January 3, 2012

Mr. Edgar Ethington
Radiation Management Unit
Radiation Control Program
Hazardous Materials and Waste Management Division
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, CO 80203

RE: Response to Quality Assurance/Quality Control Issues with Isotech Laboratory Data for the Laramie Energy II, 2008 – 2010 Production Monitoring Reports

Dear Mr. Ethington,

This letter is a response to a September 1, 2010 letter from Jennifer T. Opila that followed the review of a report entitled Laramie Energy II, LLC Tier II Gas Wells Quarterly Production Monitoring Report for the Furr 16-22D and Furr 16-22B Rulison Field Garfield County Colorado December 2009 and submitted in June 2010, and subsequent letters pertaining to the Quality Assurance/Quality Control (QA/QC) documentation. The reports were received by your department and were subsequently reviewed and compared with the requirements of the approved Rulison Sampling and Analysis Plan (RSAP). The requested QA/QC information is being submitted as a Summary Table for the data from 2008 to 2010.

The letters noted that the required quality control documentation for radiometric instrument standard performance, spike sample results, and field QC were missing from the reports. The above-cited report included a *Data Verification and Validation Report* prepared by Diane Short & Associates that had pointed out Quality Assurance/Quality Control problems with the analysis of tritium by Isotech and carbon-14 (^{14}C) by the Illinois Geological Survey and Beta Analytic.

Olsson requested that Isotech provide the information soon after the receipt of the September 1, 2010 letter, but did not begin to receive the information until the end of August 2011, and did not receive the rest until October 2011. This information was provided to Diane Short & Associates to review once it was received. The *Radiochemistry Data Quality Review Report – Addenda* report is attached along with the information provided by Isotech.

Diane Short & Associates prepared a revised *Radiochemistry Data Quality Review Report Addenda* based on a review of the additional information. A copy of the revised report along with the requested information received from Isotech laboratories, and the Illinois Geological Survey are attached. Isotech's reports do not indicate that they subcontracted the ^{14}C analysis out to another laboratory, nor which laboratory was subcontracted. In telephone conversations with Isotech personnel they had indicated that the reason for the lag between when the samples were submitted to when the results were reported was due to subcontracting a portion of the work but this is not made clear in the Isotech laboratory reports.

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Isotech personnel indicated that Beta Analytic in Miami, Florida was subcontracted to perform the ^{14}C analysis. However it appears that the Illinois Geological Survey was actually subcontracted to perform ^{14}C gas analysis for Isotech. Olsson will request that Isotech include subcontract laboratory information with future analytical reports. Information to demonstrate the data reliability will also be requested from the subcontracted laboratory as well as from Isotech.

Isotech provided information on radiometric instrument standard performance, which was given to Diane Short & Associates for their review. According to the information provided by the Illinois Geological Survey, spikes are not performed on the ^{14}C analysis. In the report prepared by Diane Short & Associates, under the Matrix Spike Section, it is noted that "*Spikes are often not amenable to radiochemical analyses as long as there is some accounting for accuracy*."

Field QC has been conducted per the frequency specified within the current version of the approved RSAP. Field QC has included field blanks and field duplicates which were identified in the individual reports submitted to the Colorado Oil and Gas Conservation Commission and CDPHE HMWMD Radiation Management Unit. Natural gas samples were collected into evacuated LP tanks through a regulator and filling station from the individual gas well separator units.

Equipment blanks were not collected since produced water samples were previously collected directly into laboratory provided containers from the dump line valve on the individual natural gas well separator units. This was done to minimize sample handling and reduce the potential for cross contamination. However, these produced water samples included a separate layer of natural gas condensate which presented problems for the laboratories performing the analyses. Future produced water samples will be collected using a dedicated 5-gallon capacity bucket with a bottom valve to enable the condensate to be discarded to alleviate the problems.

The required QA/QC documentation, including chain-of-custody documents from Olsson to Isotech, and from Isotech to the subcontracted laboratory, are included in a Summary Table along with the individual data packages. Olsson will continue to work with Isotech to improve. Please contact me at 303.237.2072 if you have any comments or concerns.

Sincerely,

Olsson Associates, Inc.

James W. Hix
Senior Project Geologist

Attachments

Cc: Wayne Bankert – Laramie Energy II, LLC;
Jennifer T. Opila – CDPHE;
Alex Fischer – COGCC;
Chris Canfield – COGCC;
Jim Rada – Garfield County Public Health;
Kirby Wynn – Garfield County Oil & Gas Liaison

TABLE 1

Laramie Energy II - Furr Lease Rulison Tier II Wells
Jacks Pocket - Garfield County Colorado
October 2010

		Surface Location												
WELL	**PAD**	**QTR/QTR**	**SEC**	**TWP**	**RNG**	**Elevation**	**TOTAL DEPTH (FT.)**	**FIRST PRODUCTION DATE**	**4th Quarter 2008**	**1st Quarter 2009**	**2nd Quarter 2009**	**3rd Quarter 2009**	**4th Quarter 2009**	**October 2010**
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 on October 7, 2010.
NS - Not Sampled
N/A - Not Applicable
B - Baseline Sampling (One Time)
P - Production Sampling of the Closest Tier II Wells

TABLE 1A
Isotech Gas Sample Analytical Results
Laramie Energy II - Furr Lease Rulison Tier II Wells
Jacks Pocket - Garfield County Colorado

		Isotech Report Information											
WELL	Date Sampled	PAD	Date Isotech Received Samples	Isotech Job #	Isotech Report Date	^{14}C Subcontracted Laboratory	FIRST PRODUCTION DATE	4th Quarter 2008	1st Quarter 2009	2nd Quarter 2009	3rd Quarter 2009	4th Quarter 2009	October 2010
Furr A11-15B	11/13/2008	Furr A-11	11/14/08	10619	1/14/2009	ILGS	9/27/08	B (11/13/08)	N/A	N/A	N/A	N/A	N/A
Furr A11-15D	11/13/2008	Furr A-11	11/14/2008	10619	1/14/2009	ILGS	10/7/08	B (11/13/08)	N/A	N/A	N/A	N/A	N/A
Furr Hagen 6-22B	12/17/2008	F-1	12/22/08	10796	3/2/2009	ILGS	10/28/08	B (12/17/08)	N/A	N/A	N/A	N/A	N/A
Furr Hagen 6-22D	12/17/2008	F-1	12/22/08	10796	3/2/2009	ILGS	10/10/08	B (12/17/08)	N/A	N/A	N/A	N/A	N/A
Furr 7-22B	12/17/2008	F-1	12/22/08	10796	3/2/2009	ILGS	10/20/08	B (12/17/08)	N/A	N/A	N/A	N/A	N/A
Furr 7-22D	12/17/2008	F-1	12/22/2008	10796	3/2/2009	ILGS	10/21/08	B (12/17/08)	N/A	N/A	N/A	N/A	N/A
Furr 10-22B	12/17/2008	F-1	12/22/08	10796	3/2/2009	ILGS	10/25/08	B (12/17/08)	N/A	N/A	N/A	N/A	N/A
Furr 9-22B	12/17/2008	F-2	12/22/08	10796	3/2/2009	ILGS	11/3/08	B (12/17/08)	N/A	N/A	N/A	N/A	N/A
Furr 9-22D	12/17/2008	F-2	12/22/08	10796	3/2/2009	ILGS	11/11/08	B (12/17/08)	N/A	N/A	N/A	N/A	N/A
Furr 16-22B	(Multiple Dates)	F-2	(Multiple Dates)	(See each Qtr)			11/3/08	B (12/17/08) Isotech Job# 10796	P (NS)	P (6/24/09) Isotech Job# 11610	P (10/01/09) Isotech Job# 12055	P (12/16/09) Isotech Job# 12367	P (10/07/10) Isotech Job #13942
Furr 16-22D	(Multiple Dates)	F-2	(Multiple Dates)	(See each Qtr)			11/11/08	B (12/17/08) Isotech Job# 10796	P (4/14/09) Isotech Job# 11299	P (6/24/09) Isotech Job# 11610	P (10/01/09) Isotech Job# 12055	P (12/16/09) Isotech Job# 12367	P (10/07/10) Isotech Job #13942
Furr 10-22D	12/17/2008	F-3	12/22/08	10796	3/2/2009	ILGS	11/17/08	B (12/17/08)	N/A	N/A	N/A	N/A	N/A
Furr 15-22B	12/17/2008	F-3	12/22/2008	10796	3/2/2009	ILGS	11/17/08	B (12/17/08)	N/A	N/A	N/A	N/A	N/A
Furr 15-22D	12/17/2008	F-3	12/22/08	10796	3/2/2009	ILGS	11/17/08	B (12/17/08)	N/A	N/A	N/A	N/A	N/A
Furr 22-09A	10/7/2010	F-4	10/13/10	13942	12/7/2010	Beta	7/7/10	N/A	N/A	N/A	N/A	N/A	B (10/07/10)
Furr 22-09C	10/7/2010	F-4	10/13/2010	13942	12/7/2010	Beta	7/1/10	N/A	N/A	N/A	N/A	N/A	B (10/07/10)
Furr 22-10A	10/7/2010	F-4	10/13/10	13942	12/7/2010	Beta	7/29/10	N/A	N/A	N/A	N/A	N/A	B (10/07/10)
Furr 22-10C	10/7/2010	F-4	10/13/10	13942	12/7/2010	Beta	7/16/10	N/A	N/A	N/A	N/A	N/A	B (10/07/10)
Furr 22-15A	10/7/2010	F-4	10/13/10	13942	12/7/2010	Beta	7/13/10	N/A	N/A	N/A	N/A	N/A	B (10/07/10)
Furr 22-15C	10/7/2010	F-4	10/13/10	13942	12/7/2010	Beta	7/13/10	N/A	N/A	N/A	N/A	N/A	B (10/07/10)
Furr 22-16A	10/7/2010	F-4	10/13/10	13942	12/7/2010	Beta	7/6/10	N/A	N/A	N/A	N/A	N/A	B (10/07/10)

NS - Not Sampled
N/A - Not Applicable
B - Baseline Sampling (One Time)
P - Production Sampling of the Closest Tier II Wells

ILGS - Illinois Geological Survey
Beta - Beta Analytic Laboratory in Miami, FL

(Multiple Dates): Since the Furr 16-22B and Furr 16-22D wells are the closest gas wells to Project Rulison, they have been sampled multiple times.
Isotech issued reports on 05/29/09 (Job# 11299); 08/11/09 (Job#11610); 11/11/09 (Job# 12055); 1/29/10 (Job #12367), and 12/7/10 (13942).

TABLE 2

GAS SAMPLE DATA
Rulison Area Well Monitoring
Furr 16-22B and Furr 16-22D Wells
Natural Gas Samples - Laramie Energy II - Rulison Field, Garfield County, Colorado

Well Name/ No.	Sample Source	Latitude/	Longitude	Isotech Lab No.	Sample Name	Date Sample	CO %	H_2S %	He %	H_2 %	Ar %	O_2 %	CO_2 %	N_2 %	C_1 %	C_2 %	C_2H_4 %	C_3 %	iC_4 %	nC_4 %	iC_5 %	nC_5 %	C_6+ %	$^{14}C_1$ pMC	Std. Dev. (±)	Tritium TU	Std. Dev. (±)	Total BTU calc	Specific Gravity calc
Furr 16-22B	Separator	39.41662	-107.97507	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		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
				165099		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
				172338		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
				176955		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
				196345		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
Furr 16-22D	Separator	39.416623	-107.97512	152398	Furr 16-22D	12/17/2008	ND	ND	0.0029	0.0033	ND	0.0060	3.25	0.053	88.76	5.35	ND	1.52	0.337	0.307	0.128	0.0895	0.192	< 0.8	N/A	< 10.0	N/A	1073	0.644
				160503		4/14/2009	ND	ND	0.0029	0.0042	ND	0.0098	3.39	0.086	88.87	5.24	ND	1.45	0.309	0.278	0.117	0.0789	0.167	0.5	0.1	< 10.0	N/A	1066	0.643
				165100		6/24/2009	ND	ND	0.0038	0.0040	ND	0.0272	2.88	0.16	89.50	5.15	ND	1.43	0.296	0.261	0.0094	0.0656	0.121	< 0.4	N/A	< 11.7	N/A	1066	0.636
				172337		10/1/2009	ND	ND	0.0028	0.0033	NA	0.008*	3.69	0.050	88.42	5.35	ND	1.50	0.314	0.270	0.105	0.0716	0.218	0.4	0.1	< 10.0	N/A	1067	0.647
				176954		12/16/2009	ND	ND	0.0031	0.0029	ND	0.034	3.58	0.16	88.54	5.31	ND	1.45	0.312	0.257	0.110	0.0774	0.164	< 0.4	N/A	< 10.0	N/A	1063	0.645
				196341		10/7/2010	ND	ND	0.0023	0.0032	ND	ND	2.71	0.07	88.54	5.09	ND	1.43	0.307	0.290	0.118	0.0826	0.180	< 0.7	N/A	< 10.0	N/A	1073	0.636
22-9-16	Separator	39.416623	-107.97512	165101	22-9-16 (Duplicate)	6/24/2009	ND	ND	0.0033	0.0040	ND	0.0144	3.36	0.10	89.07	5.17	ND	1.42	0.297	0.263	0.101	0.0666	0.133	< 0.5	N/A	< 12.8	N/A	1063	0.640
Furr 16-22X	Separator	39.417	-107.9751	196342	Furr 16-22D (Duplicate)	10/7/2010	ND	ND	0.0026	0.0030	ND	ND	2.72	0.07	89.75	5.07	ND	1.32	0.305	0.288	0.118	0.0825	0.184	1	0.2	< 10.0	N/A	1073	0.636

Note: Shaded rows present the analytical data for the samples collected on October 7, 2010 which are discussed in this report. The table presents the data as compared to the results for samples collected previously from these wells.

$^{14}C_1$ - Carbon 14 — Carbon-14 (14C) Detection Limit is 1.0 pMC. Isotopic composition of carbon is relative to the Vienna Peedee Belemnite (VPDB).

Tritium — Tritium (^3H) Detection Limit 10.0 TU. Isotopic composition of hydrogen is relative to Vienna Standard Mean Ocean Water (VSMOW).

Std. Dev./ (±) — Standard Deviation (±) Uncertainty

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

Table presents Second Quarter 2009 (06/24/09), Third Quarter 2009 (10/1/09), and Fourth Quarter 2009 (12/16/09) analytical results for the Furr 16-22B and the Furr 16-22D wells, and Fourth Quarter 2010 (10/7/10) laboratory
and also First Quarter 2009 results for the Furr 16-22D (04/14/09) and the baseline results obtained for the Furr 16-22B and Furr 16-22D (12/17/08).
* Isotech did not analyze Argon separately, but reported combined results for Oxygen and Argon for the analysis of the 10/01/09 samples.

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 calcuated 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 shut in on 04/14/09)

Gas Component:
CO - Carbon Monoxide
H_2S - Hydrogen Sulfide
He - Helium
H_2 - Hydrogen
Ar - Argon
O_2 - Oxygen
CO_2 - Carbon Dioxide
N_2 - Nitrogen
C_1 - Methane
C_2 - Ethane
C_2H_4 - Ethylene
C_3 - Propane
iC_4 - Iso-Butane
nC_4 - N-Butane
iC_5 - Iso-Pentane
nC_5 - n-Pentane
C_6+ - Hexanes+

TABLE 2A

GAS SAMPLE DATA
Rulison Area Well Monitoring
Seven New Wells Sampled 10/7/10
Natural Gas Samples - Laramie Energy II - Rulison Field, Garfield County, Colorado

Well Name/ No.	Sample Source	Latitude/	Longitude	Isotech Lab No.	Sample Name	Date Sample	CO %	H_2S %	He %	H_2 %	Ar %	O_2 %	CO_2 %	N_2 %	C_1 %	C_2 %	C_2H_4 %	C_3 %	iC_4 %	nC_4 %	iC_5 %	nC_5 %	C_6+ %	$^{14}C_1$ pMC	Std. Dev. (±)	Tritium TU	Std. Dev. (±)	Total BTU calc	Specific Gravity calculation
Furr 22-15A	Separator	39.417899	-107.9795527	196336	Furr 22-15A	10/7/2010	ND	ND	0.0025	0.0037	ND	ND	3.16	0.083	89.18	5.28	ND	1.39	0.297	0.261	0.108	0.0721	0.162	<0.7	N/A	<11.8	N/A	1067	0.639
Furr 22-15C	Separator	39.4179	-107.97946	196337	Furr 22-15C	10/7/2010	ND	ND	0.0026	0.0030	ND	ND	2.92	0.075	89.14	5.33	ND	1.51	0.329	0.305	0.124	0.0841	0.175	<0.9	N/A	<10.0	N/A	1075	0.640
Furr 22-09A	Separator	39.4179	-107.97917	196338	Furr 22-09A	10/7/2010	ND	ND	0.0027	0.0026	ND	ND	2.71	0.10	90.31	4.83	ND	1.24	0.263	0.233	0.0958	0.0637	0.153	0.8	0.1	<10.0	N/A	1063	0.630
Furr 22-10A	Separator	39.4179	-107.97939	196339	Furr 22-10A	10/7/2010	ND	ND	0.0022	0.0025	ND	ND	2.62	0.086	90.12	5.06	ND	1.26	0.280	0.236	0.100	0.0679	0.167	<0.7	N/A	<10.0	N/A	1068	0.631
Furr 22-10C	Separator	39.4179	-107.97931	196340	Furr 22-10C	10/7/2010	ND	ND	0.0026	0.0046	ND	ND	2.47	0.068	90.28	4.99	ND	1.32	0.277	0.252	0.103	0.0704	0.161	<0.7	N/A	<10.0	N/A	1070	0.630
Furr 22-09C	Separator	39.4179	-107.9791	196343	Furr 22-09C	10/7/2010	ND	ND	0.0024	0.0023	ND	ND	2.89	0.10	89.3	5.12	ND	1.51	0.326	0.309	0.128	0.0873	0.228	<0.9	N/A	< 10.0	NA	1076	0.641
Furr 22-16A	Separator	39.4179	-107.97896	196344	Furr 22-16A	10/7/2010	ND	ND	0.0022	0.0034	ND	ND	2.98	0.065	89.05	5.27	ND	1.53	0.331	0.312	0.128	0.0885	0.241	<0.7	N/A	<11.2	N/A	1077	0.643

NOTES:

$^{14}C_1$ - Carbon 14 — Carbon-14 (14C) Detection Limit is 1.0 pMC. Isotopic composition of carbon is relative to the Vienna Peedee Belemnite (VPDB).
Tritium — Tritium (^3H) Detection Limit 10.0 TU. Isotopic composition of hydrogen is relative to Vienna Standard Mean Ocean Water (VSMOW)

Std. Dev./ (±) — Standard Deviation (±) Uncertainty

Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol.% Chemical analysis based on standards accurate to within 2%.
Table presents **Fourth Quarter 2010** (10/7/10) laboratory analytical results for seven wells, not including the Furr 16-22B and the Furr 16-22D wells.

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 calcuated at 60°F and 14.7 psia)
calc - calculated value
N/A - not applicable
NA - not analyzed
ND - not detected

Gas Component:
CO - Carbon Monoxide
H_2S - Hydrogen Sulfide
He - Helium
H_2 - Hydrogen
Ar - Argon
O_2 - Oxygen
CO_2 - Carbon Dioxide
N_2 - Nitrogen
C_1 - Methane
C_2 - Ethane
C_2H_4 - Ethylene
C_3 - Propane
iC_4 - Iso-Butane
nC_4 - N-Butane
iC_5 - Iso-Pentane
nC_5 - n-Pentane
C_6+ - Hexanes+

TABLE 3

TRITIUM ANALYTICAL RESULTS FOR PRODUCED WATER SAMPLES
Furr 16-22B and Furr 16-22D Tier II Wells
Laramie Energy II, Rulison Field, Garfield County, Colorado

Well Name/Number	Sample Source	Latitude	Longitude	QTR/ QTR	Section	Township	Range	P.M.	SAMPLE ID	LAB Number	DATE SAMPLED	TIME SAMPLED	Laboratory	Tritium (TU)	Tritium (pCi/L) calculated
Furr 16-22B	Separator	39.41669	-107.97507	SE SE	22	7S	95W	6th	Furr 16-22B		12/17/2008	12:54	ISO	< 10.8	< 34.5
											4/14/2009	NS	ISO	NS	NS
											6/24/2009	11:55	ISO	< 13.7	< 43.7
											10/1/2009	11:30	ISO	< 10.0	< 31.9
											12/16/2009	13:00	ISO	< 10.0	< 31.9
										196345	10/7/2010	15:00	ISO	< 10.0	< 31.9
Furr 16-22D	Separator	39.416623	-107.97512	SE SE	22	7S	95W	6th	Furr 16-22D		12/17/2008	12:13	ISO	< 10.0	< 31.9
											4/14/2009	11:00	ISO	< 10.0	< 31.9
											6/24/2009	11:40	ISO	< 12.0	< 38.3
											10/1/2009	11:40	ISO	< 10.0	< 31.9
											12/16/2009	12:55	ISO	< 10.0	< 31.9
										196341	10/7/2010	14:30	ISO	< 10.0	< 31.9
22-9-16 (Furr 16-22D Duplicate)	Separator	39.416623	-107.97512	SE SE	22	7S	95W	6th	22-9-16		6/24/2009	12:50	ISO	< 10.5	< 33.5
Field Blank	NA	NA	NA	SE SE	22	7S	95W	6th	Blank		6/24/2009	12:05	ISO	54 ± 3.8	173.22 ± 12.1
Furr 16-22X (Furr 16-22D Duplicate)	Separator	39.416623	-107.97512	SE SE	22	7S	95W	6th	Furr 16-22X	196342	10/7/2010	14:30	ISO	< 10.0	< 31.9

Note: Shaded rows present the results for samples collected on October 7, 2010 as presented in this report. The table also presents the results from previous sampling events for these gas wells.

Tritium (3H) Detection Limit 10.0 TU. Isotopic composition of hydrogen is relative to Vienna Standard Mean Ocean Water (VSMOW).

Abbreviations:
ISO - Isotech Laboratories, Inc. of Champaign, Illinois
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
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.)

TABLE 3A

TRITIUM ANALYTICAL RESULTS FOR PRODUCED WATER SAMPLES
Seven New Tier II Wells Sampled 10/7/10
Laramie Energy II, Rulison Field, Garfield County, Colorado

Well Name/Number	Sample Source	Latitude	Longitude	SAMPLE ID	LAB Number	DATE SAMPLED	TIME SAMPLED	Laboratory	Tritium (TU)	Tritium (pCi/L) calculated
Furr 22-15A	Separator	39.4179	-107.9796	Furr 22-15A	196336	10/7/2010	13:55	ISO	< 10.0	<31.9
Furr 22-15C	Separator	39.4179	-107.9795	Furr 22-15C	196337	10/7/2010	13:40	ISO	< 10.0	<31.9
Furr 22-09A	Separator	39.4179	-107.9792	Furr 22-09A	196338	10/7/2010	13:50	ISO	< 10.0	<31.9
Furr 22-10A	Separator	39.4179	-107.9794	Furr 22-10A	196339	10/7/2010	13:55	ISO	< 10.0	<31.9
Furr 22-10C	Separator	39.4179	-107.9793	Furr 22-10C	1963340	10/7/2010	14:00	ISO	< 10.0	<31.9
Furr 22-09C	Separator	39.4179	-107.9791	Furr 22-09C	196343	10/7/2010	14:35	ISO	< 10.0	<31.9
Furr 22-16A	Separator	39.4179	-107.979	Furr 22-16A	196344	10/7/2010	14:40	ISO	< 10.6	<33.8

Note: Table presents the results for samples collected on October 7, 2010 as presented in this report.

Tritium (3H) Detection Limit 10.0 TU. Isotopic composition of hydrogen is relative to Vienna Standard Mean Ocean Water (VSMOW).

Abbreviations:
ISO - Isotech Laboratories, Inc. of Champaign, Illinois
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

ATTACHMENT A

Diane Short & Associates
Radiochemistry Data Quality
Review Report Addenda

DIANE SHORT & ASSOCIATES, INC.
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RADIOCHEMISTRY DATA QUALITY REVIEW REPORT- Addenda
Tritium Analysis in Gas and Water by LSC Carbon-14 Analysis in Gas by LSC

SDG: IsoTech 10619, 10796 , 10797 , 11289 , 11299 , 11602 , 11610 , 12055 , 12367 , 12373 ,(Report revised to reflect additional IsoTech information Received October 2011)

PROJECT: Garfield County CO, Rulison Project for Olsson Assoc. Golden CO

LABORATORY: IsoTech Laboratories , Champaign, Illinois for Tritium in water and gas and C-14 in gas (C-14 analysis subcontracted to Beta Analytic, Miami, Florida and to the Illinois Geologic Survey (ILGS).

SAMPLE MATRIX: Water and Gas
SAMPLING DATE (Mo/Yr): Various Months, 2008 through 2010

NO.SAMPLES: See prior reports

ANALYSES REQUESTED: LSC for water, Combustion/LSC for Gas

SAMPLE NUMBERS: See previous reports

DATA REVIEWER: John Huntington

QA REVIEWER: Diane Short & Associates, Inc. INITIALS/DATE: 11/11/2011 DLS

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__

This is an addendum to the above noted reports. It is a summary of re-submitted data from IsoTech that was requested by the client per the comments made in these previous reports.

The reviewer notes to the client that IsoTech subcontracts part of the work but does not make it clear in the reports which part is subcontracted, when the samples or materials from sample prep were shipped to the other lab, associated chains of custody , or what methods are used for the subcontracted analyses. The reviewer recommends that the information should be provided in the reports. We were only able to determine where samples were analyzed from the interlab COC documents.

The standard reports from IsoTech include no QC. From the chain of custody documentation and from the data provided by IsoTech, it is apparent that tritium analysis has been conducted by IsoTech, and C-14 analysis has been subcontracted to Beta Analytic and the Illinois Geologic Survey (ILGS). In October of 2011, IsoTech provided all of the raw data for the tritium work. Some raw data for Beta Analytic samples associated with SDG 13942 was provided previously and has been discussed in the validation report for that SDG. No raw data has been provided for the ILGS C-14 work.

Per the level of review performed, the data package requirements have now been met for the Beta Analytic subcontracted work and for the IsoTech tritium analyses. The entity conducting the analysis is reputable.

The information subsequently provided by IsoTech includes a QA plan with summaries of the analytical and prep procedures used at IsoTech, a calculation spreadsheet, sample reports of tritium analysis for water samples, sample reports of tritium and C-14 analysis of gas samples, and general QA documents from Beta Analytic including ISO 17025 certifications. Additionally, in October of 2011, IsoTech provided a more complete data package for tritium analysis, including raw count data, efficiency determination, NIST standards analysis, background correction data, and calculation data sheets showing the detailed calculation of results for each sample. These have been used to update this report.

No bench sheets, Chain of Custody (COC) documents, counting raw data, or calibration data were provided originally. A Beta Analytic interlab calibration study was provided for C-14. Subsequent to this, Chain of Custody documents were provided for this project by IsoTech along with COC documentation for previous projects conducted. The prior COCs will be reviewed and discussed separately. This report includes only the review of the COCs associated with the referenced SDG.

An e-mail chain was included which describes the procedure followed at Beta for LSC work. This appears to specify the protocol for C-14 analysis, and the included spreadsheet appears to be associated with C-14 analysis for the gas, which is performed by LSC.

In addition, we have information in an e-mail from Dr. Hong Wang of ILGS as follows:
I checked my record. The ISGS 6604 was counted in Quantulus 1220 on 1/22/2010 for 56 hours. The standard used for this sample was measured on 1/04/2010 for about 70 hours. The measured activity value of the standards is 9.121 +/- 0.033 and its background value is 0.292 +/-0.008 on about 70 hours counting data. The and 6605 was counted using Packard 2200 on 1/22/2010 for 30 hours. The standard used for this sample was measured on 10/23/2008 for about 50 hours. The measured activity value of this standard is 8.743 +/-0.023. the background values is 1.996 +/-0.026. We don't have spike testing for 14C dating analysis.

This does provide some information about the protocols used and the nature of the results for two samples. It is noted, that the exact samples referenced is not defined only the standard verification for the time period associated with the client samples. It has been inferred that this information, therefore, that calibration for client samples is complete. The data package remains incomplete for the C-14 samples subcontracted to ILGS.

II. ANALYTICAL REPORT FORMS

1. The Analytical Report or Data Sheets are present and complete for all requested analyses.
Yes ____ No____ NA _X__
See prior reports

2. Holding Times
A. The contract holding times were met for all analyses.
Yes ____ No____ NA _X__
See prior reports

B. Samples were properly preserved, or applicable preservative was used.
Yes ____ No____ NA _X__
See prior reports

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 ____ No __X__
No chain of custody documents were received originally for the samples sent to IsoTech, nor the samples subcontracted from IsoTech to other laboratories. After a conference with the laboratory and specific requests by the client, IsoTech provided the chain of custody documents required. IsoTech has used both Beta Analytic and the Illinois Geologic Survey (ILGS).

10619: The COC to IsoTech was properly signed and executed. Samples were sent on 11/13/2008 and received on 11/14/2008.
The C-14 samples were subcontracted to the Illinois Geologic Survey (ILGS). The form COC does not show this, but shows the samples being sent to Hong Wang, who is the Director of that Laboratory. The COC is properly executed and signed. Samples were provided to the ILGS on 12/11/2008.

10796: The COC to IsoTech was properly signed and executed. Samples were sent on 12/18/2008

and received on 12/22/2008.
The C-14 samples were subcontracted to the Illinois Geologic Survey (ILGS). The form COC does show this and also shows the samples being provided to Hong Wang, who is the Director of that Laboratory. The COC is properly executed and signed. Samples were provided to the ILGS on several dates; 1/8/2009, 1/20/2009, and 1/23/2009.

10797: The COC to IsoTech was properly signed and executed. Samples were sent on 12/18/2008 and received on 12/22/2008. Only tritium analysis was requested, so subcontracting was not required.

11289: The COC to IsoTech was properly signed and executed. Samples were sent on 4/14/2009 and received on 4/15/2009. Only tritium analysis was requested, so subcontracting was not required.

11299: The COC to IsoTech was properly signed and executed. Samples were sent on 4/14/2009 and received on 4/16/2009.
The C-14 sample was subcontracted to the Illinois Geologic Survey (ILGS). The form COC does show this and also shows the sample being provided to Hong Wang, who is the Director of that Laboratory. The COC is properly executed and signed. The sample was submitted to ILGS on 4/22/2009.

11602: The COC to IsoTech was properly signed and executed. Samples were sent on 6/24/2009 and received on 6/26/2009. Both C-14 and tritium analysis were requested, but we have not received a COC for shipment to Beta Analytic or ILGS.

11610: The COC to IsoTech was properly signed and executed. Samples were sent on 6/242009 and received on 6/29/2009.
The C-14 samples were subcontracted to the ILGS. The form COC does show this and also shows the sample being provided to Hong Wang, who is the Director of that Laboratory. The COC is properly executed and signed. Samples were submitted on 7/20/2009 and 7/27/2009.

12055: The COC to IsoTech was properly signed and executed. Samples were sent on 10/1/2009 and received on 10/2/2009.
The C-14 samples were subcontracted to the ILGS. The form COC does show this and also shows the sample being provided to Hong Wang, who is the Director of that Laboratory. The COC is properly executed and signed. Samples were submitted on 10/12/2009.

12367: The COC to IsoTech was properly signed and executed. Samples were sent on 12/16/2009 and received on 12/21/2009.
The C-14 samples were subcontracted to the ILGS. The form COC does show this and also shows the sample being provided to Hong Wang, who is the Director of that Laboratory. The COC is properly executed and signed. Samples were submitted on 1/8/2010. No receipt or relinquishment times are shown on the form.

12373: The COC to IsoTech was properly signed and executed. Samples were sent on 12/16/2009

and received on 12/21/2009.
Samples were submitted for both tritium and C-14 analysis, but we do not have COCs for shipment to either Beta or ILGS.

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 __X___ No_____ NA ____
The calibration data for the IsoTech tritium LSC analyses was received in October of 2011 and includes data for the samples noted from 2008 through 2011. Initial calibration for LSC analysis consists of acceptable efficiency and background data, which was provided in the October submittal. Decay correction of the standards was performed as required for tritium analysis.

Separate data packages from IsoTech were received for all tritium analyses for the SDGs listed in this report. These included calibrations, count data, and calculations for all samples.

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 __X__ No_____ NA____
Data including the QC check standard results was received for IsoTech Laboratories in October of 2011 and includes data from 2008 forward.

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 __X___ No_____ NA____
Data for IsoTech Laboratories was received in October of 2011 and includes data from 2008 forward.

5. The attenuation was with the (beta x r2) limits as appropriate to the method.
Yes __X___ No ____ NA__

6. There is documentation to verify that the standards are NIST traceable or the equivalent.
Yes _X____ No_____ NA____

The data provided by IsoTech Laboratories provide standard data for the NIST standard. A certificate for this standard was provided on request.

7. Quench factors were reported and noted as acceptable.
Yes __X__ No____ NA__ __
IsoTech provides efficiency results and the data from which efficiency is calculated. The efficiency is reasonable for the known behavior of tritium.

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 ___X___ No _____ NA_____

2. The laboratory reported the results with uncertainties that included all uncertainties associated with the preparation and analytical procedures.
Yes __X_ No____
Tritium and C-14: Uncertainties are not included in the reports from IsoTech laboratories for the gas samples or for tritium analysis except for results above the reporting limit. This has only occurred for C-14 analysis in gas.

The IsoTech data submitted in October of 2011 does include the uncertainties for all results, for both samples and for QC and includes data from 2008 forward.

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 __X__
No MS/MSDs have been provided for any of the analyses in this set. Spikes are often not amenable to radiochemical analyses as long as there is some accounting for accuracy.

2. The MS percent recoveries were within the limits defined in the contract or a guidance limit of 75-125%.
Yes ____ No ____ NA _X_

3. The samples used for qualification are client samples.
Yes ____ No ____ NA _X_

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 x RL ($\pm$ 2x RL for soils).
Yes ____ No __X__ NA_____
Matrix duplicates, not matrix spike duplicates, were analyzed.

IsoTech: IsoTech has provided duplicate results for tritium analysis indicating that they are for SDGs 12367 and 12373. However, the samples used are not identified as client samples. The

results appear to be in control, but their significance is not clear since we do not know their origin. Duplicate precision cannot be evaluated for these analyses.

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 ____ No__X__
For the analysis of tritium in water and gas by IsoTech, standards were re-run per method requirements but there are no LCS's indicated nor second-source standards with each run. Per EPA Method 906.0, no LCS is clearly defined and no further action is required.

For Beta Analytic, data were provided from the Fifth International Radiocarbon Intercalibration Study, which constitutes results for second source standards through 2009, but does not represent a batch-by-batch check. This does appear to fulfill the Beta SOP for C-14 analysis and no further action is taken. If an LCS-type standard is run with Beta analyses, it is requested that it be submitted with the associated reports to the client.

IsoTech data provided in October of 2011 for all SDGs referenced by this report includes NIST standards run with each sample run and includes data from 2008 forward. These are all in control. For Beta Analytic such data is available only for SDG 13942, which is covered by a separate report.

Because the data received per the client request appear to meet method requirements, no qualifiers are required.

2. The LCS %R for each analyte (background corrected) met the established control limits or the method limits of 75-125%.
Yes __ __ No ____ NA__X__

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_____

IsoTech: Blanks are present in each run of samples and are within acceptance windows.

2. The cross talk summary was acceptable and indicated no interferences
Yes ___ No_____ NA__X__

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 __X__

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 __X__
Field duplicates have not been identified.

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__X_

XI. CALCULATIONS
The calculation algorithm has been checked for 10% of the submitted data packages and accuracy of the reported results is verified.
Yes __X___ 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
This is an addendum to the above noted reports. It is a summary of re-submitted data from IsoTech that was requested by the client per the comments made in these previous reports.
The reviewer notes to the client that IsoTech subcontracts part of the work but does not make it

clear in the reports which part is subcontracted, when the samples or materials from sample prep were shipped to the other lab, associated chains of custody , or what methods are used for the subcontracted analyses. The reviewer recommends that the information should be provided in the reports. We were only able to determine where samples were analyzed from the interlab COC documents.

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Per the level of review performed, the data package requirements have now been met for the Beta Analytic subcontracted work and for the IsoTech tritium analyses. The entity conducting the analysis is reputable.

The information subsequently provided by IsoTech includes a QA plan with summaries of the analytical and prep procedures used at IsoTech, a calculation spreadsheet, sample reports of tritium analysis for water samples, sample reports of tritium and C-14 analysis of gas samples, and general QA documents from Beta Analytic including ISO 17025 certifications. Additionally, in October of 2011, IsoTech provided a more complete data package for tritium analysis, including raw count data, efficiency determination, NIST standards analysis, background correction data, and calculation data sheets showing the detailed calculation of results for each sample. These have been used to update this report.

No bench sheets, Chain of Custody (COC) documents, counting raw data, or calibration data were provided originally. A Beta Analytic interlab calibration study was provided for C-14. Subsequent to this, Chain of Custody documents were provided for this project by IsoTech along with COC documentation for previous projects conducted. The prior COCs will be reviewed and discussed separately. This report includes only the review of the COCs associated with the referenced SDG.

An e-mail chain was included which describes the procedure followed at Beta for LSC work. This appears to specify the protocol for C-14 analysis, and the included spreadsheet appears to be associated with C-14 analysis for the gas, which is performed by LSC.

In addition, we have information in an e-mail from Dr. Hong Wang of ILGS as follows:
I checked my record. The ISGS 6604 was counted in Quantulus 1220 on 1/22/2010 for 56 hours. The standard used for this sample was measured on 1/04/2010 for about 70 hours. The measured activity value of the standards is 9.121 +/- 0.033 and its background value is 0.292 +/-0.008 on about 70 hours counting data. The and 6605 was counted using Packard 2200 on 1/22/2010 for 30 hours. The standard used for this sample was measured on 10/23/2008 for about 50 hours. The measured activity value of this standard is 8.743 +/-0.023. the background values is 1.996 +/-0.026. We don't have spike testing for 14C dating analysis.

This does provide some information about the protocols used and the nature of the results for two samples. It is noted, that the exact samples referenced is not defined only the standard verification for the time period associated with the client samples. It has been inferred that this information, therefore, that calibration for client samples is complete. The data package remains incomplete for the C-14 samples subcontracted to ILGS.

Chain of Custody

No chain of custody documents were received originally for the samples sent to IsoTech, nor the samples subcontracted from IsoTech to other laboratories. After a conference with the laboratory and specific requests by the client, IsoTech provided the chain of custody documents required. IsoTech has used both Beta Analytic and the Illinois Geologic Survey (ILGS).

10619: The COC to IsoTech was properly signed and executed. Samples were sent on 11/13/2008 and received on 11/14/2008.
The C-14 samples were subcontracted to the Illinois Geologic Survey (ILGS). The form COC does not show this, but shows the samples being sent to Hong Wang, who is the Director of that Laboratory. The COC is properly executed and signed. Samples were provided to the ILGS on 12/11/2008.

10796: The COC to IsoTech was properly signed and executed. Samples were sent on 12/18/2008 and received on 12/22/2008.
The C-14 samples were subcontracted to the Illinois Geologic Survey (ILGS). The form COC does show this and also shows the samples being provided to Hong Wang, who is the Director of that Laboratory. The COC is properly executed and signed. Samples were provided to the ILGS on several dates; 1/8/2009, 1/20/2009, and 1/23/2009.

10797: The COC to IsoTech was properly signed and executed. Samples were sent on 12/18/2008 and received on 12/22/2008. Only tritium analysis was requested, so subcontracting was not required.

11289: The COC to IsoTech was properly signed and executed. Samples were sent on 4/14/2009 and received on 4/15/2009. Only tritium analysis was requested, so subcontracting was not required.

11299: The COC to IsoTech was properly signed and executed. Samples were sent on 4/14/2009 and received on 4/16/2009.
The C-14 sample was subcontracted to the Illinois Geologic Survey (ILGS). The form COC does show this and also shows the sample being provided to Hong Wang, who is the Director of that Laboratory. The COC is properly executed and signed. The sample was submitted to ILGS on 4/22/2009.

11602: The COC to IsoTech was properly signed and executed. Samples were sent on 6/24/2009 and received on 6/26/2009. Both C-14 and tritium analysis was requested, but we have not received a COC for shipment to Beta Analytic or ILGS.

11610: The COC to IsoTech was properly signed and executed. Samples were sent on 6/242009 and received on 6/29/2009.
The C-14 samples were subcontracted to the ILGS. The form COC does show this and also shows the sample being provided to Hong Wang, who is the Director of that Laboratory. The COC is properly executed and signed. Samples were submitted on 7/20/2009 and 7/27/2009.

12055: The COC to IsoTech was properly signed and executed. Samples were sent on 10/1/2009 and received on 10/2/2009.
The C-14 samples were subcontracted to the ILGS. The form COC does show this and also shows the sample being provided to Hong Wang, who is the Director of that Laboratory. The COC is properly executed and signed. Samples were submitted on 10/12/2009.

12367: The COC to IsoTech was properly signed and executed. Samples were sent on 12/16/2009 and received on 12/21/2009.
The C-14 samples were subcontracted to the ILGS. The form COC does show this and also shows the sample being provided to Hong Wang, who is the Director of that Laboratory. The COC is properly executed and signed. Samples were submitted on 1/8/2010. No receipt or relinquishment times are shown on the form.

12373: The COC to IsoTech was properly signed and executed. Samples were sent on 12/16/2009 and received on 12/21/2009.
Samples were submitted for both tritium and C-14 analysis, but we do not have COCs for shipment to either Beta or ILGS.

Detection and Reporting Limits:
The calibration data for the IsoTech tritium LSC analyses was received in October of 2011. Initial calibration for LSC analysis consists of acceptable efficiency and background data, which was provided in the October submittal. Decay correction of the standards was performed as required for tritium analysis.

Separate data packages from IsoTech were received for all tritium analyses for the SDGs listed in this report. These included calibrations, count data, and calculations for all samples.

Matrix Duplicates
Matrix duplicates, not matrix spike duplicates, were analyzed which is acceptable for the methods.

IsoTech: IsoTech has provided duplicate results for tritium analysis indicating that they are for SDGs 12367 and 12373. However, the samples used are not identified as client samples. The results appear to be in control, but their significance is not clear since we do not know their origin. Duplicate precision cannot be evaluated for these analyses.
There is no indication of field duplicates and field precision cannot be evaluated.

LCS
For the analysis of tritium in water and gas by IsoTech, standards were re-run per method requirements but there are no LCS's indicated nor second-source standards with each run. Per

EPA Method 906.0, no LCS is clearly defined and no further action is required.

For Beta Analytic, data were provided from the Fifth International Radiocarbon Intercalibration Study, which constitutes results for second source standards through 2009, but does not represent a batch-by-batch check. This does appear to fulfill the Beta SOP for C-14 analysis and no further action is taken. If an LCS-type standard is run with Beta analyses, it is requested that it be submitted with the associated reports to the client.

IsoTech data provided in October of 2011 for all SDGs referenced by this report includes NIST standards run with each sample run and includes data from 2008 forward. These are all in control. For Beta Analytic such data is available only for SDG 13942, which is covered by a separate report.

Because the data received per the client request appear to meet method requirements, no qualifiers are required.

ATTACHMENT B

Isotech Quality Assurance Plan
May 2009

QUALITY

ASSURANCE

PLAN

for

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821

Revised May 21, 2009

_____

President and Laboratory Director Date

_____

Laboratory Manager and QA/QC Officer Date

GENERAL QA/QC PROCEDURES

1. SAMPLES

1.1 Sampling Procedures It is the responsibility of the person collecting a sample to follow a sound sampling procedure. This will ensure that the sample collected is representative of the whole. Unless employees of Isotech do the sample collection, the entire responsibility for sample collection resides with the client. However, we at Isotech in addition to being available for sample collection, will provide advice on sampling methods, sample storage procedures, and sample size requirements.

1.2 Sample Containers Sample containers should be matched in size, type and condition to the anticipated analysis that will give best representation of the source, while preserving the sample integrity prior to analysis. Unless sample containers are provided by Isotech, the responsibility for adequate containers resides with the client. Again, in addition to being able to provide appropriate sample containers, shipping cartons and shipping instructions, Isotech will provide advice on sample containers/cartons and shipping procedures.

1.3 Sample Custody A completed "Chain of Custody" record is the responsibility of the client and, if required, should be submitted with the samples. Isotech will provide a "Chain of Custody/Request for Analysis" form if needed. Isotech assumes full responsibility for all samples received and stored for analysis at our laboratory. If any samples are removed from Isotech for additional analysis at other laboratories, a "Chain of Custody" form will be completed. All samples received for analysis are assigned a unique, non-duplicated laboratory number which is used as an identifier for each analysis performed.

2. INSTRUCTIONS AND PROCEDURES

2.1 Instrument Operation Procedures Analyses performed with manufactured analysis instruments are carried out by the methods either specified or recommended by the manufacturer of the instrument as identified in the instrument manual or provided by on-site training through the manufacturer's service technicians. Much of the operation of these instruments is controlled by personal computers utilizing software written and licensed by the manufacturers.

2.2 Analytical Procedures The analytical procedures used routinely at Isotech are described in written standard operating procedures (SOP's) for each analysis. Additional procedures may be used, as needed, in the process of satisfying a client's specific analysis requirements. These procedures will either follow published analytical methods, or methods developed at Isotech for a specific analysis. If the Isotech developed procedure becomes routine, then a standard operating procedure is written. All procedures are reviewed and approved by the laboratory supervisors. Various procedural tests and verifications performed are recorded in bound maintenance log books.

3. CALIBRATION AND STANDARDIZATION

3.1 Calibration Procedure and Frequency Depending on the analytical technique, instruments used for quantitative analyses are either calibrated at the beginning of every operating period or the calibration is checked by using a reference sample or a calibration standard. The instrument calibration is also checked at appropriate intervals during analyses. Specific instruments that form components of a sample preparation system are calibrated using duplicate sample analysis as well as analysis of a reference sample at appropriate intervals. Records of calibration results are kept in laboratory notebooks or other secure medium (see Documentation).

3.2 Method Validation Analytical methods are validated by one or more of the following techniques:

3.2.1 check or reference samples are analyzed and the results are compared with the internal documented or external certified (primary and secondary standards) values,

3.2.2 results from the candidate method are compared with those from another method known to be applicable and reliable, or

3.2.2 spiked samples and surrogate samples are analyzed and the method results are compared with the known concentrations.

3.3 Check/Reference Samples A check/reference sample is re-analyzed approximately every tenth analysis. This, in essence, results in a test of the method. Check/reference samples are chosen which have been analyzed many times over a period of years with consistent results.

3.4 Standards Primary standards are obtained from the International Atomic Energy Agency, Vienna, Austria, and certified by NIST (National Institute of Standards and Technology, formerly U.S. National Bureau of Standards) or directly from NIST. Secondary standards are obtained from commercially available sources recognized in the industry. Internal Reference standards are prepared by direct calibration against primary and secondary standards.

3.5 Duplicate Samples Duplicate analyses are performed approximately every tenth analysis. This duplicate sample analysis is performed approximately five analyses after the check/reference sample analysis is performed. Therefore, for a particular analysis procedure, a test of the method is performed every five analyses. This assures that at least 20% of all analyses are for maintaining QA/QC.

3.6 Specific Routine Procedures to Assess Performance Standard reference samples, chosen to match the submitted samples as closely as possible, in conjunction with duplicate samples and check samples, provide a matrix for performance evaluation. Control charts of replicate analytical data for reference samples are kept for each analytical method practiced routinely. Control charts are used to check the performance of an instrument and/or analytical technique.

Control charts for replicate samples are kept as tables and/or graphs. Graphs are displayed on the wall and data is plotted when measured to see if it falls within a predetermined acceptable range and to monitor for long term changes or trends. If a problem is detected with the reference sample, then the problem is first addressed by checking the integrity of the sample itself. Other reference samples are analyzed to determine if the problem persists. If reference sample integrity is verified, further diagnostic testing is carried out until the cause of the discrepancy is identified.

Isotech willingly participates in round-robin testing whenever the opportunity arises and recently participated in a hydrogen isotope study sponsored by the Finnigan Corporation. Cross-checks with the Illinois State Geological Survey are carried out frequently. Three natural gas standards set up by the International Atomic Energy Agency (IAEA) and now maintained by NIST are periodically analyzed. A supply of these standards is maintained and clients are encouraged to include one of these standards as a sample to be analyzed. Instrument calibration is carried out whenever analysis of internal standards and check samples suggests a potential problem.

3.7 External Quality Control Checks Blind duplicates, check samples, blanks, and spiked samples may be submitted by the client, and this practice is encouraged.

4. ANALYSES AND ANALYTICAL RESULTS

4.1 Data Reduction and Reporting Calculations made in reducing raw data to reportable form are verified (preferably by a second person) before reporting the results to the client. If a computer program is used to perform calculations, the accuracy of the input data is verified by comparison with the raw data. In all cases where computer programs are used to make the calculations, the person making the calculations verifies that the proper program is used. Data reduction and calculation is performed automatically by the computers which control the instruments. Reported results are verified relative to the computer printouts. This verification involves copying the value from the printout to a report format and is generally performed by the same person who performed the analyses.

4.2 Hard Copy and Electronic Data Deliverables Normally, final data is emailed to clients as an Excel workbook file, and also a PDF version of the data. Depending on the sample type, hard copy reports can be either a single page per sample, or can be in tabular format with multiple samples per page. Hard copy reports are mailed to clients, unless clients indicate that the email versions are sufficient for their needs. Upon request, CD's will be submitted to clients in addition to the hard copy reports. Also, appropriate graphs will be provided upon request. Compositional analyses for natural gas samples are normalized to 100% when the Analysis Report is generated. Upon request a QA/QC report containing results for all check samples and duplicates as well as copies of raw data can be provided at additional cost.

4.3 Documentation All laboratory notes, observations, calibrations, manual calculations, and any other pertinent information are kept in bound laboratory notebooks or other secure recording medium. Computer programs used for data storage, retrieval, and calculations, which are developed within Isotech Laboratories, Inc., are documented well enough that someone not intimately familiar with the program development, but who is familiar with the programming language, can understand the operation of the program. Printed and dated copies of the current version and each previous version (insofar as possible) of the program are kept in the developer's files. These copies remain at and are the property of Isotech, should the developer leave employment of Isotech Laboratories, Inc. Electronic backup copies of currently-used computer programs are securely kept by the program's developer or principal user. Computer software provided by the instrument manufacturers that reduces raw data and calculates results have been checked by doing the calculations manually. Backup copies of analyses databases are made periodically. The frequency of making backup copies depends on the frequency of updating the database, but the minimum frequency for making backup copies is weekly. All laboratory notebooks, data, computer programs, computerized databases, and any other means of recording data, observations, calculations, and other pertinent information developed at or on behalf of Isotech, remain the property of Isotech Laboratories, Inc., unless otherwise designated by the Board of Directors of Isotech Laboratories, Inc.

4.4 Hard Copy Data Files and Storage All pertinent paperwork associated with each batch of samples is stored in the client files. Typical paperwork can include chain of custody records, client analysis requests, email communication to/from clients regarding samples, final data, and cover letter mailed to client with final data. Data files are kept indefinitely unless clients request that we dispose of them.

5. MAINTENANCE AND REPAIR

5.1 Instruments Each instrument or machine used to produce quantitative analysis results, or leading up to their production, undergoes periodic preventive maintenance according to manufacturer's instructions, or some established preventive maintenance schedule. Preventive maintenance may be done by laboratory personnel, manufacturer's representative, or a qualified third-party contractor, depending on the abilities of the laboratory operator and the complexity of the equipment. Records of repairs and preventive maintenance are kept by the appropriate laboratory personnel in files or notebooks. Records of equipment problems and solutions are kept in files or notebooks. The analyst is the person best qualified to recognize when the instrument or machine they operate is in need of repair, or the method they practice is in need of corrective action. They are aided in this monitoring by control charts. Corrective action is needed when predetermined limits for data acceptability are exceeded. Analysts are also to use their experience and scientific judgment in deciding when corrective action is needed.

5.2 Other Equipment Other laboratory equipment such as vacuum pumps, ovens, test meters and non-instruments such as glassware are maintained by Isotech personnel. In most cases this is performed by the same person who utilizes the equipment for analysis. Visual checks backed

by mechanical and electronic gauges provide constant maintenance checks directly to the operators.

6. REVIEW

6.1 Analytical Review At the time of each analysis or sample preparation, the staff chemist performing the analysis reports anomalies to the Laboratory Manager, who is the primary QA/QC officer. Staff chemists are all trained on a variety of techniques and work closely together. Constant communication between staff members results in most problems being addressed when they occur. Unusual problems are brought to the attention of the Laboratory Director. Whenever possible, a sample that is questionable for any reason is re-analyzed to verify results, regardless of when the sample was analyzed initially. This means that more than 10% of samples will be duplicates if the data appears to be unusual in any way.

Before final reports are printed, data is checked to verify that the final data agrees with the raw printouts, and raw percentages for compositional analyses are checked to ensure that all components are identified. Reproducibility of duplicate isotopic samples is compared to stated precision limits. Analytical data is reviewed for anomalies by both the QA/QC Officer and the Laboratory Director prior to reporting.

6.2 Standard Operating Procedures (SOP's): These procedures are developed from specific analytical methods for operating specified equipment and supplies to obtain high quality data reflective of each sample analyzed. In addition to revisions due to procedural or equipment changes these SOP's are reviewed by the Laboratory Manager annually.

7. QA/QC PROBLEM REPORTING

7.1 Responsibilities QA/QC is the responsibility of every person who collects or analyzes samples. If any Isotech Laboratories, Inc. employee observes any QA/QC problem, that employee will discuss the problem with the analyst, QA/QC officer, or Isotech Laboratories, Inc. Board Member. No negative action will be ever be brought against nor will accrue to any staff member who reports QA/QC problems.

8. SUBCONTRACT POLICY

Samples for analysis of ^{14}C (radiocarbon) are converted to purified carbon dioxide and then submitted to an established radiocarbon dating laboratory for the final analysis. When analyses are requested for which Isotech does not have either the necessary equipment or expertise to provide high quality results, these analyses too may, with the knowledge of the client, be submitted to a subcontract laboratory. Only established, reputable laboratories which maintain strict QA/QC control are utilized. All samples are prepared and packaged using techniques that have been recommended or approved by the subcontract laboratory. Analysis of reference

samples and standards is the responsibility of the subcontract laboratory. Duplicate analyses of samples submitted to a subcontract laboratory should be requested by the client and will be charged as regular samples.

APPENDICES: ANALYTICAL PROCEDURES

I. Sample Preparation Procedures for Stable Isotope Analyses

A. Procedures for Stable Isotope Analysis of Water Samples

1. $\delta^{13}C$ (Carbon Isotope Analysis) of Dissolved Inorganic Carbon (DIC)

Equipment and Supplies

Vacuum pumps and gauges
Glass and metal vacuum system
Dry ice
Isopropyl alcohol
Liquid nitrogen
Phosphoric acid
Gas-Oxygen torch

Method/Procedure The $\delta^{13}C$ of DIC is determined by injecting up to 20 ml of sample water into an evacuated 60 ml serum bottle containing 2 ml of 85% phosphoric acid and a magnetic spin bar. Sample size is determined based on alkalinity, which is measured by titration with 0.1N HCl.

The sample is stirred for a minimum of 15 minutes and then connected to the vacuum system via a needle port. The hypodermic needle is embedded into the stopper and the air within the needle port is evacuated. The needle is then inserted completely through the stopper. The CO_2 generated is liberated from the water and transferred through a trap cooled in a dry-ice/isopropyl-alcohol mixture (for H_2O removal) to a U-trap which is cooled in liquid nitrogen. The sample is constantly stirred to ensure that all CO_2 is liberated from the water. All residual gases are pumped away through the vacuum system. The CO_2 is transferred into a Pyrex cold finger for yield determination by placing a Dewar of dry ice slush on the U-trap to liberate the CO_2 and placing a Dewar of liquid nitrogen on the cold finger to collect the CO_2. The sample is sealed into the cold finger and the liquid nitrogen Dewar is removed to allow the sample to sublimate. The yield is calculated from the pressure reading on a digital manometer connected to the cold finger.

The CO_2 is then collected in ¼" OD Pyrex tubing by transferring the purified CO_2 into the seal tube with liquid nitrogen. The tube is fused shut with a gas-oxygen torch and tagged with a piece of label tape for mass spectrometric analysis.

Maintenance The system is thoroughly evacuated between samples. Vials are washed and dried.

Replication At a minimum, every tenth analysis is a replicate.

Calculation Calculations are performed by the software on the IRMS (Isotope Ratio Mass Spectrometer) at the time of final analysis.

Documentation All procedural tests and verifications performed are recorded in bound maintenance log books. All sample data including the date prepared with analyst identification are recorded on laboratory log sheets and in bound log books.

2. δD (Hydrogen Isotope Analysis) and δ^{18}O (Oxygen Isotope Analysis) of H_2O

Equipment

3mL syringes
0.2 micron syringe filters
2mL glass vials with septum caps
Picarro CRDS (cavity ringdown spectrometer) model L1102-i fitted with a Leap autosampler

Method/Procedure

Water samples are individually filtered into 2mL vials with 0.2 micron syringe filters. If samples are high salinity brines, they should be vacuum distilled prior to loading. The vials are then loaded onto trays which are installed on the autosampler. Samples are analyzed by the CRDS in replicate in accordance with the manufacturer's recommendation.

Reference Sample Two reference water samples are used to verify accuracy and reproducibility. These reference waters are analyzed approximately every tenth analysis. Performance is also periodically checked by direct analysis of primary reference standards obtained from IAEA or NIST.

Replication

At a minimum, every tenth sample analysis is a replicate.

Calculation

Calculations are performed by the software on the CRDS at the time of analysis.

Documentation

All procedural tests, sample preparations and verifications performed are recorded in bound maintenance log books. All final data including the date prepared with analyst identification in bound log books.

3. $\delta^{15}N$ and $\delta^{18}O$ (Nitrates)

Equipment and Supplies

Filter paper
Glass filtration apparatus
1N HCl
$BaCl_2$
Borosilicate glass balls
Hot Plate
Cation exchange resin
Anion exchange resin
1N HBr
Ag_2O
DI Water
Flasks
Stirbars
Glass funnel
Freezer
Oven
Freeze-dryer
Teflon beakers

Method/Procedure Nitrate is extracted from groundwater samples and converted into $AgNO_3$ using ion-exchange techniques. Samples are filtered and pH adjusted to 1-3 using 1N HCl boiled to final volume of 250 ml. $BaCl_2$ is added to remove dissolved sulfates. The sample is poured into seperatory funnels and passed through a pretreated cation exchange column. The sample is then passed through the anion column, where nitrate is held within the column. 1N HBr is added, and the eluate collected, diluted with 20mL DI water, and Ag_2O is added. The sample is filtered, frozen in a Teflon beaker, and placed in a freeze drying vacuum oven until only the $AgNO_3$ crystals remain. The crystals are then analyzed using for 15N using an EA and isotope ratio mass spectrometer (IRMS) and the 18O values measured using a TCEA-IRMS.

B. Procedures for Stable Isotope Analysis of Gas Samples

1. $\delta^{13}C$ and δD (Carbon and Hydrogen Isotope Analysis) for Hydrocarbon Gases, Offline Prep Systems

Equipment and Supplies

3 SRI 8610C Gas chromatographs
Evacuated transfer system
Copper oxide combustion furnace

Dry ice
Isopropyl alcohol
Liquid nitrogen
Electronic manometer
Electronic vacuum gauge
Helium
Oxygen
Gas-oxygen torch

Method/Procedure The determination of carbon and hydrogen isotopic ratios for hydrocarbons in gas mixtures (e.g. natural gas) requires a sample preparation system capable of first separating the individual hydrocarbons and then quantitatively converting them into carbon dioxide (CO_2) and water for mass-spectrometric analysis. There are 2 systems utilized for processing natural gases. The systems employed are helium purged flow systems consisting of two major units.

The first unit consists of sample injection syringes, SRI 8610C gas chromatographs, a personal computer, and several flow-control valves. This configuration separates the hydrocarbon of interest from the sample and channels it into the combustion-collection unit. The second unit is the combined combustion-collection unit which includes quartz combustion tubes filled with cupric oxide (CuO), and vacuum lines. This system converts the hydrocarbon of interest into CO_2 and water, which are then collected and purified for isotopic analysis.

Samples can be analyzed from a variety of different sampling containers such as high-pressure cylinders, gas bags, or vacutainers. The sample is expanded into the injection syringes which have been pre-set to the desired volume, and adjusted to atmospheric pressure. Once the sample is loaded into the injection syringe, the separation is automated by both a personal computer and on-board computers within the gas chromatographs. Once a run is initiated, the GC software controls valves to the injection syringes, and controls the valves to the separation columns.

The sample hydrocarbon is flowed through a copper oxide combustion furnace set at 850°C utilizing helium as the carrier gas. On the downstream side of the furnace, both the carbon dioxide and the water of combustion are collected in a liquid nitrogen-cooled trap. Once the entire sample has been collected, the helium carrier gas is evacuated. The carbon dioxide is then transferred into a cold finger attached to a digital manometer for yield measurement by placing a dewar of dry ice slush on the collection trap to liberate the CO_2 while maintaining the water in the collection trap. Once all of the CO_2 has been collected in a cold finger, the valve to the cold finger is closed and the liquid nitrogen is removed to allow the CO_2 to sublimate for yield determination.

The water of combustion is then transferred into a 12-inch length of ¼" OD Pyrex tubing that has been sealed at one end and contains a weighed quantity of zinc turnings. The zinc is prepared by evacuating and heating to 400°C for at least 5 minutes while open to vacuum Once the sample water has been completely transferred into the sample tube and frozen with liquid nitrogen, the sample tube is sealed off with a torch for later mass spectrometric analysis.

After the water has been sealed off, the pressure reading on an electronic pressure gauge connected to the coldfinger is used to calculate the yield of CO_2, and this is recorded in the lab notebook. The CO_2 is then transferred into ¼" OD Pyrex tubing and sealed with a torch for later mass spectrometric analysis.

Maintenance The packed columns used for GC separation are backflushed after every sample and serviced when the peak separation decreases. This service consists of baking at manufacturer's recommended temperature and time. During the heating and cooling process, O_2 is flowed through the copper oxide combustion furnaces to regenerate the CuO. This conditioning process is completed each day samples are analyzed. The transfer/collection system is thoroughly evacuated between samples. Valve o-ring seals within the evacuated transfer system are replaced as required.

Reference Samples The system is tested by analyzing a reference sample every tenth analysis performed.

Replication A duplicate analysis of one of the samples is performed approximately every tenth analysis. This duplicate analysis is performed approximately five analyses after the reference sample analysis is performed. Therefore, a test of the system operation is performed every five analyses.

Calculation The expected yield is calculated form the injection volume and the hydrocarbon concentration

Documentation All procedural tests, sample preparations and verifications performed are recorded in bound maintenance log books. All final data including the date prepared with analyst identification are recorded on laboratory log sheets and/or in bound log books. Digital copies of all chromatograms are stored and backed up regularly.

2. $\delta^{13}C$ (Carbon Isotope Analysis) of CO_2, Offline Prep Method

Method/Procedure Preparation of samples for measurement of the $\delta^{13}C$ of CO_2 is performed on the same system as the hydrocarbons. The procedure is identical to that for the hydrocarbons, with two exceptions. First, CO_2 does not pass through a combustion furnace; gas is channeled directly from the GC outlet to the collection trap. Second, there is no water of combustion. Therefore, the collection/purification system is slightly smaller as it has only one sample tube, and all steps related to collecting the water of combustion are omitted.

3. **GC-C-IRMS systems, $\delta^{13}C$, δD, and $\delta^{15}N$**

Equipment and Supplies

HP6890 GC interfaced to ThermoFinnigan Delta Plus Advantage
HP6890 interfaced to Thermo Electron Delta V Plus
HP 6890 interfaced to Thermo Scientific Delta V Plus

CTC Analytical GC PAL autosampler

Method/Procedure

GC-C-IRMS systems, also referred to as "online" or "continuous flow", consist of an Agilent 6890 GC combustion unit and Finnegan GCCIII interfaced with a mass spectrometer (Delta V Plus or Delta Plus Advantage), and are used to analyze the carbon isotopic value of hydrocarbon components in gas samples. Samples are injected into the HP6890 split/splitless injector either manually, or using customized GC PAL auto-samplers. The hydrocarbon components are separated by the GC column in the HP6890, and each individual component slated for isotopic analysis is combusted in a combustion furnace supplied by the instrument manufacturer. The resultant CO_2 is introduced directly into the mass spectrometer, and Finnegan's Isodat software is utilized for peak detection and quantification.

Hydrogen isotopic values for methane are completed using the same system, but the gas is channeled through a high-temperature pyrolysis furnace instead of through the combustion furnace. The pyrolysis furnace converts methane into H_2 and carbon, and the H_2 gas is introduced directly into the mass spectrometer.

Nitrogen isotopic data for elemental nitrogen (N_2) is generated using the same system, with one key difference: the temperature on the combustion reactor is reduced so that the N_2 is not oxidized.

Maintenance

Septa on the GC inlet system are replaced daily when the system is operational. Pyrolysis and combustion tubes are replaced as needed. Combustion tubes are oxidized daily during analysis sequences.

Reference Samples

Reference gases are analyzed at the start of each analysis sequence, and then at least 10% of all analyses during a sequence are check samples.

Replication

At least 10% of client samples are analyzed in duplicate.

C. Procedures for Stable Isotope Analysis of Organic Solids and Liquids

Equipment and Supplies

Carlo Erba Elemental Analyzer connected to a Finnigan Delta S Mass Spectrometer
ThermoElectron TCEA interfaced to a Thermo Electron Delta V Plus Mass Spectrometer

Elementar EL Vario III interfaced to a Thermo Scientific Delta V Plus Mass Spectrometer

Method/Procedure The determination of carbon, nitrogen, oxygen, hydrogen, and sulfur isotopic ratios for organic solids and liquids is accomplished by combustion or pyrolysis of the materials for mass-spectrometric analysis. The systems employed are standard elemental analyzers with carousel auto samplers, connected to isotope ratio mass spectrometers through an interface supplied by the manufacturer. The combustion products of interest from the elemental analyzers are: carbon dioxide (CO_2) for carbon isotope analysis, N_2 for nitrogen isotope analysis, and sulfur dioxide (SO_2) for sulfurn isotope analysis. Oxygen and hydrogen isotopic ratios are analyzed on the TCEA, which converts hydrogen from the organic materials to H_2 gas for hydrogen isotopic measurements, and oxygen within the organic materials is converted to carbon monoxide (CO) for oxygen isotope analysis.
This system in its entirety was purchased expressly for analysis of these samples.

Samples are weighed on a Mettler balance and loaded into a standard EA tin capsule for carbon, nitrogen, or sulfur isotopic analysis, or into a silver capsule for oxygen or hydrogen isotopic analysis. Once the samples are loaded into the EA, a run is started and all instrument control is done by software provided by the MS manufacturer. Samples are combusted as per normal EA operating procedures, and the CO_2 N_2, and SO_2 are separated by the EA. Similarly, the pyrolysis products H2 and CO from the TCEA are separated within the instrument. The vents of the EA and the TCEA are connected to the mass spectrometers via the interface, where a small portion of the EA or TCEA output flows directly into the MS. The MS measures the isotopic value of the component of interest (CO_2, N_2, SO_2, CO, or H_2) and the final isotopic value is generated by software provided by the manufacturer.

Maintenance Ash is removed from the top of the combustion column in the EA or the top of the pyrolysis reactor in the TCEA as directed by the manufacturer, or when peak tailing becomes apparent. Combustion and reduction furnaces in the EA are replaced at appropriate intervals as outlined by the dealer, or when peak shape deteriorates. The TCEA contains glassy carbon, which is periodically replaced.

Reference Samples The systems are tested by analyzing at least one reference at least once per batch of 25 samples loaded into the auto sampler. A blank is also run at the start of each batch.

Replication Approximately 10% of all samples analyzed are replicates.

Documentation All final data including the date analyzed are recorded on laboratory log sheets and/or in bound log books. Digital copies of chromatograms are stored and backed up regularly.

II. Sample Preparation Procedures for Radiogenic Isotope Analyses

A. Procedures for Radiogenic Isotope Analysis of Gases

1. ^{14}C (Radiocarbon) and ^{3}H (Tritium) in CH_4 (Methane) by Radiometric Analysis

Equipment

Peristaltic pump
Flow meters
Gas regulators
Vacuum gauge
Molecular sieve trap
High temperature tube furnaces
Quartz combustion chamber
Vacuum traps and gauges
Vacuum pumps
Mercury manometer

Method/Procedure

1.1 Methane Combustion

The system used for tritium (^{3}H) analysis of methane and for radiocarbon (^{14}C) analysis of methane consists of a peristaltic pump, a CO_2 removal unit, and a sample combustion/collection flow unit. The CO_2 removal unit includes a trap filled with molecular sieve and an ascarite backup trap. The combustion/collection unit is composed of a tube furnace, an inner and an outer quartz combustion tube which are interconnected through an orifice located at the tip of inner tube, a flow control valve, and a series of gas purification and collection traps. The system is attached to a vacuum manifold.

The molecular sieve is baked and evacuated to 350°C before each use to ensure that all absorbed gases are removed from the trap. After the molecular sieve is cooled to room temperature, the system is first evacuated, and then pressurized with argon. Oxygen is then introduced into the outer combustion tube which is partly filled with cupric oxide (CuO) and placed in a tube furnace preheated to 850°C. After the flow is established, the gas sample enters the system through a flow control valve (if the sample is above atmospheric pressure) or is pumped in slowly by a peristaltic pump (if the sample is at or below atmospheric pressure). CO_2 associated with the sample is absorbed by the molecular sieve and removed from the sample quantitatively. Methane in the sample is then carried by argon through the inner combustion tube and ignited at the tip of the tube where oxygen is supplied.

The water of combustion is collected in a trap immediately after the combustion furnace. This collection trap is heated under vacuum prior to each analysis to ensure that there is no cross-contamination between samples. To collect the sample water, the trap is immersed in a dry ice/isopropanol bath. Once the entire sample has been combusted, the frozen water of combustion is melted and transferred to a glass vial to await tritium analysis.

The CO_2 formed by combustion is collected in two liquid nitrogen cooled traps, measured volumetrically, and transferred into a storage cylinder. Storage cylinders are effectively leak-tested during each use by evacuation prior to transferring the sample CO_2. Each cylinder is tagged with sample identification and is forwarded to a subcontractor for ^{14}C analysis along with a chain-of-custody form.

If the yield of CO_2 is less than one liter, the sample is diluted to approximately one liter with ^{14}C free CO_2 prepared from the combustion of natural gas. The dilution gas has been analyzed to verify that it is ^{14}C free, and found to be statistically indistinguishable from background. The volume of the sample and the volume of the dilution gas are precisely measured with a mercury manometer. The dilution factor measured is used in the final calculation of the ^{14}C activity.

1.2 Tritium Analysis

The water of combustion from methane samples is ready to be analyzed in the liquid scintillation (LS) spectrometer. There is no pre-treatment necessary for the sample, as it is essentially distilled water when it is collected.

The scintillation counting vials are prepared by pipetting 10 ml of commercial scintillation cocktail into a 20 ml plastic vial and then weighing to ±1 mg. The sample is then pipetted or poured into the counting vial and the vial is re-weighed. If the amount of sample is less than 10ml, then tritium-free water is added to bring the total volume of water to about 10ml. Details of the tritium analysis procedure are given later in this document.

Maintenance After each sample, the molecular sieve is baked and evacuated at 350°C. The vacuum system is thoroughly evacuated to remove all residual gas and water vapor after each sample. The water trapping system is disassembled and thoroughly dried and evacuated after each sample.

Calibration/Standardization Gas storage volumes have been calibrated using known quantities of carbon dioxide gas. No further standardization of this system is necessary. Calibration and standardization of the final ^{14}C analysis is performed by the subcontracted laboratory.

Replication and Reference Samples Replicate or reference sample analysis for these analyses are performed only when requested and supported by the client.

Calculation Yields are calculated by comparing the volume of CO_2 generated and the weight of the water collected to the amount expected based on the amount of CO_2 collected. ^{14}C concentrations are determined by the subcontracted laboratory and corrected for isotope fractionation by Isotech's database program.

2. ^{14}C (Radiocarbon) in CO_2 by Radiometric Analysis

Equipment

Same as for ^{14}C of CH_4

Method/Procedure After the CO_2 from methane has been collected as described in the previous section, the expansion cylinder and the collection traps are evacuated. The argon carrier gas trapped in the molecular sieve is evacuated and then a tube heater is placed on the molecular sieve trap. The trap is heated to 350°C to liberate the sample CO_2 from the molecular sieve. The CO_2 is then transferred via a shunt to the CO_2 collection system. The CO_2 is collected in a liquid nitrogen-cooled trap. Once the sample has been transferred into the collection traps, the sample yield is measured and the sample is transferred into a storage cylinder using the same method as for methane. The purified CO_2 is then submitted to a subcontract laboratory for radiometric analysis of ^{14}C.

3. ^{14}C (Radiocarbon) in CH4 and CO_2 by Accelerator Mass Spectrometry (AMS)

Equipment:
Same as for $\delta^{13}C$ of CO_2 and $\delta^{13}C$ of Hydrocarbons.

Method/Procedure:
The same method is employed for sample preparation as for $\delta^{13}C$ of either CH_4 or CO_2. Once the purified CO_2 has been sealed into Pyrex tubing, the tube is tagged with a piece of label tape and sent to the subcontractor along with a chain of custody form for ^{14}C analysis. When there is only enough material available for one sample preparation, the $\delta^{13}C$ is first determined by MS analysis. Then the sample is frozen back out of the MS with liquid nitrogen and sealed into the same Pyrex tubing before shipment to the subcontractor. A longer sample tube is used on the initial sample preparation to ensure that there is sufficient tube available for sealing after MS analysis. The sealed sample is then submitted to a subcontract laboratory for ^{14}C determination by accelerator mass spectrometry.

B. Procedures for Radiogenic Isotope Analysis of Water

1. ^{14}C (Radiocarbon) in dissolved inorganic carbon (DIC) by Accelerator Mass Spectrometry (AMS)

Equipment
Same as for $\delta^{13}C$ of DIC.

Method/Procedure
The same method is used as for $\delta^{13}C$ of DIC. Once the purified CO_2 has been sealed into Pyrex tubing, the tube is tagged with a piece of label tape and sent to the subcontractor, along with a chain of custody form, for ^{14}C analysis. When there is only enough material available for one sample preparation, the $\delta^{13}C$ is first determined by MS analysis. Then the sample is frozen back out of the MS with liquid nitrogen and sealed into the same Pyrex tubing before shipment to the subcontractor. A longer sample tube is used on the initial sample preparation to ensure that there is sufficient tube available for sealing after MS analysis. The sealed sample is then submitted to a subcontract laboratory for ^{14}C determination by accelerator mass spectrometry.

2. ^{3}H (Tritium) in H_2O

Equipment

Vacuum pumps and gauges
Distillation column
Electrolytic enrichment cells
Electrolysis power source and cooling system
Liquid scintillation counting system
Assorted chemicals and glassware
Dry ice/ isopropyl alcohol
Drying oven

Method/Procedure--Direct Counting of Higher Tritium Content Water (greater than 15 TU).
Approximately 15ml of the water sample is treated with 0.1 M $KMnO_4$ at 70°C for about an hour. This sample is then vacuum distilled. Ten ml of the distillate is accurately weighed and mixed with 10ml of an appropriate organic scintillator cocktail in a 20ml plastic vial and counted in a liquid scintillation spectrometer for 1000 minutes. Background and a NIST standard are also similarly counted and the tritium content calculated.

Method/Procedure--Enrichment of Lower Tritium Content Water (less than 15 TU). About 300 ml of the water sample is conventionally distilled to near completion. Exactly 200g is added to an enrichment cell along with 2ml of 9M tritium-free sodium hydroxide and is electrolytically enriched down to about 11-13 ml (final weight is exactly determined), and then neutralized with carbon dioxide for 20 minutes. The enrichment procedure is carried

out under conditions of about 2°C and constant voltage of 4V. Ten ml of the enriched sample is accurately weighed and mixed with an appropriate organic scintillator cocktail in a 20 ml plastic vial and counted in a liquid scintillation spectrometer for 1000 minutes. Background and a NIST standard are also similarly counted and the tritium content calculated.

General QA/QC Procedures include critically reviewing TU/cpm/g of NIST standard versus existing data, critically reviewing background cpm versus existing data, and comparing data from splits of NIST and other samples with outside established laboratories. A criteria of exceeding 1 sigma limits from existing data triggers investigation of possible errors. Electrolytic enrichment cells are calibrated using working standards approximately every 6 months, or whenever duplicates prepared in different cells suggest a possible change in enrichment factor.

Maintenance The vacuum system is thoroughly evacuated between samples. All glassware and electrolytic cells are cleaned with deionized water and baked out at about 130° C between samples.

Replication At a minimum, every tenth analysis is a replicate. Periodically a blind split is sent to another established tritium analysis laboratory for check purposes.

Reference Sample A NIST water standard (a dilution of NIST 4361B) is used for each sample set to verify accuracy and reproducibility. A glass-sealed high tritium sample is routinely checked to verify that the counter is operating satisfactorily. QA/QC plots are maintained for both standard and background counts using deviation of 1 sigma as a criteria for a more detailed evaluation of the data.

Calculation Calculations are performed utilizing a spreadsheet to calculate tritium concentration in TU on the date counted.

Documentation All procedural tests, sample preparations and verifications performed are recorded in bound maintenance log books. All final data including the date prepared, with analyst identification, are recorded on laboratory log sheets or in bound log books.

III. Dual Inlet Mass Spectrometric Analysis

A. Measurement of $^{13}C/^{12}C$ and $^{18}O/^{16}O$ in CO_2

Equipment Finnigan MAT Delta S Isotope Ratio Mass Spectrometer

Method/Procedure Because $^{13}C/^{12}C$ and $^{18}O/^{16}O$ analyses are performed simultaneously, the procedure described here generates both measurements. A mass spectrometric analysis involves comparisons of a sample to a reference standard; in this case the comparisons are measurements of mass 44, 45, and 46, giving the both the oxygen and carbon isotopic compositions. This is accomplished by a dual inlet system where the sample and the reference standard are measured alternately. At the beginning of each day, a reference standard is introduced into the standard side of the inlet system, and this gas is generally used for the entire session. There are two different reference standards in aluminum cylinders which are permanently mounted on the MS inlet system. The sample to be analyzed against the standard is introduced into the system via an evacuated inlet system and tube-cracker. With the inlet system fully evacuated, the sample (which is sealed into ¼" Pyrex tubing) is introduced by breaking the glass sample tube and allowing the sample to fill a variable volume bellows. Once the sample has been introduced into the MS, the actual analysis is computer controlled using equipment obtained from the manufacturer. Each analysis is given a specific reference name and/or number, utilizing the lab number as the primary reference. Final results are calculated by the manufacturer's software, and are stored on the hard drive of the computer, recorded in a bound lab notebook, and stored as the computer generated printout.

Maintenance The source region of the MS is periodically disassembled and cleaned. The filament is replaced as needed. Oil levels in mechanical vacuum pumps are checked frequently and maintained at the proper level. Turbomolecular pumps are lubricated according to the manufacturer's recommendations.

Calibration/Standardization The first analysis of each session is a zero enrichment, where the working standard is analyzed against itself to check machine stability. Isotope ratio determination involves multiple direct comparisons of the sample to a reference standard (generally at least 6 comparisons). Stable carbon and oxygen isotope compositions are always reported as the difference between the ratios of the two isotopes of interest in the sample and the ratio in a primary reference standard. That is,

$$\delta X_{(sample)} = [(R_{sample} - R_{standard})/ R_{standard}] \times 1000$$

Where X represents the isotope of interest, ^{13}C or ^{18}O, and R represents the ratio of $^{13}C/^{12}C$, or $^{18}O/^{16}O$. The δ value is expressed in terms of per mil (‰), or parts per thousand.

In practice, the difference between the sample and an internal reference standard is measured and then the value relative to the primary standard is calculated by the instrument manufacturer's software. Two internal reference standards are used at Isotech, both of which have been calibrated multiple times over the past 20 years relative to several standards (graphite, oil, carbonates, waters, etc.) available from the International Atomic Energy Agency and the National Institute of Standards and Technology, in at least two different laboratories and on up to five different mass spectrometers. Standardization of the mass spectrometer involves analyzing one the reference standards against the other (the reference standard used for the actual analysis is chosen according to the types of samples to be analyzed). This standardization is carried out at least once each day that analyses are to be conducted. In the rare event that the value obtained differs by more than 2 standard deviations from the expected value, the standardization is repeated with new aliquots of the reference standards. If the difference persists, the calibration of the reference gases is checked by having them analyzed by another laboratory, or by recalibrating them relative to NIST or IAEA standards.

Replication Because of replicate sample preparations, at least 10% of all analyses are replicates.

Reference Samples Because 10% of all samples prepared for stable isotope analysis are check samples or reference samples which have been previously analyzed, these samples also serve as check samples for the mass spectrometer.

Calculation All calculations are performed by the software obtained from the manufacturer.

B. Measurement of $^{2}H/^{1}H$ (Deuterium/Hydrogen) in H_2

Equipment

Finnigan Delta Plus XL isotope ratio mass spectrometer
Aluminum heating block
Personal computer

Method/Procedure The H_3 factor, which is the portion of the mass 3 signal attributable to ^{1}H-^{1}H-^{1}H (instead of ^{2}H-^{2}H), is determined before each run early in the day and periodically throughout the day based on machine performance (if the values start drifting, a new H_3 factor is determined). The reference standard must be replenished at least once during an 8 hour period.

Water samples for deuterium/hydrogen analysis are sealed into ¼" Pyrex tubing as H_2O, along with a measured quantity of zinc. Each sample tube is labeled and reacted in a heating block at 500°C for 35 minutes to generate hydrogen gas. Once the sample has been reacted, it is introduced into the sample side of the MS inlet system and analyzed against the working standard. Each analysis is given a unique label, using the lab number as the primary reference. Once the sample has been introduced into the MS, the analysis is computer controlled. The raw result is calculated by the manufacturer's software and recorded into a bound lab notebook, as well as being stored on computer hard disk and computer generated printout of results.

Maintenance The source region of the MS is periodically disassembled and cleaned. The filament is replaced as needed. Oil levels in mechanical vacuum pumps are checked frequently and maintained at the proper level. Turbomolecular pumps are lubricated according to the manufacturer's recommendations.

Calibration/Standardization The first run each day is a zero-enrichment where the standard is run against itself to check machine stability. Stable hydrogen isotope compositions are always reported as the difference between the ratios of the two isotopes of interest in the sample and the ratio in a primary reference standard. That is,

$$\delta D_{(sample)} = [(^2H/^1H_{sample} - {}^2H/^1H_{standard})/ {}^2H/^1H_{standard}] \times 1000$$

The δ value is expressed in terms of per mil (‰), or parts per thousand.

In practice, the difference between the sample and an internal reference standard is measured and then the value relative to the primary standard is calculated by the instrument manufacturer's software. Two internal reference standards are used at Isotech which have been calibrated relative to several water standards available from the International Atomic Energy Agency and the National Institute of Standards and Technology. Standardization of the mass spectrometer involves analyzing one the reference standards against the other. This standardization is carried out at least once each day that analyses are to be conducted. In the rare event that the value obtained differs by more than 2 standard deviations from the expected value, the standardization is repeated with new aliquots of the reference standards. If the difference persists, the calibration of the reference gases is checked by having them analyzed by another laboratory, or by recalibrating them relative to NIST or IAEA standards. Aliquots of the NIST and IAEA standards are also periodically analyzed as samples as a further check on the calibration of the reference standard.

Replication Because of replicate preparation of samples, at least 10% of all analyses are replicates.

Reference Samples Because 10% of all samples prepared for stable isotope analysis are check samples or reference samples which have been previously analyzed, these samples also serve as check samples for the mass spectrometer.

Calculation All calculations are performed by the manufacturer's computer software. The raw data is then converted to final data using a spreadsheet on a personal computer. The spreadsheets are stored on computer hard disk and a copy is attached to the raw printouts for each batch of analyses.

IV. Gas Chromatographic Analysis of Gases

A. Analysis of hydrocarbons

Equipment Carle AGC 400 Gas Chromatograph which was custom designed by the manufacturer for Isotech. The GC is equipped with both thermal conductivity (TCD) and flame ionization (FID) detectors. Data processing is provided by a Nelson Analytical PC Interface coupled with a personal computer.

Method/Procedure At the start of each day, the detectors are turned on and the flow rate of the carrier gas is adjusted to an optimum level. The system is given 30 minutes for the thermistor detector to stabilize before the first sample is analyzed.

All gas sampling cylinders are fitted with a regulator containing a septum on the outlet. Before opening the valve on the cylinder, the air from the regulator is evacuated through a needle port connected to the inlet vacuum. If there is sufficient sample pressure, the outlet pressure is adjusted to approximately 50 psig.

The sample loop on the GC is evacuated to less than 60 microns between each sample. Samples are taken from the cylinder using a gas-lock syringe and injected through a septum into the evacuated sample loop. Air contamination from the syringe needle is evacuated while the loop is still open to the vacuum line. A large enough syringe is used to pressurize the sample loop with gas, and then the loop is adjusted to atmospheric pressure through a tube that is vented under water (to prevent air from leaking back into the vent). Sample identification is entered into the Nelson software and the method is downloaded into the PC interface. The run is then started by pressing a "run" keypad on the GC.

The Carle AGC 400 operates under isothermal conditions, utilizing several different packed columns and valve switching to separate the various components. Instrument configuration was designed by Carle specifically to meet the requirements of Isotech. Helium is used as the carrier gas. All valve switching during the analysis is computer-controlled. The detectors are connected to the PC interface, which converts the analog signal to digital and sends the data to the PC software for processing. The software for the Nelson system does component detection and area integration. The resulting component peak areas are then quantified by the software (given raw percent values) by comparing them to previously run standards. The lab technician checks the raw total for each analysis to ensure that all components have been detected. The raw total can vary from day to day depending on atmospheric pressure, with acceptable raw totals of 97% to 103%. The lab technician also checks all baselines for accuracy from the chromatograms shown on the computer screen. This raw computer record is maintained for each sample corresponding to its individual lab number. The raw percentage values for each sample are downloaded into the main sample database, and are normalized to 100% when the Analysis Report is generated.

Maintenance GC columns are periodically baked out according to manufacturer's instructions. Septa in the sampling valves are replaced as needed.

Calibration/Standardization Approximately 10 different reference standards are used for standardization of the Carle AGC 400 gas chromatograph. These standards were all purchased from Scott Specialty Gases. Most of these standards also contain some of the fixed gases. Normally all 10 are analyzed on the same day during a new standardization to minimize the effects of barometric pressure variations. The concentration for the individual components range from 15ppm to 99% (for methane). Maximum concentrations of other hydrocarbons are 12.6% for ethane, 7% for propane, 3% for butanes, and 1% for pentanes. These concentration ranges cover the majority of natural gases submitted for analysis. For each new standardization, the peak area of each concentration for each compound is inserted into a table within the Nelson software. This table is then accessed by the software, which uses point-to-point interpolation, to determine component concentrations for gas samples during analysis. At least four points are used for each component.

Reference Samples The reference sample used as the 1st run of each day and every tenth sample thereafter is representative of the majority of natural gas samples received for analysis. Reference samples are either created from a single sample or are mixed from several samples to give the desired composition. New reference samples are created before the current sample is depleted, and older reference samples are stored for future analysis and cross checks should problems arise. Data obtained for reference samples and expected results based on previous analyses can be provided as part of a QA/QC report.

Replication Every tenth analysis is a replicate. This replicate analysis is done approximately five samples following the check sample, thus a system check is performed at least every five analyses.

Calculation Each individual component for each sample is manually compared to the computer generated output to insure that the peak was labeled correctly and integrated correctly by the Nelson software.

B. Analysis of fixed gases

Equipment Carle AGC 400 Gas Chromatograph, Carle AGC 100 Gas Chromatograph with dual TCD detectors, and Nelson Analytical GC Interface.

Method/Procedure The procedure for analysis of fixed gases is identical to that for analysis of hydrocarbons, with two exceptions. First, for separation of oxygen and argon, an external column on the AGC 100 is used. This column operates at -78°C, therefore a dewar of dry ice/isopropyl alcohol is placed on the column before each run. At the end of each run, the dewar is removed and the column is warmed to room temperature to allow any other components held on the column to be passed. The column is flushed for 15 minutes between runs while the other

GC is in operation. The second difference is that the Carle AGC 100 is not computer controlled. This means that the technician must control the two valves manually. Both valves are switched to forward flow at the start of each analysis, and the Nelson PC interface is then started. Both valves are switched to backflush at predetermined times. The exact time of the switch is determined by monitoring the "real time" display on the computer screen. The lab technician checks all baselines to verify peak integration.

Maintenance GC columns are periodically baked out according to manufacturer's instructions. The septum on the injection valve is periodically replaced.

Calibration/Standardization Approximately 10 different reference standards are used to standardize the Carle AGC 100 and Carle AGC 400 for compositional analysis of fixed gases. All of these gases were purchased from Scott Specialty Gases. Some of these standards also contain hydrocarbons and are used for standardization of those compounds as well. Normally, all gases are analyzed on the same day during a new standardization to minimize the effects of barometric pressure. The concentration ranges of the standards cover the majority of natural gases submitted for analysis. For each new standardization, the peak area of each concentration for each compound is inserted into a table within the Nelson software. This table is then accessed by the software which uses point-to-point interpolation to determine component concentrations for gas samples during analysis.

Check Sample The reference sample used as the 1st run of each day and every tenth sample thereafter is chosen based on its composition. All reference samples contain at least nitrogen and carbon dioxide, and most also contain hydrogen, helium, and argon. The reference samples are either a single sample meeting the above requirements, or are mixtures of several samples to give the desired composition. New reference samples are created before the current sample is depleted, and older reference samples are stored for future analysis and cross checks should problems arise. Data obtained for reference samples and expected results based on previous analyses can be provided as part of a QA/QC report.

Replication Every tenth analysis is a duplicate. This duplicate analysis is performed approximately five samples following the check sample, thus a system check is performed at least every five analyses.

Calculation Each individual component for each sample is manually compared to the computer generated output to insure that the peak was labeled correctly and integrated correctly by the Nelson software.

V. Radiocarbon Analysis of Prepared Samples

Radiocarbon analyses of purified CO2 samples prepared by Isotech are currently being subcontracted to either Beta Analytic Inc., Coral Gables, Florida or to Illinois State Geological Survey, Champaign, Illinois. Beta Analytic is the largest commercial radiocarbon dating laboratory in the world. The attached QA/QC plans have been provided by

BETA ANALYTIC INC
University Branch
4985 S.W. 74 Court
Miami, FL 33155

Illinois State Geological Survey
Natural Resources Building
615 East Peabody Drive
Champaign, IL 61820

ATTACHMENT C

Isotech Quality Assurance and
Quality Control Documentation

National Institute of Standards & Technology
Certificate

Standard Reference Material 4361C
Hydrogen-3 Radioactivity Standard

This Standard Reference Material (SRM) consists of tritiated water, having a standardized and certified quantity of radioactive hydrogen-3. It is intended primarily for the calibration of instruments that are used to measure radioactivity and for the monitoring of radiochemical procedures. The solution, whose composition is specified in Table 1, is contained in a 500-mL borosilicate-glass serum vial.

The certified **hydrogen-3** massic activity value, at a **Reference Time of 1200 EST, 3 September 1998**, is:

$$(2.009 \pm 0.015)\ \mathrm{Bq \cdot g^{-1}}$$

Additional physical, chemical, and radiological properties for the SRM, as well as details on the standardization method, are given in Table 1. Uncertainty intervals for certified quantities are expanded ($k = 2$) uncertainties calculated according to the ISO and NIST Guidelines (see Note 1)*. Table 2 contains a specification of the components that comprise the uncertainty analyses.

The certification of this SRM, within the measurement uncertainties specified, is valid for at least five (5) years after receipt. The solution matrix, in an unopened ampoule, is believed to be indefinitely homogeneous and stable, within its half-life-dependent, useful lifetime. NIST will monitor this material and will report any substantive changes in certification to the purchaser. Should any of the certified values change, purchasers of this SRM will be notified of the change by NIST.

This SRM may represent a radiological hazard. Hydrogen-3 decays by beta particle emission. None of the beta particles escape from the SRM vial. During the decay process no photons are emitted. The SRM should be stored and used at a temperature between 5 and 35 °C. The vial (or any subsequent container should always be clearly marked as containing radioactive material. If the vial is transported it should be packed, marked, labeled and shipped in accordance with the applicable national, international, and carrier regulations. The SRM should be used only by persons qualified to handle radioactive materials.

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, Dr. M.P Unterweger, Acting Group Leader. The overall technical direction and physical measurements leading to certification were provided by Drs. L.L. Lucas and M.P Unterweger 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.

Lisa R. Karam, Deputy Chief
Ionizing Radiation Division

Robert L. Watters, Jr., Chief
Measurement Services Division

Gaithersburg, Maryland 20899
June 1999
Half-life and text revised October 2000
Text revised and expiration date extended February 2004
Text revised and expiration date extended February 2007

*Notes and references are on page 4

Table 1. Properties of SRM 4361C

Certified values

Radionuclide	**Hydrogen-3**
Reference time	**1200 EST, 3 September 1998**
Massic activity of the solution	**2.009 Bq•g^{-1}**
Relative expanded uncertainty ($k = 2$)	**0.76 %** (see Note 1)*

Uncertified information

Source description	Liquid in 500 mL borosilicate-glass media bottle with Teflon-lined screw cap
Solution composition	Distilled water
Solution density	(0.998 ± 0.002) g•mL^{-1} at 20 °C (see Note 2)
Solution mass	Approximately 500g
Radionuclidic impurities	None detected (see Note 3)
Half-lifes used	^{3}H: (4500 ± 8) d (see Note 4)
Calibration method (and instruments)	The certified massic activity for ^{3}H was obtained by 4πβ gas counting of SRM 4927E using the NIST length-compensated internal gas proportional counters and intercomparison of SRMs 4927E/4926E/4361C using two 4πβ liquid-scintillation (LS) counting systems (see Note 5)

*Notes and references are on page 4

Table 2. Uncertainty evaluation for the massic activity for SRM 4361C

	Uncertainty component	Assessment Type †	Relative standard uncertainty contribution on massic activity of ^{3}H (%)
1	Massic count rate of SRM 4927E, corrected for background and decay; standard deviation of the mean for 23 sets of gas counting measurements (see Note 5)	A	0.18
2	LS intercomparison of SRM 4926E and SRM 4927E; standard deviation of the mean for 7 sets of LS measurements	A	0.06
3	Decay corrections for ^{3}H; (for half-life uncertainty of 0.18%)	A	0.002
4	Dilution of SRM 4926E to make SRM 4361C	B	0.12
5	Gram-mole determinations based on pressure, volume and temperature measurements	B	0.20
6	Livetime determinations	B	0.10
7	Extrapolation of count-rate-versus-energy to zero energy	B	0.20
8	Limit for radionuclidic impurities	B	0.05
Relative combined standard uncertainty			**0.38**
Relative expanded uncertainty ($k = 2$)			**0.76**

† = (A) denotes evaluation by statistical methods; (B) denotes evaluation by other methods.

NOTES

Note 1. The uncertainties on certified values are expanded uncertainties, $U = ku_c$. The quantity u_c is the combined standard uncertainty calculated according to the ISO and NIST Guides (see references [1] and [2]). The combined standard uncertainty is multiplied by a coverage factor of $k = 2$ and was chosen to obtain an approximate 95 % level of confidence.

Note 2. The stated uncertainty is two times the standard uncertainty. See reference [2]

Note 3. The estimated lower limit of detection for radionuclidic impurities is 0.001 $Bq \cdot g^{-1}$

Note 4. The stated uncertainty is the standard uncertainty. See reference [2] and [3].

Note 5. Extensive gas-counting measurements were made on the SRM 4927E solution during 1998 and 1999. The SRM 4926E solution was intercompared with the SRM 4927E using LS counting. The SRM 4926E solution was then quantitatively diluted, using distilled water with a measured hydrogen-3 content, to make the SRM 4361C solution. The 4926E/4361C massic activity ratio was confirmed by LS counting.

REFERENCES

[1] International Organization for Standardization (ISO), *Guide to the Expression of Uncertainty in Measurement*, 1993 (corrected and reprinted, 1995). Available from Global Engineering Documents, 12 Inverness Way East, Englewood, CO 80112, U.S.A. Telephone 1-800-854-7179.

[2] 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.

[3] L.L Lucas and M.P. Unterweger, *Comprehensive Review and Critical Evaluation of the Half-Life of Tritium*, J. Res. Natl. Inst. Stand. Technol. **105**, 541-549 (2000)

BETA #	ISOTECH #	Instrument Calibration Hot Prior to Sample Count (Directly Traceable to NIST OX II - SRM 4990C)	Sample Hot Following Sample Count (Directly Traceable to NIST OX II - SRM 4990C)	Calibration Reference Hot (Directly Traceable to NIST OX II - SRM 4990C)	Net Hot Difference Calibration Hot - Sample Hot (+/- 140 cpm limit)	Sample Quench Correction Check (tSIE)	Instrument Quench Correction Normative (tSIE) Calibration Value	Net (tSIE) Difference Normative - Sample (+/- 0.10 limit)	Sample Counting Statistics (% <1 sigma/ %1-2 / %2-3 / %3-4 / % >4)
287280	I-196336	4872 cpm	4881 cpm	4861 cpm	-20 cpm (passed)	5.10	5.05	-0.05	62/38/0/0/0
287281	I-196337	5481 cpm	5490 cpm	5538 cpm	-48 cpm (passed)	5.63	5.60	-0.03	66/33/4/0/0
287282	I-196338	6531 cpm	6549 cpm	6550 cpm	-1 cpm (passed)	6.84	6.81	-0.03	92/8/0/0/0
287283	I-196339	4171 cpm	4171 cpm	4176 cpm	-5 cpm (passed)	5.16	5.20	0.04	67/31/3/0/0
287284	I-196340	5154 cpm	5165 cpm	5191 cpm	-26 cpm (passed)	5.03	5.05	0.02	71/29/0/0/0
287285	I-196341	5730 cpm	5753 cpm	5783 cpm	-30 cpm (passed)	5.80	5.77	-0.03	72/28/0/0/0
287286	I-196342	8721 cpm	8678 cpm	8730 cpm	-52 cpm (passed)	4.46	4.49	0.03	73/27/0/0/0
287287	I-196343	4957 cpm	4985 cpm	5021 cpm	- 36 cpm (passed)	5.52	5.55	0.03	76/24/0/0/0
287288	I-196344	6492 cpm	6504 cpm	6563 cpm	-59 cpm (passed)	6.08	6.06	-0.02	71/25/4/0/0
287289	I-196345	4167 cpm	4171 cpm	4176 cpm	-5 cpm (passed)	5.22	5.16	-0.06	65/35/0/0/0

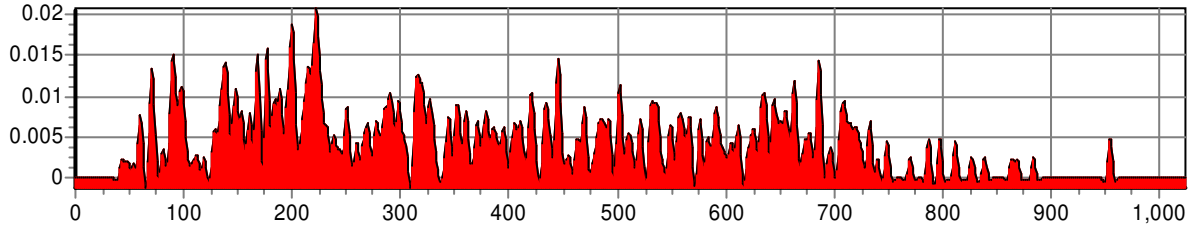
Spectrum report

10/26/2011 12:52:14 PM

Setup information
\my documents\default.ini

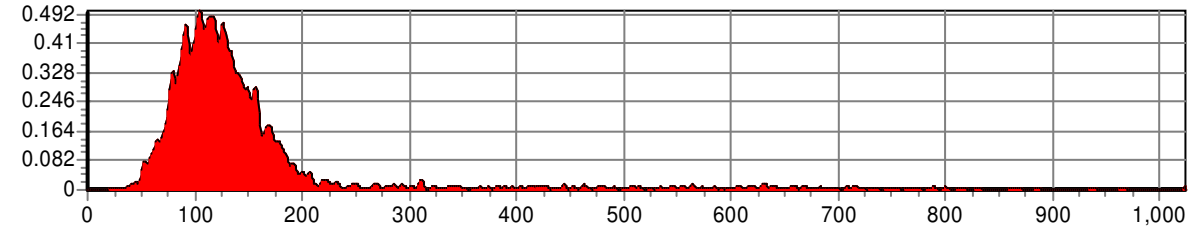
file :Z:\ 3\ GWEN\ LSC\ LCS-3\ GWEN134\ Q054505N.001
spectrum :12
counting time :5861.78 s
SQP(E) :747.42
counting :11/2/2010 3:07:12 AM
sampling :11/2/2010 3:07:12 AM
ID: BLANK_10-25

	C rate	Error	D rate	D error	Eff	BG	FM	MDA



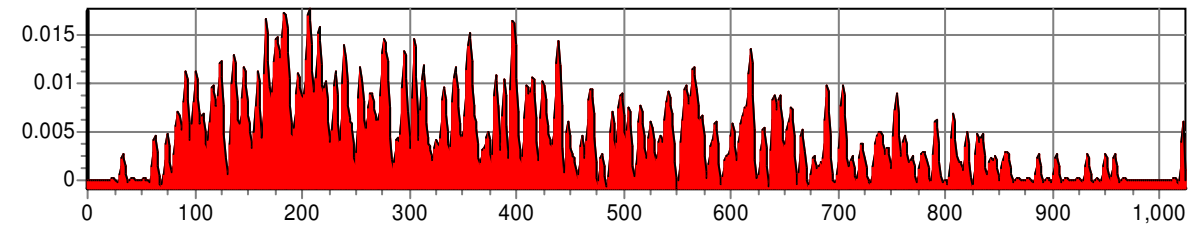
file :Z:\ 3\ GWEN\ LSC\ LCS-3\ GWEN134\ Q064605N.001
spectrum :12
counting time :5861.76 s
SQP(E) :748.40
counting :11/2/2010 11:45:36 PM
sampling :11/2/2010 11:45:36 PM
ID: NIST_10-19

	C rate	Error	D rate	D error	Eff	BG	FM	MDA



file :Z:\ 3\ GWEN\ LSC\ LCS-3\ GWEN136\ Q034305N.001
spectrum :12
counting time :5861.84 s
SQP(E) :746.59
counting :11/7/2010 5:45:36 AM
sampling :11/7/2010 5:45:36 AM
ID: 196343_DC

	C rate	Error	D rate	D error	Eff	BG	FM	MDA



COUNTER 2 (new) **Year 2008-2009**
NIST and BLANK Values

JOB #	NIST date	count date	Value	+/-	SD	AVG NIST :		BLK date	count date	Value	+/-	SD	AVG BLK :		Comments
"NEW" Batch COCKTAIL						TU/cpm/g							cpm		
	14-Nov	18-Nov	776.79	+/-	4.29			14-Nov	17-Nov	1.717	+/-	0.034			
						776.79	+/- 4.29	19-Nov	23-Nov	1.799	+/-	0.036	1.758	+/- 0.035	
	1-Dec	3-Dec	772.91	+/-	4.29	774.85	+/- 4.29	1-Dec	2-Dec	1.727	+/-	0.034	1.748	+/- 0.035	
	9-Dec	11-Dec	775.15	+/-	4.29	774.95	+/- 4.29	9-Dec	12-Dec	1.767	+/-	0.034	1.753	+/- 0.034	
								17-Dec	21-Dec	1.779	+/-	0.034	1.758	+/- 0.034	
Job 10619 CNC	24-Dec	29-Dec	777.09	+/-	4.36	**775.48**	+/- **4.31**	24-Dec	28-Dec	1.806	+/-	0.035	1.776	+/- 0.035	
								5-Jan	8-Jan	1.851	+/-	0.035	**1.829**	**+/- 0.035**	**avg last 2 for CNC**

COUNTER #2

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	12/29/2008		
Value on above date	1.12463	Bq/gm =	9520 TU
Dilution factor	1		
Concentration of dilution	1.12463	Bq/gm =	9520.01 TU

Standard Activity				
Background count rate	1.806	+/-	0.035	cpm
Standard count rate	26.139	+/-	0.132	cpm
Net activity	24.333	+/-	0.136	cpm
Grams of sample	1.9862			grams
Net standard activity per gram	12.251	+/-	0.069	cpm/gm
TU/cpm/gm	777.09	+/-	4.36	

Counting efficiency	
total cpm	67.48 TU of std *0.007088
net actvy (cpm)/g	12.251 (std count - bkgrd count)/g
efficiency %	**18.16** net actvy/total dpm std

DATA FILE **477,479** counter 2
JOB # **10619 CNC**
Count dates: **12-28 through 1-9-09**

	477	479			
Position #	13	14	1	2	3
Sample ID	Blank	NIST 1.9862g	149418 DC	149419 DC	Blank
Cocktail date	24-Dec	24-Dec	5-Jan	5-Jan	5-Jan
Date counted	28-Dec	29-Dec	6-Jan	7-Jan	8-Jan

POS	FNCT1	FNCT2	FNCT3	FNCT4	CPMW5	CPMW6	SQPE	SQPI	CPM	CTIME	TIME	DATE
13	1.82	2.01	1.82	1.82	2	4.6	729.22	207.43	4.6	6000	5:39 AM	12/28/2008
13	1.77	1.98	1.77	1.77	2	5	729.77	213.33	5	6000	7:20 AM	12/28/2008
13	1.92	2.19	1.93	1.93	2.2	5.3	728.62	221.65	5.3	6000	9:01 AM	12/28/2008
13	1.71	1.87	1.71	1.71	1.9	4.4	729.32	210.38	4.4	6000	10:41 AM	12/28/2008
13	1.65	1.76	1.66	1.66	1.8	4.4	728.92	206.14	4.4	6000	12:22 PM	12/28/2008
13	1.88	2.06	1.88	1.88	2.1	5	729.27	213.31	5	6000	2:03 PM	12/28/2008
13	1.87	2.02	1.88	1.87	2	4.7	728.87	213.52	4.7	6000	3:44 PM	12/28/2008
13	1.76	1.96	1.76	1.76	2	4.5	728.72	210.46	4.5	6000	5:25 PM	12/28/2008
13	1.85	2.08	1.85	1.85	2.1	5.1	728.52	217.26	5.1	6000	7:06 PM	12/28/2008
13	1.75	1.91	1.75	1.75	1.9	4.7	729.17	213.78	4.7	6000	8:47 PM	12/28/2008
13	1.86	2.11	1.86	1.86	2.1	4.9	728.87	208.14	4.9	6000	10:28 PM	12/28/2008
13	1.75	1.89	1.75	1.75	1.9	5	728.72	215.56	5	6000	12:09 AM	12/29/2008
13	1.67	1.84	1.67	1.67	1.8	4.5	729.07	216.91	4.5	6000	1:49 AM	12/29/2008
13	1.81	2.08	1.81	1.81	2.1	4.9	729.27	212.81	4.9	6000	3:30 AM	12/29/2008
13	2.02	2.24	2.02	2.02	2.2	5.4	729.12	214.53	5.4	6000	5:11 AM	12/29/2008
14	25.96	26.76	26.04	26.01	26.8	30.6	729.77	126.14	30.6	6000	6:52 AM	12/29/2008
14	26.06	26.8	26.1	26.08	26.8	30.5	729.62	124.98	30.5	6000	8:33 AM	12/29/2008
14	26.47	27.26	26.54	26.49	27.3	31.3	729.72	126.46	31.3	6000	10:14 AM	12/29/2008
14	25.93	26.64	25.95	25.94	26.6	30.1	729.82	123.08	30.1	6000	11:55 AM	12/29/2008
14	25.99	26.67	26.02	26.01	26.7	30.5	730.37	125.18	30.4	6000	1:36 PM	12/29/2008
14	27.11	27.75	27.14	27.12	27.8	31.6	729.52	124.7	31.6	6000	3:17 PM	12/29/2008
14	27	27.71	27.02	27.01	27.7	31.3	729.12	123.75	31.3	6000	4:58 PM	12/29/2008
14	26.56	27.33	26.68	26.61	27.4	30.8	729.42	123.61	30.8	6000	6:38 PM	12/29/2008
14	25.41	26.12	25.43	25.41	26.1	30.2	729.07	125.95	30.2	6000	8:19 PM	12/29/2008
14	25.94	26.62	25.99	25.94	26.6	30.6	729.57	125.41	30.6	6000	10:00 PM	12/29/2008
14	26.37	27.19	26.43	26.38	27.2	30.6	728.97	123.32	30.6	6000	11:41 PM	12/29/2008
14	26.17	26.82	26.2	26.18	26.8	30.8	729.97	125.22	30.8	6000	1:22 AM	12/30/2008
14	26.7	27.39	26.76	26.73	27.4	30.9	729.17	123.07	30.9	6000	3:03 AM	12/30/2008
14	24.99	25.69	25.06	25.04	25.7	29.5	729.12	125.26	29.5	6000	4:44 AM	12/30/2008
14	25.42	26.12	25.45	25.42	26.1	29.4	728.82	122.86	29.4	6000	6:25 AM	12/30/2008

POS	FNCT1	FNCT2	FNCT3	FNCT4	CPMW5	CPMW6	SQPE	SQPI	CPM	CTIME	TIME	DATE	RPT
1	1.87	2.01	1.87	1.87	2	4.9	729.52	213.51	4.9	6000	8:39 AM	1/6/2009	1
1	2	2.19	2	2	2.2	5	728.77	214.22	5	6000	10:20 AM	1/6/2009	2
1	1.92	2.09	1.93	1.93	2.1	5.3	729.42	215.33	5.3	6000	12:01 PM	1/6/2009	3
1	1.73	1.96	1.73	1.73	2	5.2	729.92	215.91	5.2	6000	1:42 PM	1/6/2009	4
1	1.94	2.18	1.95	1.95	2.2	5.9	729.02	219.52	5.9	6000	3:23 PM	1/6/2009	5
1	2.19	2.42	2.2	2.19	2.4	5.4	728.27	207.3	5.4	6000	5:03 PM	1/6/2009	6
1	2.1	2.26	2.11	2.1	2.3	5.5	729.67	217.72	5.5	6000	6:44 PM	1/6/2009	7
1	2.11	2.31	2.11	2.11	2.3	5.5	727.97	216.93	5.5	6000	8:25 PM	1/6/2009	8
1	1.89	2.07	1.89	1.89	2.1	5	729.72	212.54	5	6000	10:06 PM	1/6/2009	9
1	1.89	2.03	1.89	1.89	2	5.3	728.87	217.6	5.3	6000	11:47 PM	1/6/2009	10
1	2.26	2.48	2.27	2.27	2.5	5.6	729.42	206.97	5.6	6000	1:28 AM	1/7/2009	11
1	2.03	2.31	2.06	2.06	2.3	5.5	729.47	209.5	5.5	6000	3:09 AM	1/7/2009	12
1	1.96	2.27	1.96	1.96	2.3	5.5	729.07	218.31	5.5	6000	4:50 AM	1/7/2009	13
1	2.06	2.18	2.06	2.06	2.2	5.2	728.27	210.04	5.2	6000	6:31 AM	1/7/2009	14
1	2.1	2.33	2.1	2.1	2.3	5.2	729.02	209.35	5.2	6000	8:11 AM	1/7/2009	15
2	1.98	2.15	1.98	1.98	2.1	5.6	729.97	214.1	5.6	6000	9:52 AM	1/7/2009	1
2	2.14	2.37	2.15	2.14	2.4	5.3	728.72	203.51	5.3	6000	11:33 AM	1/7/2009	2
2	2.17	2.29	2.17	2.17	2.3	5.3	729.67	208.79	5.3	6000	1:14 PM	1/7/2009	3
2	1.94	2.13	1.94	1.94	2.1	5.1	728.57	210.88	5.1	6000	2:55 PM	1/7/2009	4
2	2.13	2.34	2.13	2.13	2.3	5.5	729.82	212.98	5.5	6000	4:36 PM	1/7/2009	5
2	2.04	2.26	2.04	2.04	2.3	5.7	728.72	215.16	5.7	6000	6:17 PM	1/7/2009	6
2	2.14	2.31	2.14	2.14	2.3	5.5	729.72	208.83	5.5	6000	7:58 PM	1/7/2009	7
2	1.97	2.2	1.97	1.97	2.2	5.3	728.47	212.16	5.3	6000	9:39 PM	1/7/2009	8
2	2.07	2.23	2.07	2.07	2.2	5.3	729.47	210.22	5.3	6000	11:20 PM	1/7/2009	9
2	1.63	1.8	1.63	1.63	1.8	4.8	728.82	218.89	4.8	6000	1:00 AM	1/8/2009	10
2	1.96	2.11	1.96	1.96	2.1	5.1	728.97	215.86	5.1	6000	2:41 AM	1/8/2009	11
2	1.79	1.99	1.79	1.79	2	4.9	729.17	212.63	4.9	6000	4:22 AM	1/8/2009	12
2	2.14	2.37	2.15	2.14	2.4	5.7	729.12	211.79	5.7	6000	6:03 AM	1/8/2009	13
2	1.75	1.93	1.76	1.76	1.9	5.4	728.27	223.95	5.4	6000	7:44 AM	1/8/2009	14
2	2.04	2.27	2.04	2.04	2.3	5.2	728.52	210.02	5.2	6000	9:25 AM	1/8/2009	15
3	1.92	2.08	1.92	1.92	2.1	5	730.22	217.22	5	6000	11:06 AM	1/8/2009	1
3	1.75	1.89	1.75	1.75	1.9	4.7	728.82	213.85	4.7	6000	12:47 PM	1/8/2009	2
3	1.83	2.03	1.83	1.83	2	5.2	731.32	218.19	5.2	6000	2:28 PM	1/8/2009	3
3	1.75	1.91	1.75	1.75	1.9	5.1	730.32	225.14	5.1	6000	4:09 PM	1/8/2009	4
3	2.02	2.16	2.03	2.03	2.2	5.3	729.52	212.29	5.3	6000	5:49 PM	1/8/2009	5
3	1.9	2.11	1.9	1.9	2.1	5	729.87	213.38	5	6000	7:30 PM	1/8/2009	6
3	1.85	2.11	1.85	1.85	2.1	5.1	729.97	213.34	5.1	6000	9:11 PM	1/8/2009	7
3	1.71	1.91	1.71	1.71	1.9	4.7	730.57	216.37	4.7	6000	10:52 PM	1/8/2009	8
3	1.7	1.85	1.7	1.7	1.8	4.6	729.92	216.47	4.6	6000	12:33 AM	1/9/2009	9
3	1.83	2.03	1.84	1.84	2	4.6	730.87	210.94	4.6	6000	2:14 AM	1/9/2009	10
3	1.83	1.98	1.83	1.83	2	4.7	730.82	211.82	4.7	6000	3:55 AM	1/9/2009	11
3	1.9	2.03	1.9	1.9	2	4.8	728.67	211.64	4.8	6000	5:36 AM	1/9/2009	12
3	1.91	2.11	1.91	1.91	2.1	5.3	729.87	216.23	5.3	6000	7:17 AM	1/9/2009	13
3	1.87	2.09	1.87	1.87	2.1	4.8	729.87	208.58	4.8	6000	8:57 AM	1/9/2009	14
3	2	2.2	2	2	2.2	5.2	729.87	208.19	5.2	6000	10:38 AM	1/9/2009	15

LABORATORY # 149418

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	12/29/2008		
Value on above date	1.12463	Bq/gm =	9520 TU
Dilution factor	1		
Concentration of dilution	1.12463	Bq/gm =	9520.01 TU

Standard Activity				
Background count rate	1.806	+/-	0.035	cpm
Standard count rate	26.139	+/-	0.132	cpm
Net activity	24.333	+/-	0.136	cpm
Grams of sample	1.9862			grams
Net standard activity per gram	12.251	+/-	0.069	cpm/gm
TU/cpm/gm	777.09	+/-	4.36	

Sample Activity				
Background rate	1.851	+/-	0.035	cpm
Sample count rate	2.003	+/-	0.037	cpm
Net activity	0.152	+/-	0.0506	cpm
Grams of sample	10.0258			grams
Net sample activity per gram	0.0152	+/-	0.0051	cpm/gm
TU	11.78	+/-	3.925	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**11.781**	**+/-**	**3.927 TU**

LABORATORY # 149418

methane

Avg Standard Activity				
TU/cpm/gm	**775.48**	**+/-**	**4.31**	

Sample Activity				
Background rate	1.829	+/-	0.035	cpm
Sample count rate	2.003	+/-	0.037	cpm
Net activity	0.175	+/-	0.0505	cpm
Grams of sample	10.0258			grams
Net sample activity per gram	0.0174	+/-	0.0050	cpm/gm
TU	13.51	+/-	3.907	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**13.510**	**+/-**	**3.909 TU**

LABORATORY # 149419

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	12/29/2008		
Value on above date	1.12463	Bq/gm =	9520 TU
Dilution factor	1		
Concentration of dilution	1.12463	Bq/gm =	9520.01 TU

Standard Activity				
Background count rate	1.806	+/-	0.035	cpm
Standard count rate	26.139	+/-	0.132	cpm
Net activity	24.333	+/-	0.136	cpm
Grams of sample	1.9862			grams
Net standard activity per gram	12.251	+/-	0.069	cpm/gm
TU/cpm/gm	777.09	+/-	4.36	

Sample Activity				
Background rate	1.851	+/-	0.035	cpm
Sample count rate	1.993	+/-	0.036	cpm
Net activity	0.141	+/-	0.0506	cpm
Grams of sample	9.9756			grams
Net sample activity per gram	0.0142	+/-	0.0051	cpm/gm
TU	11.01	+/-	3.940	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**11.010**	**+/-**	**3.941 TU**

LABORATORY # 149419

methane

Avg Standard Activity				
TU/cpm/gm	**775.48**	**+/-**	**4.31**	

Sample Activity				
Background rate	1.829	+/-	0.035	cpm
Sample count rate	1.993	+/-	0.036	cpm
Net activity	0.164	+/-	0.0504	cpm
Grams of sample	9.9756			grams
Net sample activity per gram	0.0164	+/-	0.0051	cpm/gm
TU	12.75	+/-	3.921	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**12.749**	**+/-**	**3.923 TU**

COUNTER 3 (new) **Year 2009**
NIST and BLANK Values

JOB #	NIST date	count date	Value	+/-	SD	AVG NIST :		BLK date	count date	Value	+/-	SD	AVG BLK :		Comments
	4-Feb	5-Feb	434.66	+/-	2.17			4-Feb	5-Feb	1.421	+/-	0.042			
	"	6-Feb	430.62	+/-	2.13			"	6-Feb	1.341	+/-	0.037			
	"	8-Feb	434.56	+/-	2.17	433.28	+/- 2.15	"	7-Feb	1.438	+/-	0.038			
Job 10796 CNC	10-Feb	14-Feb	431.23	+/-	2.54	**432.77**	**+/- 2.25**	10-Feb	13-Feb	1.273	+/-	0.040			
								"	17-Feb	1.296	+/-	0.040	1.354	+/- 0.039	**1.296 +/- 0.040 for CNC job 10796**

COUNTER #3

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/14/2009		
Value on above date	1.11653	Bq/gm =	9451 TU
Dilution factor	1		
Concentration of dilution	1.11653	Bq/gm =	9451.40 TU

Standard Activity				
Background count rate	1.273	+/-	0.040	cpm
Standard count rate	44.849	+/-	0.253	cpm
Net activity	43.576	+/-	0.256	cpm
Grams of sample	1.9882			grams
Net standard activity per gram	21.917	+/-	0.129	cpm/gm
TU/cpm/gm	431.23	+/-	2.54	

Counting efficiency	
total cpm	66.99 TU of std *0.007088
net actvy (cpm)/g	21.917 (std count - bkgrd count)/g
efficiency %	**32.72** net actvy/total dpm std

DATA FILE **090210** counter 3
JOB # **10796 CNC**
Count dates: **2-12 through 2-20-09**
window 3(60-220)

Position #	24	25	26	27	28	29	30	31	32	26	33	34	35	36	37
Sample ID	152394 DC	152395 DC	Blank	NIST 1.9882 g	152396 DC	152397 DC	152398 DC	152399 DC	152400 DC	Blank recount	152401 DC	152402 DC	152403 DC	152404 DC	152405 DC
Cocktail date	10-Feb	10-Feb	10-Feb	10-Feb	10-Feb	10-Feb	10-Feb	10-Feb	10-Feb	10-Feb	10-Feb	10-Feb	10-Feb	10-Feb	10-Feb
Date counted	12-Feb	12-Feb	13-Feb	14-Feb	14-Feb	15-Feb	15-Feb	16-Feb	17-Feb	17-Feb	18-Feb	18-Feb	19-Feb	20-Feb	20-Feb

Jobs xxxxxx, 10796 CNC

TUE 10 FEB 2009 13:25

*** DIRECTORY PATH :C:\GWEN8 ***

PARAMETER GROUP: 8

ID: 080210

00A PROGRAM MODE 6 ->

ORDER	POS	ID	CTIME	COUNTS	CUCNTS	MCW	REP	STD	STMS	STIME
1	21	1!	xxxxxx							
2	22	1!	xxxxxx							
3	23	1!	xxxxxx							
4	24	152394	100:00	NO LIM	NO LIM	1	8	N		
5	25	152395	100:00	NO LIM	NO LIM	1	8	N		
6	26	BLANK	100:00	NO LIM	NO LIM	1	8	N		
7	27	NIST	100:00	NO LIM	NO LIM	1	8	N		
8	28	152396	100:00	NO LIM	NO LIM	1	8	N		
9	29	152397	100:00	NO LIM	NO LIM	1	8	N		
10	30	152398	100:00	NO LIM	NO LIM	1	8	N		
11	31	152399	100:00	NO LIM	NO LIM	1	8	N		
12	32	152400	100:00	NO LIM	NO LIM	1	8	N		
13	26	BLANK	100:00	NO LIM	NO LIM	1	8	N		
14	33	152401	100:00	NO LIM	NO LIM	1	8	N		
15	34	152402	100:00	NO LIM	NO LIM	1	8	N		
16	35	152403	100:00	NO LIM	NO LIM	1	8	N		
17	36	152404	100:00	NO LIM	NO LIM	1	8	N		
18	37	152405	100:00	NO LIM	NO LIM	1	8	N		

NUMBER OF CYCLES 1

COINCIDENCE BIAS (L/H) L

MCA INPUT TRIGG. INHIBIT MEMORY SPLIT

1 LRSUM DCOS G L*R

2 GSUM G L*R

WINDOW	CHANNELS		MCA	HALF
2	50-	270	1	2
3	60-	220	1	2
4	50-	320	1	1
5	50-	270	1	1
6	60-	220	1	1
7	1-	1024	2	1
8	1-	1024	2	2

SELECTED PRINTOUT FOR TERMINAL 1 (A)

	CYC	POS	REP	CTIME	CUCNTS	SQP	ID	CPM1	CPM2	**CPM3**	CPM4	CPM5	CPM6	CPM7	CPM8
Q012101N.001	1	21	1	100:01.8	285	0		2.91	2.41	**1.77**	0.25	0.25	0.22	1301	27.09
Q012102N.001	1	21	2	100:01.8	539	0		2.59	2.11	**1.51**	0.16	0.16	0.12	1301	26.23
Q012103N.001	1	21	3	100:01.8	774	0		2.4	2.09	**1.63**	0.13	0.13	0.1	1300	27.41
Q012104N.001	1	21	4	100:01.8	1031	0		2.63	2.06	**1.59**	0.16	0.16	0.1	1298	26.49
Q012105N.001	1	21	5	100:01.8	1253	0		2.27	1.84	**1.51**	0.03	0.03	0.02	1298	27.3
Q012106N.001	1	21	6	100:01.8	1477	0		2.29	1.96	**1.51**	0.06	0.06	0.05	1301	26.57
Q012107N.001	1	21	7	100:01.8	1690	0		2.18	1.86	**1.34**	0.06	0.06	0.05	1313	27.3
Q012108N.001	1	21	8	100:01.8	1920	0		2.35	1.94	**1.42**	0.07	0.07	0.07	1312	27
Q012109N.001	1	21	9	100:01.8	2162	0		2.47	2.06	**1.39**	0.04	0.04	0.04	1328	25.73
Q012110N.001	1	21	10	100:01.8	2404	0		2.47	1.97	**1.56**	0.02	0.02	0.02	1334	26.01
Q022201N.001	1	22	1	100:01.8	246	0		2.51	2.03	**1.58**	0.05	0.05	0.05	1336	27.42
Q022202N.001	1	22	2	100:01.8	489	0		2.48	1.93	**1.4**	0.15	0.15	0.11	1347	27.78
Q022203N.001	1	22	3	100:01.8	746	0		2.63	2.16	**1.54**	0.06	0.06	0.04	1356	27.18
Q022204N.001	1	22	4	100:01.8	1053	0		3.14	2.62	**2.07**	0.06	0.06	0.04	1373	27.17
Q022205N.001	1	22	5	100:01.8	1292	0		2.44	2.1	**1.5**	0.06	0.06	0.03	1384	29.08
Q022206N.001	1	22	6	100:01.8	1499	0		2.11	1.83	**1.37**	0.06	0.06	0.04	1372	28.24
Q022207N.001	1	22	7	100:01.8	1748	0		2.54	2.07	**1.61**	0.02	0.02	0.02	1349	27.66
Q022208N.001	1	22	8	100:01.8	1981	0		2.38	1.92	**1.47**	0.08	0.08	0.08	1322	26.8
Q032301N.001	1	23	1	100:01.8	210	0		2.14	1.69	**1.19**	0.04	0.04	0	1312	26.1
Q032302N.001	1	23	2	100:01.8	451	0		2.46	1.92	**1.45**	0.05	0.05	0.03	1303	27.02
Q032303N.001	1	23	3	100:01.8	664	0		2.18	1.81	**1.29**	0.07	0.07	0.05	1295	26.99
Q032304N.001	1	23	4	100:01.8	866	0		2.06	1.6	**1.21**	0.04	0.04	0.02	1283	27.2
Q032305N.001	1	23	5	100:01.8	1061	0		1.99	1.69	**1.25**	0.05	0.05	0.05	1284	26.02
Q032306N.001	1	23	6	100:01.8	1282	0		2.26	1.89	**1.38**	0.08	0.08	0.04	1276	26.85
Q032307N.001	1	23	7	100:01.8	1541	0		2.65	2.13	**1.57**	0.07	0.07	0.07	1274	26.34
Q032308N.001	1	23	8	100:01.8	1765	0		2.29	1.84	**1.42**	0.05	0.05	0.03	1273	26.69
Q042401N.001	1	24	1	100:01.8	199	0	**152394**	2.03	1.74	**1.27**	0.06	0.06	0.05	1262	26.37
Q042402N.001	1	24	2	100:01.8	444	0	**152394**	2.5	2.15	**1.47**	0.07	0.07	0.05	1261	24.96
Q042403N.001	1	24	3	100:01.8	680	0	**152394**	2.41	1.98	**1.44**	0.04	0.04	0.04	1259	25.84
Q042404N.001	1	24	4	100:01.8	894	0	**152394**	2.19	1.7	**1.17**	0.05	0.05	0.05	1268	26.59
Q042405N.001	1	24	5	100:01.8	1130	0	**152394**	2.41	1.95	**1.52**	0.09	0.09	0.06	1270	26.46
Q042406N.001	1	24	6	100:01.8	1351	0	**152394**	2.26	1.9	**1.35**	0.1	0.1	0.08	1259	26.26
Q042407N.001	1	24	7	100:01.8	1557	0	**152394**	2.1	1.76	**1.36**	0.07	0.07	0.07	1265	25.66
Q042408N.001	1	24	8	100:01.8	1762	0	**152394**	2.09	1.66	**1.27**	0.06	0.06	0.04	1254	26.33
Q052501N.001	1	25	1	100:01.8	218	0	**152395**	2.23	1.84	**1.42**	0.1	0.1	0.07	1253	26.36
Q052502N.001	1	25	2	100:01.8	460	0	**152395**	2.47	2.03	**1.59**	0.03	0.03	0.02	1253	26.61
Q052503N.001	1	25	3	100:01.8	672	0	**152395**	2.16	1.77	**1.18**	0.09	0.09	0.08	1254	25.29
Q052504N.001	1	25	4	100:01.8	889	0	**152395**	2.22	1.77	**1.33**	0.04	0.04	0.03	1248	25.58
Q052505N.001	1	25	5	100:01.8	1121	0	**152395**	2.37	1.93	**1.52**	0.05	0.05	0.02	1252	25.78
Q052506N.001	1	25	6	100:01.8	1335	0	**152395**	2.19	1.83	**1.41**	0.07	0.07	0.04	1258	25.73
Q052507N.001	1	25	7	100:01.8	1538	0	**152395**	2.07	1.68	**1.23**	0.06	0.05	0.03	1256	25.39
Q052508N.001	1	25	8	100:01.8	1760	0	**152395**	2.27	1.89	**1.51**	0.03	0.03	0.02	1262	25.72
Q062601N.001	1	26	1	100:01.8	209	0	**BLANK**	2.13	1.81	**1.31**	0.03	0.03	0.02	1264	26.57
Q062602N.001	1	26	2	100:01.8	416	0	**BLANK**	2.11	1.72	**1.23**	0.01	0.01	0.01	1267	26.23
Q062603N.001	1	26	3	100:01.8	634	0	**BLANK**	2.23	1.8	**1.28**	0.04	0.04	0.01	1269	25.98
Q062604N.001	1	26	4	100:01.8	865	0	**BLANK**	2.36	1.88	**1.42**	0.06	0.06	0.05	1279	26.37
Q062605N.001	1	26	5	100:01.8	1041	0	**BLANK**	1.8	1.45	**1.08**	0.02	0.02	0.01	1280	25.75
Q062606N.001	1	26	6	100:01.8	1221	0	**BLANK**	1.84	1.6	**1.17**	0.04	0.04	0.04	1277	26.33
Q062607N.001	1	26	7	100:01.8	1448	0	**BLANK**	2.32	1.95	**1.41**	0.03	0.03	0.02	1280	26.68
Q062608N.001	1	26	8	100:01.8	1634	0	**BLANK**	1.9	1.57	**1.28**	0.09	0.09	0.08	1277	26.6
Q072701N.001	1	27	1	100:01.8	4482	0	**NIST**	45.9	45.5	**44.35**	0.09	0.09	0.06	1284	26.36

Q072702N.001	1	27	2	100:01.8	9080	0	**NIST**	47.1	46.4	**45.36**	0.03	0.03	0.03	1277	26.69
Q072703N.001	1	27	3	100:01.8	13595	0	**NIST**	46.2	45.9	**44.57**	0.07	0.07	0.06	1267	26.96
Q072704N.001	1	27	4	100:01.8	17928	0	**NIST**	44.3	44	**42.93**	0.07	0.07	0.05	1266	25.92
Q072705N.001	1	27	5	100:01.8	22448	0	**NIST**	46.3	45.7	**44.71**	0.03	0.03	0.02	1270	27.57
Q072706N.001	1	27	6	100:01.8	26960	0	**NIST**	46.2	45.8	**44.69**	0.04	0.04	0.04	1266	26.11
Q072707N.001	1	27	7	100:01.8	31543	0	**NIST**	46.9	46.5	**45.28**	0.06	0.06	0.03	1266	25.79
Q072708N.001	1	27	8	100:01.8	36089	0	**NIST**	46.5	46	**44.98**	0.05	0.05	0.04	1264	27.1
Q082801N.001	1	28	1	100:01.8	197	0	**152396**	2.01	1.65	**1.32**	0.03	0.03	0.02	1262	26.14
Q082802N.001	1	28	2	100:01.8	412	0	**152396**	2.2	1.87	**1.4**	0.07	0.07	0.07	1258	25.69
Q082803N.001	1	28	3	100:01.8	605	0	**152396**	1.97	1.57	**1.19**	0.06	0.06	0.03	1259	26.77
Q082804N.001	1	28	4	100:01.8	819	0	**152396**	2.19	1.85	**1.26**	0.04	0.04	0.03	1252	26.32
Q082805N.001	1	28	5	100:01.8	1014	0	**152396**	1.99	1.54	**1.13**	0.04	0.04	0.02	1259	26.05
Q082806N.001	1	28	6	100:01.8	1210	0	**152396**	2	1.54	**1.14**	0.06	0.06	0.02	1248	26.02
Q082807N.001	1	28	7	100:01.8	1427	0	**152396**	2.22	1.91	**1.41**	0.07	0.07	0.04	1247	26.4
Q082808N.001	1	28	8	100:01.8	1639	0	**152396**	2.16	1.76	**1.34**	0.04	0.04	0.03	1250	26.07
Q092901N.001	1	29	1	100:01.8	196	0	**152397**	2	1.66	**1.19**	0.09	0.09	0.07	1252	25.2
Q092902N.001	1	29	2	100:01.8	390	0	**152397**	1.98	1.63	**1.29**	0.07	0.07	0.06	1257	26.25
Q092903N.001	1	29	3	100:01.8	603	0	**152397**	2.18	1.84	**1.4**	0.06	0.06	0.01	1248	25.75
Q092904N.001	1	29	4	100:01.8	826	0	**152397**	2.28	1.98	**1.47**	0.05	0.05	0.04	1244	26.28
Q092905N.001	1	29	5	100:01.8	1040	0	**152397**	2.19	1.84	**1.31**	0.08	0.08	0.06	1249	26.24
Q092906N.001	1	29	6	100:01.8	1250	0	**152397**	2.14	1.73	**1.34**	0.03	0.03	0.02	1259	26.8
Q092907N.001	1	29	7	100:01.8	1459	0	**152397**	2.13	1.82	**1.42**	0.07	0.07	0.05	1244	26.51
Q092908N.001	1	29	8	100:01.8	1647	0	**152397**	1.92	1.55	**1.15**	0.04	0.04	0.02	1252	25.37
Q103001N.001	1	30	1	100:01.8	183	0	**152398**	1.87	1.56	**1.08**	0.04	0.04	0.03	1243	25.85
Q103002N.001	1	30	2	100:01.8	400	0	**152398**	2.22	1.82	**1.31**	0.05	0.05	0.03	1252	26.26
Q103003N.001	1	30	3	100:01.8	609	0	**152398**	2.13	1.8	**1.44**	0.05	0.05	0.03	1245	25.42
Q103004N.001	1	30	4	100:01.8	824	0	**152398**	2.2	1.89	**1.38**	0.02	0.02	0.01	1235	25.49
Q103005N.001	1	30	5	100:01.8	995	0	**152398**	1.75	1.47	**1.12**	0.02	0.02	0.02	1243	25.36
Q103006N.001	1	30	6	100:01.8	1193	0	**152398**	2.02	1.67	**1.27**	0.09	0.09	0.06	1236	25.65
Q103007N.001	1	30	7	100:01.8	1407	0	**152398**	2.19	1.74	**1.23**	0.03	0.03	0.01	1247	26.59
Q103008N.001	1	30	8	100:01.8	1604	0	**152398**	2.01	1.55	**1.12**	0.04	0.04	0.03	1236	25.66
Q113101N.001	1	31	1	100:01.8	207	0	**152399**	2.11	1.75	**1.29**	0.06	0.06	0.03	1231	25.28
Q113102N.001	1	31	2	100:01.8	433	0	**152399**	2.31	1.95	**1.49**	0.03	0.03	0.02	1232	26.12
Q113103N.001	1	31	3	100:01.8	627	0	**152399**	1.98	1.72	**1.32**	0.07	0.07	0.05	1223	25.99
Q113104N.001	1	31	4	100:01.8	856	0	**152399**	2.34	1.86	**1.43**	0.06	0.06	0.04	1228	27.15
Q113105N.001	1	31	5	100:01.8	1068	0	**152399**	2.16	1.76	**1.32**	0.07	0.07	0.06	1246	25.91
Q113106N.001	1	31	6	100:01.8	1285	0	**152399**	2.22	1.87	**1.35**	0.03	0.03	0.02	1235	24.62
Q113107N.001	1	31	7	100:01.8	1519	0	**152399**	2.39	1.99	**1.37**	0.04	0.04	0.01	1243	26.08
Q113108N.001	1	31	8	100:01.8	1728	0	**152399**	2.13	1.82	**1.41**	0.07	0.07	0.04	1243	26.19
Q123201N.001	1	32	1	100:01.8	201	0	**152400**	2.05	1.59	**1.2**	0.07	0.07	0.04	1247	26.08
Q123202N.001	1	32	2	100:01.8	424	0	**152400**	2.28	1.86	**1.34**	0.07	0.07	0.07	1243	27.06
Q123203N.001	1	32	3	100:01.8	641	0	**152400**	2.22	1.83	**1.36**	0.08	0.08	0.07	1247	26.73
Q123204N.001	1	32	4	100:01.8	845	0	**152400**	2.08	1.72	**1.34**	0.05	0.05	0.03	1246	26.63
Q123205N.001	1	32	5	100:01.8	1058	0	**152400**	2.18	1.72	**1.38**	0.04	0.04	0.03	1261	27.11
Q123206N.001	1	32	6	100:01.8	1265	0	**152400**	2.11	1.75	**1.39**	0.13	0.13	0.11	1262	26.56
Q123207N.001	1	32	7	100:01.8	1492	0	**152400**	2.32	1.84	**1.37**	0.05	0.05	0.04	1263	26.7
Q123208N.001	1	32	8	100:01.8	1715	0	**152400**	2.28	1.84	**1.29**	0.03	0.03	0.01	1269	26.43
Q132601N.001	1	26	1	100:01.8	245	0	**BLANK**	2.5	2.03	**1.51**	0.07	0.07	0.06	1279	27.04
Q132602N.001	1	26	2	100:01.8	480	0	**BLANK**	2.4	2.05	**1.48**	0.06	0.06	0.05	1289	25.78
Q132603N.001	1	26	3	100:01.8	692	0	**BLANK**	2.16	1.74	**1.31**	0.04	0.04	0.04	1300	26.22
Q132604N.001	1	26	4	100:01.8	898	0	**BLANK**	2.1	1.75	**1.24**	0.03	0.03	0.02	1297	26.84
Q132605N.001	1	26	5	100:01.8	1121	0	**BLANK**	2.28	1.92	**1.46**	0.02	0.02	0.02	1311	27.89

Q132606N.001	1	26	6	100:01.8	1308	0	**BLANK**	1.91	1.53	**1.1**	0.03	0.03	0.02	1314	26.56
Q132607N.001	1	26	7	100:01.8	1493	0	**BLANK**	1.89	1.54	**1.08**	0	0	0	1331	27.78
Q132608N.001	1	26	8	100:01.8	1690	0	**BLANK**	2.01	1.57	**1.19**	0.04	0.04	0.04	1326	27.81
Q143301N.001	1	33	1	100:01.8	221	0	**152401**	2.26	1.85	**1.38**	0.06	0.06	0.05	1324	27.34
Q143302N.001	1	33	2	100:01.8	425	0	**152401**	2.08	1.65	**1.29**	0.06	0.06	0.03	1351	26.47
Q143303N.001	1	33	3	100:01.8	648	0	**152401**	2.28	1.99	**1.56**	0.04	0.04	0.04	1346	26.24
Q143304N.001	1	33	4	100:01.8	874	0	**152401**	2.31	1.94	**1.38**	0.04	0.04	0.02	1362	28.49
Q143305N.001	1	33	5	100:01.8	1115	0	**152401**	2.46	2.07	**1.55**	0.05	0.05	0.04	1364	28.93
Q143306N.001	1	33	6	100:01.8	1331	0	**152401**	2.21	1.9	**1.42**	0.06	0.06	0.05	1368	27.51
Q143307N.001	1	33	7	100:01.8	1543	0	**152401**	2.16	1.86	**1.31**	0.01	0.01	0.01	1368	28.25
Q143308N.001	1	33	8	100:01.8	1772	0	**152401**	2.34	1.97	**1.41**	0.05	0.05	0.01	1357	28.25
Q153401N.001	1	34	1	100:01.8	221	0	**152402**	2.26	1.81	**1.4**	0.06	0.06	0.03	1349	28.39
Q153402N.001	1	34	2	100:01.8	453	0	**152402**	2.37	1.97	**1.56**	0.04	0.04	0.02	1349	26.98
Q153403N.001	1	34	3	100:01.8	656	0	**152402**	2.07	1.68	**1.21**	0.03	0.03	0.02	1345	27.88
Q153404N.001	1	34	4	100:01.8	874	0	**152402**	2.23	1.79	**1.25**	0.07	0.07	0.05	1325	27.83
Q153405N.001	1	34	5	100:01.8	1080	0	**152402**	2.1	1.76	**1.38**	0.06	0.06	0.04	1320	27.11
Q153406N.001	1	34	6	100:01.8	1302	0	**152402**	2.27	1.92	**1.41**	0.1	0.1	0.1	1318	27
Q153407N.001	1	34	7	100:01.8	1516	0	**152402**	2.19	1.83	**1.24**	0.06	0.06	0.04	1310	27.61
Q153408N.001	1	34	8	100:01.8	1745	0	**152402**	2.34	1.78	**1.34**	0.06	0.06	0.03	1317	27.71
Q163501N.001	1	35	1	100:01.8	201	0	**152403**	2.05	1.67	**1.24**	0.04	0.04	0.03	1307	26.89
Q163502N.001	1	35	2	100:01.8	426	0	**152403**	2.3	1.96	**1.65**	0.08	0.08	0.04	1294	27.48
Q163503N.001	1	35	3	100:01.8	670	0	**152403**	2.49	1.98	**1.41**	0.04	0.04	0.02	1295	26.83
Q163504N.001	1	35	4	100:01.8	889	0	**152403**	2.24	1.81	**1.36**	0.02	0.02	0.01	1284	26.96
Q163505N.001	1	35	5	100:01.8	1077	0	**152403**	1.92	1.62	**1.31**	0.05	0.05	0.03	1287	26.2
Q163506N.001	1	35	6	100:01.8	1293	0	**152403**	2.21	1.81	**1.28**	0.08	0.08	0.05	1272	26.15
Q163507N.001	1	35	7	100:01.8	1516	0	**152403**	2.28	1.89	**1.34**	0.04	0.04	0.02	1277	26.41
Q163508N.001	1	35	8	100:01.8	1724	0	**152403**	2.12	1.62	**1.19**	0.06	0.06	0.03	1284	26.53
Q173601N.001	1	36	1	100:01.8	226	0	**152404**	2.31	1.99	**1.48**	0.02	0.02	0.01	1278	25.95
Q173602N.001	1	36	2	100:01.8	437	0	**152404**	2.15	1.74	**1.36**	0.09	0.09	0.08	1282	26.66
Q173603N.001	1	36	3	100:01.8	651	0	**152404**	2.19	1.8	**1.34**	0.05	0.05	0.05	1274	26.45
Q173604N.001	1	36	4	100:01.8	828	0	**152404**	1.81	1.45	**1.07**	0.06	0.06	0.05	1271	25.77
Q173605N.001	1	36	5	100:01.8	1063	0	**152404**	2.4	1.89	**1.41**	0.06	0.06	0.05	1272	26.27
Q173606N.001	1	36	6	100:01.8	1251	0	**152404**	1.92	1.62	**1.12**	0.03	0.03	0.03	1268	27.58
Q173607N.001	1	36	7	100:01.8	1483	0	**152404**	2.37	1.86	**1.17**	0.03	0.03	0.02	1259	26.02
Q173608N.001	1	36	8	100:01.8	1703	0	**152404**	2.25	1.78	**1.34**	0.07	0.07	0.05	1263	25.76
Q183701N.001	1	37	1	100:01.8	214	0	**152405**	2.19	1.83	**1.32**	0.02	0.02	0.02	1269	26.83
Q183702N.001	1	37	2	100:01.8	424	0	**152405**	2.14	1.7	**1.28**	0.03	0.03	0.03	1265	26.54
Q183703N.001	1	37	3	100:01.8	639	0	**152405**	2.2	1.79	**1.36**	0	0	0	1263	27.34
Q183704N.001	1	37	4	100:01.8	851	0	**152405**	2.16	1.83	**1.29**	0.02	0.02	0.02	1269	25.9
Q183705N.001	1	37	5	100:01.8	1096	0	**152405**	2.5	2.07	**1.48**	0.03	0.03	0.02	1273	25.97
Q183706N.001	1	37	6	100:01.8	1292	0	**152405**	2	1.6	**1.1**	0.06	0.06	0.03	1277	26.31
Q183707N.001	1	37	7	100:01.8	1505	0	**152405**	2.18	1.63	**1.05**	0.05	0.05	0.03	1286	27.01
Q183708N.001	1	37	8	100:01.8	1709	0	**152405**	2.08	1.73	**1.26**	0.13	0.13	0.09	1273	26.03

LABORATORY # 152394

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/14/2009		
Value on above date	1.11653	Bq/gm =	9451 TU
Dilution factor	1		
Concentration of dilution	1.11653	Bq/gm =	9451.40 TU

Standard Activity				
Background count rate	1.273	+/-	0.040	cpm
Standard count rate	44.849	+/-	0.253	cpm
Net activity	43.576	+/-	0.256	cpm
Grams of sample	1.9882			grams
Net standard activity per gram	21.917	+/-	0.129	cpm/gm
TU/cpm/gm	431.23	+/-	2.54	

Sample Activity				
Background rate	1.273	+/-	0.040	cpm
Sample count rate	1.356	+/-	0.041	cpm
Net activity	0.084	+/-	0.0574	cpm
Grams of sample	10.0257			grams
Net sample activity per gram	0.0084	+/-	0.0057	cpm/gm
TU	3.60	+/-	2.467	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**3.602**	**+/-**	**2.467 TU**

LABORATORY # 152394

Methane

Avg Standard Activity				
TU/cpm/gm	**432.77**	**+/-**	**2.25**	

Sample Activity				
Background rate	1.296	+/-	0.040	cpm
Sample count rate	1.356	+/-	0.041	cpm
Net activity	0.060	+/-	0.0576	cpm
Grams of sample	10.0257			grams
Net sample activity per gram	0.0060	+/-	0.0057	cpm/gm
TU	2.59	+/-	2.488	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**2.590**	**+/-**	**2.488 TU**

Report < 10.0 TU

LABORATORY # 152395

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/14/2009		
Value on above date	1.11653	Bq/gm =	9451 TU
Dilution factor	1		
Concentration of dilution	1.11653	Bq/gm =	9451.40 TU

Standard Activity				
Background count rate	1.273	+/-	0.040	cpm
Standard count rate	44.849	+/-	0.253	cpm
Net activity	43.576	+/-	0.256	cpm
Grams of sample	1.9882			grams
Net standard activity per gram	21.917	+/-	0.129	cpm/gm
TU/cpm/gm	431.23	+/-	2.54	

Sample Activity				
Background rate	1.273	+/-	0.040	cpm
Sample count rate	1.399	+/-	0.042	cpm
Net activity	0.126	+/-	0.0578	cpm
Grams of sample	10.0239			grams
Net sample activity per gram	0.0126	+/-	0.0058	cpm/gm
TU	5.43	+/-	2.486	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**5.431**	**+/-**	**2.487 TU**

LABORATORY # 152395

Methane

Avg Standard Activity				
TU/cpm/gm	**432.77**	**+/-**	**2.25**	

Sample Activity				
Background rate	1.296	+/-	0.040	cpm
Sample count rate	1.399	+/-	0.042	cpm
Net activity	0.103	+/-	0.0581	cpm
Grams of sample	10.0239			grams
Net sample activity per gram	0.0102	+/-	0.0058	cpm/gm
TU	4.43	+/-	2.507	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**4.425**	**+/-**	**2.507 TU**

Report < 10.0 TU

LABORATORY # 152396

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/14/2009		
Value on above date	1.11653	Bq/gm =	9451 TU
Dilution factor	1		
Concentration of dilution	1.11653	Bq/gm =	9451.40 TU

Standard Activity				
Background count rate	1.273	+/-	0.040	cpm
Standard count rate	44.849	+/-	0.253	cpm
Net activity	43.576	+/-	0.256	cpm
Grams of sample	1.9882			grams
Net standard activity per gram	21.917	+/-	0.129	cpm/gm
TU/cpm/gm	431.23	+/-	2.54	

Sample Activity				
Background rate	1.273	+/-	0.040	cpm
Sample count rate	1.306	+/-	0.040	cpm
Net activity	0.034	+/-	0.0564	cpm
Grams of sample	9.9466			grams
Net sample activity per gram	0.0034	+/-	0.0057	cpm/gm
TU	1.45	+/-	2.446	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**1.452**	**+/-**	**2.446 TU**

LABORATORY # 152396

Methane

Avg Standard Activity				
TU/cpm/gm	**432.77**	**+/-**	**2.25**	

Sample Activity				
Background rate	1.296	+/-	0.040	cpm
Sample count rate	1.306	+/-	0.040	cpm
Net activity	0.010	+/-	0.0567	cpm
Grams of sample	9.9466			grams
Net sample activity per gram	0.0010	+/-	0.0057	cpm/gm
TU	0.42	+/-	2.467	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.424**	**+/-**	**2.467 TU**

Report < 10.0 TU

LABORATORY # 152397

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/14/2009		
Value on above date	1.11653	Bq/gm =	9451 TU
Dilution factor	1		
Concentration of dilution	1.11653	Bq/gm =	9451.40 TU

Standard Activity				
Background count rate	1.273	+/-	0.040	cpm
Standard count rate	44.849	+/-	0.253	cpm
Net activity	43.576	+/-	0.256	cpm
Grams of sample	1.9882			grams
Net standard activity per gram	21.917	+/-	0.129	cpm/gm
TU/cpm/gm	431.23	+/-	2.54	

Sample Activity				
Background rate	1.273	+/-	0.040	cpm
Sample count rate	1.321	+/-	0.041	cpm
Net activity	0.049	+/-	0.0569	cpm
Grams of sample	5.9408			grams
Net sample activity per gram	0.0082	+/-	0.0096	cpm/gm
TU	3.54	+/-	4.132	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**3.539**	**+/-**	**4.132 TU**

LABORATORY # 152397

Methane

Avg Standard Activity				
TU/cpm/gm	**432.77**	**+/-**	**2.25**	

Sample Activity				
Background rate	1.296	+/-	0.040	cpm
Sample count rate	1.321	+/-	0.041	cpm
Net activity	0.025	+/-	0.0572	cpm
Grams of sample	5.9408			grams
Net sample activity per gram	0.0042	+/-	0.0096	cpm/gm
TU	1.82	+/-	4.167	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**1.821**	**+/-**	**4.167 TU**

Report < 10.2 TU

note: water of combustion only 5.94 g

LABORATORY # 152398

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/14/2009		
Value on above date	1.11653	Bq/gm =	9451 TU
Dilution factor	1		
Concentration of dilution	1.11653	Bq/gm =	9451.40 TU

Standard Activity				
Background count rate	1.273	+/-	0.040	cpm
Standard count rate	44.849	+/-	0.253	cpm
Net activity	43.576	+/-	0.256	cpm
Grams of sample	1.9882			grams
Net standard activity per gram	21.917	+/-	0.129	cpm/gm
TU/cpm/gm	431.23	+/-	2.54	

Sample Activity				
Background rate	1.273	+/-	0.040	cpm
Sample count rate	1.306	+/-	0.039	cpm
Net activity	0.034	+/-	0.0561	cpm
Grams of sample	10.1446			grams
Net sample activity per gram	0.0033	+/-	0.0055	cpm/gm
TU	1.42	+/-	2.384	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**1.424**	**+/-**	**2.384 TU**

LABORATORY # 152398

Methane

Avg Standard Activity				
TU/cpm/gm	**432.77**	**+/-**	**2.25**	

Sample Activity				
Background rate	1.296	+/-	0.040	cpm
Sample count rate	1.306	+/-	0.039	cpm
Net activity	0.010	+/-	0.0564	cpm
Grams of sample	10.1446			grams
Net sample activity per gram	0.0010	+/-	0.0056	cpm/gm
TU	0.42	+/-	2.404	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.416**	**+/-**	**2.404 TU**

Report < 10.0 TU

LABORATORY # 152399

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/14/2009		
Value on above date	1.11653	Bq/gm =	9451 TU
Dilution factor	1		
Concentration of dilution	1.11653	Bq/gm =	9451.40 TU

Standard Activity				
Background count rate	1.273	+/-	0.040	cpm
Standard count rate	44.849	+/-	0.253	cpm
Net activity	43.576	+/-	0.256	cpm
Grams of sample	1.9882			grams
Net standard activity per gram	21.917	+/-	0.129	cpm/gm
TU/cpm/gm	431.23	+/-	2.54	

Sample Activity				
Background rate	1.273	+/-	0.040	cpm
Sample count rate	1.373	+/-	0.041	cpm
Net activity	0.100	+/-	0.0575	cpm
Grams of sample	10.1954			grams
Net sample activity per gram	0.0098	+/-	0.0056	cpm/gm
TU	4.23	+/-	2.432	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**4.230**	**+/-**	**2.432 TU**

LABORATORY # 152399

Methane

Avg Standard Activity				
TU/cpm/gm	**432.77**	**+/-**	**2.25**	

Sample Activity				
Background rate	1.296	+/-	0.040	cpm
Sample count rate	1.373	+/-	0.041	cpm
Net activity	0.076	+/-	0.0578	cpm
Grams of sample	10.1954			grams
Net sample activity per gram	0.0075	+/-	0.0057	cpm/gm
TU	3.24	+/-	2.452	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**3.237**	**+/-**	**2.453 TU**

Report < 10.0 TU

LABORATORY # 152400

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/14/2009		
Value on above date	1.11653	Bq/gm =	9451 TU
Dilution factor	1		
Concentration of dilution	1.11653	Bq/gm =	9451.40 TU

Standard Activity				
Background count rate	1.273	+/-	0.040	cpm
Standard count rate	44.849	+/-	0.253	cpm
Net activity	43.576	+/-	0.256	cpm
Grams of sample	1.9882			grams
Net standard activity per gram	21.917	+/-	0.129	cpm/gm
TU/cpm/gm	431.23	+/-	2.54	

Sample Activity				
Background rate	1.273	+/-	0.040	cpm
Sample count rate	1.334	+/-	0.041	cpm
Net activity	0.061	+/-	0.0571	cpm
Grams of sample	10.1697			grams
Net sample activity per gram	0.0060	+/-	0.0056	cpm/gm
TU	2.60	+/-	2.420	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**2.597**	**+/-**	**2.420 TU**

LABORATORY # 152400

Methane

Avg Standard Activity			
TU/cpm/gm	**432.77**	**+/-**	**2.25**

Sample Activity				
Background rate	1.296	+/-	0.040	cpm
Sample count rate	1.334	+/-	0.041	cpm
Net activity	0.038	+/-	0.0573	cpm
Grams of sample	10.1697			grams
Net sample activity per gram	0.0037	+/-	0.0056	cpm/gm
TU	1.60	+/-	2.440	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**1.596**	**+/-**	**2.440 TU**

Report < 10.0 TU

LABORATORY # 152401

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/14/2009		
Value on above date	1.11653	Bq/gm =	9451 TU
Dilution factor	1		
Concentration of dilution	1.11653	Bq/gm =	9451.40 TU

Standard Activity				
Background count rate	1.273	+/-	0.040	cpm
Standard count rate	44.849	+/-	0.253	cpm
Net activity	43.576	+/-	0.256	cpm
Grams of sample	1.9882			grams
Net standard activity per gram	21.917	+/-	0.129	cpm/gm
TU/cpm/gm	431.23	+/-	2.54	

Sample Activity				
Background rate	1.273	+/-	0.040	cpm
Sample count rate	1.413	+/-	0.042	cpm
Net activity	0.140	+/-	0.0579	cpm
Grams of sample	10.0514			grams
Net sample activity per gram	0.0139	+/-	0.0058	cpm/gm
TU	6.01	+/-	2.486	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**6.006**	**+/-**	**2.486 TU**

LABORATORY # 152401

Methane

Avg Standard Activity				
TU/cpm/gm	**432.77**	**+/-**	**2.25**	

Sample Activity				
Background rate	1.296	+/-	0.040	cpm
Sample count rate	1.413	+/-	0.042	cpm
Net activity	0.116	+/-	0.0582	cpm
Grams of sample	10.0514			grams
Net sample activity per gram	0.0116	+/-	0.0058	cpm/gm
TU	5.01	+/-	2.506	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**5.005**	**+/-**	**2.507 TU**

Report < 10.0 TU

LABORATORY # 152402

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/14/2009		
Value on above date	1.11653	Bq/gm =	9451 TU
Dilution factor	1		
Concentration of dilution	1.11653	Bq/gm =	9451.40 TU

Standard Activity				
Background count rate	1.273	+/-	0.040	cpm
Standard count rate	44.849	+/-	0.253	cpm
Net activity	43.576	+/-	0.256	cpm
Grams of sample	1.9882			grams
Net standard activity per gram	21.917	+/-	0.129	cpm/gm
TU/cpm/gm	431.23	+/-	2.54	

Sample Activity				
Background rate	1.273	+/-	0.040	cpm
Sample count rate	1.349	+/-	0.041	cpm
Net activity	0.076	+/-	0.0573	cpm
Grams of sample	9.9033			grams
Net sample activity per gram	0.0077	+/-	0.0058	cpm/gm
TU	3.32	+/-	2.494	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**3.320**	**+/-**	**2.495 TU**

LABORATORY # 152402

Methane

Avg Standard Activity				
TU/cpm/gm	**432.77**	**+/-**	**2.25**	

Sample Activity				
Background rate	1.296	+/-	0.040	cpm
Sample count rate	1.349	+/-	0.041	cpm
Net activity	0.053	+/-	0.0576	cpm
Grams of sample	9.9033			grams
Net sample activity per gram	0.0053	+/-	0.0058	cpm/gm
TU	2.29	+/-	2.515	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**2.294**	**+/-**	**2.516 TU**

Report < 10.0 TU

LABORATORY # 152403

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/14/2009		
Value on above date	1.11653	Bq/gm =	9451 TU
Dilution factor	1		
Concentration of dilution	1.11653	Bq/gm =	9451.40 TU

Standard Activity				
Background count rate	1.273	+/-	0.040	cpm
Standard count rate	44.849	+/-	0.253	cpm
Net activity	43.576	+/-	0.256	cpm
Grams of sample	1.9882			grams
Net standard activity per gram	21.917	+/-	0.129	cpm/gm
TU/cpm/gm	431.23	+/-	2.54	

Sample Activity				
Background rate	1.273	+/-	0.040	cpm
Sample count rate	1.348	+/-	0.041	cpm
Net activity	0.075	+/-	0.0572	cpm
Grams of sample	10.0257			grams
Net sample activity per gram	0.0075	+/-	0.0057	cpm/gm
TU	3.23	+/-	2.461	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**3.226**	**+/-**	**2.461 TU**

LABORATORY # 152403

Methane

Avg Standard Activity				
TU/cpm/gm	**432.77**	**+/-**	**2.25**	

Sample Activity				
Background rate	1.296	+/-	0.040	cpm
Sample count rate	1.348	+/-	0.041	cpm
Net activity	0.051	+/-	0.0575	cpm
Grams of sample	10.0257			grams
Net sample activity per gram	0.0051	+/-	0.0057	cpm/gm
TU	2.21	+/-	2.482	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**2.212**	**+/-**	**2.482 TU**

Report < 10.0 TU

LABORATORY # 152404

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/14/2009		
Value on above date	1.11653	Bq/gm =	9451 TU
Dilution factor	1		
Concentration of dilution	1.11653	Bq/gm =	9451.40 TU

Standard Activity				
Background count rate	1.273	+/-	0.040	cpm
Standard count rate	44.849	+/-	0.253	cpm
Net activity	43.576	+/-	0.256	cpm
Grams of sample	1.9882			grams
Net standard activity per gram	21.917	+/-	0.129	cpm/gm
TU/cpm/gm	431.23	+/-	2.54	

Sample Activity				
Background rate	1.273	+/-	0.040	cpm
Sample count rate	1.306	+/-	0.040	cpm
Net activity	0.034	+/-	0.0566	cpm
Grams of sample	10.0097			grams
Net sample activity per gram	0.0033	+/-	0.0057	cpm/gm
TU	1.44	+/-	2.437	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**1.443**	**+/-**	**2.437 TU**

LABORATORY # 152404

Methane

Avg Standard Activity

TU/cpm/gm	**432.77**	**+/-**	**2.25**

Sample Activity				
Background rate	1.296	+/-	0.040	cpm
Sample count rate	1.306	+/-	0.040	cpm
Net activity	0.010	+/-	0.0569	cpm
Grams of sample	10.0097			grams
Net sample activity per gram	0.0010	+/-	0.0057	cpm/gm
TU	0.42	+/-	2.458	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.422**	**+/-**	**2.458 TU**

Report < 10.0 TU

LABORATORY # 152405

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/14/2009		
Value on above date	1.11653	Bq/gm =	9451 TU
Dilution factor	1		
Concentration of dilution	1.11653	Bq/gm =	9451.40 TU

Standard Activity				
Background count rate	1.273	+/-	0.040	cpm
Standard count rate	44.849	+/-	0.253	cpm
Net activity	43.576	+/-	0.256	cpm
Grams of sample	1.9882			grams
Net standard activity per gram	21.917	+/-	0.129	cpm/gm
TU/cpm/gm	431.23	+/-	2.54	

Sample Activity				
Background rate	1.273	+/-	0.040	cpm
Sample count rate	1.306	+/-	0.040	cpm
Net activity	0.034	+/-	0.0562	cpm
Grams of sample	9.9318			grams
Net sample activity per gram	0.0034	+/-	0.0057	cpm/gm
TU	1.45	+/-	2.441	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**1.455**	**+/-**	**2.441 TU**

LABORATORY # 152405

Methane

Avg Standard Activity				
TU/cpm/gm	**432.77**	**+/-**	**2.25**	

Sample Activity				
Background rate	1.296	+/-	0.040	cpm
Sample count rate	1.306	+/-	0.040	cpm
Net activity	0.010	+/-	0.0565	cpm
Grams of sample	9.9318			grams
Net sample activity per gram	0.0010	+/-	0.0057	cpm/gm
TU	0.42	+/-	2.462	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.425**	**+/-**	**2.462 TU**

Report < 10.0 TU

COUNTER 1 **Year 2009**
NIST and BLANK Values

JOB #	NIST date	count date	Value	+/-	SD	AVG NIST):			BLK date	count date	Value	+/-	SD	AVG BLK :			Date reported
	22-Aug	25-Aug	733.31	+/-	3.94				22-Aug	24-Aug	1.585	+/-	0.033				
	"								"	26-Aug	1.561	+/-	0.033	1.573	+/-	0.033	
	14-Nov	23-Nov	726.34	+/-	3.82	729.83	+/-	3.88	19-Nov	24-Nov	1.546	+/-	0.032	1.564	+/-	0.033	
	"								1-Dec	4-Dec	1.581	+/-	0.033	1.568	+/-	0.033	
	1-Dec	10-Dec	719.95	+/-	3.83	726.54	+/-	3.86	8-Dec	11-Dec	1.648	+/-	0.033	1.584	+/-	0.033	
	"								17-Dec	22-Dec	1.613	+/-	0.033	1.589	+/-	0.033	
	24-Dec	4-Jan	727.80	+/-	3.91	726.85	+/-	3.88	30-Dec	3-Jan	1.643	+/-	0.033	1.597	+/-	0.033	
	12-Jan	16-Jan	728.59	+/-	3.89	727.20	+/-	3.88	19-Jan	21-Jan	1.668	+/-	0.033	1.606	+/-	0.033	
Job 10797 CNC	28-Jan	5-Feb	719.46	+/-	3.81	**725.91**	**+/-**	**3.87**	28-Jan	4-Feb	1.598	+/-	0.033	**1.605**	**+/-**	**0.033**	

COUNTER #1

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/5/2009		
Value on above date	1.11807	Bq/gm =	9464 TU
Dilution factor	1		
Concentration of dilution	1.11807	Bq/gm =	9464.50 TU

Standard Activity				
Background count rate	1.598	+/-	0.033	cpm
Standard count rate	28.254	+/-	0.137	cpm
Net activity	26.656	+/-	0.141	cpm
Grams of sample	2.0263			grams
Net standard activity per gram	13.155	+/-	0.070	cpm/gm
TU/cpm/gm	719.46	+/-	3.81	

Counting efficiency	
total cpm	67.08 TU of std *0.007088
net actvy (cpm)/g	13.155 (std count - bkgrd count)/g
efficiency %	**19.61** net actvy/total dpm std

DATA FILE **962,963** counter 1
JOB # **10797 CNC**
Count dates: **1-31 through 2-16-09**

	962,963	963					
Position #	2,2&26	3	4	5	6	7	8
Sample ID	152406	152407	152408	BLANK	NIST	152409	152410
	DC	DC	DC		2.0263 g	DC	DC
Cocktail date	28-Jan	28-Jan	28-Jan	28-Jan	28-Jan	28-Jan	28-Jan
Date counted	1/31,2/2&17	2-Feb	3-Feb	4-Feb	5-Feb	6-Feb	7-Feb

9	10	11	12	13	14
152411	152412	152413	152414	152415	152416
DC	DC	DC	DC	DC	DC
28-Jan	28-Jan	28-Jan	28-Jan	28-Jan	28-Jan
9-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb

POS	FNCT1	FNCT2	FNCT3	FNCT4	CPMW5	CPMW6	SQPE	SQPI	CPM	CTIME	TIME	DATE	RPT
1	1.88	1.88	1.81	1.81	1.90	4.90	785.15	208.46	4.90	6000	11:52 AM	1/30/2009	1
1	1.66	1.67	1.62	1.61	1.70	4.80	784.32	221.85	4.80	6000	1:33 PM	1/30/2009	2
1	1.83	1.83	1.73	1.73	1.80	4.50	785.00	205.47	4.50	6000	3:13 PM	1/30/2009	3
1	1.81	1.81	1.68	1.68	1.80	4.50	784.95	213.32	4.50	6000	4:54 PM	1/30/2009	4
1	1.72	1.75	1.70	1.68	1.70	4.80	785.62	220.98	4.80	6000	6:35 PM	1/30/2009	5
1	1.68	1.68	1.62	1.62	1.70	4.40	784.17	214.18	4.40	6000	8:16 PM	1/30/2009	6
1	1.70	1.70	1.65	1.65	1.70	4.40	785.20	213.77	4.40	6000	9:57 PM	1/30/2009	7
1	1.78	1.78	1.73	1.73	1.80	4.70	785.20	221.34	4.70	6000	11:38 PM	1/30/2009	8
1	1.56	1.57	1.44	1.43	1.60	4.30	784.48	217.86	4.30	6000	1:19 AM	1/31/2009	9
1	1.89	1.90	1.82	1.81	1.90	4.80	785.15	212.75	4.80	6000	3:00 AM	1/31/2009	10
1	1.90	1.90	1.80	1.80	1.90	4.70	784.74	211.79	4.70	6000	4:41 AM	1/31/2009	11
1	1.67	1.67	1.60	1.60	1.70	4.30	785.00	211.45	4.30	6000	6:21 AM	1/31/2009	12
1	1.78	1.79	1.64	1.63	1.80	4.70	784.74	212.09	4.70	6000	8:02 AM	1/31/2009	13
1	1.55	1.55	1.49	1.49	1.50	4.00	784.69	213.67	4.00	6000	9:43 AM	1/31/2009	14
1	1.90	1.90	1.80	1.80	1.90	4.80	784.95	207.92	4.80	6000	11:24 AM	1/31/2009	15
2	1.73	1.73	1.68	1.68	1.70	4.70	784.38	217.25	4.70	6000	1:05 PM	1/31/2009	1
2	1.89	1.89	1.77	1.77	1.90	4.50	784.95	207.87	4.50	6000	2:46 PM	1/31/2009	2
2	1.68	1.68	1.57	1.57	1.70	4.50	784.07	213.91	4.50	6000	4:27 PM	1/31/2009	3
2	1.75	1.75	1.68	1.68	1.80	4.60	783.39	218.56	4.60	6000	6:08 PM	1/31/2009	4
2	1.61	1.61	1.57	1.57	1.60	4.40	784.48	210.28	4.40	6000	7:49 PM	1/31/2009	5
2	1.70	1.70	1.64	1.64	1.70	4.30	784.69	209.94	4.30	6000	9:30 PM	1/31/2009	6
2	1.53	1.53	1.44	1.44	1.50	4.30	783.45	217.62	4.30	6000	11:10 PM	1/31/2009	7
2	1.67	1.67	1.58	1.58	1.70	4.50	783.34	218.73	4.50	6000	0:51 AM	2/1/2009	8
2	1.36	1.36	1.32	1.32	1.40	3.90	784.01	218.09	3.90	6000	2:32 AM	2/1/2009	9

POS	FNCT1	FNCT2	FNCT3	FNCT4	CPMW5	CPMW6	SQPE	SQPI	CPM	CTIME	TIME	DATE	RPT
2	1.97	1.97	1.9	1.9	2	4.8	787.39	204.2	4.8	6000	9:10 AM	2/2/2009	1
2	1.58	1.6	1.46	1.44	1.6	4	783.91	214.08	4	6000	10:51 AM	2/2/2009	2
2	1.75	1.75	1.67	1.67	1.8	4.5	784.48	212.08	4.5	6000	12:32 PM	2/2/2009	3
2	1.55	1.56	1.5	1.49	1.6	4.3	784.58	213.7	4.3	5787	2:13 PM	2/2/2009	4
3	1.73	1.73	1.65	1.65	1.7	4.4	786.66	216.03	4.4	6000	3:50 PM	2/2/2009	1
3	1.63	1.63	1.57	1.57	1.6	4.6	785.57	221.47	4.6	6000	5:31 PM	2/2/2009	2
3	1.79	1.79	1.69	1.69	1.8	4.5	784.95	210.94	4.5	6000	7:12 PM	2/2/2009	3
3	1.27	1.27	1.19	1.19	1.3	4	785.72	224.07	4	6000	8:53 PM	2/2/2009	4
3	1.55	1.55	1.44	1.44	1.5	4.3	785.83	213.42	4.3	6000	10:34 PM	2/2/2009	5
3	1.61	1.61	1.54	1.54	1.6	4.3	785.05	218.15	4.3	6000	12:15 AM	2/3/2009	6
3	1.94	1.94	1.81	1.81	1.9	4.9	785.46	209.62	4.9	6000	1:56 AM	2/3/2009	7
3	1.57	1.57	1.51	1.51	1.6	4.1	785.41	221.4	4.1	6000	3:36 AM	2/3/2009	8
3	1.96	1.96	1.86	1.86	2	4.8	786.09	211.51	4.8	6000	5:17 AM	2/3/2009	9
3	1.72	1.72	1.64	1.64	1.7	4.4	785.41	217.07	4.4	6000	6:58 AM	2/3/2009	10
3	1.74	1.74	1.65	1.65	1.7	4.7	784.79	216.8	4.7	6000	8:39 AM	2/3/2009	11
3	1.73	1.73	1.61	1.61	1.7	4.3	785.78	218.29	4.3	6000	10:20 AM	2/3/2009	12
3	1.61	1.61	1.54	1.54	1.6	4.5	786.24	215.04	4.5	6000	12:01 PM	2/3/2009	13
3	1.62	1.62	1.47	1.47	1.6	4.3	785.98	219.15	4.3	6000	1:42 PM	2/3/2009	14
3	1.63	1.63	1.59	1.59	1.6	4.1	785.52	218.37	4.1	6000	3:23 PM	2/3/2009	15
4	1.86	1.86	1.74	1.74	1.9	4.5	784.95	206.52	4.5	6000	5:04 PM	2/3/2009	1
4	1.61	1.61	1.55	1.55	1.6	4.6	785.36	225.21	4.6	6000	6:45 PM	2/3/2009	2
4	1.7	1.7	1.62	1.62	1.7	4.7	784.74	218.45	4.7	6000	8:26 PM	2/3/2009	3
4	1.58	1.58	1.53	1.53	1.6	4.3	785.62	212.91	4.3	6000	10:06 PM	2/3/2009	4
4	1.78	1.78	1.65	1.65	1.8	4.7	785.46	218.21	4.7	6000	11:47 PM	2/3/2009	5
4	1.66	1.67	1.62	1.61	1.7	4.2	786.35	212.99	4.2	6000	1:28 AM	2/4/2009	6
4	1.66	1.66	1.59	1.59	1.7	4.6	785.57	219.9	4.6	6000	3:09 AM	2/4/2009	7
4	1.68	1.68	1.56	1.56	1.7	4.3	786.19	215.1	4.3	6000	4:50 AM	2/4/2009	8
4	1.47	1.47	1.4	1.4	1.5	4.1	785.15	222.63	4.1	6000	6:31 AM	2/4/2009	9
4	1.86	1.86	1.77	1.77	1.9	4.9	785.2	221.37	4.9	6000	8:12 AM	2/4/2009	10
4	1.64	1.64	1.58	1.58	1.6	4.8	785.72	223.59	4.8	6000	9:53 AM	2/4/2009	11
4	1.64	1.64	1.58	1.58	1.6	4.2	784.74	212.55	4.2	6000	11:34 AM	2/4/2009	12
4	1.53	1.53	1.52	1.52	1.5	4.2	785.72	218.39	4.2	6000	1:14 PM	2/4/2009	13
4	1.84	1.84	1.67	1.67	1.8	4.7	785.31	218.87	4.7	6000	2:55 PM	2/4/2009	14
4	1.5	1.5	1.45	1.45	1.5	4.2	785	217.85	4.2	6000	4:36 PM	2/4/2009	15
5	1.59	1.59	1.52	1.52	1.6	4.4	783.86	220.45	4.4	6000	6:17 PM	2/4/2009	1
5	1.29	1.29	1.21	1.21	1.3	3.9	784.07	223.57	3.9	6000	7:58 PM	2/4/2009	2
5	1.62	1.62	1.53	1.53	1.6	4.3	783.76	207.9	4.3	6000	9:39 PM	2/4/2009	3
5	1.64	1.64	1.55	1.55	1.6	4.5	784.38	221.05	4.5	6000	11:20 PM	2/4/2009	4
5	1.86	1.86	1.78	1.78	1.9	4.3	783.6	205.61	4.3	6000	1:01 AM	2/5/2009	5
5	1.65	1.65	1.55	1.55	1.7	4.5	784.58	215.82	4.5	6000	2:42 AM	2/5/2009	6
5	1.81	1.81	1.74	1.74	1.8	4.5	784.22	210.39	4.5	6000	4:23 AM	2/5/2009	7
5	1.64	1.64	1.57	1.57	1.6	4.2	784.07	219.38	4.2	6000	6:04 AM	2/5/2009	8
5	1.62	1.62	1.55	1.55	1.6	4.3	784.32	217.31	4.3	6000	7:44 AM	2/5/2009	9
5	1.63	1.63	1.55	1.55	1.6	4	783.96	217.65	4	6000	9:25 AM	2/5/2009	10
5	1.42	1.42	1.36	1.36	1.4	3.9	784.79	224.96	3.9	6000	11:06 AM	2/5/2009	11
5	1.7	1.7	1.57	1.57	1.7	4.1	783.96	210.19	4.1	6000	12:47 PM	2/5/2009	12
5	1.56	1.57	1.54	1.53	1.6	4.2	784.69	218.43	4.2	6000	2:28 PM	2/5/2009	13
5	1.44	1.44	1.38	1.38	1.4	4	784.69	219.26	4	6000	4:09 PM	2/5/2009	14
5	1.5	1.5	1.43	1.43	1.5	3.9	784.89	214.25	3.9	6000	5:50 PM	2/5/2009	15
6	28.92	28.94	28.48	28.46	28.9	32.6	783.55	121.9	32.6	6000	7:31 PM	2/5/2009	1
6	28.06	28.08	27.41	27.39	28.1	31.9	784.01	121.97	31.9	6000	9:12 PM	2/5/2009	2
6	29.22	29.24	28.84	28.82	29.2	33.5	783.34	122.61	33.5	6000	10:53 PM	2/5/2009	3

6	28.44	28.48	27.92	27.88	28.5	32.3	784.17	122.57	32.3	6000	12:33 AM	2/6/2009	4
6	27.98	27.99	27.55	27.54	28	31.7	784.17	122.53	31.7	6000	2:14 AM	2/6/2009	5
6	27.74	27.77	27.22	27.2	27.8	31.6	784.27	122.93	31.6	6000	3:55 AM	2/6/2009	6
6	28.27	28.29	27.75	27.73	28.3	32	783.86	121.89	32	6000	5:36 AM	2/6/2009	7
6	27.93	27.97	27.54	27.49	28	32.1	783.24	123.93	32.1	6000	7:17 AM	2/6/2009	8
6	27.84	27.87	27.36	27.33	27.9	32.3	784.17	123.6	32.3	6000	8:58 AM	2/6/2009	9
6	28.39	28.4	27.87	27.86	28.4	32.2	783.5	121.3	32.2	6000	10:39 AM	2/6/2009	10
6	28.35	28.38	27.87	27.84	28.4	32.1	784.01	121.9	32.1	6000	12:20 PM	2/6/2009	11
6	28.13	28.13	27.6	27.6	28.1	31.7	783.65	121.18	31.7	6000	2:01 PM	2/6/2009	12
6	27.86	27.86	27.32	27.32	27.9	31.8	783.6	122.79	31.8	6000	3:41 PM	2/6/2009	13
6	28.48	28.49	28.09	28.08	28.5	32.5	783.65	122.22	32.5	6000	5:22 PM	2/6/2009	14
6	28.2	28.24	27.72	27.68	28.2	32.3	784.12	122.11	32.3	6000	7:03 PM	2/6/2009	15
7	1.38	1.38	1.32	1.32	1.4	3.8	784.12	215.48	3.8	6000	8:44 PM	2/6/2009	1
7	1.55	1.55	1.51	1.51	1.5	4	784.89	207.84	4	6000	10:25 PM	2/6/2009	2
7	1.68	1.68	1.64	1.64	1.7	4.2	784.22	203.84	4.2	6000	12:06 AM	2/7/2009	3
7	1.79	1.79	1.65	1.65	1.8	4.4	784.43	206.89	4.4	6000	1:47 AM	2/7/2009	4
7	1.45	1.45	1.36	1.36	1.5	4	784.69	210.7	4	6000	3:28 AM	2/7/2009	5
7	1.46	1.46	1.44	1.44	1.5	4.1	784.48	214.6	4.1	6000	5:09 AM	2/7/2009	6
7	1.53	1.53	1.46	1.46	1.5	4.1	783.81	211.66	4.1	6000	6:50 AM	2/7/2009	7
7	1.46	1.46	1.39	1.39	1.5	4	783.45	216.96	4	6000	8:30 AM	2/7/2009	8
7	1.82	1.82	1.71	1.71	1.8	4.5	783.5	208.47	4.5	6000	10:11 AM	2/7/2009	9
7	1.87	1.87	1.78	1.78	1.9	4.7	784.22	216.02	4.7	6000	11:52 AM	2/7/2009	10
7	1.7	1.7	1.61	1.61	1.7	4.1	783.6	204.17	4.1	6000	1:33 PM	2/7/2009	11
7	1.39	1.39	1.36	1.36	1.4	4.3	784.74	226.06	4.3	6000	3:14 PM	2/7/2009	12
7	1.62	1.62	1.54	1.54	1.6	3.8	784.17	210.46	3.8	6000	4:55 PM	2/7/2009	13
7	1.39	1.39	1.36	1.36	1.4	3.8	783.86	214.64	3.8	6000	6:36 PM	2/7/2009	14
7	1.47	1.47	1.42	1.42	1.5	4.2	783.6	217.77	4.2	6000	8:17 PM	2/7/2009	15
8	1.78	1.78	1.72	1.72	1.8	4.3	784.53	208.15	4.3	6000	9:58 PM	2/7/2009	1
8	1.81	1.81	1.8	1.8	1.8	4.1	784.48	206.47	4.1	6000	11:39 PM	2/7/2009	2
8	1.73	1.73	1.65	1.65	1.7	4.4	784.89	214	4.4	6000	1:20 AM	2/8/2009	3
8	1.64	1.64	1.57	1.57	1.6	4.2	784.27	213.12	4.2	6000	3:00 AM	2/8/2009	4
8	1.69	1.69	1.62	1.62	1.7	4.1	784.38	204.98	4.1	6000	4:41 AM	2/8/2009	5
8	1.63	1.63	1.55	1.55	1.6	4.3	784.89	212.88	4.3	6000	6:22 AM	2/8/2009	6
8	1.41	1.42	1.39	1.38	1.4	4.1	783.55	212.52	4.1	6000	8:03 AM	2/8/2009	7
8	1.63	1.63	1.51	1.51	1.6	4.2	784.12	209.55	4.2	6000	9:44 AM	2/8/2009	8
8	1.78	1.78	1.73	1.73	1.8	4.8	784.53	218.05	4.8	6000	11:25 AM	2/8/2009	9
8	1.46	1.46	1.39	1.39	1.5	4	783.34	213.94	4	6000	1:06 PM	2/8/2009	10
8	1.44	1.44	1.34	1.34	1.4	3.9	782.98	211.44	3.9	6000	2:47 PM	2/8/2009	11
8	1.7	1.7	1.66	1.66	1.7	4.1	784.69	210.88	4.1	6000	4:28 PM	2/8/2009	12
8	1.45	1.45	1.36	1.36	1.5	4.3	783.91	222.6	4.3	6000	6:08 PM	2/8/2009	13
8	1.77	1.77	1.69	1.69	1.8	3.9	784.27	203.25	3.9	6000	7:49 PM	2/8/2009	14
8	1.55	1.55	1.44	1.44	1.5	4	783.76	214.12	4	6000	9:30 PM	2/8/2009	15
9	1.43	1.43	1.37	1.37	1.4	4	784.43	220.97	4	6000	11:11 PM	2/8/2009	1
9	1.84	1.84	1.73	1.73	1.8	4.4	783.55	210.25	4.4	6000	12:52 AM	2/9/2009	2
9	1.74	1.74	1.69	1.69	1.7	4	783.76	199.9	4	6000	2:33 AM	2/9/2009	3
9	1.51	1.51	1.39	1.39	1.5	3.9	783.7	215.42	3.9	6000	4:14 AM	2/9/2009	4
9	1.62	1.63	1.57	1.56	1.6	4.2	784.69	208.3	4.2	6000	5:55 AM	2/9/2009	5
9	1.65	1.65	1.58	1.58	1.7	4.2	783.29	214.97	4.2	6000	7:36 AM	2/9/2009	6
9	1.64	1.64	1.55	1.55	1.6	4.1	783.81	211.97	4.1	6000	9:17 AM	2/9/2009	7
9	1.69	1.69	1.59	1.59	1.7	4.1	783.45	206.97	4.1	6000	10:58 AM	2/9/2009	8
9	1.65	1.65	1.6	1.6	1.7	4.3	784.48	214.09	4.3	6000	12:38 PM	2/9/2009	9
9	1.63	1.63	1.53	1.53	1.6	3.9	782.83	202.49	3.9	6000	2:19 PM	2/9/2009	10
9	1.64	1.64	1.56	1.56	1.6	3.9	783.08	209.09	3.9	6000	4:00 PM	2/9/2009	11

9	1.53	1.53	1.49	1.49	1.5	4	784.27	214.88	4	6000	5:41 PM	2/9/2009	12
9	1.69	1.69	1.62	1.62	1.7	4.1	783.65	208	4.1	6000	7:22 PM	2/9/2009	13
9	1.55	1.55	1.5	1.5	1.5	3.8	783.55	211.19	3.8	6000	9:03 PM	2/9/2009	14
9	1.76	1.76	1.71	1.71	1.8	4.3	783.55	207.72	4.3	6000	10:44 PM	2/9/2009	15
10	1.62	1.62	1.55	1.55	1.6	4	784.12	208.45	4	6000	12:25 AM	2/10/2009	1
10	1.56	1.56	1.5	1.5	1.6	4.2	783.96	218.7	4.2	6000	2:06 AM	2/10/2009	2
10	1.76	1.77	1.64	1.63	1.8	4.5	784.69	211.22	4.5	6000	3:47 AM	2/10/2009	3
10	1.52	1.52	1.44	1.44	1.5	3.9	783.5	213.45	3.9	6000	5:28 AM	2/10/2009	4
10	1.5	1.5	1.4	1.4	1.5	4.3	784.43	213.3	4.3	6000	7:08 AM	2/10/2009	5
10	1.86	1.86	1.77	1.77	1.9	4.4	784.64	205.36	4.4	6000	8:49 AM	2/10/2009	6
10	1.53	1.53	1.47	1.47	1.5	4.1	783.7	208.12	4.1	6000	10:30 AM	2/10/2009	7
10	1.66	1.66	1.62	1.62	1.7	4.3	783.81	212.18	4.3	6000	12:11 PM	2/10/2009	8
10	1.51	1.51	1.45	1.45	1.5	3.6	783.03	207.6	3.6	6000	1:52 PM	2/10/2009	9
10	1.56	1.56	1.5	1.5	1.6	4.2	783.34	218.89	4.2	6000	3:33 PM	2/10/2009	10
10	1.53	1.53	1.5	1.5	1.5	4.1	784.22	216.04	4.1	6000	5:14 PM	2/10/2009	11
10	1.76	1.76	1.69	1.69	1.8	4.1	783.76	204.4	4.1	6000	6:55 PM	2/10/2009	12
10	1.51	1.51	1.46	1.46	1.5	3.9	783.19	211.2	3.9	6000	8:36 PM	2/10/2009	13
10	1.78	1.78	1.73	1.73	1.8	4.6	783.08	207	4.6	6000	10:16 PM	2/10/2009	14
10	1.64	1.64	1.51	1.51	1.6	4.2	784.48	213.93	4.2	6000	11:57 PM	2/10/2009	15
11	1.76	1.76	1.72	1.72	1.8	4.3	783.55	209.12	4.3	6000	1:38 AM	2/11/2009	1
11	1.6	1.6	1.47	1.47	1.6	4	782.83	205.89	4	6000	3:19 AM	2/11/2009	2
11	1.64	1.64	1.59	1.59	1.6	4.3	782.88	213.23	4.3	6000	5:00 AM	2/11/2009	3
11	1.64	1.64	1.54	1.54	1.6	4.2	783.24	214.88	4.2	6000	6:41 AM	2/11/2009	4
11	1.61	1.61	1.47	1.47	1.6	4.2	783.6	212.33	4.2	6000	8:22 AM	2/11/2009	5
11	1.97	1.97	1.81	1.81	2	4.2	783.6	199.43	4.2	6000	10:03 AM	2/11/2009	6
11	1.62	1.62	1.55	1.55	1.6	4.4	783.91	216.16	4.4	6000	11:44 AM	2/11/2009	7
11	1.65	1.65	1.58	1.58	1.7	4.3	784.22	211.69	4.3	6000	1:25 PM	2/11/2009	8
11	1.66	1.66	1.61	1.61	1.7	4.3	783.5	214.06	4.3	6000	3:05 PM	2/11/2009	9
11	1.69	1.69	1.53	1.53	1.7	4.4	784.22	213.79	4.4	6000	4:46 PM	2/11/2009	10
11	1.56	1.56	1.4	1.4	1.6	4.1	783.91	215.48	4.1	6000	6:27 PM	2/11/2009	11
11	1.6	1.6	1.53	1.53	1.6	3.9	784.01	207.93	3.9	6000	8:08 PM	2/11/2009	12
11	1.8	1.8	1.72	1.72	1.8	4.2	783.19	208	4.2	6000	9:49 PM	2/11/2009	13
11	1.55	1.55	1.47	1.47	1.5	4	783.6	215.42	4	6000	11:30 PM	2/11/2009	14
11	1.83	1.83	1.78	1.78	1.8	4.7	784.12	219.13	4.7	6000	1:11 AM	2/12/2009	15
12	1.6	1.6	1.54	1.54	1.6	4	783.55	220.18	4	6000	2:52 AM	2/12/2009	1
12	1.51	1.51	1.41	1.41	1.5	4	783.03	213	4	6000	4:33 AM	2/12/2009	2
12	1.49	1.49	1.43	1.43	1.5	4.1	783.19	220.07	4.1	6000	6:14 AM	2/12/2009	3
12	1.71	1.71	1.63	1.63	1.7	4.2	783.91	207.82	4.2	6000	7:54 AM	2/12/2009	4
12	1.6	1.6	1.48	1.48	1.6	4	784.07	213.74	4	6000	9:35 AM	2/12/2009	5
12	1.88	1.88	1.75	1.75	1.9	4.3	783.03	205.33	4.3	6000	11:16 AM	2/12/2009	6
12	1.51	1.51	1.44	1.44	1.5	4	783.45	213.62	4	6000	12:57 PM	2/12/2009	7
12	1.43	1.43	1.34	1.34	1.4	4.1	783.5	218.84	4.1	6000	2:38 PM	2/12/2009	8
12	1.57	1.57	1.45	1.45	1.6	4.2	783.24	212.6	4.2	6000	4:19 PM	2/12/2009	9
12	1.5	1.5	1.47	1.47	1.5	3.9	783.45	211.22	3.9	6000	6:00 PM	2/12/2009	10
12	1.45	1.45	1.39	1.39	1.5	3.9	782.93	221.27	3.9	6000	7:41 PM	2/12/2009	11
12	1.55	1.55	1.47	1.47	1.5	4.3	782.83	214.2	4.3	6000	9:22 PM	2/12/2009	12
12	1.55	1.55	1.46	1.46	1.5	3.9	783.6	215.16	3.9	6000	11:02 PM	2/12/2009	13
12	1.61	1.61	1.54	1.54	1.6	4	782.62	212.96	4	6000	12:43 AM	2/13/2009	14
12	1.54	1.54	1.46	1.46	1.5	4.2	783.65	222.14	4.2	6000	2:24 AM	2/13/2009	15
13	1.47	1.47	1.38	1.38	1.5	4.1	784.12	221.2	4.1	6000	4:05 AM	2/13/2009	1
13	1.43	1.43	1.35	1.35	1.4	3.8	783.76	220.99	3.8	6000	5:46 AM	2/13/2009	2
13	1.6	1.6	1.53	1.53	1.6	4	784.38	211.02	4	6000	7:27 AM	2/13/2009	3
13	1.7	1.7	1.61	1.61	1.7	4.3	784.12	209.42	4.3	6000	9:08 AM	2/13/2009	4

13	1.6	1.6	1.54	1.54	1.6	3.9	783.29	209.34	3.9	6000	10:49 AM	2/13/2009	5
13	1.37	1.37	1.31	1.31	1.4	3.8	783.86	219.03	3.8	6000	12:30 PM	2/13/2009	6
13	1.61	1.61	1.56	1.56	1.6	4.2	784.12	213.3	4.2	6000	2:11 PM	2/13/2009	7
13	1.73	1.74	1.7	1.69	1.7	4.2	783.34	206.12	4.2	6000	3:52 PM	2/13/2009	8
13	1.69	1.69	1.58	1.58	1.7	4.5	784.07	211.09	4.5	6000	5:32 PM	2/13/2009	9
13	1.75	1.75	1.69	1.69	1.8	4.1	783.5	211.42	4.1	6000	7:13 PM	2/13/2009	10
13	1.54	1.54	1.41	1.41	1.5	3.9	784.32	212.61	3.9	6000	8:54 PM	2/13/2009	11
13	1.69	1.69	1.63	1.63	1.7	4.2	784.01	207.43	4.2	6000	10:35 PM	2/13/2009	12
13	1.69	1.69	1.6	1.6	1.7	3.9	783.81	210.21	3.9	6000	12:16 AM	2/14/2009	13
13	1.61	1.61	1.52	1.52	1.6	4.2	784.12	209.01	4.2	6000	1:57 AM	2/14/2009	14
13	1.73	1.73	1.71	1.71	1.7	4.7	783.5	216.35	4.7	6000	3:38 AM	2/14/2009	15
14	1.81	1.81	1.75	1.75	1.8	4.6	783.45	207.3	4.6	6000	5:19 AM	2/14/2009	1
14	1.56	1.56	1.47	1.47	1.6	3.9	783.29	211.87	3.9	6000	7:00 AM	2/14/2009	2
14	1.5	1.5	1.4	1.4	1.5	4	783.65	217.9	4	6000	8:41 AM	2/14/2009	3
14	1.54	1.54	1.52	1.52	1.5	4.1	783.65	214.29	4.1	6000	10:22 AM	2/14/2009	4
14	1.5	1.51	1.41	1.4	1.5	4.1	783.6	213.22	4.1	6000	12:02 PM	2/14/2009	5
14	1.61	1.61	1.58	1.58	1.6	4.4	783.34	214.97	4.4	6000	1:43 PM	2/14/2009	6
14	1.8	1.8	1.67	1.67	1.8	4.3	783.81	207.18	4.3	6000	3:24 PM	2/14/2009	7
14	1.51	1.51	1.44	1.44	1.5	4.1	782.88	211.58	4.1	6000	5:05 PM	2/14/2009	8
14	1.53	1.53	1.44	1.44	1.5	4	783.65	210.75	4	6000	6:46 PM	2/14/2009	9
14	1.5	1.51	1.4	1.39	1.5	4.1	782.72	214.2	4.1	6000	8:27 PM	2/14/2009	10
14	1.66	1.66	1.61	1.61	1.7	4.2	783.08	210.21	4.2	6000	10:08 PM	2/14/2009	11
14	1.49	1.49	1.41	1.41	1.5	3.8	783.03	213.1	3.8	6000	11:49 PM	2/14/2009	12
14	1.71	1.71	1.66	1.66	1.7	4.4	782.67	209.81	4.4	6000	1:30 AM	2/15/2009	13
14	1.47	1.47	1.41	1.41	1.5	4	783.55	211.92	4	6000	3:10 AM	2/15/2009	14
14	1.55	1.55	1.47	1.47	1.5	3.9	782.77	215.17	3.9	6000	4:51 AM	2/15/2009	15
26	1.69	1.69	1.59	1.59	1.7	4.2	783.76	207.93	4.2	6000	8:22 AM	2/17/2009	1
26	1.63	1.63	1.57	1.57	1.6	3.7	782.62	208.63	3.7	4288	10:03 AM	2/17/2009	2

LABORATORY # 152406

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/5/2009		
Value on above date	1.11807	Bq/gm =	9464 TU
Dilution factor	1		
Concentration of dilution	1.11807	Bq/gm =	9464.50 TU

Standard Activity				
Background count rate	1.598	+/-	0.033	cpm
Standard count rate	28.254	+/-	0.137	cpm
Net activity	26.656	+/-	0.141	cpm
Grams of sample	2.0263			grams
Net standard activity per gram	13.155	+/-	0.070	cpm/gm
TU/cpm/gm	719.46	+/-	3.81	

Sample Activity				
Background rate	1.598	+/-	0.033	cpm
Sample count rate	1.673	+/-	0.033	cpm
Net activity	0.075	+/-	0.0467	cpm
Grams of sample	10.0375			grams
Net sample activity per gram	0.0074	+/-	0.0046	cpm/gm
TU	5.35	+/-	3.345	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**5.352**	**+/-**	**3.346 TU**

LABORATORY # 152406

water

Avg Standard Activity				
TU/cpm/gm	**725.91**	**+/-**	**3.87**	

Sample Activity				
Background rate	1.605	+/-	0.033	cpm
Sample count rate	1.673	+/-	0.033	cpm
Net activity	0.068	+/-	0.0468	cpm
Grams of sample	10.0375			grams
Net sample activity per gram	0.0068	+/-	0.0047	cpm/gm
TU	4.91	+/-	3.386	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**4.912**	**+/-**	**3.386 TU**

Report < 11.7

LABORATORY # 152407

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/5/2009		
Value on above date	1.11807	Bq/gm =	9464 TU
Dilution factor	1		
Concentration of dilution	1.11807	Bq/gm =	9464.50 TU

Standard Activity				
Background count rate	1.598	+/-	0.033	cpm
Standard count rate	28.254	+/-	0.137	cpm
Net activity	26.656	+/-	0.141	cpm
Grams of sample	2.0263			grams
Net standard activity per gram	13.155	+/-	0.070	cpm/gm
TU/cpm/gm	719.46	+/-	3.81	

Sample Activity				
Background rate	1.598	+/-	0.033	cpm
Sample count rate	1.673	+/-	0.033	cpm
Net activity	0.075	+/-	0.0467	cpm
Grams of sample	9.9893			grams
Net sample activity per gram	0.0075	+/-	0.0047	cpm/gm
TU	5.43	+/-	3.362	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**5.426**	**+/-**	**3.362 TU**

LABORATORY # 152407

water

Avg Standard Activity				
TU/cpm/gm	**725.91**	**+/-**	**3.87**	

Sample Activity				
Background rate	1.605	+/-	0.033	cpm
Sample count rate	1.673	+/-	0.033	cpm
Net activity	0.069	+/-	0.0468	cpm
Grams of sample	9.9893			grams
Net sample activity per gram	0.0069	+/-	0.0047	cpm/gm
TU	4.98	+/-	3.402	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**4.984**	**+/-**	**3.403 TU**

Report < 11.8

LABORATORY # 152408

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/5/2009		
Value on above date	1.11807	Bq/gm =	9464 TU
Dilution factor	1		
Concentration of dilution	1.11807	Bq/gm =	9464.50 TU

Standard Activity				
Background count rate	1.598	+/-	0.033	cpm
Standard count rate	28.254	+/-	0.137	cpm
Net activity	26.656	+/-	0.141	cpm
Grams of sample	2.0263			grams
Net standard activity per gram	13.155	+/-	0.070	cpm/gm
TU/cpm/gm	719.46	+/-	3.81	

Sample Activity				
Background rate	1.598	+/-	0.033	cpm
Sample count rate	1.667	+/-	0.033	cpm
Net activity	0.069	+/-	0.0466	cpm
Grams of sample	10.0122			grams
Net sample activity per gram	0.0069	+/-	0.0047	cpm/gm
TU	4.98	+/-	3.349	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**4.982**	**+/-**	**3.349 TU**

LABORATORY # 152408

water

Avg Standard Activity			
TU/cpm/gm	**725.91**	**+/-**	**3.87**

Sample Activity				
Background rate	1.605	+/-	0.033	cpm
Sample count rate	1.667	+/-	0.033	cpm
Net activity	0.063	+/-	0.0467	cpm
Grams of sample	10.0122			grams
Net sample activity per gram	0.0063	+/-	0.0047	cpm/gm
TU	4.54	+/-	3.389	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**4.537**	**+/-**	**3.390 TU**

Report < 11.3

LABORATORY # 152409

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/5/2009		
Value on above date	1.11807	Bq/gm =	9464 TU
Dilution factor	1		
Concentration of dilution	1.11807	Bq/gm =	9464.50 TU

Standard Activity				
Background count rate	1.598	+/-	0.033	cpm
Standard count rate	28.254	+/-	0.137	cpm
Net activity	26.656	+/-	0.141	cpm
Grams of sample	2.0263			grams
Net standard activity per gram	13.155	+/-	0.070	cpm/gm
TU/cpm/gm	719.46	+/-	3.81	

Sample Activity				
Background rate	1.598	+/-	0.033	cpm
Sample count rate	1.615	+/-	0.032	cpm
Net activity	0.017	+/-	0.046	cpm
Grams of sample	10.0467			grams
Net sample activity per gram	0.0017	+/-	0.0046	cpm/gm
TU	1.22	+/-	3.291	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**1.217**	**+/-**	**3.291 TU**

LABORATORY # 152409

water

Avg Standard Activity			
TU/cpm/gm	**725.91**	**+/-**	**3.87**

Sample Activity				
Background rate	1.605	+/-	0.033	cpm
Sample count rate	1.615	+/-	0.032	cpm
Net activity	0.010	+/-	0.0461	cpm
Grams of sample	10.0467			grams
Net sample activity per gram	0.0010	+/-	0.0046	cpm/gm
TU	0.74	+/-	3.332	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.741**	**+/-**	**3.332 TU**

Report < 10.0 TU

LABORATORY # 152410

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/5/2009		
Value on above date	1.11807	Bq/gm =	9464 TU
Dilution factor	1		
Concentration of dilution	1.11807	Bq/gm =	9464.50 TU

Standard Activity				
Background count rate	1.598	+/-	0.033	cpm
Standard count rate	28.254	+/-	0.137	cpm
Net activity	26.656	+/-	0.141	cpm
Grams of sample	2.0263			grams
Net standard activity per gram	13.155	+/-	0.070	cpm/gm
TU/cpm/gm	719.46	+/-	3.81	

Sample Activity				
Background rate	1.598	+/-	0.033	cpm
Sample count rate	1.631	+/-	0.033	cpm
Net activity	0.033	+/-	0.0464	cpm
Grams of sample	10.0348			grams
Net sample activity per gram	0.0033	+/-	0.0046	cpm/gm
TU	2.39	+/-	3.326	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**2.390**	**+/-**	**3.326 TU**

LABORATORY # 152410

water

Avg Standard Activity				
TU/cpm/gm	**725.91**	**+/-**	**3.87**	

Sample Activity				
Background rate	1.605	+/-	0.033	cpm
Sample count rate	1.631	+/-	0.033	cpm
Net activity	0.027	+/-	0.0465	cpm
Grams of sample	10.0348			grams
Net sample activity per gram	0.0026	+/-	0.0046	cpm/gm
TU	1.92	+/-	3.366	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**1.923**	**+/-**	**3.366 TU**

Report < 10.0 TU

LABORATORY # 152411

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/5/2009		
Value on above date	1.11807	Bq/gm =	9464 TU
Dilution factor	1		
Concentration of dilution	1.11807	Bq/gm =	9464.50 TU

Standard Activity				
Background count rate	1.598	+/-	0.033	cpm
Standard count rate	28.254	+/-	0.137	cpm
Net activity	26.656	+/-	0.141	cpm
Grams of sample	2.0263			grams
Net standard activity per gram	13.155	+/-	0.070	cpm/gm
TU/cpm/gm	719.46	+/-	3.81	

Sample Activity				
Background rate	1.598	+/-	0.033	cpm
Sample count rate	1.638	+/-	0.033	cpm
Net activity	0.040	+/-	0.0464	cpm
Grams of sample	9.9938			grams
Net sample activity per gram	0.0040	+/-	0.0046	cpm/gm
TU	2.88	+/-	3.339	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**2.880**	**+/-**	**3.340 TU**

LABORATORY # 152411

water

Avg Standard Activity				
TU/cpm/gm	**725.91**	**+/-**	**3.87**	

Sample Activity				
Background rate	1.605	+/-	0.033	cpm
Sample count rate	1.638	+/-	0.033	cpm
Net activity	0.033	+/-	0.0465	cpm
Grams of sample	9.9938			grams
Net sample activity per gram	0.0033	+/-	0.0047	cpm/gm
TU	2.42	+/-	3.380	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**2.415**	**+/-**	**3.380 TU**

Report < 10.0 TU

LABORATORY # 152412

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/5/2009		
Value on above date	1.11807	Bq/gm =	9464 TU
Dilution factor	1		
Concentration of dilution	1.11807	Bq/gm =	9464.50 TU

Standard Activity				
Background count rate	1.598	+/-	0.033	cpm
Standard count rate	28.254	+/-	0.137	cpm
Net activity	26.656	+/-	0.141	cpm
Grams of sample	2.0263			grams
Net standard activity per gram	13.155	+/-	0.070	cpm/gm
TU/cpm/gm	719.46	+/-	3.81	

Sample Activity				
Background rate	1.598	+/-	0.033	cpm
Sample count rate	1.620	+/-	0.033	cpm
Net activity	0.022	+/-	0.0463	cpm
Grams of sample	10.0505			grams
Net sample activity per gram	0.0022	+/-	0.0046	cpm/gm
TU	1.57	+/-	3.316	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**1.575**	**+/-**	**3.316 TU**

LABORATORY # 152412

water

Avg Standard Activity			
TU/cpm/gm	**725.91**	**+/-**	**3.87**

Sample Activity				
Background rate	1.605	+/-	0.033	cpm
Sample count rate	1.620	+/-	0.033	cpm
Net activity	0.015	+/-	0.0465	cpm
Grams of sample	10.0505			grams
Net sample activity per gram	0.0015	+/-	0.0046	cpm/gm
TU	1.10	+/-	3.356	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**1.101**	**+/-**	**3.356 TU**

Report < 10.0 TU

LABORATORY # 152413

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/5/2009		
Value on above date	1.11807	Bq/gm =	9464 TU
Dilution factor	1		
Concentration of dilution	1.11807	Bq/gm =	9464.50 TU

Standard Activity				
Background count rate	1.598	+/-	0.033	cpm
Standard count rate	28.254	+/-	0.137	cpm
Net activity	26.656	+/-	0.141	cpm
Grams of sample	2.0263			grams
Net standard activity per gram	13.155	+/-	0.070	cpm/gm
TU/cpm/gm	719.46	+/-	3.81	

Sample Activity				
Background rate	1.598	+/-	0.033	cpm
Sample count rate	1.658	+/-	0.034	cpm
Net activity	0.060	+/-	0.0474	cpm
Grams of sample	10.01			grams
Net sample activity per gram	0.0060	+/-	0.0047	cpm/gm
TU	4.30	+/-	3.406	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**4.302**	**+/-**	**3.407 TU**

LABORATORY # 152413

water

Avg Standard Activity			
TU/cpm/gm	**725.91**	**+/-**	**3.87**

Sample Activity				
Background rate	1.605	+/-	0.033	cpm
Sample count rate	1.658	+/-	0.034	cpm
Net activity	0.053	+/-	0.0475	cpm
Grams of sample	10.01			grams
Net sample activity per gram	0.0053	+/-	0.0047	cpm/gm
TU	3.85	+/-	3.447	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**3.851**	**+/-**	**3.448 TU**

Report <10.8 TU

LABORATORY # 152414

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/5/2009		
Value on above date	1.11807	Bq/gm =	9464 TU
Dilution factor	1		
Concentration of dilution	1.11807	Bq/gm =	9464.50 TU

Standard Activity				
Background count rate	1.598	+/-	0.033	cpm
Standard count rate	28.254	+/-	0.137	cpm
Net activity	26.656	+/-	0.141	cpm
Grams of sample	2.0263			grams
Net standard activity per gram	13.155	+/-	0.070	cpm/gm
TU/cpm/gm	719.46	+/-	3.81	

Sample Activity				
Background rate	1.598	+/-	0.033	cpm
Sample count rate	1.615	+/-	0.032	cpm
Net activity	0.017	+/-	0.0459	cpm
Grams of sample	10.0622			grams
Net sample activity per gram	0.0017	+/-	0.0046	cpm/gm
TU	1.22	+/-	3.281	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**1.216**	**+/-**	**3.281 TU**

LABORATORY # 152414

water

Avg Standard Activity

TU/cpm/gm	**725.91**	**+/-**	**3.87**

Sample Activity				
Background rate	1.605	+/-	0.033	cpm
Sample count rate	1.615	+/-	0.032	cpm
Net activity	0.010	+/-	0.046	cpm
Grams of sample	10.0622			grams
Net sample activity per gram	0.0010	+/-	0.0046	cpm/gm
TU	0.74	+/-	3.322	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.739**	**+/-**	**3.322 TU**

Report < 10.0 TU

LABORATORY # 152415

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/5/2009		
Value on above date	1.11807	Bq/gm =	9464 TU
Dilution factor	1		
Concentration of dilution	1.11807	Bq/gm =	9464.50 TU

Standard Activity				
Background count rate	1.598	+/-	0.033	cpm
Standard count rate	28.254	+/-	0.137	cpm
Net activity	26.656	+/-	0.141	cpm
Grams of sample	2.0263			grams
Net standard activity per gram	13.155	+/-	0.070	cpm/gm
TU/cpm/gm	719.46	+/-	3.81	

Sample Activity				
Background rate	1.598	+/-	0.033	cpm
Sample count rate	1.614	+/-	0.033	cpm
Net activity	0.016	+/-	0.0462	cpm
Grams of sample	10.0613			grams
Net sample activity per gram	0.0016	+/-	0.0046	cpm/gm
TU	1.14	+/-	3.307	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**1.144**	**+/-**	**3.307 TU**

LABORATORY # 152415

water

Avg Standard Activity				
TU/cpm/gm	**725.91**	**+/-**	**3.87**	

Sample Activity				
Background rate	1.605	+/-	0.033	cpm
Sample count rate	1.614	+/-	0.033	cpm
Net activity	0.009	+/-	0.0464	cpm
Grams of sample	10.0613			grams
Net sample activity per gram	0.0009	+/-	0.0046	cpm/gm
TU	0.67	+/-	3.347	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.667**	**+/-**	**3.347 TU**

Report < 10.0 TU

LABORATORY # 152416

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	2/5/2009		
Value on above date	1.11807	Bq/gm =	9464 TU
Dilution factor	1		
Concentration of dilution	1.11807	Bq/gm =	9464.50 TU

Standard Activity				
Background count rate	1.598	+/-	0.033	cpm
Standard count rate	28.254	+/-	0.137	cpm
Net activity	26.656	+/-	0.141	cpm
Grams of sample	2.0263			grams
Net standard activity per gram	13.155	+/-	0.070	cpm/gm
TU/cpm/gm	719.46	+/-	3.81	

Sample Activity				
Background rate	1.598	+/-	0.033	cpm
Sample count rate	1.615	+/-	0.033	cpm
Net activity	0.017	+/-	0.046	cpm
Grams of sample	9.9873			grams
Net sample activity per gram	0.0017	+/-	0.0046	cpm/gm
TU	1.22	+/-	3.316	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**1.225**	**+/-**	**3.316 TU**

LABORATORY # 152416

water

Avg Standard Activity				
TU/cpm/gm	**725.91**	**+/-**	**3.87**	

Sample Activity				
Background rate	1.605	+/-	0.033	cpm
Sample count rate	1.615	+/-	0.033	cpm
Net activity	0.010	+/-	0.0462	cpm
Grams of sample	9.9873			grams
Net sample activity per gram	0.0010	+/-	0.0046	cpm/gm
TU	0.74	+/-	3.357	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.745**	**+/-**	**3.357 TU**

Report < 10.0 TU

LABORATORY # 152417 *sample was NOT water could not analyze for tritium*

NIST standard calculations				
Standardization date	9/3/1998			
Standardized value	2.00900	Bq/gm		
Date of measurement	2/5/2009			
Value on above date	1.11807	Bq/gm =	9464	TU
Dilution factor	1			
Concentration of dilution	1.11807	Bq/gm =	9464.50	TU

Standard Activity				
Background count rate	1.598	+/-	0.033	cpm
Standard count rate	28.254	+/-	0.137	cpm
Net activity	26.656	+/-	0.141	cpm
Grams of sample	2.0263			grams
Net standard activity per gram	13.155	+/-	0.070	cpm/gm
TU/cpm/gm	719.46	+/-	3.81	

Sample Activity				
Background rate	1.598	+/-	0.033	cpm
Sample count rate		+/-		cpm
Net activity	-1.598	+/-	0.0326	cpm
Grams of sample				grams
Net sample activity per gram	#DIV/0!	+/-	#DIV/0!	cpm/gm
TU	#DIV/0!	+/-	#DIV/0!	

Sample Enrichment				
Initial amount of water	1			
final amount of water	1			
Enrichment factor for cell	1	+/-	0.01	
Tf/To	1.00	+/-	0.010	
TRITIUM CONC. OF SAMPLE	**#DIV/0!**	**+/-**	**#DIV/0!**	**TU**

LABORATORY # 152417 water

Avg Standard Activity				
TU/cpm/gm	**725.91**	**+/-**	**3.87**	

Sample Activity				
Background rate	1.605	+/-	0.033	cpm
Sample count rate	0.000	+/-	0.000	cpm
Net activity	-1.605	+/-	0.0328	cpm
Grams of sample	0			grams
Net sample activity per gram	#DIV/0!	+/-	#DIV/0!	cpm/gm
TU	#DIV/0!	+/-	#DIV/0!	

Sample Enrichment				
Initial amount of water	1			
final amount of water	1			
Enrichment factor for cell	1	+/-	0.01	
Tf/To	1.00	+/-	0.010	
TRITIUM CONC. OF SAMPLE	**#DIV/0!**	**+/-**	**#DIV/0!**	**TU**

NOTE: sample was NOT water could not analyze for tritium

COUNTER 3 (new) **Year 2009**
NIST and BLANK Values

JOB #	NIST date	count date	Value	+/-	SD	AVG NIST : TU/cpm/g	+/-		BLK date	count date	Value	+/-	SD	AVG BLK : cpm	+/-	
	4-Feb	5-Feb	434.66	+/-	2.17				4-Feb	5-Feb	1.421	+/-	0.042			
	"	6-Feb	430.62	+/-	2.13				"	6-Feb	1.341	+/-	0.037			
	"	8-Feb	434.56	+/-	2.17	433.28	+/-	2.15	"	7-Feb	1.438	+/-	0.038	1.400	+/-	0.039
	10-Feb	14-Feb	431.23	+/-	2.54	432.77	+/-	2.25	10-Feb	13-Feb	1.273	+/-	0.040	1.368	+/-	0.039
									"	17-Feb	1.296	+/-	0.040	1.354	+/-	0.039
	20-Feb	24-Feb	434.10	+/-	2.38	433.03	+/-	2.28	20-Feb	23-Feb	1.250	+/-	0.040	1.336	+/-	0.039
									"	28-Feb	1.286	**+/-**	0.040	1.329	+/-	0.040
	5-Mar								5-Mar	9-Mar	1.439	**+/-**	0.038	1.343	+/-	0.039
	"	10-Mar	438.40	+/-	2.04	433.93	+/-	2.24	"	14-Mar	1.370	**+/-**	0.037	1.346	+/-	0.039
									"	20-Mar	1.279	**+/-**	0.038	1.339	+/-	0.039
									19-Mar	21-Mar	1.282	**+/-**	0.036	1.334	+/-	0.039
									23-Mar	23-Mar	1.352	**+/-**	0.037	1.336	+/-	0.038
									24-Mar	27-Mar	1.438	**+/-**	0.035	1.343	+/-	0.038
									26-Mar	27-Mar	1.376	**+/-**	0.0314	1.346	+/-	0.038
	24-Mar	29-Mar	430.27	+/-	2.13	433.40	+/-	2.22	24-Mar	28-Mar	1.423	**+/-**	0.034	1.351	+/-	0.038
									"	3-Apr	1.373	**+/-**	0.041	1.352	+/-	0.038
	"	9-Apr	434.22	+/-	2.16	433.51	+/-	2.21	3-Apr	8-Apr	1.369	+/-	0.034	1.353	+/-	0.038
									"	10-Apr	1.285	+/-	0.038	1.349	+/-	0.038
Job 11289 CNC	6-Apr	19-Apr	437.46	+/-	2.44	433.95	+/-	2.24	6-Apr	18-Apr	1.420	+/-	0.042	1.353	+/-	0.038
"	"	20-Apr	437.09	+/-	2.43	**434.26**	+/-	**2.26**	"	20-Apr	1.310	+/-	0.041	1.351	+/-	0.038
"									20-Apr	21-Apr	1.291	+/-	0.036	**1.348**	**+/-**	**0.038**

COUNTER #3

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	4/20/2009		
Value on above date	1.10541	Bq/gm =	9357 TU
Dilution factor	1		
Concentration of dilution	1.10541	Bq/gm =	9357.33 TU

Standard Activity				
Background count rate	1.310	+/-	0.041	cpm
Standard count rate	44.069	+/-	0.235	cpm
Net activity	42.759	+/-	0.238	cpm
Grams of sample	1.9973			grams
Net standard activity per gram	21.408	+/-	0.119	cpm/gm
TU/cpm/gm	437.09	+/-	2.43	

Counting efficiency	
total cpm	66.32 TU of std *0.007088*
net actvy (cpm/g)	21.408 (std count - bkgrd count)/g
efficiency %	**32.28** net actvy/total dpm std

DATA FILE **21** counter 3
JOB # **11289 CNC**
Count dates: **4-17 through 4-22-09**

Position #	3	4	3	4	21	22
Sample ID	Blank	NIST	Blank	NIST	160371 DC	Blank
Cocktail date	6-Apr	6-Apr	6-Apr	6-Apr	20-Apr	20-Apr
Date counted	18-Apr	19-Apr	20-Apr	20-Apr	21-Apr	21-Apr

FRI 17 APR 2009 14:33

*** DIRECTORY PATH :C:\GWEN21 ***

PARAMETER GROUP: 8
ID: 4-17-2009

00A PROGRAM MODE 6 ->

ORDER	POS	ID	CTIME	COUNTS	CUCNTS	MCW	REP	STD	STMS	STIME
1	1	HOT ONE	100:00	NO LIM	NO LIM	1	8	N		
2	2	COLD ONE	100:00	NO LIM	NO LIM	1	8	N		
3	3	BLANK 4-6	100:00	NO LIM	NO LIM	1	8	N		
4	4	NIST 4-6	100:00	NO LIM	NO LIM	1	8	N		
5	3	BLANK 4-6	100:00	NO LIM	NO LIM	1	8	N		
6	4	NIST 4-6	100:00	NO LIM	NO LIM	1	8	N		
7	21	160371	100:00	NO LIM	NO LIM	1	8	N		
8	22	BLANK 4-20	100:00	NO LIM	NO LIM	1	10	N		

NUMBER OF CYCLES 1
COINCIDENCE BIAS (L/H) L

MCA INPUT TRIGG. INHIBIT MEMORY SPLIT
1 LRSUM DCOS G L*R
2 GSUM G L*R

WINDOW	CHANNELS	MCA	HALF
2	50- 270	1	2
3	60- 220	1	2
4	50- 320	1	1
5	50- 270	1	1
6	60- 220	1	1
7	1- 1024	2	1
8	1- 1024	2	2

SELECTED PRINTOUT FOR TERMINAL 1 (A)

	CYC	POS	REP	CTIME	SQP	SQP%	STIME	ID	CPM3	CPM4	CPM5	CPM6	CPM7	CPM8
Q030301N.001	1	3	1	100:01.893	0	0	0:00	BLANK 4-6	1.48	0.01	0.01	0.01	1265.53	26.65
Q030302N.001	1	3	2	100:01.884	0	0	0:00	BLANK 4-6	1.47	0.04	0.04	0.03	1275.17	25.81
Q030303N.001	1	3	3	100:01.884	0	0	0:00	BLANK 4-6	1.42	0.03	0.03	0.03	1266.05	26.66
Q030304N.001	1	3	4	100:01.883	0	0	0:00	BLANK 4-6	1.5	0.06	0.06	0.04	1265.21	27.31
Q030305N.001	1	3	5	100:01.883	0	0	0:00	BLANK 4-6	1.28	0.05	0.05	0.05	1270.83	27.27
Q030306N.001	1	3	6	100:01.878	0	0	0:00	BLANK 4-6	1.56	0.01	0.01	0.01	1271.71	26.78
Q030307N.001	1	3	7	100:01.884	0	0	0:00	BLANK 4-6	1.14	0.04	0.04	0.04	1280.3	26.53
Q030308N.001	1	3	8	100:01.883	0	0	0:00	BLANK 4-6	1.51	0.05	0.05	0.02	1277.67	27.13
Q040401N.001	1	4	1	100:01.893	0	0	0:00	NIST 4-6	44.6	0.01	0.01	0	1279.92	27.46
Q040402N.001	1	4	2	100:01.883	0	0	0:00	NIST 4-6	44.94	0.06	0.06	0.04	1287.99	27.59
Q040403N.001	1	4	3	100:01.877	0	0	0:00	NIST 4-6	43.56	0.03	0.03	0.02	1285.62	27.44
Q040404N.001	1	4	4	100:01.883	0	0	0:00	NIST 4-6	44.13	0.02	0.02	0.01	1291.7	26.64
Q040405N.001	1	4	5	100:01.883	0	0	0:00	NIST 4-6	44.28	0.04	0.04	0.03	1299	27.15
Q040406N.001	1	4	6	100:01.883	0	0	0:00	NIST 4-6	43.73	0.03	0.03	0.01	1305.7	27.2
Q040407N.001	1	4	7	100:01.883	0	0	0:00	NIST 4-6	43.95	0.06	0.06	0.06	1314.52	27.31
Q040408N.001	1	4	8	100:01.883	0	0	0:00	NIST 4-6	44	0.07	0.07	0.04	1318.09	27.27
Q050301N.001	1	3	1	100:01.892	0	0	0:00	BLANK 4-6	1.42	0.02	0.02	0.02	1323.38	26.22
Q050302N.001	1	3	2	100:01.883	0	0	0:00	BLANK 4-6	1.17	0.04	0.04	0.04	1317.07	27.45
Q050303N.001	1	3	3	100:01.883	0	0	0:00	BLANK 4-6	1.27	0.05	0.05	0.01	1323.61	27.97
Q050304N.001	1	3	4	100:01.883	0	0	0:00	BLANK 4-6	1.35	0.04	0.04	0.03	1317.18	26.88
Q050305N.001	1	3	5	100:01.883	0	0	0:00	BLANK 4-6	1.42	0.03	0.03	0.03	1303.83	27.09
Q050306N.001	1	3	6	100:01.883	0	0	0:00	BLANK 4-6	1.24	0.09	0.09	0.07	1303.61	26.92
Q050307N.001	1	3	7	100:01.877	0	0	0:00	BLANK 4-6	1.26	0.07	0.06	0.04	1302.99	26.18
Q050308N.001	1	3	8	100:01.883	0	0	0:00	BLANK 4-6	1.35	0.07	0.07	0.05	1302.93	26.98
Q060401N.001	1	4	1	100:01.886	0	0	0:00	NIST 4-6	43.87	0.03	0.03	0	1304.98	26.7
Q060402N.001	1	4	2	100:01.883	0	0	0:00	NIST 4-6	43.66	0.04	0.04	0.02	1304.35	27.68
Q060403N.001	1	4	3	100:01.883	0	0	0:00	NIST 4-6	44.79	0.03	0.03	0.02	1311.61	27.19
Q060404N.001	1	4	4	100:01.883	0	0	0:00	NIST 4-6	44.54	0.04	0.04	0.04	1318.15	28.67
Q060405N.001	1	4	5	100:01.883	0	0	0:00	NIST 4-6	44.48	0.05	0.05	0.03	1307.73	27.12
Q060406N.001	1	4	6	100:01.883	0	0	0:00	NIST 4-6	44.48	0.03	0.03	0.03	1295.85	26.97
Q060407N.001	1	4	7	100:01.883	0	0	0:00	NIST 4-6	43.91	0.06	0.06	0.04	1300.78	27.21
Q060408N.001	1	4	8	100:01.883	0	0	0:00	NIST 4-6	42.82	0.04	0.04	0.04	1304.5	28.32

Q072101N.001	1	21	1	100:01.892	0	0	0:00	160371	1.39	0.02	0.02	0.01	1309.57	25.96
Q072102N.001	1	21	2	100:01.883	0	0	0:00	160371	1.38	0.09	0.09	0.06	1316.05	27.15
Q072103N.001	1	21	3	100:01.883	0	0	0:00	160371	1.35	0.04	0.04	0.02	1323.76	28.26
Q072104N.001	1	21	4	100:01.883	0	0	0:00	160371	1.45	0.05	0.05	0.02	1323.5	28.06
Q072105N.001	1	21	5	100:01.883	0	0	0:00	160371	1.52	0.04	0.04	0.03	1318.33	27.56
Q072106N.001	1	21	6	100:01.883	0	0	0:00	160371	1.19	0.03	0.03	0.02	1311.27	26.73
Q072107N.001	1	21	7	100:01.883	0	0	0:00	160371	1.46	0.01	0.01	0.01	1307.89	26.88
Q072108N.001	1	21	8	100:01.883	0	0	0:00	160371	1.39	0.02	0.02	0.01	1313.65	27.03
Q082201N.001	1	22	1	100:01.892	0	0	0:00	BLANK 4-20	1.28	0.02	0.02	0.02	1314.54	26.71
Q082202N.001	1	22	2	100:01.883	0	0	0:00	BLANK 4-20	1.13	0.05	0.05	0.04	1310.35	28.38
Q082203N.001	1	22	3	100:01.877	0	0	0:00	BLANK 4-20	1.45	0.02	0.02	0.02	1299.77	26.37
Q082204N.001	1	22	4	100:01.883	0	0	0:00	BLANK 4-20	1.32	0.06	0.06	0.05	1305.32	27.19
Q082205N.001	1	22	5	100:01.883	0	0	0:00	BLANK 4-20	1.28	0.05	0.05	0.04	1302.34	27.05
Q082206N.001	1	22	6	100:01.883	0	0	0:00	BLANK 4-20	1.28	0.05	0.05	0.04	1305.83	27.79
Q082207N.001	1	22	7	100:01.883	0	0	0:00	BLANK 4-20	1.17	0.02	0.02	0.02	1287.06	26.71
Q082208N.001	1	22	8	100:01.883	0	0	0:00	BLANK 4-20	1.35	0.06	0.06	0.06	1303.3	27.46
Q082209N.001	1	22	9	100:01.883	0	0	0:00	BLANK 4-20	1.43	0.06	0.06	0.06	1293.3	27.13
Q082210N.001	1	22	10	100:01.883	0	0	0:00	BLANK 4-20	1.22	0.06	0.06	0.04	1292.37	26.6

LABORATORY # 160371

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	4/20/2009		
Value on above date	1.10541	Bq/gm =	9357 TU
Dilution factor	1		
Concentration of dilution	1.10541	Bq/gm =	9357.33 TU

Standard Activity				
Background count rate	1.310	+/-	0.041	cpm
Standard count rate	44.069	+/-	0.235	cpm
Net activity	42.759	+/-	0.238	cpm
Grams of sample	1.9973			grams
Net standard activity per gram	21.408	+/-	0.119	cpm/gm
TU/cpm/gm	437.09	+/-	2.43	

Sample Activity				
Background rate	1.310	+/-	0.041	cpm
Sample count rate	1.420	+/-	0.045	cpm
Net activity	0.110	+/-	0.0605	cpm
Grams of sample	10.0518			grams
Net sample activity per gram	0.0109	+/-	0.0060	cpm/gm
TU	4.78	+/-	2.633	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**4.783**	**+/-**	**2.633 TU**

LABORATORY # 160371

water

Avg Standard Activity			
TU/cpm/gm	**434.26**	**+/-**	**2.26**

Sample Activity				
Background rate	1.348	+/-	0.038	cpm
Sample count rate	1.420	+/-	0.045	cpm
Net activity	0.072	+/-	0.059	cpm
Grams of sample	10.0518			grams
Net sample activity per gram	0.0071	+/-	0.0059	cpm/gm
TU	3.10	+/-	2.548	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**3.103**	**+/-**	**2.548 TU**

REPORT < 10.0 TU

COUNTER 3 (new) **Year 2009**
NIST and BLANK Values

JOB #	NIST date	count date	Value	+/-	SD	AVG NIST : TU/cpm/g	+/-		BLK date	count date	Value	+/-	SD	AVG BLK : cpm	+/-	
	4-Feb	5-Feb	434.66	+/-	2.17				4-Feb	5-Feb	1.421	+/-	0.042			
	"	6-Feb	430.62	+/-	2.13				"	6-Feb	1.341	+/-	0.037			
	"	8-Feb	434.56	+/-	2.17	433.28	+/-	2.15	"	7-Feb	1.438	+/-	0.038	1.400	+/-	0.039
	10-Feb	14-Feb	431.23	+/-	2.54	432.77	+/-	2.25	10-Feb	13-Feb	1.273	+/-	0.040	1.368	+/-	0.039
	"								"	17-Feb	1.296	+/-	0.040	1.354	+/-	0.039
	20-Feb	24-Feb	434.10	+/-	2.38	433.03	+/-	2.28	20-Feb	23-Feb	1.250	+/-	0.040	1.336	+/-	0.039
	"								"	28-Feb	1.286	**+/-**	0.040	1.329	+/-	0.040
	5-Mar								5-Mar	9-Mar	1.439	**+/-**	0.038	1.343	+/-	0.039
	"	10-Mar	438.40	+/-	2.04	433.93	+/-	2.24	"	14-Mar	1.370	**+/-**	0.037	1.346	+/-	0.039
	"								"	20-Mar	1.279	**+/-**	0.038	1.339	+/-	0.039
	"								19-Mar	21-Mar	1.282	**+/-**	0.036	1.334	+/-	0.039
									23-Mar	23-Mar	1.352	**+/-**	0.037	1.336	+/-	0.038
									24-Mar	27-Mar	1.438	**+/-**	0.035	1.343	+/-	0.038
									26-Mar	27-Mar	1.376	**+/-**	0.0314	1.346	+/-	0.038
	24-Mar	29-Mar	430.27	+/-	2.13	433.40	+/-	2.22	24-Mar	28-Mar	1.423	**+/-**	0.034	1.351	+/-	0.038
	"								"	3-Apr	1.373	**+/-**	0.041	1.352	+/-	0.038
	"	9-Apr	434.22	+/-	2.16	433.51	+/-	2.21	3-Apr	8-Apr	1.369	+/-	0.034	1.353	+/-	0.038
	"								"	10-Apr	1.285	+/-	0.038	1.349	+/-	0.038
	6-Apr	19-Apr	437.46	+/-	2.44	433.95	+/-	2.24	6-Apr	18-Apr	1.420	+/-	0.042	1.353	+/-	0.038
	"	20-Apr	437.09	+/-	2.43	**434.26**	+/-	**2.26**	"	20-Apr	1.310	+/-	0.041	1.351	+/-	0.038
	"								20-Apr	21-Apr	1.291	+/-	0.036	1.348	+/-	0.038
Job 11299 CNC	"								"	23-Apr	1.310	+/-	0.036	**1.346**	**+/-**	**0.038**

COUNTER #3

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	4/20/2009		
Value on above date	1.10541	Bq/gm =	9357 TU
Dilution factor	1		
Concentration of dilution	1.10541	Bq/gm =	9357.33 TU

Standard Activity				
Background count rate	1.310	+/-	0.041	cpm
Standard count rate	44.069	+/-	0.235	cpm
Net activity	42.759	+/-	0.238	cpm
Grams of sample	1.9973			grams
Net standard activity per gram	21.408	+/-	0.119	cpm/gm
TU/cpm/gm	437.09	+/-	2.43	

Counting efficiency	
total cpm	66.32 TU of std *0.007088* wt of std
net actvy (cpm/g)	21.408 (std count - bkgrd count)/g
efficiency %	**32.28** net actvy/total dpm std

DATA FILE	**Gwen 21,23** counter 3					
JOB #	**11299 CNC**					
Count dates:	**4-17 through 4-22-09**					
	21				23	
Position #	3	4	3	4	21	22
Sample ID	Blank	NIST	Blank	NIST	160503 DC	Blank
Cocktail date	6-Apr	6-Apr	6-Apr	6-Apr	21-Apr	20-Apr
Date counted	18-Apr	19-Apr	20-Apr	20-Apr	22-Apr	23-Apr

WED 22 APR 2009 10:05

*** DIRECTORY PATH :C:\GWEN23 ***

PARAMETER GROUP: 8
ID: <090421>

00A PROGRAM MODE 6 ->

ORDER POS ID CTIME COUNTS CUCNTS MCW REP STD STMS STIME
1 21 160503 100:00 NO LIM NO LIM 1 10 N
2 22 BLANK 4-20 100:00 NO LIM NO LIM 1 45 N
3 23 NIST 4-20 100:00 NO LIM NO LIM 1 22 N
NUMBER OF CYCLES 1
COINCIDENCE BIAS (L/H) L

MCA INPUT TRIGG. INHIBIT MEMORY SPLIT
1 LRSUM DCOS G L*R
2 GSUM G L*R

WINDOW CHANNELS MCA HALF
2 50- 270 1 2
3 60- 220 1 2
4 50- 320 1 1
5 50- 270 1 1
6 60- 220 1 1
7 1- 1024 2 1
8 1- 1024 2 2

SELECTED PRINTOUT FOR TERMINAL 1 (A)

	CYC	POS	REP	CTIME	SQP	SQP%	STIME	ID	CPM1	CPM2	CPM3	CPM4	CPM5	CPM6	CPM7	CPM8
Q012101N.001	1	21	1	100:01.759	0	0	0:00	**160503**	2.45	2.07	**1.5**	0.05	0.05	0.05	1272.98	25.71
Q012102N.001	1	21	2	100:01.884	0	0	0:00	**160503**	2.12	1.84	**1.4**	0.04	0.04	0.03	1287.4	26.51
Q012103N.001	1	21	3	100:01.884	0	0	0:00	**160503**	2.05	1.66	**1.15**	0.04	0.04	0.03	1290.14	26.33
Q012104N.001	1	21	4	100:01.884	0	0	0:00	**160503**	2.18	1.8	**1.41**	0.05	0.05	0.04	1289.19	26.14
Q012105N.001	1	21	5	100:01.884	0	0	0:00	**160503**	2.21	1.83	**1.28**	0.03	0.03	0.03	1279.54	25.5
Q012106N.001	1	21	6	100:01.884	0	0	0:00	**160503**	2.55	2.07	**1.54**	0.05	0.05	0.02	1271.06	26.35
Q012107N.001	1	21	7	100:01.884	0	0	0:00	**160503**	2.11	1.69	**1.25**	0.04	0.04	0.03	1274.52	26.69
Q012108N.001	1	21	8	100:01.878	0	0	0:00	**160503**	2.27	1.84	**1.34**	0.01	0.01	0.01	1268.27	26.09
Q012109N.001	1	21	9	100:01.884	0	0	0:00	**160503**	2.32	1.9	**1.5**	0.08	0.08	0.05	1265.42	26.17
Q012110N.001	1	21	10	100:01.884	0	0	0:00	**160503**	2.03	1.7	**1.2**	0.01	0.01	0	1260.37	26.75
Q022201N.001	1	22	1	100:01.893	0	0	0:00	**BLANK 4-20**	2.29	1.79	**1.31**	0.04	0.04	0.03	1265.76	26.68
Q022202N.001	1	22	2	100:01.884	0	0	0:00	**BLANK 4-20**	2.07	1.68	**1.19**	0.06	0.06	0.04	1257.46	26.37
Q022203N.001	1	22	3	100:01.878	0	0	0:00	**BLANK 4-20**	2.23	1.78	**1.31**	0.04	0.04	0.03	1259.83	26.55
Q022204N.001	1	22	4	100:01.884	0	0	0:00	**BLANK 4-20**	2.34	1.85	**1.31**	0.04	0.04	0.04	1251.61	27.02
Q022205N.001	1	22	5	100:01.884	0	0	0:00	**BLANK 4-20**	2.36	1.84	**1.35**	0.07	0.07	0.05	1257.84	26.16
Q022206N.001	1	22	6	100:01.884	0	0	0:00	**BLANK 4-20**	2.26	1.8	**1.31**	0.1	0.1	0.06	1259.85	26.34
Q022207N.001	1	22	7	100:01.884	0	0	0:00	**BLANK 4-20**	2.32	1.8	**1.4**	0.07	0.07	0.07	1271.37	26.37
Q022208N.001	1	22	8	100:01.883	0	0	0:00	**BLANK 4-20**	2.16	1.74	**1.27**	0.07	0.07	0.04	1271.9	26.81
Q022209N.001	1	22	9	100:01.884	0	0	0:00	**BLANK 4-20**	2.57	1.99	**1.46**	0.08	0.08	0.07	1282.75	26.09
Q022210N.001	1	22	10	100:01.877	0	0	0:00	**BLANK 4-20**	1.99	1.71	**1.19**	0.04	0.04	0.03	1278.29	27.4

note: see file 21 (LSC #3) with Job # 11289

LABORATORY # 160503

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	4/20/2009		
Value on above date	1.10541	Bq/gm =	9357 TU
Dilution factor	1		
Concentration of dilution	1.10541	Bq/gm =	9357.33 TU

Standard Activity				
Background count rate	1.310	+/-	0.041	cpm
Standard count rate	44.069	+/-	0.235	cpm
Net activity	42.759	+/-	0.238	cpm
Grams of sample	1.9973			grams
Net standard activity per gram	21.408	+/-	0.119	cpm/gm
TU/cpm/gm	437.09	+/-	2.43	

Sample Activity				
Background rate	1.310	+/-	0.041	cpm
Sample count rate	1.357	+/-	0.037	cpm
Net activity	0.047	+/-	0.0547	cpm
Grams of sample	9.9995			grams
Net sample activity per gram	0.0047	+/-	0.0055	cpm/gm
TU	2.05	+/-	2.392	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**2.054**	**+/-**	**2.392 TU**

LABORATORY # 160503

methane

Avg Standard Activity				
TU/cpm/gm	**434.26**	**+/-**	**2.26**	

Sample Activity				
Background rate	1.346	+/-	0.038	cpm
Sample count rate	1.357	+/-	0.037	cpm
Net activity	0.011	+/-	0.0529	cpm
Grams of sample	9.9995			grams
Net sample activity per gram	0.0011	+/-	0.0053	cpm/gm
TU	0.46	+/-	2.298	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.459**	**+/-**	**2.298 TU**

REPORT < 10.0 TU

COUNTER 1 **Year 2009**

NIST and BLANK Values

JOB #	NIST date	count date	Value	+/-	SD	AVG NIST):			BLK date	count date	Value	+/-	SD	AVG BLK :		
	22-Aug	25-Aug	733.31	+/-	3.94				22-Aug	24-Aug	1.585	+/-	0.033			
									"	26-Aug	1.561	+/-	0.033	1.573	+/-	0.033
	14-Nov	23-Nov	726.34	+/-	3.82	729.83	+/-	3.88	19-Nov	24-Nov	1.546	+/-	0.032	1.564	+/-	0.033
									1-Dec	4-Dec	1.581	+/-	0.033	1.568	+/-	0.033
	1-Dec	10-Dec	719.95	+/-	3.83	726.54	+/-	3.86	8-Dec	11-Dec	1.648	+/-	0.033	1.584	+/-	0.033
									17-Dec	22-Dec	1.613	+/-	0.033	1.589	+/-	0.033
	24-Dec	4-Jan	727.80	+/-	3.91	726.85	+/-	3.88	30-Dec	3-Jan	1.643	+/-	0.033	1.597	+/-	0.033
	12-Jan	16-Jan	728.59	+/-	3.89	727.20	+/-	3.88	19-Jan	21-Jan	1.668	+/-	0.033	1.606	+/-	0.033
	28-Jan	5-Feb	719.46	+/-	3.81	725.91	+/-	3.87	28-Jan	4-Feb	1.598	+/-	0.033	1.605	+/-	0.033
	14-Feb	22-Feb	716.86	+/-	3.83	724.62	+/-	3.86	12-Feb	21-Feb	1.579	+/-	0.032	1.602	+/-	0.033
									23-Feb	3-Mar	1.610	+/-	0.033	1.603	+/-	0.033
	9-Mar	15-Mar	718.98	+/-	3.87	723.91	+/-	3.86	9-Mar	14-Mar	1.600	+/-	0.033	1.603	+/-	0.033
	5-Mar	25-Mar	725.41	+/-	3.64	724.08	+/-	3.84	5-Mar	24-Mar	1.654	+/-	0.033	1.607	+/-	0.033
									19-Mar	31-Mar	1.577	+/-	0.032	1.604	+/-	0.033
	5-Mar	6-Apr	718.25	+/-	3.58	723.50	+/-	3.81	18-Mar	5-Apr	1.616	+/-	0.033	1.605	+/-	0.033
	17-Apr	25-Apr	726.06	+/-	3.89	723.73	+/-	3.82	17-Apr	24-Apr	1.591	+/-	0.034	1.604	+/-	0.033
	1-May	5-May	717.53	+/-	3.85	723.21	+/-	3.82	1-May	4-May	1.537	+/-	0.032	1.600	+/-	0.033
									"	10-May	1.574	+/-	0.032	1.599	+/-	0.033
	15-May	21-May	733.54	+/-	4.01	724.01	+/-	3.84	15-May	20-May	1.566	+/-	0.032	1.597	+/-	0.033
	27-May	29-May	738.25	+/-	4.16	725.02	+/-	3.86	20-May	28-May	1.593	+/-	0.033	1.597	+/-	0.033
	8-Jun	12-Jun	*741.97*	*+/-*	*4.22*	725.02	+/-	3.86	8-Jun	11-Jun	1.571	+/-	0.032	1.596	+/-	0.033
	15-Jun	20-Jun	726.37	+/-	3.41	725.11	+/-	3.83	15-Jun	19-Jun	1.584	+/-	0.034	1.595	+/-	0.033
Job 11602 CNC	29-Jun	3-Jul	713.13	+/-	4.14	**724.36**	**+/-**	**3.85**	29-Jun	2-Jul	1.592	+/-	0.033	**1.595**	**+/-**	**0.033**

COUNTER #1

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	7/3/2009		
Value on above date	1.09289	Bq/gm =	9251 TU
Dilution factor	1		
Concentration of dilution	1.09289	Bq/gm =	9251.37 TU

Standard Activity				
Background count rate	1.592	+/-	0.033	cpm
Standard count rate	27.046	+/-	0.144	cpm
Net activity	25.454	+/-	0.148	cpm
Grams of sample	1.9621			grams
Net standard activity per gram	12.973	+/-	0.075	cpm/gm
TU/cpm/gm	713.13	+/-	4.14	

Counting efficiency	
total cpm	65.57 TU of std *0.007088
net actvy (cpm)/g	12.973 (std count - bkgrd count)/wt std
efficiency %	**19.78** net actvy/total cpm std

DATA FILE **982** counter 1
JOB # **11602 CNC**
Count dates: **6-29 through 7-5-09**

Position #	1	2	3	4	5	12
Sample ID	165053 DC-H2O	165054 DC-H2O	165056 DC-H2O	BLK	NIST 1.9621 g	165055 DC-H2O
Cocktail date	29-Jun	29-Jun	29-Jun	29-Jun	29-Jun	30-Jun
Date counted	29-Jun	30-Jun	1-Jul	2-Jul	3-Jul	4-Jul

RACKPOS	POS	FNCT1	FNCT2	FNCT3	FNCT4	CPMW5	CPMW6	SQPE	SQPI	CPM	CTIME	TIME	DATE	RPT
1	1	1.7	1.7	1.67	1.67	1.7	4.6	784.12	216.65	4.6	6000	2:53 PM	6/29/2009	1
1	1	1.73	1.73	1.68	1.68	1.7	4.2	784.12	218.69	4.2	6000	4:34 PM	6/29/2009	2
1	1	1.58	1.58	1.5	1.5	1.6	4.2	784.53	205.46	4.2	6000	6:15 PM	6/29/2009	3
1	1	1.75	1.75	1.64	1.64	1.8	4.4	784.17	213.85	4.4	6000	7:56 PM	6/29/2009	4
1	1	1.72	1.72	1.6	1.6	1.7	4.1	784.07	209.42	4.1	6000	9:37 PM	6/29/2009	5
1	1	1.75	1.75	1.69	1.69	1.8	4.3	784.27	205.2	4.3	6000	11:18 PM	6/29/2009	6
1	1	1.65	1.65	1.5	1.5	1.7	4.3	783.96	212.78	4.3	6000	12:59 AM	6/30/2009	7
1	1	1.74	1.74	1.67	1.67	1.7	4.3	784.12	211.51	4.3	6000	2:40 AM	6/30/2009	8
1	1	1.78	1.78	1.7	1.7	1.8	4.4	784.27	209.83	4.4	6000	4:20 AM	6/30/2009	9
1	1	1.55	1.55	1.47	1.47	1.5	4.3	783.81	217.95	4.3	6000	6:01 AM	6/30/2009	10
1	1	1.64	1.64	1.61	1.61	1.6	4.4	784.58	213.31	4.4	6000	7:42 AM	6/30/2009	11
1	1	1.52	1.53	1.47	1.46	1.5	4.2	783.91	216.62	4.2	6000	9:23 AM	6/30/2009	12
1	1	1.64	1.64	1.61	1.61	1.6	4.3	783.86	215.8	4.3	6000	11:04 AM	6/30/2009	13
1	1	1.86	1.87	1.81	1.8	1.9	4.5	784.32	209.61	4.5	6000	12:45 PM	6/30/2009	14
1	1	1.73	1.73	1.64	1.64	1.7	4.1	784.17	203.57	4.1	6000	2:26 PM	6/30/2009	15
2	2	1.76	1.76	1.69	1.69	1.8	4.2	784.32	207.69	4.2	6000	4:07 PM	6/30/2009	1
2	2	1.63	1.63	1.53	1.53	1.6	4.3	783.76	218.04	4.3	6000	5:48 PM	6/30/2009	2
2	2	1.72	1.72	1.62	1.62	1.7	4.1	783.7	212.04	4.1	6000	7:29 PM	6/30/2009	3
2	2	1.51	1.51	1.44	1.44	1.5	4.1	784.32	214.97	4.1	6000	9:09 PM	6/30/2009	4
2	2	1.76	1.77	1.69	1.68	1.8	4.6	783.96	212.07	4.6	6000	10:50 PM	6/30/2009	5
2	2	1.7	1.7	1.6	1.6	1.7	4.2	783.81	206.64	4.2	6000	12:31 AM	7/1/2009	6
2	2	1.57	1.57	1.45	1.45	1.6	4.2	784.07	212.51	4.2	6000	2:12 AM	7/1/2009	7
2	2	1.67	1.67	1.63	1.63	1.7	4.2	783.91	211.48	4.2	6000	3:53 AM	7/1/2009	8
2	2	1.9	1.91	1.86	1.85	1.9	4.5	783.24	207.95	4.5	6000	5:34 AM	7/1/2009	9
2	2	1.59	1.59	1.53	1.53	1.6	4.2	784.89	211.16	4.2	6000	7:15 AM	7/1/2009	10
2	2	1.61	1.61	1.48	1.48	1.6	4.2	783.5	213.67	4.2	6000	8:56 AM	7/1/2009	11
2	2	1.51	1.51	1.46	1.46	1.5	4.1	784.64	216.51	4.1	6000	10:37 AM	7/1/2009	12
2	2	1.78	1.78	1.74	1.74	1.8	4.4	783.34	212.34	4.4	6000	12:18 PM	7/1/2009	13
2	2	1.75	1.75	1.66	1.66	1.8	4.3	784.32	210.51	4.3	6000	1:58 PM	7/1/2009	14
2	2	1.56	1.56	1.5	1.5	1.6	4.5	783.91	220.74	4.5	6000	3:39 PM	7/1/2009	15
3	3	2.14	2.14	2.08	2.08	2.1	5.1	784.27	206.37	5.1	6000	5:20 PM	7/1/2009	1
3	3	2.38	2.38	2.29	2.29	2.4	5.2	784.43	200.15	5.2	6000	7:01 PM	7/1/2009	2
3	3	2.19	2.19	2.06	2.06	2.2	4.8	784.17	200.12	4.8	6000	8:42 PM	7/1/2009	3
3	3	2.2	2.2	2.06	2.06	2.2	5	784.58	208.51	5	6000	10:23 PM	7/1/2009	4
3	3	2.34	2.34	2.24	2.24	2.3	5.1	783.91	195.52	5.1	6000	12:04 AM	7/2/2009	5
3	3	2.35	2.35	2.29	2.29	2.3	5	783.6	201.62	5	6000	1:45 AM	7/2/2009	6
3	3	2.42	2.42	2.31	2.31	2.4	5.4	784.95	204.81	5.4	6000	3:26 AM	7/2/2009	7
3	3	2.54	2.54	2.49	2.49	2.5	5.6	784.38	201.68	5.6	6000	5:07 AM	7/2/2009	8
3	3	2.35	2.36	2.28	2.27	2.4	5.1	784.38	199.48	5.1	6000	6:47 AM	7/2/2009	9
3	3	2.41	2.41	2.3	2.3	2.4	4.9	784.27	193.86	4.9	6000	8:28 AM	7/2/2009	10
3	3	2.62	2.62	2.53	2.53	2.6	5.1	785.2	189.79	5.1	6000	10:09 AM	7/2/2009	11
3	3	2.31	2.31	2.26	2.26	2.3	4.5	784.17	188.49	4.5	6000	11:50 AM	7/2/2009	12
3	3	2.4	2.4	2.25	2.25	2.4	5.1	784.95	195.56	5.1	6000	1:31 PM	7/2/2009	13
3	3	2.26	2.26	2.18	2.18	2.3	4.7	783.86	199.45	4.7	6000	3:12 PM	7/2/2009	14
3	3	2.29	2.29	2.22	2.22	2.3	5	784.64	202.08	5	6000	4:53 PM	7/2/2009	15
4	4	1.51	1.51	1.42	1.42	1.5	4.5	784.64	222.06	4.5	6000	6:34 PM	7/2/2009	1
4	4	1.44	1.44	1.35	1.35	1.4	4.4	784.12	218.13	4.4	6000	8:15 PM	7/2/2009	2
4	4	1.55	1.55	1.49	1.49	1.5	4.2	785.26	218.88	4.2	6000	9:56 PM	7/2/2009	3
4	4	1.58	1.58	1.45	1.45	1.6	4.5	784.48	218.53	4.5	6000	11:37 PM	7/2/2009	4
4	4	1.5	1.5	1.42	1.42	1.5	3.8	785.1	213.43	3.8	6000	1:17 AM	7/3/2009	5
4	4	1.76	1.76	1.69	1.69	1.8	4.5	784.69	214.67	4.5	6000	2:58 AM	7/3/2009	6
4	4	1.79	1.79	1.72	1.72	1.8	4.6	785.2	211.87	4.6	6000	4:39 AM	7/3/2009	7
4	4	1.46	1.46	1.41	1.41	1.5	3.9	784.32	219.08	3.9	6000	6:20 AM	7/3/2009	8
4	4	1.68	1.68	1.61	1.61	1.7	4.5	785.15	211.86	4.5	6000	8:01 AM	7/3/2009	9
4	4	1.72	1.72	1.64	1.64	1.7	4.5	784.17	216.98	4.5	6000	9:42 AM	7/3/2009	10
4	4	1.58	1.58	1.47	1.47	1.6	4.1	784.89	211.22	4.1	6000	11:23 AM	7/3/2009	11
4	4	1.59	1.59	1.52	1.52	1.6	4.4	784.79	214	4.4	6000	1:04 PM	7/3/2009	12
4	4	1.57	1.57	1.5	1.5	1.6	4	784.43	216.18	4	6000	2:45 PM	7/3/2009	13
4	4	1.55	1.55	1.47	1.47	1.5	4.1	784.07	214.59	4.1	6000	4:25 PM	7/3/2009	14
4	4	1.6	1.6	1.53	1.53	1.6	4.1	784.38	210.96	4.1	6000	6:06 PM	7/3/2009	15
5	5	27.1	27.12	26.81	26.79	27.1	30.9	784.48	120.31	30.9	6000	7:47 PM	7/3/2009	1
5	5	27.41	27.41	26.99	26.99	27.4	31.6	784.12	123.12	31.6	6000	9:28 PM	7/3/2009	2
5	5	27.52	27.55	27.06	27.04	27.5	31.2	784.12	121.46	31.2	6000	11:09 PM	7/3/2009	3
5	5	26.87	26.89	26.32	26.3	26.9	30.9	783.24	122.55	30.9	6000	12:50 AM	7/4/2009	4
5	5	27.08	27.12	26.72	26.68	27.1	30.8	783.34	121.53	30.8	6000	2:31 AM	7/4/2009	5
5	5	28.55	28.55	28.12	28.12	28.6	32.3	783.91	122.21	32.3	6000	4:12 AM	7/4/2009	6
5	5	26.89	26.93	26.5	26.45	26.9	31	783.81	123.58	31	6000	5:53 AM	7/4/2009	7
5	5	26.35	26.37	25.96	25.94	26.4	30.2	784.64	122.46	30.2	6000	7:34 AM	7/4/2009	8
5	5	28.12	28.13	27.74	27.73	28.1	32	784.12	121.5	32	6000	9:15 AM	7/4/2009	9
5	5	26.59	26.61	26.25	26.23	26.6	30.4	784.27	121.84	30.4	6000	10:55 AM	7/4/2009	10
5	5	26.82	26.87	26.43	26.37	26.9	30.9	784.32	124.53	30.9	6000	12:36 PM	7/4/2009	11
5	5	27.42	27.43	26.87	26.86	27.4	31.8	784.22	126.1	31.8	6000	2:17 PM	7/4/2009	12
5	5	27.27	27.3	26.85	26.82	27.3	31.4	784.38	122.48	31.3	6000	3:58 PM	7/4/2009	13
5	5	27.02	27.03	26.59	26.58	27	30.5	784.27	120.83	30.5	6000	5:39 PM	7/4/2009	14
5	5	27.26	27.28	26.95	26.92	27.3	31.4	783.29	122.49	31.4	6000	7:20 PM	7/4/2009	15
12	12	1.43	1.43	1.35	1.35	1.4	4.3	784.22	215.19	4.3	6000	9:01 PM	7/4/2009	1
12	12	1.58	1.58	1.54	1.54	1.6	4.3	784.89	208.94	4.3	6000	10:42 PM	7/4/2009	2
12	12	1.74	1.74	1.71	1.71	1.7	4.3	784.89	207.56	4.3	6000	12:23 AM	7/5/2009	3
12	12	1.43	1.43	1.38	1.38	1.4	4	784.74	220.44	4	6000	2:04 AM	7/5/2009	4
12	12	1.71	1.71	1.63	1.63	1.7	4.2	785.05	206.82	4.2	6000	3:45 AM	7/5/2009	5
12	12	1.56	1.56	1.47	1.47	1.6	4.3	785.1	218.07	4.3	6000	5:25 AM	7/5/2009	6
12	12	1.67	1.67	1.59	1.59	1.7	4	784.17	209.92	4	6000	7:06 AM	7/5/2009	7
12	12	1.61	1.61	1.55	1.55	1.6	4.2	784.22	210.29	4.2	6000	8:47 AM	7/5/2009	8
12	12	1.54	1.54	1.49	1.49	1.5	3.8	784.01	207.7	3.8	6000	10:28 AM	7/5/2009	9
12	12	1.77	1.77	1.69	1.69	1.8	4.4	784.32	214.17	4.4	6000	12:09 PM	7/5/2009	10
12	12	1.76	1.76	1.7	1.7	1.8	4.1	785.52	211.64	4.1	6000	1:50 PM	7/5/2009	11
12	12	1.75	1.75	1.62	1.62	1.8	4.3	784.22	208.2	4.3	6000	3:31 PM	7/5/2009	12
12	12	1.63	1.63	1.52	1.52	1.6	4.1	784.27	207.81	4.1	6000	5:12 PM	7/5/2009	13
12	12	1.77	1.77	1.7	1.7	1.8	4.2	783.55	205.27	4.2	6000	6:53 PM	7/5/2009	14
12	12	1.75	1.75	1.7	1.7	1.8	4.3	784.07	211.52	4.3	6000	8:33 PM	7/5/2009	15

LABORATORY # 165053

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	7/3/2009		
Value on above date	1.09289	Bq/gm =	9251 TU
Dilution factor	1		
Concentration of dilution	1.09289	Bq/gm =	9251.37 TU

Standard Activity				
Background count rate	1.592	+/-	0.033	cpm
Standard count rate	27.046	+/-	0.144	cpm
Net activity	25.454	+/-	0.148	cpm
Grams of sample	1.9621			grams
Net standard activity per gram	12.973	+/-	0.075	cpm/gm
TU/cpm/gm	713.13	+/-	4.14	

Sample Activity				
Background rate	1.592	+/-	0.033	cpm
Sample count rate	1.689	+/-	0.034	cpm
Net activity	0.097	+/-	0.047	cpm
Grams of sample	9.9883			grams
Net sample activity per gram	0.0097	+/-	0.0047	cpm/gm
TU	6.95	+/-	3.358	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**6.949**	**+/-**	**3.358 TU**

LABORATORY # 165053

water

Avg Standard Activity				
TU/cpm/gm	**724.36**	**+/-**	**3.85**	

Sample Activity				
Background rate	1.595	+/-	0.033	cpm
Sample count rate	1.689	+/-	0.034	cpm
Net activity	0.094	+/-	0.0469	cpm
Grams of sample	9.9883			grams
Net sample activity per gram	0.0094	+/-	0.0047	cpm/gm
TU	6.83	+/-	3.404	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**6.835**	**+/-**	**3.405 TU**

Report < 13.7 TU

LABORATORY # 165054

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	7/3/2009		
Value on above date	1.09289	Bq/gm =	9251 TU
Dilution factor	1		
Concentration of dilution	1.09289	Bq/gm =	9251.37 TU

Standard Activity				
Background count rate	1.592	+/-	0.033	cpm
Standard count rate	27.046	+/-	0.144	cpm
Net activity	25.454	+/-	0.148	cpm
Grams of sample	1.9621			grams
Net standard activity per gram	12.973	+/-	0.075	cpm/gm
TU/cpm/gm	713.13	+/-	4.14	

Sample Activity				
Background rate	1.592	+/-	0.033	cpm
Sample count rate	1.668	+/-	0.033	cpm
Net activity	0.076	+/-	0.0468	cpm
Grams of sample	10.0472			grams
Net sample activity per gram	0.0076	+/-	0.0047	cpm/gm
TU	5.39	+/-	3.323	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**5.394**	**+/-**	**3.323 TU**

LABORATORY # 165054

water

Avg Standard Activity

TU/cpm/gm	**724.36**	**+/-**	**3.85**

Sample Activity				
Background rate	1.595	+/-	0.033	cpm
Sample count rate	1.668	+/-	0.033	cpm
Net activity	0.073	+/-	0.0467	cpm
Grams of sample	10.0472			grams
Net sample activity per gram	0.0073	+/-	0.0047	cpm/gm
TU	5.26	+/-	3.369	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**5.256**	**+/-**	**3.369 TU**

Report < 12.0 TU

LABORATORY # 165055

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	7/3/2009		
Value on above date	1.09289	Bq/gm =	9251 TU
Dilution factor	1		
Concentration of dilution	1.09289	Bq/gm =	9251.37 TU

Standard Activity				
Background count rate	1.592	+/-	0.033	cpm
Standard count rate	27.046	+/-	0.144	cpm
Net activity	25.454	+/-	0.148	cpm
Grams of sample	1.9621			grams
Net standard activity per gram	12.973	+/-	0.075	cpm/gm
TU/cpm/gm	713.13	+/-	4.14	

Sample Activity				
Background rate	1.592	+/-	0.033	cpm
Sample count rate	1.647	+/-	0.033	cpm
Net activity	0.055	+/-	0.0467	cpm
Grams of sample	9.9947			grams
Net sample activity per gram	0.0055	+/-	0.0047	cpm/gm
TU	3.90	+/-	3.330	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**3.901**	**+/-**	**3.330 TU**

LABORATORY # 165055

water

Avg Standard Activity				
TU/cpm/gm	**724.36**	**+/-**	**3.85**	

Sample Activity				
Background rate	1.595	+/-	0.033	cpm
Sample count rate	1.647	+/-	0.033	cpm
Net activity	0.052	+/-	0.0466	cpm
Grams of sample	9.9947			grams
Net sample activity per gram	0.0052	+/-	0.0047	cpm/gm
TU	3.74	+/-	3.376	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**3.738**	**+/-**	**3.376 TU**

Report < 10.5 TU

LABORATORY # 165056

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	7/3/2009		
Value on above date	1.09289	Bq/gm =	9251 TU
Dilution factor	1		
Concentration of dilution	1.09289	Bq/gm =	9251.37 TU

Standard Activity				
Background count rate	1.592	+/-	0.033	cpm
Standard count rate	27.046	+/-	0.144	cpm
Net activity	25.454	+/-	0.148	cpm
Grams of sample	1.9621			grams
Net standard activity per gram	12.973	+/-	0.075	cpm/gm
TU/cpm/gm	713.13	+/-	4.14	

Sample Activity				
Background rate	1.592	+/-	0.033	cpm
Sample count rate	2.347	+/-	0.040	cpm
Net activity	0.755	+/-	0.0515	cpm
Grams of sample	10.0254			grams
Net sample activity per gram	0.0753	+/-	0.0051	cpm/gm
TU	53.68	+/-	3.675	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**53.681**	**+/-**	**3.714 TU**

LABORATORY # 165056
water

Avg Standard Activity				
TU/cpm/gm	**724.36**	**+/-**	**3.85**	

Sample Activity				
Background rate	1.595	+/-	0.033	cpm
Sample count rate	2.347	+/-	0.040	cpm
Net activity	0.752	+/-	0.0514	cpm
Grams of sample	10.0254			grams
Net sample activity per gram	0.0750	+/-	0.0051	cpm/gm
TU	54.30	+/-	3.725	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**54.304**	**+/-**	**3.765 TU**

COUNTER 1 **Year 2009**

NIST and BLANK Values

JOB #	NIST date	count date	Value	+/-	SD	AVG NIST):		
	22-Aug	25-Aug	733.31	+/-	3.94			
	14-Nov	23-Nov	726.34	+/-	3.82	729.83	+/-	3.88
	1-Dec	10-Dec	719.95	+/-	3.83	726.54	+/-	3.86
	24-Dec	4-Jan	727.80	+/-	3.91	726.85	+/-	3.88
	12-Jan	16-Jan	728.59	+/-	3.89	727.20	+/-	3.88
	28-Jan	5-Feb	719.46	+/-	3.81	725.91	+/-	3.87
	14-Feb	22-Feb	716.86	+/-	3.83	724.62	+/-	3.86
	9-Mar	15-Mar	718.98	+/-	3.87	723.91	+/-	3.86
	5-Mar	25-Mar	725.41	+/-	3.64	724.08	+/-	3.84
	5-Mar	6-Apr	718.25	+/-	3.58	723.50	+/-	3.81
	17-Apr	25-Apr	726.06	+/-	3.89	723.73	+/-	3.82
	1-May	5-May	717.53	+/-	3.85	723.21	+/-	3.82
	15-May	21-May	733.54	+/-	4.01	724.01	+/-	3.84
	27-May	29-May	738.25	+/-	4.16	725.02	+/-	3.86
	8-Jun	12-Jun	*741.97*	*+/-*	*4.22*	725.02	+/-	3.86
	15-Jun	20-Jun	726.37	+/-	3.41	725.11	+/-	3.83
	29-Jun	3-Jul	*713.13*	*+/-*	*4.14*	725.11	+/-	3.83
	26-Jun	7-Jul	723.24	+/-	3.90	725.00	+/-	3.83
	11-Jul	17-Jul	717.18	+/-	3.39	724.54	+/-	3.81
Job 11610 CNC	20-Jul	25-Jul	731.66	+/-	3.93	**724.93**	**+/-**	**3.81**

BLK date	count date	Value	+/-	SD	AVG BLK :		
22-Aug	24-Aug	1.585	+/-	0.033			
"	26-Aug	1.561	+/-	0.033	1.573	+/-	0.033
19-Nov	24-Nov	1.546	+/-	0.032	1.564	+/-	0.033
1-Dec	4-Dec	1.581	+/-	0.033	1.568	+/-	0.033
8-Dec	11-Dec	1.648	+/-	0.033	1.584	+/-	0.033
17-Dec	22-Dec	1.613	+/-	0.033	1.589	+/-	0.033
30-Dec	3-Jan	1.643	+/-	0.033	1.597	+/-	0.033
19-Jan	21-Jan	1.668	+/-	0.033	1.606	+/-	0.033
28-Jan	4-Feb	1.598	+/-	0.033	1.605	+/-	0.033
12-Feb	21-Feb	1.579	+/-	0.032	1.602	+/-	0.033
23-Feb	3-Mar	1.610	+/-	0.033	1.603	+/-	0.033
9-Mar	14-Mar	1.600	+/-	0.033	1.603	+/-	0.033
5-Mar	24-Mar	1.654	+/-	0.033	1.607	+/-	0.033
19-Mar	31-Mar	1.577	+/-	0.032	1.604	+/-	0.033
18-Mar	5-Apr	1.616	+/-	0.033	1.605	+/-	0.033
17-Apr	24-Apr	1.591	+/-	0.034	1.604	+/-	0.033
1-May	4-May	1.537	+/-	0.032	1.600	+/-	0.033
"	10-May	1.574	+/-	0.032	1.599	+/-	0.033
15-May	20-May	1.566	+/-	0.032	1.597	+/-	0.033
20-May	28-May	1.593	+/-	0.033	1.597	+/-	0.033
8-Jun	11-Jun	1.571	+/-	0.032	1.596	+/-	0.033
15-Jun	19-Jun	1.584	+/-	0.034	1.595	+/-	0.033
29-Jun	2-Jul	1.592	+/-	0.033	1.595	+/-	0.033
7-Jul	10-Jul	1.576	+/-	0.038	1.594	+/-	0.033
11-Jul	13-Jul	1.604	+/-	0.034	1.595	+/-	0.033
20-Jul	24-Jul	1.601	+/-	0.033	1.595	+/-	0.033
28-Jul	1-Aug	1.582	+/-	0.033	**1.594**	**+/-**	**0.033**

COUNTER #1

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	7/25/2009		
Value on above date	1.08920	Bq/gm =	9220 TU
Dilution factor	1		
Concentration of dilution	1.08920	Bq/gm =	9220.10 TU

Standard Activity				
Background count rate	1.601	+/-	0.033	cpm
Standard count rate	27.535	+/-	0.136	cpm
Net activity	25.934	+/-	0.139	cpm
Grams of sample	2.058			grams
Net standard activity per gram	12.602	+/-	0.068	cpm/gm
TU/cpm/gm	731.66	+/-	3.93	

Counting efficiency	
total cpm	65.35 TU of std *0.007088
net actvy (cpm)/g	12.602 (std count - bkgrd count)/g
efficiency %	**19.28** net actvy/total dpm std

DATA FILE **984** counter 1
JOB # **11610 CNC**
Count dates: **7-24 trhough 8-4-09**

Position #	5	6	14	15	16	17
Sample ID	Blank	NIST 2.058 g	Blank	165099 DC -methane	165100 DC -methane	165101 DC -methane
Cocktail date	20-Jul	20-Jul	28-Jul	28-Jul	28-Jul	28-Jul
Date counted	24-Jul	25-Jul	1-Aug	2-Aug	3-Aug	4-Aug

POS	FNCT1	FNCT2	FNCT3	FNCT4	CPMW5	CPMW6	SQPE	SQPI	CPM	CTIME	TIME	DATE	RPT
5	1.39	1.39	1.33	1.33	1.4	4	782.98	216.38	4	6000	4:51 PM	7/24/2009	1
5	1.66	1.66	1.58	1.58	1.7	3.9	782.52	204.44	3.9	6000	6:32 PM	7/24/2009	2
5	1.79	1.79	1.75	1.75	1.8	4.3	783.7	208.59	4.3	6000	8:13 PM	7/24/2009	3
5	1.51	1.51	1.41	1.41	1.5	3.8	784.17	213.83	3.8	6000	9:54 PM	7/24/2009	4
5	1.53	1.54	1.48	1.47	1.5	4.3	783.7	217.42	4.3	6000	11:35 PM	7/24/2009	5
5	1.62	1.62	1.58	1.58	1.6	4.2	783.34	212.68	4.2	6000	1:16 AM	7/25/2009	6
5	1.57	1.58	1.51	1.5	1.6	3.9	782.88	210.34	3.9	6000	2:56 AM	7/25/2009	7
5	1.61	1.61	1.54	1.54	1.6	4.1	783.96	214.44	4.1	6000	4:37 AM	7/25/2009	8
5	1.59	1.59	1.45	1.45	1.6	4	783.96	214.35	4	6000	6:18 AM	7/25/2009	9
5	1.54	1.54	1.44	1.44	1.5	4.4	782.41	214.71	4.4	6000	7:59 AM	7/25/2009	10
5	1.57	1.57	1.47	1.47	1.6	3.7	784.32	207.43	3.7	6000	9:40 AM	7/25/2009	11
5	1.62	1.62	1.52	1.52	1.6	4.2	782.88	213.38	4.2	6000	11:21 AM	7/25/2009	12
5	1.5	1.5	1.4	1.4	1.5	3.9	783.55	210.46	3.9	6000	1:02 PM	7/25/2009	13
5	1.7	1.7	1.63	1.63	1.7	4.3	783.45	215.2	4.3	6000	2:43 PM	7/25/2009	14
5	1.82	1.82	1.76	1.76	1.8	4.3	783.65	209.8	4.3	6000	4:24 PM	7/25/2009	15
6	27.85	27.88	27.45	27.42	27.9	31.7	783.19	121.4	31.7	6000	6:05 PM	7/25/2009	1
6	27.55	27.57	27.16	27.14	27.6	31.1	782.62	120.72	31.1	6000	7:45 PM	7/25/2009	2
6	27.29	27.32	26.87	26.84	27.3	31	783.19	121.27	31	6000	9:26 PM	7/25/2009	3
6	28.49	28.5	28.08	28.07	28.5	32.6	782.98	123.9	32.6	6000	11:07 PM	7/25/2009	4
6	27.51	27.54	27.03	27	27.5	31.8	782.93	123.74	31.8	6000	12:48 AM	7/26/2009	5
6	27.63	27.67	27.23	27.18	27.7	31.3	783.03	121.05	31.3	6000	2:29 AM	7/26/2009	6
6	27.8	27.81	27.39	27.38	27.8	31.6	783.03	122.14	31.6	6000	4:10 AM	7/26/2009	7
6	27.82	27.86	27.51	27.46	27.9	31.8	783.39	122.16	31.8	6000	5:51 AM	7/26/2009	8
6	27.2	27.22	26.77	26.75	27.2	31	783.6	123.24	31	6000	7:32 AM	7/26/2009	9
6	27.71	27.71	27.24	27.24	27.7	31.6	783.29	121.09	31.6	6000	9:13 AM	7/26/2009	10
6	27.54	27.56	27.15	27.13	27.6	31.4	782.83	121.15	31.4	6000	10:53 AM	7/26/2009	11
6	28.25	28.26	27.78	27.77	28.3	32.3	783.14	122.58	32.3	6000	12:34 PM	7/26/2009	12
6	26.44	26.44	25.98	25.98	26.4	30.5	782.47	124.39	30.5	6000	2:15 PM	7/26/2009	13
6	27	27.01	26.57	26.56	27	30.8	783.55	121.54	30.8	6000	3:56 PM	7/26/2009	14
6	26.95	27	26.62	26.58	27	31.2	782.67	123.16	31.2	6000	5:37 PM	7/26/2009	15
14	1.46	1.46	1.41	1.41	1.5	4.1	784.27	214.85	4.1	6000	1:26 AM	8/1/2009	1
14	1.85	1.85	1.68	1.68	1.8	4.4	784.58	207.3	4.4	6000	3:07 AM	8/1/2009	2
14	1.64	1.64	1.58	1.58	1.6	4.4	783.6	214.08	4.4	6000	4:48 AM	8/1/2009	3
14	1.56	1.57	1.53	1.52	1.6	4	784.74	214.61	4	6000	6:29 AM	8/1/2009	4
14	1.62	1.62	1.56	1.56	1.6	4.1	783.76	210.88	4.1	6000	8:09 AM	8/1/2009	5
14	1.54	1.54	1.48	1.48	1.5	4	783.34	210.55	4	6000	9:50 AM	8/1/2009	6
14	1.45	1.45	1.39	1.39	1.5	4	784.43	210.63	4	6000	11:31 AM	8/1/2009	7
14	1.75	1.75	1.67	1.67	1.8	4.5	782.98	211.87	4.5	6000	1:12 PM	8/1/2009	8
14	1.48	1.48	1.41	1.41	1.5	4	783.65	214.63	4	6000	2:53 PM	8/1/2009	9
14	1.57	1.57	1.5	1.5	1.6	4.1	784.53	212.57	4.1	6000	4:34 PM	8/1/2009	10
14	1.58	1.58	1.54	1.54	1.6	4.1	783.86	208.94	4.1	6000	6:15 PM	8/1/2009	11
14	1.44	1.44	1.36	1.36	1.4	4	783.45	217.08	4	6000	7:56 PM	8/1/2009	12
14	1.79	1.79	1.76	1.76	1.8	4.3	783.81	209.91	4.3	6000	9:37 PM	8/1/2009	13
14	1.41	1.41	1.38	1.38	1.4	4.1	783.86	222.89	4.1	6000	11:17 PM	8/1/2009	14
14	1.59	1.59	1.54	1.54	1.6	4.1	783.55	210.61	4.1	6000	12:58 AM	8/2/2009	15
15	1.81	1.81	1.7	1.7	1.8	4.4	783.7	209.77	4.4	6000	2:39 AM	8/2/2009	1
15	1.83	1.84	1.72	1.71	1.8	4.6	783.6	212.86	4.6	6000	4:20 AM	8/2/2009	2
15	1.52	1.52	1.46	1.46	1.5	4.2	783.65	212.57	4.2	6000	6:01 AM	8/2/2009	3
15	1.34	1.34	1.29	1.29	1.3	4.1	783.24	224.53	4.1	6000	7:42 AM	8/2/2009	4
15	1.77	1.77	1.7	1.7	1.8	4.4	783.19	211.44	4.4	6000	9:23 AM	8/2/2009	5
15	1.46	1.47	1.35	1.34	1.5	4.2	783.19	221.79	4.2	6000	11:04 AM	8/2/2009	6
15	1.64	1.64	1.53	1.53	1.6	4.4	783.86	219.52	4.4	6000	12:45 PM	8/2/2009	7
15	1.63	1.63	1.5	1.5	1.6	4.4	783.6	221.92	4.4	6000	2:26 PM	8/2/2009	8
15	1.64	1.64	1.55	1.55	1.6	4.2	783.29	214.98	4.2	6000	4:06 PM	8/2/2009	9
15	1.53	1.53	1.47	1.47	1.5	3.9	783.29	214.56	3.9	6000	5:47 PM	8/2/2009	10
15	1.45	1.45	1.37	1.37	1.5	3.9	784.07	214.7	3.9	6000	7:28 PM	8/2/2009	11
15	1.62	1.63	1.53	1.52	1.6	4.2	782.67	211.02	4.2	6000	9:09 PM	8/2/2009	12
15	1.53	1.54	1.49	1.47	1.5	4	783.29	212.59	4	6000	10:50 PM	8/2/2009	13
15	1.51	1.51	1.46	1.46	1.5	4.1	783.14	217.63	4.1	6000	12:31 AM	8/3/2009	14
15	1.43	1.43	1.36	1.36	1.4	3.7	783.34	215.52	3.7	6000	2:12 AM	8/3/2009	15
16	1.65	1.65	1.55	1.55	1.7	4.2	783.19	206.48	4.2	6000	3:53 AM	8/3/2009	1
16	1.7	1.7	1.61	1.61	1.7	4.4	783.34	215.83	4.4	6000	5:34 AM	8/3/2009	2
16	1.67	1.67	1.63	1.63	1.7	4.5	783.39	220.56	4.5	6000	7:15 AM	8/3/2009	3
16	1.62	1.62	1.54	1.54	1.6	4	783.03	214.24	4	6000	8:56 AM	8/3/2009	4
16	1.54	1.54	1.45	1.45	1.5	4.1	783.7	218.89	4.1	6000	10:36 AM	8/3/2009	5
16	1.62	1.62	1.59	1.59	1.6	4.3	782.62	215.91	4.3	6000	12:17 PM	8/3/2009	6
16	1.5	1.5	1.37	1.37	1.5	4	782.93	212.43	4	6000	1:58 PM	8/3/2009	7
16	1.65	1.65	1.57	1.57	1.7	4.3	782.93	212.8	4.3	6000	3:39 PM	8/3/2009	8
16	1.61	1.63	1.5	1.48	1.6	4	782.93	213.4	4	6000	5:20 PM	8/3/2009	9
16	1.76	1.76	1.7	1.7	1.8	4.3	782.83	212.8	4.3	6000	7:01 PM	8/3/2009	10
16	1.77	1.77	1.71	1.71	1.8	4.4	783.34	212.32	4.4	6000	8:42 PM	8/3/2009	11
16	1.83	1.83	1.8	1.8	1.8	4.4	782.72	204.67	4.4	6000	10:23 PM	8/3/2009	12
16	2.01	2.01	1.88	1.88	2	4.4	783.39	201.14	4.4	6000	12:04 AM	8/4/2009	13
16	2.02	2.02	1.95	1.95	2	4.5	783.14	204.2	4.5	6000	1:44 AM	8/4/2009	14
16	1.64	1.64	1.51	1.51	1.6	4.1	782.47	212	4.1	6000	3:25 AM	8/4/2009	15
17	1.61	1.61	1.54	1.54	1.6	4.1	783.96	211.08	4.1	6000	5:06 AM	8/4/2009	1
17	1.86	1.86	1.72	1.72	1.9	4.7	782.83	211.49	4.7	6000	6:47 AM	8/4/2009	2
17	1.9	1.9	1.76	1.76	1.9	4.5	782.57	204.56	4.5	6000	8:28 AM	8/4/2009	3
17	1.57	1.57	1.49	1.49	1.6	4.7	782.93	223.37	4.7	6000	10:09 AM	8/4/2009	4
17	1.7	1.7	1.6	1.6	1.7	4.2	782.93	210.67	4.2	6000	11:50 AM	8/4/2009	5
17	1.55	1.55	1.47	1.47	1.5	4.2	783.08	214.45	4.2	6000	1:31 PM	8/4/2009	6
17	1.68	1.68	1.63	1.63	1.7	4	783.81	206.1	4	6000	3:12 PM	8/4/2009	7
17	1.76	1.76	1.65	1.65	1.8	4.1	782.67	206.3	4.1	6000	4:53 PM	8/4/2009	8
17	1.62	1.62	1.56	1.56	1.6	4	782.26	206.51	4	6000	6:34 PM	8/4/2009	9
17	1.85	1.85	1.78	1.78	1.8	4.5	783.24	204.91	4.5	6000	8:14 PM	8/4/2009	10
17	1.58	1.58	1.47	1.47	1.6	4.1	782.1	213	4.1	6000	9:55 PM	8/4/2009	11
17	1.52	1.52	1.43	1.43	1.5	4.2	783.7	222.29	4.2	6000	11:36 PM	8/4/2009	12
17	1.75	1.75	1.67	1.67	1.8	4.1	783.19	206.73	4.1	6000	1:17 AM	8/5/2009	13
17	1.53	1.53	1.45	1.45	1.5	4	782.26	213.31	4	6000	2:58 AM	8/5/2009	14
17	1.68	1.68	1.6	1.6	1.7	4.3	783.03	211.76	4.3	6000	4:39 AM	8/5/2009	15

LABORATORY # 165099

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	7/25/2009		
Value on above date	1.08920	Bq/gm =	9220 TU
Dilution factor	1		
Concentration of dilution	1.08920	Bq/gm =	9220.10 TU

Standard Activity				
Background count rate	1.601	+/-	0.033	cpm
Standard count rate	27.535	+/-	0.136	cpm
Net activity	25.934	+/-	0.139	cpm
Grams of sample	2.058			grams
Net standard activity per gram	12.602	+/-	0.068	cpm/gm
TU/cpm/gm	731.66	+/-	3.93	

Sample Activity				
Background rate	1.601	+/-	0.033	cpm
Sample count rate	1.604	+/-	0.033	cpm
Net activity	0.003	+/-	0.0461	cpm
Grams of sample	10.026			grams
Net sample activity per gram	0.0003	+/-	0.0046	cpm/gm
TU	0.19	+/-	3.364	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.195**	**+/-**	**3.364 TU**

LABORATORY # 165099

methane

Avg Standard Activity				
TU/cpm/gm	**724.93**	**+/-**	**3.81**	

Sample Activity				
Background rate	1.594	+/-	0.033	cpm
Sample count rate	1.604	+/-	0.033	cpm
Net activity	0.010	+/-	0.0463	cpm
Grams of sample	10.026			grams
Net sample activity per gram	0.0009	+/-	0.0046	cpm/gm
TU	0.69	+/-	3.349	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.688**	**+/-**	**3.349 TU**

Report < 10.0 TU

LABORATORY # 165100

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	7/25/2009		
Value on above date	1.08920	Bq/gm =	9220 TU
Dilution factor	1		
Concentration of dilution	1.08920	Bq/gm =	9220.10 TU

Standard Activity				
Background count rate	1.601	+/-	0.033	cpm
Standard count rate	27.535	+/-	0.136	cpm
Net activity	25.934	+/-	0.139	cpm
Grams of sample	2.058			grams
Net standard activity per gram	12.602	+/-	0.068	cpm/gm
TU/cpm/gm	731.66	+/-	3.93	

Sample Activity				
Background rate	1.601	+/-	0.033	cpm
Sample count rate	1.658	+/-	0.036	cpm
Net activity	0.057	+/-	0.0484	cpm
Grams of sample	10.023			grams
Net sample activity per gram	0.0057	+/-	0.0048	cpm/gm
TU	4.17	+/-	3.534	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**4.170**	**+/-**	**3.534 TU**

LABORATORY # 165100

methane

Avg Standard Activity				
TU/cpm/gm	**724.93**	**+/-**	**3.81**	

Sample Activity				
Background rate	1.594	+/-	0.033	cpm
Sample count rate	1.658	+/-	0.036	cpm
Net activity	0.064	+/-	0.0486	cpm
Grams of sample	10.023			grams
Net sample activity per gram	0.0064	+/-	0.0049	cpm/gm
TU	4.63	+/-	3.516	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**4.627**	**+/-**	**3.516 TU**

Report < 11.7 TU

LABORATORY # 165101

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	7/25/2009		
Value on above date	1.08920	Bq/gm =	9220 TU
Dilution factor	1		
Concentration of dilution	1.08920	Bq/gm =	9220.10 TU

Standard Activity				
Background count rate	1.601	+/-	0.033	cpm
Standard count rate	27.535	+/-	0.136	cpm
Net activity	25.934	+/-	0.139	cpm
Grams of sample	2.058			grams
Net standard activity per gram	12.602	+/-	0.068	cpm/gm
TU/cpm/gm	731.66	+/-	3.93	

Sample Activity				
Background rate	1.601	+/-	0.033	cpm
Sample count rate	1.677	+/-	0.033	cpm
Net activity	0.076	+/-	0.0467	cpm
Grams of sample	10.0549			grams
Net sample activity per gram	0.0076	+/-	0.0046	cpm/gm
TU	5.53	+/-	3.401	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**5.530**	**+/-**	**3.402 TU**

LABORATORY # 165101

methane

Avg Standard Activity				
TU/cpm/gm	**724.93**	**+/-**	**3.81**	

Sample Activity				
Background rate	1.594	+/-	0.033	cpm
Sample count rate	1.677	+/-	0.033	cpm
Net activity	0.083	+/-	0.0469	cpm
Grams of sample	10.0549			grams
Net sample activity per gram	0.0082	+/-	0.0047	cpm/gm
TU	5.97	+/-	3.385	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor for cell	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**5.973**	**+/-**	**3.386 TU**

Report < 12.8 TU

COUNTER 3 (new 2-2-2009) **Year 2009**
NIST and BLANK Values

JOB #	NIST date	count date	Value	+/-	SD	AVG NIST :		BLK date	count date	Value	+/-	SD	AVG BLK :		Comments
	27-Aug	3-Sep	438.03	+/-	2.44	438.03	+/- 2.44	27-Aug	3-Sep	1.302	+/-	0.036	1.302	+/- 0.036	
	"	"						"	"	1.311	+/-	0.036	1.307	+/- 0.036	
	9-Sep	15-Sep	433.35	+/-	2.43	435.69	+/- 2.43	9-Sep	15-Sep	1.316	+/-	0.036	1.310	+/- 0.036	
	"							9-Sep (2)	20-Sep	1.279	+/-	0.034	1.302	+/- 0.036	
	7-Aug	28-Sep	442.00	+/-	1.95	437.79	+/- 2.27	7-Aug	27-Sep	1.299	+/-	0.035	1.301	+/- 0.036	
12055 CNC waters	7-Oct	8-Oct	438.14	+/-	2.20	**437.88**	+/- **2.25**	7-Oct	8-Oct	1.369	+/-	0.037	1.313	+/- 0.036	
								"	12-Oct	1.255	+/-	0.035	**1.304**	**+/- 0.036**	

COUNTER #3

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	10/8/2009		
Value on above date	1.07670	Bq/gm =	9114 TU
Dilution factor	1		
Concentration of dilution	1.07670	Bq/gm =	9114.29 TU

Standard Activity				
Background count rate	1.312	+/-	0.037	cpm
Standard count rate	43.532	+/-	0.209	cpm
Net activity	42.220	+/-	0.212	cpm
Grams of sample	2.0296			grams
Net standard activity per gram	20.802	+/-	0.104	cpm/gm
TU/cpm/gm	438.14	+/-	2.20	

Counting efficiency	
total cpm	64.60 TU of std *0.007088
net actvy (cpm)/g	20.802 (std count - bkgrd count) / wt std
efficiency %	**32.20** net actvy/total dpm std

DATA FILE	**56** counter 3				
JOB #	**12055**				
Count dates:	**10-8 through 10-13-09**				
Position #	41	42	44	45	42
Sample ID	NIST 2.0296 g	Blank	172337 DC- water	172338 DC-water	Blank
Cocktail date	7-Oct	7-Oct	7-Oct	7-Oct	7-Oct
Date counted	8-Oct	8-Oct	10-Oct	11-Oct	12-Oct

THU 8 OCT 2009 6:57

*** DIRECTORY PATH :C:\GWEN56 ***

PARAMETER GROUP: 8
ID: <091008>

00A PROGRAM MODE 6 ->

ORDER POS ID CTIME COUNTS CUCNTS MCW REP STD STMS STIME
1 41 NIST 10-7 100:00 NO LIM NO LIM 1 10 Y 1/10 1:00
2 42 BLANK 10-7 100:00 NO LIM NO LIM 1 10 Y 1/10 1:00
3 43 172518 100:00 NO LIM NO LIM 1 10 Y 1/10 1:00
4 44 172337 100:00 NO LIM NO LIM 1 10 Y 1/10 1:00
5 45 172338 100:00 NO LIM NO LIM 1 10 Y 1/10 1:00
6 42 BLANK 10-7 100:00 NO LIM NO LIM 1 10 N
7 46 RECAL #3 100:00 NO LIM NO LIM 1 12 N
NUMBER OF CYCLES 1
COINCIDENCE BIAS (L/H) L

MCA INPUT TRIGG. INHIBIT MEMORY SPLIT
1 LRSUM DCOS G L*R
2 GSUM G L*R

WINDOW CHANNELS MCA HALF
2 50- 270 1 2
3 60- 220 1 2
4 50- 320 1 1
5 50- 270 1 1
6 60- 220 1 1
7 1- 1024 2 1
8 1- 1024 2 2

SELECTED PRINTOUT FOR TERMINAL 1 (A)

	CYC	POS	REP	CTIME	CUCNTS	SQP	SQP%	STIME	ID	CPM3	CPM4	CPM5	CPM6	CPM7	CPM8
Q014101N.001	1	41	1	100:01.774	4329	753.87	0.15	1:01	**NIST 10-7**	**42.71**	0.04	0.04	0.02	1247.97	26.16
Q014102N.001	1	41	2	100:01.893	8628	749.46	0.15	1:02	**NIST 10-7**	**42.51**	0.01	0.01	0.01	1248.09	25.56
Q014103N.001	1	41	3	100:01.886	13064	747.96	0.17	1:02	**NIST 10-7**	**43.67**	0.03	0.03	0.02	1254.16	25.59
Q014104N.001	1	41	4	100:01.886	17367	750.72	0.19	1:02	**NIST 10-7**	**42.41**	0.04	0.04	0.04	1247.5	26.51
Q014105N.001	1	41	5	100:01.893	21878	750.3	0.13	1:02	**NIST 10-7**	**44.67**	0.05	0.05	0.03	1266.44	26.26
Q014106N.001	1	41	6	100:01.893	26299	749.28	0.14	1:02	**NIST 10-7**	**43.57**	0.04	0.04	0.03	1273	25.8
Q014107N.001	1	41	7	100:01.893	30708	750.34	0.11	1:02	**NIST 10-7**	**43.71**	0.03	0.03	0.02	1260.41	26.34
Q014108N.001	1	41	8	100:01.893	35124	747.98	0.14	1:02	**NIST 10-7**	**43.62**	0.06	0.06	0.02	1261.47	26.91
Q014109N.001	1	41	9	100:01.893	39634	747.9	0.12	1:02	**NIST 10-7**	**44.74**	0.08	0.08	0.07	1268.39	26.96
Q014110N.001	1	41	10	100:01.893	44078	748.55	0.18	1:02	**NIST 10-7**	**43.71**	0.06	0.06	0.03	1264.36	25.55
Q024201N.001	1	42	1	100:01.893	219	750.6	0.16	1:02	**BLANK 10**	**1.41**	0.08	0.08	0.06	1275.3	26.17
Q024202N.001	1	42	2	100:01.893	452	749.28	0.14	1:02	**BLANK 10**	**1.5**	0.03	0.03	0.03	1274.59	25.57
Q024203N.001	1	42	3	100:01.893	687	751.7	0.17	1:02	**BLANK 10**	**1.53**	0	0	0	1270.69	26.93
Q024204N.001	1	42	4	100:01.893	899	747.66	0.14	1:02	**BLANK 10**	**1.09**	0.05	0.05	0.05	1278.48	26
Q024205N.001	1	42	5	100:01.893	1130	751.43	0.15	1:02	**BLANK 10**	**1.41**	0.08	0.08	0.06	1268.68	26.12
Q024206N.001	1	42	6	100:01.893	1348	750.37	0.17	1:02	**BLANK 10**	**1.36**	0.01	0.01	0.01	1268.37	26.8
Q024207N.001	1	42	7	100:01.893	1545	750.23	0.14	1:02	**BLANK 10**	**1.13**	0.03	0.03	0.02	1269.8	26.82
Q024208N.001	1	42	8	100:01.893	1768	750.12	0.13	1:02	**BLANK 10**	**1.49**	0.04	0.04	0.03	1276.09	26.55
Q024209N.001	1	42	9	100:01.893	1988	749.6	0.12	1:02	**BLANK 10**	**1.42**	0.05	0.05	0.04	1271.36	25.76
Q024210N.001	1	42	10	100:01.893	2189	750.92	0.17	1:02	**BLANK 10**	**1.35**	0.02	0.02	0.02	1270.39	25.27
Q044401N.001	1	44	1	100:01.892	191	749.63	0.14	1:02	**172337**	**1.31**	0.07	0.07	0.05	1231.25	25.93
Q044402N.001	1	44	2	100:01.892	386	750.84	0.16	1:02	**172337**	**1.29**	0.02	0.02	0.02	1229.17	24.87
Q044403N.001	1	44	3	100:01.892	579	749.84	0.19	1:02	**172337**	**1.2**	0.02	0.02	0.02	1240.47	25.44
Q044404N.001	1	44	4	100:01.892	764	749.18	0.15	1:02	**172337**	**1.23**	0.05	0.05	0.03	1240.7	26.05
Q044405N.001	1	44	5	100:01.893	966	748.99	0.17	1:02	**172337**	**1.23**	0.04	0.04	0.01	1233.49	25.63
Q044406N.001	1	44	6	100:01.893	1169	749.95	0.18	1:02	**172337**	**1.23**	0.07	0.07	0.06	1229.93	25.88
Q044407N.001	1	44	7	100:01.887	1358	750.82	0.13	1:02	**172337**	**1.13**	0.05	0.05	0.04	1226.36	25.94
Q044408N.001	1	44	8	100:01.886	1587	749.72	0.15	1:02	**172337**	**1.4**	0.03	0.03	0.02	1216.79	26.75
Q044409N.001	1	44	9	100:01.893	1789	751.5	0.13	1:02	**172337**	**1.23**	0.03	0.03	0.03	1225.1	25.14
Q044410N.001	1	44	10	100:01.893	1996	749.61	0.14	1:02	**172337**	**1.23**	0.02	0.02	0.02	1222.04	25.38
Q054501N.001	1	45	1	100:01.892	216	748.89	0.14	1:02	**172338**	**1.32**	0.1	0.1	0.07	1218.59	25.6
Q054502N.001	1	45	2	100:01.892	404	748.1	0.19	1:02	**172338**	**1.1**	0.05	0.05	0.04	1216.15	26.16
Q054503N.001	1	45	3	100:01.892	614	749.16	0.19	1:02	**172338**	**1.42**	0.04	0.04	0.04	1211.47	26.05
Q054504N.001	1	45	4	100:01.892	800	749.51	0.18	1:02	**172338**	**1.24**	0.03	0.03	0.03	1207.46	25.13
Q054505N.001	1	45	5	100:01.892	990	749.74	0.13	1:02	**172338**	**1.13**	0.04	0.04	0.04	1204.85	26.38
Q054506N.001	1	45	6	100:01.886	1188	749.51	0.13	1:02	**172338**	**1.11**	0.01	0.01	0.01	1213.38	25.5
Q054507N.001	1	45	7	100:01.886	1395	748.24	0.13	1:02	**172338**	**1.35**	0.06	0.06	0.06	1224.08	25.48
Q054508N.001	1	45	8	100:01.892	1606	749.71	0.15	1:02	**172338**	**1.31**	0.02	0.02	0.01	1220.6	25.18
Q054509N.001	1	45	9	100:01.892	1804	749.66	0.19	1:02	**172338**	**1.29**	0.05	0.05	0.04	1226.92	25.32
Q054510N.001	1	45	10	100:01.892	2006	748.3	0.15	1:02	**172338**	**1.29**	0.02	0.02	0.02	1231.59	25.97
Q064201N.001	1	42	1	100:01.892	181	0	0	0:00	**BLANK 10**	**1.27**	0.06	0.06	0.04	1225.87	25.46
Q064202N.001	1	42	2	100:01.883	396	0	0	0:00	**BLANK 10**	**1.41**	0.02	0.02	0.02	1223.16	25.71
Q064203N.001	1	42	3	100:01.883	604	0	0	0:00	**BLANK 10**	**1.23**	0.06	0.06	0.04	1213.98	26.42
Q064204N.001	1	42	4	100:01.883	794	0	0	0:00	**BLANK 10**	**1.11**	0.02	0.02	0.02	1223.63	25.65
Q064205N.001	1	42	5	100:01.883	1003	0	0	0:00	**BLANK 10**	**1.29**	0.01	0.01	0.01	1232.01	25.35
Q064206N.001	1	42	6	100:01.883	1195	0	0	0:00	**BLANK 10**	**1.15**	0.03	0.03	0.03	1238.16	25.35
Q064207N.001	1	42	7	100:01.883	1392	0	0	0:00	**BLANK 10**	**1.22**	0.03	0.03	0.02	1227.53	26.39
Q064208N.001	1	42	8	100:01.877	1596	0	0	0:00	**BLANK 10**	**1.33**	0.02	0.02	0.01	1226.66	25.07
Q064209N.001	1	42	9	100:01.883	1829	0	0	0:00	**BLANK 10**	**1.43**	0.02	0.02	0.02	1227.99	24.82
Q064210N.001	1	42	10	100:01.883	2013	0	0	0:00	**BLANK 10**	**1.11**	0.06	0.06	0.02	1234.96	25.37

LABORATORY # 172337

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	10/8/2009		
Value on above date	1.07670	Bq/gm =	9114 TU
Dilution factor	1		
Concentration of dilution	1.07670	Bq/gm =	9114.29 TU

Standard Activity				
Background count rate	1.312	+/-	0.037	cpm
Standard count rate	43.532	+/-	0.209	cpm
Net activity	42.220	+/-	0.212	cpm
Grams of sample	2.0296			grams
Net standard activity per gram	20.802	+/-	0.104	cpm/gm
TU/cpm/gm	438.14	+/-	2.20	

Sample Activity				
Background rate	1.312	+/-	0.037	cpm
Sample count rate	1.314	+/-	0.035	cpm
Net activity	0.002	+/-	0.0511	cpm
Grams of sample	10.0301			grams
Net sample activity per gram	0.0002	+/-	0.0051	cpm/gm
TU	0.09	+/-	2.234	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.087**	**+/-**	**2.234 TU**

LABORATORY # 172337
SAMPLE SOURCE: water

Avg Standard Activity

TU/cpm/gm	**437.88**	+/-	**2.25**

Sample Activity				
Background rate	1.304	+/-	0.036	cpm
Sample count rate	1.314	+/-	0.035	cpm
Net activity	0.010	+/-	0.0502	cpm
Grams of sample	10.0301			grams
Net sample activity per gram	0.0010	+/-	0.0050	cpm/gm
TU	0.42	+/-	2.192	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.417**	**+/-**	**2.192 TU**

Report < 10.0 TU

LABORATORY # 172338

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	10/8/2009		
Value on above date	1.07670	Bq/gm =	9114 TU
Dilution factor	1		
Concentration of dilution	1.07670	Bq/gm =	9114.29 TU

Standard Activity				
Background count rate	1.312	+/-	0.037	cpm
Standard count rate	43.532	+/-	0.209	cpm
Net activity	42.220	+/-	0.212	cpm
Grams of sample	2.0296			grams
Net standard activity per gram	20.802	+/-	0.104	cpm/gm
TU/cpm/gm	438.14	+/-	2.20	

Sample Activity				
Background rate	1.312	+/-	0.037	cpm
Sample count rate	1.314	+/-	0.035	cpm
Net activity	0.002	+/-	0.0512	cpm
Grams of sample	10.052			grams
Net sample activity per gram	0.0002	+/-	0.0051	cpm/gm
TU	0.09	+/-	2.232	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.087**	**+/-**	**2.232 TU**

LABORATORY # 172338
SAMPLE SOURCE: water

Avg Standard Activity			
TU/cpm/gm	**437.88**	+/-	**2.25**

Sample Activity				
Background rate	1.304	+/-	0.036	cpm
Sample count rate	1.314	+/-	0.035	cpm
Net activity	0.010	+/-	0.0503	cpm
Grams of sample	10.052			grams
Net sample activity per gram	0.0009	+/-	0.0050	cpm/gm
TU	0.42	+/-	2.191	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.416**	**+/-**	**2.191 TU**

Report < 10.0 TU

COUNTER 1 **Year 2009**

NIST and BLANK Values

JOB #	NIST date	count date	Value	+/-	SD	AVG NIST):		BLK date	count date	Value	+/-	SD	AVG BLK :	
	2-Sep	4-Sep	718.43	+/-	3.87	718.43	+/- 3.87	2-Sep	3-Sep	1.590	+/-	0.034	1.590	+/- 0.034
	"	14-Sep	722.79	+/-	4.02	720.61	+/- 3.95	8-Sep	13-Sep	1.551	+/-	0.032	1.571	+/- 0.033
	21-Sep	24-Sep	725.98	+/-	3.98	722.40	+/- 3.96	21-Sep	23-Sep	1.604	+/-	0.034	1.571	+/- 0.033
Job 12055 CNC	9-Oct	12-Oct	719.64	+/-	4.05	**721.71**	**+/- 3.98**	9-Oct	11-Oct	1.561	+/-	0.032	**1.568**	**+/- 0.033**

COUNTER #1

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	10/12/2009		
Value on above date	1.07604	Bq/gm =	9109 TU
Dilution factor	1		
Concentration of dilution	1.07604	Bq/gm =	9108.68 TU

Standard Activity				
Background count rate	1.561	+/-	0.032	cpm
Standard count rate	26.805	+/-	0.138	cpm
Net activity	25.244	+/-	0.142	cpm
Grams of sample	1.9944			grams
Net standard activity per gram	12.657	+/-	0.071	cpm/gm
TU/cpm/gm	719.64	+/-	4.05	

Counting efficiency	
total cpm	64.56 TU of std *0.007088
net actvy (cpm)/g	12.657 (std count - bkgrd count) / wt std
efficiency %	**19.60** net actvy/total dpm std

RACKPOS	FNCT1	FNCT2	FNCT3	FNCT4	CPMW5	CPMW6	SQPE	SQPI	CPM	CTIME	TIME	DATE	RPT
1	1.91	1.91	1.79	1.79	1.9	4.9	782.72	213.42	4.9	6000	4:32 PM	10/9/2009	1
1	1.56	1.56	1.5	1.5	1.6	4.2	782.41	222.24	4.2	6000	6:13 PM	10/9/2009	2
1	1.54	1.54	1.48	1.48	1.5	4.6	781.95	221.24	4.6	6000	7:53 PM	10/9/2009	3
1	1.62	1.63	1.55	1.54	1.6	4.1	782.21	215.95	4.1	6000	9:34 PM	10/9/2009	4
1	1.75	1.75	1.65	1.64	1.8	4.2	782.52	213.58	4.2	6000	11:15 PM	10/9/2009	5
1	1.64	1.65	1.59	1.58	1.7	4.1	782.16	219.45	4.1	6000	12:56 AM	10/10/2009	6
1	1.5	1.5	1.46	1.45	1.5	4	782.83	219.45	4	6000	2:37 AM	10/10/2009	7
1	1.5	1.5	1.41	1.41	1.5	4.2	782.57	223.14	4.2	6000	4:18 AM	10/10/2009	8
1	1.49	1.49	1.39	1.39	1.5	4.3	782.47	220.21	4.3	6000	5:59 AM	10/10/2009	9
1	1.5	1.5	1.36	1.36	1.5	4.1	782	219.11	4.1	6000	7:40 AM	10/10/2009	10
1	1.64	1.64	1.5	1.5	1.6	4.2	782.52	216.95	4.2	6000	9:20 AM	10/10/2009	11
1	1.14	1.14	1.08	1.08	1.1	3.6	782.67	228.59	3.6	6000	11:01 AM	10/10/2009	12
1	1.56	1.56	1.45	1.45	1.6	4	782.52	219.11	4	6000	12:42 PM	10/10/2009	13
1	1.46	1.46	1.35	1.35	1.5	4.2	781.85	223.3	4.2	6000	2:23 PM	10/10/2009	14
1	1.64	1.64	1.56	1.56	1.6	4.1	782	208.2	4.1	6000	4:04 PM	10/10/2009	15
2	1.61	1.61	1.54	1.54	1.6	3.9	783.14	212.16	3.9	6000	5:45 PM	10/10/2009	1
2	1.73	1.73	1.65	1.65	1.7	4.3	783.76	213.38	4.3	6000	7:26 PM	10/10/2009	2
2	1.65	1.65	1.56	1.56	1.7	4.6	783.65	216.06	4.6	6000	9:07 PM	10/10/2009	3
2	1.58	1.58	1.47	1.47	1.6	3.9	782.67	209.04	3.9	6000	10:48 PM	10/10/2009	4
2	1.42	1.42	1.37	1.37	1.4	4.1	783.5	223.05	4.1	6000	12:29 AM	10/11/2009	5
2	1.7	1.7	1.61	1.61	1.7	4.2	783.29	209.96	4.2	6000	2:09 AM	10/11/2009	6
2	1.44	1.44	1.37	1.37	1.4	4.4	784.22	219.56	4.4	6000	3:50 AM	10/11/2009	7
2	1.74	1.74	1.61	1.61	1.7	4.1	783.19	207.79	4.1	6000	5:31 AM	10/11/2009	8
2	1.5	1.5	1.43	1.43	1.5	4	782.72	216.1	4	6000	7:12 AM	10/11/2009	9
2	1.65	1.65	1.6	1.6	1.7	4.7	782.83	223.83	4.7	6000	8:53 AM	10/11/2009	10
2	1.45	1.45	1.37	1.37	1.5	4.2	783.45	223.73	4.2	6000	10:34 AM	10/11/2009	11
2	1.67	1.67	1.59	1.59	1.7	4.2	783.65	211.59	4.2	6000	12:15 PM	10/11/2009	12
2	1.49	1.49	1.43	1.43	1.5	4.4	783.08	219.49	4.4	6000	1:56 PM	10/11/2009	13
2	1.73	1.73	1.64	1.64	1.7	4.4	782.52	214.11	4.4	6000	3:37 PM	10/11/2009	14
2	1.44	1.44	1.4	1.4	1.4	4	783.08	217.39	4	6000	5:18 PM	10/11/2009	15
3	1.54	1.54	1.5	1.5	1.5	4.3	782.77	222.62	4.3	6000	6:59 PM	10/11/2009	1
3	1.59	1.59	1.53	1.53	1.6	4.1	783.24	211.77	4.1	6000	8:39 PM	10/11/2009	2
3	1.64	1.64	1.53	1.53	1.6	4.4	783.76	220.4	4.4	6000	10:20 PM	10/11/2009	3
3	1.73	1.73	1.63	1.63	1.7	4.4	782.16	218.88	4.4	6000	12:01 AM	10/12/2009	4
3	1.46	1.46	1.34	1.34	1.5	4	782.21	225.35	4	6000	1:42 AM	10/12/2009	5
3	1.41	1.41	1.34	1.34	1.4	3.9	782.98	213.9	3.9	6000	3:23 AM	10/12/2009	6
3	1.75	1.75	1.62	1.62	1.8	4.3	782.41	207.95	4.3	6000	5:04 AM	10/12/2009	7
3	1.38	1.38	1.33	1.33	1.4	3.7	782.98	218.73	3.7	6000	6:45 AM	10/12/2009	8
3	1.65	1.66	1.6	1.59	1.7	4.3	782.26	212.4	4.3	6000	8:26 AM	10/12/2009	9
3	1.67	1.67	1.57	1.57	1.7	4.2	782.77	217.55	4.2	6000	10:07 AM	10/12/2009	10
3	1.44	1.44	1.32	1.32	1.4	4.1	782.62	219.38	4.1	6000	11:48 AM	10/12/2009	11
3	1.59	1.59	1.47	1.47	1.6	4.1	783.14	206.81	4.1	6000	1:28 PM	10/12/2009	12
3	1.56	1.56	1.45	1.45	1.6	4.1	782.16	213.71	4.1	6000	3:09 PM	10/12/2009	13
3	1.51	1.51	1.4	1.4	1.5	4	782.67	213.54	4	6000	4:50 PM	10/12/2009	14
3	1.5	1.51	1.43	1.42	1.5	4	782.31	217.88	4	6000	6:31 PM	10/12/2009	15
4	26.58	26.6	26.19	26.17	26.6	30.2	783.29	120.78	30.2	6000	8:12 PM	10/12/2009	1
4	26.88	26.91	26.58	26.55	26.9	31	783.03	123.02	31	6000	9:53 PM	10/12/2009	2
4	27.19	27.19	26.86	26.86	27.2	30.9	782.57	121.34	30.9	6000	11:34 PM	10/12/2009	3
4	27.04	27.07	26.49	26.46	27.1	30.8	783.39	121.12	30.8	6000	1:15 AM	10/13/2009	4
4	26.97	26.99	26.66	26.64	27	30.6	782.31	120.91	30.6	6000	2:56 AM	10/13/2009	5
4	27.33	27.33	26.88	26.88	27.3	31	783.34	121.21	31	6000	4:36 AM	10/13/2009	6
4	27.58	27.6	27.08	27.07	27.6	31.3	782.41	121.77	31.3	6000	6:17 AM	10/13/2009	7
4	26.94	26.95	26.59	26.58	27	30.9	782.05	123.25	30.9	6000	7:58 AM	10/13/2009	8
4	26.25	26.26	25.91	25.9	26.3	30.2	783.34	122.1	30.2	6000	9:39 AM	10/13/2009	9
4	26.17	26.19	25.71	25.69	26.2	29.9	782.05	122.75	29.9	6000	11:20 AM	10/13/2009	10
4	28.55	28.57	28.03	28.02	28.6	32.4	782.72	121.6	32.4	6000	1:01 PM	10/13/2009	11
4	26.92	26.94	26.53	26.51	26.9	30.8	782.72	123.04	30.8	6000	2:42 PM	10/13/2009	12
4	26.08	26.1	25.74	25.72	26.1	29.8	783.14	120.37	29.8	6000	4:23 PM	10/13/2009	13
4	26.73	26.73	26.35	26.35	26.7	30.7	783.6	122.07	30.7	6000	6:04 PM	10/13/2009	14
4	26.61	26.63	26.17	26.15	26.6	30.7	783.14	122.95	30.7	6000	7:44 PM	10/13/2009	15

DATA FILE	**999** counter 1			
JOB #	**12055**			
Count dates:	**10-9 through 10-13-09**			
Position #	1	2	3	4
Sample ID	172337 DC-methane	172338 DC-methane	Blank	NIST 1.9944 g
Cocktail date	9-Oct	9-Oct	9-Oct	9-Oct
Date counted	9-Oct	10-Oct	11-Oct	12-Oct

LABORATORY # 172337

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	10/12/2009		
Value on above date	1.07604	Bq/gm =	9109 TU
Dilution factor	1		
Concentration of dilution	1.07604	Bq/gm =	9108.68 TU

Standard Activity				
Background count rate	1.561	+/-	0.032	cpm
Standard count rate	26.805	+/-	0.138	cpm
Net activity	25.244	+/-	0.142	cpm
Grams of sample	1.9944			grams
Net standard activity per gram	12.657	+/-	0.071	cpm/gm
TU/cpm/gm	719.64	+/-	4.05	

Sample Activity				
Background rate	1.561	+/-	0.032	cpm
Sample count rate	1.569	+/-	0.035	cpm
Net activity	0.008	+/-	0.0474	cpm
Grams of sample	10.0432			grams
Net sample activity per gram	0.0008	+/-	0.0047	cpm/gm
TU	0.57	+/-	3.397	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.566**	**+/-**	**3.397 TU**

LABORATORY # 172337
SAMPLE SOURCE: methane

Avg Standard Activity			
TU/cpm/gm	**721.71**	**+/-**	**3.98**

Sample Activity				
Background rate	1.568	+/-	0.033	cpm
Sample count rate	1.569	+/-	0.035	cpm
Net activity	0.002	+/-	0.0479	cpm
Grams of sample	10.0432			grams
Net sample activity per gram	0.0002	+/-	0.0048	cpm/gm
TU	0.12	+/-	3.441	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.120**	**+/-**	**3.441 TU**

LABORATORY # 172338

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	10/12/2009		
Value on above date	1.07604	Bq/gm =	9109 TU
Dilution factor	1		
Concentration of dilution	1.07604	Bq/gm =	9108.68 TU

Standard Activity				
Background count rate	1.561	+/-	0.032	cpm
Standard count rate	26.805	+/-	0.138	cpm
Net activity	25.244	+/-	0.142	cpm
Grams of sample	1.9944			grams
Net standard activity per gram	12.657	+/-	0.071	cpm/gm
TU/cpm/gm	719.64	+/-	4.05	

Sample Activity				
Background rate	1.561	+/-	0.032	cpm
Sample count rate	1.587	+/-	0.033	cpm
Net activity	0.025	+/-	0.0458	cpm
Grams of sample	10.031			grams
Net sample activity per gram	0.0025	+/-	0.0046	cpm/gm
TU	1.82	+/-	3.287	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**1.817**	**+/-**	**3.287 TU**

LABORATORY # 172338
SAMPLE SOURCE: methane

Avg Standard Activity

TU/cpm/gm	**721.71**	**+/-**	**3.98**

Sample Activity				
Background rate	1.568	+/-	0.033	cpm
Sample count rate	1.587	+/-	0.033	cpm
Net activity	0.019	+/-	0.0463	cpm
Grams of sample	10.031			grams
Net sample activity per gram	0.0019	+/-	0.0046	cpm/gm
TU	1.38	+/-	3.332	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**1.375**	**+/-**	**3.332 TU**

Report < 10.0 TU

duplicate tritium samples

EE = electrolytic enrichment
DC = direct counting

YEAR	Count date	Tritium value	Duplicate sample value	Comments
2009	20-Dec	< 1.0 TU	< 1.0 TU	EE
	27-Dec	< 10.0 TU	< 10.0 TU	DC
2010	11-Jan	2.80 +/- 0.27	2.80 +/- 0.28	EE

COUNTER 3 **Year 2009-10**
NIST and BLANK Values

JOB #	NIST date	count date	Value	+/-	SD	AVG NIST :			BLK date	count date	Value	+/-	SD	AVG BLK :			Comments
Batch cocktail: sep09-						(TU/cpm/g)								cpm			
	20-Nov	25-Nov	437.30	+/-	2.35	437.30	+/-	2.35	20-Nov (2)	25-Nov	1.331	+/-	0.037	1.331	+/-	0.037	
									20-Nov (1)	26-Nov	1.353	+/-	0.037	1.342	+/-	0.037	
	20-Nov	28-Nov	437.64	+/-	2.35	437.47	+/-	2.35	20-Nov (2)	27-Nov	1.307	+/-	0.036	1.330	+/-	0.037	
	29-Dec	1-Jan	434.92	+/-	2.47	436.62	+/-	2.39	29-Dec	31-Dec	1.302	+/-	0.036	1.323	+/-	0.036	*New A/C*
									"	3-Jan	1.318	+/-	0.038	1.322	+/-	0.037	
	5-Jan	7-Jan	438.62	+/-	2.50	437.12	+/-	2.42	5-Jan	6-Jan	1.386	+/-	0.037	1.333	+/-	0.037	
Job 12367 CNC	"	9-Jan	436.65	+/-	2.48	**437.03**	+/-	**2.43**	"	8-Jan	1.286	+/-	0.036	**1.326**	**+/-**	**0.037**	

COUNTER #3

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	1/9/2010		
Value on above date	1.06140	Bq/gm =	8985 TU
Dilution factor	1		
Concentration of dilution	1.06140	Bq/gm =	8984.77 TU

Standard Activity				
Background count rate	1.286	+/-	0.036	cpm
Standard count rate	42.289	+/-	0.230	cpm
Net activity	41.003	+/-	0.233	cpm
Grams of sample	1.9927			grams
Net standard activity per gram	20.576	+/-	0.117	cpm/gm
TU/cpm/gm	436.65	+/-	2.48	

Counting efficiency	
total cpm	63.68 TU of std *0.007088
net actvy (cpm)	20.576 (std count - bkgrd count)/wt std
efficiency %	**32.31** net actvy/total cpm

DATA FILE	**76** counter 3			
JOB #	**12367 CNC**			
Count dates:	**1-7 through 1-9-10**			
Position #	21	22	23	24
Sample ID	176954	176955	Blank	NIST
	DC-C	DC-C		1.9927 g
Cocktail date	7-Jan	7-Jan	5-Jan	5-Jan
Date counted	7-Jan	8-Jan	8-Jan	9-Jan

THU 7 JAN 2010 14:42

*** DIRECTORY PATH :C:\GWEN76 ***

PARAMETER GROUP: 8
ID: <100107>

00A PROGRAM MODE 6 ->

ORDER POS ID CTIME COUNTS CUCNTS MCW REP STD STMS STIME
1 21 176954 DC-C 100:00 NO LIM NO LIM 1 10 Y 1/10 1:00
2 22 176955 DC-C 100:00 NO LIM NO LIM 1 10 Y 1/10 1:00
3 23 BLANK 1-5 100:00 NO LIM NO LIM 1 10 Y 1/10 1:00
4 24 NIST 1-5 100:00 NO LIM NO LIM 1 8 Y 1/10 1:00
5 25 1 xxxxx
6 26 1 xxxxxx
7 27 1 xxxxx
8 28 B xxxxx
9 29 1 xxxxx
10 30 1 xxxxx
NUMBER OF CYCLES 1
COINCIDENCE BIAS (L/H) L

MCA INPUT TRIGG. INHIBIT MEMORY SPLIT
1 LRSUM DCOS G L*R
2 GSUM G L*R

WINDOW CHANNELS MCA HALF
2 50- 270 1 2
3 60- 220 1 2
4 50- 320 1 1
5 50- 270 1 1
6 60- 220 1 1
7 1- 1024 2 1
8 1- 1024 2 2

SELECTED PRINTOUT FOR TERMINAL 1 (A)

	POS	REP	CTIME	CUCNTS	SQP	SQP%	ID	CPM1	CPM2	CPM3
Q012101N.001	21	1	100:01	206	752.8	0.16	**176954 DC-C**	2.1	1.83	**1.36**
Q012102N.001	21	2	100:01	418	750.02	0.12	**176954 DC-C**	2.16	1.9	**1.46**
Q012103N.001	21	3	100:01	633	748.26	0.16	**176954 DC-C**	2.2	1.68	**1.23**
Q012104N.001	21	4	100:01	855	747.83	0.16	**176954 DC-C**	2.27	1.95	**1.57**
Q012105N.001	21	5	100:01	1071	747.08	0.2	**176954 DC-C**	2.21	1.85	**1.45**
Q012106N.001	21	6	100:01	1283	749.96	0.13	**176954 DC-C**	2.16	1.82	**1.34**
Q012107N.001	21	7	100:01	1494	748.29	0.16	**176954 DC-C**	2.15	1.87	**1.41**
Q012108N.001	21	8	100:01	1713	748.39	0.16	**176954 DC-C**	2.24	1.99	**1.46**
Q012109N.001	21	9	100:01	1928	749.18	0.2	**176954 DC-C**	2.2	1.81	**1.39**
Q012110N.001	21	10	100:01	2156	749.46	0.13	**176954 DC-C**	2.33	1.98	**1.53**
Q022201N.001	22	1	100:01	211	749.09	0.14	**176955 DC-C**	2.15	1.87	**1.41**
Q022202N.001	22	2	100:01	427	747.95	0.18	**176955 DC-C**	2.21	1.92	**1.5**
Q022203N.001	22	3	100:01	639	747.86	0.17	**176955 DC-C**	2.16	1.78	**1.33**
Q022204N.001	22	4	100:01	827	745.16	0.15	**176955 DC-C**	1.92	1.53	**1.24**
Q022205N.001	22	5	100:01	1057	749.77	0.17	**176955 DC-C**	2.35	1.98	**1.37**
Q022206N.001	22	6	100:01	1264	749.67	0.17	**176955 DC-C**	2.11	1.65	**1.21**
Q022207N.001	22	7	100:01	1474	748.78	0.17	**176955 DC-C**	2.14	1.69	**1.23**
Q022208N.001	22	8	100:01	1657	747.9	0.16	**176955 DC-C**	1.87	1.67	**1.29**
Q022209N.001	22	9	100:01	1886	748.35	0.16	**176955 DC-C**	2.34	1.91	**1.58**
Q022210N.001	22	10	100:01	2092	747.57	0.13	**176955 DC-C**	2.1	1.76	**1.32**
Q032301N.001	23	1	100:01	252	748.51	0.17	**BLANK 1-5**	2.57	2.18	**1.55**
Q032302N.001	23	2	100:01	440	749.12	0.15	**BLANK 1-5**	1.92	1.63	**1.16**
Q032303N.001	23	3	100:01	622	749.25	0.19	**BLANK 1-5**	1.86	1.52	**1.14**
Q032304N.001	23	4	100:01	839	747.67	0.16	**BLANK 1-5**	2.22	1.87	**1.4**
Q032305N.001	23	5	100:01	1045	749.46	0.13	**BLANK 1-5**	2.1	1.78	**1.27**
Q032306N.001	23	6	100:01	1257	748.59	0.17	**BLANK 1-5**	2.16	1.79	**1.44**
Q032307N.001	23	7	100:01	1446	748.5	0.16	**BLANK 1-5**	1.93	1.63	**1.28**
Q032308N.001	23	8	100:01	1641	748.75	0.13	**BLANK 1-5**	1.99	1.6	**1.15**
Q032309N.001	23	9	100:01	1828	749.17	0.14	**BLANK 1-5**	1.91	1.56	**1.14**
Q032310N.001	23	10	100:01	2039	749.86	0.13	**BLANK 1-5**	2.15	1.79	**1.33**
Q042401N.001	24	1	100:01	4284	752.82	0.13	**NIST 1-5**	43.84	43.58	**42.6**
Q042402N.001	24	2	100:01	8583	750.96	0.18	**NIST 1-5**	44	43.69	**42.66**
Q042403N.001	24	3	100:01	12752	751.26	0.16	**NIST 1-5**	42.67	42.24	**41.39**
Q042404N.001	24	4	100:01	16963	749.93	0.13	**NIST 1-5**	43.1	42.87	**41.9**
Q042405N.001	24	5	100:01	21130	748.38	0.15	**NIST 1-5**	42.65	42.24	**41.12**
Q042406N.001	24	6	100:01	25370	751.12	0.14	**NIST 1-5**	43.39	43.15	**41.91**
Q042407N.001	24	7	100:01	29783	748.11	0.17	**NIST 1-5**	45.16	44.76	**43.64**
Q042408N.001	24	8	100:01	34141	750.33	0.15	**NIST 1-5**	44.6	44.24	**43.09**

LABORATORY # 176954

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	1/9/2010		
Value on above date	1.06140	Bq/gm =	8985 TU
Dilution factor	1		
Concentration of dilution	1.06140	Bq/gm =	8984.77 TU

Standard Activity				
Background count rate	1.286	+/-	0.036	cpm
Standard count rate	42.289	+/-	0.230	cpm
Net activity	41.003	+/-	0.233	cpm
Grams of sample	1.9927			grams
Net standard activity per gram	20.576	+/-	0.117	cpm/gm
TU/cpm/gm	436.65	+/-	2.48	

Sample Activity				
Background rate	1.286	+/-	0.036	cpm
Sample count rate	1.420	+/-	0.038	cpm
Net activity	0.134	+/-	0.0521	cpm
Grams of sample	10.0078			grams
Net sample activity per gram	0.0134	+/-	0.0052	cpm/gm
TU	5.85	+/-	2.272	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**5.847**	**+/-**	**2.272 TU**

LABORATORY # 176954
SAMPLE SOURCE: methane

Avg Standard Activity

TU/cpm/gm	**437.03**	**+/-**	**2.43**

Sample Activity				
Background rate	1.326	+/-	0.037	cpm
Sample count rate	1.420	+/-	0.038	cpm
Net activity	0.094	+/-	0.0526	cpm
Grams of sample	10.0078			grams
Net sample activity per gram	0.0094	+/-	0.0053	cpm/gm
TU	4.10	+/-	2.298	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**4.100**	**+/-**	**2.298 TU**

Report < 10.0 TU

LABORATORY # 176955

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	1/9/2010		
Value on above date	1.06140	Bq/gm =	8985 TU
Dilution factor	1		
Concentration of dilution	1.06140	Bq/gm =	8984.77 TU

Standard Activity				
Background count rate	1.286	+/-	0.036	cpm
Standard count rate	42.289	+/-	0.230	cpm
Net activity	41.003	+/-	0.233	cpm
Grams of sample	1.9927			grams
Net standard activity per gram	20.576	+/-	0.117	cpm/gm
TU/cpm/gm	436.65	+/-	2.48	

Sample Activity				
Background rate	1.286	+/-	0.036	cpm
Sample count rate	1.348	+/-	0.037	cpm
Net activity	0.062	+/-	0.0513	cpm
Grams of sample	10.0557			grams
Net sample activity per gram	0.0062	+/-	0.0051	cpm/gm
TU	2.69	+/-	2.229	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**2.692**	**+/-**	**2.230 TU**

LABORATORY # 176955
SAMPLE SOURCE: methane

Avg Standard Activity

TU/cpm/gm	**437.03**	**+/-**	**2.43**

Sample Activity				
Background rate	1.326	+/-	0.037	cpm
Sample count rate	1.348	+/-	0.037	cpm
Net activity	0.022	+/-	0.0519	cpm
Grams of sample	10.0557			grams
Net sample activity per gram	0.0022	+/-	0.0052	cpm/gm
TU	0.95	+/-	2.256	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.951**	**+/-**	**2.256 TU**

Report < 10.0 TU

COUNTER 1 **Year 2009**
NIST and BLANK Values

JOB #	NIST date	count date	Value	+/-	SD	AVG NIST): (TU/cpm/g)			BLK date	count date	Value	+/-	SD	AVG BLK : cpm			Date reported
Batch cocktail: sep09-																	
	10-Sep	20-Sep	735.48	+/-	4.46				10-Sep (1)	18-Sep	1.605	+/-	0.033				
									10-Sep (2)	19-Sep	1.601	+/-	0.033	1.603	+/-	0.033	
									20-Nov (1)	20-Nov	1.581	+/-	0.033	1.595	+/-	0.033	
									"	23-Nov	1.598	+/-	0.033	1.596	+/-	0.033	
	20-Nov	25-Nov	746.82	+/-	4.20	741.15	+/-	4.33	20-Nov (2)	24-Nov	1.601	+/-	0.033	1.597	+/-	0.033	
									20-Nov (1)	26-Nov	1.547	+/-	0.032	1.589	+/-	0.033	
	20-Nov	28-Nov	743.27	+/-	4.17	741.85	+/-	4.28	20-Nov (2)	27-Nov	1.580	+/-	0.033	1.587	+/-	0.033	
									20-Nov (1)	29-Nov	1.535	+/-	0.032	1.581	+/-	0.032	*New A/C*
	20-Nov	1-Dec	748.16	+/-	4.21	743.43	+/-	4.26	20-Nov (2)	30-Nov	1.537	+/-	0.032	1.576	+/-	0.032	
Job 12373 CNC	23-Dec	25-Dec	735.71	+/-	4.07	**741.89**	+/-	**4.22**	23-Dec	24-Dec	1.576	+/-	0.032	**1.576**	**+/-**	**0.032**	

COUNTER #1

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	12/25/2009		
Value on above date	1.06385	Bq/gm =	9006 TU
Dilution factor	1		
Concentration of dilution	1.06385	Bq/gm =	9005.54 TU

Standard Activity				
Background count rate	1.576	+/-	0.032	cpm
Standard count rate	26.182	+/-	0.132	cpm
Net activity	24.606	+/-	0.136	cpm
Grams of sample	2.0102			grams
Net standard activity per gram	12.241	+/-	0.068	cpm/gm
TU/cpm/gm	735.71	+/-	4.07	

Counting efficiency	
total cpm	63.83 TU of std *0.007088
net actvy (cpm)	12.241 (std count - bkgrd count)/wt std
efficiency %	**19.18** net actvy/total cpm

DATA FILE	**013** counter 1			
JOB #	**12373 CNC**			
Count dates:	**12-24 through 12-28-09**			
Position #	1	2	3	4
Sample ID	Blank	NIST 2.0102 g new cocktail	177010 DC	177011 DC
Cocktail date	23-Dec	23-Dec	24-Dec	24-Dec
Date counted	24-Dec	25-Dec	26-Dec	27-Dec

POS	FNCT1	FNCT2	FNCT3	FNCT4	CPMW5	CPMW6	SQPE	SQPI	CPM	CTIME	TIME	DATE	RPT
1	1.39	1.39	1.32	1.32	1.4	3.6	784.43	212.09	3.6	6000	11:41 AM	12/24/2009	1
1	1.48	1.48	1.43	1.43	1.5	4	783.5	213.72	4	6000	1:22 PM	12/24/2009	2
1	1.32	1.32	1.27	1.27	1.3	3.8	783.76	217.87	3.8	6000	3:02 PM	12/24/2009	3
1	1.59	1.59	1.5	1.5	1.6	3.9	783.81	208.38	3.9	6000	4:43 PM	12/24/2009	4
1	1.52	1.52	1.45	1.45	1.5	4	783.5	205.98	4	6000	6:24 PM	12/24/2009	5
1	1.71	1.71	1.61	1.61	1.7	4	783.39	204.03	4	6000	8:05 PM	12/24/2009	6
1	1.55	1.55	1.44	1.44	1.5	3.9	784.01	212.45	3.9	6000	9:46 PM	12/24/2009	7
1	1.66	1.66	1.57	1.57	1.7	4.5	783.5	213.22	4.5	6000	11:27 PM	12/24/2009	8
1	1.77	1.77	1.73	1.73	1.8	4.3	783.14	202.51	4.3	6000	1:08 AM	12/25/2009	9
1	1.63	1.63	1.52	1.52	1.6	4	783.39	207.78	4	6000	2:49 AM	12/25/2009	10
1	1.68	1.68	1.61	1.61	1.7	4.3	783.86	208.52	4.3	6000	4:30 AM	12/25/2009	11
1	1.82	1.82	1.7	1.7	1.8	4.3	783.7	208.69	4.3	6000	6:11 AM	12/25/2009	12
1	1.37	1.37	1.31	1.31	1.4	3.7	783.65	214.98	3.7	6000	7:51 AM	12/25/2009	13
1	1.55	1.55	1.47	1.47	1.5	3.9	783.76	208.44	3.9	6000	9:32 AM	12/25/2009	14
1	1.6	1.6	1.58	1.58	1.6	4.1	783.91	205.71	4.1	6000	11:13 AM	12/25/2009	15
2	27.38	27.42	26.96	26.92	27.4	31.4	783.39	123.08	31.4	6000	12:54 PM	12/25/2009	1
2	26.42	26.43	26.02	26.01	26.4	30.3	783.34	123.08	30.3	6000	2:35 PM	12/25/2009	2
2	26.24	26.26	25.79	25.77	26.3	29.9	782.77	121.7	29.9	6000	4:16 PM	12/25/2009	3
2	25.32	25.35	24.93	24.9	25.4	28.8	783.08	121.19	28.7	6000	5:57 PM	12/25/2009	4
2	25.36	25.4	25.04	24.99	25.4	29.2	783.76	122.54	29.2	6000	7:38 PM	12/25/2009	5
2	26.54	26.57	26.08	26.05	26.6	30.2	783.55	121.8	30.2	6000	9:19 PM	12/25/2009	6
2	25.81	25.81	25.42	25.42	25.8	29.6	784.17	123.11	29.6	6000	11:00 PM	12/25/2009	7
2	26.06	26.08	25.64	25.62	26.1	29.5	783.7	120.81	29.5	6000	12:41 AM	12/26/2009	8
2	26.37	26.4	25.98	25.95	26.4	30	783.39	121.8	30	6000	2:21 AM	12/26/2009	9
2	26.57	26.61	26.18	26.13	26.6	30	784.38	119.85	30	6000	4:02 AM	12/26/2009	10
2	25.86	25.88	25.42	25.4	25.9	29.3	783.55	119.59	29.3	6000	5:43 AM	12/26/2009	11
2	25.19	25.21	24.72	24.7	25.2	28.7	783.55	121.55	28.7	6000	7:24 AM	12/26/2009	12
2	26.36	26.39	26.03	26	26.4	29.9	783.65	120.31	29.9	6000	9:05 AM	12/26/2009	13
2	26.55	26.56	26.13	26.12	26.6	30	784.53	121.04	30	6000	10:46 AM	12/26/2009	14
2	26.7	26.73	26.34	26.32	26.7	30.4	783.29	120.7	30.4	6000	12:27 PM	12/26/2009	15
3	1.5	1.5	1.45	1.45	1.5	3.8	783.5	205.86	3.8	6000	2:08 PM	12/26/2009	1
3	1.71	1.71	1.64	1.64	1.7	4.5	782.88	209.89	4.5	6000	3:49 PM	12/26/2009	2
3	1.28	1.28	1.25	1.25	1.3	3.7	783.29	217.03	3.7	6000	5:30 PM	12/26/2009	3
3	1.6	1.6	1.54	1.54	1.6	4	782.31	210.22	4	6000	7:11 PM	12/26/2009	4
3	1.5	1.5	1.41	1.41	1.5	3.8	783.34	206.81	3.8	6000	8:52 PM	12/26/2009	5
3	1.54	1.54	1.45	1.45	1.5	3.6	782.72	209.37	3.6	6000	10:33 PM	12/26/2009	6
3	1.41	1.41	1.36	1.36	1.4	3.7	782.41	213.18	3.7	6000	12:13 AM	12/27/2009	7
3	1.47	1.49	1.45	1.44	1.5	4	783.65	205.97	4	6000	1:54 AM	12/27/2009	8
3	1.5	1.5	1.42	1.42	1.5	3.8	783.7	212.96	3.8	6000	3:35 AM	12/27/2009	9
3	1.43	1.43	1.36	1.36	1.4	3.8	783.7	213.89	3.8	6000	5:16 AM	12/27/2009	10
3	1.59	1.59	1.5	1.5	1.6	4.3	784.12	218.68	4.3	6000	6:57 AM	12/27/2009	11
3	1.43	1.43	1.34	1.34	1.4	3.9	783.08	214.45	3.9	6000	8:38 AM	12/27/2009	12
3	1.57	1.57	1.52	1.52	1.6	3.8	782.47	203.47	3.8	6000	10:19 AM	12/27/2009	13
3	1.6	1.6	1.51	1.51	1.6	4	784.12	209.22	4	6000	12:00 PM	12/27/2009	14
3	1.51	1.51	1.46	1.46	1.5	3.9	783.14	207.42	3.9	6000	1:40 PM	12/27/2009	15
4	1.43	1.43	1.37	1.37	1.4	3.9	783.76	211.52	3.9	6000	3:21 PM	12/27/2009	1
4	1.53	1.53	1.41	1.41	1.5	3.9	783.65	213.14	3.9	6000	5:02 PM	12/27/2009	2
4	1.57	1.57	1.44	1.44	1.6	4	783.6	208.17	4	6000	6:43 PM	12/27/2009	3
4	1.54	1.54	1.49	1.49	1.5	3.8	783.24	208.32	3.8	6000	8:24 PM	12/27/2009	4
4	1.44	1.44	1.36	1.36	1.4	3.5	784.12	210.48	3.5	6000	10:05 PM	12/27/2009	5
4	1.67	1.68	1.56	1.55	1.7	4	783.39	205.39	4	6000	11:46 PM	12/27/2009	6
4	1.67	1.67	1.63	1.63	1.7	4	784.48	206.73	4	6000	1:27 AM	12/28/2009	7
4	1.36	1.36	1.24	1.24	1.4	3.8	783.6	211.78	3.8	6000	3:08 AM	12/28/2009	8
4	1.42	1.42	1.38	1.38	1.4	3.8	783.34	205.33	3.8	6000	4:48 AM	12/28/2009	9
4	1.65	1.65	1.62	1.62	1.7	3.9	783.7	207.91	3.9	6000	6:29 AM	12/28/2009	10
4	1.5	1.5	1.47	1.47	1.5	3.9	783.91	212.73	3.9	6000	8:10 AM	12/28/2009	11
4	1.48	1.48	1.42	1.42	1.5	3.6	783.96	205.77	3.6	6000	9:51 AM	12/28/2009	12
4	1.53	1.54	1.46	1.45	1.5	3.9	783.86	213.38	3.9	6000	11:32 AM	12/28/2009	13
4	1.47	1.49	1.43	1.42	1.5	4	783.08	210.38	4	6000	1:13 PM	12/28/2009	14
4	1.48	1.48	1.39	1.39	1.5	3.7	783.03	208	3.7	6000	2:54 PM	12/28/2009	15

LABORATORY # 177010

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	12/25/2009		
Value on above date	1.06385	Bq/gm =	9006 TU
Dilution factor	1		
Concentration of dilution	1.06385	Bq/gm =	9005.54 TU

Standard Activity				
Background count rate	1.576	+/-	0.032	cpm
Standard count rate	26.182	+/-	0.132	cpm
Net activity	24.606	+/-	0.136	cpm
Grams of sample	2.0102			grams
Net standard activity per gram	12.241	+/-	0.068	cpm/gm
TU/cpm/gm	735.71	+/-	4.07	

Sample Activity				
Background rate	1.576	+/-	0.032	cpm
Sample count rate	1.586	+/-	0.033	cpm
Net activity	0.010	+/-	0.0462	cpm
Grams of sample	10.0175			grams
Net sample activity per gram	0.0010	+/-	0.0046	cpm/gm
TU	0.73	+/-	3.396	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.734**	**+/-**	**3.396 TU**

LABORATORY # 177010
SAMPLE SOURCE: water

Avg Standard Activity			
TU/cpm/gm	**741.89**	**+/-**	**4.22**

Sample Activity				
Background rate	1.576	+/-	0.032	cpm
Sample count rate	1.586	+/-	0.033	cpm
Net activity	0.010	+/-	0.0463	cpm
Grams of sample	10.0175			grams
Net sample activity per gram	0.0010	+/-	0.0046	cpm/gm
TU	0.74	+/-	3.426	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.741**	**+/-**	**3.426 TU**

Report < 10.0 TU

LABORATORY # 177011

NIST standard calculations			
Standardization date	9/3/1998		
Standardized value	2.00900	Bq/gm	
Date of measurement	12/25/2009		
Value on above date	1.06385	Bq/gm =	9006 TU
Dilution factor	1		
Concentration of dilution	1.06385	Bq/gm =	9005.54 TU

Standard Activity				
Background count rate	1.576	+/-	0.032	cpm
Standard count rate	26.182	+/-	0.132	cpm
Net activity	24.606	+/-	0.136	cpm
Grams of sample	2.0102			grams
Net standard activity per gram	12.241	+/-	0.068	cpm/gm
TU/cpm/gm	735.71	+/-	4.07	

Sample Activity				
Background rate	1.576	+/-	0.032	cpm
Sample count rate	1.586	+/-	0.032	cpm
Net activity	0.010	+/-	0.0454	cpm
Grams of sample	9.9941			grams
Net sample activity per gram	0.0010	+/-	0.0045	cpm/gm
TU	0.74	+/-	3.342	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.736**	**+/-**	**3.342 TU**

LABORATORY # 177011
SAMPLE SOURCE: water

Avg Standard Activity			
TU/cpm/gm	**741.89**	**+/-**	**4.22**

Sample Activity				
Background rate	1.576	+/-	0.032	cpm
Sample count rate	1.586	+/-	0.032	cpm
Net activity	0.010	+/-	0.0454	cpm
Grams of sample	9.9941			grams
Net sample activity per gram	0.0010	+/-	0.0045	cpm/gm
TU	0.74	+/-	3.371	

Sample Enrichment			
Initial amount of water	1		
final amount of water	1		
Enrichment factor	1	+/-	0.01
Tf/To	1.00	+/-	0.010
TRITIUM CONC. OF SAMPLE	**0.742**	**+/-**	**3.371 TU**

Report < 10.0 TU

ATTACHMENT D

Beta Analytic
Quality Assurance and
Quality Control Documentation

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Tel: 305 667 5167
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Beta@radiocarbon.com
Www.radiocarbon.com

Consistent Accuracy...

Delivered On Time.

Quality Assurance at BETA;

Beta has been providing routine radiocarbon dating services since 1979. In that time we have produced over 275,000 Radiocarbon results for more than 10,600 researchers' world wide (approximately 145,000 Radiometric (LSC) dates and 130,000 AMS dates). *There are arguably more BETA radiocarbon dates in publication today than all of the other radiocarbon laboratories in the world combined.*

Beta is and always has been a professional radiocarbon dating laboratory. Our sole mission is to produce accurate, precise, on-time results in a professional and courteous manner and to provide our clients with the highest levels of quality and customer service. We are not distracted by personal research or outside commitments and you have 100% of our attention and efforts applied to every sample we receive.

BETA is the only radiocarbon dating laboratory in the world to have achieved *Accreditation to the ISO/ISE 17025:2005 International Laboratory Testing Standard* (certificate attached). This accreditation not only attests to our quality in management (laboratories accredited to ISO 17025 also operate in conformance to the ISO 9001:2008 standard) but also and more importantly is an accreditation of our technical competency in all areas of radiocarbon measurements (see scope of testing, certificate 2nd page). This accreditation is performed by an outside technical party who is recognized by ISO and over 60 of the world's leading laboratory accreditation bodies, (Perry Johnson Laboratory Accreditation www.pjlabs.com). We are annually audited for our management, facilities and technical operations by PJLA to insure that we are operating to the required standards of quality management, testing and customer service required by the ISO standard.

Additionally, we are also the only Radiocarbon dating facility to ever be listed as a *"Qualified Supplier" of Radiocarbon Determinations to the Yucca Mountain Project* overseen by the US Geological Survey and Department of Energy (we have been audited by the USGS/DOE annually since 1994). This site will be used to store all of the radioactive waste created by reactors and defence contractors in the US and is one of the most highly regulated and scientifically important projects in American history.

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Miami, Florida 33155 USA
Tel: 305 667 5167
Fax: 305 663 0964
Beta@radiocarbon.com
Www.radiocarbon.com

Consistent Accuracy...
Delivered On Time.

BETA has and continues to participate in all International Radiocarbon Intercalibration Studies. Our results are and have always been impeccable (see attached results spanning from 1990 to 2008)

BETA is the most calibrated and inter-calibrated radiocarbon laboratory in the world. Since 1984 (when we started keeping computer records) we have analyzed more than 50,000 total known age International Standards, Blanks and Internal QA blinds by AMS and over 80,000 by Radiometric counting. This is in addition to the 275,000 unknown dates reported to our client-colleagues. *We have run vastly more standards than most other laboratories have run samples.*

These standards are run on a daily basis and interspersed between the synthesis and counting of your samples. In addition we cross-count these standards on a daily basis between our Radiometric and AMS divisions, insuring that regardless of the technique chosen, the results are correct and inter-comparable.

Since 1984, approximately 40% of all AMS measurements and 56% of Radiometric measurements have been performed on NIST traceable Standards, Blanks, known age or QA samples.

As you can see we take the quality of our results *VERY* seriously because they represent your as well as our reputations, livelihoods and in many instances provide man's only irreplaceable glimpse of our past and quite possibly future.

If you have any questions regarding the above or our ISO/ISE 17025:2005 Accredited Testing programs, please feel free to contact me at any time.

Cheers,

Ron

R.E. Hatfield
Deputy Director / Quality Manager

Beta Analytic Inc. is an Accredited ISO/ISE 17025:2005 testing laboratory operating in conformance with ISO 9001:2008; having demonstrated both the technical competency and management system requirements necessary to consistently deliver technically valid test results. These standards are universally recognized as the highest level of quality attainable by a testing laboratory.

4.2.2 Quality Policy Statement

Policy:

The policies and objectives for laboratory operations are documented in this Quality Manual. The overall objectives are set out in the Quality Policy Statement and reviewed during management review. The Quality Policy Statement is issued under the authority of the President / Director on the effective date.

Effective Date: September 1, 2010

Quality Policy Statement:

BETA Analytic Inc is committed to the continuous improvement of our Quality Management System, which will insure that we will be able to provide the accurate and on-time delivery of radiocarbon content measurements, while continuously meeting or exceed the stated and/or implied expectations of our customers through day-to-day interactions.

a) ***Management is commitment to good professional practices and the quality of services provided to the customer*:** Tests are only carried out in accordance with stated standardized methods and/or as requested / required by the customer.

Requests to perform tests that may jeopardize an objective result or have which may have a low validity are not performed.

b) ***Standards of Service include:***

- Quality BEFORE Delivery – test results are only reported when we are sure of the accuracy and precision as stated. Results that have not been verified through the defined quality system will not be reported regardless of stated or required delivery.
- Accuracy and Precision of Results – The highest possible accuracy and precision will be required of all testing results reported.
- Timely Delivery of Results, when not at the expense of quality of the results
- Customer Support and Satisfaction before during and after reporting of results

- Excellence in the workplace will be promoted and maintained by providing all employees with the knowledge, training, and tools necessary to allow for the completion of the highest quality work, reported with accuracy an in and timely manner.

c) ***Purpose of management system related to quality*:** To manage our business by adhering to the requirements of our stated Quality and Management goals, Technical and Implementing procedures, while meeting the needs and requirements of our customers.

d) ***Personnel*:** Will be fully trained with regards to all appropriate quality systems and necessary documentation and will implement the defined policies and procedures in all aspects of their work.

e) ***Management is committed to complying with ISO 17025 international standards and to continually improve the effectiveness of the management system***: the objective of this Quality Manual is to document the compliant policies and associated procedures that are integrated into our daily activities. Continual improvements are established, implemented, and locked into the management system.

Additional objectives include:

- to constantly evaluate and improve the level of the laboratory's performance
- to make test method changes to improve performance
- to participate in proficiency testing or quality evaluation programs with peer laboratories and or governing bodies
- to ensure that all personnel are trained to a level of familiarity with the quality management system appropriate to the individual's degree of responsibility
- to improve and validate laboratory methodologies by participation in method validation collaborative tests
- to establish and report on quality savings

BETA

Radiocarbon Dating

Consistent Accuracy
Delivered On-Time

We thought you'd like to know what our Accreditation as a Testing Laboratory to ISO 17025 Standards means for you.

- Your radiocarbon results have been produced by the ***ONLY*** Radiocarbon Laboratory in the world that has achieved *Accreditation to ISO/IEC 17025:2005 Testing Standards* and represent the highest level of internationally recognized quality attainable.

- Instant recognition of the technical validity of your radiocarbon test results by other researchers, governmental agencies, international organizations and over 60 of the world's most respected laboratory accreditation bodies, including;

  ISO - *International Organization for Standardization,*
  ILAC - *International Laboratory Accreditation Cooperation*
  IAF - *International Accreditation Forum*
  APLAC - *Asian Pacific Laboratory Cooperation*
  NACLA - *National Cooperation for Laboratory Accreditation*

- Our on-going commitment to the continuous improvement of our Quality Management System, Technical and Implementing Procedures and Customer Service, through annual surveillance audits by an impartial, internationally recognized laboratory accreditation body; PJLA – Perry Johnson Laboratory Accreditation (www.pjla.com)

PJLA
Testing
Accreditation #59423
Certificate # L08-89-R1

"This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system" ***Refer to the joint ISO-ILAC-IAF Communiqué date 18 June 2005"listed below***

Joint ISO-ILAC-IAF Communiqué on the Management Systems Requirements of ISO/IEC 17025:2005

"A laboratory's fulfillment of the requirements of ISO/IEC 17025:2005 means the laboratory meets both the technical competence requirements and management system requirements that are necessary for it to consistently deliver technically valid test results and calibrations. Testing and calibration laboratories that comply with this International Standard will therefore also operate in accordance with ISO 9001."

PJLA

October 29, 2010

Mr. Ronald E. Hatfield
BETA Analytic, Inc.
4985 SW 74th Court
Miami, Florida 33155

Dear Mr. Ronald E. Hatfield

This letter confirms your ISO/IEC 17025: 2005 re-accreditation assessment was concluded on 10/18/2010 with PJLA assessor, Doug Berg.

As I am sure you are aware, your current ISO/IEC 17025: 2005 Certificate expires on 10/31/2010. This letter extends that certificate, issued to the address above, until December 31, 2010.

A new certificate will be issued following the completion of the ISO/IEC 17025: 2005 assessment, the acceptance of any corrective action, the recommendation of the executive committee for re-accreditation, and/ or full payment for the assessment, as applicable.

If we can be of any further assistance to you, please feel free to contact me directly. Thank you for selecting Perry Johnson Laboratory Accreditation, Inc.

Cordially,

Tracy Szerszen
Operations Manager

PERRY JOHNSON LABORATORY ACCREDITATION, INC.

Certificate of Accreditation

Perry Johnson Laboratory Accreditation, Inc., has assessed the Laboratory of:

BETA Analytic Inc.
4985 SW 74th Court
Miami, Florida 33155

(Hereinafter called the Organization) and hereby declares that Organization is accredited in accordance with the recognized International Standard:

ISO/IEC 17025:2005

This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (as outlined by the joint ISO-ILAC-IAF Communiqué dated January 2009):

Measurement of Natural Levels of Radiocarbon by Accelerator Mass Spectrometry (AMS), Liquid Scintillation Counting (LSC) and /or Proportional Scintillation-Counter Method (PSM), and the Stable Isotopes Ratios of Carbon, Nitrogen, and Oxygen by Isotope Ratio Mass Spectrometry (IRMS)
(As detailed in the supplement)

Such testing and/or calibration services shall only be offered at or from the address given above. This Accreditation is granted subject to the system rules governing the Accreditation referred to above, and the Organization hereby covenants with the Accreditation body's duty to observe and comply with the said rules.

For PJLA:

Tracy Szerszen
President/Operations Manager

The validity of this certificate is mandated through ongoing surveillance.

Perry Johnson Laboratory Accreditation, Inc. (PJLA)
26555 Evergreen, Suite 1325
Southfield, Michigan 48076

Initial Accreditation Date:	*Issue Date:*	*Revision Date:*	*Expiration Date:*
November 01, 2008	November 01, 2008	December 23, 2009	October 31, 2010

Accreditation No:	*Certificate No:*	*Page No:*
59423	L08-89-R1	Page 1 of 2

Certificate of Accreditation: Supplement

BETA Analytic Inc.
4985 SW 74th Court
Miami, Florida 33155

Accreditation is granted to this facility to perform the following testing:

FIELD OF TEST	ITEMS, MATERIALS OR PRODUCTS TESTED	SPECIFIC TESTS OR PROPERTIES MEASURED	SPECIFICATION, STANDARD METHOD OR TECHNIQUE USED	RANGE (WHERE APPROPRIATE) AND DETECTION LIMIT
Chemical Testing	Archaeological / Geological Materials and Water	Determination of Radiocarbon Age / Activity: Measurement of $^{14/13}C$, $^{14/12}C$, $^{13/12}C$	Determination of Radiocarbon Content: by the Benzene Method (LSC) and Accelerator Mass Spectrometry (AMS)	Range (LSC or AMS): From Present Day back to 47 000 years BP Detection Limit (AMS or LSC): 47 000 BP
	Organic and Carbonate Materials	Determination of Stable Isotope Ratios: Measurement of $^{13/12}C$, $^{15/14}N$, $^{18/16}O$	Stable Isotope Ratios (by Isotope Ratio Mass Spectrometry – IRMS)	Range: -100 per mil to 100 per mil Detection Limit: 0.05 mV mass 13 output
	Any Carbon containing material; solid, liquid or gaseous forms	Determination of the Biobased Carbon Content of Natural Range Materials: $^{14/13}C$, $^{14/12}C$ and $^{13/12}C$	ASTM D6866-B (By AMS Counting)	Range: 0% pMC to 198% pMC Detection Limit: 0.28 pMC
			ASTM D6866-C (By LSC Counting)	Range: 0% pMC to 198% pMC Detection Limit: 0.37 pMC
	Solid Materials; Specifically solid recovered fuels (SRF) or refuse derived fuels (RDF)	Determination of Bio-Carbon Content: Measurement of $^{14/13}C$, $^{14/12}C$ and $^{13/12}C$	CEN/TS 15747:2008 CEN/TR 15591:2007	Range (AMS): 0% pMC to 198% pMC Detection Limit: 0.28 pMC
				Range (LSC/PSM): 0% pMC to 198% pMC Detection Limit: 0.37 pMC

Joint IAF-ILAC-ISO Communiqué
on the
Management Systems Requirements of ISO/IEC 17025:2005, General requirements for the competence of testing and calibration laboratories

A laboratory's fulfilment of the requirements of ISO/IEC 17025:2005 means the laboratory meets both the technical competence requirements and **management system requirements** that are necessary for it to consistently deliver technically valid test results and calibrations. The **management system requirements** in ISO/IEC 17025:2005 (Section 4) are written in language relevant to laboratory operations and meet the principles of ISO 9001:2008 **Quality Management Systems — Requirements** and are aligned with its pertinent requirements.

IAF Chair	ILAC Chair	ISO Secretary General

January 2009

BETA IAEA, TIRI, FIRI AND VIRI COMPARATIVE RESULTS

Fifth International Radiocarbon Intercalibration (VIRI) Stage 3 (2008-2009)	EXPECTED or CONSENSUS AGE	BETA RADIOMETRIC AGE	BETA AMS AGE	Statistical Agreement with the Consensus Age
Sample Identifier				
J - Humic Acid	43230 +/- 140 BP	Sample Available for AMS Labs Only	43850 +/- 1050 BP	Yes
K - Wood 1	59920 +/- 870 BP ("Radiocarbon Dead")	Sample Available for AMS Labs Only	> 47000 BP ("Radiocarbon Dead")	Yes
L - Wood2	2230 +/- 6 BP	Sample Available for AMS Labs Only	2320 +/- 40 BP	Yes
M - Wood 3 Loch Tay	2430 +/- 6 BP	Sample Available for AMS Labs Only	2440 +/- 40 BP	Yes
N - Wood 4 Loch Tay	2440 +/- 6 BP	NA	2450 +/- 40 BP	Yes
O - Cellulose	120 +/- 6 BP	NA	140 +/- 40 BP	Yes
P - Charcoal	1750 +/- 10 BP	Sample Available for AMS Labs Only	We did not receive this VIRI Sample for Measurement	NA
Q - Charcoal	640 +/- 6 BP	Sample Available for AMS Labs Only	620 +/- 40 BP	Yes
R - Shell Murex	2490 +/- 6 BP	NA	2520 +/- 40 BP	Yes
S - Barley Mash	109.96 +/- 0.04 pMC	NA	110.3 +/- 0.4 pMC	Yes
T - Humic Acid	3360 +/- 6 BP	Sample Available for AMS Labs Only	3360 +/- 40 BP	Yes
U - Humic Acid (Same as FIRI - E Above)	11780 +/- 10	11770 +/- 70	11810 +/- 50 BP	Yes

Fifth International Radiocarbon Intercalibration (VIRI) Stage 2 (2006-2007)	EXPECTED or CONSENSUS AGE	BETA RADIOMETRIC AGE	BETA AMS AGE	Statistical Agreement with the Consensus Age
Sample Identifier				
E - Mammoth Bone	39301 +/- 121 BP	Sample Available for AMS Labs Only	39580 +/- 880 BP	Yes
F - Horse Bone	2513 +/- 5 BP	Sample Available for AMS Labs Only	2560 +/- 40 BP	Yes
G - Human Bone	969 +/- 5 BP	Sample Available for AMS Labs Only	950 +/- 40 BP	Yes
H - Whale Bone	9528 +/- 7 BP	Sample Available for AMS Labs Only	9530 +/- 40 BP	Yes
I - Whale Bone	8331 +/- 6 BP	Sample Available for AMS Labs Only	8350 +/- 40 BP	Yes

Fifth International Radiocarbon Intercalibration (VIRI) Stage 1 (2005-2006)	EXPECTED or CONSENSUS AGE	BETA RADIOMETRIC AGE	BETA AMS AGE	Statistical Agreement with the Consensus Age
Sample Identifier				
A - Barley Mash	109.1 +/- 0.04 pMC	108.0 +/- 0.6 pMC	108.4 +/- 0.4 pMC	Yes Yes
B - Seed / Grain	2820 +/- 3.3 BP	2920 +/- 60 BP	2840 +/- 40 BP	Yes Yes
C - Barley Mash	110.7 +/-0.04 pMC	108.7 +/- 0.6 pMC	111.0 +/- 0.4 pMC	Yes Yes
D - Seed / Grain	2836 +/- 3.3 BP	2900 +/- 60 BP	2860 +/- 40 BP	Yes Yes

* TIRI samples F and G gave widely varying results as reported by most laboratories. Sample F has since been shown to be radiocarbon dead (> 50 Ky). Sample G should have been sub-fossil. Both BETA results are consistent with those estimations.

BETA IAEA, TIRI, FIRI AND VIRI COMPARATIVE RESULTS

Fourth International Radiocarbon Intercalibration (FIRI) (1999 - 2001)	EXPECTED or CONSENSUS AGE	BETA RADIOMETRIC AGE	BETA AMS AGE	Statistical Agreement with the Consensus Age
Sample Identifier				
A - Kauri Wood	45868 +/- NA	> 43760 BP	45970 +/- 790 BP	Yes Yes
B - Kauri Wood	46504 +/- NA	> 44650 BP	46660 +/- 770 BP	Yes Yes
C - Marine Turbidite	18173 +/- 11 BP	18110 +/- 110 BP	18170 +/- 50 BP	Yes Yes
D - Belfast Pine	4508 +/- 3 BP	4360 +/- 60 BP	4500 +/- 20BP	Yes Yes
E - Humic Acid (Same As VIRI - U Below)	11778 +/- 7 BP	11600 +/- 70 BP	11770 +/- 70 BP	Yes Yes
F - Belfast Pine	4508 +/- 3 BP	4450 +/- 50 BP	4470 +/- 20 BP	Yes Yes
G - Glengoyne Barley Mash	110.69 +/-0.1% Modern	110.4 +/- 0.6% Modern	110.8 +/-0.3% Modern	Yes Yes
H - Hohenheim Oak	2232 +/- 5 BP	2200 +/- 50 BP	2180 +/- 20 BP	Yes Yes
I- Belfast Cellulose	4485 +/- 5 BP	4380 +/- 50 BP	4500 +/- 20 BP	Yes Yes
J - Glengoyne Barley Mash	110.69 +/-0.1% Modern	109.4 +/-0.7% Modern	110.9 +/- 0.3% Modern	Yes Yes

Third International Radiocarbon Intercalibration (TIRI) (1991 - 1993)	EXPECTED or CONSENSUS AGE	BETA RADIOMETRIC AGE	BETA AMS AGE	Statistical Agreement with the Consensus Age
Sample Identifier				
A - Barley Mash	116.4 +/-0.1% Modern	116.7 +/-0.6% Modern	116.3 +/-0.6% Modern	Yes Yes
B - Belfast Pine	4503 +/- 6 BP	4480 +/- 60 BP	4510 +/- 40 BP	Yes Yes
C - IAEA Cellulose	129.7 +/-0.1% Modern	129.1 +/-0.6% Modern	129.8 +/-0.5% Modern	Yes Yes
D - Hekla Peat	3810 +/- 7 BP	3820 +/- 60 BP	3800 +/- 70 BP	Yes Yes
E - Ellanmore Humic	11129 +/- 12 BP	11180 +/- 70 BP	11090 +/- 50 BP	Yes Yes
H - Ellanmore Whole Peat	11152 +/- 23 BP	10950 +/- 60 BP	10960 +/- 80 BP	Yes Yes
I - Travertine	11060 +/- 17 BP	10990 +/- 60 BP	11260 +/- 50 BP	Yes Yes
J - Crannog Wood	1605 +/- 8 BP	1510 +/- 50 BP	1550 +/- 60 BP	Yes Yes
K - Turbidite Carbonate	18155 +/- 34 BP	18190 +/- 100 BP	18290 +/- 70 BP	Yes Yes
L - Whalebone	12788 +/- 30 BP	12890 +/- 90 BP	12750 +/- 70 BP	Yes Yes
M - Icelandic Peat	1682 +/- 15 BP	1720 +/- 60 BP	1660 +/- 60 BP	Yes Yes
F - Icelandic Doublespar	46750 +/- 208 BP	> 45000 BP	> 50000 BP	* Yes * Yes

* TIRI samples F and G gave widely varying results as reported by most laboratories. Sample F has since been shown to be radiocarbon dead (> 50 Ky).
Sample G should have been sub-fossil. Both BETA results are consistent with those estimations.

BETA IAEA, TIRI, FIRI AND VIRI COMPARATIVE RESULTS

IAEA Radiocarbon Intercalibration (1990 to 1991)	EXPECTED or CONSENSUS AGE	BETA RADIOMETRIC AGE	BETA AMS AGE	Statistical Agreement with the Consensus Age
Sample Identifier				
C1 - Marble	0.00 +/- 0.02 pMC ("Radiocarbon Dead")	< 0.69 pMC < 0.65 pMC	AMS Dates were not produced at BETA until 1992	YES YES
C2 - Travertine	41.14 +/- 0.3 pMC	41.53 +/- 0.24 pMC 40.79 +/- 0.43 pMC	AMS Dates were not produced at BETA until 1992	YES YES
C3 - Cellulose	129.41 +/- 0.73 pMC	127.28 +/- 0.48 pMC 125.64 +/- 0.69 pMC	AMS Dates were not produced at BETA until 1992	YES NO Sample @ 2.65 Sigma Agreement
C4 - Wood	0.32 +/- 0.02 pMC ("Radiocarbon Dead")	< 0.55 pMC < 0.62 pMC ("Radiocarbon Dead")	AMS Dates were not produced at BETA until 1992	YES YES
C5 - Wood	23.05 +/- 0.24 pMC	22.94 +/- 0.19 pMC 23.53 +/- 0.22 pMC	AMS Dates were not produced at BETA until 1992	YES YES
C6 - Sucrose	150.6 +/- 0.7 pMC	149.76 +/- 0.54 pMC 147.71 +/- 0.88 pMC	AMS Dates were not produced at BETA until 1992	YES YES

* TIRI samples F and G gave widely varying results as reported by most laboratories. Sample F has since been shown to be radiocarbon dead (> 50 Ky).
Sample G should have been sub-fossil. Both BETA results are consistent with those estimations.

ATTACHMENT E

Chain-of-Custody Documents

ISOTECH

Send Data and Invoice to

Name: James W. Hix
Company: Cordilleran Compliance Services Inc.
Address: 4690 Table Mountain Dr. #200
Golden, CO 80403
Phone: 303.237.2072
Fax: 303.237.2659
Email: jameshix@cordcomp.com

Project: Bucison Area Well Monitoring
~~Location:~~ EG08360
Sampled by: T. Dobransky

Circle one:
(Standard)
Priority
Rush

Analysis Package Codes on Back

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821
Phone: 217-398-3490
Fax: 217-398-3493
www.isotechlabs.com
mail@isotechlabs.com

Sample Description

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: Tritium	Analyses Requested: Carbon-14	Analyses Requested:	Comments
21A	A11-15B	11/13/08	0850	x	x		
24A	A11-15D	11/13/08	0900	x	x		

Chain-of-Custody Record

Signature	Company	Date	Time
Relinquished by Tim Dobransky - Cordilleran	Cordilleran Compliance	11/13/08	1600
Received by Shea Dejon	Isotech	11/14/08	0900
Relinquished by			
Received by			
Relinquished by			
Received by			

Samples Submitted to

Hong Wang

Analysis Requested by

Gwen Daniels

Isotech Laboratories, Inc.

1308 Parkland Court

Champaign, IL 61821-1826

ISOTECH

Sample Identification

Sample Number	Type or Description of Sample	Analyses & Services Requested: Carbon-14 Analysis	Tritium Enrichment	Tritium Analysis	Tritium Counting Only	Comments
I-149418	A-11-15B. Cylinder #7	✓				
I-149419	A-11-15D. Cylinder #2	✓				
~~I-149420~~						

Chain of Custody Record

	Signature	Company	Date	Time
Relinquished by	Hong Wang	Shipped via Isotech	12/11/2008	4:20 PM
Received by	Hong Wang	ISG's	12/11/08	4:20 pm
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.

Samples Submitted to

Analysis Requested by

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821-1826

ISOTECH

Sample Identification

Sample Number	Type or Description of Sample	Carbon-14 Analysis	Tritium Enrichment	Tritium Analysis	Tritium Counting Only	Comments
I-14946	A-11-5B Cylinder #7	✓				
I-14941	A-11-5D, Cylinder #2	✓				
I-15219	SP311-3-NG-GPTF, Cylinder #5	✓				
I-15220	SP331-13-NG-GPTF, Cylinder #3	✓				
I-15221	SP22-13-16-GPTF, Cylinder #4	✓				
I-15223	SP22-3-16-GPTF, Cylinder #1	✓				

Chain of Custody Record

	Signature	Company	Date	Time
Relinquished by		Shipped via Isotech	12/11/2013	4:20 p.m.
Received by		UPS	12/12/13	9:20 a.m.
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.

ISOTECH

Send Data and Invoice to

Name: James W. Hix
Company: Cordilleran Compliance Services Inc.
Address: 4690 Table Mountain Dr. #200
Golden, CO 80403
Phone: 303.237.2072
Fax: 303.237.2659
Email: jameshix@cordcomp.com

Project: Bucison Area Well Monitoring
~~Location:~~ EG08360
Sampled by: T. Dobransky

Circle one:
(Standard)
Priority
Rush

Analysis Package Codes on Back

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821
Phone: 217-398-3490
Fax: 217-398-3493
www.isotechlabs.com
mail@isotechlabs.com

Sample Description

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: Tritium	Analyses Requested: Carbon-14		Comments
21A	A11-15B	11/13/08	0850	x	x		
24A	A11-15D	11/13/08	0900	x	x		

Chain-of-Custody Record

Signature	Company	Date	Time
Relinquished by Tim Dobransky - Cordilleran	Cordilleran Compliance	11/13/08	1600
Received by Shar Dejon	Isotech	11/14/08	0900
Relinquished by			
Received by			
Relinquished by			
Received by			

Samples Submitted to

Hong Wang

Analysis Requested by

Gwen Dunnals

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821-1826

ISOTECH

Sample Identification

Sample Number	Type or Description of Sample	Carbon-14 Analysis	Tritium Enrichment	Tritium Analysis	Tritium Counting Only							Comments
I-149418	A-11-15B, Cylinder #7	✓										
I-149419	A-11-15D, Cylinder #2	✓										
~~I-149~~												

Chain of Custody Record

Signature		Company	Date	Time
Relinquished by	[illegible]	Shipped via Isotech	12/11/2008	4:20 PM
Received by	Hong Wang	ISGS	12/11/08	4:20 PM
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.

Samples Submitted to

Analysis Requested by

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821-1826

ISOTECH

Sample Identification

Sample Number	Type or Description of Sample	Carbon-14 Analysis	Tritium Enrichment	Tritium Analysis	Tritium Counting Only	Comments
I-14941K	A-11-5B Cylinder #7	✓				
I-14941Q	A-11-5D Cylinder #2	✓				
I-[illegible]						
I-15221K	SP411-3-NG-GPTF Cylinder #5	✓				
I-15221Q	SP331-13-NG-GPTF Cylinder #3	✓				
I-15221L	SP22-13-LG-GPTF Cylinder #4	✓				
I-15223-1	SP22-3-[illegible]-GPTF Cylinder #1	✓				

Analyses & Services Requested

Chain of Custody Record

	Signature	Company	Date	Time
Relinquished by	[illegible]	Shipped via Isotech	12/11/2008	4:20 p.m.
Received by	[illegible]	UPS	12/12/08	9:20 a.m.
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.

ISOTECH

Send Data and Invoice to

Name: JAMES W. HIX
Company: CORDILLERAN, a divison of Olsson Associates
Address: 4690 TABLE MOUNTAIN DR. #200
GOLDEN, CO 80403
Phone: 303.237.2072
Fax: 303.237.2659
Email: JHix@oaconsulting.com

Project: RULISON AREA WELL MONITORING
Location: 008 - 2362
Sampled by: T. DOBRANSKY

Circle one:
(Standard)
Priority
Rush

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821
Phone: 217-398-3490
Fax: 217-398-3493
www.isotechlabs.com
mail@isotechlabs.com

Sample Description

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: TRITIUM	Analyses Requested: CARBON-14	Analyses Requested	Comments
41A	FURR 10-22B	12/17/08	0945	✓	✓		

Analysis Package Codes on Back

Chain-of-Custody Record

Signature	Company	Date	Time
Relinquished by TIM DOBRANSKY - CORDILLERAN	CORDILLERAN, a divison of Olsson	12/18/08	1600
Received by Nancy Brook	ISOTECH LABS	12/28/08	10:00
Relinquished by			
Received by			
Relinquished by			
Received by			

Send Data and Invoice to

Name: JAMES W. HIX

Company: CORDILLERAN, a division of Olsson Associates

Address: 4690 TABLE MOUNTAIN DR. # 200
GOLDEN, CO 80403

Phone: 303.237.2072

Fax: 303.237.2659

Email: JHix@oaconsulting.com

Project: PIUCEON AREA WELL MONITORING

Location: 008 - 2362

Sampled by: T. DOBRANSKY

Circle one:
(Standard)
Priority
Rush

ISOTECH

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821
Phone: 217-398-3490
Fax: 217-398-3493
www.isotechlabs.com
mail@isotechlabs.com

Sample Description

Analysis Package Codes on Back

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: TRITIUM	Analyses Requested: CARBON-14	Analyses Requested:	Comments
35 A	FUEL 7-22B	12/17/08	0855	✓	✓		

Chain-of-Custody Record

Signature		Company	Date	Time
Relinquished by	TIM DOBRANSKY - CORDILLERAN	CORDILLERAN, a division of Olsson	12/18/08	1600
Received by	Nancy Drook	ISOTECH LABS	12/22/08	10:00
Relinquished by				
Received by				
Relinquished by				
Received by				

Send Data and Invoice to

Name: JAMES W. HIX

Company: CORDILLERAN, a divison of Olsson Associates

Address: 4690 TABLE MOUNTAIN DR. #200
GOLDEN, CO 80403

Phone: 303.237.2072

Fax: 303.237.2659

Email: JHix@oaconsulting.com

Project: RULISON AREA WELL MONITORING

Location: 008 - 2362

Sampled by: T. DOBRANSKY

Circle one:
(Standard)
Priority
Rush

ISOTECH

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821
Phone: 217-398-3490
Fax: 217-398-3493
www.isotechlabs.com
mail@isotechlabs.com

Sample Description

Analysis Package Codes on Back

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: TRITIUM	Analyses Requested: CARBON-14	Analyses Requested	Comments
38 A	FURR 6-22 B	12/17/08	0955	✓	✓		

Chain-of-Custody Record

	Signature	Company	Date	Time
Relinquished by	TIM DOBRANSKY - CORDILLERAN	CORDILLERAN, a divison of Olsson	12/18/08	1600
Received by	Nancy Brook	ISOTECH LABS	12/22/08	10:00
Relinquished by				
Received by				
Relinquished by				
Received by				

Send Data and Invoice to

Name: JAMES W. HIX

Company: CORDILLERAN, a divison of Olsson Associates

Address: 4690 TABLE MOUNTAIN DR. # 200
GOLDEN, CO 80403

Phone: 303.237.2072

Fax: 303.237.2659

Email: JHix@oaconsulting.com

Project: RULISON AREA WELL MONITORING

Location: 008 - 2362

Sampled by: T. DOBRANSKY

Circle one:
(Standard)
Priority
Rush

ISOTECH

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821
Phone: 217-398-3490
Fax: 217-398-3493
www.isotechlabs.com
mail@isotechlabs.com

Sample Description

Analysis Package Codes on Back

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: TRITIUM	Analyses Requested: CARBON-14	Analyses Requested:	Comments
8	FURR 6-22D	12/17/08	1015	✓	✓		

Chain-of-Custody Record

	Signature	Company	Date	Time
Relinquished by	TIM DOBRANSKY - CORDILLERAN	CORDILLERAN, a divison of Olsson	12/18/08	1600
Received by	Nancy Brook	ISOTECH LABS	12/22/08	10:00
Relinquished by				
Received by				
Relinquished by				
Received by				

Send Data and Invoice to

Name: JAMES W. HIX

Company: CORDILLERAN, a divison of Olsson Associates

Address: 4690 TABLE MOUNTAIN DR. #200
GOLDEN, CO 80403

Phone: 303.237.2072

Fax: 303.237.2659

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Circle one:
(Standard)
Priority
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Fax: 217-398-3493
www.isotechlabs.com
mail@isotechlabs.com

Sample Description

Analysis Package Codes on Back

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: TRITIUM	Analyses Requested: CARBON-14	Analyses Requested:	Comments
18A	FURR 16-22D	12/17/08	1210	✓	✓		

Chain-of-Custody Record

	Signature	Company	Date	Time
Relinquished by	TIM DOBRANSKY - CORDILLERAN	CORDILLERAN, a divison of Olsson	12/18/08	1600
Received by	Nancy Brook	ISOTECH LABS	12/22/08	10:00
Relinquished by				
Received by				
Relinquished by				
Received by				

ISOTECH

Send Data and Invoice to

Name: JAMES W. HIX
Company: CORDILLERAN, a divison of Olsson Associates
Address: 4690 TABLE MOUNTAIN DR. #200
GOLDEN, CO 80403
Phone: 303.237.2072
Fax: 303.237.2659
Email: JHix@oaconsulting.com

Project: RULISON MESA WELL MONITORING
Location: 008 - 2362
Sampled by: T. DOBRANSKY

Circle one:
(Standard)
Priority
Rush

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821
Phone: 217-398-3490
Fax: 217-398-3493
www.isotechlabs.com
mail@isotechlabs.com

Sample Description

Analysis Package Codes on Back

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: Tritium	Analyses Requested: Carbon-14	Analyses Requested:	Comments
83A	FURR 9-22D	12/17/08	1225	✓	✓		

Chain-of-Custody Record

	Signature	Company	Date	Time
Relinquished by	TIM DOBRANSKY - CORDILLERAN	CORDILLERAN, a divison of Olsson	12/18/08	1600
Received by	Nancy Brook	ISOTECH LABS	12/22/08	10:00
Relinquished by				
Received by				
Relinquished by				
Received by				

Send Data and invoice to

Name: JAMES W. HIX

Company: CORDILLERAN, a divison of Olsson Associates

Address: 4690 TABLE MOUNTAIN DR. #200
GOLDEN, CO 80403

Phone: 303.237.2072

Fax: 303.237.2659

Email: JHix@oaconsulting.com

Project: BULLSON AREA WELL MONITORING

Location: 008 - 2362

Sampled by: T. DOBRANSKY

Circle one:
(Standard)
Priority
Rush

ISOTECH

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61621
Phone: 217-398-3490
Fax: 217-398-3493
www.isotechlabs.com
mail@isotechlabs.com

Sample Description

Analysis Package Codes on Back

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: TRITIUM	Analyses Requested: CARBON-14	Analyses Requested:	Comments
52A	FURR 16-22B	12/17/08	1235	✓	✓		

Chain-of-Custody Record

	Signature	Company	Date	Time
Relinquished by	TIM DOBRANSKY - CORDILLERAN	CORDILLERAN, a divison of OLSSON	12/18/08	1600
Received by	Nancy Brook	ISOTECH LABS	12/22/08	10:00
Relinquished by				
Received by				
Relinquished by				
Received by				

ISOTECH

Send Data and Invoice to

Name: JAMES W. HIX
Company: CORDILLERAN, a divison of Olsson Associates
Address: 4690 TABLE MOUNTAIN DR. #200
GOLDEN, CO 80403
Phone: 303.237.2072
Fax: 303.237.2659
Email: JHix@oaconsulting.com

Project: RULISON AREA WELL MONITORING
Location: 008 - 2362
Sampled by: T. DOBRANSKY

Circle one:
(Standard)
Priority
Rush

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821
Phone: 217-398-3490
Fax: 217-398-3493
www.isotechlabs.com
mail@isotechlabs.com

Sample Description

Analysis Package Codes on Back

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: TRITIUM	Analyses Requested: CARBON-14		Comments
80A	FURR 9-22B	12/17/08	1245	✓	✓		

Chain-of-Custody Record

	Signature	Company	Date	Time
Relinquished by	TIM DOBRANSKY - CORDILLERAN	CORDILLERAN, a divison of Olsson	12/18/08	1600
Received by	Nancy Brook	ISOTECH LABS	12/22/08	10:00
Relinquished by				
Received by				
Relinquished by				
Received by				

Send Data and Invoice to

Name: JAMES W. HIX

Company: CORDILLERAN, a division of Olsson Associates

Address: 4690 TABLE MOUNTAIN DR. #200
GOLDEN, CO 80403

Phone: 303.237.2072

Fax: 303.237.2659

Email: JHix@oaconsulting.com

Project: RULISON AREA WELL MONITORING

Location: 008 - 2362

Sampled by: T. DOBRANSKY

Circle one:
(Standard)
Priority
Rush

ISOTECH

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821
Phone: 217-398-3490
Fax: 217-398-3493
www.isotechlabs.com
mail@isotechlabs.com

Sample Description

Analysis Package Codes on Back

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: TRITIUM	Analyses Requested: CARBON-14		Comments
9A	FORR 10-22D	12/17/08	1255	✓	✓		

Chain-of-Custody Record

	Signature	Company	Date	Time
Relinquished by	TIM DOBRANSKY - CORDILLERAN	CORDILLERAN, a division of Olsson	12/18/08	1600
Received by	Nancy Brook	ISOTECH LABS	12/22/08	10:00
Relinquished by				
Received by				
Relinquished by				
Received by				

Send Data and Invoice to

Name: JAMES W. HIX
Company: CORDILLERAN, a divison of Olsson Associates
Address: 4690 TABLE MOUNTAIN DR. # 200
GOLDEN, CO 80403
Phone: 303.237.2072
Fax: 303.237.2659
Email: JHix@oaconsulting.com

Project: RULISON AREA WELL MONITORING
Location: 008 - 2362
Sampled by: T. DOBRANSKY

Circle one:
(Standard)
Priority
Rush

ISOTECH

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821
Phone: 217-398-3490
Fax: 217-398-3493
www.isotechlabs.com
mail@isotechlabs.com

Sample Description

Analysis Package Codes on Back

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: TRITIUM	Analyses Requested: CARBON-14	Analyses Requested:	Comments
84A	FURR 15-22B	12/17/08	1305	✓	✓		

Chain-of-Custody Record

	Signature	Company	Date	Time
Relinquished by	TIM DOBRANSKY - CORDILLERAN	CORDILLERAN, a divison of OLSSON	12/18/08	1600
Received by	Nancy Drook	ISOTECH LABS	12/22/08	10:00
Relinquished by				
Received by				
Relinquished by				
Received by				

Send Data and Invoice to

Name: JAMES W. HIX

Company: CORDILLERAN, a division of Olsson Associates

Address: 4690 TABLE MOUNTAIN DR. #200
GOLDEN, CO 80403

Phone: 303.237.2072

Fax: 303.237.2659

Email: JHix@oaconsulting.com

Project: RULISON AREA WELL MONITORING

Location: 008 - 2362

Sampled by: T. DOBRANSKY

Circle one:
(Standard)
Priority
Rush

ISOTECH

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821
Phone: 217-398-3490
Fax: 217-398-3493
www.isotechlabs.com
mail@isotechlabs.com

Sample Description

Analysis Package Codes on Back

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: TRITIUM	Analyses Requested: CARBON-14		Comments
82A	FURR 15-22D	12/17/08	1315	✓	✓		

Chain-of-Custody Record

	Signature	Company	Date	Time
Relinquished by	TIM DOBRANSKY - CORDILLERAN	CORDILLERAN, a division of Olsson	12/18/08	1600
Received by	Nancy Brooks	ISOTECH LABS	12/22/08	10:00
Relinquished by				
Received by				
Relinquished by				
Received by				

ISOTECH

Send Data and Invoice to

Name: JAMES W. HIX
Company: CORDILLERAN, a divison of Olsson Associates
Address: 4690 TABLE MOUNTAIN DR. #200
GOLDEN, CO 80403
Phone: 303.237.2072
Fax: 303.237.2659
Email: JHix@oaconsulting.com

Project: RULISON AREA WELL MONITORING
Location: 008 - 2362
Sampled by: T. DOBRANSKY

Circle one:
(Standard)
Priority
Rush

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821
Phone: 217-398-3490
Fax: 217-398-3493
www.isotechlabs.com
mail@isotechlabs.com

Sample Description

Analysis Package Codes on Back

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: TRITIUM	Analyses Requested: CARBON-14	Analyses Requested:	Comments
31A	FURR 7-22D	12/18/17/08	0920	✓	✓		

Chain-of-Custody Record

	Signature	Company	Date	Time
Relinquished by	TIM DOBRANSKY - CORDILLERAN	CORDILLERAN, a divison of Olsson	12/18/08	1600
Received by	Nancy Brook	ISOTECH LABS	12/22/08	10:00
Relinquished by				
Received by				
Relinquished by				
Received by				

Send Data and Invoice to

Name: James Hix

Company: Cordilleran, a division of Olsson Associates

Address: 4690 Table Mountain Dr. #200
Golden, CO 80403

Phone: 303.237.2072

Fax: 303.237.2659

Email: jhix@oaconsulting.com

Project: Rulison Area Well Monitoring

Location: 008-2362

Sampled by: J. Hix

Circle one:
(Standard)
Priority
Rush

ISOTECH

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821
Phone: 217-398-3490
Fax: 217-398-3493
www.isotechlabs.com
mail@isotechlabs.com

Sample Description

Analysis Package Codes on Back

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: Tritium			Comments
	7-22B	12/17/08	0838	✓			
	7-22D	"	0907	✓			
	10-22B	"	1001	✓			
	6-22B	"	1018	✓			
	6-22D	"	1108	✓			
	16-22D	"	1213	✓			
	9-22D	"	1239	✓			
	16-22B	"	1254	✓			
	9-22B	"	1310	✓			
	10-22D	"	1343	✓			

Chain-of-Custody Record

	Signature	Company	Date	Time
Relinquished by	Tim Dobransky-Cordilleran	Cordilleran	12/18/08	1600
Received by	Steve Denver	Isotech	12/22/08	0900
Relinquished by				
Received by				
Relinquished by				
Received by				

Send Data and Invoice to

Name: JAMES HIX

Company: Cordilleran, a division of Olsson Associates

Address: 4690 Table Mountain Dr. #200
Golden, CO 80403

Phone: 303.237.2072

Fax: 303.237.2659

Email: jhix@oaconsulting.com

Project: Rulison Area Well Monitoring

Location: 008-2362

Sampled by: J. HIX

Circle one:
(Standard)
Priority
Rush

ISOTECH

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821
Phone: 217-398-3490
Fax: 217-398-3493
www.isotechlabs.com
mail@isotechlabs.com

Sample Description

Analysis Package Codes on Back

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: Tritium			Comments
	15-22B	12/17/08	1358	✓			
	15-22D	"	1435	✓			

Chain-of-Custody Record

Signature	Company	Date	Time
Relinquished by: TIM DOBRANSKY-Cordilleran	Cordilleran	12/18/08	1600
Received by: Shirley Dixon	Isotech	12/22/08	0900
Relinquished by:			
Received by:			
Relinquished by:			
Received by:			

Samples Submitted to

Hong Wang
ZSGS

Analysis Requested by

Gwen Daunals
Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821-1826

ISOTECH

Sample Identification

Sample Number	Type or Description of Sample	Carbon-14 Analysis	Tritium Enrichment	Tritium Analysis	Tritium Counting Only	Comments
Analyses & Services Requested						
-152394	Furr 7-22B, CO_2 Cylinder # 12	V				
-152395	Furr 10-22B, CO_2 Cylinder # 11	V				

Chain of Custody Record

	Signature	Company	Date	Time
Relinquished by	Gwen Daunals	Shipped via ISOTECH	1/8/2009	1030
Received by	Hong Wang	I.SGS	1/8/09	12:30
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.

Samples Submitted to

ISGS

Hong Wang

Analysis Requested by

Gwen Dennals

Isotech Laboratories, Inc.

1308 Parkland Court

Champaign, IL 61821-1826

ISOTECH

Sample Identification

Sample Number	Type or Description of Sample	Carbon-14 Analysis	Tritium Enrichment	Tritium Analysis	Tritium Counting Only	Comments
I-152396	Furr 6-22B, Cylinder #4 CO_2	✓				
I-152397	Furr 6-22D, Cylinder #2, CO_2	✓				
I-152398	Furr 16-22D, Cylinder #1, CO_2	✓				
I-152399	Furr 9-22D, Cylinder #8, CO_2	✓				
I-152400	Furr 16-22B, Cylinder #7, CO_2	✓				
I-152401	Furr 9-22B, Cylinder #5, CO_2	✓				
I-152402	Furr 10-22D, Cylinder #3, CO_2	✓				

Chain of Custody Record

	Signature	Company	Date	Time
Relinquished by	Jack Liu	Shipped via ~~ISGS~~ Isotech	1/20/2009	9:40
Received by	Hong Wang	ISGS	1/20/2009	9:40
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.

Samples Submitted to

ISGS

Hong Wang

Analysis Requested by

Gwen Donnals

Isotech Laboratories, Inc.

1308 Parkland Court

Champaign, IL 61821-1826

ISOTECH

Sample Identification

Sample Number	Type or Description of Sample :	Analyses & Services Requested: Carbon-14 Analysis	Tritium Enrichment	Tritium Analysis	Tritium Counting Only	Comments
~~ISGS~~ T-152403	Furr 15-22B, Cylinder #9	✓				
T-152404	Furr 15-22D, Cylinder #6	✓				
T-152405	Furr 7-22D Cylinder #12	✓				

Chain of Custody Record

	Signature	Company	Date	Time
Relinquished by	Jack Liu	Shipped via Isotech	1/23/2019	11:00 AM
Received by	Hong Wang	ISGS	1/23/19	11:00 AM
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.

Analysis Requested by

Name JAMES Hix

Company CORDILLERAN, a division of Olsen Associates

Address 4690 TABLE MOUNTAIN DR., STE 200

GOLDEN, CO 80403

jhix@oaconsulting.com

Project 008-2362 LARAMIE ENERGY RULISON AREA WELL MONITORING

Location FURR HAGEN

Sampled by TFH

ISOTECH

Sample Description

Cylinder Number	Source or Description of Sample	Date Sampled	Analyses & Services Requested: NG-1 Analysis	NG-2 Analysis	NG-3 Analysis	BG-1 Analysis	BG-2 Analysis	BG-3 Analysis	SIW analysis	RAG Analysis	TAG Analysis	Tritium	Comments
-	FURR 16-22D @ 1100	4/14/09										X	

Chain of Custody Record

	Signature	Company	Date	Time
Relinquished by		Cordillera, a division of Olsen Associates	4/14/09	1600
Received by	Steve Dunn	ISOTECH	4/15/09	0900
Relinquished by				
Received by				
Relinquished by				
Received by				

Samples Submitted to

Ilong Wang
IsGs

Analysis Requested by

Gwen Dounals
Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821-1826

ISOTECH

Sample Identification

Sample Number	Type or Description of Sample	Carbon-14 Analysis	Tritium Enrichment	Tritium Analysis	Tritium Counting Only	Comments
I-160503	CO_2, Cylinder #7	✓				

Chain of Custody Record

	Signature		Company	Date	Time
Relinquished by	Jack Lee	Shipped via	IsGs	4/22/09	10:15AM
Received by	Ilong Wang		IsGs	4/23/09	10:20AM
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.

Send Data and Invoice to

Name: JAMES HIX

Company: CORDILLERAN, a division of Olsson Associates

Address: 4690 TABLE MOUNTAIN DRIVE, STE. 200
GOLDEN, CO 80403

Phone: 303.237.2072

Fax: 303.237.2659

Email: jhix@oaconsulting.com

Project: LARAMIE ENERGY ROCKIES AREA WELL MONITORING
008-2362

Location: FURR HAGEN

Sampled by: TPD

Circle one:
(Standard)
Priority
Rush

ISOTECH

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821
Phone: 217-398-3490
Fax: 217-398-3493
www.isotechlabs.com
mail@isotechlabs.com

Sample Description

Analysis Package Codes on Back

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: Tritium	Analyses Requested: Carbon-14	Analyses Requested:	Comments
10A	FURR 16-22D	4/14/09	1115	X	X		

Chain-of-Custody Record

Signature	Company	Date	Time
Relinquished by	CORDILLERAN, a division of Olsson	4/14/09	1600
Received by	ISOTECH LABS	4/16/09	1000
Relinquished by			
Received by			
Relinquished by			
Received by			

Send Data and Invoice to

Name: Jason Hix

Company: Cabin Associates

Address: 4690 Table Mountain Dr

Suite 200 Golden CO 80403

Phone: 303.237.2092

Fax: 303.237.2657

Email: jhix@cabinassociates.com

Project: Lakanic II Area Well Monitoring

Location: Rifle Hagen

Sampled by: T. Delaney

Circle one:

Standard

Priority

Rush

ISOTECH

Isotech Laboratories, Inc.

1308 Parkland Court

Champaign, IL 61821

Phone: 217-398-3490

Fax: 217-398-3493

www.isotechlabs.com

mail@isotechlabs.com

Sample Description

Analysis Package Codes on Back

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: Carbon 14	Analyses Requested: Tritium		Comments
	16-228	6/24/09	1110	X	X		LP Tanks → Water Samples
	16-226	6/24/09	1120	X	X		in Separate Shipments
	22-9-16	6/24/09	1150	X	X		

Field Blank Rec'd also. J. Hix REQUESTED Sample to be RAN for Tritium direct count Also

Received H2O Samples Analysis = Tritium direct count

Chain-of-Custody Record

Signature	Company	Date	Time
Relinquished by	Cabin Associates	6/24/09	1600
Received by	Isotech Labs	6/26/09	1000
Relinquished by			
Received by			
Relinquished by			
Received by			

Samples Submitted to

Dr. Hong Wang

ISGS

Analysis Requested by

Glen, Donna L

Isotech Laboratories, Inc.

1308 Parkland Court

Champaign, IL 61821-1826

ISOTECH

Sample Identification

Sample Number	Type or Description of Sample	Carbon-14 Analysis	Tritium Enrichment	Tritium Analysis	Tritium Counting Only	Comments
16-50-11	16-22B cylinder #1	✓				
16-51-12	16-22D Cylinder #10	✓				

Analyses & Services Requested

Chain of Custody Record

	Signature	Company	Date	Time
Relinquished by	Chao-Li Jack Liu	Shipped via [illegible]	7/20/2009	10:16AM
Received by	Hong Wang	ISGS	7/20/09	11:20AM
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.

Samples Submitted to

Analysis Requested by

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821-1826

ISOTECH

Sample Identification

Sample Number	Type or Description of Sample	Analyses & Services Requested: Carbon-14 Analysis	Tritium Enrichment	Tritium Analysis	Tritium Counting Only	Comments

Chain of Custody Record

	Signature	Company	Date	Time
Relinquished by		Shipped via		
Received by	Hong Wang	ISGS	7/27/09	11:00 AM
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.

ISOTECH

Send Data and Invoice to

Name: JAMES HIX
Company: OLSSON ASSOCIATES
Address: 4690 TABLE MOUNTAIN DR
SUITE 200 ; GOLDEN CO 80403
Phone: 303.237.2012
Fax: 303.237.2659
Email: jhix@olssonconsulting.com

Project: LARAMIE II AREA WELL MONITORING
Location: FORT HAGEN
Sampled by: T. DOBRANSKY

Circle one:
(Standard)
Priority
Rush

Analysis Package Codes on Back

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821
Phone: 217-398-3490
Fax: 217-398-3493
www.isotechlabs.com
mail@isotechlabs.com

Sample Description

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: Carbon-14	Analyses Requested: Tritium		Comments
3A	16-22B	6/24/09	1110	X	X		* LP TANKS → water Samples
4A	16-22D	6/24/09	1120	X	X		in Separate Shipments.
22A	22-9-16	6/24/09	1150	X	X		

Ref: 008-2362
Dep
Date 06/24/2009
Wgt 10 0 LBS
DV: 0 00
SHIPPING 58 50
SPECIAL 0 59
HANDLING 0 00
TOTAL 59 09
Svcs: PRIORITY OVERNIGHT
TRCK: 9660 0451 3100

Chain-of-Custody Record

	Signature	Company	Date	Time
Relinquished by		OLSSON ASSOCIATES	6/24/09	1600
Received by		Isotech Labs	6/29/09	0830
Relinquished by				
Received by				
Relinquished by				
Received by				

Samples Submitted to

Dr. Hong Wang
ISCS

Analysis Requested by

Gwen Donnals
Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821-1826

ISOTECH

Sample Identification

Sample Number	Type or Description of Sample	Carbon-14 Analysis	Tritium Enrichment	Tritium Analysis	Tritium Counting Only	Comments
Analyses & Services Requested						
172337	16-22D, Cylinder #7	✓				
172338	16-22B cylinder #6	✓				

Chain of Custody Record

Signature		Company		Date	Time
Relinquished by	J Lin	Shipped via	isotech	10/12/2009	1:40 PM
Received by	Hong Wang		ISCS	10/12/09	2:00 PM
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.

ISOTECH

Send Data and Invoice to

Name: JAMES HIX
Company: OLSSON ASSOCIATES
Address: 4690 TABLE MOUNTAIN DRIVE
STE 200, GOLDEN, CO 80403
Phone: 303.237.2072
Fax: 303.237.2659
Email: jhix@oaconsult-ng.com

Project: LARAMIE II - RULISON AREA WELL MONITORING
Location: FORT HAGEN
Sampled by: T. DOBRANSKY

Circle one:
(Standard)
Priority
Rush

Analysis Package Codes on Back

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821
Phone: 217-398-3490
Fax: 217-398-3493
www.isotechlabs.com
mail@isotechlabs.com

Sample Description

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: CARBON-14	TRITIUM		Comments
65A	16-22D	10/1/09	1200	X	X		Rec'd. 2-1L Bottles
9A	16-22B	10/1/09	1210	X	X		↓
							2 - LP tanks

Chain-of-Custody Record

Signature	Company	Date	Time
Relinquished by	OLSSON ASSOCIATES	10/1/09	1600
Received by	Isotech Labs	10/2/09	0900
Relinquished by			
Received by			
Relinquished by			
Received by			

Samples Submitted to

Dr. Hong Wang
ISGS

Analysis Requested by

Glen Donnals
Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821-1826

ISOTECH

Sample Identification

Sample Number	Type or Description of Sample	Analyses & Services Requested: Carbon-14 Analysis	Tritium Enrichment	Tritium Analysis	Tritium Counting Only					Comments
I-176954	16-22 D Cylinder #9	✓								
I-176955	16-22B, Cylinder #12									

Chain of Custody Record

	Signature	Company	Date	Time
Relinquished by	Jack Lin	Shipped via Isotech	1/8/2010	
Received by	Hong Wang	ISGS	1/11/10	
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.

ISOTECH

Analysis Requested by

Name: JAMES HIX

Company: OLSSON ASSOCIATES

Address: 4690 TABLE MOUNTAIN DRIVE

STE 200, GOLDEN, CO 80403

303.287.2072(p) 303.238.2659(f)

jhix@oacconsulting.com

Project: 008-2362-100-100001 LARAMIE II - ROLLING HILLS WIND PROJECT

Location: FORT HAGEN

Sampled by: T. DOBRANSKY

Sample Description

Cylinder Number	Source or Description of Sample	Date Sampled	Analyses & Services Requested: NG-1 Analysis	NG-2 Analysis	NG-3 Analysis	BG-1 Analysis	BG-2 Analysis	BG-3 Analysis	SIW analysis	RAG Analysis	TAG Analysis	CARBON-14 & TRITIUM	Comments
62 A	16-22D	12/16/09										X	
32 A	16-22B	12/16/09										X	

Chain of Custody Record

	Signature	Company	Date	Time
Relinquished by		OLSSON ASSOCIATES	12/16/09	1500
Received by		ISOTECH LABS	12/21/09	845 am
Relinquished by				
Received by				
Relinquished by				
Received by				

Analysis Requested by

Name JAMES HIX

Company OLSSON ASSOCIATES

Address 4690 TABLE MOUNTAIN DRIVE

STE 200, GOLDEN, CO 80403

303.287.2072(p) 303.239.2659(f)

jhix@oa.consulting.com

Project 008-2362.100.100001 LARAMIE II - BOLTON AREA WELL MONITORING

Location FORT HAGEN

Sampled by T. DOBRANSKY

ISOTECH

Sample Description

Cylinder Number	Source or Description of Sample	Date Sampled	NG-1 Analysis	NG-2 Analysis	NG-3 Analysis	BG-1 Analysis	BG-2 Analysis	BG-3 Analysis	SIW analysis	RAG Analysis	TAG Analysis	CARBON-14 + Tritium	Comments
62 A	16-22D	12/16/09										X	Rec'd
32 A	16-22B	12/16/09										X	2 - 1 Liter P.B's
													"
													2 - diss. gas btls.
	Confirmed by Phone TDC only - RPB's sent by mistake - will dispose After tritium is Complete. Thx.												

Chain of Custody Record

	Signature	Company	Date	Time
Relinquished by		OLSSON ASSOCIATES	12/16/09	1500
Received by		Isotech Labs	12/21/09	1000
Relinquished by				
Received by				
Relinquished by				
Received by				

ISOTECH

Send Data and Invoice to

Name: James Hix
Company: Olsson Associates
Address: 4620 Table Mountain Drive
Ste 200, Golden, CO 80403
Phone: 303.237.2072
Fax: 303.237.2659
Email: jhix@woaconsulting.com

Project: Laramie II - Rulison Area Well Monitoring
Location: Furr Hagen
Sampled by: T. Dobransky / J. Vann

Circle one:
(Standard)
Priority
Rush

Analysis Package Codes on Back

Isotech Laboratories, Inc.
1308 Parkland Court
Champaign, IL 61821
Phone: 217-398-3490
Fax: 217-398-3493
www.isotechlabs.com
mail@isotechlabs.com

Sample Description

Container Number	Sample Identification	Date Sampled	Time	Analyses Requested: Carbon 14	Analyses Requested: Tritium	Analyses Requested:	Comments
95A	Furr 22-15A	10-07-10	1355	X	X		* LP Tanks + Water Samples
31A	Furr 22-15C	10-07-10	1340	X	X		to Arrive in Separate
96A	Furr 22-09A	10-07-10	1350	X	X		Shipments.
30A	Furr 22-10A	10-07-10	1355	X	X		
98A	Furr 22-10C	10-07-10	1400	X	X		
53A	Furr 16-22D	10-07-10	1430	X	X		
74A	Furr 16-22X	10-07-10	1430	X	X		
93A	Furr 22-09C	10-07-10	1935	X	X		
97A	Furr 22-16A	10-07-10	1440	X	X		
94A	Furr 16-22B	10-07-10	1500	X	X		

Chain-of-Custody Record

Signature	Company	Date	Time
Relinquished by	Olsson Associates	10-12-10	1630
Received by	Isotech Labs	10/13/10 @	1030
Relinquished by			
Received by			
Relinquished by			
Received by			