679%
3A	3	9/28/2013 11:27	3	21107	1173	5.5574%	6.5	5.3354%
3A	4	9/28/2013 11:23	3	19994	1350	6.7520%	16.4	6.2625%
3A	5	9/28/2013 12:05	3	18364	1103	6.0063%	32.1	6.5285%
3A	6	9/28/2013 12:22	3	19172	1144	5.9670%	47.6	6.0379%
3A	7	9/28/2013 12:18	3	15343	909	5.9245%	65.0	5.5690%
3A	8	9/28/2013 12:14	3	14977	878	5.8623%	79.5	6.0115%
3B	1	9/28/2013 11:23	3	25137	578	2.2994%	0.0	2.5381%
3B	2	9/28/2013 11:17	3	25279	694	2.7454%	3.3	2.8814%
3B	3	9/28/2013 12:00	3	21707	776	3.5749%	6.5	3.1650%
3B	4	9/28/2013 11:27	3	20350	816	4.0098%	16.4	3.7706%
3B	5	9/28/2013 12:14	3	18766	707	3.7675%	32.1	4.0887%
3B	6	9/28/2013 12:06	3	19186	724	3.7736%	47.6	3.9709%
3B	7	9/28/2013 12:23	3	15800	665	4.2089%	65.0	3.8050%
3B	8	9/28/2013 12:18	3	15326	591	3.8562%	79.5	4.0158%
3C	1	9/28/2013 11:27	3	25221	987	3.9134%	0.0	4.0896%
3C	2	9/28/2013 11:23	3	25616	1221	4.7666%	3.3	4.5836%
3C	3	9/28/2013 11:18	3	21224	1020	4.8059%	6.5	4.9921%
3C	4	9/28/2013 12:00	3	20272	1287	6.3487%	16.4	5.8676%
3C	5	9/28/2013 12:18	3	18956	1137	5.9981%	32.1	6.3347%
3C	6	9/28/2013 12:14	3	19478	1165	5.9811%	47.6	6.1711%
3C	7	9/28/2013 12:06	3	15879	999	6.2913%	65.0	5.9252%
3C	8	9/28/2013 12:23	3	15868	962	6.0625%	79.5	6.2038%
3D	1	9/28/2013 12:01	3	25060	1188	4.7406%	0.0	4.8892%
3D	2	9/28/2013 11:27	3	25866	1464	5.6599%	3.3	5.4581%
3D	3	9/28/2013 11:23	3	21471	1220	5.6821%	6.5	5.9165%
3D	4	9/28/2013 11:18	3	20662	1511	7.3129%	16.4	6.8289%
3D	5	9/28/2013 12:23	3	19025	1271	6.6807%	32.1	7.1220%
3D	6	9/28/2013 12:18	3	20014	1356	6.7753%	47.6	6.7328%

Detector (#)	Source ID (#)	Raw Count Data				Po-210 Xtalk (Beta/Alpha)	Source Measured Weight	Calculated Xtalk (Beta/Alpha)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
3D	7	9/28/2013 12:14	3	16029	1068	6.6629%	65.0	6.4863%
3D	8	9/28/2013 12:06	3	15777	1126	7.1370%	79.5	7.2177%
4A	1	9/28/2013 12:06	3	24259	823	3.3926%	0.0	3.5535%
4A	2	9/28/2013 12:23	3	25050	987	3.9401%	3.3	3.9691%
4A	3	9/28/2013 12:18	3	21255	945	4.4460%	6.5	4.3184%
4A	4	9/28/2013 12:14	3	19862	1078	5.4274%	16.4	5.1003%
4A	5	9/28/2013 11:18	3	18568	980	5.2779%	32.1	5.6126%
4A	6	9/28/2013 12:01	3	18661	1022	5.4767%	47.6	5.5824%
4A	7	9/28/2013 11:27	3	15692	892	5.6844%	65.0	5.3895%
4A	8	9/28/2013 11:23	3	15125	810	5.3554%	79.5	5.4748%
4B	1	9/28/2013 12:14	3	22311	3371	15.1091%	0.0	16.5676%
4B	2	9/28/2013 12:06	3	22303	4318	19.3606%	3.3	18.4902%
4B	3	9/28/2013 12:23	3	18675	3811	20.4070%	6.5	20.0675%
4B	4	9/28/2013 12:18	3	16960	4227	24.9233%	16.4	23.3633%
4B	5	9/28/2013 11:23	3	16207	3809	23.5022%	32.1	24.8011%
4B	6	9/28/2013 11:19	3	16836	3739	22.2084%	47.6	23.5848%
4B	7	9/28/2013 12:01	3	13681	3282	23.9895%	65.0	21.7911%
4B	8	9/28/2013 11:28	3	13533	2874	21.2370%	79.5	22.0715%
4C	1	9/28/2013 12:18	3	24643	1166	4.7316%	0.0	4.9532%
4C	2	9/28/2013 12:14	3	25722	1405	5.4623%	3.3	5.4832%
4C	3	9/28/2013 12:06	3	21018	1289	6.1328%	6.5	5.9137%
4C	4	9/28/2013 12:23	3	20337	1438	7.0709%	16.4	6.7929%
4C	5	9/28/2013 11:28	3	18775	1296	6.9028%	32.1	7.1588%
4C	6	9/28/2013 11:23	3	19904	1326	6.6620%	47.6	6.9241%
4C	7	9/28/2013 11:19	3	15923	1159	7.2788%	65.0	6.8532%
4C	8	9/28/2013 12:01	3	15756	1181	7.4956%	79.5	7.6576%
4D	1	9/28/2013 12:23	3	25033	611	2.4408%	0.0	2.5177%
4D	2	9/28/2013 12:18	3	25788	740	2.8696%	3.3	2.9489%
4D	3	9/28/2013 12:14	3	21843	765	3.5023%	6.5	3.2950%
4D	4	9/28/2013 12:06	3	20627	820	3.9754%	16.4	3.9753%
4D	5	9/28/2013 12:01	3	19214	793	4.1272%	32.1	4.1663%
4D	6	9/28/2013 11:28	3	19752	739	3.7414%	47.6	3.8387%
4D	7	9/28/2013 11:23	3	16209	611	3.7695%	65.0	3.6329%
4D	8	9/28/2013 11:19	3	15831	657	4.1501%	79.5	4.2014%
5A	1	9/28/2013 12:27	3	25791	972	3.7688%	0.0	4.0975%
5A	2	9/28/2013 12:40	3	26249	1150	4.3811%	3.3	4.6438%
5A	3	9/28/2013 12:36	3	21361	1202	5.6271%	6.5	5.0921%
5A	4	9/28/2013 12:32	3	20823	1378	6.6177%	16.4	6.0307%
5A	5	9/28/2013 12:46	3	19318	1130	5.8495%	32.1	6.4486%
5A	6	9/28/2013 13:00	3	20169	1156	5.7316%	47.6	6.1215%
5A	7	9/28/2013 12:56	3	16302	1043	6.3980%	65.0	5.6463%
5A	8	9/28/2013 12:51	3	16311	893	5.4748%	79.5	5.7680%
5B	1	9/28/2013 12:32	3	25329	913	3.6046%	0.0	3.8896%
5B	2	9/28/2013 12:28	3	25989	1178	4.5327%	3.3	4.3649%
5B	3	9/28/2013 12:41	3	21385	1023	4.7837%	6.5	4.7566%
5B	4	9/28/2013 12:36	3	20834	1259	6.0430%	16.4	5.5889%
5B	5	9/28/2013 12:51	3	19130	1047	5.4731%	32.1	6.0131%
5B	6	9/28/2013 12:46	3	19939	1170	5.8679%	47.6	5.8361%
5B	7	9/28/2013 13:00	3	16302	957	5.8704%	65.0	5.6069%
5B	8	9/28/2013 12:56	3	16111	935	5.8035%	79.5	5.9228%
5C	1	9/28/2013 12:36	3	24987	1071	4.2862%	0.0	4.5203%
5C	2	9/28/2013 12:32	3	25899	1356	5.2357%	3.3	5.1217%
5C	3	9/28/2013 12:28	3	21143	1186	5.6094%	6.5	5.6103%
5C	4	9/28/2013 12:41	3	20400	1431	7.0147%	16.4	6.6061%
5C	5	9/28/2013 12:56	3	18620	1261	6.7723%	32.1	6.9844%
5C	6	9/28/2013 12:51	3	19514	1201	6.1546%	47.6	6.5966%

Detector (#)	Source ID (#)	Raw Count Data				Po-210 Xtalk (Beta/Alpha)	Source Measured Weight	Calculated Xtalk (Beta/Alpha)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
5C	7	9/28/2013 12:46	3	16664	1132	6.7931%	65.0	6.2171%
5C	8	9/28/2013 13:00	3	15900	1032	6.4906%	79.5	6.7001%
5D	1	9/28/2013 12:41	3	25263	782	3.0954%	0.0	3.2106%
5D	2	9/28/2013 12:36	3	26469	944	3.5664%	3.3	3.6140%
5D	3	9/28/2013 12:32	3	21902	875	3.9951%	6.5	3.9478%
5D	4	9/28/2013 12:28	3	21226	1068	5.0316%	16.4	4.6670%
5D	5	9/28/2013 13:00	3	19336	941	4.8666%	32.1	5.0713%
5D	6	9/28/2013 12:56	3	20849	972	4.6621%	47.6	4.9900%
5D	7	9/28/2013 12:51	3	16540	884	5.3446%	65.0	4.8973%
5D	8	9/28/2013 12:46	3	16288	831	5.1019%	79.5	5.2658%
6A	1	9/28/2013 12:47	3	25388	1010	3.9783%	0.0	4.1421%
6A	2	9/28/2013 13:00	3	26085	1282	4.9147%	3.3	4.7672%
6A	3	9/28/2013 12:56	3	21554	1130	5.2426%	6.5	5.2656%
6A	4	9/28/2013 12:51	3	20801	1330	6.3939%	16.4	6.2241%
6A	5	9/28/2013 12:28	3	19007	1200	6.3135%	32.1	6.4221%
6A	6	9/28/2013 12:41	3	19966	1134	5.6797%	47.6	5.8596%
6A	7	9/28/2013 12:37	3	16179	930	5.7482%	65.0	5.4972%
6A	8	9/28/2013 12:32	3	16286	1016	6.2385%	79.5	6.3314%
6B	1	9/28/2013 12:51	3	25721	713	2.7721%	0.0	3.1045%
6B	2	9/28/2013 12:47	3	26877	958	3.5644%	3.3	3.5223%
6B	3	9/28/2013 13:01	3	21843	916	4.1936%	6.5	3.8634%
6B	4	9/28/2013 12:56	3	21221	1022	4.8160%	16.4	4.5700%
6B	5	9/28/2013 12:32	3	19704	893	4.5321%	32.1	4.8827%
6B	6	9/28/2013 12:28	3	20537	927	4.5138%	47.6	4.6893%
6B	7	9/28/2013 12:41	3	16530	816	4.9365%	65.0	4.5352%
6B	8	9/28/2013 12:37	3	16553	797	4.8148%	79.5	4.9757%
6C	1	9/28/2013 12:56	3	25963	810	3.1198%	0.0	3.4493%
6C	2	9/28/2013 12:51	3	26699	1059	3.9664%	3.3	3.8675%
6C	3	9/28/2013 12:47	3	21740	977	4.4940%	6.5	4.2017%
6C	4	9/28/2013 13:01	3	20975	1049	5.0012%	16.4	4.8510%
6C	5	9/28/2013 12:37	3	19449	934	4.8023%	32.1	5.0189%
6C	6	9/28/2013 12:33	3	20296	908	4.4738%	47.6	4.7145%
6C	7	9/28/2013 12:28	3	16193	811	5.0083%	65.0	4.6093%
6C	8	9/28/2013 12:41	3	16261	843	5.1842%	79.5	5.3378%
7A	1	9/29/2013 17:21	3	25046	1276	5.0946%	0.0	5.0849%
7A	2	9/29/2013 17:50	3	26168	1546	5.9080%	3.3	5.9148%
7A	3	9/29/2013 17:46	3	21617	1350	6.2451%	6.5	6.5987%
7A	4	9/29/2013 17:42	3	20539	1808	8.8028%	16.4	8.0489%
7A	5	9/29/2013 17:38	3	18601	1545	8.3060%	32.1	8.7634%
7A	6	9/29/2013 17:34	3	19428	1591	8.1892%	47.6	8.3821%
7A	7	9/29/2013 17:30	3	15978	1313	8.2175%	65.0	7.8162%
7A	8	9/29/2013 17:26	3	15944	1273	7.9842%	79.5	8.1384%
7B	1	9/29/2013 17:26	3	25563	913	3.5716%	0.0	4.0787%
7B	2	9/29/2013 17:21	3	25922	1315	5.0729%	3.3	4.6717%
7B	3	9/29/2013 17:50	3	21461	1130	5.2654%	6.5	5.1580%
7B	4	9/29/2013 17:46	3	20701	1343	6.4876%	16.4	6.1756%
7B	5	9/29/2013 17:42	3	18995	1203	6.3332%	32.1	6.6443%
7B	6	9/29/2013 17:38	3	19999	1200	6.0003%	47.6	6.3532%
7B	7	9/29/2013 17:34	3	16062	1056	6.5745%	65.0	6.0074%
7B	8	9/29/2013 17:30	3	15982	987	6.1757%	79.5	6.3923%
7C	1	9/29/2013 17:30	3	24732	1459	5.8992%	0.0	6.3213%
7C	2	9/29/2013 17:26	3	25041	1892	7.5556%	3.3	7.2397%
7C	3	9/29/2013 17:21	3	20727	1666	8.0378%	6.5	7.9838%
7C	4	9/29/2013 17:51	3	19910	1974	9.9146%	16.4	9.4868%
7C	5	9/29/2013 17:46	3	18308	1739	9.4986%	32.1	10.0117%
7C	6	9/29/2013 17:42	3	19221	1782	9.2711%	47.6	9.3555%

Detector (#)	Source ID (#)	Raw Count Data				Po-210 Xtalk (Beta/Alpha)	Source Measured Weight	Calculated Xtalk (Beta/Alpha)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
7C	7	9/29/2013 17:38	3	15597	1419	9.0979%	65.0	8.7148%
7C	8	9/29/2013 17:34	3	15483	1435	9.2682%	79.5	9.4296%
7D	1	9/29/2013 17:34	3	24637	1202	4.8788%	0.0	5.2798%
7D	2	9/29/2013 17:30	3	25087	1587	6.3260%	3.3	5.9332%
7D	3	9/29/2013 17:26	3	20852	1352	6.4838%	6.5	6.4702%
7D	4	9/29/2013 17:21	3	20046	1564	7.8021%	16.4	7.6012%
7D	5	9/29/2013 17:51	3	18113	1440	7.9501%	32.1	8.1479%
7D	6	9/29/2013 17:46	3	19149	1458	7.6140%	47.6	7.8665%
7D	7	9/29/2013 17:42	3	15498	1228	7.9236%	65.0	7.5296%
7D	8	9/29/2013 17:38	3	15655	1226	7.8314%	79.5	7.9813%
8A	1	9/29/2013 17:38	3	21426	4961	23.1541%	0.0	22.0825%
8A	2	9/29/2013 17:34	3	22354	5198	23.2531%	3.3	24.8937%
8A	3	9/29/2013 17:30	3	17698	4860	27.4607%	6.5	27.1315%
8A	4	9/29/2013 17:26	3	16875	5207	30.8563%	16.4	31.3871%
8A	5	9/29/2013 17:21	3	14681	5117	34.8546%	32.1	31.9129%
8A	6	9/29/2013 17:51	3	17172	4209	24.5108%	47.6	28.4564%
8A	7	9/29/2013 17:46	3	13656	3721	27.2481%	65.0	24.7857%
8A	8	9/29/2013 17:42	3	13763	3452	25.0817%	79.5	25.7698%
8B	1	9/29/2013 17:43	3	21186	5505	25.9841%	0.0	24.9176%
8B	2	9/29/2013 17:39	3	21892	5890	26.9048%	3.3	26.9841%
8B	3	9/29/2013 17:34	3	18297	4728	25.8403%	6.5	28.6941%
8B	4	9/29/2013 17:30	3	16678	5892	35.3280%	16.4	32.3452%
8B	5	9/29/2013 17:26	3	15668	5148	32.8568%	32.1	34.1113%
8B	6	9/29/2013 17:21	3	16307	5311	32.5688%	47.6	32.8251%
8B	7	9/29/2013 17:51	3	13369	4138	30.9522%	65.0	30.3313%
8B	8	9/29/2013 17:47	3	13555	3955	29.1774%	79.5	29.4038%
8C	1	9/29/2013 17:47	3.01	21166	5404	25.5315%	0.0	25.4814%
8C	2	9/29/2013 17:43	3	21574	5931	27.4914%	3.3	27.6169%
8C	3	9/29/2013 17:39	3	17944	4993	27.8255%	6.5	29.3600%
8C	4	9/29/2013 17:34	3	16447	5979	36.3531%	16.4	32.9364%
8C	5	9/29/2013 17:31	3	15215	4930	32.4022%	32.1	34.2127%
8C	6	9/29/2013 17:26	3	16355	5056	30.9141%	47.6	32.3019%
8C	7	9/29/2013 17:21	3	13106	4139	31.5810%	65.0	29.3678%
8C	8	9/29/2013 17:51	3	13493	3751	27.7996%	79.5	28.6213%
8D	1	9/29/2013 17:51	3	25596	1311	5.1219%	0.0	5.1967%
8D	2	9/29/2013 17:47	3	26892	1573	5.8493%	3.3	6.0174%
8D	3	9/29/2013 17:43	3	21837	1487	6.8095%	6.5	6.6706%
8D	4	9/29/2013 17:39	3	21096	1756	8.3239%	16.4	7.9245%
8D	5	9/29/2013 17:35	3	19454	1522	7.8236%	32.1	8.2036%
8D	6	9/29/2013 17:31	3	20229	1513	7.4794%	47.6	7.5668%
8D	7	9/29/2013 17:26	3	16725	1282	7.6652%	65.0	7.3744%
8D	8	9/29/2013 17:21	3	16469	1446	8.7801%	79.5	8.8989%
9A	1	9/29/2013 19:02	3	18427	6057	32.8702%	0.0	31.8861%
9A	2	9/29/2013 19:31	3	19414	6378	32.8526%	3.3	33.4294%
9A	3	9/29/2013 19:27	3	16105	5133	31.8721%	6.5	34.7094%
9A	4	9/29/2013 19:23	3	14477	6083	42.0184%	16.4	37.4532%
9A	5	9/29/2013 19:18	3	14035	5088	36.2522%	32.1	38.7648%
9A	6	9/29/2013 19:14	3	14655	5429	37.0454%	47.6	37.6553%
9A	7	9/29/2013 19:11	3	11783	4351	36.9261%	65.0	35.3174%
9A	8	9/29/2013 19:07	3	12025	3998	33.2474%	79.5	33.8688%
9B	1	9/29/2013 19:07	3	25303	1168	4.6161%	0.0	5.0061%
9B	2	9/29/2013 19:02	3	25759	1584	6.1493%	3.3	5.9062%
9B	3	9/29/2013 19:31	3	21388	1462	6.8356%	6.5	6.6260%
9B	4	9/29/2013 19:27	3	20413	1666	8.1615%	16.4	8.0264%
9B	5	9/29/2013 19:23	3	18670	1530	8.1950%	32.1	8.3768%
9B	6	9/29/2013 19:18	3	19624	1449	7.3838%	47.6	7.6593%

Detector (#)	Source ID (#)	Raw Count Data				Po-210 Xtalk (Beta/Alpha)	Source Measured Weight	Calculated Xtalk (Beta/Alpha)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
9B	7	9/29/2013 19:14	3	15973	1226	7.6755%	65.0	7.2567%
9B	8	9/29/2013 19:11	3	15958	1340	8.3970%	79.5	8.5561%
9C	1	9/29/2013 19:11	3	24939	1186	4.7556%	0.0	4.9759%
9C	2	9/29/2013 19:07	3	25068	1485	5.9239%	3.3	5.8343%
9C	3	9/29/2013 19:02	3	21058	1400	6.6483%	6.5	6.5304%
9C	4	9/29/2013 19:31	3	19969	1632	8.1727%	16.4	7.9406%
9C	5	9/29/2013 19:27	3	18372	1498	8.1537%	32.1	8.4588%
9C	6	9/29/2013 19:23	3	18991	1494	7.8669%	47.6	7.9072%
9C	7	9/29/2013 19:18	3	15847	1213	7.6544%	65.0	7.4352%
9C	8	9/29/2013 19:15	3	15412	1260	8.1754%	79.5	8.2687%
9D	1	9/29/2013 19:15	3	25578	902	3.5265%	0.0	3.7739%
9D	2	9/29/2013 19:11	3	26284	1239	4.7139%	3.3	4.4236%
9D	3	9/29/2013 19:07	3	21930	1063	4.8472%	6.5	4.9550%
9D	4	9/29/2013 19:02	3	21026	1333	6.3398%	16.4	6.0585%
9D	5	9/29/2013 19:31	3	19381	1206	6.2226%	32.1	6.5380%
9D	6	9/29/2013 19:27	3	20186	1248	6.1825%	47.6	6.1777%
9D	7	9/29/2013 19:23	3	16310	967	5.9289%	65.0	5.7595%
9D	8	9/29/2013 19:18	3	16253	990	6.0912%	79.5	6.1665%
10A	1	9/29/2013 19:18	3	23424	2378	10.1520%	0.0	10.7130%
10A	2	9/29/2013 19:15	3	23984	2816	11.7412%	3.3	11.9144%
10A	3	9/29/2013 19:11	3	19399	2613	13.4698%	6.5	12.8976%
10A	4	9/29/2013 19:07	3	18647	2980	15.9811%	16.4	14.9402%
10A	5	9/29/2013 19:02	3	17064	2515	14.7386%	32.1	15.8116%
10A	6	9/29/2013 19:31	3	18029	2637	14.6264%	47.6	15.0742%
10A	7	9/29/2013 19:27	3	14464	2195	15.1756%	65.0	14.1067%
10A	8	9/29/2013 19:23	3	14794	2092	14.1409%	79.5	14.5678%
10B	1	9/29/2013 19:23	3	24853	1270	5.1100%	0.0	5.3791%
10B	2	9/29/2013 19:19	3	25492	1698	6.6609%	3.3	6.1926%
10B	3	9/29/2013 19:15	3	21207	1369	6.4554%	6.5	6.8535%
10B	4	9/29/2013 19:11	3	19963	1728	8.6560%	16.4	8.1979%
10B	5	9/29/2013 19:07	3	18472	1565	8.4723%	32.1	8.6923%
10B	6	9/29/2013 19:02	3	19151	1496	7.8116%	47.6	8.1235%
10B	7	9/29/2013 19:31	3	15675	1245	7.9426%	65.0	7.5124%
10B	8	9/29/2013 19:27	3	15453	1217	7.8755%	79.5	8.0330%
10C	1	9/29/2013 19:27	3	24397	1404	5.7548%	0.0	5.8205%
10C	2	9/29/2013 19:23	3	25018	1709	6.8311%	3.3	6.6705%
10C	3	9/29/2013 19:19	3	20713	1447	6.9860%	6.5	7.3604%
10C	4	9/29/2013 19:15	3	19553	1827	9.3438%	16.4	8.7616%
10C	5	9/29/2013 19:11	3	18215	1635	8.9761%	32.1	9.2770%
10C	6	9/29/2013 19:07	3	18974	1606	8.4642%	47.6	8.7033%
10C	7	9/29/2013 19:02	3	15585	1327	8.5146%	65.0	8.1373%
10C	8	9/29/2013 19:32	3	15543	1346	8.6598%	79.5	8.7999%
10D	1	9/29/2013 19:31	3	24465	1711	6.9937%	0.0	7.3820%
10D	2	9/29/2013 19:27	3	25323	2138	8.4429%	3.3	8.2382%
10D	3	9/29/2013 19:23	3	20657	1853	8.9703%	6.5	8.9405%
10D	4	9/29/2013 19:19	3	19714	2174	11.0277%	16.4	10.4091%
10D	5	9/29/2013 19:15	3	18223	1930	10.5910%	32.1	11.0685%
10D	6	9/29/2013 19:11	3	18973	1929	10.1671%	47.6	10.5915%
10D	7	9/29/2013 19:07	3	15170	1617	10.6592%	65.0	9.9534%
10D	8	9/29/2013 19:02	3	15406	1547	10.0415%	79.5	10.3102%
11A	1	9/29/2013 18:08	3	22552	3569	15.8256%	0.0	16.0845%
11A	2	9/29/2013 19:07	3	23435	4045	17.2605%	3.3	17.7727%
11A	3	9/29/2013 19:00	3	18738	3688	19.6819%	6.5	19.1486%
11A	4	9/29/2013 18:52	3	17900	4101	22.9106%	16.4	21.9703%
11A	5	9/29/2013 18:45	3	16500	3713	22.5030%	32.1	23.0508%
11A	6	9/29/2013 18:36	3	17447	3634	20.8288%	47.6	21.8406%

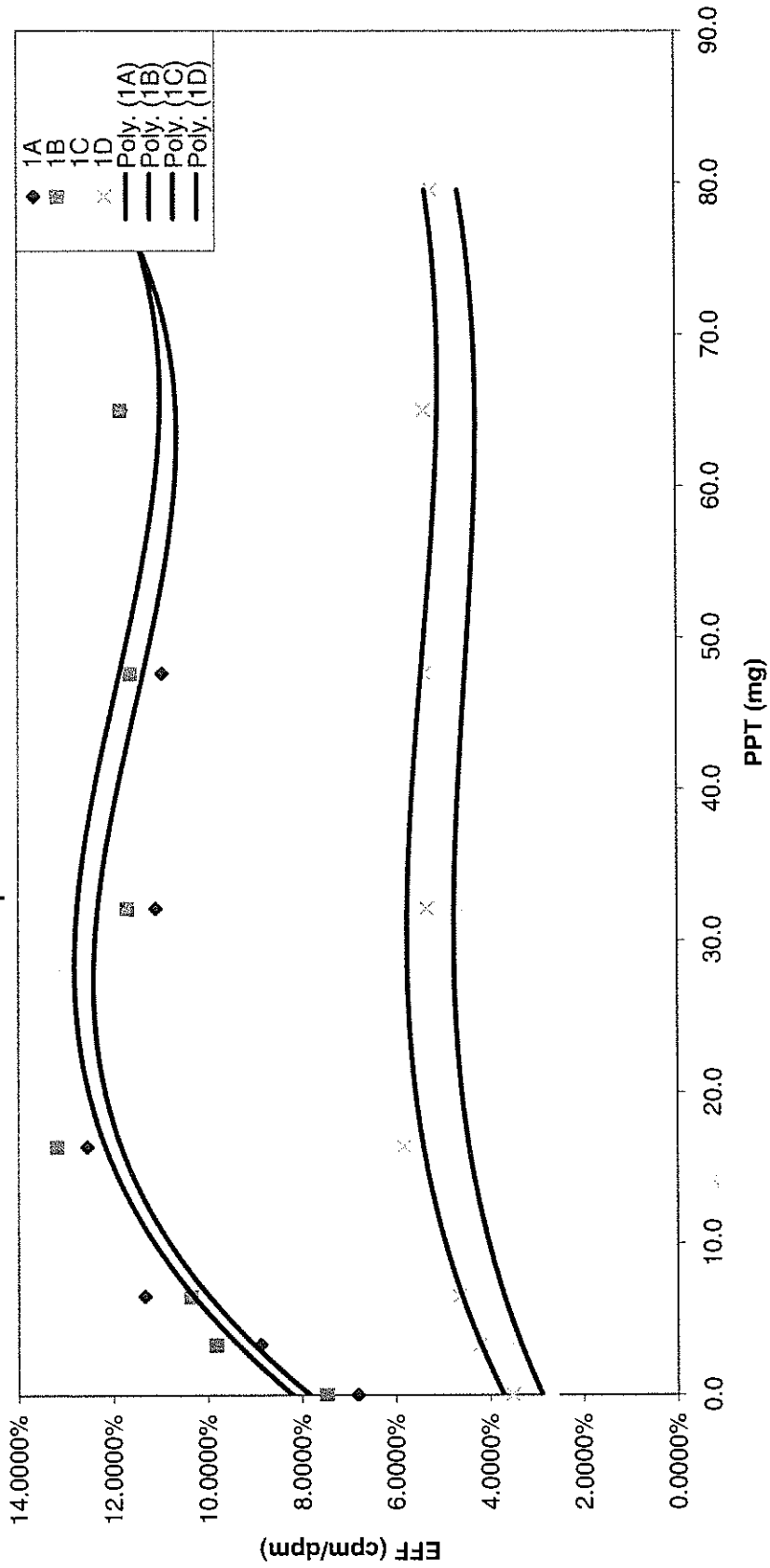
Detector (#)	Source ID (#)	Raw Count Data				Po-210 Xtalk (Beta/Alpha)	Source Measured Weight	Calculated Xtalk (Beta/Alpha)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
11A	7	9/29/2013 18:28	3	13934	3019	21.6664%	65.0	20.3164%
11A	8	9/29/2013 18:16	3	14197	2898	20.4128%	79.5	20.9059%
11B	1	9/29/2013 18:16	3	24608	2081	8.4566%	0.0	9.1098%
11B	2	9/29/2013 18:08	3	25250	2761	10.9347%	3.3	10.5635%
11B	3	9/29/2013 19:07	3	21154	2460	11.6290%	6.5	11.7363%
11B	4	9/29/2013 19:00	3	19466	3001	15.4166%	16.4	14.0741%
11B	5	9/29/2013 18:52	3	18279	2506	13.7097%	32.1	14.7965%
11B	6	9/29/2013 18:45	3	19384	2531	13.0572%	47.6	13.6589%
11B	7	9/29/2013 18:35	3	15571	2154	13.8334%	65.0	12.6286%
11B	8	9/29/2013 18:28	3	15551	2087	13.4204%	79.5	13.8899%
11C	1	9/29/2013 18:28	3	24504	2173	8.8679%	0.0	9.3752%
11C	2	9/29/2013 18:16	3	25228	2743	10.8728%	3.3	10.6576%
11C	3	9/29/2013 18:08	3	20522	2444	11.9092%	6.5	11.7065%
11C	4	9/29/2013 19:07	3	19896	2874	14.4451%	16.4	13.8835%
11C	5	9/29/2013 19:00	3	18034	2603	14.4338%	32.1	14.8214%
11C	6	9/29/2013 18:52	3	19304	2589	13.4117%	47.6	14.0858%
11C	7	9/29/2013 18:45	3	15645	2212	14.1387%	65.0	13.2031%
11C	8	9/29/2013 18:35	3	15795	2145	13.5802%	79.5	13.9265%
11D	1	9/29/2013 18:35	3	24668	1868	7.5726%	0.0	7.8580%
11D	2	9/29/2013 18:28	3	25472	2347	9.2140%	3.3	9.0840%
11D	3	9/29/2013 18:16	3	20808	2057	9.8856%	6.5	10.0679%
11D	4	9/29/2013 18:08	3	19788	2564	12.9573%	16.4	12.0008%
11D	5	9/29/2013 19:07	3	18427	2184	11.8522%	32.1	12.5298%
11D	6	9/29/2013 19:00	3	19431	2164	11.1368%	47.6	11.5586%
11D	7	9/29/2013 18:52	3	15470	1804	11.6613%	65.0	10.8810%
11D	8	9/29/2013 18:45	3	15279	1844	12.0689%	79.5	12.3685%
12A	1	9/29/2013 18:45	3	23718	2817	11.8771%	0.0	12.4488%
12A	2	9/29/2013 18:35	3	23935	3441	14.3764%	3.3	13.8717%
12A	3	9/29/2013 18:28	3	19852	2931	14.7643%	6.5	15.0380%
12A	4	9/29/2013 18:16	3	18651	3470	18.6049%	16.4	17.4740%
12A	5	9/29/2013 18:08	3	17481	3068	17.5505%	32.1	18.5708%
12A	6	9/29/2013 19:07	3	18175	3196	17.5846%	47.6	17.8131%
12A	7	9/29/2013 19:00	3	14640	2583	17.6434%	65.0	16.8668%
12A	8	9/29/2013 18:52	3	14529	2517	17.3240%	79.5	17.6421%
12B	1	9/29/2013 18:52	3	22117	4551	20.5769%	0.0	20.9013%
12B	2	9/29/2013 18:45	3	22345	5419	24.2515%	3.3	22.9056%
12B	3	9/29/2013 18:35	3	18570	4092	22.0355%	6.5	24.5464%
12B	4	9/29/2013 18:28	3	17100	5293	30.9532%	16.4	27.9552%
12B	5	9/29/2013 18:16	3	16044	4406	27.4620%	32.1	29.3936%
12B	6	9/29/2013 18:08	3	16781	4682	27.9006%	47.6	28.1001%
12B	7	9/29/2013 19:07	3	13689	3747	27.3723%	65.0	26.3194%
12B	8	9/29/2013 19:00	3	13793	3643	26.4119%	79.5	26.8425%
12C	1	9/29/2013 19:00	3	25769	1184	4.5947%	0.0	4.8697%
12C	2	9/29/2013 18:52	3	26340	1599	6.0706%	3.3	5.6234%
12C	3	9/29/2013 18:45	3	21943	1263	5.7558%	6.5	6.2394%
12C	4	9/29/2013 18:35	3	21022	1745	8.3008%	16.4	7.5184%
12C	5	9/29/2013 18:28	3	19225	1432	7.4486%	32.1	8.0887%
12C	6	9/29/2013 18:16	3	20187	1554	7.6980%	47.6	7.7292%
12C	7	9/29/2013 18:08	3	16576	1284	7.7461%	65.0	7.3975%
12C	8	9/29/2013 19:07	3	16129	1282	7.9484%	79.5	8.0968%
12D	1	9/29/2013 19:07	3	25737	1552	6.0302%	0.0	6.3999%
12D	2	9/29/2013 19:00	3	26401	2090	7.9164%	3.3	7.6854%
12D	3	9/29/2013 18:52	3	22016	1858	8.4393%	6.5	8.7200%
12D	4	9/29/2013 18:45	3	20876	2508	12.0138%	16.4	10.7713%
12D	5	9/29/2013 18:35	3	19216	1976	10.2831%	32.1	11.3921%
12D	6	9/29/2013 18:28	3	20440	2112	10.3327%	47.6	10.4374%

Detector (#)	Source ID (#)	Raw Count Data				Po-210 Xtalk (Beta/Alpha)	Source Measured Weight	Calculated Xtalk (Beta/Alpha)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
12D	7	9/29/2013 18:16	3	16320	1701	10.4228%	65.0	9.7483%
12D	8	9/29/2013 18:08	3	16345	1792	10.9636%	79.5	11.2475%
13A	1	9/29/2013 18:11	3	24814	1515	6.1054%	0.0	6.6755%
13A	2	9/29/2013 19:11	3	25538	2089	8.1800%	3.3	7.7377%
13A	3	9/29/2013 19:04	3	20873	1799	8.6188%	6.5	8.6033%
13A	4	9/29/2013 18:56	3	19705	2179	11.0581%	16.4	10.3847%
13A	5	9/29/2013 18:49	3	18289	1891	10.3395%	32.1	11.1278%
13A	6	9/29/2013 18:41	3	19181	2012	10.4895%	47.6	10.5538%
13A	7	9/29/2013 18:32	3	15614	1647	10.5482%	65.0	10.0372%
13A	8	9/29/2013 18:22	3	15447	1670	10.8112%	79.5	11.0307%
13B	1	9/29/2013 18:22	3	25436	1788	7.0294%	0.0	7.7066%
13B	2	9/29/2013 18:11	3	25935	2446	9.4313%	3.3	8.8561%
13B	3	9/29/2013 19:11	3	21595	2093	9.6921%	6.5	9.7907%
13B	4	9/29/2013 19:04	3	20520	2586	12.6023%	16.4	11.7018%
13B	5	9/29/2013 18:56	3	18970	2193	11.5604%	32.1	12.4740%
13B	6	9/29/2013 18:49	3	20301	2363	11.6398%	47.6	11.8571%
13B	7	9/29/2013 18:41	3	16437	1995	12.1373%	65.0	11.4048%
13B	8	9/29/2013 18:32	3	15956	1978	12.3966%	79.5	12.6980%
13C	1	9/29/2013 18:32	3	21655	5234	24.1699%	0.0	23.7914%
13C	2	9/29/2013 18:22	3	21919	6254	28.5323%	3.3	26.1014%
13C	3	9/29/2013 18:11	3	19170	4345	22.6656%	6.5	28.0144%
13C	4	9/29/2013 19:11	3	16567	5983	36.1140%	16.4	32.1250%
13C	5	9/29/2013 19:04	3	15861	5163	32.5515%	32.1	34.3006%
13C	6	9/29/2013 18:56	3	16305	5429	33.2965%	47.6	33.3837%
13C	7	9/29/2013 18:49	3	13431	4349	32.3803%	65.0	31.7517%
13C	8	9/29/2013 18:41	3	13496	4325	32.0465%	79.5	32.2885%
13D	1	9/29/2013 18:41	3	24865	1603	6.4468%	0.0	6.9421%
13D	2	9/29/2013 18:32	3	25667	2148	8.3687%	3.3	7.8880%
13D	3	9/29/2013 18:22	3	21211	1788	8.4296%	6.5	8.6600%
13D	4	9/29/2013 18:11	3	20290	2259	11.1336%	16.4	10.2547%
13D	5	9/29/2013 19:11	3	18619	1867	10.0274%	32.1	10.9354%
13D	6	9/29/2013 19:04	3	19548	2041	10.4410%	47.6	10.4337%
13D	7	9/29/2013 18:56	3	15631	1630	10.4280%	65.0	9.9510%
13D	8	9/29/2013 18:49	3	15736	1662	10.5618%	79.5	10.7719%
14A	1	9/29/2013 18:49	3	21398	5191	24.2593%	0.0	24.9178%
14A	2	9/29/2013 18:41	3	21897	6041	27.5883%	3.3	27.3791%
14A	3	9/29/2013 18:32	3	17886	5207	29.1122%	6.5	29.3749%
14A	4	9/29/2013 18:22	3	16628	5913	35.5605%	16.4	33.4100%
14A	5	9/29/2013 18:11	3	15479	5122	33.0900%	32.1	34.7963%
14A	6	9/29/2013 19:10	3	16485	5309	32.2050%	47.6	32.9126%
14A	7	9/29/2013 19:04	3	13323	4323	32.4476%	65.0	30.8379%
14A	8	9/29/2013 18:56	3	13268	4189	31.5722%	79.5	32.2066%
14B	1	9/29/2013 18:56	3	24017	4394	18.2954%	0.0	19.0424%
14B	2	9/29/2013 18:49	3	24515	5278	21.5297%	3.3	20.9685%
14B	3	9/29/2013 18:41	3	20449	4492	21.9668%	6.5	22.5580%
14B	4	9/29/2013 18:32	3	19198	5432	28.2946%	16.4	25.9431%
14B	5	9/29/2013 18:22	3	17898	4548	25.4107%	32.1	27.6598%
14B	6	9/29/2013 18:11	3	18623	5014	26.9237%	47.6	26.8470%
14B	7	9/29/2013 19:10	3	15203	4056	26.6789%	65.0	25.6056%
14B	8	9/29/2013 19:04	3	15299	3964	25.9102%	79.5	26.3856%
14C	1	9/29/2013 19:04	3	20042	6576	32.8111%	0.0	33.8532%
14C	2	9/29/2013 18:56	3	20185	7605	37.6765%	3.3	36.5198%
14C	3	9/29/2013 18:49	3	17044	6278	36.8341%	6.5	38.7326%
14C	4	9/29/2013 18:41	3	15413	7420	48.1412%	16.4	43.5107%
14C	5	9/29/2013 18:32	3	14511	6120	42.1749%	32.1	46.0811%
14C	6	9/29/2013 18:22	3	15106	6783	44.9027%	47.6	45.0005%



Detector (#)	Source ID (#)	Raw Count Data				Po-210 Xtalk (Beta/Alpha)	Source Measured Weight	Calculated Xtalk (Beta/Alpha)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
14C	7	9/29/2013 18:11	3	12381	5559	44.8994%	65.0	42.8726%
14C	8	9/29/2013 19:10	3	12260	5167	42.1452%	79.5	43.0145%
14D	1	9/29/2013 19:10	3	21782	5049	23.1797%	0.0	23.7789%
14D	2	9/29/2013 19:04	3	22206	5822	26.2181%	3.3	26.1077%
14D	3	9/29/2013 18:56	3	18447	5066	27.4625%	6.5	28.0086%
14D	4	9/29/2013 18:49	3	16969	5919	34.8813%	16.4	31.9347%
14D	5	9/29/2013 18:41	3	15866	4924	31.0349%	32.1	33.5867%
14D	6	9/29/2013 18:32	3	16642	5325	31.9974%	47.6	32.2624%
14D	7	9/29/2013 18:22	3	13200	4277	32.4015%	65.0	30.8447%
14D	8	9/29/2013 18:11	3	13360	4259	31.8787%	79.5	32.5304%

# Alpha Xtalk Calibration



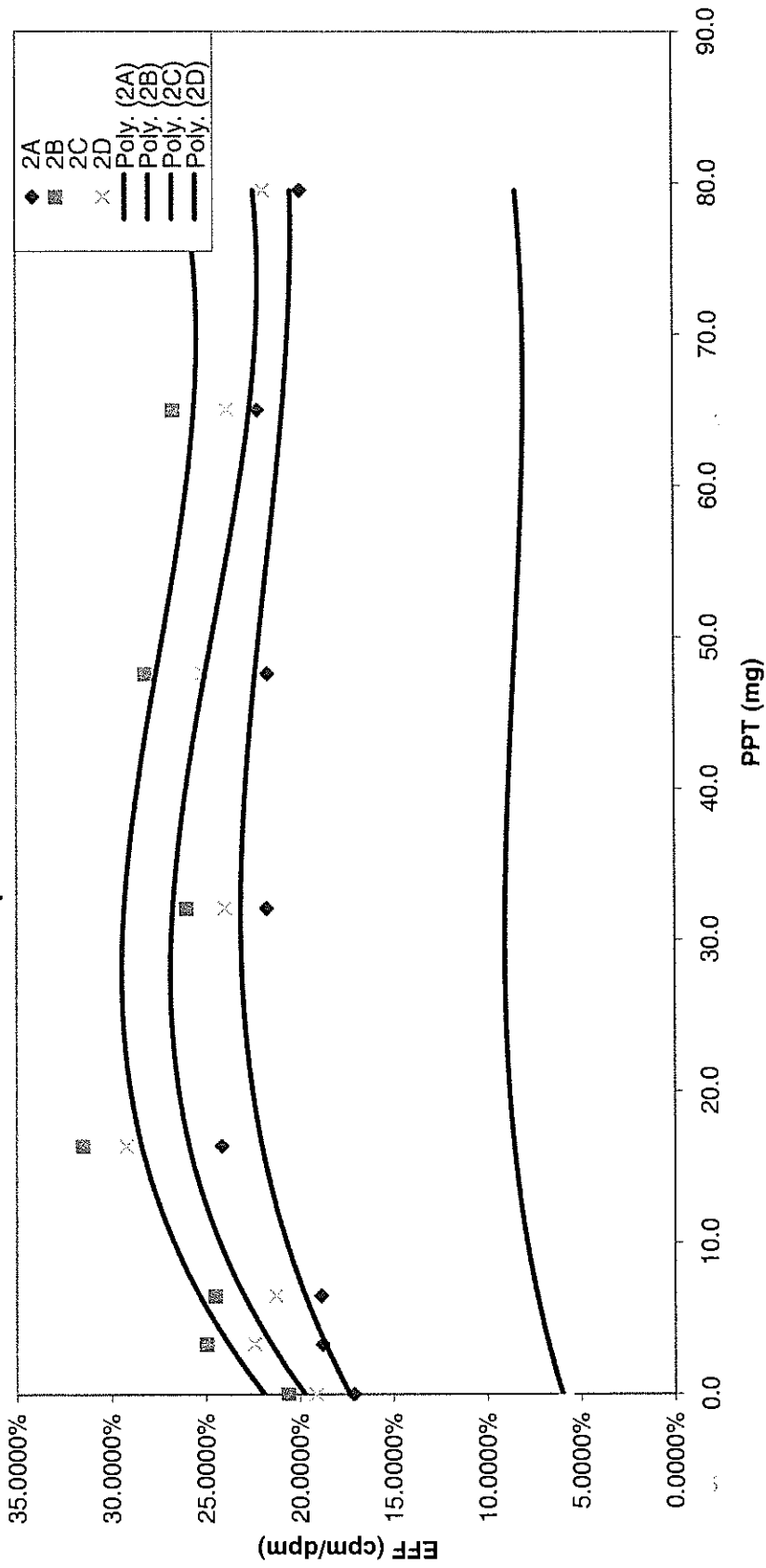
1A  $y = 7.594635E-07x^3 - 1.031744E-04x^2 + 3.929950E-03x + 7.827241E-02$

1B  $y = 6.874343E-07x^3 - 9.696660E-05x^2 + 3.826143E-03x + 8.196985E-02$

1C  $y = 2.473057E-07x^3 - 3.518821E-05x^2 + 1.453269E-03x + 2.892608E-02$

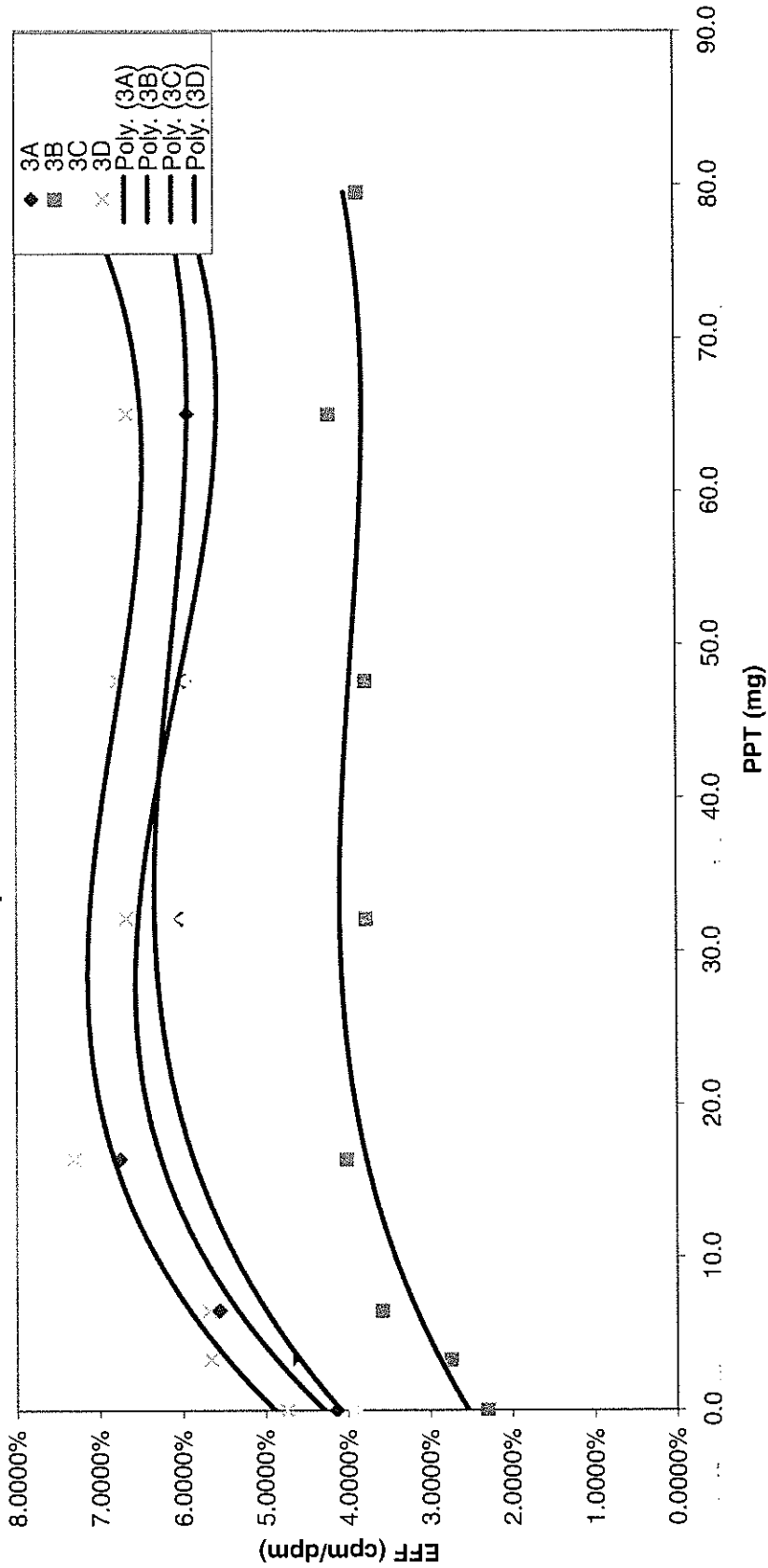
1D  $y = 2.627522E-07x^3 - 3.839188E-05x^2 + 1.595805E-03x + 3.707757E-02$

# Alpha Xtalk Calibration



2A  $y = 5.810864E-07x^3 - 9.466370E-05x^2 + 4.238758E-03x + 1.734244E-01$   
 2B  $y = 1.074182E-06x^3 - 1.575273E-04x^2 + 6.263786E-03x + 2.188958E-01$   
 2C  $y = 4.007389E-07x^3 - 5.826446E-05x^2 + 2.399226E-03x + 6.013077E-02$   
 2D  $y = 9.586927E-07x^3 - 1.460055E-04x^2 + 5.882230E-03x + 1.973259E-01$

# Alpha Xtalk Calibration



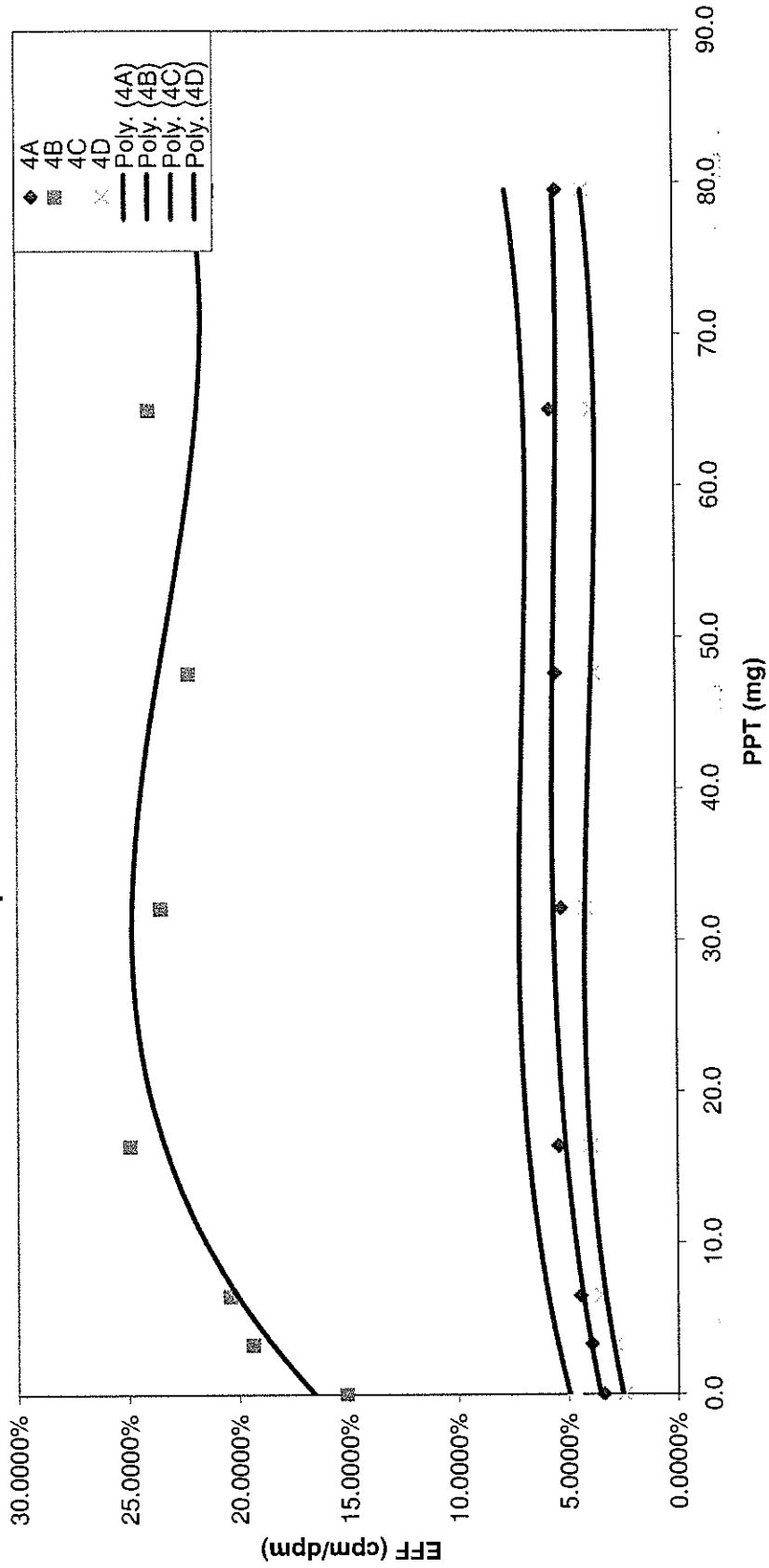
3A  $y = 3.499233E-07x^3 - 4.920473E-05x^2 + 1.917011E-03x + 4.287615E-02$

3B  $y = 1.716394E-07x^3 - 2.542473E-05x^2 + 1.122325E-03x + 2.538148E-02$

3C  $y = 2.434329E-07x^3 - 3.631193E-05x^2 + 1.614184E-03x + 4.089564E-02$

3D  $y = 3.571480E-07x^3 - 4.835300E-05x^2 + 1.879700E-03x + 4.889174E-02$

# Alpha Xtalk Calibration



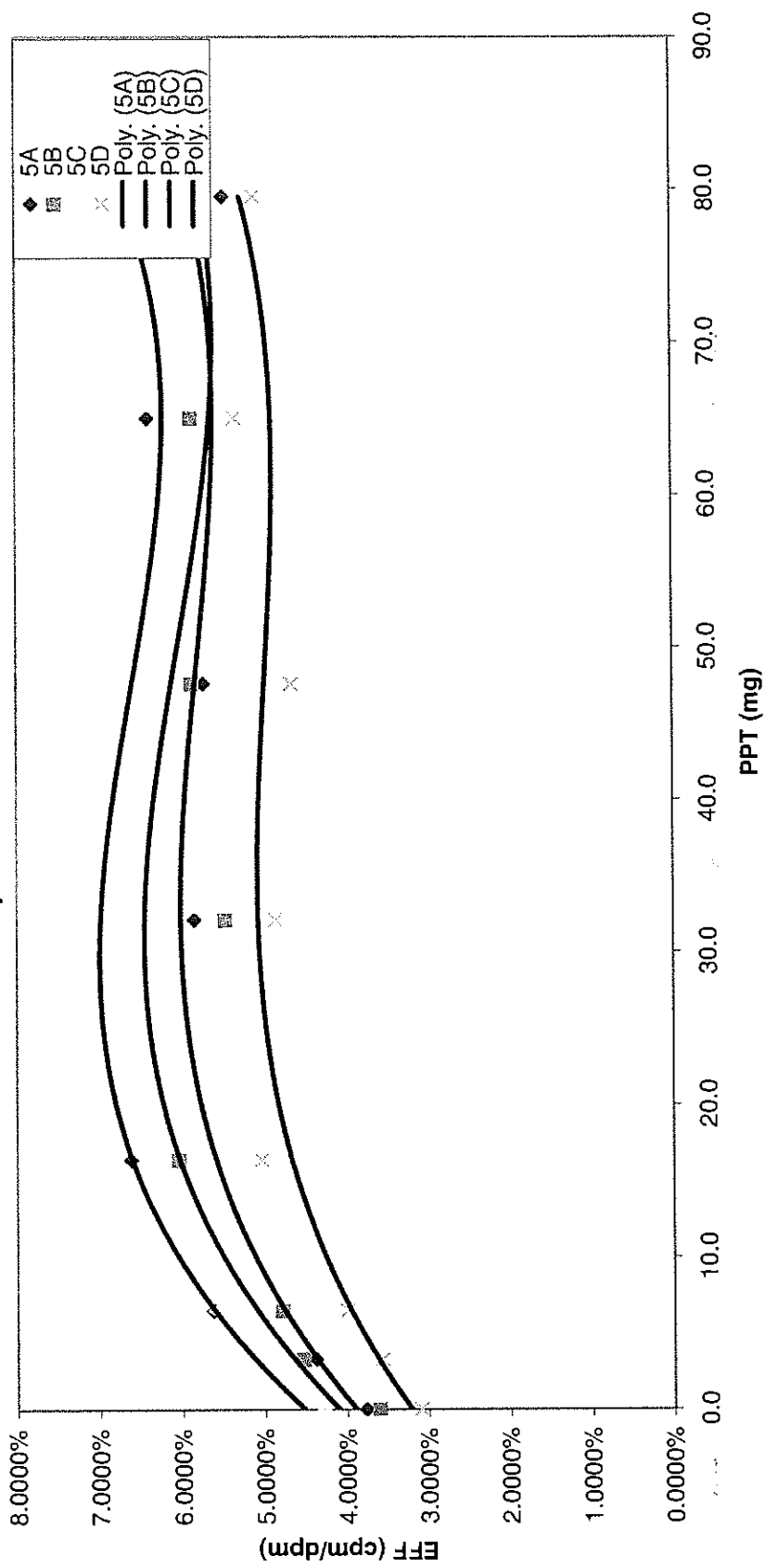
4A  $y = 1.708662E-07x^3 - 2.750311E-05x^2 + 1.348251E-03x + 3.553498E-02$

4B  $y = 9.675298E-07x^3 - 1.474834E-04x^2 + 6.302217E-03x + 1.656760E-01$

4C  $y = 3.227857E-07x^3 - 4.334194E-05x^2 + 1.745777E-03x + 4.953165E-02$

4D  $y = 2.778185E-07x^3 - 3.737147E-05x^2 + 1.426932E-03x + 2.517713E-02$

# Alpha Xtalk Calibration



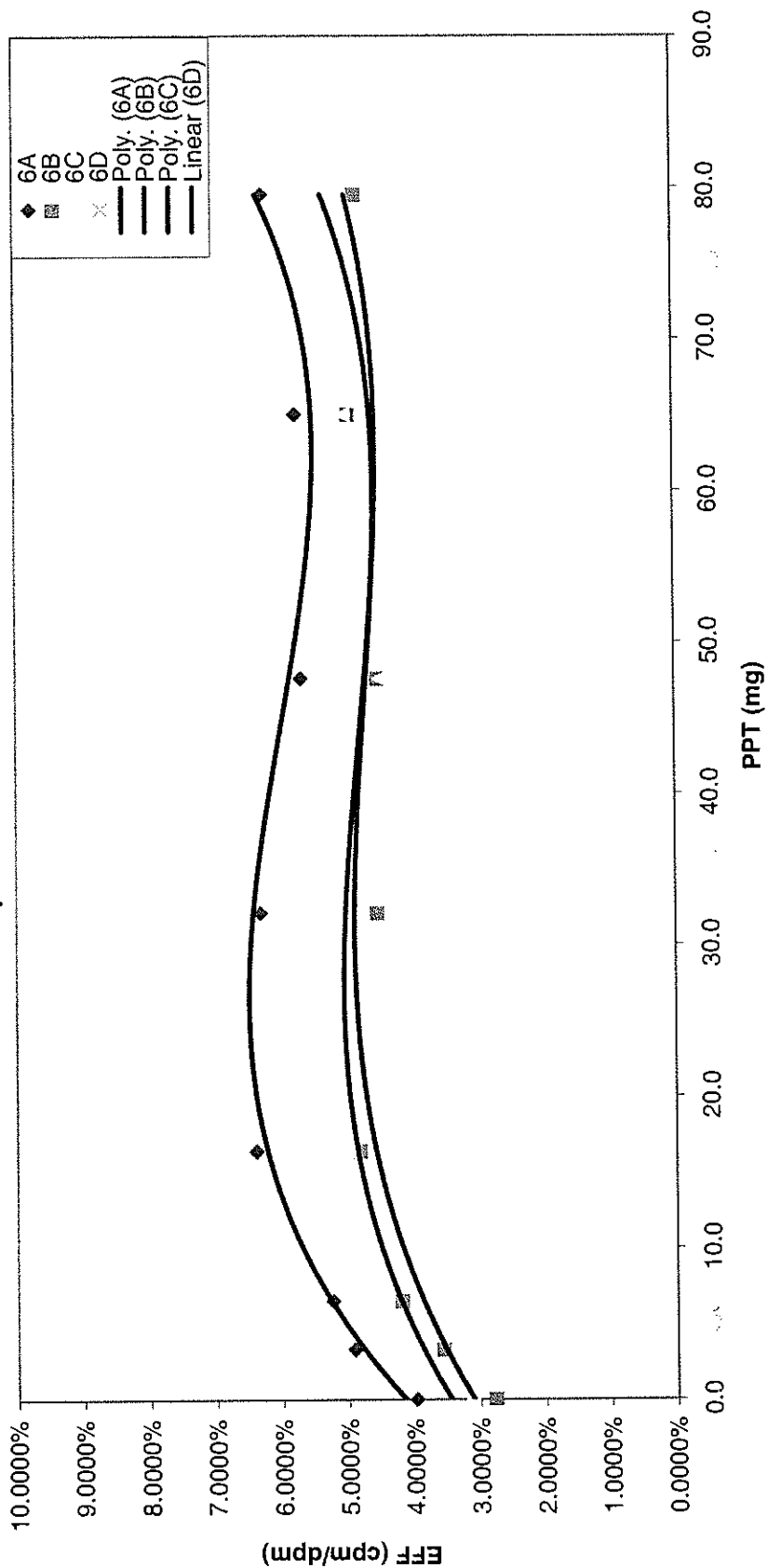
5A  $y = 2.759235E-07x^3 - 4.181222E-05x^2 + 1.790288E-03x + 4.097519E-02$

5B  $y = 2.425168E-07x^3 - 3.562565E-05x^2 + 1.555231E-03x + 3.889570E-02$

5C  $y = 3.439531E-07x^3 - 4.879524E-05x^2 + 1.979540E-03x + 4.520306E-02$

5D  $y = 2.038893E-07x^3 - 2.952907E-05x^2 + 1.317440E-03x + 3.210630E-02$

# Alpha Xtalk Calibration



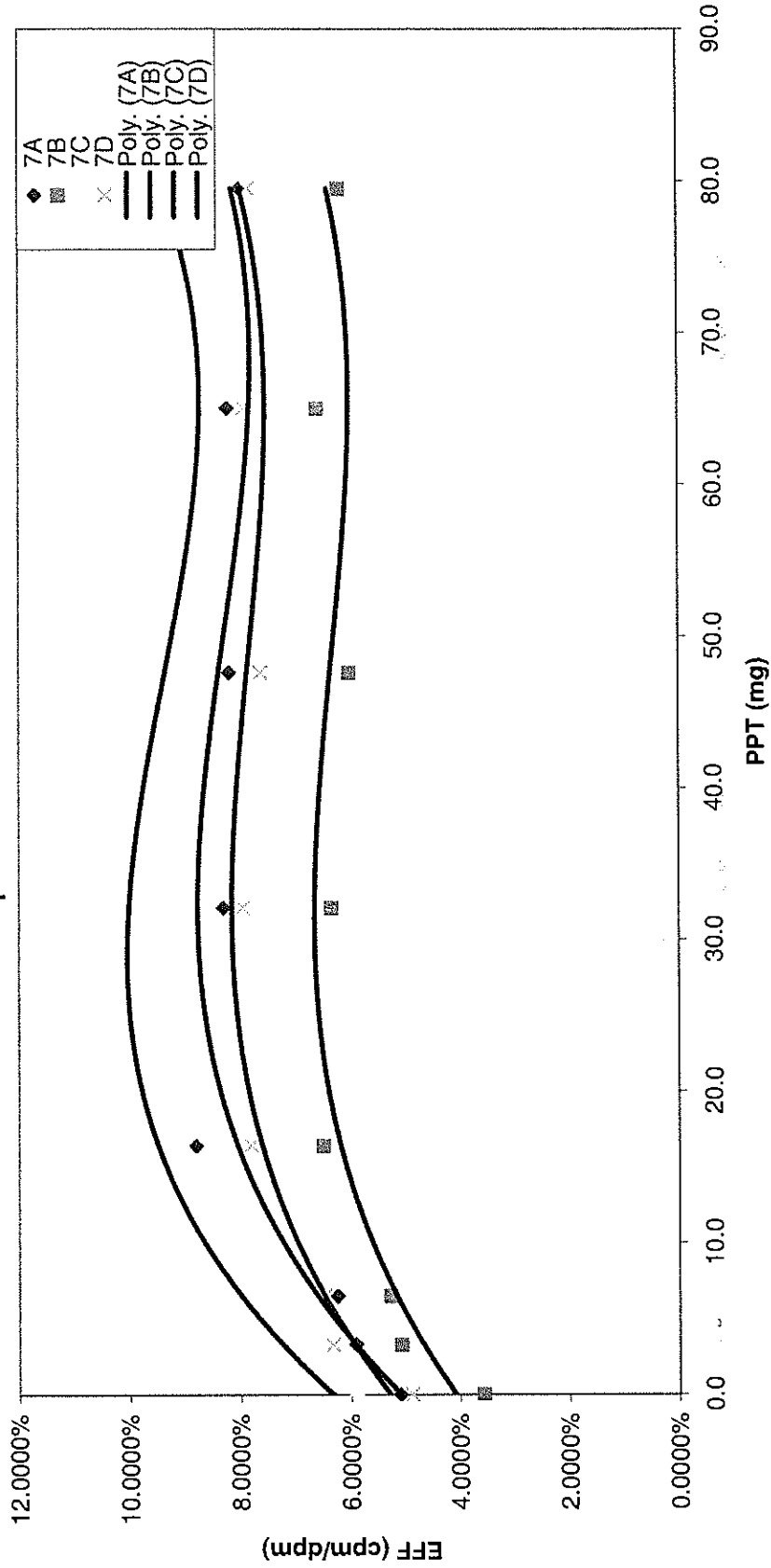
6A  $y = 4.191221E-07x^3 - 5.594868E-05x^2 + 2.074343E-03x + 4.142131E-02$

6B  $y = 2.362976E-07x^3 - 3.309202E-05x^2 + 1.372734E-03x + 3.104491E-02$

6C  $y = 2.850867E-07x^3 - 3.712003E-05x^2 + 1.386774E-03x + 3.449302E-02$

6D

# Alpha Xtalk Calibration



7A  $y = 4.128525E-07x^3 - 6.214764E-05x^2 + 2.715506E-03x + 5.084852E-02$

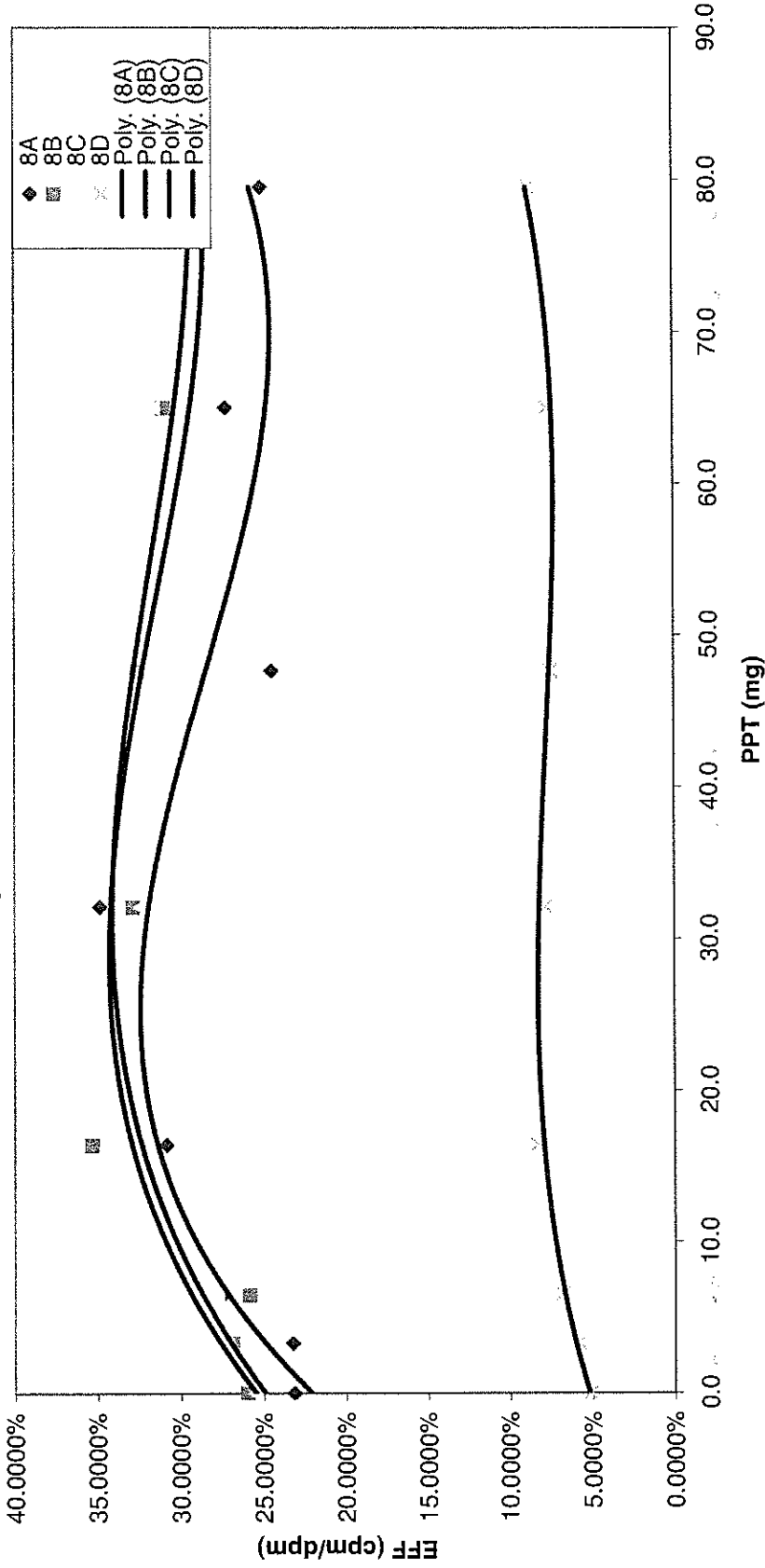
7B  $y = 3.139340E-07x^3 - 4.575758E-05x^2 + 1.944599E-03x + 4.078697E-02$

7C  $y = 5.342045E-07x^3 - 7.562344E-05x^2 + 3.026736E-03x + 6.321283E-02$

7D  $y = 3.417990E-07x^3 - 4.982558E-05x^2 + 2.140682E-03x + 5.279833E-02$



# Alpha Xtalk Calibration



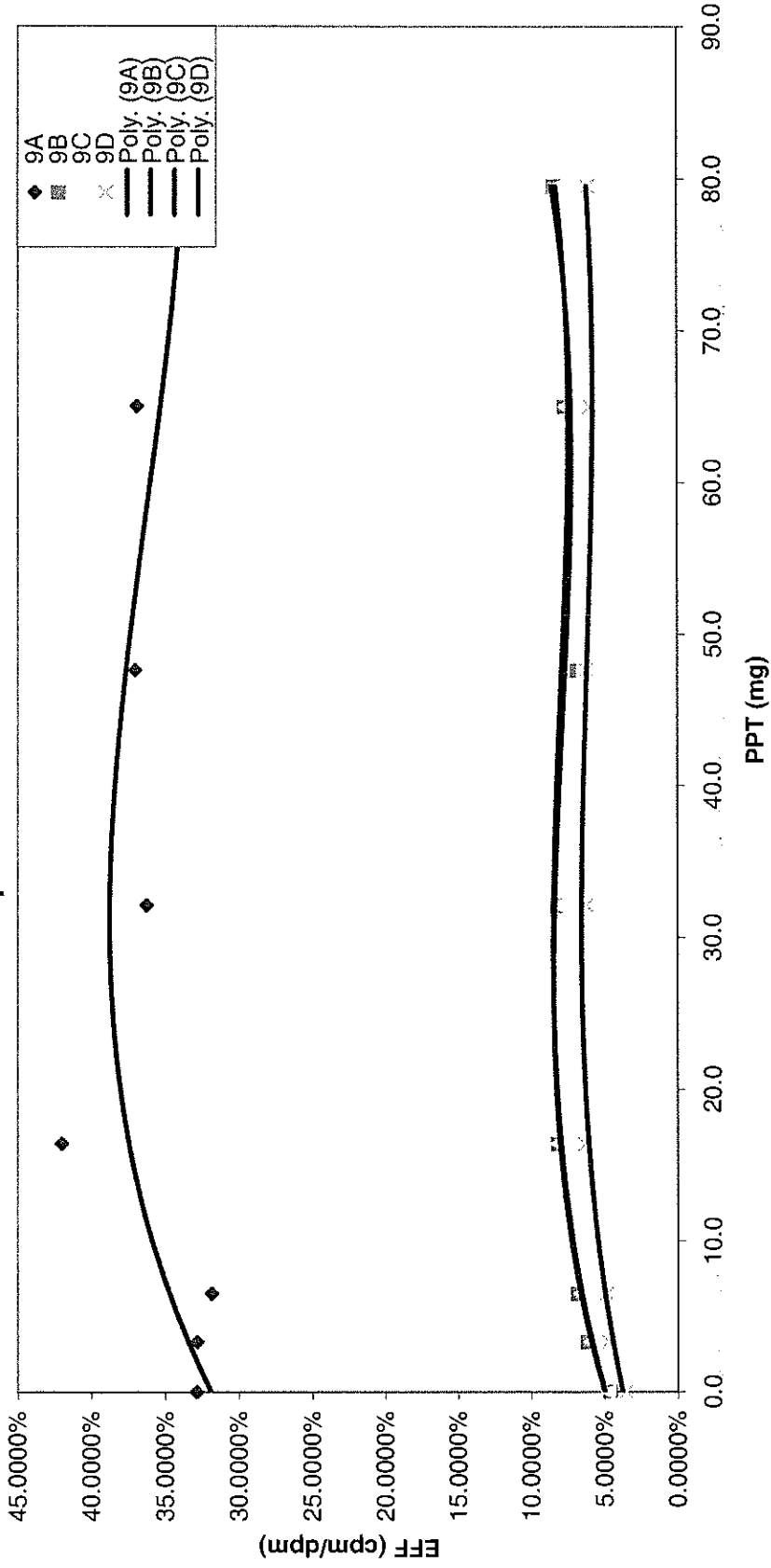
8A  $y = 1.766854E-06x^3 - 2.520044E-04x^2 + 9.331203E-03x + 2.208246E-01$

8B  $y = 9.117207E-07x^3 - 1.502662E-04x^2 + 6.748167E-03x + 2.491760E-01$

8C  $y = 1.065514E-06x^3 - 1.679634E-04x^2 + 7.013727E-03x + 2.548144E-01$

8D  $y = 5.759302E-07x^3 - 7.421136E-05x^2 + 2.725455E-03x + 5.196739E-02$

### Alpha Xtalk Calibration



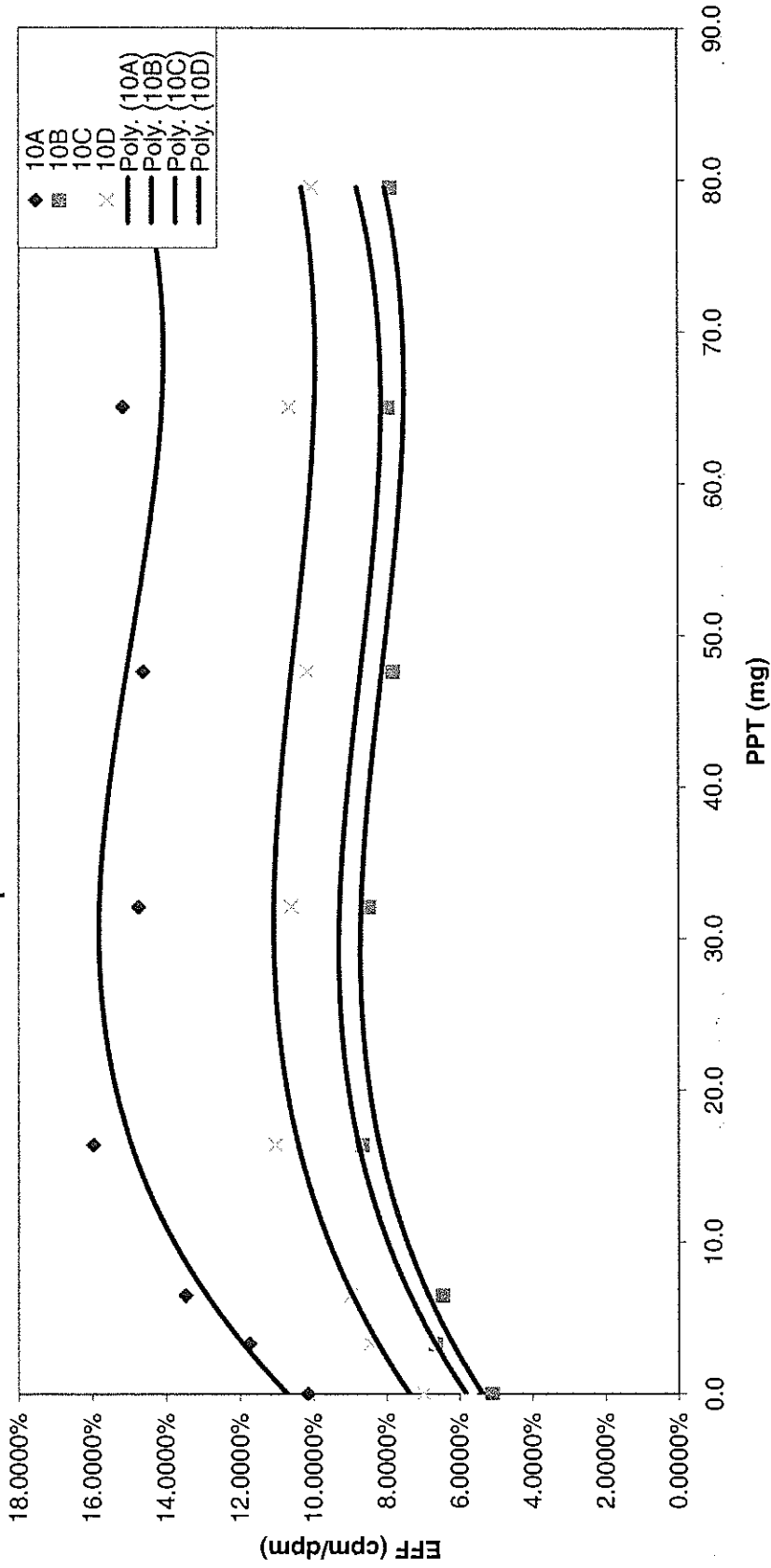
9A  $y = 6.304017E-07x^3 - 1.103001E-04x^2 + 5.033961E-03x + 3.188606E-01$

9B  $y = 5.972531E-07x^3 - 7.938585E-05x^2 + 2.982927E-03x + 5.006128E-02$

9C  $y = 5.052770E-07x^3 - 7.054130E-05x^2 + 2.828747E-03x + 4.975861E-02$

9D  $y = 3.496949E-07x^3 - 5.084321E-05x^2 + 2.132832E-03x + 3.773850E-02$

# Alpha Xtalk Calibration



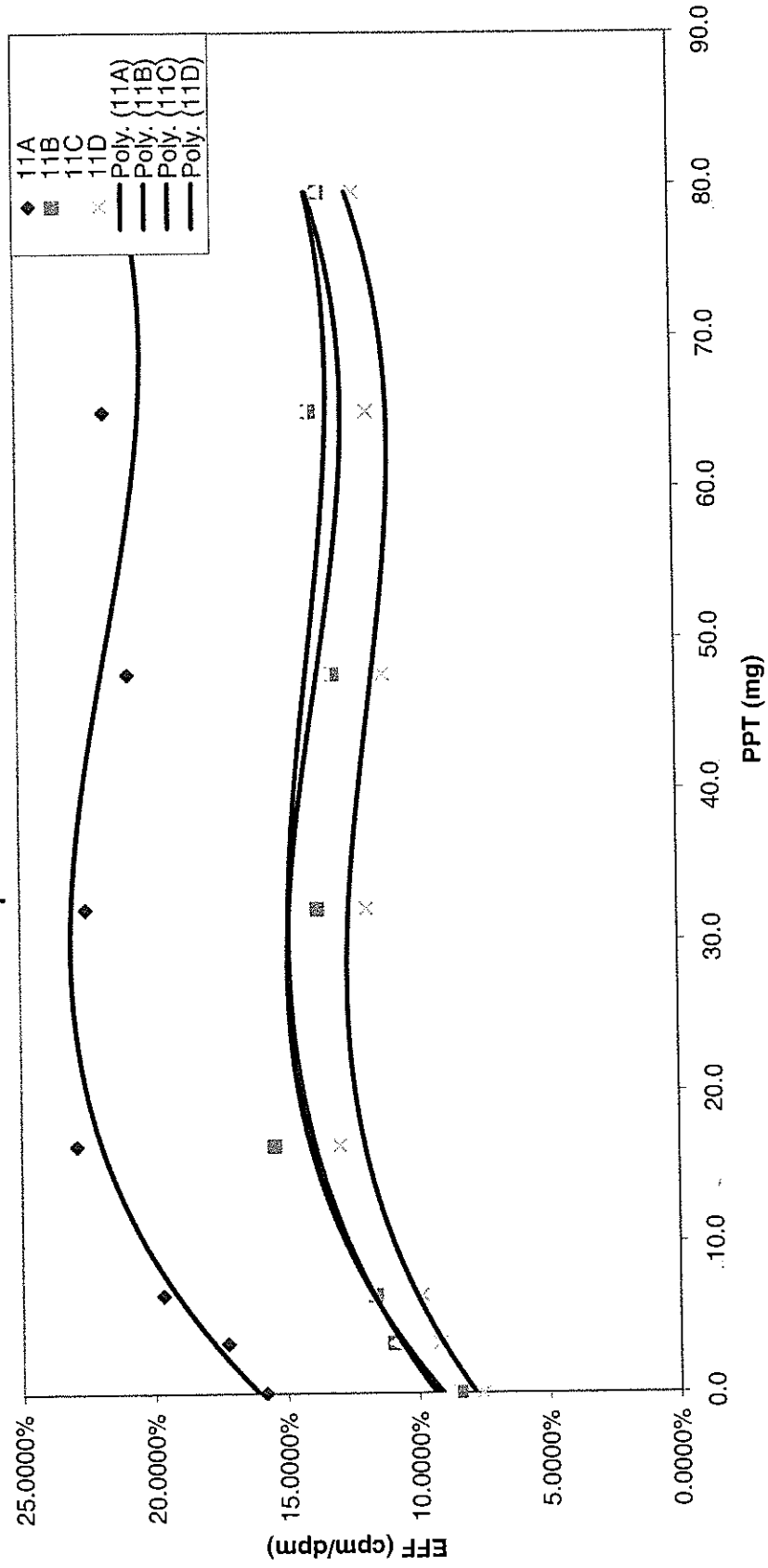
10A  $y = 6.295806E-07x^3 - 9.354133E-05x^2 + 3.942306E-03x + 1.071303E-01$

10B  $y = 4.596032E-07x^3 - 6.602443E-05x^2 + 2.677959E-03x + 5.379125E-02$

10C  $y = 4.886156E-07x^3 - 6.934015E-05x^2 + 2.799132E-03x + 5.820509E-02$

10D  $y = 4.430732E-07x^3 - 6.590523E-05x^2 + 2.807467E-03x + 7.381956E-02$

### Alpha Xtalk Calibration



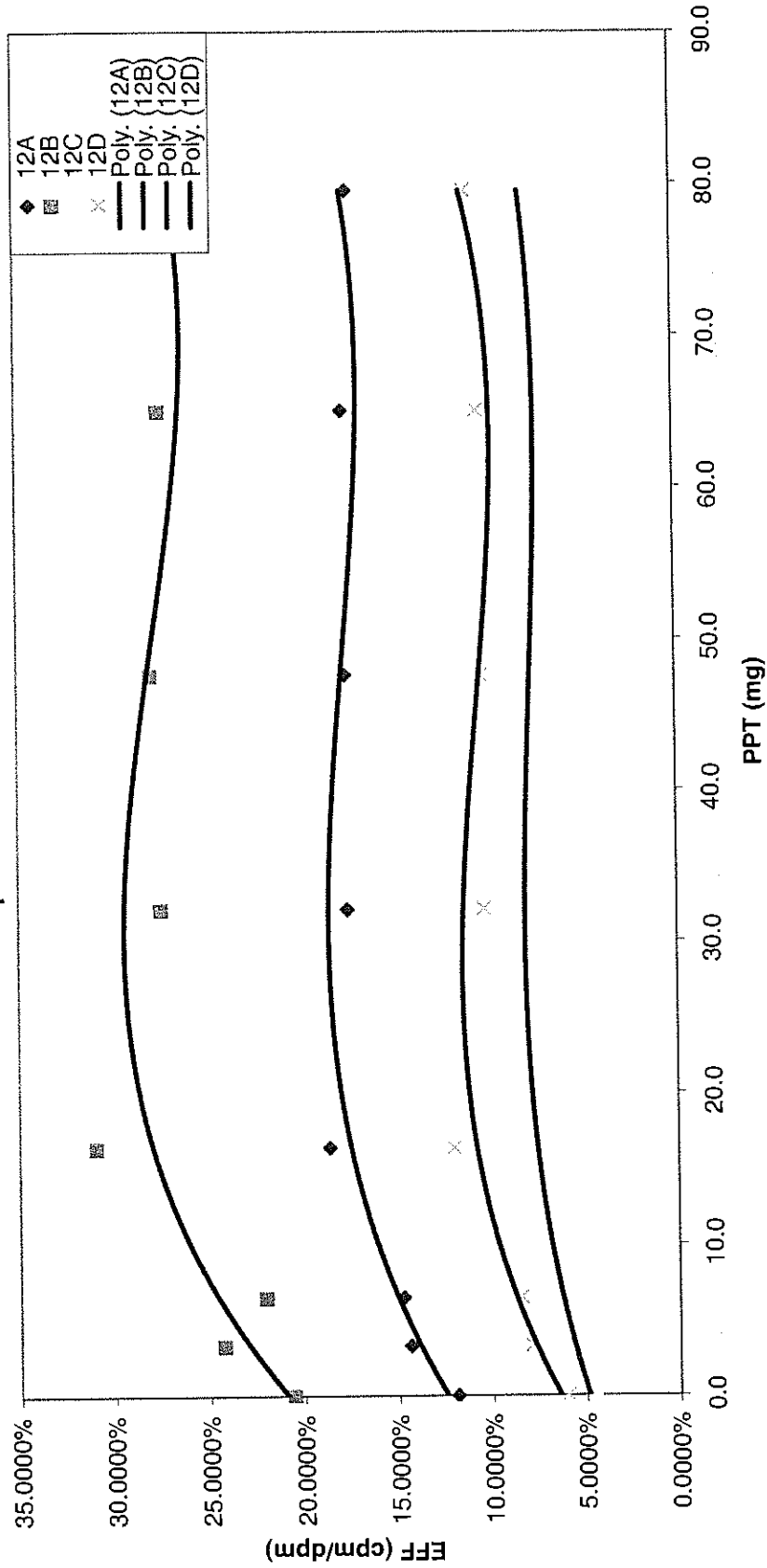
11A  $y = 9.092391E-07x^3 - 1.344608E-04x^2 + 5.549478E-03x + 1.608452E-01$

11B  $y = 8.760469E-07x^3 - 1.224562E-04x^2 + 4.799707E-03x + 9.109776E-02$

11C  $y = 6.864198E-07x^3 - 1.003206E-04x^2 + 4.209624E-03x + 9.375205E-02$

11D  $y = 7.838426E-07x^3 - 1.062118E-04x^2 + 4.057104E-03x + 7.858043E-02$

# Alpha Xtalk Calibration



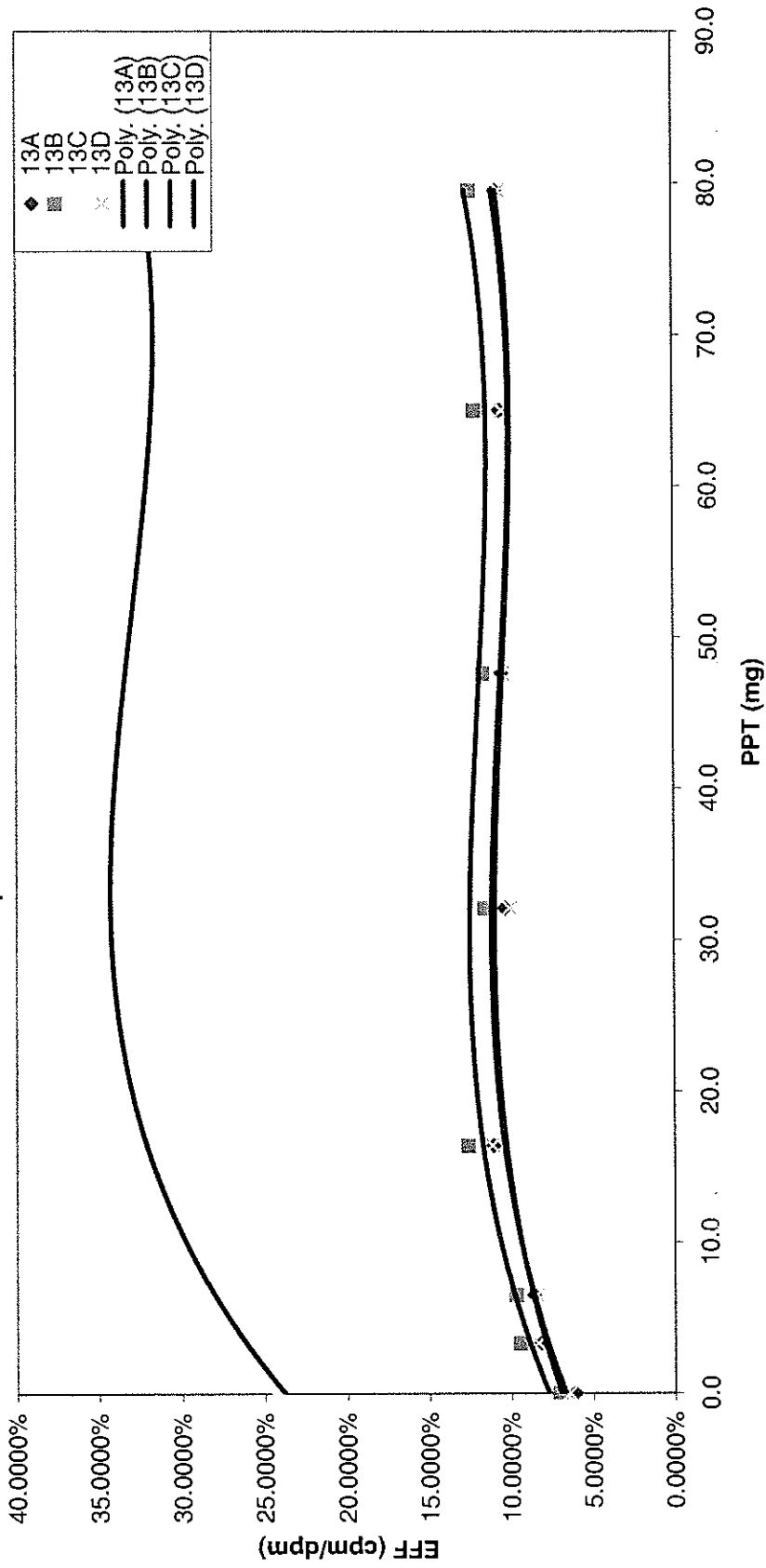
12A  $y = 7.486322E-07x^3 - 1.100013E-04x^2 + 4.666807E-03x + 1.244876E-01$

12B  $y = 1.036503E-06x^3 - 1.557214E-04x^2 + 6.576215E-03x + 2.090130E-01$

12C  $y = 4.184401E-07x^3 - 5.929049E-05x^2 + 2.474862E-03x + 4.869745E-02$

12D  $y = 8.046165E-07x^3 - 1.097415E-04x^2 + 4.248843E-03x + 6.399859E-02$

# Alpha Xtalk Calibration



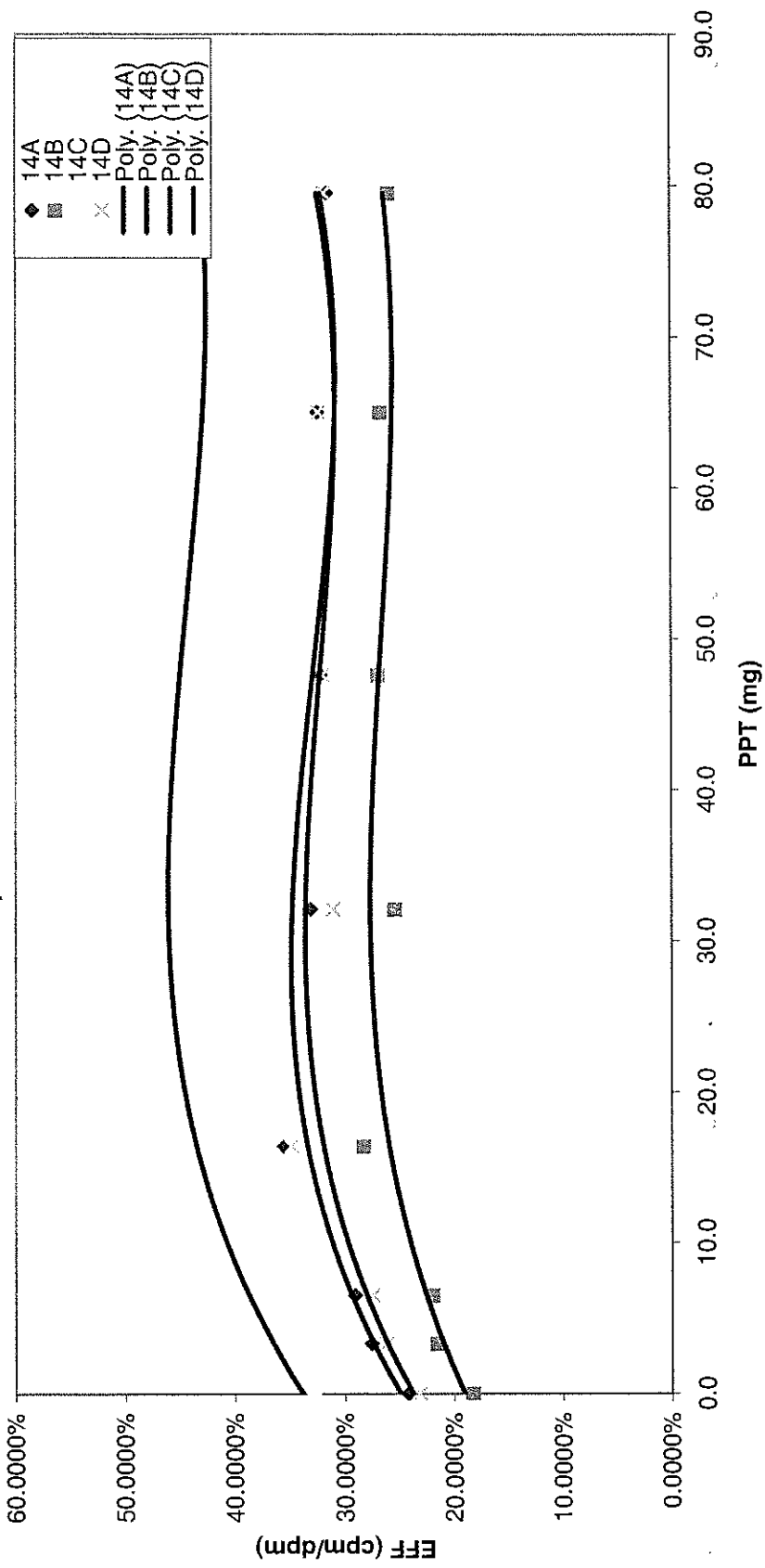
13A  $y = 6.023498E-07x^3 - 8.492706E-05x^2 + 3.492530E-03x + 6.675455E-02$

13B  $y = 6.732310E-07x^3 - 9.321981E-05x^2 + 3.783847E-03x + 7.706553E-02$

13C  $y = 1.087340E-06x^3 - 1.678677E-04x^2 + 7.542047E-03x + 2.379142E-01$

13D  $y = 5.282912E-07x^3 - 7.503950E-05x^2 + 3.108447E-03x + 6.942060E-02$

# Alpha Xtalk Calibration



14A  $y = 1.398148E-06x^3 - 2.016154E-04x^2 + 8.108614E-03x + 2.491776E-01$

14B  $y = 9.487814E-07x^3 - 1.430334E-04x^2 + 6.298294E-03x + 1.904240E-01$

14C  $y = 1.210676E-06x^3 - 1.911657E-04x^2 + 8.698270E-03x + 3.385315E-01$

14D  $y = 1.282239E-06x^3 - 1.843340E-04x^2 + 7.651297E-03x + 2.377888E-01$

Current Calibration - PIC

Geometry	Cal Date	10/1/2013	Exp Date	9/30/2014	
Alpha X-talk	A0	A1	A2	A3	A4
Protean					
1A	7.827241E-02	3.929950E-03	-1.031744E-04	7.594635E-07	
1B	8.196985E-02	3.826143E-03	-9.696660E-05	6.874343E-07	
1C	2.892608E-02	1.453269E-03	-3.518821E-05	2.473057E-07	
1D	3.707757E-02	1.595805E-03	-3.839188E-05	2.627522E-07	
2A	1.734244E-01	4.238758E-03	-9.466370E-05	5.810864E-07	
2B	2.188958E-01	6.263786E-03	-1.575273E-04	1.074182E-06	
2C	6.013077E-02	2.399226E-03	-5.826446E-05	4.007389E-07	
2D	1.973259E-01	5.882230E-03	-1.460055E-04	9.586927E-07	
3A	4.287615E-02	1.917011E-03	-4.920473E-05	3.499233E-07	
3B	2.538148E-02	1.122325E-03	-2.542473E-05	1.716394E-07	
3C	4.089564E-02	1.614184E-03	-3.631193E-05	2.434329E-07	
3D	4.889174E-02	1.879700E-03	-4.835300E-05	3.571480E-07	
4A	3.553498E-02	1.348251E-03	-2.750311E-05	1.708662E-07	
4B	1.656760E-01	6.302217E-03	-1.474834E-04	9.675298E-07	
4C	4.953165E-02	1.745777E-03	-4.334194E-05	3.227857E-07	
4D	2.517713E-02	1.426932E-03	-3.737147E-05	2.778185E-07	
5A	4.097519E-02	1.790288E-03	-4.181222E-05	2.759235E-07	
5B	3.889570E-02	1.555231E-03	-3.562565E-05	2.425168E-07	
5C	4.520306E-02	1.979540E-03	-4.879524E-05	3.439531E-07	
5D	3.210630E-02	1.317440E-03	-2.952907E-05	2.038893E-07	
6A	4.142131E-02	2.074343E-03	-5.594868E-05	4.191221E-07	
6B	3.104491E-02	1.372734E-03	-3.309202E-05	2.362976E-07	
6C	3.449302E-02	1.386774E-03	-3.712003E-05	2.850867E-07	
6D	#N/A	#N/A	#N/A	#N/A	
7A	5.084852E-02	2.715506E-03	-6.214764E-05	4.128525E-07	
7B	4.078697E-02	1.944599E-03	-4.575758E-05	3.139340E-07	
7C	6.321283E-02	3.026736E-03	-7.562344E-05	5.342045E-07	
7D	5.279833E-02	2.140682E-03	-4.982558E-05	3.417990E-07	
8A	2.208246E-01	9.331203E-03	-2.520044E-04	1.766854E-06	
8B	2.491760E-01	6.748167E-03	-1.502662E-04	9.117207E-07	
8C	2.548144E-01	7.013727E-03	-1.679634E-04	1.065514E-06	
8D	5.196739E-02	2.725455E-03	-7.421136E-05	5.759302E-07	
9A	3.188606E-01	5.033961E-03	-1.103001E-04	6.304017E-07	
9B	5.006128E-02	2.982927E-03	-7.938585E-05	5.972531E-07	
9C	4.975861E-02	2.828747E-03	-7.054130E-05	5.052770E-07	
9D	3.773850E-02	2.132832E-03	-5.084321E-05	3.496949E-07	
10A	1.071303E-01	3.942306E-03	-9.354133E-05	6.295806E-07	
10B	5.379125E-02	2.677959E-03	-6.602443E-05	4.596032E-07	
10C	5.820509E-02	2.799132E-03	-6.934015E-05	4.886156E-07	
10D	7.381956E-02	2.807467E-03	-6.590523E-05	4.430732E-07	
11A	1.608452E-01	5.549478E-03	-1.344608E-04	9.092391E-07	
11B	9.109776E-02	4.799707E-03	-1.224562E-04	8.760469E-07	
11C	9.375205E-02	4.209624E-03	-1.003206E-04	6.864198E-07	
11D	7.858043E-02	4.057104E-03	-1.062118E-04	7.838426E-07	
12A	1.244876E-01	4.666807E-03	-1.100013E-04	7.486322E-07	
12B	2.090130E-01	6.576215E-03	-1.557214E-04	1.036503E-06	
12C	4.869745E-02	2.474862E-03	-5.929049E-05	4.184401E-07	
12D	6.399859E-02	4.248843E-03	-1.097415E-04	8.046165E-07	
13A	6.675455E-02	3.492530E-03	-8.492706E-05	6.023498E-07	
13B	7.706553E-02	3.783847E-03	-9.321981E-05	6.732310E-07	
13C	2.379142E-01	7.542047E-03	-1.678677E-04	1.087340E-06	
13D	6.942060E-02	3.108447E-03	-7.503950E-05	5.282912E-07	
14A	2.491776E-01	8.108614E-03	-2.016154E-04	1.398148E-06	
14B	1.904240E-01	6.298294E-03	-1.430334E-04	9.487814E-07	
14C	3.385315E-01	8.698270E-03	-1.911657E-04	1.210676E-06	
14D	2.377888E-01	7.651297E-03	-1.843340E-04	1.282239E-06	



SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
X1	10A	3	23424	2378	9/29/2013 19:18	9/29/2013 19:21	PIC	PO210X13
X2	10A	3	23984	2816	9/29/2013 19:15	9/29/2013 19:18	PIC	PO210X13
X3	10A	3	19399	2613	9/29/2013 19:11	9/29/2013 19:14	PIC	PO210X13
X4	10A	3	18647	2980	9/29/2013 19:07	9/29/2013 19:10	PIC	PO210X13
X5	10A	3	17064	2515	9/29/2013 19:02	9/29/2013 19:05	PIC	PO210X13
X6	10A	3	18029	2637	9/29/2013 19:31	9/29/2013 19:34	PIC	PO210X13
X7	10A	3	14464	2195	9/29/2013 19:27	9/29/2013 19:30	PIC	PO210X13
X8	10A	3	14794	2092	9/29/2013 19:23	9/29/2013 19:26	PIC	PO210X13
X1	10B	3	24853	1270	9/29/2013 19:23	9/29/2013 19:26	PIC	PO210X13
X2	10B	3	25492	1698	9/29/2013 19:19	9/29/2013 19:22	PIC	PO210X13
X3	10B	3	21207	1369	9/29/2013 19:15	9/29/2013 19:18	PIC	PO210X13
X4	10B	3	19963	1728	9/29/2013 19:11	9/29/2013 19:14	PIC	PO210X13
X5	10B	3	18472	1565	9/29/2013 19:07	9/29/2013 19:05	PIC	PO210X13
X6	10B	3	19151	1496	9/29/2013 19:31	9/29/2013 19:34	PIC	PO210X13
X7	10B	3	15675	1245	9/29/2013 19:27	9/29/2013 19:30	PIC	PO210X13
X8	10B	3	15453	1217	9/29/2013 19:27	9/29/2013 19:30	PIC	PO210X13
X1	10C	3	24397	1404	9/29/2013 19:27	9/29/2013 19:26	PIC	PO210X13
X2	10C	3	25018	1709	9/29/2013 19:23	9/29/2013 19:22	PIC	PO210X13
X3	10C	3	20713	1447	9/29/2013 19:19	9/29/2013 19:22	PIC	PO210X13
X4	10C	3	19553	1827	9/29/2013 19:15	9/29/2013 19:18	PIC	PO210X13
X5	10C	3	18215	1635	9/29/2013 19:11	9/29/2013 19:14	PIC	PO210X13
X6	10C	3	18974	1606	9/29/2013 19:07	9/29/2013 19:10	PIC	PO210X13
X7	10C	3	15585	1327	9/29/2013 19:02	9/29/2013 19:05	PIC	PO210X13
X8	10C	3	15543	1346	9/29/2013 19:32	9/29/2013 19:35	PIC	PO210X13
X1	10D	3	24465	1711	9/29/2013 19:31	9/29/2013 19:34	PIC	PO210X13
X2	10D	3	25323	2138	9/29/2013 19:27	9/29/2013 19:30	PIC	PO210X13
X3	10D	3	20657	1853	9/29/2013 19:23	9/29/2013 19:26	PIC	PO210X13
X4	10D	3	19714	2174	9/29/2013 19:19	9/29/2013 19:22	PIC	PO210X13
X5	10D	3	18223	1930	9/29/2013 19:15	9/29/2013 19:18	PIC	PO210X13
X6	10D	3	18973	1929	9/29/2013 19:11	9/29/2013 19:14	PIC	PO210X13
X7	10D	3	15170	1617	9/29/2013 19:07	9/29/2013 19:10	PIC	PO210X13
X8	10D	3	15406	1547	9/29/2013 19:02	9/29/2013 19:05	PIC	PO210X13
X1	11A	3	22552	3569	9/29/2013 18:08	9/29/2013 18:11	PIC	PO210X13
X2	11A	3	23435	4045	9/29/2013 19:07	9/29/2013 19:10	PIC	PO210X13
X3	11A	3	18738	3688	9/29/2013 19:00	9/29/2013 19:03	PIC	PO210X13
X4	11A	3	17900	4101	9/29/2013 18:52	9/29/2013 18:55	PIC	PO210X13

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X5	11A	3	16500	3713	9/29/2013 18:45	9/29/2013 18:48	PIC	PO210X13
X6	11A	3	17447	3634	9/29/2013 18:36	9/29/2013 18:39	PIC	PO210X13
X7	11A	3	13934	3019	9/29/2013 18:28	9/29/2013 18:31	PIC	PO210X13
X8	11A	3	14197	2898	9/29/2013 18:16	9/29/2013 18:19	PIC	PO210X13
X1	11B	3	24608	2081	9/29/2013 18:16	9/29/2013 18:19	PIC	PO210X13
X2	11B	3	25250	2761	9/29/2013 18:08	9/29/2013 18:11	PIC	PO210X13
X3	11B	3	21154	2460	9/29/2013 19:07	9/29/2013 19:10	PIC	PO210X13
X4	11B	3	19466	3001	9/29/2013 19:00	9/29/2013 19:03	PIC	PO210X13
X5	11B	3	18279	2506	9/29/2013 18:52	9/29/2013 18:55	PIC	PO210X13
X6	11B	3	19384	2531	9/29/2013 18:45	9/29/2013 18:48	PIC	PO210X13
X7	11B	3	15571	2154	9/29/2013 18:35	9/29/2013 18:38	PIC	PO210X13
X8	11B	3	15551	2087	9/29/2013 18:28	9/29/2013 18:31	PIC	PO210X13
X1	11C	3	24504	2173	9/29/2013 18:28	9/29/2013 18:31	PIC	PO210X13
X2	11C	3	25228	2743	9/29/2013 18:16	9/29/2013 18:19	PIC	PO210X13
X3	11C	3	20522	2444	9/29/2013 18:08	9/29/2013 18:11	PIC	PO210X13
X4	11C	3	19896	2874	9/29/2013 19:07	9/29/2013 19:10	PIC	PO210X13
X5	11C	3	18034	2603	9/29/2013 19:00	9/29/2013 19:03	PIC	PO210X13
X6	11C	3	19304	2589	9/29/2013 18:52	9/29/2013 18:55	PIC	PO210X13
X7	11C	3	15645	2212	9/29/2013 18:45	9/29/2013 18:48	PIC	PO210X13
X8	11C	3	15795	2145	9/29/2013 18:35	9/29/2013 18:38	PIC	PO210X13
X1	11D	3	24668	1868	9/29/2013 18:35	9/29/2013 18:38	PIC	PO210X13
X2	11D	3	25472	2347	9/29/2013 18:28	9/29/2013 18:31	PIC	PO210X13
X3	11D	3	20808	2057	9/29/2013 18:16	9/29/2013 18:19	PIC	PO210X13
X4	11D	3	19788	2564	9/29/2013 18:08	9/29/2013 18:11	PIC	PO210X13
X5	11D	3	18427	2184	9/29/2013 19:07	9/29/2013 19:10	PIC	PO210X13
X6	11D	3	19431	2164	9/29/2013 19:00	9/29/2013 19:03	PIC	PO210X13
X7	11D	3	15470	1804	9/29/2013 18:52	9/29/2013 18:55	PIC	PO210X13
X8	11D	3	15279	1844	9/29/2013 18:45	9/29/2013 18:48	PIC	PO210X13
X1	12A	3	23718	2817	9/29/2013 18:45	9/29/2013 18:48	PIC	PO210X13
X2	12A	3	23935	3441	9/29/2013 18:35	9/29/2013 18:38	PIC	PO210X13
X3	12A	3	19852	2931	9/29/2013 18:28	9/29/2013 18:31	PIC	PO210X13
X4	12A	3	18651	3470	9/29/2013 18:16	9/29/2013 18:19	PIC	PO210X13
X5	12A	3	17481	3068	9/29/2013 18:08	9/29/2013 18:11	PIC	PO210X13
X6	12A	3	18175	3196	9/29/2013 19:07	9/29/2013 19:10	PIC	PO210X13
X7	12A	3	14640	2583	9/29/2013 19:00	9/29/2013 19:03	PIC	PO210X13
X8	12A	3	14529	2517	9/29/2013 18:52	9/29/2013 18:55	PIC	PO210X13
X1	12B	3	22117	4551	9/29/2013 18:52	9/29/2013 18:55	PIC	PO210X13

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X2	12B	3	22345	5419	9/29/2013 18:45	9/29/2013 18:48	PIC	PO210X13
X3	12B	3	18570	4092	9/29/2013 18:35	9/29/2013 18:38	PIC	PO210X13
X4	12B	3	17100	5293	9/29/2013 18:28	9/29/2013 18:31	PIC	PO210X13
X5	12B	3	16044	4406	9/29/2013 18:16	9/29/2013 18:19	PIC	PO210X13
X6	12B	3	16781	4682	9/29/2013 18:08	9/29/2013 18:11	PIC	PO210X13
X7	12B	3	13689	3747	9/29/2013 19:07	9/29/2013 19:10	PIC	PO210X13
X8	12B	3	13793	3643	9/29/2013 19:00	9/29/2013 19:03	PIC	PO210X13
X1	12C	3	25769	1184	9/29/2013 19:00	9/29/2013 19:03	PIC	PO210X13
X2	12C	3	26340	1599	9/29/2013 18:52	9/29/2013 18:55	PIC	PO210X13
X3	12C	3	21943	1263	9/29/2013 18:45	9/29/2013 18:48	PIC	PO210X13
X4	12C	3	21022	1745	9/29/2013 18:35	9/29/2013 18:38	PIC	PO210X13
X5	12C	3	19225	1432	9/29/2013 18:28	9/29/2013 18:31	PIC	PO210X13
X6	12C	3	20187	1554	9/29/2013 18:16	9/29/2013 18:19	PIC	PO210X13
X7	12C	3	16576	1284	9/29/2013 18:08	9/29/2013 18:11	PIC	PO210X13
X8	12C	3	16129	1282	9/29/2013 19:07	9/29/2013 19:10	PIC	PO210X13
X1	12D	3	25737	1552	9/29/2013 19:07	9/29/2013 19:10	PIC	PO210X13
X2	12D	3	26401	2090	9/29/2013 19:00	9/29/2013 19:03	PIC	PO210X13
X3	12D	3	22016	1858	9/29/2013 18:52	9/29/2013 18:55	PIC	PO210X13
X4	12D	3	20876	2508	9/29/2013 18:45	9/29/2013 18:48	PIC	PO210X13
X5	12D	3	19216	1976	9/29/2013 18:35	9/29/2013 18:38	PIC	PO210X13
X6	12D	3	20440	2112	9/29/2013 18:28	9/29/2013 18:31	PIC	PO210X13
X7	12D	3	16320	1701	9/29/2013 18:16	9/29/2013 18:19	PIC	PO210X13
X8	12D	3	16345	1792	9/29/2013 18:08	9/29/2013 18:11	PIC	PO210X13
X1	13A	3	24814	1515	9/29/2013 18:11	9/29/2013 18:14	PIC	PO210X13
X2	13A	3	25538	2089	9/29/2013 19:11	9/29/2013 19:14	PIC	PO210X13
X3	13A	3	20873	1799	9/29/2013 19:04	9/29/2013 19:07	PIC	PO210X13
X4	13A	3	19705	2179	9/29/2013 18:56	9/29/2013 18:59	PIC	PO210X13
X5	13A	3	18289	1891	9/29/2013 18:49	9/29/2013 18:52	PIC	PO210X13
X6	13A	3	19181	2012	9/29/2013 18:41	9/29/2013 18:44	PIC	PO210X13
X7	13A	3	15614	1647	9/29/2013 18:32	9/29/2013 18:35	PIC	PO210X13
X8	13A	3	15447	1670	9/29/2013 18:22	9/29/2013 18:25	PIC	PO210X13
X1	13B	3	25436	1788	9/29/2013 18:22	9/29/2013 18:25	PIC	PO210X13
X2	13B	3	25935	2446	9/29/2013 18:11	9/29/2013 18:14	PIC	PO210X13
X3	13B	3	21595	2093	9/29/2013 19:11	9/29/2013 19:14	PIC	PO210X13
X4	13B	3	20520	2586	9/29/2013 19:04	9/29/2013 19:07	PIC	PO210X13
X5	13B	3	18970	2193	9/29/2013 18:56	9/29/2013 18:59	PIC	PO210X13
X6	13B	3	20301	2363	9/29/2013 18:49	9/29/2013 18:52	PIC	PO210X13

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X7	13B	3	16437	1995	9/29/2013 18:41	9/29/2013 18:44	PIC	PO210X13
X8	13B	3	15956	1978	9/29/2013 18:32	9/29/2013 18:35	PIC	PO210X13
X1	13C	3	21655	5234	9/29/2013 18:32	9/29/2013 18:35	PIC	PO210X13
X2	13C	3	21919	6254	9/29/2013 18:22	9/29/2013 18:25	PIC	PO210X13
X3	13C	3	19170	4345	9/29/2013 18:11	9/29/2013 18:14	PIC	PO210X13
X4	13C	3	16567	5983	9/29/2013 19:11	9/29/2013 19:14	PIC	PO210X13
X5	13C	3	15861	5163	9/29/2013 19:04	9/29/2013 19:07	PIC	PO210X13
X6	13C	3	16305	5429	9/29/2013 18:56	9/29/2013 18:59	PIC	PO210X13
X7	13C	3	13431	4349	9/29/2013 18:49	9/29/2013 18:52	PIC	PO210X13
X8	13C	3	13496	4325	9/29/2013 18:41	9/29/2013 18:44	PIC	PO210X13
X1	13D	3	24865	1603	9/29/2013 18:41	9/29/2013 18:44	PIC	PO210X13
X2	13D	3	25667	2148	9/29/2013 18:32	9/29/2013 18:35	PIC	PO210X13
X3	13D	3	21211	1788	9/29/2013 18:22	9/29/2013 18:25	PIC	PO210X13
X4	13D	3	20290	2259	9/29/2013 18:11	9/29/2013 18:14	PIC	PO210X13
X5	13D	3	18619	1867	9/29/2013 19:11	9/29/2013 19:14	PIC	PO210X13
X6	13D	3	19548	2041	9/29/2013 19:04	9/29/2013 19:07	PIC	PO210X13
X7	13D	3	15631	1630	9/29/2013 18:56	9/29/2013 18:59	PIC	PO210X13
X8	13D	3	15736	1662	9/29/2013 18:49	9/29/2013 18:52	PIC	PO210X13
X1	14A	3	21398	5191	9/29/2013 18:49	9/29/2013 18:52	PIC	PO210X13
X2	14A	3	21897	6041	9/29/2013 18:41	9/29/2013 18:44	PIC	PO210X13
X3	14A	3	17886	5207	9/29/2013 18:32	9/29/2013 18:35	PIC	PO210X13
X4	14A	3	16628	5913	9/29/2013 18:22	9/29/2013 18:25	PIC	PO210X13
X5	14A	3	15479	5122	9/29/2013 18:11	9/29/2013 18:14	PIC	PO210X13
X6	14A	3	16485	5309	9/29/2013 19:10	9/29/2013 19:13	PIC	PO210X13
X7	14A	3	13323	4323	9/29/2013 19:04	9/29/2013 19:07	PIC	PO210X13
X8	14A	3	13268	4189	9/29/2013 18:56	9/29/2013 18:59	PIC	PO210X13
X1	14B	3	24017	4394	9/29/2013 18:56	9/29/2013 18:59	PIC	PO210X13
X2	14B	3	24515	5278	9/29/2013 18:49	9/29/2013 18:52	PIC	PO210X13
X3	14B	3	20449	4492	9/29/2013 18:41	9/29/2013 18:44	PIC	PO210X13
X4	14B	3	19198	5432	9/29/2013 18:32	9/29/2013 18:35	PIC	PO210X13
X5	14B	3	17898	4548	9/29/2013 18:22	9/29/2013 18:25	PIC	PO210X13
X6	14B	3	18623	5014	9/29/2013 18:11	9/29/2013 18:14	PIC	PO210X13
X7	14B	3	15203	4056	9/29/2013 19:10	9/29/2013 19:13	PIC	PO210X13
X8	14B	3	15299	3964	9/29/2013 19:04	9/29/2013 19:07	PIC	PO210X13
X1	14C	3	20042	6576	9/29/2013 19:04	9/29/2013 19:07	PIC	PO210X13
X2	14C	3	20185	7605	9/29/2013 18:56	9/29/2013 18:59	PIC	PO210X13
X3	14C	3	17044	6278	9/29/2013 18:49	9/29/2013 18:52	PIC	PO210X13

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X4	14C	3	15413	7420	9/29/2013 18:41	9/29/2013 18:44	PIC	PO210X13
X5	14C	3	14511	6120	9/29/2013 18:32	9/29/2013 18:35	PIC	PO210X13
X6	14C	3	15106	6783	9/29/2013 18:22	9/29/2013 18:25	PIC	PO210X13
X7	14C	3	12381	5559	9/29/2013 18:11	9/29/2013 18:14	PIC	PO210X13
X8	14C	3	12260	5167	9/29/2013 19:10	9/29/2013 19:13	PIC	PO210X13
X1	14D	3	21782	5049	9/29/2013 19:10	9/29/2013 19:13	PIC	PO210X13
X2	14D	3	22206	5822	9/29/2013 19:04	9/29/2013 19:07	PIC	PO210X13
X3	14D	3	18447	5066	9/29/2013 18:56	9/29/2013 18:59	PIC	PO210X13
X4	14D	3	16969	5919	9/29/2013 18:49	9/29/2013 18:52	PIC	PO210X13
X5	14D	3	15866	4924	9/29/2013 18:41	9/29/2013 18:44	PIC	PO210X13
X6	14D	3	16642	5325	9/29/2013 18:32	9/29/2013 18:35	PIC	PO210X13
X7	14D	3	13200	4277	9/29/2013 18:22	9/29/2013 18:25	PIC	PO210X13
X8	14D	3	13360	4259	9/29/2013 18:11	9/29/2013 18:14	PIC	PO210X13
X1	1A	3	24383	1661	9/28/2013 10:34	9/28/2013 10:37	PIC	PO210X13
X2	1A	3	24805	2203	9/28/2013 10:49	9/28/2013 10:52	PIC	PO210X13
X3	1A	3	20231	2291	9/28/2013 10:39	9/28/2013 10:42	PIC	PO210X13
X4	1A	3	19233	2414	9/28/2013 10:54	9/28/2013 10:57	PIC	PO210X13
X5	1A	3	18031	2001	9/28/2013 11:11	9/28/2013 11:14	PIC	PO210X13
X6	1A	3	18807	2060	9/28/2013 11:06	9/28/2013 11:09	PIC	PO210X13
X7	1A	3	15185	1794	9/28/2013 11:01	9/28/2013 11:04	PIC	PO210X13
X8	1A	3	15065	1738	9/28/2013 10:39	9/28/2013 10:42	PIC	PO210X13
X1	1B	3	24552	1834	9/28/2013 10:34	9/28/2013 10:37	PIC	PO210X13
X2	1B	3	24776	2434	9/28/2013 10:49	9/28/2013 10:52	PIC	PO210X13
X3	1B	3	20578	2130	9/28/2013 10:44	9/28/2013 10:47	PIC	PO210X13
X4	1B	3	19206	2532	9/28/2013 11:01	9/28/2013 11:04	PIC	PO210X13
X5	1B	3	17964	2100	9/28/2013 10:54	9/28/2013 10:57	PIC	PO210X13
X6	1B	3	18540	2153	9/28/2013 11:12	9/28/2013 11:15	PIC	PO210X13
X7	1B	3	15291	1808	9/28/2013 11:06	9/28/2013 11:09	PIC	PO210X13
X8	1B	3	15112	1741	9/28/2013 10:44	9/28/2013 10:47	PIC	PO210X13
X1	1C	3	26155	706	9/28/2013 10:39	9/28/2013 10:42	PIC	PO210X13
X2	1C	3	27237	947	9/28/2013 10:34	9/28/2013 10:37	PIC	PO210X13
X3	1C	3	22120	823	9/28/2013 10:49	9/28/2013 10:52	PIC	PO210X13
X4	1C	3	21824	1011	9/28/2013 11:06	9/28/2013 11:09	PIC	PO210X13
X5	1C	3	20082	912	9/28/2013 11:02	9/28/2013 11:05	PIC	PO210X13
X6	1C	3	20813	920	9/28/2013 10:54	9/28/2013 10:57	PIC	PO210X13
X7	1C	3	17039	762	9/28/2013 11:12	9/28/2013 11:15	PIC	PO210X13
X8	1C	3	16753	762	9/28/2013 11:12	9/28/2013 11:15	PIC	PO210X13

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X1	1D	3	25215	890	9/28/2013 10:49	9/28/2013 10:52	PIC	PO210X13
X2	1D	3	26170	1103	9/28/2013 10:44	9/28/2013 10:47	PIC	PO210X13
X3	1D	3	21375	993	9/28/2013 10:39	9/28/2013 10:42	PIC	PO210X13
X4	1D	3	20570	1198	9/28/2013 10:34	9/28/2013 10:37	PIC	PO210X13
X5	1D	3	18973	1010	9/28/2013 11:12	9/28/2013 11:15	PIC	PO210X13
X6	1D	3	19898	1069	9/28/2013 11:06	9/28/2013 11:09	PIC	PO210X13
X7	1D	3	16180	869	9/28/2013 11:02	9/28/2013 11:05	PIC	PO210X13
X8	1D	3	16030	835	9/28/2013 10:54	9/28/2013 10:57	PIC	PO210X13
X1	2A	3	22128	3791	9/28/2013 10:55	9/28/2013 10:58	PIC	PO210X13
X2	2A	3	22805	4285	9/28/2013 11:12	9/28/2013 11:15	PIC	PO210X13
X3	2A	3	18493	3487	9/28/2013 11:06	9/28/2013 11:09	PIC	PO210X13
X4	2A	3	17586	4245	9/28/2013 11:02	9/28/2013 11:05	PIC	PO210X13
X5	2A	3	16304	3546	9/28/2013 10:34	9/28/2013 10:37	PIC	PO210X13
X6	2A	3	16892	3662	9/28/2013 10:49	9/28/2013 10:52	PIC	PO210X13
X7	2A	3	13827	3066	9/28/2013 10:44	9/28/2013 10:47	PIC	PO210X13
X8	2A	3	13979	2782	9/28/2013 10:39	9/28/2013 10:42	PIC	PO210X13
X1	2B	3	21823	4499	9/28/2013 11:02	9/28/2013 11:05	PIC	PO210X13
X2	2B	3	21515	5370	9/28/2013 10:55	9/28/2013 10:58	PIC	PO210X13
X3	2B	3	17951	4396	9/28/2013 11:12	9/28/2013 11:15	PIC	PO210X13
X4	2B	3	16474	5189	9/28/2013 11:06	9/28/2013 11:09	PIC	PO210X13
X5	2B	3	15897	4133	9/28/2013 10:39	9/28/2013 10:42	PIC	PO210X13
X6	2B	3	16154	4552	9/28/2013 10:35	9/28/2013 10:38	PIC	PO210X13
X7	2B	3	13337	3558	9/28/2013 10:49	9/28/2013 10:52	PIC	PO210X13
X8	2B	3	13300	3398	9/28/2013 10:44	9/28/2013 10:47	PIC	PO210X13
X1	2C	3	23795	1386	9/28/2013 11:06	9/28/2013 11:09	PIC	PO210X13
X2	2C	3	24158	1672	9/28/2013 11:02	9/28/2013 11:05	PIC	PO210X13
X3	2C	3	20717	1461	9/28/2013 10:55	9/28/2013 10:58	PIC	PO210X13
X4	2C	3	18926	1752	9/28/2013 11:12	9/28/2013 11:15	PIC	PO210X13
X5	2C	3	17182	1498	9/28/2013 10:44	9/28/2013 10:47	PIC	PO210X13
X6	2C	3	17756	1424	9/28/2013 10:40	9/28/2013 10:43	PIC	PO210X13
X7	2C	3	14968	1302	9/28/2013 10:35	9/28/2013 10:38	PIC	PO210X13
X8	2C	3	14465	1178	9/28/2013 10:49	9/28/2013 10:52	PIC	PO210X13
X1	2D	3	22067	4223	9/28/2013 11:12	9/28/2013 11:15	PIC	PO210X13
X2	2D	3	21959	4924	9/28/2013 11:06	9/28/2013 11:09	PIC	PO210X13
X3	2D	3	18527	3944	9/28/2013 11:02	9/28/2013 11:05	PIC	PO210X13
X4	2D	3	16990	4963	9/28/2013 10:55	9/28/2013 10:58	PIC	PO210X13
X5	2D	3	16296	3907	9/28/2013 10:49	9/28/2013 10:52	PIC	PO210X13

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X6	2D	3	16646	4180	9/28/2013 10:44	9/28/2013 10:47	PIC	PO210X13
X7	2D	3	13729	3270	9/28/2013 10:40	9/28/2013 10:43	PIC	PO210X13
X8	2D	3	13993	3058	9/28/2013 10:35	9/28/2013 10:38	PIC	PO210X13
X1	3A	3	24316	1007	9/28/2013 11:17	9/28/2013 11:20	PIC	PO210X13
X2	3A	3	25057	1175	9/28/2013 12:00	9/28/2013 12:03	PIC	PO210X13
X3	3A	3	21107	1173	9/28/2013 11:27	9/28/2013 11:30	PIC	PO210X13
X4	3A	3	19994	1350	9/28/2013 11:23	9/28/2013 11:26	PIC	PO210X13
X5	3A	3	18364	1103	9/28/2013 12:05	9/28/2013 12:08	PIC	PO210X13
X6	3A	3	19172	1144	9/28/2013 12:22	9/28/2013 12:25	PIC	PO210X13
X7	3A	3	15343	909	9/28/2013 12:18	9/28/2013 12:21	PIC	PO210X13
X8	3A	3	14977	878	9/28/2013 12:14	9/28/2013 12:17	PIC	PO210X13
X1	3B	3	25137	578	9/28/2013 11:23	9/28/2013 11:26	PIC	PO210X13
X2	3B	3	25279	694	9/28/2013 11:17	9/28/2013 11:20	PIC	PO210X13
X3	3B	3	21707	776	9/28/2013 12:00	9/28/2013 12:03	PIC	PO210X13
X4	3B	3	20350	816	9/28/2013 11:27	9/28/2013 11:30	PIC	PO210X13
X5	3B	3	18766	707	9/28/2013 12:14	9/28/2013 12:17	PIC	PO210X13
X6	3B	3	19186	724	9/28/2013 12:06	9/28/2013 12:09	PIC	PO210X13
X7	3B	3	15800	665	9/28/2013 12:23	9/28/2013 12:26	PIC	PO210X13
X8	3B	3	15326	591	9/28/2013 12:18	9/28/2013 12:21	PIC	PO210X13
X1	3C	3	25221	987	9/28/2013 11:27	9/28/2013 11:30	PIC	PO210X13
X2	3C	3	25616	1221	9/28/2013 11:23	9/28/2013 11:26	PIC	PO210X13
X3	3C	3	21224	1020	9/28/2013 11:18	9/28/2013 11:21	PIC	PO210X13
X4	3C	3	20272	1287	9/28/2013 12:00	9/28/2013 12:03	PIC	PO210X13
X5	3C	3	18956	1137	9/28/2013 12:18	9/28/2013 12:21	PIC	PO210X13
X6	3C	3	19478	1165	9/28/2013 12:14	9/28/2013 12:17	PIC	PO210X13
X7	3C	3	15879	999	9/28/2013 12:06	9/28/2013 12:09	PIC	PO210X13
X8	3C	3	15868	962	9/28/2013 12:23	9/28/2013 12:26	PIC	PO210X13
X1	3D	3	25060	1188	9/28/2013 12:01	9/28/2013 12:04	PIC	PO210X13
X2	3D	3	25866	1464	9/28/2013 11:27	9/28/2013 11:30	PIC	PO210X13
X3	3D	3	21471	1220	9/28/2013 11:23	9/28/2013 11:26	PIC	PO210X13
X4	3D	3	20662	1511	9/28/2013 11:18	9/28/2013 11:21	PIC	PO210X13
X5	3D	3	19025	1271	9/28/2013 12:23	9/28/2013 12:26	PIC	PO210X13
X6	3D	3	20014	1356	9/28/2013 12:18	9/28/2013 12:21	PIC	PO210X13
X7	3D	3	16029	1068	9/28/2013 12:14	9/28/2013 12:17	PIC	PO210X13
X8	3D	3	15777	1126	9/28/2013 12:06	9/28/2013 12:09	PIC	PO210X13
X1	4A	3	24259	823	9/28/2013 12:06	9/28/2013 12:09	PIC	PO210X13
X2	4A	3	25050	987	9/28/2013 12:23	9/28/2013 12:26	PIC	PO210X13

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X3	4A	3	21255	945	9/28/2013 12:18	9/28/2013 12:21	PIC	PO210X13
X4	4A	3	19862	1078	9/28/2013 12:14	9/28/2013 12:17	PIC	PO210X13
X5	4A	3	18568	980	9/28/2013 11:18	9/28/2013 11:21	PIC	PO210X13
X6	4A	3	18661	1022	9/28/2013 12:01	9/28/2013 12:04	PIC	PO210X13
X7	4A	3	15692	892	9/28/2013 11:27	9/28/2013 11:30	PIC	PO210X13
X8	4A	3	15125	810	9/28/2013 11:23	9/28/2013 11:26	PIC	PO210X13
X1	4B	3	22311	3371	9/28/2013 12:14	9/28/2013 12:17	PIC	PO210X13
X2	4B	3	22303	4318	9/28/2013 12:06	9/28/2013 12:09	PIC	PO210X13
X3	4B	3	18675	3811	9/28/2013 12:23	9/28/2013 12:26	PIC	PO210X13
X4	4B	3	16960	4227	9/28/2013 12:18	9/28/2013 12:21	PIC	PO210X13
X5	4B	3	16207	3809	9/28/2013 11:23	9/28/2013 11:26	PIC	PO210X13
X6	4B	3	16836	3739	9/28/2013 11:19	9/28/2013 11:22	PIC	PO210X13
X7	4B	3	13681	3282	9/28/2013 12:01	9/28/2013 12:04	PIC	PO210X13
X8	4B	3	13533	2874	9/28/2013 11:28	9/28/2013 11:31	PIC	PO210X13
X1	4C	3	24643	1166	9/28/2013 12:18	9/28/2013 12:21	PIC	PO210X13
X2	4C	3	25722	1405	9/28/2013 12:14	9/28/2013 12:17	PIC	PO210X13
X3	4C	3	21018	1289	9/28/2013 12:06	9/28/2013 12:09	PIC	PO210X13
X4	4C	3	20337	1438	9/28/2013 12:23	9/28/2013 12:26	PIC	PO210X13
X5	4C	3	18775	1296	9/28/2013 11:28	9/28/2013 11:31	PIC	PO210X13
X6	4C	3	19904	1326	9/28/2013 11:23	9/28/2013 11:26	PIC	PO210X13
X7	4C	3	15923	1159	9/28/2013 11:19	9/28/2013 11:22	PIC	PO210X13
X8	4C	3	15756	1181	9/28/2013 12:01	9/28/2013 12:04	PIC	PO210X13
X1	4D	3	25033	611	9/28/2013 12:23	9/28/2013 12:26	PIC	PO210X13
X2	4D	3	25788	740	9/28/2013 12:18	9/28/2013 12:21	PIC	PO210X13
X3	4D	3	21843	765	9/28/2013 12:14	9/28/2013 12:17	PIC	PO210X13
X4	4D	3	20627	820	9/28/2013 12:06	9/28/2013 12:09	PIC	PO210X13
X5	4D	3	19214	793	9/28/2013 12:01	9/28/2013 12:04	PIC	PO210X13
X6	4D	3	19752	739	9/28/2013 11:28	9/28/2013 11:31	PIC	PO210X13
X7	4D	3	16209	611	9/28/2013 11:23	9/28/2013 11:26	PIC	PO210X13
X8	4D	3	15831	657	9/28/2013 11:19	9/28/2013 11:22	PIC	PO210X13
X1	5A	3	25791	972	9/28/2013 12:27	9/28/2013 12:30	PIC	PO210X13
X2	5A	3	26249	1150	9/28/2013 12:40	9/28/2013 12:43	PIC	PO210X13
X3	5A	3	21361	1202	9/28/2013 12:36	9/28/2013 12:39	PIC	PO210X13
X4	5A	3	20823	1378	9/28/2013 12:32	9/28/2013 12:35	PIC	PO210X13
X5	5A	3	19318	1130	9/28/2013 12:46	9/28/2013 12:49	PIC	PO210X13
X6	5A	3	20169	1156	9/28/2013 13:00	9/28/2013 13:03	PIC	PO210X13
X7	5A	3	16302	1043	9/28/2013 12:56	9/28/2013 12:59	PIC	PO210X13



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X8	5A	3	16311	893	9/28/2013 12:51	9/28/2013 12:54	PIC	PO210X13
X1	5B	3	25329	913	9/28/2013 12:32	9/28/2013 12:35	PIC	PO210X13
X2	5B	3	25989	1178	9/28/2013 12:28	9/28/2013 12:31	PIC	PO210X13
X3	5B	3	21385	1023	9/28/2013 12:41	9/28/2013 12:44	PIC	PO210X13
X4	5B	3	20834	1259	9/28/2013 12:36	9/28/2013 12:39	PIC	PO210X13
X5	5B	3	19130	1047	9/28/2013 12:51	9/28/2013 12:54	PIC	PO210X13
X6	5B	3	19939	1170	9/28/2013 12:46	9/28/2013 12:49	PIC	PO210X13
X7	5B	3	16302	957	9/28/2013 13:00	9/28/2013 13:03	PIC	PO210X13
X8	5B	3	16111	935	9/28/2013 12:56	9/28/2013 12:59	PIC	PO210X13
X1	5C	3	24987	1071	9/28/2013 12:36	9/28/2013 12:39	PIC	PO210X13
X2	5C	3	25899	1356	9/28/2013 12:32	9/28/2013 12:35	PIC	PO210X13
X3	5C	3	21143	1186	9/28/2013 12:28	9/28/2013 12:31	PIC	PO210X13
X4	5C	3	20400	1431	9/28/2013 12:41	9/28/2013 12:44	PIC	PO210X13
X5	5C	3	18620	1261	9/28/2013 12:56	9/28/2013 12:59	PIC	PO210X13
X6	5C	3	19514	1201	9/28/2013 12:51	9/28/2013 12:54	PIC	PO210X13
X7	5C	3	16664	1132	9/28/2013 12:46	9/28/2013 12:49	PIC	PO210X13
X8	5C	3	15900	1032	9/28/2013 13:00	9/28/2013 13:03	PIC	PO210X13
X1	5D	3	25263	782	9/28/2013 12:41	9/28/2013 12:44	PIC	PO210X13
X2	5D	3	26469	944	9/28/2013 12:36	9/28/2013 12:39	PIC	PO210X13
X3	5D	3	21902	875	9/28/2013 12:32	9/28/2013 12:35	PIC	PO210X13
X4	5D	3	21226	1068	9/28/2013 12:28	9/28/2013 12:31	PIC	PO210X13
X5	5D	3	19336	941	9/28/2013 13:00	9/28/2013 13:03	PIC	PO210X13
X6	5D	3	20849	972	9/28/2013 12:56	9/28/2013 12:59	PIC	PO210X13
X7	5D	3	16540	884	9/28/2013 12:51	9/28/2013 12:54	PIC	PO210X13
X8	5D	3	16288	831	9/28/2013 12:46	9/28/2013 12:49	PIC	PO210X13
X1	6A	3	25388	1010	9/28/2013 12:47	9/28/2013 12:50	PIC	PO210X13
X2	6A	3	26085	1282	9/28/2013 13:00	9/28/2013 13:03	PIC	PO210X13
X3	6A	3	21554	1130	9/28/2013 12:56	9/28/2013 12:59	PIC	PO210X13
X4	6A	3	20801	1330	9/28/2013 12:51	9/28/2013 12:54	PIC	PO210X13
X5	6A	3	19007	1200	9/28/2013 12:28	9/28/2013 12:31	PIC	PO210X13
X6	6A	3	19966	1134	9/28/2013 12:41	9/28/2013 12:44	PIC	PO210X13
X7	6A	3	16179	930	9/28/2013 12:37	9/28/2013 12:40	PIC	PO210X13
X8	6A	3	16286	1016	9/28/2013 12:32	9/28/2013 12:35	PIC	PO210X13
X1	6B	3	25721	713	9/28/2013 12:51	9/28/2013 12:54	PIC	PO210X13
X2	6B	3	26877	958	9/28/2013 12:47	9/28/2013 12:50	PIC	PO210X13
X3	6B	3	21843	916	9/28/2013 13:01	9/28/2013 13:04	PIC	PO210X13
X4	6B	3	21221	1022	9/28/2013 12:56	9/28/2013 12:59	PIC	PO210X13

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X5	6B	3	19704	893	9/28/2013 12:32	9/28/2013 12:35	PIC	PO210X13
X6	6B	3	20537	927	9/28/2013 12:28	9/28/2013 12:31	PIC	PO210X13
X7	6B	3	16530	816	9/28/2013 12:41	9/28/2013 12:44	PIC	PO210X13
X8	6B	3	16553	797	9/28/2013 12:37	9/28/2013 12:40	PIC	PO210X13
X1	6C	3	25963	810	9/28/2013 12:56	9/28/2013 12:59	PIC	PO210X13
X2	6C	3	26699	1059	9/28/2013 12:51	9/28/2013 12:54	PIC	PO210X13
X3	6C	3	21740	977	9/28/2013 12:47	9/28/2013 12:50	PIC	PO210X13
X4	6C	3	20975	1049	9/28/2013 13:01	9/28/2013 13:04	PIC	PO210X13
X5	6C	3	19449	934	9/28/2013 12:37	9/28/2013 12:40	PIC	PO210X13
X6	6C	3	20296	908	9/28/2013 12:33	9/28/2013 12:36	PIC	PO210X13
X7	6C	3	16193	811	9/28/2013 12:28	9/28/2013 12:31	PIC	PO210X13
X8	6C	3	16261	843	9/28/2013 12:41	9/28/2013 12:44	PIC	PO210X13
X1	7A	3	25046	1276	9/29/2013 17:21	9/29/2013 17:24	PIC	PO210X13
X2	7A	3	26168	1546	9/29/2013 17:50	9/29/2013 17:53	PIC	PO210X13
X3	7A	3	21617	1350	9/29/2013 17:46	9/29/2013 17:49	PIC	PO210X13
X4	7A	3	20539	1808	9/29/2013 17:42	9/29/2013 17:45	PIC	PO210X13
X5	7A	3	18601	1545	9/29/2013 17:38	9/29/2013 17:41	PIC	PO210X13
X6	7A	3	19428	1591	9/29/2013 17:34	9/29/2013 17:37	PIC	PO210X13
X7	7A	3	15978	1313	9/29/2013 17:30	9/29/2013 17:33	PIC	PO210X13
X8	7A	3	15944	1273	9/29/2013 17:26	9/29/2013 17:29	PIC	PO210X13
X1	7B	3	25563	913	9/29/2013 17:26	9/29/2013 17:29	PIC	PO210X13
X2	7B	3	25922	1315	9/29/2013 17:21	9/29/2013 17:24	PIC	PO210X13
X3	7B	3	21461	1130	9/29/2013 17:50	9/29/2013 17:53	PIC	PO210X13
X4	7B	3	20701	1343	9/29/2013 17:46	9/29/2013 17:49	PIC	PO210X13
X5	7B	3	18995	1203	9/29/2013 17:42	9/29/2013 17:45	PIC	PO210X13
X6	7B	3	19999	1200	9/29/2013 17:38	9/29/2013 17:41	PIC	PO210X13
X7	7B	3	16062	1056	9/29/2013 17:34	9/29/2013 17:37	PIC	PO210X13
X8	7B	3	15982	987	9/29/2013 17:30	9/29/2013 17:33	PIC	PO210X13
X1	7C	3	24732	1459	9/29/2013 17:30	9/29/2013 17:33	PIC	PO210X13
X2	7C	3	25041	1892	9/29/2013 17:26	9/29/2013 17:29	PIC	PO210X13
X3	7C	3	20727	1666	9/29/2013 17:21	9/29/2013 17:24	PIC	PO210X13
X4	7C	3	19910	1974	9/29/2013 17:51	9/29/2013 17:54	PIC	PO210X13
X5	7C	3	18308	1739	9/29/2013 17:46	9/29/2013 17:49	PIC	PO210X13
X6	7C	3	19221	1782	9/29/2013 17:42	9/29/2013 17:45	PIC	PO210X13
X7	7C	3	15597	1419	9/29/2013 17:38	9/29/2013 17:41	PIC	PO210X13
X8	7C	3	15483	1435	9/29/2013 17:34	9/29/2013 17:37	PIC	PO210X13
X1	7D	3	24637	1202	9/29/2013 17:34	9/29/2013 17:37	PIC	PO210X13

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X2	7D	3	25087	1587	9/29/2013 17:30	9/29/2013 17:33	PIC	PO210X13
X3	7D	3	20852	1352	9/29/2013 17:26	9/29/2013 17:29	PIC	PO210X13
X4	7D	3	20046	1564	9/29/2013 17:21	9/29/2013 17:24	PIC	PO210X13
X5	7D	3	18113	1440	9/29/2013 17:51	9/29/2013 17:54	PIC	PO210X13
X6	7D	3	19149	1458	9/29/2013 17:46	9/29/2013 17:49	PIC	PO210X13
X7	7D	3	15498	1228	9/29/2013 17:42	9/29/2013 17:45	PIC	PO210X13
X8	7D	3	15655	1226	9/29/2013 17:38	9/29/2013 17:41	PIC	PO210X13
X1	8A	3	21426	4961	9/29/2013 17:38	9/29/2013 17:41	PIC	PO210X13
X2	8A	3	22354	5198	9/29/2013 17:34	9/29/2013 17:37	PIC	PO210X13
X3	8A	3	17698	4860	9/29/2013 17:30	9/29/2013 17:33	PIC	PO210X13
X4	8A	3	16875	5207	9/29/2013 17:26	9/29/2013 17:29	PIC	PO210X13
X5	8A	3	14681	5117	9/29/2013 17:21	9/29/2013 17:24	PIC	PO210X13
X6	8A	3	17172	4209	9/29/2013 17:51	9/29/2013 17:54	PIC	PO210X13
X7	8A	3	13656	3721	9/29/2013 17:46	9/29/2013 17:49	PIC	PO210X13
X8	8A	3	13763	3452	9/29/2013 17:42	9/29/2013 17:45	PIC	PO210X13
X1	8B	3	21186	5505	9/29/2013 17:43	9/29/2013 17:46	PIC	PO210X13
X2	8B	3	21892	5890	9/29/2013 17:39	9/29/2013 17:42	PIC	PO210X13
X3	8B	3	18297	4728	9/29/2013 17:34	9/29/2013 17:37	PIC	PO210X13
X4	8B	3	16678	5892	9/29/2013 17:30	9/29/2013 17:33	PIC	PO210X13
X5	8B	3	15668	5148	9/29/2013 17:26	9/29/2013 17:29	PIC	PO210X13
X6	8B	3	16307	5311	9/29/2013 17:21	9/29/2013 17:24	PIC	PO210X13
X7	8B	3	13369	4138	9/29/2013 17:51	9/29/2013 17:54	PIC	PO210X13
X8	8B	3	13555	3955	9/29/2013 17:47	9/29/2013 17:50	PIC	PO210X13
X1	8C	3.01	21166	5404	9/29/2013 17:47	9/29/2013 17:50	PIC	PO210X13
X2	8C	3	21574	5931	9/29/2013 17:43	9/29/2013 17:46	PIC	PO210X13
X3	8C	3	17944	4993	9/29/2013 17:39	9/29/2013 17:42	PIC	PO210X13
X4	8C	3	16447	5979	9/29/2013 17:34	9/29/2013 17:37	PIC	PO210X13
X5	8C	3	15215	4930	9/29/2013 17:31	9/29/2013 17:34	PIC	PO210X13
X6	8C	3	16355	5056	9/29/2013 17:26	9/29/2013 17:29	PIC	PO210X13
X7	8C	3	13106	4139	9/29/2013 17:21	9/29/2013 17:24	PIC	PO210X13
X8	8C	3	13493	3751	9/29/2013 17:51	9/29/2013 17:54	PIC	PO210X13
X1	8D	3	25596	1311	9/29/2013 17:51	9/29/2013 17:54	PIC	PO210X13
X2	8D	3	26892	1573	9/29/2013 17:47	9/29/2013 17:50	PIC	PO210X13
X3	8D	3	21837	1487	9/29/2013 17:43	9/29/2013 17:46	PIC	PO210X13
X4	8D	3	21096	1756	9/29/2013 17:39	9/29/2013 17:42	PIC	PO210X13
X5	8D	3	19454	1522	9/29/2013 17:35	9/29/2013 17:38	PIC	PO210X13
X6	8D	3	20229	1513	9/29/2013 17:31	9/29/2013 17:34	PIC	PO210X13

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X7	8D	3	16725	1282	9/29/2013 17:26	9/29/2013 17:29	PIC	PO210X13
X8	8D	3	16469	1446	9/29/2013 17:21	9/29/2013 17:24	PIC	PO210X13
X1	9A	3	18427	6057	9/29/2013 19:02	9/29/2013 19:05	PIC	PO210X13
X2	9A	3	19414	6378	9/29/2013 19:31	9/29/2013 19:34	PIC	PO210X13
X3	9A	3	16105	5133	9/29/2013 19:27	9/29/2013 19:30	PIC	PO210X13
X4	9A	3	14477	6083	9/29/2013 19:23	9/29/2013 19:26	PIC	PO210X13
X5	9A	3	14035	5088	9/29/2013 19:18	9/29/2013 19:21	PIC	PO210X13
X6	9A	3	14655	5429	9/29/2013 19:14	9/29/2013 19:17	PIC	PO210X13
X7	9A	3	11783	4351	9/29/2013 19:11	9/29/2013 19:14	PIC	PO210X13
X8	9A	3	12025	3998	9/29/2013 19:07	9/29/2013 19:10	PIC	PO210X13
X1	9B	3	25303	1168	9/29/2013 19:07	9/29/2013 19:10	PIC	PO210X13
X2	9B	3	25759	1584	9/29/2013 19:02	9/29/2013 19:05	PIC	PO210X13
X3	9B	3	21388	1462	9/29/2013 19:31	9/29/2013 19:34	PIC	PO210X13
X4	9B	3	20413	1666	9/29/2013 19:27	9/29/2013 19:30	PIC	PO210X13
X5	9B	3	18670	1530	9/29/2013 19:23	9/29/2013 19:26	PIC	PO210X13
X6	9B	3	19624	1449	9/29/2013 19:18	9/29/2013 19:21	PIC	PO210X13
X7	9B	3	15973	1226	9/29/2013 19:14	9/29/2013 19:17	PIC	PO210X13
X8	9B	3	15958	1340	9/29/2013 19:11	9/29/2013 19:14	PIC	PO210X13
X1	9C	3	24939	1186	9/29/2013 19:11	9/29/2013 19:14	PIC	PO210X13
X2	9C	3	25068	1485	9/29/2013 19:07	9/29/2013 19:10	PIC	PO210X13
X3	9C	3	21058	1400	9/29/2013 19:02	9/29/2013 19:05	PIC	PO210X13
X4	9C	3	19969	1632	9/29/2013 19:31	9/29/2013 19:34	PIC	PO210X13
X5	9C	3	18372	1498	9/29/2013 19:27	9/29/2013 19:30	PIC	PO210X13
X6	9C	3	18991	1494	9/29/2013 19:23	9/29/2013 19:26	PIC	PO210X13
X7	9C	3	15847	1213	9/29/2013 19:18	9/29/2013 19:21	PIC	PO210X13
X8	9C	3	15412	1260	9/29/2013 19:15	9/29/2013 19:18	PIC	PO210X13
X1	9D	3	25578	902	9/29/2013 19:15	9/29/2013 19:18	PIC	PO210X13
X2	9D	3	26284	1239	9/29/2013 19:11	9/29/2013 19:14	PIC	PO210X13
X3	9D	3	21930	1063	9/29/2013 19:07	9/29/2013 19:10	PIC	PO210X13
X4	9D	3	21026	1333	9/29/2013 19:02	9/29/2013 19:05	PIC	PO210X13
X5	9D	3	19381	1206	9/29/2013 19:31	9/29/2013 19:34	PIC	PO210X13
X6	9D	3	20186	1248	9/29/2013 19:27	9/29/2013 19:30	PIC	PO210X13
X7	9D	3	16310	967	9/29/2013 19:23	9/29/2013 19:26	PIC	PO210X13
X8	9D	3	16253	990	9/29/2013 19:18	9/29/2013 19:21	PIC	PO210X13

**Beta Xtalk Calibration - PIC - Sep 2013**

Standard Data	Isotope	Sr-90
	Standard ID number	0133-T
	Half Life (days)	10555.725
	Std. Act. (dpm/mL)***	55362.7
	Reference Date	4/1/1996
	Volume of spike (mL)	0.5
	Std. Nominal (dpm)	18204.73
	Decay Date	9/21/2013

\*\*\* Includes activity of Y-90, which is in equilibrium.

Source Weight	
Source	Measured weight (mg)
1	0.0
2	12.8
3	27.7
4	50.8
5	60.8
6	73.2
7	98.4
8	115.8

The following detectors were not calibrated:

6D

Detector (#)	Source ID (#)	Raw Count Data				Sr-90 Xtalk (Alpha/Beta)	Source Measured Weight	Average Xtalk (Alpha/Beta)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
1A	1	9/21/2013 13:30	3	20	25625	0.0780%	0.0	
1A	2	9/21/2013 13:53	3	18	25019	0.0719%	12.8	
1A	3	9/21/2013 13:40	3	21	22593	0.0929%	27.7	
1A	4	9/21/2013 13:36	3	28	22383	0.1251%	50.8	
1A	5	9/21/2013 13:57	3	23	23109	0.0995%	60.8	
1A	6	9/21/2013 14:20	3	24	22120	0.1085%	73.2	
1A	7	9/21/2013 14:06	3	27	21380	0.1263%	98.4	
1A	8	9/21/2013 14:02	3	24	20797	0.1154%	115.8	0.1022%
1B	1	9/21/2013 13:36	3	63	25604	0.2461%	0.0	
1B	2	9/21/2013 13:30	3	54	24236	0.2228%	12.8	
1B	3	9/21/2013 13:53	3	50	22325	0.2240%	27.7	
1B	4	9/21/2013 13:40	3	59	22268	0.2650%	50.8	
1B	5	9/21/2013 14:02	3	48	23291	0.2061%	60.8	
1B	6	9/21/2013 13:57	3	33	22223	0.1485%	73.2	
1B	7	9/21/2013 14:20	3	45	21257	0.2117%	98.4	
1B	8	9/21/2013 14:07	3	53	20600	0.2573%	115.8	0.2227%
1C	1	9/21/2013 13:41	3	442	26407	1.6738%	0.0	
1C	2	9/21/2013 13:36	3	422	24969	1.6901%	12.8	
1C	3	9/21/2013 13:30	3	435	22919	1.8980%	27.7	
1C	4	9/21/2013 13:53	3	414	22445	1.8445%	50.8	
1C	5	9/21/2013 14:07	3	404	23570	1.7140%	60.8	
1C	6	9/21/2013 14:02	3	360	22340	1.6115%	73.2	
1C	7	9/21/2013 13:57	3	348	21628	1.6090%	98.4	
1C	8	9/21/2013 14:20	3	320	20846	1.5351%	115.8	1.6970%
1D	1	9/21/2013 13:53	3	357	25634	1.3927%	0.0	
1D	2	9/21/2013 13:41	3	286	24501	1.1673%	12.8	
1D	3	9/21/2013 13:36	3	286	22573	1.2670%	27.7	
1D	4	9/21/2013 13:30	3	313	22099	1.4164%	50.8	
1D	5	9/21/2013 14:20	3	284	22891	1.2407%	60.8	
1D	6	9/21/2013 14:07	3	258	22081	1.1684%	73.2	
1D	7	9/21/2013 14:02	3	240	21132	1.1357%	98.4	
1D	8	9/21/2013 13:58	3	254	20524	1.2376%	115.8	1.2532%
2A	1	9/21/2013 13:58	3	2	23125	0.0086%	0.0	
2A	2	9/21/2013 14:20	3	6	22846	0.0263%	12.8	
2A	3	9/21/2013 14:07	3	1	20461	0.0049%	27.7	
2A	4	9/21/2013 14:02	3	6	20333	0.0295%	50.8	
2A	5	9/21/2013 13:31	3	5	21066	0.0237%	60.8	
2A	6	9/21/2013 13:53	3	3	20302	0.0148%	73.2	

Detector (#)	Source ID (#)	Raw Count Data				Sr-90 Xtalk (Alpha/Beta)	Source Measured Weight	Average Xtalk (Alpha/Beta)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
2A	7	9/21/2013 13:41	3	3	19482	0.0154%	98.4	
2A	8	9/21/2013 13:36	3	3	18865	0.0159%	115.8	0.0174%
2B	1	9/21/2013 14:02	3	3	22785	0.0132%	0.0	
2B	2	9/21/2013 13:58	3	4	22179	0.0180%	12.8	
2B	3	9/21/2013 14:20	3	4	20359	0.0196%	27.7	
2B	4	9/21/2013 14:07	3	4	19835	0.0202%	50.8	
2B	5	9/21/2013 13:36	3	0	21151	0.0000%	60.8	
2B	6	9/21/2013 13:31	3	3	19660	0.0153%	73.2	
2B	7	9/21/2013 13:53	3	2	19215	0.0104%	98.4	
2B	8	9/21/2013 13:41	3	4	18355	0.0218%	115.8	0.0148%
2C	1	9/21/2013 14:07	3	48	23809	0.2016%	0.0	
2C	2	9/21/2013 14:02	3	44	22311	0.1972%	12.8	
2C	3	9/21/2013 13:58	3	36	21118	0.1705%	27.7	
2C	4	9/21/2013 14:20	3	60	20958	0.2863%	50.8	
2C	5	9/21/2013 13:41	3	38	21668	0.1754%	60.8	
2C	6	9/21/2013 13:37	3	47	20769	0.2263%	73.2	
2C	7	9/21/2013 13:31	3	45	20374	0.2209%	98.4	
2C	8	9/21/2013 13:53	3	49	19290	0.2540%	115.8	0.2165%
2D	1	9/21/2013 14:20	3	4	23028	0.0174%	0.0	
2D	2	9/21/2013 14:07	3	3	21788	0.0138%	12.8	
2D	3	9/21/2013 14:03	3	4	19932	0.0201%	27.7	
2D	4	9/21/2013 13:58	3	8	20266	0.0395%	50.8	
2D	5	9/21/2013 13:53	3	10	20864	0.0479%	60.8	
2D	6	9/21/2013 13:41	3	2	19378	0.0103%	73.2	
2D	7	9/21/2013 13:37	3	6	19163	0.0313%	98.4	
2D	8	9/21/2013 13:31	3	3	18448	0.0163%	115.8	0.0246%
3A	1	9/21/2013 12:02	3	271	24286	1.1159%	0.0	
3A	2	9/21/2013 12:18	3	279	23428	1.1909%	12.8	
3A	3	9/21/2013 12:13	3	251	21194	1.1843%	27.7	
3A	4	9/21/2013 12:07	3	218	21238	1.0265%	50.8	
3A	5	9/21/2013 12:26	3	273	22086	1.2361%	60.8	
3A	6	9/21/2013 13:24	3	262	21312	1.2294%	73.2	
3A	7	9/21/2013 13:19	3	226	20136	1.1224%	98.4	
3A	8	9/21/2013 13:12	3	258	19693	1.3101%	115.8	1.1769%
3B	1	9/21/2013 12:07	3	508	25317	2.0066%	0.0	
3B	2	9/21/2013 12:02	3	475	24358	1.9501%	12.8	
3B	3	9/21/2013 12:18	3	449	22204	2.0222%	27.7	
3B	4	9/21/2013 12:13	3	396	22090	1.7927%	50.8	
3B	5	9/21/2013 13:12	3	467	22953	2.0346%	60.8	
3B	6	9/21/2013 12:27	3	434	21791	1.9916%	73.2	
3B	7	9/21/2013 13:24	3	402	21142	1.9014%	98.4	
3B	8	9/21/2013 13:19	3	374	20555	1.8195%	115.8	1.9398%
3C	1	9/21/2013 12:13	3	218	25442	0.8569%	0.0	
3C	2	9/21/2013 12:07	3	256	24503	1.0448%	12.8	
3C	3	9/21/2013 12:02	3	181	22403	0.8079%	27.7	
3C	4	9/21/2013 12:18	3	164	22022	0.7447%	50.8	
3C	5	9/21/2013 13:20	3	182	23164	0.7857%	60.8	
3C	6	9/21/2013 13:12	3	193	21951	0.8792%	73.2	
3C	7	9/21/2013 12:27	3	202	20923	0.9654%	98.4	
3C	8	9/21/2013 13:24	3	185	20428	0.9056%	115.8	0.8738%
3D	1	9/21/2013 12:18	3	181	24704	0.7327%	0.0	
3D	2	9/21/2013 12:13	3	184	23963	0.7679%	12.8	
3D	3	9/21/2013 12:07	3	156	22298	0.6996%	27.7	
3D	4	9/21/2013 12:02	3	138	21817	0.6325%	50.8	
3D	5	9/21/2013 13:24	3	189	22704	0.8325%	60.8	
3D	6	9/21/2013 13:20	3	163	21537	0.7568%	73.2	

Detector (#)	Source ID (#)	Raw Count Data				Sr-90 Xtalk (Alpha/Beta)	Source Measured Weight	Average Xtalk (Alpha/Beta)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
3D	7	9/21/2013 13:12	3	157	20982	0.7483%	98.4	
3D	8	9/21/2013 12:27	3	131	20298	0.6454%	115.8	0.7270%
4A	1	9/21/2013 12:27	3	202	24165	0.8359%	0.0	
4A	2	9/21/2013 13:24	3	192	23633	0.8124%	12.8	
4A	3	9/21/2013 13:20	3	144	22390	0.6431%	27.7	
4A	4	9/21/2013 13:12	3	160	21559	0.7421%	50.8	
4A	5	9/21/2013 12:03	3	163	22516	0.7239%	60.8	
4A	6	9/21/2013 12:19	3	129	21729	0.5937%	73.2	
4A	7	9/21/2013 12:13	3	140	20553	0.6812%	98.4	
4A	8	9/21/2013 12:07	3	108	20009	0.5398%	115.8	0.6965%
4B	1	9/21/2013 13:12	3	3	25102	0.0120%	0.0	
4B	2	9/21/2013 12:27	3	7	24143	0.0290%	12.8	
4B	3	9/21/2013 13:25	3	3	21901	0.0137%	27.7	
4B	4	9/21/2013 13:20	3	7	22047	0.0318%	50.8	
4B	5	9/21/2013 12:08	3	5	22736	0.0220%	60.8	
4B	6	9/21/2013 12:03	3	1	21870	0.0046%	73.2	
4B	7	9/21/2013 12:19	3	5	21039	0.0238%	98.4	
4B	8	9/21/2013 12:13	3	4	20015	0.0200%	115.8	0.0196%
4C	1	9/21/2013 13:20	3	74	24607	0.3007%	0.0	
4C	2	9/21/2013 13:12	3	67	23130	0.2897%	12.8	
4C	3	9/21/2013 12:27	3	49	21352	0.2295%	27.7	
4C	4	9/21/2013 13:25	3	56	22152	0.2528%	50.8	
4C	5	9/21/2013 12:13	3	76	22261	0.3414%	60.8	
4C	6	9/21/2013 12:08	3	65	21527	0.3019%	73.2	
4C	7	9/21/2013 12:03	3	43	20985	0.2049%	98.4	
4C	8	9/21/2013 12:19	3	62	20088	0.3086%	115.8	0.2787%
4D	1	9/21/2013 13:25	3	491	25199	1.9485%	0.0	
4D	2	9/21/2013 13:20	3	420	23618	1.7783%	12.8	
4D	3	9/21/2013 13:13	3	374	22248	1.6810%	27.7	
4D	4	9/21/2013 12:27	3	418	21918	1.9071%	50.8	
4D	5	9/21/2013 12:19	3	391	22494	1.7382%	60.8	
4D	6	9/21/2013 12:13	3	373	21560	1.7301%	73.2	
4D	7	9/21/2013 12:08	3	363	20559	1.7657%	98.4	
4D	8	9/21/2013 12:03	3	346	19888	1.7397%	115.8	1.7861%
5A	1	9/21/2013 14:24	3	128	26044	0.4915%	0.0	
5A	2	9/21/2013 14:45	3	131	24973	0.5246%	12.8	
5A	3	9/21/2013 14:38	3	131	22977	0.5701%	27.7	
5A	4	9/21/2013 14:34	3	136	22672	0.5999%	50.8	
5A	5	9/21/2013 15:00	3	129	23532	0.5482%	60.8	
5A	6	9/21/2013 15:13	3	119	22258	0.5346%	73.2	
5A	7	9/21/2013 15:09	3	101	21577	0.4681%	98.4	
5A	8	9/21/2013 15:04	3	104	20799	0.5000%	115.8	0.5296%
5B	1	9/21/2013 14:34	3	100	25846	0.3869%	0.0	
5B	2	9/21/2013 14:24	3	126	24804	0.5080%	12.8	
5B	3	9/21/2013 14:45	3	94	22810	0.4121%	27.7	
5B	4	9/21/2013 14:38	3	104	22478	0.4627%	50.8	
5B	5	9/21/2013 15:04	3	108	23360	0.4623%	60.8	
5B	6	9/21/2013 15:00	3	95	22017	0.4315%	73.2	
5B	7	9/21/2013 15:13	3	97	21376	0.4538%	98.4	
5B	8	9/21/2013 15:09	3	75	20752	0.3614%	115.8	0.4348%
5C	1	9/21/2013 14:39	3	93	25881	0.3593%	0.0	
5C	2	9/21/2013 14:34	3	105	25038	0.4194%	12.8	
5C	3	9/21/2013 14:24	3	93	22892	0.4063%	27.7	
5C	4	9/21/2013 14:45	3	91	22178	0.4103%	50.8	
5C	5	9/21/2013 15:09	3	83	23120	0.3590%	60.8	
5C	6	9/21/2013 15:04	3	84	22262	0.3773%	73.2	

Detector (#)	Source ID (#)	Raw Count Data				Sr-90 Xtalk (Alpha/Beta)	Source Measured Weight	Average Xtalk (Alpha/Beta)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
5C	7	9/21/2013 15:00	3	79	21171	0.3732%	98.4	
5C	8	9/21/2013 15:13	3	87	20671	0.4209%	115.8	0.3907%
5D	1	9/21/2013 14:45	3	160	25415	0.6295%	0.0	
5D	2	9/21/2013 14:39	3	150	24521	0.6117%	12.8	
5D	3	9/21/2013 14:34	3	150	22700	0.6608%	27.7	
5D	4	9/21/2013 14:24	3	145	22605	0.6415%	50.8	
5D	5	9/21/2013 15:13	3	133	23311	0.5705%	60.8	
5D	6	9/21/2013 15:09	3	151	22277	0.6778%	73.2	
5D	7	9/21/2013 15:04	3	145	21113	0.6868%	98.4	
5D	8	9/21/2013 15:00	3	143	20574	0.6951%	115.8	0.6467%
6A	1	9/21/2013 15:00	3	133	25444	0.5227%	0.0	
6A	2	9/21/2013 15:14	3	112	24148	0.4638%	12.8	
6A	3	9/21/2013 15:09	3	86	22561	0.3812%	27.7	
6A	4	9/21/2013 15:04	3	113	22213	0.5087%	50.8	
6A	5	9/21/2013 14:26	3	85	23089	0.3681%	60.8	
6A	6	9/21/2013 14:46	3	92	21889	0.4203%	73.2	
6A	7	9/21/2013 14:39	3	83	21003	0.3952%	98.4	
6A	8	9/21/2013 14:35	3	96	20384	0.4710%	115.8	0.4414%
6B	1	9/21/2013 15:05	3	271	25842	1.0487%	0.0	
6B	2	9/21/2013 15:00	3	204	24756	0.8240%	12.8	
6B	3	9/21/2013 15:14	3	183	22966	0.7968%	27.7	
6B	4	9/21/2013 15:10	3	191	22553	0.8469%	50.8	
6B	5	9/21/2013 14:35	3	207	23518	0.8802%	60.8	
6B	6	9/21/2013 14:28	3	192	21991	0.8731%	73.2	
6B	7	9/21/2013 14:46	3	169	21384	0.7903%	98.4	
6B	8	9/21/2013 14:39	3	192	20538	0.9349%	115.8	0.8744%
6C	1	9/21/2013 15:10	3	211	25095	0.8408%	0.0	
6C	2	9/21/2013 15:05	3	188	24324	0.7729%	12.8	
6C	3	9/21/2013 15:00	3	166	22361	0.7424%	27.7	
6C	4	9/21/2013 15:14	3	188	22007	0.8543%	50.8	
6C	5	9/21/2013 14:39	3	191	23024	0.8296%	60.8	
6C	6	9/21/2013 14:35	3	157	21525	0.7294%	73.2	
6C	7	9/21/2013 14:28	3	154	21308	0.7227%	98.4	
6C	8	9/21/2013 14:46	3	152	20267	0.7500%	115.8	0.7803%
7A	1	9/21/2013 15:24	3	26	25836	0.1006%	0.0	
7A	2	9/21/2013 15:38	3	29	24812	0.1169%	12.8	
7A	3	9/21/2013 15:33	3	31	22637	0.1369%	27.7	
7A	4	9/21/2013 15:29	3	25	22367	0.1118%	50.8	
7A	5	9/21/2013 15:44	3	25	23254	0.1075%	60.8	
7A	6	9/21/2013 15:57	3	28	22113	0.1266%	73.2	
7A	7	9/21/2013 15:52	3	30	21394	0.1402%	98.4	
7A	8	9/21/2013 15:48	3	23	20794	0.1106%	115.8	0.1189%
7B	1	9/21/2013 15:29	3	45	25947	0.1734%	0.0	
7B	2	9/21/2013 15:25	3	57	24962	0.2283%	12.8	
7B	3	9/21/2013 15:38	3	56	22788	0.2457%	27.7	
7B	4	9/21/2013 15:33	3	55	22297	0.2467%	50.8	
7B	5	9/21/2013 15:48	3	51	23465	0.2173%	60.8	
7B	6	9/21/2013 15:44	3	42	22274	0.1886%	73.2	
7B	7	9/21/2013 15:57	3	45	21551	0.2088%	98.4	
7B	8	9/21/2013 15:52	3	35	20819	0.1681%	115.8	0.2096%
7C	1	9/21/2013 15:34	3	8	24857	0.0322%	0.0	
7C	2	9/21/2013 15:29	3	8	24176	0.0331%	12.8	
7C	3	9/21/2013 15:25	3	7	22112	0.0317%	27.7	
7C	4	9/21/2013 15:38	3	14	21602	0.0648%	50.8	
7C	5	9/21/2013 15:53	3	18	22837	0.0788%	60.8	
7C	6	9/21/2013 15:48	3	11	21615	0.0509%	73.2	



Detector (#)	Source ID (#)	Raw Count Data				Sr-90 Xtalk (Alpha/Beta)	Source Measured Weight	Average Xtalk (Alpha/Beta)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
7C	7	9/21/2013 15:44	3	16	20772	0.0770%	98.4	
7C	8	9/21/2013 15:57	3	5	20339	0.0246%	115.8	0.0491%
7D	1	9/21/2013 15:39	3	21	25491	0.0824%	0.0	
7D	2	9/21/2013 15:34	3	26	24470	0.1063%	12.8	
7D	3	9/21/2013 15:29	3	18	22692	0.0793%	27.7	
7D	4	9/21/2013 15:25	3	18	22394	0.0804%	50.8	
7D	5	9/21/2013 15:57	3	25	22949	0.1089%	60.8	
7D	6	9/21/2013 15:53	3	19	22151	0.0858%	73.2	
7D	7	9/21/2013 15:48	3	15	20830	0.0720%	98.4	
7D	8	9/21/2013 15:44	3	16	20618	0.0776%	115.8	0.0866%
8A	1	9/21/2013 15:44	3	3	22437	0.0134%	0.0	
8A	2	9/21/2013 15:57	3	2	21492	0.0093%	12.8	
8A	3	9/21/2013 15:53	3	5	20337	0.0246%	27.7	
8A	4	9/21/2013 15:48	3	7	19590	0.0357%	50.8	
8A	5	9/21/2013 15:25	3	6	19913	0.0301%	60.8	
8A	6	9/21/2013 15:39	3	5	19463	0.0257%	73.2	
8A	7	9/21/2013 15:34	3	1	18241	0.0055%	98.4	
8A	8	9/21/2013 15:30	3	3	18172	0.0165%	115.8	0.0201%
8B	1	9/21/2013 15:48	3	3	22367	0.0134%	0.0	
8B	2	9/21/2013 15:44	3	1	21728	0.0046%	12.8	
8B	3	9/21/2013 15:57	3	3	20205	0.0148%	27.7	
8B	4	9/21/2013 15:53	3	7	19767	0.0354%	50.8	
8B	5	9/21/2013 15:30	3	4	20729	0.0193%	60.8	
8B	6	9/21/2013 15:25	3	3	19567	0.0153%	73.2	
8B	7	9/21/2013 15:39	3	1	18959	0.0053%	98.4	
8B	8	9/21/2013 15:34	3	2	18303	0.0109%	115.8	0.0149%
8C	1	9/21/2013 15:53	3	2	21830	0.0092%	0.0	
8C	2	9/21/2013 15:48	3	6	21368	0.0281%	12.8	
8C	3	9/21/2013 15:44	3	0	19704	0.0000%	27.7	
8C	4	9/21/2013 15:57	3	5	19401	0.0258%	50.8	
8C	5	9/21/2013 15:34	3	6	19818	0.0303%	60.8	
8C	6	9/21/2013 15:30	3	5	19029	0.0263%	73.2	
8C	7	9/21/2013 15:25	3	1	18223	0.0055%	98.4	
8C	8	9/21/2013 15:39	3	2	17983	0.0111%	115.8	0.0170%
8D	1	9/21/2013 15:57	3	40	25811	0.1550%	0.0	
8D	2	9/21/2013 15:53	3	34	24854	0.1368%	12.8	
8D	3	9/21/2013 15:48	3	27	22758	0.1186%	27.7	
8D	4	9/21/2013 15:44	3	40	22505	0.1777%	50.8	
8D	5	9/21/2013 15:39	3	38	23615	0.1609%	60.8	
8D	6	9/21/2013 15:34	3	30	22557	0.1330%	73.2	
8D	7	9/21/2013 15:30	3	29	21368	0.1357%	98.4	
8D	8	9/21/2013 15:25	3	37	20679	0.1789%	115.8	0.1496%
9A	1	9/21/2013 17:01	3	54	26109	0.2068%	0.0	
9A	2	9/21/2013 17:16	3	47	25227	0.1863%	12.8	
9A	3	9/21/2013 17:11	3	51	22999	0.2217%	27.7	
9A	4	9/21/2013 17:07	3	60	22512	0.2665%	50.8	
9A	5	9/21/2013 17:21	3	50	23507	0.2127%	60.8	
9A	6	9/21/2013 17:37	3	48	21945	0.2187%	73.2	
9A	7	9/21/2013 17:31	3	39	21492	0.1815%	98.4	
9A	8	9/21/2013 17:27	3	46	20691	0.2223%	115.8	0.2146%
9B	1	9/21/2013 17:07	3	60	25990	0.2309%	0.0	
9B	2	9/21/2013 17:01	3	59	24930	0.2367%	12.8	
9B	3	9/21/2013 17:16	3	54	22796	0.2369%	27.7	
9B	4	9/21/2013 17:11	3	58	22590	0.2568%	50.8	
9B	5	9/21/2013 17:27	3	69	23152	0.2980%	60.8	
9B	6	9/21/2013 17:21	3	59	22396	0.2634%	73.2	

Detector (#)	Source ID (#)	Raw Count Data				Sr-90 Xtalk (Alpha/Beta)	Source Measured Weight	Average Xtalk (Alpha/Beta)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
9B	7	9/21/2013 17:37	3	54	21751	0.2483%	98.4	
9B	8	9/21/2013 17:32	3	51	20646	0.2470%	115.8	0.2522%
9C	1	9/21/2013 17:12	3	62	25465	0.2435%	0.0	
9C	2	9/21/2013 17:07	3	50	24707	0.2024%	12.8	
9C	3	9/21/2013 17:01	3	69	22353	0.3087%	27.7	
9C	4	9/21/2013 17:16	3	53	22173	0.2390%	50.8	
9C	5	9/21/2013 17:32	3	68	22883	0.2972%	60.8	
9C	6	9/21/2013 17:27	3	55	22218	0.2475%	73.2	
9C	7	9/21/2013 17:21	3	65	20983	0.3098%	98.4	
9C	8	9/21/2013 17:37	3	52	20661	0.2517%	115.8	0.2625%
9D	1	9/21/2013 17:16	3	59	24913	0.2368%	0.0	
9D	2	9/21/2013 17:12	3	72	23917	0.3010%	12.8	
9D	3	9/21/2013 17:07	3	46	21731	0.2117%	27.7	
9D	4	9/21/2013 17:01	3	64	21652	0.2956%	50.8	
9D	5	9/21/2013 17:37	3	57	22477	0.2536%	60.8	
9D	6	9/21/2013 17:32	3	73	21347	0.3420%	73.2	
9D	7	9/21/2013 17:28	3	53	20518	0.2583%	98.4	
9D	8	9/21/2013 17:21	3	42	20002	0.2100%	115.8	0.2636%
10A	1	9/21/2013 17:21	3	16	25003	0.0640%	0.0	
10A	2	9/21/2013 17:37	3	17	24350	0.0698%	12.8	
10A	3	9/21/2013 17:32	3	9	22013	0.0409%	27.7	
10A	4	9/21/2013 17:28	3	22	21667	0.1015%	50.8	
10A	5	9/21/2013 17:02	3	13	22954	0.0566%	60.8	
10A	6	9/21/2013 17:17	3	16	21760	0.0735%	73.2	
10A	7	9/21/2013 17:12	3	12	20689	0.0580%	98.4	
10A	8	9/21/2013 17:07	3	15	20403	0.0735%	115.8	0.0672%
10B	1	9/21/2013 17:28	3	89	25413	0.3502%	0.0	
10B	2	9/21/2013 17:21	3	84	24409	0.3441%	12.8	
10B	3	9/21/2013 17:37	3	84	22490	0.3735%	27.7	
10B	4	9/21/2013 17:32	3	65	22490	0.2890%	50.8	
10B	5	9/21/2013 17:07	3	86	22772	0.3777%	60.8	
10B	6	9/21/2013 17:02	3	63	21996	0.2864%	73.2	
10B	7	9/21/2013 17:17	3	56	21251	0.2635%	98.4	
10B	8	9/21/2013 17:12	3	61	20748	0.2940%	115.8	0.3223%
10C	1	9/21/2013 17:32	3	85	25627	0.3317%	0.0	
10C	2	9/21/2013 17:28	3	61	24800	0.2460%	12.8	
10C	3	9/21/2013 17:21	3	65	22496	0.2889%	27.7	
10C	4	9/21/2013 17:37	3	62	22381	0.2770%	50.8	
10C	5	9/21/2013 17:12	3	76	23254	0.3268%	60.8	
10C	6	9/21/2013 17:07	3	74	21971	0.3368%	73.2	
10C	7	9/21/2013 17:02	3	47	21225	0.2214%	98.4	
10C	8	9/21/2013 17:17	3	68	20600	0.3301%	115.8	0.2948%
10D	1	9/21/2013 17:37	3	54	25707	0.2101%	0.0	
10D	2	9/21/2013 17:32	3	58	24666	0.2351%	12.8	
10D	3	9/21/2013 17:28	3	47	22551	0.2084%	27.7	
10D	4	9/21/2013 17:21	3	53	22518	0.2354%	50.8	
10D	5	9/21/2013 17:17	3	43	23963	0.1794%	60.8	
10D	6	9/21/2013 17:12	3	57	22285	0.2558%	73.2	
10D	7	9/21/2013 17:07	3	40	21399	0.1869%	98.4	
10D	8	9/21/2013 17:02	3	31	20830	0.1488%	115.8	0.2075%
11A	1	9/21/2013 16:16	3	0	23343	0.0000%	0.0	
11A	2	9/21/2013 16:30	3	8	23076	0.0347%	12.8	
11A	3	9/21/2013 16:25	3	3	20922	0.0143%	27.7	
11A	4	9/21/2013 16:21	3	7	20687	0.0338%	50.8	
11A	5	9/21/2013 16:36	3	3	21368	0.0140%	60.8	
11A	6	9/21/2013 17:08	3	5	21140	0.0237%	73.2	

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		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
11A	7	9/21/2013 16:57	3	1	20106	0.0050%	98.4	
11A	8	9/21/2013 16:40	3	5	19597	0.0255%	115.8	0.0189%
11B	1	9/21/2013 16:21	3	1	25687	0.0039%	0.0	
11B	2	9/21/2013 16:16	3	5	24716	0.0202%	12.8	
11B	3	9/21/2013 16:30	3	5	22599	0.0221%	27.7	
11B	4	9/21/2013 16:25	3	9	22423	0.0401%	50.8	
11B	5	9/21/2013 16:40	3	5	23148	0.0216%	60.8	
11B	6	9/21/2013 16:36	3	2	22238	0.0090%	73.2	
11B	7	9/21/2013 17:08	3	2	21184	0.0094%	98.4	
11B	8	9/21/2013 16:57	3	2	20581	0.0097%	115.8	0.0170%
11C	1	9/21/2013 16:25	3	2	25944	0.0077%	0.0	
11C	2	9/21/2013 16:21	3	5	24751	0.0202%	12.8	
11C	3	9/21/2013 16:16	3	7	22621	0.0309%	27.7	
11C	4	9/21/2013 16:30	3	14	22444	0.0624%	50.8	
11C	5	9/21/2013 16:57	3	3	23360	0.0128%	60.8	
11C	6	9/21/2013 16:40	3	3	22361	0.0134%	73.2	
11C	7	9/21/2013 16:36	3	8	21503	0.0372%	98.4	
11C	8	9/21/2013 17:08	3	5	20724	0.0241%	115.8	0.0261%
11D	1	9/21/2013 16:30	3	1	25789	0.0039%	0.0	
11D	2	9/21/2013 16:26	3	5	24851	0.0201%	12.8	
11D	3	9/21/2013 16:21	3	4	22574	0.0177%	27.7	
11D	4	9/21/2013 16:17	3	5	22497	0.0222%	50.8	
11D	5	9/21/2013 17:08	3	2	23408	0.0085%	60.8	
11D	6	9/21/2013 16:58	3	3	22214	0.0135%	73.2	
11D	7	9/21/2013 16:40	3	4	21079	0.0190%	98.4	
11D	8	9/21/2013 16:36	3	4	20358	0.0196%	115.8	0.0156%
12A	1	9/21/2013 16:36	3	2	25088	0.0080%	0.0	
12A	2	9/21/2013 17:08	3	1	24334	0.0041%	12.8	
12A	3	9/21/2013 16:58	3	3	22035	0.0136%	27.7	
12A	4	9/21/2013 16:40	3	2	21621	0.0093%	50.8	
12A	5	9/21/2013 16:17	3	3	22780	0.0132%	60.8	
12A	6	9/21/2013 16:30	3	2	21800	0.0092%	73.2	
12A	7	9/21/2013 16:26	3	2	20729	0.0096%	98.4	
12A	8	9/21/2013 16:21	3	2	20591	0.0097%	115.8	0.0096%
12B	1	9/21/2013 16:40	3	1	23678	0.0042%	0.0	
12B	2	9/21/2013 16:36	3	4	22544	0.0177%	12.8	
12B	3	9/21/2013 17:09	3	5	20388	0.0245%	27.7	
12B	4	9/21/2013 16:58	3	7	20391	0.0343%	50.8	
12B	5	9/21/2013 16:21	3	3	21250	0.0141%	60.8	
12B	6	9/21/2013 16:17	3	6	19693	0.0305%	73.2	
12B	7	9/21/2013 16:30	3	5	19347	0.0258%	98.4	
12B	8	9/21/2013 16:26	3	4	18471	0.0217%	115.8	0.0216%
12C	1	9/21/2013 16:58	3	12	25849	0.0464%	0.0	
12C	2	9/21/2013 16:40	3	14	24804	0.0564%	12.8	
12C	3	9/21/2013 16:36	3	9	22706	0.0396%	27.7	
12C	4	9/21/2013 17:09	3	11	22573	0.0487%	50.8	
12C	5	9/21/2013 16:26	3	11	23680	0.0465%	60.8	
12C	6	9/21/2013 16:22	3	12	22297	0.0538%	73.2	
12C	7	9/21/2013 16:17	3	14	21578	0.0649%	98.4	
12C	8	9/21/2013 16:31	3	13	20526	0.0633%	115.8	0.0525%
12D	1	9/21/2013 17:09	3	3	26384	0.0114%	0.0	
12D	2	9/21/2013 17:03	3	11	25368	0.0434%	12.8	
12D	3	9/21/2013 16:41	3	8	23293	0.0343%	27.7	
12D	4	9/21/2013 16:36	3	11	22898	0.0480%	50.8	
12D	5	9/21/2013 16:31	3	2	23905	0.0084%	60.8	
12D	6	9/21/2013 16:26	3	4	23037	0.0174%	73.2	

Detector (#)	Source ID (#)	Raw Count Data				Sr-90 Xtalk (Alpha/Beta)	Source Measured Weight	Average Xtalk (Alpha/Beta)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
12D	7	9/21/2013 16:22	3	8	22185	0.0361%	98.4	
12D	8	9/21/2013 16:17	3	6	21281	0.0282%	115.8	0.0284%
13A	1	9/24/2013 15:16	3	6	25299	0.0237%	0.0	
13A	2	9/24/2013 16:07	3	2	24154	0.0083%	12.8	
13A	3	9/24/2013 16:02	3	6	22411	0.0268%	27.7	
13A	4	9/24/2013 15:46	3	10	22123	0.0452%	50.8	
13A	5	9/24/2013 16:12	3	1	23299	0.0043%	60.8	
13A	6	9/24/2013 17:06	3	4	21941	0.0182%	73.2	
13A	7	9/24/2013 16:28	3	3	21501	0.0140%	98.4	
13A	8	9/24/2013 16:21	3	2	20330	0.0098%	115.8	0.0188%
13B	1	9/24/2013 15:46	3	3	25707	0.0117%	0.0	
13B	2	9/24/2013 15:16	3	2	25003	0.0080%	12.8	
13B	3	9/24/2013 16:07	3	7	22716	0.0308%	27.7	
13B	4	9/24/2013 16:02	3	6	22665	0.0265%	50.8	
13B	5	9/24/2013 16:21	3	3	23407	0.0128%	60.8	
13B	6	9/24/2013 16:12	3	1	22288	0.0045%	73.2	
13B	7	9/24/2013 17:06	3	3	21552	0.0139%	98.4	
13B	8	9/24/2013 16:28	3	6	20809	0.0288%	115.8	0.0171%
13C	1	9/24/2013 16:02	3	1	24439	0.0041%	0.0	
13C	2	9/24/2013 15:46	3	6	23471	0.0256%	12.8	
13C	3	9/24/2013 15:16	3	2	20847	0.0096%	27.7	
13C	4	9/24/2013 16:07	3	6	21047	0.0285%	50.8	
13C	5	9/24/2013 16:28	3	3	21798	0.0138%	60.8	
13C	6	9/24/2013 16:21	3	6	20780	0.0289%	73.2	
13C	7	9/24/2013 16:12	3	4	19932	0.0201%	98.4	
13C	8	9/24/2013 17:06	3	4	19649	0.0204%	115.8	0.0189%
13D	1	9/24/2013 16:08	3	7	25369	0.0276%	0.0	
13D	2	9/24/2013 16:02	3	0	24423	0.0000%	12.8	
13D	3	9/24/2013 15:46	3	5	22268	0.0225%	27.7	
13D	4	9/24/2013 15:16	3	7	22067	0.0317%	50.8	
13D	5	9/24/2013 17:06	3	7	22700	0.0308%	60.8	
13D	6	9/24/2013 16:28	3	6	21712	0.0276%	73.2	
13D	7	9/24/2013 16:22	3	4	20958	0.0191%	98.4	
13D	8	9/24/2013 16:12	3	5	20458	0.0244%	115.8	0.0230%
14A	1	9/24/2013 16:12	3	3	25239	0.0119%	0.0	
14A	2	9/24/2013 17:06	3	3	23924	0.0125%	12.8	
14A	3	9/24/2013 16:29	3	2	21860	0.0091%	27.7	
14A	4	9/24/2013 16:22	3	7	22077	0.0317%	50.8	
14A	5	9/24/2013 15:16	3	5	22308	0.0224%	60.8	
14A	6	9/24/2013 16:08	3	1	21266	0.0047%	73.2	
14A	7	9/24/2013 16:02	3	6	20788	0.0289%	98.4	
14A	8	9/24/2013 15:46	3	4	20028	0.0200%	115.8	0.0177%
14B	1	9/24/2013 16:22	3	1	26392	0.0038%	0.0	
14B	2	9/24/2013 16:12	3	3	25423	0.0118%	12.8	
14B	3	9/24/2013 17:06	3	5	23499	0.0213%	27.7	
14B	4	9/24/2013 16:29	3	12	22910	0.0524%	50.8	
14B	5	9/24/2013 15:46	3	7	23778	0.0294%	60.8	
14B	6	9/24/2013 15:17	3	4	22469	0.0178%	73.2	
14B	7	9/24/2013 16:08	3	0	21921	0.0000%	98.4	
14B	8	9/24/2013 16:02	3	6	21162	0.0284%	115.8	0.0206%
14C	1	9/24/2013 16:29	3	0	24820	0.0000%	0.0	
14C	2	9/24/2013 16:22	3	5	24032	0.0208%	12.8	
14C	3	9/24/2013 16:12	3	2	21582	0.0093%	27.7	
14C	4	9/24/2013 17:06	3	7	21926	0.0319%	50.8	
14C	5	9/24/2013 16:02	3	3	22686	0.0132%	60.8	
14C	6	9/24/2013 15:47	3	6	21331	0.0281%	73.2	

Detector (#)	Source ID (#)	Raw Count Data				Sr-90 Xtalk (Alpha/Beta)	Source Measured Weight	Average Xtalk (Alpha/Beta)
		Start Time	Count Time (min)	Alpha (counts)	Beta (counts)			
14C	7	9/24/2013 15:17	3	4	20928	0.0191%	98.4	
14C	8	9/24/2013 16:08	3	4	20079	0.0199%	115.8	0.0178%
14D	1	9/24/2013 17:06	3	2	25905	0.0077%	0.0	
14D	2	9/24/2013 16:29	3	4	25199	0.0159%	12.8	
14D	3	9/24/2013 16:22	3	5	23027	0.0217%	27.7	
14D	4	9/24/2013 16:12	3	7	22602	0.0310%	50.8	
14D	5	9/24/2013 16:08	3	2	23468	0.0085%	60.8	
14D	6	9/24/2013 16:02	3	5	22259	0.0225%	73.2	
14D	7	9/24/2013 15:47	3	7	21431	0.0327%	98.4	
14D	8	9/24/2013 15:17	3	2	21039	0.0095%	115.8	0.0187%

**Current Calibration - PIC**

Geometry					
Beta X-talk	Cal Date	10/1/2013	Exp Date	9/30/2014	
Protean	A0	A1	A2	A3	A4
1A	1.022191E-03				
1B	2.226678E-03				
1C	1.696998E-02				
1D	1.253215E-02				
2A	1.739007E-04				
2B	1.480946E-04				
2C	2.165168E-03				
2D	2.456314E-04				
3A	1.176928E-02				
3B	1.939830E-02				
3C	8.737820E-03				
3D	7.269509E-03				
4A	6.965207E-03				
4B	1.958849E-04				
4C	2.786976E-03				
4D	1.786080E-02				
5A	5.296226E-03				
5B	4.348336E-03				
5C	3.907030E-03				
5D	6.467152E-03				
6A	4.413757E-03				
6B	8.743589E-03				
6C	7.802520E-03				
6D	#N/A				
7A	1.188994E-03				
7B	2.096274E-03				
7C	4.913259E-04				
7D	8.658276E-04				
8A	2.010084E-04				
8B	1.488820E-04				
8C	1.702166E-04				
8D	1.495879E-03				
9A	2.145775E-03				
9B	2.522389E-03				
9C	2.624654E-03				
9D	2.636224E-03				
10A	6.723928E-04				
10B	3.223075E-03				
10C	2.948472E-03				
10D	2.074942E-03				
11A	1.887800E-04				
11B	1.701720E-04				
11C	2.610271E-04				
11D	1.557698E-04				
12A	9.581431E-05				
12B	2.161303E-04				
12C	5.246508E-04				
12D	2.838761E-04				
13A	1.878553E-04				
13B	1.712672E-04				
13C	1.885235E-04				
13D	2.297071E-04				
14A	1.765414E-04				
14B	2.060497E-04				
14C	1.779809E-04				
14D	1.867909E-04				

SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
S1	10A	3	16	25003	9/21/2013 17:21	9/21/2013 17:24	PIC	GABS13
S2	10A	3	17	24350	9/21/2013 17:37	9/21/2013 17:40	PIC	GABS13
S3	10A	3	9	22013	9/21/2013 17:32	9/21/2013 17:35	PIC	GABS13
S4	10A	3	22	21667	9/21/2013 17:28	9/21/2013 17:31	PIC	GABS13
S5	10A	3	13	22954	9/21/2013 17:02	9/21/2013 17:05	PIC	GABS13
S6	10A	3	16	21760	9/21/2013 17:17	9/21/2013 17:20	PIC	GABS13
S7	10A	3	12	20689	9/21/2013 17:12	9/21/2013 17:15	PIC	GABS13
S8	10A	3	15	20403	9/21/2013 17:07	9/21/2013 17:10	PIC	GABS13
S1	10B	3	89	25413	9/21/2013 17:28	9/21/2013 17:31	PIC	GABS13
S2	10B	3	84	24409	9/21/2013 17:21	9/21/2013 17:24	PIC	GABS13
S3	10B	3	84	22490	9/21/2013 17:37	9/21/2013 17:40	PIC	GABS13
S4	10B	3	65	22490	9/21/2013 17:32	9/21/2013 17:35	PIC	GABS13
S5	10B	3	86	22772	9/21/2013 17:07	9/21/2013 17:10	PIC	GABS13
S6	10B	3	63	21996	9/21/2013 17:02	9/21/2013 17:05	PIC	GABS13
S7	10B	3	56	21251	9/21/2013 17:17	9/21/2013 17:20	PIC	GABS13
S8	10B	3	61	20748	9/21/2013 17:12	9/21/2013 17:15	PIC	GABS13
S1	10C	3	85	25627	9/21/2013 17:32	9/21/2013 17:35	PIC	GABS13
S2	10C	3	61	24800	9/21/2013 17:28	9/21/2013 17:31	PIC	GABS13
S3	10C	3	65	22496	9/21/2013 17:21	9/21/2013 17:24	PIC	GABS13
S4	10C	3	62	22381	9/21/2013 17:37	9/21/2013 17:40	PIC	GABS13
S5	10C	3	76	23254	9/21/2013 17:12	9/21/2013 17:15	PIC	GABS13
S6	10C	3	74	21971	9/21/2013 17:07	9/21/2013 17:10	PIC	GABS13
S7	10C	3	47	21225	9/21/2013 17:02	9/21/2013 17:05	PIC	GABS13
S8	10C	3	68	20600	9/21/2013 17:17	9/21/2013 17:20	PIC	GABS13
S1	10D	3	54	25707	9/21/2013 17:37	9/21/2013 17:40	PIC	GABS13
S2	10D	3	58	24666	9/21/2013 17:32	9/21/2013 17:35	PIC	GABS13
S3	10D	3	47	22551	9/21/2013 17:28	9/21/2013 17:31	PIC	GABS13
S4	10D	3	53	22518	9/21/2013 17:21	9/21/2013 17:24	PIC	GABS13
S5	10D	3	43	23963	9/21/2013 17:17	9/21/2013 17:20	PIC	GABS13
S6	10D	3	57	22285	9/21/2013 17:12	9/21/2013 17:15	PIC	GABS13
S7	10D	3	40	21399	9/21/2013 17:07	9/21/2013 17:10	PIC	GABS13
S8	10D	3	31	20830	9/21/2013 17:02	9/21/2013 17:05	PIC	GABS13
S1	11A	3	0	23343	9/21/2013 16:16	9/21/2013 16:19	PIC	GABS13
S2	11A	3	8	23076	9/21/2013 16:30	9/21/2013 16:33	PIC	GABS13
S3	11A	3	3	20922	9/21/2013 16:25	9/21/2013 16:28	PIC	GABS13
S4	11A	3	7	20687	9/21/2013 16:21	9/21/2013 16:24	PIC	GABS13

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S5	11A	3	21368	9/21/2013 16:36	9/21/2013 16:39	PIC	GABS13
S6	11A	3	21140	9/21/2013 17:08	9/21/2013 17:11	PIC	GABS13
S7	11A	3	20106	9/21/2013 16:57	9/21/2013 17:00	PIC	GABS13
S8	11A	3	19597	9/21/2013 16:40	9/21/2013 16:43	PIC	GABS13
S1	11B	3	25687	9/21/2013 16:21	9/21/2013 16:24	PIC	GABS13
S2	11B	3	24716	9/21/2013 16:16	9/21/2013 16:19	PIC	GABS13
S3	11B	3	22599	9/21/2013 16:30	9/21/2013 16:33	PIC	GABS13
S4	11B	3	22423	9/21/2013 16:25	9/21/2013 16:28	PIC	GABS13
S5	11B	3	23148	9/21/2013 16:40	9/21/2013 16:43	PIC	GABS13
S6	11B	3	22238	9/21/2013 16:36	9/21/2013 16:39	PIC	GABS13
S7	11B	3	21184	9/21/2013 17:08	9/21/2013 17:11	PIC	GABS13
S8	11B	3	20581	9/21/2013 16:57	9/21/2013 17:00	PIC	GABS13
S1	11C	3	25944	9/21/2013 16:25	9/21/2013 16:28	PIC	GABS13
S2	11C	3	24751	9/21/2013 16:21	9/21/2013 16:24	PIC	GABS13
S3	11C	3	22621	9/21/2013 16:16	9/21/2013 16:19	PIC	GABS13
S4	11C	3	22444	9/21/2013 16:30	9/21/2013 16:33	PIC	GABS13
S5	11C	3	23360	9/21/2013 16:57	9/21/2013 17:00	PIC	GABS13
S6	11C	3	22361	9/21/2013 16:40	9/21/2013 16:43	PIC	GABS13
S7	11C	3	21503	9/21/2013 16:36	9/21/2013 16:39	PIC	GABS13
S8	11C	3	20724	9/21/2013 17:08	9/21/2013 17:11	PIC	GABS13
S1	11D	3	25789	9/21/2013 16:30	9/21/2013 16:33	PIC	GABS13
S2	11D	3	24851	9/21/2013 16:26	9/21/2013 16:29	PIC	GABS13
S3	11D	3	22574	9/21/2013 16:21	9/21/2013 16:24	PIC	GABS13
S4	11D	3	22497	9/21/2013 16:17	9/21/2013 16:20	PIC	GABS13
S5	11D	3	23408	9/21/2013 17:08	9/21/2013 17:11	PIC	GABS13
S6	11D	3	22214	9/21/2013 16:58	9/21/2013 17:01	PIC	GABS13
S7	11D	3	21079	9/21/2013 16:40	9/21/2013 16:43	PIC	GABS13
S8	11D	3	20358	9/21/2013 16:36	9/21/2013 16:39	PIC	GABS13
S1	12A	3	25088	9/21/2013 16:36	9/21/2013 16:39	PIC	GABS13
S2	12A	3	24334	9/21/2013 17:08	9/21/2013 17:11	PIC	GABS13
S3	12A	3	22035	9/21/2013 16:58	9/21/2013 17:01	PIC	GABS13
S4	12A	3	21621	9/21/2013 16:40	9/21/2013 16:43	PIC	GABS13
S5	12A	3	22780	9/21/2013 16:17	9/21/2013 16:20	PIC	GABS13
S6	12A	3	21800	9/21/2013 16:30	9/21/2013 16:33	PIC	GABS13
S7	12A	3	20729	9/21/2013 16:26	9/21/2013 16:29	PIC	GABS13
S8	12A	3	20591	9/21/2013 16:21	9/21/2013 16:24	PIC	GABS13
S1	12B	3	23678	9/21/2013 16:40	9/21/2013 16:43	PIC	GABS13



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S2	12B	3	4	22544	9/21/2013 16:36	9/21/2013 16:39	PIC	GABS13
S3	12B	3	5	20388	9/21/2013 17:09	9/21/2013 17:12	PIC	GABS13
S4	12B	3	7	20391	9/21/2013 16:58	9/21/2013 17:01	PIC	GABS13
S5	12B	3	3	21250	9/21/2013 16:21	9/21/2013 16:24	PIC	GABS13
S6	12B	3	6	19693	9/21/2013 16:17	9/21/2013 16:20	PIC	GABS13
S7	12B	3	5	19347	9/21/2013 16:30	9/21/2013 16:33	PIC	GABS13
S8	12B	3	4	18471	9/21/2013 16:26	9/21/2013 16:29	PIC	GABS13
S1	12C	3	12	25849	9/21/2013 16:58	9/21/2013 17:01	PIC	GABS13
S2	12C	3	14	24804	9/21/2013 16:40	9/21/2013 16:43	PIC	GABS13
S3	12C	3	9	22706	9/21/2013 16:36	9/21/2013 16:39	PIC	GABS13
S4	12C	3	11	22573	9/21/2013 17:09	9/21/2013 17:12	PIC	GABS13
S5	12C	3	11	23680	9/21/2013 16:26	9/21/2013 16:29	PIC	GABS13
S6	12C	3	12	22297	9/21/2013 16:22	9/21/2013 16:25	PIC	GABS13
S7	12C	3	14	21578	9/21/2013 16:17	9/21/2013 16:20	PIC	GABS13
S8	12C	3	13	20526	9/21/2013 16:31	9/21/2013 16:34	PIC	GABS13
S1	12D	3	3	26384	9/21/2013 17:09	9/21/2013 17:12	PIC	GABS13
S2	12D	3	11	25368	9/21/2013 17:03	9/21/2013 17:06	PIC	GABS13
S3	12D	3	8	23293	9/21/2013 16:41	9/21/2013 16:44	PIC	GABS13
S4	12D	3	11	22898	9/21/2013 16:36	9/21/2013 16:39	PIC	GABS13
S5	12D	3	2	23905	9/21/2013 16:31	9/21/2013 16:34	PIC	GABS13
S6	12D	3	4	23037	9/21/2013 16:26	9/21/2013 16:29	PIC	GABS13
S7	12D	3	8	22185	9/21/2013 16:22	9/21/2013 16:25	PIC	GABS13
S8	12D	3	6	21281	9/21/2013 16:17	9/21/2013 16:20	PIC	GABS13
S1	13A	3	6	25299	9/24/2013 15:16	9/24/2013 15:19	PIC	GABS13
S2	13A	3	2	24154	9/24/2013 16:07	9/24/2013 16:10	PIC	GABS13
S3	13A	3	6	22411	9/24/2013 16:02	9/24/2013 16:05	PIC	GABS13
S4	13A	3	10	22123	9/24/2013 15:46	9/24/2013 15:49	PIC	GABS13
S5	13A	3	1	23299	9/24/2013 16:12	9/24/2013 16:15	PIC	GABS13
S6	13A	3	4	21941	9/24/2013 17:06	9/24/2013 17:09	PIC	GABS13
S7	13A	3	3	21501	9/24/2013 16:28	9/24/2013 16:31	PIC	GABS13
S8	13A	3	2	20330	9/24/2013 16:21	9/24/2013 16:24	PIC	GABS13
S1	13B	3	3	25707	9/24/2013 15:46	9/24/2013 15:49	PIC	GABS13
S2	13B	3	2	25003	9/24/2013 15:16	9/24/2013 15:19	PIC	GABS13
S3	13B	3	7	22716	9/24/2013 16:07	9/24/2013 16:10	PIC	GABS13
S4	13B	3	6	22665	9/24/2013 16:02	9/24/2013 16:05	PIC	GABS13
S5	13B	3	3	23407	9/24/2013 16:21	9/24/2013 16:24	PIC	GABS13
S6	13B	3	1	22288	9/24/2013 16:12	9/24/2013 16:15	PIC	GABS13

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S7	13B	3	21552	9/24/2013 17:06	9/24/2013 17:09	PIC	GABS13
S8	13B	3	20809	9/24/2013 16:28	9/24/2013 16:31	PIC	GABS13
S1	13C	3	24439	9/24/2013 16:02	9/24/2013 16:05	PIC	GABS13
S2	13C	3	23471	9/24/2013 15:46	9/24/2013 15:49	PIC	GABS13
S3	13C	3	20847	9/24/2013 15:16	9/24/2013 15:19	PIC	GABS13
S4	13C	3	21047	9/24/2013 16:07	9/24/2013 16:10	PIC	GABS13
S5	13C	3	21798	9/24/2013 16:28	9/24/2013 16:31	PIC	GABS13
S6	13C	3	20780	9/24/2013 16:21	9/24/2013 16:24	PIC	GABS13
S7	13C	3	19932	9/24/2013 16:12	9/24/2013 16:15	PIC	GABS13
S8	13C	3	19649	9/24/2013 17:06	9/24/2013 17:09	PIC	GABS13
S1	13D	3	25369	9/24/2013 16:08	9/24/2013 16:11	PIC	GABS13
S2	13D	3	24423	9/24/2013 16:02	9/24/2013 16:05	PIC	GABS13
S3	13D	3	22268	9/24/2013 15:46	9/24/2013 15:49	PIC	GABS13
S4	13D	3	22067	9/24/2013 15:16	9/24/2013 15:19	PIC	GABS13
S5	13D	3	22700	9/24/2013 17:06	9/24/2013 17:09	PIC	GABS13
S6	13D	3	21712	9/24/2013 16:28	9/24/2013 16:31	PIC	GABS13
S7	13D	3	20958	9/24/2013 16:22	9/24/2013 16:25	PIC	GABS13
S8	13D	3	20458	9/24/2013 16:12	9/24/2013 16:15	PIC	GABS13
S1	14A	3	25239	9/24/2013 17:06	9/24/2013 17:09	PIC	GABS13
S2	14A	3	23924	9/24/2013 16:29	9/24/2013 16:32	PIC	GABS13
S3	14A	3	21860	9/24/2013 16:22	9/24/2013 16:25	PIC	GABS13
S4	14A	3	22077	9/24/2013 15:16	9/24/2013 15:19	PIC	GABS13
S5	14A	3	22308	9/24/2013 16:08	9/24/2013 16:11	PIC	GABS13
S6	14A	3	21266	9/24/2013 16:02	9/24/2013 16:05	PIC	GABS13
S7	14A	3	20788	9/24/2013 15:46	9/24/2013 15:49	PIC	GABS13
S8	14A	3	20028	9/24/2013 16:22	9/24/2013 16:25	PIC	GABS13
S1	14B	3	26392	9/24/2013 16:12	9/24/2013 16:15	PIC	GABS13
S2	14B	3	25423	9/24/2013 17:06	9/24/2013 17:09	PIC	GABS13
S3	14B	3	23499	9/24/2013 16:29	9/24/2013 16:32	PIC	GABS13
S4	14B	3	22910	9/24/2013 15:46	9/24/2013 15:49	PIC	GABS13
S5	14B	3	23778	9/24/2013 15:17	9/24/2013 15:20	PIC	GABS13
S6	14B	3	22469	9/24/2013 16:08	9/24/2013 16:11	PIC	GABS13
S7	14B	3	21921	9/24/2013 16:02	9/24/2013 16:05	PIC	GABS13
S8	14B	3	21162	9/24/2013 16:29	9/24/2013 16:32	PIC	GABS13
S1	14C	3	24820	9/24/2013 16:22	9/24/2013 16:25	PIC	GABS13
S2	14C	3	24032	9/24/2013 16:12	9/24/2013 16:15	PIC	GABS13
S3	14C	3	21582	9/24/2013 16:12	9/24/2013 16:15	PIC	GABS13

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S4	14C	3	7	21926	9/24/2013 17:06	9/24/2013 17:09	PIC	GABS13
S5	14C	3	3	22686	9/24/2013 16:02	9/24/2013 16:05	PIC	GABS13
S6	14C	3	6	21331	9/24/2013 15:47	9/24/2013 15:50	PIC	GABS13
S7	14C	3	4	20928	9/24/2013 15:17	9/24/2013 15:20	PIC	GABS13
S8	14C	3	4	20079	9/24/2013 16:08	9/24/2013 16:11	PIC	GABS13
S1	14D	3	2	25905	9/24/2013 17:06	9/24/2013 17:09	PIC	GABS13
S2	14D	3	4	25199	9/24/2013 16:29	9/24/2013 16:32	PIC	GABS13
S3	14D	3	5	23027	9/24/2013 16:22	9/24/2013 16:25	PIC	GABS13
S4	14D	3	7	22602	9/24/2013 16:12	9/24/2013 16:15	PIC	GABS13
S5	14D	3	2	23468	9/24/2013 16:08	9/24/2013 16:11	PIC	GABS13
S6	14D	3	5	22259	9/24/2013 16:02	9/24/2013 16:05	PIC	GABS13
S7	14D	3	7	21431	9/24/2013 15:47	9/24/2013 15:50	PIC	GABS13
S8	14D	3	2	21039	9/24/2013 15:17	9/24/2013 15:20	PIC	GABS13
S1	1A	3	20	25625	9/21/2013 13:30	9/21/2013 13:33	PIC	GABS13
S2	1A	3	18	25019	9/21/2013 13:53	9/21/2013 13:56	PIC	GABS13
S3	1A	3	21	22593	9/21/2013 13:40	9/21/2013 13:43	PIC	GABS13
S4	1A	3	28	22383	9/21/2013 13:36	9/21/2013 13:39	PIC	GABS13
S5	1A	3	23	23109	9/21/2013 13:57	9/21/2013 14:00	PIC	GABS13
S6	1A	3	24	22120	9/21/2013 14:20	9/21/2013 14:23	PIC	GABS13
S7	1A	3	27	21380	9/21/2013 14:06	9/21/2013 14:09	PIC	GABS13
S8	1A	3	24	20797	9/21/2013 14:02	9/21/2013 14:05	PIC	GABS13
S1	1B	3	63	25604	9/21/2013 13:36	9/21/2013 13:39	PIC	GABS13
S2	1B	3	54	24236	9/21/2013 13:30	9/21/2013 13:33	PIC	GABS13
S3	1B	3	50	22325	9/21/2013 13:53	9/21/2013 13:56	PIC	GABS13
S4	1B	3	59	22268	9/21/2013 13:40	9/21/2013 13:43	PIC	GABS13
S5	1B	3	48	23291	9/21/2013 14:02	9/21/2013 14:05	PIC	GABS13
S6	1B	3	33	22223	9/21/2013 13:57	9/21/2013 14:00	PIC	GABS13
S7	1B	3	45	21257	9/21/2013 14:20	9/21/2013 14:23	PIC	GABS13
S8	1B	3	53	20600	9/21/2013 14:07	9/21/2013 14:10	PIC	GABS13
S1	1C	3	442	26407	9/21/2013 13:41	9/21/2013 13:44	PIC	GABS13
S2	1C	3	422	24969	9/21/2013 13:36	9/21/2013 13:39	PIC	GABS13
S3	1C	3	435	22919	9/21/2013 13:30	9/21/2013 13:33	PIC	GABS13
S4	1C	3	414	22445	9/21/2013 13:53	9/21/2013 13:56	PIC	GABS13
S5	1C	3	404	23570	9/21/2013 14:07	9/21/2013 14:10	PIC	GABS13
S6	1C	3	360	22340	9/21/2013 14:02	9/21/2013 14:05	PIC	GABS13
S7	1C	3	348	21628	9/21/2013 13:57	9/21/2013 14:00	PIC	GABS13
S8	1C	3	320	20846	9/21/2013 14:20	9/21/2013 14:23	PIC	GABS13

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S1	1D	3	357	25634	9/21/2013 13:53	9/21/2013 13:56	PIC	GABS13
S2	1D	3	286	24501	9/21/2013 13:41	9/21/2013 13:44	PIC	GABS13
S3	1D	3	286	22573	9/21/2013 13:36	9/21/2013 13:39	PIC	GABS13
S4	1D	3	313	22099	9/21/2013 13:30	9/21/2013 13:33	PIC	GABS13
S5	1D	3	284	22891	9/21/2013 14:20	9/21/2013 14:23	PIC	GABS13
S6	1D	3	258	22081	9/21/2013 14:07	9/21/2013 14:10	PIC	GABS13
S7	1D	3	240	21132	9/21/2013 14:02	9/21/2013 14:05	PIC	GABS13
S8	1D	3	254	20524	9/21/2013 13:58	9/21/2013 14:01	PIC	GABS13
S1	2A	3	2	23125	9/21/2013 13:58	9/21/2013 14:01	PIC	GABS13
S2	2A	3	6	22846	9/21/2013 14:20	9/21/2013 14:23	PIC	GABS13
S3	2A	3	1	20461	9/21/2013 14:07	9/21/2013 14:10	PIC	GABS13
S4	2A	3	6	20333	9/21/2013 14:02	9/21/2013 14:05	PIC	GABS13
S5	2A	3	5	21066	9/21/2013 13:31	9/21/2013 13:34	PIC	GABS13
S6	2A	3	3	20302	9/21/2013 13:53	9/21/2013 13:56	PIC	GABS13
S7	2A	3	3	19482	9/21/2013 13:41	9/21/2013 13:44	PIC	GABS13
S8	2A	3	3	18865	9/21/2013 13:36	9/21/2013 13:39	PIC	GABS13
S1	2B	3	3	22785	9/21/2013 14:02	9/21/2013 14:05	PIC	GABS13
S2	2B	3	4	22179	9/21/2013 13:58	9/21/2013 14:01	PIC	GABS13
S3	2B	3	4	20359	9/21/2013 14:20	9/21/2013 14:23	PIC	GABS13
S4	2B	3	4	19835	9/21/2013 14:07	9/21/2013 14:10	PIC	GABS13
S5	2B	3	0	21151	9/21/2013 13:36	9/21/2013 13:39	PIC	GABS13
S6	2B	3	3	19660	9/21/2013 13:31	9/21/2013 13:34	PIC	GABS13
S7	2B	3	2	19215	9/21/2013 13:53	9/21/2013 13:56	PIC	GABS13
S8	2B	3	4	18355	9/21/2013 13:41	9/21/2013 13:44	PIC	GABS13
S1	2C	3	48	23809	9/21/2013 14:07	9/21/2013 14:10	PIC	GABS13
S2	2C	3	44	22311	9/21/2013 14:02	9/21/2013 14:05	PIC	GABS13
S3	2C	3	36	21118	9/21/2013 13:58	9/21/2013 14:01	PIC	GABS13
S4	2C	3	60	20958	9/21/2013 14:20	9/21/2013 14:23	PIC	GABS13
S5	2C	3	38	21668	9/21/2013 13:41	9/21/2013 13:44	PIC	GABS13
S6	2C	3	47	20769	9/21/2013 13:37	9/21/2013 13:40	PIC	GABS13
S7	2C	3	45	20374	9/21/2013 13:31	9/21/2013 13:34	PIC	GABS13
S8	2C	3	49	19290	9/21/2013 13:53	9/21/2013 13:56	PIC	GABS13
S1	2D	3	4	23028	9/21/2013 14:20	9/21/2013 14:23	PIC	GABS13
S2	2D	3	3	21788	9/21/2013 14:07	9/21/2013 14:10	PIC	GABS13
S3	2D	3	4	19932	9/21/2013 14:03	9/21/2013 14:06	PIC	GABS13
S4	2D	3	8	20266	9/21/2013 13:58	9/21/2013 14:01	PIC	GABS13
S5	2D	3	10	20864	9/21/2013 13:53	9/21/2013 13:56	PIC	GABS13

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S6	2D	3	2	19378	9/21/2013 13:41	9/21/2013 13:44	PIC	GABS13
S7	2D	3	6	19163	9/21/2013 13:37	9/21/2013 13:40	PIC	GABS13
S8	2D	3	3	18448	9/21/2013 13:31	9/21/2013 13:34	PIC	GABS13
S1	3A	3	271	24286	9/21/2013 12:02	9/21/2013 12:05	PIC	GABS13
S2	3A	3	279	23428	9/21/2013 12:18	9/21/2013 12:21	PIC	GABS13
S3	3A	3	251	21194	9/21/2013 12:13	9/21/2013 12:16	PIC	GABS13
S4	3A	3	218	21238	9/21/2013 12:07	9/21/2013 12:10	PIC	GABS13
S5	3A	3	273	22086	9/21/2013 12:26	9/21/2013 12:29	PIC	GABS13
S6	3A	3	262	21312	9/21/2013 13:24	9/21/2013 13:27	PIC	GABS13
S7	3A	3	226	20136	9/21/2013 13:19	9/21/2013 13:22	PIC	GABS13
S8	3A	3	258	19693	9/21/2013 13:12	9/21/2013 13:15	PIC	GABS13
S1	3B	3	508	25317	9/21/2013 12:07	9/21/2013 12:10	PIC	GABS13
S2	3B	3	475	24358	9/21/2013 12:02	9/21/2013 12:05	PIC	GABS13
S3	3B	3	449	22204	9/21/2013 12:18	9/21/2013 12:21	PIC	GABS13
S4	3B	3	396	22090	9/21/2013 12:13	9/21/2013 12:16	PIC	GABS13
S5	3B	3	467	22953	9/21/2013 13:12	9/21/2013 13:15	PIC	GABS13
S6	3B	3	434	21791	9/21/2013 12:27	9/21/2013 13:27	PIC	GABS13
S7	3B	3	402	21142	9/21/2013 13:24	9/21/2013 13:22	PIC	GABS13
S8	3B	3	374	20555	9/21/2013 13:19	9/21/2013 13:22	PIC	GABS13
S1	3C	3	218	25442	9/21/2013 12:13	9/21/2013 12:16	PIC	GABS13
S2	3C	3	256	24503	9/21/2013 12:07	9/21/2013 12:10	PIC	GABS13
S3	3C	3	181	22403	9/21/2013 12:02	9/21/2013 12:05	PIC	GABS13
S4	3C	3	164	22022	9/21/2013 12:18	9/21/2013 12:21	PIC	GABS13
S5	3C	3	182	23164	9/21/2013 13:20	9/21/2013 13:23	PIC	GABS13
S6	3C	3	193	21951	9/21/2013 13:12	9/21/2013 13:15	PIC	GABS13
S7	3C	3	202	20923	9/21/2013 12:27	9/21/2013 12:30	PIC	GABS13
S8	3C	3	185	20428	9/21/2013 13:24	9/21/2013 13:27	PIC	GABS13
S1	3D	3	181	24704	9/21/2013 12:18	9/21/2013 12:21	PIC	GABS13
S2	3D	3	184	23963	9/21/2013 12:13	9/21/2013 12:16	PIC	GABS13
S3	3D	3	156	22298	9/21/2013 12:07	9/21/2013 12:10	PIC	GABS13
S4	3D	3	138	21817	9/21/2013 12:02	9/21/2013 12:05	PIC	GABS13
S5	3D	3	189	22704	9/21/2013 13:24	9/21/2013 13:27	PIC	GABS13
S6	3D	3	163	21537	9/21/2013 13:20	9/21/2013 13:23	PIC	GABS13
S7	3D	3	157	20982	9/21/2013 13:12	9/21/2013 13:15	PIC	GABS13
S8	3D	3	131	20298	9/21/2013 12:27	9/21/2013 12:30	PIC	GABS13
S1	4A	3	202	24165	9/21/2013 12:27	9/21/2013 12:30	PIC	GABS13
S2	4A	3	192	23633	9/21/2013 13:24	9/21/2013 13:27	PIC	GABS13

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S3	4A	3	144	22390	9/21/2013 13:20	9/21/2013 13:23	PIC	GABS13
S4	4A	3	160	21559	9/21/2013 13:12	9/21/2013 13:15	PIC	GABS13
S5	4A	3	163	22516	9/21/2013 12:03	9/21/2013 12:06	PIC	GABS13
S6	4A	3	129	21729	9/21/2013 12:19	9/21/2013 12:22	PIC	GABS13
S7	4A	3	140	20553	9/21/2013 12:13	9/21/2013 12:16	PIC	GABS13
S8	4A	3	108	20009	9/21/2013 12:07	9/21/2013 12:10	PIC	GABS13
S1	4B	3	3	25102	9/21/2013 13:12	9/21/2013 13:15	PIC	GABS13
S2	4B	3	7	24143	9/21/2013 12:27	9/21/2013 12:30	PIC	GABS13
S3	4B	3	3	21901	9/21/2013 13:25	9/21/2013 13:28	PIC	GABS13
S4	4B	3	7	22047	9/21/2013 13:20	9/21/2013 13:23	PIC	GABS13
S5	4B	3	5	22736	9/21/2013 12:08	9/21/2013 12:11	PIC	GABS13
S6	4B	3	1	21870	9/21/2013 12:03	9/21/2013 12:06	PIC	GABS13
S7	4B	3	5	21039	9/21/2013 12:19	9/21/2013 12:22	PIC	GABS13
S8	4B	3	4	20015	9/21/2013 12:13	9/21/2013 12:16	PIC	GABS13
S1	4C	3	74	24607	9/21/2013 13:20	9/21/2013 13:23	PIC	GABS13
S2	4C	3	67	23130	9/21/2013 13:12	9/21/2013 13:15	PIC	GABS13
S3	4C	3	49	21352	9/21/2013 12:27	9/21/2013 12:30	PIC	GABS13
S4	4C	3	56	22152	9/21/2013 13:25	9/21/2013 13:28	PIC	GABS13
S5	4C	3	76	22261	9/21/2013 12:13	9/21/2013 12:16	PIC	GABS13
S6	4C	3	65	21527	9/21/2013 12:08	9/21/2013 12:11	PIC	GABS13
S7	4C	3	43	20985	9/21/2013 12:03	9/21/2013 12:06	PIC	GABS13
S8	4C	3	62	20088	9/21/2013 12:19	9/21/2013 12:22	PIC	GABS13
S1	4D	3	491	25199	9/21/2013 13:25	9/21/2013 13:28	PIC	GABS13
S2	4D	3	420	23618	9/21/2013 13:20	9/21/2013 13:23	PIC	GABS13
S3	4D	3	374	22248	9/21/2013 13:13	9/21/2013 13:16	PIC	GABS13
S4	4D	3	418	21918	9/21/2013 12:27	9/21/2013 12:30	PIC	GABS13
S5	4D	3	391	22494	9/21/2013 12:19	9/21/2013 12:22	PIC	GABS13
S6	4D	3	373	21560	9/21/2013 12:13	9/21/2013 12:16	PIC	GABS13
S7	4D	3	363	20559	9/21/2013 12:08	9/21/2013 12:11	PIC	GABS13
S8	4D	3	346	19888	9/21/2013 12:03	9/21/2013 12:06	PIC	GABS13
S1	5A	3	128	26044	9/21/2013 14:24	9/21/2013 14:27	PIC	GABS13
S2	5A	3	131	24973	9/21/2013 14:45	9/21/2013 14:48	PIC	GABS13
S3	5A	3	131	22977	9/21/2013 14:38	9/21/2013 14:41	PIC	GABS13
S4	5A	3	136	22672	9/21/2013 14:34	9/21/2013 14:37	PIC	GABS13
S5	5A	3	129	23532	9/21/2013 15:00	9/21/2013 15:03	PIC	GABS13
S6	5A	3	119	22258	9/21/2013 15:13	9/21/2013 15:16	PIC	GABS13
S7	5A	3	101	21577	9/21/2013 15:09	9/21/2013 15:12	PIC	GABS13

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S8	5A	3	104	20799	9/21/2013 15:04	9/21/2013 15:07	PIC	GABS13
S1	5B	3	100	25846	9/21/2013 14:34	9/21/2013 14:37	PIC	GABS13
S2	5B	3	126	24804	9/21/2013 14:24	9/21/2013 14:27	PIC	GABS13
S3	5B	3	94	22810	9/21/2013 14:45	9/21/2013 14:48	PIC	GABS13
S4	5B	3	104	22478	9/21/2013 14:38	9/21/2013 14:41	PIC	GABS13
S5	5B	3	108	23360	9/21/2013 15:04	9/21/2013 15:07	PIC	GABS13
S6	5B	3	95	22017	9/21/2013 15:00	9/21/2013 15:03	PIC	GABS13
S7	5B	3	97	21376	9/21/2013 15:13	9/21/2013 15:16	PIC	GABS13
S8	5B	3	75	20752	9/21/2013 15:09	9/21/2013 15:12	PIC	GABS13
S1	5C	3	93	25881	9/21/2013 14:39	9/21/2013 14:42	PIC	GABS13
S2	5C	3	105	25038	9/21/2013 14:34	9/21/2013 14:37	PIC	GABS13
S3	5C	3	93	22892	9/21/2013 14:24	9/21/2013 14:27	PIC	GABS13
S4	5C	3	91	22178	9/21/2013 14:45	9/21/2013 14:48	PIC	GABS13
S5	5C	3	83	23120	9/21/2013 15:09	9/21/2013 15:12	PIC	GABS13
S6	5C	3	84	22262	9/21/2013 15:04	9/21/2013 15:07	PIC	GABS13
S7	5C	3	79	21171	9/21/2013 15:00	9/21/2013 15:03	PIC	GABS13
S8	5C	3	87	20671	9/21/2013 15:13	9/21/2013 15:16	PIC	GABS13
S1	5D	3	160	25415	9/21/2013 14:45	9/21/2013 14:48	PIC	GABS13
S2	5D	3	150	24521	9/21/2013 14:39	9/21/2013 14:42	PIC	GABS13
S3	5D	3	150	22700	9/21/2013 14:34	9/21/2013 14:37	PIC	GABS13
S4	5D	3	145	22605	9/21/2013 14:24	9/21/2013 14:27	PIC	GABS13
S5	5D	3	133	23311	9/21/2013 15:13	9/21/2013 15:16	PIC	GABS13
S6	5D	3	151	22277	9/21/2013 15:09	9/21/2013 15:12	PIC	GABS13
S7	5D	3	145	21113	9/21/2013 15:04	9/21/2013 15:07	PIC	GABS13
S8	5D	3	143	20574	9/21/2013 15:00	9/21/2013 15:03	PIC	GABS13
S1	6A	3	133	25444	9/21/2013 15:00	9/21/2013 15:03	PIC	GABS13
S2	6A	3	112	24148	9/21/2013 15:14	9/21/2013 15:17	PIC	GABS13
S3	6A	3	86	22561	9/21/2013 15:09	9/21/2013 15:12	PIC	GABS13
S4	6A	3	113	22213	9/21/2013 15:04	9/21/2013 15:07	PIC	GABS13
S5	6A	3	85	23089	9/21/2013 14:26	9/21/2013 14:29	PIC	GABS13
S6	6A	3	92	21889	9/21/2013 14:46	9/21/2013 14:49	PIC	GABS13
S7	6A	3	83	21003	9/21/2013 14:39	9/21/2013 14:42	PIC	GABS13
S8	6A	3	96	20384	9/21/2013 14:35	9/21/2013 14:38	PIC	GABS13
S1	6B	3	271	25842	9/21/2013 15:05	9/21/2013 15:08	PIC	GABS13
S2	6B	3	204	24756	9/21/2013 15:00	9/21/2013 15:03	PIC	GABS13
S3	6B	3	183	22966	9/21/2013 15:14	9/21/2013 15:17	PIC	GABS13
S4	6B	3	191	22553	9/21/2013 15:10	9/21/2013 15:13	PIC	GABS13

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S5	6B	3	207	23518	9/21/2013 14:35	9/21/2013 14:38	PIC	GABS13
S6	6B	3	192	21991	9/21/2013 14:28	9/21/2013 14:31	PIC	GABS13
S7	6B	3	169	21384	9/21/2013 14:46	9/21/2013 14:49	PIC	GABS13
S8	6B	3	192	20538	9/21/2013 14:39	9/21/2013 14:42	PIC	GABS13
S1	6C	3	211	25095	9/21/2013 15:10	9/21/2013 15:13	PIC	GABS13
S2	6C	3	188	24324	9/21/2013 15:05	9/21/2013 15:08	PIC	GABS13
S3	6C	3	166	22361	9/21/2013 15:00	9/21/2013 15:03	PIC	GABS13
S4	6C	3	188	22007	9/21/2013 15:14	9/21/2013 15:17	PIC	GABS13
S5	6C	3	191	23024	9/21/2013 14:39	9/21/2013 14:42	PIC	GABS13
S6	6C	3	157	21525	9/21/2013 14:35	9/21/2013 14:38	PIC	GABS13
S7	6C	3	154	21308	9/21/2013 14:28	9/21/2013 14:31	PIC	GABS13
S8	6C	3	152	20267	9/21/2013 14:46	9/21/2013 14:49	PIC	GABS13
S1	7A	3	26	25836	9/21/2013 15:24	9/21/2013 15:27	PIC	GABS13
S2	7A	3	29	24812	9/21/2013 15:38	9/21/2013 15:41	PIC	GABS13
S3	7A	3	31	22637	9/21/2013 15:33	9/21/2013 15:36	PIC	GABS13
S4	7A	3	25	22367	9/21/2013 15:29	9/21/2013 15:32	PIC	GABS13
S5	7A	3	25	23254	9/21/2013 15:44	9/21/2013 15:47	PIC	GABS13
S6	7A	3	28	22113	9/21/2013 15:57	9/21/2013 16:00	PIC	GABS13
S7	7A	3	30	21394	9/21/2013 15:52	9/21/2013 15:55	PIC	GABS13
S8	7A	3	23	20794	9/21/2013 15:48	9/21/2013 15:51	PIC	GABS13
S1	7B	3	45	25947	9/21/2013 15:29	9/21/2013 15:32	PIC	GABS13
S2	7B	3	57	24962	9/21/2013 15:25	9/21/2013 15:28	PIC	GABS13
S3	7B	3	56	22788	9/21/2013 15:38	9/21/2013 15:41	PIC	GABS13
S4	7B	3	55	22297	9/21/2013 15:33	9/21/2013 15:36	PIC	GABS13
S5	7B	3	51	23465	9/21/2013 15:48	9/21/2013 15:51	PIC	GABS13
S6	7B	3	42	22274	9/21/2013 15:44	9/21/2013 15:47	PIC	GABS13
S7	7B	3	45	21551	9/21/2013 15:57	9/21/2013 16:00	PIC	GABS13
S8	7B	3	35	20819	9/21/2013 15:52	9/21/2013 15:55	PIC	GABS13
S1	7C	3	8	24857	9/21/2013 15:34	9/21/2013 15:37	PIC	GABS13
S2	7C	3	8	24176	9/21/2013 15:29	9/21/2013 15:32	PIC	GABS13
S3	7C	3	7	22112	9/21/2013 15:25	9/21/2013 15:28	PIC	GABS13
S4	7C	3	14	21602	9/21/2013 15:38	9/21/2013 15:41	PIC	GABS13
S5	7C	3	18	22837	9/21/2013 15:53	9/21/2013 15:56	PIC	GABS13
S6	7C	3	11	21615	9/21/2013 15:48	9/21/2013 15:51	PIC	GABS13
S7	7C	3	16	20772	9/21/2013 15:44	9/21/2013 15:47	PIC	GABS13
S8	7C	3	5	20339	9/21/2013 15:57	9/21/2013 16:00	PIC	GABS13
S1	7D	3	21	25491	9/21/2013 15:39	9/21/2013 15:42	PIC	GABS13



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S2	7D	3	26	24470	9/21/2013 15:34	9/21/2013 15:37	PIC	GABS13
S3	7D	3	18	22692	9/21/2013 15:29	9/21/2013 15:32	PIC	GABS13
S4	7D	3	18	22394	9/21/2013 15:25	9/21/2013 15:28	PIC	GABS13
S5	7D	3	25	22949	9/21/2013 15:57	9/21/2013 16:00	PIC	GABS13
S6	7D	3	19	22151	9/21/2013 15:53	9/21/2013 15:56	PIC	GABS13
S7	7D	3	15	20830	9/21/2013 15:48	9/21/2013 15:51	PIC	GABS13
S8	7D	3	16	20618	9/21/2013 15:44	9/21/2013 15:47	PIC	GABS13
S1	8A	3	3	22437	9/21/2013 15:44	9/21/2013 15:47	PIC	GABS13
S2	8A	3	2	21492	9/21/2013 15:57	9/21/2013 16:00	PIC	GABS13
S3	8A	3	5	20337	9/21/2013 15:53	9/21/2013 15:56	PIC	GABS13
S4	8A	3	7	19590	9/21/2013 15:48	9/21/2013 15:51	PIC	GABS13
S5	8A	3	6	19913	9/21/2013 15:25	9/21/2013 15:28	PIC	GABS13
S6	8A	3	5	19463	9/21/2013 15:39	9/21/2013 15:42	PIC	GABS13
S7	8A	3	1	18241	9/21/2013 15:34	9/21/2013 15:37	PIC	GABS13
S8	8A	3	3	18172	9/21/2013 15:30	9/21/2013 15:33	PIC	GABS13
S1	8B	3	3	22367	9/21/2013 15:48	9/21/2013 15:51	PIC	GABS13
S2	8B	3	1	21728	9/21/2013 15:44	9/21/2013 15:47	PIC	GABS13
S3	8B	3	3	20205	9/21/2013 15:57	9/21/2013 16:00	PIC	GABS13
S4	8B	3	7	19767	9/21/2013 15:53	9/21/2013 15:56	PIC	GABS13
S5	8B	3	4	20729	9/21/2013 15:30	9/21/2013 15:33	PIC	GABS13
S6	8B	3	3	19567	9/21/2013 15:25	9/21/2013 15:28	PIC	GABS13
S7	8B	3	1	18959	9/21/2013 15:39	9/21/2013 15:42	PIC	GABS13
S8	8B	3	2	18303	9/21/2013 15:34	9/21/2013 15:37	PIC	GABS13
S1	8C	3	2	21830	9/21/2013 15:53	9/21/2013 15:56	PIC	GABS13
S2	8C	3	6	21368	9/21/2013 15:48	9/21/2013 15:51	PIC	GABS13
S3	8C	3	0	19704	9/21/2013 15:44	9/21/2013 15:47	PIC	GABS13
S4	8C	3	5	19401	9/21/2013 15:57	9/21/2013 16:00	PIC	GABS13
S5	8C	3	6	19818	9/21/2013 15:34	9/21/2013 15:37	PIC	GABS13
S6	8C	3	5	19029	9/21/2013 15:30	9/21/2013 15:33	PIC	GABS13
S7	8C	3	1	18223	9/21/2013 15:25	9/21/2013 15:28	PIC	GABS13
S8	8C	3	2	17983	9/21/2013 15:39	9/21/2013 15:42	PIC	GABS13
S1	8D	3	40	25811	9/21/2013 15:57	9/21/2013 16:00	PIC	GABS13
S2	8D	3	34	24854	9/21/2013 15:53	9/21/2013 15:56	PIC	GABS13
S3	8D	3	27	22758	9/21/2013 15:48	9/21/2013 15:51	PIC	GABS13
S4	8D	3	40	22505	9/21/2013 15:44	9/21/2013 15:47	PIC	GABS13
S5	8D	3	38	23615	9/21/2013 15:39	9/21/2013 15:42	PIC	GABS13
S6	8D	3	30	22557	9/21/2013 15:34	9/21/2013 15:37	PIC	GABS13

PIC\_Beta Xtalk\_Sep13\_RawData.xls

S7	8D	3	29	21368	9/21/2013 15:30	9/21/2013 15:33	PIC	GABS13
S8	8D	3	37	20679	9/21/2013 15:25	9/21/2013 15:28	PIC	GABS13
S1	9A	3	54	26109	9/21/2013 17:01	9/21/2013 17:04	PIC	GABS13
S2	9A	3	47	25227	9/21/2013 17:16	9/21/2013 17:19	PIC	GABS13
S3	9A	3	51	22999	9/21/2013 17:11	9/21/2013 17:14	PIC	GABS13
S4	9A	3	60	22512	9/21/2013 17:07	9/21/2013 17:10	PIC	GABS13
S5	9A	3	50	23507	9/21/2013 17:21	9/21/2013 17:24	PIC	GABS13
S6	9A	3	48	21945	9/21/2013 17:37	9/21/2013 17:40	PIC	GABS13
S7	9A	3	39	21492	9/21/2013 17:31	9/21/2013 17:34	PIC	GABS13
S8	9A	3	46	20691	9/21/2013 17:27	9/21/2013 17:30	PIC	GABS13
S1	9B	3	60	25990	9/21/2013 17:07	9/21/2013 17:10	PIC	GABS13
S2	9B	3	59	24930	9/21/2013 17:01	9/21/2013 17:04	PIC	GABS13
S3	9B	3	54	22796	9/21/2013 17:16	9/21/2013 17:19	PIC	GABS13
S4	9B	3	58	22590	9/21/2013 17:11	9/21/2013 17:14	PIC	GABS13
S5	9B	3	69	23152	9/21/2013 17:27	9/21/2013 17:30	PIC	GABS13
S6	9B	3	59	22396	9/21/2013 17:21	9/21/2013 17:24	PIC	GABS13
S7	9B	3	54	21751	9/21/2013 17:37	9/21/2013 17:40	PIC	GABS13
S8	9B	3	51	20646	9/21/2013 17:32	9/21/2013 17:35	PIC	GABS13
S1	9C	3	62	25465	9/21/2013 17:12	9/21/2013 17:15	PIC	GABS13
S2	9C	3	50	24707	9/21/2013 17:07	9/21/2013 17:10	PIC	GABS13
S3	9C	3	69	22353	9/21/2013 17:01	9/21/2013 17:04	PIC	GABS13
S4	9C	3	53	22173	9/21/2013 17:16	9/21/2013 17:19	PIC	GABS13
S5	9C	3	68	22883	9/21/2013 17:32	9/21/2013 17:35	PIC	GABS13
S6	9C	3	55	22218	9/21/2013 17:27	9/21/2013 17:30	PIC	GABS13
S7	9C	3	65	20983	9/21/2013 17:21	9/21/2013 17:24	PIC	GABS13
S8	9C	3	52	20661	9/21/2013 17:37	9/21/2013 17:40	PIC	GABS13
S1	9D	3	59	24913	9/21/2013 17:16	9/21/2013 17:19	PIC	GABS13
S2	9D	3	72	23917	9/21/2013 17:12	9/21/2013 17:15	PIC	GABS13
S3	9D	3	46	21731	9/21/2013 17:07	9/21/2013 17:10	PIC	GABS13
S4	9D	3	64	21652	9/21/2013 17:01	9/21/2013 17:04	PIC	GABS13
S5	9D	3	57	22477	9/21/2013 17:37	9/21/2013 17:40	PIC	GABS13
S6	9D	3	73	21347	9/21/2013 17:32	9/21/2013 17:35	PIC	GABS13
S7	9D	3	53	20518	9/21/2013 17:28	9/21/2013 17:31	PIC	GABS13
S8	9D	3	42	20002	9/21/2013 17:21	9/21/2013 17:24	PIC	GABS13

### Gross Alpha/Beta Liquid

Filename : GAB.XLS  
 File type : Excel  
 Version # : 1.3.8

Alpha Spike S/N : N/A  
 Alpha Spike Exp Date : N/A  
 Alpha Spike Activity (dpm/ml) : N/A  
 Alpha Spike Volume Added: N/A  
 Alpha Spike Nuclide: N/A

Beta Spike S/N : N/A  
 Beta Spike Exp Date : N/A  
 Beta Spike Activity (dpm/ml) : N/A  
 Beta Spike Volume Added: N/A  
 Beta Spike Nuclide: N/A

Batch : 1082559  
 Analyst : NXLI  
 Prep Date : 8/29/2011

Beta LCS S/N : 1243-A  
 Beta LCS Exp Date : 9/27/2013  
 Beta LCS Activity (dpm/ml) : 211664.13  
 Beta LCS Volume Added: 0.10  
 Beta LCS Nuclide: Sr-90

Alpha Method Uncertainty : 0.0829  
 Beta Method Uncertainty : 0.0821

Procedure Code : GFCGANBL  
 Parmname1 : Alpha  
 Parmname2 : Beta  
 Required Alpha MDA : 1 pCi/L  
 Required Beta MDA : 1 pCi/L

Geometry: 2 inch Panchett

Sample Characteristics			Count Raw Data			Counting Time (min.)			Gross Counts			Count Start Date/Time	
Pos.	Sample ID	Sample Aliquot L	Sample Residue Wt. (mg)	Sample Aliquot StDev. L	Sample Date/Time	Detector ID	Alpha	Beta	Alpha	Beta	Alpha	Beta	Start Date/Time
1	1202347886.1	1.0000	0	2.0399E-05	8/29/2011 0:00	1A	23592	45806	2	2	23592	45806	9/21/2013 13:21
2	1202347887.1	1.0000	10.4	2.0399E-05	8/29/2011 0:00	1B	18833	43797	2	2	18833	43797	9/21/2013 13:21
3	1202347888.1	1.0000	23.8	2.0399E-05	8/29/2011 0:00	1C	16796	38423	2	2	16796	38423	9/21/2013 13:21
4	1202347889.1	1.0000	44.2	2.0399E-05	8/29/2011 0:00	1D	14234	36643	2	2	14234	36643	9/21/2013 13:21
5	1202347890.1	1.0000	54.7	2.0399E-05	8/29/2011 0:00	2A	10703	34673	2	2	10703	34673	9/21/2013 13:21
6	1202347891.1	1.0000	73.9	2.0399E-05	8/29/2011 0:00	2B	8760	32873	2	2	8760	32873	9/21/2013 13:21
7	1202347892.1	1.0000	95.2	2.0399E-05	8/29/2011 0:00	2C	8406	30884	2	2	8406	30884	9/21/2013 13:21
8	1202347893.1	1.0000	103	2.0399E-05	8/29/2011 0:00	2D	6292	29301	2	2	6292	29301	9/21/2013 13:22
9	1202347894.1	1.0000	0	2.0399E-05	8/29/2011 0:00	3A	24216	42765	2	2	24216	42765	9/21/2013 13:31
10	1202347895.1	1.0000	10.4	2.0399E-05	8/29/2011 0:00	3B	20218	42262	2	2	20218	42262	9/21/2013 13:32
11	1202347896.1	1.0000	23.8	2.0399E-05	8/29/2011 0:00	3C	15320	37512	2	2	15320	37512	9/21/2013 13:32
12	1202347897.1	1.0000	44.2	2.0399E-05	8/29/2011 0:00	3D	14003	36197	2	2	14003	36197	9/21/2013 13:32
13	1202347898.1	1.0000	54.7	2.0399E-05	8/29/2011 0:00	4A	12330	34416	2	2	12330	34416	9/21/2013 13:32
14	1202347899.1	1.0000	73.9	2.0399E-05	8/29/2011 0:00	4B	9452	35173	2	2	9452	35173	9/21/2013 13:32
15	1202347900.1	1.0000	95.2	2.0399E-05	8/29/2011 0:00	4C	8857	31629	2	2	8857	31629	9/21/2013 13:32
16	1202347901.1	1.0000	103	2.0399E-05	8/29/2011 0:00	4D	8154	30378	2	2	8154	30378	9/21/2013 13:32
17	1202347902.1	1.0000	0	2.0399E-05	8/29/2011 0:00	5A	25440	46456	2	2	25440	46456	9/21/2013 12:08
18	1202347903.1	1.0000	10.4	2.0399E-05	8/29/2011 0:00	5B	19808	43863	2	2	19808	43863	9/21/2013 12:08
19	1202347904.1	1.0000	23.8	2.0399E-05	8/29/2011 0:00	5C	15610	38606	2	2	15610	38606	9/21/2013 12:08
20	1202347905.1	1.0000	44.2	2.0399E-05	8/29/2011 0:00	5D	14638	36556	2	2	14638	36556	9/21/2013 12:08
21	1202347906.1	1.0000	54.7	2.0399E-05	8/29/2011 0:00	6A	13248	35713	2	2	13248	35713	9/21/2013 12:10
22	1202347907.1	1.0000	73.9	2.0399E-05	8/29/2011 0:00	6B	11775	34829	2	2	11775	34829	9/21/2013 12:10
23	1202347908.1	1.0000	95.2	2.0399E-05	8/29/2011 0:00	6C	9876	31502	2	2	9876	31502	9/21/2013 12:11
24	1202347909.1	1.0000	103	2.0399E-05	8/29/2011 0:00	6D	0	0	2	2	0	0	9/21/2013 12:11
25	1202347910.1	1.0000	0	2.0399E-05	8/29/2011 0:00	7A	24570	46232	2	2	24570	46232	9/21/2013 12:15
26	1202347911.1	1.0000	10.4	2.0399E-05	8/29/2011 0:00	7B	19830	43657	2	2	19830	43657	9/21/2013 12:15
27	1202347912.1	1.0000	23.8	2.0399E-05	8/29/2011 0:00	7C	14850	38544	2	2	14850	38544	9/21/2013 12:15
28	1202347913.1	1.0000	44.2	2.0399E-05	8/29/2011 0:00	7D	13473	37809	2	2	13473	37809	9/21/2013 12:15
29	1202347914.1	1.0000	54.7	2.0399E-05	8/29/2011 0:00	8A	9411	33431	2	2	9411	33431	9/21/2013 12:15
30	1202347915.1	1.0000	73.9	2.0399E-05	8/29/2011 0:00	8B	8626	32884	2	2	8626	32884	9/21/2013 12:16
31	1202347916.1	1.0000	95.2	2.0399E-05	8/29/2011 0:00	8C	6894	30183	2	2	6894	30183	9/21/2013 12:16
32	1202347917.1	1.0000	103	2.0399E-05	8/29/2011 0:00	8D	23921	47306	2	2	23921	47306	9/21/2013 12:20
33	1202347918.1	1.0000	0	2.0399E-05	8/29/2011 0:00	9A	19296	44434	2	2	19296	44434	9/21/2013 12:20
34	1202347919.1	1.0000	10.4	2.0399E-05	8/29/2011 0:00	9B	14435	38894	2	2	14435	38894	9/21/2013 12:20
35	1202347920.1	1.0000	23.8	2.0399E-05	8/29/2011 0:00	9C	12908	36500	2	2	12908	36500	9/21/2013 12:21
36	1202347921.1	1.0000	44.2	2.0399E-05	8/29/2011 0:00	10A	10944	36700	2	2	10944	36700	9/21/2013 12:21
37	1202347922.1	1.0000	54.7	2.0399E-05	8/29/2011 0:00	10B	10676	34602	2	2	10676	34602	9/21/2013 12:21
38	1202347923.1	1.0000	73.9	2.0399E-05	8/29/2011 0:00	10C	8796	32964	2	2	8796	32964	9/21/2013 12:21
39	1202347924.1	1.0000	95.2	2.0399E-05	8/29/2011 0:00	10D	7450	32649	2	2	7450	32649	9/21/2013 12:21
40	1202347925.1	1.0000	103	2.0399E-05	8/29/2011 0:00				2	2			

Analytical SOP: GL-RAD-A-001  
Instrument SOP: GL-RAD-I-016

Pos.	Calibration Data				Alpha				Beta				Weekly Background					
	Counted on	Calibration Date	Calibration Due Date	Calibration Source Used	Det. Eff. Error (cpm/dpm)	Detector Efficiency (cpm/dpm)	Calibration Date	Calibration Due Date	Calibration Source Used	Calibration Source Used	Det. Eff. Error (cpm/dpm)	Detector Efficiency (cpm/dpm)	Calibration Date	Calibration Due Date	Calibration Source Used	Alpha	Beta	Count Start Date/Time
1	PIC	10/1/2012	9/30/2016	Th230	0.00657	0.2462	10/1/2012	9/30/2016	Sr90	0.4570	0.00738	0.00102	0.104	0.616	9/14/2013 18:26	500		
2	PIC	10/1/2012	9/30/2016	Th230	0.01356	0.2008	10/1/2012	9/30/2016	Sr90	0.4450	0.00711	0.00223	0.124	0.504	9/14/2013 18:26	500		
3	PIC	10/1/2012	9/30/2016	Th230	0.00967	0.4692	10/1/2012	9/30/2016	Sr90	0.4468	0.00847	0.01697	0.158	0.858	9/14/2013 18:26	500		
4	PIC	10/1/2012	9/30/2016	Th230	0.00996	0.0590	10/1/2012	9/30/2016	Sr90	0.4228	0.00692	0.01253	0.144	0.574	9/14/2013 18:26	500		
5	PIC	10/1/2012	9/30/2016	Th230	0.1025	0.1316	10/1/2012	9/30/2016	Sr90	0.3812	0.01914	0.00017	0.116	0.600	9/14/2013 18:26	500		
6	PIC	10/1/2012	9/30/2016	Th230	0.0895	0.2011	10/1/2012	9/30/2016	Sr90	0.3626	0.02111	0.00015	0.040	0.646	9/14/2013 18:26	500		
7	PIC	10/1/2012	9/30/2016	Th230	0.0887	0.1156	10/1/2012	9/30/2016	Sr90	0.3677	0.01274	0.00017	0.124	0.512	9/14/2013 18:26	500		
8	PIC	10/1/2012	9/30/2016	Th230	0.0760	0.1278	10/1/2012	9/30/2016	Sr90	0.4313	0.01401	0.01177	0.188	1.990	9/14/2013 18:26	500		
9	PIC	10/1/2012	9/30/2016	Th230	0.2466	0.0290	10/1/2012	9/30/2016	Sr90	0.4320	0.01614	0.01940	0.204	0.638	9/14/2013 18:26	500		
10	PIC	10/1/2012	9/30/2016	Th230	0.2128	0.00553	10/1/2012	9/30/2016	Sr90	0.4358	0.00988	0.00874	0.194	1.202	9/14/2013 18:26	500		
11	PIC	10/1/2012	9/30/2016	Th230	0.1669	0.0658	10/1/2012	9/30/2016	Sr90	0.4148	0.02297	0.00727	0.112	0.484	9/14/2013 18:26	500		
12	PIC	10/1/2012	9/30/2016	Th230	0.1343	0.0657	10/1/2012	9/30/2016	Sr90	0.4043	0.01123	0.00697	0.134	1.020	9/14/2013 18:26	500		
13	PIC	10/1/2012	9/30/2016	Th230	0.1191	0.1036	10/1/2012	9/30/2016	Sr90	0.3967	0.01519	0.00020	0.114	1.036	9/14/2013 18:26	500		
14	PIC	10/1/2012	9/30/2016	Th230	0.0941	0.00704	10/1/2012	9/30/2016	Sr90	0.3721	0.00869	0.00279	0.174	0.796	9/14/2013 18:26	500		
15	PIC	10/1/2012	9/30/2016	Th230	0.0946	0.01587	10/1/2012	9/30/2016	Sr90	0.3812	0.00889	0.00773	0.192	2.692	9/14/2013 18:26	500		
16	PIC	10/1/2012	9/30/2016	Th230	0.0926	0.00613	10/1/2012	9/30/2016	Sr90	0.4628	0.00851	0.00530	0.124	0.534	9/14/2013 18:26	500		
17	PIC	10/1/2012	9/30/2016	Th230	0.2653	0.00491	10/1/2012	9/30/2016	Sr90	0.4516	0.00426	0.00435	0.158	8.378	9/14/2013 18:26	500		
18	PIC	10/1/2012	9/30/2016	Th230	0.2134	0.01152	10/1/2012	9/30/2016	Sr90	0.4427	0.00657	0.00391	0.240	4.354	9/14/2013 18:26	500		
19	PIC	10/1/2012	9/30/2016	Th230	0.1694	0.01161	10/1/2012	9/30/2016	Sr90	0.4251	0.00925	0.00647	0.146	1.948	9/14/2013 18:26	500		
20	PIC	10/1/2012	9/30/2016	Th230	0.1403	0.00639	10/1/2012	9/30/2016	Sr90	0.4138	0.02228	0.00441	0.234	0.748	9/14/2013 18:26	500		
21	PIC	10/1/2012	9/30/2016	Th230	0.1259	0.02108	10/1/2012	9/30/2016	Sr90	0.4062	0.00851	0.00874	0.128	0.522	9/14/2013 18:26	500		
22	PIC	10/1/2012	9/30/2016	Th230	0.1184	0.01195	10/1/2012	9/30/2016	Sr90	0.3852	0.01970	0.00780	0.140	0.914	9/14/2013 18:26	500		
23	PIC	10/1/2012	9/30/2016	Th230	0.1023	0.01553	10/1/2012	9/30/2016	Sr90	0.6099	0.01844	0.00960	FAIL	FAIL	9/14/2013 18:26	500		
24	PIC	10/1/2012	9/30/2016	Th230	0.0900	0.01442	10/1/2012	9/30/2016	Sr90	0.4576	0.00594	0.00210	0.122	0.576	9/14/2013 18:26	500		
25	PIC	10/1/2012	9/30/2016	Th230	0.2598	0.00525	10/1/2012	9/30/2016	Sr90	0.4527	0.00627	0.00049	0.074	0.606	9/14/2013 18:26	500		
26	PIC	10/1/2012	9/30/2016	Th230	0.2196	0.00479	10/1/2012	9/30/2016	Sr90	0.4283	0.00790	0.00049	0.146	0.400	9/14/2013 18:26	500		
27	PIC	10/1/2012	9/30/2016	Th230	0.1631	0.00790	10/1/2012	9/30/2016	Sr90	0.4232	0.00790	0.00087	0.162	0.546	9/14/2013 18:26	500		
28	PIC	10/1/2012	9/30/2016	Th230	0.1280	0.00619	10/1/2012	9/30/2016	Sr90	0.3656	0.01579	0.00020	0.160	0.354	9/14/2013 18:26	500		
29	PIC	10/1/2012	9/30/2016	Th230	0.1015	0.01473	10/1/2012	9/30/2016	Sr90	0.3591	0.02146	0.00015	0.100	0.430	9/14/2013 18:26	500		
30	PIC	10/1/2012	9/30/2016	Th230	0.0919	0.01664	10/1/2012	9/30/2016	Sr90	0.3367	0.01955	0.00017	0.096	0.326	9/14/2013 18:26	500		
31	PIC	10/1/2012	9/30/2016	Th230	0.0802	0.01321	10/1/2012	9/30/2016	Sr90	0.3878	0.00609	0.00150	0.096	1.068	9/14/2013 18:26	500		
32	PIC	10/1/2012	9/30/2016	Th230	0.0961	0.00794	10/1/2012	9/30/2016	Sr90	0.4646	0.00768	0.00215	0.076	0.776	9/14/2013 18:26	500		
33	PIC	10/1/2012	9/30/2016	Th230	0.2494	0.00726	10/1/2012	9/30/2016	Sr90	0.4533	0.00754	0.00252	0.114	0.782	9/14/2013 18:26	500		
34	PIC	10/1/2012	9/30/2016	Th230	0.2088	0.00633	10/1/2012	9/30/2016	Sr90	0.4114	0.02610	0.00262	0.126	1.110	9/14/2013 18:26	500		
35	PIC	10/1/2012	9/30/2016	Th230	0.1610	0.01265	10/1/2012	9/30/2016	Sr90	0.4367	0.00652	0.00264	0.114	1.926	9/14/2013 18:26	500		
36	PIC	10/1/2012	9/30/2016	Th230	0.1269	0.02427	10/1/2012	9/30/2016	Sr90	0.4114	0.02610	0.00264	0.114	1.926	9/14/2013 18:26	500		
37	PIC	10/1/2012	9/30/2016	Th230	0.1095	0.01461	10/1/2012	9/30/2016	Sr90	0.4095	0.00651	0.00067	0.164	0.932	9/14/2013 18:26	500		
38	PIC	10/1/2012	9/30/2016	Th230	0.1098	0.00844	10/1/2012	9/30/2016	Sr90	0.4033	0.00652	0.00322	0.124	0.820	9/14/2013 18:26	500		
39	PIC	10/1/2012	9/30/2016	Th230	0.0821	0.00710	10/1/2012	9/30/2016	Sr90	0.3889	0.00638	0.00295	0.100	0.396	9/14/2013 18:26	500		
40	PIC	10/1/2012	9/30/2016	Th230	0.0864	0.00563	10/1/2012	9/30/2016	Sr90	0.3893	0.00557	0.00207	0.116	0.918	9/14/2013 18:26	500		

Notes:  
1 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date

Pos.	Alpha Results		Critical Level	Required MDA	MDA	pCi/L	Sample Act. Conc.	Sample Act. pCi/L	Sample Act. Error	Net Count Rate	Net Count Rate Error	Net Count Rate Error CPM	Net Count Rate Error CPM	2 SIGMA		2 SIGMA		Sample Type	RER	Nominal pCVL	Recovery
	Decision Level	pCi/L												Counting Uncertainty	Total Prop. Uncertainty	OC	RPD				
1	0.9742	0.6878	1	4.1205	21542.8667	0.0093	11755.8960	76.7984	275.4507	3529.4329	LCS	20916.1917	103.0%								
2	1.3041	0.9207	1	5.2063	21014.1603	0.0154	9416.3760	68.6167	301.6955	3490.8957	LCS	20916.1917	100.5%								
3	1.6501	1.1650	1	6.1016	20297.1162	0.0124	8397.8420	64.7997	319.3682	3469.1368	LCS	20916.1917	97.0%								
4	2.1449	1.5143	1	8.1644	23560.9455	0.0130	7116.8560	59.6532	400.3179	4007.7537	LCS	20916.1917	112.7%								
5	2.4711	1.7446	1	10.0818	23506.1206	0.0217	5351.3840	51.7277	445.5931	3950.6323	LCS	20916.1917	112.4%								
6	1.6616	1.1731	1	9.8951	22030.3267	0.0228	4379.9600	46.7974	461.6048	3714.2751	LCS	20916.1917	105.3%								
7	2.9507	2.0892	1	11.7803	21163.4935	0.0159	4202.8760	45.8421	456.0667	3529.4668	LCS	20916.1917	101.2%								
8	4.2423	2.9951	1	14.8804	18623.2171	0.0179	3145.8120	39.6611	480.7226	3099.6347	LCS	20916.1917	89.0%								
9	1.1040	0.7795	1	4.2994	21660.7163	0.0301	12107.8660	77.8075	278.6148	3623.6894	LCS	20916.1917	103.6%								
10	1.5785	1.1144	1	5.4043	20532.2868	0.0111	10108.7960	71.0950	294.9921	3507.9376	LCS	20916.1917	98.2%								
11	1.9628	1.3858	1	6.8207	20234.7420	0.0099	7659.6050	61.9870	327.4374	3383.4768	LCS	20916.1917	96.7%								
12	1.6632	1.3064	1	7.6481	23043.2561	0.0107	7001.3880	59.1671	398.9870	3647.5519	LCS	20916.1917	110.2%								
13	2.2865	1.6143	1	8.9041	22872.3607	0.0137	6164.8660	55.5203	411.7392	3841.6845	LCS	20916.1917	109.4%								
14	2.6682	1.8837	1	10.9478	22605.7570	0.0125	4725.8860	48.6107	456.0794	3717.0690	LCS	20916.1917	108.1%								
15	3.2777	2.3141	1	11.7679	20668.2196	0.0191	4428.3290	47.0558	438.9948	3514.5710	LCS	20916.1917	99.8%								
16	3.5175	2.4894	1	12.2608	18505.0707	0.0127	4076.8080	45.1498	430.3167	3258.4647	LCS	20916.1917	88.5%								
17	0.9670	0.6969	1	3.9406	21388.4516	0.0080	12719.8760	79.7496	265.4007	3525.3661	LCS	20916.1917	102.3%								
18	1.3653	0.9780	1	5.1227	20706.6931	0.0135	9903.8420	70.3705	291.1760	3442.1933	LCS	20916.1917	99.0%								
19	2.1509	1.5185	1	7.0263	20556.0699	0.0141	7804.7600	62.4700	325.6305	3421.0722	LCS	20916.1917	98.3%								
20	2.0247	1.4284	1	7.6735	23112.3176	0.0104	7318.8540	60.4938	360.5736	3847.2121	LCS	20916.1917	110.5%								
21	2.8574	2.0173	1	9.4017	23416.2787	0.0228	6623.7660	57.5500	403.5987	3993.9286	LCS	20916.1917	112.0%								
22	2.4778	1.5870	1	8.8827	21826.8888	0.0151	5987.3720	54.2563	404.7221	3700.5254	LCS	20916.1917	104.4%								
23	2.7197	1.9201	1	10.4448	21200.4445	0.0185	4937.5600	49.6890	428.8137	3619.6036	LCS	20916.1917	101.4%								
24	#DIV/0!	#DIV/0!	4	#DIV/0!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	LCS	20916.1917	#VALUE!								
25	0.9996	0.7057	1	4.0117	21248.4778	0.0063	12284.8780	76.3741	266.2929	3477.4222	LCS	20916.1917	101.6%								
26	0.9472	0.6688	1	4.5015	20817.1392	0.0086	9914.9260	70.4095	291.0905	3416.2301	LCS	20916.1917	99.5%								
27	1.7419	1.2298	1	6.5776	23041.2275	0.0114	7424.8540	60.9303	329.7767	3662.7289	LCS	20916.1917	97.9%								
28	2.3376	1.6504	1	8.5778	23461.2275	0.0106	6736.3360	56.0366	400.1851	3882.0753	LCS	20916.1917	113.0%								
29	2.9315	2.0687	1	10.7984	20873.7881	0.0180	4705.3400	48.5032	422.0506	3472.9665	LCS	20916.1917	99.8%								
30	2.5671	1.8060	1	12.4858	19352.1652	0.0198	4312.9000	46.4381	446.0010	3530.6799	LCS	20916.1917	101.0%								
31	2.8739	2.0290	1	12.4858	19352.1652	0.0179	3446.9040	41.5151	457.1786	3219.0762	LCS	20916.1917	92.5%								
32	2.9885	1.8934	1	10.4207	19112.9039	0.0136	4099.9040	45.2769	416.1391	3165.6073	LCS	20916.1917	91.4%								
33	0.8220	0.5604	1	3.8701	21511.9449	0.0096	11960.4240	77.3321	273.7862	3534.2913	LCS	20916.1917	102.8%								
34	1.2023	0.8488	1	4.9332	20689.6223	0.0096	9647.8960	69.4550	293.6385	3403.9179	LCS	20916.1917	98.9%								
35	1.6398	1.1577	1	6.5131	20054.2724	0.0151	7217.3740	60.0729	329.4917	3335.9833	LCS	20916.1917	95.9%								
36	1.9939	1.4077	1	8.1813	22914.8241	0.0258	6463.8660	56.8067	398.2909	3928.9258	LCS	20916.1917	109.6%								
37	2.7759	1.9598	1	10.1480	22869.0418	0.0175	5471.8360	52.3068	425.6912	3772.6906	LCS	20916.1917	108.4%								
38	2.3655	1.6842	1	9.5236	21675.2850	0.0128	5337.8760	51.6624	415.5157	3601.5136	LCS	20916.1917	103.6%								
39	2.5529	1.8024	1	10.9400	21273.8146	0.0128	4398.9000	46.8988	449.5147	3536.7486	LCS	20916.1917	101.7%								
40	2.9528	2.0706	1	11.9654	19252.7513	0.0130	3724.8840	43.1587	441.2164	3195.3862	LCS	20916.1917	92.0%								

Notes:  
1 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date

Pos.	Beta Results		Critical Level	Required MDA	MDA	Sample Act. Conc.	Sample Act. Error	Net Count Rate	Net Count Rate Error	2 SIGMA Counting Uncertainty	2 SIGMA Total Prop. Uncertainty	Sample OC	Sample Type	RPD	RER	Nominal pCVL	Recovery
	Decision Level	pCVL															
1	1.2772	0.9017		1	3.2820	21665.1381	0.0087	22902.3840	107.0117	206.7470	3653.2393	LCS	LCS			19068.8403	113.6%
2	1.1863	0.8375		1	3.1933	21096.9417	0.0086	21897.9960	104.6387	207.5915	3588.0428	LCS	LCS			19068.8403	110.6%
3	1.5418	1.0885		1	3.6895	18972.2965	0.0099	19210.6420	98.0089	193.6866	3139.3804	LCS	LCS			19068.8403	99.5%
4	1.3324	0.9407		1	3.4734	19098.5772	0.0087	18320.9260	95.7118	195.8508	3159.2018	LCS	LCS			19068.8403	100.2%
5	1.5111	1.0668		1	3.9062	19112.2206	0.0199	17335.9000	93.1034	215.6353	3391.6866	LCS	LCS			19068.8403	100.2%
6	1.6462	1.1636		1	4.1905	19028.7148	0.0218	16435.8540	90.6546	220.7135	3399.2902	LCS	LCS			19068.8403	99.8%
7	1.4469	1.0215		1	3.8804	18367.1163	0.0140	15441.4880	87.8692	210.9545	3087.2062	LCS	LCS			19068.8403	96.3%
8	3.0505	2.1537		1	6.2722	17944.2715	0.0095	14648.5100	85.5877	219.7375	3108.1099	LCS	LCS			19068.8403	94.1%
9	2.2575	1.5938		1	4.7543	21789.8742	0.0148	21380.7860	103.3985	211.6784	3651.6938	LCS	LCS			19068.8403	114.3%
10	1.3437	0.9487		1	3.4259	21176.9019	0.0169	21130.3620	102.7886	205.2976	3537.1577	LCS	LCS			19068.8403	111.1%
11	1.8707	1.3208		1	4.1919	18893.9717	0.0111	18754.7980	96.8401	195.1851	3147.9692	LCS	LCS			19068.8403	99.1%
12	1.2473	0.8806		1	3.3901	19134.5256	0.0236	18098.0160	95.1276	202.4825	3290.3783	LCS	LCS			19068.8403	100.3%
13	1.8578	1.3116		1	4.2947	18796.9980	0.0125	17207.9800	92.7605	202.5879	3120.8034	LCS	LCS			19068.8403	98.6%
14	1.9078	1.3469		1	4.3969	18804.8215	0.0161	17565.4640	93.7723	208.6766	3274.0988	LCS	LCS			19068.8403	98.6%
15	1.7404	1.2287		1	4.2299	18155.1915	0.0105	15913.7040	86.9227	205.9441	3031.4273	LCS	LCS			19068.8403	95.2%
16	3.2790	2.3150		1	6.4456	17993.0220	0.0096	15186.3080	87.1485	206.7751	2978.5698	LCS	LCS			19068.8403	94.4%
17	1.1742	0.8290		1	3.1181	22102.4212	0.0097	23228.4680	107.7706	205.6039	3663.6309	LCS	LCS			19068.8403	115.9%
18	4.7659	3.3647		1	8.2256	21357.2727	0.0064	21923.1220	104.7176	204.7106	3529.2538	LCS	LCS			19068.8403	112.0%
19	3.5049	2.4745		1	6.4752	19085.3581	0.0083	19298.6460	98.2421	195.9185	3175.8713	LCS	LCS			19068.8403	100.1%
20	2.4417	1.7239		1	5.0373	18877.7413	0.0106	18276.0520	95.5981	198.5624	3142.5580	LCS	LCS			19068.8403	99.5%
21	1.5541	1.0972		1	3.8271	19031.2795	0.0229	17855.7520	94.4894	201.5857	3246.8640	LCS	LCS			19068.8403	99.8%
22	1.3228	0.9339		1	3.5314	19005.1039	0.0101	17413.9780	93.3127	202.8361	3130.9880	LCS	LCS			19068.8403	99.7%
23	1.8458	1.3032		1	4.3607	17980.9622	0.0205	15750.0660	88.7440	203.4267	3055.0727	LCS	LCS			19068.8403	94.3%
24	#DIV/0!	#DIV/0!		4	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	LCS	LCS			#VALUE!	#VALUE!
25	1.2392	0.8707		1	3.2177	22166.7662	0.0075	23145.4240	107.5779	207.5384	3681.3672	LCS	LCS			19068.8403	116.2%
26	1.2787	0.9028		1	3.2981	21162.5419	0.0079	21827.8940	104.4713	203.7432	3511.0559	LCS	LCS			19068.8403	111.0%
27	1.0982	0.7753		1	3.1283	19491.8892	0.0094	19271.6000	98.1631	202.3658	3283.0522	LCS	LCS			19068.8403	102.2%
28	1.2983	0.9166		1	3.4298	19549.8839	0.0123	18903.9540	97.2227	202.8200	3273.6428	LCS	LCS			19068.8403	102.5%
29	1.2103	0.8545		1	3.5573	19052.0951	0.0167	16715.1460	91.4207	220.7948	3382.3141	LCS	LCS			19068.8403	99.9%
30	1.3579	0.9587		1	3.7990	19027.3656	0.0222	16441.5700	90.6697	222.9257	3437.7847	LCS	LCS			19068.8403	99.8%
31	1.2610	0.8903		1	3.7873	18715.4465	0.0204	15091.1740	86.8663	227.7738	3347.3410	LCS	LCS			19068.8403	98.1%
32	1.9816	1.3990		1	4.5403	17814.8379	0.0089	16053.9320	89.5963	203.9721	3015.7281	LCS	LCS			19068.8403	93.4%
33	1.4099	0.9954		1	3.4450	19233.0508	0.0089	22216.2180	105.3969	205.2690	3573.1240	LCS	LCS			19068.8403	100.9%
34	1.4506	1.0241		1	3.6388	21373.9875	0.0089	19445.8900	98.6078	199.3748	3242.2668	LCS	LCS			19068.8403	101.9%
35	1.7942	1.2667		1	4.0809	19435.0441	0.0077	18248.0740	95.5249	204.9934	3379.7375	LCS	LCS			19068.8403	102.4%
36	2.5084	1.7710		1	5.1843	19535.1800	0.0266	18349.0680	95.7862	206.5153	3264.6679	LCS	LCS			19068.8403	101.2%
37	1.7531	1.2377		1	4.1254	19305.5960	0.0093	17300.1600	93.0081	203.6251	3126.0406	LCS	LCS			19068.8403	98.9%
38	1.6698	1.1789		1	4.0333	18867.5874	0.0085	16481.6040	90.7600	206.0719	3087.7791	LCS	LCS			19068.8403	97.0%
39	1.2032	0.8495		1	3.4362	18488.2059	0.0084	16323.5920	90.3452	204.8683	3052.8554	LCS	LCS			19068.8403	95.7%
40	1.8300	1.2920		1	4.3194	18247.8878	0.0079	16323.5920	90.3452	204.8683	3052.8554	LCS	LCS			19068.8403	95.7%

### Gross Alpha/Beta Liquid

Filename : GAB.XLS  
 File type : Excel  
 Version # : 1.3.8

Alpha Spike S/N : N/A  
 Alpha Spike Exp Date : N/A  
 Alpha Spike Activity (dpm/ml): N/A  
 Alpha Spike Volume Added: N/A  
 Alpha Spike Nuclide: N/A

Beta Spike S/N : N/A  
 Beta Spike Exp Date : N/A  
 Beta Spike Activity (dpm/ml): N/A  
 Beta Spike Volume Added: N/A  
 Beta Spike Nuclide: N/A

Batch : 1082959  
 Analyst : NXL1  
 Prep Date : 8/29/2011

Beta LCS S/N : 1243-A  
 Beta LCS Exp Date : 9/27/2013  
 Beta LCS Activity (dpm/ml): 211664.13  
 Beta LCS Volume Added: 0.10  
 Beta LCS Nuclide: Sr-90

Alpha Method Uncertainty : 0.0829  
 Beta Method Uncertainty : 0.0821

Procedure Code : GFCGANBL  
 Parmname1 : Alpha  
 Parmname2 : Beta  
 Required Alpha MDA : 1 pCi/L  
 Required Beta MDA : 1 pCi/L

Geometry: 2 inch Planchett

Pos.	Sample Characteristics			Count Raw Data			Count Start Date/Time			
	Sample ID	Sample Aliquot L	Sample Residue Wt. (mg)	Sample Aliquot S/Dev. L	Sample Date/Time	Detector ID		Counting Time (min.)	Gross Counts Alpha	Gross Counts Beta
1	1202347886.1	1.0000	0	2.0399E-05	8/29/2011 0:00	11A	2	22226	45030	9/21/2013 12:36
2	1202347887.1	1.0000	10.4	2.0399E-05	8/29/2011 0:00	11B	2	19131	44735	9/21/2013 12:36
3	1202347888.1	1.0000	23.8	2.0399E-05	8/29/2011 0:00	11C	2	14862	40050	9/21/2013 12:36
4	1202347889.1	1.0000	44.2	2.0399E-05	8/29/2011 0:00	11D	2	13293	38227	9/21/2013 12:36
5	1202347890.1	1.0000	54.7	2.0399E-05	8/29/2011 0:00	12A	2	11196	37057	9/21/2013 12:37
6	1202347891.1	1.0000	73.9	2.0399E-05	8/29/2011 0:00	12B	2	8682	32807	9/21/2013 12:37
7	1202347892.1	1.0000	95.2	2.0399E-05	8/29/2011 0:00	12C	2	9544	33079	9/21/2013 12:37
8	1202347893.1	1.0000	103	2.0399E-05	8/29/2011 0:00	12D	2	8013	33682	9/21/2013 12:37
9	1202347894.1	1.0000	0	2.0399E-05	8/29/2011 0:00	13A	2	23967	46435	9/21/2013 12:41
10	1202347895.1	1.0000	10.4	2.0399E-05	8/29/2011 0:00	13B	2	19604	45723	9/21/2013 12:41
11	1202347896.1	1.0000	23.8	2.0399E-05	8/29/2011 0:00	13C	2	12572	38019	9/21/2013 12:41
12	1202347897.1	1.0000	44.2	2.0399E-05	8/29/2011 0:00	13D	2	13559	37385	9/21/2013 12:41
13	1202347898.1	1.0000	54.7	2.0399E-05	8/29/2011 0:00	14A	2	9770	36250	9/21/2013 12:41
14	1202347899.1	1.0000	73.9	2.0399E-05	8/29/2011 0:00	14B	2	10494	38059	9/21/2013 12:42
15	1202347900.1	1.0000	95.2	2.0399E-05	8/29/2011 0:00	14C	2	6702	34514	9/21/2013 12:42
16	1202347901.1	1.0000	103	2.0399E-05	8/29/2011 0:00	14D	2	6095	34591	9/21/2013 12:42

Analytical SOP: GL-RAD-A-001  
Instrument SOP: GL-RAD-I-016

Pos.	Calibration Data				Alpha				Beta				Weekly Background						
	Counted on	Calibration Date	Calibration Due Date	Calibration Used	Calibration Source Used	Detector Efficiency (cpm/dpm)	Det. Eff. Error (cpm/dpm)	X-Talk	Calibration Date	Calibration Due Date	Calibration Used	Detector Efficiency (cpm/dpm)	Det. Eff. Error (cpm/dpm)	X-Talk	Alpha	CPM	Beta	Count Start Date/Time	Count Time (min.)
1	PIC	10/1/2012	9/30/2016	Th230	Th230	0.2368	0.00683	0.16085	10/1/2012	9/30/2016	Sr90	0.4187	0.01317	0.00019	0.046	0.394	0.394	9/14/2013 18:38	500
2	PIC	10/1/2012	9/30/2016	Th230	Th230	0.2097	0.00743	0.12876	10/1/2012	9/30/2016	Sr90	0.4495	0.00697	0.00017	0.232	4.818	4.818	9/15/2013 12:45	500
3	PIC	10/1/2012	9/30/2016	Th230	Th230	0.1652	0.01271	0.14637	10/1/2012	9/30/2016	Sr90	0.4264	0.01068	0.00026	0.100	0.726	0.726	9/14/2013 18:38	500
4	PIC	10/1/2012	9/30/2016	Th230	Th230	0.1314	0.01128	0.11809	10/1/2012	9/30/2016	Sr90	0.4098	0.01964	0.00010	0.162	0.878	0.878	9/14/2013 18:38	500
5	PIC	10/1/2012	9/30/2016	Th230	Th230	0.1121	0.01685	0.17315	10/1/2012	9/30/2016	Sr90	0.3661	0.01114	0.00022	0.148	1.364	1.364	9/15/2013 12:45	500
6	PIC	10/1/2012	9/30/2016	Th230	Th230	0.0966	0.01035	0.26288	10/1/2012	9/30/2016	Sr90	0.3928	0.01666	0.00052	0.090	0.558	0.558	9/14/2013 18:38	500
7	PIC	10/1/2012	9/30/2016	Th230	Th230	0.1056	0.02199	0.10798	10/1/2012	9/30/2016	Sr90	0.3985	0.01845	0.00028	0.088	0.608	0.608	9/15/2013 12:45	500
8	PIC	10/1/2012	9/30/2016	Th230	Th230	0.0959	0.01863	0.21661	10/1/2012	9/30/2016	Sr90	0.4495	0.00714	0.00019	0.036	0.739	0.739	9/14/2013 18:38	1000
9	PIC	10/1/2012	9/30/2016	Th230	Th230	0.2495	0.00669	0.06675	10/1/2012	9/30/2016	Sr90	0.4521	0.00967	0.00017	0.058	2.305	2.305	9/15/2013 12:43	1000
10	PIC	10/1/2012	9/30/2016	Th230	Th230	0.2134	0.01043	0.10709	10/1/2012	9/30/2016	Sr90	0.4143	0.01708	0.00019	0.027	0.716	0.716	9/14/2013 18:38	1000
11	PIC	10/1/2012	9/30/2016	Th230	Th230	0.1472	0.02157	0.33699	10/1/2012	9/30/2016	Sr90	0.4194	0.01144	0.00023	0.038	1.204	1.204	9/14/2013 18:38	1000
12	PIC	10/1/2012	9/30/2016	Th230	Th230	0.1317	0.01236	0.10583	10/1/2012	9/30/2016	Sr90	0.4065	0.02119	0.00018	0.049	1.132	1.132	9/14/2013 18:38	1000
13	PIC	10/1/2012	9/30/2016	Th230	Th230	0.0966	0.02505	0.31630	10/1/2012	9/30/2016	Sr90	0.4153	0.01028	0.00021	0.013	0.937	0.937	9/14/2013 18:38	1000
14	PIC	10/1/2012	9/30/2016	Th230	Th230	0.1068	0.01557	0.25764	10/1/2012	9/30/2016	Sr90	0.3804	0.01828	0.00018	0.020	0.367	0.367	9/14/2013 18:38	1000
15	PIC	10/1/2012	9/30/2016	Th230	Th230	0.0776	0.02173	0.47864	10/1/2012	9/30/2016	Sr90	0.3890	0.00738	0.00019	0.011	0.568	0.568	9/14/2013 18:38	1000
16	PIC	10/1/2012	9/30/2016	Th230	Th230	0.0733	0.01512	0.47141	10/1/2012	9/30/2016	Sr90	0.3890	0.00738	0.00019	0.011	0.568	0.568	9/14/2013 18:38	1000



Notes:  
1 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date

Alpha Results		Critical Level		Required MDA		Sample Act. Conc.		Sample Act. Error		Net Count Rate		2 SIGMA Counting Uncertainty		2 SIGMA Total Prop. Uncertainty		Sample OC		Sample Type		RPD RER		Nominal pCi/L		Recovery	
Pos.	Level	pCi/L	Level	MDA	MDA	pCi/L	pCi/L	pCi/L	pCi/L	CPM	CPM	CPM	pCi/L	pCi/L	pCi/L	OC	Type	RPD	RER	pCi/L	pCi/L	Recovery	Recovery		
1	0.8734	0.4754	1	3.8038	21128.0983	0.0096	11112.9540	74.5419	277.8777	3457.4549	LCS	20916.1917	101.0%												
2	1.7080	1.2059	1	5.6338	20536.3825	0.0104	9565.2680	69.1574	291.1635	3364.4971	LCS	20916.1917	98.2%												
3	1.4236	1.0051	1	6.1006	20249.6193	0.0151	7430.9000	60.9549	325.7960	3346.9018	LCS	20916.1917	96.8%												
4	2.2781	1.6083	1	8.3594	22776.6934	0.0142	6646.3380	57.6478	387.3829	3756.6554	LCS	20916.1917	108.9%												
5	2.2210	1.5680	1	9.1660	22496.1642	0.0163	5597.8880	52.9056	416.8498	3754.4023	LCS	20916.1917	107.5%												
6	2.9602	2.0900	1	11.1716	20216.6245	0.0149	4340.8520	48.5886	425.6224	3340.2991	LCS	20916.1917	96.7%												
7	2.1120	1.4911	1	9.3790	20312.9991	0.0243	4771.9100	48.8467	408.2851	3445.2254	LCS	20916.1917	97.1%												
8	2.3013	1.6248	1	10.2984	18804.6384	0.0217	4006.4120	44.7577	412.2414	3162.4201	LCS	20916.1917	89.9%												
9	0.5650	0.3989	1	3.5064	21631.0817	0.0093	11983.4640	77.4064	273.9598	3538.0469	LCS	20916.1917	103.4%												
10	0.8383	0.5918	1	4.3494	20678.9894	0.0126	9801.9420	70.0071	289.5934	3400.1854	LCS	20916.1917	98.9%												
11	0.8293	0.5855	1	5.7613	19225.3094	0.0233	6285.9730	56.0625	336.2612	3247.1050	LCS	20916.1917	91.9%												
12	1.0992	0.7761	1	6.6809	23165.5175	0.0151	6779.4620	58.2216	390.1772	3827.9848	LCS	20916.1917	110.8%												
13	1.7017	1.2014	1	9.3951	22755.2861	0.0270	4884.9510	49.4217	451.5395	3891.4810	LCS	20916.1917	108.8%												
14	0.7929	0.5598	1	7.4443	22107.3336	0.0184	5246.9870	51.2201	423.2994	3682.0340	LCS	20916.1917	105.7%												
15	1.3540	0.9560	1	10.6201	19436.1733	0.0249	3350.9800	40.9329	465.7635	3300.8220	LCS	20916.1917	92.9%												
16	1.0624	0.7501	1	10.7136	18698.7445	0.0198	3047.4890	39.0352	469.9416	3127.1766	LCS	20916.1917	89.4%												

Notes:  
1 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date

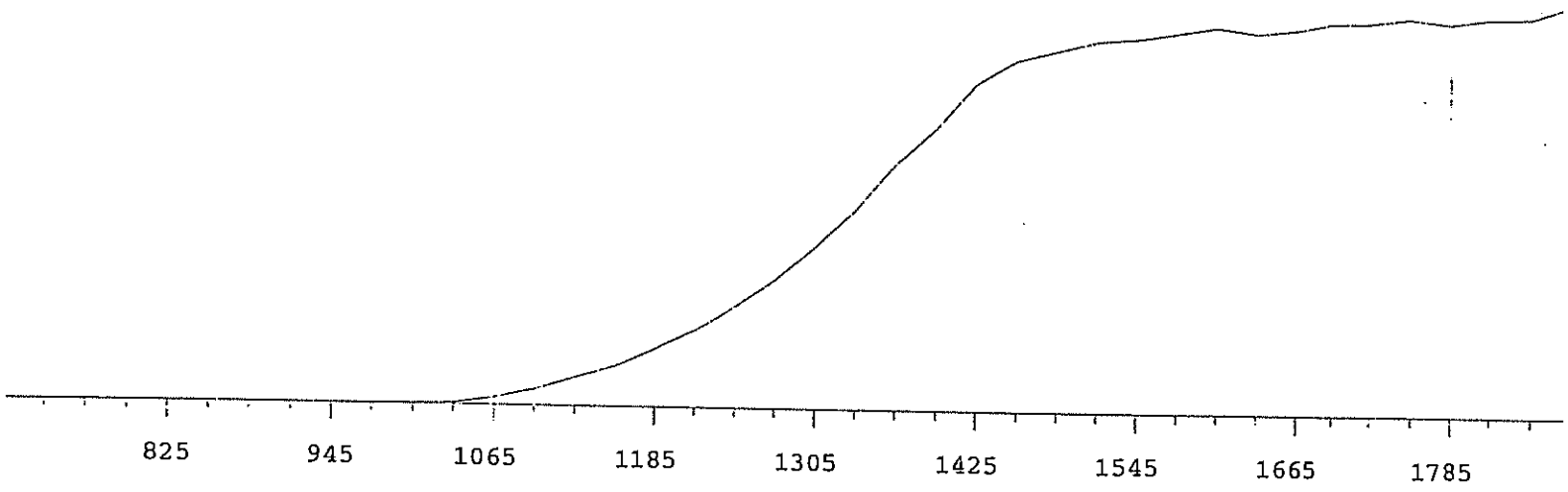
Beta Results		Critical Level		Required MDA		Sample Act. Conc.		Sample Act. Error		Net Count Rate		Net Count Rate Error		2 SIGMA Counting Uncertainty		2 SIGMA Total Prop. Uncertainty		Sample QC		Sample Type		Nominal pCi/L		Recovery	
Pos.	Decision Level pCi/L	pCi/L	MDA pCi/L	MDA pCi/L	MDA pCi/L	Conc. pCi/L	pCi/L	Rate CPM	Rate Error CPM	Rate CPM	Rate Error CPM	Rate CPM	Rate Error CPM	pCi/L	pCi/L	QC	Type	RPD	RER	pCi/L	pCi/L	Recovery	Recovery		
1	1.1148	0.7871	1	3.1879	22299.3585	0.0140	22514.6050	106.1014	223.7331	3953.9493	3625.2680	LCS	19068.8403	116.9%											
2	3.6315	2.5699	1	6.6310	21177.0295	0.0084	22362.6820	105.7533	207.7272	3625.2680	3328.7701	LCS	19068.8403	111.1%											
3	1.4333	1.0119	1	3.5522	19295.1891	0.0137	20024.2740	100.0625	199.8363	3328.7701	3282.3805	LCS	19068.8403	101.2%											
4	1.6340	1.1536	1	3.8917	19360.1055	0.0118	19112.6220	97.7586	202.3998	3282.3805	3375.8867	LCS	19068.8403	101.2%											
5	1.5525	1.0961	1	3.8409	19299.5014	0.0203	18527.7680	96.2510	207.3582	3375.8867	3284.4795	LCS	19068.8403	98.5%											
6	2.3722	1.6748	1	5.1952	18776.8098	0.0124	16402.1360	90.5635	218.3984	3284.4795	3121.2365	LCS	19068.8403	96.4%											
7	1.4143	0.9985	1	3.7174	18377.4944	0.0175	16538.9420	90.9382	204.4218	3121.2365	3146.4989	LCS	19068.8403	94.7%											
8	1.4552	1.0274	1	3.7506	18057.0157	0.0192	16840.3920	91.7633	203.3278	3146.4989	3763.9379	LCS	19068.8403	117.8%											
9	1.4207	1.0031	1	3.5093	22464.2003	0.0085	23216.7610	107.7439	211.6245	3763.9379	3696.2229	LCS	19068.8403	114.0%											
10	2.4947	1.7613	1	5.0171	21729.8976	0.0107	22859.1950	106.9147	208.7882	3696.2229	3402.9896	LCS	19068.8403	96.3%											
11	1.5171	1.0711	1	3.7730	18362.6387	0.0178	19008.7840	97.4923	207.7396	3402.9896	3267.8929	LCS	19068.8403	101.2%											
12	1.9436	1.3722	1	4.3554	19304.1451	0.0126	18691.2960	96.6760	203.5098	3267.8929	3528.2444	LCS	19068.8403	102.1%											
13	1.9444	1.3728	1	4.4077	19468.5152	0.0218	19123.8660	97.7880	212.3871	3528.2444	3353.2782	LCS	19068.8403	100.5%											
14	1.7314	1.2224	1	4.0716	19171.4059	0.0115	19028.5630	97.5436	207.3517	3353.2782	3375.3132	LCS	19068.8403	97.2%											
15	1.1830	0.8352	1	3.4464	18533.3336	0.0191	17256.6330	92.8897	215.5696	3375.3132	3242.6499	LCS	19068.8403	96.3%											
16	1.4393	1.0162	1	3.7694	18364.0364	0.0091	17294.9320	92.9933	211.0663	3242.6499		LCS													

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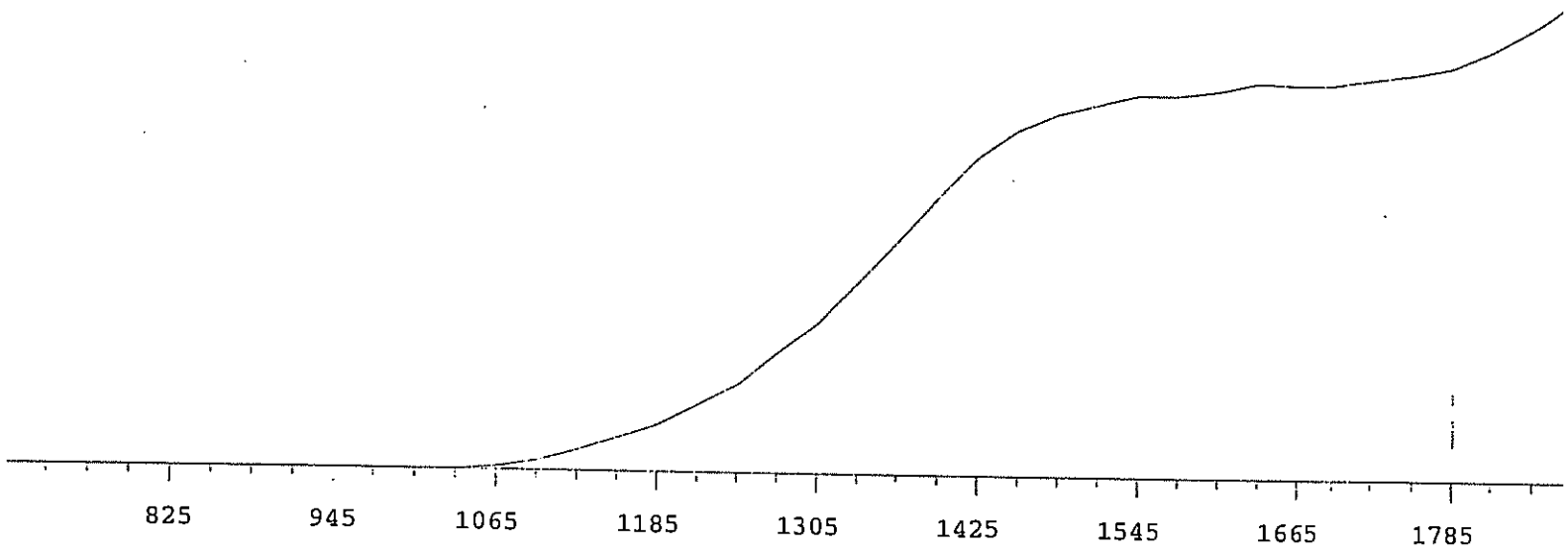
SampleID	Instr	Time (min.)	Alpha Counts	Beta Counts	Count Start Time	Count End Time	Machine	Batch ID
V1	1A	2	23592	45806	9/21/2013 13:21	9/21/2013 13:23	PIC	GABV13
V2	1B	2	18833	43797	9/21/2013 13:21	9/21/2013 13:23	PIC	GABV13
V3	1C	2	16796	38423	9/21/2013 13:21	9/21/2013 13:23	PIC	GABV13
V4	1D	2	14234	36643	9/21/2013 13:21	9/21/2013 13:23	PIC	GABV13
V5	2A	2	10703	34673	9/21/2013 13:21	9/21/2013 13:23	PIC	GABV13
V6	2B	2	8760	32873	9/21/2013 13:21	9/21/2013 13:23	PIC	GABV13
V7	2C	2	8406	30884	9/21/2013 13:21	9/21/2013 13:23	PIC	GABV13
V8	2D	2	6292	29301	9/21/2013 13:22	9/21/2013 13:24	PIC	GABV13
V1	3A	2	24216	42765	9/21/2013 13:31	9/21/2013 13:33	PIC	GABV13
V2	3B	2	20218	42262	9/21/2013 13:32	9/21/2013 13:34	PIC	GABV13
V3	3C	2	15320	37512	9/21/2013 13:32	9/21/2013 13:34	PIC	GABV13
V4	3D	2	14003	36197	9/21/2013 13:32	9/21/2013 13:34	PIC	GABV13
V5	4A	2	12330	34418	9/21/2013 13:32	9/21/2013 13:34	PIC	GABV13
V6	4B	2	9452	35173	9/21/2013 13:32	9/21/2013 13:34	PIC	GABV13
V7	4C	2	8857	31629	9/21/2013 13:32	9/21/2013 13:34	PIC	GABV13
V8	4D	2	8154	30378	9/21/2013 13:32	9/21/2013 13:34	PIC	GABV13
V1	5A	2	25440	46458	9/21/2013 12:08	9/21/2013 12:10	PIC	GABV13
V2	5B	2	19808	43863	9/21/2013 12:08	9/21/2013 12:10	PIC	GABV13
V3	5C	2	15610	38606	9/21/2013 12:08	9/21/2013 12:10	PIC	GABV13
V4	5D	2	14638	36556	9/21/2013 12:08	9/21/2013 12:10	PIC	GABV13
V5	6A	2	13248	35713	9/21/2013 12:10	9/21/2013 12:12	PIC	GABV13
V6	6B	2	11775	34829	9/21/2013 12:10	9/21/2013 12:12	PIC	GABV13
V7	6C	2	9876	31502	9/21/2013 12:11	9/21/2013 12:13	PIC	GABV13
V1	7A	2	24570	46292	9/21/2013 12:15	9/21/2013 12:17	PIC	GABV13
V2	7B	2	19830	43657	9/21/2013 12:15	9/21/2013 12:17	PIC	GABV13
V3	7C	2	14850	38544	9/21/2013 12:15	9/21/2013 12:17	PIC	GABV13
V4	7D	2	13473	37809	9/21/2013 12:15	9/21/2013 12:17	PIC	GABV13
V5	8A	2	9411	33431	9/21/2013 12:15	9/21/2013 12:17	PIC	GABV13
V6	8B	2	8626	32884	9/21/2013 12:16	9/21/2013 12:18	PIC	GABV13
V7	8C	2	6894	30183	9/21/2013 12:16	9/21/2013 12:18	PIC	GABV13
V8	8D	2	8200	32110	9/21/2013 12:16	9/21/2013 12:18	PIC	GABV13
V1	9A	2	23921	47306	9/21/2013 12:20	9/21/2013 12:22	PIC	GABV13
V2	9B	2	19296	44434	9/21/2013 12:20	9/21/2013 12:22	PIC	GABV13
V3	9C	2	14435	38894	9/21/2013 12:20	9/21/2013 12:22	PIC	GABV13
V4	9D	2	12908	36500	9/21/2013 12:21	9/21/2013 12:23	PIC	GABV13
V5	10A	2	10944	36700	9/21/2013 12:21	9/21/2013 12:23	PIC	GABV13

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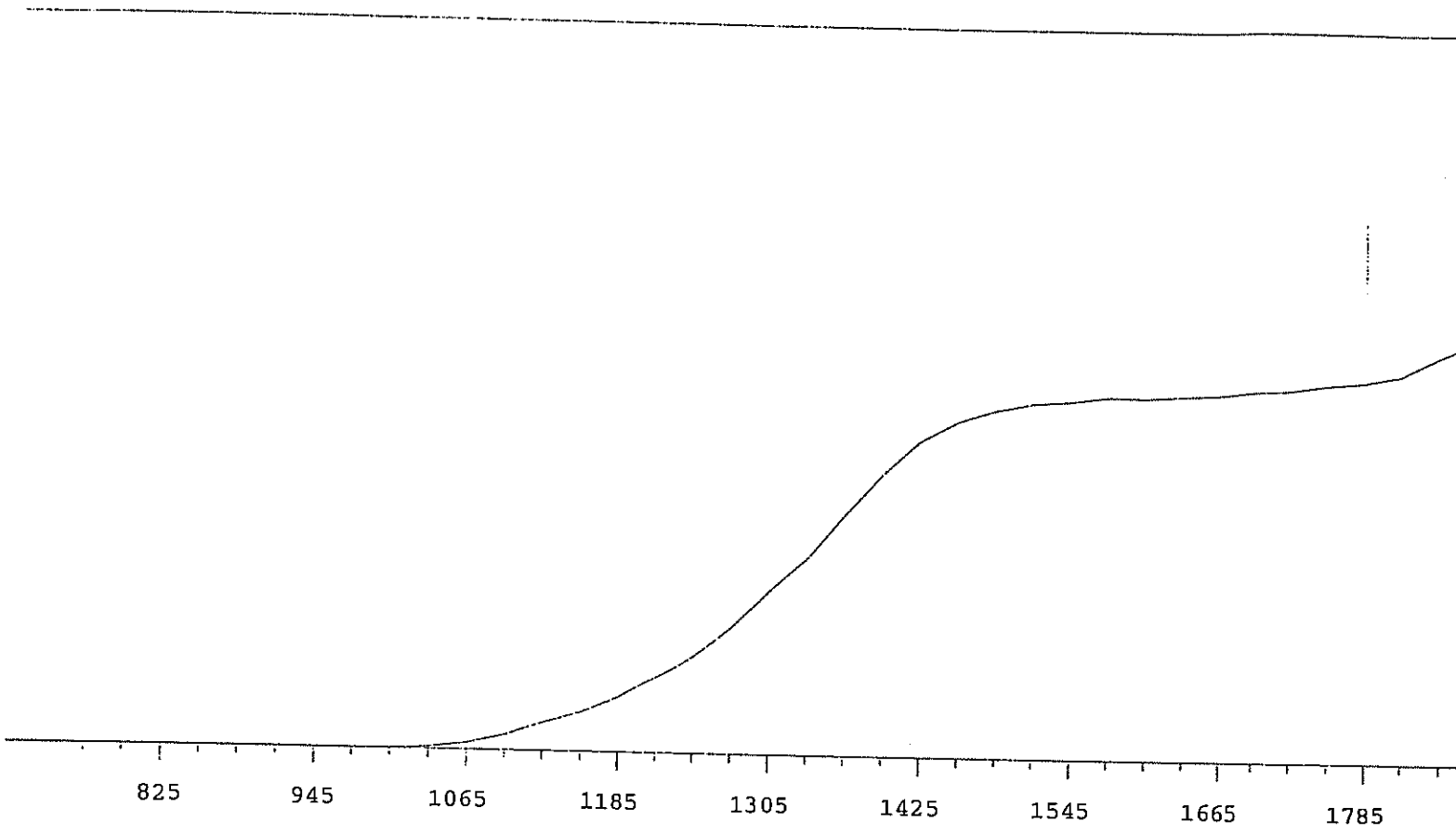
V6	10B	2	10676	34602	9/21/2013 12:21	9/21/2013 12:23	PIC	GABV13
V7	10C	2	8798	32964	9/21/2013 12:21	9/21/2013 12:23	PIC	GABV13
V8	10D	2	7450	32649	9/21/2013 12:21	9/21/2013 12:23	PIC	GABV13
V1	11A	2	22226	45030	9/21/2013 12:36	9/21/2013 12:38	PIC	GABV13
V2	11B	2	19131	44735	9/21/2013 12:36	9/21/2013 12:38	PIC	GABV13
V3	11C	2	14862	40050	9/21/2013 12:36	9/21/2013 12:38	PIC	GABV13
V4	11D	2	13293	38227	9/21/2013 12:36	9/21/2013 12:38	PIC	GABV13
V5	12A	2	11196	37057	9/21/2013 12:37	9/21/2013 12:39	PIC	GABV13
V6	12B	2	8682	32807	9/21/2013 12:37	9/21/2013 12:39	PIC	GABV13
V7	12C	2	9544	33079	9/21/2013 12:37	9/21/2013 12:39	PIC	GABV13
V8	12D	2	8013	33682	9/21/2013 12:37	9/21/2013 12:39	PIC	GABV13
V1	13A	2	23967	46435	9/21/2013 12:41	9/21/2013 12:43	PIC	GABV13
V2	13B	2	19604	45723	9/21/2013 12:41	9/21/2013 12:43	PIC	GABV13
V3	13C	2	12572	38019	9/21/2013 12:41	9/21/2013 12:43	PIC	GABV13
V4	13D	2	13559	37385	9/21/2013 12:41	9/21/2013 12:43	PIC	GABV13
V5	14A	2	9770	38250	9/21/2013 12:41	9/21/2013 12:43	PIC	GABV13
V6	14B	2	10494	38059	9/21/2013 12:42	9/21/2013 12:44	PIC	GABV13
V7	14C	2	6702	34514	9/21/2013 12:42	9/21/2013 12:44	PIC	GABV13
V8	14D	2	6095	34591	9/21/2013 12:42	9/21/2013 12:44	PIC	GABV13



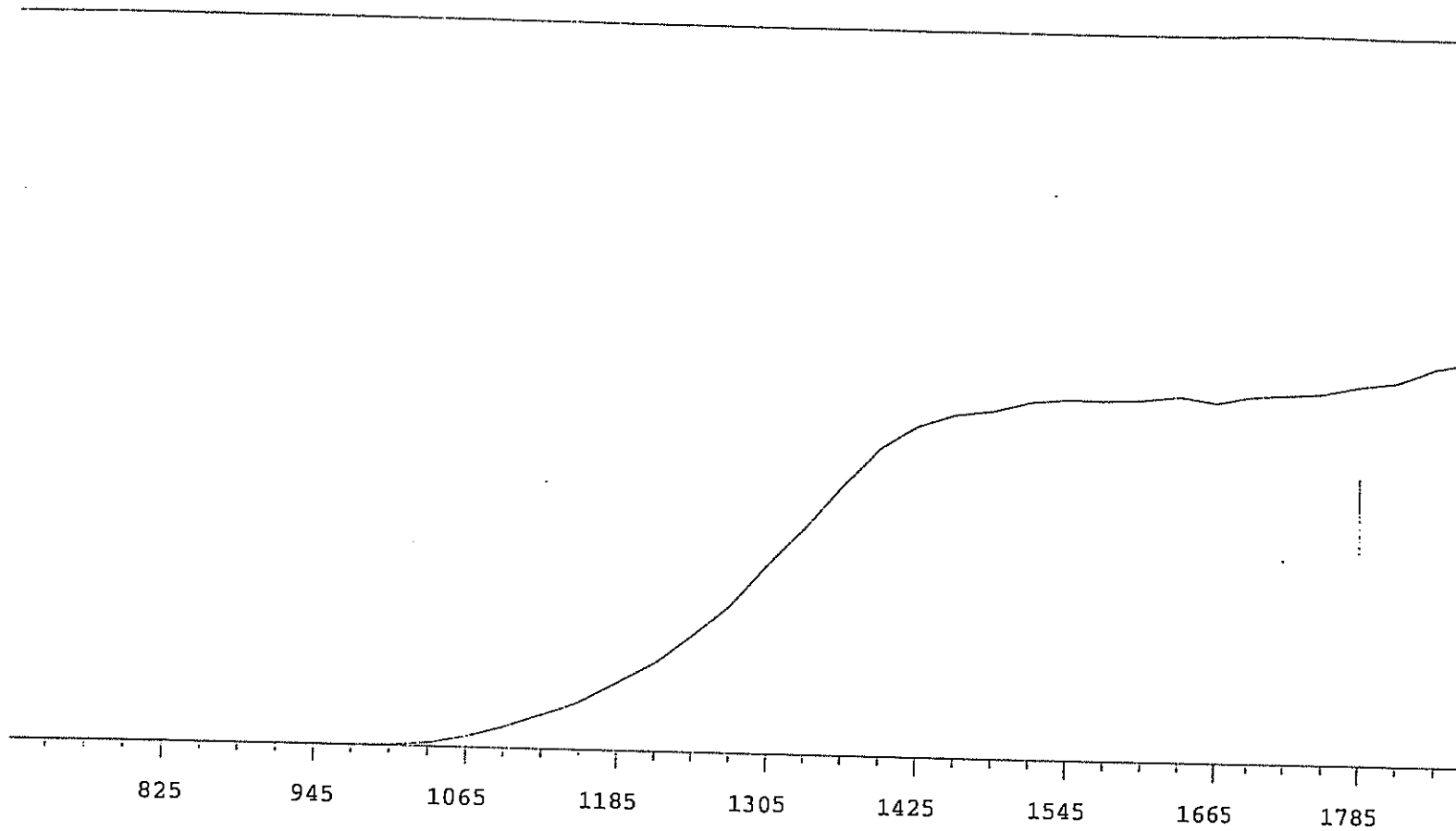
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	11640	+69.78
735	1		1335	14241	+62.88
765	0		1365	17534	+55.91
795	0	+0.00	1395	20127	+45.04
825	0	>100	1425	23254	+31.29
855	1	>100	1455	24902	+20.41
885	0	+55.56	1485	25605	+10.49
915	2	+66.67	1515	26310	+6.44
945	0	>100	1545	26535	+5.31
975	2	>100	1575	26953	+2.79
1005	42	>100	1605	27399	+1.83
1035	145	>100	1635	27000	+1.71
1065	544	>100	1665	27255	+1.62
1095	1136	>100	1695	27723	+3.14
1125	1967	>100	1725	27705	+1.56
1155	2845	>100	1755	28072	+1.15
1185	4078	>100	1785	27729	+1.43
1215	5483	+93.18	1815	28194	+3.24
1245	7400	+83.35	1845	28243	
1275	9328	+75.40	1875	29191	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	13188	+75.92
735	0		1335	16818	+67.60
765	0	+55.56	1365	20420	+59.86
795	1	+83.33	1395	24341	+47.85
825	1	+55.56	1425	27854	+35.51
855	0	>100	1455	30288	+23.26
885	1	+0.00	1485	31798	+14.54
915	0	+0.00	1515	32622	+8.32
945	1	>100	1545	33496	+5.11
975	0	>100	1575	33475	+4.43
1005	4	>100	1605	33903	+3.09
1035	56	>100	1635	34654	+2.46
1065	292	>100	1665	34485	+1.74
1095	890	>100	1695	34445	+1.84
1125	1841	>100	1725	34908	+3.91
1155	2936	>100	1755	35401	+6.80
1185	4179	>100	1785	36062	+10.27
1215	5837	>100	1815	37505	+14.30
1245	7821	+91.28	1845	39508	
1275	10638	+83.88	1875	41843	

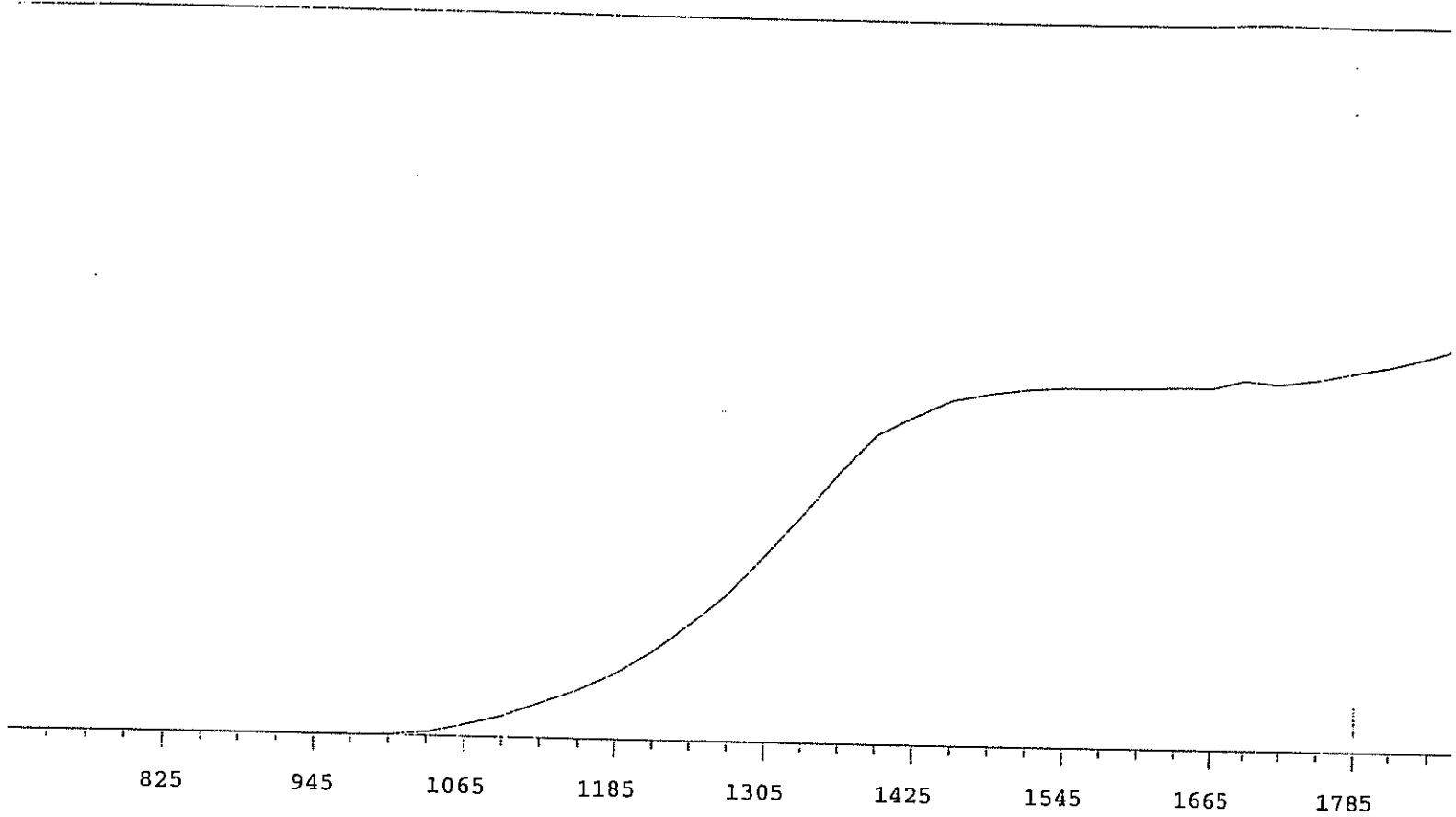


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	14817	+71.06
735	0		1335	17823	+63.34
765	1	+0.00	1365	21704	+53.63
795	0	>100	1395	25422	+42.55
825	1	-55.56	1425	28424	+29.21
855	1	+55.56	1455	30244	+18.11
885	0	>100	1485	31305	+10.10
915	1	>100	1515	31989	+6.07
945	0	>100	1545	32223	+3.43
975	4	>100	1575	32671	+2.15
1005	32	>100	1605	32621	+1.68
1035	206	>100	1635	32837	+1.52
1065	639	>100	1665	32961	+2.01
1095	1416	>100	1695	33249	+2.64
1125	2551	>100	1725	33409	+3.21
1155	3619	>100	1755	33931	+4.07
1185	5037	+98.68	1785	34234	+7.20
1215	6875	+91.19	1815	34909	+10.28
1245	8915	+85.53	1845	36660	
1275	11519	+77.28	1875	38205	

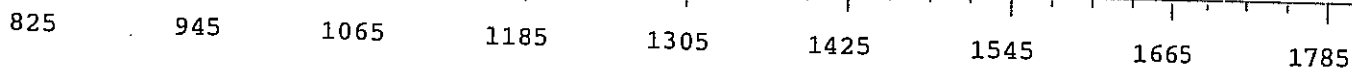


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	15202	+66.36
735	1		1335	18216	+57.86
765	0	+0.00	1365	21597	+45.58
795	1	+0.00	1395	24648	+32.96
825	0	+0.00	1425	26505	+19.92
855	1	>100	1455	27475	+11.42
885	0	>100	1485	27836	+7.08
915	0	>100	1515	28609	+4.51
945	0	>100	1545	28896	+2.93
975	8	>100	1575	28862	+1.66
1005	75	>100	1605	28969	+0.36
1035	303	>100	1635	29292	+0.80
1065	872	>100	1665	28836	+1.06
1095	1656	>100	1695	29279	+1.48
1125	2729	>100	1725	29439	+3.59
1155	3862	>100	1755	29642	+4.07
1185	5425	+98.19	1785	30243	+6.51
1215	7256	+88.82	1815	30699	+7.79
1245	9510	+81.89	1845	31876	
1275	11944	+74.07	1875	32444	





VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19017	+67.45
735	1		1335	23157	+59.23
765	0	+83.33	1365	27625	+45.78
795	0	-83.33	1395	31465	+32.72
825	1	>100	1425	33352	+20.41
855	0	>100	1455	35084	+11.74
885	1	+100.00	1485	35819	+7.11
915	1	>100	1515	36292	+3.35
945	2	>100	1545	36527	+1.63
975	12	>100	1575	36540	+0.87
1005	91	>100	1605	36585	+0.48
1035	421	>100	1635	36742	+1.76
1065	1239	>100	1665	36691	+1.53
1095	2155	>100	1695	37461	+1.89
1125	3527	>100	1725	37073	+3.07
1155	4974	>100	1755	37603	+4.02
1185	6647	+97.44	1785	38346	+6.58
1215	9250	+89.00	1815	39111	+7.95
1245	12041	+82.15	1845	40115	
1275	15094	+73.81	1875	41409	

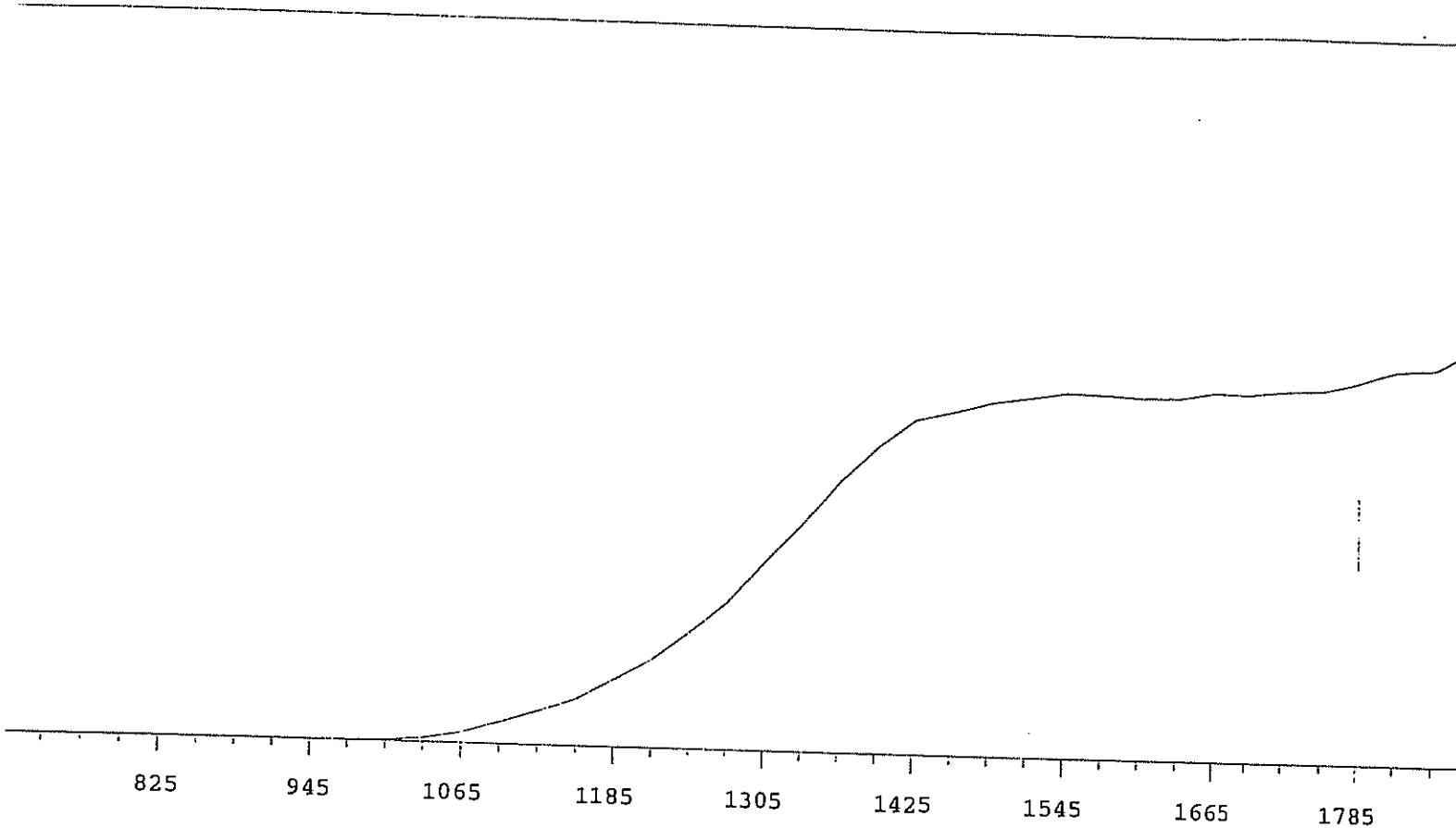


VOLTS	COUNTS	%/100 Volts
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VOLTS	COUNTS	%/100 Volts
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705	0	
735	1	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	1	>100
975	2	>100
1005	3	>100
1035	14	>100
1065	127	>100
1095	500	>100
1125	1332	>100
1155	2373	>100
1185	3614	>100
1215	5227	>100
1245	7060	+97.33
1275	9574	+90.30

1305	12541	+83.18
1335	16192	+74.48
1365	20083	+67.17
1395	24273	+58.43
1425	29090	+46.86
1455	33223	+34.56
1485	35608	+22.67
1515	37581	+13.63
1545	38762	+8.18
1575	39185	+4.42
1605	39484	+3.06
1635	39806	+2.61
1665	40264	+2.03
1695	40353	+2.32
1725	40431	+3.28
1755	41127	+7.09
1785	41882	+12.40
1815	44049	+18.52
1845	46950	
1875	51097	

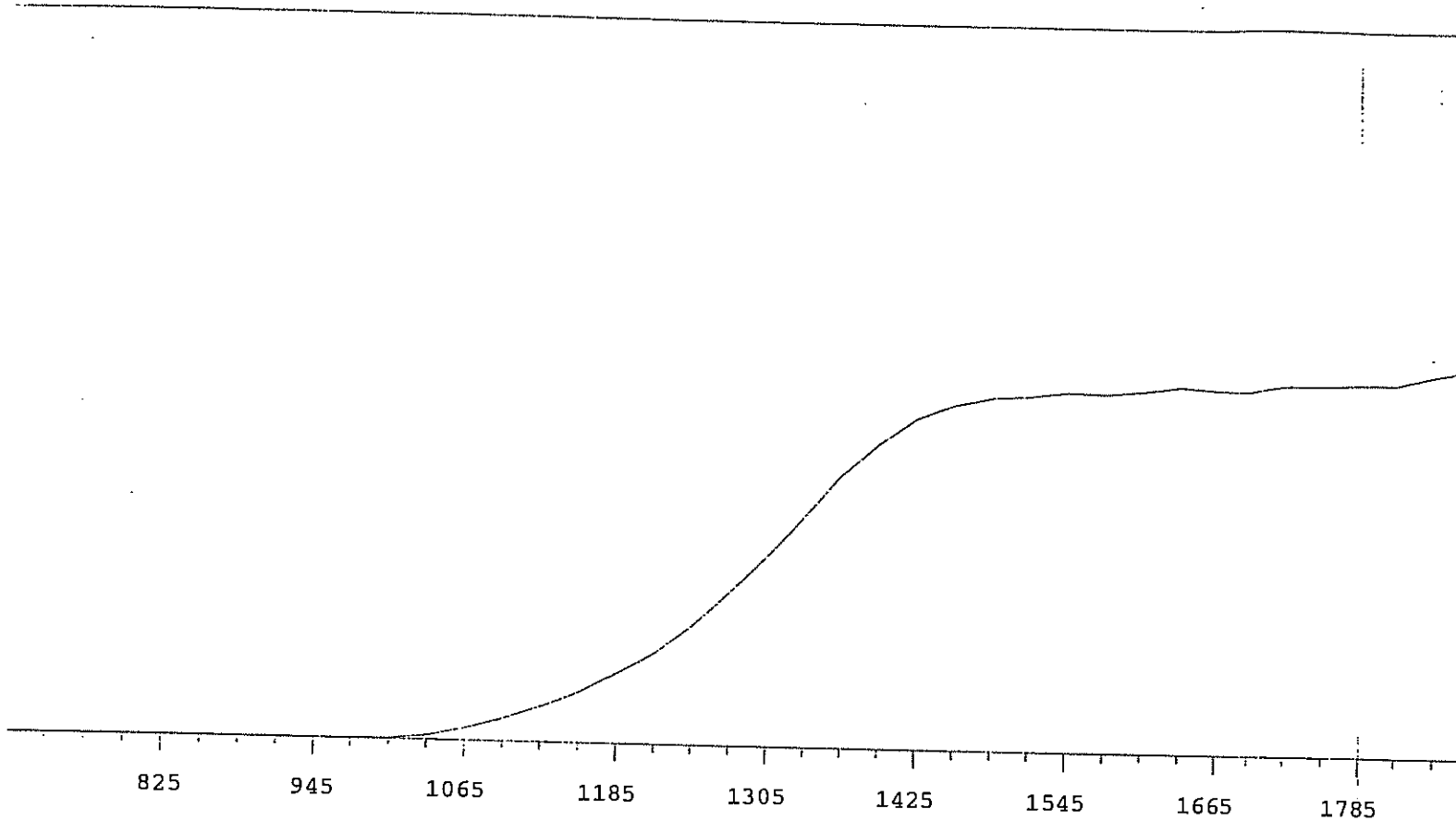


VOLTS	COUNTS	%/100 Volts
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705	1	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	1	>100
945	0	>100
975	17	>100
1005	87	>100
1035	438	>100
1065	1055	>100
1095	2114	>100
1125	3282	>100
1155	4625	>100
1185	6554	+97.66
1215	8743	+88.09
1245	11345	+81.31
1275	14261	+74.60

VOLTS	COUNTS	%/100 Volts
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1305	18216	+67.74
1335	21995	+58.11
1365	26173	+46.11
1395	29479	+32.75
1425	32186	+20.62
1455	33022	+12.13
1485	33981	+7.22
1515	34520	+4.95
1545	35095	+2.07
1575	35014	+0.38
1605	34812	+0.55
1635	34859	+1.11
1665	35460	+1.94
1695	35273	+1.95
1725	35629	+2.73
1755	35811	+5.77
1785	36656	+6.44
1815	37896	+9.21
1845	38145	
1875	40283	

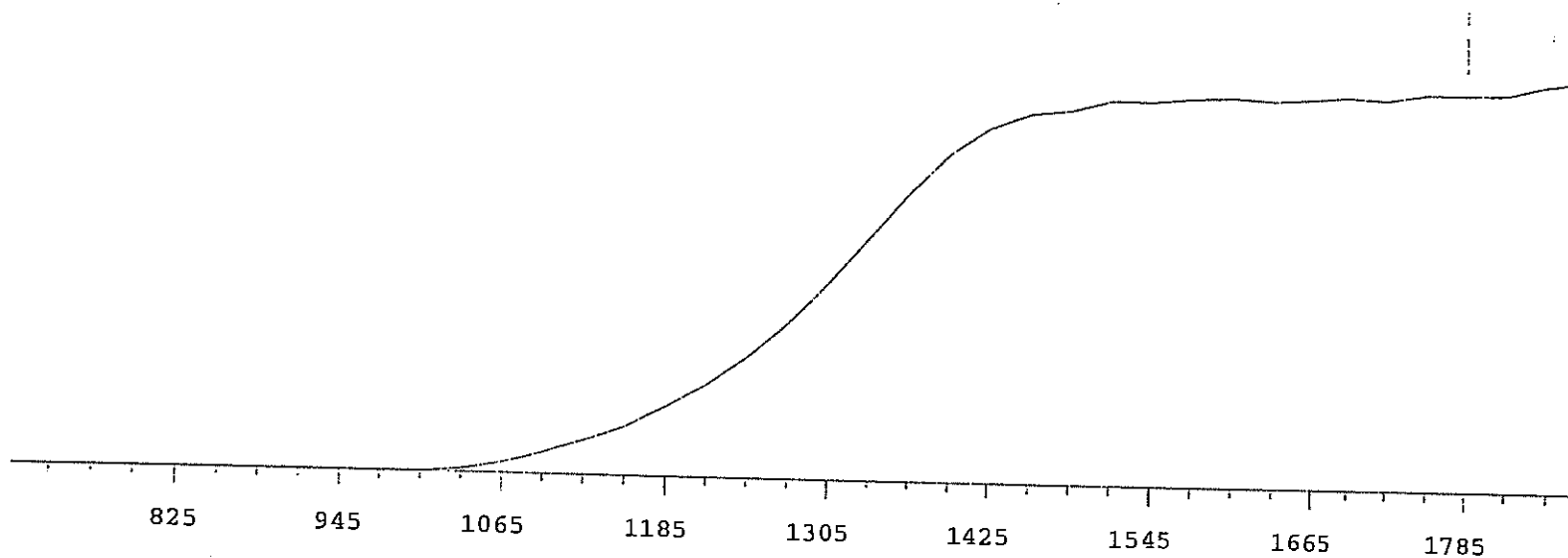


VOLTS	COUNTS	%/100 Volts
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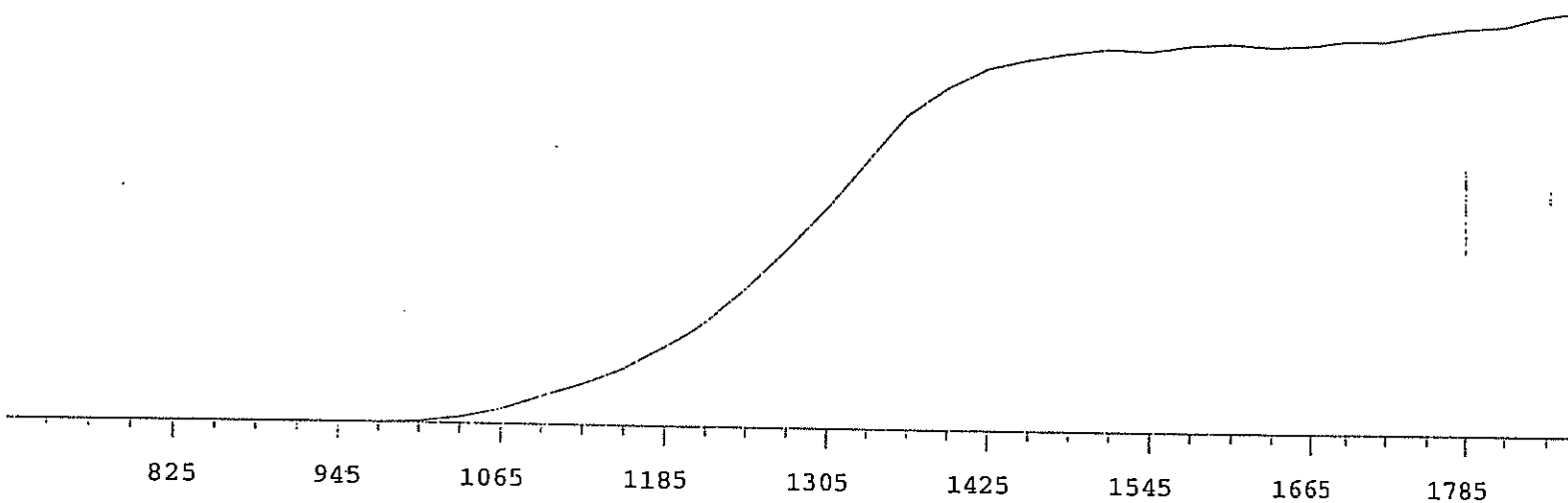
VOLTS	COUNTS	%/100 Volts
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705	1	
735	0	
765	0	+83.33
795	2	+55.56
825	1	>100
855	0	>100
885	0	>100
915	0	>100
945	2	>100
975	9	>100
1005	89	>100
1035	439	>100
1065	1198	>100
1095	2164	>100
1125	3436	>100
1155	4917	>100
1185	6762	+96.59
1215	9006	+89.14
1245	11800	+81.34
1275	15132	+73.59

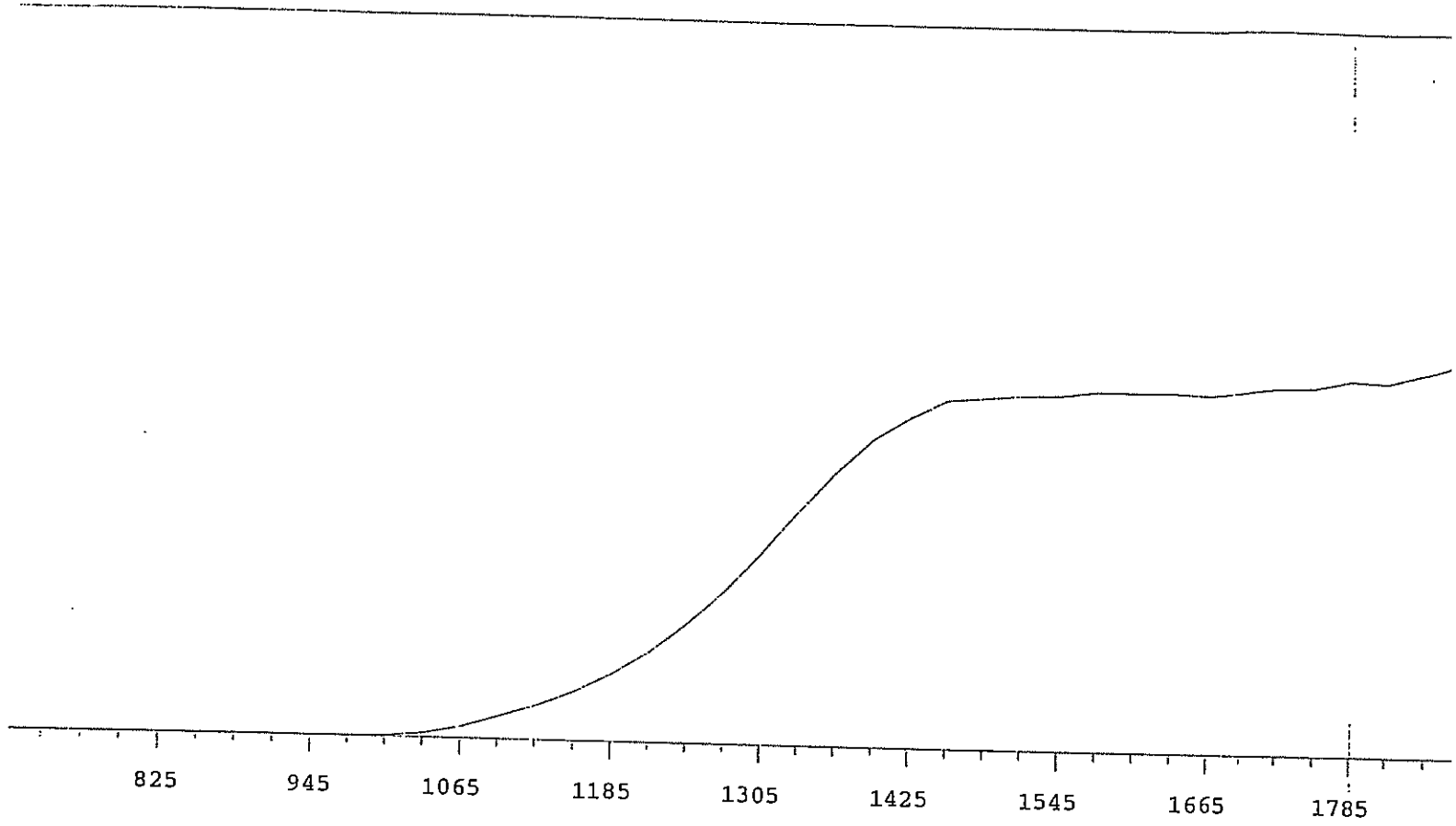
1305	18675	+65.94
1335	22620	+55.69
1365	26869	+44.63
1395	29957	+32.08
1425	32494	+20.49
1455	33836	+11.98
1485	34627	+6.45
1515	34849	+3.22
1545	35298	+1.98
1575	35180	+2.37
1605	35503	+1.57
1635	36006	+0.99
1665	35722	+0.89
1695	35597	+0.93
1725	36188	+1.86
1755	36272	+1.90
1785	36389	+2.55
1815	36529	+4.39
1845	37459	
1875	38170	



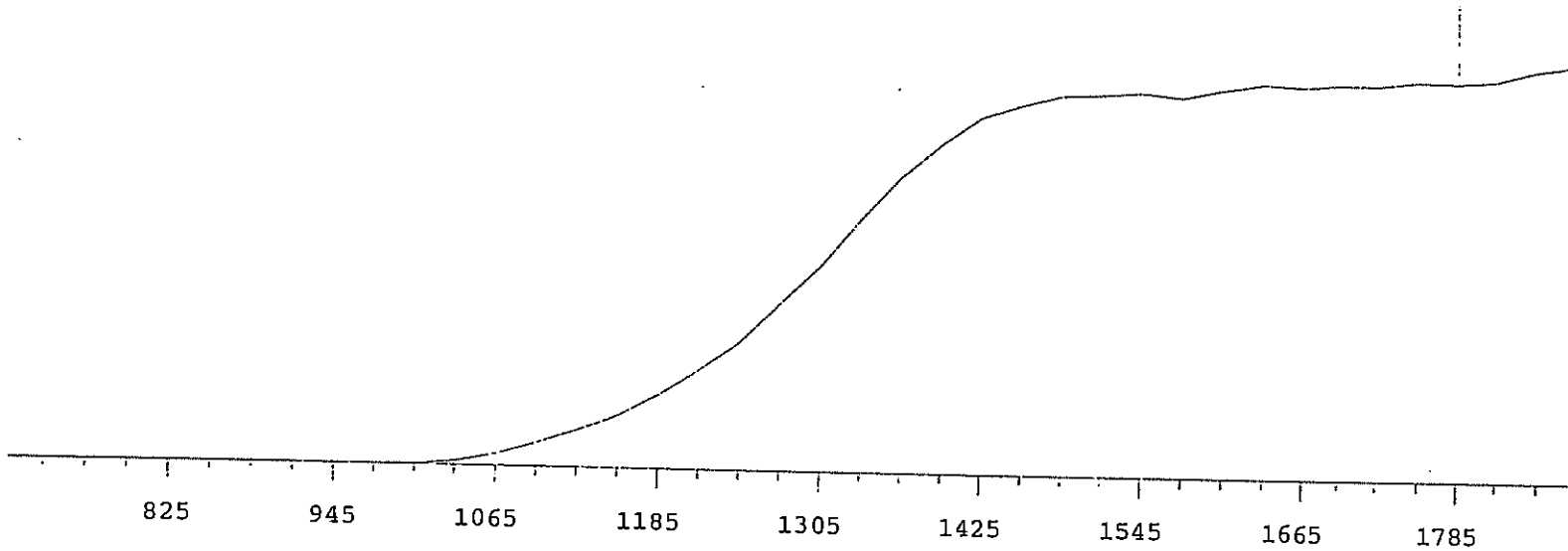
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	16654	+68.57
735	0		1335	20416	+59.26
765	0	+55.56	1365	24191	+47.28
795	1	>100	1395	27643	+34.04
825	1	+0.00	1425	29891	+21.08
855	1	>100	1455	31183	+12.30
885	0	>100	1485	31558	+6.67
915	0	>100	1515	32444	+4.05
945	0	>100	1545	32413	+2.90
975	9	>100	1575	32704	+0.81
1005	53	>100	1605	32837	+0.71
1035	302	>100	1635	32629	+0.49
1065	878	>100	1665	32797	+0.16
1095	1805	>100	1695	32964	+1.32
1125	2887	>100	1725	32746	+1.40
1155	4163	>100	1755	33308	+1.56
1185	5842	+99.81	1785	33318	+3.21
1215	7959	+90.90	1815	33456	+3.92
1245	10323	+83.03	1845	34283	
1275	13250	+75.91	1875	34815	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	19810	+64.73
735	1		1335	23962	+52.62
765	0	-55.56	1365	28091	+39.27
795	0	>100	1395	30594	+25.61
825	1	>100	1425	32381	+14.86
855	3	+33.33	1455	33206	+8.91
885	0	+0.00	1485	33832	+4.41
915	1	>100	1515	34260	+3.01
945	2	>100	1545	34071	+2.33
975	29	>100	1575	34623	+1.34
1005	165	>100	1605	34848	+1.22
1035	613	>100	1635	34564	+0.89
1065	1394	>100	1665	34733	+1.01
1095	2558	>100	1695	35144	+2.76
1125	3702	>100	1725	35084	+3.66
1155	5222	>100	1755	35839	+3.97
1185	7161	+96.06	1785	36332	+5.39
1215	9507	+89.18	1815	36654	+5.35
1245	12552	+81.52	1845	37609	
1275	16030	+73.64	1875	38164	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	21412	+66.80
735	1		1335	26262	+56.32
765	1		1365	30679	+43.71
795	0	>100	1395	34466	+31.61
825	0	+0.00	1425	36949	+20.14
855	0	>100	1455	38998	+11.16
885	1	>100	1485	39313	+5.34
915	1	>100	1515	39625	+2.44
945	1	>100	1545	39751	+2.04
975	17	>100	1575	40227	+1.45
1005	122	>100	1605	40228	+0.56
1035	533	>100	1635	40255	+0.13
1065	1287	>100	1665	40075	+1.22
1095	2493	>100	1695	40384	+1.95
1125	3753	>100	1725	40900	+3.50
1155	5482	>100	1755	41028	+3.05
1185	7538	+99.39	1785	41899	+3.71
1215	10305	+90.31	1815	41767	+5.64
1245	13415	+82.57	1845	42852	
1275	17141	+75.13	1875	44132	



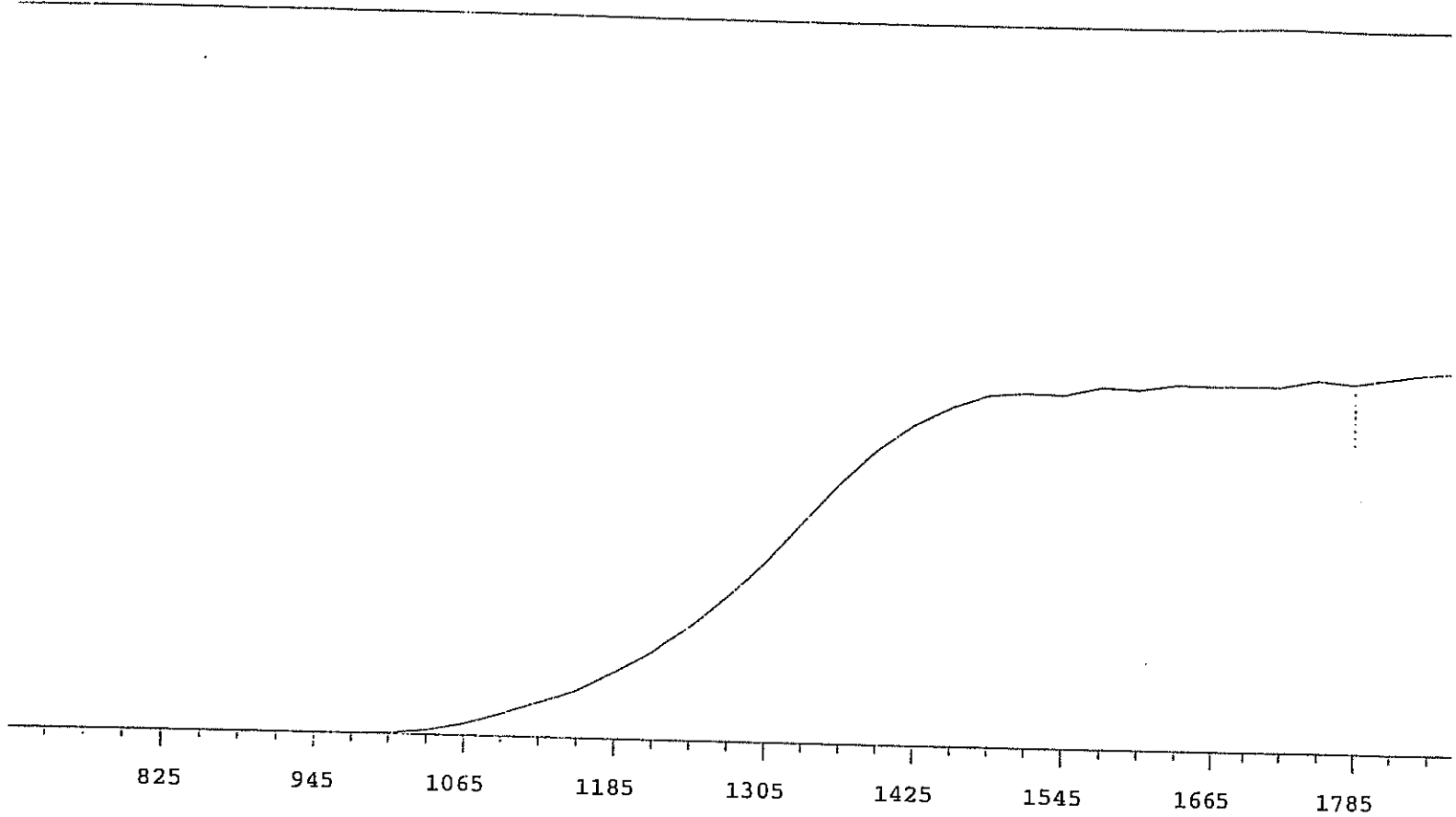
VOLTS	COUNTS	%/100 Volts
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VOLTS	COUNTS	%/100 Volts
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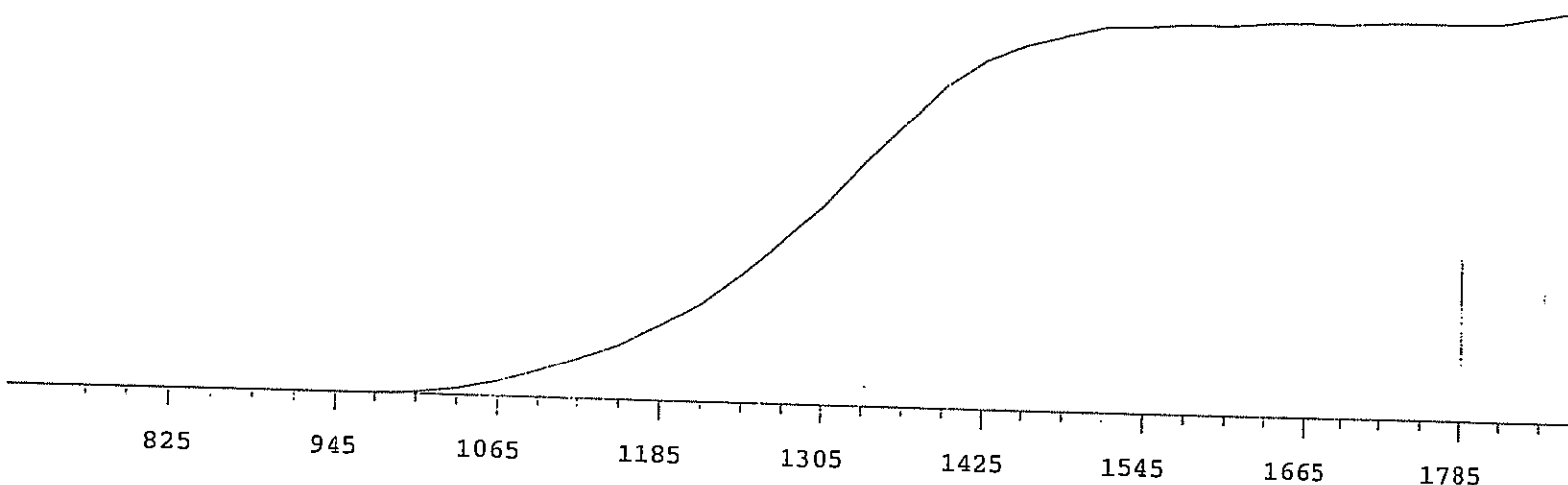
705	0	
735	1	
765	0	+0.00
795	1	>100
825	0	+83.33
855	0	-83.33
885	1	>100
915	0	>100
945	1	>100
975	12	>100
1005	51	>100
1035	298	>100
1065	848	>100
1095	1649	>100
1125	2535	>100
1155	3602	>100
1185	5036	+98.31
1215	6880	+91.37
1245	8822	+82.29
1275	11546	+74.61

1305	14171	+66.45
1335	17362	+54.90
1365	20310	+43.83
1395	22647	+30.82
1425	24551	+20.19
1455	25440	+11.69
1485	26124	+5.90
1515	26245	+2.21
1545	26428	+1.39
1575	26151	+2.69
1605	26721	+2.72
1635	27168	+2.80
1665	27007	+0.87
1695	27135	+0.70
1725	27089	+1.24
1755	27414	+1.43
1785	27373	+3.21
1815	27581	+4.34
1845	28332	
1875	28750	



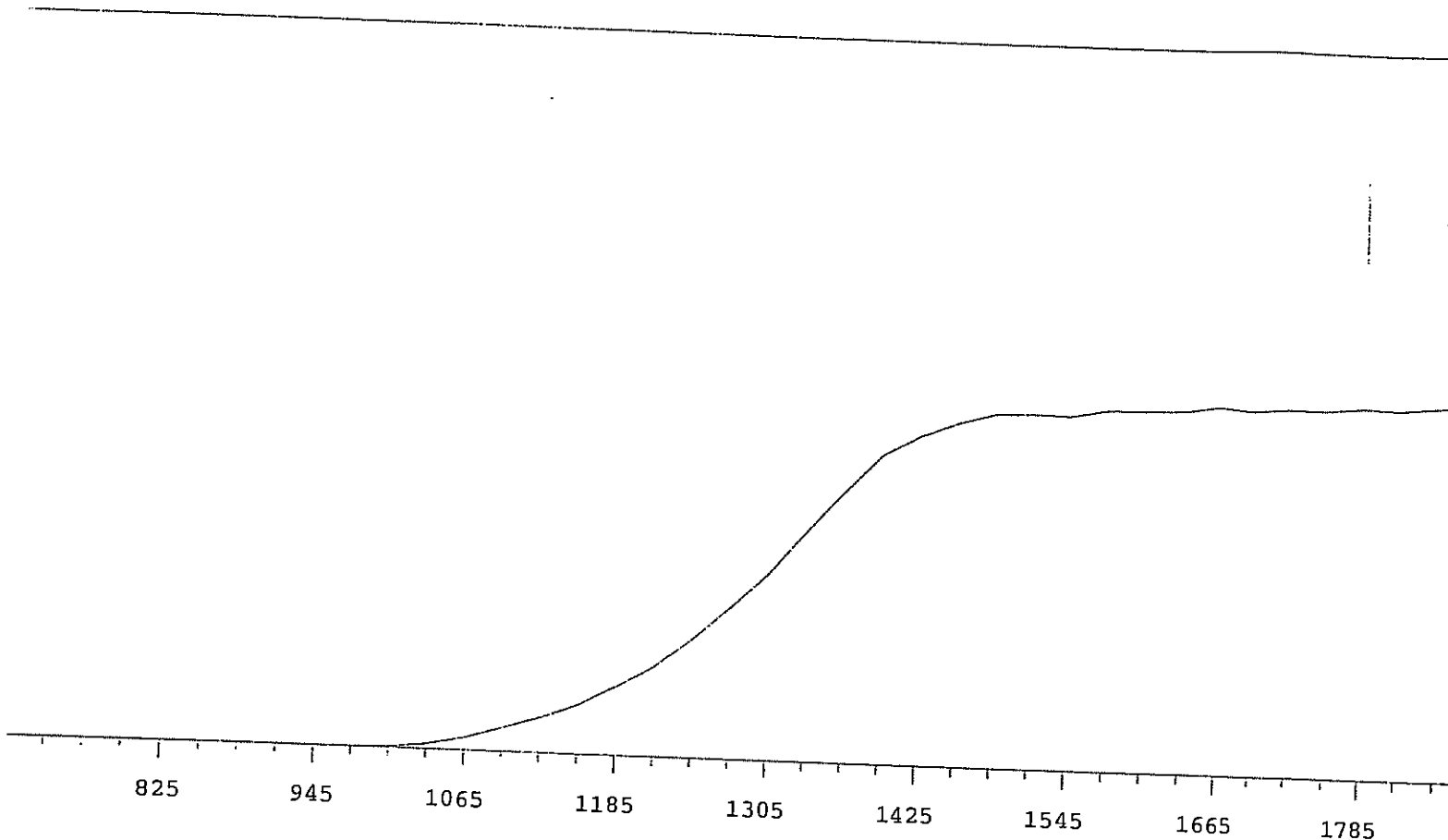


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16442	+66.24
735	0		1335	20146	+57.40
765	0		1365	23769	+46.40
795	0	>100	1395	26926	+34.68
825	2	+55.56	1425	29276	+24.40
855	1	>100	1455	31037	+15.28
885	0	-55.56	1485	32197	+7.91
915	3	>100	1515	32425	+4.33
945	0	>100	1545	32314	+2.14
975	16	>100	1575	33071	+2.66
1005	114	>100	1605	32918	+2.52
1035	451	>100	1635	33435	+1.02
1065	1100	>100	1665	33382	+0.73
1095	2068	>100	1695	33349	+1.07
1125	3189	>100	1725	33324	+1.28
1155	4386	>100	1755	34001	+2.26
1185	6094	+94.81	1785	33701	+3.08
1215	8184	+87.09	1815	34304	+2.97
1245	10489	+78.88	1845	34744	
1275	13273	+72.66	1875	35012	

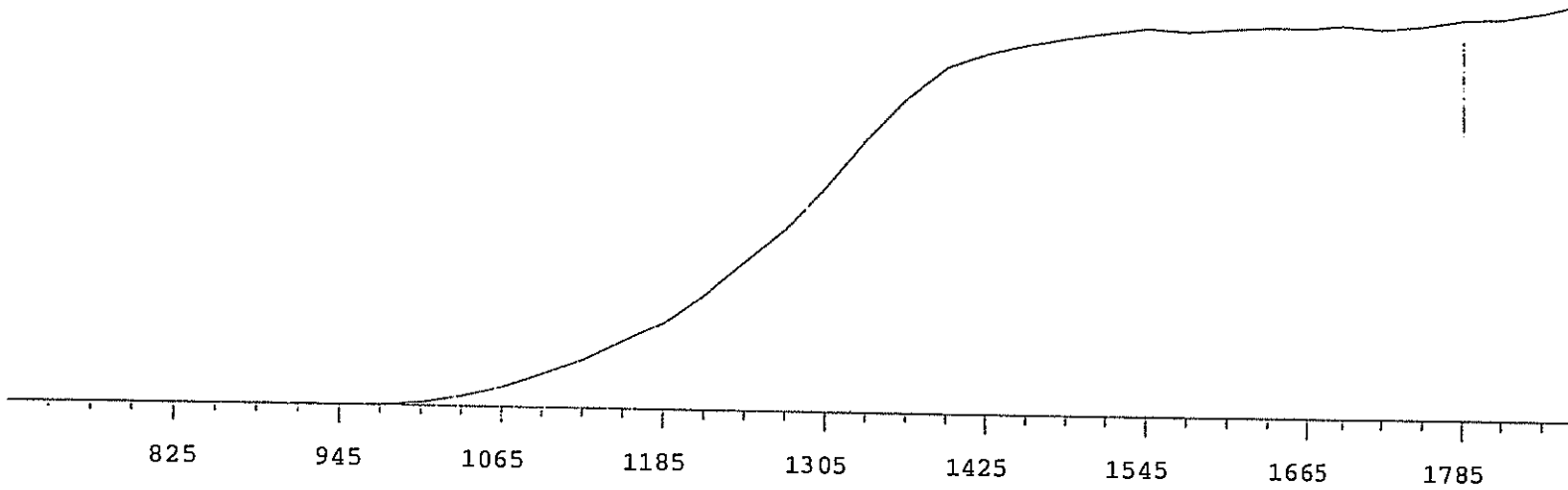


VOLTS	COUNTS	%/100 Volts
705	0	
735	1	
765	0	+0.00
795	1	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	2	>100
975	31	>100
1005	176	>100
1035	550	>100
1065	1218	>100
1095	2114	>100
1125	3212	>100
1155	4416	>100
1185	6066	+92.28
1215	7936	+85.60
1245	10288	+76.79
1275	13020	+70.59

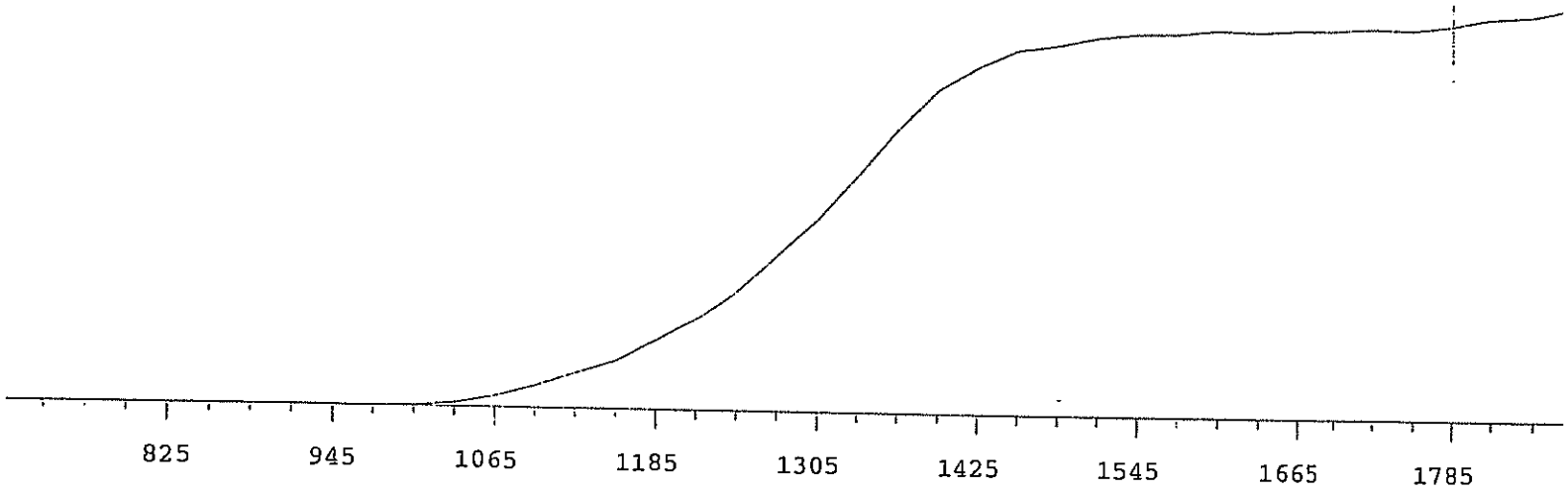
VOLTS	COUNTS	%/100 Volts
1305	15747	+62.38
1335	19230	+54.19
1365	22255	+44.46
1395	25299	+32.45
1425	27370	+22.24
1455	28625	+14.10
1485	29467	+8.56
1515	30213	+5.29
1545	30326	+2.77
1575	30564	+1.57
1605	30548	+1.52
1635	30820	+0.85
1665	30898	+0.79
1695	30779	+0.44
1725	30934	+0.45
1755	31008	+0.96
1785	30991	+2.01
1815	31196	+3.80
1845	31781	
1875	32406	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19796	+65.77
735	1		1335	24338	+57.55
765	0	+55.56	1365	28686	+45.86
795	2	+0.00	1395	32750	+32.27
825	0	-55.56	1425	34919	+20.83
855	1	>100	1455	36434	+11.45
885	0	>100	1485	37487	+5.80
915	0	>100	1515	37623	+3.32
945	2	>100	1545	37528	+2.07
975	24	>100	1575	38277	+2.12
1005	134	>100	1605	38338	+2.70
1035	558	>100	1635	38426	+1.12
1065	1361	>100	1665	39007	+1.06
1095	2511	>100	1695	38592	+0.64
1125	3762	>100	1725	38870	+0.63
1155	5246	>100	1755	38868	+1.30
1185	7268	+96.29	1785	39238	+1.45
1215	9733	+88.98	1815	39169	+2.34
1245	12701	+79.94	1845	39570	
1275	16176	+73.13	1875	40086	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18491	+61.09
735	0		1335	22444	+51.56
765	0	+0.00	1365	25756	+37.44
795	0	>100	1395	28379	+23.82
825	1	+83.33	1425	29517	+14.00
855	1	+55.56	1455	30309	+8.08
885	0	+0.00	1485	30874	+6.03
915	1	>100	1515	31345	+3.66
945	1	>100	1545	31782	+2.17
975	60	>100	1575	31567	+1.31
1005	297	>100	1605	31789	+0.78
1035	855	>100	1635	31963	+1.34
1065	1647	>100	1665	31956	+0.29
1095	2700	>100	1695	32123	+0.20
1125	3921	>100	1725	31850	+1.46
1155	5471	+96.54	1755	32114	+2.39
1185	7042	+90.21	1785	32665	+3.95
1215	9405	+82.23	1815	32876	+4.96
1245	12266	+76.33	1845	33399	
1275	14989	+69.38	1875	34206	

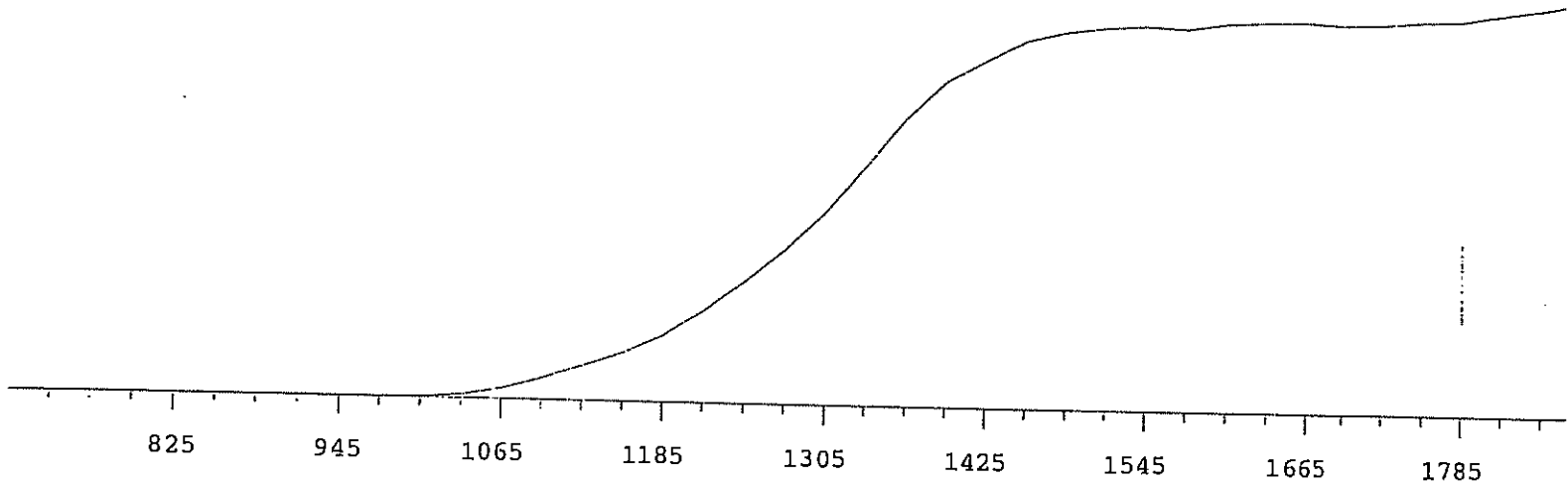


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	13974	+68.00
735	0		1335	17170	+58.62
765	1		1365	20456	+47.04
795	1	+83.33	1395	23332	+33.83
825	1	-83.33	1425	24996	+21.10
855	1	>100	1455	26290	+12.40
885	0	-55.56	1485	26683	+7.74
915	0	>100	1515	27270	+4.43
945	1	>100	1545	27590	+3.48
975	9	>100	1575	27635	+1.71
1005	76	>100	1605	27932	+1.20
1035	308	>100	1635	27807	+0.88
1065	814	>100	1665	28006	+0.62
1095	1600	>100	1695	27964	+0.63
1125	2598	>100	1725	28112	+0.98
1155	3596	>100	1755	28020	+2.84
1185	5065	+96.05	1785	28392	+3.76
1215	6773	+90.23	1815	29028	+5.17
1245	8717	+81.43	1845	29220	
1275	11391	+74.83	1875	29849	

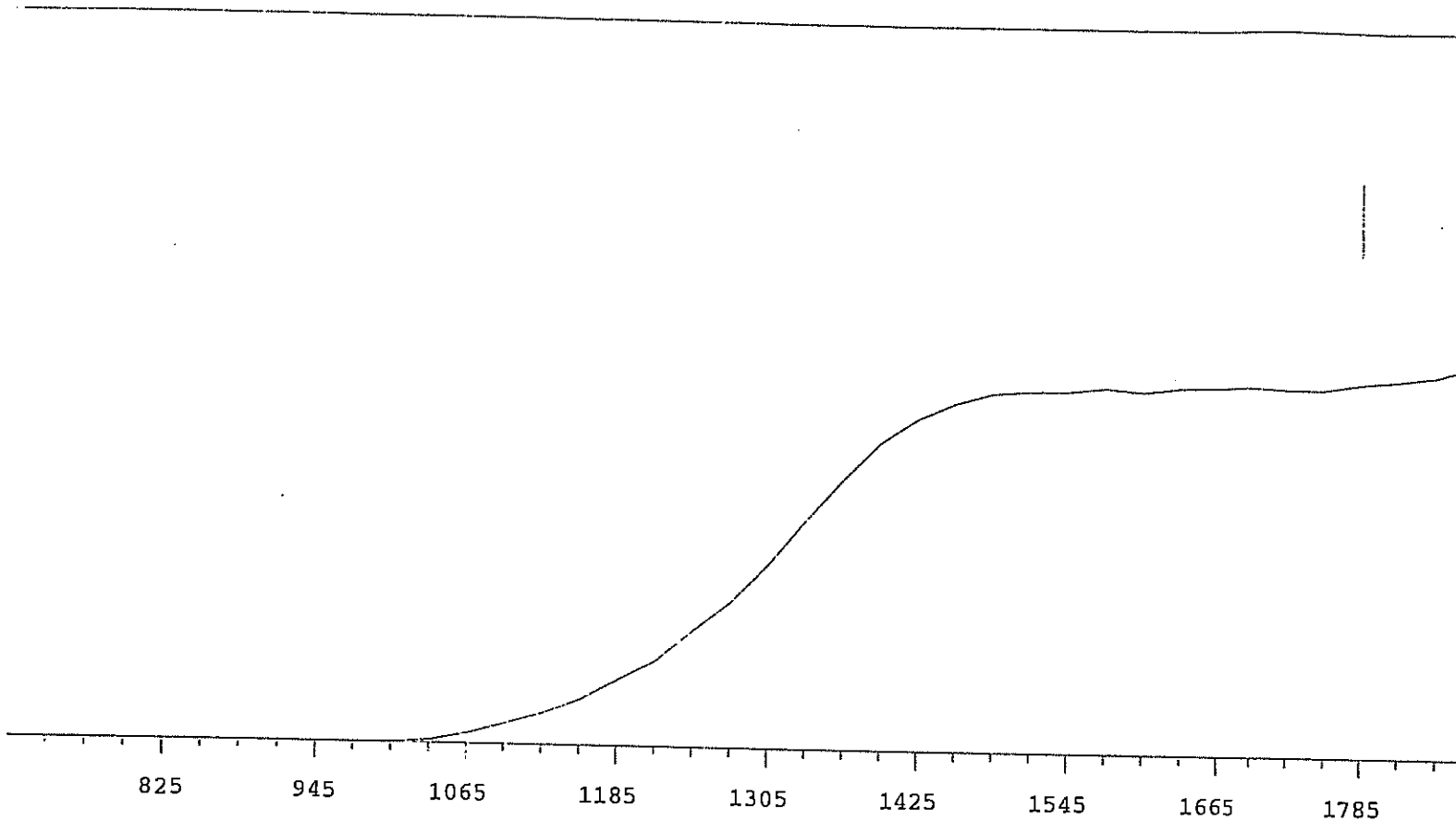
MPC 9600 Plateau  
 Alpha Volts: 705

Instrument 5 MPC 9604 Detector B  
 Beta Volts: 1575

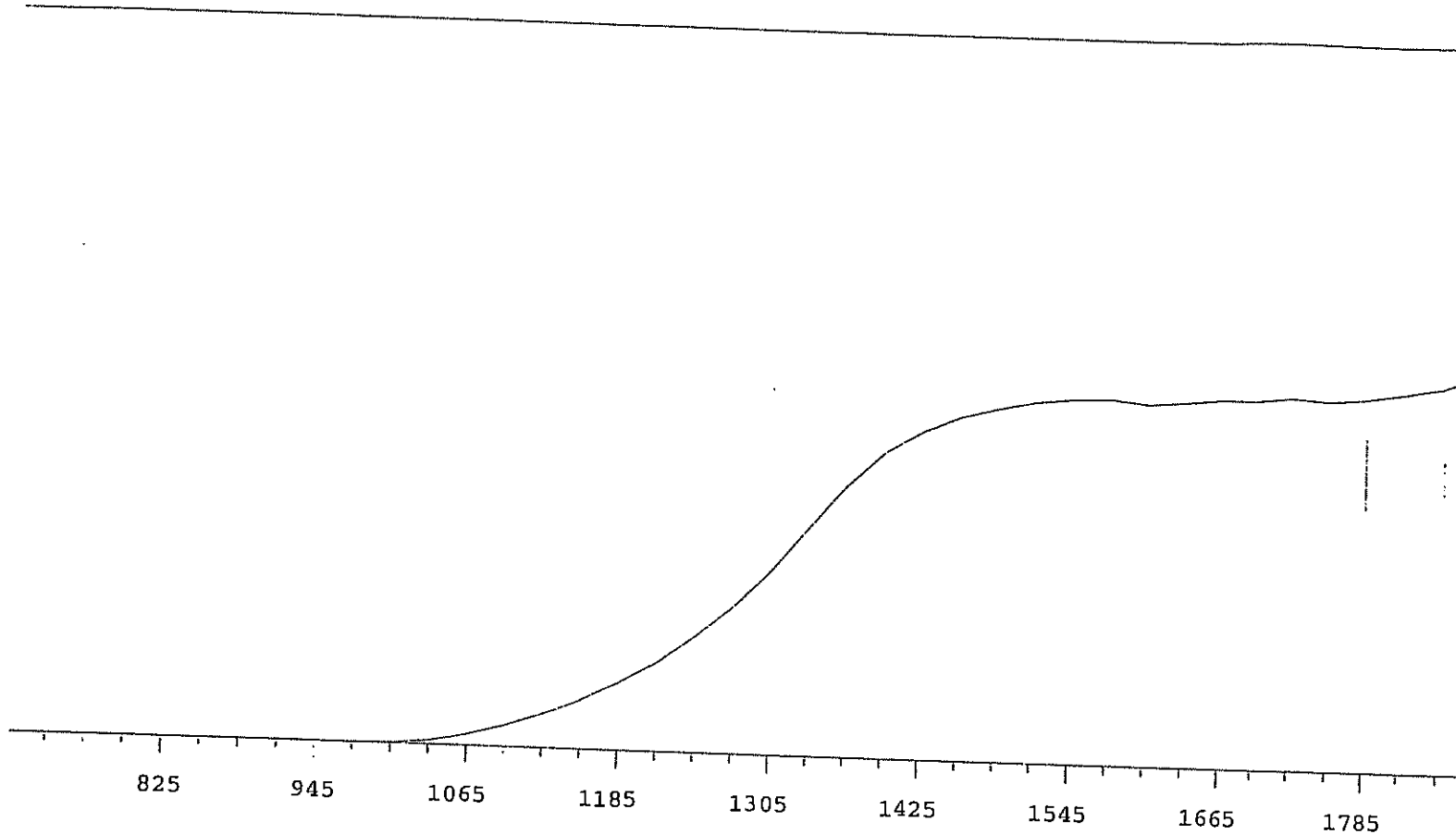
7/1/2009



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17414	+68.46
735	0		1335	21540	+59.98
765	0		1365	25854	+46.75
795	0	>100	1395	29222	+33.38
825	1	>100	1425	31128	+21.52
855	1	+41.67	1455	32995	+13.26
885	2	-33.33	1485	33846	+8.09
915	0	>100	1515	34289	+3.25
945	1	>100	1545	34528	+2.00
975	17	>100	1575	34311	+1.78
1005	87	>100	1605	34866	+1.78
1035	336	>100	1635	35046	+1.14
1065	1010	>100	1665	35087	-0.26
1095	1955	>100	1695	34795	+0.11
1125	3124	>100	1725	34857	+0.93
1155	4486	>100	1755	35220	+2.81
1185	6017	>100	1785	35363	+3.98
1215	8507	+91.20	1815	36028	+4.79
1245	11148	+82.59	1845	36577	
1275	14003	+74.21	1875	37207	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17085	+68.24
735	0		1335	21135	+59.99
765	0		1365	25066	+47.39
795	0	>100	1395	28530	+33.93
825	0	>100	1425	30823	+22.30
855	1	>100	1455	32287	+12.93
885	0	>100	1485	33217	+6.71
915	1	>100	1515	33474	+3.57
945	2	>100	1545	33517	+1.17
975	7	>100	1575	33921	+1.13
1005	56	>100	1605	33584	+1.27
1035	305	>100	1635	34014	+1.12
1065	982	>100	1665	34116	+0.98
1095	1874	>100	1695	34225	-0.22
1125	2890	>100	1725	33980	+0.58
1155	4260	>100	1755	33971	+1.96
1185	6001	>100	1785	34541	+3.64
1215	8050	+91.54	1815	34954	+5.38
1245	10895	+82.98	1845	35375	
1275	13556	+76.26	1875	36384	



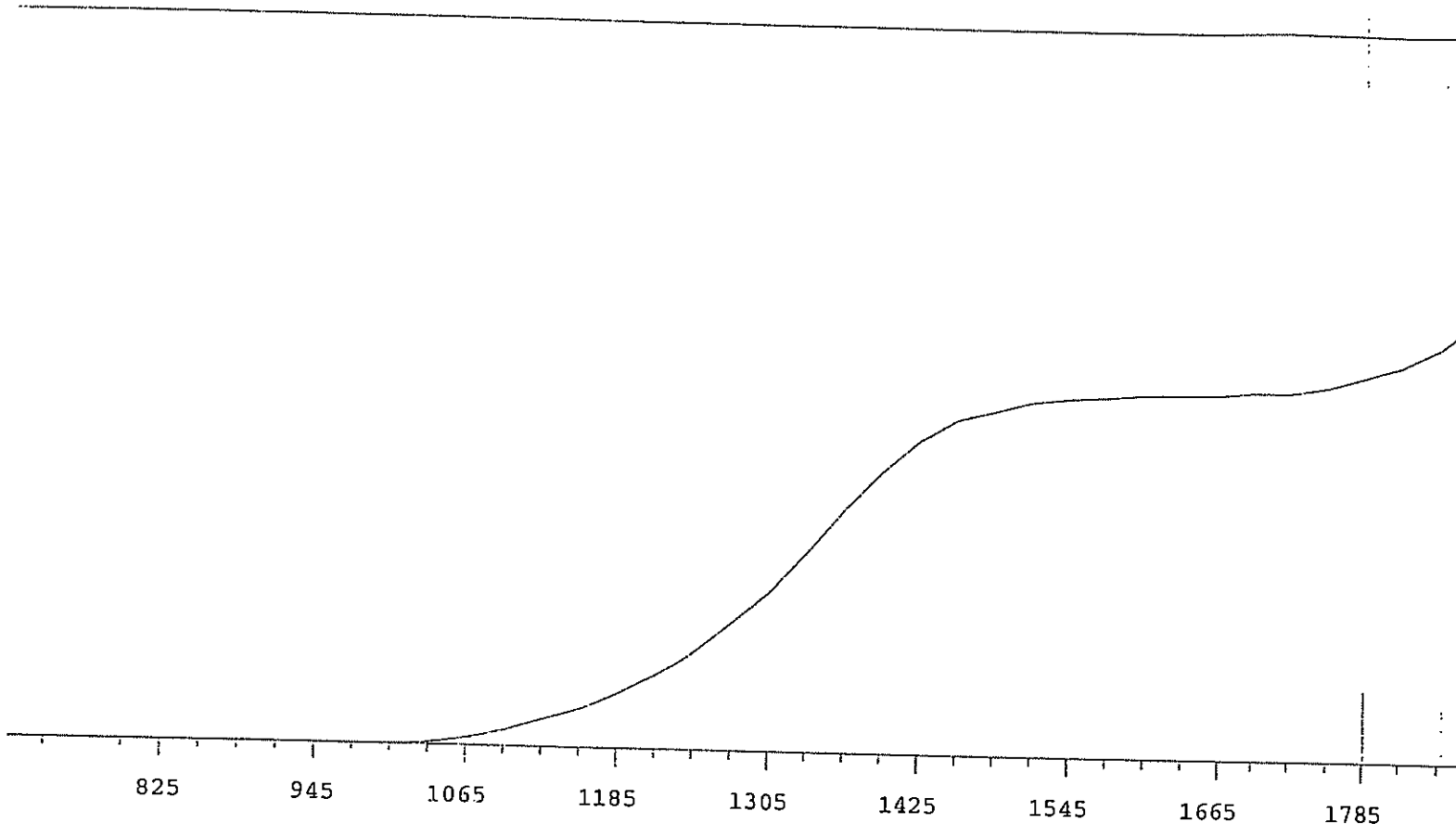
VOLTS	COUNTS	%/100 Volts
-------	--------	-------------

705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	6	>100
1005	81	>100
1035	318	>100
1065	897	>100
1095	1710	>100
1125	2714	>100
1155	3925	>100
1185	5395	+97.31
1215	7282	+88.49
1245	9426	+81.36
1275	12007	+75.65

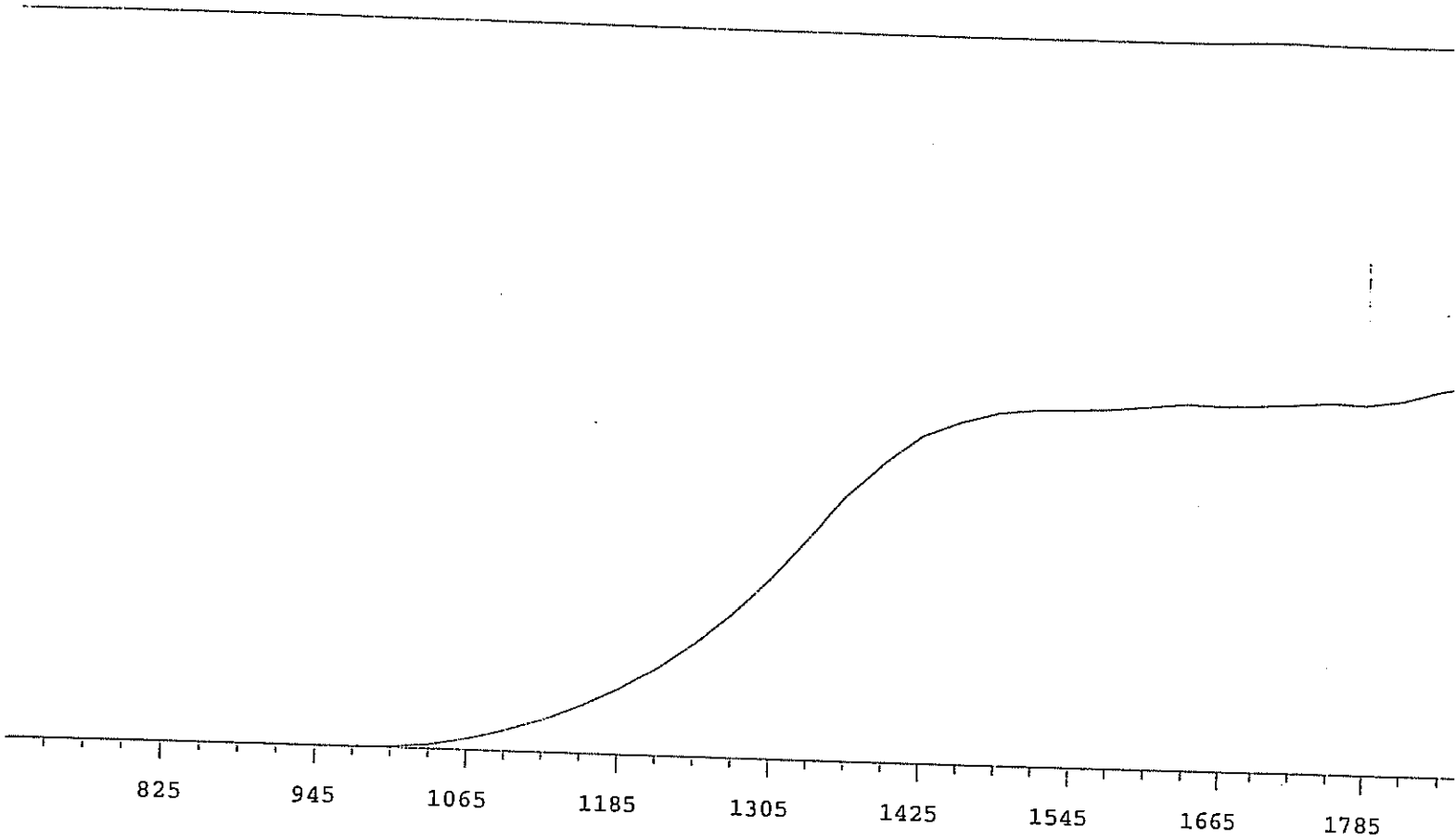
VOLTS	COUNTS	%/100 Volts
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1305	15025	+68.87
1335	18640	+58.97
1365	22048	+45.84
1395	24877	+32.08
1425	26653	+20.83
1455	27899	+13.08
1485	28670	+8.43
1515	29257	+5.13
1545	29568	+2.06
1575	29683	+0.52
1605	29362	+0.57
1635	29589	+0.80
1665	29870	+1.82
1695	29783	+0.90
1725	30077	+0.75
1755	29889	+2.02
1785	30152	+3.33
1815	30656	+6.54
1845	31211	
1875	32389	





VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16217	+71.57
735	0		1335	20184	+63.76
765	0		1365	24605	+53.98
795	0	>100	1395	28528	+41.40
825	0	>100	1425	31675	+28.02
855	0	>100	1455	33899	+17.93
885	0	>100	1485	34826	+10.65
915	0	>100	1515	35815	+6.13
945	0	>100	1545	36225	+4.15
975	7	>100	1575	36456	+2.28
1005	31	>100	1605	36747	+1.47
1035	238	>100	1635	36801	+1.26
1065	810	>100	1665	36859	+0.85
1095	1637	>100	1695	37095	+1.85
1125	2743	>100	1725	37072	+4.01
1155	3932	>100	1755	37724	+6.65
1185	5579	>100	1785	38802	+10.33
1215	7602	+94.41	1815	40036	+14.71
1245	10078	+84.86	1845	41975	
1275	13091	+77.67	1875	45123	

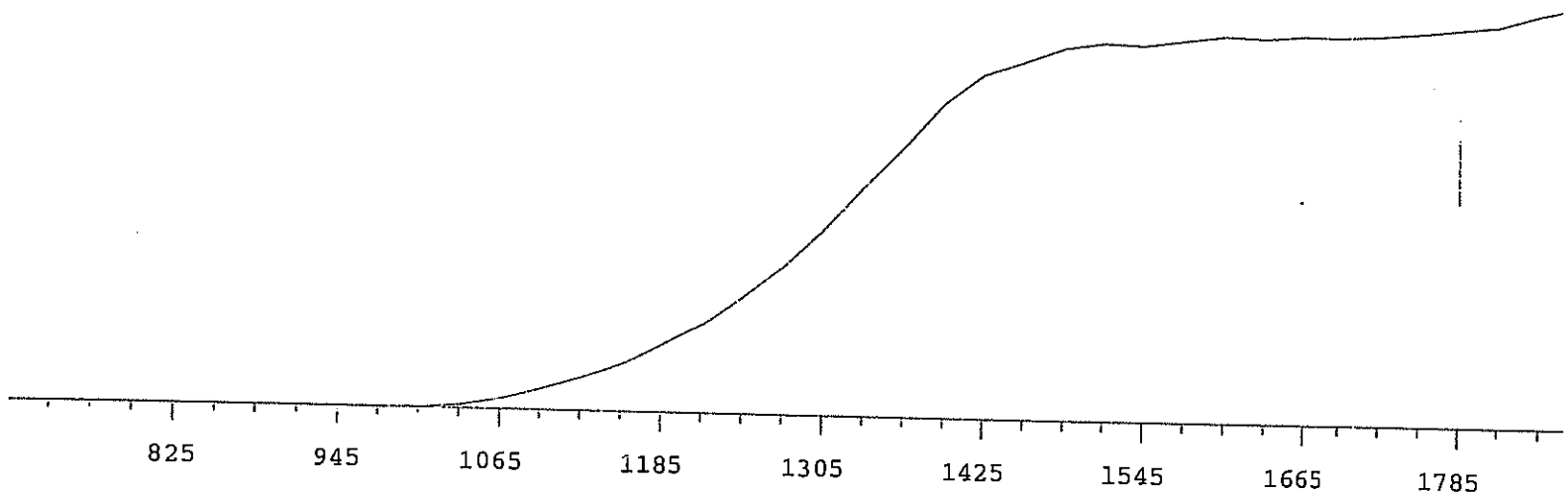


VOLTS    COUNTS    %/100 Volts

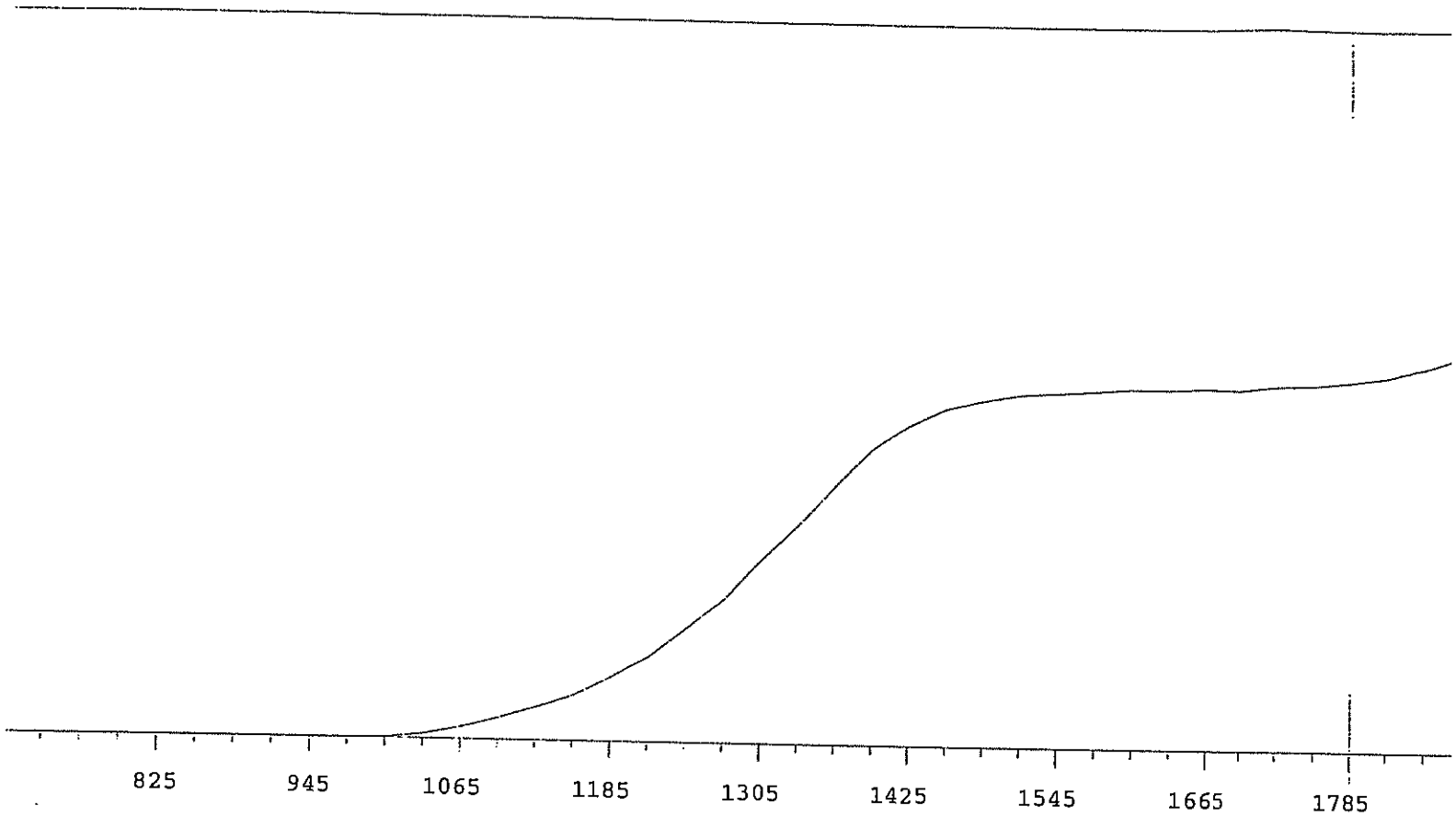
VOLTS    COUNTS    %/100 Volts

705	0	
735	0	
765	0	
795	0	>100
825	1	+83.33
855	1	-83.33
885	0	>100
915	0	>100
945	5	>100
975	18	>100
1005	125	>100
1035	482	>100
1065	1255	>100
1095	2318	>100
1125	3540	>100
1155	5288	>100
1185	7168	+98.51
1215	9760	+88.48
1245	12656	+81.52
1275	16065	+74.58

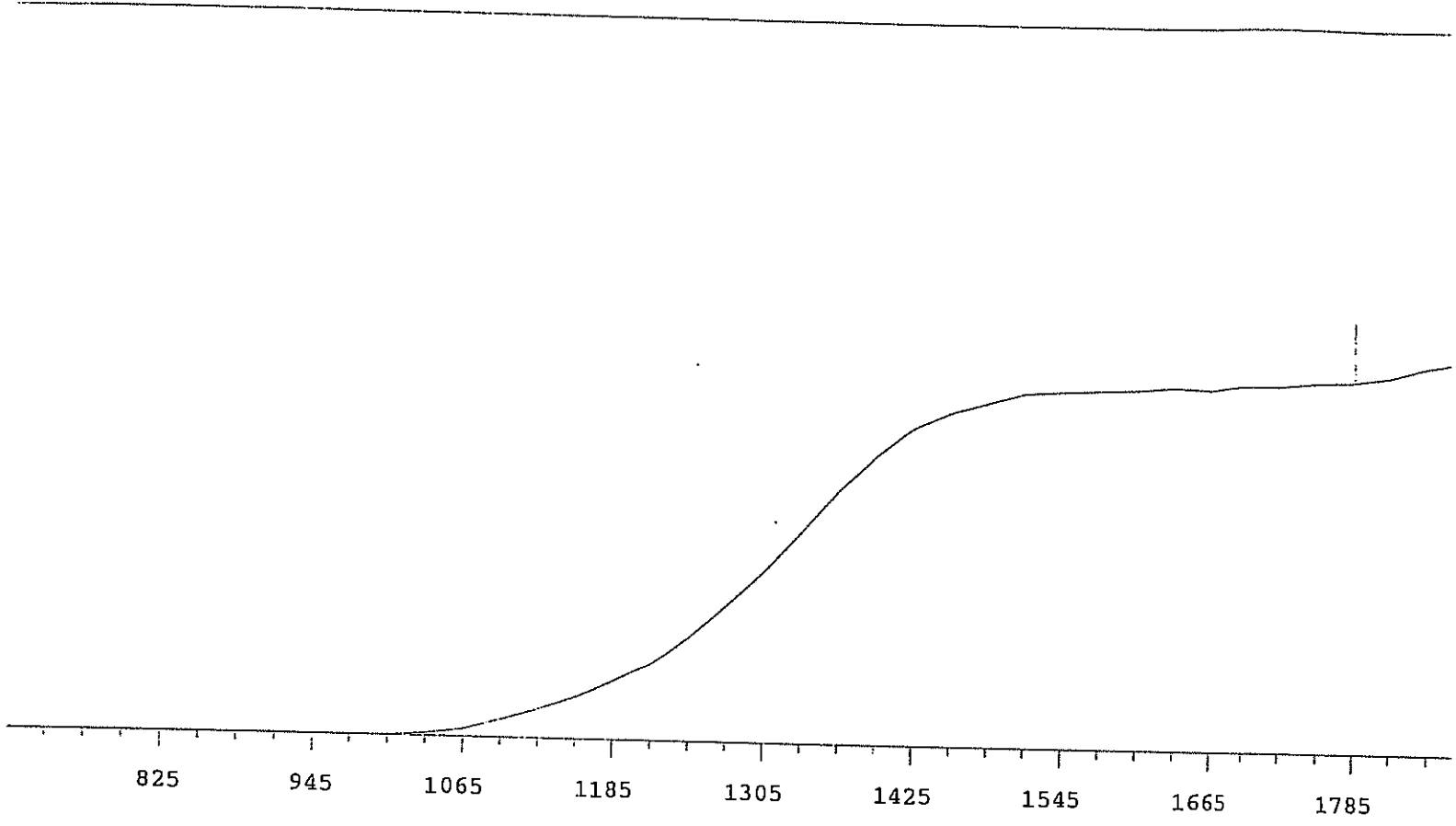
1305	20094	+68.67
1335	24665	+59.40
1365	29591	+47.86
1395	33376	+34.51
1425	36440	+22.50
1455	38024	+13.58
1485	39187	+7.04
1515	39608	+3.63
1545	39722	+2.10
1575	39894	+2.32
1605	40298	+2.09
1635	40711	+1.41
1665	40574	+0.80
1695	40608	+1.02
1725	40839	+1.28
1755	41201	+1.97
1785	41065	+3.74
1815	41711	+5.42
1845	42917	
1875	43699	



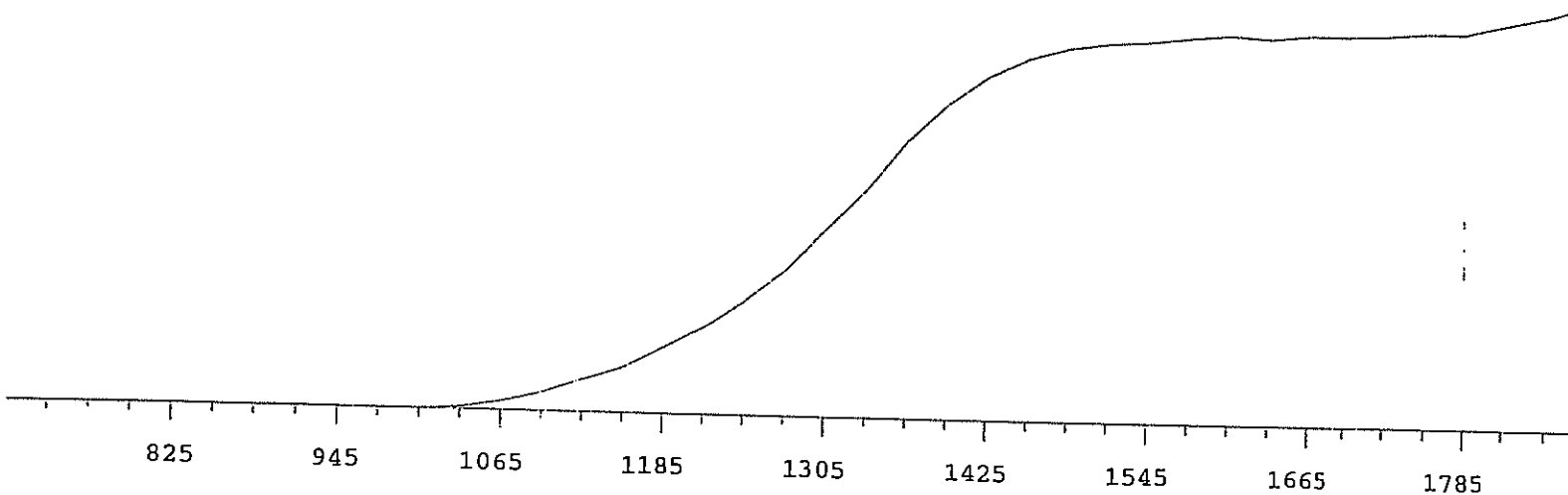
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17350	+67.80
735	0		1335	21371	+60.27
765	1	+0.00	1365	25084	+49.32
795	0	>100	1395	29177	+36.15
825	0	+0.00	1425	31927	+24.86
855	0	>100	1455	33217	+14.70
885	1	>100	1485	34545	+7.74
915	1	>100	1515	35097	+4.64
945	2	>100	1545	34927	+2.96
975	8	>100	1575	35439	+2.21
1005	70	>100	1605	35939	+2.41
1035	353	>100	1635	35763	+0.94
1065	990	>100	1665	36053	+0.35
1095	1956	>100	1695	35886	+1.15
1125	3024	>100	1725	36066	+1.77
1155	4400	>100	1755	36379	+3.03
1185	6173	+99.75	1785	36768	+4.80
1215	8230	+89.85	1815	37193	+6.14
1245	10904	+82.36	1845	38320	
1275	13747	+76.18	1875	39061	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	17954	+65.82
735	0		1335	21482	+57.64
765	0		1365	25373	+45.78
795	1	+0.00	1395	29042	+34.80
825	0	>100	1425	31373	+23.29
855	0	+0.00	1455	33143	+14.25
885	0	>100	1485	34006	+8.49
915	1	>100	1515	34662	+4.71
945	0	>100	1545	34892	+3.14
975	14	>100	1575	35129	+1.86
1005	109	>100	1605	35411	+1.49
1035	481	>100	1635	35380	+0.62
1065	1177	>100	1665	35554	+0.65
1095	2133	>100	1695	35385	+1.18
1125	3243	>100	1725	35755	+1.89
1155	4554	>100	1755	35907	+3.26
1185	6285	+98.38	1785	36305	+4.62
1215	8468	+89.75	1815	36870	+6.98
1245	11266	+83.13	1845	37807	
1275	14088	+74.43	1875	39047	

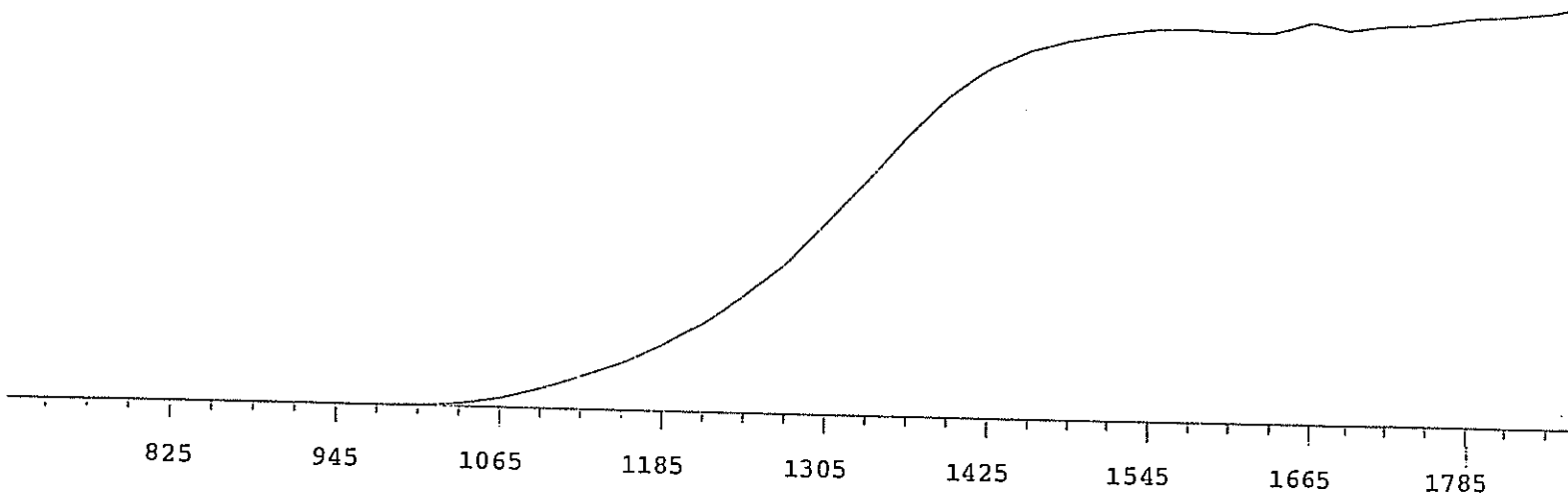


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	13228	+70.36
735	0		1335	16271	+60.12
765	0		1365	19506	+49.19
795	0	>100	1395	22188	+36.46
825	1	+83.33	1425	24373	+24.43
855	1	-83.33	1455	25649	+15.99
885	0	-55.56	1485	26433	+9.58
915	0	>100	1515	27195	+5.74
945	1	>100	1545	27367	+3.24
975	3	>100	1575	27490	+1.86
1005	42	>100	1605	27608	+1.22
1035	242	>100	1635	27841	+1.33
1065	613	>100	1665	27695	+1.11
1095	1353	>100	1695	27999	+1.42
1125	2213	>100	1725	27992	+2.04
1155	3256	>100	1755	28289	+2.52
1185	4474	>100	1785	28408	+4.56
1215	5932	+94.10	1815	28863	+5.70
1245	8072	+87.32	1845	29664	
1275	10579	+79.61	1875	30148	

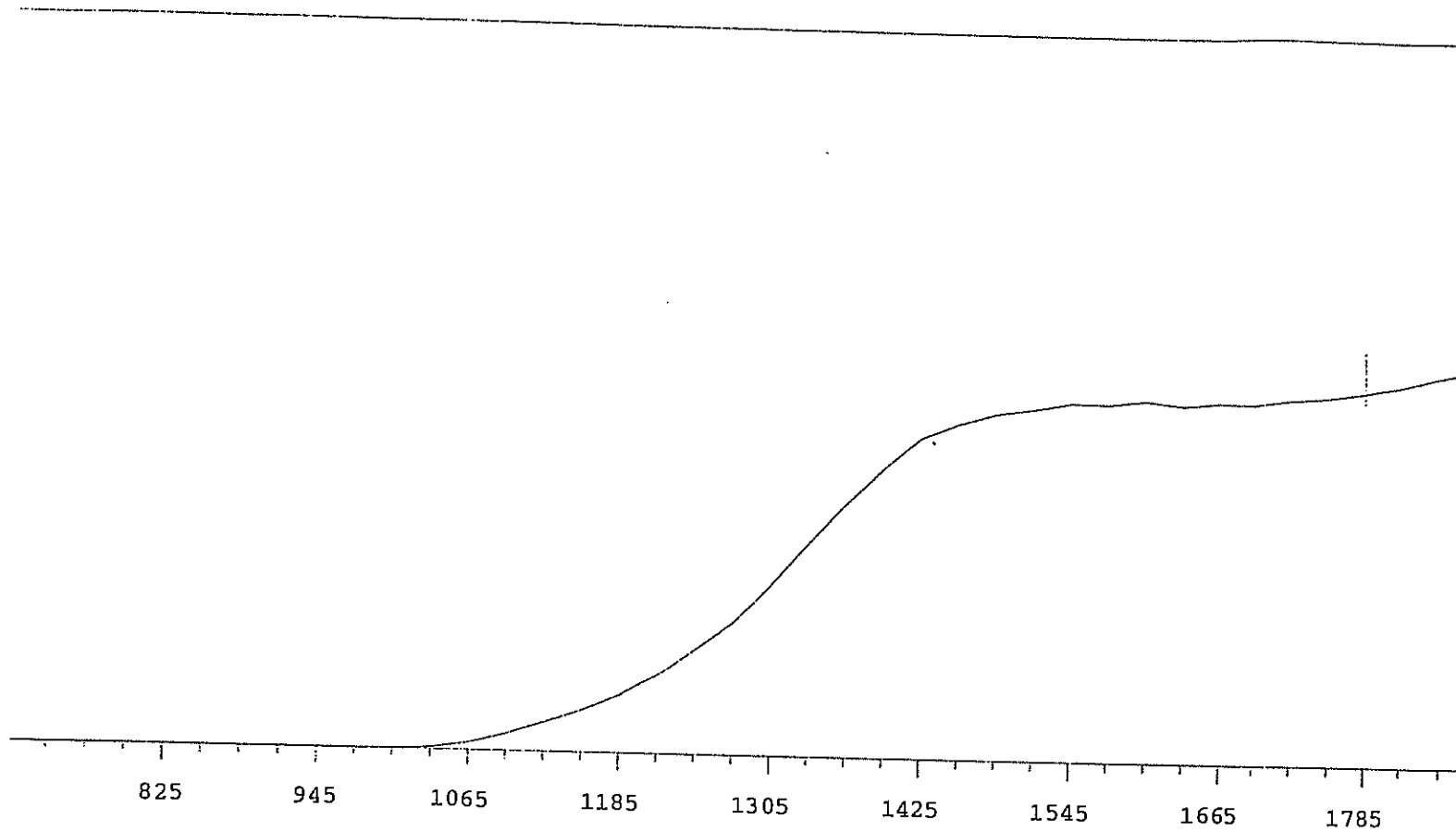


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	1	>100
945	1	>100
975	3	>100
1005	34	>100
1035	221	>100
1065	825	>100
1095	1709	>100
1125	2873	>100
1155	4078	>100
1185	5858	>100
1215	7809	+91.82
1245	10336	+85.02
1275	13215	+77.79

VOLTS	COUNTS	%/100 Volts
1305	16978	+70.97
1335	20569	+61.39
1365	24989	+48.97
1395	28389	+36.69
1425	30977	+24.05
1455	32727	+14.93
1485	33697	+8.42
1515	34195	+4.89
1545	34437	+3.49
1575	34850	+2.11
1605	35174	+1.62
1635	34923	+0.68
1665	35250	+0.35
1695	35171	+1.24
1725	35237	+1.02
1755	35584	+2.79
1785	35587	+4.59
1815	36485	+6.74
1845	37270	
1875	38453	

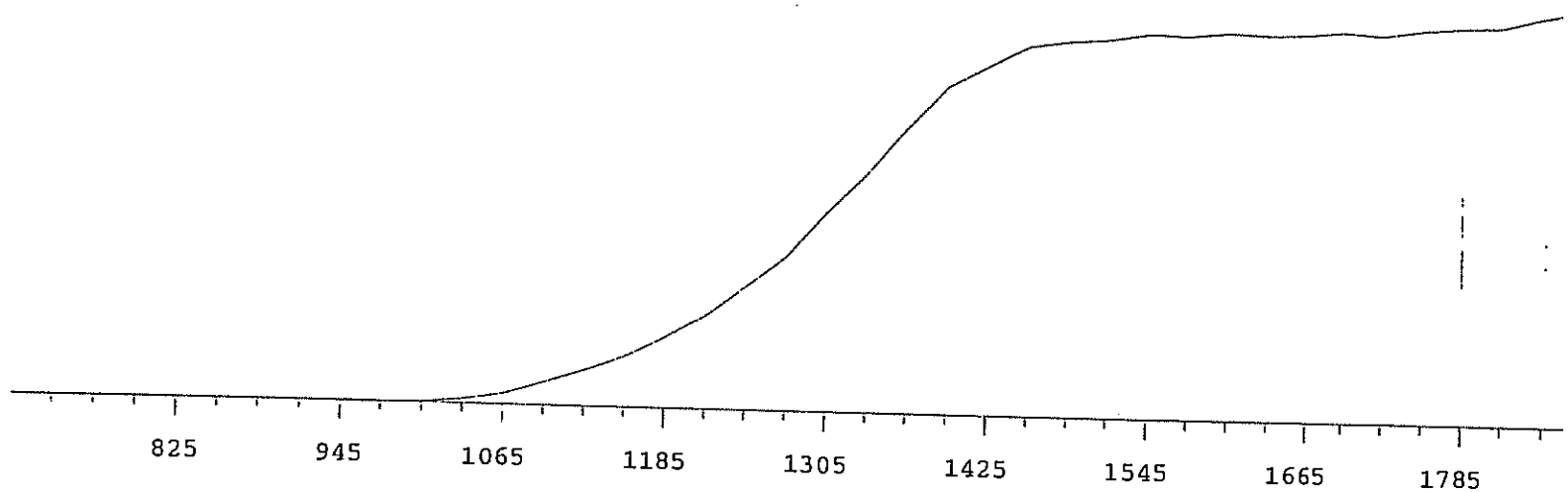


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16543	+70.03
735	0		1335	20257	+60.71
765	0		1365	24245	+48.17
795	0	>100	1395	27602	+35.50
825	0	>100	1425	30019	+23.48
855	0	>100	1455	31614	+14.53
885	0	>100	1485	32522	+8.91
915	0	>100	1515	33103	+5.28
945	0	>100	1545	33572	+2.60
975	4	>100	1575	33695	+0.70
1005	57	>100	1605	33525	+1.48
1035	277	>100	1635	33477	+0.99
1065	817	>100	1665	34432	+1.49
1095	1666	>100	1695	33745	+1.43
1125	2766	>100	1725	34149	+1.60
1155	4077	>100	1755	34350	+3.69
1185	5667	>100	1785	34955	+3.62
1215	7694	+91.50	1815	35251	+4.44
1245	10209	+84.83	1845	35592	
1275	12950	+77.50	1875	36382	

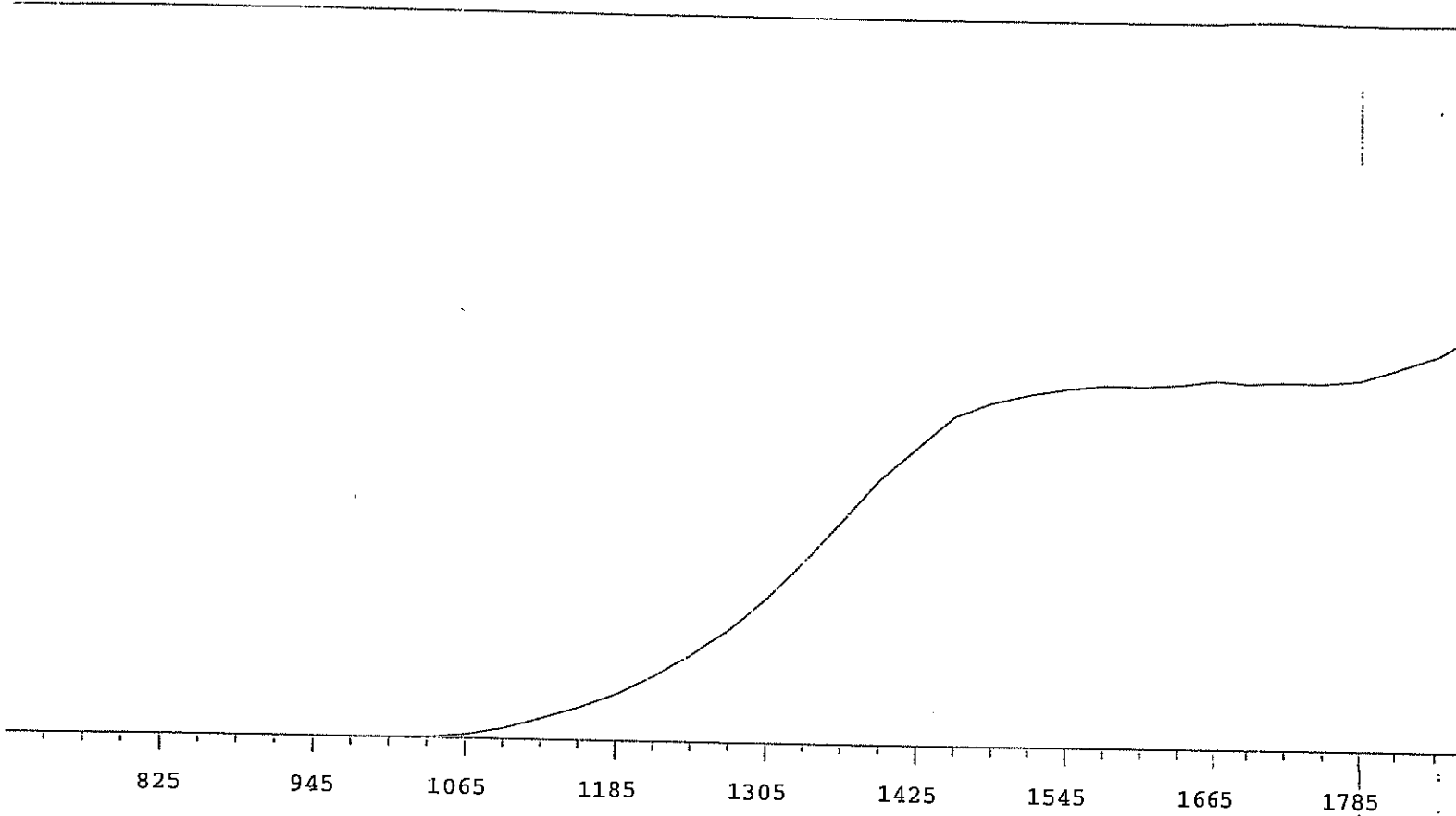


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	14016	+71.42
735	0		1335	17436	+62.21
765	0		1365	20814	+50.32
795	0	>100	1395	23760	+36.91
825	0	>100	1425	26302	+24.91
855	0	>100	1455	27519	+15.17
885	0	>100	1485	28410	+8.91
915	0	>100	1515	28843	+5.41
945	0	>100	1545	29396	+3.58
975	5	>100	1575	29357	+1.54
1005	29	>100	1605	29719	+0.51
1035	204	>100	1635	29358	+0.23
1065	609	>100	1665	29623	+0.57
1095	1354	>100	1695	29509	+2.12
1125	2316	>100	1725	29896	+2.84
1155	3418	>100	1755	30165	+4.42
1185	4654	>100	1785	30570	+5.65
1215	6455	+92.99	1815	31180	+6.95
1245	8669	+86.45	1845	31995	
1275	10931	+79.15	1875	32717	

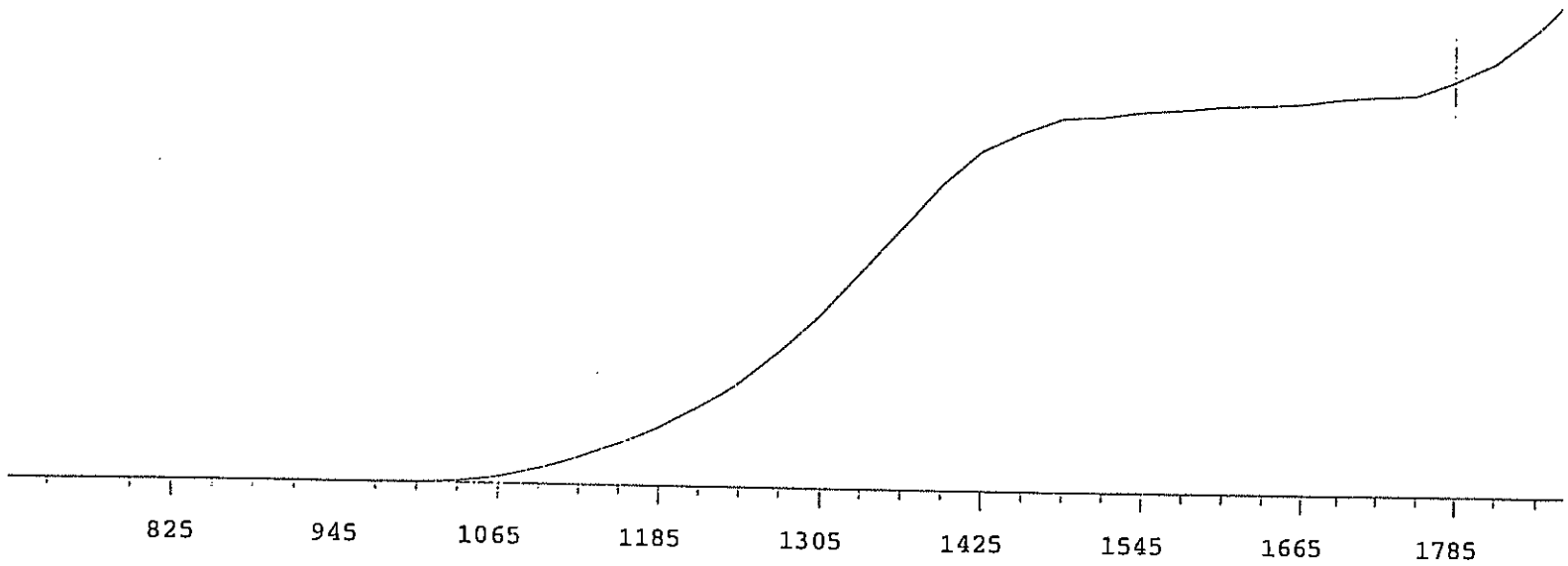




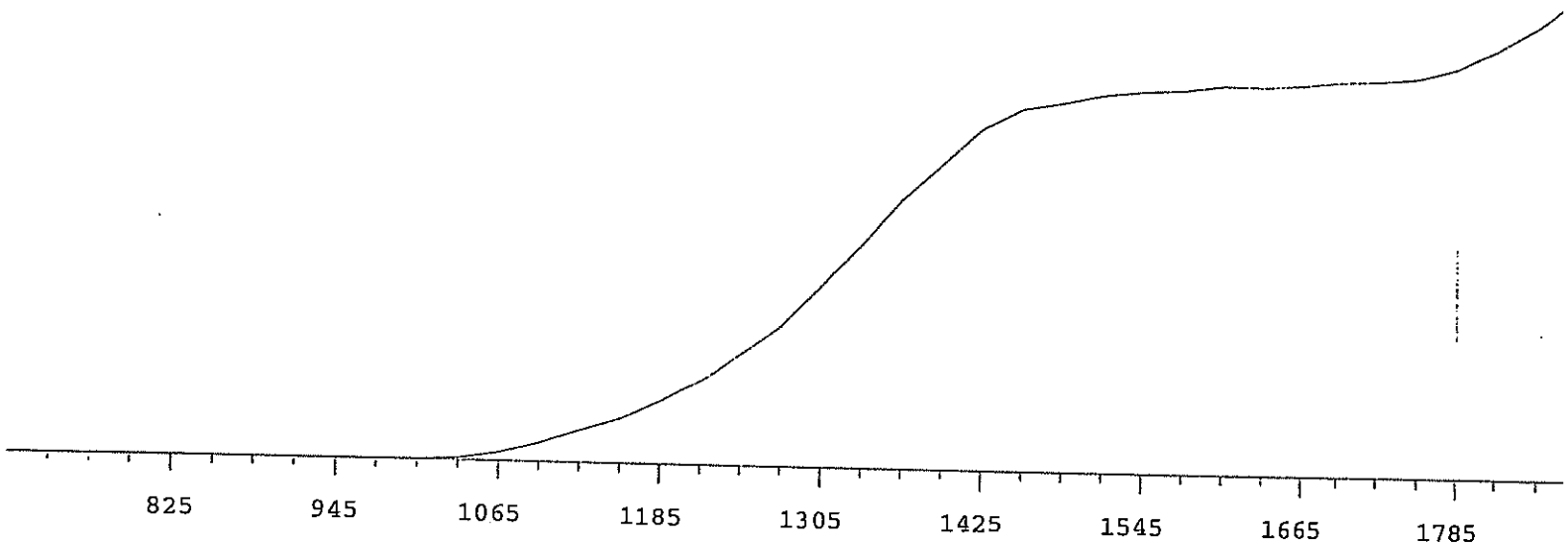
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	19482	+67.45
735	0		1335	23344	+59.35
765	0		1365	27793	+45.86
795	0	>100	1395	31916	+34.29
825	0	>100	1425	33979	+21.61
855	0	>100	1455	35993	+11.71
885	0	>100	1485	36530	+7.04
915	0	>100	1515	36796	+3.11
945	1	>100	1545	37393	+2.44
975	9	>100	1575	37279	+1.41
1005	96	>100	1605	37650	+0.49
1035	468	>100	1635	37458	+0.91
1065	1084	>100	1665	37579	+0.12
1095	2286	>100	1695	37828	+1.10
1125	3479	>100	1725	37535	+1.72
1155	4912	>100	1755	38104	+2.18
1185	6819	+98.23	1785	38416	+4.12
1215	9153	+89.05	1815	38633	+4.92
1245	12105	+83.21	1845	39649	
1275	15122	+75.24	1875	40366	



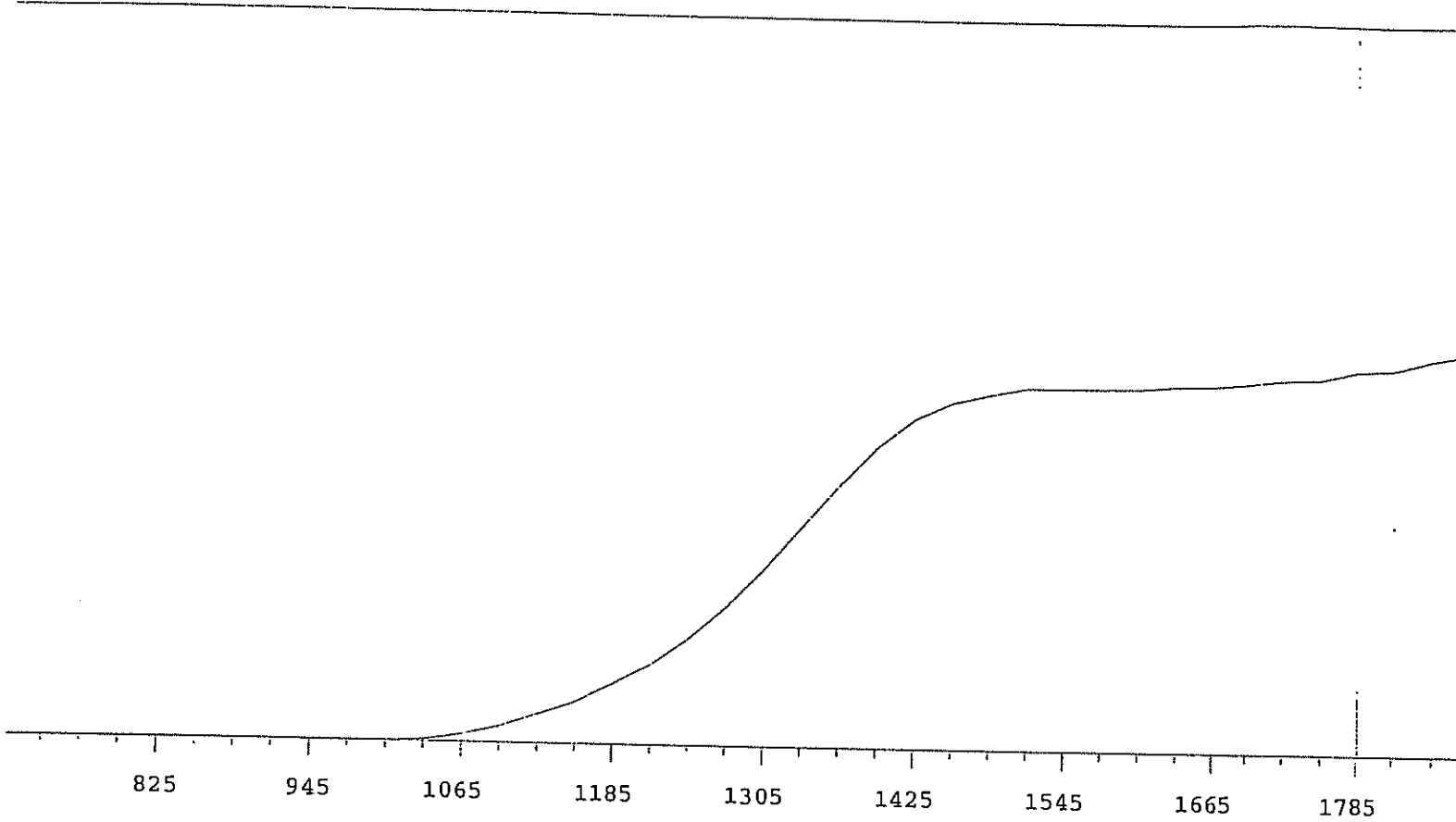
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16337	+74.91
735	0		1335	20471	+68.07
765	0		1365	25012	+57.86
795	0	>100	1395	29694	+47.48
825	0	>100	1425	33409	+35.17
855	0	>100	1455	37013	+23.27
885	0	>100	1485	38629	+14.35
915	0	>100	1515	39529	+7.69
945	0	>100	1545	40284	+4.34
975	0	>100	1575	40711	+2.52
1005	20	>100	1605	40642	+1.97
1035	122	>100	1635	40879	+1.11
1065	511	>100	1665	41405	+0.98
1095	1263	>100	1695	41011	+0.30
1125	2390	>100	1725	41182	+0.41
1155	3641	>100	1755	41178	+3.28
1185	5246	>100	1785	41573	+6.47
1215	7212	+98.32	1815	42858	+10.82
1245	9897	+89.80	1845	44440	
1275	12742	+82.40	1875	46780	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16303	+72.82
735	0		1335	20309	+64.32
765	0		1365	24364	+53.82
795	0	>100	1395	28527	+40.95
825	0	>100	1425	31774	+28.74
855	0	>100	1455	33631	+16.87
885	0	>100	1485	35030	+9.25
915	0	>100	1515	35208	+5.21
945	0	>100	1545	35741	+3.27
975	4	>100	1575	36019	+2.95
1005	46	>100	1605	36373	+2.21
1035	202	>100	1635	36484	+2.27
1065	697	>100	1665	36713	+2.28
1095	1532	>100	1695	37093	+2.46
1125	2614	>100	1725	37325	+4.17
1155	3953	>100	1755	37543	+7.52
1185	5474	>100	1785	38833	+13.43
1215	7466	+93.09	1815	40656	+19.49
1245	9842	+86.73	1845	43753	
1275	12814	+80.29	1875	47246	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16889	+70.18
735	0		1335	20600	+61.29
765	1	+0.00	1365	24824	+50.40
795	0	>100	1395	28208	+38.85
825	0	>100	1425	31539	+25.79
855	0	>100	1455	33391	+16.06
885	0	>100	1485	33991	+8.60
915	0	>100	1515	34782	+5.01
945	0	>100	1545	35201	+4.10
975	5	>100	1575	35380	+2.50
1005	47	>100	1605	35849	+1.87
1035	243	>100	1635	35784	+1.79
1065	792	>100	1665	36000	+1.43
1095	1744	>100	1695	36269	+2.10
1125	2933	>100	1725	36381	+3.46
1155	4123	>100	1755	36733	+6.86
1185	5780	>100	1785	37669	+11.78
1215	7791	+91.58	1815	39465	+16.64
1245	10478	+84.93	1845	41803	
1275	13118	+77.50	1875	44665	

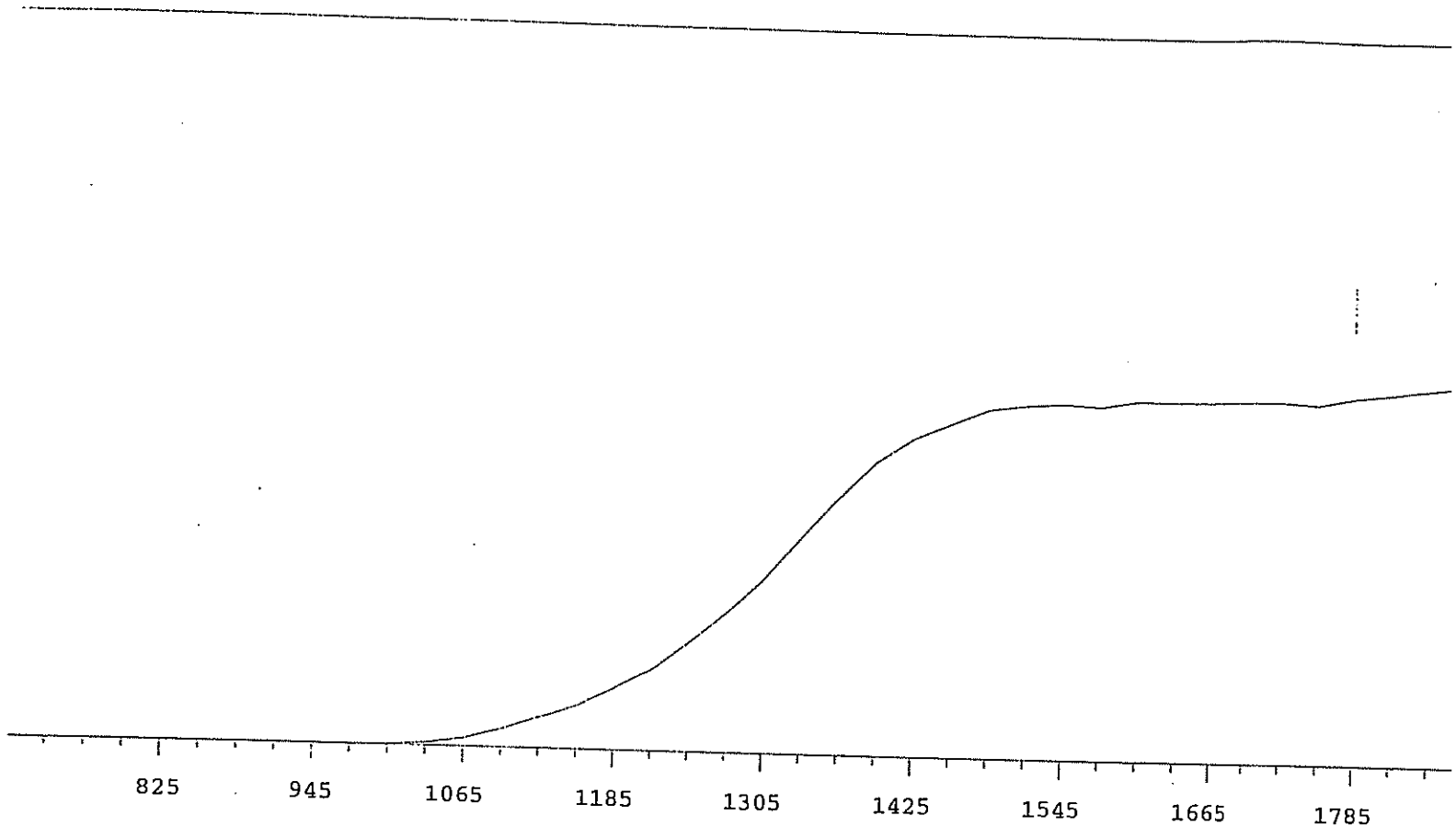


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16226	+71.71
735	0		1335	20083	+61.95
765	1	+0.00	1365	23913	+49.99
795	0	>100	1395	27526	+36.97
825	0	>100	1425	30193	+24.54
855	0	>100	1455	31747	+14.71
885	0	>100	1485	32544	+7.71
915	0	>100	1515	33198	+3.66
945	0	>100	1545	33188	+1.51
975	2	>100	1575	33227	+0.73
1005	33	>100	1605	33278	+1.04
1035	203	>100	1635	33518	+1.38
1065	668	>100	1665	33565	+1.95
1095	1403	>100	1695	33774	+1.99
1125	2545	>100	1725	34135	+3.30
1155	3800	>100	1755	34244	+3.67
1185	5363	>100	1785	35022	+4.84
1215	7355	+95.00	1815	35229	+5.93
1245	9807	+87.69	1845	36179	
1275	12700	+80.28	1875	36821	

MPC 9600 Plateau  
 Alpha Volts: 870

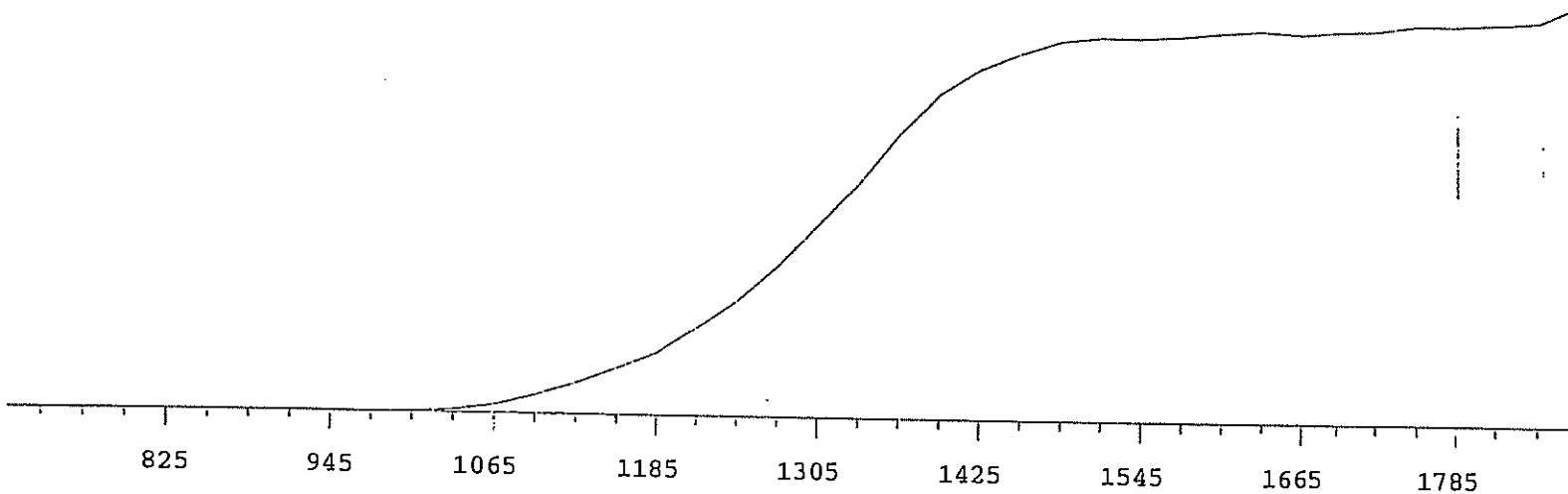
Instrument 9 MPC 9604 Detector B  
 Beta Volts: 1530

7/1/2009

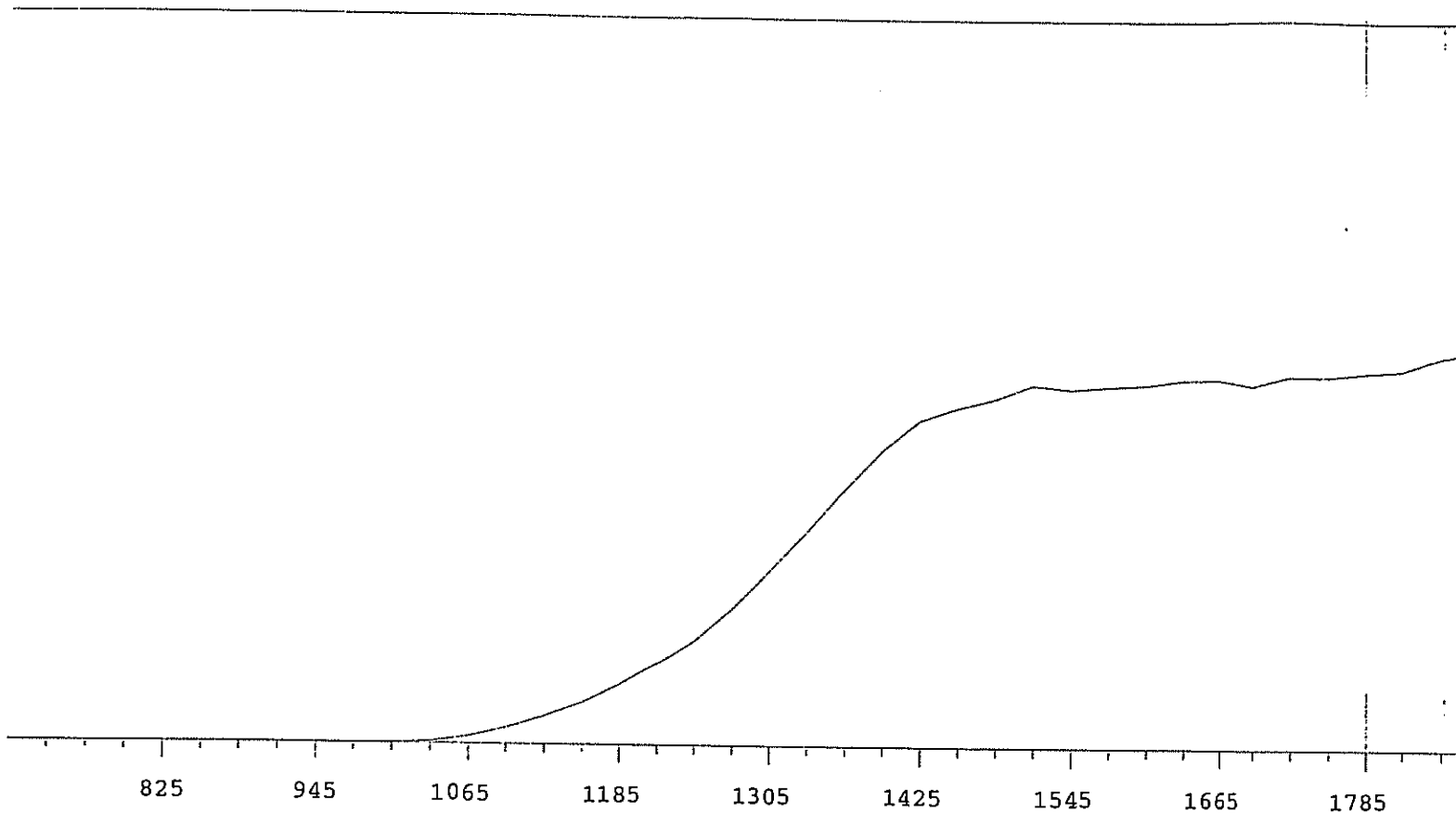


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	4	>100
1005	45	>100
1035	300	>100
1065	836	>100
1095	1742	>100
1125	2896	>100
1155	4198	>100
1185	5849	>100
1215	7887	+92.20
1245	10561	+83.55
1275	13442	+76.62
1305	16723	+68.78
1335	20749	+60.55
1365	24686	+48.78
1395	28343	+35.24
1425	30657	+24.31
1455	32208	+15.22
1485	33662	+9.32
1515	34098	+4.47
1545	34326	+2.17
1575	34133	+1.60
1605	34758	+1.41
1635	34706	+1.35
1665	34769	+0.30
1695	34830	-0.10
1725	34850	+0.90
1755	34613	+2.41
1785	35351	+3.87
1815	35849	+4.97
1845	36285	
1875	36814	

VOLTS	COUNTS	%/100 Volts
1305	16723	+68.78
1335	20749	+60.55
1365	24686	+48.78
1395	28343	+35.24
1425	30657	+24.31
1455	32208	+15.22
1485	33662	+9.32
1515	34098	+4.47
1545	34326	+2.17
1575	34133	+1.60
1605	34758	+1.41
1635	34706	+1.35
1665	34769	+0.30
1695	34830	-0.10
1725	34850	+0.90
1755	34613	+2.41
1785	35351	+3.87
1815	35849	+4.97
1845	36285	
1875	36814	

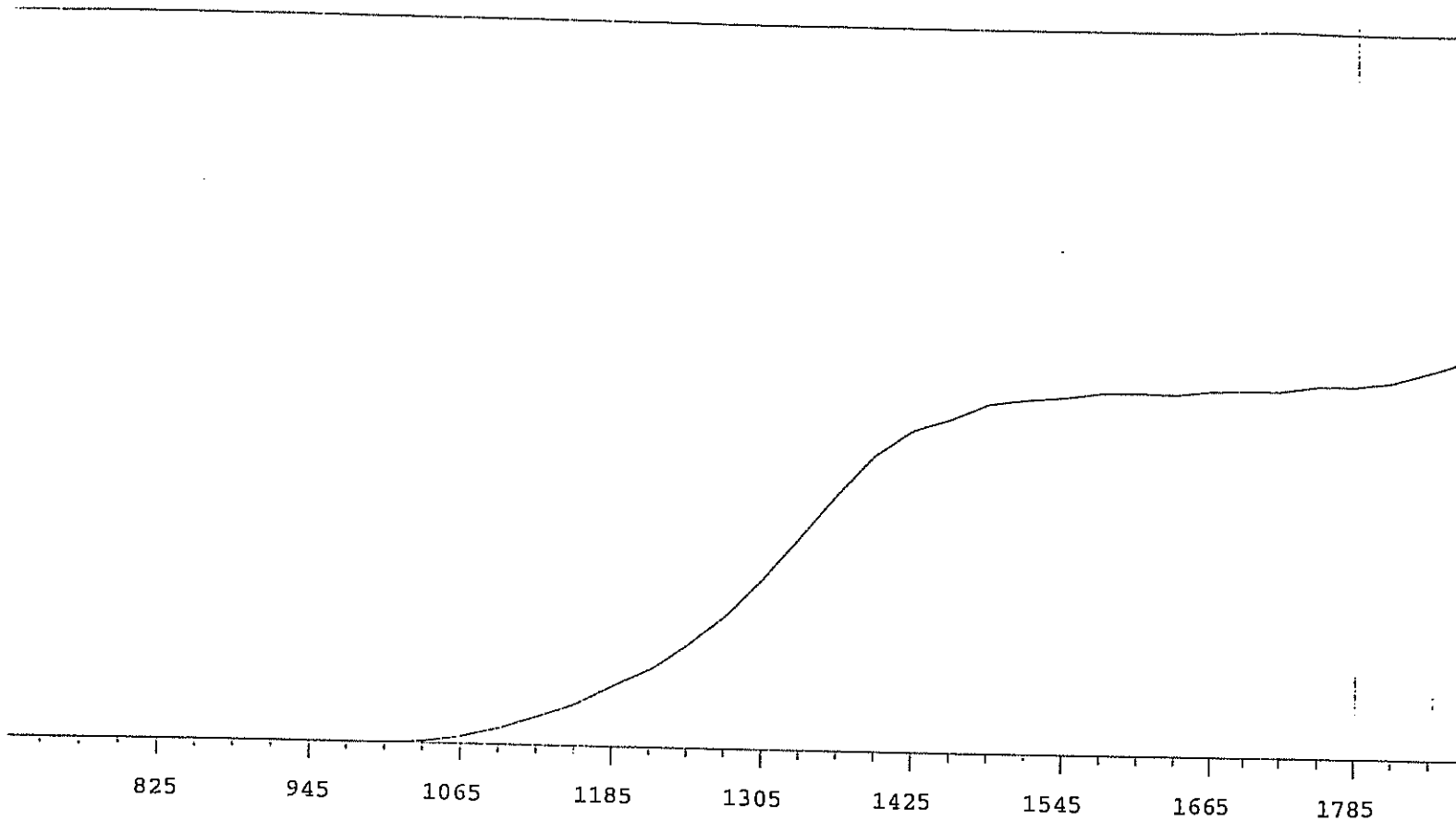


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	20192	+70.39
735	0		1335	24524	+60.97
765	0		1365	29650	+48.44
795	0	>100	1395	33904	+35.09
825	0	>100	1425	36549	+22.73
855	0	>100	1455	38217	+13.58
885	1	>100	1485	39628	+7.51
915	1	>100	1515	40035	+3.73
945	2	>100	1545	40020	+1.92
975	3	>100	1575	40236	+2.06
1005	64	>100	1605	40680	+1.62
1035	349	>100	1635	40953	+1.03
1065	970	>100	1665	40643	+0.43
1095	1982	>100	1695	40882	+1.41
1125	3328	>100	1725	40979	+2.18
1155	5012	>100	1755	41654	+2.20
1185	6669	>100	1785	41602	+2.27
1215	9448	+92.67	1815	41935	+4.50
1245	12293	+86.58	1845	42259	
1275	15917	+76.99	1875	44183	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	13319	+70.94
735	0		1335	16319	+61.35
765	0		1365	19577	+50.27
795	0	>100	1395	22498	+36.85
825	0	>100	1425	24782	+23.90
855	0	>100	1455	25761	+15.37
885	0	>100	1485	26486	+8.38
915	1	>100	1515	27503	+5.11
945	0	>100	1545	27223	+2.67
975	5	>100	1575	27453	+1.71
1005	35	>100	1605	27604	+2.70
1035	186	>100	1635	28021	+0.78
1065	618	>100	1665	28059	+1.05
1095	1280	>100	1695	27548	+0.90
1125	2141	>100	1725	28280	+2.16
1155	3268	>100	1755	28290	+3.51
1185	4659	>100	1785	28600	+4.46
1215	6343	+90.68	1815	28879	+6.35
1245	8064	+83.46	1845	29913	
1275	10497	+77.03	1875	30417	



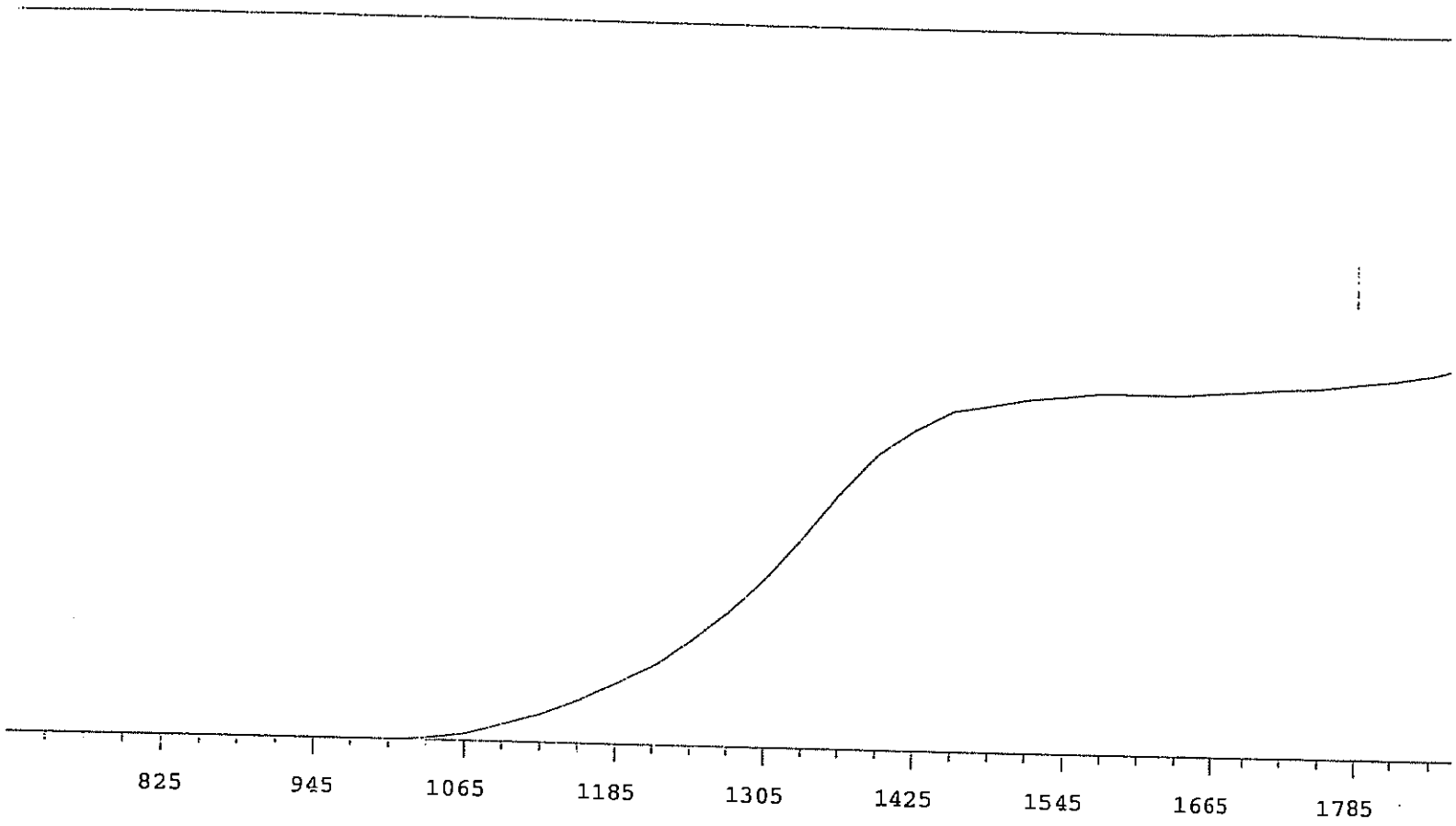


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	16076	+72.76
735	1		1335	19985	+63.85
765	0		1365	24102	+50.95
795	0	>100	1395	27819	+36.01
825	0	>100	1425	30228	+23.86
855	0	>100	1455	31343	+14.40
885	0	>100	1485	32811	+8.77
915	0	>100	1515	33243	+6.10
945	0	>100	1545	33518	+3.25
975	1	>100	1575	34010	+1.98
1005	37	>100	1605	34061	+1.59
1035	198	>100	1635	33973	+0.97
1065	687	>100	1665	34346	+0.93
1095	1491	>100	1695	34366	+1.72
1125	2580	>100	1725	34341	+1.54
1155	3920	>100	1755	34860	+2.47
1185	5588	>100	1785	34897	+4.50
1215	7384	+91.32	1815	35377	+6.60
1245	9794	+84.81	1845	36458	
1275	12572	+79.73	1875	37630	

MPC 9600 Plateau  
 Alpha Volts: 870

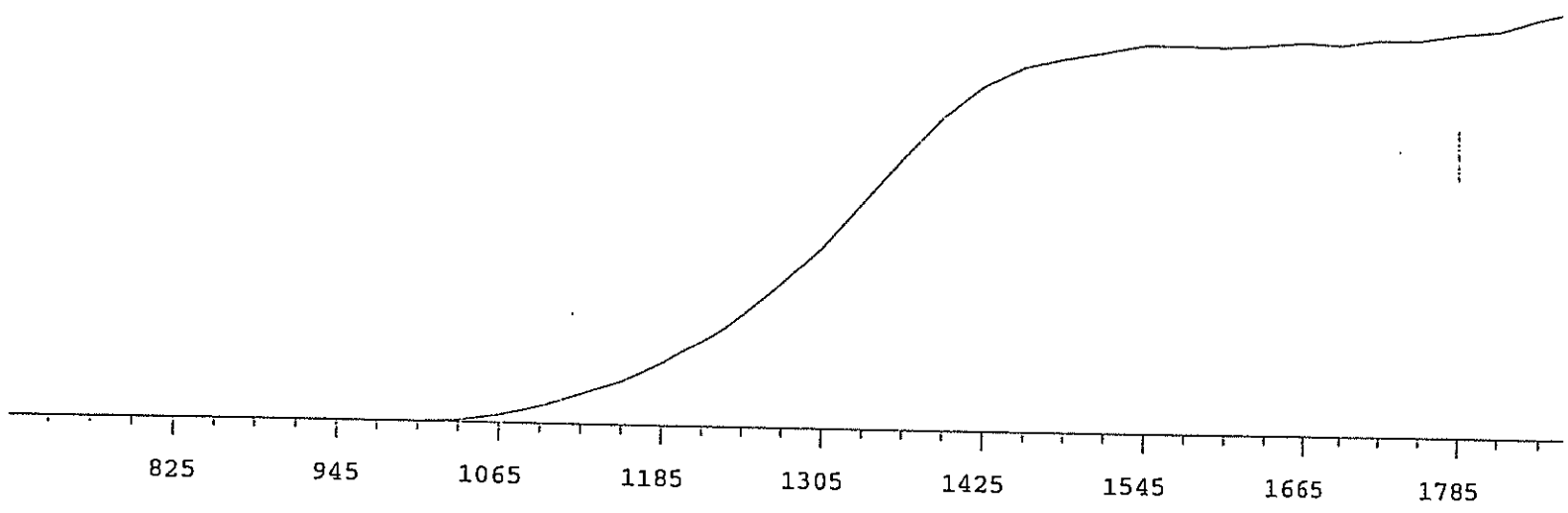
Instrument 10 MPC 9604 Detector B  
 Beta Volts: 1552

7/1/2009

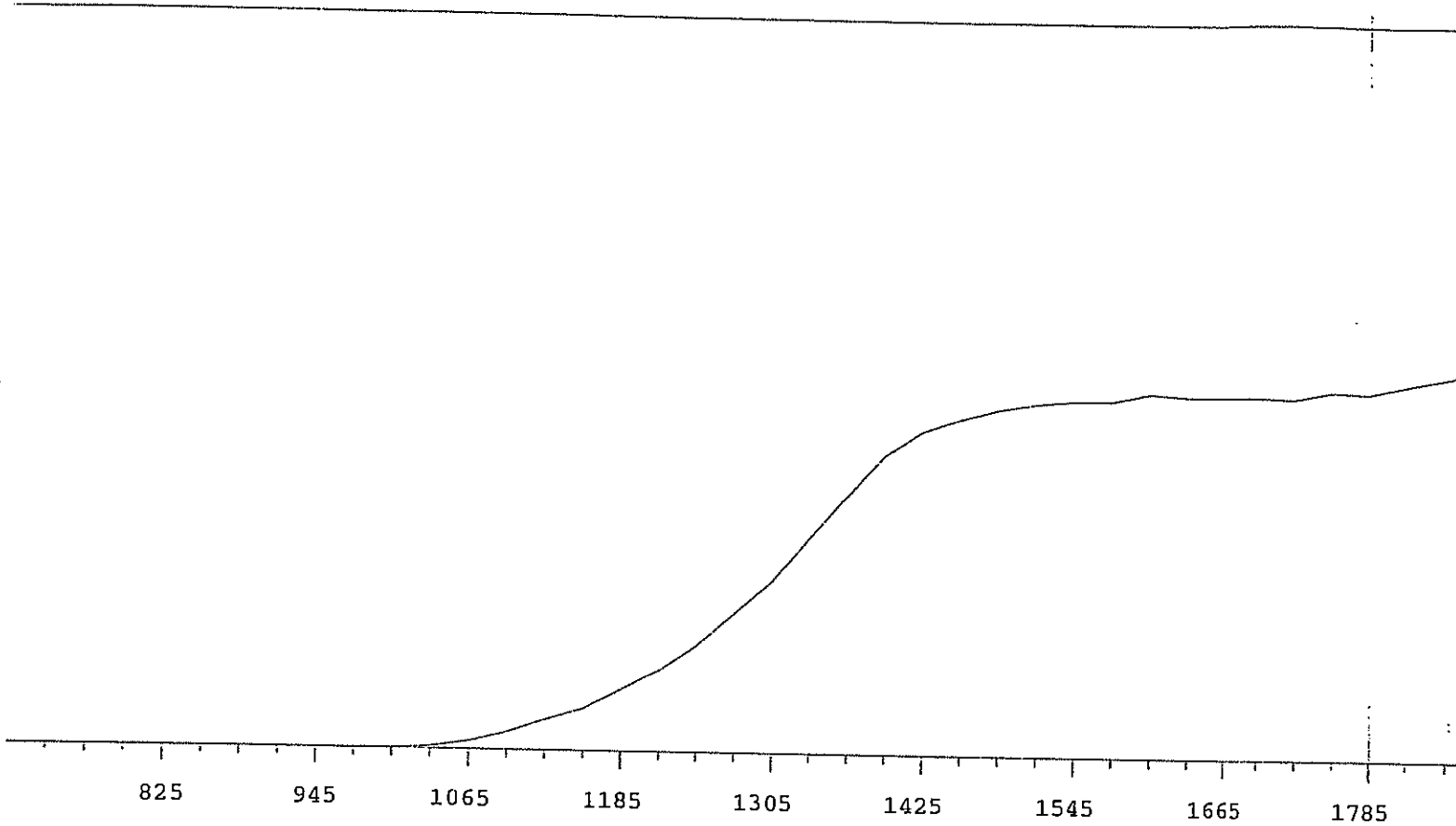


VOLTS	COUNTS	%/100 Volts
705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	1	>100
975	7	>100
1005	28	>100
1035	190	>100
1065	597	>100
1095	1474	>100
1125	2383	>100
1155	3680	>100
1185	5131	>100
1215	6808	+89.95
1245	8990	+83.03
1275	11493	+77.30

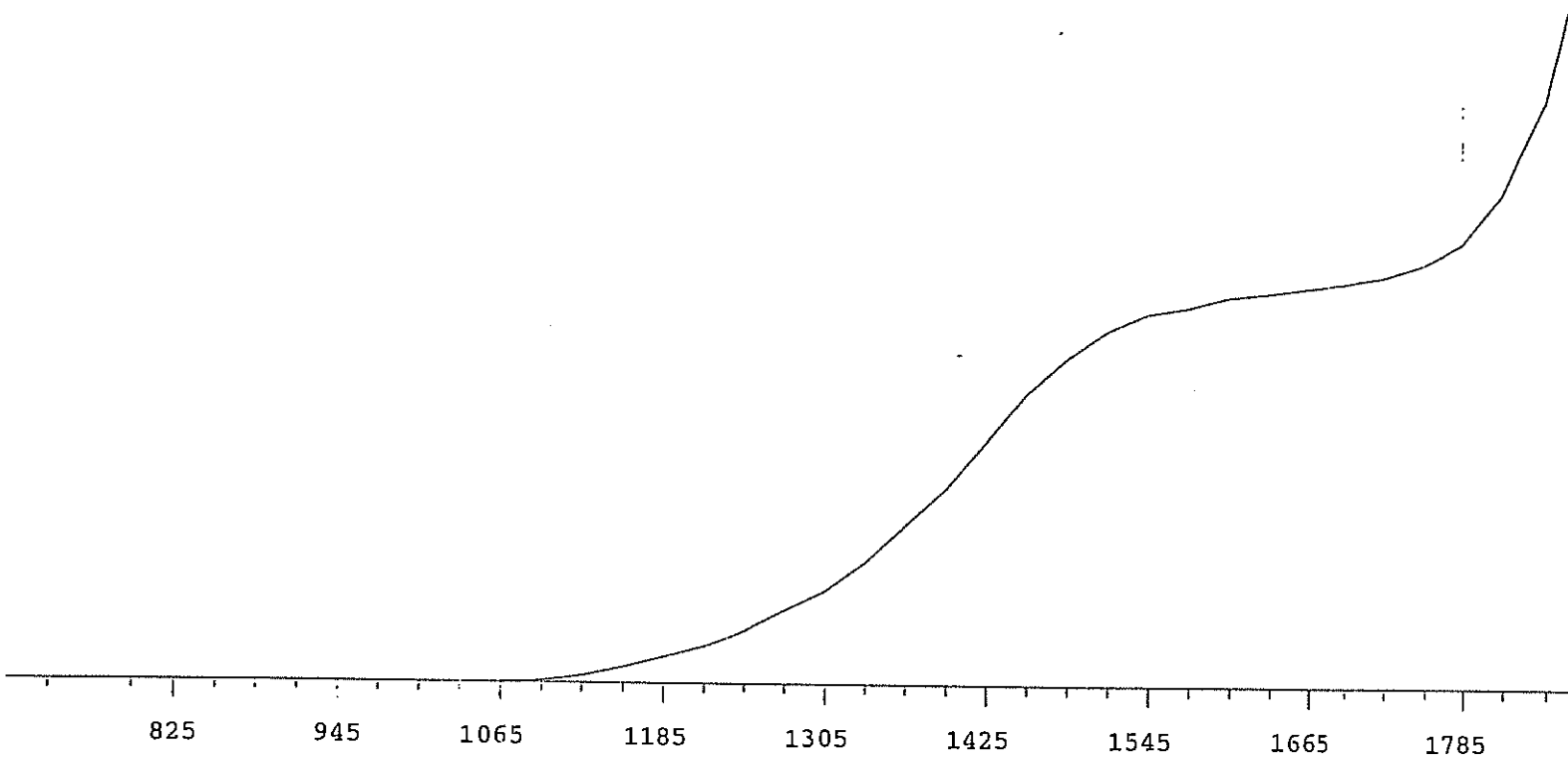
VOLTS	COUNTS	%/100 Volts
1305	14469	+71.08
1335	17904	+63.07
1365	21677	+51.20
1395	25027	+38.06
1425	27237	+24.55
1455	28914	+14.61
1485	29480	+8.48
1515	30075	+5.06
1545	30374	+3.42
1575	30738	+1.68
1605	30703	+1.08
1635	30679	+0.77
1665	30902	+1.46
1695	30992	+1.89
1725	31224	+2.40
1755	31397	+3.27
1785	31826	+4.13
1815	32236	+5.59
1845	32782	
1875	33632	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	1		1305	18051	+71.16
735	0		1335	22586	+62.34
765	0		1365	26973	+51.47
795	0	>100	1395	31137	+38.24
825	0	>100	1425	34321	+25.70
855	0	>100	1455	36267	+15.37
885	1	>100	1485	37197	+9.21
915	0	>100	1515	37851	+5.38
945	2	>100	1545	38622	+3.00
975	2	>100	1575	38600	+1.55
1005	36	>100	1605	38538	+1.03
1035	220	>100	1635	38786	+0.91
1065	780	>100	1665	39129	+1.38
1095	1712	>100	1695	38832	+1.20
1125	2926	>100	1725	39323	+2.00
1155	4297	>100	1755	39390	+3.35
1185	6097	>100	1785	40031	+4.86
1215	8397	+95.11	1815	40466	+6.64
1245	11155	+85.84	1845	41713	
1275	14430	+78.79	1875	42620	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	15430	+69.87
735	0		1335	19258	+61.49
765	0		1365	23018	+50.06
795	0	>100	1395	26562	+35.34
825	0	>100	1425	28750	+22.67
855	0	>100	1455	29911	+13.20
885	0	>100	1485	30798	+8.01
915	0	>100	1515	31375	+4.83
945	0	>100	1545	31684	+3.74
975	3	>100	1575	31721	+2.38
1005	49	>100	1605	32398	+1.44
1035	244	>100	1635	32154	+0.64
1065	764	>100	1665	32157	-0.77
1095	1584	>100	1695	32152	+0.99
1125	2677	>100	1725	32029	+1.41
1155	3763	>100	1755	32699	+3.00
1185	5395	>100	1785	32566	+4.71
1215	7350	+93.71	1815	33351	+5.92
1245	9655	+83.52	1845	34031	
1275	12504	+76.82	1875	34941	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	3225	+87.64
735	1		1335	4189	+80.15
765	0		1365	5428	+75.12
795	0	>100	1395	6662	+68.60
825	0	>100	1425	8241	+58.14
855	0	>100	1455	9857	+46.65
885	0	>100	1485	11018	+33.24
915	0	>100	1515	11953	+21.01
945	1	+0.00	1545	12538	+13.57
975	0	>100	1575	12760	+8.35
1005	0	>100	1605	13114	+5.84
1035	2	>100	1635	13258	+4.78
1065	9	>100	1665	13430	+3.99
1095	61	>100	1695	13551	+5.46
1125	248	>100	1725	13771	+8.65
1155	528	>100	1755	14204	+16.44
1185	882	>100	1785	14916	+30.03
1215	1270	>100	1815	16579	+48.74
1245	1786	>100	1845	19717	
1275	2478	+93.67	1875	25029	

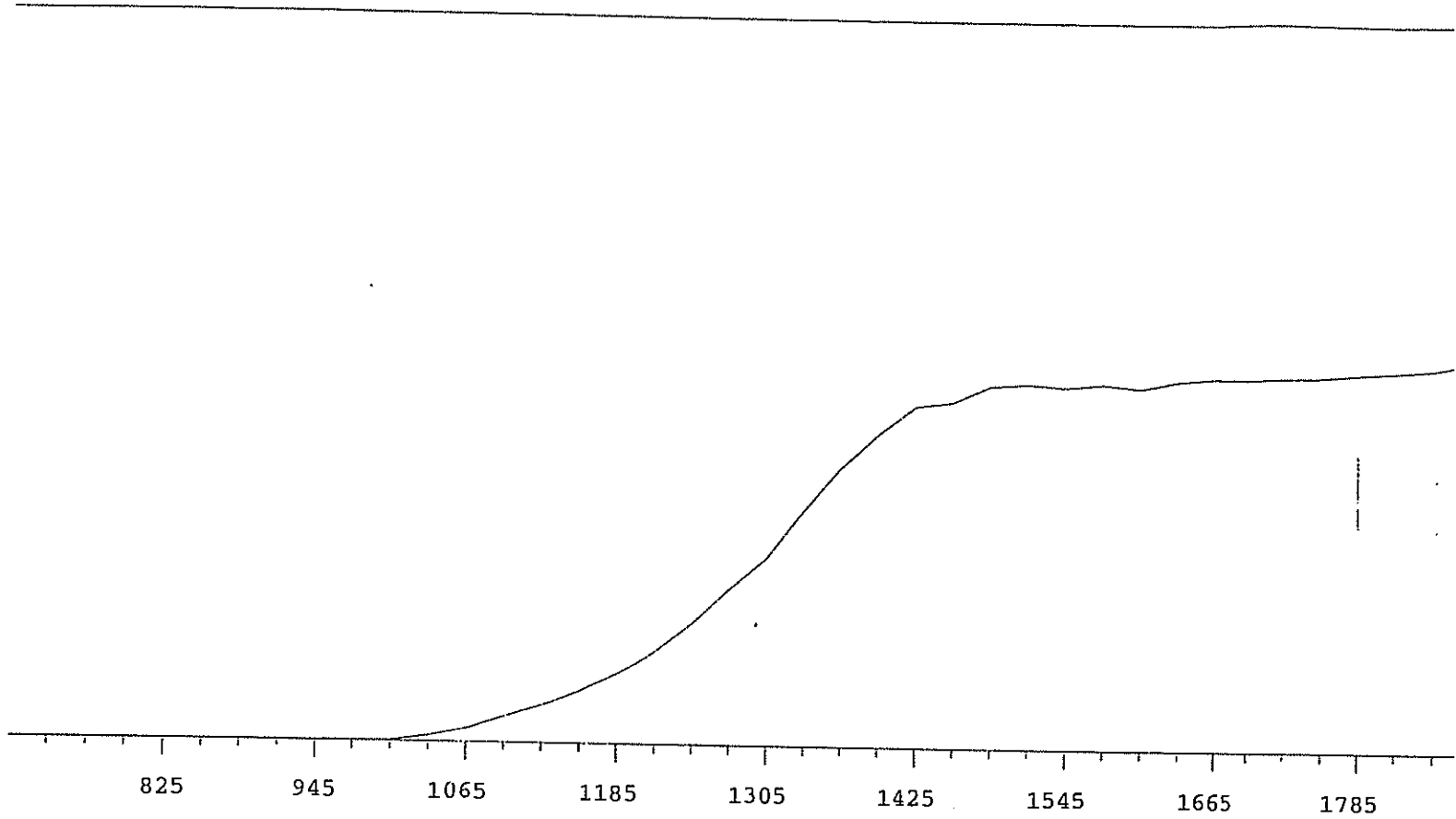
Plateau 7/1/09

Instrument 11 MPC 9604 Detector B

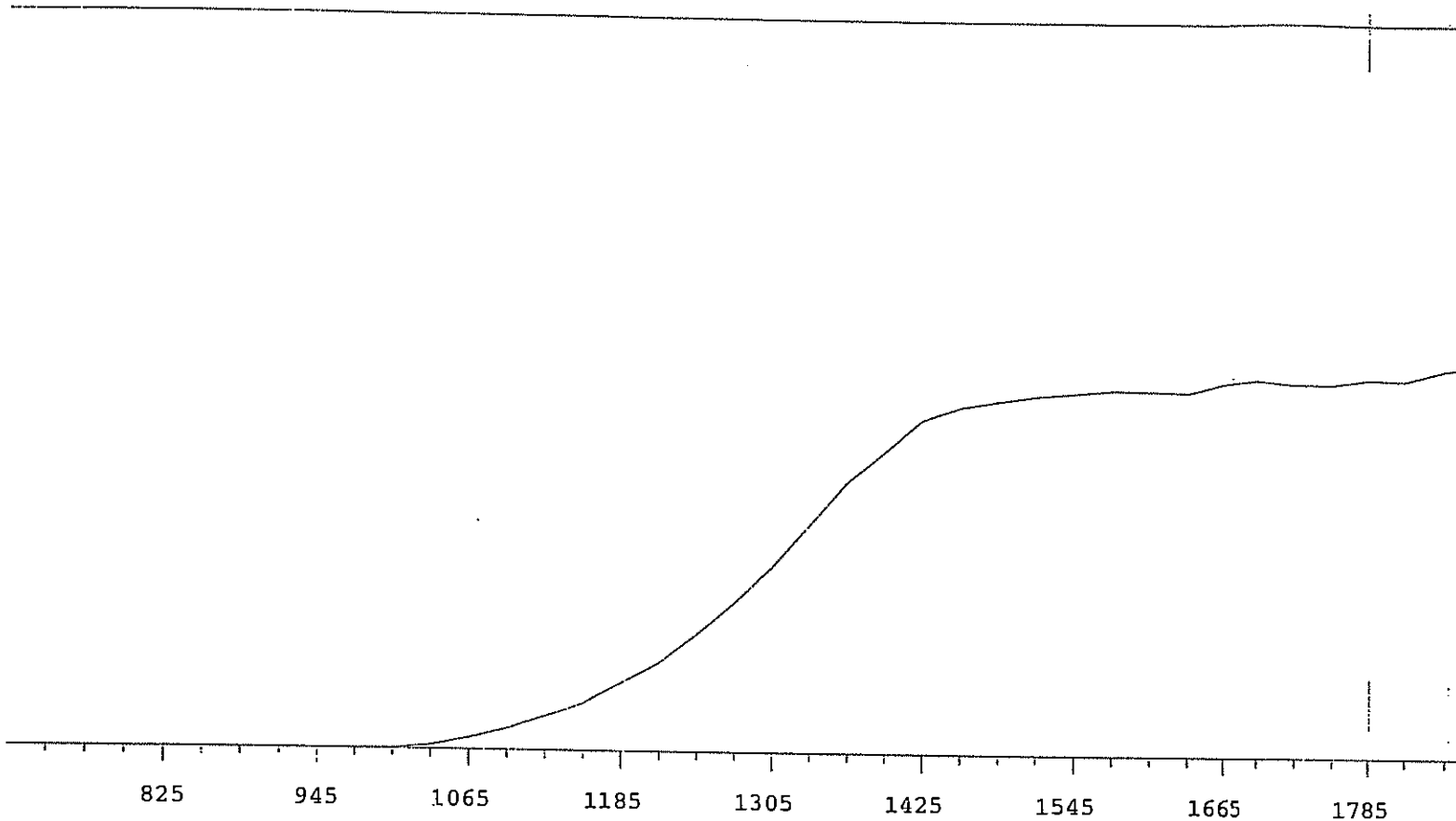
7/1/2009

Alpha Volts: 1515

Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8947	+65.63
735	0		1335	11238	+56.58
765	0		1365	13246	+46.66
795	0	>100	1395	14838	+30.69
825	0	>100	1425	16166	+20.11
855	0	>100	1455	16396	+11.95
885	0	>100	1485	17161	+5.61
915	1	>100	1515	17274	+3.59
945	0	>100	1545	17144	-0.00
975	11	>100	1575	17323	+0.80
1005	47	>100	1605	17136	+2.21
1035	280	>100	1635	17484	+1.94
1065	610	>100	1665	17638	+2.16
1095	1192	>100	1695	17580	+0.85
1125	1789	>100	1725	17655	+1.05
1155	2466	>100	1755	17700	+1.98
1185	3337	+94.91	1785	17857	+2.38
1215	4526	+88.85	1815	18006	+3.36
1245	5885	+78.40	1845	18140	
1275	7518	+72.09	1875	18468	

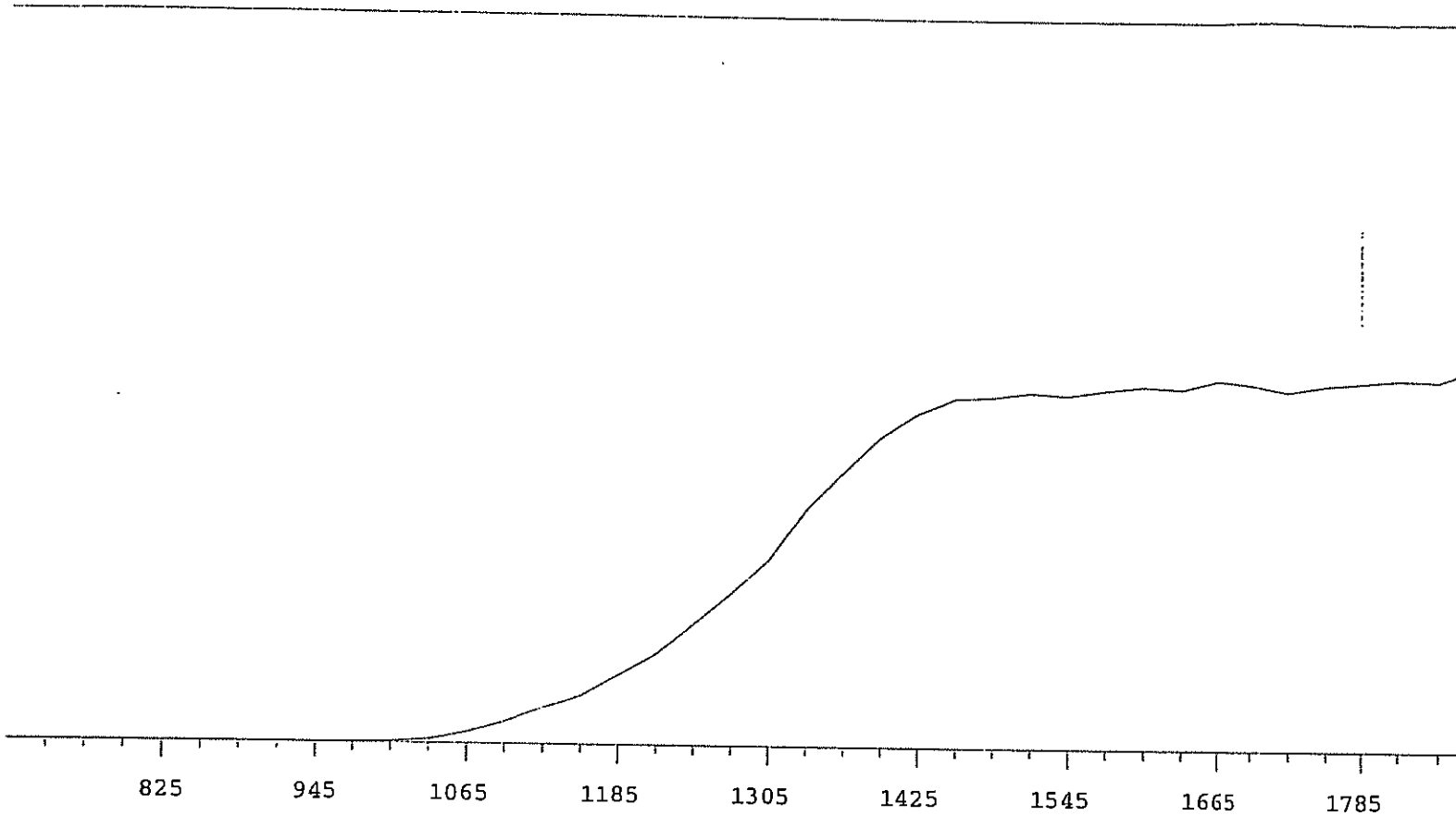


VOLTS	COUNTS	%/100 Volts
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VOLTS	COUNTS	%/100 Volts
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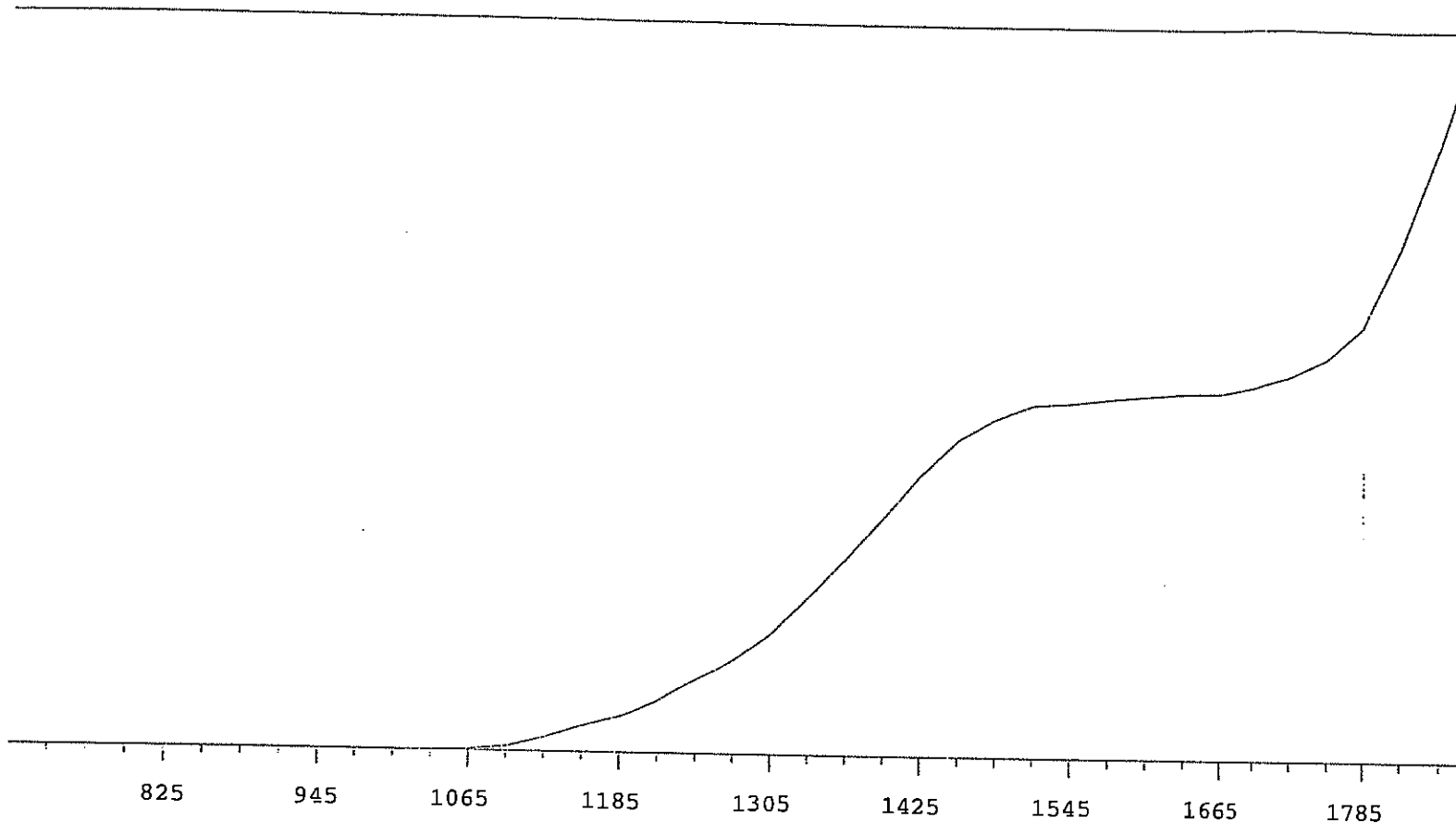
705	1	
735	0	
765	0	+0.00
795	0	>100
825	1	+0.00
855	0	>100
885	0	+0.00
915	0	>100
945	1	>100
975	7	>100
1005	46	>100
1035	191	>100
1065	540	>100
1095	957	>100
1125	1597	>100
1155	2217	>100
1185	3154	+98.74
1215	4239	+89.75
1245	5550	+79.98
1275	6980	+73.12

1305	8636	+66.44
1335	10593	+56.56
1365	12582	+46.23
1395	13957	+33.45
1425	15443	+21.49
1455	16048	+13.14
1485	16331	+6.45
1515	16603	+4.19
1545	16736	+2.73
1575	16884	+1.11
1605	16875	+1.91
1635	16813	+2.86
1665	17257	+2.60
1695	17425	+1.58
1725	17238	+0.49
1755	17230	+0.63
1785	17482	+3.27
1815	17468	+4.46
1845	17977	
1875	18163	

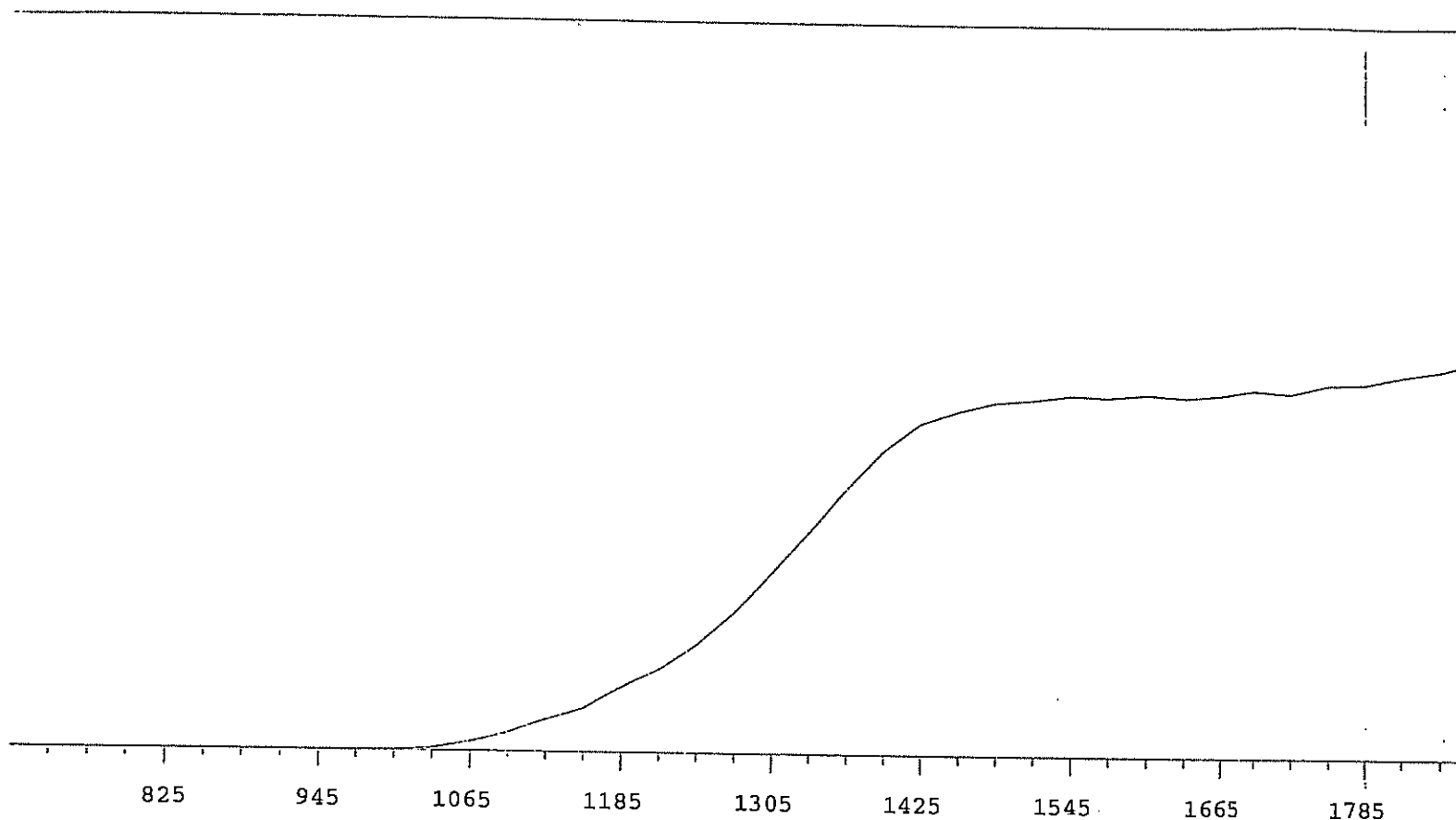


VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	7679	+65.97
735	0		1335	9737	+57.57
765	0		1365	11301	+45.87
795	0	>100	1395	12767	+31.71
825	0	>100	1425	13767	+19.90
855	1	+83.33	1455	14399	+10.72
885	1	+55.56	1485	14467	+4.38
915	0	>100	1515	14671	+2.12
945	1	>100	1545	14576	+2.61
975	9	>100	1575	14808	+1.80
1005	60	>100	1605	14974	+3.15
1035	173	>100	1635	14872	+1.76
1065	480	>100	1665	15248	-0.41
1095	911	>100	1695	15067	-0.27
1125	1508	>100	1725	14784	-0.43
1155	2024	>100	1755	15044	+2.01
1185	2872	+97.38	1785	15163	+2.82
1215	3858	+89.30	1815	15333	+3.61
1245	5070	+78.02	1845	15278	
1275	6322	+73.30	1875	15817	

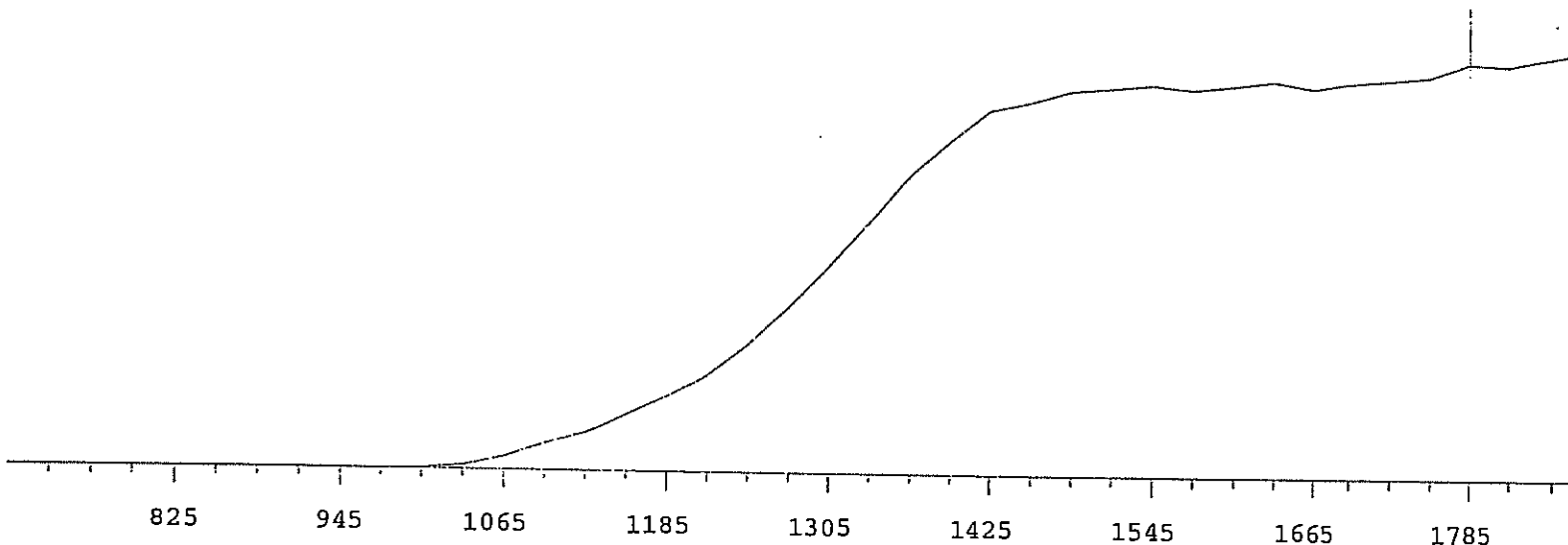




VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	6302	+80.03
735	1		1335	8191	+73.78
765	0		1365	10140	+66.18
795	0	>100	1395	12247	+55.83
825	0	>100	1425	14468	+43.92
855	0	>100	1455	16303	+31.28
885	0	>100	1485	17411	+18.64
915	0	>100	1515	18150	+9.87
945	0	>100	1545	18275	+5.30
975	1	>100	1575	18496	+3.16
1005	3	>100	1605	18685	+2.66
1035	17	>100	1635	18820	+2.63
1065	84	>100	1665	18855	+4.16
1095	267	>100	1695	19152	+7.70
1125	709	>100	1725	19706	+13.90
1155	1299	>100	1755	20640	+26.51
1185	1813	>100	1785	22308	+40.92
1215	2638	>100	1815	26460	+51.46
1245	3777	+96.47	1845	31616	
1275	4915	+87.98	1875	37348	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	10207	+70.42
735	0		1335	12473	+60.75
765	0		1365	14900	+48.87
795	0	>100	1395	17101	+35.36
825	0	>100	1425	18643	+22.53
855	1	+83.33	1455	19350	+12.34
885	1	-83.33	1485	19848	+6.68
915	0	-55.56	1515	20014	+3.51
945	0	>100	1545	20278	+2.03
975	1	>100	1575	20186	+0.80
1005	43	>100	1605	20375	+0.32
1035	165	>100	1635	20209	+1.36
1065	557	>100	1665	20364	+0.83
1095	1055	>100	1695	20607	+2.43
1125	1775	>100	1725	20429	+2.51
1155	2470	>100	1755	20924	+3.64
1185	3617	+98.46	1785	20984	+5.11
1215	4757	+90.95	1815	21470	+5.63
1245	6186	+83.59	1845	21773	
1275	8021	+77.85	1875	22346	

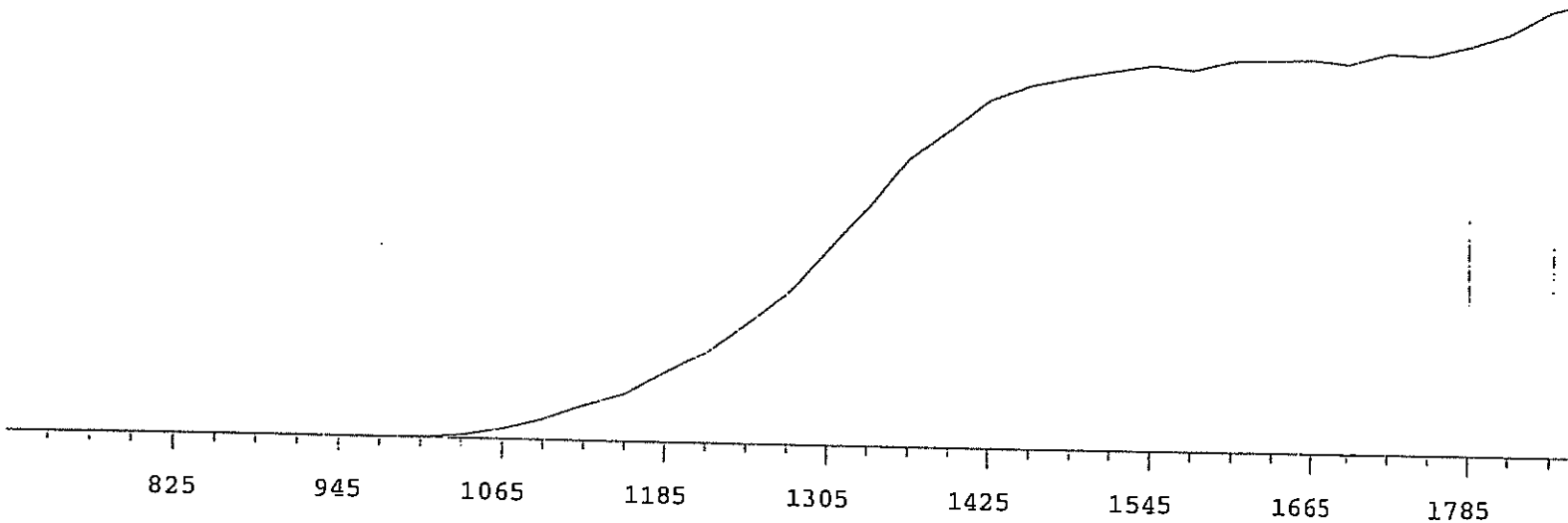


VOLTS	COUNTS	%/100 Volts
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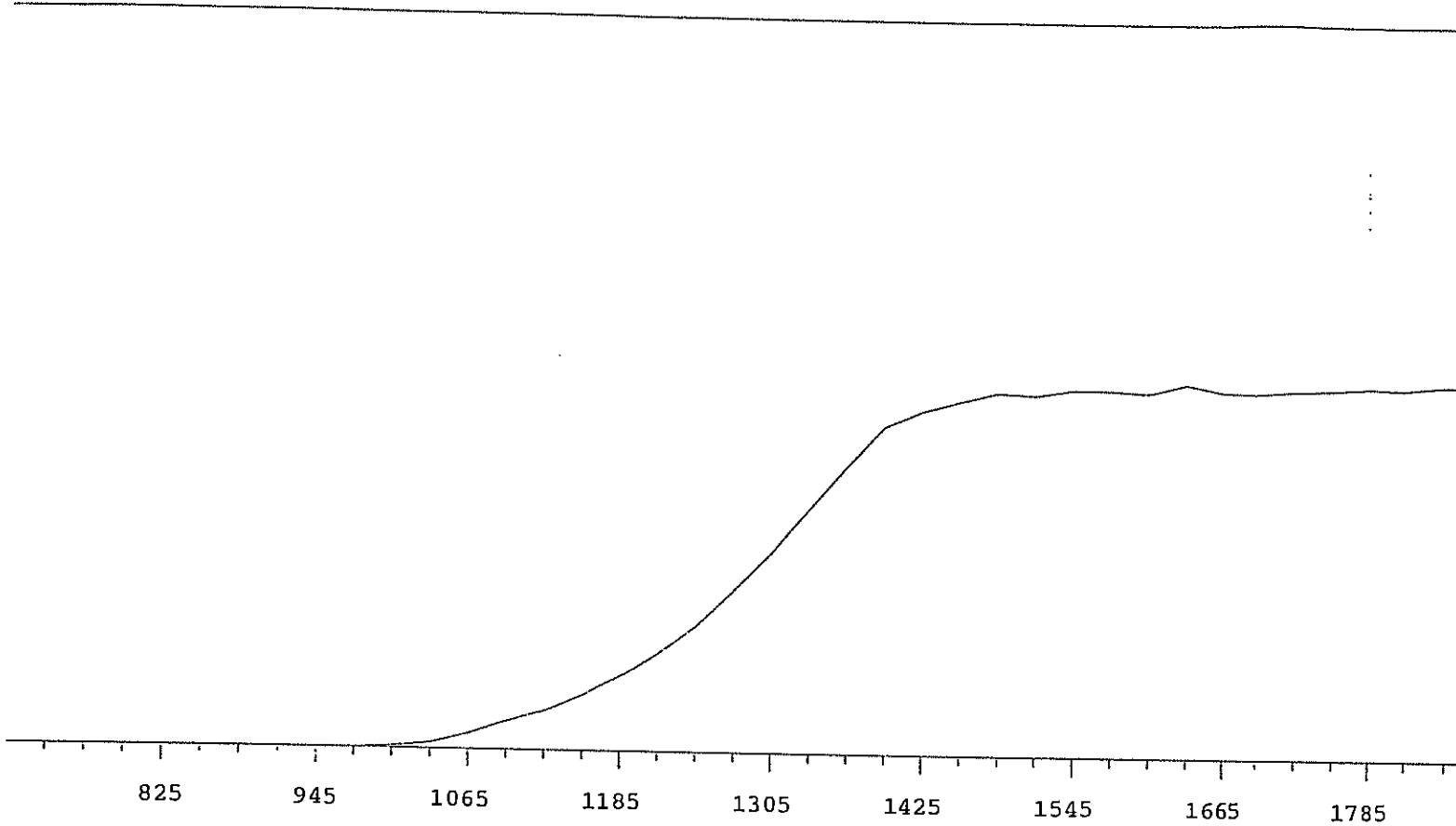
VOLTS	COUNTS	%/100 Volts
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705	1	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	1	+0.00
915	0	>100
945	0	>100
975	7	>100
1005	52	>100
1035	214	>100
1065	590	>100
1095	1201	>100
1125	1759	>100
1155	2569	>100
1185	3440	+95.13
1215	4583	+87.74
1245	5985	+81.67
1275	7682	+74.54

1305	9543	+67.01
1335	11617	+56.47
1365	13791	+45.47
1395	15387	+31.66
1425	16819	+20.02
1455	17210	+11.63
1485	17742	+6.05
1515	17892	+3.04
1545	18070	+1.09
1575	17856	+1.43
1605	18054	+0.42
1635	18287	+1.06
1665	17969	+0.78
1695	18187	+1.48
1725	18317	+4.89
1755	18518	+4.76
1785	19156	+5.18
1815	19100	+5.18
1845	19496	
1875	19842	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	9144	+69.92
735	0		1335	11120	+58.43
765	0		1365	13399	+45.40
795	0	>100	1395	14711	+32.57
825	0	>100	1425	16134	+20.69
855	0	>100	1455	16805	+13.46
885	0	>100	1485	17209	+7.90
915	0	>100	1515	17500	+4.31
945	0	>100	1545	17812	+3.48
975	4	>100	1575	17629	+2.80
1005	26	>100	1605	18066	+2.23
1035	169	>100	1635	18122	+1.44
1065	483	>100	1665	18166	+1.20
1095	955	>100	1695	17967	+1.60
1125	1639	>100	1725	18469	+3.41
1155	2233	>100	1755	18409	+6.35
1185	3262	+98.61	1785	18884	+9.47
1215	4306	+89.77	1815	19535	+11.98
1245	5662	+82.36	1845	20630	
1275	7113	+76.36	1875	21076	



VOLTS	COUNTS	%/100 Volts
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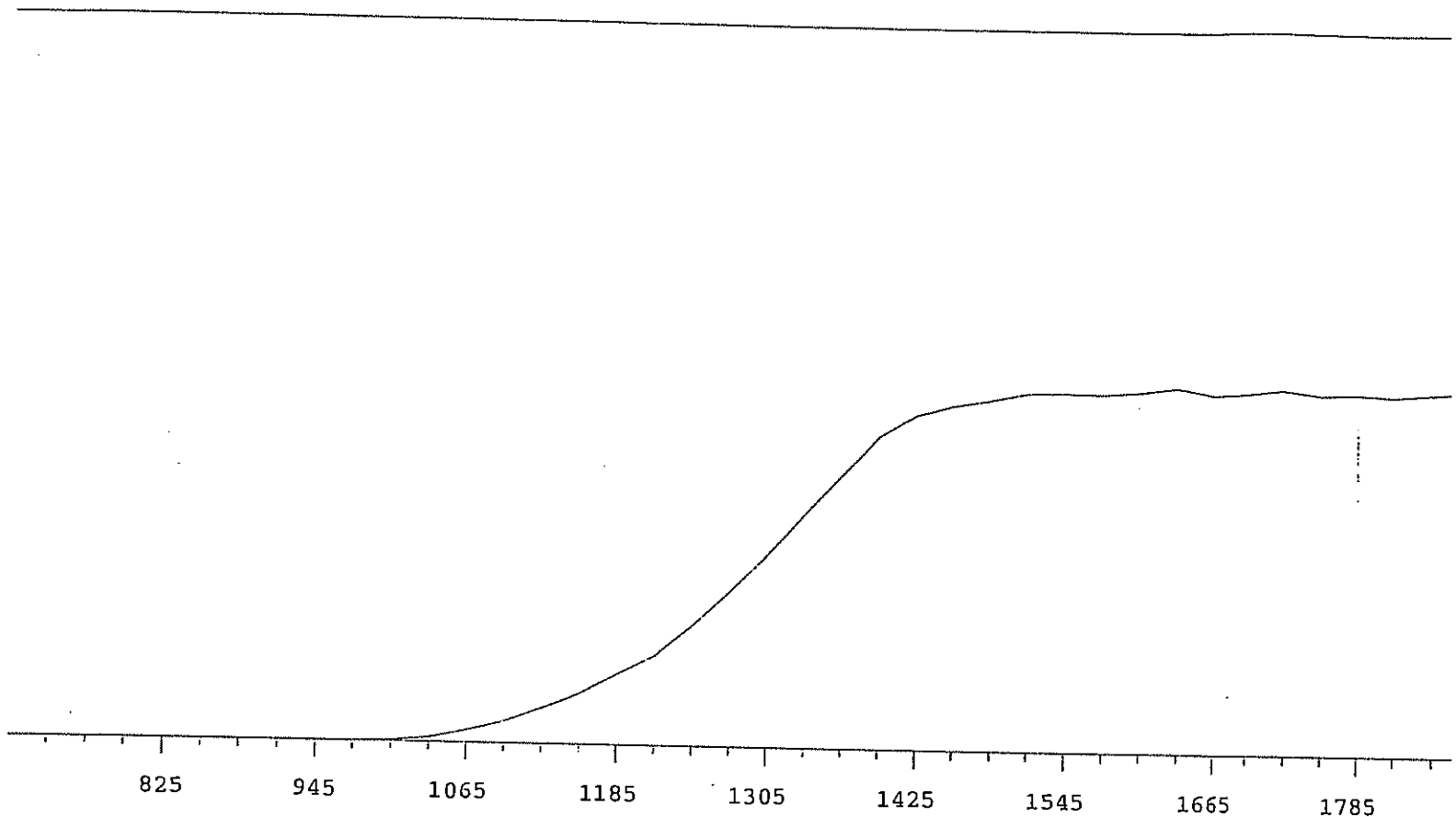
VOLTS	COUNTS	%/100 Volts
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705	0	
735	1	
765	0	+55.56
795	2	>100
825	0	+0.00
855	0	>100
885	1	>100
915	0	>100
945	1	>100
975	14	>100
1005	104	>100
1035	281	>100
1065	720	>100
1095	1302	>100
1125	1834	>100
1155	2544	>100
1185	3485	+92.28
1215	4624	+85.50
1245	5878	+77.82
1275	7515	+71.49

1305	9209	+64.55
1335	11200	+55.94
1365	13123	+43.27
1395	14957	+29.04
1425	15658	+17.41
1455	16123	+8.01
1485	16530	+4.92
1515	16437	+2.71
1545	16704	+0.83
1575	16707	+2.14
1605	16602	+0.55
1635	17024	-0.28
1665	16684	-0.42
1695	16597	-0.85
1725	16711	+1.27
1755	16796	+1.51
1785	16903	+1.57
1815	16880	+1.46
1845	17066	
1875	17085	

Plateau 7/1/09  
 Alpha Volts: 705

Instrument 13 MPC 9604 Detector B 7/1/2009  
 Beta Volts: 1515



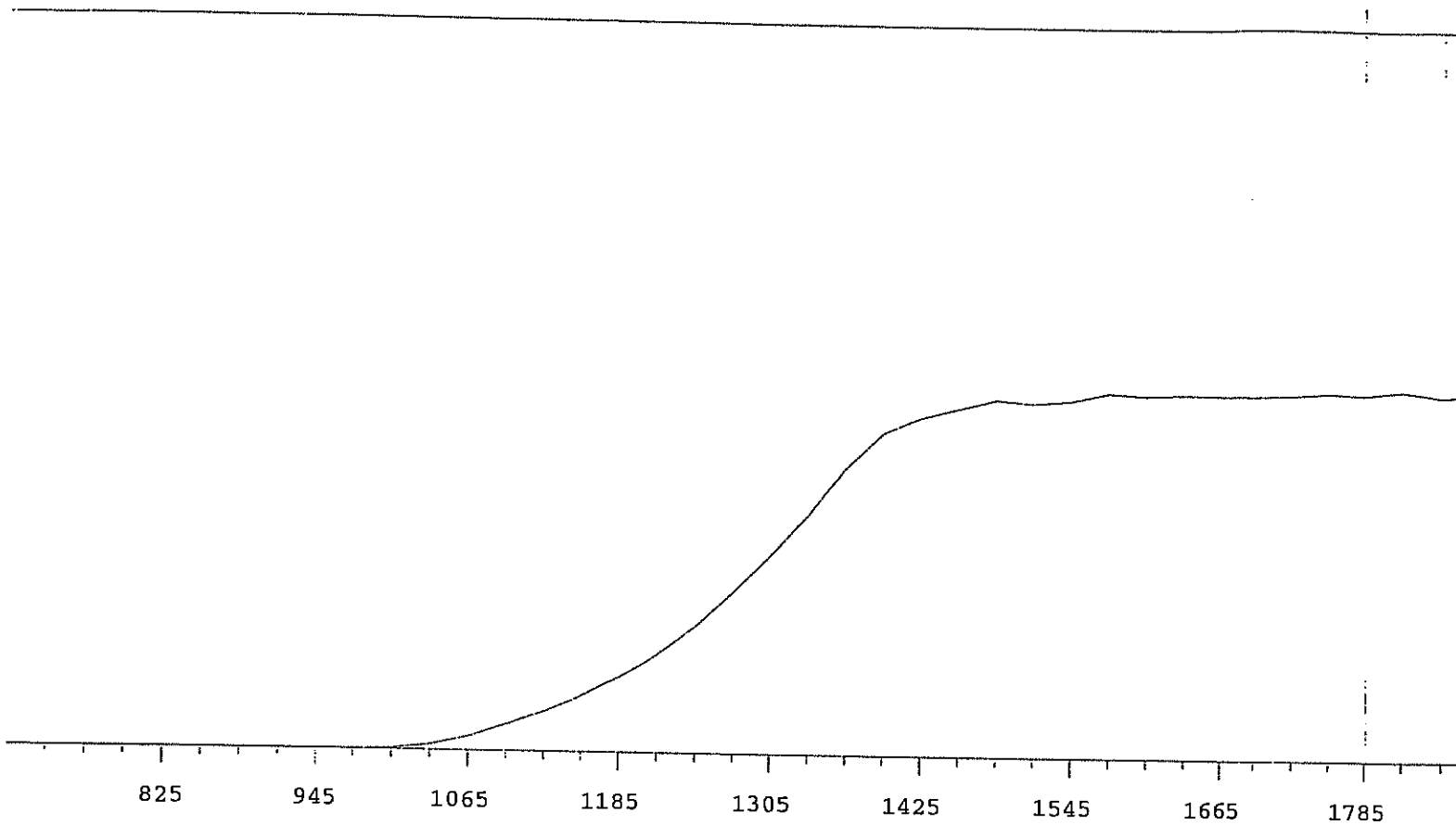
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	9666	+64.39
735	0		1335	11722	+55.91
765	0		1365	13680	+44.91
795	0	>100	1395	15677	+31.56
825	0	>100	1425	16786	+19.46
855	0	>100	1455	17283	+10.57
885	0	>100	1485	17608	+5.95
915	1	>100	1515	17972	+3.32
945	0	>100	1545	18006	+1.84
975	4	>100	1575	17970	+1.58
1005	70	>100	1605	18104	+0.74
1035	257	>100	1635	18351	+0.24
1065	648	>100	1665	18016	+0.16
1095	1116	>100	1695	18080	-0.63
1125	1784	>100	1725	18283	+0.29
1155	2560	>100	1755	18047	-0.47
1185	3531	+96.11	1785	18110	-0.32
1215	4568	+89.22	1815	18040	+1.17
1245	6137	+81.65	1845	18200	
1275	7855	+74.42	1875	18320	

Plateau 7/1/09

Instrument 13 MPC 9604 Detector C

7/1/2009

Alpha Volts: 705 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	11573	+64.95
735	0		1335	13929	+56.47
765	0		1365	16726	+43.82
795	0	>100	1395	18834	+29.38
825	0	>100	1425	19743	+16.84
855	0	>100	1455	20314	+7.95
885	0	>100	1485	20860	+4.16
915	0	>100	1515	20670	+3.23
945	0	>100	1545	20844	+2.09
975	9	>100	1575	21330	+2.48
1005	93	>100	1605	21188	+1.16
1035	325	>100	1635	21280	-0.32
1065	834	>100	1665	21237	+0.08
1095	1525	>100	1695	21202	+0.42
1125	2318	>100	1725	21254	+0.60
1155	3233	>100	1755	21406	+1.41
1185	4357	+92.07	1785	21326	+0.42
1215	5755	+85.64	1815	21619	+0.16
1245	7438	+78.35	1845	21282	
1275	9463	+70.89	1875	21478	

Plateau 7/1/09

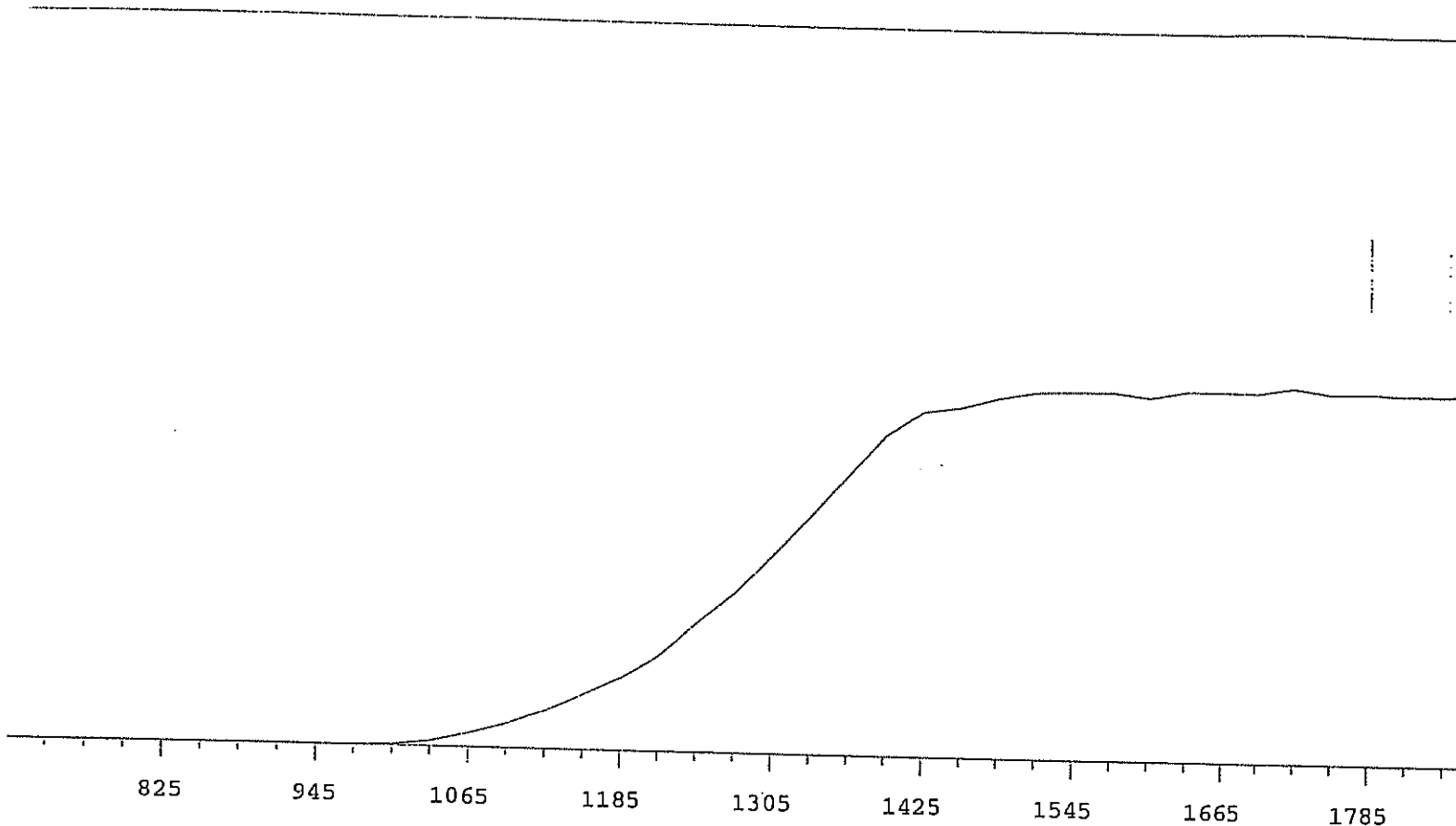
Instrument 13

MPC 9604 Detector D

7/1/2009

Alpha Volts: 705

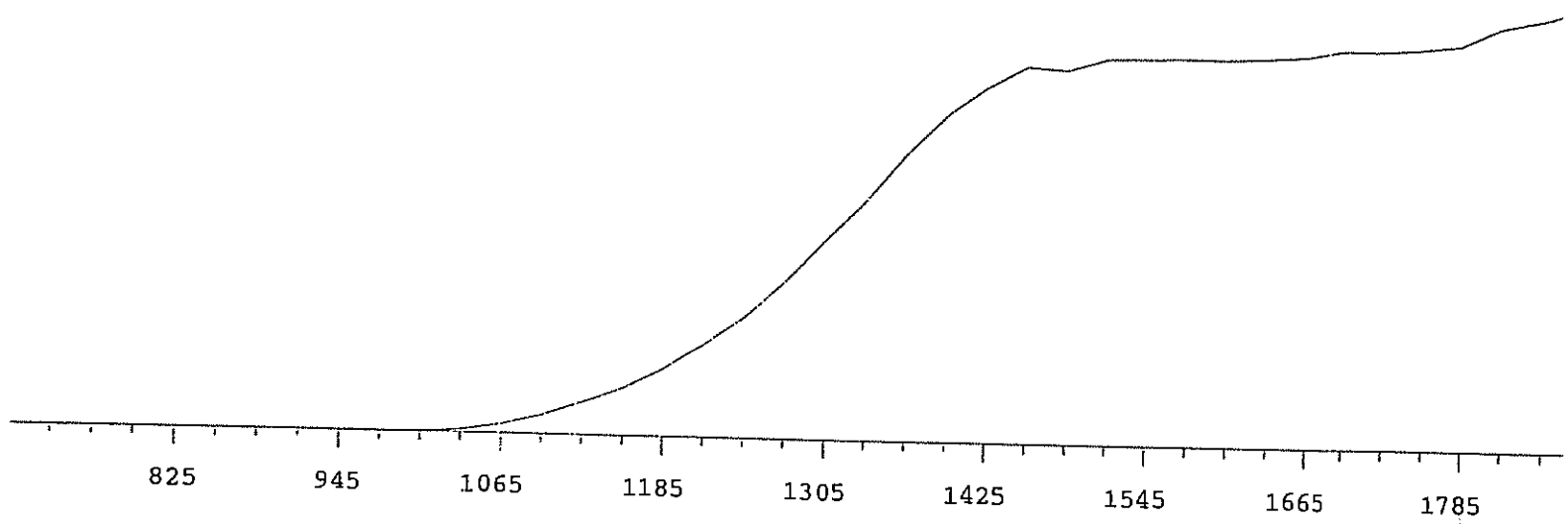
Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts
705	1	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	0	>100
915	0	>100
945	0	>100
975	9	>100
1005	58	>100
1035	228	>100
1065	544	>100
1095	936	>100
1125	1468	>100
1155	2110	>100
1185	2770	+94.71
1215	3670	+85.91
1245	4937	+79.46
1275	6066	+70.79
1305	7524	+61.93
1335	9002	+55.36
1365	10542	+44.70
1395	12064	+31.21
1425	12981	+19.20
1455	13192	+10.41
1485	13570	+5.93
1515	13820	+4.08
1545	13866	+0.75
1575	13880	+0.21
1605	13695	+0.59
1635	13950	+0.77
1665	13954	+1.92
1695	13911	+0.19
1725	14116	+0.02
1755	13908	-0.24
1785	13960	-0.81
1815	13939	+0.71
1845	13931	
1875	14071	

VOLTS	COUNTS	%/100 Volts
1305	7524	+61.93
1335	9002	+55.36
1365	10542	+44.70
1395	12064	+31.21
1425	12981	+19.20
1455	13192	+10.41
1485	13570	+5.93
1515	13820	+4.08
1545	13866	+0.75
1575	13880	+0.21
1605	13695	+0.59
1635	13950	+0.77
1665	13954	+1.92
1695	13911	+0.19
1725	14116	+0.02
1755	13908	-0.24
1785	13960	-0.81
1815	13939	+0.71
1845	13931	
1875	14071	





VOLTS	COUNTS	%/100 Volts
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VOLTS	COUNTS	%/100 Volts
-------	--------	-------------

705	0	
735	0	
765	0	
795	0	>100
825	0	>100
855	0	>100
885	1	+0.00
915	0	>100
945	0	>100
975	0	>100
1005	18	>100
1035	137	>100
1065	430	>100
1095	865	>100
1125	1444	>100
1155	2151	>100
1185	2981	>100
1215	4168	+92.14
1245	5377	+84.73
1275	6924	+74.92

1305	8778	+67.49
1335	10502	+57.68
1365	12516	+46.36
1395	14215	+35.88
1425	15472	+22.01
1455	16469	+12.99
1485	16342	+6.70
1515	16874	+3.07
1545	16918	+2.53
1575	16950	+0.58
1605	16943	+0.95
1635	17008	+2.13
1665	17130	+2.45
1695	17403	+2.43
1725	17377	+2.43
1755	17515	+4.88
1785	17710	+7.54
1815	18533	+9.04
1845	18905	
1875	19415	

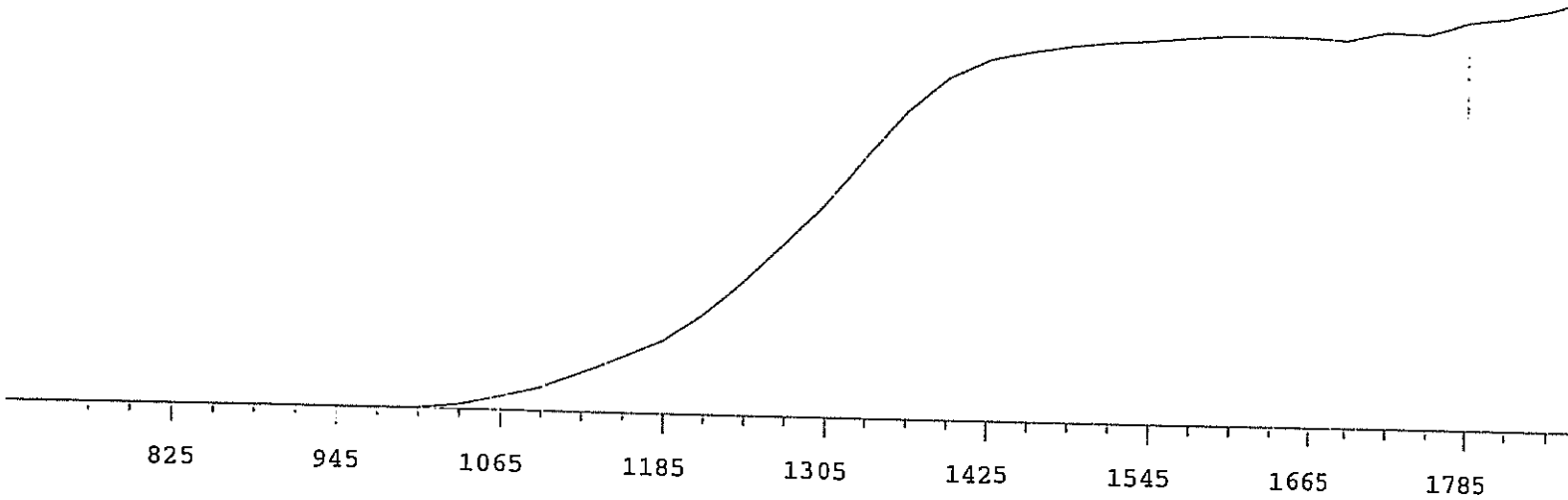
Plateau 7/1/09

Instrument 14 MPC 9604 Detector B

7/1/2009

Alpha Volts: 705

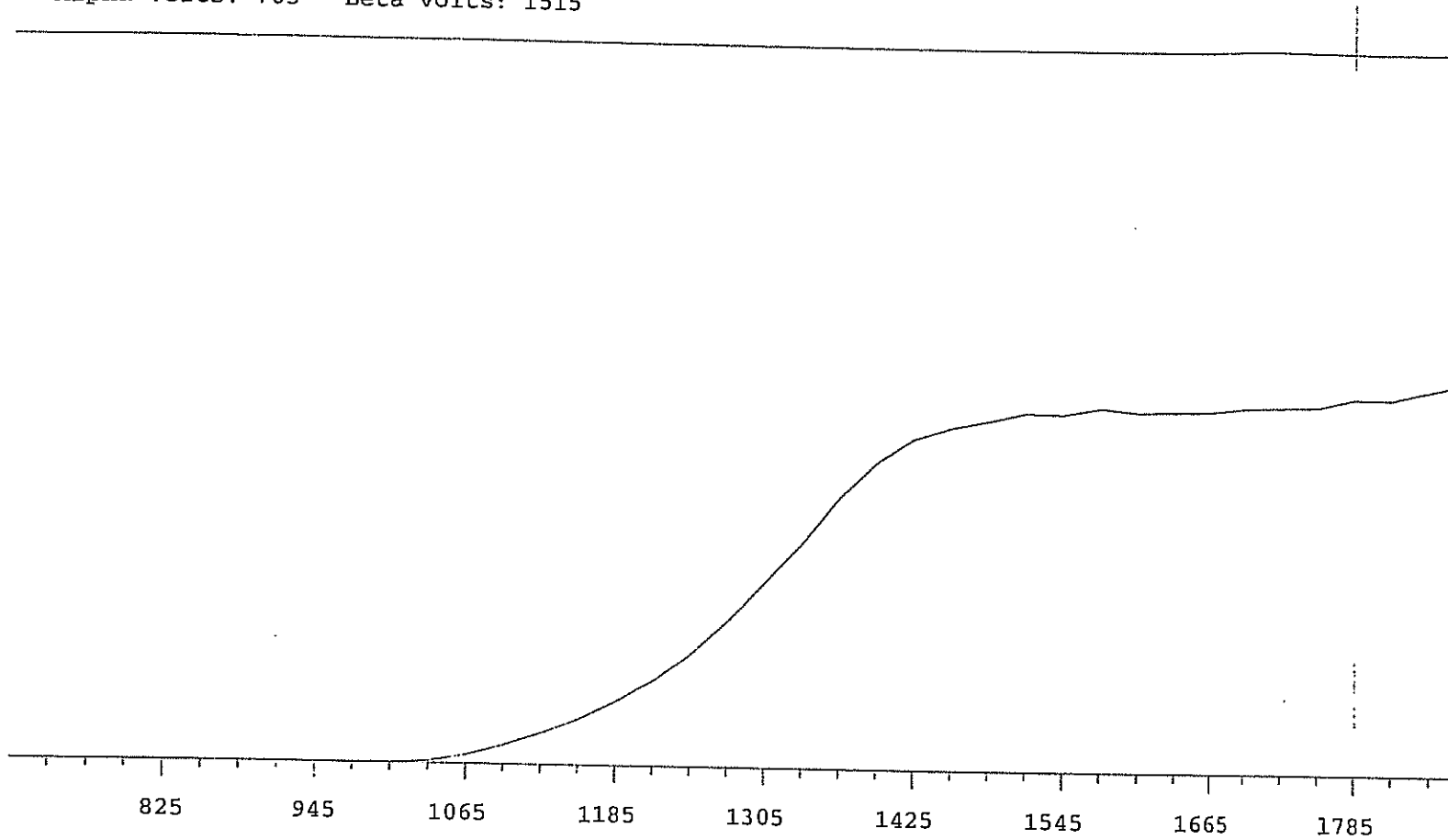
Beta Volts: 1515



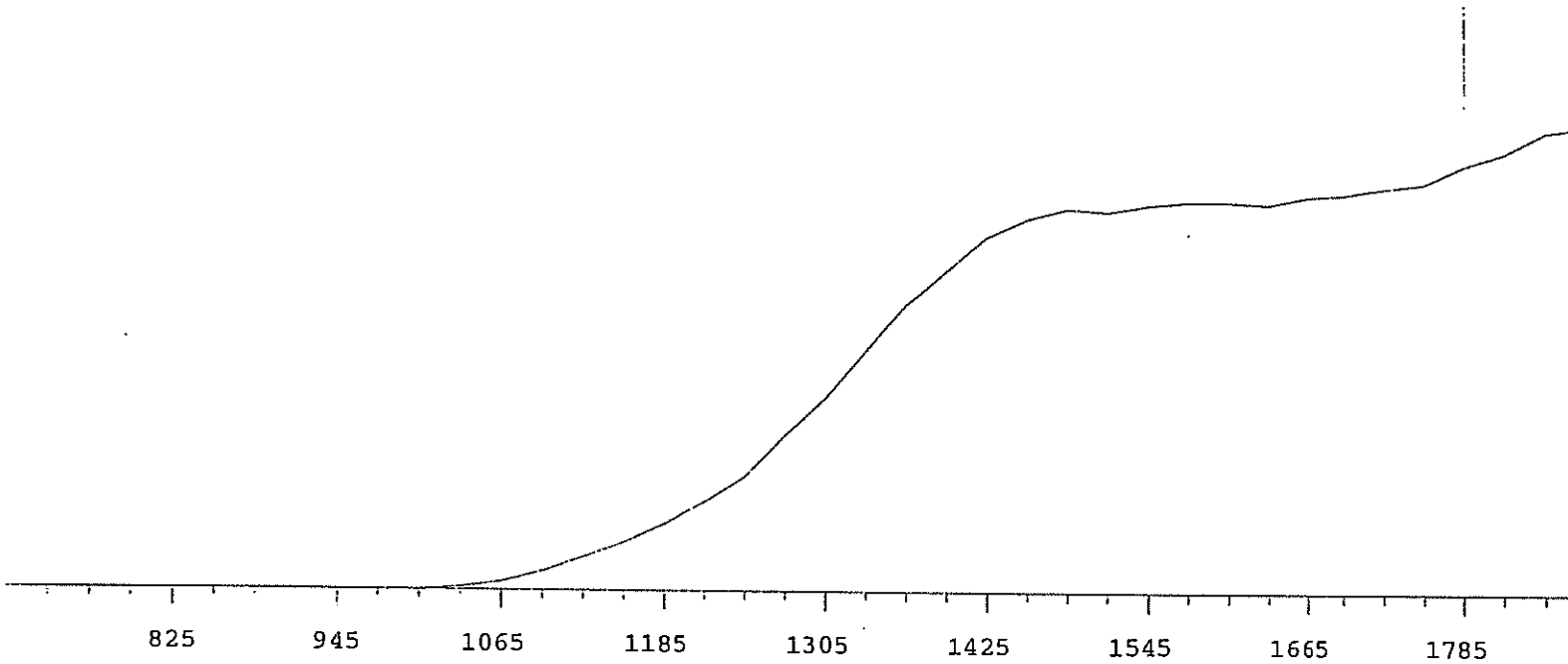
VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8797	+65.44
735	0		1335	10726	+54.47
765	0		1365	12570	+41.11
795	0	>100	1395	13917	+26.79
825	0	>100	1425	14687	+15.44
855	1	+0.00	1455	15048	+8.47
885	0	>100	1485	15318	+5.00
915	0	>100	1515	15494	+3.76
945	0	>100	1545	15606	+3.04
975	3	>100	1575	15776	+2.35
1005	40	>100	1605	15889	+1.44
1035	210	>100	1635	15907	-0.16
1065	590	>100	1665	15881	+0.64
1095	983	>100	1695	15741	+1.21
1125	1645	>100	1725	16124	+3.63
1155	2342	>100	1755	16076	+5.41
1185	3045	+96.43	1785	16588	+5.79
1215	4201	+90.42	1815	16830	+7.53
1245	5579	+83.64	1845	17185	
1275	7121	+74.44	1875	17682	

Plateau 7/1/09  
 Alpha Volts: 705

Instrument 14 MPC 9604 Detector C 7/1/2009  
 Beta Volts: 1515



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	10118	+69.76
735	0		1335	12269	+59.65
765	0		1365	14810	+47.35
795	0	>100	1395	16773	+33.46
825	0	>100	1425	18104	+20.13
855	0	>100	1455	18720	+11.98
885	1	+0.00	1485	19122	+6.50
915	0	>100	1515	19580	+4.77
945	0	>100	1545	19527	+2.48
975	2	>100	1575	19902	+0.81
1005	21	>100	1605	19690	+0.53
1035	132	>100	1635	19739	+0.23
1065	491	>100	1665	19765	+1.29
1095	1036	>100	1695	19932	+1.40
1125	1698	>100	1725	19976	+2.72
1155	2517	>100	1755	20051	+2.92
1185	3468	>100	1785	20523	+4.26
1215	4721	+91.83	1815	20542	+5.57
1245	6175	+85.13	1845	21035	
1275	8025	+76.82	1875	21528	



VOLTS	COUNTS	%/100 Volts	VOLTS	COUNTS	%/100 Volts
705	0		1305	8095	+71.16
735	0		1335	10052	+58.38
765	0		1365	11990	+47.92
795	0	>100	1395	13400	+35.01
825	0	>100	1425	14808	+23.58
855	0	>100	1455	15554	+13.45
885	0	>100	1485	15987	+6.39
915	0	>100	1515	15861	+3.45
945	0	>100	1545	16156	+2.18
975	1	>100	1575	16297	+1.72
1005	14	>100	1605	16297	+1.33
1035	130	>100	1635	16208	+1.62
1065	363	>100	1665	16526	+2.92
1095	785	>100	1695	16581	+3.94
1125	1357	>100	1725	16832	+5.91
1155	1996	>100	1755	17039	+8.68
1185	2735	+99.45	1785	17800	+11.53
1215	3785	+94.20	1815	18351	+11.46
1245	4857	+86.43	1845	19265	
1275	6571	+78.80	1875	19468	



Eckert & Ziegler

Analytics

1380 Seaboard Industrial Blvd.  
Atlanta, Georgia 30318  
Tel 404-352-8677  
Fax 404-352-2837  
www.analytisc.com

CERTIFICATE OF CALIBRATION  
Standard Radionuclide Source

1105

75251-278

Th-230 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked with germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Th-230
ACTIVITY (Bq):	3.832 E4
HALF-LIFE:	7.538 E4 years
CALIBRATION DATE:	June 14, 2007 12:00 EST
RELATIVE EXPANDED UNCERTAINTY (k=2):	2.0%

Impurities:  $\gamma$ -impurities <0.1%,  $\alpha$ -impurities <0.01%

5.09604 grams 0.5M HNO<sub>3</sub> solution.

P O NUMBER 2744RD, Item 3

SOURCE PREPARED BY: M. D. Dimitrova for  
M. D. Dimitrova, Radiochemist

Q A APPROVED: [Signature]

RECEIVED  
6/25/07

RC-S-045-146

# GEL Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	1105	Isotope:	Thorium-230
Prepared By:	Daniel Roy	Prepared By:	Daniel Roy
Carrier Conc:	0.5M HNO3	Prep Date:	07/23/2008
Reference Date:	06/14/2007	Verification Date:	01/09/2013
Ampoule Mass (g):	5.09604 g	Expiration Date:	01/08/2014
Uncertainty:	+/- 2 %	Primary Code:	1105-A
LogBook No:	RC-S-045-146	Dilution(mL):	100 mL
		Mass of Parent(g):	4.8933 g
		Density(g/mL):	1.0137
		Balance ID:	38080204

### Calculations Converting parent activity to dpm/mL|dpm/g

$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(4.8933 \text{ g}) * (38320 \text{ Bq}) * (60 \text{ dpm/Bq}) / (5.09604 \text{ g} * 100 \text{ mL}) = 22077.2901 \text{ dpm/mL}$
$(4.8933 \text{ g}) * (38320 \text{ Bq}) * (60 \text{ dpm/Bq}) / (1.0137 \text{ g/mL}) / (5.09604 \text{ g} * 100 \text{ mL}) = 21779.7999 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
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GEL Laboratories LLC  
Version 1.0 9/18/2000

# Verification for Th-230 Standard 1105-A

v1.02

Instrument	Silver
Analyst	BF1
Verification Prep Date	1/8/2013

Standard Information	
Isotope	Th-230
Serial Number	1105-A
Isotope Half-life	7.5380E+04 Y
Reference Date	6/14/2007
Ref. Act. (DPM/mL)	22077.2901
Amount of Std. (mL)	0.1
Standard Prep Date	7/23/2008

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	1/9/2013	89.40	2285.68	46.20
2	1/9/2013	91.40	2290.23	46.20
3	1/9/2013	92.60	2305.98	46.20

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	2239.48	1.011815	22133.30	2213.33
2	2244.03	1.011815	22178.26	2217.83
3	2259.78	1.011815	22333.93	2233.39

dpm/mL  
 22215.16  
 105.2811441  
 Mean Value =  
 Stdev =  
 Certificate Value\* = 22076.2  
 Two sigma = 210.562  
 10 % of Mean = 2221.516  
 Rule A (Pass/Fail) Pass  
 % Recovery 100.63%  
 Rule B (Pass/Fail) Pass  
 Expiration Date 1/8/2014

### Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.  
 Rule B = The determined mean value shall be within 5% of the certificate value.

\* Certificate Value is decay corrected to Count Date.

The analyst prepared three standard verification sources for Th-230 source 1105-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCSilver for Th-230 source standard verification. The Th-230 efficiency calibration which was used for verification calculations was performed on 1/9/2013 using Th-230 source 1242-A.

Standard results for each verification source was calculated as follows:

$$\text{Source dpm/mL} = (A - B)/(C)(D)$$

where:

- A = Ver. source cpm,
- B = BKG cpm,
- C = System efficiency (cpm/dpm), and
- D = volume used for standard verification.

RAD-M-001

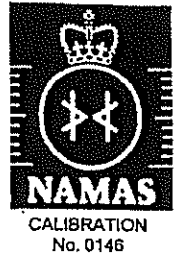
*[Signature]* 1/13

*Amanda J. Fisher*  
11/25/13





0133



ISSUED  
BY:

Nycomed Amersham plc  
Radiation & Radioactivity  
Calibration Laboratory  
Amersham Laboratories  
White Lion Road  
Amersham  
Buckinghamshire  
HP7 9LL

ISSUED  
FOR:

AEA Technology plc  
Isotrak  
Amersham Laboratories  
White Lion Road  
Amersham  
Buckinghamshire  
HP7 9LL

Description Principal radionuclide: Strontium-90

Product code: SIZ64  
Solution number: S6/7/19

Measurement Reference time: 1200 GMT on 1 April 1996

Nuclear data Nuclear data quoted on this certificate are taken from the Joint European File, Version 2.2.

Expression of uncertainties The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k = 2.00$ , which for a  $t$ -distribution with  $\nu_{\text{eff}} = \infty$  effective degrees of freedom corresponds to a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Unless indicated, all other uncertainties are expressed at the confidence level associated with one standard uncertainty.

The format used for the uncertainties in the values of radionuclidic purity is illustrated by the following examples;

6.5(21)	=	6.5 ± 2.1
6.54(21)	=	6.54 ± 0.21
6.543(21)	=	6.543 ± 0.021

Approved  
Signatory

*W. F. Case*

W F Case

Date of  
issue

11. May 1999

Page 1 of 3 pages

RC-S-013-06009

**Nycomed  
Amersham**

0133

UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

Measurement Reference time for solution number S6/7/19: 1200 GMT on 1 April 1996

Radioactive concentration of strontium-90: 477.1 kilobecquerels per gram of solution  
 which is equivalent to: 12.89 microcuries per gram of solution

Mass of solution: 5.0669 grams

Total activity of strontium-90: 2.417 megabecquerels  
 which is equivalent to: 65.3 microcuries

Method of measurement used (see page 3 of the certificate): K

Calibration dates: 25 March 1996 to 27 March 1996

The calibration date is provided for added information only, and must not be confused with the reference date on pages 1 and 2 of the certificate. It is the reference date that must be used in all calculations relating to the values of activity.

Accuracy Expanded uncertainty in the radioactive concentration quoted above:  $\pm 0.80\%$

Combined Type A uncertainty :  $\pm 0.05\%$

Combined Type B uncertainty :  $\pm 0.40\%$

Radionuclidic purity The estimated activities of any radioactive impurities found by high-resolution gamma ray spectrometry, or in any other examination of the solution, are listed below expressed as percentages of the activity of the principal radionuclide at the reference time.

Other radionuclides 0.0005(3) %

Chemical composition 0.1 M HCl containing 100 micrograms of strontium and 100 micrograms of yttrium per ml.

Physical data Recommended half life:  $29.12 \pm 0.24$  years (1 year = 365.25 days)

Strontium-90: 100% beta particle emission.  
 Yttrium-90: 100% beta particle emission. Half life  $64.1 \pm 0.1$  hours.

The activity of the yttrium-90 is equal to the activity of the strontium-90.

Remarks This product meets the quality assurance requirements for achieving traceability to NIST as defined in ANSI N42.22-1995.

Tests made over a period of 2 years on standardised solutions of strontium-90 stored in glass ampoules have shown that loss of strontium-90 from solution is negligible other than by radioactive decay.

21-5-023-0000 of 909

UKAS ACCREDITED CALIBRATION LABORATORY No. 0146

Methods of measurement The measurement techniques listed below are currently in use at Nycomed Amersham for the absolute standardisation of radioactive solutions. The methods used for this standardisation are indicated on page 2 of the certificate.

Using a gas flow proportional counter

- A 4 pi beta counting
- B 4 pi alpha counting
- C 4 pi internal conversion electron counting
- D 4 pi coincidence counting
- E 4 pi anticoincidence counting
- F 4 pi coincidence and anticoincidence counting

Using a liquid scintillation counter

- G 4 pi coincidence counting
- H 4 pi anticoincidence counting
- J 4 pi coincidence and anticoincidence counting
- K 4 pi efficiency tracing

SI unit of radioactivity The S.I. unit of radioactivity is the becquerel

- 1 becquerel (Bq) = 1 nuclear transformation per second, therefore
- 1 curie (Ci) =  $3.7 \times 10^{10}$  becquerels exactly

Useful conversion factors are:

- 1 microcurie ( $\mu$ Ci) =  $3.7 \times 10^4$  Bq = 37 kilobecquerels (kBq)
- 1 millicurie (mCi) =  $3.7 \times 10^7$  Bq = 37 megabecquerels (MBq)
- 1 kilobecquerel (kBq) = 27.027 nanocuries (nCi)
- 1 megabecquerel (MBq) = 27.027 microcuries ( $\mu$ Ci)

# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	0133	Isotope:	Strontium-90
Prepared By:	Joe Davis	Prepared By:	Aadli Abdul-Kareem
Carrier Conc:	0.1 M HCL	Prep Date:	09/25/1999
Reference Date:	04/01/1996	Verification Date:	08/13/2013
Ampoule Mass (g):	5.0669 g	Expiration Date:	08/13/2014
Uncertainty:	+/- .8 %	Primary Code:	0133-A
LogBook No:	RC S 023 060	Dilution(mL):	100 mL
		Mass of Parent(g):	4.8374 g
		Density(g/mL):	1.0041
		Balance ID:	38080204

### Calculations Converting parent activity to dpm/mL/dpm/g

$(\text{Mass of parent(g)} * (\text{Parm Activity (uCi/g)} * (\text{conversion dpm to uCi}) / (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parm Activity (uCi/g)} * (\text{conversion dpm to uCi}) / \text{Density (g/mL)}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$
$(4.8374 \text{ g}) * (12.89 \text{ uCi/g}) * (2220000 \text{ dpm/uCi}) / (100 \text{ mL}) = 1384260.7092 \text{ dpm/mL}$
$(4.8374 \text{ g}) * (12.89 \text{ uCi/g}) * (2220000 \text{ dpm/uCi}) / (1.0041 \text{ g/mL}) / (100 \text{ mL}) = 1378622.1492 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
08/13/2013	Christina Kimball	.0050588	100	0133-BB	69.7424 dpm/mL	08/13/2013	08/13/2014
04/18/2003	Lonnie Morris	.3247	1000	0133-M	447.6386 dpm/mL	04/16/2004	04/16/2005
05/25/2004	Amanda Fehr	.361	1000	0133-N	497.6826 dpm/mL	05/24/2005	05/24/2006
07/22/2005	Brenda Burke	.098	500	0133-O	270.2099 dpm/mL	09/21/2006	09/21/2007
08/15/2005	Amanda Fehr	.1582	500	0133-P	436.196 dpm/mL	08/15/2005	08/15/2006
12/20/2005	Amanda Fehr	.3248	1000	0133-Q	447.78 dpm/mL	12/20/2005	12/20/2006
10/27/2006	Julie Strock	.000924958	100	0133-R	12.7516809 dpm/mL	10/27/2006	10/27/2007
11/17/2006	Amanda Fehr	.289	1000	0133-S	398.42 dpm/mL	11/17/2006	11/17/2007

11/17/2006	Angela Johnson	2.0079	100	0133-T	27681.35 dpm/mL	09/27/2012	09/27/2013
12/19/2006	Amanda Fehr	.35	1000	0133-U	482.52 dpm/mL	07/26/2007	12/19/2007
05/08/2007	Julie Strock	.010019421	100	0133-V	138.202 dpm/mL	04/29/2008	04/29/2009
07/11/2007	Daniel Roy	.3527	1000	0133-W	486.24 dpm/ml	07/11/2008	07/11/2009
04/29/2009	Tina Schoneman	.0100581	100	0133-X	138.666 dpm/mL	04/29/2010	04/29/2011
04/18/2011	Christina Kimball	.010141	100	0133-Y	139.8124 dpm/mL	04/11/2012	04/11/2013
07/31/2012	Christina Kimball	.01013	100	0133-Z	139.6486 dpm/mL	07/26/2013	07/26/2014

GEL Laboratories LLC  
Version 1.0 9/18/2000

# Verification for Sr-90 Standard 0133-T

vt.0.1

Instrument	Red
Analyst	BXF1
Verification Prep Date	9/27/2012

Standard Information	
Isotope	Sr-90
Serial Number	0133-T
Isotope Half-life	28.9000 Y
Reference Date	4/1/1996
Ref. Act. (DPM/mL)	27681.35
Amount of Std. (mL)	1.0
Standard Prep Date	9/27/2012

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	9/27/2012	97.90	38626.66	37.60
2	9/27/2012	97.70	38200.00	37.60
3	9/27/2012	97.80	38330.00	37.60

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	38589.06	2.042732	18890.91	18890.91
2	38162.40	2.042732	18682.04	18682.04
3	38292.40	2.042732	18745.68	18745.68

Mean Value = 18772.88  
 Stdev = 107.0564993  
 Certificate Value\* = 18639.0  
 Two sigma = 214.113  
 10 % of Mean = 1877.288  
 Rule A (Pass/Fail) Pass  
 % Recovery 100.72%  
 Rule B (Pass/Fail) Pass  
 Expiration Date 9/27/2013

### Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.  
 Rule B = The determined mean value shall be within 5% of the certificate value.

\* Certificate Value is decay corrected to Count Date.

The analyst prepared three standard verification sources for Sr-90 source 0133-T by transferring 1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecocint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecocint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCRed for Sr-90 source standard verification. The Sr-90 efficiency calibration which was used for verification calculations was performed on 9/27/2012 using Sr-90 source 1243-A.

Standard results for each verification source was calculated as follows:

$$\text{Source dpm/mL} = (A - B)/(C)(D)$$

where:

- A = Ver. source cpm,
- B = BKG cpm,
- C = System efficiency (cpm/dpm), and
- D = volume used for standard verification.

RAD-M-001

*Amenda L. Fuku 11/2/12*





**Eckert & Ziegler**

Isotope Products

24937 Avenue Tibbitts  
Valencia, California 91355

Tel 661-309-1010  
Fax 661-257-8303

1673

# CERTIFICATE OF CALIBRATION ALPHA STANDARD SOLUTION

<b>Radionuclide:</b> Po-210	<b>Customer:</b> GENERAL ENGINEERING LABS.
<b>Half-life:</b> 138.376 ± 0.002 days	<b>P.O. No.:</b> GEL1304374
<b>Catalog No.:</b> 7310	<b>Reference Date:</b> 1-Aug-13 12:00 PST
<b>Source No.:</b> 1686-39	<b>Contained Radioactivity:</b> 1.050 μCi 38.85 kBq

**Physical Description:**

- A. Mass of solution: 5.19741 g in 5 mL flame-sealed ampoule
- B. Chemical form: PoCl<sub>4</sub> in 2M HCl
- C. Carrier content: None
- D. Density: 1.033 g/mL @ 20°C

**Radioimpurities:**

None detected

**Radionuclide Concentration:** 0.2020 μCi/g, 7.474 kBq/g

**Method of Calibration:**

This source was prepared from a weighed aliquot of solution whose activity in μCi/g was determined using a liquid scintillation counter.

**Uncertainty of Measurement:**

- A. Type A (random) uncertainty: ± 0.5 %
- B. Type B (systematic) uncertainty: ± 3.0 %
- C. Uncertainty in aliquot weighing: ± 0.0 %
- D. Total uncertainty at the 99% confidence level: ± 3.0 %

**Notes:**

- See reverse side for leak test(s) performed on this source.
- EZIP participates in a NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (as in NRC Regulatory Guide 4.15).
- Nuclear data was taken from NCRP Report No. 58, 1985.
- This source has a working life of 9 months.

RECEIVED  
R11/13

Daniel James Van Dalsen  
Quality Control

1-Jul-13  
Date

EZIP Ref. No.: 1686-39

RC-S-065-02

ISO 9001 CERTIFIED

Medical Imaging Laboratory  
24937 Avenue Tibbitts Valencia, California 91355

Industrial Gauging Laboratory  
1800 North Keystone Street Burbank, California 91504





# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	1673	Isotope:	Polonium-210
Prepared By:	Gregory Ramsay	Prepared By:	Tim Chandler
Carrier Conc:	2M HCl	Prep Date:	07/29/2013
Reference Date:	08/01/2013	Verification Date:	08/26/2013
Ampoule Mass (g):	5.19741 g	Expiration Date:	08/26/2014
Uncertainty:	+/- 1.172 %	Primary Code:	1673-A
LogBook No:	RC-S-065-102	Dilution(mL):	100 mL
		Mass of Parent(g):	5.0441 g
		Density(g/mL):	1.0315
		Balance ID:	38080204

### Calculations Converting parent activity to dpm/mL/dpm/g

$(\text{Mass of parent(g)} * (\text{Parm Activity (kbq)}) * (\text{conversion dpm to kbq}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parm Activity (kbq)}) * (\text{conversion dpm to kbq}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(5.0441 \text{ g}) * (38.85 \text{ kbq}) * (60000 \text{ dpm/kbq}) / (5.19741 \text{ g} * 100 \text{ mL}) = 22622.4160 \text{ dpm/mL}$
$(5.0441 \text{ g}) * (38.85 \text{ kbq}) * (60000 \text{ dpm/kbq}) / (1.0315 \text{ g/mL}) / (5.19741 \text{ g} * 100 \text{ mL}) = 21932.2093 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
07/31/2013	Tim Chandler	2.8134	100	1673-B	617.040778 dpm/mL	08/07/2013	08/07/2014
08/21/2013	Christina Kimball	.3091	100	1673-C	67.79246 dpm/mL	08/26/2013	08/26/2014

GEL Laboratories LLC  
Version 1.0 9/18/2000

# Verification for Po-210 Standard 1673-A

v1.0

Analyst	TC1
Verification Prep Date	7/30/2013

Tracer Information	
Isotope	Po-209
Serial Number	1423-F
Amount of Std. (mL)	0.1
Expiration Date	8/2/2013

Standard Information	
Isotope	Po-210
Serial Number	1673-A
Isotope Half-life	138.3800 D
Reference Date	8/1/2013
Ref. Act. (dpm/mL)	22622.4159
Amount of Std. (mL)	0.0001
Standard Prep Date	7/29/2013

Std #	Count Date	Activity pCi	Standard dpm/mL
1	7/30/2013	1.040	23088.00
2	7/30/2013	1.120	24864.00
3	7/30/2013	1.020	22644.00

Mean Value = 1.060 23532.000  
 Stdev = 0.052915026 1174.713582

Certificate Value\* = 1.0293 pCi  
 Two sigma = 0.1058 dpm/mL  
 10 % of Mean = 0.1060  
 Rule A (Pass/Fail) Pass  
 % Recovery 102.98%  
 Rule B (Pass/Fail) Pass  
 Expiration Date 7/30/2014

### Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.

Rule B = The determined mean value shall be within 5% of the certificate value.

\* Certificate Value is decay corrected to Verification Prep Date.

The analyst prepared three standard verification sources for Po-210 standard 1673-A using 0.0001 mL for each source. Each standard was combined with 0.1 mL of Po-209 standard 1423-F and was diluted in a plastic cup containing 2 grams of ascorbic acid and 75 mL of 1M HCl. The polonium was plated onto a nickel disc by spinning with a stir bar in the solution for 4 hours. The samples were prepared for counting following routine procedures for alpha spectroscopy source preparation. Each source was counted using routine alpha spec procedures. DPM values for Po-210 were calculated by comparison to Po-209 certified values.

*Asfa AQL 7/31/13*

*1.1.11 7-31-13*

GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER : 1318659  
 SAMPLE ID : S1202918178\_PO  
 SAMPLE QTY : 1.000 L  
 SAMPLE DATE : 30-Jul-2013 00:00:00  
 ANALYST : TC1  
 % YIELD : 0.8 +/-48.240 %

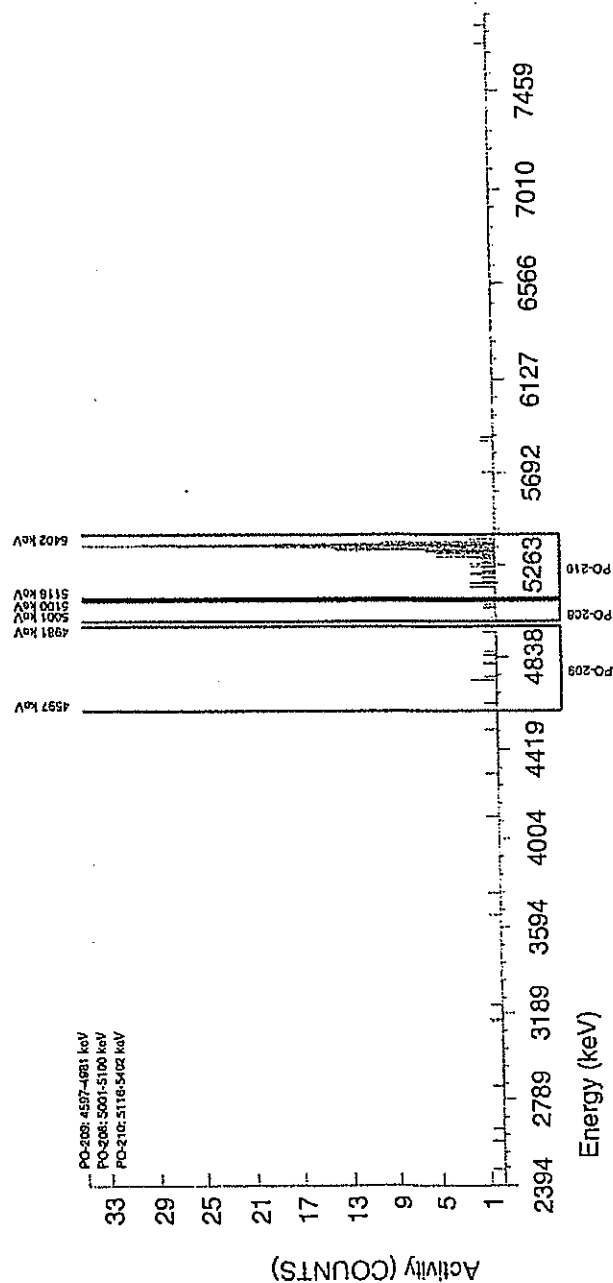
CHAMBER : 069  
 DETECTOR S/N : 78795  
 AVERAGE %EFFICIENCY : 33.2166  
 AVERAGE %EFF ERROR : 0.6386  
 COUNT DATE : 30-Jul-2013 17:47:46  
 ELAPSED LIVE TIME(SEC) : 30300.00

LIB FILE : PO  
 BKG FILE : B069.CNF;1481  
 BKG DATE : 27-Jul-2013  
 BKG LIVE TIME(SEC) : 60000.00  
 EFF FILE : W069.CNF;410  
 CAL DATE : 08-Jul-2013

TRACER ID : 1423-F  
 NUCLIDE : PO-209  
 NOMINAL : 5.2508E+00 dpm  
 RESULTS : 4.1720E-02 dpm

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG S/D	%ABUN	ACTIVITY pCi/L	1.96-sigma TPU pCi/L	MDA pCi/L	Lc pCi/L	1.96-sigma cnt Unc pCi/L
PO-208	5080.00	5085.21	0.000	5.000	5.000	0.000	0.0000	100.000	1.69E+00	2.30E+00	1.01E+00	0.00E+00	1.66E+00
PO-209	4882.00	4792.13	4.908	9.000	6.980	2.020	1.4213	99.740	2.37E+00	3.16E+00	2.96E+00	9.72E-01	2.23E+00
PO-210	5304.38	5333.72	21.922	220.000	219.495	0.505	0.7106	100.000	7.45E+01	7.12E+01	1.99E+00	4.87E-01	9.90E+00



GEL Laboratories LLC  
 ALPHA SPECTROSCOPY REPORT

Instrument SOP: GL-RAD-1-009  
 Analytical SOP:

BATCH NUMBER : 1318659  
 SAMPLE ID : S1202918179\_PO  
 SAMPLE QTY : 1.000 L +/-0.500 %  
 SAMPLE DATE : 30-Jul-2013 00:00:00  
 ANALYST : TC1  
 % YIELD : 73.2 +/-5.273 %

CHAMBER : 070  
 DETECTOR S/N : 78262  
 AVERAGE %EFFICIENCY : 34.5949  
 AVERAGE %EFF ERROR : 0.6645  
 COUNT DATE : 30-Jul-2013 17:47:46  
 ELAPSED LIVE TIME(SEC) : 30300.00

LIB FILE : PO  
 BKG FILE : B070.CNF;1483  
 BKG DATE : 27-Jul-2013  
 BKG LIVE TIME(SEC) : 60000.00  
 EFF FILE : W070.CNF;400  
 CAL DATE : 08-Jul-2013

TRACER

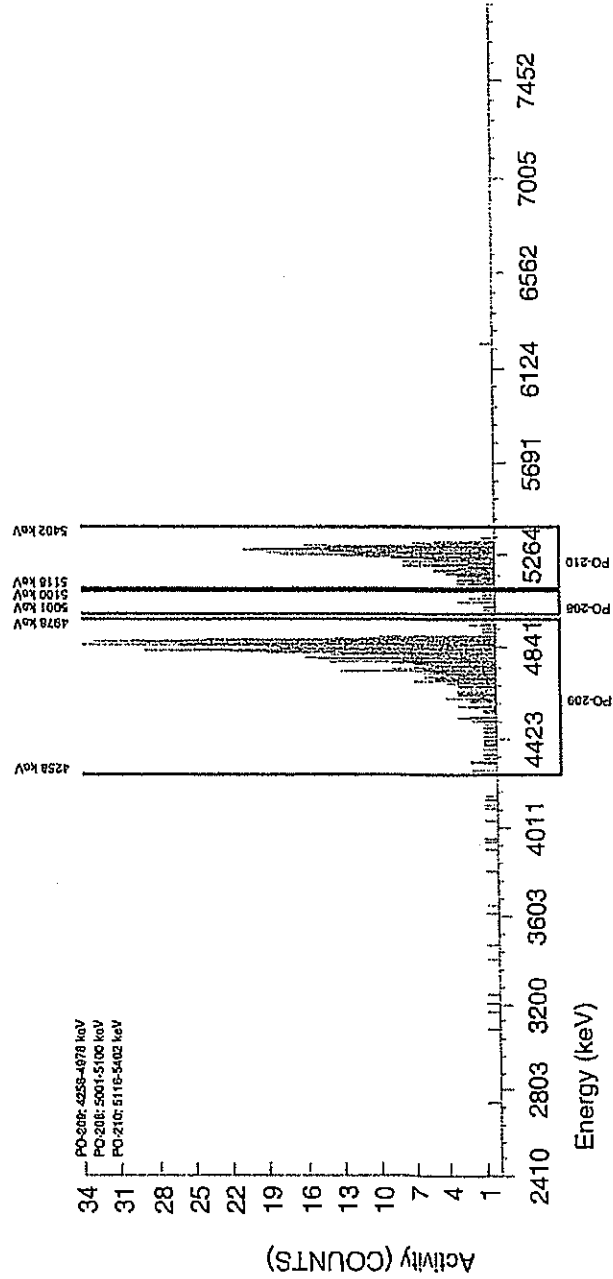
ID : 1423-F  
 NUCLIDE : PO-209  
 NOMINAL : 5.2508E+00 dpm  
 RESULTS : 3.8451E+00 dpm

LCS

ID  
 NUCLIDE  
 NOMINAL (pCi/L)  
 % RECOVERY

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG SDev	%ABUN	ACTIVITY pCi/L	1.96-sigma TPU pCi/L	MDA pCi/L	Lc pCi/L	1.96-sigma cnt Unc pCi/L
PO-208	5080.00	5057.08	0.000	11.000	11.000	0.000	0.0000	100.000	3.88E-02	2.45E-02	1.06E-02	0.00E+00	2.42E-02
PO-209	4882.00	4787.03	63.543	671.000	669.980	1.010	1.0050	99.740	2.37E+00	3.17E-01	2.49E-02	7.16E-03	1.79E-01
PO-210	5304.98	5260.28	52.655	296.000	294.990	1.010	1.0050	100.000	1.04E+00	1.66E-01	2.50E-02	7.17E-03	1.20E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

Alpha Spectroscopy Software Version 2.3.16  
effective date: 12-Jun-2013

BATCH NUMBER : 1318659  
 SAMPLE ID : S1202918180\_PO  
 SAMPLE QTY : 1.000 L +/-0.500 %  
 SAMPLE DATE : 30-Jul-2013 00:00:00  
 ANALYST : TC1  
 % YIELD : 72.0 +/-5.403 %

CHAMBER : 071  
 DETECTOR S/N : 80020  
 AVERAGE %EFFICIENCY : 32.2871  
 AVERAGE %EFF ERROR : 0.6210  
 COUNT DATE : 30-Jul-2013 17:47:47  
 ELAPSED LIVE TIME(SEC) : 30299.99

LIB FILE : PO  
 BKG FILE : B071.CNF;1476  
 BKG DATE : 27-Jul-2013  
 BKG LIVE TIME(SEC) : 59999.99  
 EFF FILE : W071.CNF;382  
 CAL DATE : 08-Jul-2013

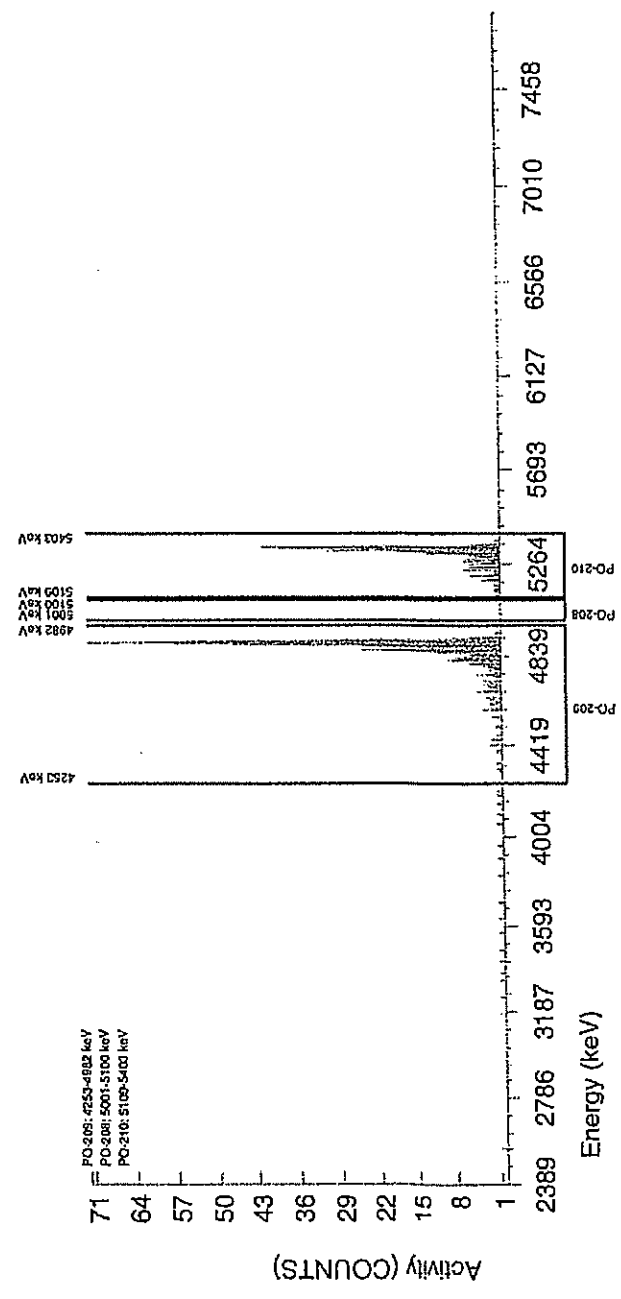
LCS

TRACER ID : 1423-F  
 NUCLIDE : PO-209  
 NOMINAL : 5.2508E+00 dpm  
 RESULTS : 3.7786E+00 dpm

NUCLIDE ID  
 NOMINAL (pCi/L)  
 % RECOVERY

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG SDev	%ABUN	ACTIVITY pCi/L	1.96-sigma TPU pCi/L	MDA pCi/L	Lc pCi/L	1.96-sigma cnt Unc pCi/L
PO-208	5080.00	5050.46	0.000	0.000	-0.505	0.505	0.7106	100.000	-1.94E-03	9.26E-03	2.25E-02	5.51E-03	9.25E-03
PO-209	4882.00	4849.53	25.915	616.000	614.485	1.515	1.2309	99.740	2.37E+00	3.26E-01	3.07E-02	9.56E-03	1.88E-01
PO-210	5304.38	5305.73	24.591	291.000	291.000	0.000	0.0000	100.000	1.12E+00	1.81E-01	1.16E-02	0.00E+00	1.29E-01



GEL Laboratories LLC  
ALPHA SPECTROSCOPY REPORT

BATCH NUMBER : 1318659  
 SAMPLE ID : S1202918181\_PO  
 SAMPLE QTY : 1.000 L  
 SAMPLE DATE : 30-Jul-2013 00:00:00  
 ANALYST : TC1  
 % YIELD : 70.6 +/-5.438 %

CHAMBER : 072  
 DETECTOR S/N : 67584  
 AVERAGE %EFFICIENCY : 32.3134  
 AVERAGE %EFF ERROR : 0.6215  
 COUNT DATE : 30-Jul-2013 17:47:45  
 ELAPSED LIVE TIME(SEC) : 30299.99

LIB FILE : PO  
 BKG FILE : B072.CNF:1463  
 BKG DATE : 27-Jul-2013  
 BKG LIVE TIME(SEC) : 59999.99  
 EFF FILE : W072.CNF:388  
 CAL DATE : 08-Jul-2013

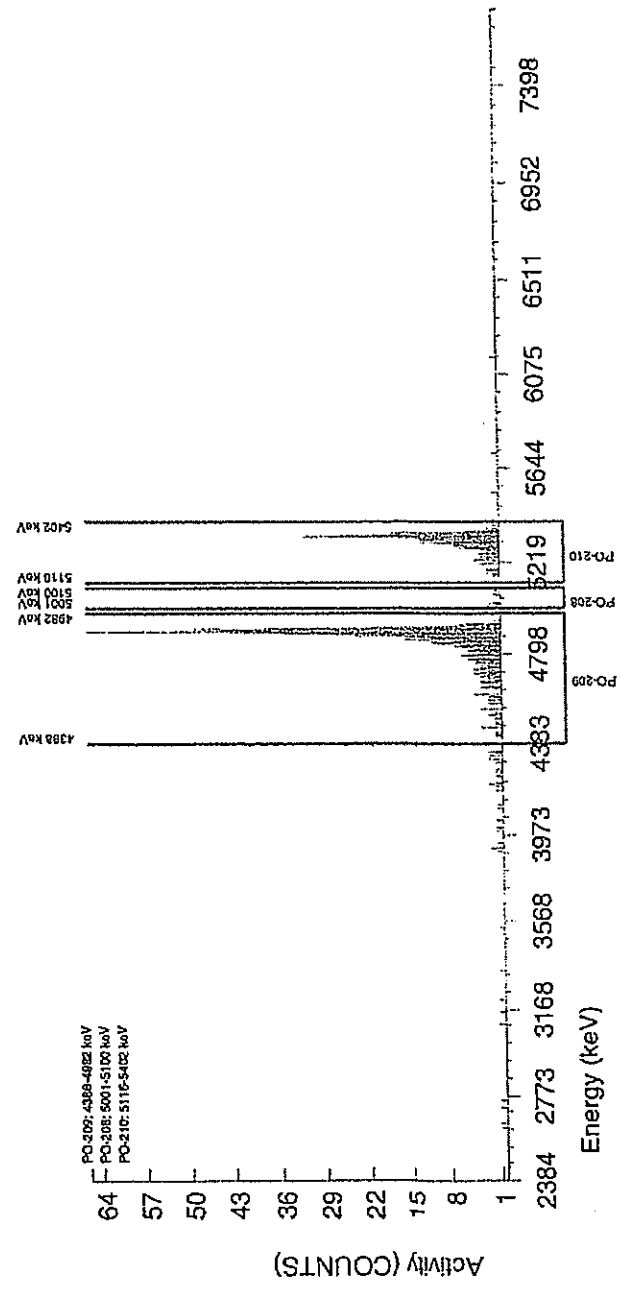
LCS


TRACER ID : 1423-F  
 NUCLIDE : PO-209  
 NOMINAL : 5.2508E+00 dpm  
 RESULTS : 3.7078E+00 dpm

NUCLIDE ID  
 NOMINAL (pCi/L)  
 % RECOVERY

NUCLIDE ACTIVITY SUMMARY

NUCLIDE	LIBRARY ENERGY	PEAK ENERGY	PEAK FWHM	GROSS AREA	NET AREA	BKG AREA	BKG SDev	%ABUN	ACTIVITY pCi/L	1.96-sigma TPU pCi/L	MDA pCi/L	Lc pCi/L	1.96-sigma cnt Unc pCi/L
PO-208	5080.00	5045.35	16.930	10.000	10.000	0.000	0.0000	100.000	3.91E-02	2.61E-02	1.17E-02	0.00E+00	2.57E-02
PO-209	4882.00	4846.67	26.817	607.000	603.465	3.535	1.8802	99.740	2.37E+00	3.29E-01	4.15E-02	1.49E-02	1.90E-01
PO-210	5304.38	5309.14	26.139	261.000	260.495	0.505	0.7106	100.000	1.02E+00	1.70E-01	2.30E-02	5.63E-03	1.25E-01





# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	1673	Isotope:	Polonium-210
Prepared By:	Gregory Ramsay	Prepared By:	Tim Chandler
Carrier Conc:	2M HCl	Prep Date:	07/29/2013
Reference Date:	08/01/2013	Verification Date:	07/30/2013
Ampoule Mass (g):	5.19741 g	Expiration Date:	07/30/2014
Uncertainty:	+/- 3 %	Primary Code:	1673-A
LogBook No:	RC-S-065-102	Dilution(mL):	100 mL
		Mass of Parent(g):	5.0441 g
		Density(g/mL):	1.0315
		Balance ID:	38080204

### Calculations Converting parent activity to dpm/mL/dpm/g

$(\text{Mass of parent(g)}) * (\text{Parent Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parent Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / (\text{Density (g/mL)}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$
$(5.0441 \text{ g}) * (7.47487691 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (100 \text{ mL}) = 22622.4160 \text{ dpm/mL}$
$(5.0441 \text{ g}) * (7.47487691 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (1.0315 \text{ g/mL}) / (100 \text{ mL}) = 21932.2093 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date

GEL Laboratories LLC  
Version 1.0 9/18/2000

419  
7/31/13

ML  
7-31-13

# Polonium Queue Sheet

30-JUL-13

Verification of Po-210 1673-A

Batch #: 1318659 Analyst: TCI First Client Due Date: Internal Due Date: 16-AUG-13  
 Tracer Isotope: Po-209 Tracer Code: 1423-F Expiration Date: 8-2-13 Vol: 0.1  
 LCS Isotope: Po-210 LCS Code: 1673-A Expiration Date: 7-30-13 Vol: 0.0001  
 Spike Isotope: Po-210 Spike Code: N/A Expiration Date: N/A Vol: N/A  
 Prep Date: 7-30-13 Initials: TCI Pipet ID: 1840222 Balance ID: 1113021618 Witness: N/A

Sample ID	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos.	Label #	Wet/Dry Aliquot (g/l/f)	To Det #
1202918178-1	MB for batch 1318659	MB		.05 pCi/L	WATER	QC ACCOUNT	25-JUL-13	1	1	1.0	69
1202918179-1	LCS for batch 1318659	LCS		.05 pCi/L	WATER	QC ACCOUNT	25-JUL-13	2	2	1.0	70
1202918180-1	LCS for batch 1318659	LCS		.05 pCi/L	WATER	QC ACCOUNT	25-JUL-13	3	3	1.0	71
1202918181-1	LCS for batch 1318659	LCS		.05 pCi/L	WATER	QC ACCOUNT	25-JUL-13	4	4	1.0	72

MB = spiked with Po-210 1673-A 0.1-mL only

took 0.1-mL diluted up to level than took 0.1-mL for aliquot = 0.0001-mL

Solid Sample Dissolution by: LEACH or DIGESTION

*T. Hill* 7-31-13

Data Reviewed By:

Circle One



**General Engineering Laboratories**  
**GFC Calibration Source Preparation Sheet**  
 Alpha Cross talk

Applicable SOP Number GL-RAD-A-001

Isotope Po-210

Date Standards Prepared 9/27/13

Standard ID 1673-A

Matrix of Planchet/Filter 47 mm Concentric ring  
S.S. planchette

Amount Used (g or ml) 2.0

Standard Activity (DPM/g or ml) 22622.4159

Residue/Carrier Agent tap water

Reference Date 8/1/13

Pipette ID Used 1608405

Expiration Date 8/26/14

Balance ID Used F30560

Standard Number	Residue Volume (mL) (tap water)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
P1	0	7.6765	7.6765	0.0
P2	5	7.6486	7.6519	3.3
P3	10	7.6430	<del>7.6480</del> 7.6495	6.5
P4	15	7.7009	7.7173	16.4
P5	20	7.6602	7.6923	32.1
P6	25	7.6423	7.6899	47.6
P7	30	7.6766	7.7416	65.0
P8	35	7.6391	7.7186	79.5

037912713

Prepared By: Amanda DeLuca Date 9/27/13

Reviewed By: [Signature] Date 10/1/13



Eckert & Ziegler

Analytics

1380 Seaboard Industrial Blvd.  
Atlanta, Georgia 30318  
Tel 404-352-8677  
Fax 404-352-2837  
www.analytisc.com

CERTIFICATE OF CALIBRATION  
Standard Radionuclide Source

1242

78148-278

Th-230 5 mL Liquid in Flame Sealed Vial

Customer: General Engineerings Labs  
P.O. No.: 7311RD, Item 1

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

Isotope:	Th-230
Activity (Bq):	4.021 E4
Half-Life:	7.538 E4 years
Calibration Date:	August 25, 2008 12:00 EST
Relative Expanded Uncertainty (k=2):	2.0%

Comments:

Impurities:  $\gamma$ -impurities <0.1%,  $\alpha$ -impurities <0.04%  
5.07467 grams 0.5M HNO3 solution.

Source Prepared By: M. I. Taskaeva  
M. I. Taskaeva, Radiochemist

QA Approved: D. M. Montgomery  
D. M. Montgomery, QA Manager

Date: 9-4-08

End of Certificate

Corporate Office

RECEIVED  
9/17/08

RC-S-048-123  
Laboratory



**Eckert & Ziegler**  
 Analytics

1380 Seaboard Industrial Blvd.  
 Atlanta, Georgia 30318  
 Tel 404-352-8677  
 Fax 404-352-2837  
 www.analyticinc.com

**CERTIFICATE OF CALIBRATION**  
 Standard Radionuclide Source

1243

78352-278

Sr-90 10 mL Liquid in Flame Sealed Vial

Customer: General Engineering Labs/Charleston, SC  
 P.O. No.: 7312 RD, Item 3

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting.

Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

Isotope:	Sr-90
Activity (Bq):	3.856 E5
Half-Life:	28.79 years
Calibration Date:	October 1, 2008 12:00 EST
Relative Expanded Uncertainty (k=2):	1.7%

**Comments:**

Impurities:  $\gamma$ -impurities <0.1%  
 10.41484 grams 0.1M HCl solution with 30  $\mu$ g/g Sr carrier.

NOTE: This source also contains Y-90 in secular equilibrium with Sr-90. The Y-90 activity is equal to the Sr-90 activity. Since Sr-90 and Y-90 both decay 100% by beta emission, the total beta emission rate for the source is twice the certified Sr-90 activity. The half-life for Y-90 is 64.08 hours.

Source Prepared By: W. Mao  
 W. Mao, Radiochemist

QA Approved: D. M. Montgomery  
 D. M. Montgomery, QA Manager

Date: 10/3/08





# Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	1243	Isotope:	Strontium-90
Prepared By:	Daniel Roy	Prepared By:	Daniel Roy
Carrier Conc:	0.1M HCL	Prep Date:	12/19/2008
Reference Date:	10/01/2008	Verification Date:	02/12/2013
Ampoule Mass (g):	10.41484 g	Expiration Date:	02/12/2014
Uncertainty:	+/- 1.7 %	Primary Code:	1243-A
LogBook No:	RC-S-048-124	Dilution(mL):	100 mL
		Mass of Parent(g):	10.2164 g
		Density(g/mL):	0.9991
		Balance ID:	38080204

### Calculations Converting parent activity to dpm/mL|dpm/g

$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(10.2164 \text{ g}) * (385600 \text{ Bq}) * (60 \text{ dpm/Bq}) / (10.41484 \text{ g} * 100 \text{ mL}) = 226951.7634 \text{ dpm/mL}$
$(10.2164 \text{ g}) * (385600 \text{ Bq}) * (60 \text{ dpm/Bq}) / (0.9991 \text{ g/mL}) / (10.41484 \text{ g} * 100 \text{ mL}) = 227146.2010 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
01/21/2010	Bethany Fiem	2.2467	1000	1243-B	510.329369 dpm/mL	01/21/2010	01/21/2011
08/03/2010	Bethany Fiem	2.5604	1000	1243-C	581.5851 dpm/mL	08/03/2010	08/03/2011
01/12/2011	Bethany Fiem	2.4946	1000	1243-D	566.6389 dpm/mL	01/12/2011	01/12/2012
08/12/2011	Tim Chandler	3.3115	100	1243-G	18.7877 dpm/mL	08/11/2011	08/11/2012
08/17/2011	Tim Chandler	2.5541	100	1243-H	14.49064 dpm/mL	08/18/2011	08/16/2012
06/21/2011	Tim Chandler	.0235	100	1243-E	53.37936 dpm/mL	06/25/2012	06/20/2013
07/05/2011	Bethany Fiem	2.6072	1000	1243-F	592.2156 dpm/mL	07/05/2011	07/05/2012

01/31/2012	Gregory Ramsay	2.6792	1000	1243-I	608.5701 dpm/ml	01/31/2012	01/31/2013
08/29/2012	Bethany Fiem	2.6799	1000	1243-J	608.729104 dpm/mL	09/14/2012	09/11/2013
02/12/2013	Gregory Ramsay	2.6526	1000	1243-K	602.528 dpm/ml	02/12/2013	02/12/2014

GEL Laboratories LLC  
Version 1.0 9/18/2000

# Verification for Sr-90 Standard 1243-A

v1.0.2

Instrument	GOLD
Analyst	BF
Verification Prep Date	2/12/2013

Standard Information	
Isotope	Sr-90
Serial Number	1243-A
Isotope Half-life	28.9000 Y
Reference Date	10/1/2008
Ref. Act. (DPM/mL)	226951.7634
Amount of Std. (mL)	0.1
Standard Prep Date	12/19/2008

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	2/12/2013	55.70	41976.00	38.20
2	2/12/2013	56.10	41080.00	38.20
3	2/12/2013	56.00	42256.00	38.20

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	41937.80	1.986325	211132.62	21113.26
2	41041.80	1.986325	206621.78	20662.18
3	42217.80	1.986325	212542.26	21254.23

Mean Value = 210098.89 dpm/mL  
 Stdev = 3092.649469  
 Certificate Value\* = 204384.1  
 Two sigma = 6185.299  
 10 % of Mean = 21009.889  
 Rule A (Pass/Fail) Pass  
 % Recovery 102.80%  
 Rule B (Pass/Fail) Pass  
 Expiration Date 2/12/2014

### Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.

Rule B = The determined mean value shall be within 5% of the certificate value.

\* Certificate Value is decay corrected to Count Date.

The analyst prepared three standard verification sources for Sr-90 source 1243-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecoscint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecoscint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCGOLD for Sr-90 source standard verification. The Sr-90 efficiency calibration which was used for verification calculations was performed on 2/12/2013 using Sr-90 source 1244-A.

Standard results for each verification source was calculated as follows:

$$\text{Source dpm/mL} = (A - B)/(C)(D)$$

where:


A = Ver. source cpm,

B = BKG cpm,

C = System efficiency (cpm/dpm), and

D = volume used for standard verification.

RAD-M-001

  
 Amanda J. Hubbs, 112  
 2/12/13

**General Engineering Laboratories  
GFC Verification Source Preparation Sheet**

Applicable SOP Number GL-RAD-A-001

Isotope Th-230 / Sr-90

Date Standards Prepared 8-29-11

Standard ID 1242-A / 1243-A

Matrix of Vial/Planchett 47mm concentric ring  
SS planchette 0

Amount Used (g or ml) 2.0 / 0.1

Standard Activity (DPM/g or ml) 23217.6149 / 226951.763

Residue/Carrier Agent USGS cal solution B

Reference Date 8-25-08 / 10-1-08

Pipette ID Used 10183301 / 1795419

Expiration Date ~~7-5-12~~ <sup>10/11/12</sup> / ~~7-5-12~~ <sup>10/11/12</sup>  
6/22/13 11/31/13

Balance ID Used 1113021018

	Standard Number	Residue Volume(mL)	Initial Wt. (g)	Final Wt. (g)	Net Wt. (mg)
/	V <sub>1</sub>	0	7.5843	7.5840	0
	V <sub>2</sub>	2.5	7.5812	7.5916	10.4
	V <sub>3</sub>	5	7.5944	7.6182	23.8
	V <sub>4</sub>	10	7.6239	7.6681	44.2
	V <sub>5</sub>	12	7.5984	7.6531	54.7
	V <sub>6</sub>	15	7.6059	7.6798	73.9
	V <sub>7</sub>	20	7.6178	7.7130	95.2
	V <sub>8</sub>	25	7.5955	7.6985	103

wt ✓

8/29/11

Prepared By: *[Signature]* Date 8-29-11  
 Reviewed By: *[Signature]* Date 9/15/11

# **Continuing Calibration Data**



# Gas Flow Proportional Counter Checks for 03-Jan-2014

Detectors LB4100 A1 through J4 and PIC 1A through 14D

Short Name	Status	Parmname	Run Time	Count Time	CPM or dec	Low Limit	High Limit	Stdev
LB4100A2	Below	Alpha eff	03-Jan 09:38	5	9572	10330	12260	-5.36
LB4100B2	Below	Alpha eff	03-Jan 07:50	5	7728	8363	10160	-5.12
LB4100B2	Above	Alpha XTalk	03-Jan 07:50	5	0.328	0.217	0.289	+6.30
LB4100B3	Below	Alpha eff	03-Jan 07:50	5	16428	17650	21120	-5.11
LB4100B3	Above	Alpha XTalk	03-Jan 07:50	5	0.346	0.248	0.345	+3.06
LB4100B3	Above	Beta bkg	03-Jan 06:25	60	5.233	0.777	1.874	+21.37
LB4100C1	Above	Alpha bkg	03-Jan 06:32	60	0.450	-4.66E-3	0.345	+4.80
LB4100C1	Above	Alpha eff	03-Jan 07:59	5	11997	10840	11520	+7.21
LB4100C1	Above	Beta eff	03-Jan 07:51	5	18028	16250	17770	+4.02
LB4100C3	Below	Alpha eff	03-Jan 08:24	5	8258	8458	10100	-3.73
LB4100C4	Below	Alpha eff	03-Jan 07:59	5	7166	7639	9591	-4.45
LB4100C4	Above	Beta bkg	03-Jan 06:32	60	4.317	0.555	2.577	+8.16
LB4100C4	need 2nd	Beta XTalk	03-Jan 07:51	5	6.21E-5	5.82E-5	3.79E-4	-2.93
LB4100D1	Below	Alpha eff	03-Jan 08:01	5	9793	10830	12970	-5.91
LB4100D1	Below	Beta eff	03-Jan 07:52	5	45974	50120	59690	-5.60
LB4100D2	Below	Beta eff	03-Jan 09:38	5	21719	22430	24610	-4.96
LB4100D4	Below	Beta eff	03-Jan 09:38	5	43000	43640	47170	-4.09
LB4100F2	Below	Alpha eff	03-Jan 09:09	5	6389	7334	8837	-6.77
LB4100F4	Below	Alpha eff	03-Jan 09:09	5	8725	10410	12330	-8.27
LB4100F4	Above	Alpha XTalk	03-Jan 09:09	5	0.502	0.330	0.484	+3.73
LB4100F4	Below	Beta eff	03-Jan 07:42	5	40038	40300	42960	-3.59
LB4100F4	Below	Beta XTalk	03-Jan 07:42	5	5.49E-5	9.55E-5	3.05E-4	-4.16
LB4100G1	Above	Alpha eff	03-Jan 09:09	5	10868	8871	10440	+4.64
LB4100G2	Below	Alpha eff	03-Jan 09:09	5	9140	9728	11070	-5.63
LB4100H2	Below	Beta eff	03-Jan 09:06	5	19892	20080	21440	-3.83
LB4100H3	Below	Alpha eff	03-Jan 09:25	5	20536	20890	22530	-4.29
LB4100H4	Below	Alpha eff	03-Jan 09:25	5	11447	11920	13690	-4.60
LB4100H4	Below	Beta eff	03-Jan 09:06	5	38089	38800	41100	-4.86
PIC3A	Above	Alpha bkg	03-Jan 06:38	60	1.200	-1.09E-1	0.333	+14.75

PIC3A	Above	Beta bkg	03-Jan 06:38	60	2.033	-1.30E-1	1.970	+3.18
PIC4B	Below	Beta eff	03-Jan 09:58	5	22085	22110	24230	-3.07
PIC5D	Above	Beta eff	03-Jan 09:37	5	26421	24760	26190	+3.97
PIC6B	Above	Alpha bkg	03-Jan 06:54	60	0.367	-1.06E-1	0.248	+5.02
PIC6B	need 2nd	Beta eff	03-Jan 06:45	5	22761	22680	23870	-2.59
PIC8B	Above	Alpha eff	03-Jan 08:30	5	9902	8876	9586	+5.67
PIC8B	Below	Alpha XTalk	03-Jan 08:30	5	0.295	0.303	0.459	-3.30
PIC8B	Above	Beta eff	03-Jan 09:45	5	22563	19740	21590	+6.15
PIC8B	Below	Beta XTalk	03-Jan 09:45	5	1.79E-4	1.95E-4	5.70E-4	-3.26
PIC8C	Above	Alpha eff	03-Jan 08:30	5	22541	20720	22200	+4.38
PIC8C	Below	Alpha XTalk	03-Jan 08:30	5	0.276	0.323	0.403	-6.56
PIC8C	Above	Beta eff	03-Jan 09:37	5	26491	22230	24170	+10.18
PIC10B	Above	Alpha bkg	03-Jan 08:01	60	0.250	-8.49E-2	0.232	+3.34
PIC10B	Below	Alpha eff	03-Jan 06:52	5	9256	9583	10080	-6.95
PIC10B	Above	Alpha XTalk	03-Jan 06:52	5	0.364	0.248	0.272	+26.24
PIC10B	Below	Beta eff	03-Jan 07:00	5	20819	23360	24290	-19.39
PIC13B	Below	Alpha eff	03-Jan 10:04	5	14039	14280	15200	-4.57
PIC13B	Below	Beta eff	03-Jan 10:45	5	23085	23230	24610	-3.63
PIC14B	Below	Alpha eff	03-Jan 07:06	5	8627	9895	11040	-9.64
PIC14B	Above	Alpha XTalk	03-Jan 07:06	5	0.463	0.196	0.421	+4.15
PIC14B	Below	Beta eff	03-Jan 07:14	5	20748	23580	26300	-9.25

INSTRUMENTS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

The following detectors may not have properly transferred to the LIMS system

PIC6D                      Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk

Reviewed by                     *KDot*                    

Date                     1/3/14                    

GEL Laboratories LLC

# Gas Flow Proportional Counter Checks for 06-Jan-2014

Detectors LB4100 A1 through J4 and PIC 1A through 14D

Short Name	Status	Parmname	Run Time	Count Time	CPM or dec	Low Limit	High Limit	Stdev
LB4100B2	Below	Alpha eff	06-Jan 07:18	5	8334	8363	10160	-3.10
LB4100B2	Above	Alpha XTalk	06-Jan 07:18	5	0.293	0.217	0.289	+3.37
LB4100B2	Above	Beta bkg	06-Jan 05:56	60	2.717	0.772	2.131	+5.59
LB4100B3	need 2nd	Alpha eff	06-Jan 07:18	5	18342	17650	21120	-1.80
LB4100B3	Above	Beta bkg	06-Jan 05:56	60	8.100	0.777	1.874	+37.04
LB4100C1	Above	Alpha bkg	06-Jan 06:02	60	0.533	-4.66E-3	0.345	+6.23
LB4100C1	Above	Alpha eff	06-Jan 07:30	5	12054	10840	11520	+7.72
LB4100C1	Above	Beta bkg	06-Jan 06:02	60	1.800	0.971	1.797	+3.02
LB4100C1	Above	Beta eff	06-Jan 07:18	5	18109	16250	17770	+4.34
LB4100C4	need 2nd	Alpha eff	06-Jan 07:30	5	7895	7639	9591	-2.21
LB4100C4	Above	Beta bkg	06-Jan 06:02	60	10.617	0.555	2.577	+26.86
LB4100C4	Below	Beta XTalk	06-Jan 07:18	5	2.68E-5	5.82E-5	3.79E-4	-3.59
LB4100D1	Below	Alpha eff	06-Jan 07:31	5	10041	10830	12970	-5.21
LB4100D1	Below	Beta eff	06-Jan 07:20	5	45757	50120	59690	-5.74
LB4100D2	Above	Alpha eff	06-Jan 08:52	5	9375	7955	9201	+3.84
LB4100D2	Below	Alpha XTalk	06-Jan 08:52	5	0.281	0.294	0.361	-4.17
LB4100F2	Above	Beta bkg	06-Jan 07:37	60	2.083	0.533	1.607	+5.66
LB4100F4	Below	Beta XTalk	06-Jan 09:49	5	9.43E-5	9.55E-5	3.05E-4	-3.03
LB4100H2	Below	Beta eff	06-Jan 08:38	5	20041	20080	21440	-3.17
LB4100H4	Below	Beta eff	06-Jan 08:38	5	38321	38800	41100	-4.25
PIC3A	Above	Alpha bkg	06-Jan 06:08	60	1.167	-1.09E-1	0.333	+14.30
PIC3A	Above	Beta bkg	06-Jan 06:08	60	7.133	-1.30E-1	1.970	+17.75
PIC5B	need 2nd	Alpha bkg	06-Jan 06:22	60	0.300	-1.12E-1	0.356	+2.28
PIC5B	need 2nd	Alpha eff	06-Jan 06:06	5	13852	13790	14450	-2.43
PIC5C	Above	Alpha bkg	06-Jan 06:41	60	0.283	-9.33E-2	0.273	+3.17
PIC6B	need 2nd	Alpha bkg	06-Jan 06:22	60	0.233	-1.06E-1	0.248	+2.75
PIC6B	Above	Beta bkg	06-Jan 06:22	60	2.300	-5.02E+0	11.330	-0.31
PIC6B	Below	Beta eff	06-Jan 06:14	5	22620	22680	23870	-3.30
PIC8B	Above	Alpha eff	06-Jan 08:01	5	9598	8876	9586	+3.10
PIC8B	Above	Beta eff	06-Jan 09:06	5	22642	19740	21590	+6.41



# Gas Flow Proportional Counter Checks for 08-Jan-2014

Detectors LB4100 A1 through J4 and PIC 1A through 14D

Short Name	Status	Parmname	Run Time	Count Time	CPM or dec	Low Limit	High Limit	Stdev
LB4100A1	Below	Alpha eff	08-Jan 08:23	5	7015	7290	9377	-3.79
LB4100A2	Below	Alpha eff	08-Jan 08:23	5	9148	10330	12260	-6.67
LB4100A2	Above	Alpha XTalk	08-Jan 08:23	5	0.363	0.250	0.347	+4.03
LB4100A3	Below	Alpha eff	08-Jan 08:23	5	7791	7979	9478	-3.75
LB4100B2	Below	Alpha eff	08-Jan 07:46	5	7116	8363	10160	-7.16
LB4100B2	Above	Alpha XTalk	08-Jan 07:46	5	0.356	0.217	0.289	+8.64
LB4100B3	Below	Alpha eff	08-Jan 07:46	5	14235	17650	21120	-8.90
LB4100B3	Above	Alpha XTalk	08-Jan 07:46	5	0.397	0.248	0.345	+6.18
LB4100B3	Above	Beta bkg	08-Jan 06:18	60	2.317	0.777	1.874	+5.42
LB4100B4	Below	Alpha eff	08-Jan 08:24	5	12222	13540	16370	-5.79
LB4100B4	Above	Alpha XTalk	08-Jan 08:24	5	0.338	0.229	0.311	+4.96
LB4100C1	Above	Alpha eff	08-Jan 07:56	5	11928	10840	11520	+6.60
LB4100C1	Above	Beta eff	08-Jan 07:46	5	18094	16250	17770	+4.28
LB4100C2	Below	Alpha eff	08-Jan 11:26	5	12386	12650	14880	-3.71
LB4100C2	Above	Alpha XTalk	08-Jan 11:26	5	0.283	0.215	0.282	+3.11
LB4100C2	Below	Beta XTalk	08-Jan 09:11	5	9.83E-5	1.35E-4	6.95E-4	-3.39
LB4100C3	Below	Alpha eff	08-Jan 12:50	5	8371	8458	10100	-3.32
LB4100C4	Below	Alpha eff	08-Jan 07:56	5	6632	7639	9591	-6.10
LB4100C4	Above	Beta bkg	08-Jan 06:25	60	2.450	0.555	2.577	+2.62
LB4100D1	Below	Alpha eff	08-Jan 07:57	5	9977	10830	12970	-5.39
LB4100D1	Below	Beta eff	08-Jan 07:48	5	46492	50120	59690	-5.27
LB4100D2	Below	Beta eff	08-Jan 09:02	5	21842	22430	24610	-4.62
LB4100D3	Below	Alpha eff	08-Jan 08:26	5	17816	18470	21450	-4.32
LB4100D4	Below	Beta eff	08-Jan 09:02	5	43242	43640	47170	-3.68
LB4100D4	Below	Beta XTalk	08-Jan 09:02	5	9.71E-5	1.10E-4	3.16E-4	-3.37
LB4100E2	Below	Alpha eff	08-Jan 09:21	5	7783	8789	10550	-6.43
LB4100E2	Above	Alpha XTalk	08-Jan 09:21	5	0.445	0.300	0.412	+4.79
LB4100E3	Below	Alpha eff	08-Jan 09:21	5	9377	9726	11220	-4.40
LB4100E3	Above	Alpha XTalk	08-Jan 09:21	5	0.272	0.215	0.271	+3.10
LB4100E4	Above	Beta bkg	08-Jan 07:54	60	6.217	0.557	1.965	+21.12

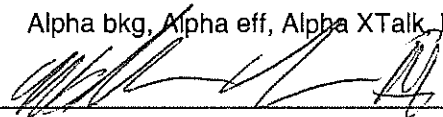
LB4100F2	Below	Alpha eff	08-Jan 08:14	5	6347	7334	8837	-6.94
LB4100F4	Below	Alpha eff	08-Jan 08:34	5	7698	10410	12330	-11.48
LB4100F4	Above	Alpha XTalk	08-Jan 08:34	5	0.569	0.330	0.484	+6.34
LB4100F4	Below	Beta eff	08-Jan 08:21	5	39828	40300	42960	-4.07
LB4100G2	Below	Alpha eff	08-Jan 12:59	5	8611	9728	11070	-7.99
LB4100G2	Above	Alpha XTalk	08-Jan 12:59	5	0.387	0.269	0.384	+3.17
LB4100G3	Below	Alpha eff	08-Jan 12:59	5	7917	8328	9530	-5.05
LB4100G4	Below	Beta XTalk	08-Jan 07:28	5	1.80E-5	7.19E-5	3.88E-4	-4.02
LB4100H2	Below	Beta eff	08-Jan 13:24	5	19562	20080	21440	-5.29
LB4100H3	Below	Alpha eff	08-Jan 09:26	5	20053	20890	22530	-6.06
LB4100H4	Below	Alpha eff	08-Jan 09:26	5	10712	11920	13690	-7.10
LB4100H4	Below	Beta eff	08-Jan 07:28	5	38375	38800	41100	-4.11
LB4100I2	Above	Alpha XTalk	08-Jan 15:48	5	0.210	0.124	0.179	+6.42
LB4100I3	Above	Alpha XTalk	08-Jan 15:48	5	0.202	0.132	0.171	+7.84
LB4100I4	Above	Alpha XTalk	08-Jan 15:48	5	0.192	0.147	0.179	+5.41
LB4100J2	Above	Alpha XTalk	08-Jan 15:48	5	0.171	0.137	0.164	+4.40
LB4100J3	Above	Alpha XTalk	08-Jan 15:48	5	0.205	0.142	0.184	+6.16
LB4100J4	Above	Alpha XTalk	08-Jan 15:48	5	0.185	0.154	0.182	+3.67
PIC1A	need 2nd	Alpha bkg	08-Jan 08:50	60	0.217	-9.91E-2	0.260	+2.27
PIC1A	need 2nd	Beta bkg	08-Jan 08:50	60	0.650	-4.26E-2	1.268	+0.17
PIC1B	Below	Beta eff	08-Jan 09:56	5	22006	22340	23620	-4.56
PIC3A	Above	Alpha bkg	08-Jan 06:31	60	1.067	-1.09E-1	0.333	+12.95
PIC5D	Above	Beta eff	08-Jan 11:37	5	26520	24760	26190	+4.38
PIC6B	Above	Alpha bkg	08-Jan 07:49	60	0.317	-1.06E-1	0.248	+4.17
PIC6B	need 2nd	Beta eff	08-Jan 06:34	5	22750	22680	23870	-2.64
PIC8B	Above	Alpha eff	08-Jan 09:42	5	9861	8876	9586	+5.33
PIC8B	Below	Alpha XTalk	08-Jan 09:42	5	0.297	0.303	0.459	-3.25
PIC8B	Above	Beta eff	08-Jan 10:02	5	22353	19740	21590	+5.47
PIC8C	Above	Alpha eff	08-Jan 09:42	5	22360	20720	22200	+3.65
PIC8C	Below	Alpha XTalk	08-Jan 09:42	5	0.278	0.323	0.403	-6.38
PIC8C	Above	Beta eff	08-Jan 10:02	5	26669	22230	24170	+10.73

PIC9A	Above	Alpha bkg	08-Jan 07:55	60	0.333	-1.36E-1	0.323	+3.14
PIC9A	need 2nd	Beta eff	08-Jan 06:48	5	21267	21200	22270	-2.62
PIC10B	Above	Alpha bkg	08-Jan 08:17	60	0.233	-8.49E-2	0.232	+3.03
PIC10B	Below	Alpha eff	08-Jan 06:41	5	9290	9583	10080	-6.54
PIC10B	Above	Alpha XTalk	08-Jan 06:41	5	0.348	0.248	0.272	+22.16
PIC10B	Below	Beta eff	08-Jan 06:49	5	21336	23360	24290	-16.06
PIC13A	Above	Alpha bkg	08-Jan 08:17	60	0.350	-1.14E-1	0.300	+3.73
PIC13B	Below	Alpha eff	08-Jan 10:00	5	14081	14280	15200	-4.30
PIC13B	Below	Beta eff	08-Jan 07:03	5	23076	23230	24610	-3.67
PIC13C	Above	Alpha bkg	08-Jan 07:48	60	0.483	-9.58E-2	0.376	+4.37
PIC14A	Above	Alpha bkg	08-Jan 07:48	60	0.333	-7.49E-2	0.260	+4.31
PIC14B	Above	Alpha bkg	08-Jan 07:48	60	0.267	-9.59E-2	0.207	+4.18
PIC14B	Below	Alpha eff	08-Jan 13:35	5	9192	9895	11040	-6.68
PIC14B	need 2nd	Alpha XTalk	08-Jan 13:35	5	0.378	0.196	0.421	+1.87
PIC14B	Below	Beta eff	08-Jan 07:04	5	21122	23580	26300	-8.42
PIC14B	need 2nd	Beta XTalk	08-Jan 07:04	5	2.37E-4	1.93E-4	5.50E-4	-2.26

INSTRUMENTS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

The following detectors may not have properly transferred to the LIMS system

PIC6D Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk

Reviewed by  \_\_\_\_\_

Date 1/8/14 \_\_\_\_\_

GEL Laboratories LLC

# Gas Flow Proportional Counter Checks for 09-Jan-2014

Detectors LB4100 A1 through J4 and PIC 1A through 14D

Short Name	Status	Parmname	Run Time	Count Time	CPM or dec	Low Limit	High Limit	Stdev
LB4100A1	Below	Alpha eff	09-Jan 11:25	5	7155	7290	9377	-3.39
LB4100A2	Below	Alpha eff	09-Jan 07:34	5	9250	10330	12260	-6.36
LB4100A2	Above	Alpha XTalk	09-Jan 07:34	5	0.360	0.250	0.347	+3.84
LB4100A2	Above	Beta bkg	09-Jan 09:39	60	15.117	0.563	1.644	+77.81
LB4100A3	Below	Alpha eff	09-Jan 11:25	5	7886	7979	9478	-3.37
LB4100B1	Above	Alpha XTalk	09-Jan 09:38	5	0.222	0.155	0.207	+4.78
LB4100B2	Below	Alpha eff	09-Jan 07:34	5	7142	8363	10160	-7.08
LB4100B2	Above	Alpha XTalk	09-Jan 07:34	5	0.352	0.217	0.289	+8.30
LB4100B3	Below	Alpha eff	09-Jan 07:34	5	14580	17650	21120	-8.31
LB4100B3	Above	Alpha XTalk	09-Jan 07:34	5	0.384	0.248	0.345	+5.38
LB4100B3	Above	Beta bkg	09-Jan 06:16	60	2.450	0.777	1.874	+6.15
LB4100B4	Below	Alpha eff	09-Jan 09:38	5	12065	13540	16370	-6.13
LB4100B4	Above	Alpha XTalk	09-Jan 09:38	5	0.339	0.229	0.311	+5.06
LB4100C1	Above	Alpha bkg	09-Jan 06:22	60	0.417	-4.66E-3	0.345	+4.23
LB4100C1	Above	Alpha eff	09-Jan 07:43	5	11841	10840	11520	+5.83
LB4100C1	Above	Beta eff	09-Jan 07:35	5	18133	16250	17770	+4.43
LB4100C3	Below	Alpha eff	09-Jan 12:04	5	8309	8458	10100	-3.54
LB4100C3	need 2nd	Beta XTalk	09-Jan 11:23	5	1.52E-4	1.00E-4	4.34E-4	-2.08
LB4100C4	Below	Alpha eff	09-Jan 07:43	5	6495	7639	9591	-6.52
LB4100C4	Above	Beta bkg	09-Jan 06:22	60	2.983	0.555	2.577	+4.21
LB4100C4	Below	Beta XTalk	09-Jan 07:35	5	5.35E-5	5.82E-5	3.79E-4	-3.09
LB4100D1	Below	Alpha eff	09-Jan 07:44	5	10205	10830	12970	-4.75
LB4100D1	Below	Beta eff	09-Jan 07:36	5	47138	50120	59690	-4.87
LB4100D2	Below	Beta eff	09-Jan 09:06	5	21966	22430	24610	-4.28
LB4100D4	Below	Beta eff	09-Jan 09:06	5	43465	43640	47170	-3.30
LB4100E2	Below	Alpha eff	09-Jan 09:02	5	8307	8789	10550	-4.64
LB4100E2	Above	Alpha XTalk	09-Jan 09:02	5	0.416	0.300	0.412	+3.21
LB4100E3	Below	Alpha eff	09-Jan 09:02	5	9527	9726	11220	-3.80
LB4100E4	Above	Beta bkg	09-Jan 07:40	60	2.467	0.557	1.965	+5.14
LB4100F2	Below	Alpha eff	09-Jan 08:17	5	6221	7334	8837	-7.44



LB4100F4	Below	Alpha eff	09-Jan 07:19	5	8200	10410	12330	-9.91
LB4100F4	Above	Alpha XTalk	09-Jan 07:19	5	0.539	0.330	0.484	+5.15
LB4100F4	Below	Beta eff	09-Jan 07:26	5	40086	40300	42960	-3.48
LB4100G1	Above	Alpha eff	09-Jan 08:18	5	10705	8871	10440	+4.01
LB4100G2	Below	Alpha eff	09-Jan 08:18	5	8662	9728	11070	-7.77
LB4100G3	Below	Alpha eff	09-Jan 08:18	5	8049	8328	9530	-4.39
LB4100H2	Below	Beta eff	09-Jan 09:35	5	19817	20080	21440	-4.16
LB4100H3	Below	Alpha eff	09-Jan 07:26	5	20145	20890	22530	-5.72
LB4100H4	Below	Alpha eff	09-Jan 07:26	5	10991	11920	13690	-6.15
LB4100H4	Below	Beta eff	09-Jan 09:35	5	38642	38800	41100	-3.41
LB4100H4	Below	Beta XTalk	09-Jan 09:35	5	6.21E-5	7.76E-5	3.19E-4	-3.39
LB4100I2	Above	Alpha XTalk	09-Jan 11:36	5	0.206	0.124	0.179	+5.99
LB4100I3	Below	Alpha eff	09-Jan 11:36	5	0.00E+0	11540	12360	-87.44
LB4100I3	Above	Alpha XTalk	09-Jan 11:36	5	6.000	0.132	0.171	+902.15
LB4100I4	Above	Alpha XTalk	09-Jan 11:36	5	0.188	0.147	0.179	+4.71
LB4100J2	Above	Alpha XTalk	09-Jan 11:36	5	0.173	0.137	0.164	+4.76
LB4100J3	Above	Alpha XTalk	09-Jan 11:36	5	0.201	0.142	0.184	+5.50
LB4100J4	Above	Alpha XTalk	09-Jan 11:36	5	0.188	0.154	0.182	+4.11
PIC1B	Below	Beta eff	09-Jan 09:13	5	22293	22340	23620	-3.22
PIC3A	Above	Alpha bkg	09-Jan 06:28	60	1.150	-1.09E-1	0.333	+14.08
PIC8B	Above	Alpha eff	09-Jan 09:38	5	9755	8876	9586	+4.43
PIC8B	Below	Alpha XTalk	09-Jan 09:38	5	0.298	0.303	0.459	-3.17
PIC8B	Above	Beta eff	09-Jan 07:51	5	22043	19740	21590	+4.47
PIC8C	Above	Alpha eff	09-Jan 09:38	5	22451	20720	22200	+4.02
PIC8C	Below	Alpha XTalk	09-Jan 09:38	5	0.272	0.323	0.403	-6.82
PIC8C	Above	Beta eff	09-Jan 07:51	5	26137	22230	24170	+9.08
PIC8C	need 2nd	Beta XTalk	09-Jan 07:51	5	1.64E-4	9.27E-5	4.24E-4	-1.71
PIC10B	Below	Alpha eff	09-Jan 06:40	5	9366	9583	10080	-5.62
PIC10B	Above	Alpha XTalk	09-Jan 06:40	5	0.344	0.248	0.272	+21.21
PIC10B	Below	Beta eff	09-Jan 06:47	5	21473	23360	24290	-15.18
PIC13B	Above	Alpha bkg	09-Jan 07:08	60	0.617	-1.03E-1	0.300	+7.72
PIC13B	Below	Alpha eff	09-Jan 06:55	5	14092	14280	15200	-4.23
PIC13B	Below	Beta eff	09-Jan 07:01	5	22996	23230	24610	-4.02

PIC14B	Above	Alpha bkg	09-Jan 07:08	60	0.233	-9.59E-2	0.207	+3.52
PIC14B	Below	Alpha eff	09-Jan 06:55	5	8580	9895	11040	-9.89
PIC14B	Above	Alpha XTalk	09-Jan 06:55	5	0.477	0.196	0.421	+4.52
PIC14B	Below	Beta eff	09-Jan 07:01	5	20886	23580	26300	-8.94

INSTRUMENTS NOT LISTED HAVE PASSED ALL QUALITY ASSURANCE PARAMETERS

The following detectors may not have properly transferred to the LIMS system

PIC6D                      Alpha bkg, Alpha eff, Alpha XTalk, Beta bkg, Beta eff, Beta XTalk

Reviewed by *KDSt*

Date 1/9/14

GEL Laboratories LLC

# Runlogs

# Instrument Run Log

Instrument Type: GFPC

Batch ID: 1355958

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
339629001	SAMPLE	JAOC	PIC9C	JAN-03-14 14:58:16	DONE	2 inch Planchett	01-OCT-13 00:00
339630001	SAMPLE	JAOC	PIC9D	JAN-03-14 14:58:16	DONE	2 inch Planchett	01-OCT-13 00:00
339804001	SAMPLE	JAOC	PIC10C	JAN-03-14 14:58:19	DONE	2 inch Planchett	01-OCT-13 00:00
1203009780	MB	JAOC	PIC10D	JAN-03-14 14:58:19	DONE	2 inch Planchett	01-OCT-13 00:00
1203009782	MS	JAOC	PIC12B	JAN-03-14 14:59:03	DONE	2 inch Planchett	01-OCT-13 00:00
1203009783	MSD	JAOC	PIC12C	JAN-03-14 14:59:03	DONE	2 inch Planchett	01-OCT-13 00:00
1203009784	LCS	JAOC	PIC12D	JAN-03-14 14:59:03	DONE	2 inch Planchett	01-OCT-13 00:00
1203009781	DUP	JAOC	PIC12A	JAN-03-14 14:59:25	DONE	2 inch Planchett	01-OCT-13 00:00
339628001	SAMPLE	JAOC	LB4100D3	JAN-06-14 12:15:32	DONE	2 inch Planchett	01-OCT-13 00:00
339739001	SAMPLE	JAOC	LB4100D4	JAN-06-14 12:15:32	DONE	2 inch Planchett	01-OCT-13 00:00

# Instrument Run Log

Instrument Type: GFPC

Batch ID: 1356857

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
1203011971	MS	EXK2	PIC6A	JAN-08-14 13:20:30	DONE	Tuffryn Filter	01-MAR-13 00:00
1203011972	LCS	EXK2	PIC6C	JAN-08-14 13:20:30	DONE	Tuffryn Filter	01-MAR-13 00:00
1203011969	MB	EXK2	PIC7A	JAN-08-14 13:20:36	DONE	Tuffryn Filter	01-MAR-13 00:00
339804001	SAMPLE	EXK2	PIC3B	JAN-08-14 16:24:31	DONE	Tuffryn Filter	01-MAR-13 00:00
1203011970	DUP	EXK2	PIC5D	JAN-09-14 16:12:50	DONE	Tuffryn Filter	01-MAR-13 00:00

# Liquid Scintillation Raw Data

07-Jan-2014

Batch# 1350537 Product: TC-99 Date: 1/17/14

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			NA
Samples have been blank corrected (if required). Blank correction reported included (if required).			NA
If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	/		
Instrument source check is within limits.	/		
Instrument bkg check is within limits.	/		
Method RDL/ LLD has been met.	/		
If duplicate activities are: Less than 5* MDA/ MDC, then RPD is 100% or less, If greater 5* MDA/ MDC, then RPD 20% or less, If below the MDA/ MDC, the RPD is 0%, Or meets the client's required RER acceptance criteria.	/		
Tracer yield is 15-125% . Carrier yield 25-125%. (Or meets the client's contract acceptance criteria).	/		
Method blank is less than the RDL/ LLD. (If rad samples. < 5% of lowest activity)	/		
Sample was run within hold time.	/		
Sample was correctly preserved if required.	/		
Smears Taken for Radioactive batches.			NA
Method Spike and LCS are within 75-125% (or meets the client's contract acceptance criteria).	/		
No blank spaces on data forms. All line outs initialed and dated. No transcription errors are apparent.	/		
Aux data is correct.			NA
Client Special requirements page has been checked.	/		
Raw Data and/ or spectrum are included and properly stasured.	/		
MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified	/		
Hit notification complete (if necessary)			NA
Batch entered into Case Narrative.	/		
Batch Data Exception Reports (DER) completed, if applicable.			NA
Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed.			NA
Aliquot Correction completed if required.			NA
Review sample historical results if available (If REMP, results above MDC have been verified by historical results, recount or re-analysis.)	/		

Primary Review Performed By: [Signature]  
Secondary Review Performed By: [Signature]

OLSS 1/17/14

# Technetium-99 Queue Sheet

12/26/2013

25

Batch #: 1356537    Analyst: MYMI    First Client Due Date: 01/17/2014    Internal Due Date: 01/06/2014  
 Spike Isotope: Technetium-99    Spike Code: 1207-E    Expiration Date: 8/15/14    Vol: 0.1  
 LCS Isotope: Technetium-99    LCS Code: 1207-E    Expiration Date: 8/15/14    Vol: 0.1  
 Tracer Isotope: Technetium-99m    Tracer Code: T0777-A    Reference Date: 12/14    Expiration Date: 1/3/14    Vol: 1.0  
 Prep Date: 1/3/14    Initials: MAK/AV    Pipet ID: 409992    Balance ID: 2810007    Witness: [Signature] 1/3/14

Sample I	Client Description	Type	Hazard Code	Min CRDL	Matrix	Client	Collection Date	Pos. #	Wet/Dry	Sample Mass (g/mL)	LSC Rack #
339804001-1	FURR 16-22B	SAMPLE		50 pCi/L	WATER	OLSS001	19-DEC-13 10:15 AM	1		100	41-2
1203011105-1	MB for batch 1356537	MB		50 pCi/L	WATER	QC ACCOUNT		2		100	41-3
1203011106-1	FURR 16-22B(339804001DUP)	DUP		50 pCi/L	WATER	QC ACCOUNT	19-DEC-13 10:15 AM	3		100	41-4
1203011107-1	FURR 16-22B(339804001MS)	MS		50 pCi/L	WATER	QC ACCOUNT	19-DEC-13 10:15 AM	4		50	41-5
1203011108-1	LCS for batch 1356537	LCS		50 pCi/L	WATER	QC ACCOUNT		5		100	41-6

Bkg Rack #: 41-1

Comments: Choose SOP Used: GL-RAD-A-005 (TEVA)    GL-RAD-B-016 (Bioassay)    GL-RAD-A-059 (AG)  
 Instrument Used: LS6000 (Red)    7065155, LS6500 (Blue)    7067083, LS6500 (Green)    7067404 Wallac (Yellow)    4140127, Wallac (Pink)    2200082, LS6000 (Brown)    7060655, LS6500 (Gold)    7070506, Wallac (White)    4140299, Purple    7069123, Silver    7060656, Orange    DG06095168  
 GEL Laboratories LLC, Radiochemistry Division

Data Reviewed By: [Signature] 1/7/14



# Technetium-99 Liquid

Filename : TC99.XLS  
 File type : Excel  
 Version # : 1.2.14

Tracer S/N : TC1777-A  
 Tracer Exp Date : 1/3/2014  
 Tracer Volume Added : 1.00

Batch : 1356537  
 Analyst : MYM1  
 Prep Date : 1/3/2014  
 Tc-99 Method Uncertainty : 0.0556

Procedure Code : LSC99TCL  
 Parmname : Technetium-99  
 Required MDA : 50 pCi/L  
 Tc-99 Abundance : 1.00  
 Half-life of Tc-99 : 211100 years

Geometry: 14mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin

Pos.	Sample Characteristics		Tracer Calculations				Tracer Ref. Count Uncertainty (%)		Tracer Samp. Count Uncertainty (%)		Tracer Aliquot StDev. (mL)	
	Sample ID	Sample Aliquot L	Sample Aliquot StDev. L	Tracer Ref. Activity (CPM)	Tracer Ref. Count Uncertainty (%)	Tracer Samp. Activity (CPM)	Tracer Samp. Count Uncertainty (%)	Tracer Aliquot (mL)	Tracer Aliquot StDev. (mL)			
1	339804001.1	0.1000	1.1370E-05	38888	0.93%	28052	0.95%	1.0	0.002000			
2	1203011105.1	0.1000	1.1370E-05	38888	0.93%	36218	0.94%	1.0	0.002000			
3	1203011106.1	0.1000	1.1370E-05	38888	0.93%	27695	0.95%	1.0	0.002000			
4	1203011107.1	0.0500	7.8397E-06	38888	0.93%	32740	0.94%	1.0	0.002000			
5	1203011108.1	0.1000	1.1370E-05	38888	0.93%	36384	0.94%	1.0	0.002000			

Pipet, 0.1 ml Stdev : +/- 0.000200 ml  
 Pipet, 0.5 ml Stdev : +/- 0.001000 ml  
 Pipet, 1 ml Stdev : +/- 0.002000 ml

Analytical SOP: GL-RAD-A-059  
 Instrument SOP: GL-RAD-I-004

Count raw Data										Calibration Data				Detector Efficiency Error		Background Count			
Pos.	Rack Position #	Counting Time (min.)	Quench#	Gross cpm	Bkg cpm	Bkg Count Time (min.)	Bkg Quench#	Corrected Bkg cpm	Count Start Date/Time	Sample Decay	Calculated Sample Recovery %	Sample Recovery Error %	Counted on	Calibration Date	Calibration Due Date	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Background Position #	Background Count Start Date/Time
1	41-2	25	167.1	17.36	15.92	25	168.9	15.90	1/7/2014 8:18	1.000	72.1%	0.72%	LSCGOLD	6/25/2013	6/30/2014	0.5704	0.00792	41-1	1/7/2014 7:51
2	41-3	25	161.3	14.68	15.92	25	168.9	15.86	1/7/2014 8:45	1.000	93.1%	0.72%	LSCGOLD	6/25/2013	6/30/2014	0.5720	0.00792	41-1	1/7/2014 7:51
3	41-4	25	170.6	16.48	15.92	25	168.9	15.94	1/7/2014 9:12	1.000	71.2%	0.72%	LSCGOLD	6/25/2013	6/30/2014	0.5687	0.00792	41-1	1/7/2014 7:51
4	41-5	25	155.4	117.24	15.92	25	168.9	15.85	1/7/2014 9:39	1.000	84.2%	0.72%	LSCGOLD	6/25/2013	6/30/2014	0.5719	0.00792	41-1	1/7/2014 7:51
5	41-6	25	162.2	123.6	15.92	25	168.9	15.87	1/7/2014 10:06	1.000	93.6%	0.72%	LSCGOLD	6/25/2013	6/30/2014	0.5719	0.00792	41-1	1/7/2014 7:51

Spike SN : 1297-E  
 Spike Exp Date : 8/15/2014  
 Spike Activity (dpm/ml): 1928.72  
 Spike Volume Added: 0.10

Notes:  
 1 - Results are decay corrected to Sample Date/Time  
 2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date  
 3 - Spike Nominals are decay corrected to Sample Date/Time

LCS SN : 1297-E  
 LCS Exp Date : 8/15/2014  
 LCS Activity (dpm/ml): 1928.72  
 LCS Volume Added (ml): 0.10

\* - RPD changed to 0% due to sample & dup activity below MDA

Pos.	Decision Level		Critical Level	Required MDA	MDA	Sample Act. Conc.		Sample Act. Error	Net Count Rate	Net Count Rate Error	2 SIGMA Counting Uncertainty		Total Prop. Uncertainty	Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery	
	pCi/L	pCi/L				pCi/L	pCi/L				CPM	CPM								pCi/L
1	28.7697	20.3116	50	41.9370	15.9563	0.7914	1.4576	1.1535	24.7495	24.8127	24.8127	24.8127	24.8127		SAMPLE					
2	22.1932	15.6686	50	32.3518	-9.9950	0.9351	-1.1821	1.1053	18.3178	18.3179	18.3179	18.3179	18.3179		MB					
3	29.2615	20.6589	50	42.6523	6.0209	2.1035	0.5414	1.1387	24.8229	24.8319	24.8319	24.8319	24.8319		DUP	0.0%		1737.5864	109.2%	
4	49.0939	34.6607	50	71.5669	1897.2413	0.0251	101.3909	2.3073	84.6216	226.9157	226.9157	226.9157	226.9157		MS			868.7931	104.4%	
5	22.1007	15.6033	50	32.2169	907.0136	0.0244	107.7394	2.3619	38.9749	107.9381	107.9381	107.9381	107.9381		LCS					

ASSAY 3-Jan-14 13:57:08

Protocol id 12 TC99\_REC  
Time limit 500  
Count limit 10000  
Isotope Tc-99m  
Protocol date 23-Sep-13 14:21:59  
Run id. 41

POS	RACK	BATCH	TIME	COUNTS	CPM	ERROR	% RECOVERY	COUNT TIME
1	86	1	18	11613	38888.3	0.93		13:57:15
2	86	2	24	11173	28052.1	0.95	72.14	13:57:46
3	86	3	19	11396	36218.3	0.94	93.13	13:58:22
4	86	4	24	11008	27694.7	0.95	71.22	13:58:53
5	86	5	21	11366	32740.1	0.94	84.19	13:59:29
6	92	6	19	11405	36383.8	0.94	93.56	14:00:18

END OF ASSAY

1356537

ID: TC-99

7 JAN 2014 07:54

USER: 7

COMMENT: GOLD

PRESET TIME : 25.00  
 DATA CALC : CPM H# : YES SAMPLE REPEATS: 1 PRINTER : STD  
 COUNT BLANK : NO IC# : NO REPLICATES : 1 RS232 : EDIT  
 TWO PHASE : NO AQC : NO CYCLE REPEATS : 1 DISK : OFF  
 SCINTILLATOR: LIQUID LUMEX: YES LOW SAMPLE REJ: 0  
 LOW LEVEL : NO HALF LIFE CORRECTION DATE: none

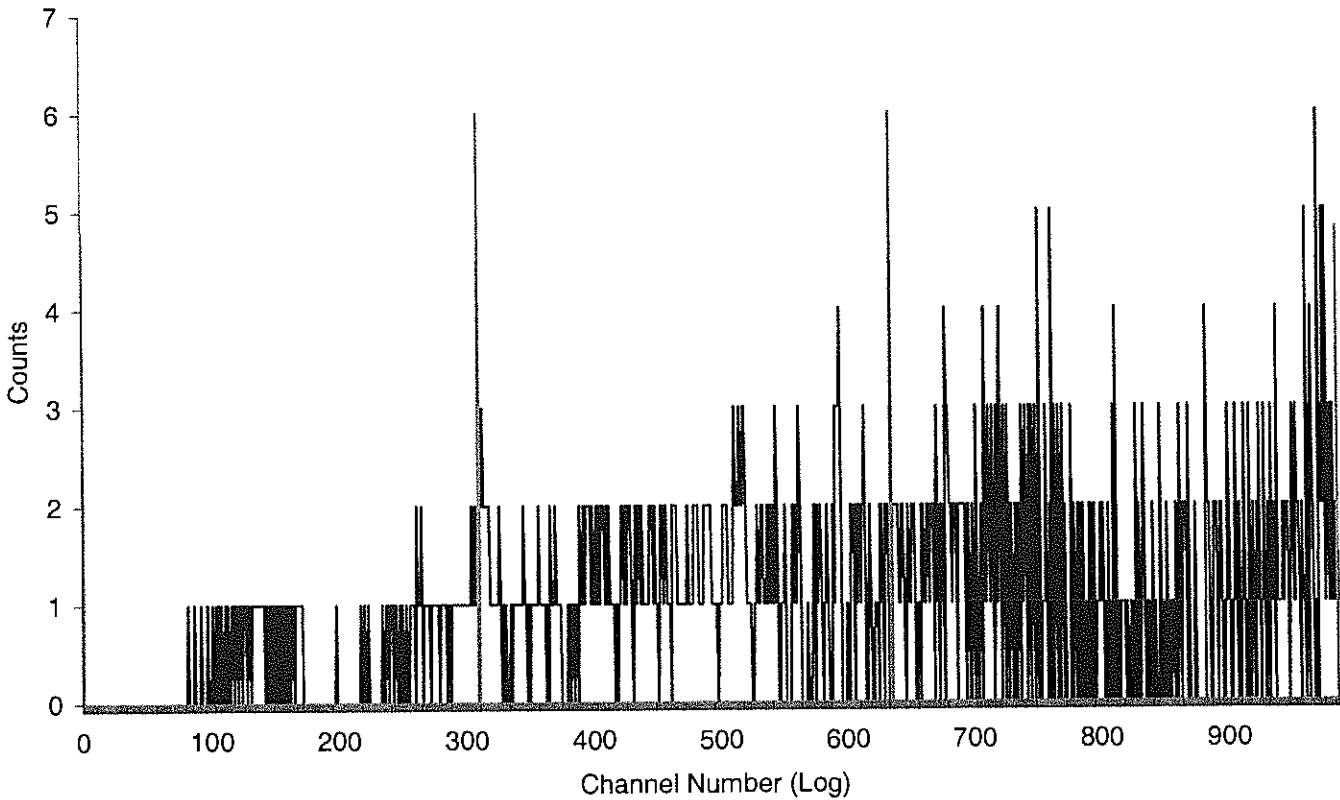
CHAN: 310.0 - 635.0 %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0  
 CHAN: 0.0 - 1000.0 %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0

SAM NO	POS	TIME MIN	H#	WIND1		WIND2		LUMEX %	ELAPSED TIME
				CPM	%ERROR	CPM	%ERROR		
1	41-1	25.00	168.9	15.92	10.03	39.84	6.72	11.41	26.39
2	41-2	25.00	167.1	17.36	9.60	38.20	6.82	10.35	53.24
3	41-3	25.00	161.3	14.68	10.44	39.76	6.71	10.84	80.13
4	41-4	25.00	170.6	16.48	9.85	37.44	6.98	12.63	107.04
5	41-5	25.00	155.4	117.24	3.69	150.68	3.29	1.90	133.81
6	41-6	25.00	162.2	123.60	3.60	156.80	3.24	3.04	160.72

Sample Count Start Time:	7 Jan 2014 07:51:57		
Data Capture Date	07 Jan 2014 08:17:22		
User Filename	S07010741-1A.XLS		
	U07010741-1A.XLS		
Spectrum Type	Log Counts		
User Number	07		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	1	41-1	25.00
H#, Total Counts:	168.9	996	
Win1: Tc-99 - Start, End, Counts:	310	635	398
Win2: - Start, End, Counts:	0	990	974

SPECTRUM PLOT

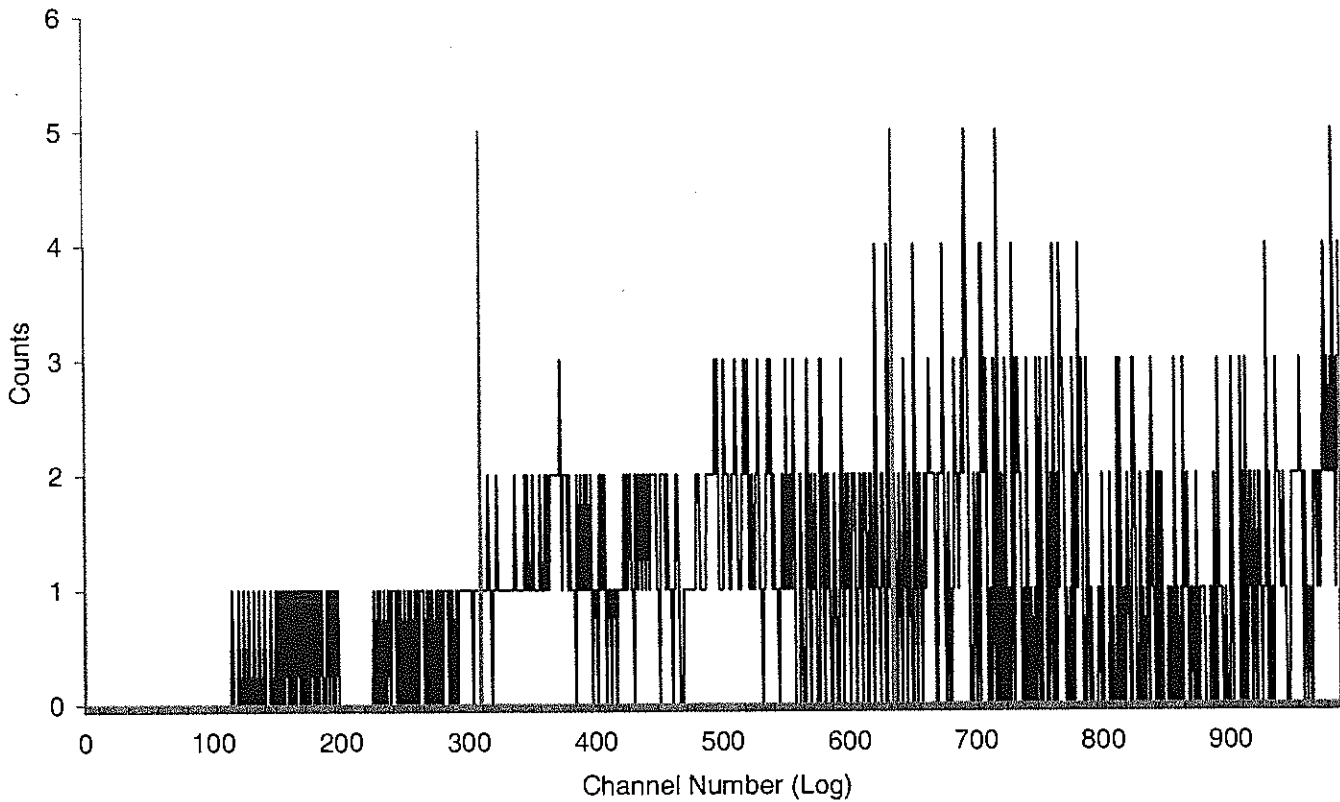
USER 07 - TC-99



Sample Count Start Time:	7 Jan 2014 08:18:48		
Data Capture Date	07 Jan 2014 08:44:13		
User Filename	S07010741-2A.XLS		
	U07010741-1A.XLS		
Spectrum Type	Log Counts		
User Number	07		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	2	41-2	25.00
H#, Total Counts:	167.1	963	
Win1: Tc-99 - Start, End, Counts:	310	635	435
Win2: - Start, End, Counts:	0	990	940

SPECTRUM PLOT

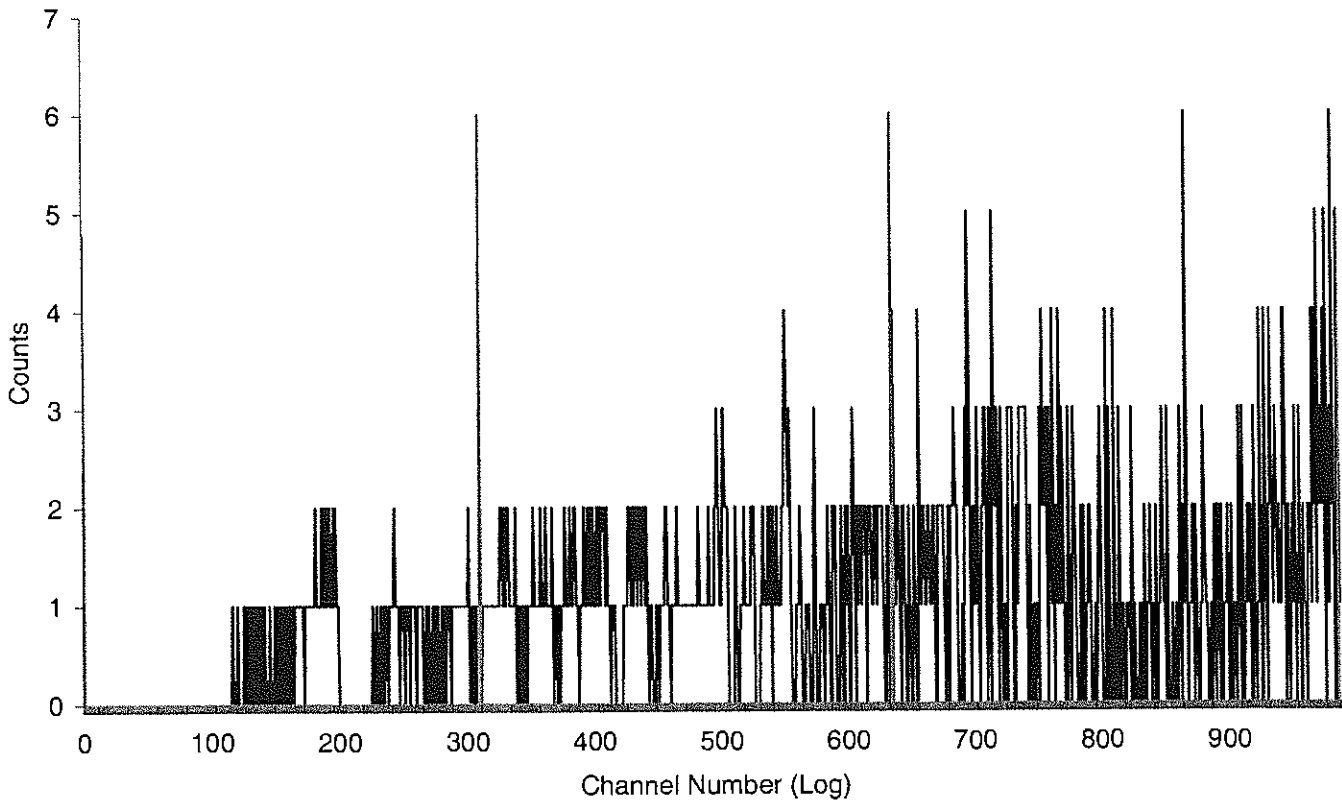
USER 07 - TC-99



Sample Count Start Time:	7 Jan 2014 08:45:42		
Data Capture Date	07 Jan 2014 09:11:06		
User Filename	S07010741-3A.XLS		
	U07010741-1A.XLS		
Spectrum Type	Log Counts		
User Number	07		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	3	41-3	25.00
H#, Total Counts:	161.3	1018	
Win1: Tc-99 - Start, End, Counts:	310	635	370
Win2: - Start, End, Counts:	0	990	980

SPECTRUM PLOT

USER 07 - TC-99

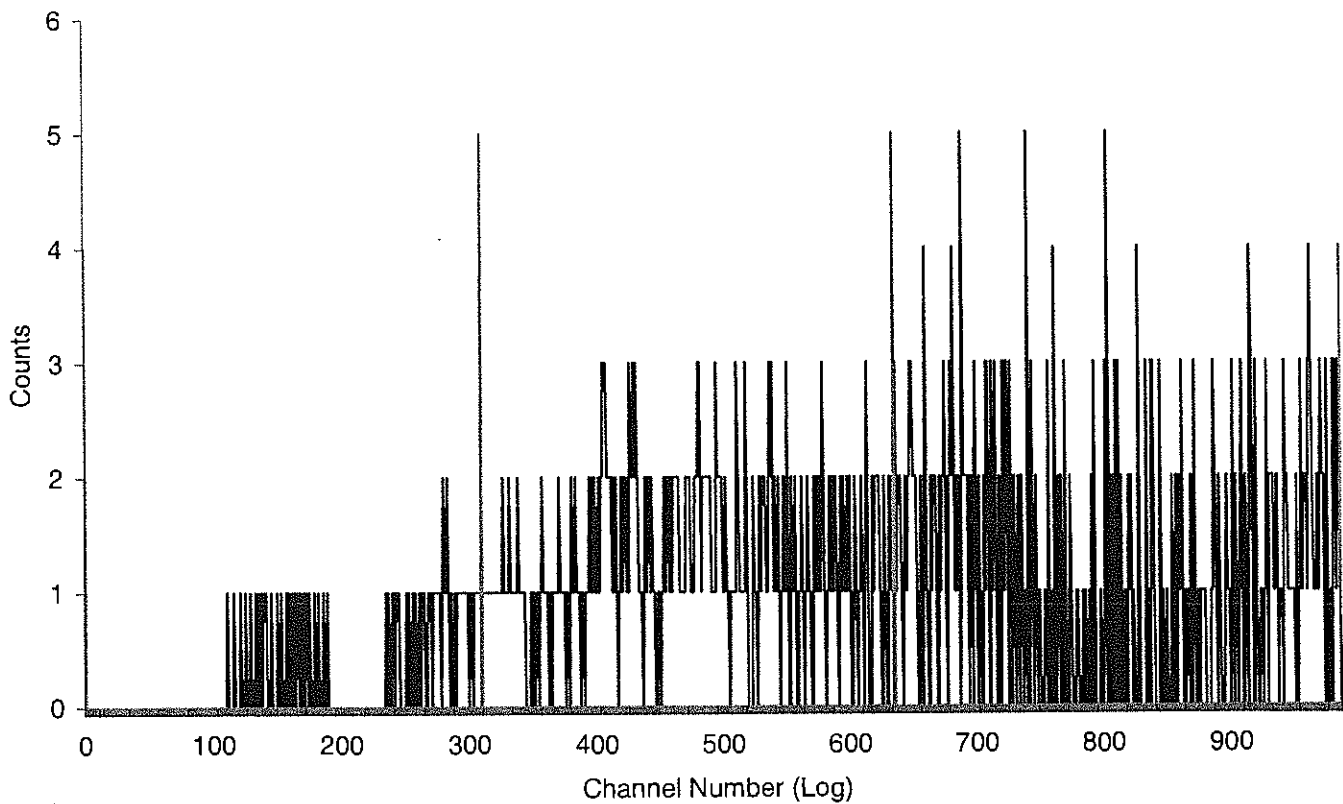




Sample Count Start Time:	7 Jan 2014 09:12:36		
Data Capture Date	07 Jan 2014 09:38:01		
User Filename	S07010741-4A.XLS		
	U07010741-1A.XLS		
Spectrum Type	Log Counts		
User Number	07		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	4	41-4	25.00
H#, Total Counts:	170.6	936	
Win1: Tc-99 - Start, End, Counts:	310	635	414
Win2: - Start, End, Counts:	0	990	914

SPECTRUM PLOT

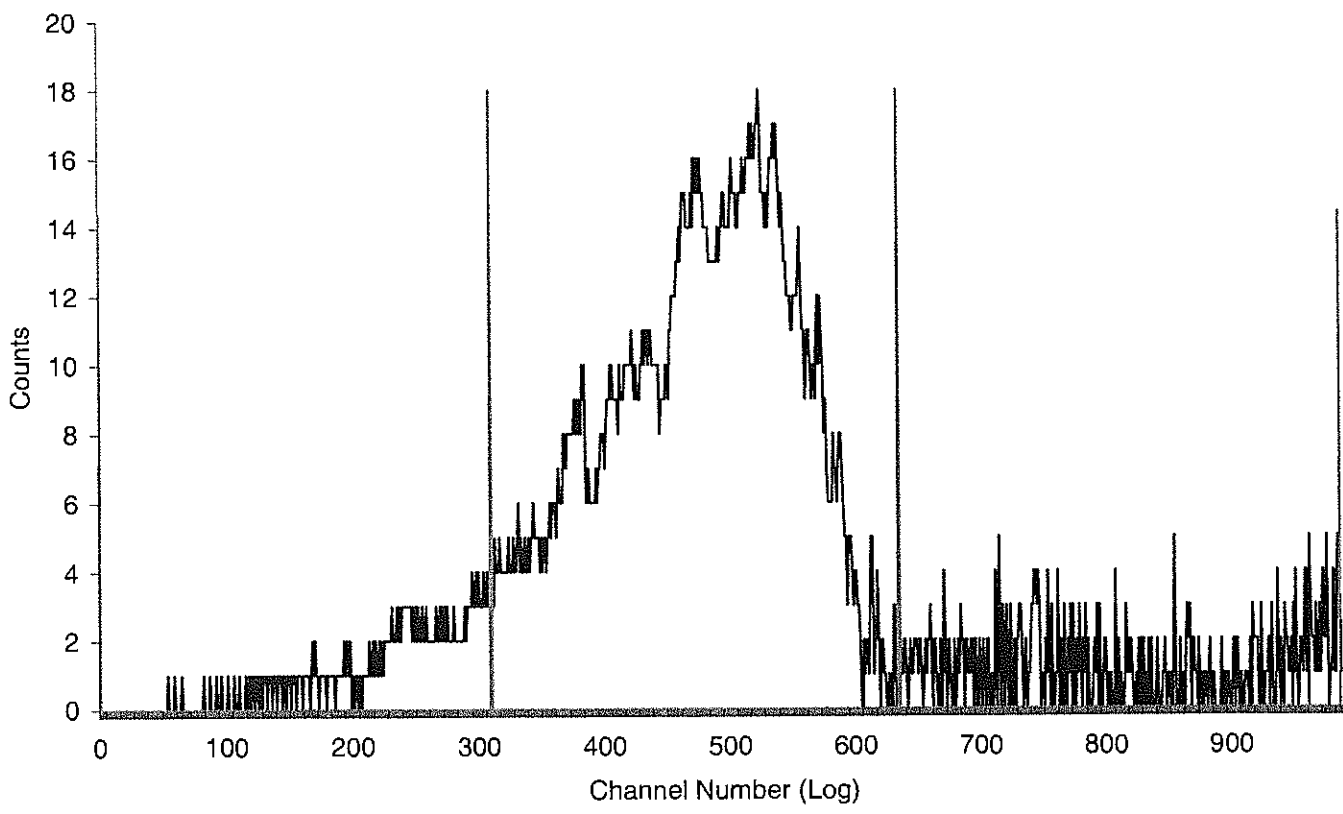
USER 07 - TC-99



Sample Count Start Time:	7 Jan 2014 09:39:23		
Data Capture Date	07 Jan 2014 10:04:49		
User Filename	S07010741-5A.XLS		
	U07010741-1A.XLS		
Spectrum Type	Log Counts		
User Number	07		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	5	41-5	25.00
H#, Total Counts:	155.4	3791	
Win1: Tc-99 - Start, End, Counts:	310	635	2930
Win2: - Start, End, Counts:	0	990	3719

SPECTRUM PLOT

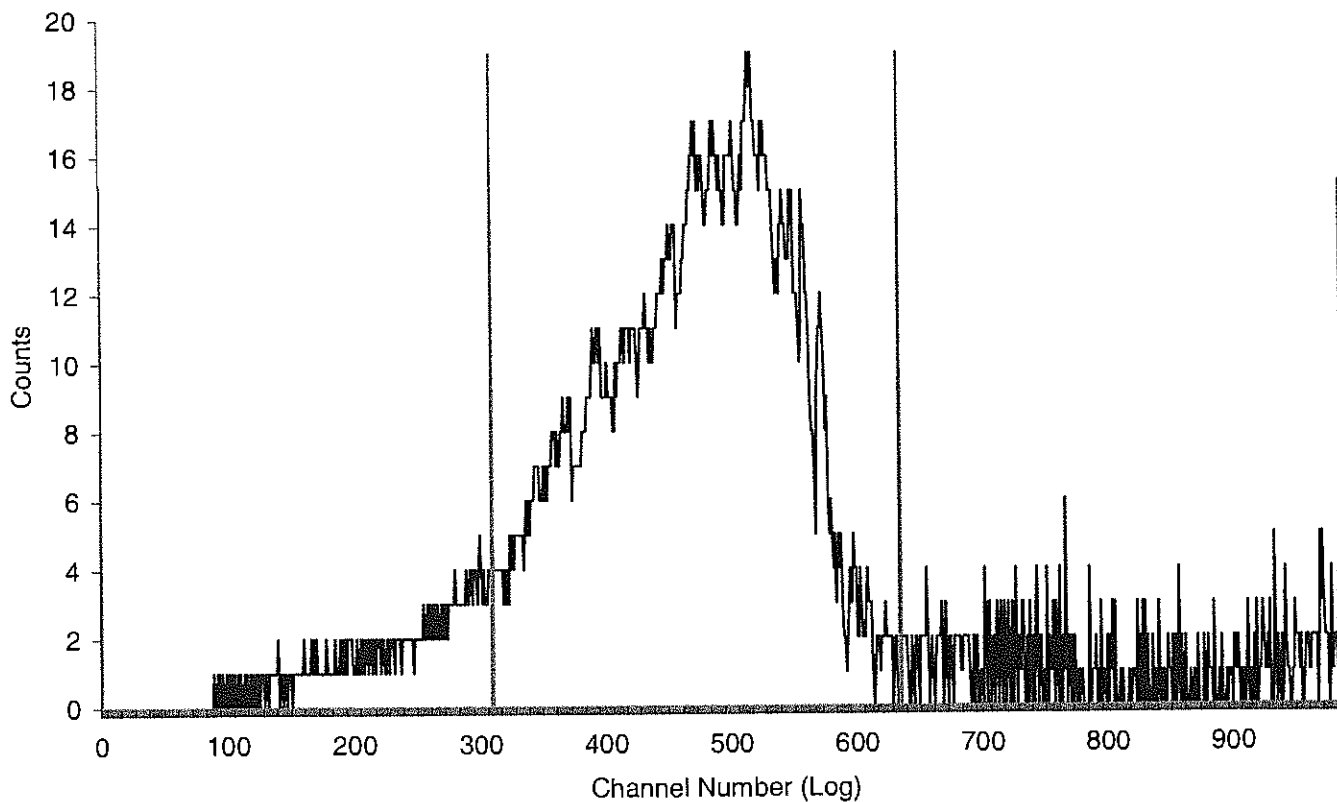
USER 07 - TC-99



Sample Count Start Time:	7 Jan 2014 10:06:17		
Data Capture Date	07 Jan 2014 10:31:42		
User Filename	S07010741-6A.XLS		
	U07010741-1A.XLS		
Spectrum Type	Log Counts		
User Number	07		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	6	41-6	25.00
H#, Total Counts:	162.2	3928	
Win1: Tc-99 - Start, End, Counts:	310	635	3088
Win2: - Start, End, Counts:	0	990	3889

SPECTRUM PLOT

USER 07 - TC-99



Batch# 1357134 Product: H-3 Date: 1/7/14

Criteria:	Yes	No	Comments
Sample Solids are less than or equal to 100 mg for GAB.			NA
Samples have been blank corrected (if required). Blank correction reported included (if required).			NA
If activity less than 10x MDA/MDC, error is less than or equal to 150% of sample activity. If greater than 10* MDA/ MDC, error is 40% or less. If below the MDA/ MDC, error is okay.	/		
Instrument source check is within limits.	/		
Instrument bkg check is within limits.	/		
Method RDL/ LLD has been met.			
If duplicate activities are: Less than 5* MDA/ MDC, then RPD is 100% or less, If greater 5* MDA/ MDC, then RPD 20% or less, If below the MDA/ MDC, the RPD is 0%, Or meets the client's required RER acceptance criteria.	/		
Tracer yield is 15-125% . Carrier yield 25-125%. (Or meets the client's contract acceptance criteria).			NA
Method blank is less than the RDL/ LLD. (If rad samples. < 5% of lowest activity)	/		
Sample was run within hold time.	/		
Sample was correctly preserved if required.	/		
Smears Taken for Radioactive batches.			NA
Method Spike and LCS are within 75-125% (or meets the client's contract acceptance criteria).	/		
No blank spaces on data forms. All line outs initialed and dated. No transcription errors are apparent.	/		
Aux data is correct.			NA
Client Special requirements page has been checked.	/		
Raw Data and/ or spectrum are included and properly stated.	/		
MS, LCS, and Duplicate RPD/RER values uploaded to LIMS and values verified	/		
Hit notification complete (if necessary)			NA
Batch entered into Case Narrative.	/		
Batch Data Exception Reports (DER) completed, if applicable.			NA
Batch Data Exception Reports (DER) second reviewed. Disposition verified to be completed.			NA
Aliquot Correction completed if required.			NA
Review sample historical results if available (If REMF, results above MDC have been verified by historical results, recount or re-analysis.)	/		

Primary Review Performed By: [Signature]

OLSS 1/17/14

Secondary Review Performed By: [Signature]

# Tritium Queue Sheet

31-DEC-13

Batch #: 1357134 Analyst: BYSI First Client Due Date 17-JAN-14 Internal Due Date: 06-JAN-14  
 Spike Isotope: Hydrogen-3 Spike Code: 1029-B Expiration Date: 5.13.14 Vol: 0.1mL  
 LCS Isotope: Hydrogen-3 LCS Code: 1029-B Expiration Date: 5.13.14 Vol: 0.1mL

Prep Date: 1.6.14 Initials: BDS Pipet ID: 29709408 Witness: [Signature] 1/6/14 Balance ID: NA

Sample ID	Client Samp ID	Type	Hazard Code	Min CRDL	Matrix	Client	Sample Date	Aliquot in vial (g/mL)	LSC Rack #	Dist Rig #	Vol added for Dist (mL)	Initial Sample Aliquot (g/mL)	Final Wt (g)	Dist Vol (mL)
339804001-1	FURR 16-22B	SAMPLE	.7 pCi/mL	WATER	OLSS001	19-DEC-13	10	81-2	9	81-6	50	81-6	13	
1203012727-1	MB for batch 1357134	MB	.7 pCi/mL	WATER	QC ACCOUNT		10	81-3	32	81-6	50	81-6	13	
1203012728-1	FURR 16-22B(339804001DUP)	DUP	.7 pCi/mL	WATER	QC ACCOUNT	19-DEC-13	10	81-4	36	81-6	50	81-6	13	
1203012729-1	FURR 16-22B(339804001MS)	MS	.7 pCi/mL	WATER	QC ACCOUNT	19-DEC-13	10	81-5	46	81-6	50	81-6	13	
1203012730-1	LCS for batch 1357134	LCS	.7 pCi/mL	WATER	QC ACCOUNT		10	81-6	65	81-6	50	81-6	13	

Bkg Rack #: 81-1

Comments: Bkg prepared with dead water?  Yes/ No  
 Instrument Used (circle as appropriate): LS6000 (Red) 7065155, LS6500 (Blue) 7067083, LS6500 (Gold) 7070506, LS6500 (Green) 7067404, Wallac (Yellow) 4140127, LS6000 (Brown) 7060655, Wallac (Pink) 2200082, Wallac (White) 4140299, Purple 7069123, Silver 7060656, Orange DG06095468  
 Calibration Used: Ecospic Ultra  
 Data Reviewed By: [Signature]  
 Gray 4150033

T1957134

# Tritium Liquid

Filename : H3DST.XLS  
File type : Excel  
Version # : 1.2.11

Batch : 1357134  
Analyst : BYS1  
Prep Date : 1/6/2014  
Method Uncertainty : 0.0983

Procedure Code : LSCDSH3L  
Parmname : Tritium  
Required MDA : 700 pCi/L  
H-3 Abundance : 1.00  
Half-life of Tritium : 12.32 years

Geometry: 10mL DW/13mL Ecoscint Ultra

### Sample Characteristics

Pos.	Sample ID	Total Sample Volume (L)	Sample Aliquot (L)	Sample Aliquot StDev.	Distilled Sample Counted (L)	Sample Counted StDev.	Rig number	Sample Date/Time
1	339804001.1	0.0500	0.0500	7.8337E-06	0.0100	1.0000E-05	9	12/19/2013 10:15
2	1203012727.1	0.0500	0.0500	7.8337E-06	0.0100	1.0000E-05	32	1/6/2014 0:00
3	1203012728.1	0.0500	0.0500	7.8337E-06	0.0100	1.0000E-05	36	12/19/2013 10:15
4	1203012729.1	0.0500	0.0500	7.8337E-06	0.0100	1.0000E-05	46	12/19/2013 10:15
5	1203012730.1	0.0500	0.0500	7.8337E-06	0.0100	1.0000E-05	65	1/6/2014 0:00

T1357134

Pipet, 0.1 ml Stdev : +/- 0.000200 ml  
 Pipet, 0.5 ml Stdev : +/- 0.001000 ml  
 Pipet, 1.0 ml Stdev : +/- 0.002000 ml  
 Pipet, 5.0 ml Stdev : +/- 0.010000 ml

Analytical SOP: GL-RAD-A-002  
 Instrument SOP: GL-RAD-I-014

Count raw Data		Calibration Data										Background Count					
Pos.	Rack Position #	Counting Time (min.)	Quench#	Gross cpm	Bkg cpm	Bkg Count Time (min.)	Bkg Quench#	Corrected Bkg cpm	Count Start Date/Time	Sample Decay	Counted on	Calibration Date	Calibration Due Date	Detector Efficiency (cpm/dpm)	Detector Efficiency Error (cpm/dpm)	Background Rack Position #	Background Count Start Date/Time
1	81-2	15	716.52	2.83	1.94	15	718.18	1.92	1/6/2014 15:18	0.997	LSCGRAY	8/1/2013	7/31/2014	0.1587	0.00792	81-1	1/6/2014 15:01
2	81-3	15	717.13	2.07	1.94	15	718.18	1.93	1/6/2014 15:34	1.000	LSCGRAY	8/1/2013	7/31/2014	0.1597	0.00792	81-1	1/6/2014 15:01
3	81-4	15	717.83	3.25	1.94	15	718.18	1.94	1/6/2014 15:50	0.997	LSCGRAY	8/1/2013	7/31/2014	0.1609	0.00792	81-1	1/6/2014 15:01
4	81-5	15	716.63	8.64	1.94	15	718.18	1.92	1/6/2014 16:06	0.997	LSCGRAY	8/1/2013	7/31/2014	0.1589	0.00792	81-1	1/6/2014 15:01
5	81-6	15	717.73	9.82	1.94	15	718.18	1.93	1/6/2014 16:22	1.000	LSCGRAY	8/1/2013	7/31/2014	0.1607	0.00792	81-1	1/6/2014 15:01

T1357134

Spike S/N : 1629-B  
 Spike Exp Date : 5/13/2014  
 Spike Activity (dpm/ml): 2044.86  
 Spike Volume Added: 0.10

LCS S/N : 1629-B  
 LCS Exp Date : 5/13/2014  
 LCS Activity (dpm/ml): 2044.86  
 LCS Volume Added: 0.10

Notes:  
 1 - Results are decay corrected to Sample Date/Time  
 2 - Reference date for Spike Activity (dpm/ml) is the batch Prep Date  
 3 - Spike Nominals are decay corrected to Sample Date/Time

\* - RPD changed to 0% due to sample & dup activity below MDA

Pos.	Decision Level pCi/L	Critical Level pCi/L	Required MDA pCi/L	MDA pCi/L	Sample Act. Conc. pCi/L	Sample Act. Error pCi/L	Net Count Rate CPM	Net Count Rate Error CPM	2 SIGMA		Sample QC	Sample Type	RPD	RER	Nominal pCi/L	Recovery
									Counting Uncertainty pCi/L	Total Prop. Uncertainty pCi/L						
1	335.4722	236.8463	700	530.6089	259.0355	0.6183	0.9102	0.5627	313.8727	317.8421		SAMPLE				
2	333.1291	235.1920	700	526.7947	40.2957	3.6133	0.1429	0.5162	285.3751	285.4814		MB				
3	332.4013	234.6781	700	525.5192	369.0790	0.4474	1.3143	0.5880	323.6186	331.3902	339804001.1	DUP	0.0%			
4	335.2128	236.6631	700	530.1790	1909.9424	0.1251	6.7189	0.8391	467.5050	595.7190	339804001.1	MS		1847.2096	103.4%	
5	331.7348	234.2076	700	524.4834	2210.6387	0.1125	7.8855	0.8852	486.4049	647.4663		LCS		1842.2162	120.0%	



1357134

H-3 GRAY

PROTOCOL : 2 H-3 15 min  
DATE : 2014/01/06  
TIME : 15:01  
ID : P02AS613

H-3

Wallac 1400 DSA ver 2.50 S/N4150033

Counting mode : CPM  
Isotope(s) : H3  
H3 = 5- 350,12.43 y  
Protocol name : H-3 15 min  
Counting time : 900  
Repeats : 1  
Cycles : 1  
Replicates : 1  
2 sigma % : 0.00  
Minimum cpm : 0.00 Checking time: 10  
Advanced modes : Chemilum  
Output to Display :  
POS,DPM1,CPMw2,CLMM,FNCT2,  
RACK,RACKPOS,FNCT1,SQPE,TIME,  
DATE,CPMw1,CPM,CPM1,CTIME  
Additions to Display : Spectrum,Header,Listing  
Header : H-3  
Spectrum : Rnd.Cos,Beta  
Window 1 : 25- 190 /Beta  
Window 2 : 25- 190 /Rnd.Cos  
Window 3 : 1-1024 /Beta  
Window 4 : 1-1024 /Beta  
Window 5 : 1-1024 /Beta  
Window 6 : 1-1024 /Beta  
FNCT1 = FNCT1 : CTIME/60  
FNCT2 = FNCT2 : CPMW1-CPMW2  
FNCT3 = FNCT3 :  
FNCT4 = FNCT4 :

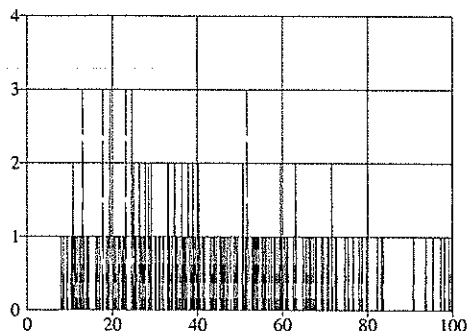
Total count rate:

H3 51.6 CPM

H-3 GRAY

*1*

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
81	1	718.18	1.94	1/6/2014 3:01 PM



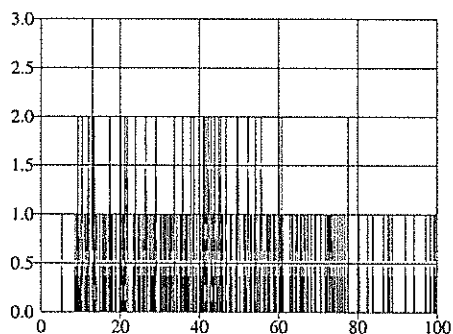
Counts Chem  
Counts Beta

Gross\_B\_CPM 2.00 Lumex 0.00

Lumex\_CPM 0.10 DPM 0.00

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
81	2	716.52	2.83	1/6/2014 3:18 PM

*1*



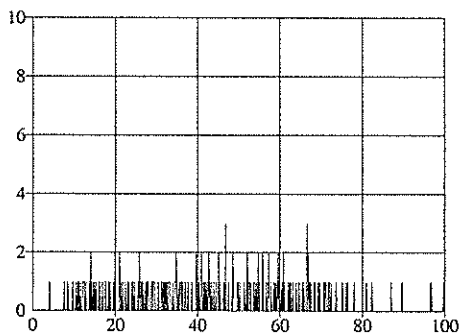
Counts Chem  
Counts Beta

Gross\_B\_CPM 2.80 Lumex 0.00

Lumex\_CPM 0.00 DPM 0.00

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
81	3	717.13	2.07	1/6/2014 3:34 PM

*2*



Counts Chem  
Counts Beta

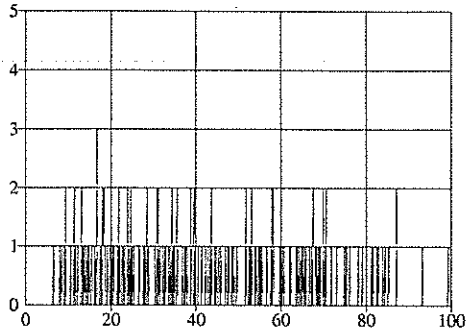
Gross\_B\_CPM 2.10 Lumex 0.00

Lumex\_CPM 0.00 DPM 0.00

H-3 GRAY

3

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
81	4	717.83	3.25	1/6/2014 3:50 PM



Counts Chem

Counts Beta

Gross\_B\_CPM  
3.20

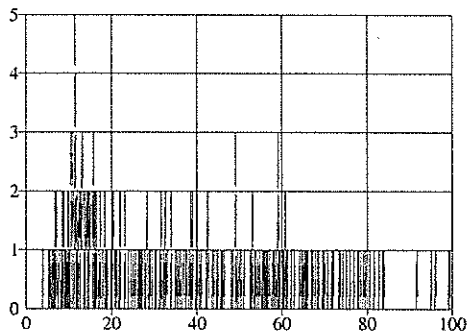
Lumex  
0.00

Lumex\_CPM  
0.00

DPM  
0.00

4

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
81	5	716.63	8.64	1/6/2014 4:06 PM



Counts Chem

Counts Beta

Gross\_B\_CPM  
8.70

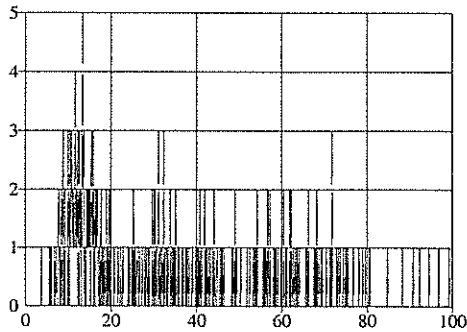
Lumex  
0.00

Lumex\_CPM  
0.10

DPM  
0.00

5

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
81	6	717.73	9.82	1/6/2014 4:22 PM



Counts Chem

Counts Beta

Gross\_B\_CPM  
9.80

Lumex  
0.00

Lumex\_CPM  
0.00

DPM  
0.00

# **Method Calibration Data**

25-Jun-2013

**GEL Laboratories**

2040 Savage Road, Charleston, SC 29407  
(843)556-8171

**Liquid Scintillation Counter Calibration Package**

Method: TC-99 Ag 1x8

Instrument Color Code: Gold

**Part 1: Efficiency determination**

- 1 Efficiency spreadsheet (eff pts, graph, trendline equation)
- 2 Verification Spreadsheet (recoveries 90%-110%)
- 3 Applicable portion of Machines.XLS
- 4 Raw Data and spectra
- 5 Window, Low Level and Lumex settings

Included/ Acceptable	Comments
✓	
✓	
✓	
✓	
✓	

**Part 2. Documentation for Calibration Source**

- 1 Vendor Certificate
- 2 Standard Traceability Log (from LIMS)
- 3 Verification of Source
- 4 Source preparation sheet
- 5 Efficiency standard precision check

✓	
✓	
✓	
✓	
✓	

**Part 3. Documentation for Verification Source**

- 1 Vendor Certificate
- 2 Standard Traceability Log (from LIMS)
- 3 Verification of Source
- 4 Source preparation sheet

✓	
✓	
✓	
✓	

**Part 4. Enter into LIMS**

- 1 Alpha LIMS instrument calibration updated

✓	
---	--

Primary Review of Package

Secondary Review of Package

*[Handwritten Signature]*  
*[Handwritten Signature]*

Effective Date:  
6/25/13

Expiration Date: 6/30/14

# Tc-99 Calibration

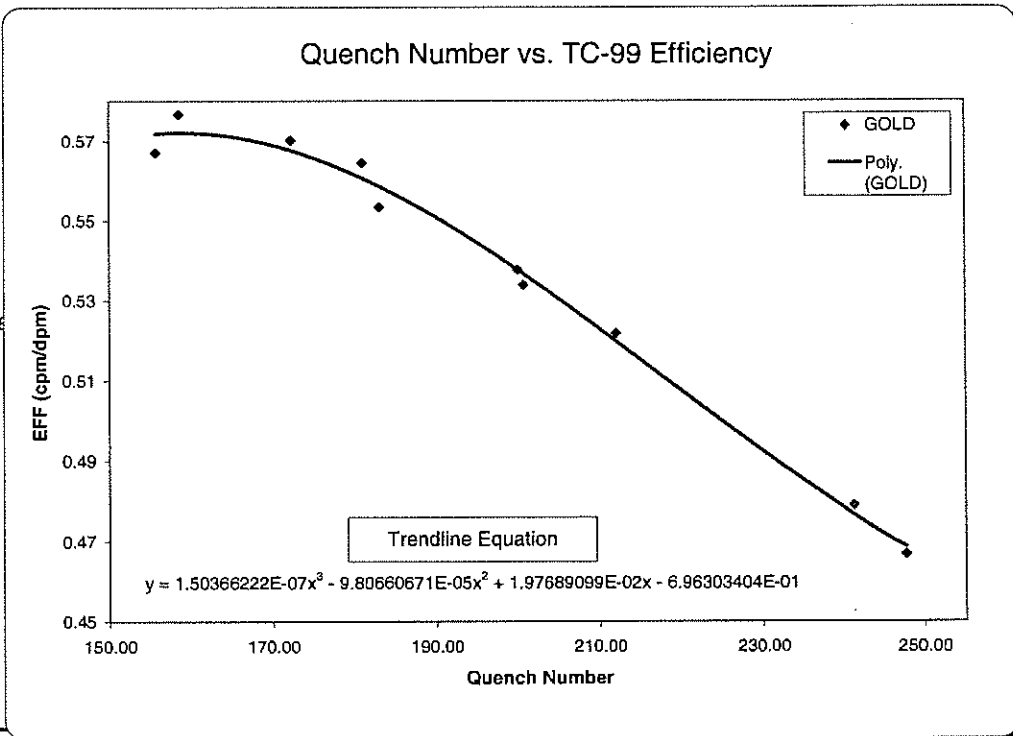
Standard information from prep sheet

Isotope	TC-99
Serial Number	1234-A
Isotope Half-life (days)	77798250
Reference Date	6/27/2008
Ref. Act. (DPM/mL)	21213.34
Amount of Std. (mL)	0.5

Instrument	GOLD
------------	------

Std #	Start Count Time	Quench Number	RAW CPM	BKG	RAW CPM-BKG	Nominal DPM	EFF.
1	6/13/13 7:54	155.70	6033.53	18.33	6015.20	10606.49934	0.56712
2	6/13/13 7:56	158.60	6135.15	18.33	6116.82	10606.49933	0.57670
3	6/13/13 7:59	172.30	6066.67	18.33	6048.34	10606.49933	0.57025
4	6/13/13 8:02	183.10	5887.06	18.33	5868.73	10606.49933	0.55331
5	6/13/13 8:04	181.00	6005.29	18.33	5986.96	10606.49933	0.56446
6	6/13/13 8:07	212.00	5552.97	18.33	5534.64	10606.49933	0.52182
7	6/13/13 8:10	200.00	5721.71	18.33	5703.38	10606.49933	0.53773
8	6/13/13 8:13	200.70	5681.11	18.33	5662.78	10606.49933	0.53390
9	6/13/13 8:15	247.80	4989.27	18.33	4950.94	10606.49933	0.46678
10	6/13/13 8:19	241.30	5098.00	18.33	5079.67	10606.49933	0.47892

Copy into Machines.xls	
Cal Date	06/25/13
Min H#	150.1
Max H#	242.0
A0	-6.96303403E-01
A1	1.97689099E-02
A2	-9.80660670E-05
A3	1.50366222E-07
A4	0
A5	0
Geometry	500 GL/5mL DI H20/AG 1x6
Exp Date	06/30/14
Low Level	N
Eff Error	0.007920
Window1 LL	310
Window1 UL	635
Window2 LL	0
Window2 UL	1000



# TC-99 Verification

Instrument	GOLD
------------	------

Standard Information from prep sheet	
Isotope	TC-99
Serial Number	1297-A
Isotope Half-life (days)	77798250
Reference Date	9/1/1996
Ref. Act. (DPM/mL)	95579.91
Amount of Std. (mL)	0.1

Std #	Start Count Time	Quench Number	Raw CPM	BKG	BKG Corrected CPM	Calculated EFF.	Standard DPM	Measured DPM	Recovery %
1	6/13/13 8:38	150.10	5550.81	19.73	5531.08	0.5701	9557.47	9702.25	101.51%
2	6/13/13 8:41	161.00	5688.89	19.73	5669.16	0.5720	9557.47	9910.41	103.69%
3	6/13/13 8:44	173.30	5428.65	19.73	5408.92	0.5671	9557.47	9538.66	99.80%
4	6/13/13 8:47	188.50	5297.37	19.73	5277.64	0.5528	9557.47	9547.88	99.90%
5	6/13/13 8:50	184.30	5464.32	19.73	5444.59	0.5574	9557.47	9767.08	102.19%
6	6/13/13 8:53	198.00	5305.79	19.73	5286.06	0.5406	9557.47	9778.85	102.32%
7	6/13/13 8:55	228.30	4754.42	19.73	4734.69	0.4949	9557.47	9567.24	100.10%
8	6/13/13 8:59	213.80	4992.20	19.73	4972.47	0.5172	9557.47	9614.97	100.60%
9	6/13/13 9:02	242.00	4571.36	19.73	4551.63	0.4757	9557.47	9568.38	100.11%

	Calibration Coeffs
a0	-6.96303403E-01
a1	1.97689099E-02
a2	-9.80660670E-05
a3	1.50366222E-07

#pubs/13

GOLD-RAD

<b>Gold</b>	<b>Tc-99 AG</b>
<b>Cal Date</b>	06/25/2013
<b>Min H#</b>	150.10
<b>Max H#</b>	242.00
<b>A0</b>	-6.9630340293E-01
<b>A1</b>	1.9768909920E-02
<b>A2</b>	-9.8066067002E-05
<b>A3</b>	1.5036622216E-07
<b>A4</b>	0.00000000000000E+00
<b>A5</b>	0.00000000000000E+00
<b>B0</b>	3.86704717304227E+01
<b>B1</b>	-3.50079422303846E-01
<b>B2</b>	1.79220128022830E-03
<b>B3</b>	-2.86205673215724E-06
<b>B4</b>	0.00000000000000E+00
<b>B5</b>	0.00000000000000E+00
<b>Geometry</b>	14mL Ecoscint GL/5mL DI H2O/AC
<b>Exp Date</b>	06/30/2014
<b>Low Level</b>	N
<b>Eff Error</b>	0.007920
<b>Window1 LL</b>	310
<b>Window1 UL</b>	635
<b>Window2 LL</b>	0
<b>Window2 UL</b>	1000



# Ag Cals

PAGE: 1

ID: TC-99

13 JUN 2013 07:36

USER: 6

COMMENT: GOLD

PRESET TIME : 15.00  
DATA CALC : CPM H# : YES SAMPLE REPEATS: 1 PRINTER : STD  
COUNT BLANK : NO IC# : NO REPLICATES : 1 RS232 : EDIT  
TWO PHASE : NO AGC : NO CYCLE REPEATS : 1 DISK : OFF  
SCINTILLATOR: LIQUID LUMEX: YES LOW SAMPLE REJ: 0  
LOW LEVEL : NO HALF LIFE CORRECTION DATE: none

CHAN: 310.0 - 635.0 %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0  
CHAN: 0.0 - 1000.0 %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0

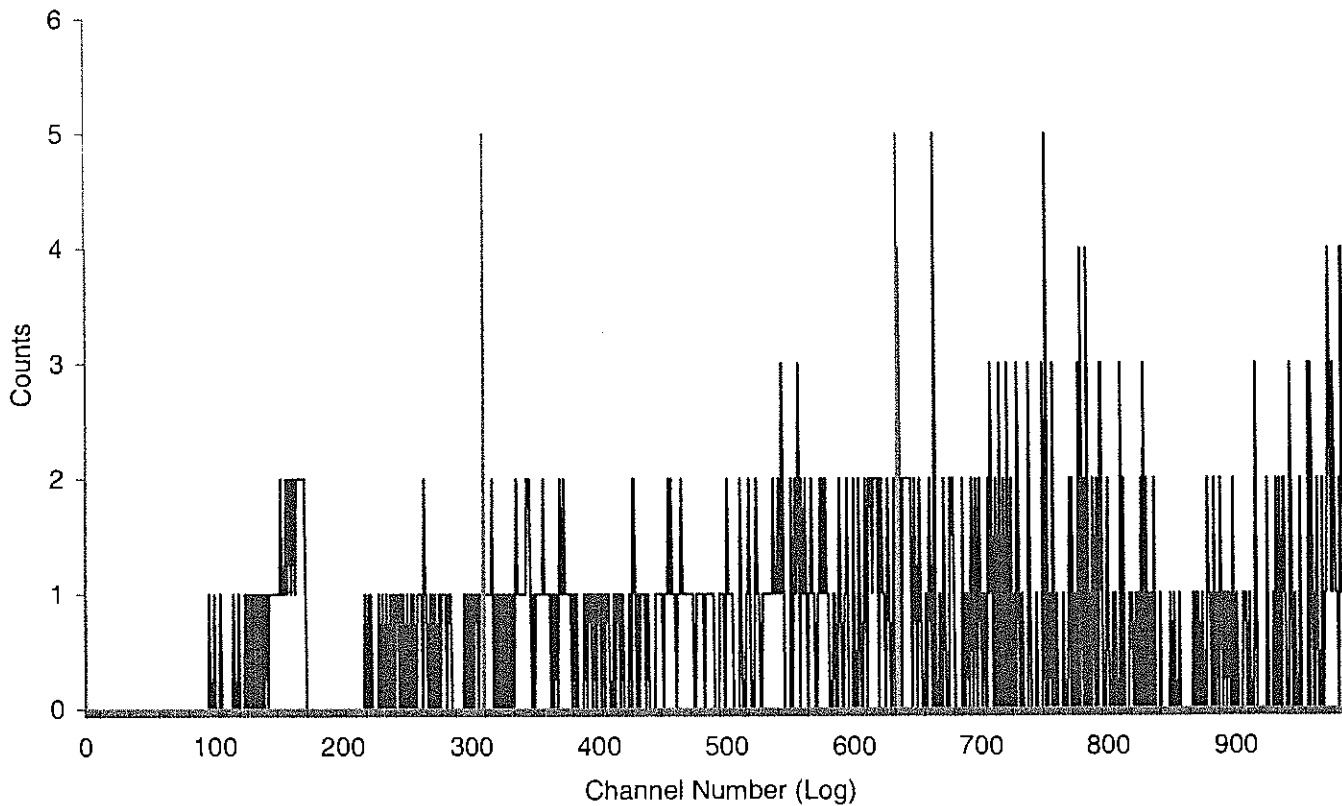
SAM NO	POS	TIME MIN	H#	WINDJ		WIND2		LUMEX %	ELAPSED TIME
				CPM	%ERROR	CPM	%ERROR		
1	B-1	15.00	149.7	18.33	12.06	44.27	8.04	7.33	15.98
2	B-2	1.70	155.7	6033.53	1.97	7097.06	1.02	0.07	18.71
3	B-3	1.65	158.6	6135.15	1.99	7203.03	1.03	0.06	21.37
4	B-4	1.65	172.3	6066.67	2.00	7053.33	1.05	0.04	24.02
5	B-5	1.70	183.1	5887.06	2.00	6896.47	1.05	0.04	26.72
6	B-6	1.70	181.0	6005.29	1.98	7059.41	1.03	0.04	29.44
7	B-7	1.85	212.0	5552.97	1.97	6677.04	1.00	0.03	32.29
8	B-8	1.75	200.0	5721.71	2.00	6732.00	1.04	0.03	35.04
9	B-9	1.80	200.7	5681.11	1.98	6723.89	1.02	0.03	37.85
10	B-10	2.05	247.8	4969.27	1.98	6229.27	1.77	0.02	40.90
11	B-11	2.00	241.3	5098.00	1.98	6361.00	1.77	0.02	43.50

*JP 6/13/13*

Sample Count Start Time:	13 Jun 2013 07:38:07		
Data Capture Date	13 Jun 2013 07:53:31		
User Filename	S06061308-1A.XLS		
	U06061308-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	1	8-1	15.00
H#, Total Counts:	149.7	728	
Win1: Tc-99 - Start, End, Counts:	310	635	278
Win2: - Start, End, Counts:	0	990	651

SPECTRUM PLOT

USER 06 - TC-99

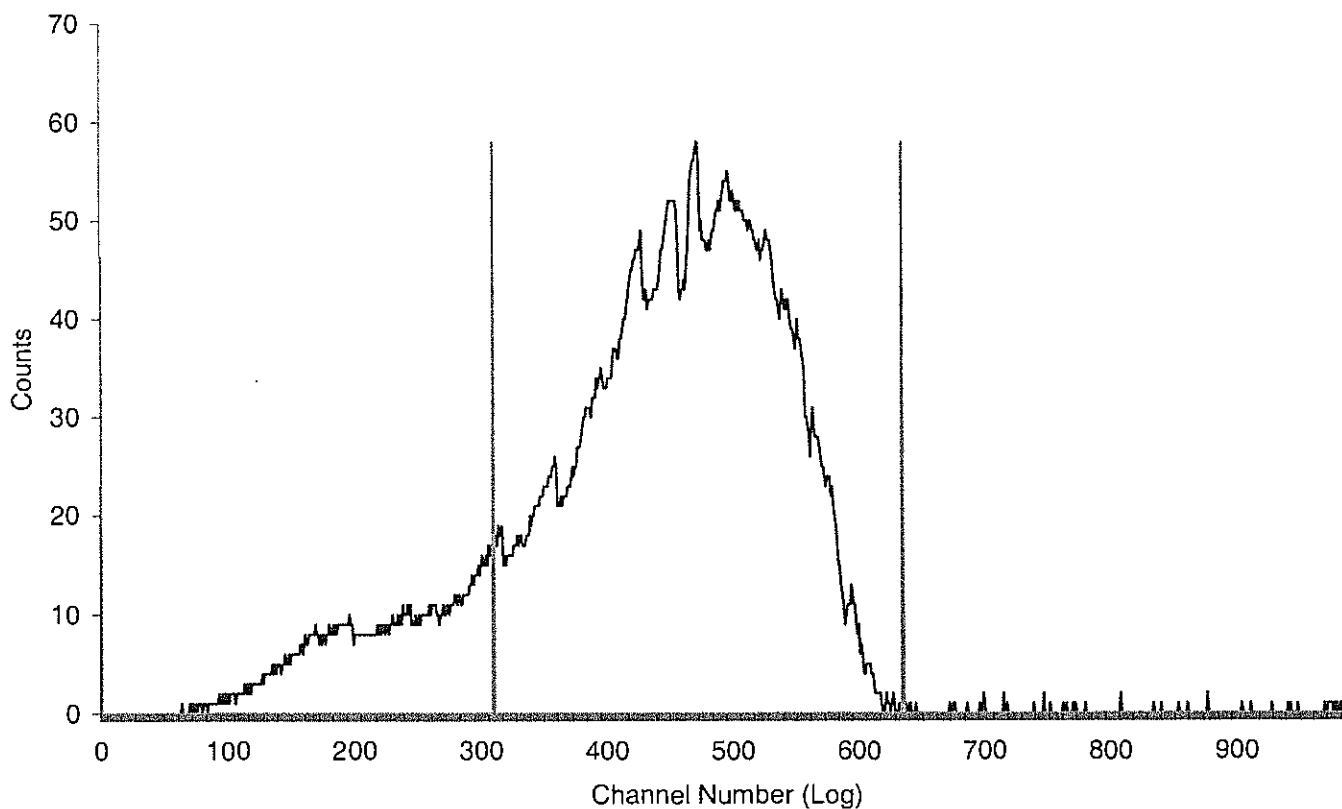


*pp 6/25/13*

Sample Count Start Time:	13 Jun 2013 07:54:09		
Data Capture Date	13 Jun 2013 07:56:14		
User Filename	S06061308-2A.XLS		
	U06061308-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	2	8-2	1.70
H#, Total Counts:	155.7	12065	
Win1: Tc-99 - Start, End, Counts:	310	635	10239
Win2: - Start, End, Counts:	0	990	12056

SPECTRUM PLOT

USER 06 - TC-99

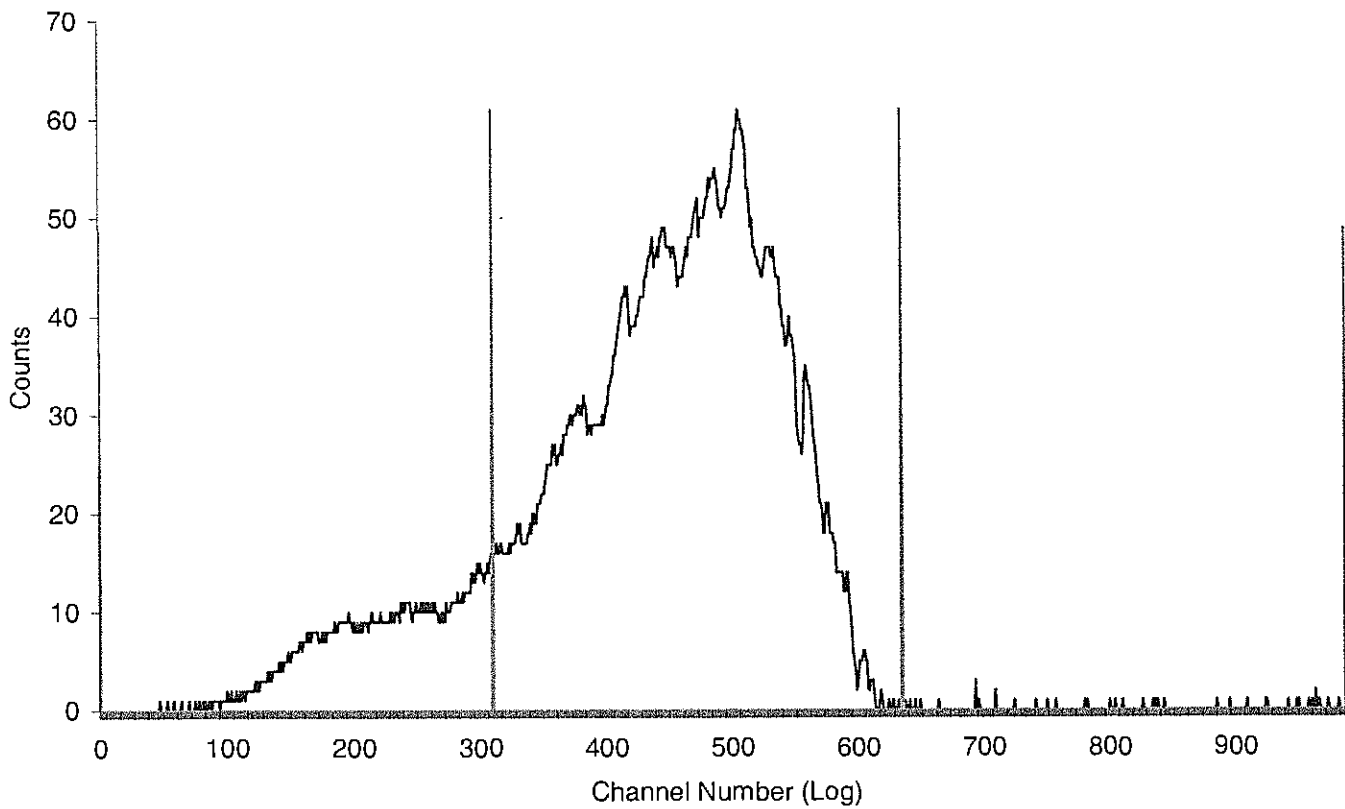


*Handwritten signature/initials*  
 4/16/2013

Sample Count Start Time:	13 Jun 2013 07:56:51		
Data Capture Date	13 Jun 2013 07:58:53		
User Filename	S06061308-3A.XLS		
	U06061308-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	3	8-3	1.65
H#, Total Counts:	158.6	11885	
Win1: Tc-99 - Start, End, Counts:	310	635	10108
Win2: - Start, End, Counts:	0	990	11878

SPECTRUM PLOT

USER 06 - TC-99

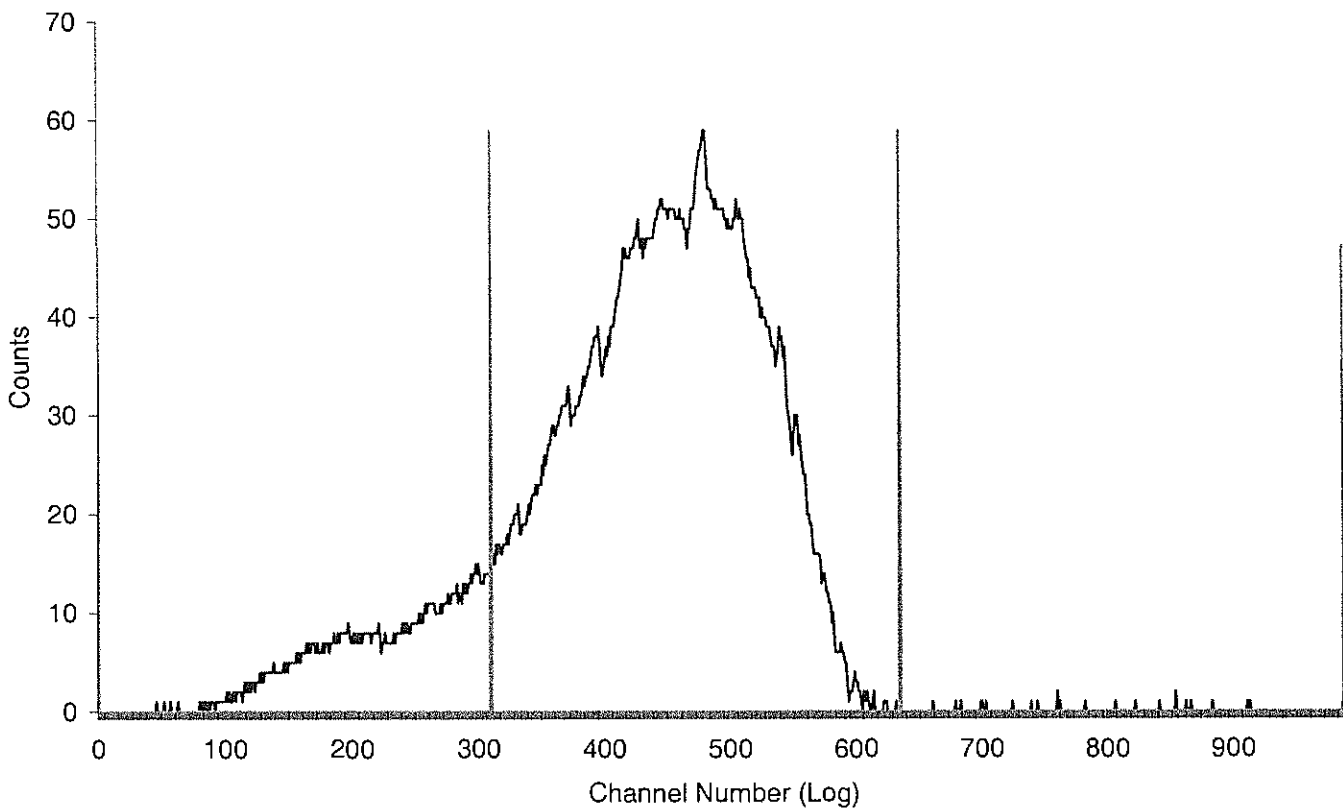


*Handwritten signature/initials*

Sample Count Start Time:	13 Jun 2013 07:59:30		
Data Capture Date	13 Jun 2013 08:01:32		
User Filename	S06061308-4A.XLS		
	U06061308-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	4	8-4	1.65
H#, Total Counts:	172.3	11638	
Win1: Tc-99 - Start, End, Counts:	310	635	9994
Win2: - Start, End, Counts:	0	990	11628

SPECTRUM PLOT

USER 06 - TC-99

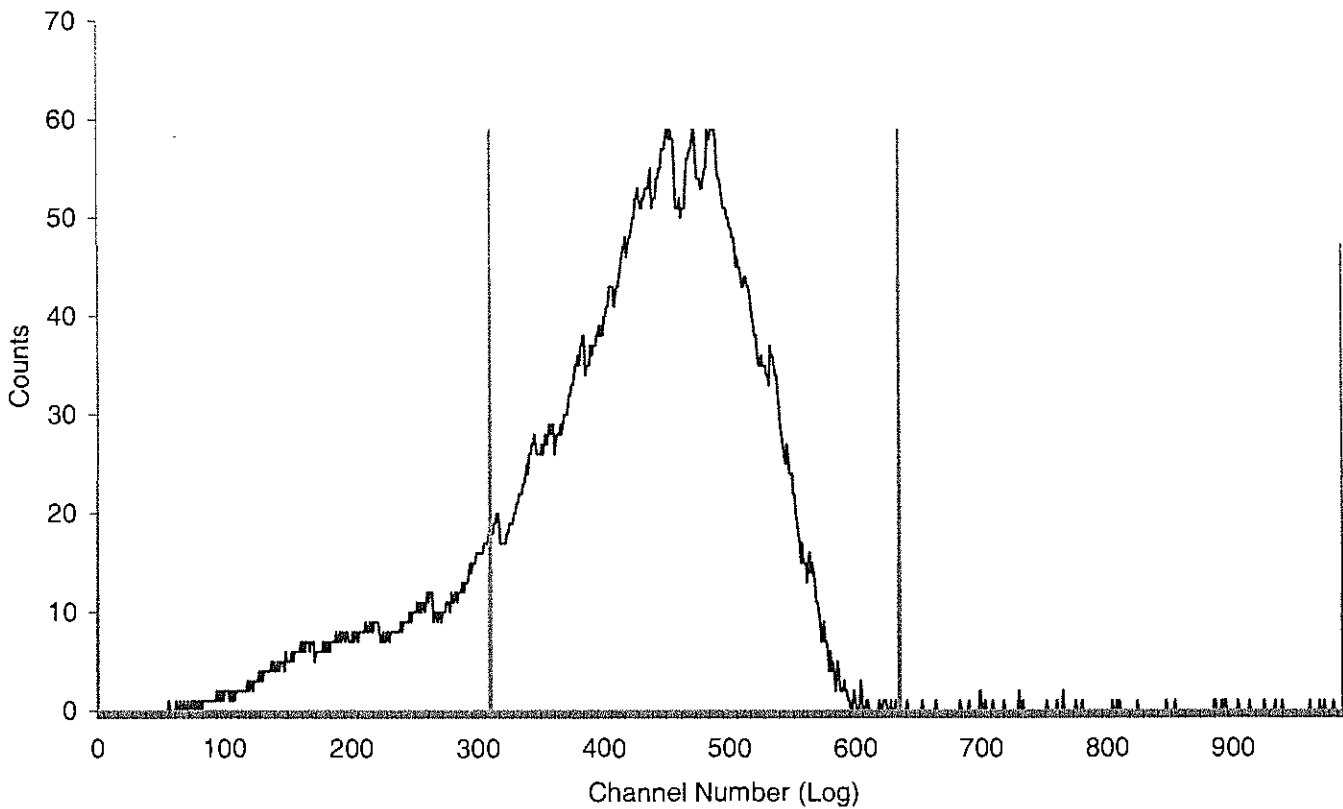


*Handwritten signature/initials*

Sample Count Start Time:	13 Jun 2013 08:02:09		
Data Capture Date	13 Jun 2013 08:04:15		
User Filename	S06061308-5A.XLS		
	U06061308-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	5	8-5	1.70
H#, Total Counts:	183.1	11724	
Win1: Tc-99 - Start, End, Counts:	310	635	9990
Win2: - Start, End, Counts:	0	990	11718

SPECTRUM PLOT

USER 06 - TC-99

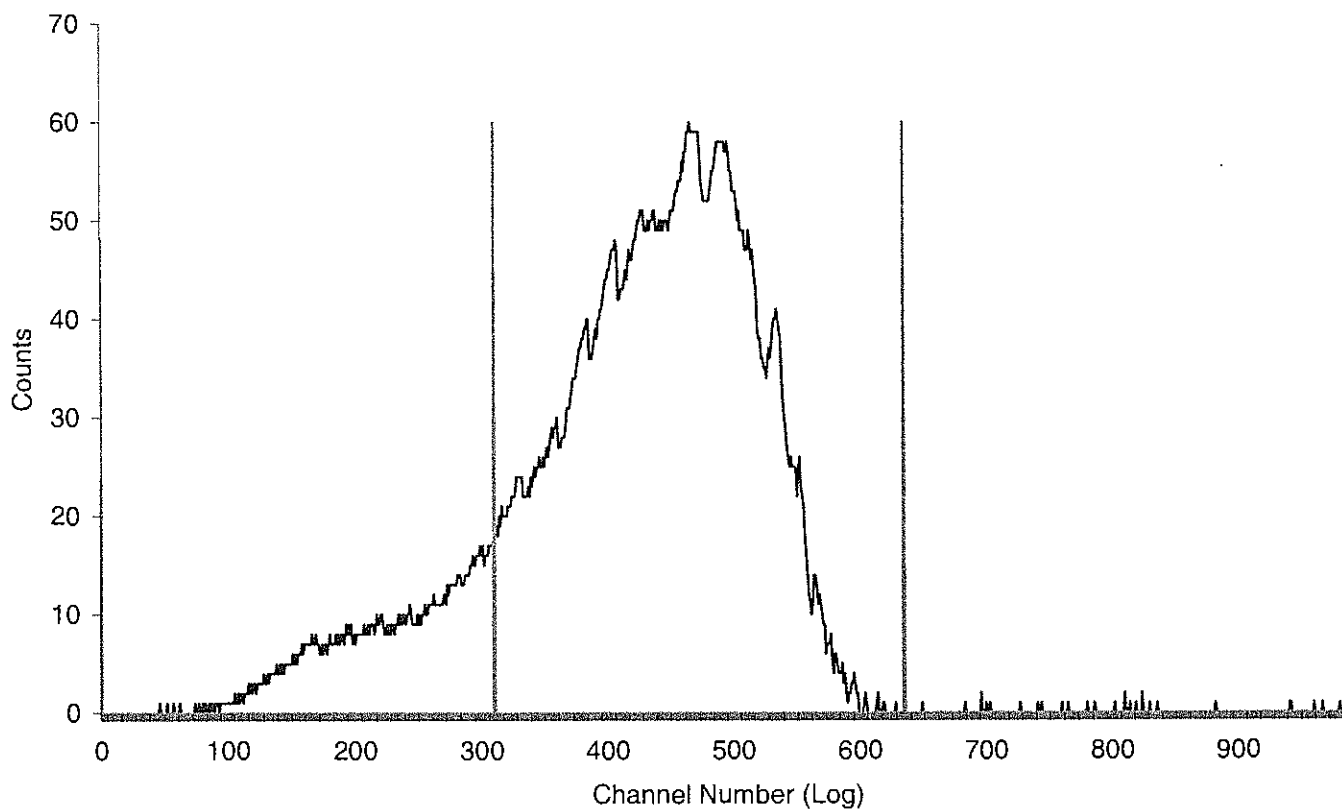


*Handwritten signature and date: JP 6/13/13*

Sample Count Start Time:	13 Jun 2013 08:04:52		
Data Capture Date	13 Jun 2013 08:06:57		
User Filename	S06061308-6A.XLS		
	U06061308-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	6	8-6	1.70
H#, Total Counts:	181.0	12001	
Win1: Tc-99 - Start, End, Counts:	310	635	10190
Win2: - Start, End, Counts:	0	990	11995

SPECTRUM PLOT

USER 06 - TC-99

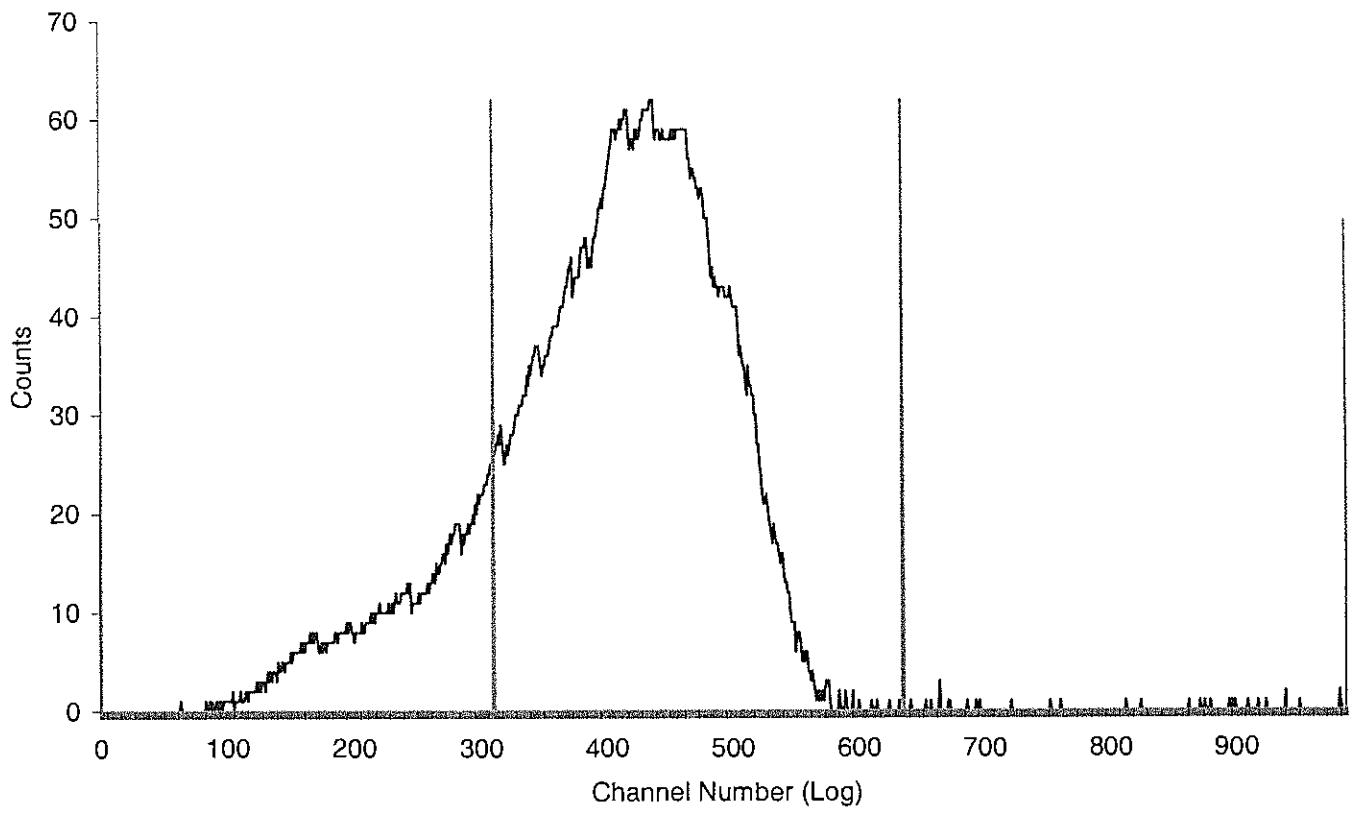


*Handwritten signature/initials*

Sample Count Start Time:	13 Jun 2013 08:07:34		
Data Capture Date	13 Jun 2013 08:09:48		
User Filename	S06061308-7A.XLS		
	U06061308-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	7	8-7	1.85
H#, Total Counts:	212.0	12354	
Win1: Tc-99 - Start, End, Counts:	310	635	10247
Win2: - Start, End, Counts:	0	990	12351

SPECTRUM PLOT

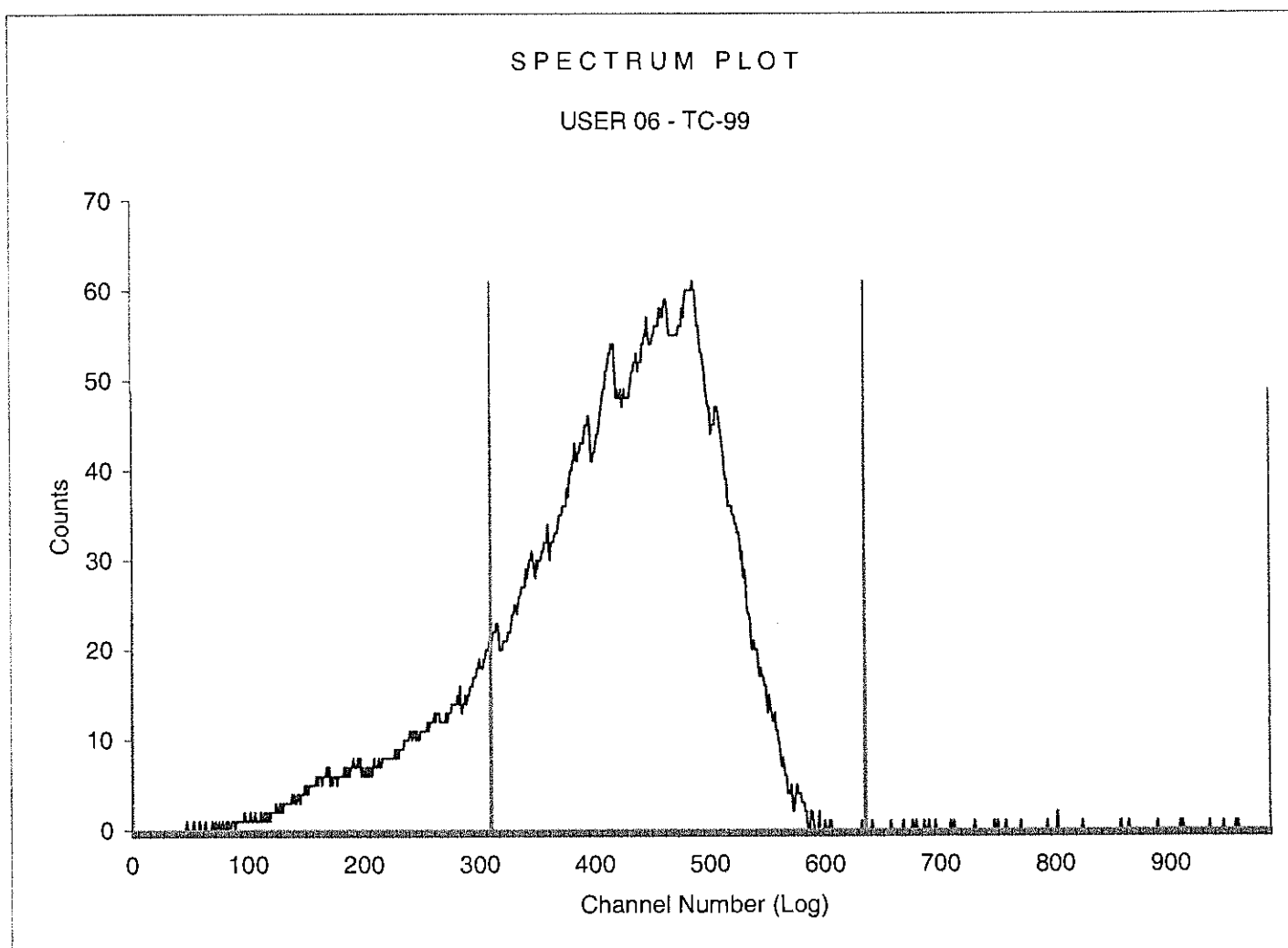
USER 06 - TC-99



*yp 10/25/13*



Sample Count Start Time:	13 Jun 2013 08:10:25		
Data Capture Date	13 Jun 2013 08:12:33		
User Filename	S06061308-8A.XLS		
	U06061308-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	8	8-8	1.75
H#, Total Counts:	200.0	11781	
Win1: Tc-99 - Start, End, Counts:	310	635	9993
Win2: - Start, End, Counts:	0	990	11777

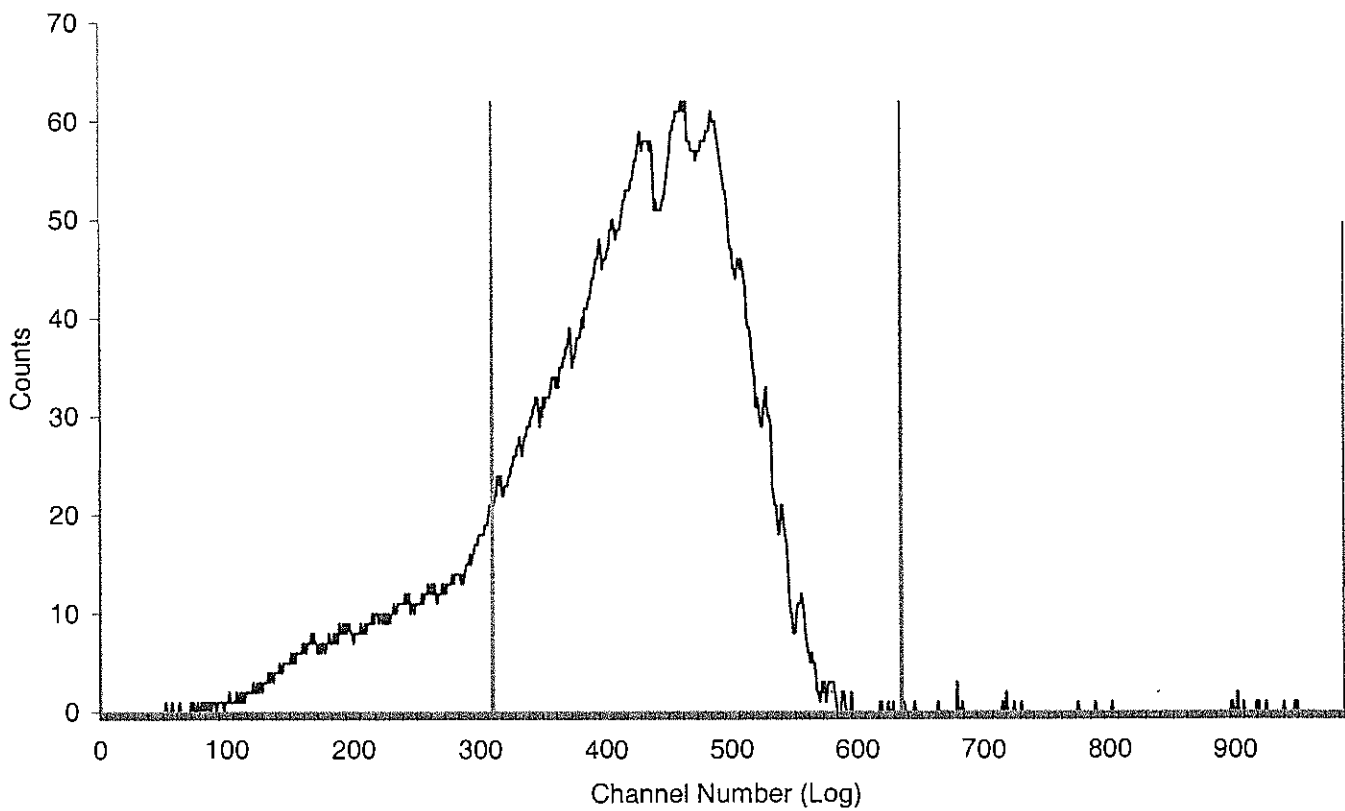


*Handwritten signature/initials*

Sample Count Start Time:	13 Jun 2013 08:13:11		
Data Capture Date	13 Jun 2013 08:15:22		
User Filename	S06061308-9A.XLS		
	U06061308-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	9	8-9	1.80
H#, Total Counts:	200.7	12103	
Win1: Tc-99 - Start, End, Counts:	310	635	10204
Win2: - Start, End, Counts:	0	990	12102

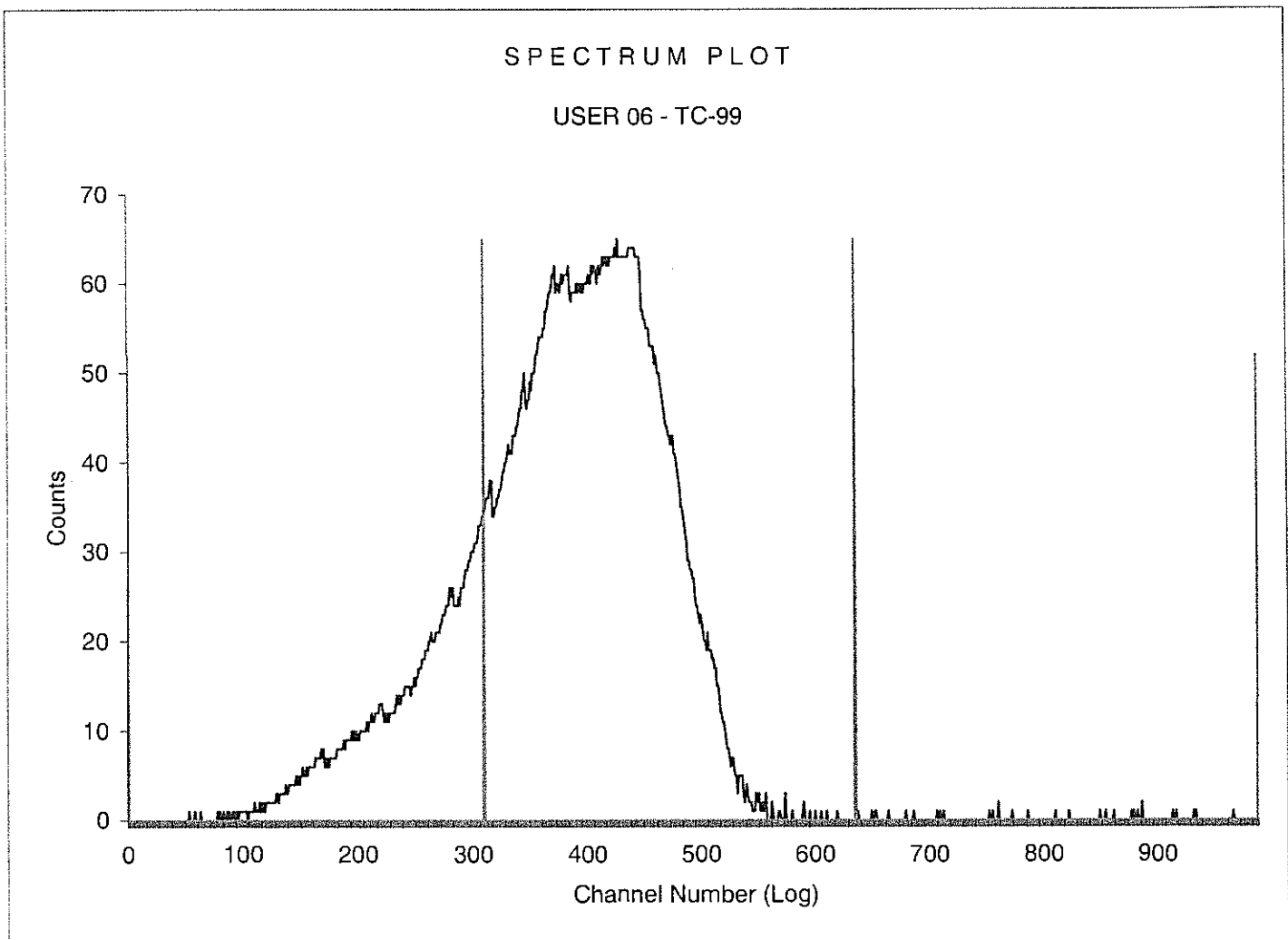
SPECTRUM PLOT

USER 06 - TC-99



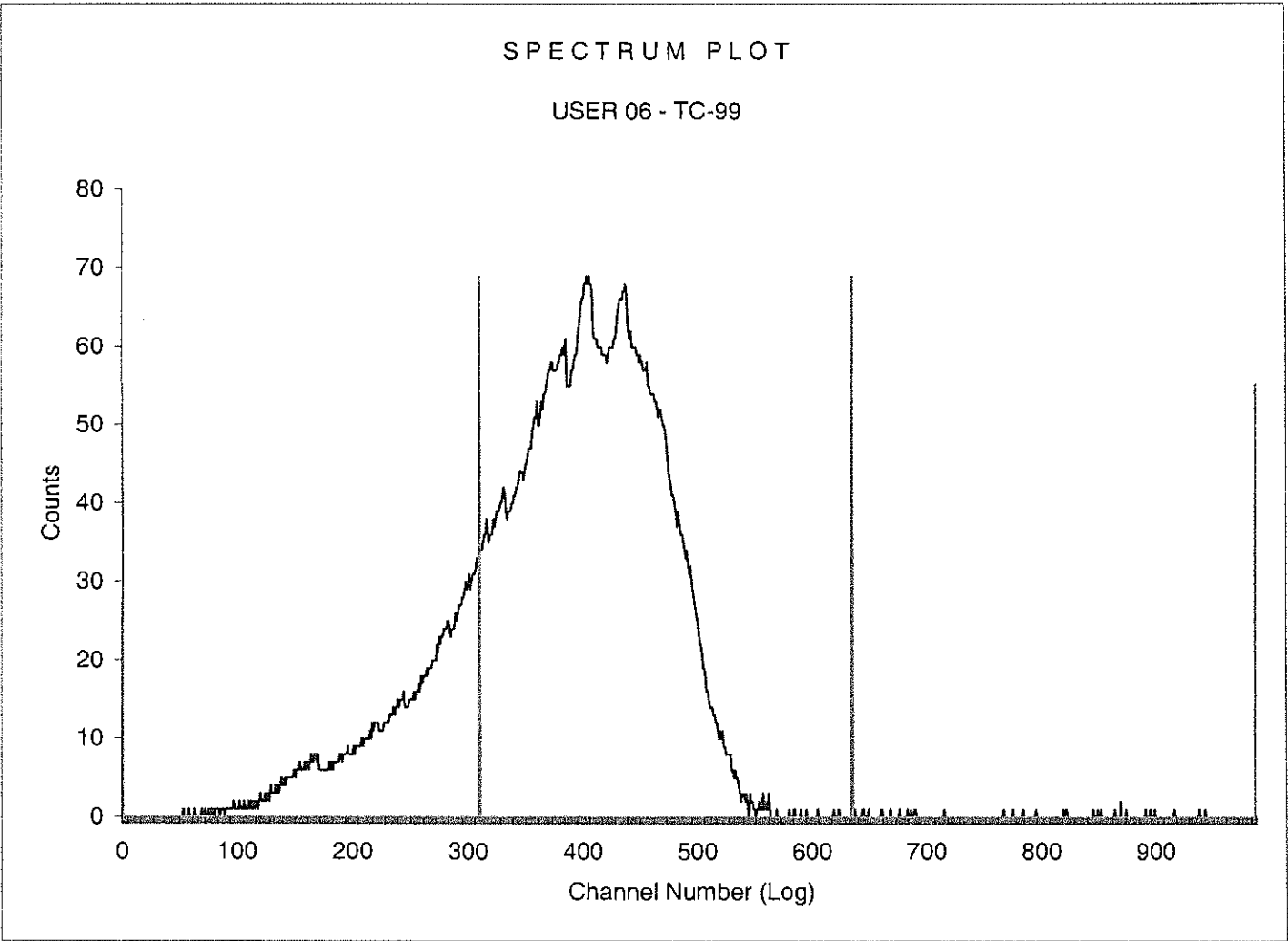
*OP 6/13/13*

Sample Count Start Time:	13 Jun 2013 08:15:59		
Data Capture Date	13 Jun 2013 08:18:25		
User Filename	S06061308-10A.XLS		
	U06061308-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	10	8-10	2.05
H#, Total Counts:	247.8	12770	
Win1: Tc-99 - Start, End, Counts:	310	635	10153
Win2: - Start, End, Counts:	0	990	12769



*Handwritten signature/initials*

Sample Count Start Time:	13 Jun 2013 08:19:02		
Data Capture Date	13 Jun 2013 08:21:25		
User Filename	S06061308-11A.XLS		
	U06061308-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	11	8-11	2.00
H#, Total Counts:	241.3	12722	
Win1: Tc-99 - Start, End, Counts:	310	635	10162
Win2: - Start, End, Counts:	0	990	12719



*HP 06/08/13*

Ag Vers

ID: TC-99

13 JUN 2013 06:23

USER: 6

COMMENT: GOLD

PRESET TIME : 15.00  
 DATA CALC : CPM H# : YES SAMPLE REPEATS: 1 PRINTER : STD  
 COUNT BLANK : NO IC# : NO REPLICATES : 1 RS232 : EDIT  
 TWO PHASE : NO AOC : NO CYCLE REPEATS : 1 DISK : OFF  
 SCINTILLATOR: LIQUID LUMEX: YES LOW SAMPLE REJ: 0  
 LOW LEVEL : NO HALF LIFE CORRECTION DATE: none

CHAN: 310.0 - 635.0 %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0  
 CHAN: 0.0 - 1000.0 %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0

SAM NO	POS	TIME MIN	H#	WIND1		WIND2		LUMEX %	ELAPSED TIME
				CPM	%ERROR	CPM	%ERROR		
1	15-1	15.00	157.0	19.73	11.62	45.00	8.04	0.81	15.99
2	15-2	1.55	150.1	5550.81	1.97	6534.59	1.82	0.05	18.86
3	15-3	1.80	161.0	5688.89	1.98	6600.56	1.84	0.04	21.66
4	15-4	1.85	173.3	5428.65	2.00	6400.54	1.84	0.04	24.52
5	15-5	1.90	188.5	5297.37	1.99	6314.74	1.83	0.03	27.44
6	15-6	1.85	184.3	5464.32	1.99	6431.35	1.83	0.03	30.30
7	15-7	1.90	198.0	5305.79	1.99	6255.26	1.83	0.03	33.21
8	15-8	2.15	228.3	4754.42	1.98	5836.74	1.79	0.02	36.38
9	15-9	2.05	213.8	4992.20	1.98	6004.39	1.79	0.02	39.43
10	15-10	2.20	242.0	4571.36	1.99	5679.09	1.79	0.02	42.63
<del>11</del>	<del>15-11</del>	<del>2.50</del>	<del>271.4</del>	<del>3850.00</del>	<del>1.99</del>	<del>5203.00</del>	<del>1.71</del>	<del>0.02</del>	<del>45.84</del>
<del>12</del>	<del>15-12</del>	<del>2.75</del>	<del>276.7</del>	<del>3628.36</del>	<del>1.99</del>	<del>5073.46</del>	<del>1.69</del>	<del>0.02</del>	<del>49.09</del>

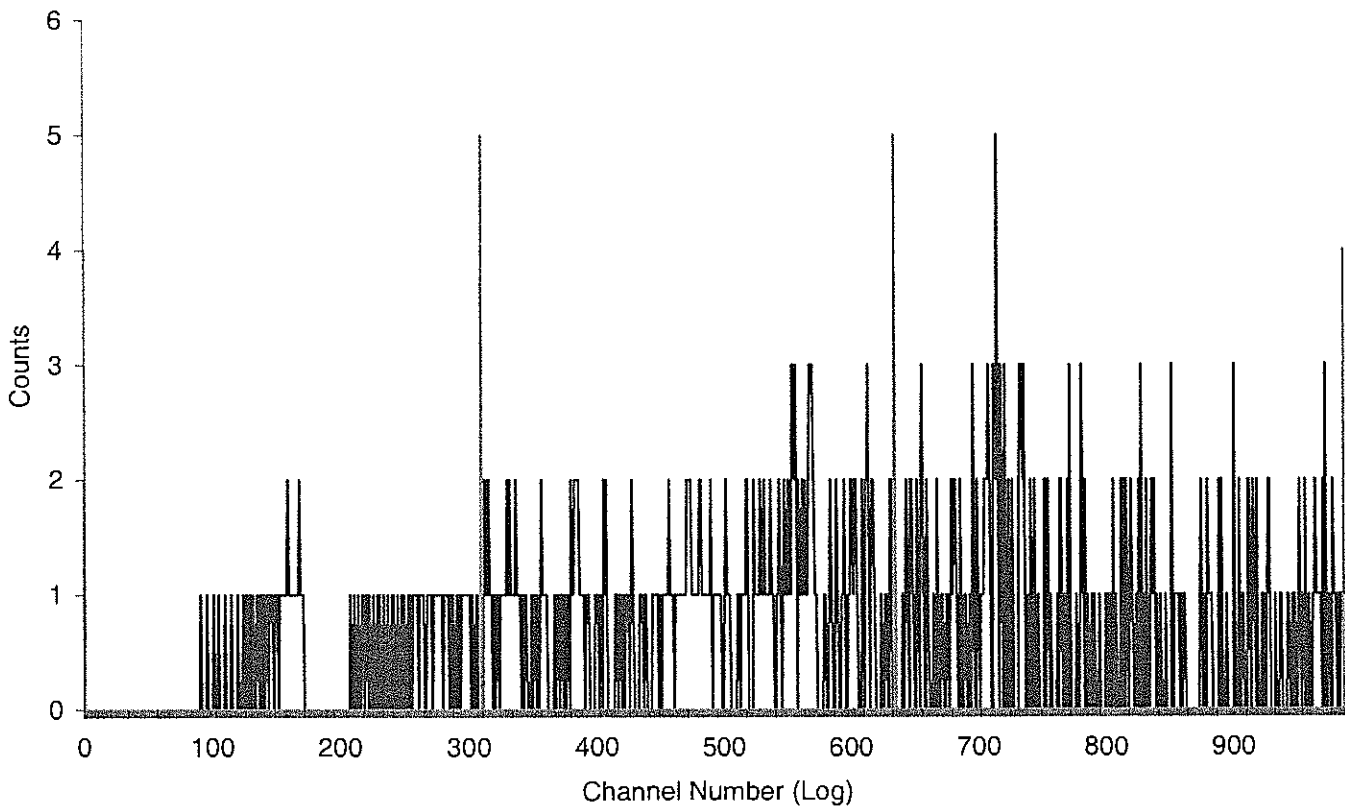
→ reject

pp 6/25/13

Sample Count Start Time:	13 Jun 2013 08:22:40		
Data Capture Date	13 Jun 2013 08:38:04		
User Filename	S06061315-1A.XLS		
	U06061315-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	1	15-1	15.00
H#, Total Counts:	157.0	699	
Win1: Tc-99 - Start, End, Counts:	310	635	295
Win2: - Start, End, Counts:	0	990	661

SPECTRUM PLOT

USER 06 - TC-99

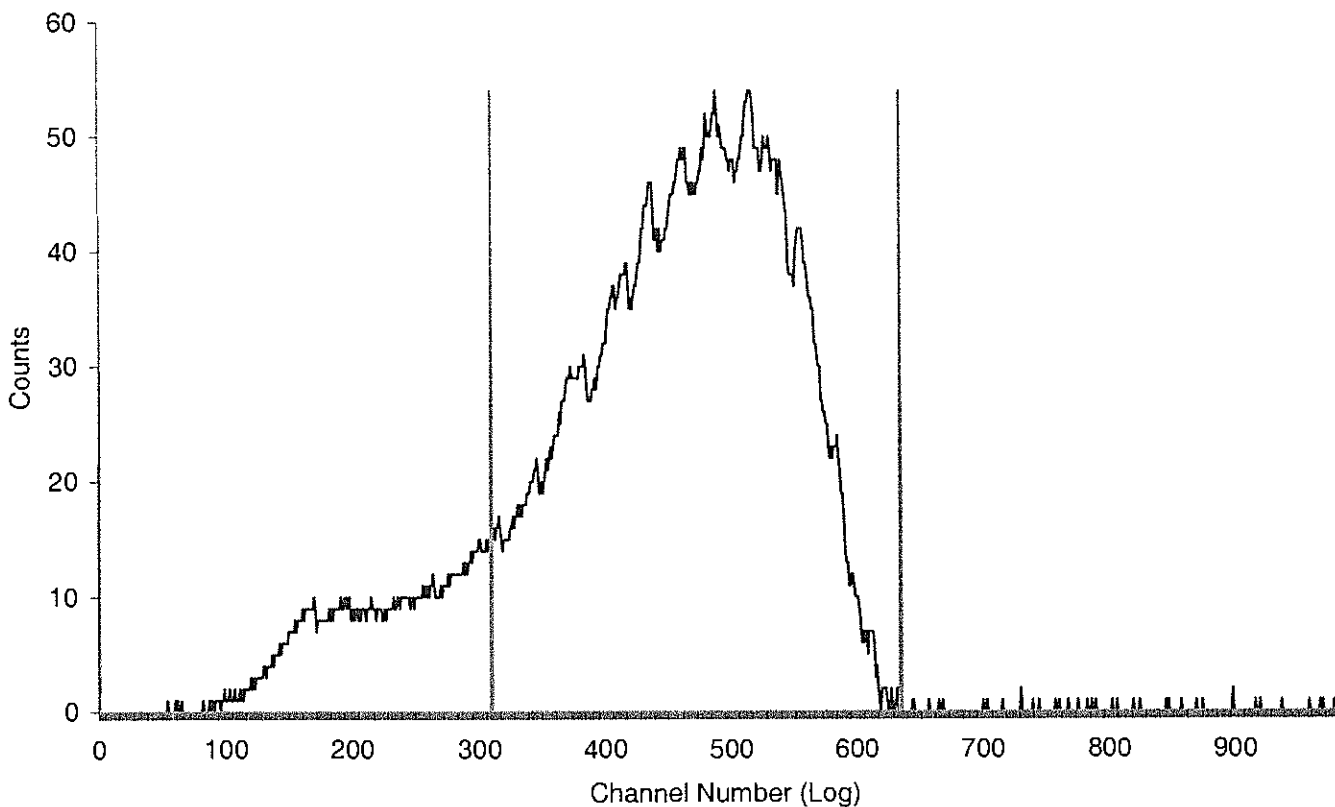


*Handwritten signature/initials*

Sample Count Start Time:	13 Jun 2013 08:38:42		
Data Capture Date	13 Jun 2013 08:40:56		
User Filename	S06061315-2A.XLS		
	U06061315-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	2	15-2	1.85
H#, Total Counts:	150.1	12089	
Win1: Tc-99 - Start, End, Counts:	310	635	10254
Win2: - Start, End, Counts:	0	990	12078

SPECTRUM PLOT

USER 06 - TC-99

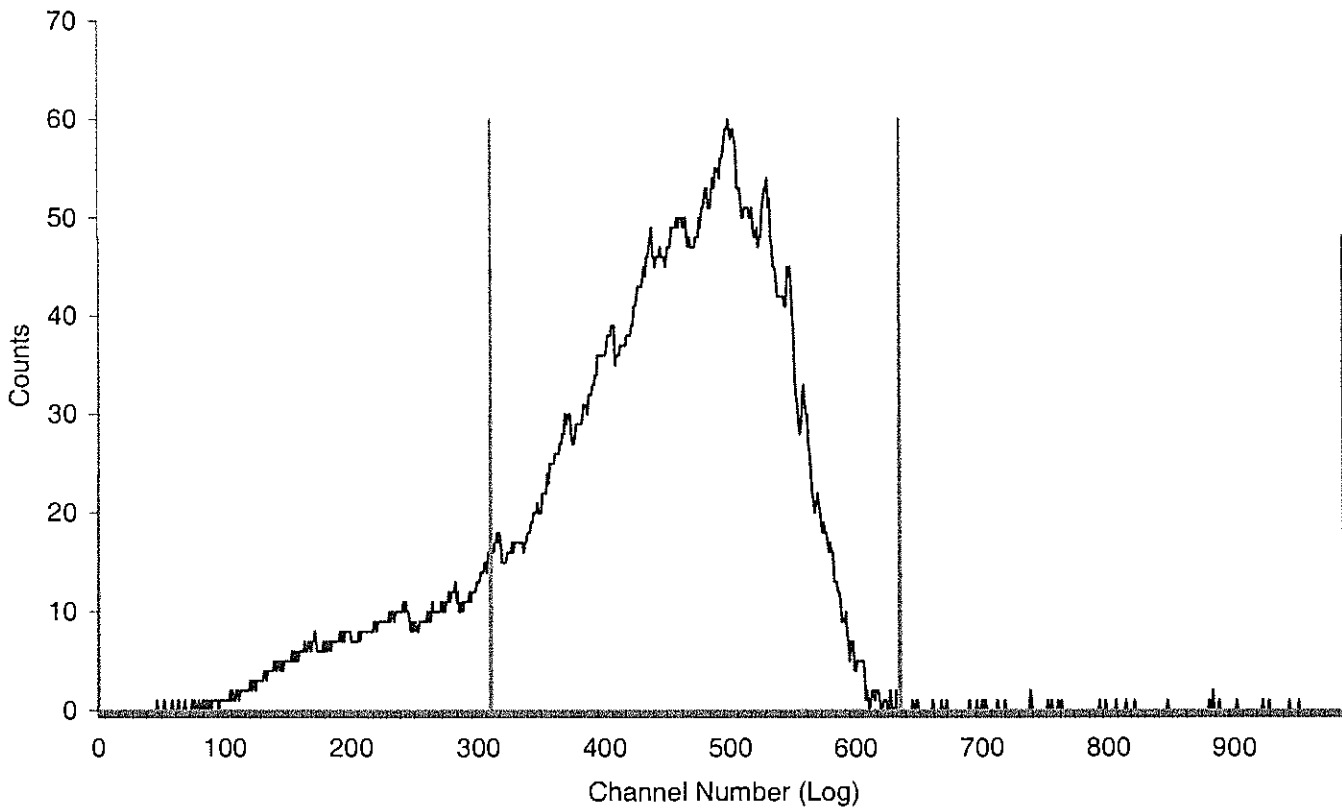


*pp 6/25/13*

Sample Count Start Time:	13 Jun 2013 08:41:33		
Data Capture Date	13 Jun 2013 08:43:44		
User Filename	S06061315-3A.XLS		
	U06061315-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	3	15-3	1.80
H#, Total Counts:	161.0	11881	
Win1: Tc-99 - Start, End, Counts:	310	635	10224
Win2: - Start, End, Counts:	0	990	11876

SPECTRUM PLOT

USER 06 - TC-99



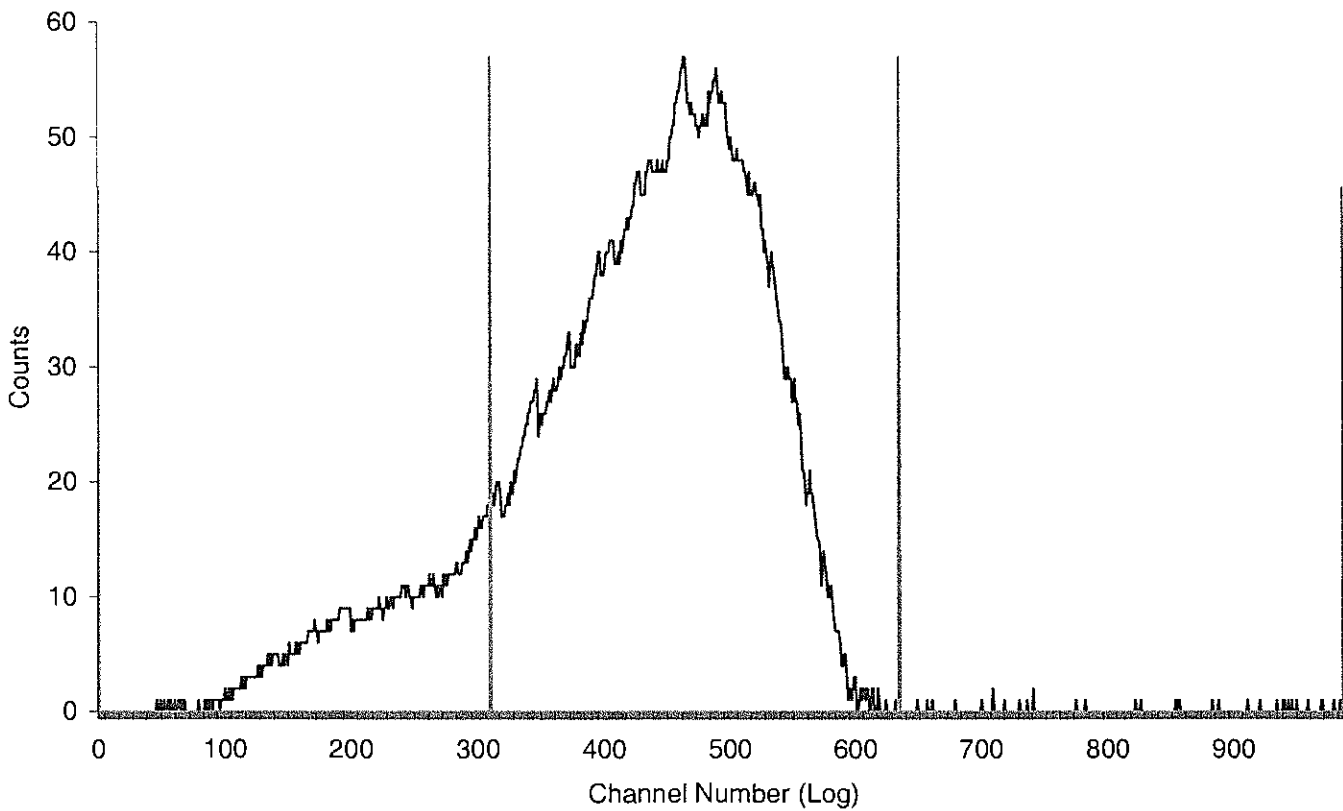
*ypw/s/13*



Sample Count Start Time:	13 Jun 2013 08:44:21		
Data Capture Date	13 Jun 2013 08:46:36		
User Filename	S06061315-4A.XLS		
	U06061315-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	4	15-4	1.85
H#, Total Counts:	173.3	11841	
Win1: Tc-99 - Start, End, Counts:	310	635	10024
Win2: - Start, End, Counts:	0	990	11837

SPECTRUM PLOT

USER 06 - TC-99

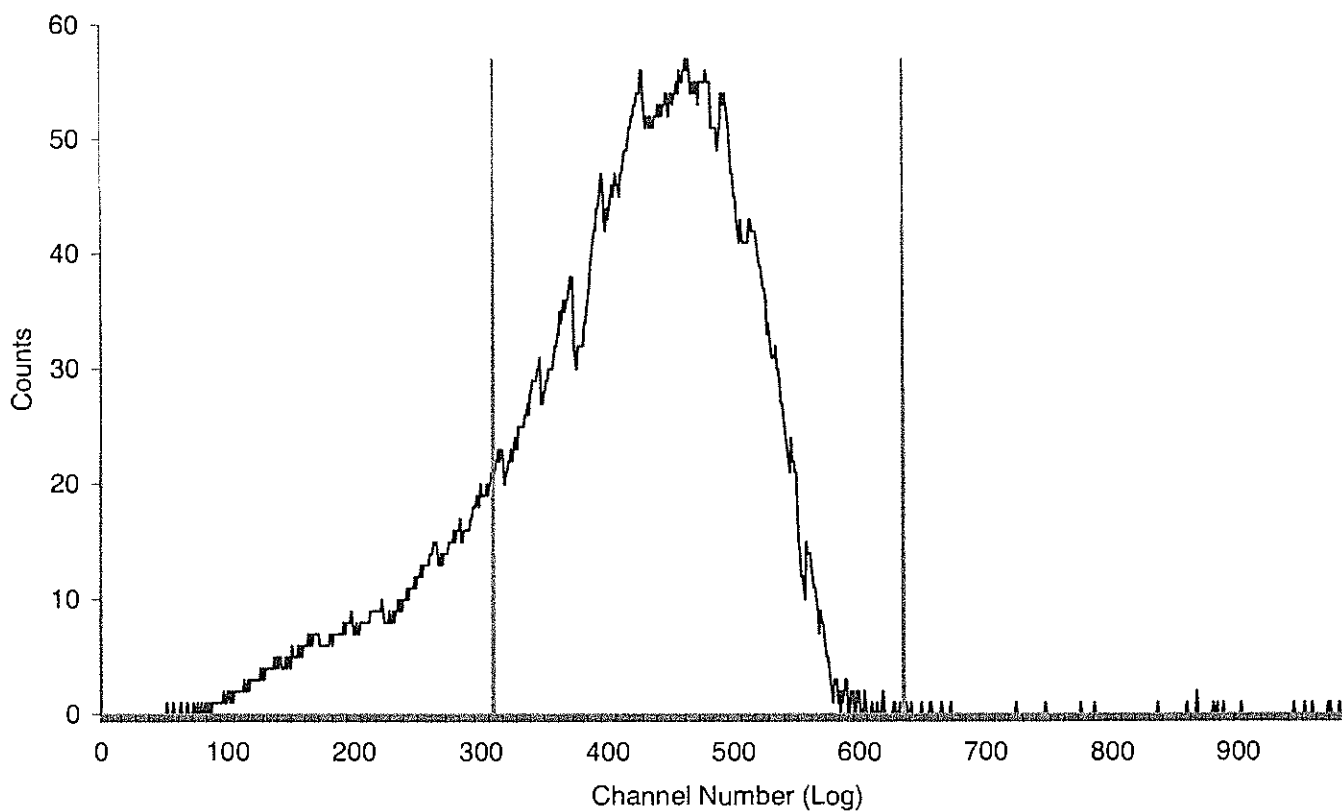


*HP 6/13/13*  
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Sample Count Start Time:	13 Jun 2013 08:47:13		
Data Capture Date	13 Jun 2013 08:49:30		
User Filename	S06061315-5A.XLS		
	U06061315-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	5	15-5	1.90
H#, Total Counts:	188.5	11998	
Win1: Tc-99 - Start, End, Counts:	310	635	10044
Win2: - Start, End, Counts:	0	990	11989

SPECTRUM PLOT

USER 06 - TC-99

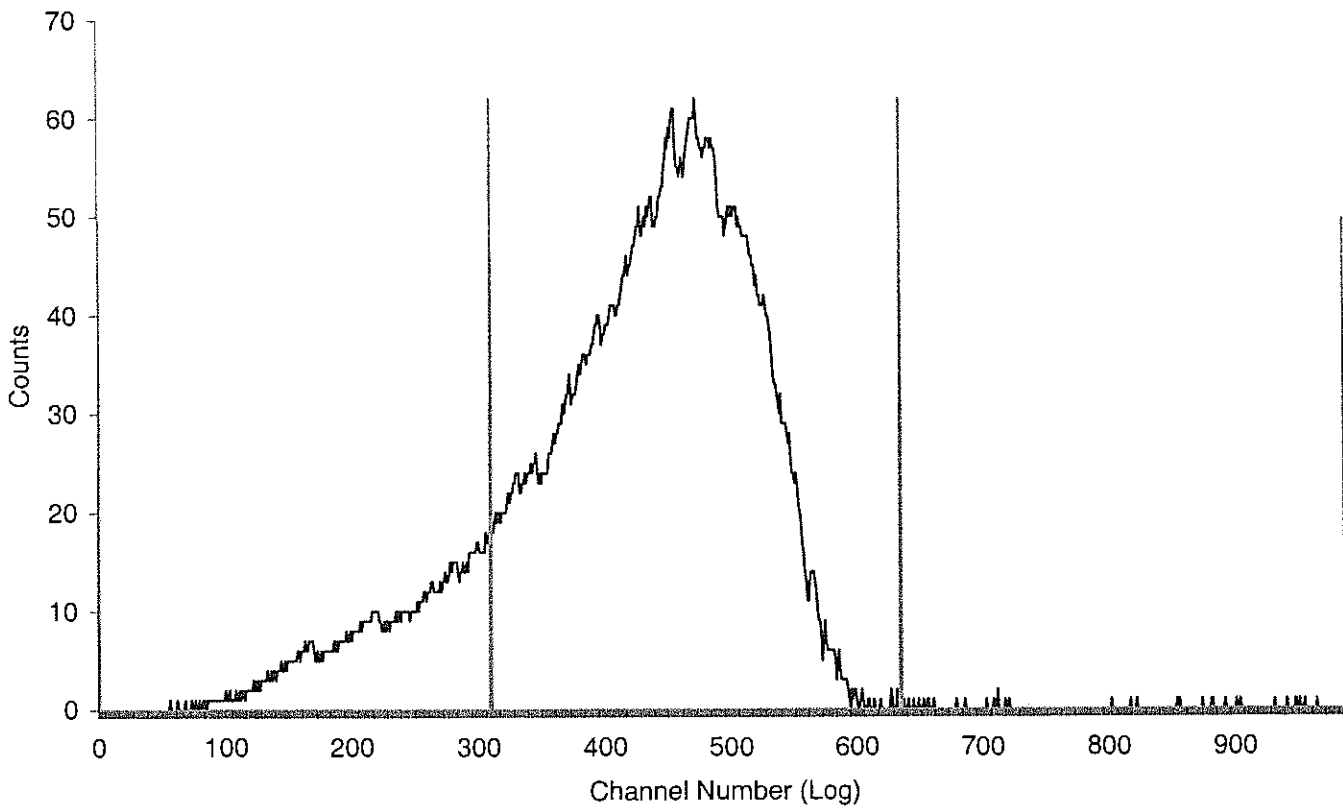


*7/10 6/25/13*

Sample Count Start Time:	13 Jun 2013 08:50:08		
Data Capture Date	13 Jun 2013 08:52:22		
User Filename	S06061315-6A.XLS		
	U06061315-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	6	15-6	1.85
H#, Total Counts:	184.3	11898	
Win1: Tc-99 - Start, End, Counts:	310	635	10091
Win2: - Start, End, Counts:	0	990	11889

SPECTRUM PLOT

USER 06 - TC-99

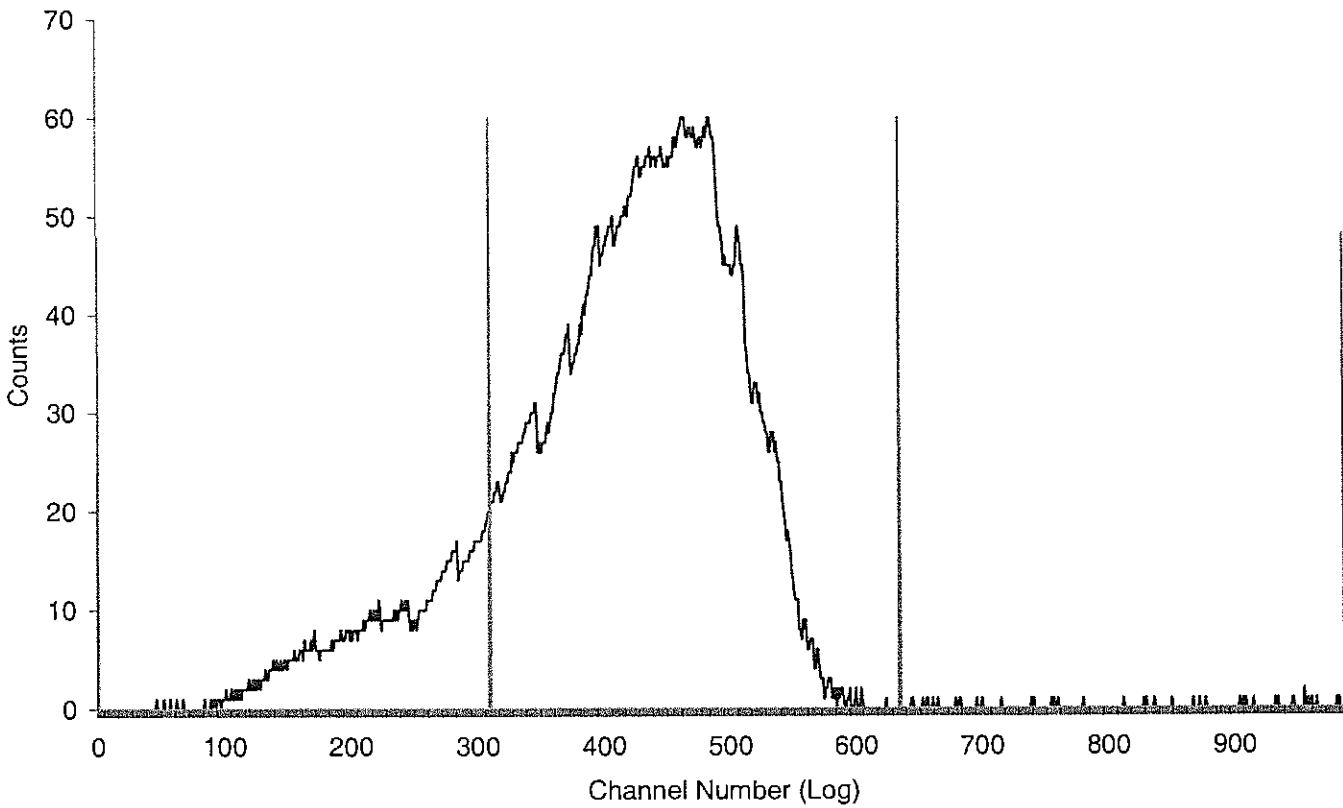


*pp 6/13/13*  
 Page 851 of 909

Sample Count Start Time:	13 Jun 2013 08:53:00		
Data Capture Date	13 Jun 2013 08:55:16		
User Filename	S06061315-7A.XLS		
	U06061315-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	7	15-7	1.90
H#, Total Counts:	198.0	11885	
Win1: Tc-99 - Start, End, Counts:	310	635	10061
Win2: - Start, End, Counts:	0	990	11884

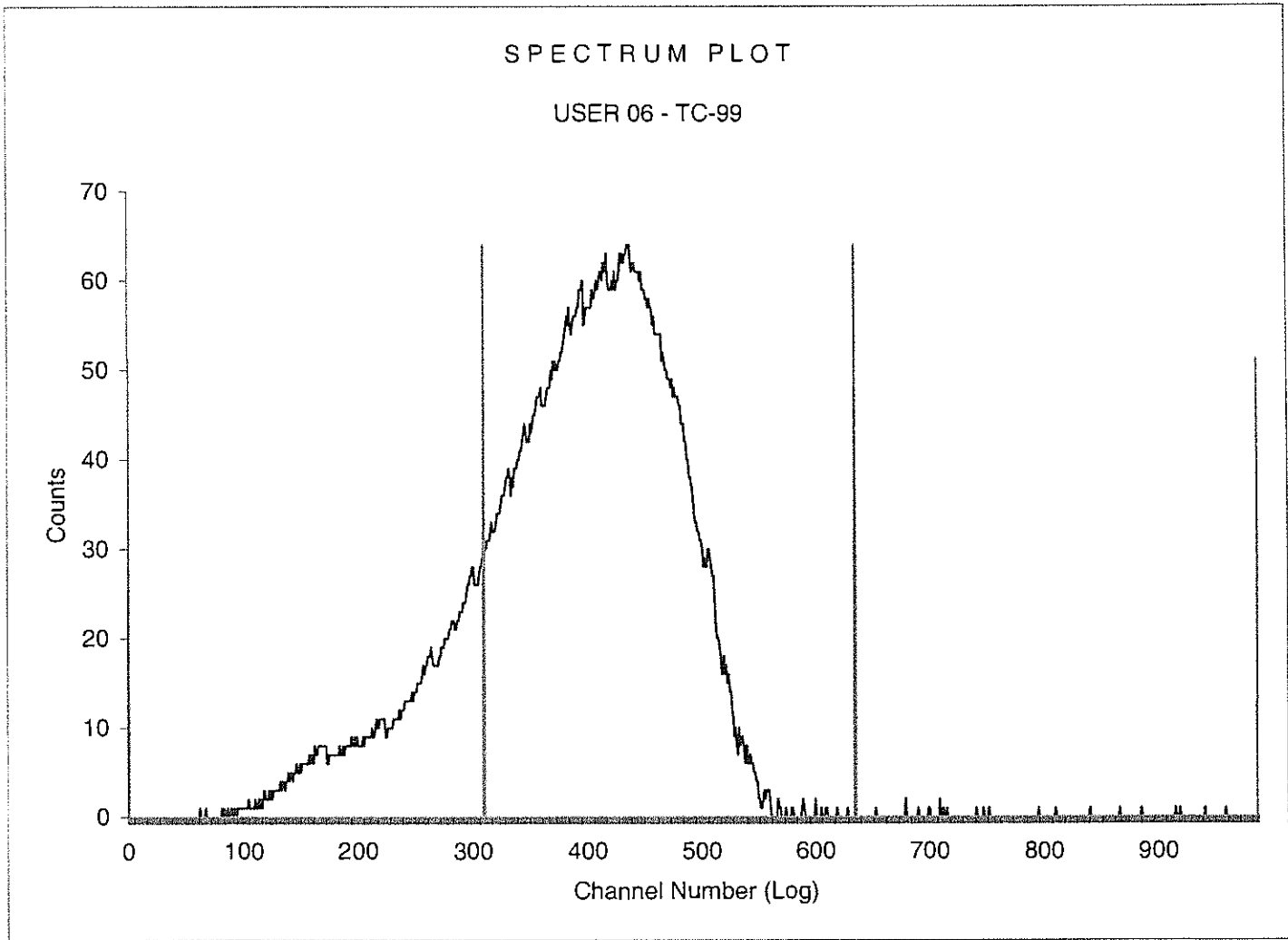
SPECTRUM PLOT

USER 06 - TC-99



*Handwritten signature*

Sample Count Start Time:	13 Jun 2013 08:55:55		
Data Capture Date	13 Jun 2013 08:58:26		
User Filename	S06061315-8A.XLS		
	U06061315-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	8	15-8	2.15
H#, Total Counts:	228.3	12549	
Win1: Tc-99 - Start, End, Counts:	310	635	10193
Win2: - Start, End, Counts:	0	990	12548



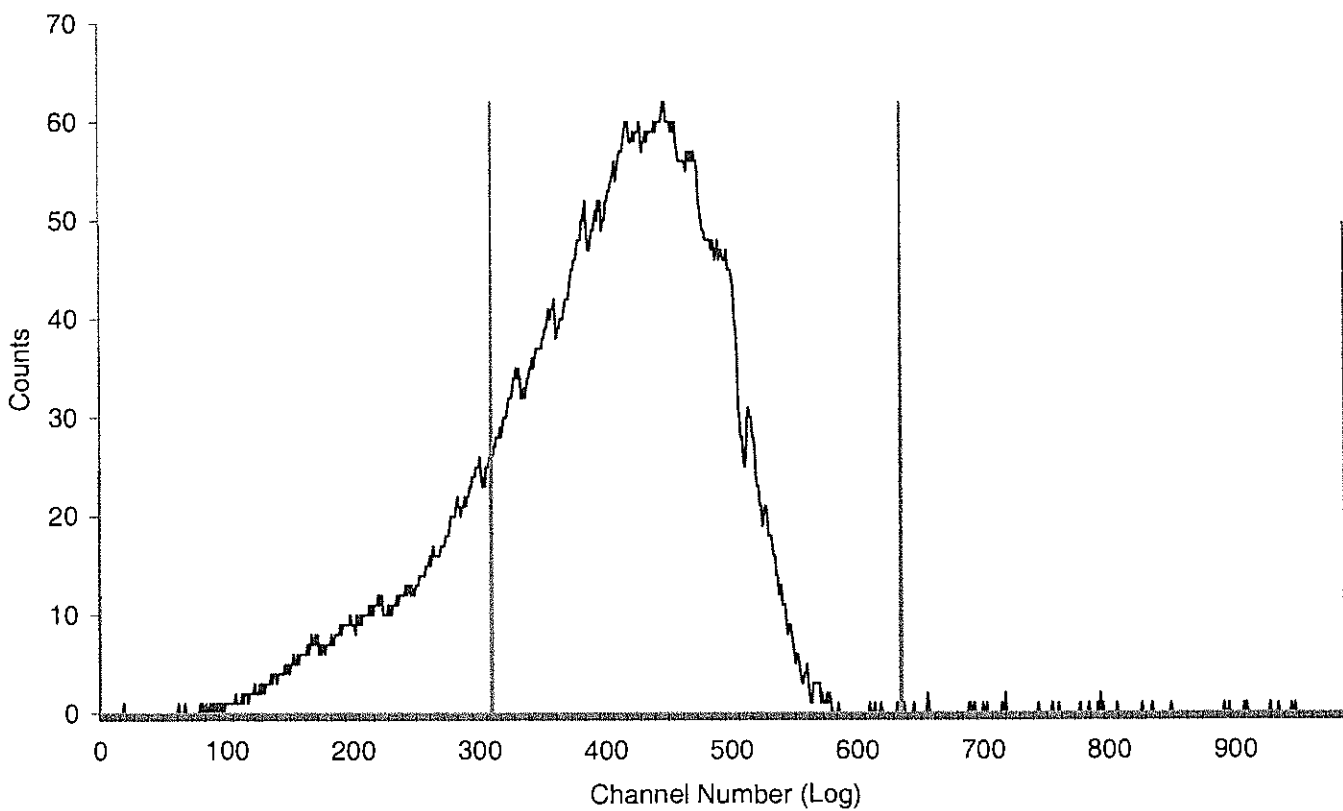
*JP 6/13/13*

Page 853 of 909

Sample Count Start Time:	13 Jun 2013 08:59:04		
Data Capture Date	13 Jun 2013 09:01:30		
User Filename	S06061315-9A.XLS		
	U06061315-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	9	15-9	2.05
H#, Total Counts:	213.8	12473	
Win1: Tc-99 - Start, End, Counts:	310	635	10209
Win2: - Start, End, Counts:	0	990	12472

SPECTRUM PLOT

USER 06 - TC-99

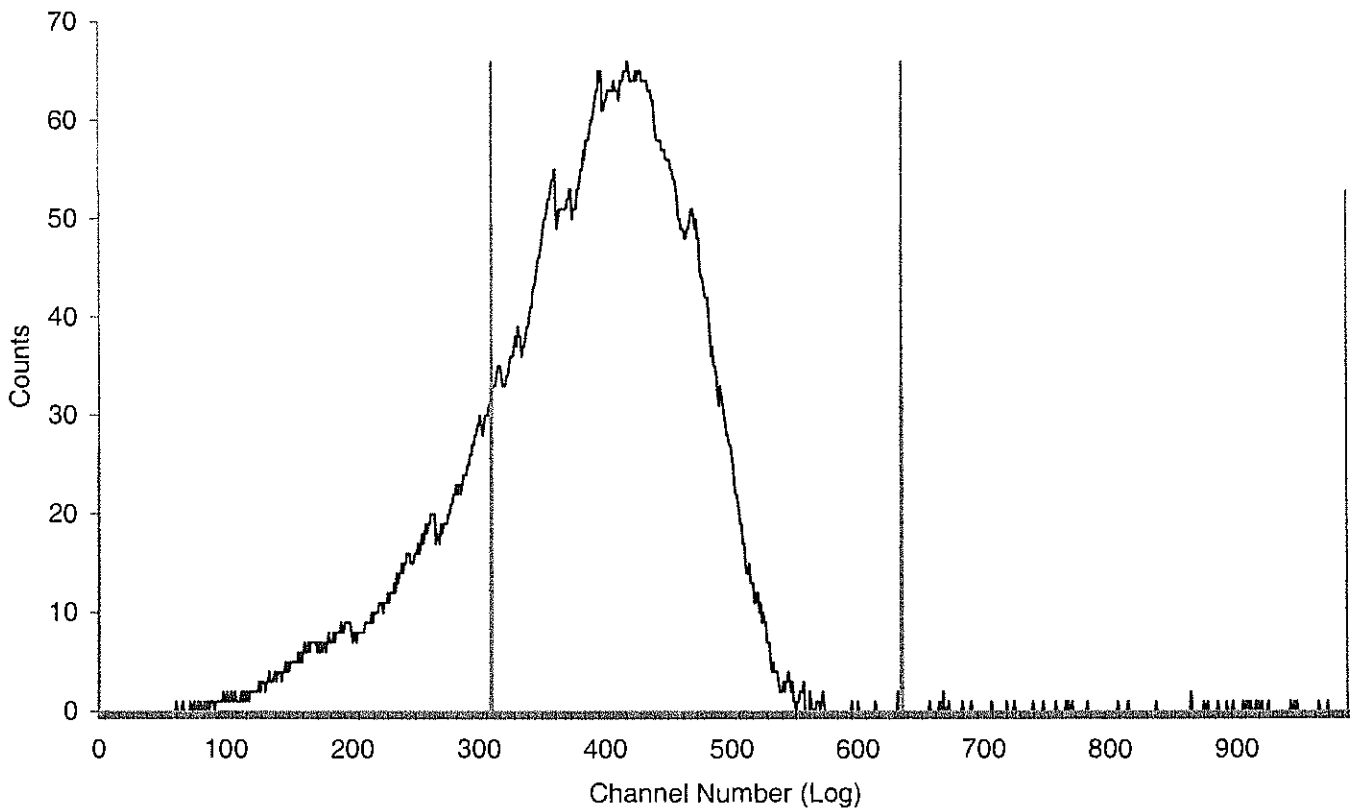


*JP 6/25/13*

Sample Count Start Time:	13 Jun 2013 09:02:07		
Data Capture Date	13 Jun 2013 09:04:42		
User Filename	S06061315-10A.XLS		
	U06061315-1A.XLS		
Spectrum Type	Log Counts		
User Number	06		
User Id	TC-99		
User Comment	GOLD		
Scintillator	LIQUID		
Sample, Rack-Pos, Time:	10	15-10	2.20
H#, Total Counts:	242.0	12494	
Win1: Tc-99 - Start, End, Counts:	310	635	10025
Win2: - Start, End, Counts:	0	990	12493

SPECTRUM PLOT

USER 06 - TC-99



*Handwritten signature/initials*



Eckert & Ziegler

Analytics

1380 Seaboard Industrial Blvd.  
Atlanta, Georgia 30318  
Tel 404-352-8677  
Fax 404-352-2837  
www.analyticsinc.com

CERTIFICATE OF CALIBRATION  
Standard Radionuclide Source

1234

77768-278

Tc-99 5 mL Liquid in Flame Sealed Vial

Customer: General Engineering Labs  
P. O. No.: 7310 RD, Item 1

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated by liquid scintillation counting. The calibration was checked by liquid scintillation counting after source preparation.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Tc-99
ACTIVITY (Bq):	3.662 E4
HALF-LIFE:	2.111 E5 years
CALIBRATION DATE:	June 27, 2008 12:00 EST
RELATIVE EXPANDED UNCERTAINTY (k=2):	2.5%

Comments:

Impurities:  $\gamma$ -impurities <0.1%

5.01268 grams 0.3M NH<sub>4</sub>OH with 225  $\mu$ g/g TcO<sub>4</sub>(-I).

Source Prepared By: M. I. Taskaeva  
M. I. Taskaeva, Radiochemist

QA Approved: D. M. Montgomery  
D. M. Montgomery, QA Manager

Date: 6-30-08

End of Certificate

RECEIVED  
6/25/08

770 4/25/13

RC-5-048-115

Corporate Office

24937 Avenue Tibbitts Valencia, California 91355

Laboratory

1380 Seaboard Industrial Blvd. Atlanta, Georgia, 30318



# GEL Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	1234	Isotope:	Technetium-99
Prepared By:	Daniel Roy	Prepared By:	Gregory Ramsay
Carrier Conc:	.3M NH4OH	Prep Date:	03/23/2011
Reference Date:	06/27/2008	Verification Date:	02/07/2013
Ampoule Mass (g):	5.01268 g	Expiration Date:	02/07/2014
Uncertainty:	+/- 2.5 %	Primary Code:	1234-A
LogBook No:	RC-S-048-115	Dilution(mL):	100 mL
		Mass of Parent(g):	4.8396 g
		Density(g/mL):	0.9939
		Balance ID:	38080204

### Calculations Converting parent activity to dpm/mL|dpm/g

$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(4.8396 \text{ g}) * (36620 \text{ Bq}) * (60 \text{ dpm/Bq}) / (5.01268 \text{ g} * 100 \text{ mL}) = 21213.3412 \text{ dpm/mL}$
$(4.8396 \text{ g}) * (36620 \text{ Bq}) * (60 \text{ dpm/Bq}) / (0.9939 \text{ g/mL}) / (5.01268 \text{ g} * 100 \text{ mL}) = 21343.4079 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
-----------	----------	--------------	---------------	------	-------------	-------------------	-----------------

GEL Laboratories LLC  
Version 1.0 9/18/2000

*Handwritten:* 412  
6/26/13

# Verification for Tc-99 Standard 1234-A

v1.1

Analyst	JAS1
Verification Prep Date	2/7/2013

Calibration Information	
Isotope	Tc-99
Serial Number	1297-A
Amount of Std. (mL)	0.1
Expiration Date	2/25/2013

Standard Information	
Serial Number	1234-A
Reference Date	6/27/2008
Standard Prep Date	3/23/2011

Nuclide Information	
Isotope	Tc-99
Isotope Half-life	2.1110E+05 Y
Ref. Act. (ug/L)	557.817

Std #	Count Date	Activity ug/L
1	2/9/2013	0.55723000
2	2/9/2013	0.56092500
3	2/9/2013	0.56476800

Mean Value = 0.56097433  
 Stdev = 0.003769242

Certificate Value\* = 0.55780854  
 Two sigma = 0.00753848  
 10 % of Mean = 0.05609743  
 Rule A (Pass/Fail) Pass  
 % Recovery 100.57%  
 Rule B (Pass/Fail) Pass  
 Expiration Date 2/7/2014

### Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.  
 Rule B = The determined mean value shall be within 5% of the certificate value.

\* Certificate Value is decay corrected to Verification Count Date.

The analyst performed three analyses of a dilution of standard 1234-A on the ICPMS for Tc-99. 0.05 mL of 1234-A was diluted to 50 mL with 2% Nitric Acid. The ICPMS was calibrated using dilutions of Tc-99 standard 1297-A.  
 Reference SOP RAD M-001

*cks 2/9/13*  
*JP 6/25/13*

*RP 1/13*

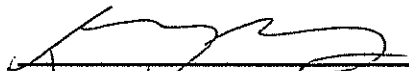
**General Engineering Laboratories  
Calibration Source Preparation Sheet**

Applicable SOP Number GL-RAD-A-059 Isotope Tc 99  
 Date Standards Prepared 6/6/13 Cocktail Type Used Euoscint GL  
 Standard ID 1234-A Matrix of Vial/Planchett 14mL Euoscint GL  
 Amount Used (g or ml) 0.5 5mL DI H<sub>2</sub>O  
 Standard Activity (DPM/g or mL) 2121343412 <sup>at 6/6/13</sup> Type of Scintillation Vial Plastic  
AG 1X8 RESIN  
 Reference Date 6/27/08 Pipette ID Used 3158763  
 Expiration Date 2/6/14 Balance ID Used N/A  
 Residue/Carrier Agent N/A Quenching Agent conc. Brown Colorant

Standard Number	Quenching Vol (uL)
1	0
2	30
3	60
4	90
5	120
6	150
7	180
8	210
9	240
10	270
11	<del>300</del>

to 6/6/13

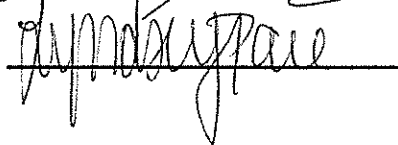
Prepared By:



Date:

6/6/13

Reviewed By:



Date:

6/25/13

CAL or VER  
Date: 5/14/13

Efficiency Standard Precision Check

Rack	Time (min.)	CPM Isol	Within +/- 5% mean
21-2	1	6720.00	NO
21-3	1	7019.00	YES
21-4	1	7142.00	YES
21-5	1	6953.00	YES
21-6	1	7153.00	YES
21-7	1	7326.00	YES
21-8	1	7304.00	YES
21-9	1	7469.00	YES
21-10	1	7326.00	YES
21-11	1	7450.00	YES
21-12	1	7130.00	YES

5/14/13

-5% Mean	Mean	+5% Mean
6822.04	7181.09	7540.15

5/14/13

CALS

ID: TOTAL ACTIVITY

7 JUN 2013 04:25

USER: 11

COMMENT: SILVER

PRESET TIME : 1.00

DATA CALC : CPM H# : YES SAMPLE REPEATS: 1 PRINTER : EDIT

COUNT BLANK : NO IC# : NO REPLICATES : 1 RS232 : EDIT

TWO PHASE : NO AQC : NO CYCLE REPEATS : 1 DISK : OFF

SCINTILLATOR: LIQUID LUMEX: YES LOW SAMPLE REJ: 0

LOW LEVEL : NO HALF LIFE CORRECTION DATE: none

CHAN: 0.0 - 990.0 %ERROR: 2.00 FACTOR: 1.0000000 BKG. SUB: 0

CHAN: 0.0 - 1000.0 %ERROR: 2.00 FACTOR: 1.0000000 BKG. SUB: 0

LUMEX NO %	POS	TIME ELAPSED MIN TIME	H#	WIND1 RAW CPM	WIND2 RAW CPM	WIND1		WIND2	
						CPM	%ERROR	CPM	%ERROR
0.31	21-1	1.00	139.9	57.00	59.00	41.00	36.85	43.00	35.75
0.31	21-2	1.00	147.8	6738.00	6742.00	6720.00	2.44	6724.00	2.44
0.32	21-3	1.00	146.1	7039.00	7045.00	7019.00	2.39	7025.00	2.39
0.32	21-4	1.00	152.9	7164.00	7169.00	7142.00	2.37	7147.00	2.37
0.32	21-5	1.00	147.9	6973.00	6977.00	6953.00	2.40	6957.00	2.40
0.29	21-6	1.00	147.7	7171.00	7172.00	7153.00	2.37	7154.00	2.37
0.30	21-7	1.00	158.3	7346.00	7346.00	7326.00	2.34	7326.00	2.34
0.30	21-8	1.00	162.0	7324.00	7326.00	7304.00	2.34	7306.00	2.34
0.31	21-9	1.00	160.9	7489.00	7493.00	7469.00	2.32	7473.00	2.32
0.30	21-10	1.00	152.4	7346.00	7351.00	7326.00	2.34	7331.00	2.34
0.34	21-11	1.00	153.5	7473.00	7474.00	7450.00	2.32	7451.00	2.32
0.32	21-12	1.00	150.6	7150.00	7152.00	7130.00	2.37	7132.00	2.37

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1297



# National Institute of Standards & Technology Certificate

## Standard Reference Material 4288A Technetium-99 Radioactivity Standard

This Standard Reference Material (SRM) consists of radioactive technetium-99, as potassium pertechnetate, and potassium hydroxide dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of beta-particle counting instruments and for the monitoring of radiochemical procedures.

### Radiological Hazard

The SRM ampoule contains technetium-99 with a total activity of approximately 160 kBq. Technetium-99 decays by beta-particle emission. None of the beta particles escape from the SRM ampoule. During the decay process no photons are emitted. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]\*. There is no detectable external radiation. The SRM should be used only by persons qualified to handle radioactive material.

### Chemical Hazard

The SRM ampoule contains potassium hydroxide (KOH) with a concentration of 0.001 moles per liter of water. The solution is mildly corrosive and could represent a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2.

### Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least September 2006.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) because of the radioactivity.

### Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas of the Radioactivity Group.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

Gaithersburg, Maryland 20899  
October 1996

Thomas E. Gills, Chief  
Standard Reference Materials Program

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10/10/96

JP 10/25/13

DC-S-051-011

### Recommended Procedure for Opening the SRM Ampoule

- 1) If the SRM solution is to be diluted, it is recommended that the diluting solution have a composition comparable to that of the SRM solution.
- 2) Wear eye protection, gloves, and protective clothing and work over a tray with absorbent paper in it.
- 3) Shake the ampoule to wet all of the inside surface of the ampoule. Return the ampoule to the upright position.
- 4) Check that all of the liquid has drained out of the neck of the ampoule. If necessary, gently tap the neck to speed the process.
- 5) Holding the ampoule upright, score the narrowest part of the neck with a scribe or diamond pencil.
- 6) Lightly wet the scored line. This reduces the crack propagation velocity and makes for a cleaner break.
- 7) Hold the ampoule upright with a paper towel, a wiper, or a support jig. Position the scored line away from you. Using a paper towel or wiper to avoid contamination, snap off the top of the ampoule by pressing the narrowest part of the neck away from you while pulling the tip of the ampoule towards you.
- 8) Transfer the solution from the ampoule using a pycnometer or a pipet with dispenser handle. NEVER PIPETTE BY MOUTH.
- 9) Seal any unused SRM solution in a flame-sealed glass ampoule, if possible, to minimize the evaporation loss. See also reference [4]\*

*Handwritten:* ppw/ps/13

PROPERTIES OF SRM 4288A  
(Certified values are shown in bold type)

Source identification number	NIST SRM 4288A		
Physical Properties:			
Source description	Liquid in flame-sealed NIST borosilicate-glass ampoule		
Ampoule specifications	Body outside diameter	(16.5 ± 0.5) mm	
	Wall Thickness	(0.60 ± 0.04) mm	
	Barium content	Less than 2.5%	
	Lead-oxide content	Less than 0.02%	
	Other heavy elements	Trace quantities	
Solution density	(0.998 ± 0.002) g·mL <sup>-1</sup> at 21 °C [b]*		
Solution mass	(4.998 ± 0.002) g [b]		
Chemical Properties:			
Solution composition	Chemical Formula	Concentration (mol·L <sup>-1</sup> )	Mass Fraction (g·g <sup>-1</sup> )
	H <sub>2</sub> O	55	1.00
	KOH	0.001	0.00006
	K <sup>99</sup> TcO <sub>4</sub>	0.0005	0.0001
Radiological Properties:			
Radionuclide	Technetium-99		
Reference time	1200 EST, 1 September 1996		
Massic activity of the solution [c]	32.61 kBq·g <sup>-1</sup>		
Relative expanded uncertainty (k=2)	1.14% [d] [e]		
Photon-emitting impurities	None detected [f]		
Half lives used in the decay corrections	Cobalt-60: (5.2714 ± 0.0005) a [g] Technetium-99: (2.111 ± 0.012) × 10 <sup>5</sup> a [g]		
Measuring instrument	NIST 4πβ(LS)-γ-anticoincidence counting system using cobalt-60 as the efficiency-tracing radionuclide. The efficiency was varied electronically from 50 to 93 percent.		

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EVALUATION OF THE UNCERTAINTY OF THE MASSIC ACTIVITY [d]

Input Quantity $x_i$ , the source of uncertainty (and individual uncertainty components where appropriate)	Method Used To Evaluate $u(x_i)$ , the standard uncertainty of $x_i$	Relative Uncertainty Of Input Quantity, $u(x_i)/x_i$ , (%) [h]	Relative Sensitivity Factor, $(\partial y/\partial x_i) \cdot$ $(x_i/y)$ [i]	Relative Uncertainty Of Output Quantity, $u_c(y)/y$ , (%) [j]
Extrapolated massic liquid-scintillation count rate of the Te-99 solution, corrected for background, cobalt-60 tracer count rate, and decay.	(A) denotes evaluation by statistical methods (B) denotes evaluation by other methods	0.10	1.0	0.10
Decay corrections for cobalt-60 for technetium-99	Standard deviation of the mean for 4 sets of repeated measurements on each of 3 samples (A)	[k] 0.01 0.6	[m] 0.01 0.0000005	0.000003
Decay scheme data	Standard uncertainty of the half life (A) Standard uncertainty of the half life (A)	0.01	1.0	0.01
Extrapolation of the beta-particle-count-rate versus anticoincidence-gamma-ray-count-rate to zero anticoincidence-gamma-ray-count-rate	Standard uncertainty of the probability of decay by beta-particle emission (A)	0.40	1.0	0.40
Calibration of the cobalt-60 tracer solution using the $^{45}\text{Sc(LS)}\gamma$ -anticoincidence counting system	Estimated (B) Standard uncertainty of the extrapolated massic count rate (B)	0.25	1.0	0.25
Gravimetric measurements	Estimated (B)	0.20	1.0	0.20
Live-time measurements [n]	Estimated (B)	0.10	1.0	0.10
Variability between ampoules	Estimated (B)	0.20	1.0	0.20
Photon-emitting impurities	Limit of detection (B) [p]	100.	0.000004	0.0004
Relative Combined Standard Uncertainty of the Output Quantity, $u_c(y)/y$ , (%)				0.57
Coverage Factor, k				$\times 2$
Relative Expanded Uncertainty of the Output Quantity, $U(y)$ , (%)				1.14

\*Notes and references are on pages 5 and 6.

PC-S-051-016  
 2/6/2013

## NOTES

- [a] The Sievert is the SI unit for dose equivalent. See reference [1]. One  $\mu\text{Sv}$  is equal to 0.1 mrem.  
 Distance from Ampoule (cm):            1        20       100  
 Approximate Dose Rate ( $\mu\text{Sv/h}$ ):   <0.1 (Not detectable)
- [b] The stated uncertainty is two times the standard uncertainty.
- [c] **Massic activity** is the preferred name for the quantity activity divided by the total mass of the sample. See reference [1].
- [d] The reported value,  $y$ , of massic activity (activity per unit mass) at the reference time was not measured directly but was derived from measurements and calculations of other quantities. This can be expressed as  $y = f(x_1, x_2, x_3, \dots, x_n)$ , where  $f$  is a mathematical function derived from the assumed model of the measurement process.
- The value,  $x_i$ , used for each input quantity  $i$  has a standard uncertainty,  $u(x_i)$ , that generates a corresponding uncertainty in  $y$ ,  $u_i(y) = |\partial y / \partial x_i| \cdot u(x_i)$ , called a component of combined standard uncertainty of  $y$ .
- The combined standard uncertainty of  $y$ ,  $u_c(y)$ , is the positive square root of the sum of the squares of the components of combined standard uncertainty.
- The combined standard uncertainty is multiplied by a coverage factor of  $k = 2$  to obtain  $U$ , the expanded uncertainty of  $y$ .
- Since it can be assumed that the possible estimated values of the massic activity are approximately normally distributed with approximate standard deviation  $u_c(y)$ , the unknown value of the massic activity is believed to lie in the interval  $y \pm U$  with a level of confidence of approximately 95 percent.
- For further information on the expression of uncertainties, see references [2] and [3].
- [e] The value of each standard uncertainty component, and hence the value of the expanded uncertainty itself, is a best estimate based upon all available information, but is only approximately known. That is to say, the "uncertainty of the uncertainty" is large and not well known. This is true for uncertainties evaluated by statistical methods (e.g., the relative standard deviation of the standard deviation of the mean for the liquid-scintillation counting is approximately 50%) and for uncertainties evaluated by other methods (which could easily be over estimated or under estimated by substantial amounts). The unknown value of the expanded uncertainty is believed to lie in the interval  $U/2$  to  $2U$  (i.e., within a factor of 2 of the estimated value).
- [f] Estimated limits of detection for photon-emitting impurities are:  
 $2 \times 10^{-4} \text{ } \gamma \cdot \text{s}^{-1} \cdot \text{g}^{-1}$  for energies between 20 and 85 keV,  
 $2 \times 10^{-5} \text{ } \gamma \cdot \text{s}^{-1} \cdot \text{g}^{-1}$  for energies between 93 and 503 keV,  
 $1 \times 10^{-5} \text{ } \gamma \cdot \text{s}^{-1} \cdot \text{g}^{-1}$  for energies between 519 and 1457 keV, and  
 $5 \times 10^{-6} \text{ } \gamma \cdot \text{s}^{-1} \cdot \text{g}^{-1}$  for energies between 1465 and 3250 keV.
- [g] The stated uncertainty is the standard uncertainty. See reference [5].

404/05/13

- [h] Relative standard uncertainty of the input quantity  $x_i$ .
- [i] The relative change in the output quantity  $y$  divided by the relative change in the input quantity  $x_i$ . If  $|\partial y / \partial x_i| \cdot (x_i / y) = 1.0$ , then a 1% change in  $x_i$  results in a 1% change in  $y$ . If  $|\partial y / \partial x_i| \cdot (x_i / y) = 0.05$ , then a 1% change in  $x_i$  results in a 0.05% change in  $y$ .
- [j] Relative component of combined standard uncertainty of output quantity  $y$ , rounded to two significant figures or less. The relative component of combined standard uncertainty of  $y$  is given by  $u_i(y) / y \approx |\partial y / \partial x_i| \cdot u(x_i) / y = |\partial y / \partial x_i| \cdot (x_i / y) \cdot u(x_i) / x_i$ . The numerical values of  $u(x_i) / x_i$ ,  $|\partial y / \partial x_i| \cdot (x_i / y)$ , and  $u_i(y) / y$ , all dimensionless quantities, are listed in columns 3, 4, and 5, respectively. Thus, the value in column 5 is equal to the value in column 4 multiplied by the value in column 3. The input quantities are independent, or very nearly so. Hence the covariances are zero or negligible.
- [k] The relative standard uncertainty of  $\lambda \cdot t$  is determined by the relative standard uncertainty of  $\lambda$  (i.e., of the half life). The relative standard uncertainty of  $t$  is negligible.
- [m]  $|\partial y / \partial x_i| \cdot (x_i / y) = \lambda \cdot t$ , multiplied by other sensitivity factors where appropriate.
- [n] The live time is determined by counting the pulses from a gated crystal-controlled oscillator.
- [p] The standard uncertainty for each undetected impurity that might reasonably be expected to be present is estimated to be equal to the estimated limit of detection for that impurity, i.e.  $u(x_i) / x_i = 100\%$ .  $|\partial y / \partial x_i| \cdot (x_i / y) = \{(\text{response per Bq of impurity}) / (\text{response per Bq of } ^{99}\text{Tc})\} \cdot \{(13\text{q of impurity}) / (13\text{q of } ^{99}\text{Tc})\}$ . Thus  $u_i(y) / y$  is the relative change in  $y$  if the impurity were present with a massic activity equal to the estimated limit of detection.

REFERENCES

- [1] International Organization for Standardization (ISO), *ISO Standards Handbook - Quantities and Units*, 1993. Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036, U.S.A. 1-212-642-4900.
- [2] International Organization for Standardization (ISO), *Guide to the Expression of Uncertainty in Measurement*, 1993. Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036, U.S.A. 1-212-642-4900. (Listed under ISO miscellaneous publications as "ISO Guide to the Expression 1993".)
- [3] B. N. Taylor and C. E. Kuyatt, *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*, NIST Technical Note 1297, 1994. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20407, U.S.A.
- [4] National Council on Radiation Protection and Measurements Report No. 58, *A Handbook of Radioactivity Measurements Procedures*, Second Edition, 1985. Available from the National Council on Radiation Protection and Measurements, 7910 Woodmont Avenue, Bethesda, MD 20814 U.S.A.
- [5] Evaluated Nuclear Structure Data File (ENSDF), September 1996.

HP 6/25/13

RC-S-051-f



# Standard Traceability Log Rad

Source Material Info	
Parent Code:	1297
Prepared By:	Amanda Fehr
Carrier Conc:	DI Water
Reference Date:	09/01/1996
Ampoule Mass (g):	4.998 g
Uncertainty:	+/- 1.14 %
LogBook No:	RC-S-051-016

A Solution Material Info	
Isotope:	Technetium-99
Prepared By:	Gregory Ramsay
Prep Date:	02/16/2009
Verification Date:	02/07/2013
Expiration Date:	02/07/2014
Primary Code:	1297-A
Dilution(mL):	100 mL
Mass of Parent(g):	4.885 g
Density(g/mL):	0.9968
Balance ID:	38080204

### Calculations Converting parent activity to dpm/mL|dpm/g

$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / (\text{Dilution Vol}) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parm Activity (kBq/g)}) * (\text{conversion dpm to kBq}) / \text{Density (g/mL)} / (\text{Dilution Vol}) = \text{Parent Activity (dpm/g)}$
$(4.885 \text{ g}) * (32.61 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (100 \text{ mL}) = 95579.9100 \text{ dpm/mL}$
$(4.885 \text{ g}) * (32.61 \text{ kBq/g}) * (60000 \text{ dpm/kBq}) / (0.9968 \text{ g/mL}) / (100 \text{ mL}) = 95883.4800 \text{ dpm/g}$

### Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
04/27/2009	Julie Strock	.02	10	1297-090427-1	5.0636 ug/L	05/04/2008	05/04/2009
04/30/2009	Julie Strock	.01	10	1005-090430-1	5.0373 ug/L	05/04/2008	05/04/2009
04/30/2009	Julie Strock	.02	10	1005-090430-2	5.0373 ug/L	05/04/2008	05/04/2009
04/30/2009	Julie Strock	.2	10	1005-090430-3	5.0373 ug/L	05/04/2008	05/04/2009
04/27/2009	Julie Strock	.2	20	1297-090427-2	5.0636 ug/L	05/04/2008	05/04/2009
04/30/2009	Julie Strock	.2	10	1297-090430-1	5.0636 ug/L	05/04/2008	05/04/2009
04/27/2009	Julie Strock	.1	25	13321297-090427	5.0636 ug/L	05/04/2008	05/04/2009
05/05/2009	Julie Strock	.02	10	1297-090505-1	5.0636 ug/L	05/12/2008	05/12/2009

At 6/26/13

05/05/2009	Julie Strock	.01	10	1005-090505-4	.0050373 ug/L	05/12/2008	05/12/2009
05/05/2009	Julie Strock	.2	20	1297-090505-2	5.0636 ug/L	05/12/2008	05/12/2009
05/05/2009	Julie Strock	.1	25	13321297-090505-1		05/12/2008	05/12/2009
06/18/2009	James Schoneman	.02	10	1297-090618-1	5.04782 ug/L	06/25/2008	06/25/2009
06/18/2009	James Schoneman	.2	20	1297-090618-2	5.04782 ug/L	06/25/2008	06/25/2009
06/24/2009	James Schoneman	.2	20	1297-090624-1	5.04782 ug/L	06/25/2008	06/25/2009
06/18/2009	James Schoneman	.1	25	13451297-090618-1	5.04782 ug/L	06/25/2008	06/25/2009
06/24/2009	James Schoneman	.1	25	13451297-090624-1	5.04782 ug/L	06/25/2008	06/25/2009
08/10/2009	James Schoneman	.02	10	1297-090810-1	5.0478 ug/L	08/17/2008	08/17/2009
08/10/2009	James Schoneman	.04	20	1297-090810-2		08/17/2008	08/17/2009
08/10/2009	James Schoneman	.4	20	1297-090810-3		08/17/2008	08/17/2009
08/10/2009	James Schoneman	.02	20	1297-090810-4		08/17/2008	08/17/2009
08/11/2009	James Schoneman	4	20	1297-090811-1	5.0478 ug/L	08/17/2008	08/17/2009
08/10/2009	James Schoneman	.1	25	12971345-090810-1		08/17/2008	08/17/2009
09/29/2009	James Schoneman	.02	10	1297-090929-1	95575.8 dpm/mL	10/06/2008	10/06/2009
09/29/2009	James Schoneman	.04	20	1297-090929-2	5.0478 ug/L	10/06/2008	10/06/2009
09/29/2009	James Schoneman	.4	20	1297-090929-3	5.0478 ug/L	10/06/2008	10/06/2009
09/29/2009	James Schoneman	4	20	1297-090929-4	5.0478 ug/L	10/06/2008	10/06/2009
09/29/2009	James Schoneman	.02	20	1297-090929-5	5.0478 ug/L	10/06/2008	10/06/2009
09/29/2009	James Schoneman	.1	25	12971332-090929-1	95575.8 dpm/mL	10/06/2008	10/06/2009
10/30/2009	James Schoneman	.02	10	1297-091030-1	95575.8 dpm/mL	11/06/2008	11/06/2009

*AG ce/2ce/13*

10/30/2009	James Schoneman	.04	20	1297-091030-2	5.0478 ug/L	11/06/2008	11/06/2009
10/30/2009	James Schoneman	.4	20	1297-091030-3	5.0478 ug/L	11/06/2008	11/06/2009
10/30/2009	James Schoneman	4	20	1297-091030-4	5.0478 ug/L	11/06/2008	11/06/2009
10/30/2009	James Schoneman	.02	20	1297-091030-5	5.0478 ug/L	11/06/2008	11/06/2009
11/03/2009	James Schoneman	.02	20	1297-091103-1	5.0478 ug/L	11/06/2008	11/06/2009
10/30/2009	James Schoneman	.1	25	12971332-091030-1		11/06/2008	11/06/2009
11/06/2009	James Schoneman	.02	10	1297-091106-1	95575.8 dpm/mL	11/13/2008	11/13/2009
11/06/2009	James Schoneman	.04	20	1297-091106-2	5.0478 ug/L	11/13/2008	11/13/2009
11/06/2009	James Schoneman	.4	20	1297-091106-3	5.0478 ug/L	11/13/2008	11/13/2009
11/06/2009	James Schoneman	4	20	1297-091106-4	5.0478 ug/L	11/13/2008	11/13/2009
11/06/2009	James Schoneman	.02	20	1297-091106-5	5.0478 ug/L	11/13/2008	11/13/2009
11/06/2009	James Schoneman	.1	25	12971332-091106-1		11/13/2008	11/13/2009
11/16/2009	James Schoneman	.02	10	1297-091116-1	95575.8 dpm/mL	11/23/2008	11/23/2009
11/16/2009	James Schoneman	.04	20	1247-091116-2	5.0478 ug/L	11/23/2008	11/23/2009
11/16/2009	James Schoneman	.4	20	1297-091116-3	5.0478 ug/L	11/23/2008	11/23/2009
11/16/2009	James Schoneman	4	20	1297-091116-4	5.0478 ug/L	11/23/2008	11/23/2009
11/16/2009	James Schoneman	.02	20	1297-091116-5	5.0478 ug/L	11/23/2008	11/23/2009
11/19/2009	Julie Strock	.04	20	1297-091119-01	95575.8 dpm/mL	11/26/2008	11/26/2009
11/16/2009	James Schoneman	.1	25	12971332-091116-1		11/23/2008	11/23/2009
11/19/2009	Julie Strock	.02	10	1297-091119-2	95575.8 dpm/mL	11/26/2008	11/26/2009
11/19/2009	Julie Strock	.04	20	1297-091119-3	95575.8 dpm/mL	11/23/2008	11/23/2009

*Handwritten:* 11/26/13

11/19/2009	Julie Strock	.4	20	1297-091119-4	5.0478 ug/L	11/26/2008	11/26/2009
11/19/2009	Julie Strock	4	20	1297-091119-5	5.0478 ug/L	11/26/2008	11/26/2009
11/23/2009	James Schoneman	.02	10	1297-091123-1	95575.8 dpm/mL	11/30/2008	11/30/2009
11/23/2009	James Schoneman	.04	20	1297-091123-2	5.0478 ug/L	11/30/2008	11/30/2009
11/23/2009	James Schoneman	.4	20	1297-091123-3	5.0478 ug/L	11/30/2008	11/30/2009
11/23/2009	James Schoneman	.1	25	12971332-091123-1		11/30/2008	11/30/2009
12/15/2009	James Schoneman	.02	10	1297-091215-1	95575.8 dpm/mL	12/22/2008	12/22/2009
12/15/2009	James Schoneman	.04	20	1297-091215-2	5.0478 ug/L	12/22/2008	12/22/2009
12/15/2009	James Schoneman	.4	20	1297-091215-3	5.0478 ug/L	12/22/2008	12/22/2009
12/15/2009	James Schoneman	4	20	1297-091215-4	5.0478 ug/L	12/22/2008	12/22/2009
12/15/2009	James Schoneman	.02	20	1297-091215-5	5.0478 ug/L	12/22/2008	12/22/2009
12/15/2009	James Schoneman	.1	25	12971333-091215-1		12/22/2008	12/22/2009
02/17/2009	Mary Aders	10.5308	500	1297-B	2019.4595 dpm/ml	02/17/2009	02/17/2010
12/07/2009	Bethany Fiem	10.2418	500	1297-C	1964.0388 dpm/mL	11/29/2010	11/29/2011
04/05/2011	Gregory Ramsay	10.3169	500	1297-D	1978.44055 dpm/mL	03/29/2012	03/29/2012
09/05/2012	Gregory Ramsay	10.0582	500	1297-E	1928.83044 dpm/mL	09/05/2012	09/05/2013

GEL Laboratories LLC  
Version 1.0 9/18/2000

Handwritten: J19 6/26/13

# Verification for Tc-99 Standard 1297-A

v1.1

Analyst	JAS1
Verification Prep Date	2/7/2013

Calibration Information	
Isotope	Tc-99
Serial Number	1234-A
Amount of Std. (mL)	0.1
Expiration Date	2/28/2013

Standard Information	
Serial Number	1297-A
Reference Date	9/1/1996
Standard Prep Date	2/16/2009

Nuclide Information	
Isotope	Tc-99
Isotope Half-life	2.1110E+05 Y
Ref. Act. (ug/L)	2513.24

Std #	Count Date	Activity ug/L
1	2/9/2013	0.51004900
2	2/9/2013	0.50164700
3	2/9/2013	0.49908200

Certificate Value\* = 0.50262087  
 Two sigma = 0.01147310  
 10 % of Mean = 0.05035927  
 Rule A (Pass/Fail) Pass  
 % Recovery 100.19%  
 Rule B (Pass/Fail) Pass  
 Expiration Date 2/7/2014

Mean Value = 0.50359267  
 Stdev = 0.005736548

## Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.

Rule B = The determined mean value shall be within 5% of the certificate value.

\* Certificate Value is decay corrected to Verification Count Date.

The analyst performed three analyses of a dilution of standard 1297-A on the ICPMS for Tc-99. 0.1 mL of 1297-A was diluted to 50 mL. 5 mL of the dilution was taken and further diluted to 50 mL. All standards diluted with 2% nitric acid. The ICPMS was calibrated using dilutions of Tc-99 standard 1234-A.

Reference SOP RAD M-001

*Joe 2/9/13*  
*4/6/2013*

*Quality*



**General Engineering Laboratories  
Verification Source Preparation Sheet**

Applicable SOP Number GL-RAD-A-059 Isotope Tc 99  
 Date Standards Prepared 6/6/13 Cocktail Type Used Ecoscint 6L  
 Standard ID 1297-A Matrix of Vial/Planchett 14 mL Ecoscint 6L  
5 mL DI H<sub>2</sub>O  
AG 1x8 RESIN  
 Amount Used (g or (ml)) 0.1  
 Standard Activity (DPM/g or (mL)) 95579.91 Type of Scintillation Vial Plastic  
 Reference Date <sup>for 6/6/13</sup> 2/6/14 9/1/96 Pipette ID Used 2272418  
 Expiration Date 2/6/14 Balance ID Used NA  
 Residue/Carrier Agent NA Quenching Agent Conc. Brown Colorant

Standard Number	Quenching Vol (uL)
1	0
2	30
3	60
4	90
5	120
6	150
7	180
8	210
9	240
10	270
11	300

Prepared By:

[Signature]

Date:

6/6/13

Reviewed By:

[Signature]

Date:

10/25/13

CAL or VER  
Date: 6/7/13

Efficiency Standard Precision Check

Rack	Time (min.)	CPM Isol	Within +/- 5% mean
61-2	1	6791.00	YES
61-3	1	6789.00	YES
61-4	1	6807.00	YES
61-5	1	6742.00	YES
61-6	1	6575.00	YES
61-7	1	6689.00	YES
61-8	1	6800.00	YES
61-9	1	6669.00	YES
61-10	1	6882.00	YES
61-11	1	6911.00	YES
61-12	1	6988.00	YES

-5% Mean	Mean	+5% Mean
6446.44	6785.73	7125.01

7/16/2013

✓ 05

PAGE: 1

ID: TOTAL ACTIVITY

7 JUN 2013 04:49

USER: 11 COMMENT: SILVER

PRESET TIME : 1.00  
 DATA CALC : CPM H# : YES SAMPLE REPEATS: 1 PRINTER : EDIT  
 COUNT BLANK : NO IC# : NO REPLICATES : 1 RS232 : EDIT  
 TWO PHASE : NO ADC : NO CYCLE REPEATS : 1 DISK : OFF  
 SCINTILLATOR: LIQUID LUMEX: YES LOW SAMPLE REJ: 0  
 LOW LEVEL : NO HALF LIFE CORRECTION DATE: none

CHAN: 0.0 - 990.0 %ERROR: 2.00 FACTOR: 1.0000000 BKG. SUB: 0  
 CHAN: 0.0 - 1000.0 %ERROR: 2.00 FACTOR: 1.0000000 BKG. SUB: 0

LUMEX NO %	SAM POS	TIME ELAPSED MIN TIME	H#	WIND1 RAW CPM	WIND2 RAW CPM	WIND1		WIND2		
						CPM	%ERROR	CPM	%ERROR	
30.09	1	61-1	1.00	157.7	62.00	64.00	46.00	34.25	48.00	33.35
0.24	2	61-2	1.00	144.9	6805.00	6809.00	6791.00	2.43	6795.00	2.43
0.26	3	61-3	1.00	151.7	6804.00	6808.00	6789.00	2.43	6793.00	2.43
0.22	4	61-4	1.00	143.9	6820.00	6822.00	6807.00	2.43	6809.00	2.43
0.23	5	61-5	1.00	145.7	6755.00	6756.00	6742.00	2.44	6743.00	2.44
0.22	6	61-6	1.00	140.9	6588.00	6590.00	6575.00	2.47	6577.00	2.47
0.22	7	61-7	1.00	145.9	6702.00	6705.00	6689.00	2.45	6692.00	2.45
0.22	8	61-8	1.00	142.2	6813.00	6814.00	6800.00	2.43	6801.00	2.43
0.23	9	61-9	1.00	137.3	6682.00	6685.00	6669.00	2.45	6672.00	2.45
0.25	10	61-10	1.00	147.3	6897.00	6897.00	6882.00	2.41	6882.00	2.41
0.28	11	61-11	1.00	149.7	6928.00	6931.00	6911.00	2.41	6914.00	2.41
0.26	12	61-12	1.00	150.2	7004.00	7006.00	6988.00	2.40	6990.00	2.39

3PQ'

JP 6/25/13

31-Jul-2013

**GEL Laboratories**  
2040 Savage Road, Charleston, SC 29407  
(843)556-8171

**Liquid Scintillation Counter Calibration Package**

Method: H-3

Instrument Color Code: Gray

**Part 1: Efficiency determination**

- 1 Efficiency spreadsheet (eff pts, graph, trendline equation)
- 2 Verification Spreadsheet (recoveries 90%-110%)
- 3 Applicable portion of Machines.XLS
- 4 Raw Data and spectra
- 5 Window, Low Level and Lumex settings

Included/ Acceptable	Comments
✓	
✓	
✓	
✓	
✓	

**Part 2. Documentation for Calibration Source**

- 1 Vendor Certificate
- 2 Standard Traceability Log (from LIMS)
- 3 Verification of Source
- 4 Source preparation sheet
- 5 Efficiency standard precision check

✓	
✓	
✓	
✓	
✓	

**Part 3. Documentation for Verification Source**

- 1 Vendor Certificate
- 2 Standard Traceability Log (from LIMS)
- 3 Verification of Source
- 4 Source preparation sheet

✓	
✓	
✓	
✓	

**Part 4. Enter into LIMS**

- 1 Alpha LIMS instrument calibration updated

✓	
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Primary Review of Package

Secondary Review of Package

*[Handwritten Signature]*  
*[Handwritten Signature]*

Effective Date:  
8/1/13

Expiration Date: 7/31/14

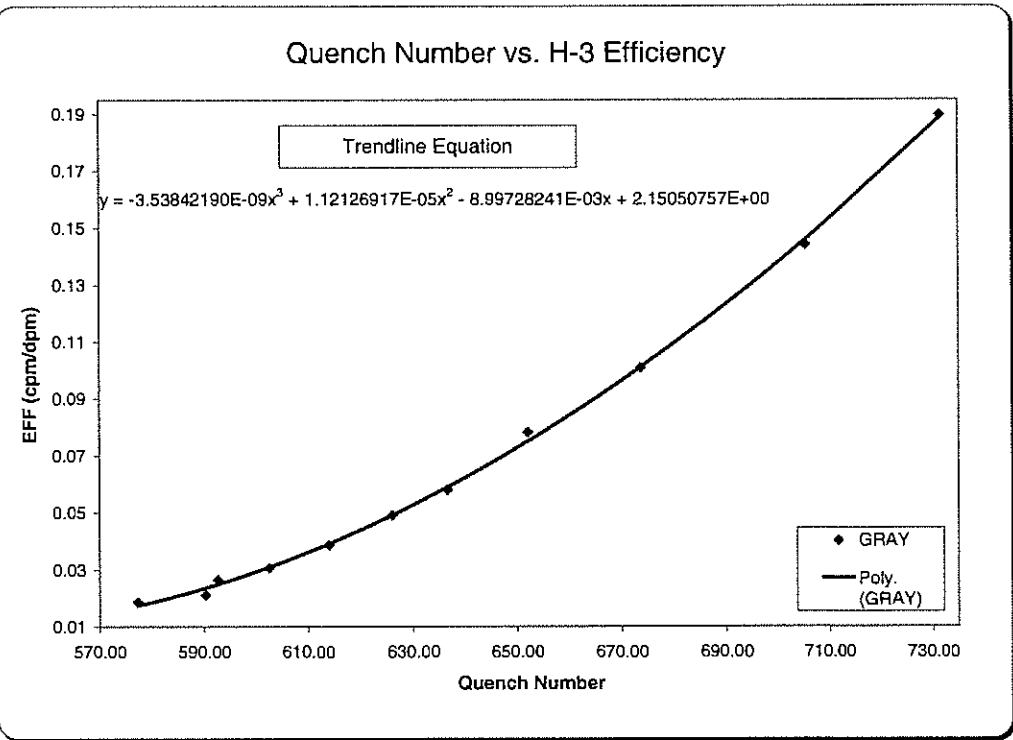
# H-3 Calibration

Standard Information from prep sheet	
Isotope	H-3
Serial Number	1583-A
Isotope Halflife (days)	4485.27
Reference Date	11/30/2011
Ref. Act. (DPM/mL)	23356.11
Amount of Std. (mL)	0.5

Instrument	GRAY
------------	------

Std #	Start Count Time	Quench Number	RAW CPM	BKG	RAW CPM-BKG	Nominal DPM	EFF.
1	7/23/13 7:32	731.49	1966.08	1.76	1964.32	10641.7524	0.18459
2	7/23/13 7:53	705.29	1483.09	1.76	1481.33	10641.72842	0.13920
3	7/23/13 8:21	673.67	1022.80	1.76	1021.04	10641.69644	0.09595
4	7/23/13 8:52	652.06	781.01	1.76	779.25	10641.66104	0.07323
5	7/23/13 9:23	636.62	567.02	1.76	565.26	10641.62563	0.05312
6	7/23/13 9:54	626.07	470.88	1.76	469.12	10641.59023	0.04408
7	7/23/13 10:25	613.97	359.94	1.76	358.18	10641.55483	0.03366
8	7/23/13 10:57	602.54	275.64	1.76	273.88	10641.51828	0.02574
9	7/23/13 11:28	592.70	230.85	1.76	229.09	10641.48288	0.02153
10	7/23/13 11:59	590.34	173.65	1.76	171.89	10641.44748	0.01615
11	7/23/13 12:30	577.30	147.22	1.76	145.46	10641.41207	0.01367

Copy into Machines.xls	
Cal Date	08/01/13
Min H#	579.2
Max H#	727.7
A0	2.15050757E+00
A1	-8.99728241E-03
A2	1.12126917E-05
A3	-3.53842190E-09
A4	0
A5	0
Geometry	L DW/13mL Ecoscint Ultra
Exp Date	07/31/14
Low Level	N
Eff Error	0.007920
Window1 LL	25
Window1 UL	190
Window2 LL	1
Window2 UL	1024



## H-3 Verification

Instrument	GRAY
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Standard Information from prep sheet	
Isotope	H-3
Serial Number	1629-A
Isotope Halflife (days)	4485.27
Reference Date	12/13/2012
Ref. Act. (DPM/mL)	22010.46
Amount of Std. (mL)	0.5

Std #	Start	Quench	Raw	BKG	BKG Corrected	Calculated	Standard	Measured	Recovery
	Count Time	Number	CPM		CPM	EFF.	DPM	DPM	%
1	7/23/13 14:07	727.71	2043.93	2.01	2041.92	0.1773	10633.11	11515.70	108.30%
2	7/23/13 14:27	698.38	1431.66	2.01	1429.65	0.1305	10633.08	10952.52	103.00%
3	7/23/13 14:56	672.68	1016.72	2.01	1014.71	0.0949	10633.05	10693.29	100.57%
4	7/23/13 15:28	652.00	757.98	2.01	755.97	0.0701	10633.01	10783.72	101.42%
5	7/23/13 15:59	635.78	580.12	2.01	578.11	0.0532	10632.98	10862.87	102.16%
6	7/23/13 16:30	620.92	441.97	2.01	439.96	0.0398	10632.94	11051.51	103.94%
7	7/23/13 17:01	610.25	347.17	2.01	345.16	0.0314	10632.91	10979.52	103.26%
8	7/23/13 17:33	602.30	281.90	2.01	279.89	0.0259	10632.87	10807.64	101.64%
9	7/23/13 18:04	592.22	228.58	2.01	226.57	0.0198	10632.83	11471.17	107.88%
10	7/23/13 19:06	579.24	153.85	2.01	151.84	0.0133	10632.76	11404.22	107.26%

	Calibration Coeffs
a0	2.15050757E+00
a1	-8.99728241E-03
a2	1.12126917E-05
a3	-3.53842190E-09

GRAY-RAD

<b>Cal Date</b>	08/01/2013
<b>Min H#</b>	579.24
<b>Max H#</b>	727.71
<b>A0</b>	2.15050757E+00
<b>A1</b>	-8.99728241E-03
<b>A2</b>	1.12126917E-05
<b>A3</b>	-3.53842190E-09
<b>A4</b>	0.00000000E+00
<b>A5</b>	0.00000000E+00
<b>B0</b>	-5.38113183E+01
<b>B1</b>	2.86808713E-01
<b>B2</b>	-4.88866872E-04
<b>B3</b>	2.76437414E-07
<b>B4</b>	0.00000000E+00
<b>B5</b>	0.00000000E+00
<b>Geometry</b>	10mL DW/13mL Ecoscint Ultra
<b>Exp Date</b>	07/31/14
<b>Low Level</b>	N
<b>Eff Error</b>	0.007920
<b>Window1 LL</b>	25
<b>Window1 UL</b>	190
<b>Window2 LL</b>	1
<b>Window2 UL</b>	1024

Cals

H-3 GRAY

PROTOCOL : 2 H-3 30 min  
DATE : 2013/07/23  
TIME : 07:00  
ID : P02AS533

H-3

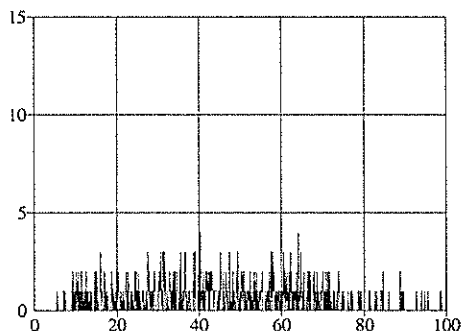
Wallac 1400 DSA ver 2.50 S/N4150033  
Counting mode : CPM  
Isotope(s) : H3  
H3 = 5- 350,12.43 y  
Protocol name : H-3 30 min  
Counting time : 1800  
Repeats : 1  
Cycles : 1  
Replicates : 1  
2 sigma % : 0.00  
Minimum cpm : 0.00 Checking time: 10  
Advanced modes : Chemilum  
Output to Display :  
POS,DPM1,CPMw2,CLMM,FNCT2,  
RACK,RACKPOS,FNCT1,SQPE,TIME,  
DATE,CPMw1,CPM,CPM1,CTIME  
Additions to Display : Spectrum,Header,Listing  
Header : H-3  
Spectrum : Rnd.Cos,Beta  
Window 1 : 25- 190 /Beta  
Window 2 : 25- 190 /Rnd.Cos  
Window 3 : 1-1024 /Beta  
Window 4 : 1-1024 /Beta  
Window 5 : 1-1024 /Beta  
Window 6 : 1-1024 /Beta  
FNCT1 = FNCT1 : CTIME/60  
FNCT2 = FNCT2 : CPMW1-CPMW2  
FNCT3 = FNCT3 :  
FNCT4 = FNCT4 :

Total count rate:  
H3 7751.6 CPM



H-3 GRAY

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
81	1	30.00	733.66	7/23/2013 7:00 AM



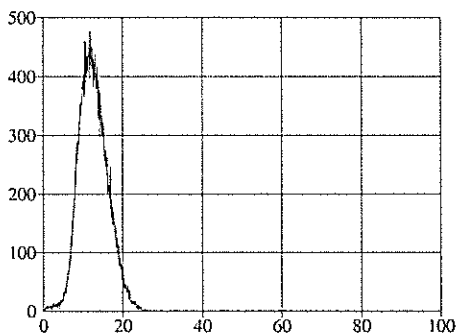
Counts Chem

Counts Beta

Gross_B_CPM	Lumex
1.80	0.00

Lumex_CPM	DPM
0.10	0.00

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
81	2	19.75	731.49	7/23/2013 7:32 AM



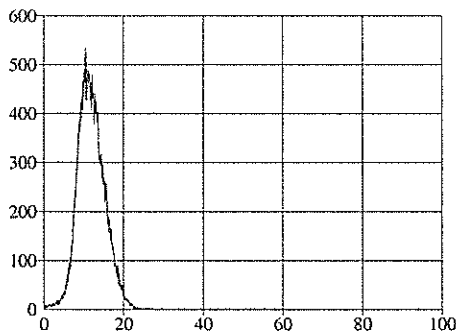
Counts Chem

Counts Beta

Gross_B_CPM	Lumex
1966.10	0.00

Lumex_CPM	DPM
0.10	0.00

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
81	3	26.80	705.29	7/23/2013 7:53 AM



Counts Chem

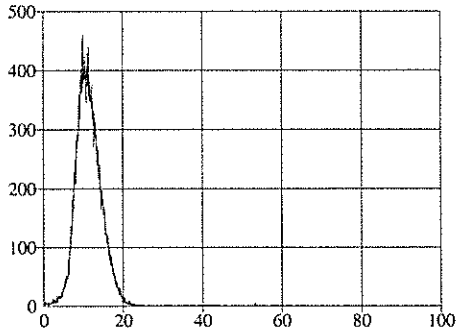
Counts Beta

Gross_B_CPM	Lumex
1483.10	0.00

Lumex_CPM	DPM
0.00	0.00

H-3 GRAY

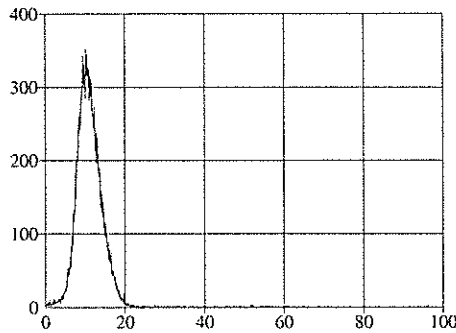
Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
81	4	30.00	673.67	1022.80



Counts Chem  
Counts Beta

Gross_B_CPM	Lumex
1022.80	0.00
Lumex_CPM	DPM
0.00	0.00

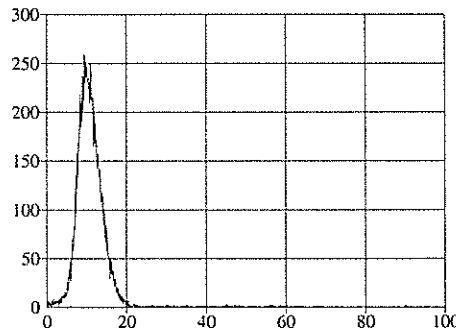
Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
81	5	30.00	652.06	781.01



Counts Chem  
Counts Beta

Gross_B_CPM	Lumex
781.00	0.00
Lumex_CPM	DPM
0.00	0.00

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
81	6	30.00	636.62	567.02

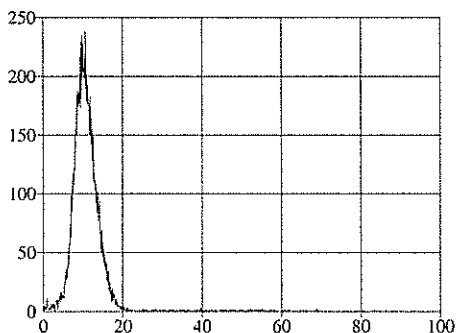


Counts Chem  
Counts Beta

Gross_B_CPM	Lumex
567.00	0.00
Lumex_CPM	DPM
0.00	0.00

H-3 GRAY

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
81	7	30.00	470.88	7/23/2013 9:54 AM

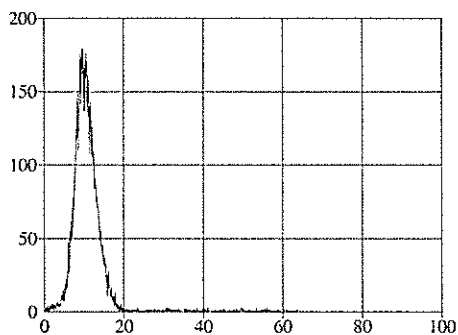


Counts Chem

Counts Beta

Gross_B_CPM	Lumex
470.90	0.00
Lumex_CPM	DPM
0.00	0.00

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
81	8	30.00	613.97	7/23/2013 10:25 AM

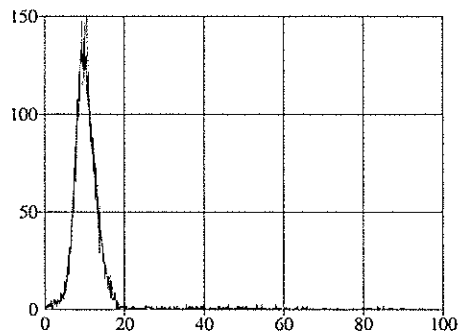


Counts Chem

Counts Beta

Gross_B_CPM	Lumex
360.00	0.00
Lumex_CPM	DPM
0.00	0.00

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
81	9	30.00	602.54	7/23/2013 10:57 AM



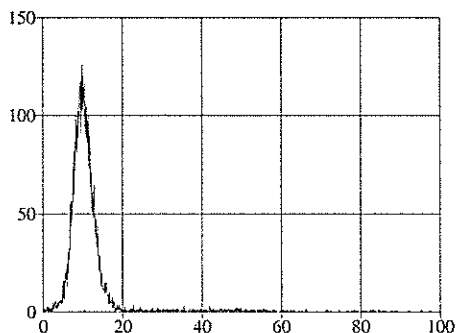
Counts Chem

Counts Beta

Gross_B_CPM	Lumex
275.60	0.00
Lumex_CPM	DPM
0.00	0.00

H-3 GRAY

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
81	10	30.00	592.70	7/23/2013 11:28 AM



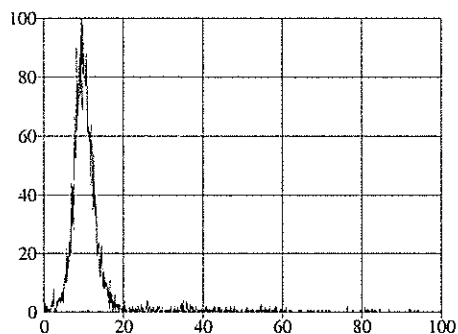
Counts Chem

Counts Beta

Gross_B_CPM	Lumex
230.90	0.00

Lumex_CPM	DPM
0.00	0.00

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
81	11	30.00	590.34	7/23/2013 11:59 AM



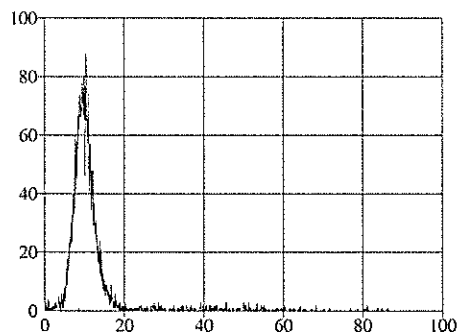
Counts Chem

Counts Beta

Gross_B_CPM	Lumex
173.70	0.00

Lumex_CPM	DPM
0.00	0.00

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
0	1	30.00	577.30	7/23/2013 12:30 PM



Counts Chem

Counts Beta

Gross_B_CPM	Lumex
147.30	0.00

Lumex_CPM	DPM
0.00	0.00

Vers

H-3 GRAY

PROTOCOL : 2 H-3 30 min  
DATE : 2013/07/23  
TIME : 13:35  
ID : P02AS534

H-3

Wallac 1400 DSA ver 2.50 S/N4150033

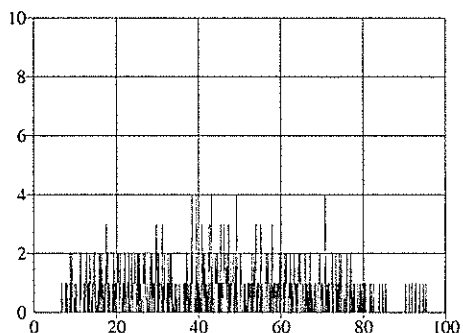
Counting mode : CPM  
Isotope(s) : H3  
H3 = 5- 350,12.43 y  
Protocol name : H-3 30 min  
Counting time : 1800  
Repeats : 1  
Cycles : 1  
Replicates : 1  
2 sigma % : 0.00  
Minimum cpm : 0.00 Checking time: 10  
Advanced modes : Chemilum  
Output to Display :  
POS,DPM1,CPMw2,CLMM,FNCT2,  
RACK,RACKPOS,FNCT1,SQPE,TIME,  
DATE,CPMw1,CPM,CPM1,CTIME  
Additions to Display : Spectrum,Header,Listing  
Header : H-3  
Spectrum : Rnd.Cos,Beta  
Window 1 : 25- 190 /Beta  
Window 2 : 25- 190 /Rnd.Cos  
Window 3 : 1-1024 /Beta  
Window 4 : 1-1024 /Beta  
Window 5 : 1-1024 /Beta  
Window 6 : 1-1024 /Beta  
FNCT1 = FNCT1 : CTIME/60  
FNCT2 = FNCT2 : CPMW1-CPMW2  
FNCT3 = FNCT3 :  
FNCT4 = FNCT4 :

Total count rate:

H3 7733.5 CPM

H-3 GRAY

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
85	1	30.00	729.63	2.01

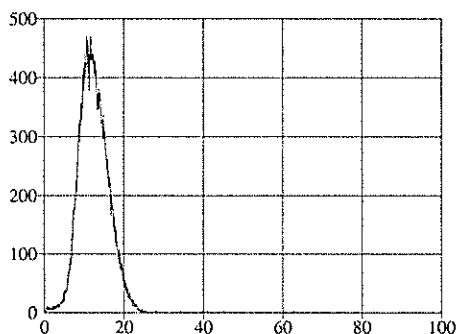


Counts Chem

Counts Beta

Gross_B_CPM	Lumex
2.00	0.00
Lumex_CPM	DPM
0.00	0.00

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
85	2	19.05	727.71	2043.93

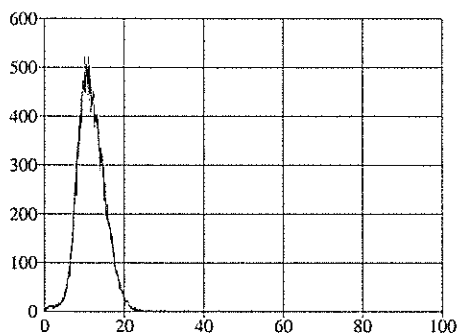


Counts Chem

Counts Beta

Gross_B_CPM	Lumex
2044.00	0.00
Lumex_CPM	DPM
0.10	0.00

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
85	3	27.85	698.38	1431.66



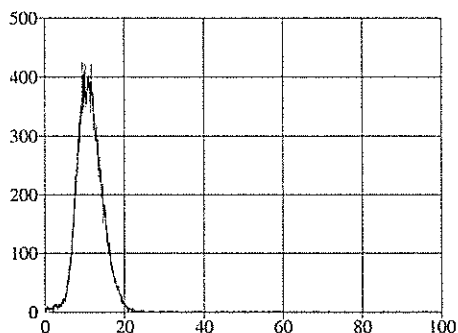
Counts Chem

Counts Beta

Gross_B_CPM	Lumex
1431.70	0.00
Lumex_CPM	DPM
0.10	0.00

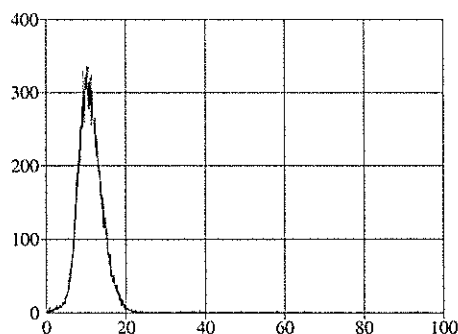
H-3 GRAY

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
85	4	30.00	672.68	7/23/2013 2:56 PM



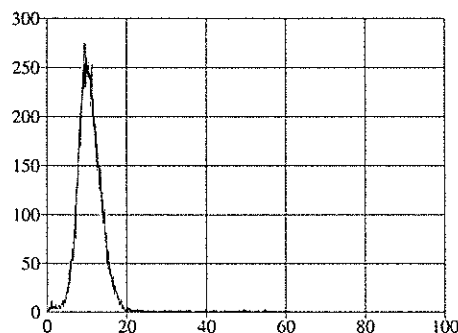
Gross_B_CPM	Lumex
1016.80	0.00
Lumex_CPM	DPM
0.10	0.00

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
85	5	30.00	652.00	7/23/2013 3:28 PM



Gross_B_CPM	Lumex
758.00	0.00
Lumex_CPM	DPM
0.00	0.00

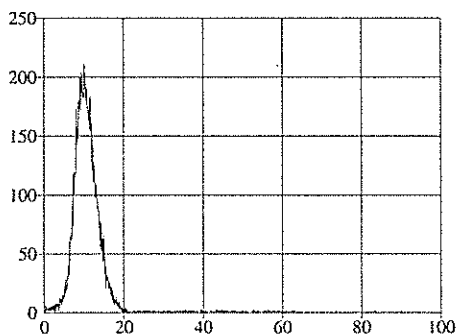
Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
85	6	30.00	635.78	7/23/2013 3:59 PM



Gross_B_CPM	Lumex
580.20	0.00
Lumex_CPM	DPM
0.00	0.00

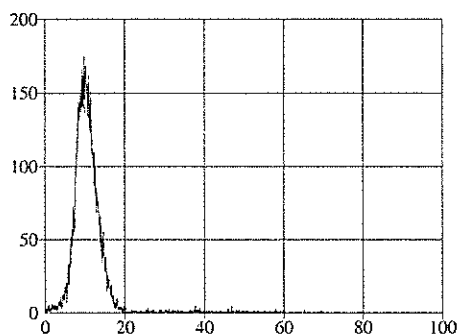
H-3 GRAY

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
85	7	30.00	441.97	7/23/2013 4:30 PM



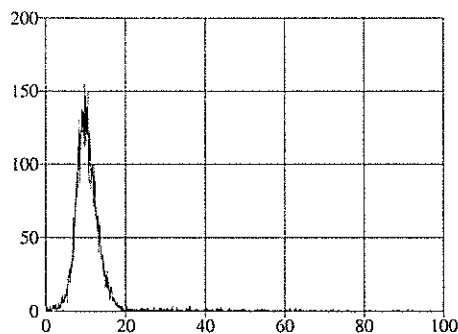
Gross_B_CPM	Lumex
442.00	0.00
Lumex_CPM	DPM
0.00	0.00

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
85	8	30.00	347.17	7/23/2013 5:01 PM



Gross_B_CPM	Lumex
347.20	0.00
Lumex_CPM	DPM
0.00	0.00

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
85	9	30.00	281.90	7/23/2013 5:33 PM

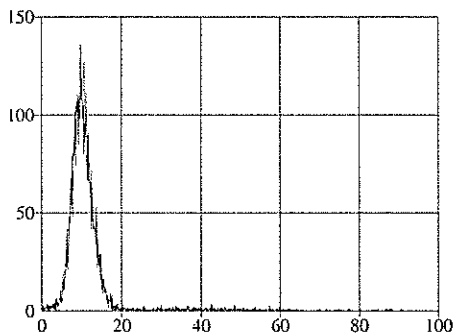


Gross_B_CPM	Lumex
281.90	0.00
Lumex_CPM	DPM
0.00	0.00



H-3 GRAY

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
85	10	30.02	228.58	7/23/2013 6:04 PM



Counts Chem

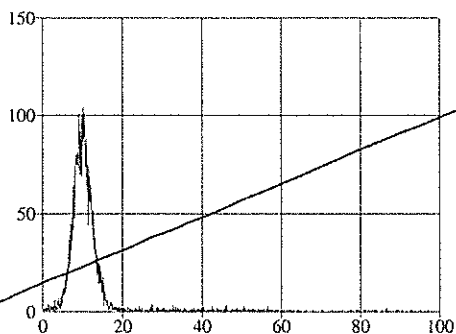
Counts Beta

Gross_B_CPM	Lumex
228.60	0.00

Lumex_CPM	DPM
0.00	0.00

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
85	11	30.02	180.32	7/23/2013 6:35 PM

*Handwritten:* 7/29/13



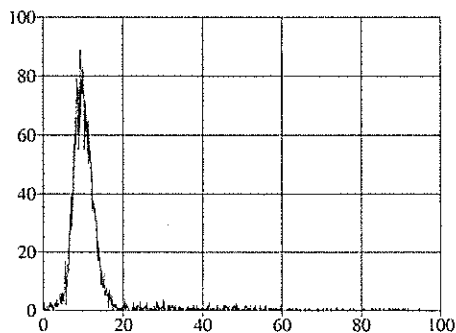
Counts Chem

Counts Beta

Gross_B_CPM	Lumex
180.30	0.00

Lumex_CPM	DPM
0.00	0.00

Rack_position	Count_time_(min)	Quench_number	H-3_CPM	Run_date
0	1	30.00	153.85	7/23/2013 7:06 PM



Counts Chem

Counts Beta

Gross_B_CPM	Lumex
153.90	0.00

Lumex_CPM	DPM
0.00	0.00



**CERTIFICATE OF CALIBRATION**  
Standard Radionuclide Source

1583

86112-278

H-3 5 mL Liquid in Flame Sealed Vial

**Customer:** GEL Laboratories, LLC  
**P.O. No.:** 936820RD, Item 2

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide purity and calibration were checked by germanium gamma-ray spectrometry and liquid scintillation counting. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 1, February, 1979, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

Isotope	Half-Life, Days	Activity (Bq)	Uncertainty* , %			Reference Date (12:00 PM EST)
			$u_A$	$u_B$	U	
H-3	4.500E+03	4.028E+04	0.2	1.6	3.2	11/30/2011

\*Uncertainty: U - Relative expanded uncertainty,  $k = 2$ . See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

**Comments:**

Impurities:  $\gamma$ -impurities < 0.1 %. 5.12269 g H<sub>2</sub>O.

Source Prepared by: *M. I. Taskaeva*  
M. I. Taskaeva, Radiochemist

QA Approved: *J. D. McCorvey*  
J. D. McCorvey, QA Manager Alternate

Date: 29 NOV 11





## Standard Traceability Log Rad

Source Material Info	
Parent Code:	1583
Prepared By:	Gregory Ramsay
Carrier Conc:	H2O
Reference Date:	11/30/2011
Ampoule Mass (g):	5.12269 g
Uncertainty:	+/- 3.2 %
LogBook No:	RC-S-065-013

A Solution Material Info	
Isotope:	Tritium
Prepared By:	Gregory Ramsay
Prep Date:	12/09/2011
Verification Date:	01/23/2013
Expiration Date:	01/23/2014
Primary Code:	1583-A
Dilution(mL):	100 mL
Mass of Parent(g):	4.9506 g
Density(g/mL):	0.9956
Balance ID:	38080204

## Calculations Converting parent activity to dpm/mL|dpm/g

$(\text{Mass of parent(g)}) * (\text{Parent Activity (Bq)}) * (\text{conversion dpm to Bq}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)}) * (\text{Parent Activity (Bq)}) * (\text{conversion dpm to Bq}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(4.9506 \text{ g}) * (40280 \text{ Bq}) * (60 \text{ dpm/Bq}) / (5.12269 \text{ g} * 100 \text{ mL}) = 23356.1080 \text{ dpm/mL}$
$(4.9506 \text{ g}) * (40280 \text{ Bq}) * (60 \text{ dpm/Bq}) / (0.9956 \text{ g/mL}) / (5.12269 \text{ g} * 100 \text{ mL}) = 23459.3055 \text{ dpm/g}$

## Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
-----------	----------	--------------	---------------	------	-------------	-------------------	-----------------

GEL Laboratories LLC  
Version 1.0 9/18/2000

# Verification for H-3 Standard 1583-A

v1.0.2

Instrument	BROWN
Analyst	CEK
Verification Prep Date	1/23/2013

Standard Information	
Isotope	H-3
Serial Number	1583-A
Isotope Half-life	12.3200 Y
Reference Date	11/30/2011
Ref. Act. (DPM/mL)	23356.108
Amount of Std. (mL)	1.0
Standard Prep Date	12/9/2011

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	1/23/2013	89.80	6810.07	13.07
2	1/23/2013	90.30	6825.27	13.07
3	1/23/2013	88.60	6837.93	13.07

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	6797.00	0.312988	21716.50	21716.50
2	6812.20	0.312988	21765.07	21765.07
3	6824.86	0.312988	21805.51	21805.51

dpm/mL  
21762.36  
44.5681412

Mean Value =  
Stdev =

Certificate Value\* = 21892.9  
Two sigma = 89.136  
10 % of Mean = 2176.236  
Rule A (Pass/Fail) Pass  
% Recovery 99.40%  
Rule B (Pass/Fail) Pass  
Expiration Date 1/23/2014

## Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.  
Rule B = The determined mean value shall be within 5% of the certificate value.

\* Certificate Value is decay corrected to Count Date.

The analyst prepared three standard verification sources for H-3 source 1583-A by transferring 1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecocint Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecocint Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCBROWN for H-3 source standard verification. The H-3 efficiency calibration which was used for verification calculations was performed on 1/23/2013 using H-3 source 1611-A.

Standard results for each verification source was calculated as follows:

$$\text{Source dpm/mL} = (A - B)/(C)(D)$$

where:

- A = Ver. source cpm,
- B = BKG cpm,
- C = System efficiency (cpm/dpm), and
- D = volume used for standard verification.

RAD-M-001

*Handwritten:* OK 1/24/13

*Handwritten:* [Signature]

**General Engineering Laboratories  
Calibration Source Preparation Sheet**

Applicable SOP Number GL-RAD-A-002 Isotope H3  
 Date Standards Prepared 7/16/13 Cocktail Type Used Ecoscint Ultra  
 Standard ID 1583-A Matrix of Vial/Planchett 10ml Dead water  
 Amount Used (g or ml) 0.5 13ml Ecoscint Ultra  
 Standard Activity (DPM/g or mL) 23356.1080 Type of Scintillation Vial Plastic  
 Reference Date 11/30/11 Pipette ID Used 3158763  
 Expiration Date 1/23/14 Balance ID Used NA  
 Residue/Carrier Agent NA Quenching Agent Conc. Brown colorant

Standard Number	Quenching Vol (uL)
1	0
2	30
3	60
4	90
5	120
6	150
7	180
8	210
9	240
10	270
11	300

Prepared By: \_\_\_\_\_

Date: 7/16/13

Reviewed By: [Signature]

Date: 7/31/13

H-3

CAL or VER  
Date: 6/20/13

Efficiency Standard Precision Check

Rack	Time (min.)	CPM Isol	Within +/- 5% mean
53-2	1	1973.00	YES
53-3	1	2000.00	YES
53-4	1	1958.00	YES
53-5	1	1961.00	YES
53-6	1	1957.00	YES
53-7	1	2091.00	YES
53-8	1	2021.00	YES
53-9	1	2002.00	YES
53-10	1	2039.00	YES
53-11	1	1987.00	YES
53-12	1	1988.00	YES

-5% Mean	Mean	+5% Mean
1898.01	1997.91	2097.80

# H-3 Cal

```

ID: TOTAL      SENSITIVITY      17 JUL 2013 10:01
USER: 11      COMMENT: GOLD
PRESET TIME :      1.00
DATA CALC   :      CPM   H#   : YES   SAMPLE REPEATS: 1   PRINTER      : STD
COUNT BLANK :      NO   IC#  : NO    REPLICATES   : 1   RBSSE       : EDIT
TWO PHASE   :      NO   ACC  : NO    CYCLE REPEATS: 1   DISK        : OFF
SCINTILLATOR: LIQUID  LUMEX: YES  LOW SAMPLE REJ: 0
LOW LEVEL   :      NO   HALF LIFE CORRECTION DATE: none
  
```

```

CHAN: 0.0 - 999.0  XERROR: 2.00  FACTOR: 1.000000  BKG. SUB: 0
CHAN: 0.0 - 1000.0 XERROR: 2.00  FACTOR: 1.000000  BKG. SUB: 0
  
```

SAM NO	POS	TIME MIN	H#	WIND1		WIND2		LUMEX %	ELAPSED TIME
				CPM	%ERROR	CPM	%ERROR		
1	53-1	1.00	124.4	28.00	37.60	33.00	34.82	1.50	1.47
2	53-2	1.00	125.6	1973.00	4.50	1977.00	4.50	0.03	3.36
3	53-3	1.00	124.7	2000.00	4.47	2004.00	4.47	0.03	5.31
4	53-4	1.00	125.4	1958.00	4.52	1961.00	4.52	0.03	7.22
5	53-5	1.00	125.6	1961.00	4.52	1963.00	4.51	0.04	9.12
6	53-6	1.00	124.9	1957.00	4.52	1963.00	4.51	0.03	11.03
7	53-7	1.00	122.1	2091.00	4.37	2093.00	4.37	0.03	13.04
8	53-8	1.00	125.2	2021.00	4.45	2025.00	4.44	0.03	14.96
9	53-9	1.00	125.4	2002.00	4.47	2004.00	4.47	0.03	16.91
10	53-10	1.00	125.7	2039.00	4.43	2042.00	4.43	0.03	18.82
11	53-11	1.00	125.5	1987.00	4.48	1990.00	4.46	0.03	20.77
12	53-12	1.00	126.2	1988.00	4.48	1994.00	4.46	0.03	22.70



# Eckert & Ziegler

## Analytics

1380 Seaboard Industrial Blvd.  
Atlanta, Georgia 30318  
Tel 404-352-8677  
Fax 404-352-2837  
www.analytiscinc.com

### CERTIFICATE OF CALIBRATION Standard Radionuclide Source

92391

H-3 5 mL Liquid in Flame Sealed Vial

1629

**Customer:** General Engineering Labs  
**P.O. No.:** GEL1202747, Item 2      **Product Code:** 8003-5FSA-37kBq

This standard radionuclide source was prepared gravimetrically from a master solution, calibrated by Eckert & Ziegler Analytics. The master solution was calibrated by liquid scintillation counting. Radionuclide calibration and purity were checked by germanium gamma-ray spectrometry, liquid scintillation counting, and/or alpha spectrometry, as applicable. The nuclear decay rate and reference date for this source are given below. Eckert & Ziegler Analytics (EZA) maintains traceability to the National Institute of Standards and Technology through a Measurements Assurance Program as described in USNRC Regulatory Guide 4.15, Revision 2, July 2007, and compliance with ANSI N42.22-1995, "Traceability of Radioactive Sources to NIST." EZA is accredited by the Health Physics Society (HPS) for the production of NIST-traceable sources, and this source was produced in accordance with the HPS accreditation requirements. Customers may report any concerns with the accreditation program to the HPS Secretariat, 1313 Dolley Madison Blvd., Ste. 402, McLean, VA 22101.

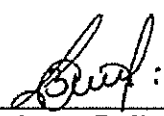
Isotope	Half-Life, Days	Activity (Bq)	Uncertainty*, %			Reference Date (12:00 PM EST)
			$u_A$	$u_B$	U	
H-3	4.500E+03	3.738E+04	0.2	1.6	3.2	12/13/2012

\*Uncertainty: U - Relative expanded uncertainty,  $k = 2$ . See NIST Technical Note 1297, "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results."

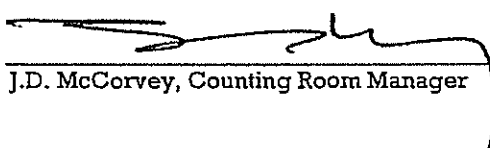
**Comments:**

Impurities:  $\gamma$ -impurities < 0.1%.  
5.04115 g H<sub>2</sub>O.

Source Prepared by:

  
Z. Dimitrova, Radiochemist

QA Approved:

  
J.D. McCorvey, Counting Room Manager

Date: 11 DEC 12

RECEIVED  
R14112  
RD

RU-S-065-058







## Standard Traceability Log Rad

Source Material Info		A Solution Material Info	
Parent Code:	1629	Isotope:	Tritium
Prepared By:	Ashley Drochter	Prepared By:	Gregory Ramsay
Carrier Conc:	H2O	Prep Date:	05/13/2013
Reference Date:	12/13/2012	Verification Date:	05/13/2013
Ampoule Mass (g):	5.04115 g	Expiration Date:	05/13/2014
Uncertainty:	+/- 3.2 %	Primary Code:	1629-A
LogBook No:	RC-S-065-058	Dilution(mL):	100 mL
		Mass of Parent(g):	4.9473 g
		Density(g/mL):	0.9974
		Balance ID:	38080204

## Calculations Converting parent activity to dpm/mL|dpm/g

$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / (\text{Ampoule Mass(g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/mL)}$
$(\text{Mass of parent(g)} * (\text{Parm Activity (Bq)}) * (\text{conversion dpm to Bq}) / \text{Density} / (\text{Ampoule Mass (g)} * (\text{Dilution Vol})) = \text{Parent Activity (dpm/g)}$
$(4.9473 \text{ g}) * (37380 \text{ Bq}) * (60 \text{ dpm/Bq}) / (5.04115 \text{ g} * 100 \text{ mL}) = 22010.4628 \text{ dpm/mL}$
$(4.9473 \text{ g}) * (37380 \text{ Bq}) * (60 \text{ dpm/Bq}) / (0.9974 \text{ g/mL}) / (5.04115 \text{ g} * 100 \text{ mL}) = 22068.9012 \text{ dpm/g}$

## Secondary Standards

Prep Date	Preparer	Mass Primary	Dilution (mL)	Code	Conc dpm/mL	Verification Date	Expiration Date
05/13/2013	Gregory Ramsay	49.3205	500	1629-B	2171.13406 dpm/ml	05/13/2013	05/13/2014
06/05/2013	Christina Kimball	5.04	500	1629-C	222.4545 dpm/ml	06/17/2013	06/17/2014
06/13/2013	Christina Kimball	2.498	250	1629-D	220.5125 dpm/ml	06/17/2013	06/17/2014

GEL Laboratories LLC  
Version 1.0 9/18/2000

# Verification for H-3 Standard 1629-A

v1.0.1

Instrument	BROWN
Analyst	GXR1
Verification Prep Date	5/13/2013

Standard Information	
Isotope	H-3
Serial Number	1629-A
Isotope Half-life	12.3200 Y
Reference Date	12/13/2012
Ref. Act. (DPM/mL)	22010.4628
Amount of Std. (mL)	0.1
Standard Prep Date	5/13/2013

Std #	Count Date	Quench Number	Gross cpm	Bkg cpm
1	5/14/2013	82.70	909.00	43.20
2	5/14/2013	82.20	919.80	43.20
3	5/14/2013	82.80	944.80	43.20

Std #	Net cpm	Calculated Avg. Eff.	Standard dpm/mL	Measured dpm
1	865.80	0.416793	20772.93	2077.29
2	876.60	0.416793	21032.05	2103.20
3	901.60	0.416793	21631.87	2163.19

Mean Value = 21145.61  
 Stdev = 440.5877898  
 Certificate Value\* = 21501.1  
 Two sigma = 881.176  
 10 % of Mean = 2114.561  
 Rule A (Pass/Fail) Pass  
 % Recovery 98.35%  
 Rule B (Pass/Fail) Pass  
 Expiration Date 5/13/2014

### Verification Rules

Rule A = The two sigma value used for the 95% confidence interval shall not exceed 10% of the mean value of the three verification measurements.  
 Rule B = The determined mean value shall be within 5% of the certificate value.

\* Certificate Value is decay corrected to Count Date.

The analyst prepared three standard verification sources for H-3 source 1629-A by transferring 0.1 mL portions of the standard into glass liquid scintillation vials. 10 mL of Ecocount Ultra liquid scintillation cocktail was added to each vial and the vials were shaken to mix. A Blank vial was prepared in a similar fashion using 10 mL of Ecocount Ultra liquid scintillation cocktail. The standard verification vials and background source were dark adapted for at least two hours and counted on LSCBROWN for H-3 source standard verification. The H-3 efficiency calibration which was used for verification calculations was performed on 5/13/2013 using H-3 source 1583-A.

Standard results for each verification source was calculated as follows:

$$\text{Source dpm/mL} = (A - B)/(C)(D)$$

where:  
 A = Ver. source cpm,  
 B = BKG cpm,  
 C = System efficiency (cpm/dpm), and  
 D = volume used for standard verification.

RAD-M-001

*Handwritten signature and date:*  
 [Signature] 6/3/13

**General Engineering Laboratories  
Verification Source Preparation Sheet**

Applicable SOP Number GL-RAD-A-002 Isotope H-3  
 Date Standards Prepared 7/16/13 Cocktail Type Used Ecoscint Ultra  
 Standard ID 1629-A Matrix of Vial/Planchett 10ml Dead water  
13ml Ecoscint Ultra  
 Amount Used (g or ml) 0.5  
 Standard Activity (DPM/g or ml) 22010.4628 Type of Scintillation Vial Plastic  
 Reference Date 12/13/12 Pipette ID Used 3158763  
 Expiration Date <sup>HP 7/21/13</sup> 6/15/14 5/13/14 Balance ID Used NA  
 Residue/Carrier Agent NA Quenching Agent Core. Brown Colorant

Standard Number	Quenching Vol (uL)
1	0
2	36
3	60
4	90
5	120
6	150
7	180
8	210
9	240
10	270
11	300

Prepared By:

[Signature]

Date:

7/16/13

Reviewed By:

[Signature]

Date:

7/31/13

H-3

CAL or VER  
Date: 6/20/13

Efficiency Standard Precision Check

Rack	Time (min.)	CPM Isol	Within +/- 5% mean
13-2	1	2024.00	YES
13-3	1	1922.00	YES
13-4	1	1888.00	YES
13-5	1	1908.00	YES
13-6	1	1995.00	YES
13-7	1	2003.00	YES
13-8	1	2019.00	YES
13-9	1	1936.00	YES
13-10	1	2050.00	YES
13-11	1	1932.00	YES
13-12	1	1961.00	YES

-5% Mean	Mean	+5% Mean
1868.74	1967.09	2065.45

H-3 Ver

ID # TOTAL ACTIVITY 17 JUL 2013 09:38  
 USER: 11 COMMENT: GOLD  
 PRESET TIME : 1.00  
 DATA CALC : CPM HW : YES SAMPLE REPEATS: 1 PRINTER : STD  
 COUNT BLANK : NO IC# : NO REPLICATES : 1 RS232 : EDIT  
 TWO PHASE : NO AGC : NO CYCLE REPEATS : 1 DISK : OFF  
 SCINTILLATOR: LIQUID LUMEX: YES LOW SAMPLE REJ: 0  
 LOW LEVEL : NO HALF LIFE CORRECTION DATE: none

CHAN: 0.0 - 990.0 %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0  
 CHAN: 0.0 - 1000.0 %ERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0

SAM NO	POS	TIME MIN	HM	WIND 1		WIND 2		LUMEX %	ELAPSED TIME
				CPM	%ERROR	CPM	%ERROR		
1	13-1	1.00	124.3	39.00	32.03	40.00	31.62	1.47	1.48
2	13-2	1.00	124.9	2024.00	4.45	2027.00	4.44	0.03	3.38
3	13-3	1.00	124.9	1922.00	4.56	1924.00	4.56	0.03	5.32
4	13-4	1.00	124.6	1888.00	4.60	1888.00	4.60	0.03	7.24
5	13-5	1.00	125.2	1908.00	4.58	1911.00	4.58	0.03	9.17
6	13-6	1.00	125.7	1995.00	4.48	1997.00	4.48	0.03	11.09
7	13-7	1.00	125.7	2003.00	4.47	2004.00	4.47	0.03	13.05
8	13-8	1.00	126.0	2019.00	4.45	2021.00	4.45	0.03	14.97
9	13-9	1.00	124.6	1936.00	4.55	1941.00	4.54	0.03	16.90
10	13-10	1.00	125.7	2050.00	4.42	2056.00	4.41	0.03	18.83
11	13-11	1.00	126.0	1932.00	4.55	1937.00	4.54	0.03	20.80
12	13-12	1.00	125.0	1961.00	4.52	1962.00	4.52	0.03	22.73

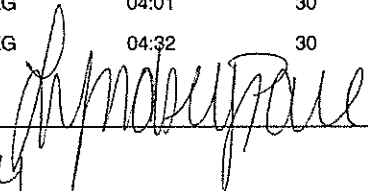
# **Continuing Calibration Data**



# Liquid Scintillation Counter Checks for 06-JAN-2014

Short Name	Parmname	Run Time	Count Time	Counts	CPM	Stdev	Status	Comments
LSCBLUE	Carbon-14	04:03	.4		113323	-1.6		
	Carbon-14	04:04	.4		113298	-1.7		
	Tritium	04:05	.3		151363	-1.6		
	Tritium	04:05	.35		150728	-2.4		
	BKG	04:06	30		24	0.07		
	BKG	04:37	30		23	-0.7		
LSCGOLD	Carbon-14	03:59	.35		124146	0.07		
	Carbon-14	03:59	.35		124655	0.87		
	Tritium	04:00	.35		133707	-2.2		
	Tritium	04:01	.35		134938	-0.5		
	BKG	04:02	30		21	1.38		
	BKG	04:33	30		19	-0.29		
LSCGRAY	Carbon-14	03:55	1.3		130124	-0.52		
	Carbon-14	03:57	1.3		130052	-0.73		
	Tritium	04:00	1.35		146693	-1.1		
	Tritium	04:02	1.35		146948	-0.41		
	BKG	04:04	30		13	-0.64		
	BKG	04:35	30		13	-0.85		
LSCGREEN	Carbon-14	04:04	.4		114080	-1.1		
	Carbon-14	04:05	.35		114491	-0.38		
	Tritium	04:06	.3		162820	0.03		
	Tritium	04:06	.3		163091	0.46		
	BKG	04:07	30		28	1.64		
	BKG	04:38	30		26	0.15		
LSCORANGE	Carbon-14	04:42	1.012433		98005	-1.1		
	Tritium	04:45	1.012433		130438	-1.2		
	BKG	05:18	30.01243		11	-1		
	Carbon-14	05:19	1.012433		98722	1.01		
	Tritium	05:21	1.012333		131261	0.92		
	BKG	05:51	30.01243		11	-1.1		
LSCPINK	Carbon-14	04:26	1.01245		118627	-2.6		
	Tritium	04:29	1.012433		143373	1.16		
	BKG	05:02	30.01243		8.6	0.13		
	Carbon-14	05:03	1.01245		119414	0.05		
	Tritium	05:05	1.012333		142763	-0.07		
	BKG	05:35	30.01243		8.94	0.74		
LSCRED	Carbon-14	04:02	.35		115022	0.04		
	Carbon-14	04:02	.35		115319	0.54		
	Tritium	04:03	.3		167168	-0.66		
	Tritium	04:04	.3		167873	0.08		
	BKG	04:05	30		27	0.43		

	BKG	04:36	30	29	1.89
LSCSILVER	Carbon-14	04:02	.35	121081	0.45
	Carbon-14	04:03	.35	120998	0.31
	Tritium	04:03	.3	163752	-0.06
	Tritium	04:04	.3	162689	-1.3
	BKG	04:05	30	26	-0.5
	BKG	04:36	30	25	-1.2
LSCTEAL	Carbon-14	04:15	1.333	130484	-1.1
	Carbon-14	04:18	1.333	130164	-2.1
	Tritium	04:20	1.283	153905	-2.8
	Tritium	04:22	1.283	154693	-1.2
	BKG	04:24	30	15	-0.12
	BKG	04:55	30	17	1.57
LSCYELLOW	Carbon-14	03:52	1.467	114809	0.64
	Carbon-14	03:54	1.467	114775	0.54
	Tritium	03:57	1.25	153155	-0.56
	Tritium	03:59	1.267	152625	-1.8
	BKG	04:01	30	15	0.08
	BKG	04:32	30	15	-0.43

Reviewed by 

Date 1/6/14

GEL Laboratories LLC




**Liquid Scintillation Counter Checks for 07-JAN-2014**

Short Name	Parmname	Run Time	Count Time	Counts	CPM	Stdev	Status	Comments
LSCBLUE	Carbon-14	06:02	.4	114498	0.85			
	Carbon-14	06:03	.4	113810	-0.32			
	Tritium	06:04	.3	151833	1.26			
	Tritium	06:05	.35	149890	-1.7			
	BKG	06:06	30	22	-0.72			
	BKG	06:37	30	22	-0.43			
LSCGOLD	Carbon-14	00:40	.35	124823	1.14			
	Carbon-14	00:40	.35	124743	1.01			
	Tritium	00:41	.35	134532	-1.1			
	Tritium	00:42	.35	134707	-0.82			
	BKG	00:43	30	18	-1.8			
	BKG	01:14	30	19	-0.63			
LSCGRAY	Carbon-14	01:56	1.317	129978	-0.95			
	Carbon-14	01:58	1.317	129777	-1.5			
	Tritium	02:01	1.35	146674	-1.2			
	Tritium	02:03	1.35	146257	-2.3			
	BKG	02:05	30	13	-0.43			
	BKG	02:36	30	14	-0.12			
LSCGREEN	Carbon-14	04:25	.35	114425	-0.5			
	Carbon-14	04:26	.35	114333	-0.67			
	Tritium	04:26	.3	161755	-1.6			
	Tritium	04:27	.3	163041	0.38			
	BKG	04:28	30	26	0.15			
	BKG	04:59	30	26	-0.2			
LSCORANGE	Carbon-14	05:03	1.012433	98123	-0.76			
	Tritium	05:06	1.012433	131607	1.8			
	BKG	05:39	30.01243	12	0.36			
	Carbon-14	05:40	1.012433	97886	-1.5			
	Tritium	05:42	1.012433	130324	-1.5			
	BKG	06:12	30.01243	11	-0.26			
LSCPINK	Carbon-14	05:08	1.01245	118500	-3			
	Tritium	05:12	1.012433	142451	-0.71			
	BKG	05:44	30.01243	8.13	-0.7			
	Carbon-14	05:45	1.01245	119423	0.08			
	Tritium	05:47	1.012333	143506	1.43			
	BKG	06:17	30.01243	8.97	0.79			
LSCRED	Carbon-14	07:42	.35	114682	-0.54			
	Carbon-14	07:43	.35	115211	0.36			
	Tritium	07:44	.3	167673	-0.13			
	Tritium	07:44	.3	169023	1.27			
	BKG	07:46	30	27	-0.22			

	BKG	08:16	30	27	0.31
LSCSILVER	Carbon-14	04:32	.35	120761	-0.06
	Carbon-14	04:33	.35	120924	0.2
	Tritium	04:34	.3	162047	-2
	Tritium	04:35	.3	161886	-2.2
	BKG	04:36	30	27	0.43
LSCTEAL	BKG	05:06	30	25	-1.1
	Carbon-14	02:06	1.3	130734	-0.22
	Carbon-14	02:08	1.3	130522	-0.93
	Tritium	02:11	1.283	154764	-1.1
	Tritium	02:13	1.283	153986	-2.7
LSCYELLOW	BKG	02:15	30	15	-0.64
	BKG	02:46	30	14	-2.5
	Carbon-14	04:12	1.467	114810	0.65
	Carbon-14	04:14	1.467	114711	0.34
	Tritium	04:17	1.25	153321	-0.18
	Tritium	04:19	1.25	154119	1.63
	BKG	04:21	30	15	-0.68
BKG	04:52	30	14	-1.7	

Reviewed by *Armando Pave*

Date 1/7/14

GEL Laboratories LLC

# Runlogs

# Instrument Run Log

Instrument Type: LSC

Batch ID: 1356537

Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
339804001	SAMPLE	MYM1	LSCGOLD	JAN-07-14 08:18:48	DONE	14mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	25-JUN-13 00:00
1203011105	MB	MYM1	LSCGOLD	JAN-07-14 08:45:42	DONE	14mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	25-JUN-13 00:00
1203011106	DUP	MYM1	LSCGOLD	JAN-07-14 09:12:36	DONE	14mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	25-JUN-13 00:00
1203011107	MS	MYM1	LSCGOLD	JAN-07-14 09:39:23	DONE	14mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	25-JUN-13 00:00
1203011108	LCS	MYM1	LSCGOLD	JAN-07-14 10:06:17	DONE	14mL Ecoscint GL/5mL DI H2O/AG 1x8 Resin	25-JUN-13 00:00

# Instrument Run Log

Instrument Type: LSC

Batch ID: 1357134

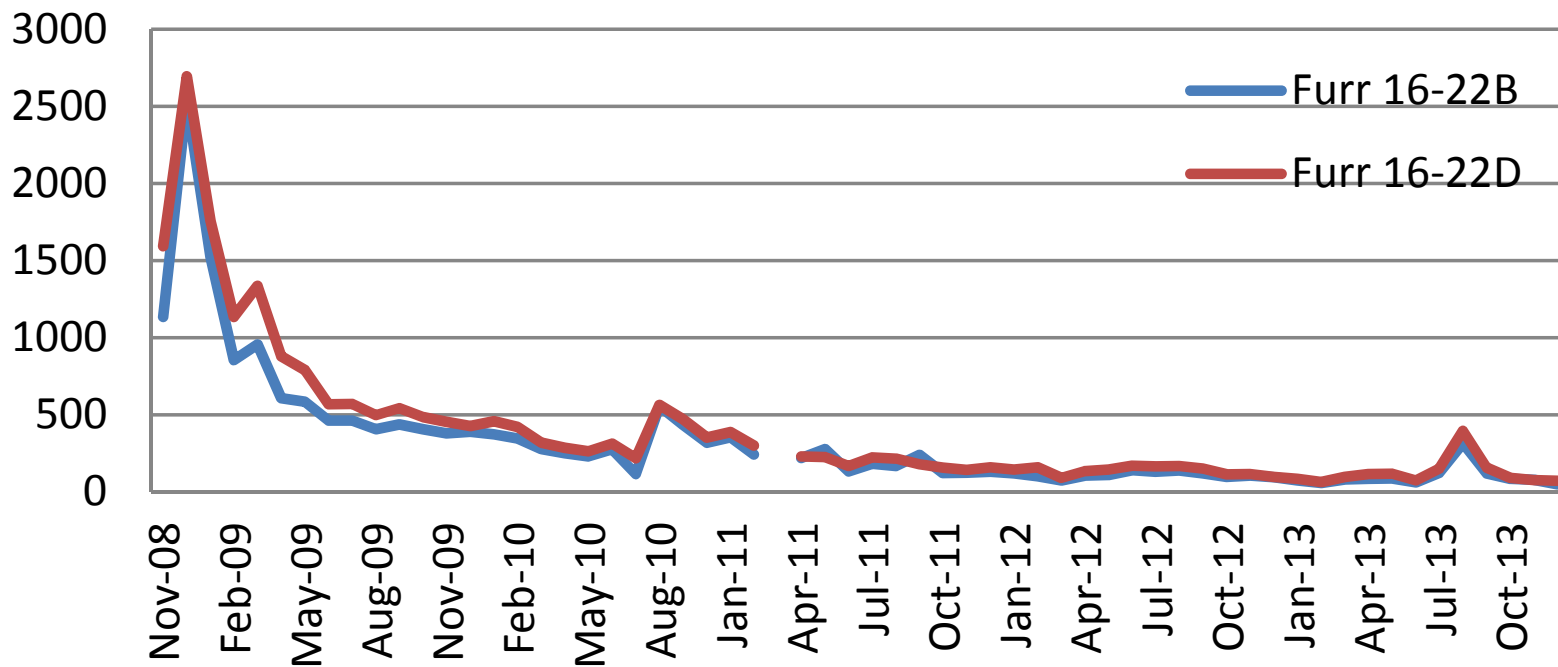
Sample ID	Sample Type	Analyst	Instrument	Run Date	Status	Geometry	Calibration Date
339804001	SAMPLE	BYS1	LSCGRAY	JAN-06-14 15:18:00	DONE	10mL DW/13mL Ecoscint Ultra	01-AUG-13 00:00
1203012727	MB	BYS1	LSCGRAY	JAN-06-14 15:34:00	DONE	10mL DW/13mL Ecoscint Ultra	01-AUG-13 00:00
1203012728	DUP	BYS1	LSCGRAY	JAN-06-14 15:50:00	DONE	10mL DW/13mL Ecoscint Ultra	01-AUG-13 00:00
1203012729	MS	BYS1	LSCGRAY	JAN-06-14 16:06:00	DONE	10mL DW/13mL Ecoscint Ultra	01-AUG-13 00:00
1203012730	LCS	BYS1	LSCGRAY	JAN-06-14 16:22:00	DONE	10mL DW/13mL Ecoscint Ultra	01-AUG-13 00:00

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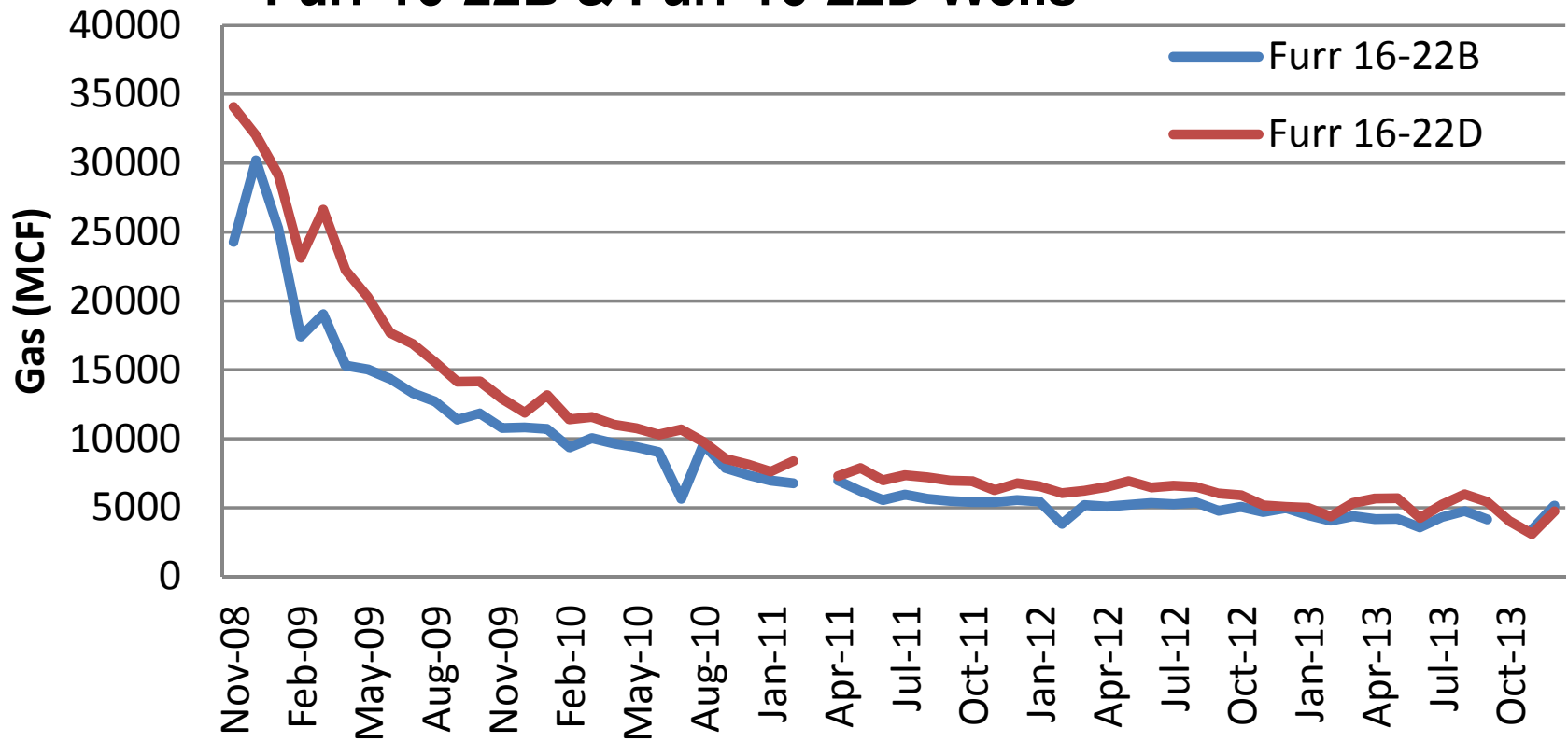
**APPENDIX C**  
**FURR 16-22B WELL**  
**PRODUCTION DATA**

## Produced Water Production Per Month Furr 16-22B & Furr 16-22D Wells

Produced Water Disposed (Barrels)

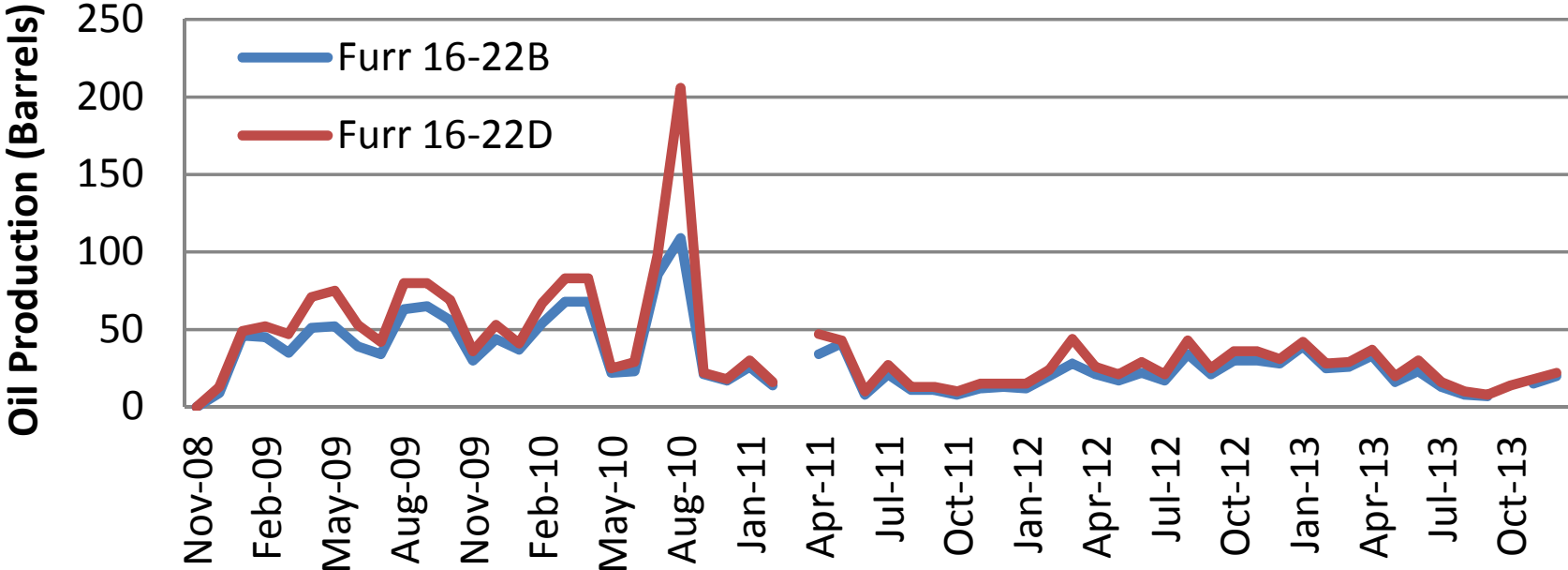


## Gas Production Data Per Month Furr 16-22B & Furr 16-22D Wells





# Oil Production Data Per Month Furr 16-22B & Furr 16-22D Wells



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**APPENDIX D**  
**DATA VERIFICATION AND**  
**VALIDATION REPORT**

**DIANE SHORT & ASSOCIATES, INC.**

1978 S. Garrison St. # 114  
Lakewood CO 80227  
303:271-9642 Fax 988-4027  
dsa7cbc@eazy.net

**RADIOCHEMISTRY DATA QUALITY REVIEW REPORT**  
**Gas Flow Proportional Counting (GFPC) and Liquid Scintillation (LSC)**  
**Tritium Analysis in Gas by Combustion followed by LSC**  
**Carbon-14 Analysis in Gas by Combustion followed by LSC**

SDG: GEL: 339804  
ISOTECH: 23895, 23896

PROJECT: Piceance Energy, a subsidiary of Laramie Energy II , Olsson Project #: 012-1919

LABORATORY: GEL Laboratories, LLC, Charleston, South Carolina; IsoTech Laboratories ,  
Champaign, Illinois for Tritium in water and tritium and C-14 in gas (C-14 analysis subcontracted  
to Beta Analytic, Miami, Florida)

SAMPLE MATRIX: Water, Gas SAMPLING DATE (Mo/Yr): 12/19/2013

NO.SAMPLES: 1 (for tritium, 1 gas sample and 1 water sample)

ANALYSES REQUESTED: GEL: GFPC for Ci-36, gross alpha/beta, and Sr-90; LSC for Tc-99,  
LSC for tritium; IsoTech: LCS for tritium and C14 in water and gas

SAMPLE NUMBERS: Furr 16-22B

DATA REVIEWER: John Huntington

QA REVIEWER: Diane Short & Associates, Inc. INITIALS/DATE: DLS 5/6/14

Telephone Logs included Yes \_\_\_ No X

Contractual Violations Yes \_\_\_ No X

The project Quality Assurance Project Plan (QAPP), the EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, 2004, the laboratory Standard Operating Procedure (SOP), and the EPA Radiochemistry Methods (current updates) have been referenced by the reviewer to perform this data validation review. The review includes evaluation of calibration, holding times and QC for all samples and a 10% review of the calculation algorithms. General comments regarding the data/ analytical quality are part of the review when raw data are submitted. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of the project Manager.

## **I. DELIVERABLES**

1. All deliverables were present as specified in the Statement of Work (SOW) or in the project contract.

Yes \_\_\_ No X

The following is noted:

C-14 QC: Beta Analytic does not provide full raw data sets, which is an incomplete deliverable per the project. The request has been made of the laboratory to provide the data and the request has not been met. They do provide standards on which they state that their results are based. Without the raw data, it is not possible to perform the required authentication of the sample data to the laboratory QC and final data results. While this does not invalidate the data, it means that the C-14 validation cannot be validated at the requested level IV. All the standards provided are within acceptance limits.

GEL also performed tritium analysis on water samples. The GEL data packages include standard certifications, quench curves, spectrum plots, and all raw data.

The IsoTech packages do not contain the same level of information as GEL, but do include count data, standard data, and detailed calculations. The package also contains efficiency determination data, and the package meets the requirements for the purposes of validation.

## **II. ANALYTICAL REPORT FORMS**

1. The Analytical Report or Data Sheets are present and complete for all requested analyses.

Yes X No \_\_\_

2. Holding Times

A. The contract holding times were met for all analyses.

Yes X No \_\_\_

B. Samples were properly preserved, or applicable preservative was used.

Yes X No \_\_\_

3. Chains of Custody (COC)

A. Chains of Custody (COC) were reviewed and all fields were complete, signatures were present and cross outs were clean and initialed.

Yes X No \_\_\_

## **III. CALIBRATION AND STANDARDIZATION**

1. Daily counting efficiency (Base Efficiency) for all methods was achieved.

Yes X No \_\_\_ NA \_\_\_

2. The calibration data include a plot of the counting efficiency obtained versus the various weights of salts spiked with a known DPM of the standard; The “best fit” curve or a computer fit equation with the estimated standard deviation meet the method calibration criteria. At least one complete self-absorption curve exists for one detector per array and the efficiency for the standard curve of  $\geq$

3 standards agree within 95% confidence level.

Yes  No  NA

3. Reliability of the daily QC check standards are within a 2 to 3 sigma control limit of the mean count of long term counting

Yes  No  NA

4. The most recent background count duration is at least as long as the sample duration and this background total is within 99% confidence level or 2 to 3 sigma of the average of the last ten background checks on that detector.

Yes  No  NA

5. The attenuation was with the (beta x r2) limits as appropriate to the method.

Yes  No  NA

6. There is documentation to verify that the standards are NIST traceable or the equivalent.

Yes  No  NA

7. Quench factors were reported and noted as acceptable.

Yes  No  NA

#### **IV. DETECTION AND REPORTING LIMITS**

1. Minimal detection concentrations (MDC) with efficiencies were established for all analytes every six months or whenever a significant background or instrument response is expected (e.g., detector change).

Yes  No  NA

2. The laboratory reported the results with uncertainties that included all uncertainties associated with the preparation and analytical procedures.

Yes  No

Samples where uncertainties are greater than the result or the result has been reported as estimated "J" may have unrealistically low MDC values. The uncertainties are multiplied by 1.65. If the result is greater than the reported MDC, the isotope has been qualified UJQ for an unrealistically low MDC. If the value calculated is less than the reported MDA, the activity result is qualified JQ estimated below the MDC.

No such instances are observed and no qualifiers are applied.

Gross Alpha and Beta: There were no detections observed for gross alpha or gross beta. The reporting limit is elevated due to matrix effects. The samples contain high TDS and the total weight must be kept to a level within the calibration range. This limits the sample size and therefore the reporting limit.

Tritium and C-14: Tritium analysis was conducted by both IsoTech and GEL laboratories on water samples. The GEL results are reported in pCi/L and the IsoTech results are reported in TU (tritium units). For water, 1 TU is 3.231 pCi/L. After conversion, the GEL results have significantly higher reporting limits, but they are consistent with the results from IsoTech.

Uncertainties are not included in the reports from IsoTech laboratories. However, the raw data provides the uncertainties and the review has been conducted using that information.

**V. MATRIX SPIKE**

1. Matrix spike (MS) was analyzed for every analysis performed and for every 20 samples or for every matrix whichever is more frequent.

Yes  No

The following MS/MSDs were conducted. For the gross alpha/beta analysis, an MS/MSD was conducted, but it was on a sample from a different SDG. For the other methods, a matrix spike was conducted plus a sample duplicate.

SDG	Method	Client Sample ID	Lab Sample ID
339804	EPA 905.0 Modified (Sr-90)	Furr 16-22B	339804001
339804	EPA 906.0 Modified (Tritium)	Furr 16-22B	339804001
339804	E EML HASL-300, Tc-02-RC Modified	Furr 16-22B	339804001

Although not all methods were spiked in this sample set, the recommended frequency of matrix spikes has been met.

IsoTech: IsoTech has not provided matrix spike results for tritium or C-14 analysis.

2. The MS percent recoveries were within the limits defined in the contract or a guidance limit of 75-125%.

Yes  No

For those noted above.

3. The samples used for qualification are client samples.

Yes  No

**VI. MATRIX DUPLICATE**

1. The matrix spike duplicate relative percent difference of the percent recoveries were within the limits defined in the contract or the CLP 20% for water and 35% for soil, or  $\pm$  RL for results  $< 5 \times$  RL ( $\pm 2 \times$  RL for soils).

Yes  No  NA

Matrix duplicates, not matrix spike duplicates, were analyzed using the same samples as were used for the matrix spikes. In the case of gross alpha and beta, a matrix spike duplicate was analyzed. All were in control. No qualifiers are added.

IsoTech: IsoTech has not provided duplicate results for tritium analysis.

B. Or met the Duplicate Error Ratio (DER) criteria calculations which account for the 2 sigma efficiency values. DER limit is 1.

Yes \_\_\_ No \_\_\_ NA \_\_\_X\_\_\_

## VII. LABORATORY CONTROL SAMPLE

1. Laboratory Control Sample (LCS) was analyzed for every analysis performed and for every 20 samples or for every matrix, whichever is more frequent

Yes \_\_\_X\_\_\_ No \_\_\_

IsoTech data includes NIST standards run with each sample run. These are all in control.

2. The LCS %R for each analyte (background corrected) met the established control limits or the method limits of 75-125%.

Yes \_\_\_X\_\_\_ No \_\_\_

3. The LCSD %R for each analyte (background corrected) met the established control limits or the method limits of 75-125%.

Yes \_\_\_ No \_\_\_ NA \_\_\_X\_\_\_

LCSDs are not reported.

4. The duplicate relative percent difference of the percent recoveries were within the limits.

Yes \_\_\_ No \_\_\_ NA \_\_\_X\_\_\_

## VIII. BLANKS

1. Low-level activities of isotopes were reported for laboratory preparation blanks and met the MDC or background CPM criteria

Yes \_\_\_X\_\_\_ No \_\_\_

For LSC methods, the MDC of the prep blank shall be less than the calibration MDC or the sample MDC whichever is reported. If all sample results in a batch are reported as detected, then the prep blank MDC must be less than the activity of the lowest MDC in the batch.

For the GFPC methods, if a sample activity is  $< 5 \times \text{MDC}$ , the activity of the prep blank shall be equivalent to zero when the measurement uncertainty is considered or shall be less than the MDC. If the sample activity is  $> 5 \times \text{MDC}$ , the activity of the prep blank shall be equivalent to zero when the measurement uncertainty is considered. This is determined from the Normalized Absolute Difference (NAD).

The impact of the blank contamination may be evaluated where appropriate by calculating the Normalized Absolute Difference (NAD) for the Method Blank and subsequent evaluation criteria as defined in the Army Corp. guidance section III and elsewhere. When the NAD is found to be greater than 1.96 but less than 2.58, the sample results are qualified JMB# where # represents the isotopes blank activity. Such results are considered to be estimated and possibly undetected values due to the presence of blank contamination.

GEL, gross alpha/beta: The raw data provides all of the necessary information to evaluate the method blanks. The measurement uncertainty is less than the MDC and the sample results are all < 5x MDC. No qualifiers are required.

GEL, Sr-90: Sample results are all non-detects and the method blank raw results are less than MDC. No qualifications are required.

GEL, Tc-99: Sample results are all non-detects and the method blank raw results are less than MDC. No qualifications are required.

IsoTech: Blanks are present in each run of samples and are within acceptance windows.

Beta Analytic (C-14 analysis): Background levels reported are within acceptance limits.

2. The cross talk summary was acceptable and indicated no interferences

Yes  No  NA

These are provided only for samples submitted to Gel Laboratories.

This is not applicable to the tritium analysis.

## IX. CHEMICAL YIELD SUMMARY

Chemical Yield (Tracer) Summary was analyzed to monitor the accuracy of percent samples recoveries and the percent recoveries were within the control limits.

Yes  No  NA

GEL: Chemical yield recoveries are reported Sr-90 and Tc-99. The recoveries reported are within limits.

Beta Analytic: The C-14 analysis proceeds by first converting all carbon to carbon dioxide, reducing the carbon dioxide to benzene, and determining the C-14 content by LSC. In this process the purity of the benzene is determined (the method for this is not specified). This information has not been provided in this data set.

## X. FIELD QC

A. If Field duplicates or Performance Check Compounds were identified, they met the RPD or % recovery criteria for the project. Guidelines of 35% RPD for water were used unless the reported results are < 5 x Reporting Limit (RL) in which case 2 x RL difference is acceptable.

Yes  No  NA

No field duplicates were present.

B. For low level data, the following DER calculations can be applied.

The Normalized Absolute Difference for isotopes with activities  $\leq 5X$  the MDC is considered for data validation rather than the Relative Percent Difference (RPD). If the NAD calculated is  $1.96 < x > 3.29$  the results for all samples have been qualified JD# where # represents the NAD calculated. If the NAD calculated were greater than 3.29 the results would be rejected. If the results are less than 1.96 no qualification has been made. Where results are greater than 5X the MDC the RPD is considered for data validation.

Yes  No  NA

## XI. CALCULATIONS



The calculation algorithm has been checked for 10% of the submitted data packages and accuracy of the reported results is verified.

Yes  No  NA

The calculations for the samples are provided in detail as printouts of the spreadsheets used. The calculations can be followed step-by step to reach the final result, both for counts and counting error calculations.

## **XII. OVERALL ASSESSMENT OF THE CASE**

The data are considered fully useable for project purposes with consideration of the qualifications or comments.

### Deliverables

The following is noted:

C-14 QC: Beta Analytic does not provide full raw data sets, which is an incomplete deliverable per the project. The request has been made of the laboratory to provide the data and the request has not been met. They do provide standards on which they state that their results are based. Without the raw data, it is not possible to perform the required authentication of the sample data to the laboratory QC and final data results. While this does not invalidate the data, it means that the C-14 validation cannot be validated at the requested level IV. All the standards provided are within acceptance limits.

GEL also performed tritium analysis on water samples. The GEL data packages include standard certifications, quench curves, spectrum plots, and all raw data.

The IsoTech packages do not contain the same level of information as GEL, but do include count data, standard data, and detailed calculations. The package also contains efficiency determination data, and the package meets the requirements for the purposes of validation.

### Matrix Spikes

The following MS/MSDs were conducted. For the gross alpha/beta analysis, an MS/MSD was conducted, but it was on a sample from a different SDG. For the other methods, a matrix spike was conducted plus a sample duplicate.

<b>SDG</b>	<b>Method</b>	<b>Client Sample ID</b>	<b>Lab Sample ID</b>
339804	EPA 905.0 Modified (Sr-90)	Furr 16-22B	339804001
339804	EPA 906.0 Modified (Tritium)	Furr 16-22B	339804001
339804	E EML HASL-300, Tc-02-RC Modified	Furr 16-22B	339804001

Although not all methods were spiked in this sample set, the recommended frequency of matrix spikes has been met.

IsoTech: IsoTech has not provided matrix spike results for tritium or C-14 analysis.

**RADIOCHEMISTRY QUALITY REVIEW REPORT  
GAMMA SPECTROMETRY**

SDG: 339804

PROJECT: Piceance Energy, a subsidiary of Laramie Energy II , Olsson Project #: 012-1919

LABORATORY: GEL Laboratories, LLC, Charleston, South Carolina

SAMPLE MATRIX: Water

SAMPLING DATE (Mo/Yr): 12/19/2013

NO.SAMPLES: 1

ANALYSES REQUESTED: Ac-228, Ag-110m, Am-241, Ba-133, Ba-140, Be-7, Bi-212, Bi-214, Ce-139, Ce-141, Ce-144, Co-56, Co-57, Co-58, Co-60, Cr-51, Cs-134, Cs-136, Cs-137, Eu-152, Eu-154, Eu-155, Fe-59, Fe-59, Hg-203, K-40, Kr-85 (dropped from list in November sampling), Mn-54, Na-22, Nb-94, Nb-95, Nd-117, Np-239, Pb-210, Pb-212, Pb-214, Pm-144, Pm-146, Ra-228, Ru-106, Sb-124, Sb-125, Sn-113, Th-230, Th-234, Tl-208, U-235, U-238, Y-88, Zn-65, Zr-95

SAMPLE NUMBERS: Furr 16-22B

DATA REVIEWER: John Huntington

QA REVIEWER Diane Short & Associates, Inc.      Initials/ Date      DLS 5/6/14

Telephone Logs included      Yes \_\_\_ No X

Contractual Violations      Yes \_\_\_ No X

The project Quality Assurance Project Plan (QAPP), the EPA Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses, (SOP), the EPA method 901.1 and the Paragon Standard Operating Procedure SOPS noted in the report have been used by the reviewer to perform this data validation review. Only a limited number of the Data Validation QC items apply to radiochemical analyses. The remaining QC items have been taken from the Paragon Method QC. The EPA qualifiers have been expanded to include a descriptor code and value to define QC violations and their values, per the approval of EPA. All chains of custody, calibrations, QC Forms have been validated and qualifiers added from the QC data on the Forms and an overview of the raw data.

## **I. DELIVERABLES**

A. All deliverables were present as specified in the Statement of Work (SOW) or in the project contract.

Yes  No

The following is noted:

The GEL Laboratories data package included raw data, and at client request a level IV review was conducted. The method used is EPA 901.1.

B. The Analytical Report or Data Sheets are present and complete for all requested analyses.

Yes  No

## **II. INSTRUMENTATION**

A. The detector range is appropriate for the samples being analyzed.

Yes  No  NA

B. The system resolution peak is within the 1332 KeV range for Co-60.

Yes  No  NA

C. The resolution is within the 3 KeV range for Co-60.

Yes  No  NA

## **III. STANDARDS**

A. Standards were NIST traceable or equivalent.

Yes  No  NA

Certificates were provided for all standards used, as well as calibration logs and raw data.

B. Standards for efficiency checks are counted at least once a month for each detector.

Yes  No  NA

C. The check source standard has not shifted more than 2 channels from the centroid position.

Yes  No  NA

This is documented in the calibration portion of the data package.

D. Samples are counted for a duration long enough to achieve the RDL.

Yes  No  NA

E. Background counts for the same duration as the sample runs are submitted and acceptable.

Yes  No  NA

This is provided for each sample in the raw data section.

F. Each standard is measured for peak resolution as full-width at half-maximum height (FWHM) and absolute counting efficiency and all center column readings (bounds test) "Pass".

Yes  No  NA

G. The MDA was checked for 10% of the samples and is  $\leq$  RDL.

Yes  No

## **IV. BLANKS**

A. The method blank was analyzed at the required frequency.

Yes  No

B. And the results were within the required control limits. When average blanks or instrument background is subtracted to determine net counts, the net blank must be  $< 2$  sigma uncertainty.

Yes  No  NA

GEL: All results are reported as ND. No blank corrections are required.

B. Field Blanks are identified and results are below the detection limit or  $< 2$  x IDL.

Yes  No  NA

No field blank is identified.

## V. SPIKE SAMPLE RECOVERY

A. A matrix (pre-digestion) spike sample was analyzed for each digestion group and/ or matrix or as required in the SOW.

Yes  No

No MS was prepared. The laboratory has not commented about the reason.

The spiking of the large sample size (~500g) required for these analyses usually prohibits the spiking of radioactive compounds. The acceptable QC sample for accuracy for this analysis is the Laboratory Control Sample (LCS).

And the Matrix spike percent recoveries were within the required control limits of 75 – 125%

Yes  No  NA

## VI. DUPLICATES

A. Matrix (pre-digestion) duplicate samples were analyzed at the required frequency.

Yes  No

B. And met the Duplicate Error Ratio (DER) criteria calculations which account for the 2 sigma efficiency values. DER limit is 1.0 (the DOE limit is 1.42)

Yes  No

The laboratory uses relative percent difference (RPD) to compare duplicate results. The duplicate error ratio (DER) is not provided in the report. In fact, the laboratory uses DER to refer to a data exception report. Historically, the DER was provided in the Excel file normally submitted by GEL. The purpose of the RPD is also to evaluate precision for duplicates, but the criteria are different. The laboratory uses  $\pm 20\%$  (should be  $< 20\%$  RPD) as the criterion for RPD. The laboratory does refer to the relative error ratio (RER) in the Case Narrative, which is functionally the same as the DER. The laboratory requires the RER to be  $< 3$ .

In this case, there are three RPD outliers. Bi-214 has an RPD of 116%. Lead-214 has an RPD of 47.2%, and potassium-40 has an RPD of 92.4%. The laboratory has flagged the duplicate result for potassium-40 as UI, and indicated in the narrative that there was not a valid peak for it in the duplicate. For Bi-214 the laboratory has noted a bias in the duplicate due to evolution of Radon. For lead-214, the RPD limits imposed by the laboratory are 0-110%. No discussion of the lead result is provided. No qualifiers have been added to lead-214 since it meets the DER limit (see below).

Some analytes in addition to these did not meet the DER limit, as shown below. The non-detected results are acceptable since they are non-detects in both duplicate and parent. All are non-detects and no qualifiers are applied, with the exception of K-40, which the laboratory

indicates has no valid peak in the duplicate run and is rejected, and with the exception of Bi-214, which fails the criterion and also fails the RPD specification followed by the laboratory, with an RPD of 116%. The laboratory indicates that this occurred because of the release of radon gas. The result for both sample and duplicate is qualified ad JMD116, indicating that it is outside the normal window for the RPD.

Samp_ID	Lab_ID	Parameter	Conc	QAQC_Flag	RL	MDC	Count_error	Units	DER
FURR 16-22B	1203009339	Am-241	-3.15	U	19.5	19.5	11.3	pCi/L	2.16148
FURR 16-22B	1203009339	Bi-214	9.78	U	10.3	10.3	9.67	pCi/L	3.62034
FURR 16-22B	1203009339	Co-60	1.85	U	6.05	6.05	2.75	pCi/L	2.14375
FURR 16-22B	1203009339	Cs-137	-1.2	U	6.03	6.03	3.46	pCi/L	1.78113
FURR 16-22B	1203009339	K-40	0	UI	38.3	38.3	34	pCi/L	3.3758
FURR 16-22B	1203009339	Nb-94	1.72	U	5.53	5.53	2.85	pCi/L	1.52478
FURR 16-22B	1203009339	Pm-144	-2.69	U	4.22	4.22	2.67	pCi/L	1.66627

C. If suspected "hot particles" were found, were samples re-analyzed.

Yes\_\_\_ No \_\_\_ NA\_X\_\_

No hot particles found, sample results low or BDL.

## VII. LABORATORY CONTROL SAMPLE

A. An LCS was analyzed at the required frequency.

Yes \_\_X\_\_ No\_\_\_

The laboratory used a subset of the nuclide target list in the LCS. Am-241, Co-60, and Cs-137 were spiked.

B. The LCS was within a control limit of 80-120% for water and 70 – 130% for soil.

Yes \_\_X\_\_ No\_\_\_

C. The LCS uncertainty calculation verifies that the observed value of the LCS is within 3 sigma control limits of the expected LCS value and the relative percent error does not exceed 5 %.

Yes \_\_X\_\_ No\_\_\_

## VIII. DETECTION LIMITS and SAMPLE IDENTIFICATION

A. Detection limits met the method limits.

Yes \_\_X\_\_ No\_\_\_

The instrument detection limit was within an isotope-specific limit for the calibration standards and QC samples.

B. The energy of the identified peaks are within 2 KeV of the library energy of the radionuclide.

Yes \_\_X\_\_ No\_\_\_ NA\_\_\_

C. Decay-corrected results have been reported appropriately for the short half-life results

Yes \_\_X\_\_ No\_\_\_ NA\_\_\_

D. Sample Identifications are accurate.

Yes\_\_\_ No\_\_X\_\_

The laboratory has flagged the sample duplicate result for K-40 with UI because there was no valid peak observed, and indicates in the EDD that the result is rejected. The result is

qualified as R to indicate that it should not be used. The result for the parent sample itself is usable.

Samp_ID	Lab_ID	Parameter	Conc	QAQC_Flag	RL	MDC	Count_error	Units	DVAL
FURR 16-22B	1203009339	K-40	0.00	UI	38.3	38.3	34	pCi/L	R

**E. Tentatively Identified Radionuclides (TIR)**

TIRs were reported and correctly identified from the library search.

Yes \_\_\_ No \_\_\_ NA X

No TIRs are reported or requested.

**IX. PREPARATION AND ANALYSIS LOGS**

A. All samples were prepared or analyzed within the required holding times referencing the SOW (time of sample receipt to preparation/distillation).

Yes X No \_\_\_

B. All samples were analyzed within the EPA Method recommended holding times (time of sample collection to date of analysis).

Yes X No \_\_\_

No 40 CFR limits exist for radchem, so method limits were referenced. All samples were analyzed within 90 days of collection.

**X. CHAINS OF CUSTODY**

A. All chains of custody were complete with initials, dates, times and any changes are crossed out with one line and initialed.

Yes X No \_\_\_

B. Samples arrived intact, at the proper pH (< 2) and temperature.

Yes X No \_\_\_

In this case the receiving checklist indicates that the sample containers were at the proper pH. No qualifiers are required.

**XI. FIELD QC**

Field QC samples were identified and have met a guidance limit of CLP 30% for water and 50% for soil, or  $\pm 2 \times RL$  (water) or  $3.5 \times RL$  (soil) for results  $< 5 \times RL$ . Or for radiochemistry, the results relative to the 2 sigma counting error (uncertainty) may be used. The difference between the 2 results is compared against the uncertainty for each sample result. DER of  $> 1$  is to be discussed. No qualifiers are applied.

Yes \_\_\_ No \_\_\_ NA X

No field duplicates are identified.

**XII. OVERALL ASSESSMENT OF THE CASE**

The data are considered fully useable for project purposes with consideration of the qualifications or comments.

Duplicates

The laboratory uses relative percent difference (RPD) to compare duplicate results. The duplicate error ratio (DER) is not provided in the report. In fact, the laboratory uses DER to

refer to a data exception report. Historically, the DER was provided in the Excel file normally submitted by GEL. The purpose of the RPD is also to evaluate precision for duplicates, but the criteria are different. The laboratory uses  $\pm 20\%$  as the criterion for RPD. The laboratory does refer to the relative error ratio (RER) in the Case Narrative, which is functionally the same as the DER. The laboratory requires the RER to be  $< 3$ .

In this case, there are three RPD outliers. Bi-214 has an RPD of 116%. Lead-214 has an RPD of 47.2%, and potassium-40 has an RPD of 92.4%. The laboratory has flagged the duplicate result for potassium-40 as UI, and indicated in the narrative that there was not a valid peak for it in the duplicate. For Bi-214 the laboratory has noted a bias in the duplicate due to evolution of Radon. For lead-214, the RPD limits imposed by the laboratory are 0-110%. No discussion of the lead result is provided. No qualifiers have been added to lead-214 since it meets the DER limit (see below).

Some analytes in addition to these did not meet the DER limit, as shown below. The non-detected results are acceptable since they are non-detects in both duplicate and parent. All are non-detects and no qualifiers are applied, with the exception of K-40, which the laboratory indicates has no valid peak in the duplicate run and is rejected, and with the exception of Bi-214, which fails the criterion and also fails the RPD specification followed by the laboratory, with an RPD of 116%. The laboratory indicates that this occurred because of the release of radon gas. The result for both sample and duplicate is qualified as JMD116, indicating that it is outside the normal window for the RPD.

#### Detection Limits and Sample Identification

The instrument detection limit was within an isotope-specific limit for the calibration standards and QC samples.

The laboratory has flagged the sample duplicate result for K-40 with UI because there was no valid peak observed, and indicates in the EDD that the result is rejected. The result is qualified as R to indicate that it should not be used. The result for the parent sample itself is usable.