



DEPARTMENT OF NATURAL RESOURCES
Bill Owens, Governor
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Denver, CO 80203
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www.oil-gas.state.co.us

MEMORANDUM

TO: COGCC Commissioners

FROM: Brian Macke - COGCC *BJM*

DATE: December 31, 2001

SUBJECT: Review of First Year Implementation of the Barrett Resources (Now Williams Production Company) 20 Acre Well Density Order
Cause No. 479, 440, 139, and 510
Orders Nos. 479-7, 440-19, 139-34, and 510-4

The above captioned order for the Barrett Resources (Williams Production Company) 20 acre well density application that was effective on October 30, 2000 required the COGCC Director to prepare and present an assessment report of the first year implementation of the order. Attached is the final version of the assessment report.

The order requires that the assessment report include a map showing the locations of new wells permitted in the application lands and information regarding the number of onsite inspections conducted, public health, safety, and welfare and environmental issues raised during the onsite inspections, site specific drilling permit conditions of approval that have been applied, and any other relevant information. The Commission may use the assessment report as a basis for discussion of the implementation of the order, and to decide if any further Commission action is necessary.

A draft of the assessment report had been provided to the applicant, the Colorado Oil and Gas Association, Garfield County, the Mackley/Savage Group, and the Grand Valley Citizens Alliance as required by the Order on December 1, 2001. No suggestions for changes were made by any of the parties.

**REVIEW OF FIRST YEAR IMPLEMENTATION OF THE BARRETT RESOURCES
(NOW WILLIAMS PRODUCTION COMPANY)
20 ACRE WELL DENSITY ORDER**

INTRODUCTION

Under the provisions of the Colorado Oil & Gas Conservation Commission (“COGCC”) Order Numbers 479-7, 440-19, 139-34, and 510-1 (“Order”), the COGCC Director is tasked to prepare and present an Assessment Report (“Report”) to the Commissioners discussing the first year implementation of the Order. This Report presents this assessment and includes the following information:

- A summary of information regarding the number of onsite inspections (onsites) conducted.
- Public health, safety, and welfare and environmental issues raised during the onsite inspections.
- Site specific drilling permit conditions of approval that have been applied, and any other relevant information.
- A map showing the locations of new wells permitted by Williams from October 2000 through November 2001 in the application lands.
- Conclusions and Recommendations

This Report was provided as a draft for review and comment by Williams Production Company (“Williams”), the Colorado Oil and Gas Association, Garfield County, the Mackley/Savage Group, and the Grand Valley Citizens Alliance.

GENERAL DISCUSSION

Throughout the Report review period (November 2000 through November 2001), COGCC staff worked closely with Williams to effectively implement the provisions of the Order within the lands subject to the Order. Williams provided the COGCC staff with an Annual Drilling Plan, required by the Order, showing proposed locations for Applications to Drill (“APDs”) for the increased well density area, including the anticipated calendar quarter (2001) that Williams planned to drill these new wells.

At the time of submittal of the Annual Drilling Plan, Williams proposed 93 APDs for the Rulison-Parachute-Grand Valley area in Garfield County. A map illustrating the Williams Annual Drilling Plan for 2001 is provided as Figure 1. Through November 20, 2001, Williams has submitted 53 APDs for the lands subject to the Order. Table 1 provides a summary of these approved APDs, and Figure 2 is a map illustrating the locations of these APDs. Of the 53 APDs approved, 15 are located on Specified Surface Lands south of the Colorado River, as defined in the Order, with the remaining 38 APDs outside the Specified Surface lands. Figure 3 is a map showing the APDs on the Specified Surface Lands. Of the 53 total APDs approved, 25 are for directional wells. Under the Order, only 14 of these wells would have been required to be directionally drilled. This represents approximately a 79 percent increase in the number of directionally drilled wells over the Order requirement.

Each APD was prepared and submitted with a site-specific reclamation plan, as required under the Order. In addition, the COGCC staff prepared a checklist to assist both Williams and the COGCC to ensure that all of the Order requirements were being met. Each APD included this checklist. A copy of the reclamation plan and checklist for the Knight PA 331-4 well is provided as an example of this submittal (Appendix A).

ONSITE INSPECTIONS

The COGCC staff conducted 4 onsite inspections for APDs submitted in the subject lands. All 4 of the onsite inspections were triggered by the requirement in the Order for inspections for any new wellsite locations within close proximity (500 feet or less) to wetland/riparian vegetation. A summary of the onsite inspections, photograph(s) of the proposed well site, attendees of the meeting, and APD conditions added as a result of the onsites are provided in Table 2.

Two onsites were conducted on two new proposed wellsites (one was the Knight PA 331-4, and the other was the Savage RWF 33-29, which was also the same surface location for its twin directional well, the Savage RWF 333-29) located within 500 feet of

wetland/riparian vegetation adjacent to the Colorado River. The remaining 2 onsite were for locations next to Parachute Creek (Chevron GM 32-29 and its twin directional well, the Chevron GM 332-29) and Wheeler Gulch (Mobil/Exxon GM 31-34 well). In addition to the parties required by the Order to be invited to the onsite (operator, landowner, and Garfield County), the COGCC provided notice of the onsite as a courtesy to the local Colorado Division of Wildlife (“DOW”) representative so that he could have the opportunity to attend the onsite to address wildlife issues.

Only 2 of the onsite inspections resulted in the inclusion of special permit conditions. For the Chevron GM 32-29 and GM 332-29 location, the DOW representative (John Broderick) requested a change in Williams’s proposed reseeding procedures to increase the depth of seed drilling for both interim and final reclamation. Williams did not object to this special permit condition. For the Savage RWF 33-29 and RWF 333-29 well location, Garfield County’s weed control specialist (Steve Anthony) requested the addition of weed seed control measures to limit spreading of weeds either onto or off the proposed new well site. The COGCC staff requested additional erosion run-on/run-off controls be added to the site reclamation plan to limit/avoid potential silt run-off into the Colorado River. Williams had no objection to these special conditions.

CONCLUSIONS

In general, all parties consulted (Williams, Garfield County, COGCC staff, and DOW) expressed favorable remarks concerning the overall APD approval process for the lands subject to the Order. One of the most positive comments that has been expressed is that communications have improved between the involved parties, both governmental and private, as a result of the Order. The small number of onsite that were required under the Order can be attributed to improved communications between the operator and affected parties, and avoidance of surface owner disputes. In addition, improved communication between Garfield County and the COGCC through implementation of the Order and the APD approval process has been helpful in decreasing the County’s concerns regarding the increasing oil and gas development in the Rulison-Parachute-Grand Valley area.

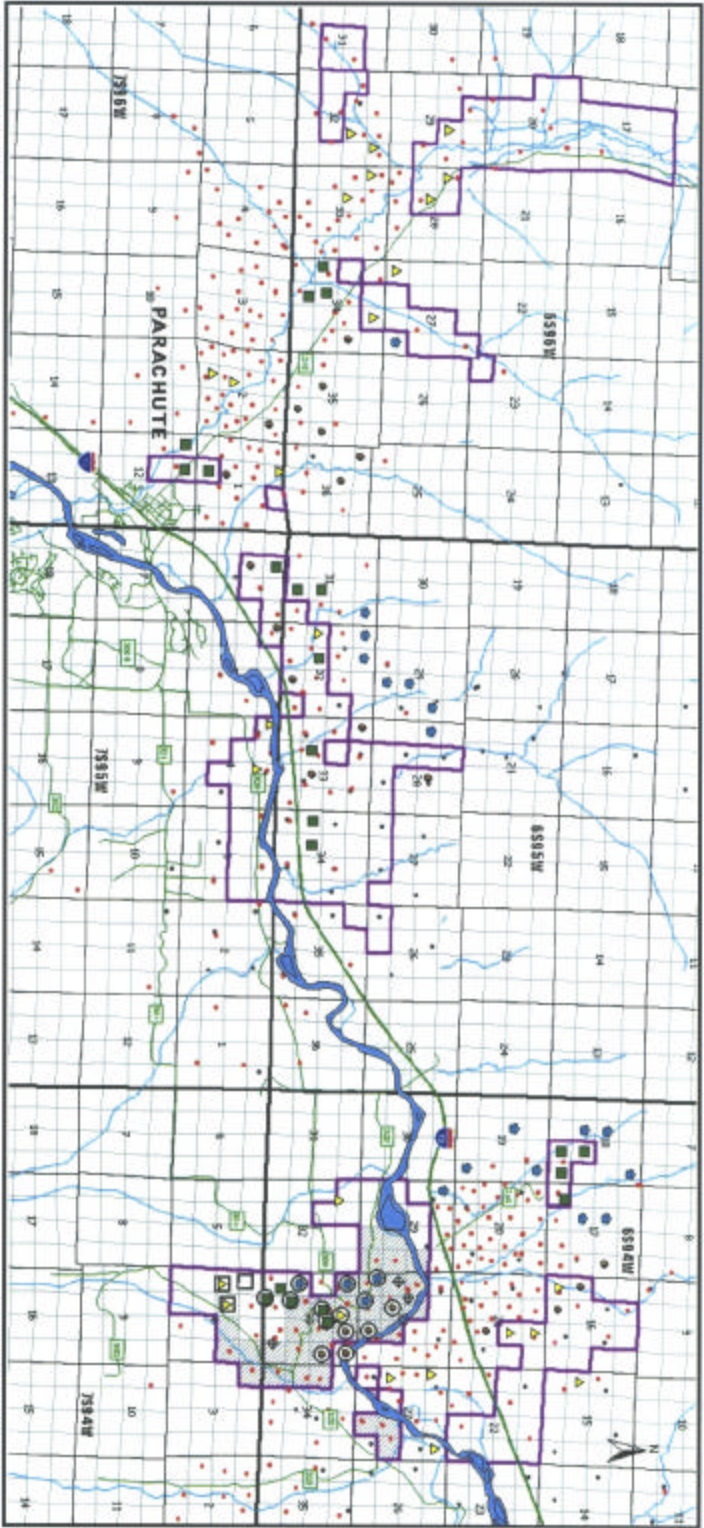
Site-specific Reclamation Plans, which are required by the Order to be submitted with each APD, are reviewed by COGCC staff for compliance with the Order and existing COGCC rules. Of the required elements of these site-specific plans, staff has found the well site diagrams and plats especially helpful in insuring that measures are taken to minimize impacts and result in opportunities for successful reclamation for the well sites. Some of the other elements of the plans, such as soil amendments, fertilizers, and interim reclamation, can not yet be evaluated until revegetation has had a chance to occur.

Observations by local COGCC field staff are that the new well sites have been constructed in accordance with the site-specific reclamation plans (submitted with each ADP), the requirements of Order, and existing COGCC rules.

RECOMMENDATIONS

Because there has only been 1 year of implementation of the Order requirements, and most well location have not had the opportunity to exhibit the success of interim reclamation and revegetation, this Report can only address the processes that have been developed under the Order to prepare the wellsites for successful restoration. Within the next year of implementation of the Order, the Reclamation and Revegetation Success Monitoring Report, currently under preparation by Williams, will be available to provide detailed site-specific evaluations of each new wellsite and will assist the COGCC staff in continuing evaluation of the reclamation success; therefore, the COGCC makes the following recommendation.

- Continued implementation of the Order with a second year implementation review report to be drafted by the Director for draft submittal to the parties by December 1, 2002 and finalized and submitted to the Commission by December 31, 2002.



© 2001, WILLIAMS PRODUCTION COMPANY
 LHM 04-1789-000000-001

LEGEND

- Existing Williams Form Wells
- Existing Well at Well
- ⊕ Existing Directional Bottomhole Location
- ⊕ Proposed 20-Acre Densify Applications Lands (Order 49-7)
- ▭ COGCC Specified Surface Waste Area
- ▭ Proposed 2001 Bottomhole Locations (Approximate locations provided by owner)
- ▲ First Quarter
- Second Quarter
- Third Quarter
- Fourth Quarter
- ▭ Permitted Directional Bottomhole Location
- Proposed Directional Bottomhole Location
- Road



FIGURE 1 - WILLIAMS PRODUCTION COMPANY PROPOSED WELLS FOR 2001, GARFIELD COUNTY, COLORADO

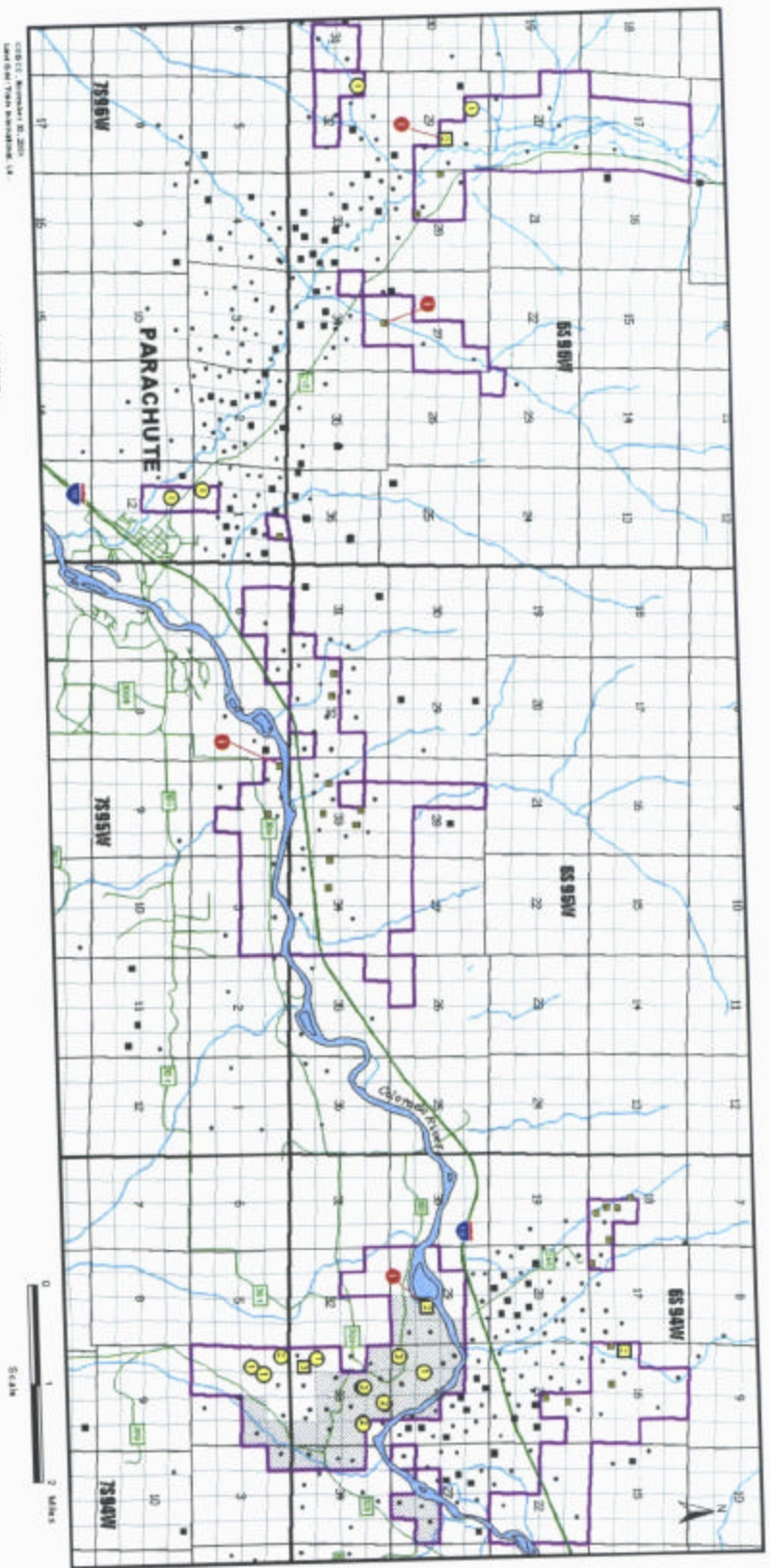
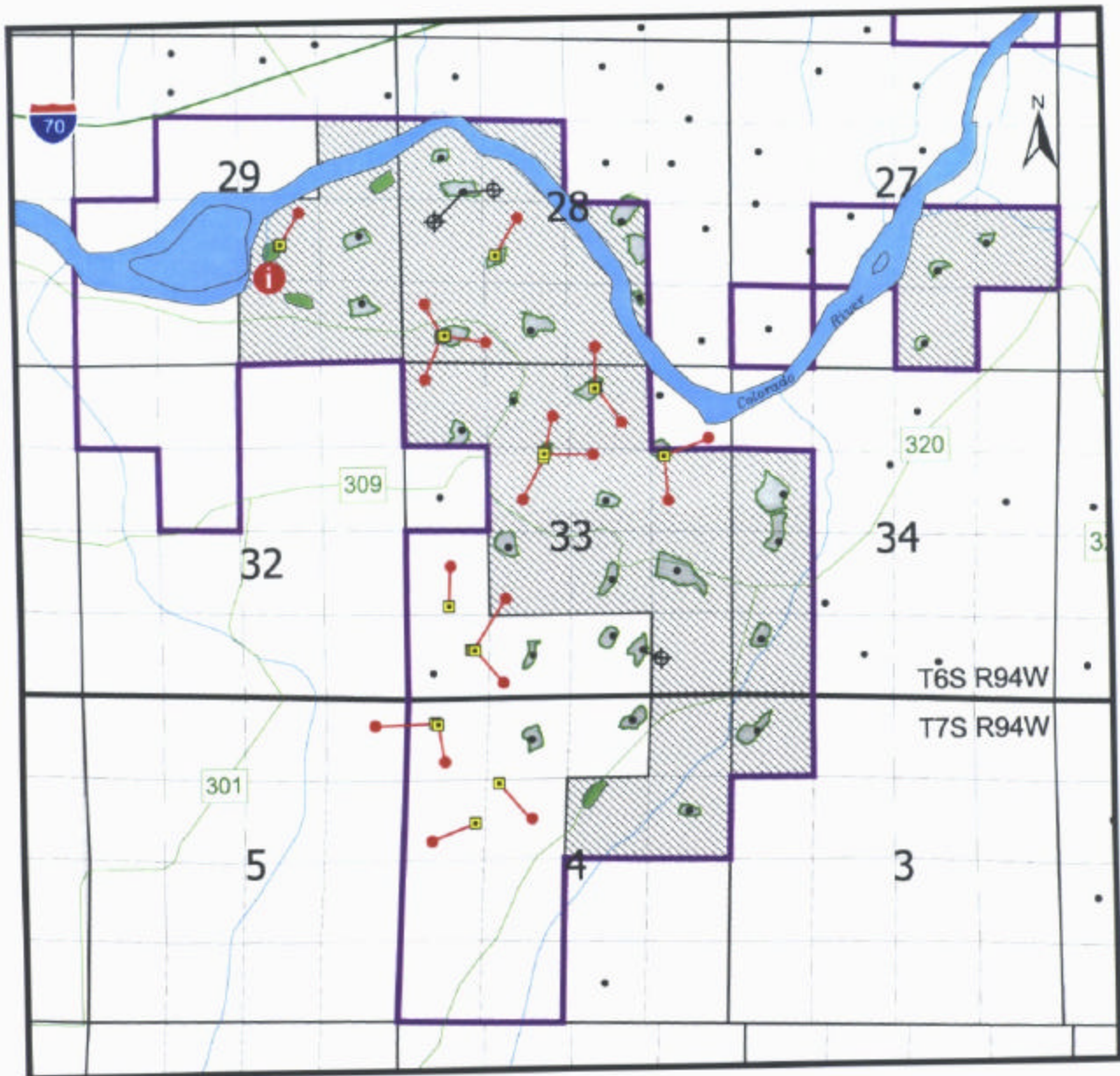


FIGURE 2 - FIRST YEAR WILLIAMS PRODUCTION COMPANY PERMIT ACTIVITY



COGCC, November 30, 2001
 Land Grid: Tobin International, Ltd.

0 0.3 0.6 Miles
 Scale

Legend:










- | | | | |
|---|---|---|---|
|  | 20-Acre Density Application Area |  | Previous Williams Fork Bottom Hole Location |
|  | Specified Surface Wellsite Lands |  | Previous Williams Fork Surface Location |
|  | Specified Limited New Surface Wellsites |  | Permit Surface Location |
|  | Previous Surface Wellsites |  | Permit Bottom Hole Location |
| | |  | Onsite Inspection Performed |

FIGURE 3
FIRST YEAR WILLIAMS PRODUCTION COMPANY
PERMIT ACTIVITY, SPECIFIED SURFACE WELLSITE LANDS

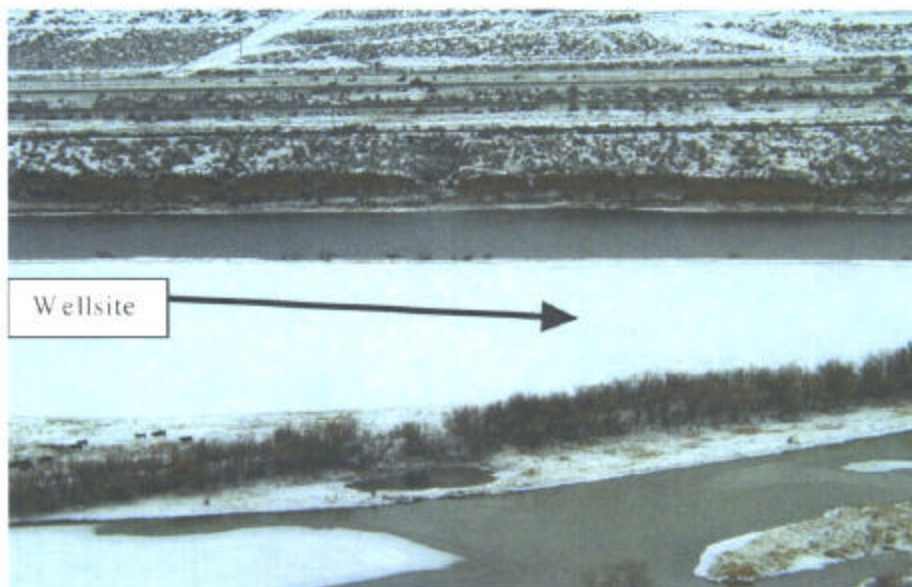
TABLE 2
ON-SITE INSPECTIONS – WILLIAMS PRODUCTION COMPANY

Date: December 13, 2000
Well Name: PA 311-4
Location: NWNW Section 4, Township 7 South, Range 95 West
Reason: Onsite required under COGCC Order No. 479-7, 440-19, 139-34, and 510-1 adopted by the Commission on October 30, 2000. New well location located within 500 feet from the outer edge of riparian or wetland vegetation. Well located on gravel bar/hay field within 500 feet of the Colorado River.

Attendees: Brian Macke, Bob Chesson, Jaime Adkins (COGCC); Dave Cesark, Scott Brady (Williams); Mike Brady, Joe Weaver (Mike Brady Construction); Mark Bean (Garfield County). The surface owner did not attend. DOW was notified of the onsite but did not send an attendee.

Specific APD conditions added as the result of the on-site meeting: None recommended by any party – any impacts were considered to be mitigated by existing COGCC rules and the site-specific reclamation plan.

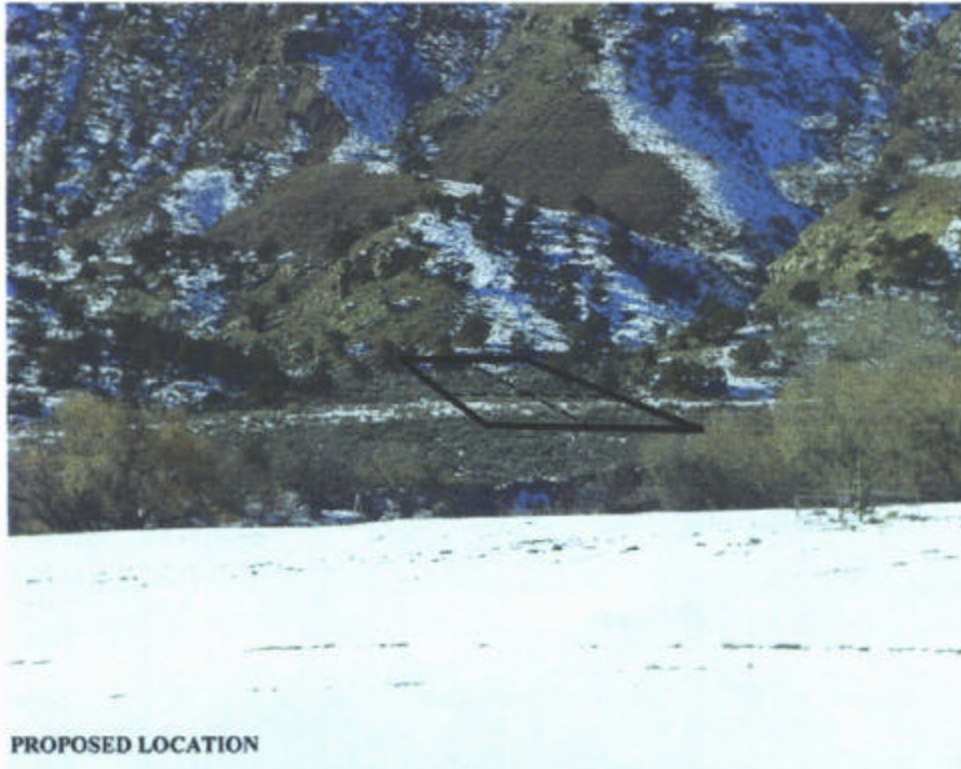
Comments: Williams volunteered that they would use a semi-closed pit system for all drilling and completion activities for this well and that no earthen pits would be used. In addition, COGCC Northwest Colorado Engineer Jaime Adkins requested that the well location be moved approximately 200 feet south (away from the river edge) from the proposed location. Williams agreed to the well location move.



Date: February 14, 2001
Well Name: Chevron GM 32-29 and Chevron GM 332-29
Location: SWNE Section 29, Township 6 South, Range 96 West
Reason: Onsite required under COGCC Order No. 479-7, 440-19, 139-34, and 510-1 adopted by the Commission on October 30, 2000. New well locations located within 500 feet from the outer edge of riparian or wetland vegetation. Well located within 500 feet of the Parachute Creek.

Attendees: Brian Macke, Bob Chesson, Jaime Adkins (COGCC); Dave Cesark, Scott Brady (Williams); Mike Brady, Joe Weaver (Mike Brady Construction); John Broderick (DOW). The landowner did not attend. Garfield County was notified of the onsite but did not send an attendee.

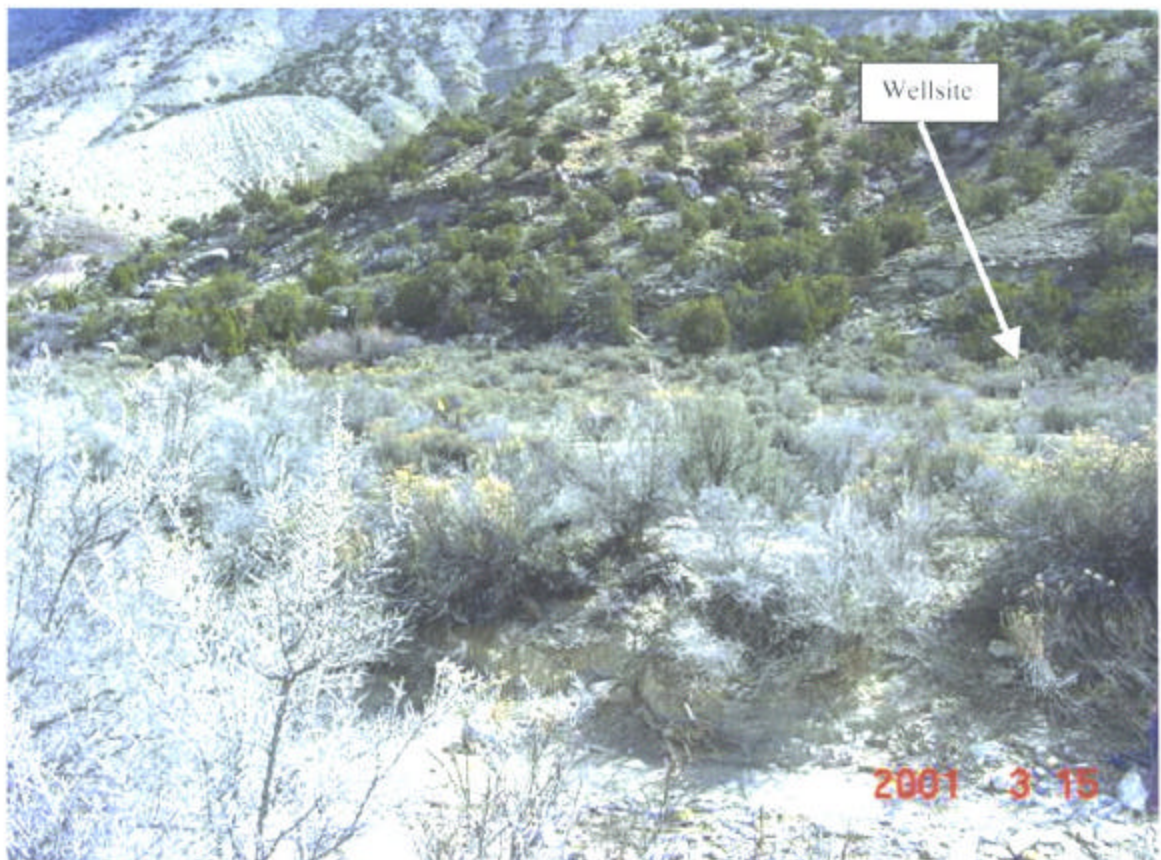
Specific APD conditions added as the result of the on-site meeting: Revision to the seed application program (deeper seed drilling depths than those proposed by Williams). Condition recommended by John Broderick. Other potential impacts considered to be mitigated by existing COGCC rules and the site-specific reclamation plan.



Date: March 15, 2001
Well Name: Mobil/Exxon GM 31-34
Location: NWNE Section 34, Township 6 South, Range 96 West
Reason: Onsite required under COGCC Order No. 479-7, 440-19, 139-34, and 510-1 adopted by the Commission on October 30, 2000. New well location located within 500 feet from the outer edge of riparian or wetland vegetation. Well located within 500 feet of the creek in Wheeler Gulch.

Attendees: Brian Macke, Bob Chesson, Jaime Adkins (COGCC); Dave Cesark, Scott Brady (Williams); Mike Brady, Joe Weaver (Mike Brady Construction); Mark Bean and Steve Anthony (Garfield County). The surface owner did not attend. DOW was notified of the onsite but did not send an attendee.

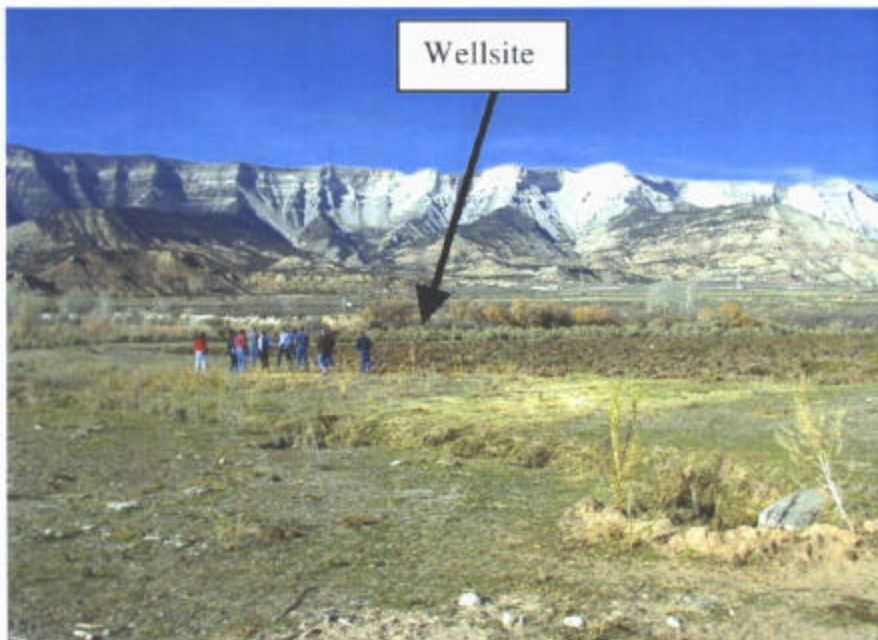
Specific APD conditions added as the result of the on-site meeting: None recommended by any party. Any potential impacts considered to be mitigated by existing COGCC rules and the site-specific reclamation plan.



Date: November 15, 2001
Well Name: Savage RWF 33-29 and Savage RWF 333-29
Location: NWSE Section 29, Township 6 South, Range 94 West
Reason: Onsite required under COGCC Order No. 479-7, 440-19, 139-34, and 510-1 adopted by the Commission on October 30, 2000. New well locations located within 500 feet from the outer edge of riparian or wetland vegetation. Wellsite located in cultivated field within 500 feet of the Colorado River.

Attendees: Roy Savage (Landowner); Rich Griebing, Brian Macke, Bob Chesson, Jaime Adkins (COGCC); Steve Soychak, Scott Brady (Williams); Mike Brady, Joe Weaver, Bobby Prather (Mike Brady Construction); Jim Kalmon (Construction Surveys), Mark Bean and Steve Anthony (Garfield County). DOW was notified of the onsite but did not send an attendee.

Specific APD conditions added as the result of the on-site meeting: Provide additional information in the reclamation plan for handling run-on and run-off erosion and silt control for the new wellsite. Condition recommended by COGCC staff. Add an additional weed control measure of pre-washing all construction equipment prior to commencing site and access road preparation, and washing all equipment after site preparation and mobilization of the equipment to other construction sites. Washing equipment minimizes spreading of weed seeds on or off the wellsite. Condition recommended by Steve Anthony (Garfield County Weed Control Manager).



APPENDIX A

Rullison/Grand Valley Field 20 Acre Density Area Operators Checklist

Please submit this checklist with all Applications for Permit-to-Drill (APD) for new wells that are drilled on new surface wellsites and existing surface wellsites in lands subject to Order Nos. 479-7, 440-19, 139-34, and 510-4.

RECEIVED

Well Name: KNIGHT PA 311-4

DEC -7 00

Location: NW/4 NW/4 Section 4-T75-R95W, Garfield County

COGCC

THE FOLLOWING APPLIES TO ALL NEW WELLS DRILLED ON NEW OR EXISTING WELLSITES IN ANY LANDS SUBJECT TO THE ORDER:

1. Has the operator submitted a site-specific reclamation plan that contains the following mandatory sections: Interim and Final Reclamation Goals Considering Surface Owner Input, Schedule and Milestones for Reclamation, Revegetation Reference Areas, Soil Horizons (High Intensity Soil Survey), and Wellsite Diagrams (and any applicable Discretionary Provisions listed in Appendix 1 of the order)?
 Yes No If no: The APD cannot be approved.
2. Has the surface owner been provided an informational copy of the APD, the Drill Site/Access Road Reclamation Form 2A, and the site-specific reclamation plan?
 Yes Surface owner has waived this requirement (attach waiver documentation).
3. Has the Garfield County Local Governmental Designee ("LGD") been provided a complete informational copy of the APD and all other attachments, including the site-specific reclamation plan?
 Yes No If no: The APD cannot be approved.
4. Is the APD for a new well within the Specified Surface Wellsite Lands?
 Yes No

If yes: Any new surface wellsites in the Specified Surface Wellsite Lands must be within the four allowable new surface wellsites listed in the above referenced orders. Any new wells drilled from existing surface wellsites in the Specified Surface Wellsite Lands shall be located no more than one hundred fifty (150) feet from an existing wellhead on the site.

5. Will the production facilities for the well be within 1,000 feet from an occupied building?
 Yes No If yes: Emission control equipment shall be installed.
6. Has an emergency preparedness plan for this well been filed with Garfield County?
 Yes No If no: The APD cannot be approved. PLAN WILL BE FILED BY 12/31/00 DUE DATE

THE FOLLOWING APPLIES ONLY TO NEW WELLSITES IN ANY LANDS SUBJECT TO THE ORDER.

7. Has the operator notified the Colorado Division of Wildlife ("CDOW") of the location of any proposed additional wellsites?
 Yes No If yes: Provide date CDOW notified: December 7, 2000
If no: The APD cannot be approved.
8. Is the new wellsite within 500 feet from the outer edge of riparian or wetland vegetation?
 Yes No If yes: COGCC staff shall conduct an onsite inspection.
9. Has the operator and surface owner entered into a surface use agreement specifically addressing the proposed wellsite and access road?
 Yes No If no: COGCC staff shall conduct an onsite inspection.
If yes: Attach documentation of the site specific agreement.
10. Is the proposed wellsite to be located within any subdivision that has been approved by Garfield County?
 Yes No If yes: COGCC staff shall conduct an onsite inspection.

If the Garfield County Local Governmental Designee (LGD) believes that a significant adverse environmental impact or adverse impact to public health, safety and welfare may occur, the COGCC shall conduct an onsite inspection.

If an onsite inspection is required, provide the following contact information about the wellsite and access road surface owner(s):

Name(s): Grant A. Knight John H. Knight, Pers. Rep. of the Estate of
Harriett P. Knight, Deceased
Address(es): 1845 County Rd 390 5075 West Hinsdale Circle
Parachute, CO 81635 Littleton, CO 80128
Telephone No(s): (970) 285-7734 (303) 979-8462

The operator shall provide a copy of the approved APD, including any conditions of approval, to the surface owner prior to commencement of operations with heavy equipment.

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete.

Signed: 

Dana V. Frankham, President

SEC. 4, T. 7 S., R. 95 W. OF THE 6TH P.M.

PLAT #1
LOCATION PLAT

GLO M.C.
BRASS CAP

S88°27'53"E

5264.09'

492'

462'

BLM
ALUM. CAP

N01°14'52"W
2620.33'

BARRETT RESOURCES
PA #311-04
GND. ELEV. 5096.8'
PAD ELEV. 5096.5'

CALCULATED POSITION
BASED ON FOUND
REFERENCE MONUMENTS



500' 0 1000'
GRAPHIC SCALE IN FEET
1 INCH = 1000 FEET

-LEGEND-

- STANDARD LOCATION OF GLO SECTION CORNERS
- ⊙ CORNERS FOUND
- ⊙ WELL LOCATION STAKED

There are no visible improvements within 200 feet of this location.

THIS WELL LOCATION PLAT WAS PREPARED FOR BARRETT RESOURCES TO LOCATE THE PA #311-04, 492 FEET FROM THE NORTH LINE AND 462 FEET FROM THE WEST LINE IN THE NW1/4 NW1/4 OF SECTION 4, T. 7 S., R. 95 W. OF THE 6TH P.M. GARFIELD COUNTY, COLORADO.

SURVEYOR'S CERTIFICATE

I, George Bauer: a Professional Land Surveyor in the State of Colorado do hereby certify that this Survey was made under my direct supervision, and that the same represents said Survey.

REFERENCE DOCUMENTS

- 1) T.7 S., R.95 W., 6TH P.M. GLO PLAT
- 2) U.S.G.S. QUAD: PARACHUTE, CO
- 3) ELEVATIONS BASED ON N.A.V.D. 1988
- 4) WELL MEASURED 90' FROM SECTION LINE

(Handwritten Signature)
 COLORADO REGISTERED
 GEORGE R. BAUER
 27925
 PROFESSIONAL LAND SURVEYOR
 COLORADO P.L.S. 27925



CONSTRUCTION SURVEYS, INC.
0012 SUNRISE BLVD.
SILT, CO 81652
(970)876-5753

SURVEYED: 06/23/00	SCALE: 1" = 1000'
DRAFTED: 07/11/00	DWG: BARRETT\PA311-4
REVISED: 11/20/00	SHEET: 1 OF 9

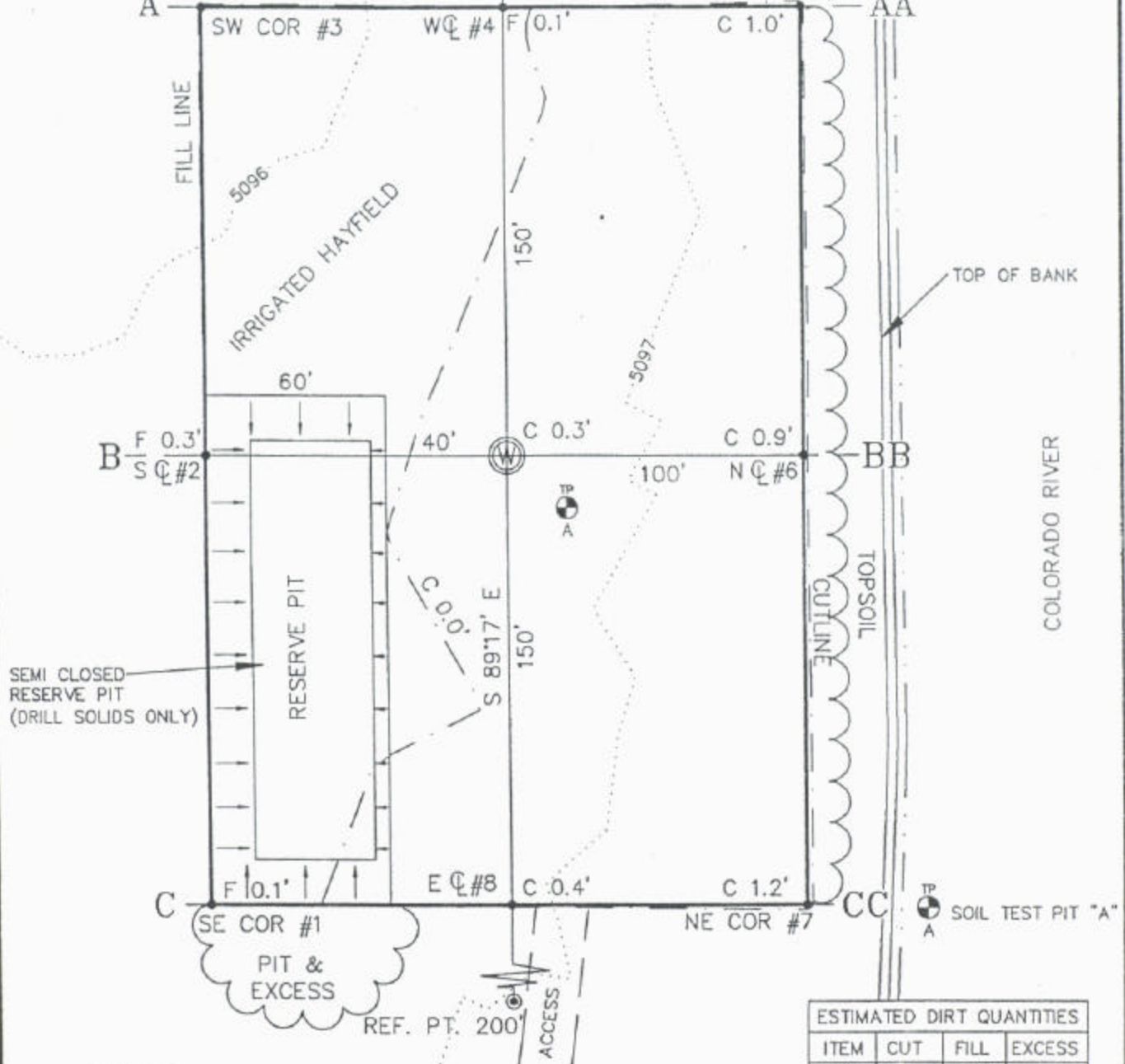
PLAT #2
PIT & PAD LAYOUT

RECEIVED

DEC-7 00

COGCC F 0.7'

REF. PT. 200'



SEMI CLOSED
RESERVE PIT
(DRILL SOLIDS ONLY)

RESERVE PIT

PIT &
EXCESS

TOP OF BANK

COLORADO RIVER

SOIL TEST PIT "A"

ESTIMATED DIRT QUANTITIES			
ITEM	CUT	FILL	EXCESS
PAD	630	180	
PIT	2870		
TOTALS	3500	180	3320



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BARRETT RESOURCES
PA #311-04

SCALE: 1" = 50'

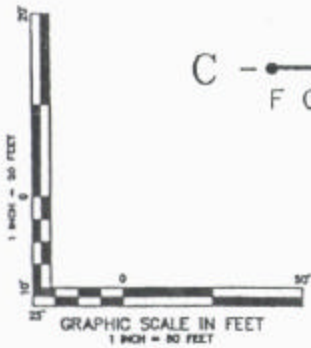
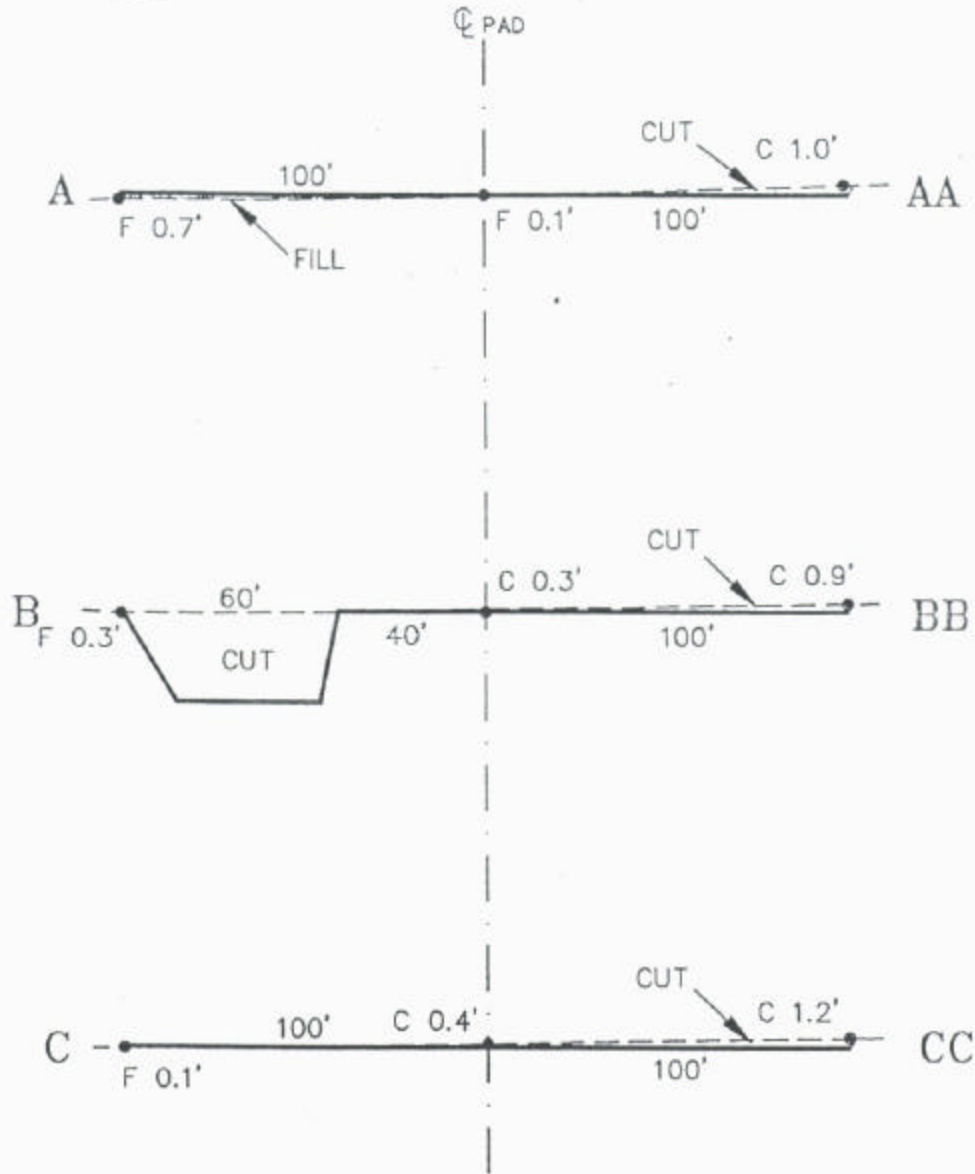
SHEET: 2 OF 8

RECEIVED

DEC-7 00

COGCC

PLAT #3
CROSS SECTIONS OF PIT & PAD

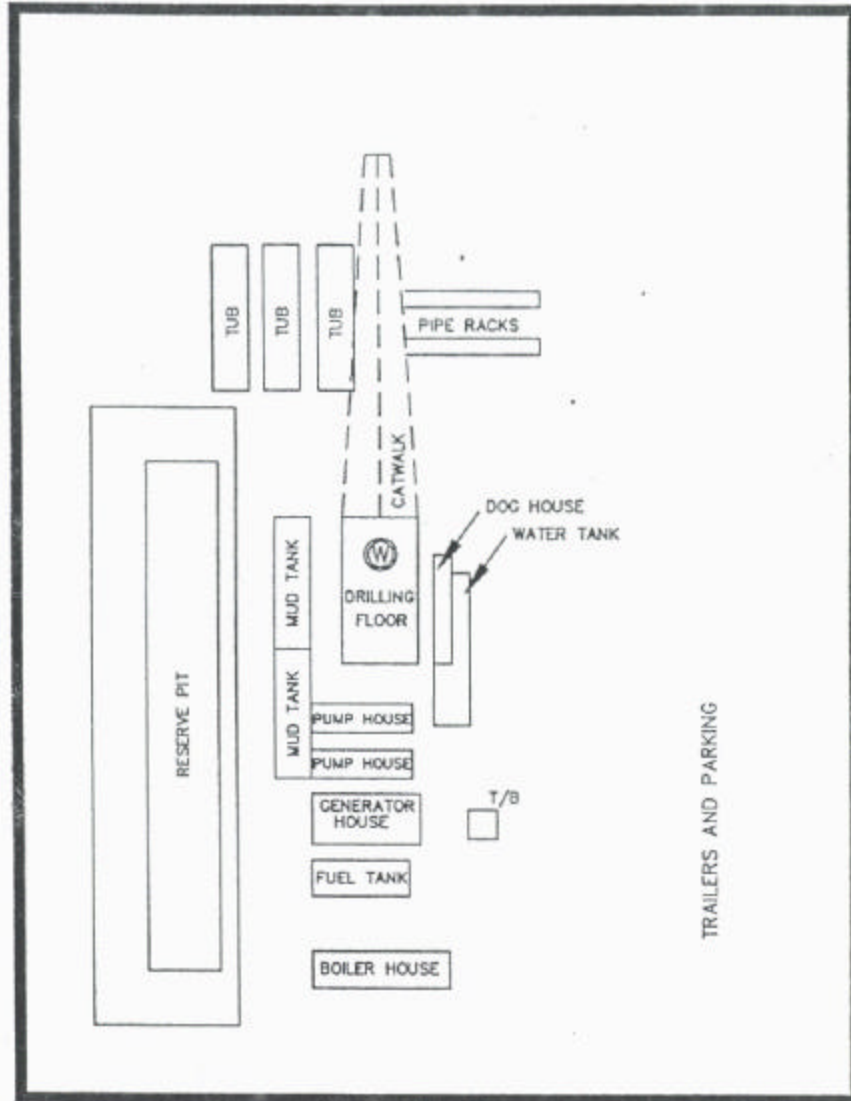
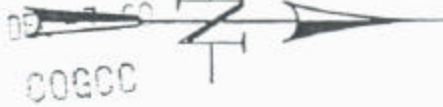


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BARRETT RESOURCES
PA #311-04

PLAT #4
RIG LAYOUT

RECEIVED



GROUND LEVEL (GL)=5096.5'
DRILLING FLOOR (DF)=5109.5
KELLY BUSHING (KB)=5110.5'



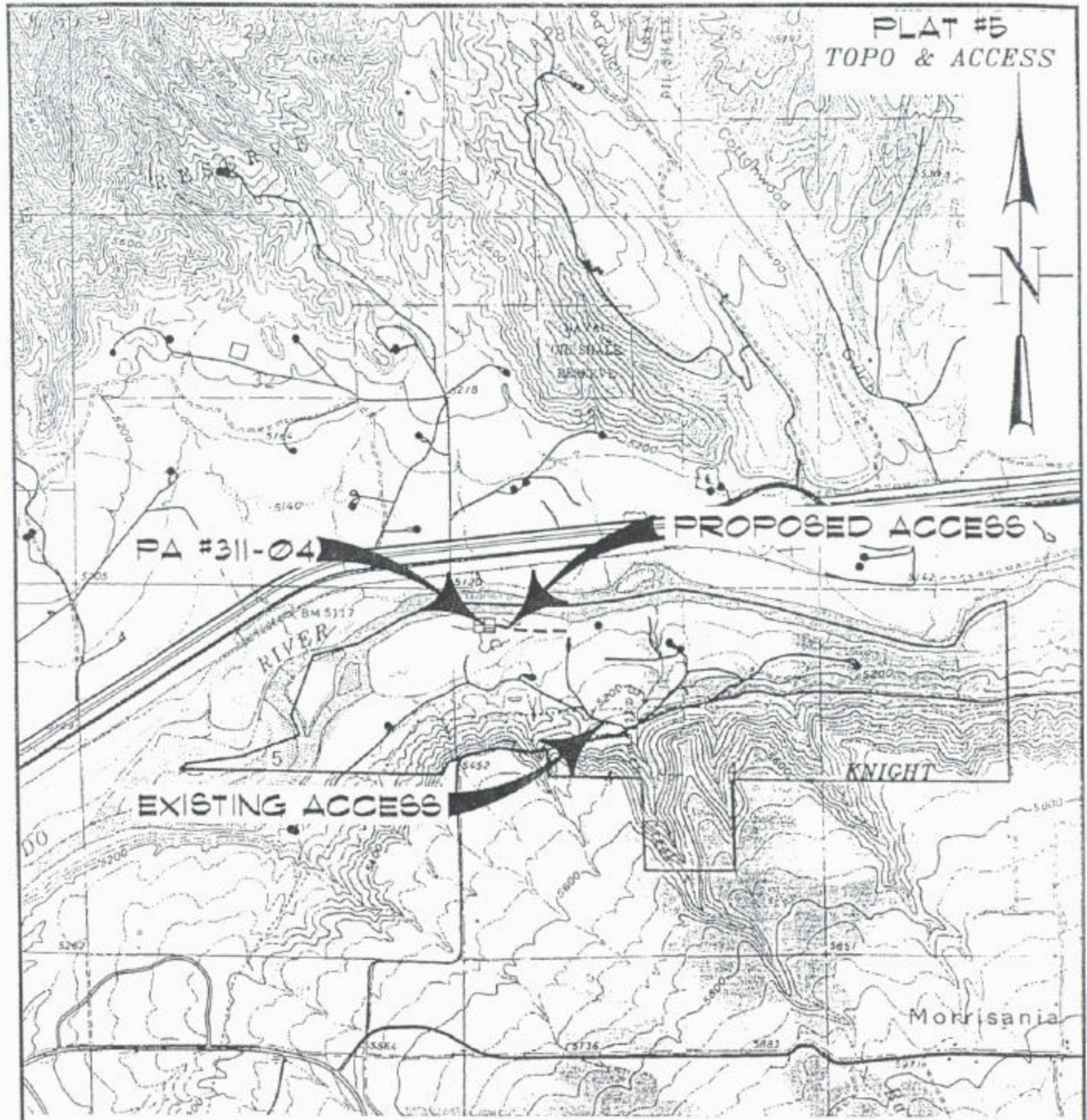
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BARRETT RESOURCES
PA #311-04

SCALE: 1" = 50'

SHEET: 4 OF 8

PLAT #5
TOPO & ACCESS



ACCESS FOOTAGES:
±1310 FEET OF PROPOSED ACCESS ON KNIGHT PROPERTY
±875 FEET OF EXISTING ACCESS ON KNIGHT PROPERTY



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BARRETT RESOURCES
PA #311-04

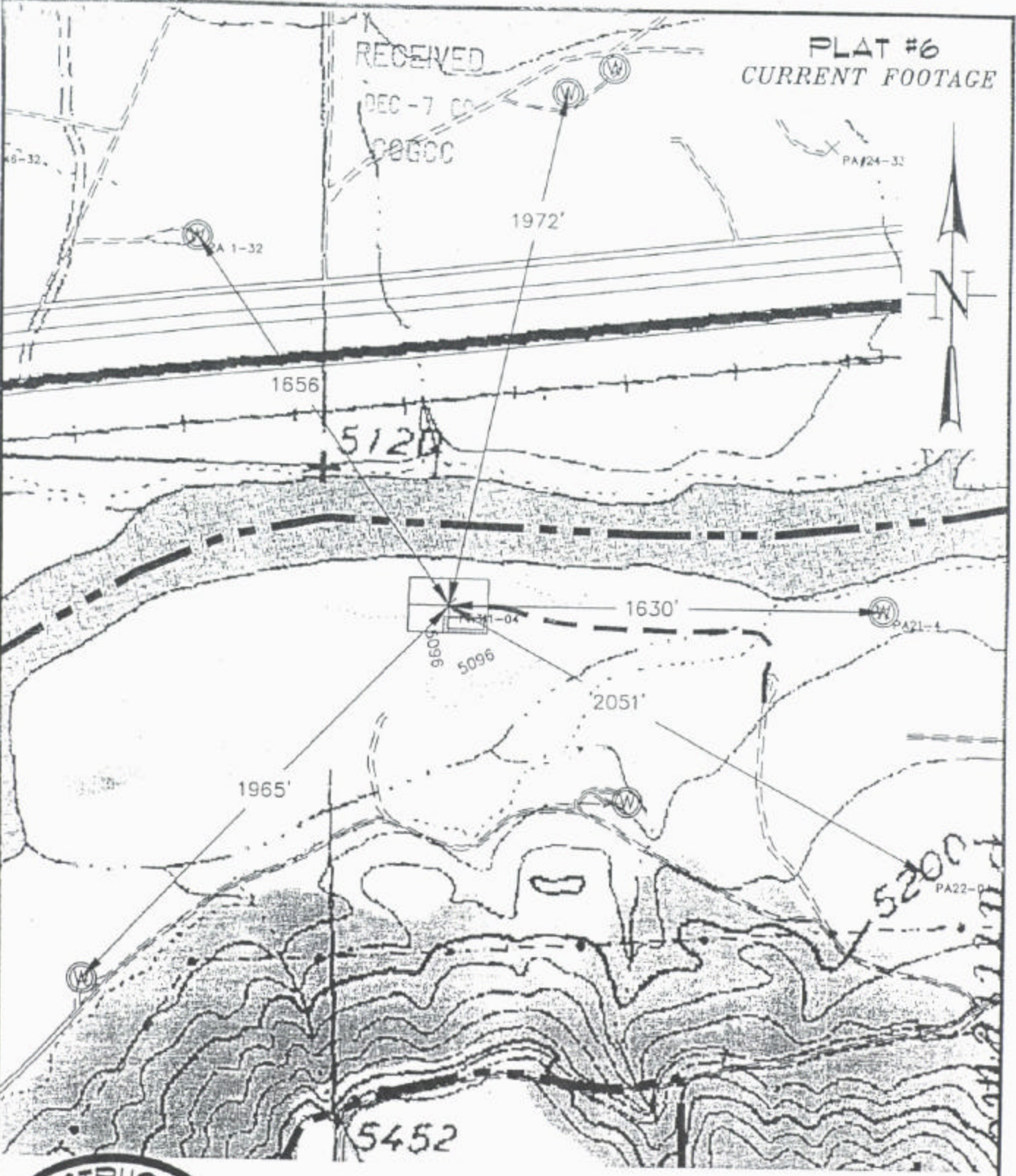
SCALE: 1" = 2000' SHEET 5 OF 9

RECEIVED

DEC -7 CO

00600

PLAT #6
CURRENT FOOTAGE



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 0012 SUNRISE BLVD.
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BARRETT RESOURCES
 PA #311-04

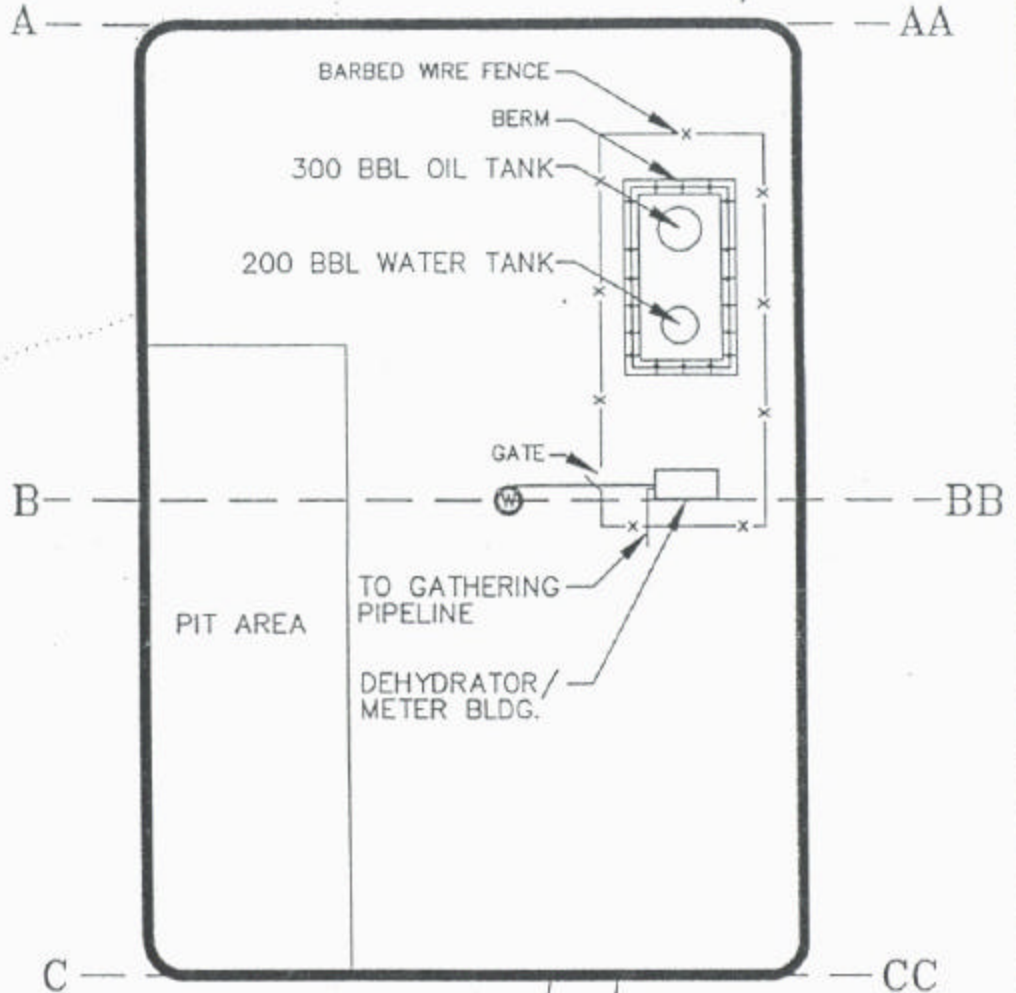
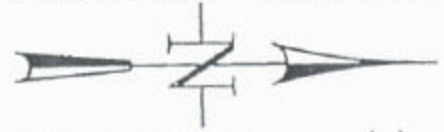
SCALE: 1" = 500' SHEET: 6 OF 9

RECEIVED

DEC -7 00

00G00

PLAT #7
RECLAMATION PAD &
PRODUCTION EQUIPMENT



1) This is a typical layout for the production equipment. The specific equipment layout for this well may vary due to well production and operator's needs.

2) The production equipment maybe placed in an off-site location agreeable to both the Land owner and Barrett Resources.

3) This pad will be reclaimed back to an irrigated hay field, therefore no reclamation fence is required.



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BARRETT RESOURCES
PA #311-04

SCALE: 1" = 50'

SHEET: 7 OF 8

RECEIVED

DEC - 7 00

COGCC

PLAT #8
FINAL RECLAMATION PAD



5096

A-----AA

IRRIGATED HAY FEILD

PLUGGED &
ABANDONED
WELL

5096

B-----BB

OUTLINE OF WELL PAD

C-----CC

5096



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BARRETT RESOURCES
PA #311-04

SCALE: 1" = 50'

SHEET: 8 OF 9

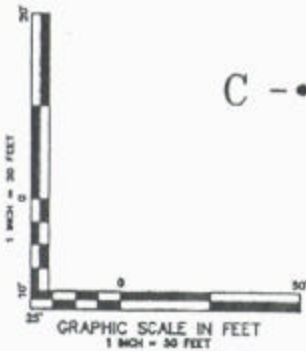
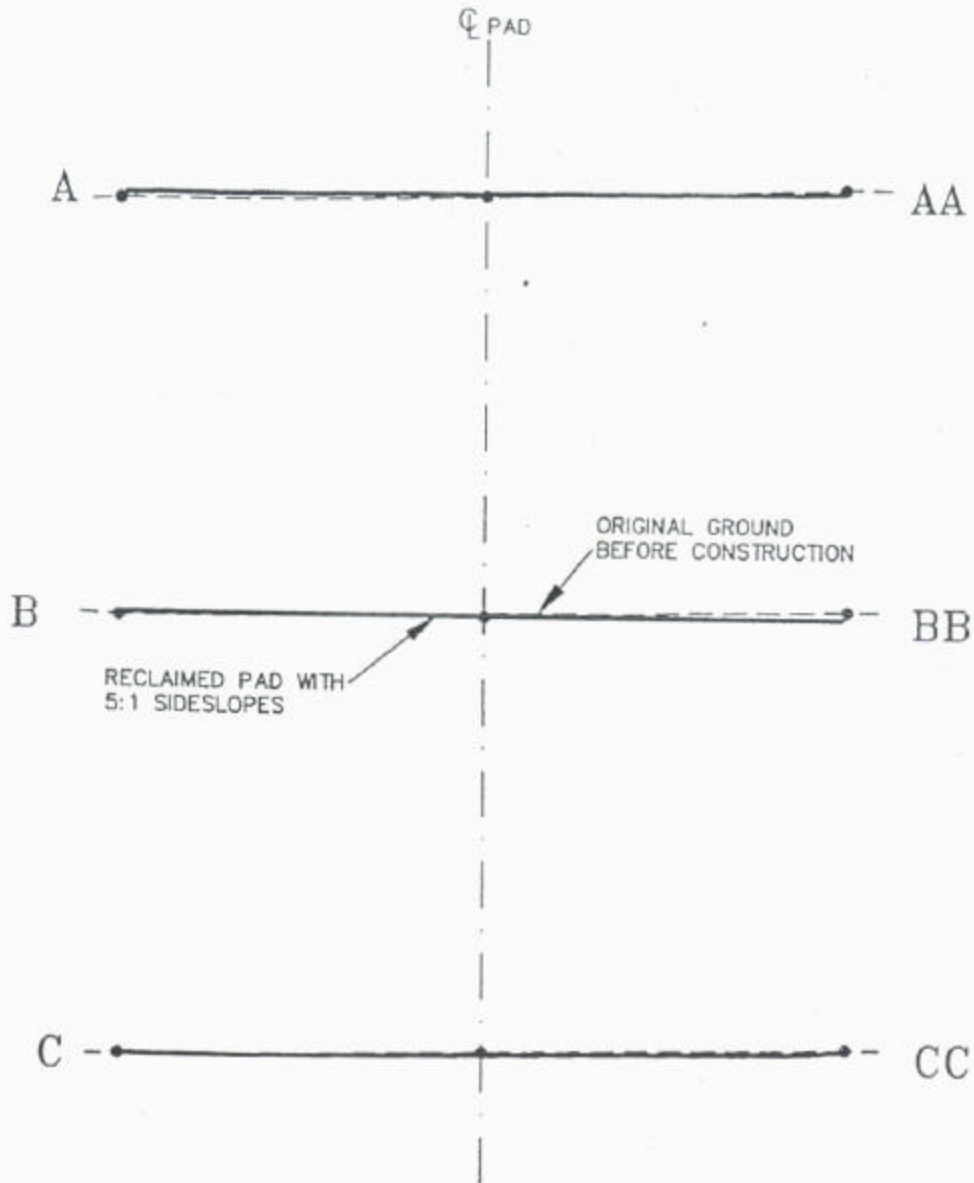
RECEIVED

DEC -7 00

COGCC

PLAT #9

CROSS SECTIONS OF RECLAMATION PAD



CONSTRUCTION SURVEYS, INC.
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(970)876-5753

BARRETT RESOURCES
PA #311-04

SCALE: AS NOTED

SHEET: 9 OF 9

PA #311-04



PROPOSED LOCATION



PROPOSED ACCESS

RECEIVED
DEC - 7 '60
CORCC

RECLAMATION PLAN
WELL PA 311-4
DISCRETIONARY PROVISIONS

RECEIVED
DEC -7 00
COGCC

AFFECTED COMMUNITIES/HABITATS

The affected community of Well #PA 311-4 is currently pasture. See Plat #6 and form 2a photographs.

PRE-DISTURBANCE INVENTORY AND SITE PLANNING

PA 311-4 will be drilled on cultivated pasture land. The revegetation reference area is directly to the west of the proposed well pad area. The revegetation reference area is shown on Plat #2.

Stormwater planning to compliment those measures that were existing were developed and are illustrated on Plat #2.

Site planning is illustrated in Plats 2 through 9. Proposed fencing of disturbed areas is illustrated on Plat #7.

TOPSOIL AND SUBSOIL DETERMINATION AND SALVAGE

Chenoweth and Associates (C&A) conducted an inspection of the soils at the PA 311-4 pad site. The pit location was located on the northeast quarter of the site. Immediately after soil samples were collected they were placed in a cooler to preserve nitrate/nitrogen levels. Soil samples were submitted to Colorado Analytical Labs in Brighton, CO for analysis of the following parameters:

- Soil texture
- pH

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- sodium absorption ratio
- electrical conductivity
- saturation percentage
- selenium
- nitrogen content
- phosphorus content
- potassium content
- cation exchange capacity
- organic matter content

The well site lies within the Arvada-Torrifluvents-Heldt soil complex

The following horizons were identified during high intensity soil sampling:

Pit A - Pasture

A 0-5"

B 5-12"

C 12" and lower - cobbles

This material appears suitable for placement as growing media. Amendments necessary to render subsoil suitable for use as a growing media are discussed in the soil amendments and fertilizer section of this plan.

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SOIL STOCKPILING

The stockpiled topsoil material will be located on the uphill side of the pad area to help prevent the loss of the soil resource. Approximately 4000 cubic yards of topsoil will be stored in this location.

TEMPORARY REVEGETATION EFFORTS

The existing topsoil stockpile as well as cut and fill slopes will be seeded during late winter or early spring when soil conditions are not too wet or frozen to allow for effective seeding. The seed mixture will consist of those quick germinating, short lived, annual species as well as two (2) longer lived perennial grass species which appear on Table 1. The seed mixture will be hand broadcast and worked into the soil surface to an approximate depth of ¼" to ½" using a rake or drag. Slopes and other physical constraints will prohibit drill seeding of the interim temporary reclamation seed mixture.

SOIL AMENDMENTS AND FERTILIZERS

The two (2) topsoil and one (1) subsoil samples were all rated good for plant growth media. Essentially there were no major physical or chemical elements that exhibited characteristics for poor seedbed quality media. Only Nitrogen and Phosphorous nutrient levels are below recommended levels for plant growth. Therefore, C&A recommends application of 250 pounds per acre of 18-46-0 (Diammonium Phosphate) fertilizer. Please refer to Table 3 for the soil analysis results.

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STABILIZATION AND INTERIM RECLAMATION

Interim reclamation will be performed within approximately 180 days of well completion. The objectives of stabilization and interim reclamation will be as follows.

1. Stabilization of the disturbed areas by providing wind and water erosion control to reduce soil loss.
2. Utilize the prescribed seed mixture and additional revegetation practices as described below to establish a self-sustaining vegetative rangeland cover for cattle pasture use.

BACKFILLING, GRADING, AND RE-CONTOURING

The interim reclamation contours therefore are in Plats #7 and #9. Reclaimed areas will be sloped to 5:1 or less. The pad area will be reduced by approximately 15% from the drilling configuration. A flat area, approximately 175' wide x 250' long, will be maintained for well servicing and potential future additional drilling efforts.

TOPSOIL AND WETLAND SOIL REPLACEMENT

Topsoil salvaged when well PA 311-4 is drilled will be redistributed over the soil surface after subsoil has been replaced and additional backfilling, grading, and re-contouring steps have been completed as described below. Topsoil will be replaced by using front-end loaders, trackhoes, and dozers. Additional favorable soil will be identified from the soil analysis of subsoil materials, or developed through amendment to make up the balance of the 12 inch favorable growth medium requirement. Any necessary amendments will be performed according to the supplemental soil amendment plan described above. Topsoil will not be replaced when it is too

wet and frozen such to jeopardize soil structure. No wetland soil exists and therefore will not be replaced on well PA 311-4.

SEED BED PREPARATION/SOIL TILLAGE

Seedbed preparation and soil tillage will be completed after the application of subsoil, topsoil, and any soil amendments. Soil tillage will be to a minimum depth of 4" utilizing a disk, chisel plow, or harrow. Seedbed preparation will also include removal of coarse fragments (rock material) that exceeds 35% to 40% of the soil surface as well as rocks 8" in diameter that occupy more than 10% of the soil surface.

SEEDING METHODS AND TIMES

It is anticipated that at a minimum, temporary seeding will be completed in early spring of 2001. If completion activities are completed and the reserve pit can be closed in time, interim reclamation seeding may also occur. If interim seeding is performed in the spring, it will be accomplished by May 15; if fall seeding is performed it will be completed after August 30 and before the soil freezes. Access road ditches will be seeded in the spring of 2001. All well sites, access roads, and flow line and gathering line right-of-ways will be mulched immediately after seeding and no later than 24 hours after seeding with a weed-free straw or grass hay material. Grass hay mulch will be applied at 1 ½ tons per acre, or straw mulch will be applied at 2 tons per acre. Mulch material will be crimped into the soil surface with a commercial mulch crimper, a straight disc, or bulldozer tracks if too steep to otherwise crimp mulch in place.

SEED MIXTURES

The landowner has requested that a dry land pasture seed mixture is utilized on this property as illustrated in Table 2.

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EROSION CONTROL BLANKETS

No erosion control blankets are anticipated at this time due to minimization of slopes during interim reclamation.

OTHER SPECIAL PROVISIONS FOR EROSION CONTROL

No other erosion control measures other than those illustrated in the plats are planned.

WEED CONTROL PLAN

The location will be inspected twice annually in the late spring and early fall by qualified person. Based on this inspection, methods, materials, and timing of weed control measures will be specified. Weed control inspections and response measures will be documented in the annual reclamation success monitoring report.

FACILITY AND STRUCTURE REMOVAL

The well will be abandoned in accordance with Colorado Oil and Gas Commission regulations. Plat #8 illustrates the configuration of the location after final reclamation.

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Temporary Reclamation Seed Mixtures
for Stockpiles and Other Temporary Disturbances

Table 1.

Common Name	Scientific Name	Pounds Pure Live Seed (PLS) per acre
Annual ryegrass	<i>Lolium multiflorum</i>	5.0
Perennial ryegrass	<i>Lolium perenne</i>	5.0
Slender wheatgrass	<i>Agropyron trachycaulum</i>	5.0
	TOTAL PLS	15.0

TABLE 2

COMMON NAME	VARIETY	POUNDS PURE LIVE SEED (PLS) PER ACRE
Alfalfa	Vernal	1.5
Orchard grass	Potomac	4.0
Smooth brome	Linar	4.0
Intermediate wheatgrass	Oahe	2.0
Crested wheatgrass	Hycrest	2.0
	TOTAL PLS PER ACRE	13.50

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TABLE 3

Barrett Resources Well Pad
Soil Analysis Results
Well Pad #PA 311 -4

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Data Collected November 2000

Sample Location Pit A

Parameter	Units	Topsoil 0" - 5"	Subsoil 5" - 12"
SAR	units	1.5	1.6
EC	mmhos/cm	0.4	0.3
PH	units	7.8	7.9
OM	%	2.1	1.1
CEC	meq/100g	8.3	5.3
% Saturation	%	40.1	44.0
NO3-N	ppm	2.5	1.1
Phosphorus	ppm	2.7	1.1
Potassium	ppm	123	82
Calcium	meq/l	4.8	3.7
Magnesium	meq/l	1.0	0.9
Sodium	meq/l	2.7	2.5
Selenium	units	BDL	BDL
Texture	%	Sandy Loam	Sandy Loam
Overall Soil Rating		Good	Good

BDL= Below Detectable Limits

*Fair rating is as a result of slightly elevated SAR values

PA 311-4
NW/4 NW/4 Section 4-T7S-R95W
Garfield County, Colorado

