UTAH OIL AND GAS CONSERVATION COMMISSION

REMARKS: WELL LOG ____ ELECTRIC LOGS ✓ FILE X WATER SANDS ____ LOCATION INSPECTED ____ SUB. REPORT abd ____

Approved for WIW 10-9-86

DATE FILED 3-8-85

LAND: FEE & PATENTED STATE LEASE NO PUBLIC LEASE NO INDIAN 14-20-603-247

DRILLING APPROVED: 3-15-85 - OIL

SPUDDED IN: 8-26 85

COMPLETED: 10-3-85 PUT TO PRODUCING: 10-3-85

INITIAL PRODUCTION: 28 BOPD, 0 MCF, 0 BWPD

GRAVITY A.P.I. 40.0

GOR 750

PRODUCING ZONES 5343-5716 Desert Creek Zone I

TOTAL DEPTH: 5724

WELL ELEVATION: 4558 GR

040703

DATE ABANDONED

FIELD: GREATER ANETH

UNIT: RATHERFORD

COUNTY: SAN JUAN

WELL NO. RATHERFORD UNIT #13-11 API #43-037-31152

LOCATION 500' FNL FT. FROM (N) (S) LINE 660' FWL FT. FROM (E) (W) LINE NW NW 1/4 — 1/4 SEC. 13

TWP	RGE	SEC	OPERATOR	TWP	RGE	SEC	OPERATOR
				41S	23E	13	PHILLIPS OIL COMPANY

QUATERNARY	Star Point	Chinle	Molas
Alluvium	Wahweap	Shinarump @7076	Manning Canyon
Lake beds	Masuk	Moenkopi	Mississippian
Pleistocene	Colorado	Sinbad	Humbug
Lake beds	Sego	PERMIAN	Brazer
TERTIARY	Buck Tongue	Kaibab	Pilot Shale
Pliocene	Castlegate	Coconino	Madison
Salt Lake	Mancos	Cutler	Leadville
Oligocene	Upper	Hoskinnini	Redwall
Norwood	Middle	DeChelly @7357	DEVONIAN
Eocene	Lower	White Rim	Upper
Duchesne River	Emery	Organ Rock	Middle
Uinta	Blue Gate	Cedar Mesa	Lower
Bridger	Ferron	Halgaite Tongue	Ouray
Green River	Frontier	Phosphoria	Elbert
	Dakota	Park City	McCracken
	Burro Canyon	Rico (Goodridge)	Aneth
	Cedar Mountain	Supai	Simonson Dolomite
	Buckhorn	Wolfcamp	Sevy Dolomite
	JURASSIC	CARBONIFEROUS	North Point
Wasatch	Morrison	Pennsylvanian	SILURIAN
Stone Cabin	Salt Wash	Oquirrh	Laketown Dolomite
Colton	San Rafeal Gr.	Weber	ORDOVICIAN
Flagstaff	Summerville	Morgan	Eureka Quartzite
North Horn	Bluff Sandstone	Hermosa @4997	Pogonip Limestone
Almy	Curtis		CAMBRIAN
Paleocene	Entrada	Pardox	Lynch
Current Creek	Moab Tongue	Ismay 5158	Bowman
North Horn	Carmel	Desert Creek 5330	Tapeats
CRETACEOUS	Glen Canyon Gr.	Akah	Ophir
Montana	Navajo	Barker Creek	Tintic
Mesaverde	Kayenta		PRE - CAMBRIAN
Price River	Wingate	Cane Creek	
Blackhawk	TRIASSIC		

VISIBLE CROZET VIRGINIA 100730

Form 9-331 C
(May 1963)

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1425.

4

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

1a. TYPE OF WORK: DRILL ☒ DEEPEN ☐ PLUG BACK ☐

b. TYPE OF WELL: OIL WELL ☒ GAS WELL ☐ OTHER SINGLE ZONE ☐ MULTIPLE ZONE ☐

2. NAME OF OPERATOR: Phillips Oil Company

3. ADDRESS OF OPERATOR: P. O. Box 2920, Casper, WY 82602

RECEIVED
MAR 08 1985
DIVISION OF OIL GAS & MINING

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.*)
At surface: 500' FNL, 660' FWL (NW NW)
At proposed prod. zone: Same

5. LEASE DESIGNATION AND SERIAL NO.: 14-20-603-247

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: Navajo

7. UNIT AGREEMENT NAME: SW-I-4192

8. FARM OR LEASE NAME: Ratherford Unit

9. WELL NO.: #13-11

10. FIELD AND POOL, OR WILDCAT: ✓Greater Aneth

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec. 13-T41S-R23E

12. COUNTY OR PARISH: San Juan

13. STATE: Utah

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*: Approximately 3 miles southeast of Montezuma Creek, Utah

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. unit line, if any): 500' south of Ratherford Unit Lease Line

16. NO. OF ACRES IN LEASE: 1600 Acres

17. NO. OF ACRES ASSIGNED TO THIS WELL: 40 Acres

18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT.: 1160' South of #12-14

19. PROPOSED DEPTH: 5700' Desert Creek

20. ROTARY OR CABLE TOOLS: Rotary

21. ELEVATIONS (Show whether DF, RT, GR, etc.): 4542' ungraded ground

22. APPROX. DATE WORK WILL START*: First Quarter 1985

23. PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT
17-1/2"	13-3/8"	48#	100'	150 sx (Circ to surface)
12-1/4"	9-5/8"	36#	1600'	600 sx (Circ to surface)
8-1/2"	7"	23# & 26#	5700'	600 sx (T.O.C. Approx. 2000')

Approval is requested to drill Ratherford Unit #13-11, a Desert Creek Development oil well. The subject well will be produced for a period of time and then it will be converted to a water injection well. The date of conversion from a production well to an injection well will be based on optimizing the ultimate recovery from the Ratherford Unit. A Sundry Notice will be submitted when the subject well is converted.

BOP equipment will be operated daily and tested weekly.

APPROVED BY THE STATE OF UTAH DIVISION OF OIL, GAS, AND MINING
DATE: 3/15/85
BY: John R. Baza
WELL SPACING: A-3 (Unit)

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen or plug back, give data on present productive zone and proposed new productive zone. If proposal is to drill or deepen directionally, give pertinent data on subsurface locations and measured and true vertical depths. Give blowout preventer program, if any.

24.

SIGNED: A. E. Stuart TITLE: Area Manager DATE: January 25, 1985

(This space for Federal or State office use)

PERMIT NO. _____ APPROVAL DATE _____

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

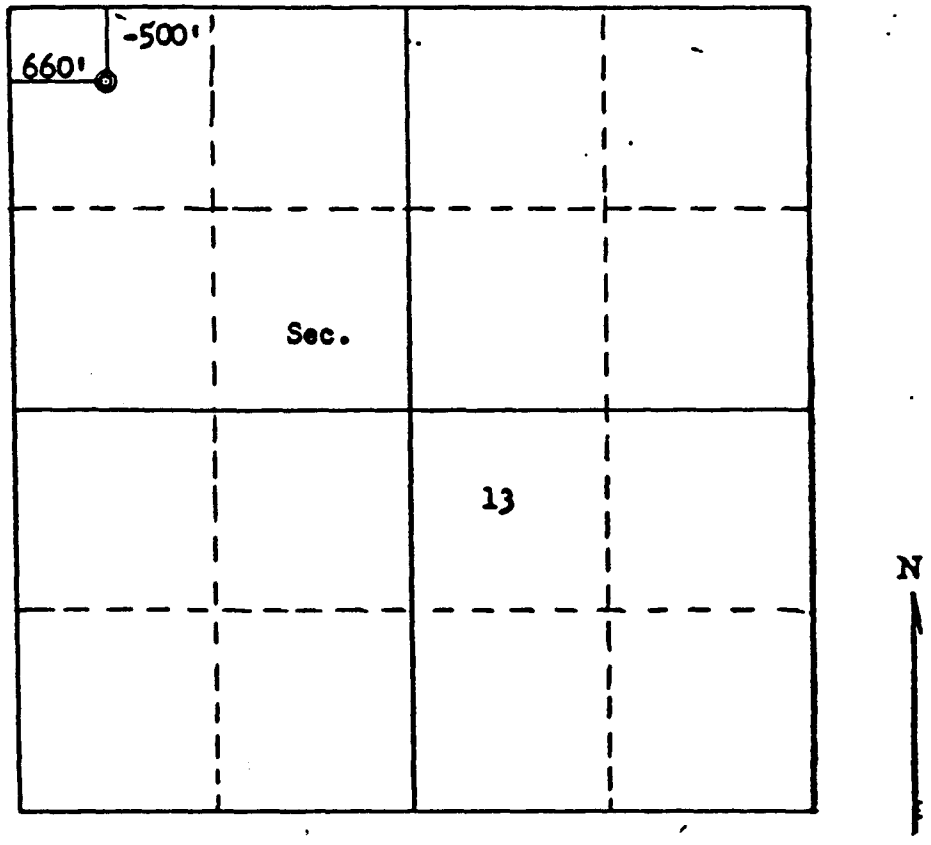
COMPANY PHILLIPS OIL COMPANY

LEASE RATHERFORD UNIT WELL NO. 13-11

SEC. 13, T 41S, R 23E
San Juan County, Utah

LOCATION 500'FNL 660'FWL

ELEVATION 4542 ungraded ground



SCALE—4 INCHES EQUALS 1 MILE

THIS IS TO CERTIFY THAT THE ABOVE PLAT WAS PREPARED FROM FIELD NOTE OF ACTUAL SURVEYS MADE BY ME UNDER MY SUPERVISION AND THAT THE SAME ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

SEAL:

Registered Land Surveyor.
#3950
FRED S. KERR, JR.

SURVEYED July 1, 19 84

FARMINGTON, N. M.

RATHERFORD UNIT #13-11

Supplement to Form 9-331C "Application for Permit to Drill, Deepen, or Plug Back."

DRILLING PROGRAM

1. Surface formation is the Dune Sand, which consists of loose windblown sand, age-recent.

   Estimated tops of geologic markers:

   Shinarump . . . . . 2078'
   DeChelly . . . . . 2390'
   Hermosa . . . . . 4291'
   Desert Creek Zone I . . . . . 5338'

2. Brackish water-bearing sands are expected in the Navajo, Wingate, and DeChelly formations. Oil is expected to be encountered in the Ismay and Desert Creek formations. The top of cement will be approximately at 2000'.

3. Blow-out preventers will be 10" Series 900 equipment to be tested initially to 3000 psi. They will be inspected and operated daily and pressure tested weekly to 1500 psi. Weekly pressure tests will be supervised by representatives of Phillips Oil Company and the drilling contractor. Tests will be recorded on the daily drilling report which will remain on the rig floor during drilling operations. BOP tests will be conducted in accordance with Phillips standards, copy attached.

4. a. Proposed Casing Program:

   1. Conductor casing:

100'	13-3/8"	48#/ft	H-40	ST&C	new

   2. Surface casing:

1600'	9-5/8"	36#/ft	K-55	ST&C	new

      Surface casing will be tested to 1500# before drilling out.

   3. Production casing:

5700'	7"	23# & 26#/ft	K-55	ST&C	new

      Production casing will be tested to 3000#.

b. Proposed Cementing Program:

1. Conductor Casing:

Conductor casing will be cemented with 150 sks Class B cement. Cement will be brought to surface.

2. Surface Casing:

Surface casing will be cemented with 300 sks "light" cement followed with 300 sks Class B cement. Cement will be brought to surface.

3. Production casing:

Production casing will be cemented with "light" cement followed with Class B cement. For cement volume, caliper will be used with 15% excess. The top of the cement should be around 2000'. If other zones with hydrocarbon potential are encountered, they will be covered with cement.

c. Auxiliary Equipment:

Auxiliary equipment will include upper and lower kelly cocks, a drill string safety valve, and a pit level indicator.

5. Drilling Fluid:

Drilling fluid will be a fresh water based mud system. Spud mud is gel and water with a weight of 8.4-8.8 ppg. From the surface to approximately 1600', gel and water will be used. Mud weight may be up to 9 ppg to control water flow from the Wingate formation. A slurry of 8.6-9.5 ppg, 32-38 viscosity, and less than 15cc/30 min. water loss will be used from 1600'-5200'. Mud weight may be increased to 10.4 ppg if a water flow is encountered. From 5200' to total depth mud properties will be 10.5-12.5 ppg, 40-45 viscosity, and below 10 cc water loss.

Adequate quantities of mud materials will be stored at the location to equal the volume of the rigs complete circulating system. A flow sensor will be used.

6. Testing, logging, and coring:

The logging program will consist of DLL, GR, SP, and Caliper from T. D. to the surface casing. A FDC/CNL and a Micro-proximity log will be run from T. D. to 4300'. A temperature or cement bond log will be run to determine cement top. No coring or drill stem tests are planned.

7. Downhole Conditions:

Drilling in the area indicates no abnormal pressures, temperatures, or hydrogen sulfide gas.

8. Phillips anticipates starting operations in the first quarter of 1985. Drilling operations are estimated to take fifteen days per well.

CULTURAL RESOURCE REPORT

Abajo Archaeology has prepared a cultural resource inventory of the subject wellsite. A copy of the report has been sent to the BLM Farmington office. Pertinent information regarding the subject well is attached.

The cultural resource inventory was performed with the idea of the subject well being a water injection well. It is now proposed to initially produce the subject well for a period of time. A plat of the proposed leadline is attached. The proposed leadline route will follow water injection routes as outlined in the August 1984 Abajo Archaeology Report and tie into existing leadlines. When the subject well is converted to a water injection well, a Sundry Notice will be submitted.

SURFACE USE PROGRAM

1. Existing Roads

   a. Access to existing lease roads is approximately 3 miles southeast of Montezuma Creek, Utah.

   b. The existing roads will be maintained in the same or better condition.

   c. Refer to the attached access road map for road information.

2. Access Roads

   Planned upgrading of existing access roads is shown on the attached map.

3. Location of Existing Wells.

   Locations of existing wells are shown on the attached maps.

4. Production from the proposed well will be piped to Ratherford Unit Tank Battery #2, located in the NW SE Sec. 12-T41S-R23E San Juan County, Utah. The flowline will be visible from the existing lease roads. A plat of the proposed leadline is attached.

5. Water Supply

   a. The source of water to drill the subject well is from the River Booster, NE/4 Sec. 5., or from the Water Injection Plant, SE/4 Sec. 17 in T41S-R24E, San Juan County, Utah.

   b. The drilling water will be trucked from the water source to the subject well.

   c. A water supply well will not be drilled on the lease.

6. Construction Materials

   a. Only native soils will be used for construction of wellsite and the access road.

   b. Pit run rock will be used on the wellsite and access road when needed.

   c. The above materials are owned by the Navajo Tribe.

7. Waste Disposal

   a. Cuttings: Cuttings will be contained in a fenced reserve pit until dry enough to cover. Upon abandonment, the reserve pit area will be backfilled, shaped to natural topography, and seeded.

   b. Drilling Fluid: Drilling fluid will be contained in a fenced reserve pit until dry enough to cover. Upon abandonment, the reserve pit area will be backfilled, shaped to natural topography, and seeded.

   c. Garbage/Trash: All garbage and trash will be put in the burn pit. The burn pit will be fenced on four sides. After the burn pit is no longer in use, the trash and garbage will be covered with a minimum of 4 feet of fill.

   d. Salt: No salts are anticipated on this well. If salt is present, it will be disposed of in the reserve pit.

   e. Chemicals: Chemicals will be disposed of in the reserve pit.

   f. Sewage: Dry chemical toilets will be used.

8. Ancillary Facilities

   No ancillary facilities are required.

9. Well Site Layout.

   a. Refer to attached Rig Layout plat

   b. There are no plans to line the reserve pit unless porous soil materials are encountered during construction.

10. Surface Reclamation Plans

   a. Construction Program: A cross section of the drill site showing cuts and fills is attached.

   b. Well Abandonment: All disturbed areas will be shaped to the natural topography and seeded in accordance with BLM requirements.

c. Producing Well: Those areas not needed for production purposes will be recontoured to the surrounding topography. Seeding will be in accordance with BLM requirements.

d. Pipelines and flowlines: Flowlines will be above ground and follow or be visable from existing roads.

e. Rehabilitation will begin as soon as possible, considering weather and other factors, and proceed per recommendation of the BLM. The reserve pit will be reclaimed once it dries.

11. Surface Ownership: The wellsite location, access road and leadline are on the Navajo Indian Reservation. No dwellings are in the proposed drilling area.

12. Other information:

The reserve pit will be fenced on three sides during drilling and on the fourth side after the rig is moved out.

13. Operator's Representative and Certification.

a. Field Representative:

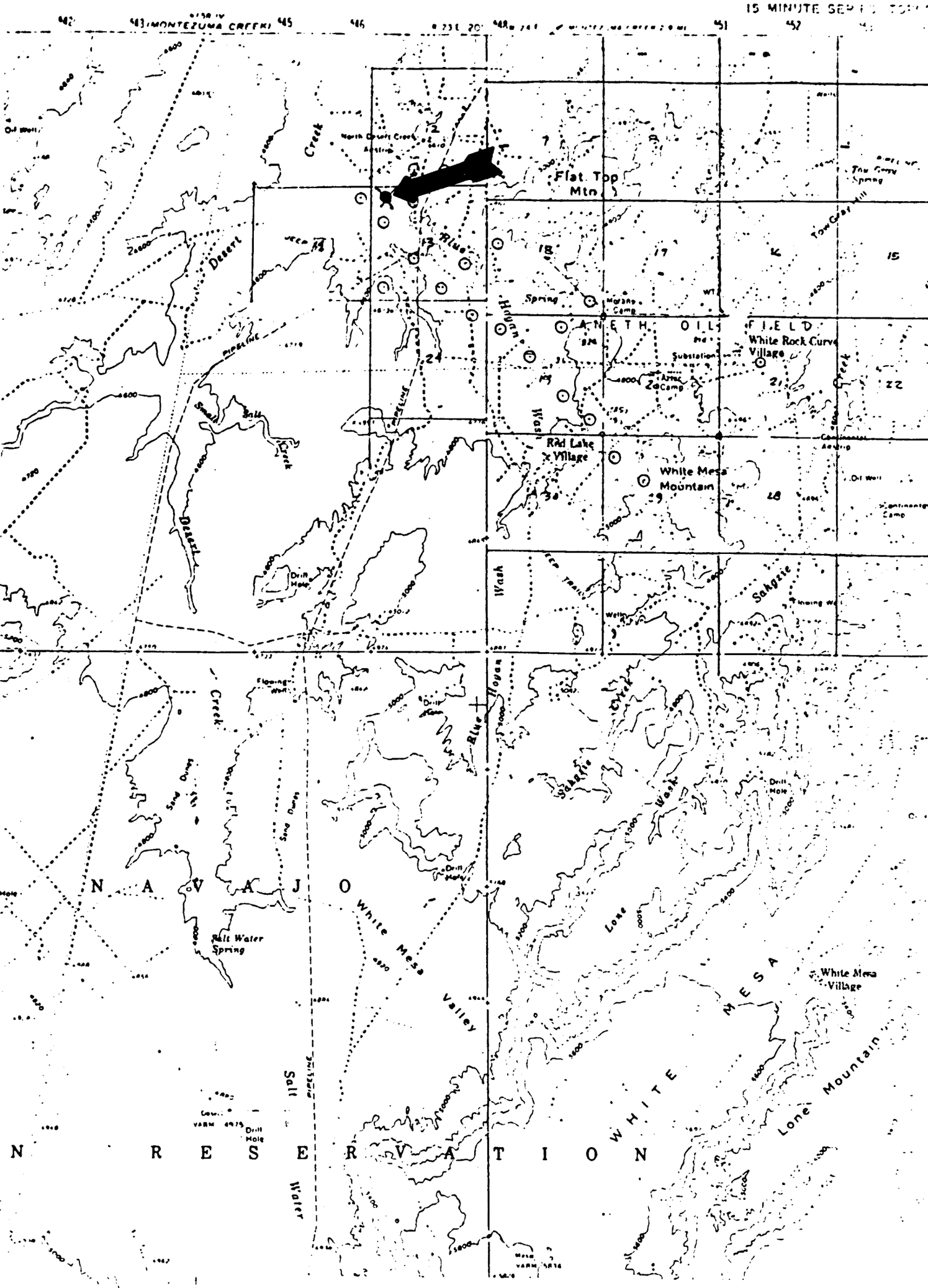
A. E. Stuart
P. O. Box 2920
Casper, Wyoming 82602
307-237-3791

I hereby certify that I or persons under my direct supervision have inspected the proposed drill site and access route; and I am familiar with the conditions which currently exist; that the statements made in this plan are to the best of my knowledge true and correct; and that the work associated with operations proposed herein will be performed by Phillips Oil Company and its contractors and subcontractors in conformity with this plan and the terms and conditions under which it is approved. This statement is subject to the provisions of the 18 U.S.C. 1001 for the filing of a false statement.

Date 3-6-85

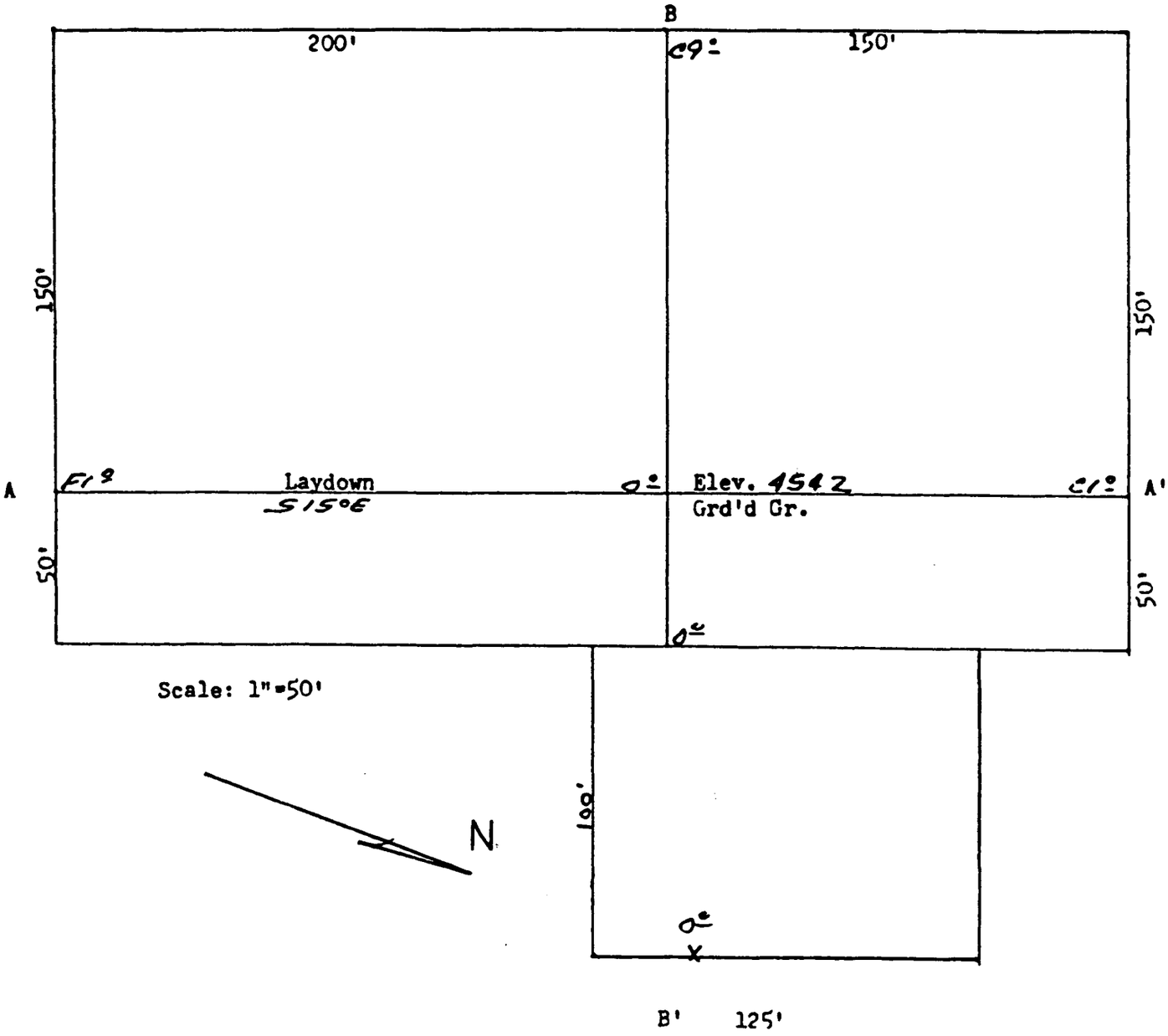
A. E. Stuart
Area Manager

BJM/fb (18)
Casper - RC

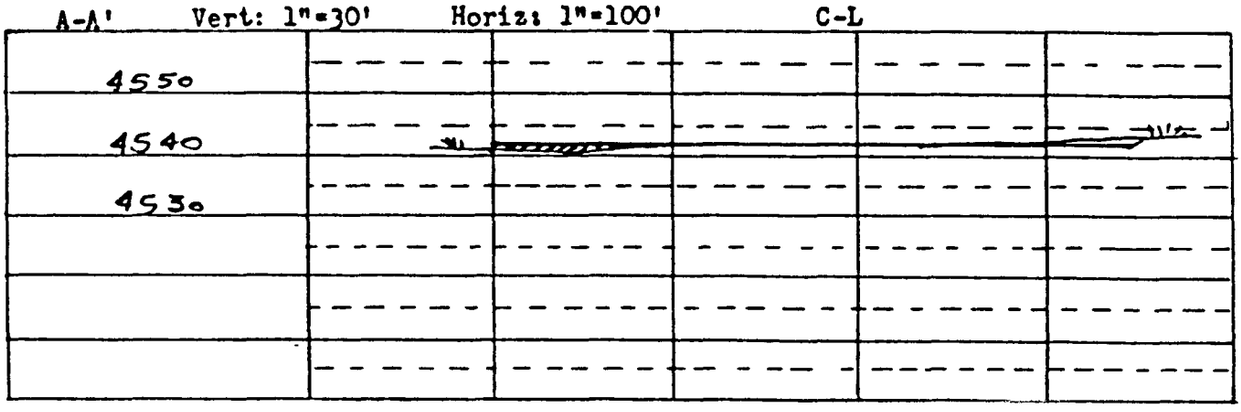


Vicinity Map for
PHILLIPS OIL COMPANY #13-11 RATHERFORD UNIT
500'FNL 660'FWL Sec. 13-T41S-R23E
SAN JUAN COUNTY, UTAH

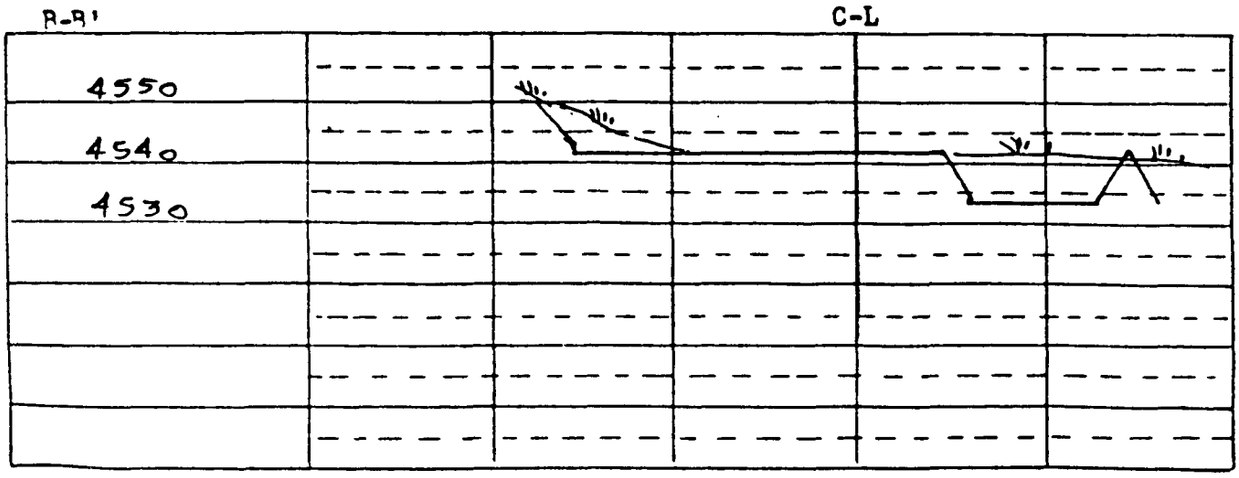
Profile for
PHILLIPS OIL COMPANY #13-11 RATHERFORD UNIT
500'FNL 660'FWL Sec. 13-T41S-R23E
SAN JUAN COUNTY, UTAH



A-A' Vert: 1"=30' Horiz: 1"=100' C-L



B-B' C-L

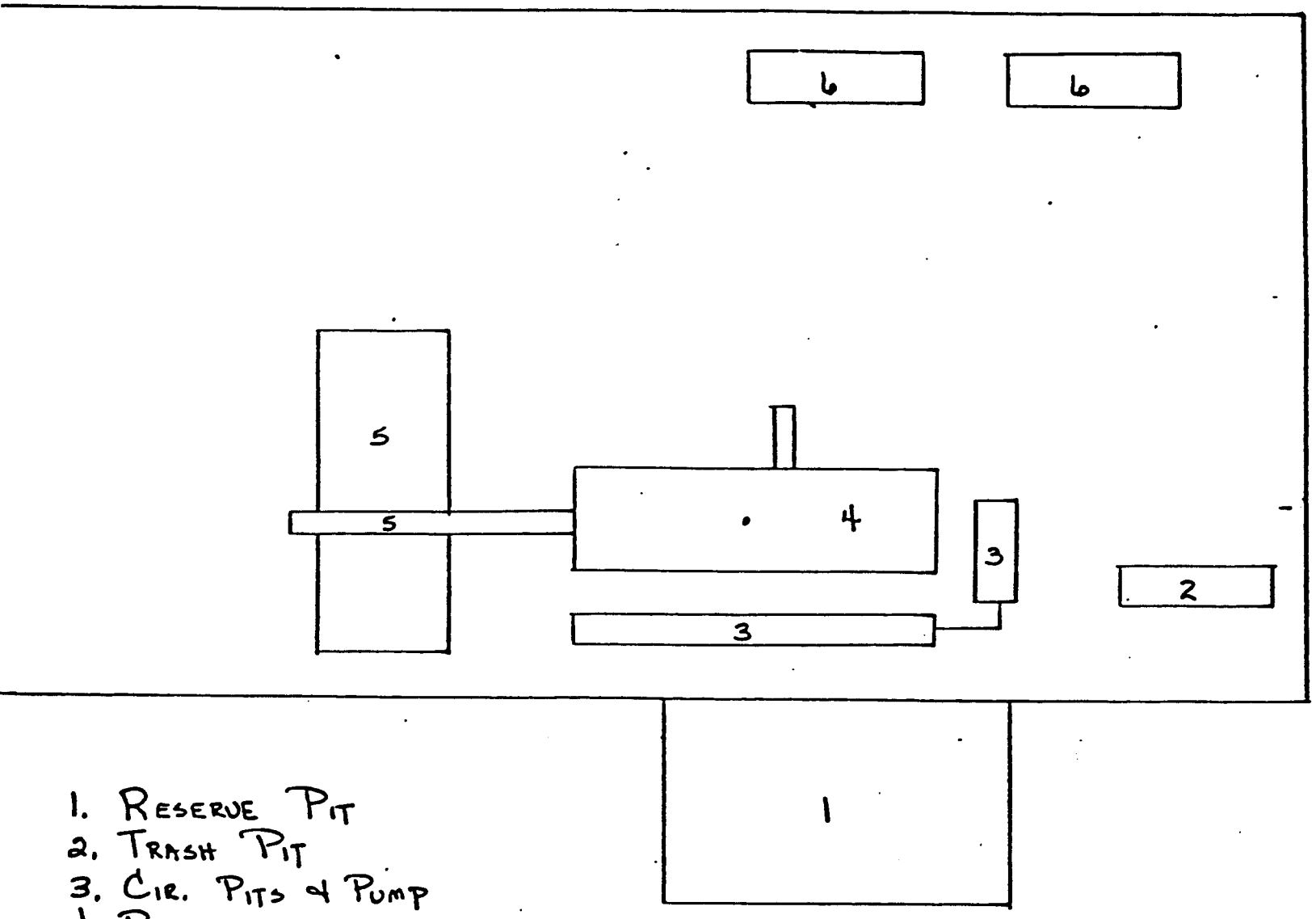


N

RATHERFORD UNIT

#13-11

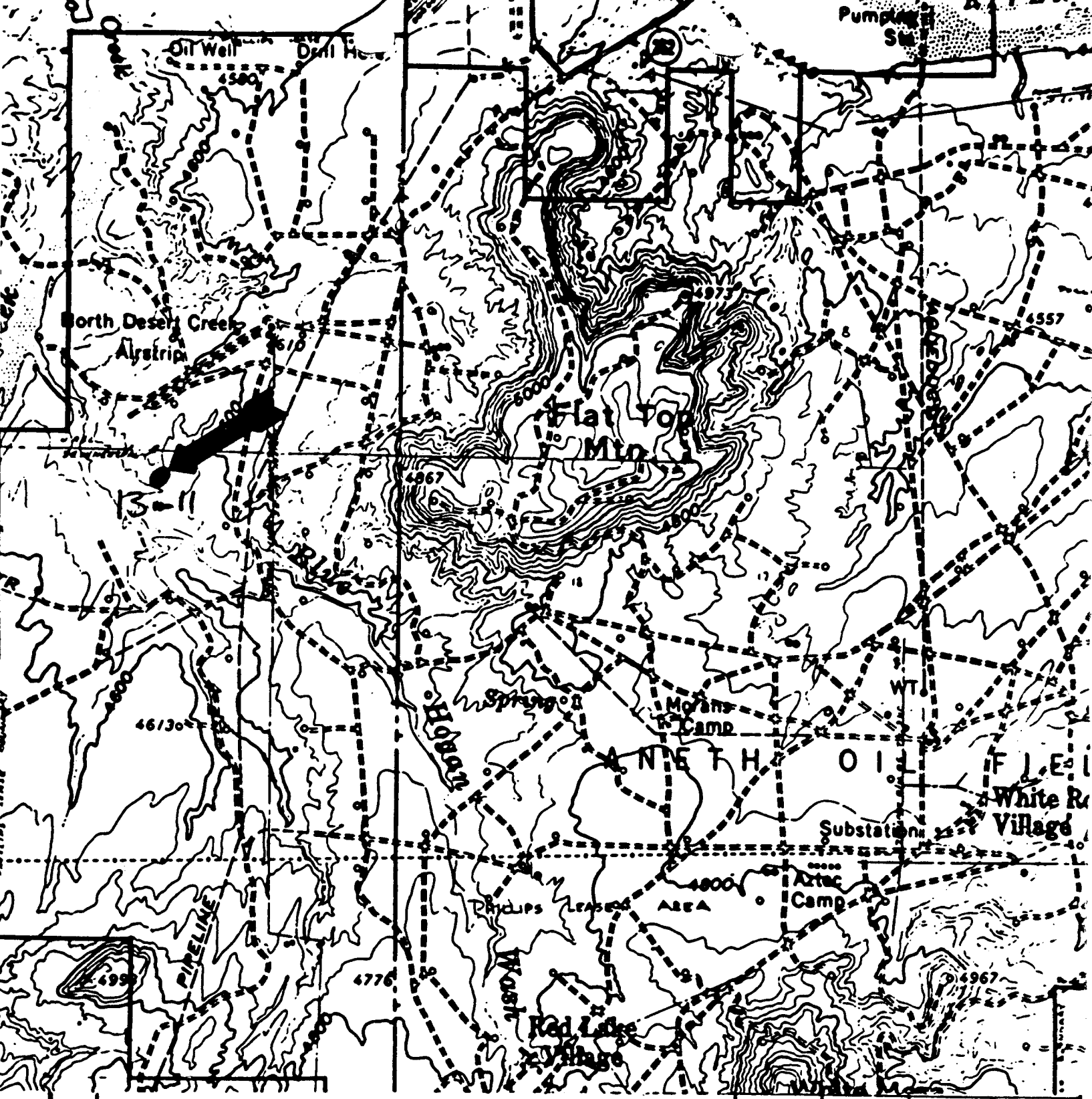
NW NW Sec. 13-T41S-R23E



1. RESERVE PIT
2. TRASH PIT
3. CIR. PITS & PUMP
4. RIG
5. CAT WALK & PIPE RACKS
6. TRAILERS

DRILLING RIG LAYOUT

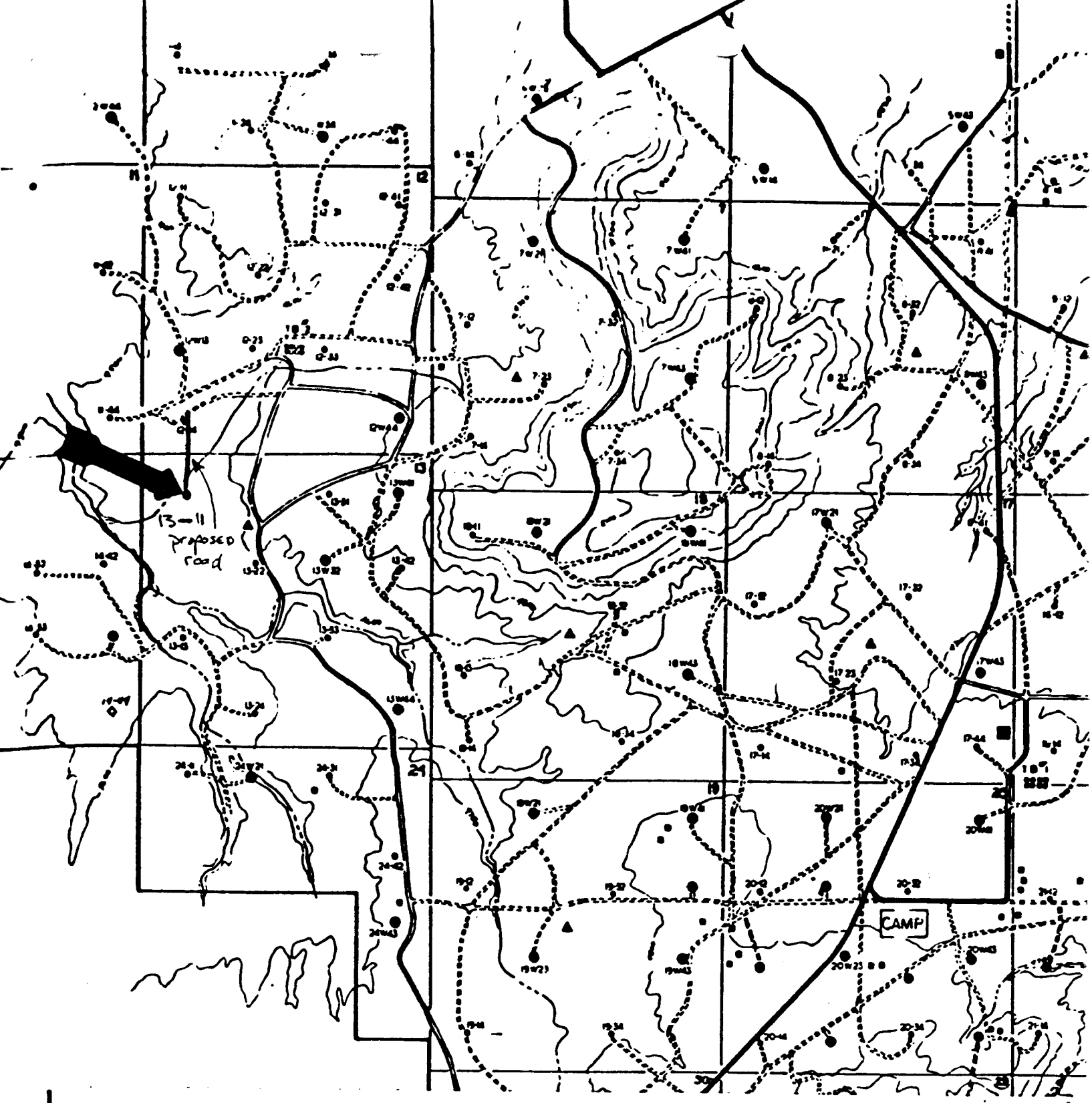
OUTLINE OF LOCATION - APPROXIMATELY 300' x 350'
NOT TO SCALE



NO.	REVISION	BY	DATE	CHKD	APP'D

FOR BIDS	PHILLIPS PETROLEUM COMPANY BARTLESVILLE, OKLAHOMA	JA NO.	FILE CODE
FOR APPR		AFE NO.	SCALE 2.2"=1 mi
FOR CONST	RATHERFORD UNIT WELL 13-11 PROPOSED NW NW SEC 13 T41S-R23E SAN JUAN CO., UTAH	DWG NO.	
DRAWN 3-30-94 BJM		SH NO.	
CHECKED			
APP'D			

FORM 1779-S 8-81



NO.	REVISION	BY	DATE	CHKD	APP'D

FOR BIDS

FOR APPR

FOR CONST

DRAWN 3-30-94 BJM

CHECKED

APP'D

PHILLIPS PETROLEUM COMPANY

BARTLESVILLE, OKLAHOMA

RATHERFORD UNIT WELL 13-11
PROPOSED ROAD PLAT
NW NW SEC 13 T41S-R23E
SAN JUAN CO., UTAH

JA NO.

FILE CODE

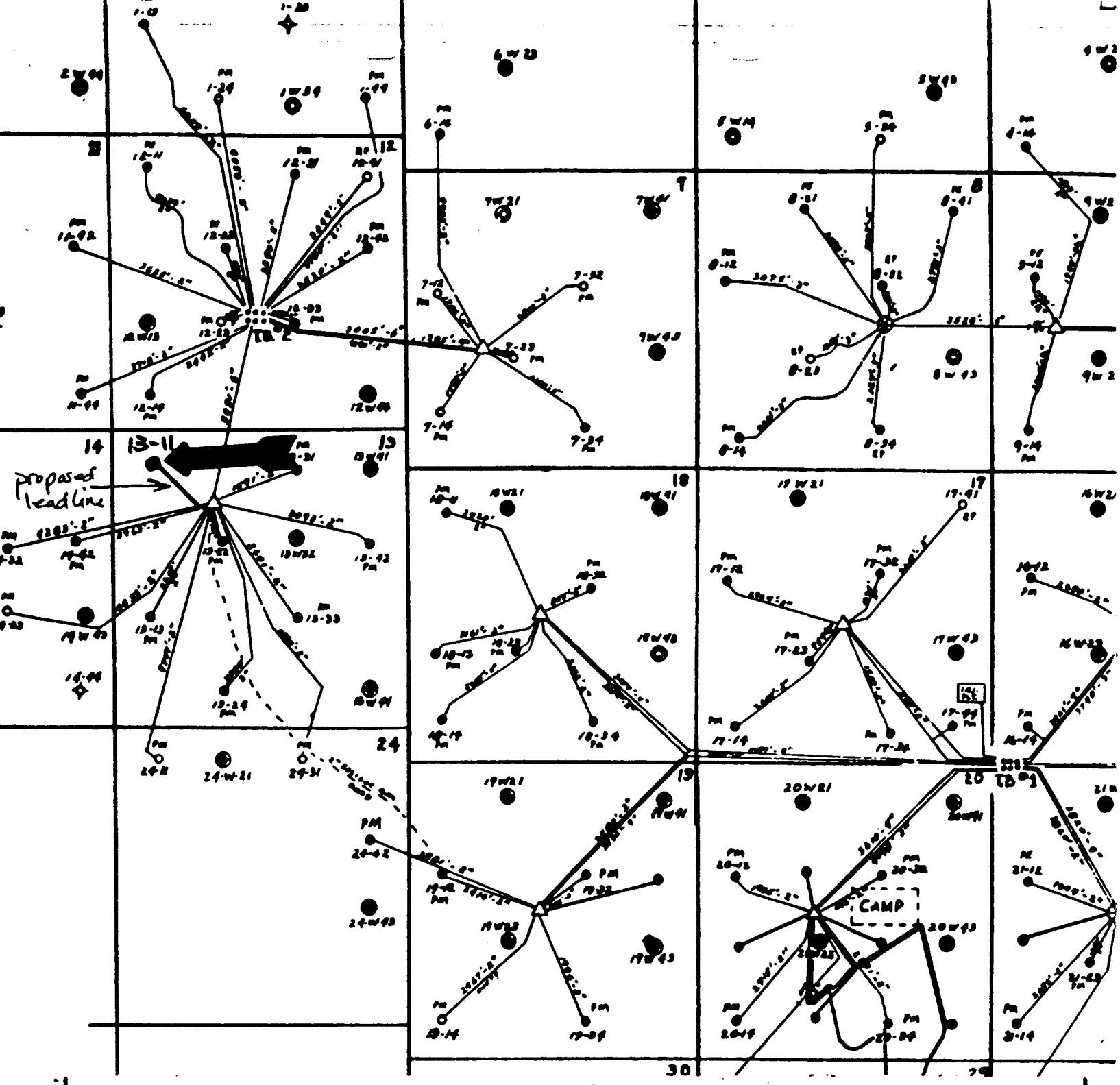
AFE NO.

SCALE 2.2" = 1 mi.

DWG NO.

SH NO.

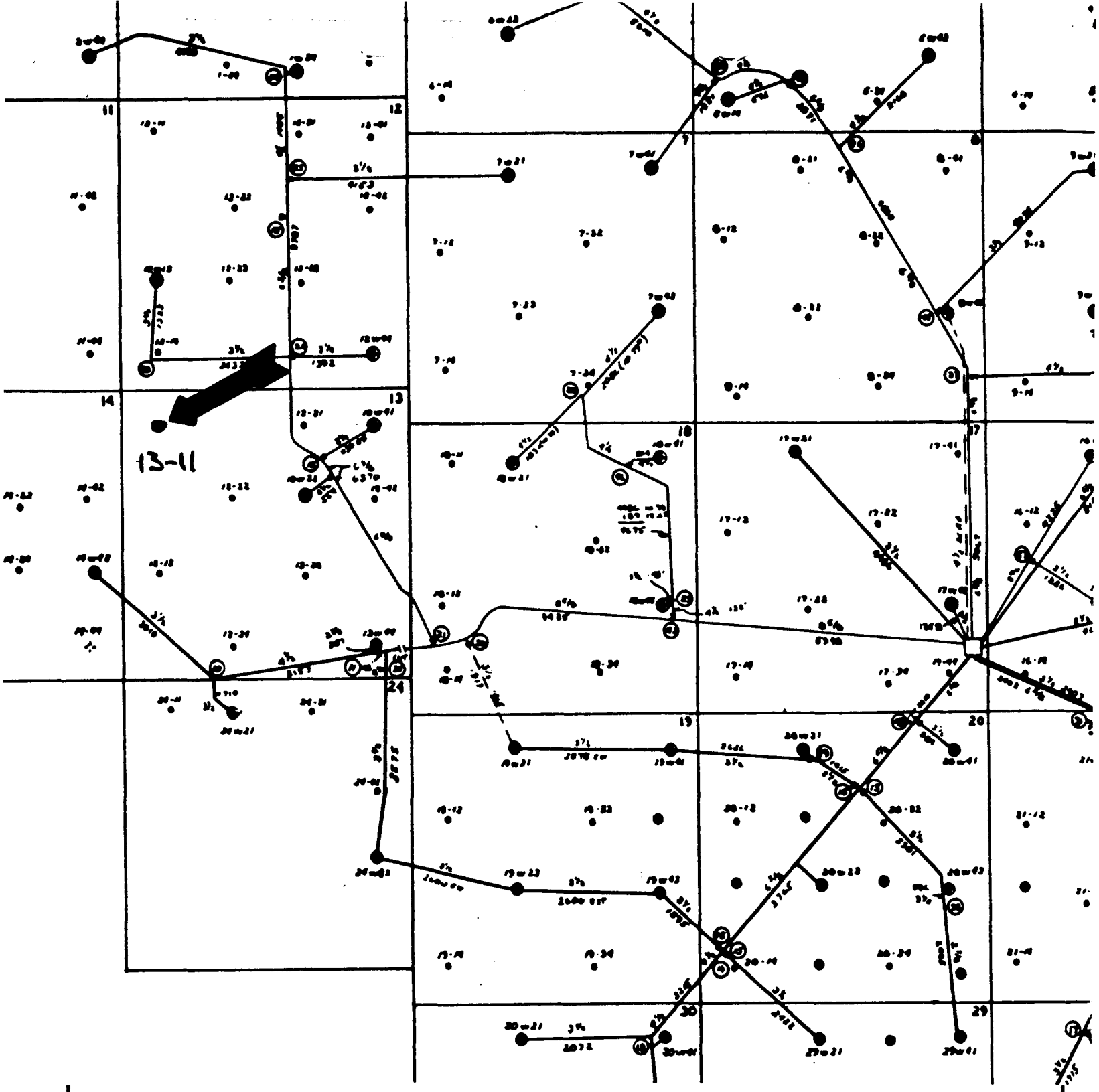
FORM 1779-S 8-81



NO.	REVISION	BY	DATE	CHKD	APP'D

FOR BIDS	PHILLIPS PETROLEUM COMPANY BARTLESVILLE, OKLAHOMA	JA NO.	FILE CODE
FOR APPR		AFE NO.	SCALE 2.2" = 1 mi
FOR CONST	RATHERFORD UNIT WELL 13-11 : PROPOSED LEADLINE PLAT NW NW SEC. 13 T41S-R23E SAN JUAN CO., UTAH	DWG NO	
DRAWN 1-20-85 BJM			
CHECKED		SH NO.	
APP'D			

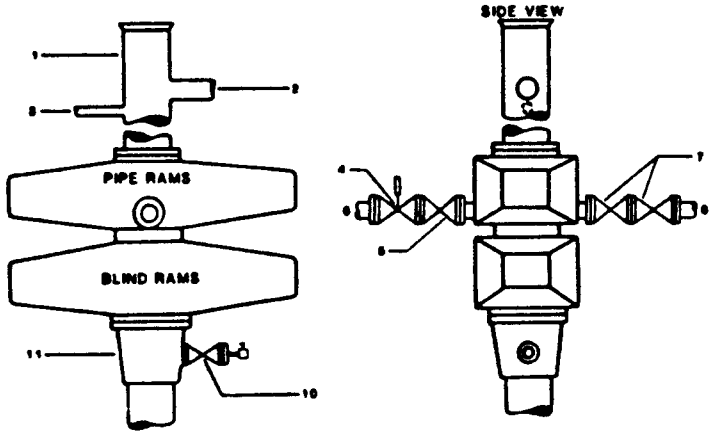
FORM 1779-S 8-81



NO.	REVISION	BY	DATE	CHKD	APP'D

FOR BIDS	PHILLIPS PETROLEUM COMPANY BARTLESVILLE, OKLAHOMA	JA NO	FILE CODE
FOR APPR		AFE NO	SCALE 2.2" = 1 mi
FOR CONST	RATHERFORD UNIT WELL 13-11 WATER INJECTION LINES NW NW SEC. 13 T41S-R23E SAN JUAN CO., UTAH	DWG NO	
DRAWN 1-20-85 BJM			
CHECKED		SH NO.	
APP'D			

FORM 1779-S 8-81



1. BELL NIPPLE
2. FLOW LINE
3. FILL-UP LINE
4. 2" FE PRESSURE-OPERATED CHOKE LINE VALVE
5. 2" FE GATE VALVE
6. 2" FE CHOKE LINE TO MANIFOLD
7. 2" FE GATE VALVES
8. 2" FE KILL LINE
10. 2" SE OR FE GATE VALVE WITH NEEDLE VALVE
11. CASING HEAD HOUSING

Figure 7-10. Standard Hydraulic Blowout Preventer Assembly (2 M or 3 M Working Pressure) Alternative 3 (without Drilling Spool)

7.6 Testing Surface Blowout Preventer Equipment

7.6.1 Pressure Test Frequency

All rams, annulars, valves, choke and kill lines, choke manifold, kelly cocks, and safety valves shall be pressure tested at the following frequencies:

(1) Initial installation of blowout preventers.

(2) After setting casing, before drilling cement.

(3) Every 7 days or on first trip out of hole after 7 days since previous pressure test.

(4) After any component of the blowout preventer assembly is disturbed, replaced or repaired (this includes lines, valves, or choke manifold). In this case, the component changed may be the only component tested.

(5) Prior to conducting first drill stem test in a series of one or more DST's.

(6) Any time the Phillips Wellsite Supervisor deems necessary, such as prior to drilling into suspected high pressure zones.

7.6.2 Function Test Frequency

All rams, annulars, valves, and other items specified below, shall be function tested at the following frequencies.

(1) On initial installation from driller control and remote panel.

(2) Each trip out of hole alternating between driller's and remote control panel but not more than once every twenty-four (24) hours. Close pipe rams or annular preventer ONLY on drill pipe.

7.6.3 Test Pressures

Use the following table to identify which test is appropriate and at what pressure.

TEST	DESCRIPTION
Low Pressure	Test to 200-300 psi prior to each high pressure test.
Initial Installation	Test all rams, annulars, valves, choke manifold, kelly cocks, and safety valves to the lesser of the following pressures. . Rated working pressure of the component in the blowout preventer assembly with the exception of annular preventer which is to be tested to 70% of the rated working pressure. . The API rated casing burst pressure of the last casing to be utilized in the well with the BOP assembly being tested. . Rated working pressure of the casing head. . If "Cup Tester" is used do not exceed 80% of the API rated burst pressure of the casing.
Repair	Repaired or replaced components are to be tested to the same pressures used in the Initial Test.

7.6.3, cont'd

TEST	DESCRIPTION
Weekly and After Setting Casing	Test all rams, annulars, valves, choke and kill lines, choke manifold, kelly cocks, and safety valves, to the lesser of the following pressures. . 50% of the rated working pressure of the component to be tested. . 80% of the API rating of the casing burst pressure then in the well. . Test blind rams during internal casing pressure test. (Refer to drilling program for test pressures).
DST Operations	Test all pipe rams, annular preventers, valves, choke and kill lines, choke manifold, kelly cocks, and safety valves to the maximum anticipated surface pressure expected while conducting drill stem tests. Do not test annular to more than 70% of its working pressure.
Shallow Casing	Where cased hole is less than 2000 feet measured depth, the test pressure may be 1.5 psi per foot of casing depth, not to exceed 80% of the API rated burst pressure. In the case of shallow conductor casing or drive pipe (500 feet or less) that is equipped with one BOP, then the test pressures do not need to exceed 1.0 psi per foot of casing depth.
Accumulator	Test accumulator to the manufacturer's rated working pressure. Test the accumulator for time to pump up to specifications.

7.6.4 Blowout Preventer Test Practices

(1) All pressure tests shall be witnessed by Phillips' Representative and the Contractor's Senior Supervisor on Location. All tests shall be recorded on the Phillips' Daily Drilling Report, the IADC Report and the BOP Test Form; see Figure 7-13. A reproducible copy of the BOP Test Form (Figure 7-13) can be found in Section III.

7.6.4, cont'd

(2) Hold all low pressure tests for three minutes and high pressure tests for five minutes or until Phillips Representative and the Contractor's Senior Supervisor are satisfied no leaks exist.

(3) A detail procedure for the testing of blowout preventer and choke manifold equipment will be included in the drilling programs. The procedure is to be distributed for each drilling unit under contract by the operating office. Each operating office must include the following practices:

a. Prior to testing, all lines and valves will be thoroughly flushed to ensure the system is clear. Test all opening and closing control lines to 1500 psi and inspect for leaks.

b. If necessary, run a stand of drill collars below the test plug to prevent unseating the test tool during testing.

c. All precautions must be taken to avoid pressuring the casing below the test tool.

d. The running string is to be full of water (or antifreeze solution) for immediate indication of test tool leakage.

e. All pipe rams, blind/shear rams, blind rams, annular preventers, valves, fail-safe valves, choke and kill lines are to be tested at the frequencies and pressures outlined in this section.

f. Drill pipe safety valve, lower and upper kelly cocks are to be tested from below at pressures and frequencies outlined in this section.

g. All test fluids are to be bled back to the pump unit in safe manner.

7.6.5 Testing Wellhead Pack-offs

The wellhead pack-off is to be pressure tested upon installation for five minutes. Test pressure is to be 80% API rated casing collapse or the rated working pressure of the casing head whichever is the lesser. Casing annulus valve(s) must be in open position to prevent casing collapse during pack-off testing.

When testing the wellhead pack-off, use recorded test pressures and volumes to determine if pack-off is leaking. Pressure should be immediately released at the first indication of a leak.

7.6.6 Safety Precautions

One pumping unit operator is to be stationed at the high pressure pumping unit, and is to remain at this station until all testing has been completed. The pump unit operator is to be in continuous communication with the person who is recording the test data. The Phillips Wellsite Supervisor and Contractor's Senior Supervisor on location will be the only personnel who will go into the test area to inspect for leaks when the equipment involved is under pressure. The rig crews are to stay clear of the area until such time that both the Phillips Wellsite Supervisor and the Contractor's Senior Supervisor have contacted the pumping unit operator and all three have agreed that all pressure has been released, and there is no possibility of pressure being trapped. The rig crews may then go into the area to repair leaks or work as directed.

All lines, swings, and connections that are used in the testing of the blowout preventers are to be adequately secured in place.

Pressure is to be released only through the pressure release lines that are vented back into the pump unit tanks. The lines are to be clamped down to direct the flow into unit tanks.

ARCHAEOLOGICAL SURVEYS OF 13 PROPOSED WELL LOCATIONS, THEIR ASSOCIATED ACCESS ROADS AND FLOW LINE ROUTES, AND 9 MILES OF PROPOSED WATER INJECTION LINE ROUTES IN SAN JUAN COUNTY, SOUTHEASTERN UTAH

12-W24	13-12	13-43
12-34	13-14	18-W12
14-41	13-21	24-41
13-11	13-23	29-22
	13-34	

Water Injection Lines: Mainline and Lines A, B, C, D, E, F, F-1, G, H, I, and J

Prepared by:

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Prepared for:

Phillips Oil Company
Cortez, Colorado

Submitted by:

William E. Davis, Director
Abajo Archaeology
Bluff, Utah

August 1984

Navajo Nation Antiquities Permit No. 1984-24
United States Department of the Interior
Bureau of Indian Affairs
Branch of Environmental Quality Control Authorization
BIA-NAO-84-ABA-048-1
and
Utah State Permit No. U-84-8-5-i

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ABSTRACT

Cultural resource surveys were conducted as part of the Rutherford Unit expansion project for Phillips Oil Company, in southeastern San Juan County, Utah. The surveys were performed on August 4, 6, 7, 9, and 11, 1984 on 13 proposed well location sites, eight associated access roads, portions of six associated flow line routes, and along nine miles of proposed injection line. The project area occurs in Sections 11, 12, 13, 14, and 24 in T 41 S, R 23 E and Sections 7, 17, and 18 in T 41 S, R 24 E, USGS White Mesa Village Quadrangle, Utah, 15'. It is under jurisdiction of the Bureau of Indian Affairs.

Seventeen isolated finds and one Anasazi Basketmeker II to Pueblo I artifact scatter (SJC-1106) were located during the survey. The isolated finds are not considered significant in terms of the eligibility criteria set forth in the National Register of Historic Places, thus, archaeological clearance is recommended for the project area, except the 100 meters of mainline injection pipeline east of its juncture with line J. It is recommended that the pipeline be rerouted or that an archaeologist be present to monitor construction of that portion of pipeline.

INTRODUCTION

On August 4, 6, 7, 9, and 11, 1984, cultural resource surveys were conducted within the Rutherford Unit south of Montezuma Creek, southeast San Juan County, Utah (Figure 1). The surveys were requested by Mr. Max Issacs, supervisor of Phillips Oil Company of Cortez, Colorado, and carried out at the request of Mr. Bob Hogg, engineer, and Mr. John ~~White~~ WEICHBROOT, who replaced Mr. Max Issacs. Both Mr. Hogg and Mr. ~~White~~ WEICHBROOT were present in the field during portions of the survey. Mr. Hogg assisted the archaeologist by flagging the access routes and flow lines during the survey. The project consisted of 13 proposed well locations, their associated access routes and flow lines, and approximately nine miles of proposed injection pipeline.

The project area lies within the boundaries of the Navajo Reservation (Tables 1 and 2) which is under the jurisdiction of the United States Department of the Interior, Bureau of Indian Affairs and the Navajo Nation. Cultural resources are administered by the USDI-BIA, Branch of Environmental Quality and by the Navajo Nation Cultural Resource Management Program.

The purpose of the survey was to verify the presence of and document any cultural resources within the proposed project impact areas. The accomplishment of these objectives fulfills compliance requirements for the preservation of archaeological and historical resources set forth by the American Antiquities Act of 1906, the Historic Preservation Act of 1966, the National Environmental Policy Act of 1969, Executive Order No. 11593 of 1971, the Archaeological and Historical Conservation Act of 1974, and the Archaeological Resources Protection Act of 1979. Cultural resources occurring on Navajo Tribal lands are further protected by Tribal laws: CJA-16-72 of 1972, Res. ACAP-86-77 of 1977, and the Navajo Tribal Code, Title Nineteen, Sections 1002 and 1004.

Field work was conducted under the Navajo Nation Antiquities Permit No 1984-24, the USDI-BIA, Environmental Quality Authorizaion No. BIA-NAO-84-048-1, and State of Utah Permit No. U-84-8-5-i. These permits and authorizations were granted to Abajo Archaeology of Bluff, Utah. BIA-NAO-84-ABA-048-1 is a "non-collection, non-disturbance" use authorization to conduct archaeological surveys on Navajo Tribal lands. The surveys were performed by Debra Foldi, an archaeological consultant with Abajo Archaeology. Dr. Anthony Klesert, Director of the Navajo Nation Cultural Resource Management Program and Mr. Terry

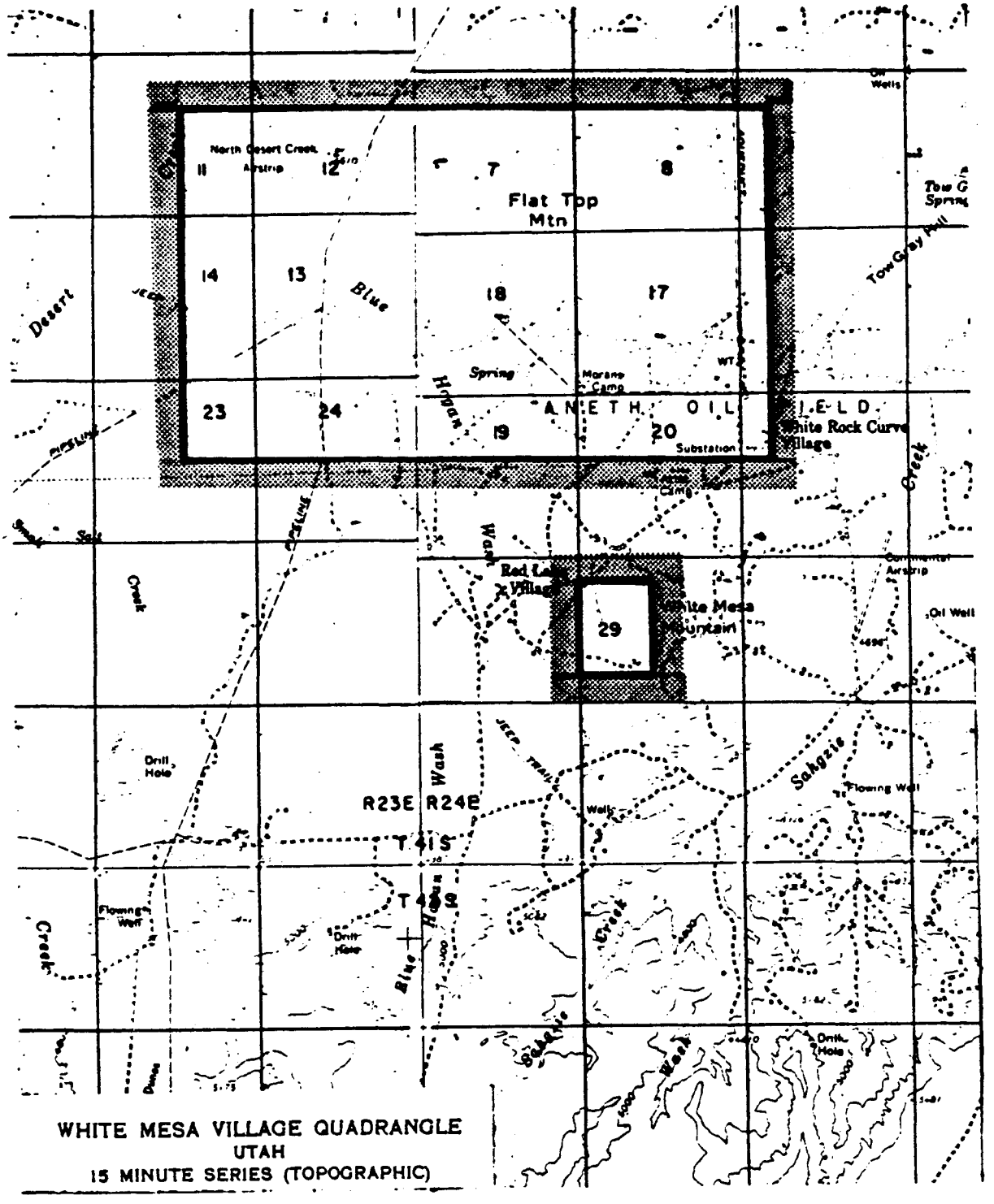

Figure 1. Location of Phillips Oil Company Rutherford Unit - 1984 expansion project. Stippling outlines project area.

Map Scale: 1:62,5000

TABLE 1

Legal Description of Project Area

Jurisdiction: Navajo Nation
Map: White Mesa Village Quadrangle, Utah, 1962, 15'

Well Pad	Legal Location	UTM (Zone 12)	Access Route, Length
12-W24	CTSESW, Sec.12 T 41 S, R 23 E	647,000 m E 4,121,825 m N	300 feet (runs west from location)
12-34	SESWSE, Sec.12 T 41 S, R 23 E	647,700 m E 4,121,800 m N	600 feet (runs SSW from location)
14-41	NENENE, Sec.14 T 41 S, R 23 E	646,250 m E 4,121,950 m N	1000 feet (runs west from location)-flow line follows access
13-11	CTNWNW, Sec.13 T 41 S, R 23 E	646,600 m E 4,121,950 m N	800 feet (runs north from location)-flow line follows access
13-12	NWSWNW, Sec.13 T 41 S, R 23 E	646,600 m E 4,121,075 m N	1300 feet (runs west from location)-flow line follows access
13-14	CTSWSW, Sec.13 T 41 S, R 23 E	646,600 m E 4,120,175 m N	800 feet (runs WSW from location)
13-21	CTNENW, Sec.13 T 41 S, R 23 E	647,000 m E 4,121,400 m N	No access surveyed No flow line surveyed
13-23	CTNWSW, Sec.13 T 41 S, R 23 E	647,000 m E 4,120,600 m N	No access surveyed No flow line surveyed
13-34	CTSWSE, Sec.13 T 41 S, R 23 E	647,700 m E 4,120,200 m N	600 feet (runs south from location)-flow line follows access
13-43	SWNESE, Sec.13 T 41 S, R 23 E	647,750 m E 4,120,500 m N	600 feet (runs NNE from location)-flow line follows access
18-W12	CTSWNW, Sec.18 T 41 S, R 24 E	648,225 m E 4,120,300 m N	500 feet (runs ENE from location)-flow line follows access
24-41	CTNENE, Sec.24 T 41 S, R 23 E	647,825 m E 4,119,800 m N	No access surveyed No flow line surveyed
29-22	SWSENW, Sec.29 T 41 S, R 24 E	650,080 m E 4,117,600 m N	900 feet (runs east from location)-flow line follows access

TABLE 2

Legal Descriptions of Water Injection Lines

Jurisdiction: Navajo Nation
Map: USGS White Mesa Village Quadrangle, Utah, 1962, 15'

Line	Legal Location	Length (Ft.)
Main	SE & SW of SE, SE & SW of SW, Sec.17, T41S, R24E SE & SW of SE, SE & SW of SW, Sec.18, T41S, R24E SE & NW of SE, SE & NW of NW, Sec.13, T41S, R23E SE of SE, Sec.11, T41S, R23E	18,500
A	SE & NE of SE, Sec.17, T41S, R24E	1,250
B	Eastern portion of: SE & NE of SE and SE & NE of NE and NENW of NE, Sec.18, T41S, R24E	6,900
C	SE & NE of SW, Sec.18, T41S, R24E	1,400
D	SW & NW of SW, SW of NW, Sec.18, T41S, R24E SE of NE, Sec.13, T41S, R23E	3,250
E	SE of NW, NW & NE of NE, Sec.13, T41S, R23E SE of SE, Sec.12, T41S, R23E SW of SW, Sec. 7, T41S, R24E	5,500
F	NW of NW, Sec.13, T41S, R23E SE of SW and NW of SE, Sec.12, T41S, R23E	3,850
F-1	SE of SW and SW of SW and NW of SW, Sec.12, T41S, R23E	1,500
G	NW of NW, Sec.13, T41S, R23E/SE of NE, Sec.14, T41S, R23E	1,700
H	SE of NW and NW of SW, Sec.13, T41S, R23E	1,500
I	NE of SE and SE of SW, Sec.13, T41S, R23E	1,700
J	SW of SW, Sec.18, T41S, R24E	300

Del Benee of the USDI-BIA Branch of Environmental Quality were notified prior to performance of the field surveys.

DESCRIPTION OF THE PROJECT AREA

The Phillips Oil Company, Rutherford Unit development project is located in the extreme southeastern portion of San Juan County, just south of Montezuma Creek, Utah. The San Juan River flows to the north (2.5 miles), White Mesa Mountain is to the south, and Flat Top Mountain is situated within the project area. The Rutherford Unit project is within the Blanding Basin of the Colorado Plateau Physiographic Province (Stokes 1977) and is characterized by broken topography ranging in elevation from 4580 feet to 6000 feet above sea level. Most of the project area is flat to rolling terrain, broken by steep-sided mesas, and dissected by intermittent washes and arroyos which feed the San Juan River. The San Juan River is the nearest permanent water source.

The surface geology is reflected in the general broken nature of the landscape. The lower flatlands are fluvial sandstones and mudstones of the Recapture Creek member of the Morrison Formation, which is generally covered by wind blown silts and sands with patches of soil and alluvium (Hintze and Stokes 1964). The lower, light-colored Bluff Sandstone Formation is exposed along Desert Creek (at the east edge of the project area) and portions of Blue Hogan Wash (Hintze and Stokes 1964). The mesas are comprised of the Westwater Canyon and Brushy Basin Members of the Morrison Formation; the later is a dinosaur-bearing, fluvial and lacustrine mudstone and siltstone (Hintze and Stokes 1964) which often contains chert deposits. The coal-bearing sandstone and carbonaceous shales of the Dakota Sandstone cap the higher mesa tops.

The vegetation is in the cool desert climates classified as the Upper Sonoran Life Zone and is characterized by a shadscale (salt desert shrub) plant community. The vegetation noted during the survey included snakeweed, rabbitbrush, shadscale, Mormon tea, big sagebrush, greasewood, saltbush, narrow-leaf yucca, prickly pear cactus, galleta grass, Indian rice grass, cheat grass, locoweed, and Russian thistle. Today, the project area supports a fairly large population of domesticated grazers: sheep, horses, and cattle. Non-domesticates noted during the survey were rabbits, rodents, lizards, and unidentified birds.

CULTURE HISTORY

Broad overviews have been written, synthesizing the known culture history of southeastern Utah (see Nickens 1982, Weber 1982) and of northwestern New Mexico (see Stuart and Gauthier 1981). In general, the San Juan Basin, as was much of the Colorado Plateau, was inhabited prehistorically by the Basketmakers and Anasazi, relatively sedentary people who first incorporated horticulture into a hunting and gathering subsistence strategy, and later practiced agriculture. The Archaic hunter-gatherers and the earlier Paleo-Indian, mega-fauna hunters preceded the Basketmakers and Anasazi.

Historically the San Juan Basin, as was much of the Intermountain West, was inhabited by the Navajo and Ute. Although their entry into this area is as little understood as their early history, it is believed that their arrival barely preceded the Spanish Entrada during the 16th century (Wilcox 1981). From that time on, the area was visited by the Spanish, Anglo explorers, trappers, and traders, and later in the 19th century, by the Mormon settlers. Presently, much of the San Juan Basin, primarily the southern portion, is inhabited by the Navajo.

Archaeological surveys related to energy development to the east and northeast of the Rutherford Unit project (see Hewett et al 1979, Moore 1983, 1984, Swift 1984a, 1984b) have documented a variety of sites from artifact scatters to multiroom structures. Documented sites range from the Anasazi Pueblo I phase through recent Navajo. The highest site density occurs during the Anasazi Pueblo II phase, AD 900-1100. In the immediate project area, numerous isolated finds and Basketmaker II through Pueblo III and recent Navajo sites have been recorded (see Langenfeld and Hooten 1984, Langenfeld 1984).

METHODOLOGY

A total of 13 proposed well location sites and eight access routes were inventoried, along with portions of six flow line routes (above ground pipes). A total of 9.13 miles (48,200 feet) of proposed water injection line (buried pipeline) were also inventoried (Figures 2 and 3). Tables 3 and 4 describe the area surveyed. Each of the well location sites were staked prior to the survey, demarcating the 300 by 350 foot pad site. Each well location was inspected by walking parallel transects spaced 10 meters apart back and forth until the entire location was surveyed. An additional 100 foot (30 meter) buffer zone was also inspected around the staked well pad site.

The access roads and flow line routes were flagged while the archaeologist surveyed the well sites. No access routes were surveyed for well locations that were situated on or at the edge of existing maintained roads. Flow lines are to follow proposed and existing roads and existing flow line routes. Only the portions of proposed flow line routes that paralleled proposed access roads which have yet to be built were surveyed. A 100 foot right-of-way was surveyed by walking a zig-zag pattern along each flagged access route. If a flow line was to follow the access route, an additional 25 feet were inspected in the same manner.

The injection line routes were marked by lath stakes. A 50 foot right-of-way was inspected along the staked route, using the stakes as a center line. This was accomplished by walking a zig-zag pattern down one side of the line and back along the other.

All cultural materials encountered during the survey were noted, described, and often illustrated. Those cultural resources which lacked spacial integrity and the potential for interpretable past human behavior (Plog et al 1978) were noted as isolated finds.

In addition to the field inspection, a search of the site files at the Navajo Nation Cultural Resource Management Program in Window Rock, Arizona, was initiated by phone, August 13, 1984. A records search by the Utah Division of State History found no sites to have been previously recorded within the proposed project impact areas.

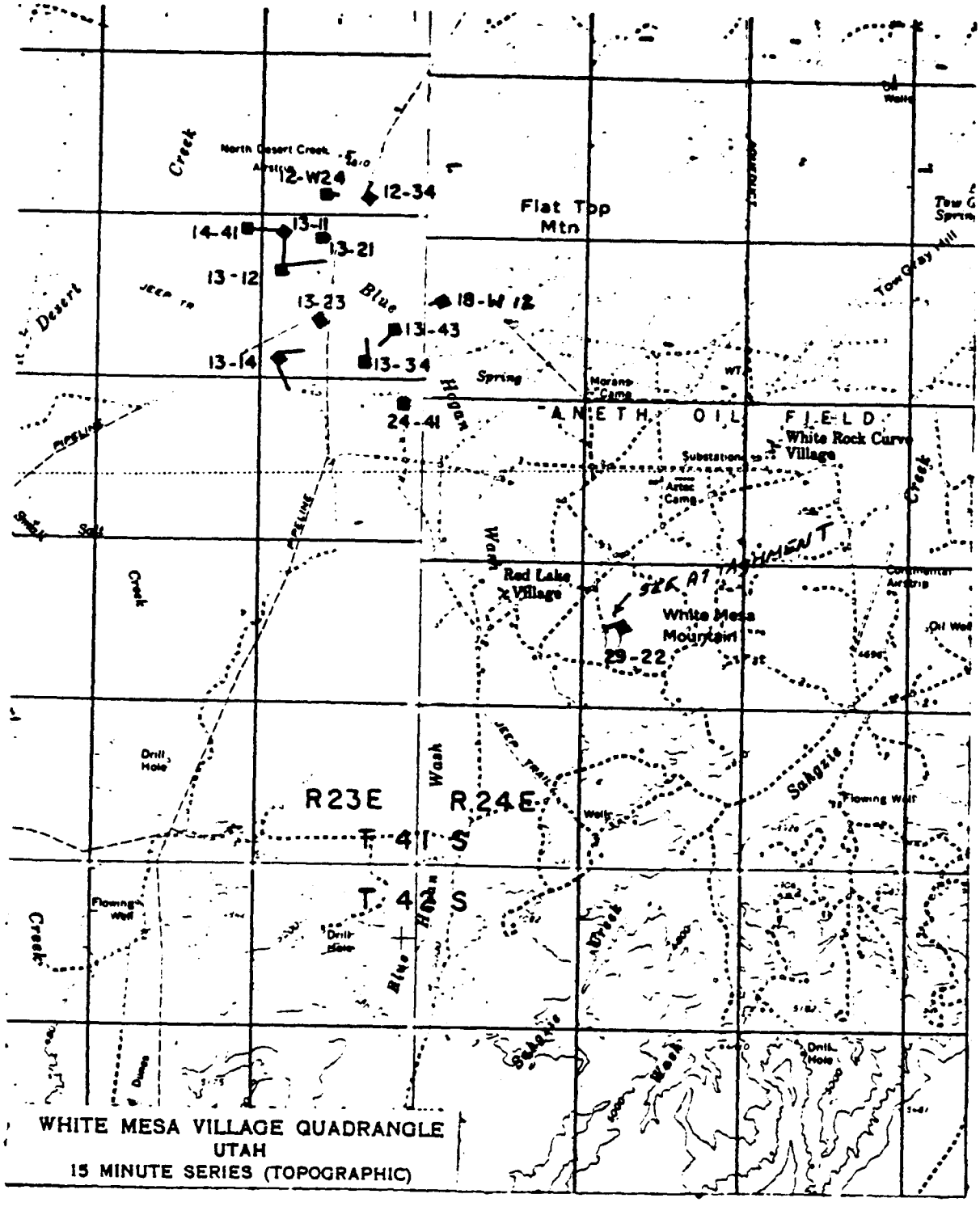

Figure 2. Locations of proposed well locations, access roads and flow line routes.

Map Scale: 1:62,500

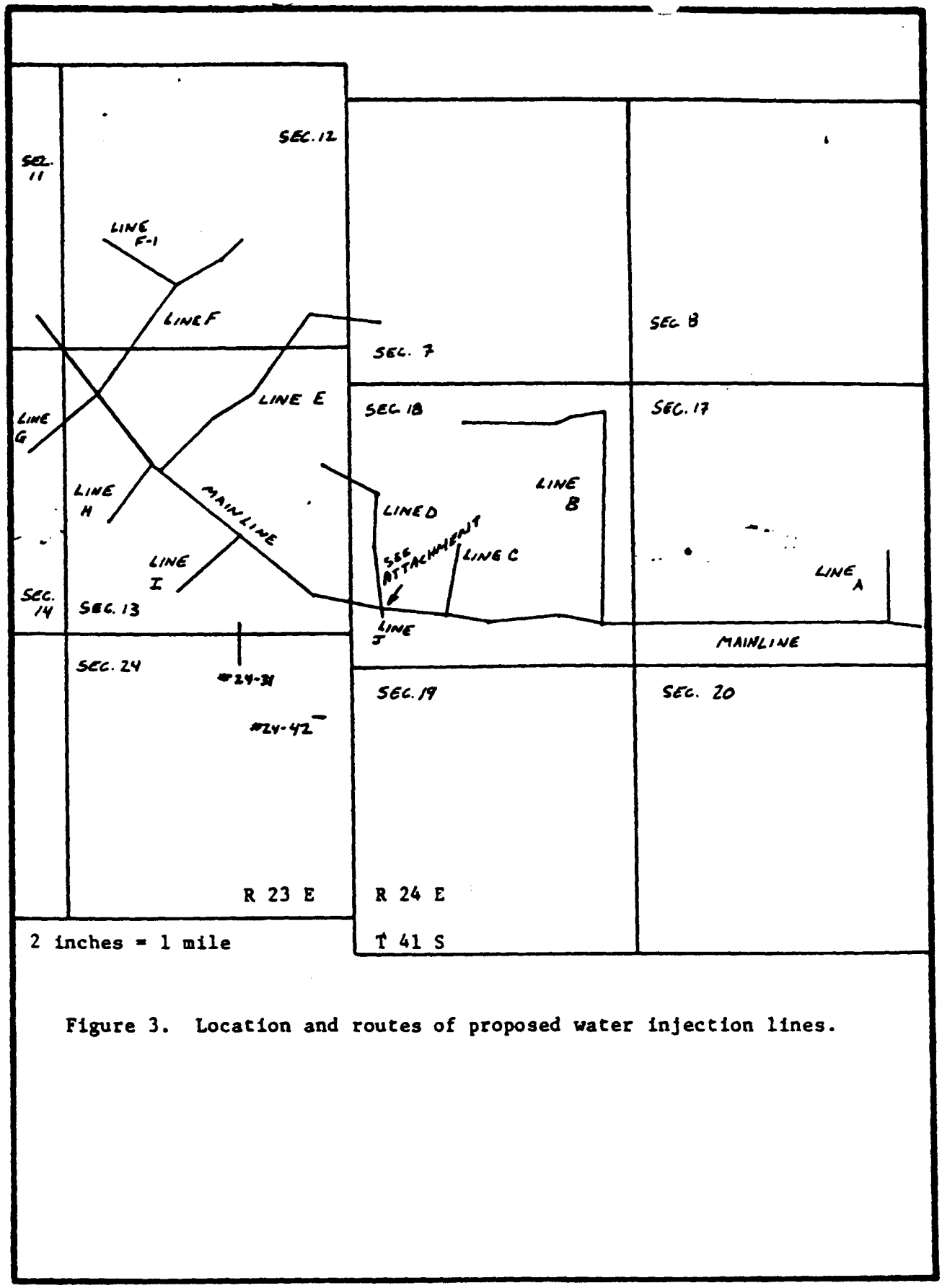

Figure 3. Location and routes of proposed water injection lines.

TABLE 3

Description of Well Pad Project Area and Area Surveyed

Well Pad	Project Area (square feet)	Area Surveyed (square feet)
12-W24	300 ft X 350 ft = 105,000 (2.41 acres)	400 ft X 450 ft = 180,000 (4.13 acres)
	Access route = 300 ft	300 ft X 100 ft = 30,000 (0.69 acres)
12-34	300 ft X 350 ft = 105,000 (2.41 acres)	400 ft X 450 ft = 180,000 (4.13 acres)
	Access & flow line = 600 ft	600 ft X 125 ft = 75,000 (1.72 acres)
14-41	300 ft X 350 ft - 105,000 (2.41 acres)	400 ft X 450 ft = 180,000 (4.13 acres)
	Access & flow line = 1,000 ft	1,000 ft X 125 ft = 125,000) (2.87 acres)
13-11	300 ft X 350 ft = 105,000 (2.41 acres)	400 ft X 450 ft = 180,000 (4.13 acres)
	Access & flow line = 800 ft	800 ft X 125 ft = 100,000 (2.30 acres)
13-12	300 ft X 350 ft = 105,000 (2.41 acres)	400 ft X 450 ft = 180,000 (4.13 acres)
	Access & flow line = 1,300 ft	1,300 ft X 125 ft = 162,500 (3.73 acres)
13-14	300 ft X 350 ft = 105,000 (2.41 acres)	400 ft X 450 ft = 180,000 (4.13 acres)
	Access route = 800 ft	800 ft X 125 ft = 100,000 (2.30 acres)
	Flow line = 700 ft	700 ft X 100 ft = 70,000 (1.61 acres)
13-21	300 ft X 350 ft = 105,000 (2.41 acres)	400 ft X 450 ft = 180,000 (4.13 acres)
	No access or flow line surveyed	
13-23	300 ft X 350 ft = 105,000 (2.41 acres)	400 ft X 450 = 180,000 (4.13 acres)
	No access or flow line surveyed	
13-34	300 ft X 350 ft = 105,000 (2.41 acres)	400 ft X 450 ft = 180,000 (4.13 acres)
	Access and flow line = 600 ft	600 ft X 125 ft = 75,000 (1.72 acres)

TABLE 3, continued

Well Pad	Project Area (square feet)	Area Surveyed (square feet)
13-43	300 ft X 350 ft = 105,000 (2.41 acres)	400 ft X 450 ft = 180,000 (4.13 acres)
	Access & flow line = 600 ft	600 ft X 125 ft = 75,000 (1.72 acres)
18-W12	300 ft X 350 ft = 105,000 (2.41 acres)	400 ft X 450 ft = 180,000 (4.13 acres)
	Access & flow line = 500 ft	500 ft X 125 ft = 62,500 (1.43 acres)
24-41	300 ft X 350 ft = 105,000 (2.41 acres)	400 ft X 450 ft = 180,000 (4.13 acres)
	No access or flow line surveyed	
29-22	300 ft X 350 ft = 105,000 (2.41 acres)	400 ft X 450 ft = 180,000 (4.13 acres)
	Access & flow line = 900 ft	900 ft X 125 ft = 112,500 (2.58 acres)

Note: The figures for access route and flow line lengths are only for the portions that cross undisturbed areas. Portions that follow maintained roads or existing flow line routes were not surveyed and those figures are not provided here.

TABLE 4

Description of Water Injection Pipeline Project Length and Area Surveyed

Line	Project Length	Area Surveyed (square feet)
Main	18,500 feet	18,500 ft X 50 ft = 925,000 (21.23 acres)
A	1,250 feet	1,250 ft X 50 ft = 62,500 (1.43 acres)
B	6,900 feet	6,900 ft X 50 ft = 345,000 (7.92 acres)
C	1,400 feet	1,400 ft X 50 ft = 70,000 (1.61 acres)
D	3,250 feet	3,250 ft X 50 ft = 162,500 (3.73 acres)
E	5,500 feet	5,500 ft X 50 ft = 275,000 (6.31 acres)
F	3,850 feet	3,850 ft X 50 ft = 192,500 (4.42 acres)
F-1	1,500 feet	1,500 ft X 50 ft = 75,000 (1.72 acres)
G	1,700 feet	1,700 ft X 50 ft = 85,000 (1.95 acres)
H	1,500 feet	1,500 ft X 50 ft = 75,000 (1.72 acres)
I	1,700 feet	1,700 ft X 50 ft = 85,000 (1.95 acres)
J	300 feet	300 ft X 50 ft = 15,000 (0.34 acres)
Line runs north from 24-31	750 feet	750 ft X 50 ft = 37,500 (0.86 acres)
Line runs east from 24-42	100 feet	Not surveyed, entirely within existing well pad location

RESULTS

One archaeological site and 17 isolated finds were encountered during the survey. The archaeological site, a Basketmaker II to Pueblo I lithic scatter (SJC-1106) had been previously recorded by San Juan College Cultural Resources Management Program (see appendix for site description). The site had been located during the survey of a proposed access route to Phillips Oil Company's proposed well location # 18-24, and relocated during the survey of the Phillips Oil Company proposed injection line pipeline. The site was encountered at the junction of the mainline and line J (Figure 4).

SEE ATTACHMENT

The injection line crosses through the extreme southwest portion of the site, where it has been disturbed by previous pipeline and road construction. Four pieces of lithic debitage were encountered in the pipeline right-of-way outside of the disturbed area. These artifacts appear to be surficial. Resurvey of the site area found artifact concentrations to occur in the existing roadway and bladed pipeline valve area. Approximately 20 pieces of lithic debitage, one biface, one uniface (chopper), and two unidentified Mesa Verde white ware sherds (7 mm thick with sand temper) were noted during the resurvey. Note: the projectile point fragments were not relocated. The integrity of these deposits has been greatly disturbed by blading activities. Despite the disturbed nature of the site, the potential for buried deposits remains. Also, there is good probability that the site is multicomponent due to the presence of the Archaic diagnostic and the relatively late Puebloan white ware ceramics.

Two alternatives are proposed for this 100 meter section of the pipeline: (1) to build the injection line where proposed with an archaeologist monitoring the construction activities, or (2) to reroute the mainline in order to avoid the site area. This alternative would require an archaeologist to survey the new route.

The remaining cultural materials were isolated finds. A total of 17 isolated finds were encountered during the survey. All are surficial occurrences and are described in Table 5.

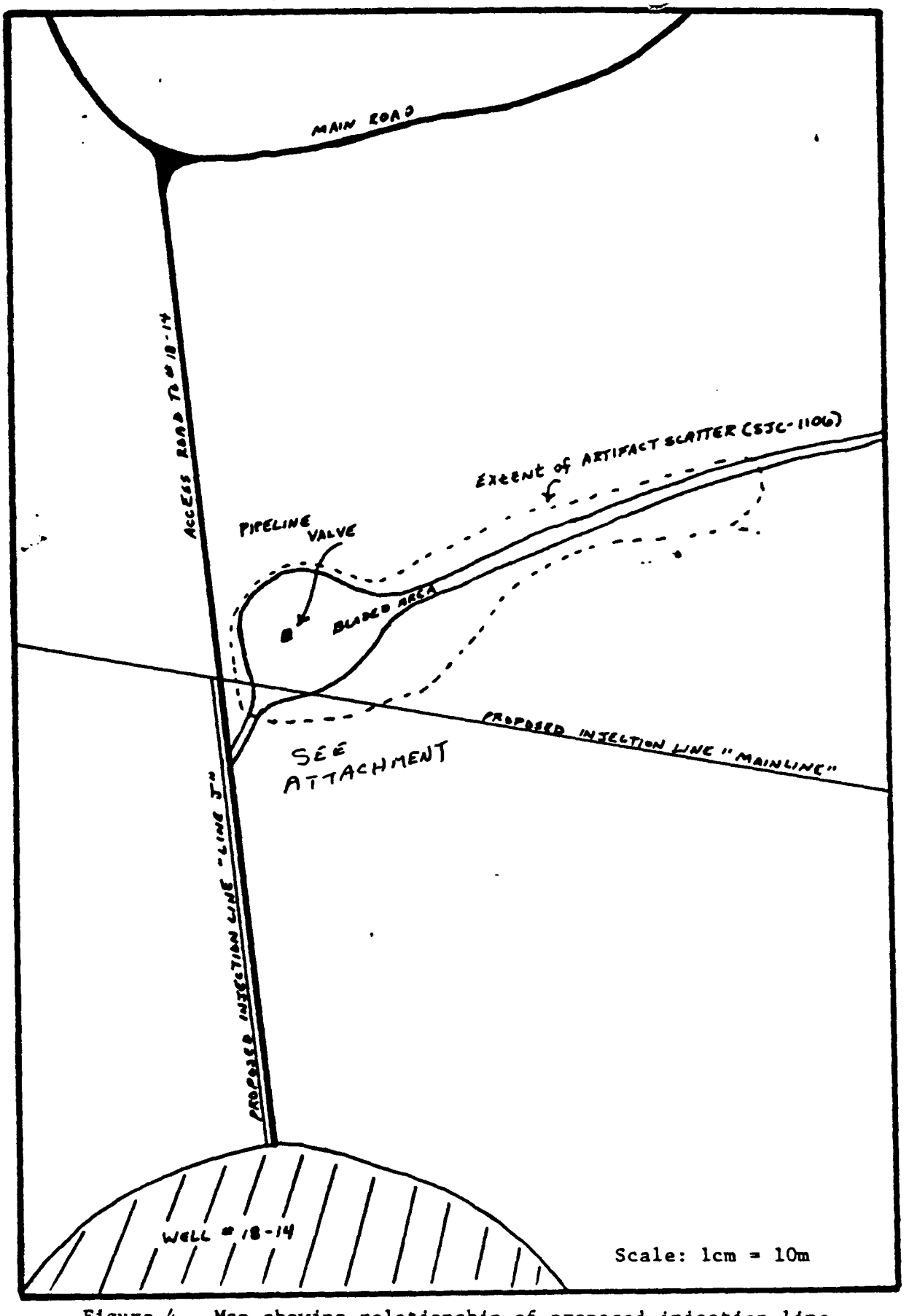

Figure 4. Map showing relationship of proposed injection line route and archaeological site - SJC-1106. Site Location: Center of E 1/2, W 1/2, SW 1/2 of Section 18, T 41 S - R 24 E, San Juan County, Utah.

TABLE 5

Isolated Finds from Phillips Oil Rutherford Unit Project
Legal Locations and Descriptions

Number	Legal Location	Description
RU # A	CTSESW Sec.12 T41S R23E UTM: 647,000 m E 4,121,825 m N	On location 12-W24. Isolated features: semi-circular, slab feature and two slab piles; a broken cup saucer found inside--white ovenware, modern; unidentified pipe fragments, wire and sole of shoe.
RU # B	CTNENW Sec.13 T41S R23E UTM: 647,000 m E 4,121,400 m N	13-21. 3 gray-green chert, interior core reduction flakes.
RU # C	CTNWNW Sec.13 T41S R23E UTM: 646,600 m E 4,121,950 m N	13-11. Gray and red quartzite cobble tool; 3 flakes removed.
RU # D	CTNWSW Sec.13 T41S R23E UTM: 647,000 m E 4,120,600 m N	*13-23. Biface with crude, heavily weathered flake scars, material type is light and dark gray mottled chert with tan cortex.
RU # E	NWSWSE Sec.13 T41S R23E UTM: 647,690 m E 4,120,400 m N	Access road to 13-34. 4 unidentified corrugated sherds; 4 recent Pepsi bottles.
RU # F	CTSWSE Sec.13 T41S R23E UTM: 647,700 m E 4,120,200 m N	*13-43. 1 crude olive-green oolitic chert biface.
RU # G	NENENE Sec.14 T41S R23E UTM: 646,250 m E 4,121,950 m N	1 Mesa Verde white ware sherd.
RU # H	NENWNW Sec.13 T41S R23E UTM: 646,775 m E 4,121,550 m N	*Injection line 12-24 to 13-11. 1 grainy, tan to yellow chert uniface with heavily weathered, yellowish patina; flake scars are smooth.
RU # I	NWNWNE Sec.18 T41S R24E UTM: 648,950 m E 4,121,325 m N	18-21 to 18-41. 3 green quartzite interior core reduction flakes.

TABLE 5, continued

Number	Legal Location	Description
RU # J	NWSESE Sec.18 T41S R24E UTM: 649,300 m E 4,120,150 m N	18-44 to 18-34. 1 gray-tan quartzite, utilized, secondary reduction flake; 1 green quartzite secondary reduction flake.
RU # K	NESWSW Sec.18 T41S R24E UTM: 648,450 m E 4,120,175 m N	18-34 to 18-14. 1 white quartzite, tertiary reduction flake; 1 green-gray quartzite, tertiary reduction flake.
RU # L	NWSWSE Sec.17 T41S R24E UTM: 650,400 m E 4,120,100 m N	17-14 to 17-44. 2 white chert, interior core reduction flakes.
RU # M	SWNWSW Sec.18 T41S R24E UTM: 648,200 m E 4,120,350 m N	18-13 to 18-14. 4 gray quartzite, secondary reduction flakes.
RU # N	NWSESE Sec.13 T41S R23E UTM: 647,700 m E 4,120,350 m N	13-33 to 13-44. 3 gray-green quartzite, interior core reduction flakes; 1 secondary reduction flake.
RU # O	SESENW Sec.13 T41S R23E UTM: 647,025 m E 4,121,000 m N	*13-22 to 13-33. 1 green chert uniface with brown patina; 1 tan quartzite, tertiary reduction flake.
RU # P	SWSESE Sec.12 T41S R23E UTM: 647,700 m E 4,121,725 m N	*13-31 to 12-44. 1 green-gray quartzite uniface.
RU # Q	NESESE Sec.13 T41S R23E UTM: 647,075 m E 4,121,100 m N	*13-22 to 13-31. 1 gray quartzite uniface with tan to brown patina.

* illustrated isolated finds.

note: all UTM coordinates are in zone 12.

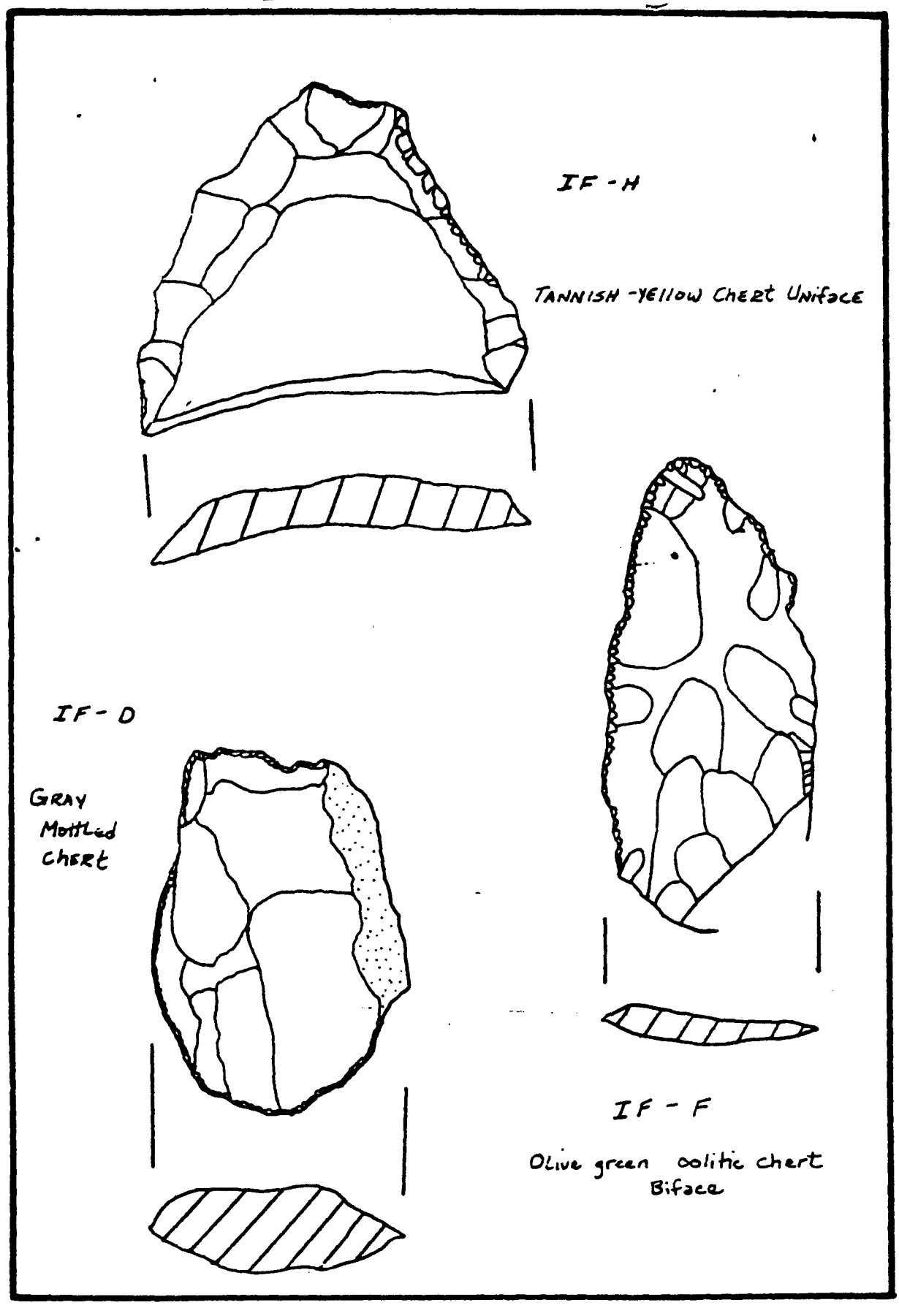

Figure 5. Flaked Stone Tools

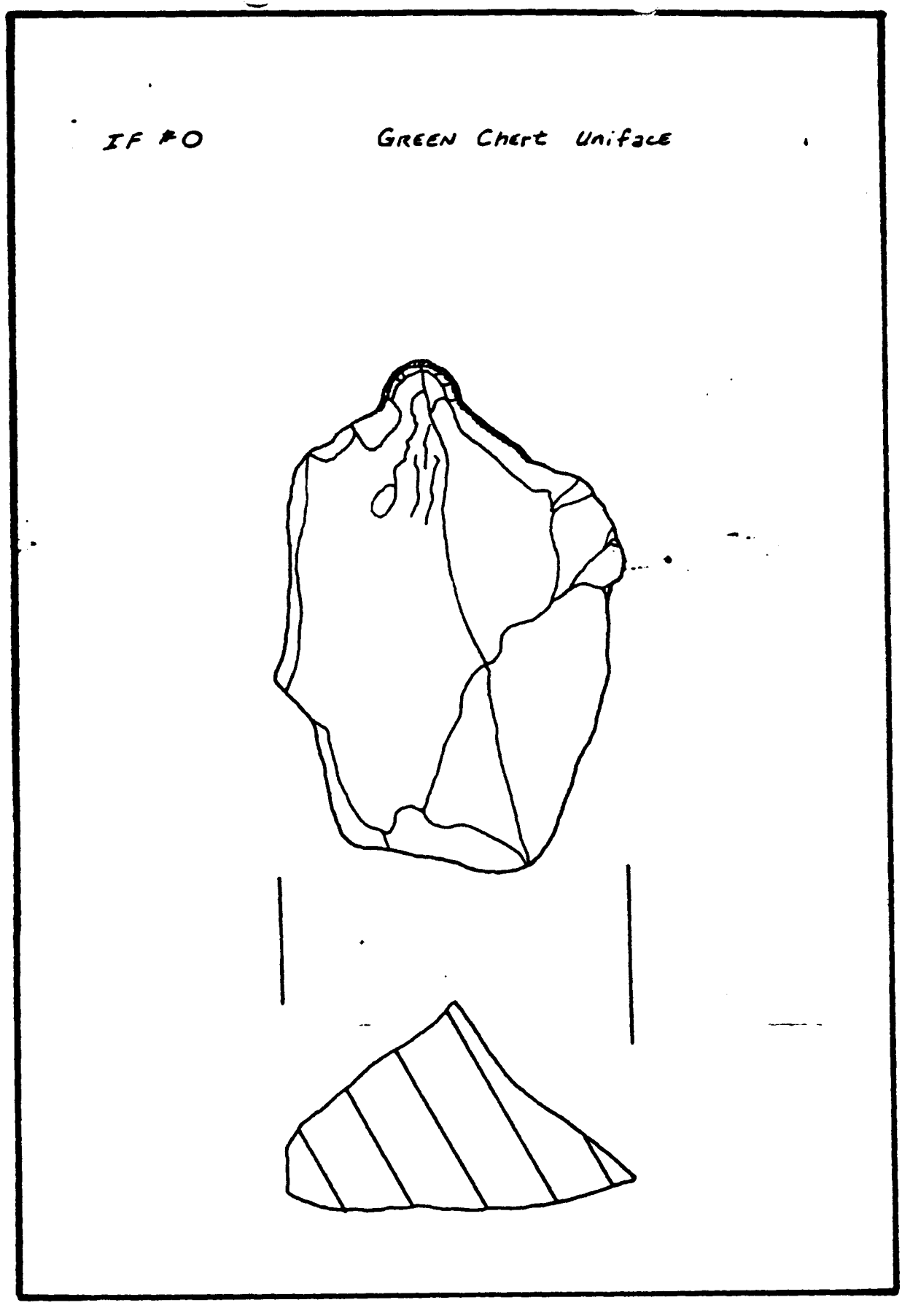

Figure 6. Flaked Stone Tool

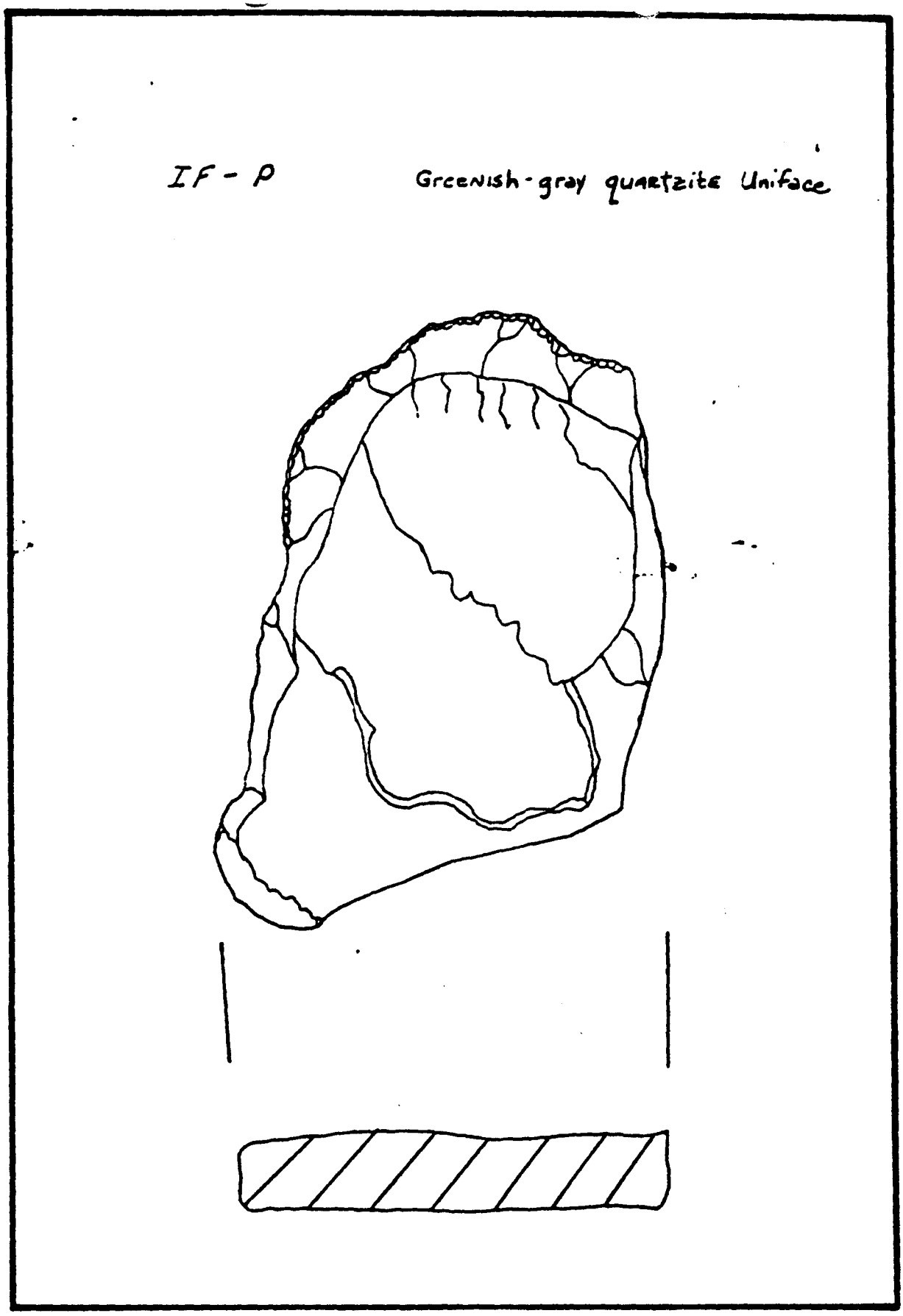

Figure 7. Flaked Stone Tool

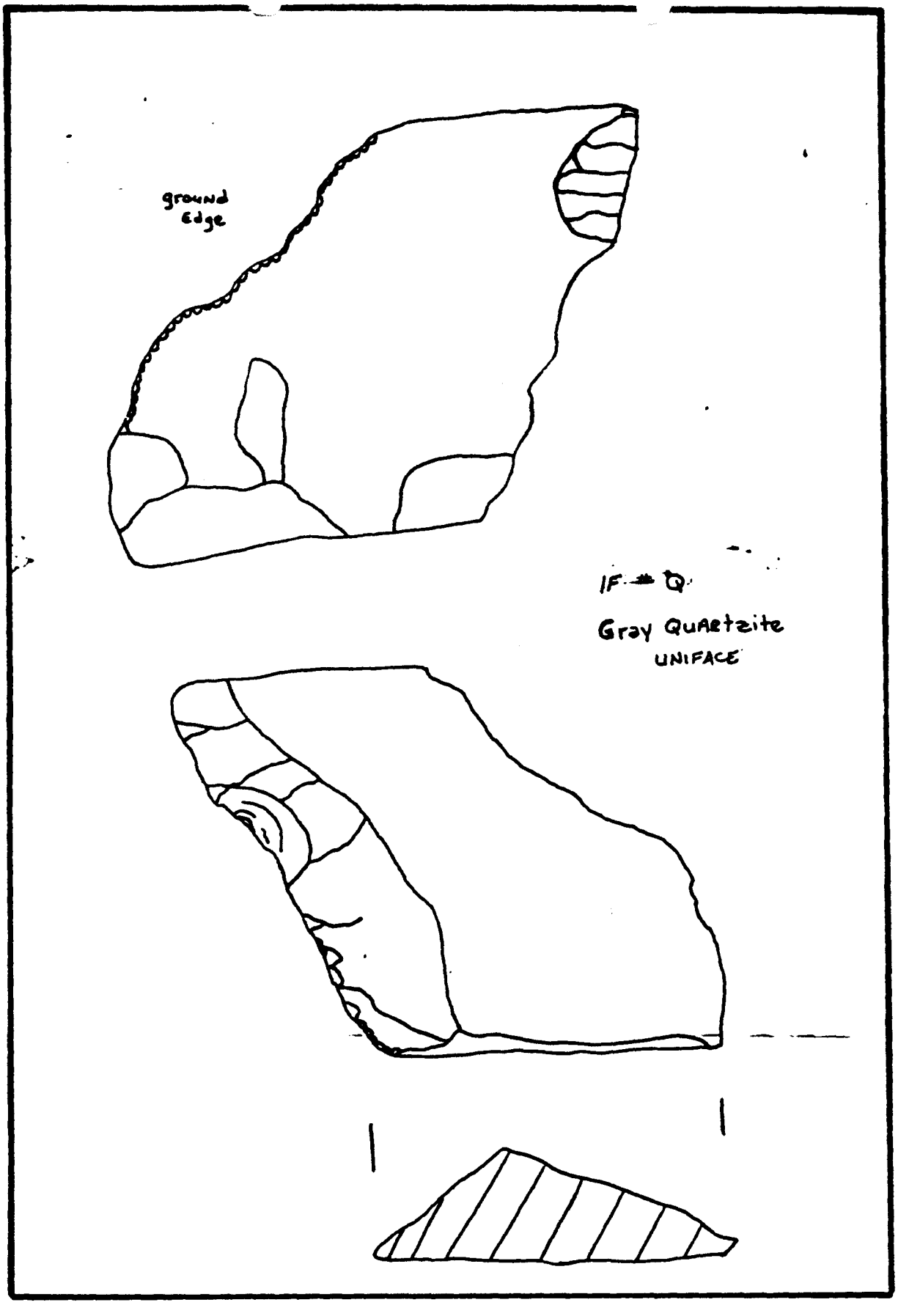

Figure 8. Flaked Stone Tool

RECOMMENDATIONS

SEE ATTACHMENT

One potentially significant archaeological site was encountered during the survey. As outlined in section "Results", the 100 meters of injection line (the mainline) west of line J can either be constructed as planned or rerouted. If the line is positioned as proposed, an archaeologist should be present to monitor construction of the 100 meters of mainline injection pipeline, extending east from line J. In the event that buried cultural deposits are encountered, construction should stop and the BIA area archaeologist be notified. The other alternative would be to reroute a portion of the mainline in order to avoid the site. An archaeological clearance would be needed if a new route is proposed. ← NEW ROUTE HAS BEEN SURVEYED SEE ATTACHMENT

The remaining cultural resources encountered during the survey were isolated finds which indicate prehistoric and modern use of the area. Most of these are the waste products from flint knapping activities. Several unifacial tools and one biface were also found. Recordation has exhausted the research potential of these isolated finds. Archaeological clearance is recommended for the proposed Rutherford Unit development project well locations, associated access roads and flow lines, and for the proposed injection line routes: mainline and lines A, B, C, D, E, F, F-1, G, H, I, and J, except for the 100 meter of mainline extnding east from its junction with line J.

REFERENCES CITED

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OPERATOR Phillips Oil Co. DATE 3-14-85

WELL NAME Rutherford Unit #13-11

SEC NW NW 13 T 41S R 23E COUNTY San Juan

43-037-31152	Indian
API NUMBER	TYPE OF LEASE

CHECK OFF:

- [x] PLAT
- [x] BOND
- [ ] NEAREST WELL
- [x] LEASE
- [x] FIELD
- [ ] POTASH OR OIL SHALE

PROCESSING COMMENTS:
Unit Well - or BLM Farmington NM
Need water permit

APPROVAL LETTER:

SPACING: [x] A-3 Rutherford UNIT [ ] c-3-a _____ CAUSE NO. & DATE

[ ] c-3-b [ ] c-3-c

STIPULATIONS:
1- Water

11/2/84
25020

STATE OF UTAH
NATURAL RESOURCES
Oil, Gas & Mining

Norman H. Bangerter, Governor
Dee C. Hansen, Executive Director
Dianne R. Nielson, Ph.D., Division Director

355 W. North Temple • 3 Triad Center • Suite 350 • Salt Lake City, UT 84180-1203 • 801-538-5340

March 15, 1985

Phillips Oil Company
P. O. Box 2920
Casper, Wyoming 82602

Gentlemen:

Re: Well No. Ratherford Unit #13-11 - NW NW Sec. 13, T. 41S, R. 23E
500' FNL, 660' FWL - San Juan County

Approval to drill the above referenced oil well is hereby granted in accordance with Section 40-6-18, Utah Code Annotated, as amended 1983; and predicated on Rule A-3, General Rules and Regulations and Rules of Practice and Procedure, subject to the following stipulations:

1. Prior to commencement of drilling, receipt by the Division of evidence providing assurance of an adequate and approved supply of water.

In addition, the following actions are necessary to fully comply with this approval:

1. Spudding notification to the Division within 24 hours after drilling operations commence.

2. Submittal to the Division of completed Form OGC-8-X, Report of Water Encountered During Drilling.

3. Prompt notification to the Division should you determine that it is necessary to plug and abandon this well. Notify John R. Baza, Petroleum Engineer, (Office) (801) 538-5340, (Home) 298-7695 or R. J. Firth, Associate Director, (Home) 571-6068.

4. Compliance with the requirements and regulations of Rule C-27, Associated Gas Flaring, General Rules and Regulations, Oil and Gas Conservation.

5. This approval shall expire one (1) year after date of issuance unless substantial and continuous operation is underway or an application for an extension is made prior to the approval expiration date.

The API number assigned to this well is 43-037-31152.

Sincerely,

R. J. Firth
Associate Director, Oil & Gas

as
Enclosures
cc: Branch of Fluid Minerals
Bureau of Indian Affairs

RECEIVED

SEP 16 1985

DIVISION OF OIL GAS & MINING

9-331
1973

Form Approved.
Budget Bureau No. 42-R1424

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use Form 9-331-C for such proposals.)

1. oil well [X] gas well [ ] other

2. NAME OF OPERATOR
Phillips Petroleum Company

3. ADDRESS OF OPERATOR
8055 E. Tufts Ave. Pkwy., Denver, CO 80237

4. LOCATION OF WELL (REPORT LOCATION CLEARLY. See space 17 below.)
AT SURFACE: 500' FNL, 660' FWL (NW/NW)
AT TOP PROD. INTERVAL:
AT TOTAL DEPTH:

5. LEASE
14-20-603-247-A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME
Navajo

7. UNIT AGREEMENT NAME
SW-I-4192

8. FARM OR LEASE NAME
Ratherford Unit

9. WELL NO.
#13-11

10. FIELD OR WILDCAT NAME
Greater Aneth

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Sec. 13, T41S, R23E

12. COUNTY OR PARISH
San Juan

13. STATE
Utah

14. API NO.
43-037-31152

15. ELEVATIONS (SHOW DF, KDB, AND WD)
4542' ung. G.L.

16. CHECK APPROPRIATE BOX TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

REQUEST FOR APPROVAL TO:		SUBSEQUENT REPORT OF:
TEST WATER SHUT-OFF	[ ]	[ ]
FRACTURE TREAT	[ ]	[ ]
SHOOT OR ACIDIZE	[ ]	[ ]
REPAIR WELL	[ ]	[ ]
PULL OR ALTER CASING	[ ]	[ ]
MULTIPLE COMPLETE	[ ]	[ ]
CHANGE ZONES	[ ]	[ ]
ABANDON*	[ ]	[ ]
(other)		

(NOTE: Report results of multiple completion or zone change on Form 9-330.)

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Drilled 18" conductor hole to 119' G.L. on 5-27-85. Ran 118' 13-3/8" 54.5# K-55 BT&C casing. Set at 118.36', cemented with 177 cu.ft. (150 sx) Class B cement to surface. Finished job and moved out rat hole driller 5-27-85.

Spudded well 8-26-85 with Energy Search Drilling Rig #2. Drilled 12-1/4" hole to 1551'. Ran 9-5/8" 36# S-80 and K-55 LT&C and ST&C casing, set at 1550.5'. Cemented with 956 cu.ft. (395 sx) Howco Light cement; tailed with 354 cu.ft. (300 sx) Class B cement. Circulated to surface. Job complete 8-28-85.

Drilled 8-3/4" hole to 5424'. Ran 7" 23# and 26# K-55 LT&C and ST&C casing; set at 5424'. Cemented with 1122 cu.ft. (550 sx) Howco Light cement; tailed with 360 cu.ft. (300 sx) Class B w/18% salt. Pressure tested casing to 2000 psi. Job complete 9-10-85. Plug back total depth 5397'.

Subsurface Safety Valve: Manu. and Type _____ Set @ _____ Ft.

18. I hereby certify that the foregoing is true and correct

SIGNED [signature] TITLE Drilling Manager DATE September 12, 1985

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

6-BLM, Farmington, NM
2-Utah O&GCC, SLC
1-Casper
1-Well File
1-J. Weichbrodt
1-Chevron USA, Inc.
1-Mobil Oil Corp.
1-Texaco, Inc.

*See Instructions on Reverse Side

1-Shell Oil Corp.

Form 3160-4
(November 1983)
(formerly 9-330)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN DUPLICATE* (See instructions on reverse side)

Form approved.
Budget Bureau No. 1004-0137
Expires August 31, 1985

WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

1a. TYPE OF WELL: OIL WELL [XX] GAS WELL [ ] DRY [ ] Other

b. TYPE OF COMPLETION: NEW WELL [XX] WORK OVER [ ] DEEP-EN [ ] PLUG BACK [ ] DIFF. RESVR. [ ] Other

2. NAME OF OPERATOR: Phillips Petroleum Company

3. ADDRESS OF OPERATOR: P. O. Box 2920, Casper, Wyoming 82602

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements)*
At surface: 500' FNL & 660' FWL, NW NW
At top prod. interval reported below
At total depth

API #43-037-31152

14. PERMIT NO.: --
DATE ISSUED: 3-15-85

RECEIVED
NOV 04 1985
DIVISION OF OIL GAS & MINING

5. LEASE DESIGNATION AND SERIAL NO.: 14-20-603-247-A
6. IF INDIAN, ALLOTTEE OR TRIBE NAME: Navajo
7. UNIT AGREEMENT NAME: SW-I-4192
8. FARM OR LEASE NAME: Ratherford Unit
9. WELL NO.: 13-11
10. FIELD AND POOL, OR WILDCAT: Greater Aneth
11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA: Sec. 13-T41S-R23E
12. COUNTY OR PARISH: San Juan
13. STATE: Utah

15. DATE SPUDDED	16. DATE T.D. REACHED	17. DATE COMPL. (Ready to prod.)	18. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	19. ELEV. CASINGHEAD
8/26/85	9/8/85	10/3/85	GR 4545.9', RKB 4557.9'	--

20. TOTAL DEPTH, MD & TVD	21. PLUG, BACK T.D., MD & TVD	22. IF MULTIPLE COMPL., HOW MANY*	23. INTERVALS DRILLED BY	ROTARY TOOLS	CABLE TOOLS
5424'	5405'	--	→	0 - 5424'	--

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)*: 5343' - 5396' Desert Creek Zone I

25. WAS DIRECTIONAL SURVEY MADE: No

26. TYPE ELECTRIC AND OTHER LOGS RUN: Dual Guard-Forxo, Contact Caliper, CDL-Dual Spaced Neutron, MSLC

27. WAS WELL CORED: No

28. CASING RECORD (Report all strings set in well)

CASING SIZE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13-3/8"	54.5#	118'	17-1/2"	177 cu.ft. Class "B"	--
9-5/8"	36#	1550'	12-1/4"	1310 cu.ft. Class "B"	--
7"	23# & 26#	5424'	8-3/4"	1482 cu.ft. Class "B"	--

29. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)
--	--	--	--	--

30. TUBING RECORD

SIZE	DEPTH SET (MD)	PACKER SET (MD)
2-7/8"	5207'	--

31. PERFORATION RECORD (Interval, size and number): 5396-5343', 2 SPF, 4" HSC Gun, 106 shots

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
5343-5396'	Broke dn ea ft of perfs w/50 gal 28% HCL. Acidized w/5350 gal 28% HCL w/2 gal/1000 F801 3 gal/1000 W802, 1 gal/1000 A-250 & 6 gal/1000 U42 w/19 bbl acid, using 150 ball sealers. Balled off.

33.* PRODUCTION Flushed w/35 bbls lease wtr.

DATE FIRST PRODUCTION	PRODUCTION METHOD (Flowing, gas lift, pumping—size and type of pump)	WELL STATUS (Producing or shut-in)
10/3/85	Pumping 1-1/2" Pump	Producing

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD	OIL—BBL.	GAS—MCF.	WATER—BBL.	GAS-OIL RATIO
10/31/85	24	--	→	28	21	2	750

FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE	OIL—BBL.	GAS—MCF.	WATER—BBL.	OIL GRAVITY-API (CORR.)
--	--	→	28	21	2	40.0

34. DISPOSITION OF GAS (Sold, used for fuel, vented, etc.): Sold

TEST WITNESSED BY: --

85110

35. LIST OF ATTACHMENTS: None

36. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records

SIGNED D. L. Nicholson for D. C. Gill TITLE Area Manager DATE 11/1/85

*(See Instructions and Spaces for Additional Data on Reverse Side)

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

37. **SUMMARY OF POROUS ZONES:** (Show all important zones of porosity and contents thereof; cored intervals; and all drill-stem, tests, including depth interval tested, cushion used, time tool open, flowing and shut-in pressures, and recoveries):

FORMATION	TOP	BOTTOM	DESCRIPTION, CONTENTS, ETC.
NO CORES or DST's RUN			

Distribution:
4 - BLM, Farmington, NM
2 - Utah O&G CC, Salt Lake City, UT
1 - The Navajo Nation, Window Rock, AZ
1 - R. Ewing, B'Ville
1 - L. R. Williamson r) G. W. Berk, Denver
1 - T. L. Carten r) P. Bertuzzi, Denver
1 - J. B. Lindemood, Denver
1 - D. L. Kennedy, Denver
16 - W. I. Owners
1 - J. Weichbrodt, Cortez
1 - File RC

38. **GEOLOGIC MARKERS**

NAME	TOP MEAS. DEPTH	TOP TRUE VERT. DEPTH
LOG TOPS		
Shinarump	2076	
DeChelly	2357	
Hermosa	4297	
Ismay	5158	
Desert Creek Zone I	5330	

UIC CHECKLIST FOR APPLICATION APPROVAL

OPERATOR Phillips Petroleum WELL NUMBER 13-11

SEC. 13 T. 41S R. 23E COUNTY San Juan

API # 43-037-31152

NEW WELL _____ DISPOSAL WELL _____ ENHANCED RECOVERY WELL ✓

- Plat showing surface ownership	Yes _____	No ✓
- Application forms complete	Yes ✓	No _____
- Schematic of well bore	Yes ✓	No _____
- Adequate geologic information	Yes * ✓	No _____
- Rate and Pressure information	Yes * ✓	No _____
- Fluid source	Yes * ✓	No _____
- Analysis of formation fluid	Yes * ✓	No _____
- Analysis of injection fluid	Yes * ✓	No _____
- USDW information	Yes * ✓	No _____
- Mechanical integrity test	Yes _____	No _____

Number of wells in 1/2 mile review: PrA Ø Prod. 7 Inj. 1

Comments: 500 BWPD, 3000 psig

13 3/8" surface, 9 5/8" intermediate, 7" production

* Info submitted in Feb. 1986

Reveiwed by Dorothy Swindel 8/20/86

UTAH
NATURAL RESOURC
OIL, GAS AND MIN

3 Triad Center, Suite 350, Salt Lake City, UT 84180-1203

Ph. (801)538-5340

APPLICATION FOR INJECTION WELL

Operator: Phillips Petroleum Company Telephone: (307)237-3791

Address: P. O. Box 2920

City: Casper State: Wyoming Zip: 82602

Well no.: 13 W11 Field or Unit name: Ratherford Unit

Sec.: 13 Twp.: 41S Rng.: 23E County: San Juan Lease no. 14-20-603-247A

	YES	NO
Is this application for expansion of an existing project?	X	
Will the proposed well be used for: Enhanced recovery?	X	
Disposal?		X
Storage?		X
Is this application for a new well to be drilled?		X
Has a casing test been performed for an existing well?		X

(If yes, date of test:)

Injection interval: from 5343' to 5396'

Maximum injection: rate 500 BWPD pressure 3000 psig

Injection zone contains X oil, X gas or ____ fresh water within 1/2 mile.

Additional information as required by Rule 502 should accompany this form.

I hereby certify that the foregoing is true and correct to the best of my knowledge:

Signed: D.C. Gill Title: Area Manager Date: 8/13/86

D.C. Gill

(This space for DOGM approval)

Approved by: Title: Date:

DOGM-UIC-1 (2/86)

LOCATION: NWNW Sec 3 - T41S - R23E

FIELD: GREATER ANETH

RESERVOIR: Desert Creek Zone I

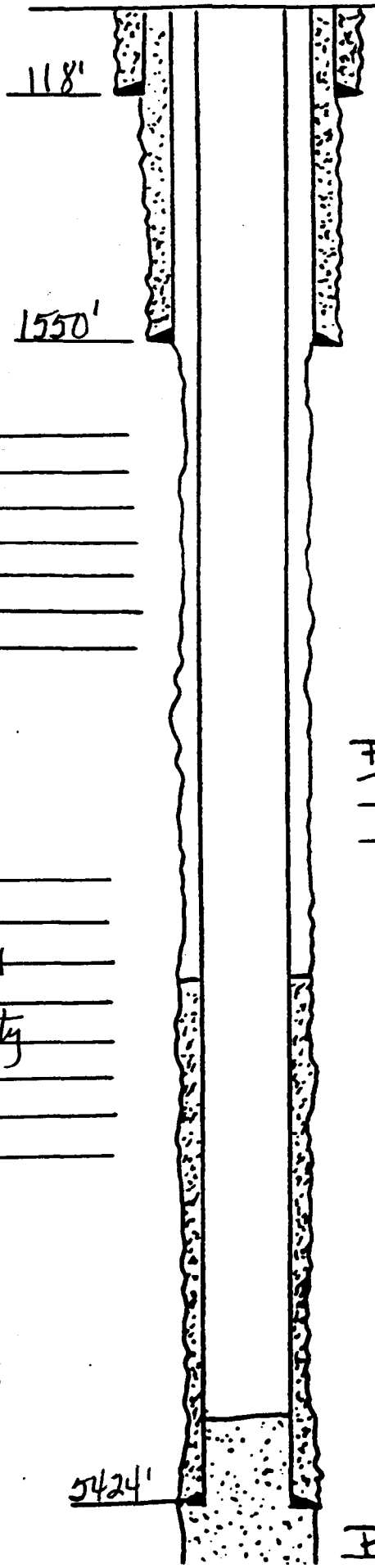
W. COMPLETION: Injector

PRESENT STATUS: Conversion

RKB 4557.9

GL 4545.9

Well #: 13W11



SURFACE CASING: 13 3/8" 54.5#

INTERMEDIATE CASING: 9 5/8" 36#

PRODUCTION CASING: 7" 23#/26#

PERFORATIONS:
5343 - 5396'

PACKER: Baker Model AB Tension Type or Similar set at 5243'

Logs on file:
Gamma Ray
Density Porosity
Neutron Porosity
Electrical Resistivity
Contact Caliper
Microlog

PBTD: 5405'

OTD: 5424'

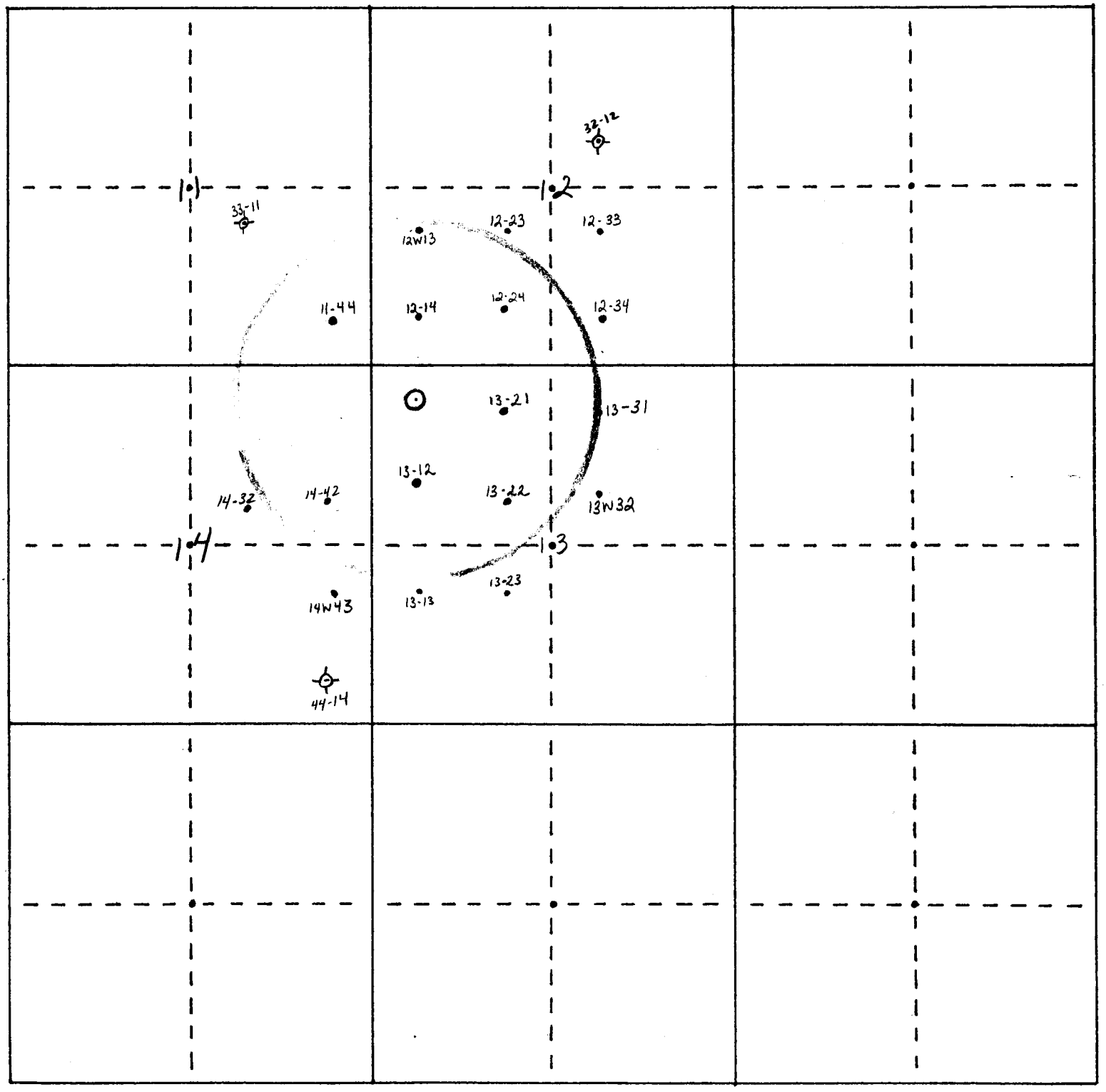
Phillips Petroleum Company

Operator Phillips

Well Ratherford Unit 13-11

Location 500 FNL, 660 FWL NW, NW

Sec. 13, T41S, R 23E San Juan Co.



UTAH
NATURAL RESOURCE
OIL, GAS AND MIN

3 Triad Center, Suite 350, Salt Lake City, UT 84180-1203

Ph. (801)538-5340

APPLICATION FOR INJECTION WELL

Operator: Phillips Petroleum Company Telephone: (307)237-3791

Address: P. O. Box 2920

City: Casper State: Wyoming Zip: 82602

Well no.: 13 W11 Field or Unit name: Ratherford Unit

Sec.: 13 Twp.: 41S Rng.: 23E County: San Juan Lease no. 14-20-603-247A

	YES	NO
Is this application for expansion of an existing project?	X	
Will the proposed well be used for: Enhanced recovery?	X	
Disposal?		X
Storage?		X
Is this application for a new well to be drilled?		X
Has a casing test been performed for an existing well?		X

(If yes, date of test:)

Injection interval: from 5343' to 5396'

Maximum injection: rate 500 BWPD pressure 3000 psig

Injection zone contains X oil, X gas or ____ fresh water within 1/2 mile.

Additional information as required by Rule 502 should accompany this form.

I hereby certify that the foregoing is true and correct to the best of my knowledge:

Signed: D.C. Gill Title: Area Manager Date: 8/13/86

D.C. Gill

(This space for DOGM approval)

Approved by: ____ Title: ____ Date: ____

DOGM-UIC-1 (2/86)

LOCATION: NWNW Sec 3 -T41S- R23E

FIELD: GREATER ANETH

RESERVOIR: Desert Creek Zone I

W_ COMPLETION: Injector

PRESENT STATUS: Conversion

RKB 4557.9

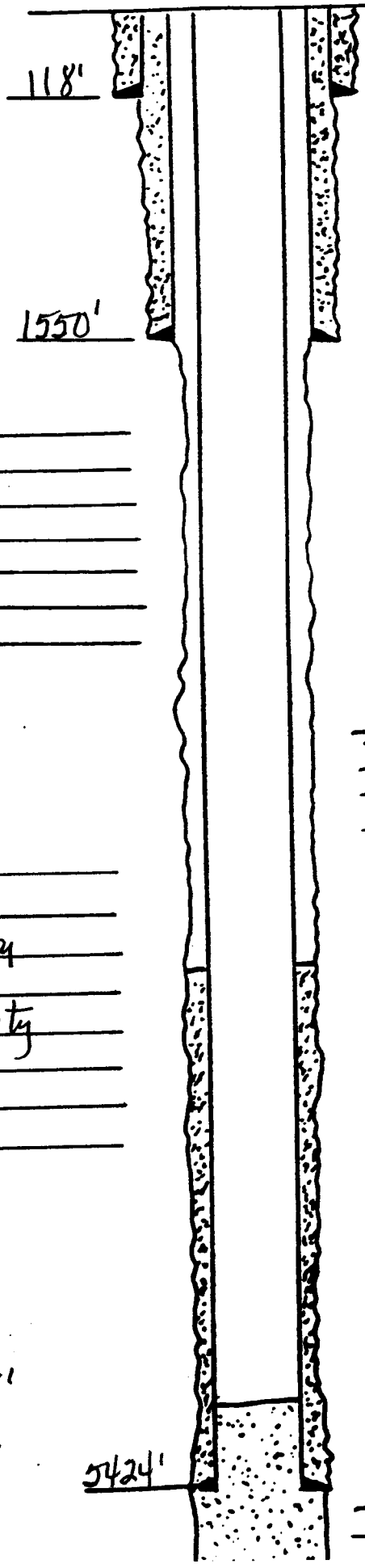
GL 4545.9

Well #: 13W11

SURFACE CASING: 13 3/8" 54.5#

INTERMEDIATE CASING: 9 5/8" 36#

PRODUCTION CASING: 7" 23#/26#



PERFORATIONS:
5343 - 5396'

PACKER: Baker Model AB Tension Type or Similar set at 5243'

Logs on file:
Gamma Ray
Density Porosity
Neutron Porosity
Electrical Resistivity
Contact Caliper
Microlog

PBTD: 5405'

OTD: 5424'

Phillips Petroleum Company

APPLICATION FOR INJECTION WELL

Operator: Phillips Petroleum Company Telephone: (307)237-3791

Address: P. O. Box 2920

City: Casper State: Wyoming Zip: 82602

Well no.: 13 W11 Field or Unit name: Ratherford Unit

Sec.: 13 Twp.: 41S Rng.: 23E County: San Juan Lease no. 14-20-603-247A

	YES	NO
Is this application for expansion of an existing project?	X	
Will the proposed well be used for: Enhanced recovery?	X	
Disposal?		X
Storage?		X
Is this application for a new well to be drilled?		X
Has a casing test been performed for an existing well?		X

(If yes, date of test:)

Injection interval: from 5343' to 5396'

Maximum injection: rate 500 BWPD pressure 3000 psig

Injection zone contains X oil, X gas or ____ fresh water within 1/2 mile.

Additional information as required by Rule 502 should accompany this form.

I hereby certify that the foregoing is true and correct to the best of my knowledge:

Signed: Original Signed By: D. C. GILL Title: Area Manager Date: 8/13/86

D.C. Gill

(This space for DOGM approval)

Approved by: Title: Date:

DOGM-UIC-1 (2/86)

LOCATION: NWNW Sec 13 - T41S - R23E

FIELD: GREATER ANE H

RESERVOIR: Desert Creek Zone I

✓ : COMPLETION: Injector/

PRESENT STATUS: Conversion

RKB 4557.9

GL 4545.9

118'

Well #: 13W11

1550'

SURFACE CASING: 13 3/8" 54.5#

INTERMEDIATE CASING: 9 5/8" 36#

PRODUCTION CASING: 7" 23#/26#

PERFORATIONS:

5343 - 5396'

PACKER: Baker Model AB Tension Type or Similar set at 5243'

Logs on file:

Gamma Ray

Density Porosity

Neutron Porosity

Electrical Resistivity

Contact Caliper

Microlog

PBTD: 5405'

OTD: 5424'

5424'

Phillips Petroleum Company

PHILLIPS PETROLEUM COMPANY
CASPER, WYOMING 82602
BOX 2920
EXPLORATION AND PRODUCTION GROUP

August 14, 1986

RECEIVED
AUG 15 1986
DIVISION OF
OIL, GAS & MINING

State of Utah
Division of Oil, Gas, and Mining
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

Attn: Gil Hunt

RE: Ratherford Unit
San Juan County
Class II Injection Well
Conversions

Dear Mr. Hunt:

Enclosed are applications of conversions for the last eleven wells in the Ratherford Unit Conversion Program. The well numbers are:

	12-W11	13-W11	13-W33
8W34	12-W24	13-W13	17-W32
11W42	12-W33	13-W22	18-W12

We have listed, on each well bore schematic, the logs on file for that well. We have also enclosed a copy of our letters to mineral lease operators and landowners in the area informing them of these proposed well conversions. Please refer to the attachment package of February and June 1986 for other required information. Please contact Renee Taylor at (307) 237-3791 with any questions.

Thank you for your help in making this conversion program run smoothly.

Sincerely,

PHILLIPS PETROLEUM COMPANY

D. C. Gill
Area Manager

RCT/fb (23)
Attach
cc: B. J. Murphy - Casper w/o attach
J. R. Reno - Cortez w/attach.
Casper RC

PHILLIPS PETROLEUM COMPANY
CASPER, WYOMING 82602
BOX 2920. Box 2920, Casper, Wyoming 82602
EXPLORATION AND PRODUCTION GROUP

August 14, 1986

Navajo Tribe
Department of Water Management
P. O. Box 308
Window Rock, AZ 86515

Attn: Masued Uz Zaman

Re: Ratherford Unit
Injection Well Conversions

Dear Sirs,

Phillips Petroleum Company has made application to the State of Utah, Division of Oil, Gas and Mining to convert eleven existing producing wells to water injection wells in the Ratherford Unit secondary recovery project. The revised rule 502(b)(12) requires that you are notified of these plans and are provided with a copy of the application for injection well (Form DOGM-UIC-1). Under Rule 503 you are provided with the opportunity to object to the proposed application.

"Applications for Injection Well" are attached for the following existing wells:

	12W11	13W11	13W33
8W34	12W24	13W13	17W32
11W42	12W33	13W22	18W12

Please contact Renee Taylor or Blair Murphy at (307) 237-3791 with any questions.

Sincerely,

Original Signed By:
D. C. GILL

D. C. Gill
Area Manager

RCT/fb (17)
cc: B. J. Murphy-Casper
J. R. Reno-Cortez
St. of Utah OG&M/UIC
Casper-RC

PHILLIPS PETROLEUM COMPANY
CASPER, WYOMING 82602
BOX 2920
P.O. Box 2920, Casper, Wyoming 82602
EXPLORATION AND PRODUCTION GROUP

August 14, 1986

Mobil Oil Corp.
P.O. Box 5444
Denver, CO 80217
Attn: Joint Interest Advisor

Re: Ratherford Unit
Injection Well Conversions

Dear Sirs,

Phillips Petroleum Company has made application to the State of Utah, Division of Oil, Gas and Mining to convert eleven existing producing wells to water injection wells in the Ratherford Unit secondary recovery project. The revised rule 502(b)(12) requires that you are notified of these plans and are provided with a copy of the application for injection well (Form DOGM-UIC-1). Under Rule 503 you are provided with the opportunity to object to the proposed application.

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	12W11	13W11	13W33
8W34	12W24	13W13	17W32
11W42	12W33	13W22	18W12

Please contact Renee Taylor or Blair Murphy at (307) 237-3791 with any questions.

Sincerely,

Original Signed By:
D. C. GILL

D. C. Gill
Area Manager

RCT/fb (17)
cc: B. J. Murphy-Casper
J. R. Reno-Cortez
St. of Utah OG&M/UIC
Casper-RC

PHILLIPS PETROLEUM COMPANY
CASPER, WYOMING 82602
BOX 2920
P.O. Box 2920, Casper, Wyoming 82602
EXPLORATION AND PRODUCTION GROUP

August 14, 1986

Texaco, Inc.
P.O. Box 3360
Casper, WY 82602
Attn: A. J. Sanford

Re: Ratherford Unit
Injection Well Conversions

Dear Sirs,

Phillips Petroleum Company has made application to the State of Utah, Division of Oil, Gas and Mining to convert eleven existing producing wells to water injection wells in the Ratherford Unit secondary recovery project. The revised rule 502(b)(12) requires that you are notified of these plans and are provided with a copy of the application for injection well (Form DOGM-UIC-1). Under Rule 503 you are provided with the opportunity to object to the proposed application.

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Please contact Renee Taylor or Blair Murphy at (307) 237-3791 with any questions.

Sincerely,

Original Signed By:
D. C. GILL

D. C. Gill
Area Manager

RCT/fb (17)
cc: B. J. Murphy-Casper
J. R. Reno-Cortez
St. of Utah OG&M/UIC
Casper-RC

Publication was sent to the following:

Phillips Petroleum Company
Box 2920
Casper, Wyoming 82602

San Juan Record
PO Box 879
937 East Highway 666
Monticello, Utah 84535

Newspaper Agency
Legal Advertising
Mezzanine Floor
143 South Main
Salt Lake City, Utah 84110

Utah State Department of Health
Water Pollution Control
Attn: Loren Morton
4241 State Office Building
Salt Lake City, Utah 84114

U.S. Environmental Protection Agency
Suite 1300
Attn: Mike Strieby
999 18th Street
Denver, Colorado 80202-2413

Bureau of Land Management
Consolidated Financial Center
324 South State Street
Salt Lake City, Utah 84111-2303

Bureau of Land Management
Fluid Minerals Caller Service #4104
Farmington, New Mexico 87499

Navajo Tribe
Department of Water Management
PO Box 308
Window Rock Arizona 86515
Attn: Masued Uz Zaman

Mobil Oil Corporation
PO Box 5444
Denver, Colorado 80217

Texaco, Inc.
PO Box 3360
Casper, Wyoming 82602
Attn: A.J. Sanford

Sept. 11, 1986
Marlayne Poulsen

STATE OF UTAH
NATURAL RESOURCES
Oil, Gas & Mining

Norman H. Bangerter, Governor
Dee C. Hansen, Executive Director
Dianne R. Nielson, Ph.D., Division Director

355 W. North Temple • 3 Triad Center • Suite 350 • Salt Lake City, UT 84180-1203 • 801-538-5340

September 11, 1986

Newspaper Agency Corporation
Legal Advertising
143 South Main - Mezzanine Floor
Salt Lake City, Utah 84110

Gentlemen:

RE: Cause No. UIC-087

Enclosed is a Notice of Application of Administrative Approval before the Division of Oil, Gas and Mining, Department of Natural Resources, State of Utah.

It is requested that this notice be published ONCE ONLY, as soon as possible, but no later than the 24th day of September, 1986. In the event that said notice cannot be published by this date, please notify me immediately by calling 538-5340.

Upon completion of this request, please send proof of publication and statement of cost to the Division of Oil, Gas and Mining, 355 West North Temple, 3 Triad Center, Suite 350, Salt Lake City, Utah 84180-1203.

Sincerely,

Marlayne Poulsen
for
Marjorie L. Anderson
Administrative Assistant

mfp

Enclosure

STATE OF UTAH
NATURAL RESOURCES
Oil, Gas & Mining

Norman H. Bangerter, Governor
Dee C. Hansen, Executive Director
Dianne R. Nielson, Ph.D., Division Director

355 W. North Temple • 3 Triad Center • Suite 350 • Salt Lake City, UT 84180-1203 • 801-538-5340

September 11, 1986

San Juan Record
P.O. Box 879
937 East Highway 666
Monticello, Utah 84535

Gentlemen:

RE: Cause No. UIC-087

Enclosed is a Notice of Application of Administrative Approval before the Division of Oil, Gas and Mining, Department of Natural Resources, State of Utah.

It is requested that this notice be published ONCE ONLY, as soon as possible, but no later than the 24th day of September, 1986. In the event that said notice cannot be published by this date, please notify me immediately by calling 538-5340.

Upon completion of this request, please send proof of publication and statement of cost to the Division of Oil, Gas and Mining, 355 West North Temple, 3 Triad Center, Suite 350, Salt Lake City, Utah 84180-1203.

Sincerely,

Marlayne Louisen
for
Marjorie L. Anderson
Administrative Assistant

mfp

Enclosure

BEFORE THE DIVISION OF OIL, GAS AND MINING
DEPARTMENT OF NATURAL RESOURCES
STATE OF UTAH

---ooOoo---

IN THE MATTER OF THE APPLICATION OF PHILLIPS PETROLEUM COMPANY, FOR ADMINISTRATIVE APPROVAL TO INJECT FLUID INTO WELLS TO BE CONVERTED TO ENHANCED RECOVERY INJECTION WELLS LOCATED IN SECTIONS 11, 12, AND 13, TOWNSHIP 41 SOUTH, RANGE 23 EAST; AND SECTIONS 8, 17 AND 18, TOWNSHIP 41 SOUTH, RANGE 24 EAST, S.L.M., SAN JUAN COUNTY, UTAH	:	CAUSE NO. UIC-087

---ooOoo---

THE STATE OF UTAH TO ALL INTERESTED PARTIES IN THE ABOVE ENTITLED MATTER.

Notice is hereby given that Phillips Petroleum Company, Box 2920, Casper, Wyoming 82602, has requested adminstrative approval from the Division to convert the following listed wells to enhanced recovery water injection wells:

RATHERFORD UNIT - San Juan County, Utah

#11W42, Sec. 11, T41S, R23E	#13W22, Sec. 13, T41S, R23E
#12W11, Sec. 12, T41S, R23E	#13W33, Sec. 13, T41S, R23E
#12W24, Sec. 12, T41S, R23E	# 8W34, Sec. 8, T41S, R24E
#12W33, Sec. 12, T41S, R23E	#17W32, Sec. 17, T41S, R24E
#13W11, Sec. 13, T41S, R23E	#18W12, Sec. 18, T41S, R24E
#13W13, Sec. 13, T41S, R23E	

The proposed operating data for the wells is as follows:

INJECTION INTERVAL: Paradox Formation 5303' - 5548'
MAXIMUM ESTIMATED SURFACE PRESSURE: 3000 psig
MAXIMUM ESTIMATED WATER INJECTION RATE: 500 BWPD

Approval of this Application will be granted unless any objections are filed with the Division of Oil, Gas and Mining within fifteen days after publication of this Notice. Objections should be mailed to the Division of Oil, Gas and Mining, Attention: UIC Program Manager, 355 West North Temple, 3 Triad Center, Suite 350, Salt Lake City, Utah 84180-1203.

DATED this 8th day of September, 1986.

STATE OF UTAH
DIVISION OF OIL, GAS AND MINING

Marjorie L. Anderson
MARJORIE L. ANDERSON
Administrative Assistant

101703

STATE OF UTAH
NATURAL RESOURCES
Oil, Gas & Mining

Norman H. Bangerter, Governor
Dee C. Hansen, Executive Director
Dianne R. Nielson, Ph.D., Division Director

355 W. North Temple • 3 Triad Center • Suite 350 • Salt Lake City, UT 84180-1203 • 801-538-5340

October 9, 1986

Phillips Petroleum Company
P.O. Box 2920
Casper, Wyoming 82602

Gentlemen:

RE: Injection Well Approval - Cause No. UIC-087

Insofar as this Division is concerned, administrative approval is hereby granted to convert the following wells to Class II enhanced recovery water injection wells:

RATHERFORD UNIT - San Juan County, Utah

#11W42, Sec. 11, T41S, R23E	#13W22, Sec. 13, T41S, R23E
#12W11, Sec. 12, T41S, R23E	#13W33, Sec. 13, T41S, R23E
#12W24, Sec. 12, T41S, R23E	# 8W34, Sec. 8, T41S, R24E
#12W33, Sec. 12, T41S, R23E	#17W32, Sec. 17, T41S, R24E
#13W11, Sec. 13, T41S, R23E	#18W12, Sec. 18, T41S, R24E
#13W13, Sec. 13, T41S, R23S	

This approval is conditional upon full compliance with the UIC rules and regulations adopted by the Board of Oil, Gas and Mining, and construction and operation of the wells as outlined in the application submitted.

If you have any questions concerning this matter, please do not hesitate to call or write.

Best regards,

Dianne R. Nielson

Dianne R. Nielson
Director

mfp
7627U

Affidavit of Publication

RECEIVED
OCT 0 - 1986
DIVISION OF
OIL, GAS & MINING

STATE OF UTAH,

ss.

County of Salt Lake

CHRIS ANDERSON

BEFORE THE DIVISION OF OIL, GAS AND MINING
DEPARTMENT OF NATURAL RESOURCES
STATE OF UTAH
CAUSE NO. UIC-087

IN THE MATTER OF THE APPLICATION OF PHILLIPS PETROLEUM COMPANY, FOR THE ADMINISTRATIVE APPROVAL TO INJECT FLUID INTO WELLS TO BE CONVERTED TO ENHANCED RECOVERY INJECTION WELLS LOCATED IN SECTIONS 11, 12, AND 13, TOWNSHIP 41 SOUTH, RANGE 23 EAST; AND SECTIONS 8, 17 AND 18, TOWNSHIP 41 SOUTH, RANGE 24 EAST, S.L.M., SAN JUAN COUNTY, UTAH.

THE STATE OF UTAH TO ALL INTERESTED PARTIES IN THE ABOVE ENTITLED MATTER.

Notice is hereby given that Phillips Petroleum Company, Box 2920, Casper, Wyoming 82602, has requested administrative approval from the Division to convert the following listed wells to enhanced recovery water injection wells:

RATHERFORD UNIT - San Juan County, Utah

#11W42, Sec. 11, T41S, R23E
#12W11, Sec. 12, T41S, R23E
#12W24, Sec. 12, T41S, R23E
#12W33, Sec. 12, T41S, R23E
#13W11, Sec. 13, T41S, R23E
#13W13, Sec. 13, T41S, R23E
#13W22, Sec. 13, T41S, R23E
#13W33, Sec. 13, T41S, R23E
8W34, Sec. 8, T41S, R24E
#17W32, Sec. 17, T41S, R24E
#18W12, Sec. 18, T41S, R24E

The proposed operating data for the wells is as follows:
Injection Interval: Paradox Formation 5303'-5548'
Maximum Estimated Surface Pressure: 3000 psig
Maximum Estimated Water Injection Rate: 500 BWPD

Approval of this Application will be granted unless any objections are filed with the Division of Oil, Gas and Mining within fifteen days after publication of this Notice. Objections should be mailed to the Division of Oil, Gas and Mining, Attention: UIC Program Manager, 355 West North Temple, 3 Triad Center, Suite 350, Salt Lake City, Utah 84180-1203.

DATED this 8th day of September, 1986.

STATE OF UTAH
DIVISION OF OIL, GAS AND MINING
MARJORIE L. ANDERSON
Administrative Assistant

A-75

Being first duly sworn, deposes and says that he/she is legal advertising clerk of THE SALT LAKE TRIBUNE, a daily newspaper printed in the English language with general circulation in Utah, and published in Salt Lake City, Salt Lake County, in the State of Utah, and of the DESERET NEWS, a daily newspaper printed in the English language with general circulation in Utah, and published in Salt Lake City, Salt Lake County, in the State of Utah.

That the legal notice of which a copy is attached hereto

CAUSE #UIC-087

was published in said newspaper on

SEPT 18, 1986

Legal Advertising Clerk

Subscribed and sworn to before me this 30th day of

SEPTEMBER A.D. 19 86

B. T. Davis
Notary Public

My Commission Expires

MARCH 01, 1988

NOTARY PUBLIC
B. T. DAVIS
STATE OF UTAH

AFFIDAVIT OF PUBLICATION

Notice

BEFORE THE DIVISION OF OIL, GAS AND MINING DEPARTMENT OF NATURAL RESOURCES, STATE OF UTAH

IN THE MATTER OF THE APPLICATION OF PHILLIPS PETROLEUM COMPANY, FOR ADMINISTRATIVE APPROVAL TO INJECT FLUID INTO WELLS TO BE CONVERTED TO ENHANCED RECOVERY INJECTION WELLS LOCATED IN SECTIONS 11, 12, AND 13, TOWNSHIP 41 SOUTH, RANGE 23 EAST; AND SECTIONS 8, 17 AND 18, TOWNSHIP 41 SOUTH, RANGE 24 EAST, S.L.M., SAN JUAN COUNTY, UTAH

★ ★ ★ ★

CAUSE NO. UIC-087

THE STATE OF UTAH TO ALL INTERESTED PARTIES IN THE ABOVE ENTITLED MATTER.

Notice is hereby given that Phillips Petroleum Company, Box 2920, Casper, Wyoming 82602, has requested administrative approval from the Division to convert the following listed wells to enhanced recovery water injection wells:

RATHERFORD UNIT —
San Juan County, Utah
#11W42, Sec. 11, T41S, R23E
#12W11, Sec. 12, T41S, R23E
#12W24, Sec. 12, T41S, R23E
#12W33, Sec. 12, T41S, R23E
[redacted]
#13W13, Sec. 13, T41S, R23E
#13W22, Sec. 13, T41S, R23E
#13W33, Sec. 13, T41S, R23E
8W34, Sec. 8, T41S, R24E
#17W32, Sec. 17, T41S, R24E
#18W12, Sec. 18, T41S, R24E

The proposed operating data for the wells is as follows:

INJECTION INTERVAL: Paradox Formation 5303' - 5548'

MAXIMUM ESTIMATED SURFACE PRESSURE: 3000 psig.

MAXIMUM ESTIMATED WATER INJECTION RATE: 500 BWPD.

Approval of this Application will be granted unless any objections are filed with the Division of Oil, Gas and Mining within fifteen days after publication of this Notice. Objections should be mailed to the Division of Oil, Gas and Mining, Attention: UIC Program Manager, 355 West North Temple, 3 Triad Center, Suite 350, Salt Lake City, Utah 84180-1203.

DATED this 8th day of September, 1986.

STATE OF UTAH
DIVISION OF OIL, GAS AND MINING
s/MARJORIE L. ANDERSON
Administrative Assistant

Published in The San Juan Record September 24, 1986.

I, Joyce A. Marks, being duly sworn on [illegible] day that [illegible] the publisher of The San Juan Record, a weekly newspaper of general circulation published at Monticello, Utah every Wednesday, that notice on converting wells, CAUSE NO. UIC-087

a copy of which is hereunto attatched, was published in the regular and entire issue of each number of said newspaper for a period of one issues, the first publication having been made on September 24, 1986. ~~and the~~ last publication having been made on _____.

Joyce A. Marks
Publisher

Subscribed and sworn to before me this 24th day of September, A.D. 1986.

Ingrid K. Adams
Notary Public residing at Monticello, Utah

My commission expires December 2, 1987

AFFIDAVIT OF PUBLICATION

In the

[illegible]

[illegible] OF UTAH

IN THE MATTER OF THE APPLICATION OF PHILLIPS PETROLEUM COMPANY, FOR ADMINISTRATIVE APPROVAL TO INJECT FLUID INTO WELLS TO BE CONVERTED TO ENHANCED RECOVERY INJECTION WELLS LOCATED IN SECTIONS 11, 12, AND 13, TOWNSHIP 41 SOUTH, RANGE 23 EAST; AND SECTIONS 8, 17 AND 18, TOWNSHIP 41 SOUTH, RANGE 24 EAST, S.L.M., SAN JUAN COUNTY, UTAH

★ ★ ★ ★

CAUSE NO. UIC-087

THE STATE OF UTAH TO ALL INTERESTED PARTIES IN THE ABOVE ENTITLED MATTER.

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RATHERFORD UNIT —
San Juan County, Utah

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#12W11, Sec. 12, T41S, R23E
#12W24, Sec. 12, T41S, R23E
#12W33, Sec. 12, T41S, R23E
~~#13W11, Sec. 13, T41S, R23E~~
#13W13, Sec. 13, T41S, R23E
#13W22, Sec. 13, T41S, R23E
#13W33, Sec. 13, T41S, R23E
8W34, Sec. 8, T41S, R24E
#17W32, Sec. 17, T41S, R24E
#18W12, Sec. 18, T41S, R24E

The proposed operating data for the wells is as follows:

INJECTION INTERVAL: Paradox Formation 5303' - 5548'

MAXIMUM ESTIMATED SURFACE PRESSURE: 3000 psig.

MAXIMUM ESTIMATED WATER INJECTION RATE: 500 BWPD.

Approval of this Application will be granted unless any objections are filed with the Division of Oil, Gas and Mining within fifteen days after publication of this Notice. Objections should be mailed to the Division of Oil, Gas and Mining, Attention: UIC Program Manager, 355 West North Temple, 3 Triad Center, Suite 350, Salt Lake City, Utah 84180-1203.

DATED this 8th day of September, 1986.

STATE OF UTAH
DIVISION OF OIL, GAS AND MINING
s/MARJORIE L. ANDERSON
Administrative Assistant

Published in The San Juan Record September 24, 1986.

[illegible] Affidavit

[illegible] duly sworn, says that notice [illegible] Cause No. UIC-087

a copy of which is hereunto attatched, was published in the regular and entire issue of each number of said newspaper for a period of one issues, the first publication having been made on September 24, 1986. ~~and the~~ last publication having been made on _____.

Joyce A. Markus
Publisher

Subscribed and sworn to before me this 24th day of September, A.D. 1986.

Ingrid K. Adams
Notary Public residing at Monticello, Utah

My commission expires December 2, 1987

Form 3160-5
(November 1983)
(Formerly 9-331)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU O__ AND MANAGEMENT

(Other instructions on reverse side)

Expires August 31, 1985

5. LEASE DESIGNATION AND SERIAL NO.
14-20-603-247A
sent 12/1/86 mp

6. IF INDIAN, ALLOTTEE OR TRIBE NAME
Navajo 122433

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

1. OIL WELL [X] GAS WELL [ ] OTHER

7. UNIT AGREEMENT NAME
SW-I-4192

2. NAME OF OPERATOR
Phillips Petroleum Company

8. FARM OR LEASE NAME
Ratherford Unit

3. ADDRESS OF OPERATOR
P. O. Box 2920, Casper, WY 82602

9. WELL NO.
13-11

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.)
At surface
500' FNL, 660' FWL (NW NW)

10. FIELD AND POOL, OR WILDCAT
Greater Aneth

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Sec. 13-T41S-R23E

14. PERMIT NO.
43-037-31152

15. ELEVATIONS (Show whether DF, RT, GR, etc.)
4558' RKB

12. COUNTY OR PARISH
San Juan

13. STATE
Utah

16. **Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data**

NOTICE OF INTENTION TO:

TEST WATER SHUT-OFF	[ ]	PULL OR ALTER CASING	[ ]
FRACTURE TREAT	[ ]	MULTIPLE COMPLETE	[ ]
SHOOT OR ACIDIZE	[X]	ABANDON*	[ ]
REPAIR WELL	[ ]	CHANGE PLANS	[ ]
(Other) Convert to Water Injection			[X]

SUBSEQUENT REPORT OF:

WATER SHUT-OFF	[ ]	REPAIRING WELL	[ ]
FRACTURE TREATMENT	[ ]	ALTERING CASING	[ ]
SHOOTING OR ACIDIZING	[ ]	ABANDONMENT*	[ ]
(Other)			[ ]

(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

It is proposed to convert Ratherford Unit #13-11 from a Zone I producer to a Zone I water injection well. Upon conversion, the well will be acidized with approximately 6000 gallons of 28% HCl Acid and placed on injection.

A 10' x 8' x 6' fenced pit will be constructed on location in a previously disturbed area. Upon completion of the workover, the pit will be dried and recovered.

5-BLM, Farmington, NM
2-Utah O&G CC, Salt Lake City, Utah
1-P. J. Adamson
1-M. Williams, 302 TRW
1-J. R. Reno
1-B. J. Murphy
1-File RC

APPROVED BY THE STATE OF UTAH DIVISION OF OIL, GAS, AND MINING
DATE: 12/1/86
BY: [signature]
Approval letter 10/9/86

RECEIVED
NOV 21 1986
DIVISION OF OIL, GAS & MINING

18. I hereby certify that the foregoing is true and correct

SIGNED D. C. Gill TITLE Area Manager DATE November 17, 1986

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____
CONDITIONS OF APPROVAL, IF ANY:

*See Instructions on Reverse Side

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

UTAH
NATURAL RESOUR
OIL, GAS AND MINING

3 Triad Center, Suite 350, Salt Lake City, UT 84180-1203

Ph. (801)538-5340

Commencement

MONTHLY REPORT OF ENHANCED RECOVERY PROJECT - PART 2

MONTHLY MONITORING OF INJECTION WELLS

Well Name	Inj. Press.	Inj. Rate	Annulus Press.	Monthly Inj. Vol.
9W41 43-037-16399 ✓	SI	SI		SI
9W43 43-037-16400 ✓	SI	SI		SI
10W21 43-037-16401 ✓	SI	SI		SI
10W23 43-037-16402 ✓	1250	270		7548
10W43 43-037-16403 ✓	1225	24		6605
11W44 43-037-15842 ✓	2300	235		6581
12W13 43-037-16404 ✓	2350	114		3180
12W22 43-037-15845 ✓	300	618		17,313
12W24 43-037-31151 New 2/21/87 ✓	0	559		4469
12W31 43-037-15847 ✓	0	485		13,589
12W33 43-037-15848 ✓	150	447		12,503
12W42 43-037-15850 ✓	1700	532		14,887
12W44 43-037-16405 ✓	SI	SI		SI
13W11 43-037-31152 New 2/20/87 ✓	0	287		2584
13W22 43-037-15852 New 2/23/87	0	391		2349
13W24 43-037-15853 New 2/3/87	0	332		8638
13W32 43-037-16406 2/2/87	Converted to a producing oil well			
13W42 43-037-15857 ✓	1850	365		10,211
13W44 43-037-16407 ✓	2300	165		4609
14W42 43-037-15860 New 2/27/87	0	353		707
14W43 43-037-16410 ✓	SI	SI		SI
15W21 43-037-16411 ✓	1075	302		8446

Form 3160-5
(November 1983)
(Formerly 9-331)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Budget Bureau No. 1004-0135
Expires August 31, 1985

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

5. LEASE DESIGNATION AND SERIAL NO.: 14-20-603- 247A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: NAVAJO

7. UNIT AGREEMENT NAME: SW-I-4192

8. FARM OR LEASE NAME: Ratherford Unit

9. WELL NO.: 13W11

10. FIELD AND POOL, OR WILDCAT: Greater Aneth

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec. 13-T41S-R23E

1. OIL WELL ☐ GAS WELL ☐ OTHER: Water Injector

2. NAME OF OPERATOR: Phillips Petroleum Company

3. ADDRESS OF OPERATOR: P.O. Box 2920, Casper, WY 82602

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.) At surface: 500' FNL, 660' FWL NW NW

API# 43-037-31152

14. PERMIT NO.:

15. ELEVATIONS (Show whether DF, RT, GR, etc.): 4558' RKB

12. COUNTY OR PARISH: San Juan

13. STATE: Utah

16. **Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data**

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	☐	PULL OR ALTER CASING	☐	WATER SHUT-OFF	☐	REPAIRING WELL	☐
FRACTURE TREAT	☐	MULTIPLE COMPLETE	☐	FRACTURE TREATMENT	☐	ALTERING CASING	☐
SHOOT OR ACIDIZE	☐	ABANDON*	☐	SHOOTING OR ACIDIZING	☐	ABANDONMENT*	☐
REPAIR WELL	☐	CHANGE PLANS	☐	(Other) Convert to water injection			XX
(Other)			☐	(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

Feb. 10, 1987 through Feb. 14, 1987

RU 2/10/87. COOH w/rods and tbg. Clean out hole to 5415'. Did not acidize Zone I. GIH w/Duoline 2-7/8" tbg and water injection pkr. Set pkr at 5285'. RD 2/13/87. HU to injection 2/20/87.

Production Before	23 BOPD	0 BWPD
Injection After	287 BWPD @ 1850 psi	

RECEIVED
AUG 4 1987
DIVISION OF OIL
GAS & MINING

4-BLM, Farmington, NM	1-Chieftain
2-Utah O&G CC, SLC, UT	1-Mobil Oil
1-M. Williams, B'Ville	1-Texaco, Inc.
1-J. Landrum, Denver	1-Chevron USA
1-J. Reno, Cortez	1-File RC

18. I hereby certify that the foregoing is true and correct

SIGNED D. C. Gill TITLE Area Manager DATE 7/27/87

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____
CONDITIONS OF APPROVAL, IF ANY:

*See Instructions on Reverse Side

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

Form 3160-5
(November 1983)
(Formerly 9-331)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Budget Bureau No. 1004-0135
Expires August 31, 1985

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

5. LEASE DESIGNATION AND SERIAL NO.

6. IF INDIAN, ALLOTTEE OR TRIBE NAME
SW-I-4192

1. OIL WELL ☐ GAS WELL ☐ OTHER WATER INJECTION & WATER SUPPLY WELLS

7. UNIT AGREEMENT NAME
RATHERFORD UNIT #7960041920

2. NAME OF OPERATOR
PHILLIPS PETROLEUM COMPANY

8. FARM OR LEASE NAME

3. ADDRESS OF OPERATOR
152 N. DURBIN, 2ND FLOOR, CASPER, WYOMING 82601

9. WELL NO.
VARIOUS (see attached)

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.)
At surface
SEE ATTACHED

10. FIELD AND POOL, OR WILDCAT
GREATER ANETH

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Sections 1 thru 30
T41S - R23E & 24E

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.)

12. COUNTY OR PARISH: San Juan

13. STATE: Utah

RECEIVED MAR 20 1989 DIV. OIL, GAS & MINING

16. **Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data**

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	☐	PULL OR ALTER CASING	☐	WATER SHUT-OFF	☐	REPAIRING WELL	☐
FRACTURE TREAT	☐	MULTIPLE COMPLETE	☐	FRACTURE TREATMENT	☐	ALTERING CASING	☐
SHOOT OR ACIDIZE	☐	ABANDON*	☐	SHOOTING OR ACIDIZING	☐	ABANDONMENT*	☐
REPAIR WELL	☐	CHANGE PLANE	☐	(Other) CHANGE OF OWNERSHIP			XX
(Other)				(NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

This is to advise all Water Injection and Water Supply Wells on the Ratherford Unit, listed on the attached sheet, were sold to Phillips Petroleum Company, effective August 1, 1985.

(former Operator - Phillips Oil Company)

3 - BLM, Farmington, NM
2 - ~~Utah~~ O&G CC, SLC, UT
1 - File

18. I hereby certify that the foregoing is true and correct

SIGNED S. H. Oden TITLE District Superintendent DATE March 17, 1989

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____
CONDITIONS OF APPROVAL, IF ANY:

*See Instructions on Reverse Side

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

DOWNHOLE SCHEMATIC

Date: 8/6/87

Rutherford Unit # 13W11

Location NW NW Sec. 13 T41S-R23E

RKB Elev. 4555'

GL Elev. 4542'

RKB Above GL' 13'

Well Drld 9/19/85

Well Converted to injector 2/14/87

Conductor Csg 13 3/8 @ 118'

Surface Csg. 9 5/8 @ 1551'

TOC 1703'

Tubing 2 7/8" @ 5321' Duoline HT2

Packer Otis Interlock Pkr Ni coated @ 5285

Perfs 5343 - 5396

PBTD 5405'

Production Csg. 7" @ 5422'
K-55, 23# + 26#

All Perfs Zone I unless noted

Form 3160-5
(June 1990)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
Budget Bureau No. 1004-0135
Expires: March 31, 1993

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to deepen or reentry to a different reservoir.
Use "APPLICATION FOR PERMIT—" for such proposals

RECEIVED
JUL 29 1991
DIVISION OF
OIL GAS & MINING

5. Lease Designation and Serial No.
14-20-603-407

6. If Indian, Allottee or Tribe Name
Navajo Tribal

7. If Unit or CA, Agreement Designation
Ratherford Unit
SW-I-4192

8. Well Name and No.
Ratherford Unit #13W11

9. API Well No.
43-037-31152

10. Field and Pool, or Exploratory Area
Greater Aneth

11. County or Parish, State
San Juan, Utah

SUBMIT IN TRIPLICATE

1. Type of Well
☐ Oil Well ☐ Gas Well ☐ Other W/W

2. Name of Operator
Phillips Petroleum Company

3. Address and Telephone No.
5525 Hwy 64 NBU 3004, Farmington, NM 87401 (505) 599-3412

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)
Sec. 13, T41S, R23E
500' FNL & 660' FWL NW/NW

12. CHECK APPROPRIATE BOX(s) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION	
☐ Notice of Intent	☐ Abandonment	☐ Change of Plans
☐ Subsequent Report	☐ Recompletion	☐ New Construction
☐ Final Abandonment Notice	☐ Plugging Back	☐ Non-Routine Fracturing
	☐ Casing Repair	☐ Water Shut-Off
	☐ Altering Casing	☐ Conversion to Injection
	☐ Other _____	☐ Dispose Water
		(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

13. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

7-8-91 thru 7-10-91
MI & RU DDU. ND WH & NU BOP. Pulled 102 jts and unplugged tubing. Ran tbg back in hole. Circ. well w/fresh water. Pumped 210 bbls water w/1 Drum WA-840 for pkr fluid. Conducted UIC test and returned to injection on 7/10/91.

Prior Inj. Rate - 394 BWPD, 0 psi
Post Inj. Rate - 585 BWPD, 0 psi

cc: 5-BLM
2-Utah, O&G
1-EPA, San Francisco
1-EPA, Window Rock
1-P.J. Konkel
1-N. Anstine
1-Chieftain
1-Mobil
1-Texaco
1-PPCo, Houston
1-PPCO, Farmington

14. I hereby certify that the foregoing is true and correct

Signed W R Sherman for L. F. Robinson Title Sr. Drlg. & Prod. Engr. Date 7-15-91

(This space for Federal or State office use)

Approved by _____ Title _____ Date _____
Conditions of approval, if any:

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

*See Instruction on Reverse Side

FORM 10

STATE OF UTAH
DIVISION OF OIL, GAS AND MINING

MONTHLY OIL AND GAS PRODUCTION REPORT

RECEIVED
AUG 16 1993
DIVISION OF
OIL, GAS & MINING

OPERATOR NAME AND ADDRESS:

P J KONKEL
PHILLIPS PETROLEUM COMPANY
5525 HWY 64 NBU 3004
FARMINGTON NM 87401

UTAH ACCOUNT NUMBER: N0772

REPORT PERIOD (MONTH/YEAR): 6 / 93

AMENDED REPORT ☐ (Highlight Changes)

Well Name API Number	Entity	Location	Producing Zone	Well Status	Days Oper	Production Volumes OIL(BBL)	GAS(MCF)	WATER(BBL)
#21-23 4303713754	06280	41S 24E 21	DSCR	POW	29	1374	883	58
#3-44 4303715031	06280	41S 24E 3	DSCR	POW	30	111	94	2905
#3-14 4303715124	06280	41S 24E 3	DSCR	POW	30	67	23	302
#9-12 4303715126	06280	41S 24E 9	DSCR	POW	30	112	654	17363
#9-14 4303715127	06280	41S 24E 9	DSCR	POW	30	201	315	423
#28-12 4303715336	06280	41S 24E 28	PRDX	POW	29	112	47	2428
#29-12 4303715337	06280	41S 24E 29	PRDX	POW	29	56	0	672
#29-32 4303715339	06280	41S 24E 29	DSCR	POW	29	1402	287	2224
#29-34 4303715340	06280	41S 24E 29	DSCR	POW	29	757	48	0
#30-32 4303715342	06280	41S 24E 30	DSCR	POW	29	588	1049	3744
#3-12 4303715620	06280	41S 24E 3	DSCR	POW	30	268	11	363
#9-34 4303715711	06280	41S 24E 9	DSCR	POW	30	45	46	9800
#10-12 4303715712	06280	41S 24E 10	DSCR	POW	30	45	23	1088
					TOTALS	5138	3480	41370

COMMENTS: Effective July 1, 1993, Phillips Petroleum Company has sold its interest in the Ratherford Unit to Mobil Exploration and Producing U.S., Incorporated, P. O. Box 633, Midland, Texas 79702. Mobil assumed operations on July 1, 1993.

I hereby certify that this report is true and complete to the best of my knowledge. Date: 8/11/93

Name and Signature: PAT KONKEL Pat Konkel Telephone Number: 505 599-3452

(6/93)

FORM 11

STATE OF UTAH
/ISION OF OIL, GAS AND MINING

MONTHLY OIL AND GAS DISPOSITION REPORT

OPERATOR NAME AND ADDRESS:

LB Sheffield
~~BRIAN BERRY~~
~~M E P N A~~ MOBIL
~~POB 219031 1807A RENTWR~~ P.O. DRAWER G
DALLAS TX 75221-9031 CORTEZ, Co. 81321

UTAH ACCOUNT NUMBER: N7370

REPORT PERIOD (MONTH/YEAR): 7 / 93

AMENDED REPORT ☐ **(Highlight Changes)**

*931001 updated. fec

ENTITY NUMBER	PRODUCT	GRAVITY BTU	BEGINNING INVENTORY	VOLUME PRODUCED	DISPOSITIONS TRANSPORTED	USED ON SITE	FLARED/VENTED	OTHER	ENDING INVENTORY
05980	OIL			177609	177609	0			
	GAS			72101	66216	5885			
11174	OIL								
	GAS								
	OIL								
	GAS								
	OIL								
	GAS								
	OIL								
	GAS								
	OIL								
	GAS								
	OIL								
	GAS								
	TOTALS			249710	243825	5885			

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SEP 13 1993
DIVISION OF
OIL, GAS & MINING

COMMENTS: PLEASE NOTE ADDRESS CHANGE. MOBIL ~~ARCO~~ PRODUCTION REPORTS WILL BE COMPILED AND SENT from the Cortez, Co. Office IN THE FUTURE.

I hereby certify that this report is true and complete to the best of my knowledge.

Date: 9/5/93

Name and Signature: Lowell B Sheffield

Telephone Number: ~~214 658 2528~~ 303 565 2212

(6/93)

FORM=NR0003.FRM 07/2

FORM 9

STATE OF UTAH
DIVISION OF OIL, GAS AND MINING

5. LEASE DESIGNATION & SERIAL NO.

SUNDRY NOTICES AND REPORTS ON WELLS

(Do not use this form for proposals to drill or to deepen or plug back to a different reservoir. Use "APPLICATION FOR PERMIT—" for such proposals.)

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: NAVAJO TRIBAL

1. OIL WELL ☐ GAS WELL ☐ OTHER

7. UNIT AGREEMENT NAME: RATHERFORD UNIT

2. NAME OF OPERATOR: MOBIL OIL CORPORATION

8. FARM OR LEASE NAME

3. ADDRESS OF OPERATOR: P. O. BOX 633 MIDLAND, TX 79702

9. WELL NO.

RECEIVED SEP 13 1993 DIVISION OF OIL, GAS & MINING

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements. See also space 17 below.)
At surface
At proposed prod. zone

10. FIELD AND POOL, OR WILDCAT: GREATER ANETH

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA

14. API NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.)

12. COUNTY: SAN JUAN

13. STATE: UTAH

16. Check Appropriate Box To Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:				SUBSEQUENT REPORT OF:			
TEST WATER SHUT-OFF	☐	PULL OR ALTER CASING	☐	WATER SHUT-OFF	☐	REPAIRING WELL	☐
FRACTURE TREAT	☐	MULTIPLE COMPLETE	☐	FRACTURE TREATMENT	☐	ALTERING CASING	☐
SHOOT OR ACIDIZE	☐	ABANDON	☐	SHOOTING OR ACIDIZING	☐	ABANDONMENT*	☐
REPAIR WELL	☐	CHANGE PLANS	☐	(Other) CHANGE OF OPERATOR			☐
(Other)				(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)			
APPROX. DATE WORK WILL START				DATE OF COMPLETION			

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)

* Must be accompanied by a cement verification report.

AS OF JULY1, 1993, MOBIL OIL CORPORATION IS THE OPERATOR OF THE RATHERFORD UNIT. ATTACHED ARE THE INDIVIDUAL WELLS.

18. I hereby certify that the foregoing is true and correct

SIGNED Shirley Todd TITLE ENV. & REG TECHNICIAN DATE 9-8-93

(This space for Federal or State office use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

See Instructions On Reverse Side

(3/89)

12W-44	43-037-16405	14-20-603-246A	SEC. 12, T41S, R23E	SE/SE 660 FSL; 660 FEL	PA'd
12W-44A	43-037-31543	14-20-603-246A	SEC. 12, T41S, R23E	SE/SE 807 FEL; 772 FSL	
13-11W	43-037-31152	14-20-603-247A	SEC. 13, T41S, R23E	NW/NW 500 FNL; 660 FWL	
13-12	43-037-31127	14-20-603-247A	SEC. 13, T41S, R23E	SW/NW 1705 FNL; 640 FWL	
13W-13	43-037-15851	14-20-603-247A	SEC. 13, T41S, R23E	NW/SW 1980 FSL; 4620 FEL	
13-14	43-037-31589	14-20-603-247A	SEC. 13, T41S, R23E	660 FSL; 660 FWL	
13-21	43-037-31128	14-20-603-247A	SEC. 13, T41S, R23E	NE/NW 660 FNL; 1920 FWL	
13W-22	43-037-15852	14-20-603-247A	SEC. 13, T41S, R23E	SE/NW 1988 FNL; 3300 FEL	
13-23	43-037-31129	14-20-603-247A	SEC. 13, T41S, R23E	NE/SW 1980 FSL; 1930 FWL	
~~13W-44~~	~~43-037-15853~~	~~14-20-603-247~~	~~SEC. 13, T41S, R23E~~	~~600 FSL; 3300 FEL~~	
13W-32	43-037-16406	14-20-603-247A	SEC. 13, T41S, R23E	1881 FNL; 1979 FEL	
13W-33	43-037-15855	14-20-603-247A	SEC. 13, T41S, R23E	NW/SE 1970 FSL; 1979 FEL	
13W-34	43-037-31130	14-20-603-247A	SEC. 13, T41S, R23E	SW/SE 660 FSL; 1980 FEL	
13-41	43-037-15856	14-20-603-247A	SEC. 13, T41S, R23E	NE/NE 660 FNL; 660 FEL	
13W-42	43-037-15857	14-20-603-247A	SEC. 13, T41S, R23E	SE/NE 2139; 585 FEL	
13-43	43-037-31131	14-20-603-247A	SEC. 13, T41S, R23E	NE/SE 1700 FSL; 960 FEL	
13W-44	43-037-16407	14-20-603-247A	SEC. 13, T41S, R23E	SE/SE 635 FSL; 659 FEL	
~~14-03~~	~~NA~~	~~14-20-603-4037~~	~~SEC. 11, T41S, R23E~~	~~SW/SW 660 FSL; 660 FEL~~	
14-32	43-037-15858	14-20-603-247A	SEC. 14, T41S, R23E	2130 FNL; 1830 FEL	
14-41	43-037-31623	14-20-603-247A	SEC. 14, T41S, R23E	NE/NE 521 FEL; 810 FNL	
14W-42	43-037-15860	14-20-603-247A	SEC. 14, T41S, R23E	SE/NE 1976 FNL; 653 FEL	
14W-43	43-037-16410	14-20-603-247A	SEC. 14, T41S, R23E	3300 FSL; 4770 FEL	
14-33	43-037-15859	14-20-603-247	SEC. 14, T41S, R23E	2130 FSL; 1830 FEL	
15-12	43-037-15715	14-20-603-355	SEC. 15, T41S, R24E	1820 FNL; 500 FWL	
15W-21	43-037-16411	14-20-603-355	SEC. 15, T41S, R24E	660 FNL; 1820 FWL	
15-22	43-037-30449	14-20-603-355	SEC. 15, T41S, R24E	SE/NW, 1980 FNL; 2050 FWL	
15-32	43-037-15717	14-20-603-355A	SEC. 15, T41S, R24E	1980 FNL; 1980 FEL	
15-33	43-037-15718	14-20-603-355	SEC. 15, T41S, R24E	NW/SE 1650 FSL; 1980 FEL	
15-41	43-037-15719	14-20-603-355	SEC. 15, T41S, R24E	660 FNL; 660' FEL	
15-42	43-037-30448	14-20-603-355	SEC. 15, T41S, R24E	SE/NE 2020 FNL; 820 FEL	
16W-12	43-037-15720	14-20-603-355	SEC. 16, T41S, R24E	SW/NW 1880 FNL; 660 FWL	
16-13	43-037-31168	14-20-603-355	SEC. 16, T41S, R24E	1980 FSL; 660 FWL	
16W-14	43-037-15721	14-20-603-355	SEC. 16, T41S, R24E	SW/SW 660 FSL; 660 FWL	
16W-21	43-037-16414	14-20-603-355	SEC. 16, T41S, R24E	NE/NW 660 FNL; 1880 FWL	
16W-23	43-037-15722	14-20-603-355	SEC. 16, T41S, R24E	NE/SW 1980 FSL; 1980 FWL	
16-32	43-037-15723	14-20-603-355	SEC. 16, T41S, R24E	1980 FNL; 1980' FEL	
16-34	43-037-15724	14-20-603-355	SEC. 16, T41S, R24E	660 FNL; 1980' FEL	
16-41	43-037-15725	14-20-603-355	SEC. 16, T41S, R24E	660 FNL; 660 FEL	
16W-43	43-037-16415	14-20-603-355	SEC. 16, T41S, R24E	NE/SE 2140 FSL; 820 FEL	
17-11	43-037-31169	14-20-603-353	SEC. 17, T41S, R24E	NW/NW 1075' FNL; 800' FWL	
17W-12	43-037-15726	14-20-603-353	SEC. 17, T41S, R24E	SW/NW 1980' FNL; 510' FWL	
17-13	43-037-31133	14-20-603-353	SEC. 17, T41S, R24E	NW/SW 2100' FSL; 660' FWL	
17W-14	43-037-15727	14-20-603-353	SEC. 17, T41S, R24E	SW/SW 660' FSL; 660' FWL	
17W-21	43-037-16416	14-20-603-353	SEC. 17, T41S, R24E	510' FNL; 1830' FWL	
17-22	43-037-31170	14-20-603-353	SEC. 17, T41S, R24E	1980' FNL; 1980' FWL	
17W-23	43-037-15728	14-20-603-353	SEC. 17, T41S, R24E	NE/SW 1980' FWL; 1880' FSL	
17-31	43-037-31178	14-20-603-353	SEC. 17, T41S, R24E	NW/NE 500' FNL; 1980' FEL	
17-32W	43-037-15729	14-20-603-353	SEC. 17, T41S, R24E	SW/NE 1830' FNL; 2030' FEL	
17-33	43-037-31134	14-20-603-353	SEC. 17, T41S, R24E	NW/SE 1980' FSL; 1845' FEL	
17-34W	43-037-15730	14-20-603-353	SEC. 17, T41S, R24E	SW/SE 560' FSL; 1880' FEL	
17W-41	43-037-15731	14-20-603-353	SEC. 17, T41S, R24E	610' FNL; 510' FEL	
17-42	43-037-31177	14-20-603-353	SEC. 17, T41S, R24E	SE/NE 1980; FNL, 660' FEL	
17-44	43-037-15732	14-20-603-353	SEC. 17, T41S, R24E	660 FSL; 660' FEL	
17W-43	43-037-16417	14-20-603-353	SEC. 17, T41S, R24E	NE/SE 1980' FSL; 660' FEL	
18-11	43-037-15733	14-20-603-353	SEC. 18, T41S, R24E	NW/NW 720' FNL; 730' FWL	
18-12W	43-037-31153	14-20-603-353	SEC. 18, T41S, R24E	SW/NW 1980' FNL; 560' FWL	
18W-21	43-037-16418	14-20-603-353	SEC. 18, T41S, R24E	NE/NW 660' FNL; 1882' FWL	
18-22	43-037-31236	14-20-603-353	SEC. 18, T41S, R24E	SW/NW 2200' FNL; 2210' FWL	
18W-23	43-037-30244	14-20-603-353	SEC. 18, T41S, R24E	NE/SW 2385' FSL; 2040' FWL	
18W-14	43-037-15735	14-20-603-353	SEC. 18, T41S, R24E	SW/SW 810' FSL; 600' FWL	
18-24	43-037-31079	14-20-603-353	SEC. 18, T41S, R24E	SE/SW 760' FSL; 1980' FWL	
18-31	43-037-31181	14-20-603-353	SEC. 18, T41S, R24E	NW/NE 795' FNL; 2090; FEL	
~~18W-32~~	~~43-037-15736~~	~~14-20-603-353~~	~~SEC. 18, T41S, R24E~~	~~SW/NE 2140' FNL; 1830' FEL~~	
18-33	43-037-31135	14-20-603-353	SEC. 18, T41S, R24E	NW/SE 1870' FSL; 1980' FEL	
18-34W	43-037-15737	14-20-603-353	SEC. 18, T41S, R24E	SW/SE 780' FSL; 1860 FEL	
18W-41	43-037-15738	14-20-603-353	SEC. 18, T41S, R24E	NE/NE 660' FNL; 660' FEL	
18-42	43-037-31182	14-20-603-353	SEC. 18, T41S, R24E	SE/NE 2120' FNL; 745' FEL	
18W-43	43-037-16419	14-20-603-353	SEC. 18, T41S, R24E	NE/SE 1980' FSL; 660' FEL	PA'd
18-44	43-037-31045	14-20-603-353	SEC. 18, T41S, R24E	SE/SE 660' FSL; 660' FEL	
19-11	43-037-31080	14-20-603-353	SEC. 19, T41S, R24E	NW/NW 660' FNL; 660' FWL	
19-12	43-037-15739	14-20-603-353	SEC. 19, T41S, R24E	600' FWL; 1980' FNL	
19-14	43-037-15740	14-20-603-353	SEC. 19, T41S, R24E	600' FSL; 660' FEL	

STATE OF UTAH
DIVISION OF OIL, GAS AND MINING

OCT 25 1993

TRANSFER OF AUTHORITY TO INJECT - UIC FORM 5

Well name and number: _____

Field or Unit name: RATHERFORD UNIT API no. _____

Well location: QQ ____ section ___ township ___ range ___ county _____

Effective Date of Transfer: July 1, 1993

CURRENT OPERATOR

Transfer approved by:

Name Ed Hasely Company Phillips Petroleum Company

Signature Ed Hasely Address 5525 HWY. 64

Title Environmental Engineer Farmington, NM 87401

Date October 22, 1993 Phone (505) 599-3460

Comments:

NEW OPERATOR

Transfer approved by:

Name Shirley Todd Company Mobil Exploration & Producing North America

Signature Shirley Todd Address P O Box 633

Title Env. & Reg. Technician Midland, TX 79702

Date October 7, 1993 Phone (915) 688-2585

Comments:

(State use only)
Transfer approved by [signature] Title UIC Manager

Approval Date 10-27-93

Lisha Cordova (801) 538-5340

(3/89)

BEFORE THE OIL AND GAS CONSERVATION COMMISSION OF THE STATE OF UTAH

APPLICATION OF PHILLIPS PETROLEUM COMPANY FOR THE APPROVAL OF THE UNIT OPERATIONS AND PRESSURE MAINTENANCE PROGRAM FOR THE RATHERFORD UNIT IN THE GREATER ANETH AREA, SAN JUAN COUNTY, UTAH	)	CAUSE NO. 63

O R D E R

This Cause came on for hearing before the Oil and Gas Conservation Commission of the State of Utah at 10 o'clock a. m. on Wednesday, September 13, 1961, in the Crystal Room, Hotel Newhouse, Fourth South at Main Street, Salt Lake City, Utah, pursuant to notice duly and regularly given. The entire Commission, except Walter G. Mann, was present, Edward W. Clyde presiding. Appearances were made as follows: Cecil C. Hamilton, attorney, on behalf of Phillips Petroleum Company; Clair M. Senior, attorney, on behalf of Texaco, Inc.; Gordon Mayberry, attorney, on behalf of Continental Oil Company; R. R. Robison on behalf of Shell Oil Company. Others present included Carl Trawick, on behalf of United States Geological Survey; and J. R. White, on behalf of Texaco, Inc.

Evidence in support of the application was introduced by Phillips Petroleum Company, the applicant and Unit Operator of the Ratherford Unit, which embraces as the unit area the following described land in San Juan County, State of Utah, to wit:

TOWNSHIP 41 SOUTH, RANGE 23 EAST, SLBM

Section 1:	All	Sections 12 and 13:	All
Section 2:	S/2	Section 14:	S/2
Section 11:	E/2	Section 24:	All

TOWNSHIP 41 SOUTH, RANGE 24 EAST, SLBM

Section 3:	SW/4	Sections 15 through 21:	All
Section 4:	S/2	Section 22:	NW/4 and W/2 of the SW/4
Sections 5 through 9:	All		
Section 10:	S/2 and NW/4 and W/2 of NE/4		
Section 11:	S/2 of SW/4	Section 23:	NW/4 and W/2 of NE/4 and W/2 of SW/4
Section 14:	W/2		
		Section 29 and 30:	All
		Section 31:	W/2
		Section 32:	W/2

R. R. Robison on behalf of Shell Oil Company stated that (as contemplated by paragraph No. 5 of the Commission's order of February 24, 1959, in Cause No. 17 authorizing the drilling of certain test wells) Shell would submit to the Commission, as arbiter, the question as between Shell and Superior Oil Company

of the monetary value, if any, to be attributed to three test wells drilled within the Ratherford Unit area pursuant to said order of February 24, 1959.

No objection to the granting of the application was filed or expressed. The Shell Oil Company, Texaco, Inc. and Continental Oil Company expressed their support of the application of Phillips Petroleum Company.

FINDINGS OF FACT

The Commission finds that:

1. The unitized operation of the Ratherford Unit Area will enable pressure maintenance operations to be initiated and permit such Area to be operated in a manner which will prevent waste, protect correlative rights and result in greater ultimate recovery of oil and gas.

2. The Ratherford Unit Agreement has been approved by the various signatory parties as fair, reasonable and acceptable.

3. The water injection pressure maintenance program proposed by the applicant appears to be proper and designed to result in the greatest economic recovery of oil and gas to the end that all concerned, including the general public, may realize and enjoy the greatest good from the oil and gas resources of the unitized lands.

O R D E R

THEREFORE, IT IS ORDERED BY THE COMMISSION, and subject to its continuing jurisdiction, that:

1. Unit operation of the Ratherford Unit Area under the Ratherford Unit Agreement is approved.

2. The plan and program of water injection pressure maintenance operations proposed by applicant in its application filed herein should be and the same is hereby approved and the unit operator is authorized to proceed with and under such plan and program as soon as the Ratherford Unit Agreement becomes effective and operative.

3. If, at any time or from time to time, it appears necessary or desirable to the unit operator to alter or modify the hereby approved plan of pressure maintenance, any such alteration or modification shall be submitted for

and shall be subject to approval by the Commission or its delegated representative, which approval may be given without notice or hearing, unless otherwise ordered or directed by the Commission.

Dated this 13th day of September, 1961.

THE OIL AND GAS CONSERVATION
COMMISSION OF THE STATE OF UTAH

Edward W. Clyde, Commissioner, presiding

C. R. Henderson, Chairman

M. V. Hatch, Commissioner

C. S. Thomson, Commissioner

Walter G. Mann, Commissioner

Sept 29, 1993

TO: Lisha Cordova - Utah Mining Oil & Gas

FROM: Janice Easley
BLM Farmington, NM
505 599-6355

Here is copy of Rutherford Unit Successor Operator.

4 pages including this one.

file Rutherford Unit (GC)

RECEIVED
BLM

27 AM 11:44

070 FARMINGTON, NM

Navajo Area Office
P. O. Box 1060
Gallup, New Mexico 87305-1060

ARES/543

JUL 2 0 1993

Mr. G. D. Cox
Mobil Exploration and
Producing North America, Inc.
P. O. Box 633
Midland, Texas 79702

Dear Mr. Cox:

Enclosed for your information and use is the approved Designation of Operator between the Phillips Petroleum Company and Mobil Exploration and Producing North America, Inc. for the Ratherford Unit.

Please note that all other concerned parties will be furnished their copy of the approved document.

Sincerely,

ACTING Area Director

Enclosure

cc: Bureau of Land Management, Farmington District Office w/enc.
TNN, Director, Minerals Department w/enc.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

RECEIVED
BLM
93 JUN 27 AM 11:44
070 FARMINGTON, NM

DESIGNATION OF OPERATOR

Phillips Petroleum Company is, on the records of the Bureau of Indian Affairs, operator of the Ratherford Unit,

AREA OFFICE: Window Rock, Arizona
LEASE NO: Attached hereto as Exhibit "A"

and, pursuant to the terms of the Ratherford Unit Agreement, is resigning as Unit Operator effective July 1, 1993, and hereby designates

NAME: Mobil Exploration and Producing North America Inc., duly elected pursuant to the terms of the Ratherford Unit Agreement,

ADDRESS: P. O. Box 633, Midland, Texas 79702
Attn: G. D. Cox

as Operator and local agent, with full authority to act on behalf of the Ratherford Unit lessees in complying with the terms of all leases and regulations applicable thereto and on whom the authorized officer may serve written or oral instructions in securing compliance with the Operating Regulations (43 CFR 3160 and 25 CFR 211 and 212) with respect to (described acreage to which this designation is applicable):

Attached hereto as Exhibit "A"

Bond coverage under 25 CFR 211, 212 or 225 for lease activities conducted by the above named designated operator is under Bond Number 05202782 (attach copy). Evidence of bonding is required prior to the commencement of operations.

It is understood that this designation of operator does not relieve any lessee of responsibility for compliance with the terms of the leases and the Operating Regulations. It is also understood that this designation of operator does not constitute an assignment of any interest in the leases.

In case of default on the part of the designated operator, the lessees will make full and prompt compliance with all regulations, lease terms, stipulations, or orders of the Secretary of the Interior or his representative.

Attached is the appropriate documentation relevant to this document.

The designated operator agrees to promptly notify the authorized officer of any change in the operatorship of said Ratherford Unit.

Phillips Petroleum Company

June 17, 1993 By: M. B. Smith
Attorney-in-Fact

Mobil Exploration and Producing
North America Inc.

June 11, 1993 By: B. D. Martiny
Attorney-in-Fact B.D. MARTINY

APPROVED BY	TITLE	DATE
	ACTING AREA DIRECTOR	7/9/93

APPROVED PURSUANT, TO SECRETARIAL REDELEGATION ORDER 209 DM 8 AND 230 DM 3.
This form does not constitute an information collection as defined by 44 U.S.C. 3502 and therefore does not require OMB approval.

EXHIBIT "A"

ATTACHED TO AND MADE A PART OF DESIGNATION OF SUCCESSOR OPERATOR, RATHERFORD UNIT

EXHIBIT "C"

Revised as of September 29, 1992)
SCHEDULE OF TRACT PERCENTAGE PARTICIPATION

Tract Number	Description of Land	Serial Number and Effective Date of Lease	Tract Percentage Participation
1	S/2 Sec. 1, E/2 SE/4 Sec. 2, E/4 Sec. 11, and all of Sec. 12, T-41-S, R-23-E, S.L.M. San Juan County, Utah	14-20-603-246-A Oct. 5, 1953	11.0652565
2	SE/4 and W/2 SW/4 Sec. 5, the irregular SW/4 Sec. 6, and all of Sec. 7 and 8, T-41-S, R-24-E, San Juan County, Utah	14-20-603-368 Oct. 26, 1953	14.4159942
3	SW/4 of Sec. 4, T-41-S, R-24-E, San Juan County, Utah	14-20-603-5446 Sept. 1, 1959	.5763826
4	SE/4 Sec. 4, and NE/4 Sec. 9, T-41-S, R-24-E, San Juan County, Utah	14-20-603-4035 March 3, 1958	1.2587779
5	SW/4 of Sec. 3, T-41-S, R-24-E, S.L.M., San Juan County, Utah	14-20-603-5445 Sept. 3, 1959	.4667669
6	NW/4 of Sec. 9, T-41-S, R-24-E, S.L.M., San Juan County, Utah	14-20-603-5045 Feb. 4, 1959	1.0187043
7	NW/4, W/2 NE/4, and SW/4 Sec. 10, SE/4 Sec. 9, T-41-S, R-24-E, San Juan County, Utah	14-20-603-4043 Feb. 18, 1958	3.5097575
8	SW/4 Sec. 9, T-41-S, R-24-E, S.L.M. San Juan County, Utah	14-20-603-5046 Feb. 4, 1959	1.1141679
9	SE/4 Sec. 10 and S/2 SW/4 Sec. 11 T-41-S, R-24-E, San Juan County, Utah	14-20-603-4037 Feb. 14, 1958	2.6186804
10	All of Sec. 13, E/2 Sec. 14, and E/2 SE/4 and N/2 Sec. 24, T-41-S, R-23-E, S.L.M., San Juan County, Utah	14-20-603-247-A Oct. 5, 1953	10.3108861
11	Sections 17, 18, 19 and 20, T-41-S, R-24-E, San Juan County Utah	14-20-603-353 Oct. 27, 1953	27.3389265
12	Sections 15, 16, 21, and NW/4, and W/2 SW/4 Sec. 22, T-41-S, R-24-E, San Juan County, Utah	14-20-603-355 Oct. 27, 1953	14.2819339
13	W/2 Section 14, T-41-S, R-24-E, San Juan County, Utah	14-20-603-370 Oct. 26,1953	1.8500847
14	N/2 and SE/4, and E/2 SW/4 Sec. 29, NE/4 and E/2 SE/4 and E/2 W/2 irregular Sec. 30, and E/2 NE/4 Sec. 32, T-41-S, R-24-E, San Juan County, Utah	14-20-603-407 Dec. 10, 1953	6.9924969
15	NW/4 Sec. 28, T-41-S, R24-E San Juan County, Utah	14-20-603-409 Dec. 10, 1953	.9416393
16	SE/4 Sec. 3, T-41-S, R-24-E San Juan County, Utah	14-20-0603-6504 July 11, 1961	.5750254
17	NE/4 Sec. 3, T-41-S, R-24-E San Juan County, Utah	14-20-0603-6505 July 11, 1961	.5449292
18	NW/4 Sec. 3, T-41-S, R-24-E San Juan County, Utah	14-20-0603-6506 July 11, 1961	.5482788
19	NE/4 Sec. 4, T-41-S, R24-E San Juan County, Utah	14-20-0603-7171 June 11, 1962	.4720628
20	E/2 NW/4 Sec. 4, T-41-S, R-24-E San Juan County, Utah	14-20-0603-7172 June 11, 1962	.0992482
100% Indian Lands		TOTAL 12,909.74	100.0000000

Division of Oil, Gas and Mining

PHONE CONVERSATION DOCUMENTATION FORM

Route original/copy to:

[] Well File _____

(Location) Sec___Twp___Rng___

(API No.) _____

[] Suspense

(Return Date) _____

(To - Initials) _____

XXX Other

OPERATOR CHANGE

1. Date of Phone Call: 10-6-93 Time: 9:30

2. DOGM Employee (name) L. CORDOVA (Initiated Call XXX)

Talked to:

Name GLEN COX (Initiated Call []) - Phone No. (915)688-2114

of (Company/Organization) MOBIL

3. Topic of Conversation: OPERATOR CHANGE FROM PHILLIPS TO MOBIL "RATHERFORD UNIT".

(NEED TO CONFIRM HOW OPERATOR WANTS THE WELLS SET UP - MEPNA AS PER BIA APPROVAL

OR MOBIL OIL CORPORATION AS PER SUNDRY DATED 9-8-93?)

4. Highlights of Conversation:

MR. COX CONFIRMED THAT THE WELLS SHOULD BE SET UNDER ACCOUNT N7370/MEPNA AS PER BIA APPROVAL, ALSO CONFIRMED THAT PRODUCTION & DISPOSITION REPORTS WILL NOW BE HANDLED OUT OF THEIR CORTEZ OFFICE RATHER THAN DALLAS.

MEPNA-

PO DRAWER G

CORTEZ, CO 81321

(303)565-2212

*ADDRESS CHANGE AFFECTS ALL WELLS CURRENTLY OPERATORED BY MEPNA, CURRENTLY REPORTED OUT OF DALLAS (MCELMO CREEK).

Division of Oil, Gas and Mining
OPERATOR CHANGE WORKSHEET

Routing:
1-~~LEC~~ 7-SJ
2-~~DTS~~ 8-FILE
3-VLC
4-RJF
5-~~LEC~~
6-PL

Attach all documentation received by the division regarding this change.
Initial each listed item when completed. Write N/A if item is not applicable.

☒ Change of Operator (well sold) ☐ Designation of Agent
☐ Designation of Operator ☐ Operator Name Change Only

The operator of the well(s) listed below has changed (EFFECTIVE DATE: 7-1-93)

TO (new operator) **M E P N A**
(address) **PO DRAWER G**
CORTEZ, CO 81321
GLEN COX (915)688-2114
phone (303) 565-2212
account no. N7370

FROM (former operator) **PHILLIPS PETROLEUM COMPANY**
(address) **5525 HWY 64 NBU 3004**
FARMINGTON, NM 87401
PAT KONKEL
phone (505) 599-3452
account no. N0772(A)

Well(s) (attach additional page if needed): ***RATHERFORD UNIT (NAVAJO)**

Name:	API:	Entity:	Sec	Twp	Rng	Lease Type:
SEE ATTACHED	43-037-31152					

OPERATOR CHANGE DOCUMENTATION

Lec 1. (Rule R615-8-10) Sundry or other legal documentation has been received from former operator (Attach to this form). (Reg. 8-20-93) (6/93 Prod. Rpt. 8-16-93)

Lec 2. (Rule R615-8-10) Sundry or other legal documentation has been received from new operator (Attach to this form). (Reg. 8-31-93) (Rec'd 9-14-93)

N/A 3. The Department of Commerce has been contacted if the new operator above is not currently operating any wells in Utah. Is company registered with the state? (yes/no) _____ If yes, show company file number: _____.

Lec 4. **(For Indian and Federal Wells ONLY)** The BLM has been contacted regarding this change (attach Telephone Documentation Form to this report). Make note of BLM status in comments section of this form. Management review of **Federal and Indian** well operator changes should take place prior to completion of steps 5 through 9 below.

Lec 5. Changes have been entered in the Oil and Gas Information System (Wang/IBM) for each well listed above. (O&G wells 10-6-93) (WIW's 10-26-93)

Lec 6. Cardex file has been updated for each well listed above. (O&G wells 10-6-93) (WIW's 10-26-93)

Lec 7. Well file labels have been updated for each well listed above. (O&G wells 10-6-93) (WIW's 10-26-93)

Lec 8. Changes have been included on the monthly "Operator, Address, and Account Changes" memo for distribution to State Lands and the Tax Commission. (10-6-93)

Lec 9. A folder has been set up for the Operator Change file, and a copy of this page has been placed there for reference during routing and processing of the original documents.

– OVER –

PERATOR CHANGE WORKSHEET (CONTINUED) Initial each item when completed. Write N/A if item is not applicable.

NTITY REVIEW

✓ 1. (Rule R615-8-7) Entity assignments have been reviewed for all wells listed above. Were entity changes made? (yes/no) ____ (If entity assignments were changed, attach copies of Form 6, Entity Action Form).

N/A 2. State Lands and the Tax Commission have been notified through normal procedures of entity changes.

OND VERIFICATION (Fee wells only)

✓ 1. (Rule R615-3-1) The new operator of any fee lease well listed above has furnished a proper bond.
N/A

__ 2. A copy of this form has been placed in the new and former operators' bond files.

__ 3. The former operator has requested a release of liability from their bond (yes/no) ___. Today's date _____ 19___. If yes, division response was made by letter dated _____ 19___.

LEASE INTEREST OWNER NOTIFICATION RESPONSIBILITY

N/A 1. (Rule R615-2-10) The former operator/lessee of any fee lease well listed above has been notified by letter dated _____ 19___, of their responsibility to notify any person with an interest in such lease of the change of operator. Documentation of such notification has been requested.
VLS 11-10-93

N/A 2. Copies of documents have been sent to State Lands for changes involving State leases.

FILMING

✓ 1. All attachments to this form have been microfilmed. Date: 11-17 1993.

FILING

✓ 1. Copies of all attachments to this form have been filed in each well file.

✓ 2. The original of this form and the original attachments have been filed in the Operator Change file.

COMMENTS

931006 BIA/Blm Approved 7-9-93.

E71/34-35

Form 3160-5
(June 1990)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
Budget Bureau No. 1004-0135
Expires: March 31, 1993

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to deepen or reentry to a different reservoir.
Use "APPLICATION FOR PERMIT - " for such proposals

SUBMIT IN TRIPLICATE

5. Lease Designation and Serial No.
14-20-603-247A

6. If Indian, Allottee or Tribe Name
NAVAJO TRIBAL

7. If Unit or CA, Agreement Designation
RATHERFORD UNIT

1. Type of Well
☐ Oil Well ☐ Gas Well ☒ Other

8. Well Name and No.
RATHERFORD UNIT 13W-11

2. Name of Operator
MOBIL EXPLORATION & PRODUCING US, AS AGENT FOR MEPNA

9. API Well No.
43-037-31152

3. Address and Telephone No.
P. O. BOX 633, MIDLAND, TX 79702 **(915) 688-2585**

10. Field and Pool, or exploratory Area
GREATER ANETH

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)
500 FNL, 660 FWL; SEC 13, T41S, R23E

11. County or Parish, State
SAN JUAN, UT

12. CHECK APPROPRIATE BOX(s) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION	
☐ Notice of Intent	☐ Abandonment	☐ Change of Plans
	☐ Recompletion	☐ New Construction
☒ Subsequent Report	☐ Plugging Back	☐ Non-Routine Fracturing
	☐ Casing Repair	☐ Water Shut-Off
☐ Final Abandonment Notice	☐ Altering Casing	☐ Conversion to Injection
	☐ Other WORKOVER	☐ Dispose Water

(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

13. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

08/25/93 MIRU. CLEAN OUT WELL TO PBTD-5405'. HIT BRIDGE @ 5390'. WORK WASH TOOL THRU PERFS. CIRC & FLOW WELL TO CLEAN. RDMO. RETURN WELL TO INJECTION.

14. I hereby certify that the foregoing is true and correct
Signed Debra for Shirley Todd Title ENV. & REG. TECHNICIAN Date 5-20-94

(This space for Federal or State office use)
Approved by _____ Title _____ Date for record
Conditions of approval, if any:

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

* See Instruction on Reverse Side

STATE OF UTAH
INVENTORY OF INJECTION WELLS

OPERATOR	API NO.	WELL	TNS	RGE	SE	WELLTYPE	INDIAN COUNT
MEPNA (MOBIL	43-037-15506	L-21	41S	25E	18	INJW	Y
MEPNA (MOBIL	43-037-16358	K-24	41S	25E	18	INJW	Y
MEPNA (MOBIL	43-037-30400	K-22X	41S	25E	18	INJI	Y
MEPNA (MOBIL	43-037-15499	J-21	41S	25E	18	INJW	Y
MEPNA (MOBIL	43-037-15508	L-25	41S	25E	19	INJW	Y
MEPNA (MOBIL	43-037-15839	1W24	41S	23E	1	INJW	Y
MEPNA (MOBIL	43-037-15838	1W13	41S	23E	1	INJW	Y
MEPNA (MOBIL	43-037-16386	2W44	41S	23E	2	INJW	Y
MEPNA (MOBIL	43-037-15842	11W44	41S	23E	11	INJW	Y
MEPNA (MOBIL	43-037-15841	11W42	41S	23E	11	INJW	Y
MEPNA (MOBIL	43-037-15848	12W33	41S	23E	12	INJW	Y
MEPNA (MOBIL	43-037-15850	12W42	41S	23E	12	INJW	Y
MEPNA (MOBIL	43-037-15847	12W31	41S	23E	12	INJW	Y
MEPNA (MOBIL	43-037-16404	12W13	41S	23E	12	INJW	Y
MEPNA (MOBIL	43-037-15845	12W22	41S	23E	12	INJW	Y
MEPNA (MOBIL	43-037-15843	12W11	41S	23E	12	INJW	Y
MEPNA (MOBIL	43-037-31151	12W24	41S	23E	12	INJW	Y
MEPNA (MOBIL	43-037-31543	RATERFORD 12	41S	23E	12	INJW	Y
MEPNA (MOBIL	43-037-15854	13W31	41S	23E	13	INJW	Y
MEPNA (MOBIL	43-037-15851	13W13	41S	23E	13	INJW	Y
MEPNA (MOBIL	43-037-15857	13W42	41S	23E	13	INJW	Y
MEPNA (MOBIL	43-037-16407	13W44	41S	23E	13	INJW	Y
MEPNA (MOBIL	43-037-15855	13W33	41S	23E	13	INJW	Y
MEPNA (MOBIL	43-037-31152	13W11	41S	23E	13	INJW	Y
MEPNA (MOBIL	43-037-15852	13W22	41S	23E	13	INJW	Y
MEPNA (MOBIL	43-037-15853	13W24	41S	23E	13	INJW	Y
MEPNA (MOBIL	43-037-16410	14W43	41S	23E	14	INJI	Y
MEPNA (MOBIL	43-037-15860	14W43	41S	23E	14	INJW	Y
MEPNA (MOBIL	43-037-15863	24W42	41S	23E	24	INJW	Y
MEPNA (MOBIL	43-037-15862	24W31	41S	23E	24	INJW	Y
MEPNA (MOBIL	43-037-15984	6W14	41S	24E	6	INJW	Y
MEPNA (MOBIL	43-037-15988	7W32	41S	24E	7	INJW	Y
MEPNA (MOBIL	43-037-15990	7W41	41S	24E	7	INJW	Y
MEPNA (MOBIL	43-037-16394	7W21	41S	24E	7	INJW	Y
MEPNA (MOBIL	43-037-15985	7W12	41S	24E	7	INJW	Y
MEPNA (MOBIL	43-037-15989	7W34	41S	24E	7	INJW	Y
MEPNA (MOBIL	43-037-15986	7W14	41S	24E	7	INJW	Y
MEPNA (MOBIL	43-037-15987	7W23	41S	24E	7	INJW	Y
MEPNA (MOBIL	43-037-16395	7W43	41S	24E	7	INJW	Y
MEPNA (MOBIL	43-037-16396	8W43	41S	24E	8	INJI	Y
MEPNA (MOBIL	43-037-15992	8W14	41S	24E	8	INJW	Y
MEPNA (MOBIL	43-037-16398	9W23	41S	24E	9	INJW	Y
MEPNA (MOBIL	43-037-16400	9W43	41S	24E	9	INJI	Y
MEPNA (MOBIL	43-037-16397	9W21	41S	24E	9	INJW	Y
MEPNA (MOBIL	43-037-16402	10W23	41S	24E	10	INJW	Y
MEPNA (MOBIL	43-037-16401	10W21	41S	24E	10	INJI	Y
MEPNA (MOBIL	43-037-16403	10W43	41S	24E	10	INJW	Y
MEPNA (MOBIL	43-037-16413	15W43	41S	24E	15	INJI	Y
MEPNA (MOBIL	43-037-16411	15W21	41S	24E	15	INJW	Y
MEPNA (MOBIL	43-037-16412	15W23	41S	24E	15	INJI	Y
MEPNA (MOBIL	43-037-16415	16W43	41S	24E	16	INJW	Y
MEPNA (MOBIL	43-037-15720	16W12	41S	24E	16	INJW	Y
MEPNA (MOBIL	43-037-15721	16W14	41S	24E	16	INJW	Y

Division of Oil, Gas and Mining

PHONE CONVERSATION DOCUMENTATION FORM

Route original/copy to:

[ ] Well File _____

(Location) Sec___Twp___Rng___

(API No.) _____

[ ] Suspense

(Return Date) _____

(To - Initials) _____

XXX Other

OPER NM CHG

1. Date of Phone Call: 8-3-95 Time: _____

2. DOGM Employee (name) L. CORDOVA (Initiated Call [ ])

Talked to:

Name R. J. FIRTH (Initiated Call XX) - Phone No. ( )

of (Company/Organization) _____

3. Topic of Conversation: M E P N A / N7370

4. Highlights of Conversation:

OPERATOR NAME IS BEING CHANGED FROM M E P N A (MOBIL EXPLORATION AND PRODUCING NORTH AMERICA INC) TO MOBIL EXPLOR & PROD. THE NAME CHANGE IS BEING DONE AT THIS TIME TO ALLEVIATE CONFUSION, BOTH IN HOUSE AND AMONGST THE GENERAL PUBLIC.

*SUPERIOR OIL COMPANY MERGED INTO M E P N A 4-24-86 (SEE ATTACHED).

Mobil Oil Corporation

P.O. BOX 5444
DENVER, COLORADO 80217-5444

May 14, 1986

RECEIVED
MAY 16 1986
DIVISION OF
OIL, GAS & MINING

Utah Board of Oil, Gas and Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

Attn: R. J. Firth
Associate Director

SUPERIOR OIL COMPANY MERGER

Dear Mr. Firth:
On September 20, 1984, The Superior Oil Company (Superior) became a wholly owned subsidiary of Mobil Corporation. Since January 1, 1985, Mobil Oil Corporation (MOC), another wholly owned subsidiary of Mobil Corporation, has acted as agent for Superior and has operated the Superior-owned properties.

On April 24, 1986, Superior was merged with Mobil Exploration and Producing North America Inc. (MEPNA), which is also a wholly owned subsidiary of Mobil Corporation. MEPNA is the surviving company of the merger.

This letter is to advise you that all properties held in the name of Superior will now be held in the name of MEPNA; and that these properties will continue to be operated by MOC as agent for MEPNA.

Attached is a listing of all wells and a separate listing of injection-disposal wells, Designation of Agent and an organization chart illustrating the relationships of the various companies. If you have any questions or require additional documentation of this merger, please feel free to contact me at the above address or (303) 298-2577.

Very truly yours,

R. D. Baker
Environmental Regulatory Manager

CNE/rd
CNE8661

Division of Oil, Gas and Mining
OPERATOR CHANGE WORKSHEET

Routing:

1-LEC	7-PL
2-LWP	8-SJ
3-~~DTS~~	9-FILE
4-VLC	
5-RJF	
6-LWP	

Attach all documentation received by the division regarding this change.
Initial each listed item when completed. Write N/A if item is not applicable.

☐ Change of Operator (well sold) ☐ Designation of Agent
☐ Designation of Operator XXX Operator Name Change Only

The operator of the well(s) listed below has changed (EFFECTIVE DATE: 8-2-95)

TO (new operator) MOBIL EXPLOR & PROD
(address) C/O MOBIL OIL CORP
PO DRAWER G
CORTEZ CO 81321
phone (303) 564-5212
account no. N7370

FROM (former operator) M E P N A
(address) C/O MOBIL OIL CORP
PO DRAWER G
CORTEZ CO 81321
phone (303)564-5212
account no. N7370

Well(s) (attach additional page if needed):

Name:	API:	Entity:	Sec	Twp	Rng	Lease Type:
** SEE ATTACHED **	037-31152					

OPERATOR CHANGE DOCUMENTATION

N/A 1. (Rule R615-8-10) Sundry or other legal documentation has been received from former operator (Attach to this form).

N/A 2. (Rule R615-8-10) Sundry or other legal documentation has been received from new operator (Attach to this form).

N/A 3. The Department of Commerce has been contacted if the new operator above is not currently operating any wells in Utah. Is company registered with the state? (yes/no) _____ If yes, show company file number: _____.

N/A 4. **(For Indian and Federal Wells ONLY)** The BLM has been contacted regarding this change (attach Telephone Documentation Form to this report). Make note of BLM status in comments section of this form. Management review of **Federal and Indian** well operator changes should take place prior to completion of steps 5 through 9 below.

Lec 5. Changes have been entered in the Oil and Gas Information System (Wang/IBM) for each well listed above. (8-3-95)

LWP 6. Cardex file has been updated for each well listed above. 8-31-95

LWP 7. Well file labels have been updated for each well listed above. 9-28-95

Lec 8. Changes have been included on the monthly "Operator, Address, and Account Changes" memo for distribution to State Lands and the Tax Commission. (8-3-95)

Lec 9. A folder has been set up for the Operator Change file, and a copy of this page has been placed there for reference during routing and processing of the original documents.

– OVER –

OPERATOR CHANGE WORKSHEET (CONTINUED) Initial each item when completed. Write N/A if item is not applicable.

ENTITY REVIEW

Lec 1. (Rule R615-8-7) Entity assignments have been reviewed for all wells listed above. Were entity changes made? (yes/no) ___ (If entity assignments were changed, attach copies of Form 6, Entity Action Form).

N/A 2. State Lands and the Tax Commission have been notified through normal procedures of entity changes.

BOND VERIFICATION (Fee wells only) * No Fee Lease Wells at this time!

N/A/Lec 1. (Rule R615-3-1) The new operator of any fee lease well listed above has furnished a proper bond.

___ 2. A copy of this form has been placed in the new and former operators' bond files.

___ 3. The former operator has requested a release of liability from their bond (yes/no) ___. Today's date _____ 19___. If yes, division response was made by letter dated _____ 19___.

LEASE INTEREST OWNER NOTIFICATION RESPONSIBILITY

N/A 1. (Rule R615-2-10) The former operator/lessee of any **fee lease** well listed above has been notified by letter dated _____ 19___, of their responsibility to notify any person with an interest in such lease of the change of operator. Documentation of such notification has been requested.

UT S 8/5/95

N/A 2. Copies of documents have been sent to State Lands for changes involving **State leases**.

FILMING

✓ 1. All attachments to this form have been microfilmed. Date: October 4 19 95.

FILING

___ 1. Copies of all attachments to this form have been filed in each well file.

___ 2. The original of this form and the original attachments have been filed in the Operator Change file.

COMMENTS

950803 UIC F5/Not necessary!

Form 3160-5
(June 1990)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
Budget Bureau No. 1004-0135
Expires: March 31, 1993

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to deepen or reentry to a different reservoir.
Use "APPLICATION FOR PERMIT - " for such proposals

SUBMIT IN TRIPLICATE

5. Lease Designation and Serial No.: 14-20-603-246A
6. If Indian, Allottee or Tribe Name: NAVAJO TRIBAL
7. If Unit or CA, Agreement Designation: RATHERFORD UNIT
8. Well Name and No.: RATHERFORD 13-11
9. API Well No.: 43-037-31152
10. Field and Pool, or exploratory Area: GREATER ANETH
11. County or Parish, State: SAN JUAN UT

1. Type of Well: [X] Oil Well [ ] Gas Well [ ] Other SIDETRACK
2. Name of Operator: Mobil Exploration & Producing U.S. Inc. as Agent for Mobil Producing TX & NM Inc.
3. Address and Telephone No.: P.O. Box 633, Midland, TX 79702 915-688-2585
4. Location of Well (Footage, Sec., T., R., M., or Survey Description): 500' FNL & 660 FWL SEC.13, T41S, R23E

12. CHECK APPROPRIATE BOX(s) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION	
[X] Notice of Intent	[ ] Abandonment	[ ] Change of Plans
[ ] Subsequent Report	[ ] Recompletion	[ ] New Construction
[ ] Final Abandonment Notice	[ ] Plugging Back	[ ] Non-Routine Fracturing
	[ ] Casing Repair	[ ] Water Shut-Off
	[ ] Altering Casing	[ ] Conversion to Injection
	[X] Other SIDETRACK	[ ] Dispose Water

(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

13. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

LEG #1 BOTTOM HOLE LOCATION:
BEARING & DISTANCE: 1400' FROM SURFACE LOCATION @ 310 DEGREES AZIMUTH.
LEG #2 BOTTOM HOLE LOCATION:
BEARING & DISTANCE: 1400' FROM SURFACE LOCATION AT 330 DEGREES AZIMUTH.
LEG #3 BOTTOM HOLE LOCATION:
BEARING & DISTANCE: 1700' FROM SURFACE LOCATION AT 120 DEGREES AZIMUTH.
LEG #4 BOTTOM HOLE LOCATION:
BEARING & DISTANCE: 1700' FROM SURFACE LOCATION AT 140 DEGREES AZIMUTH

SEE ATTACHED PROCEDURE.

RECEIVED
DEC 2 1 1996
DIV. OF OIL, GAS & MINING

14. I hereby certify that the foregoing is true and correct
Signed Shirley Robertson Douchino Title ENV. & REG. TECHNICIAN Date 12-19-96

(This space for Federal or State office use)
Approved by [signature] Title Petroleum Engineer Date 12/30/96
Conditions of approval, if any:

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

* See Instruction on Reverse Side

Ratherford Unit Well #13-11
Multilateral Horizontal Drilling Procedure

The objective of this procedure is to prepare this wellbore for sidetracking, sidetrack the subject well and drill multiple short radius horizontal laterals (1300-1700 ft).

1. Prepare location and dig working pit.

2. MIRU WSU, reverse unit, and H_2S equipment. Bullhead kill weight fluid down tubing.

3. Release packer, and pick up on wellhead to remove. ND wellhead and NU BOP's. Pressure test BOP's.

4. Continue to POH with tubing.

5. TIH with full gauge bit and casing scraper to PBTD. TOH with bit and scraper.

6. Ensure well will circulate, and set RTBP above perfs. **Pressure test casing to 1000 psi.**

7. RDMO WSU.

8. MIRU 24 hr WSU.

9. PU tubing, drill collars, and drill pipe in derrick and run in hole. Then POH and stand back.

10. RU wireline company and run gauge ring for casing down to packer setting depth.

11. Run packer on wireline and set using GR/CCL log to correlate with. RD wireline.

12. PU drillpipe with UBHO sub and latch assembly.

13. Latch into packer. Run gyro and obtain orientation of keyway on packer.

14. POH w/ gyro. POH w/ drill pipe and RIH w/ whipstock oriented on the surface for window azimuth desired.

15. Shear pilot mill bolt and start milling window.

16. POH and PU window mill and watermelon mill to finish window and drill 3 ft of formation.

17. POH w/ mills and RBIH w/ new mills to clean up window.

18. PU drill pipe and directional motors to drill curve. Use the gyro to drill until the inclination dictates that the gyro must be pulled.

19. Pull five stands of drill pipe and run steering tool to finish drilling the curve.

20. POH once curve is finished and PU lateral motor to drill the lateral using MWD.

21. Once lateral TD is reached, POH w/ directional equipment.

22. RIH w/ hook and retrieve whipstock.

23. PU new whipstock with extension in body for next window and orient on surface to desired azimuth.

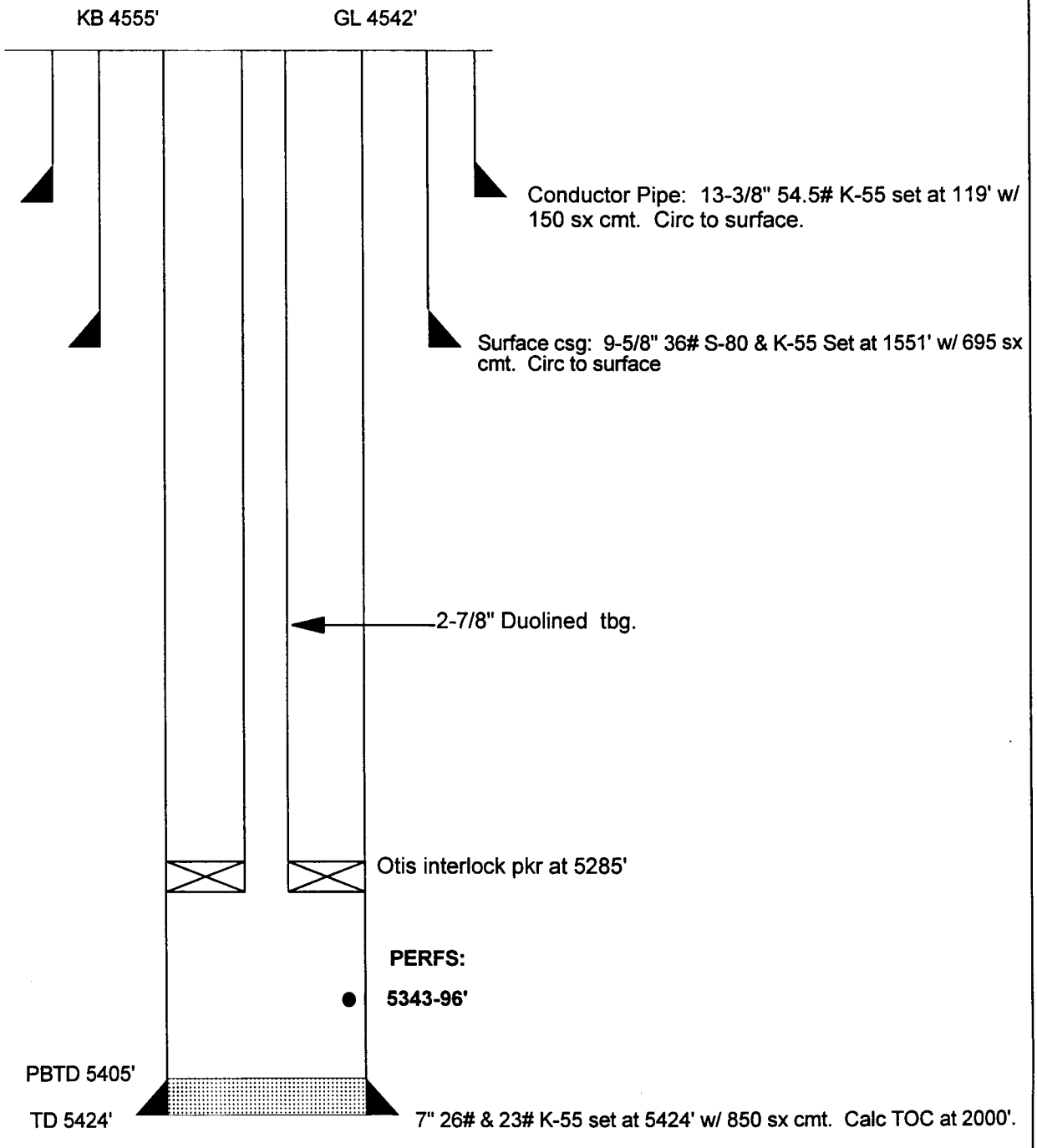
24. Repeat steps 15-23, for each successive planned lateral.

RATHERFORD UNIT # 13-W-11

GREATER ANETH FIELD
500' FNL & 660' FWL
SEC 13-T41S-R23E
SAN JUAN COUNTY, UTAH
API 43-037-31152
PRISM 0042999

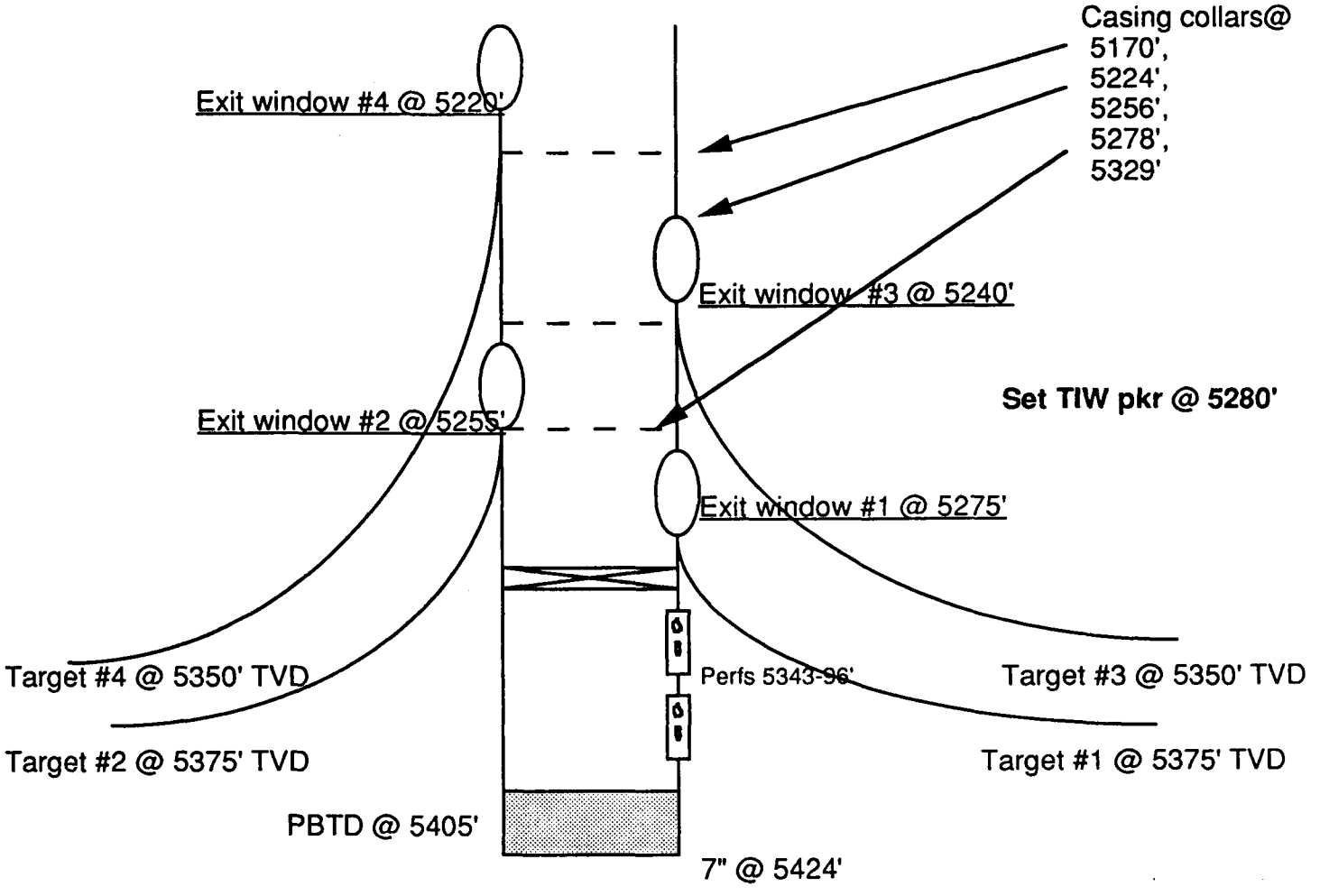
INJECTOR

Capacities:	bbl/ft	gal/ft	cuft/ft
2-7/8" 6.5#	.00579	.2431	.0325
7" 23#	.0393	1.6535	.2210
7" 26#	.0382	1.6070	.2148
2-7/8x7"23#	.0313	1.3162	.1760
2-7/8x7"26#	.0302	1.2698	.1697



L. A. TUCKER 4-17-96 R.U. # 13-W-11

Whipstock plan for Ratherford #13-11



Window	Btm-Top of window	Extension length	Curve radius	Bearing
1	5275-66	-	100	310
2	5255-46	19	120	120
3	5240-31	34	110	330
4	5220-11	52	130	140

*The double spline is 2,42 ft long and the bottom of the whipstock, latch, and debris sub are 5.68 ft long. Therefore 9.1 ft must be added to the above extension lenght to arrive at the total whipstock assembly.

WORKSHEET
APPLICATION FOR PERMIT TO DRILL

APD RECEIVED: 12/23/96

API NO. ASSIGNED: 43-037-31152

WELL NAME: RATHERFORD 13-11 (MULTI-LEG)
OPERATOR: MOBIL EXPL & PROD (N7370)

PROPOSED LOCATION:
NWNW 13 - T41S - R23E
SURFACE: 0500-FNL-0660-FWL
BOTTOM: 0660-FSL-1980-FEL
SAN JUAN COUNTY
GREATER ANETH FIELD (365)

LEASE TYPE: IND
LEASE NUMBER: 14-20-603-246A

PROPOSED PRODUCING FORMATION: DSCR

INSPECT LOCATION BY: / /		
TECH REVIEW	Initials	Date
Engineering		
Geology		
Surface		

RECEIVED AND/OR REVIEWED:

✓ Plat
✓ Bond: Federal [✓] State[] Fee[]
(Number _____)
N Potash (Y/N)
N Oil shale (Y/N)
✓ Water permit
(Number NAVAJO ALLOCATION)
N RDCC Review (Y/N)
(Date: _____)

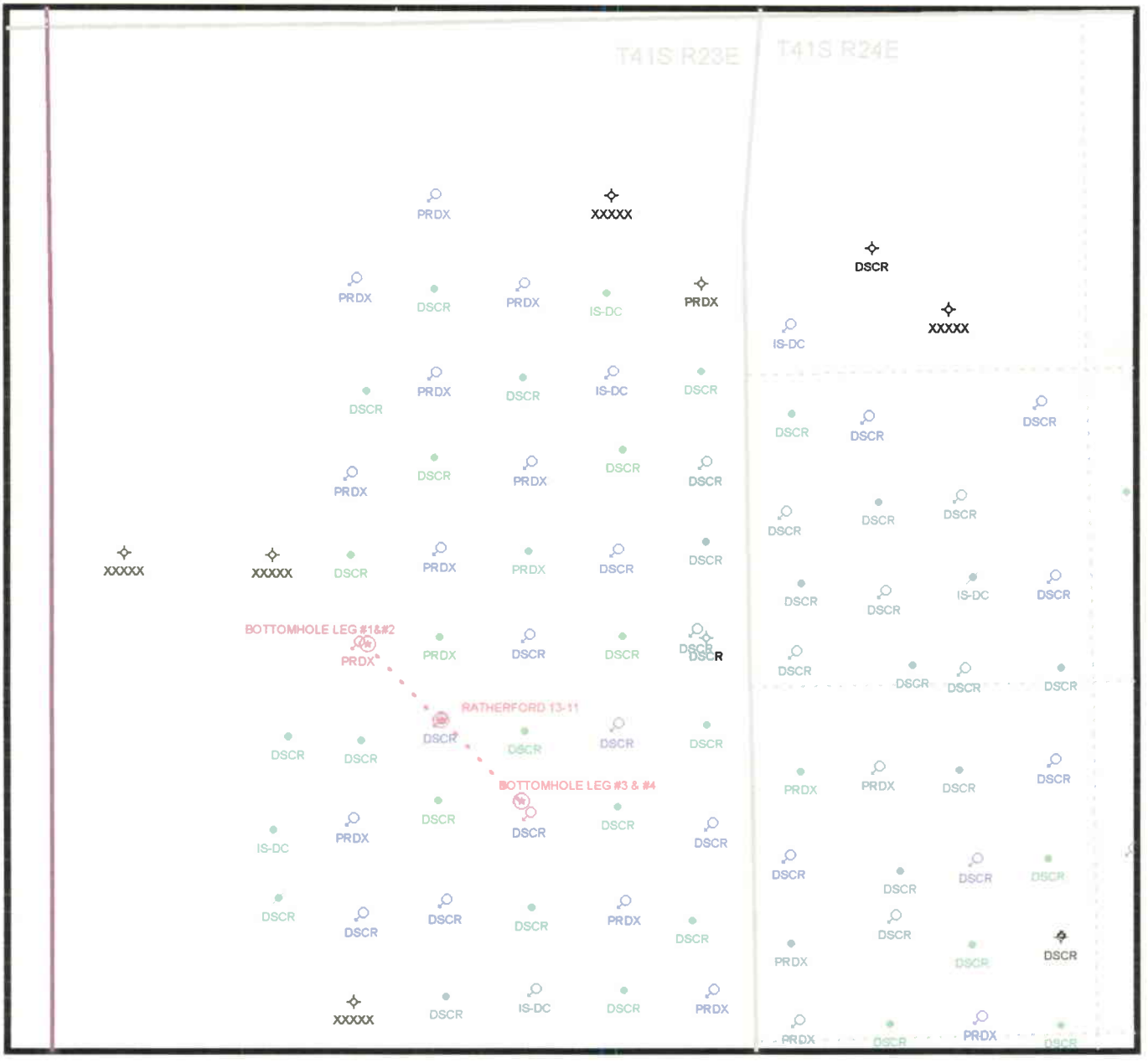
LOCATION AND SITING:

✓ R649-2-3. Unit: RATHERFORD
___ R649-3-2. General.
___ R649-3-3. Exception.
___ Drilling Unit.
Board Cause no: _____
Date: _____

COMMENTS: _____

STIPULATIONS: _____

OPERATOR: MOBIL
FIELD: GREATER ANETH (RATHERFORD)
SEC, TWP, RNG: 13, 41S, 23E
COUNTY: SAN JAUN
UAC: R 649-2-3



PREPARED:
DATE: 23-DEC-96

State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Michael O. Leavitt
Governor

Ted Stewart
Executive Director

James W. Carter
Division Director

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340
801-359-3940 (Fax)
801-538-5319 (TDD)

December 30, 1996

Mobil Exploration & Producing U.S., Inc.
P.O. Box 633
Midland, Texas 79702

Re: Ratherford 13-11 (Re-entry) Well, 500' FNL, 660' FWL, NW NW, Sec. 13, T. 41 S., R. 23 E., San Juan County, Utah

Gentlemen:

Pursuant to the provisions and requirements of Utah Code Ann. 40-6-1 et seq., Utah Administrative Code R649-3-1 et seq., and the attached Conditions of Approval, approval to drill the referenced well is granted.

This approval shall expire one year from the above date unless substantial and continuous operation is underway, or a request for extension is made prior to the expiration date. The API identification number assigned to this well is 43-037-31152.

Sincerely,

R. J. Firth
Associate Director

lwp
Enclosures
cc: San Juan County Assessor
Bureau of Land Management, Moab District Office

Operator: Mobil Exploration & Producing U.S., Inc.

Well Name & Number: Ratherford 13-11 (Re-entry)

API Number: 43-037-31152

Lease: 14-20-603-246A

Location: NW NW Sec. 13 T. 41 S. R. 23 E.

Conditions of Approval

1. General
   Compliance with the requirements of Utah Admin. R. 649-1 et seq., the Oil and Gas Conservation General Rules, and the applicable terms and provisions of the approved Application for Permit to Drill.

2. Notification Requirements
   Notify the Division within 24 hours following spudding the well or commencing drilling operations. Contact Jimmie Thompson at (801)538-5336.

   Notify the Division prior to commencing operations to plug and abandon the well. Contact Frank Matthews at (801)538-5334 or Mike Hebertson at (801)538-5333.

3. Reporting Requirements
   All required reports, forms and submittals shall be promptly filed with the Division, including but not limited to the Entity Action Form (Form 6), Report of Water Encountered During Drilling (Form 7), Weekly Progress Reports for drilling and completion operations, and Sundry Notices and Reports on Wells requesting approval of change of plans or other operational actions.

4. In accordance with Utah Admin. R. 649-3-11, Directional Drilling, submittal of a complete angular deviation and directional survey report is required.

DIVISION OF OIL, GAS AND MINING

SPUDDING INFORMATION

Name of Company: MOBIL

Well Name: RATHERFORD UNIT 13-11 (RE-ENTRY)

Api No. 43-037-31152

Section 13 Township 41S Range 23E County SAN JUAN

Drilling Contractor BIG "A"

Rig # 25

SPUDDED:

Date 2/25/97

Time

How ROTARY

Drilling will commence

Reported by SHARON

Telephone #

Date: 2/27/97 Signed: JLT

ROCKY MOUNTAIN GEO-ENGINEERING
Well Logging • Consulting Geology • Coal Bed Methane Services • Computerized Logging Equipment & Software
ROCKY MOUNTAIN GEO-ENGINEERING CORP.
2450 INDUSTRIAL BLVD. • GRAND JUNCTION, CO 81505
(970) 243-3044 • (FAX) 241-1085

RECEIVED
APR 16 1997
DIV. OF OIL, GAS & MINING

Friday, April 11, 1997

Division of Oil & Gas Mining
State of Utah
355 W. North, Suite 350
Salt Lake City, UT 84180-1203

Re: Ratherford Unit #13-11, Legs 1, 2, 3 & 4
13 Sec. ~~11~~, T41S, R23E
San Juan County, Utah
43 037 31152

UWNW
W1W

Dear Sirs:

Enclosed is the final computer colored log and geology report for the above referenced well.

We appreciate the opportunity to be of service to you and look forward to working with you again in the near future.

If you have any questions regarding the enclosed data, please contact us.

Sincerely,

Bill Nagel

Bill Nagel
Senior Geologist

BN/dn

Enc. 1 Final Computer Colored Log w/Geology Report for Each Leg

cc Letter Only; Dana Larson; Mobil Oil; Midland, TX

RECEIVED
APR 16 1997
DIV. OF OIL, GAS & MINING

MOBIL

RATHERFORD UNIT #13-11
HORIZONTAL LATERAL LEG #1
UPPER 1-C POROSITY BENCH DESERT CREEK
SECTION 13, T41S, R23E
SAN JUAN, UTAH

GEOLOGY REPORT
by

DAVE MEADE / JASON BLAKE/MARVIN ROANHORSE
ROCKY MOUNTAIN GEO-ENGINEERING CORP.
GRAND JUNCTION, COLORADO
(970) 243-3044

MICROFICHE

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WELL SUMMARY

OPERATOR:	MOBIL EXPLORATION & PRODUCTION U.S. INC.
NAME:	RATHERFORD UNIT #13-11 SE UPPER HORIZONTAL LATERAL LEG #1 IN 1-C UPPER POROSITY BENCH, DESERT CREEK
LOCATION:	SECTION 13, T41S, R23E
COUNTY/STATE:	SAN JUAN, UTAH
ELEVATION:	KB:4556' GL:4558'
SPUD DATE:	2/26/97
COMPLETION DATE:	3/07/97
DRILLING ENGINEER:	BENNY BRIGGS /
WELLSITE GEOLOGY:	DAVE MEADE / JASON BLAKE/MARVIN ROANHORSE
MUDLOGGING:	
ENGINEERS	DAVE MEADE / JASON BLAKE/MARVIN ROANHORSE
CONTRACTOR:	BIG "A" RIG 25
TOOLPUSHER:	J. COBERLY/J. DEES
HOLE SIZE:	4 3/4"
CASING RECORD:	SIDETRACK IN WINDOW AT 5275' MEASURED DEPTH
DRILLING MUD:	M-I
ENGINEER:	DANNE BEASON / CHARLES CIBBS
MUD TYPE:	BRINE WATER/POLYMER SWEEPS
ELECTRIC LOGS:	NA
ENGINEER:	NA
TYPE LOGS:	NA
TOTAL DEPTH:	7114' MEASURED DEPTH TVD-5366.95'
STATUS:	TOH & PREPARE TO RETRIEVE WHIPSTOCK & SET NEW WHIPSTOCK FOR LEG #2

DRILLING CHRONOLOGY

MOBIL
RATHERFORD UNIT #13-11
SE UPPER 1-C HORIZONTAL LATERAL LEG # 1

DATE	DEPTH	DAILY	ACTIVITY
2/25/97	5290'	0'	MOVE RIG & RIG UP-NIPPLE UP BOP & PRES. TEST-STRAP DC & DP-TIH
2/26/97	5290'	0'	STRAP DC & DP-TIH-RELEASE BRIDGE PLUG-TOH W/ BRIDGE PLUG-SET PACKER @ 5280-CUT & SLIP 60' DRILLING LINE-TOH W/ LATCH ASSEMBLY-RIG UP WIRE LINE & ORIENT-SURVEY-TAG PACKER-SET & SHEAR STINGER-TOH-PICK UP STARTER MILL & WHIPSTOCK
2/27/97	5280'	9'	ORIENT WHIPSTOCK-TIH-SET WHIPSTOCK & MILL W/ STARTER MILL 5265' TO 5267'-TOH-LAY DOWN STARTER MILL-PICK UP WINDOW MILL-TIH-MILL 5265' TO 5274'
2/28/97	5274'	26'	MILL 5274' TO 5275'-CIR. SWEEP-TOH-CUT DRLG LINE-PICK UP CURVE BHA & BIT-TEST MUD MOTOR-TIH-RIG UP GYRO DATA & RUN GYRO-TIME DRLG 5274'-5289'-CONTROL DRLG & SURVEY 5289'-5300'-PULL GYRO-RUN IN STEERING TOOL
3/01/97	5300'	139'	RUN IN STEERING TOOL-DRLG-SET WET CONN.-DRLG & DIR SURVEYS-CIR. SPLS & SWEEP @ 5439'-RIG DOWN GYRO DATA STEERING TOOL-TOH W/ CURVE BHA-PICK UP LATERAL BHA & NEW BIT
3/02/97	5439'	302'	TEST MWD & MUD MOTOR-PICK UP DP-TIH-WRK PIPE & TOOL FACE FROM 5362' TO 5439'-REPAIR GEOLOGRAPH LINE & COUNTER-DRLG & DIR SURVEYS
3/03/97	5741'	178'	DRLG & DIR SURVEYS-TWISTED OFF DRL PIPE (TD-5919')-TOH-PICK UP OVER SHOT-TIH-FISH
3/04/97	5919'	461'	LATCH ON TO FISH-TOP OF FISH @ 5308'-TOH-WRK THRU TITE HOLE @ 5373'-TOH-LAY DOWN OVER SHOT-CK MWD & TEST MUD MOTOR-TIH
3/05/97	6380'	346'	TIH-WASH 14' TO BTM-DRLG & DIR SURVEYS- CIR. SPLS & PUMP 25 BBL SWEEP OUT-TOH-HANG & BLOWOUT SWIVEL-LAY DOWN 10 JNTS-POOH-REPAIR HYDR HOSE-POOH-TEST & CHECK MWD & MOTOR-LAY DOWN MWD & MOTOR
3/06/97	6726'	373'	ORIENT MOTOR & MWD-TEST MOTOR & MWD-TIH-PICK UP 10 JNTS-ORIENT TOOL FACE-DRLG & DIR SURVEY

DRILLING CHRONOLOGY

DATE	DEPTH	DAILY	ACTIVITY
3/07/97	7099'	15'	DRLG & DIR SURVEY-TWISTED OFF DRL PIPE (TD-7114')-LATERAL TD CALLED @ 7114' (5366.95' TVD)-TOH-PICK UP OVER SHOT-TIH-FISH-LATCH ON TO FISH-TOP OF FISH @ 5322'-TOH-WORK TITE HOLE-STUCK AT 6225'-CIR. & WORK PIPE- SPOT 75 BBLS OIL-PULL PIPE FREE-TOH TO WINDOW & DISPLACE OIL W/FRESH WATER-TOH-LAY DOWN MWD & MUD MOTOR-PICK UP RETRIEVING HOOK ASSEMBLY & TIH-HOOK INTO WHIPSTOCK-TOH
3/08/97	7117'	0	TOH-NO WHIPSTOCK-TIHW/ RETRIEVING HOOK-HOOK AND ATTEMPT TO PULL WHIPSTOCK-TOH-CUT 65' DRLG LINE-P.U. JARS-TIH-TRY TO SCREW INTO WHIPSTOCK-TOH- W.O. TOOLS

DAILY ACTIVITY

Operator: MOBIL
Well Name: RATHERFORD UNIT #13-11 SE UPPER 1-C HORIZONTAL LATERAL LEG #1

DATE	DEPTH	DAILY	DATE	DEPTH	DAILY
2/25/97	5290'	0'			
2/26/97	5290'	0'			
2/27/97	5280'	9'			
2/28/97	5274'	26'			
3/01/97	5300'	139'			
3/02/97	5439'	302'			
3/03/97	5741'	178'			
3/04/97	5919'	461'			
3/05/97	6380'	346'			
3/06/97	6726'	373'			
3/07/97	7099'	15'			
3/08/97	7114'	0'			
3/09/97	5265'	0'			

BIT RECORD

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #13-11 SE UPPER 1-C HORIZONTAL LATERAL LEG #1

RUN	SIZE	MAKE	TYPE	IN/OUT	FTG	HRS	FT/HR
#1(RR) BIT	4 3/4"	STC	MF3P	5275'/ 5439'	164'	19.5	8.41
#2 BIT	4 3/4"	HTC	STR-20	5439'/ 6726'	1,287'	62.5	20.59
#3 BIT	4 3/4"	STC	MF3P	6726'/ 7114'	388'	19.5	19.90

SPERRY-SUN DRILLING SERVICES
SURVEY DATA

Customer ... : MOBIL
Platform ... : CA-MJ-70052
Slot/Well .. : LEG1/R.U.#13-11 1A1, LEG#1

MEASURED DEPTH	ANGLE DEG	DIRECTION DEG	TVD	NORTHINGS FEET	EASTINGS FEET	VERTICAL SECTION	DOG LEG
5265.00	0.42	58.75	5263.62	56.61 N	77.28 W	-95.59	0.00
5274.00	4.60	144.38	5272.61	56.33 N	77.04 W	-95.23	50.97
5280.00	4.20	145.34	5278.59	55.96 N	76.78 W	-94.78	6.78
5290.00	8.30	146.30	5288.53	55.06 N	76.17 W	-93.74	41.01
5300.00	13.70	147.26	5298.34	53.46 N	75.13 W	-91.91	54.03
5310.00	19.50	148.22	5307.92	51.04 N	73.61 W	-89.19	58.06
5320.00	26.80	149.18	5317.11	47.68 N	71.57 W	-85.47	73.10
5330.00	33.30	150.14	5325.76	43.36 N	69.04 W	-80.76	65.18
5340.00	39.60	151.10	5333.80	38.18 N	66.13 W	-75.21	63.26
5350.00	45.90	152.06	5341.14	32.22 N	62.91 W	-68.90	63.33
5360.00	52.30	153.02	5347.69	25.51 N	59.43 W	-61.92	64.41
5370.00	59.10	153.98	5353.32	18.12 N	55.75 W	-54.35	68.46
5380.00	66.00	154.94	5357.93	10.12 N	51.93 W	-46.28	69.52
5390.00	70.30	155.90	5361.65	1.68 N	48.07 W	-37.90	43.91
5400.00	70.60	156.86	5364.99	6.95 S	44.29 W	-29.46	9.53
5410.00	76.40	157.82	5367.83	15.80 S	40.60 W	-20.95	58.73
5419.00	81.40	158.78	5369.56	24.00 S	37.34 W	-13.17	56.53
5429.00	88.90	159.80	5370.41	33.32 S	33.81 W	-4.49	75.68
5439.00	93.30	159.60	5370.22	42.69 S	30.35 W	4.19	44.05
5460.74	93.50	158.90	5368.93	62.98 S	22.66 W	23.13	3.34
5492.56	91.90	157.40	5367.43	92.48 S	10.83 W	51.15	6.89
5524.35	90.50	156.40	5366.76	121.72 S	1.64 E	79.49	5.41
5556.20	89.20	155.50	5366.85	150.80 S	14.62 E	108.13	4.96
5587.96	88.70	153.60	5367.43	179.47 S	28.26 E	137.02	6.19
5619.82	88.30	151.10	5368.26	207.68 S	43.04 E	166.47	7.94
5651.49	88.60	148.70	5369.12	235.07 S	58.92 E	196.23	7.63
5683.29	90.80	147.30	5369.29	262.04 S	75.77 E	226.48	8.20
5715.13	89.60	145.20	5369.17	288.51 S	93.46 E	257.04	7.60
5746.89	89.00	144.60	5369.56	314.49 S	111.72 E	287.73	2.67
5777.87	89.80	143.90	5369.89	339.63 S	129.82 E	317.76	3.43
5809.62	90.10	143.20	5369.91	365.17 S	148.68 E	348.62	2.40
5841.37	90.40	143.20	5369.78	390.59 S	167.70 E	379.53	0.94
5873.20	90.40	142.20	5369.55	415.91 S	186.99 E	410.58	3.14
5906.28	91.80	138.30	5368.92	441.33 S	208.13 E	443.12	12.52
5937.97	91.00	137.10	5368.14	464.77 S	229.45 E	474.52	4.55
5969.67	90.00	136.60	5367.87	487.89 S	251.13 E	505.99	3.53
6001.48	90.00	136.20	5367.87	510.93 S	273.07 E	537.60	1.26
6032.44	91.30	135.70	5367.52	533.18 S	294.59 E	568.39	4.50

SPERRY-SUN DRILLING SERVICES
SURVEY DATA

Customer ... : MOBIL
Platform ... : CA-MJ-70052
Slot/Well .. : LEG1/R.U.#13-11 1A1, LEG#1

MEASURED DEPTH	ANGLE DEG	DIRECTION DEG	TVD	NORTHINGS FEET	EASTINGS FEET	VERTICAL SECTION	DOG LEG
6064.05	89.90	135.30	5367.19	555.72 S	316.74 E	599.85	4.61
6095.22	88.90	134.40	5367.51	577.70 S	338.84 E	630.91	4.32
6127.00	90.40	135.00	5367.71	600.06 S	361.43 E	662.58	5.08
6158.05	88.70	134.10	5367.95	621.84 S	383.55 E	693.53	6.19
6189.86	88.90	135.00	5368.62	644.15 S	406.22 E	725.23	2.90
6221.67	90.90	134.40	5368.67	666.52 S	428.83 E	756.93	6.56
6252.75	92.30	134.30	5367.80	688.24 S	451.04 E	787.91	4.52
6284.58	89.90	134.80	5367.19	710.56 S	473.72 E	819.63	7.70
6315.56	88.30	135.30	5367.68	732.48 S	495.60 E	850.49	5.41
6347.40	88.20	134.60	5368.65	754.97 S	518.13 E	882.19	2.22
6379.05	88.20	133.90	5369.65	777.04 S	540.79 E	913.74	2.21
6410.78	88.20	132.30	5370.64	798.71 S	563.94 E	945.41	5.04
6442.50	88.20	130.00	5371.64	819.57 S	587.81 E	977.10	7.25
6474.27	89.70	129.30	5372.22	839.84 S	612.27 E	1008.87	5.21
6506.01	89.70	128.80	5372.39	859.84 S	636.92 E	1040.60	1.58
6537.79	90.10	127.80	5372.44	879.53 S	661.86 E	1072.37	3.39
6569.54	90.50	127.60	5372.28	898.95 S	686.98 E	1104.09	1.41
6601.27	89.20	127.10	5372.36	918.20 S	712.20 E	1135.78	4.39
6633.05	88.60	126.00	5372.97	937.12 S	737.73 E	1167.50	3.94
6664.77	89.90	124.80	5373.38	955.49 S	763.58 E	1199.12	5.58
6696.56	89.50	123.00	5373.55	973.22 S	789.97 E	1230.72	5.80
6722.40	88.50	123.40	5374.00	987.37 S	811.58 E	1256.38	4.17
6754.12	89.90	122.80	5374.45	1004.69 S	838.15 E	1287.86	4.80
6785.88	90.80	121.80	5374.25	1021.66 S	865.00 E	1319.34	4.24
6817.61	91.90	121.10	5373.50	1038.21 S	892.06 E	1350.70	4.11
6849.39	93.30	121.30	5372.06	1054.65 S	919.21 E	1382.08	4.45
6881.15	93.30	121.30	5370.23	1071.13 S	946.31 E	1413.42	0.00
6912.88	91.30	120.90	5368.96	1087.50 S	973.45 E	1444.74	6.43
6944.67	91.10	120.60	5368.30	1103.75 S	1000.77 E	1476.11	1.13
6976.42	91.80	120.00	5367.49	1119.77 S	1028.17 E	1507.40	2.90
7008.21	90.30	118.10	5366.91	1135.20 S	1055.95 E	1538.60	7.61
7039.96	89.60	116.90	5366.94	1149.86 S	1084.12 E	1569.60	4.38
7071.61	90.10	115.50	5367.02	1163.83 S	1112.51 E	1600.33	4.70
7114.00	90.10	115.50	5366.95	1182.08 S	1150.77 E	1641.37	0.00

SPERRY-SUN DRILLING SERVICES
SURVEY DATA

THE DOGLEG SEVERITY IS IN DEGREES PER 100.00 FEET.
N/E COORDINATE VALUES GIVEN RELATIVE TO WELL SYSTEM REFERENCE POINT.
TVD COORDINATE VALUES GIVEN RELATIVE TO WELL HEAD.
THE VERTICAL SECTION ORIGIN IS WELL HEAD.
THE VERTICAL SECTION WAS COMPUTED ALONG 130.00 (TRUE).
CALCULATION METHOD: MINIMUM CURVATURE.

MD 5265′ INTERPOLATED GYRO SURVEY
MD 5274′ GYRO SURVEY @ BTTM WHIPSTOCK MD 5429′ MWD
SURVEY ALL AZM. INTERPOLATED ABOVE MD 7114′ T.D.

MUD REPORT

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #13-11 SE UPPER 1-C HORIZONTAL LATERAL LEG #1

DATE	DEPTH	WT	VIS	PLS	YLD	GEL	PH	WL	CK	CHL	CA	SD	SOL	WTR
2/27/97	5270'	8.3+	26	–	–	–	10.0	N/C	N/C	6000	1600	–	–	100
2/28/97	5289'	8.3+	26	–	–	–	10.5	N/C	N/C	6000	1400	–	–	100
3/01/97	5384'	8.3+	26	–	–	–	11.5	N/C	N/C	6000	1200	–	–	100
3/02/97	5461'	8.3+	26	–	–	–	11.5	N/C	N/C	6000	1000	–	–	100
3/03/97	5875'	8.3+	26	–	–	–	12.0	N/C	N/C	5800	600	–	–	100
3/04/97	6000'	8.3+	26	–	–	–	12.0	N/C	N/C	5800	400	–	–	100
3/05/97	6523'	8.3+	26	–	–	–	12.5	N/C	N/C	5500	480	–	–	100
3/06/97	6750'	8.3+	29	–	–	–	12.0	N/C	N/C	5000	320	–	–	100
3/07/97	NO CHECK													
3/08/97	NO CHECK													
3/09/97	NO CHECK													

FORMATION TOPS

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #13-11 SE UPPER 1-C HORIZONTAL LATERAL LEG #1

FORMATION NAME		SAMPLES MEASURED DEPTH	SAMPLES TRUE VERTICAL DEPTH	DATUM KB:4558
LOWER ISMAY		5285'	5281'	-723'
GOTHIC SHALE		5317'	5315'	-757'
DESERT CREEK		5340'	5333'	-775'
DC 1-A ZONE		5357'	5345'	-787'
DC 1-B ZONE		5392'	5358'	-800'
DC 1-C ZONE		5430'	5370'	-812'

GEOLOGICAL SUMMARY

AND

ZONES OF INTEREST

The Mobil Exploration and Production U.S. Inc., Ratherford Unit #13-11 Horizontal LEG #1, Section 13, T41S, R23E, was a re-entry of the Mobil Ratherford Unit #13-11 injection well, a sidetrack in a southeasterly direction from 5265' measured depth, 5265' true vertical depth, on February 27, 1997. LEG #1 reached a measured depth of 7114', a true vertical depth of 5366.95', a horizontal displacement of 1143' and true vertical plane 115.5 degrees at total depth, on March 7, 1997. The lateral was drilled with two significant problems. Two fishing jobs were run on this lateral, the first was at a measured depth of 5919', on March 3rd, with the drill string parting at depth of 5308' in the curve section of the well bore. The drill string was retrieved on the first attempt and drilling was resumed on March 4, 1997, the second fishing job was run on March 7th, at a measured depth of 7114', with a true vertical depth of 5266.95' and a horizontal displacement of 1641'. The decision to terminate the lateral was made at this time. Of note was that while drilling and turning the lateral back toward the southeasterly target line, toward the area affected by injection, the background gases noted on the accompanying mud log decreased. While tripping out with the fishing tools and the drill pipe a tight spot was encountered and oil was spotted to help slick the hole and aid in getting the pipe through the tight spot.

The primary objective of the Ratherford Unit #13-11 Horizontal Lateral LEG #1 was the upper 1-C Porosity Bench, to identify, define and if possible determine the lateral extent of the porosity bench, it's effective porosity, staining and reservoir properties in the Desert Creek Member of the Upper Paradox Formation.

The Lower Ismay, Gothic Shale, the transition zone at the top of the Desert Creek, the 1-A and 1-B zones were encountered while drilling LEG #1. Kick off point for this lateral was in the base of the Upper Ismay Member, with only minor gas increases but no shows of staining or porosity were noted. The top of the Lower Ismay was picked at 5282' measured depth, 5280' true vertical depth, at the base of the very thin Hovenweep shale. The base of the Upper Ismay was not well represented in the samples due to the high amount of metal and cement noted in the samples after milling the exit window. The lithology seen was predominately a white to tan, cryptocrystalline to microcrystalline, chalky, tight, anhydritic limestone, grading to very argillaceous, brown to gray brown, cryptocrystalline to microcrystalline dolomite. The dolomite graded into the very thin, carbonaceous, dolomitic shale of the Hovenweep. The Lower Ismay was a white to cream to tan, to light gray to light gray brown, cryptocrystalline to microcrystalline, chalky to clean, slightly dolomitic to very anhydritic, slightly cherty limestone with a trace of scattered micro fossils, no to a trace of intercrystalline porosity, with no visible fluorescence, stains or cuts in the upper 6' above a 10' thick anhydrite. The anhydrite was from a measured depth of 5290', 5288' true vertical depth, to 5300' measured depth, 5298' true vertical depth. The basal 15' of the Lower Ismay was interbedded light to medium gray to gray brown dolomites and cream to tan to light gray limestones. The dolomites were cryptocrystalline to microcrystalline, very slightly cherty, clean to argillaceous, anhydritic and tight. The limestones were cream to tan, white to light gray, cryptocrystalline to microcrystalline, slightly silty to clean, dolomitic in part, with very rare scattered micro fossils. Some dark brown to brown cherts were noted in this basal section. The dolomites increased with depth and graded into the Gothic Shale. The dolomites and limestones had no visible porosity, fluorescence, stain, or cut.

The top of the Gothic Shale is at 5317' measured depth, 5315' true vertical depth. The Gothic Shale was predominantly dark gray to black, silty, carbonaceous, brittle to firm, subblocky to blocky to platy, calcareous to slightly dolomitic and slightly micaceous. The top of the Gothic was gradational from the very thin interbedding of very argillaceous, carbonaceous limestone and very argillaceous, limy dolomite, with the dolomite grading into very dolomitic, carbonaceous shale. The top of the Gothic was picked predominantly by the decrease in penetration rate and the increased percentage of shale in the samples. Due to repairs to the rig GEOLOGRAPH neither the top of the Gothic Shale nor the Desert Creek were able to be picked from changes in penetration rate, and were picked from the samples only.

Between the Gothic Shale and Desert Creek Porosity Members is a transitional zone, which appears to be gradational. The top of the Desert Creek is commonly picked at the Gothic Shale to transition zone facies change, which in this well occurred at a measured depth of approximately 5340' and a true vertical depth of 5333'. In this well the zone was an interbedded very silty limestone; which was gray to white to light brown, cryptocrystalline to microcrystalline, with some granular limestone, very slightly sandy, and a very thinly interbedded dolomite which was brown to tan, microcrystalline to granular, slightly limy and occasionally silty. The limestone was predominately tight with very rare intercrystalline porosity that showed some anhydrite fillings. Through this transitional zone there appeared to be some interbedding or possibly cyclic deposits consisting of dolomitic to slightly calcareous, black, carbonaceous mudstones and very slightly dolomitic siltstones. The porosities ranged from none to very poor intergranular, with traces of calcite to anhydrite fillings. No visible staining was noted and had predominately a very rare spotty, very poor, faint dull yellow fluorescence, with no to very rare residue ring cut.

The top of the Desert Creek 1-A zone was picked at 5357' measured depth, 5345' true vertical depth. The pick is base on the increase in rate of penetration and sample interpretation. The top was picked in this lateral mainly based on the first significant increase in dolomites below the Desert Creek top and the occurrence of a light brown to medium brown, microcrystalline to very finely crystalline to microsucrosic, dolomite, with thinly interbedded limestones near the top of the dolomite. The limestone was predominately tight with very rare streaks of intercrystalline to very rare algal porosity , some chert fragments, and no to very rare visible fluorescence, but no visible stain or cut. The dolomites had rare intercrystalline to algal porosities, rare dull orange mineral to very rare dull yellow fluorescence, very poor spotty brown stain and only a poor slow diffuse cut.

The top of the Desert Creek 1-B zone appeared to occur at 5392' measured depth, 5358' true vertical depth. The pick is base on the rate of penetration, and by sample interpretation. The top was picked in this lateral mainly based on the overall consistent decrease penetration rate in the limestone below the Desert Creek top of the 1-A. The limestone was predominately tight with very rare, very thin streaks of intercrystalline porosity, some thin black carbonaceous shale laminations to partings, and no visible fluorescence, stain or cut. Interbedded in the limestones were very thin brown to light brown, microcrystalline to very finely crystalline dolomite grainstone and packstones. The 1-B porosity zone was in a brown to tan, microcrystalline to very finely crystalline, microsucrosic, slightly algal dolomite, which had scattered anhydrite crystals and rare scattered chert fragments. The intercrystalline porosity was fair, with fair fluorescence, a trace of brown stain, rare black dead oil stain (bitchimum), and a fair streaming cut. A significant increase in the background gas was noted while drilling the 1-B porosity zone.

The top of the Desert Creek 1-C zone was picked at 5430' measured depth, 5370' true vertical depth. The pick is based on a decrease in the penetration rate at the base of the 1-B porosity, and then an increase in the rate of penetration into the 1-C porosity, as well as sample interpretation. The top was picked in this lateral mainly based on the increase in dolomite grainstone below the top of the tight limestones and very thin dolomites between the 1-B porosity and the 1-C porosity in the Desert Creek.

The top of the main objective, the 1-C porosity zone, was picked at a measured depth of 5430', 5370' true vertical depth, in a microcrystalline to sucrosic dolomite. As the curve was being completed in the 1-C zone the dolomite became cleaner and increasing granular. While drilling curve through the section, it appeared that the 1-C porosity bench was possibly defined by the interval from 5370' true vertical depth to a possible 5393' true vertical depth. The top of the porosity Bench was marked by facies change, which was somewhat gradational since the drilling rate increased rather slowly. The top of the best porosity in the 1-C bench was at 5435' measured depth, 5371' true vertical depth, and was marked by increase in rate of penetration and an increase in intercrystalline porosity. The base of the porosity zone was not encountered while landing the curve. Of note was that while landing the curve, the well bore was inadvertently turned upwards to a 93.3 degree angle due to lower build rates reported by the gyro steering tool, than what the MWD tool reported.

At a measured depth of 5439', 5370.2' true vertical depth , with a horizontal displacement of 4' in the dolomite grainstones of the 1-C porosity horizon, a trip was made to change the bottom hole assembly from the curve assembly to the lateral bottom hole assembly and pick up the MWD tool. Upon reentering the well after the trip, the well bore was immediately oriented downward at a sharp angle. For the 12' of the lateral to a measured depth of 5451', true vertical depth of 5369.5', with a horizontal displacement of 15', the lithology was predominately a light brown to brown dolomite grainstone, with very thin dolomite packstone inclusion. This dolomite showed fair intercrystalline porosity, fluorescence, stain and cut. A change in lithology to a tighter dolomite packstone with very thin interbedded dolomite grainstone was noted from a measured depth of 5451' to 5461', true vertical depths of 5369.5' to 5369' with horizontal displacements from 15' to 23'. This dolomite packstone had noticeable amounts of anhydrite crystals, chert fragments, and very thin platy limestones which was interpreted as the top of the 1-C zone. These dolomite packstone show a decrease in porosity, fluorescence, stain and cut.

At a measured depth of 5461', 5369' true vertical depth, 23' horizontal displacement, as the well bore was turned downward toward the target line, and was continued at a slight downward angle, the lithology returned to a light brown to brown dolomite grainstone, microcrystalline to microsucrosic, some very finely crystalline, becoming slightly algal with scattered translucent to clear chert fragments and anhydrite crystals to some anhydrite cement. This dolomite grainstone had fair to good intercrystalline to scattered algal porosity, fair to good fluorescence, stain and cut to a measured depth of 5680', 5369' true vertical depth, and a horizontal displacement of 226'. As well bore was oriented toward the horizontal, the dolomite grainstones began showing increasing algal porosity at a measured depth of 5680', 5369' true vertical depth and a horizontal displacement of 226'. The dolomite grainstones from a measured depth of 5680' to 6225' measured depth , 5368.5' true vertical depth, 760' horizontal displacement , were light to dark brown, microcrystalline to finely crystalline, granular to microsucrosic to sucrosic, with varying amounts of cherts, some anhydrite crystals to inclusions, some Coral and micro fossils which gave the dolomites an almost pelletal appearance in the samples, very rare scattered Crinoid fossils and scattered rare thin cryptocrystalline, tight limestone and dolomite packstone inclusions. The samples through this interval had good sample shows. During this interval at a measured depth of 5919', 5368.5' true vertical depth, and a horizontal displacement of 456' a fishing run was made to retrieve the drill pipe, which had parted at the box and pin at approximately 5373' measured depth, in the curve section. The fishing run was successful on the first attempt and drilling was resumed.

From a measured depth of 6225', 5368.5' true vertical depth and a horizontal displacement of 760', to 6275' measured depth, 5367.8' true vertical depth, and a horizontal displacement of 810', decrease in the penetration rate was noted as the well bore oriented upward at a shallow angle to approach the target line. This decrease in penetration rate was due to the increase in light brown to brown, microcrystalline, tight dolomite packstones, and an increase in chert fragments. This appeared to be the tighter dolomites in the very top of the 1-C zone and at a measured depth of 6253' the well bore was oriented downward at a shallow angle and the penetration rate increased as the lithology returned to an algal dolomite grainstone.

As the drilling of the 1-C lateral continued to a horizontal displacement of approximately 1008', a measured depth of 6474', with a true vertical depth of 5372, as the well bore was continued at a shallow downward angle, the porosity was predominately in a light to medium brown dolomite grainstone. This dolomite was microcrystalline to very fine crystalline, microsucrosic to occasionally sucrosic, slightly anhydritic with traces of anhydrite crystals to rare inclusions, with rare micro fossils and very rare oolites, traces of algal material with decreased with depth, traces of scattered dark brown stain and very rare black oil stain residue* in the intercrystalline matrix. The dolomite had predominantly fair to good intercrystalline and traces of pin point vuggular to algal porosity which decreased with depth, very rare dolomitic packstone inclusions, rare anhydrite to very rare calcareous dolomitic mud filling and cement in the intercrystalline and vuggular porosity. Through the interval the staining was moderate to fair and cuts ranging from good moderately fast to slow steady streaming.

At 6474' the dolomite grainstones became increasingly algal as the well bore was oriented horizontal. A change in lithology was noted at a measured depth of 6550', 5372.3' true vertical depth, and a horizontal displacement of 1085'. The lithology remained predominately an algal dolomite grainstone with good porosity, and sample shows; with a slow change to increasing amounts of dolomitic limestone, increasing calcareous cement in the dolomite grainstones, and dolomite packstone noted in the samples. The apparent vertical to horizontal facies change occurred as the well bore approached the lower boundary of the 1-C zone. From a measured depth of 6550', to a measured depth of 6726', 5374' true vertical depth, with 1259' of horizontal displacement, the facies changed gradually from the algal dolomite grainstones and scattered dolomite packstones to a light brown to tan, microcrystalline to very finely crystalline, granular to microsucrosic, algal, dolomitic, limestone, with scattered anhydrite crystals and chert fragments which increased with depth, and scattered Coral to rare micro fossils. The only noted decreases in penetration rate occurred during the slides in an attempt to turn the bore hole to a upward angle to move away from the possible lower limit of the 1-C zone, with the rotates between slides having a good rate of penetration.

At a measured depth of 6726' a trip was made to change mud motors and bits. The new mud motor had a slightly more aggressive bend to turn the well bore up. After the trip the well bore was drilled upward at an angle which climbed approximately 2' per 100'. From the trip at 6726' measured depth, 5374' true vertical depth and horizontal displacement of 1259' to a measured depth of 6920', 5368' true vertical depth, and a horizontal displacement of 1450', the dolomite algal grainstone lithology decreased to minor cavings with the change to predominately a brown to light brown, occasionally cream, microcrystalline to very finely crystalline, microsucrosic to granular, algal, very slightly dolomitic, limestone grainstone, with decreasing amounts of dolomite grainstones and packstones inclusions. An increase in translucent to light brown to light gray mottle chert fragments were noted from a measured depth of 6810', 5371.5' true vertical depth, and a horizontal displacement of 1343' to a measured depth of 6920', 5368' true vertical depth, with a horizontal displacement of 1450'. The algal limestone grainstone had fair to good intercrystalline to algal porosity, fair to good dull yellow fluorescence, a fair to good brown stain, scattered black dead oil stain and a good slow to moderately fast streaming cut.

As the well was turned towards the horizontal 6920' measured depth, the well bore was continued to 7114' measured depth, 5367' true vertical depth, with a horizontal displacement of 1641'. Through this interval the lithology remained brown to light brown, occasionally cream to off-white mottled, microcrystalline to very finely crystalline, microsucrosic to granular, algal, limestone grainstone, with traces of limestone packstone and very rare, very limy dolomite grainstones, scattered anhydrite inclusions and crystals, scattered micro fossils and buff to translucent chert fragments. The limestones had fair to good intercrystalline to algal to rare pin point vuggular porosity, fair to good dull yellow fluorescence, a fair to good brown stain, scattered black dead oil stain and an increasingly poor slow diffuse to slow streaming cut. A no decrease in porosity was also noted through this interval.

At a measured depth of 7114', 5367' true vertical depth and a horizontal displacement of 1641', the drill string again parted at a measured depth of 5322', 5318' true vertical depth, in a box and pin connection. The decision to terminate the drilling of lateral leg #1 in the 1-C zone was made at this time.

In tracking the well bore through the upper bench, there were several facies changes with in the dolomites, predominately vertical, as the well bore approached the top of the 1-C zone, as the base of the 1-C zone was never encountered and only one vertical to horizontal change. This apparent vertical then horizontal facies occurred gradually, as the algal dolomite grainstones became increasingly limy and graded vertically and horizontally into a slightly dolomitic, algal limestone grainstone. The 1-C zone was projected to thin as the lateral continued toward the RU# 13-22 well. Based on the encountering of the probable transition zone, it appears that the major amount of thinning occurred at a possible horizontal displacement of 1100'. It appears that near a horizontal displacement of 810' the top of the 1-C zone turned downward toward the 1-D zone.

Predominant facies changes were associated with the rock classification with in the dolomites and a lateral change to a very slightly dolomitic limestone, with a change in the depositional environment, as the environment of deposition changed when encountering the top of 1-C zone, nearing the base of the 1-C and moving laterally toward the RU #13-22 well bore. With the classification changes, porosity in the dolomites and limestones encountered was continuous through the 1-C zone laterally penetrated, with the effective or the better porosity being associated with the granular dolomites and limestones facies which had fair to good, intercrystalline to algal porosities, and the absence of any major anhydrite plugging. The dolomite packstone had porosities which were predominately tighter, with very poor permabilities and as the lateral reached its horizontal limit a decrease in the sample shows in the limestone was noted as the well bore was turned toward the area possibly effected by flooding.

From the top of the 1-C porosity bench to a measured depth of 6550', 5372' true vertical depth and a horizontal displacement of 1085', the dolomite lithology was consistent, ranging from light brown to medium brown, rare dark brown, microcrystalline to very fine crystalline, occasionally microsucrosic to granular, with scattered, tighter dolomite packstone and some anhydrite matrixes. The dolomites had fair to good intercrystalline and algal porosities and a good constant dull to bright yellow fluorescence, with noticeable decreases when noticeable amounts of tight dolomite packstone was present. The staining in the dolomites ranged from trace to good light brown to traces of black dead oil stain and the associated cuts being trace to good slow to fast streaming and occasion slow diffuse cuts. The staining in the dolomite, fair to moderate to occasionally good, however remained rather consistent and continuous through out the dolomite porosites penetrated in the 1-C bench. Fluorescence, like the staining was consistent and continuous, and was a dull to bright yellow gold, with cuts ranging from moderate to good ring (diffuse) to moderate to good steady fast streaming cut. The lateral showed very good, decreasing to fair sample shows in the algal limestone grainstones from total measured depth of 6550', to a total measured depth of 7114', 5367' and a horizontal displacement of 1641' at the termination of the lateral.

The conclusion drawn from the southwest 1-C porosity bench Lateral Leg 1, is that in this area the primary dolomitization (due to the lack of limestone cements in the framework), was enhanced by the algal porosity. Also, having and effect on the porosity, were the cryptocrystalline dolomite packstones which graded to and were thinly interbedded with microcrystalline to granular dolomite, which in turn graded laterally into very fine grained, slightly dolomitic, algal limestone grainstone with scattered dense, dolomitic limestone packstones. Staining was fair to moderate and there were significant sections where staining was moderately good. The lateral used the a proposed projected target line as a reference point through the bench, drilling tried to follow the target line while maintaining contact with best porosity when possible. It appears that the effective porosity is continuous through the entire lateral, beginning to thin slightly prior to termination of the lateral.

While drilling, the lateral did make very minor of live oil, with significant amounts of heavies noted on the chromatograph (C_3 and C_4). Of note was the lack of H_2S encountered while drilling, and circulating the well bore. This lateral can be interpreted to have good reservoir qualities through out the lateral. It appears that the porosities are well enough developed to enhance the overall performance of the zone.

*The black residual staining has been called by Dr. Dave Eby & others as "bitchimum" and is also known as "dead oil" ("dd o stn" on mud logs). This staining is associated with the movement of oil over long periods of time and is a good indicator of producible hydrocarbons when associated with productive porosities, but can also be found in porosities that have been filled by anhydrites and other material at later dates.

SAMPLE DESCRIPTIONS

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #13-11 SE UPPER 1-C HORIZONTAL LATERAL LEG #1

DEPTH	LITHOLOGY

5275.00 5280.00 "ABNT METAL FRAG & CMT IN SPL"
"DOL brn,micxl,rthy,v sl slty,lmy ip,tt,NFSOC,w/scat dkbrn CHT frag,thn wh-tan,crpxl-micxl,rthy,chk,tt LS,rr ANHY xl-incl"

5280.00 5288.00 "DOL gybrn-dkbrn,crpxl-micxl,rthy,sl slty,lmy ip,occ grdg to v dol LS,v arg ip,chty,tt,w/tr dkbrn-brn CHT frag,v rr gybrn-ltgy crpxl tt LS,NFSOC"

5290.00 5300.00 "LS tan-gr-dkgr,fn-v fn xln,micro xln ip,slty,DOL ip,tr mico foss ip,no vis POR,NSFOC,scat-com dk gr CHT,minor ANHY wh-clr"

5300.00 5310.00 "DOL lt-mbrn,occ gybrn-dkgybrn,crpxl-micxl,arg,lmy,occ cln,v sl fos,v anhy,tt,NFSOC,w/abnt trnsl-wh xl ANHY,scat brn CHT frag,w/LS crm-tan,offwh-wh,crpxl-micxl,slty,chk,occ dol,grdg to v lmy DOL,tt,NFSOC"

5310.00 5320.00 "LS crm-tan,offwh,wh,crpxl-micxl,cln-dns,occ rhty-chk,anhy ip,sl slty,dol,v rr mic fos,tt,NFSOC,w/tr DOL AA,NFSOC,tr ANHY xl-incl,occ intbd,rr scat dkbrn-brn CHT frag"

5320.00 5330.00 "LS & DOL AA,NFSOC,scat intbd wh-trnsl xl ANHY,w/SH blk-dkgy,sbplty,calc-dol,v sl mica,carb,sooty"

5330.00 5340.00 "SH blk-dkgy-dkgybrn,sbblky,dol-sl calc,rthy,carb,sl slty,mica,v sooty,w/v thn LS-DOL-ANHY AA"

5340.00 5350.00 "SH AA,w/thn scat dkbrn,micxl DOL lams,v rr offwh-tan crpxl-micxl,arg LS incl,scat ANHY,rr CHT frag-pos cvgs"

5350.00 5360.00 "SH AA,w/crm-tan,ltbrn ip,micxl-crpxl,occ gran,lmy-slty DOL,w/thn crm-tan,wh,crpxl-icxl,v slty,chk,anhy,dol,tt LS,NFSOC"

5360.00 5380.00 5356.91 0 "LS crm-tan,occ ltgy-gybrn,crpxl,micxl,occ vfxl,micsuc-gran ip,occ slty,v sl alg,dol ip,grdg to v lmy DOL,tt-tr intxl-v rr alg POR,n-v rr dull orng mnrl-dull yel FLOR,n vis STN-CUT,W/DOL ltbrn-brn,micxl-vfxl,micsuc ip,sl lmy,rthy,v sl slty,tt-tr intxl-v rr alg POR,n-v rr dull orng mnrl-v rr dull yel FLOR,n-v rr spty dkbrn STN,n-v rr v p slow dif CUT"

5380.00 5390.00 "DOL AA,incr vfxl-micsuc,bcmg DOL GRNST,occ DOL PKST,v sl alg,tr-fr intxl POR,fr dull-bri yel FLOR,tr ltbrn STN,rr blk dd o STN,tr slow dif-slow stmg CUT,w/LS AA,v rr ANHY incl-xl,v sl chty"

5390.00 5400.00 "DOL AA,incr crpxl,sl chty,anhy ip,w/scat POR-FLOR-STN-CUT AA,w/offwh-wh-tan crpxl-micxl LS AA,tt,NFSOC"

5400.00 5410.00 "DOL,brn-tn,fn-v fn xln,suc,intr xln POR,scat brn STN,yel-grn FLOUR,fr strm CUT,rr ANHY,scat CHERT,lt gr-dk gr"

5410.00 5420.00 "DOL,brn-lt brn,fn-v fn xln, suc,POR,STN,FLOUR,CUT AA,rr ANHY,tr-no CHERT"

DEPTH	LITHOLOGY

5420.00 5430.00 "DOL,tn-brn,v fn xln,suc,pr intr xln POR, yel-gld FLOUR,sl stm CUT+DOL grd to LS ip,crm-lt gr,crypto xln,no POR,NSFOC,rr ANHY"

5430.00 5440.00 "DOL,brn-tn,v fn xln, suc,sl calc cem ip,rr foss,pr-fr intr xln POR, pr-fr yel FLOUR, sl ODOR, rr brn STN, sl strm CUT,minor ANHY, decr DOL-DOL LS AA"

5439.00 5450.00 "DOL ltbrn-brn,occ crm-tan,crpxl-vfxl,micsuc-gran,rthy-sl slty,lmy ip,rr mic fos,tr ANHY xl-incl,tr-fr intxl POR,fr dull yel FLOR,tr ltbrn STN,fr slow dif-slow stmg CUT,w/rr thn crm-offwh-ltgy crpxl chk tt dol LS incl-intbd,NFSOC"

5450.00 5460.00 "DOL AA,incr crpxl,tt,pred DOL PKST,POR-FLOR-STN-CUT AA,incr ANHY,rr trnsl CHT frag,rr-tr v thn plty,tt dol LS,NFSOC"

5460.00 5470.00 "DOL ltbrn,incr DOL GRNST,incr trnsl-ltbrn mot CHT frag,decr dol LS,POR-FLOR-STN-CUT AA"

5470.00 5480.00 "DOL ltbrn-brn,occ crm,micxl-vfxl,micsuc-gran,v rr crpxl,rthy-sl slty,cln,w/scat clr-trnsl ANHY xl-incl,v rr thn plty crpxl offwh-tan LS incl,v rr trnsl CHT frag,tr-fr intxl POR,fr dull yel FLOR,tr ltbrn STN,fr-g slow dif-tr slow stmg CUT"

5480.00 5490.00 "DOL AA,DOL PKST decr POR-FLOR-STN-CUT"

5490.00 5500.00 "DOL brn,AA,pred DOL GRNST,fr-g intxl POR,fr-g dull yel FLOR,fr brn STN,fr slow dif-tr slow-mod fast stmg CUT"

5500.00 5510.00 "DOL brn,occ ltbrn,micxl-vfxl,micsuc-gran,pred DOL GRNST,occ DOL PKST,tr ANHY xl-incl,occ ANHY-v rr LS cmt,fr intxl POR,fr dull yel FLOR,tr-fr ltbrn STN,fr slow dif-tr-fr slow-mod fast stmg CUT"

5510.00 5520.00 "P-FR SPL ABNT METAL FRAG-SH CVGS - DUE TO SWEEP"
"DOL AA,sl incr lmy DOL PKST,v rr plty dolLS FRAG,sl decr POR-FLOR-STN-CUT"

5520.00 5540.00 "DOL brn-ltbrn,micxl-micsuc,occ vfxl-gran,incr DOL GRNSTN,sl alg,scat trnsl-clr CHT frag,tr ANHY xl-incl,v rr ANHY-lmy cmt,fr-g intxl-alg POR,fr-g dull yel FLOR,fr-g ltbrn STN,fr-g slow dif-mod fast stmg CUT"

5540.00 5550.00 "DOL AA, sl incr DOL PKST,incr ANHY xl-cmt,v rr scat CHT frag,fr intxl POR,fr ltbrn STN,tr-fr slow dif-slow-mod fast stmg CUT"

5550.00 5560.00 "DOL brn,occ ltbrn,micxl-micsuc,occ vfxl-gran,sl incr DOL PKST,tr ANHY xl-incl,occ ANHY cmt,v sl lmy,fr-g intxl POR,fr-g dull yel FLOR,tr-fr ltbrn STN,rr spty blk dd o STN,tr-fr slow dif-rr slow stmg CUT"

5560.00 5570.00 "DOL AA,incr ANHY & DOL PKST,POR-FLOR-STN-CUT AA"

5570.00 5580.00 "DOL,brn-lt brn,micxln,micro suc,occ DOL PKST,micxln,rr ANHY xtl,fr dull yel FLOUR,fr intr xln POR,pr-fr brn STN,wk-sl strm CUT"

5580.00 5590.00 "DOL AA,sl decr DOL PCKST,rr ANHY,STN,POR,FLOUR & CUT AA"

DEPTH	LITHOLOGY

5590.00 5600.00 "DOL,brn-lt brn ip,v fn-micxln,sl suc,scat ANHY xlt & ANHY cem,incr DOL PKST,lt gr,micxln,dens,pr-fr intrxln POR,fr dull yel FLOUR,fr brn stn,sl-fr strm CUT"

5600.00 5610.00 "DOL AA,decr DOL PCKST,rr ANHY xl,POR,STN,FLOUR & CUT AA"

5610.00 5620.00 "DOL,brn-lt brn ip,v fn-micxln,micro suc,occ DOL PKST,micxln,dens,rr ANHY xl & minor ANHY cem,fr dull FLOUR,pr-fr intr xln POR,pr-fr brn STN,sl ODOR,sl stm CUT"

5620.00 5630.00 "DOL,brn-lt brn ip,micxln,microsuc,incr DOL PKST,lt brn,micxln,dens,rr ANHY xl,fr intrxln-rr vug POR,fr brn STN,sl-fr FLOUR,tr-sl strm CUT"

5630.00 5640.00 "DOL,brn-lt brn ip,micxln,microsuc to dens,incr DOL PKST,micxln,dens,incr ANHY and sl CALC cem,rr ANHY xl,scat CHERT,fr dul yel FLOUR,tr-por intrxln POR,sl-fr brn STN,sl strm CUT"

5640.00 5650.00 "DOL,brn,micxln,micro suc,incr intrxln POR,decr DOL PKST,decr ANHY xl & decr ANHY cem,dul yel FLOUR,wk strm CUT"

5650.00 5660.00 "DOL AA,sl DOL PKST AA,rr ANHY xl,POR,STN,FLOUR & CUT AA"

5660.00 5670.00 "DOL,brn,v fn-micxln,micro suc-suc,rr DOL PKST,rr ANHY xl,pr-fr-gd intxln & ppt vug POR,fr dull yel FLOUR,sl brn STN,sl strm CUT"

5670.00 5680.00 "DOL AA,brn,fn-mic xln,suc,rr DOL PKST AA,rr ANHY,POR,FLOUR,STN & CUT AA"

5680.00 5690.00 "DOL,brn-dkbrn,v fn-micxln,mic suc,FOSS-corals & bryo,bcm algal,fr-gd POR,fr-gd dk brn STN,dull-bri yel FLOUR,gd strm CUT,rr ANHY"

5690.00 5700.00 "DOL,brn-dkbrn,v fn-micxln,mic suc,FOSS-corals & bryo,bcm algal,fr-gd POR,fr-gd dk brn STN,dull-bri yel FLOUR,gd strm CUT,rr ANHY"

5700.00 5710.00 "DOL,brn,algal w STN,POR&CUT AA+DOL PKST,lt btn,micxln,dens,rr ANHY,1 pc CHERT,tr POR,tr FLOUR,v wk CUT"

5710.00 5720.00 "DOL,brn,vfn xln,sl suc,algal,foss,fr intr grn POR,fr dkbrn stn,fr yel FLOUR, sl-mod strm CUT+DOL PKST,lt brn,micxln,micro suc-dens,tr intrxln POR,v sl STN, dull FLOUR,v sl strm CUT"

5720.00 5730.00 "DOL,brn,algal AA,incr DOL PKST,lt brn,dens AA,rr ANHY,rr CHERT,POR,STN,FLOUR&CUT AA"

5730.00 5740.00 "DOL,brn,vfn xln,sl suc,algal,fr-gd intrxon POR,fr dk brn STN, dull yel FLOUR, sl strm-dif CUT,scat LS,crm,crypto xln,bit gouge,NSFOC"

5740.00 5750.00 "DOL,brn,v fnxln,micro suc,algal,fr-gd intrxln POR,fr dk brn STN,dull yel FLOUR,sl strm-dif CUT"

5750.00 5760.00 "DOL brn,vfn xln,alg AA,w/scat ltbrn micxl DOL PKST,POR,STN,FLOR -CUT AA,w/scat LS,crm-tan,crpxl,NSFOC"

5760.00 5770.00 "DOL brn,vfn xln,micro suc,algal w POR,STN,FLOR & CUT AA,scat LS,crypto xln,crm-tn,chky(bit four),NSFOC"

DEPTH	LITHOLOGY

5770.00 5780.00 "DOL m-dkbrn,vfxl-suc,occ micxl-micsuc,v alg,pred alg DOL GRNST,w/scat DOL PKST,scat m-ltbrn mot CHT frag,fr-g intxl POR,fr -g dull yel FLOR,fr-g lt-dkbrn STN,v rr blk dd o STN,fr-g mod fast-fast stmg CUT"

5780.00 5790.00 "DOL AA,w/scat Cor fos,POR-FLOR-STN-CUT AA"

5790.00 5800.00 "DOL m-dkbrn,vf-f xl,gran,alg,occ micxl-micsuc,v chty,w/lt-mbrn-trnsl-clr mot CHT frag,rr scat micxl ltbrn DOL PKST,rr mic-Cor FOS,g intxl-alg POR,fr-g dull yel FLOR,g brn-tr blk STN,fr-g mod fast-fast stmg CUT"

5800.00 5810.00 "DOL AA,decr CHT frag,scat Cor-rr Crin fos,scat DOL PKST,POR-FLOR-STN-CUT AA"

5810.00 5820.00 "DOL AA,w/scat crm-ltgy-wh crpxl-micxl,v chk,plty,v dol LS frag-incl,v rr scat CHT frag"

5820.00 5830.00 "DOL lt-dkbrn,pred mbrn,micxl-vfxl,f xl ip,gran-suc,v alg,scat v dol LS frag-cmt,tr lt-m brn mot CHT frag,fr-g intxl-alg POR,fr dull yel FLOR,fr ltbrn-rr blk STN,fr-g slow-fast stmg CUT"

5830.00 5840.00 "DOL AA,n-v rr v dol LS frag-grdg to sl lmy crpxl chk DOL frag-PKST,v alg,rr mic-Cor fos,POR-FLOR-STN-CUT AA"

5840.00 5860.00 "DOL ltbrn-brn,occ mbrn,rr dkbrn,micxl-vfxl,occ f xl,micsuc-gran,suc ip,rthy-v sl slty,scat mot CHT frag,rr mic-Cor FOS,v rr ANHY cmt-incl,v rr dol LS cmt,bcmg DOL PKST ip,tr-g intxl-alg POR,fr-g dull yel FLOR,tr-g slow-mod fast stmg CUT"

5860.00 5870.00 "DOL AA,mot CHT frag,v rr ltgy-crm,crpxl-micxl,chk,v dol LS incl,scat Cor fos,tr CHT frag,POR-FLOR-STN-CUT AA"

5870.00 5880.00 "DOL AA,POR-FLOR-STN-CUT AA,w/incr CHT frag"

5880.00 5890.00 "DOL lt-dkbrn,pred mbrn,mot ip,micxl-fxl,micsuc-suc,gran,sl rthy-sl slty,v alg,tr Cor-rr Crin fos,rr blk carb mud incl,incr mot brn-trnsl CHT frag,tr anhy-lmy cmt,fr-g intxl-alg POR,fr-g dull yel FLOR,tr ltbrn STN,scat blk dd o STN,fr-g slow-fast stmg CUT"

5890.00 5900.00 "DOL AA,incr g alg POR,FLOR-STN-CUT AA,decr CHT frag,scat Cor fos"

5900.00 5920.00 "DOL lt-mbrn,occ dkbrn,vf-fxl,gran,suc,occ micxl-micsuc,alg,sl rthy,v sl slty,w/tr ltbrn-brn micxl DOL PKST,rr Crin-Cor fos,w/scat ltbrn-trnsl CHT frag,tr trnsl ANHY xl-incl,g intxl-alg POR,tr-mod g dull yel FLOR,fr-g lt-mbrn STN,g slow-mod fast stmg CUT"

5920.00 5930.00 "DOL AA,POR-FLOR-STN-CUT AA"

5930.00 5940.00 "DOL lt-dkbrn,micxl-fxl,gran-suc,occ micsuc,scat DOL PKST incl,alg-v alg,sl rthy,v rr ANHY xl-incl,rr Cor fos,fr-g intxl-alg POR,tr-g dull yel FLOR,fr-g lt-dkbrn STN,tr blk dd o STN,fr-g mod fast-fast stmg CUT"

5940.00 5950.00 "DOL AA,w/rr scat ltbrn-trnsl mot CHT frag,rr Cor fos,occ ltbrn micxl DOL PKST incl,POR-FLOR-STN-CUT AA"

DEPTH	LITHOLOGY

5950.00 5960.00 "DOL ltbrn,micxl-fxl,gran-suc,alg,occ micsuc,rthy-sl slty,rr scat DOL PKST incl,tr scat CHT frag-ANHY xl-incl,v rr Cor fos,POR-FLOR-STN-CUT AA"

5960.00 5970.00 "DOL lt-mbrn,micxl-fxl,gran-suc,micsuc ip,w/rr DOL PKST incl,alg,rr Cor-v rr Crin fos,v rr CHT frag,g intxl-alg POR,fr-g dull yel FLOR,fr-g brn STN,tr blk dd o STN, g slow-fast stmg CUT"

5970.00 5980.00 "DOL AA,POR-FLOR-STN-CUT AA,w/v rr scat crm crpxl-micxl,dol LS incl,tt,NFSOC"

5980.00 5990.00 "DOL AA,POR-FLOR-STN-CUT AA,w/v rr scat crm crpxl-micxl,dol LS incl,tt,NFSOC,scat trnsl-ltbrn CHT FRAG"

5990.00 6000.00 "DOL ltbrn-brn,micxl-vfxl,gran-suc,occ fxl,micsuc ip,w/scat DOL PKST,tr ltbrn-trnsl mot CHT frag,rr v dol crm-ltgy LS incl,tr Cor fos,alg,fr-g intxl-alg POR,fr-g dull yel FLOR,fr ltbrn STN,rr blk dd o STN,fr-g slow-fast stmg CUT"

6000.00 6010.00 "DOL AA,v rr ltgy-ltgybrn CHT frag,n-v rr plty LS frag,POR-FLOR-STN-CUT AA"

6011.00 6020.00 "DOL ltbrn-brn,micxl-vfxl,gran-suc,occ fxl,micsuc ip,w/scat DOL PKST,tr ltbrn-gy mot CHT frag,v sl anhy-v rr ANHY cmt,tr Cor fos,alg,fr-g intxl-alg POR,fr-g dull yel FLOR,fr ltbrn STN,rr blk dd o STN,fr-g slow-fast stmg CUT"

6020.00 6030.00 "DOL AA,POR-FLOR-STN-CUT AA"

6030.00 6040.00 "DOL AA,scat Cor fos,rr scat CHT frag,sl anhy,scat ltbrn micxl DOL PKST,POR-FLOR-STN-CUT AA"

6040.00 6050.00 "DOL AA,rr spty blk dd o stn,POR-FLOR-STN-CUT AA"

6050.00 6070.00 "DOL ltbrn-brn,vfxl-fxl,gran-suc,occ micxl-micsuc,rthy,v sl slty,w/scat ltbrn micxl DOL PKST incl,rr ltbrn-ltgy CHT frag,alg,rr Cor-v rr Crin fos,sl anhy-v rr ANHY xl-incl,g intxl-alg POR,g dull yel FLOR,fr-g lt-mbrn stn,rr spty blk dd o STN,g fast CUT"

6070.00 6080.00 "DOL AA,v rr CHT frag,v rr Cor fos,alg,v sl anhy-rr ANHY incl-xl-occ cmt,POR-FLOR-STN-CUT AA"

6080.00 6090.00 "DOL AA,POR-FLOR-STN-CUT AA"

6090.00 6100.00 "DOL ltbrn-brn,vfxl-fxl,gran-suc,occ micxl-micsuc,rthy,v sl slty,w/scat ltbrn micxl DOL PKST incl,rr ltbrn-ltgy CHT frag,alg,rr Cor,sl anhy,g intxl-alg POR,g dull yel FLOR,fr-g lt-mbrn stn,rr spty blk dd o STN,g fast CUT"

6100.00 6110.00 "DOL AA,POR-FLOR-STN-CUT AA"

6110.00 6120.00 "DOL AA,POR-FLOR-STN-CUT AA"

6120.00 6130.00 "DOL ltbrn-brn,micxl-fxl,gran-suc,micsuc ip,rthy-sl anhy,w/v rr amor wh ANHY incl,rr ltbrn DOL PKST,v rr CHT frag,occ Cor fos,fr-g intxl-alg POR,fr-g dull yel FLOR,tr-fr ltbrn STN-spty blk dd o STN,fr-g mod fast-fast stmg CUT"

DEPTH	LITHOLOGY

6130.00 6140.00 "DOL AA,sl incr DOL PKST,anhy ip,w/occ ANHY-calc cmt,rr scat CHT frag,POR-FLOR-STN-CUT AA"

6140.00 6150.00 "DOL AA,w/scat ltbrn DOL PKST w/occ ANHY incl-xl,occ anhy-sl calc cmt,v alg-pred DOL GRNST,POR-FLOR-STN-CUT AA"

6150.00 6160.00 "DOL ltbrn-brn,micxl-fxl,gran-suc,micsuc ip,rthy-sl anhy,w/v rr ANHY incl-xl,rr ltbrn DOL PKST,v rr CHT frag,occ Cor fos,fr-g intxl-alg POR,fr-g dull yel FLOR,tr-fr ltbrn STN-spty blk dd o STN,fr-g mod fast-fast stmg CUT"

6166.00 6170.00 "DOL AA,v alg,w/occ ANHY-rr LS cmt,scat ANHY POR fl,POR-FLOR-STN-CUT AA"

6170.00 6190.00 "DOL ltbrn-brn,micxl-fxl,gran-suc,micsuc ip,rthy-sl anhy,w/v rr wh amor ANHY incl-xl,rr ltbrn DOL PKST,rr calc cmt,v rr CHT frag,occ Cor fos,fr-g intxl-alg POR,fr-g dull yel FLOR,tr-fr ltbrn STN-spty blk dd o STN,fr-g mod fast-fast stmg CUT"

6190.00 6200.00 "DOL AA,v alg,w/occ ANHY-rr LS cmt,scat ANHY POR fl,sl incr CHT frag,POR-FLOR-STN-CUT AA"

6200.00 6210.00 "DOL lt-mbrn,brn,micxl-fxl,micsuc-gran,suc ip,occ rthy anhy DOL PKST frag,ANHY-v sl calc cmt,v rr scat wh amor ANHY,scat Cor fos,fr-g intxl-alg POR,fr-g dull yel FLOR,fr-g lt-dkbrn STN,tr spty blk dd o STN,fr-g mod fast-fast stmg CUT"

6210.00 6220.00 "DOL AA,v alg,sl incr DOL PKST,w/occ ANHY-rr LS cmt,scat ANHY POR fl,POR-FLOR-STN-CUT AA"

6220.00 6230.00 "DOL brn-mbrn,micsuc-gran-micxl,suc ip,DOL GRNST,rr PKST frag/v sl calc cmt,v rr scat wh amor ANHY,scat Cor fos,POR-FLOR-STN-CUT AA"

6230.00 6240.00 "DOL AA,v alg,sl incr DOL PKST,w/occ ANHY-rr LS cmt,scat ANHY POR fl,POR-FLOR-STN-CUT AA"

6240.00 6250.00 "DOL brn-mbrn,gran-micsuc-micxl,vfxl,DOL GRNST,rthy,occ sl slty,dns,tr scat DOL PKST/sl calc-anhy cmt,slty-v sl sdy ip,tr mic fos,fr intxl/agl POR,fr even dull yel FLOR,g brn-fr blk dd o STN,g fast strmg CUT"

6250.00 6260.00 "DOL AA,micsuc-gran,micxl-vfxl-occ suc,GRNST,rthy,slty-v slty,sl sdy,tr anhy incl,tr mic fos,dns,tt-fr intxl/rr agl POR,g even dull/tr spty bri yel FLOR,g brn/fr spty blk dd o STN,g fast strmg/tr fr blooming CUT"

6260.00 6270.00 "DOL AA/tr bf CHT,tr ANHY incl,POR-FLOR-STN-CUT AA"

6270.00 6280.00 "DOL brn-mbrn,gran-micsuc-micxl,occ suc-vfxl-agl,GRNST,rthy,sl slty,v sl sdy ip,dns,incr scat bf-trnsl CHT,tr mic fos,tr scat trnsl xln ANHY,fr-g intxl/tr agl POR,g even dull-scat spty bri yel FLOR,g brn/spty blk dd o STN,g mod fast-fast strmg CUT"

6280.00 6290.00 "DOL AA,incr alg,tr CHT AA,rr ANHY,POR-FLOR-STN-CUT AA"

DEPTH	LITHOLOGY

6290.00 6300.00 "DOL brn-mbrn,micsuc-micxl-gran,occ vfxl-agl,DOL GRNST,rthy,sl slty,tr CHT AA,rr ANHY,tr mic fos/rr ool,tr scat cprxl PCKST,tt-fr intxl/tr agl POR,g even dull/tr spty bri yel FLOR,g brn/scat blk dd o STN,mod fast-fasst strmg CUT"

6300.00 6310.00 "DOL AA,rr trnsl xln ANHY incl,incr mic fos & ool,POR-FLOR-STN-CUT AA"

6310.00 6320.00 "DOL AA,occ crpxl/calc cmt PCKST strk,mic fos & ool,tr CHT & ANHY AA,POR-FLOR-STN-CUT AA"

6320.00 6330.00 "DOL brn-mbrn,gran-micxl-micsuc,occ crpxl-vfxl,pred GRNST/occ scat ool PCKST,sl slty,tr trnsl-bf CHT,tr mic fos & ool,rr ANHY POR fl,tt-fr intxl/rr agl POR,g even dull-mod bri yel FLOR,g brn/tr scat blk dd o STN,mod fast-fast strmg CUT "

6330.00 6340.00 "DOL AA,POR-FLOR-STN-CUT AA"

6340.00 6350.00 "DOL AA,incr crpxl/calc cmt PCKST strk,mic fos,rr ool,tr bf-trnsl CHT,POR-FLOR-STN-CUT AA"

6350.00 6360.00 "DOL brn-mbrn,micxl-crpxl,occ vfxl-gran,rthy,pred dns DOL GRNST,v sl slty,tr mic fos,rr ool incl,rr wh sil-cht incl,tt-fr intxl POR,g even dull yel FLOR,STN-CUT AA"

6360.00 6370.00 "DOL brn-mbrn,micxl-micsuc-gran,occ crpxl-vfxl,DOL GRNST,cln-occ slty,dns,tr mic fos,tt-fr intxl POR,g even dull yel FLOR,g brn/tr scat blk dd o STN,g mod fast-fast strmg CUT"

6370.00 6380.00 "DOL AA,cln-occ slty,dns,tr mic fos & ool,vrr trnsl xln ANHY frag,tt-fr intxl POR,g even dull yel FLOR,g brn/tr scat blk dd o STN,g mod fast-fast strmg CUT"

6380.00 6390.00 "DOL AA,DOL GRNST,cln-occ slty,dns,tr mic fos/rr ool,tt-fr intxl/rr agl POR,FLOR-STN-CUT AA"

6390.00 6400.00 "DOL brn-mbrn,micxl-micsuc-gran,vfxl-crpxl,DOL GRNST,rthy,slty ip,dns,tr mic fos & COR,rr ool,rr trnsl-bf CHT incl,tt-fr intxl POR,g even dull yel FLOR,g brn/scat blk dd o STN,g mod fast-fast strmg CUT"

6400.00 6410.00 "DOL AA,tt-fr intxl/vrr agl POR-FLOR-STN-CUT AA"

6410.00 6420.00 "DOL AA,cln-occ slty,dns,tr mic fos & COR,tr CHT AA,rr ool,vrr trnsl xln ANHY frag,tr-fr intxl POR,g even dull yel FLOR,g brn/tr scat blk dd o STN,g mod fast-fast strmg CUT"

6420.00 6430.00 "DOL brn-mbrn,micxl-micsuc-gran,vfxl-crpxl,DOL GRNST,rthy,slty ip,dns,tr mic fos & COR,tr ool,tr scat trnsl-bf CHT,tr-fr intxl POR,g even dull yel FLOR,g brn/tr scat blk dd o STN,g mod fast-fast strmg CUT"

6430.00 6440.00 "DOL AA,tr-fr intxl/vrr agl POR-FLOR-STN-CUT AA"

6440.00 6450.00 "DOL AA,cln-occ slty,dns,tr mic fos & COR,tr CHT trnsl-bf,rr ool,vrr trnsl xln ANHY frag,tr-fr intxl POR,g even dull yel FLOR,g brn/tr scat blk dd o STN,g mod fast-fast strmg CUT"

6450.00 6460.00 "DOL brn-mbrn,occ ltbrn,micxl-gran-micsuc,occ vfxl-crpxl,rthy,sl slty,tr mic fos-free scat pel,rr trnsl xln ANHY incl,rr wh sil-CHT incl,tr-fr intxl POR,FLOR-STN-CUT AA"

DEPTH	LITHOLOGY

6460.00 6470.00 "DOL AA,occ slty,dns,tr mic fos & pel,rr trnsl xln ANHY frag-incl,tr-fr intxl POR,g even dull yel FLOR,g brn/tr scat blk dd o STN,g mod fast-fast strmg CUT"

6470.00 6480.00 "DOL ltbrn-brn,occ mbrn,micxl-fxl,gran,micsuc-suc ip,alg ip,w/abnt Cor-fos frag,v sl pel,occ anhy-rr POR fl,scat ltbrn DOL PKST,fr-g intxl-tr alg POR,g dull-bri yel FLOR,fr-g ltbrn STN,scat spty blk dd o STN,fr-g slow-fast stmg CUT"

6480.00 6490.00 "DOL AA,sl incr in DOL PKST,POR-FLOR-STN-CUT AA"

6490.00 6500.00 "DOL AA,rr scat ltgy-brn mot CHT frag,sl incr DOL PKST,FLOR-CUT AA,sl decr POR-STN"

6500.00 6520.00 "DOL ltbrn-brn,occ mbrn,micxl-vfxl,gran,occ micsuc-suc,grdg to DOL PKST,w/tr Cor-v rr Crin fos,sl anhy-scat ANHY incl-xl-tr cmt,v rr carb mud incl,v sl pel,occ alg,tr-fr intxl-tr alg POR,g dull-bri yel FLOR,fr ltbrn-rr spty blk STN,fr-g mod fast-fast CUT"

6520.00 6530.00 "DOL AA,sl incr alg mat & DOL GRNST,POR-FLOR-STN-CUT AA"

6530.00 6540.00 "DOL ltbrn-brn,micxl-vfxl,occ f xl-gran,micsuc-suc ip,tr DOL PKST,w/rr blk carb mud incl,occ ANHY xl-tr ANHY-calc cmt,scat Cor-Crin fos,tr fos frag,tr alg,fr-g intxl-tr alg POR,g dull-bri yel FLOR,tr-fr ltbrn STN,rr blk dd o STN,fr mod fast-fast stmg CUT"

6540.00 6550.00 "DOL AA,sl incr alg DOL,incr calc cmt-v rr crpxl plty dol LS frag-incl,POR-FLOR-STN-CUT AA"

6550.00 6570.00 "DOL brn-ltbrn,occ mbrn,micxl-vfxl,gran-micsuc,occ suc,rthy-v sl slty,grdg to DOL PKST,v rr LS frag-tr LS CMT,alg,tR Cor fos-abnt fos frag ip,v rr CHT frag-ANHY incl,fr intxl-tr alg POR,fr-g dull-bri yel FLOR,fr ltbrn-rr spty blk STN,fr-g fast stmg CUT"

6570.00 6580.00 "DOL AA,sl incr LS cmt-rr frag,rr scat CHT frag,POR-FLOR-STN-CUT AA"

6580.00 6590.00 "DOL AA,decr LS cmt,n-v rr LS frag,rr ANHY fl POR-cmt,scat DOL PKST,fos AA,fr intxl-tr-fr alg POR,rr blk carb mud incl,fr-g dull-bri yel FLOR,tr-fr ltbrn-rr spty blk STN,fr-g mod fast-fast stmg CUT"

6590.00 6599.00 "DOL AA,POR-FLOR-STN-CUT AA"

6600.00 6620.00 "DOL ltbrn-brn,micxl-vfxl,gran,alg,occ micsuc,rthy,sl slty,scat Cor-tr fos frag,fr-g intxl-tr alg POR,fr-g dull-bri yel FLOR,tr-fr brn STN,v rr blk dd o STN,fr-g fast stmg CUT,W/ltbrn-tan crpxl-vfxl,alg,dol LS incl, v dol,grdg to v lmy DOL,tr-fr intxl POR,fr bri yel FLOR,tr ltbrn STN,fr-g fast CUT"

6620.00 6630.00 "DOL AA,w/scat dol LS incl AA,POR-FLOR-STN-CUT AA"

6630.00 6640.00 "DOL brn-ltbrn,micxl-vfxl,gran,sl alg,micsuc,occ suc,lmy,grdg to ltbrn,micxl,gran,alg dol LS,v sl anhy,v rr CHT frag,scat Cor fos-fos frag,fr-g intxl-tr alg POR,fr-g dull-bri yel FLOR,tr-fr ltbrn STN,rr blk dd o stn stks,fr-g slow-fast stmg CUT"

6640.00 6650.00 "DOL & LS AA,POR-FLOR-STN-CUT AA"

DEPTH	LITHOLOGY

6650.00 6660.00 "DOL brn-ltbrn,occ mbrn,micxl-vfxl,gran-micsuc,alg,sl rthy,lmy,v rr ANHY xl,w/LS rich cmt,scat Cor fos,trnsl-ltgy-tan CHT frag,w/ltbrn,micxl-micsuc,gran,v dol LS,alg,DOL & LS-fr-g intxl-rr alg POR,fr-g dull-bri yel FLOR,fr ltbrn STN,fr-g slow-fast CUT"

6660.00 6670.00 "DOL & LS AA,incr lmy,incr CHT frag,sl decr in FLOR,POR-STN-CUT AA"

6670.00 6680.00 "LS AA,dol-v dol,pred sl alg dol LS GRNST,decr gran DOL,CHT AA,scat Cor fos-rr fos frag,POR-FLOR-STN-CUT AA"

6680.00 6690.00 "LS ltbrn-tan,micxl-vfxl,gran ip,micsuc,sl alg,tr ltgy-brn-mot CHT frag,scat Cor fos,pred LS GRNST,rr LS PKST,w/intbd DOL AA,POR-FLOR-STN-CUT AA"

6690.00 6700.00 "DOL brn-mbrn,micsuc-micxl-gran,occ vfxl-crpxl,agl ip,lmy/tan-ltbrn LS incl AA,grdg to lmy DOL PCKST,tr wh-trnsl-bf CHT,v sl ANHY,tr mic fos & COR/rr scat pel,tr-fr intxl POR,g even dull/tr spty mod bri yel FLOR,fr brn/tr scat blk dd o STN,g blooming CUT"

6710.00 6720.00 "LS ltbrn-tan,micxl-vfxl,gran ip,micsuc,sl alg,tr ltgy-brn-mot CHT frag,scat Cor fos,pred LS GRNST,rr LS PKST,w/intbd DOL AA,POR-FLOR-STN-CUT AA"

6726.00 6730.00 "LS & DOL AA,scat CHT frag,w/ABNT CVGS AFTER TRIP"

6730.00 6740.00 "LS ltbrn,micxl-vfxl,micsuc-gran,rthy-cln,dol-v dol w/DOL GRNST-PKST incl,alg,v rr scat CHT frag,rr Cor fos,v rr ANHY xl-incl,DOL & LS-fr-g intxl-tr alg POR,fr-g dull-bri yel FLOR,fr ltbrn-v rr blk STN,fr-g slow-fast stmg CUT"

6740.00 6750.00 "LS & DOL AA,POR-FLOR-STN-CUT AA"

6750.00 6760.00 "LS AA,scat LS PKST-w/n-v rr intxl POR,decr DOL incl,LS-DOL-POR-FLOR-STN-CUT AA"

6760.00 6770.00 "LS tan-brn,crpxl-vfxl,micsuc-gran,alg,w/ltbrn-brn,micxl-vfxl,DOL GRNST-PKST incl,pred v dol-sl alg LS,w/tt LS PKST incl,v rr ltgy-trnsl CHT frag,scat Cor fros,LS-DOL tr-g intxl-tr alg POR,tr-g dull-bri yel FLOR,tr-fr ltbrn-v rr blk stn,fr-g slow-fast CUT"

6770.00 6780.00 "LS-DOL AA,sl incr DOL GRNST-PKST,pred v dol alg LS GRNST-PKST,v rr blk carb mud incl,POR-FLOR-STN-CUT AA"

6780.00 6790.00 6784.20 0 "LS AA,sl decr DOL,POR-FLOR-STN-CUT AA"

6790.00 6800.00 "LS ltbrn-tan,occ crm,micxl-vfxl,gran-micsuc,alg,intbd alg LS GRNST-PKST,v rr CHT frag,sl anhy,tr-fr intxl-alg POR,fr-g dull-bri yel FLOR,fr ltbrn STN,v rr spty blk dd o STN,fr-g slow-fast CUT,w/scat ltbrn-brn,micxl-vfxl,gran-micsuc,alg,v lmy DOL"

6800.00 6820.00 "LS AA,w/scat thn alg DOL GRNST,incr trnsl-ltgy-brn mot CHT frag,POR-FLOR-STN-CUT AA & Also In DOL GRNST-PKST,fr dull yel FLOR,tr-fr ltbrn STN,fr slow-mod fast stmg CUT"

6820.00 6830.00 "LS ltbrn-tan,occ brn,micxl-vfxl,gran-micsuc,alg,v dol,w/scat sl alg DOL GRNST incl-frag,incr ltgy-tan-offwh CHT frag,tr-g intxl-tr alg POR,fr dull-bri yel FLOR,tr-fr ltbrn-v rr blk STN,fr-g mod fast-fast CUT"

6830.00 6840.00 "LS AA,w/scat CHT frag,v sl dol-v rr DOL GRNST incl,POR-FLOR-STN-CUT AA"

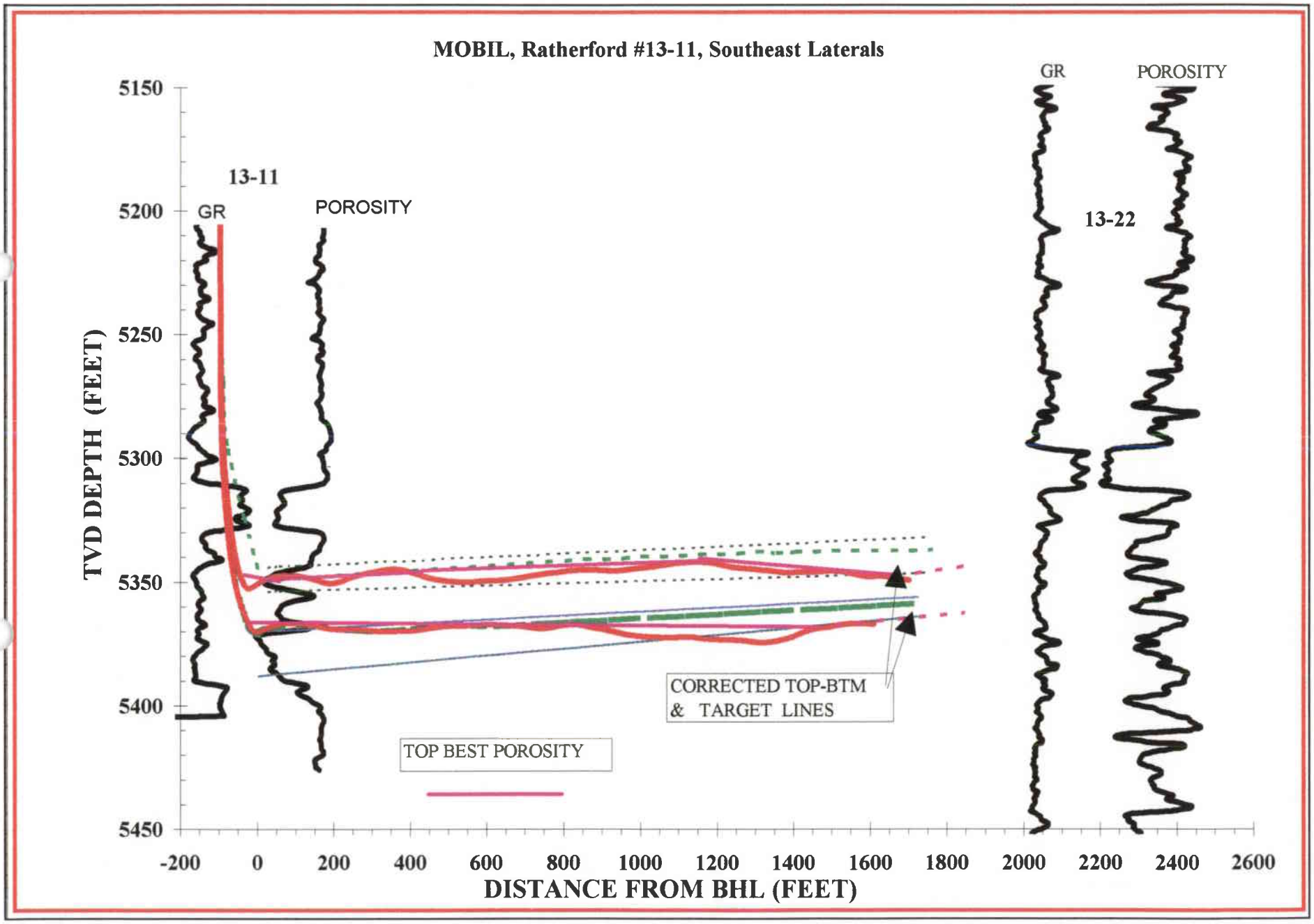
DEPTH	LITHOLOGY

7030.00 7040.00 "LS tan-ltbrn-occ crm,micxl-gran-vfxl,occ crpxl-micsuc,rthy-sl chky,cln-sl mot,sl dol,mic fos,tr ANHY AA,fr intxl/rr agl POR,FLOR-STN AA,g-fr mod slow dif/slow strmg CUT"

7040.00 7050.00 "LS AA bcmg occ suc,alg ip,v rr plty LS PKST frag,dol-DOL rich cmt,tr CHT frag,tr poss sl ool/mic fos,fr-g intxl/tr alg POR,FLOR-STN-CUT AA"

7050.00 7068.00 "LS ltbrn-tan,micxl-gran-agl,vfxl-micsuc,cln-sl mot,dns,v fos/mic fos & ool,sl chky,occ v sl dol,rr ANHY & CHT AA,fr-g intxl/tr agl POR,g even dull/spty mod bri yel FLOR,g ltbr-brn/tr pp blk dd o STN,g-fr dif/tr slow strmg CUT"

7068.00 7114.00 "SAMPLES FROM 7068' TO 7114' NOT CIRCULATED UP DUE TO DRILL STRING PARTING AND TRIPPING OUT OF HOLE FOR FISHING TOOLS"


MOBIL, Ratherford #13-11, Southeast Laterals
13-11
GR
POROSITY
13-22
GR
POROSITY
TVD DEPTH (FEET)
5150
5200
5250
5300
5350
5400
5450
-200
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
DISTANCE FROM BHL (FEET)
CORRECTED TOP-BTM
& TARGET LINES
TOP BEST POROSITY

RECEIVED
APR 16 1997
DIV. OF OIL, GAS & MINING

MOBIL

RATHERFORD UNIT #13-11
HORIZONTAL LATERAL LEG #2
UPPER 1-A/B POROSITY BENCH DESERT CREEK
SECTION 13, T41S, R23E
SAN JUAN, UTAH

GEOLOGY REPORT
by

DAVE MEADE / MARVIN ROANHORSE
ROCKY MOUNTAIN GEO-ENGINEERING CORP.
GRAND JUNCTION, COLORADO
(970) 243-3044

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WELL SUMMARY

OPERATOR:	MOBIL EXPLORATION & PRODUCTION U.S. INC.
NAME:	RATHERFORD UNIT #13-11 SE UPPER HORIZONTAL LATERAL LEG #2 IN 1-A/B UPPER POROSITY BENCH, DESERT CREEK
LOCATION:	SECTION 13, T41S, R23E
COUNTY/STATE:	SAN JUAN, UTAH
ELEVATION:	KB:4556' GL:4558'
SPUD DATE:	3/10/97
COMPLETION DATE:	3/19/97
DRILLING ENGINEER:	BENNY BRIGGS / TONY VICKERY / LOUIS SIMONS
WELLSITE GEOLOGY:	DAVE MEADE / MARVIN ROANHORSE
MUDLOGGING:	
ENGINEERS	MARVIN ROANHORSE/JOE SHIMCO/DAVE MEADE
CONTRACTOR:	BIG "A" RIG 25
TOOLPUSHER:	J. COBERLY/J. DEES
HOLE SIZE:	4 3/4"
CASING RECORD:	SIDETRACK IN WINDOW AT 5255' MEASURED DEPTH
DRILLING MUD:	M-I
ENGINEER:	DANNE BEASON / CHARLES CIBBS
MUD TYPE:	BRINE WATER/POLYMER SWEEPS
DIRECTIONAL DRILLING:	SPERRY-SUN DRILLING SERVICES
TOTAL DEPTH:	7175' MEASURED DEPTH TVD-5349.4'
STATUS:	TOH & PREPARE TO RETRIEVE WHIPSTOCK & SET NEW WHIPSTOCK FOR LEG #3

DRILLING CHRONOLOGY

MOBIL
RATHERFORD UNIT #13-11
SE UPPER 1-A/B HORIZONTAL LATERAL LEG #2

DATE	DEPTH	DAILY	ACTIVITY
3/08/97	7114'	0	TOH-NO WHIPSTOCK-TIH W/RETRIEVING HOOK-HOOK WHIPSTOCK-ATTEMPT TO PULL WHIPSTOCK-TOH-CUT 65' DRLG LINE-PICK UP JARS-TIH-TRY TO SCREW INTO WHIPSTOCK-TOH-W.O. TOOLS
3/09/97	7114'	0'	TIH W/JARS-JAR ON WHIPSTOCK-TOH-LAY DOWN JARS-W.O. TOOLS-PIG UP BASIN WIRE LINE-RUN IN & SET PACKER @ 5260'-RIG DOWN WIRE LINE-W.O. TOOLS-TIH
3/10/97	5260'	0'	TIH-W/OVER SHOT-LATCH ON & SHEAR OFF PIN-TOH-PICK UP & ORIENT SUB-TIH-RIG UP DATA GYRO-& ORIENT GYRO-WINCH BROKE-RIG DOWN & W.O. BASIN WIRE LINE-RIG UP & RUN GYRO-RIG DOWN-LAY DOWN ORIENTING SUB-PICK UP WHIPSTOCK-TIH W/WHIPSTOCK & STARTER MILL
3/11/97	5260'	8'	TIH W/WHIPSTOCK & STARTER MILL-SHEAR OFF PIN-SET WHIPSTOCK & MILL W/ STARTER MILL-TOH-PICK UP WINDOW MILL-TIH-MILL WINDOW 5247' TO 5255'-TOH-LAY DOWN MILLS-PICK UP CURVE BHA & BIT-TEST MUD MOTOR-TIH-TAG UP @ 5255'-CIR
3/12/97	5255'	162'	RIG UP GYRO DATA & RUN GYRO-TIME DRLG 5255'-5280'-SURVEY-PULL GYRO & SET WET CONNECT-RUN IN STEERING TOOL-DRLG & DIR SURVEYS TO 5345'-CIR. & REPAIR PACK OFF-DRLG & DIR. SURVEYS- CIR SPLS & SWEEP @ 5417'
3/13/97	5417'	0'	CIR OUT SWEEP-LAY DOWN 1 JT PIPE-WORK TITE HOLE FROM 5392' TO 5379'-STUCK @ 5379'- SPOT OIL -CIR & DISPLACE OIL-SPOT 15% ACID- DISPLPACE ACID W/WATER-FISH FOR WIRE LINE-PULL STEERING TOOL-LAY DOWN 50 JTS DRL PIPE-TOH W/ CURVE BHA
3/14/97	5417'	121'	TOH W/ CURVE BHA-PICK UP LATERAL BHA & NEW BIT TEST MWD & MUD MOTOR-PICK UP DP-TIH-BREAK CIR @ 5262'-WRK PIPE & TOOL FACE FROM 5262' TO 5417'-DRLG & DIR SURVEYS-ORIENTED REAMING-DRLG & DIR SURVEYS
3/15/97	5538'	376'	DRLG & DIR. SURVEYS
3/16/97	5914'	464'	DRLG & DIR SURVEYS

DRILLING CHRONOLOGY

DATE	DEPTH	DAILY	ACTIVITY
3/17/97	6378'	342'	DRLG & DIR SURVEYS-CIR & SHORT TRIP 18 STDS W/SWIVEL & PUMP ON-TIH W/SWIVEL & PUMP ON-BREAK CIR-DRLG & DIR. SURVEYS
3/18/97	6720'	439'	DRLG & DRI SURVEYS
3/19/97	7159'	16'	DRLG & DRI SURVEYS-TD @ 7175'-PUMP 18 BBL SWEEP-PUMP OUT OF HOLE 57 JTS PIPE W/ SWIVEL-TOH-LAY DOWN LATERAL ASSEMBLY-PICK UP RETRIEVING HOOK & TIH-HOOK WHIPSTOCK & TRY TO RETRIEVE-TOH W/ BROKEN RETRIEVING HOOK-TIH W/NEW HOOK-HOOK INTO & JAR WHIPSTOCK
3/20/97	7175'	0'	JAR ON WHIPSTOCK-R.U. DOWELL-DISPLACE HOLE W/ NITROGEN-JAR ON WHIPSTOCK-RIG DOWN DOWELL-DISPLACE HOLE-TOH-TIH W/RETRIEVING HOOK-PULL WHIPSTOCK FREE

DAILY ACTIVITY

Operator: MOBIL
Well Name: RATHERFORD UNIT #13-11 SE UPPER 1-A/B HORIZONTAL LATERAL LEG #2

DATE	DEPTH	DAILY	DATE	DEPTH	DAILY
3/08/97	7114'	0'			
3/09/97	5265'	0'			
3/10/97	5260'	0'			
3/11/97	5260'	8'			
3/12/97	5255'	162'			
3/13/97	5417'	0'			
3/14/97	5417'	121'			
3/15/97	5538'	376'			
3/16/97	5914'	464'			
3/17/97	6378'	342'			
3/18/97	6720'	439'			
TD	7175'	16'			

BIT RECORD

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #13-11 SE UPPER 1-A/B HORIZONTAL LATERAL LEG #2

RUN	SIZE	MAKE	TYPE	IN/OUT	FTG	HRS	FT/HR
#1(RR) BIT	4 3/4"	STC	MF3P	5255'/ 5417'	162'	17.5	9.25
#2 BIT	4 3/4"	HTC	STR-30	5417'/ 7175'	1758'	102.5	

SPERRY-SUN DRILLING SERVICES
SURVEY DATA

Customer ... : MOBIL
Platform ... : CA-MJ-70066
Slot/Well .. : LEG2/R.U. #13-11, 2A1

MEASURED DEPTH	ANGLE DEG	DIRECTION DEG	TVD	NORTHINGS FEET	EASTINGS FEET	VERTICAL SECTION	DOG LEG
5200.00	0.42	58.75	5198.62	56.37 N	77.69 W	-95.75	0.00
5245.00	0.42	58.75	5243.62	56.54 N	77.41 W	-95.64	0.00
5253.00	4.20	74.40	5251.61	56.64 N	77.10 W	-95.47	47.47
5260.00	4.70	75.84	5258.59	56.78 N	76.58 W	-95.16	7.32
5270.00	9.10	77.28	5268.52	57.05 N	75.41 W	-94.44	44.03
5280.00	15.10	78.72	5278.29	57.48 N	73.36 W	-93.14	60.07
5290.00	21.80	80.16	5287.77	58.05 N	70.25 W	-91.13	67.15
5300.00	28.20	81.60	5296.83	58.72 N	66.08 W	-88.36	64.28
5310.00	34.40	83.04	5305.37	59.40 N	60.93 W	-84.86	62.45
5320.00	40.80	84.48	5313.29	60.06 N	54.87 W	-80.64	64.60
5330.00	46.20	85.92	5320.54	60.63 N	48.01 W	-75.75	54.90
5340.00	50.20	87.36	5327.20	61.07 N	40.57 W	-70.33	41.41
5350.00	53.50	88.80	5333.38	61.33 N	32.71 W	-64.48	34.89
5360.00	58.10	90.24	5339.00	61.39 N	24.44 W	-58.19	47.51
5370.00	64.00	91.68	5343.84	61.24 N	15.70 W	-51.39	60.33
5380.00	70.00	93.12	5347.74	60.86 N	6.51 W	-44.10	61.44
5390.00	75.90	94.56	5350.67	60.21 N	3.03 E	-36.39	60.58
5397.00	80.50	96.00	5352.10	59.58 N	9.85 E	-30.75	68.73
5407.00	90.90	96.70	5352.85	58.48 N	19.75 E	-22.46	104.23
5417.00	95.90	97.70	5352.26	57.23 N	29.65 E	-14.08	50.99
5450.81	93.70	99.80	5349.43	52.11 N	62.94 E	14.72	8.98
5482.53	92.50	102.10	5347.72	46.09 N	94.04 E	42.41	8.17
5514.40	89.70	103.30	5347.10	39.09 N	125.12 E	70.72	9.56
5546.17	89.10	105.10	5347.44	31.29 N	155.91 E	99.32	5.97
5577.93	88.20	107.00	5348.19	22.51 N	186.43 E	128.34	6.62
5609.77	87.00	108.30	5349.52	12.87 N	216.74 E	157.76	5.55
5641.67	88.90	110.00	5350.66	2.41 N	246.85 E	187.55	7.99
5673.50	94.20	110.70	5349.80	8.65 S	276.67 E	217.50	16.80
5705.30	92.30	112.30	5348.00	20.28 S	306.21 E	247.61	7.81
5737.07	91.80	114.60	5346.86	32.92 S	335.34 E	278.04	7.40
5768.79	91.90	115.50	5345.84	46.34 S	364.06 E	308.67	2.85
5800.66	90.80	117.60	5345.08	60.58 S	392.56 E	339.66	7.44
5832.38	89.60	118.80	5344.97	75.57 S	420.51 E	370.70	5.35
5864.13	86.60	120.70	5346.03	91.31 S	448.06 E	401.93	11.18
5895.90	87.40	122.10	5347.69	107.84 S	475.13 E	433.29	5.07
5927.66	88.20	123.90	5348.91	125.13 S	501.75 E	464.79	6.20
5959.28	88.90	125.30	5349.71	143.08 S	527.77 E	496.26	4.95
5990.46	89.50	126.40	5350.14	161.33 S	553.04 E	527.36	4.02

SPERRY-SUN DRILLING SERVICES
SURVEY DATA

Customer ... : MOBIL
Platform ... : CA-MJ-70066
Slot/Well .. : LEG2/R.U. #13-11, 2A1

MEASURED DEPTH	ANGLE DEG	DIRECTION DEG	TVD	NORTHINGS FEET	EASTINGS FEET	VERTICAL SECTION	DOG LEG
6021.44	90.90	128.80	5350.04	180.24 S	577.58 E	558.31	8.97
6053.23	90.40	130.80	5349.68	200.58 S	602.00 E	590.09	6.48
6085.03	90.50	130.90	5349.43	221.38 S	626.06 E	621.89	0.44
6116.85	90.80	132.70	5349.07	242.59 S	649.77 E	653.69	5.73
6148.72	91.70	133.40	5348.37	264.34 S	673.06 E	685.51	3.58
6180.47	91.50	134.40	5347.48	286.34 S	695.93 E	717.17	3.21
6212.34	90.80	136.20	5346.84	308.99 S	718.34 E	748.89	6.06
6244.00	91.30	137.10	5346.26	332.01 S	740.07 E	780.34	3.25
6275.76	91.10	138.50	5345.60	355.53 S	761.39 E	811.79	4.45
6306.74	90.40	139.20	5345.19	378.86 S	781.78 E	842.40	3.20
6338.49	89.80	139.40	5345.14	402.93 S	802.48 E	873.74	1.99
6370.18	89.20	139.50	5345.41	427.01 S	823.08 E	904.99	1.92
6401.94	90.40	139.70	5345.52	451.19 S	843.67 E	936.31	3.83
6433.79	91.30	139.90	5345.05	475.52 S	864.22 E	967.69	2.89
6465.55	91.10	139.40	5344.39	499.72 S	884.78 E	998.99	1.70
6496.52	90.90	139.40	5343.85	523.23 S	904.93 E	1029.54	0.65
6527.62	91.30	139.00	5343.25	546.76 S	925.25 E	1060.24	1.82
6559.44	91.30	140.20	5342.53	570.99 S	945.87 E	1091.60	3.77
6590.49	90.40	139.70	5342.07	594.76 S	965.85 E	1122.18	3.32
6622.30	90.20	139.90	5341.90	619.05 S	986.38 E	1153.53	0.89
6654.03	88.50	139.00	5342.26	643.16 S	1007.00 E	1184.82	6.06
6685.89	87.60	138.30	5343.34	667.06 S	1028.04 E	1216.30	3.58
6717.63	89.00	137.80	5344.29	690.66 S	1049.25 E	1247.71	4.68
6749.49	89.50	138.70	5344.70	714.42 S	1070.46 E	1279.24	3.23
6781.33	89.10	138.70	5345.09	738.34 S	1091.47 E	1310.71	1.26
6812.31	88.50	138.80	5345.74	761.63 S	1111.89 E	1341.33	1.96
6844.01	89.50	138.80	5346.29	785.48 S	1132.77 E	1372.65	3.15
6875.86	91.10	139.20	5346.13	809.51 S	1153.67 E	1404.10	5.18
6907.51	89.30	138.30	5346.02	833.31 S	1174.53 E	1435.38	6.36
6939.24	91.20	138.80	5345.88	857.09 S	1195.54 E	1466.76	6.19
6971.03	90.00	138.30	5345.55	880.91 S	1216.58 E	1498.19	4.09
7002.75	88.60	137.30	5345.93	904.41 S	1237.88 E	1529.62	5.42
7034.48	87.30	135.00	5347.07	927.28 S	1259.85 E	1561.14	8.32
7066.26	90.00	136.40	5347.82	950.01 S	1282.03 E	1592.75	9.57
7098.02	90.10	137.40	5347.79	973.20 S	1303.73 E	1624.28	3.16
7129.81	88.30	136.90	5348.23	996.50 S	1325.35 E	1655.82	5.88
7145.00	88.60	137.10	5348.64	1007.61 S	1335.71 E	1670.89	2.37
* 7175.00	88.60	137.10	5349.38	1029.58 S	1356.12 E	1700.65	0.00

SPERRY-SUN DRILLING SERVICES
SURVEY DATA

THE DOGLEG SEVERITY IS IN DEGREES PER 100.00 FEET.
N/E COORDINATE VALUES GIVEN RELATIVE TO WELL SYSTEM REFERENCE POINT.
TVD COORDINATE VALUES GIVEN RELATIVE TO WELL HEAD.
THE VERTICAL SECTION ORIGIN IS WELL HEAD.
THE VERTICAL SECTION WAS COMPUTED ALONG 130.00 (TRUE).
CALCULATION METHOD: MINIMUM CURVATURE.

* LAST SURVEY ENTERED IS A PROJECTION
TO THE BIT AT TD OF LEG #2

MUD REPORT

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #13-11 SE UPPER 1-A/B HORIZONTAL LATERAL LEG #2

DATE	DEPTH	WT	VIS	PLS	YLD	GEL	PH	WL	CK	CHL	CA	SD	SOL	WTR
3/10/97	5260	NO CHECK												
3/11/97	5251'	8.4	26	–	–	–	11.5	N/C	N/C	6000	300	–	–	100
3/12/97	5271'	8.4	26	–	–	–	11.7	N/C	N/C	6200	200	–	–	100
3/13/97	5417'	8.4	26	–	–	–	11.7	N/C	N/C	6400	300	–	–	100
3/14/97	5417'	8.	26	–	–	–	12.5	N/C	N/C			–	–	100
3/15/97	5610'	8.0	28	–	–	–	11.6	N/C	N/C	6200	200	–	–	100
3/16/97	6087	8.0	30	–	–	–	11.6	N/C	N/C	6300	200	–	–	100
3/17/97	6440'	8.0	32	–	–	–	11.7	N/C	N/C	6200	200	–	–	100
3/18/97	6850'	8.0	32	–	–	–	11.7	N/C	N/C	6200	200	–	–	100
3/19/97	7175'	8.2	34	–	–	–	11.6	N/C	N/C	6300	200	–	–	100
3/20/97		NO CHECK												

SAMPLE DESCRIPTIONS

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #13-11 SE UPPER 1-A/B HORIZONTAL LATERAL LEG #2

DEPTH	LITHOLOGY
5255.00 5260.00	"LS crm-wh,occ tan-ltgy,crpxl-micxl,rthy-cln,occ chk,sl arg,dol ip,v rr blk SH incl,v rr mic fos,tt,NFSOC,w/DOL ltgybrn,micxl,rthy,arg,calc,tt,NFSOC"
5260.00 5270.00	"SH dkbrnblk-blkgy-blk,sbplty-sbblky,frm,sl mica,calc-sl lmy,carb,occ sl dol,sooty"
5270.00 5280.00	"LS crm-wh,occ tan-ltgy,crpxl-micxl,rthy-cln,occ chk,sl arg-v arg,dol ip,tr trnsl-ltgy-brn CHT,rr trnsl xln ANHY,v rr blk SH incl,v rr mic fos,tt,NFSOC"
5280.00 5290.00	"SH dkbrnblk-blkgy-blk,sbplty-sbblky,frm,sl mica,calc-sl lmy,carb,occ grdg to dol SH,sooty"
5290.00 5300.00	"LS ltgybrn,tan-brn,micxl-crpxl-vfxl,occ micsuc,cln-mot,slty ip,chk,tr wh-trnsl ANHY,tr scat trnsl-brn CHT,tt-tr intxl POR,NFSOC"
5300.00 5310.00	"LS ltgybrn,m-dkgybrn,brn-dkbrn,micxl-vfxl-crpxl,rthy,cln,dns,chk,occ sl shy,incr scat ANHY AA,tr trnsl-wh CHT,tt-tr intxln POR/tr lmy chky POR fl,NFSOC"
5310.00 5320.00	"LS ltgy-gybrn,occ m-dkgybrn,brn-dkbrn,micxl-vfxl-crpxl,rthy,cln,dns,chk,sl shy-occ slty ip,ANHY AA,tr trnsl-wh CHT,tr mic fos,tt-tr intxln POR/tr lmy chky POR fl,n-vrr dull orng mnrl FLOR,NSOC"
5320.00 5330.00	"SH dkbrnblk-blk,sbblky-sbplty,sft-frm,occ brit,carb,rthy,occ sl-v slty,calc-sl lmy,sooty"
5330.00 5340.00	"SH blk,occ dkgybrn,sbplty-blky,carb,sl slty,dol,v sl calc,occ mica,sooty,w/scat DOL-LS incl"
5340.00 5350.00	"SH AA,carb,sooty,w/tr LS & DOL incl"
5350.00 5360.00	"DOL wh-crm-ltgy,occ gybrn-brn,crpxl-micxl,occ v slty,sl lmy,occ grdg to v dol SLTST & intbd LS crm,offwh-ltgy,crpxl-micxl,grdg to v lmy SLTST,w/tr v thn blk carb SH incl,tt,NFSOC"
5360.00 5370.00	"DOL AA,w/intbd v slty LS AA,v rr CHT frag,AA"
5370.00 5380.00	"DOL AA,bcmg tan-ltbrn,micxl-micsuc,gran ip,v sl alg,v rr scat CHT frag,lmy ip,occ LS rich cmt,tt-tr intxl-v rr alg POR,n-v rr fnt dull yel FLOR,n-v rr vis STN,n-v p slow dif CUT,w/intbd v slty crpxl-micxl,chky tt LS"
5380.00 5390.00	"DOL tan-ltbrn,occ gybrn,micxl-vfxl,micsuc-gran ip,occ crpxl tt DOL PKST,v sl alg,w/v rr trnsl-brn CHT frag,scat tt chky dol LS incl,v rr ANHY xl-incl,tt-tr intxl-v rr alg POR,n-v rr spty dull yel FLOR,v rr spty ltbrn STN,n-v p slow dif CUT"
5390.00 5400.00	"DOL AA,POR-FLOR-STN-CUT AA"
5400.00 5417.00	"DOL tan-ltbrn,occ ltgy,crpxl-vfxl,micsuc-gran,occ tt DOL PKST incl,tr LS cmt,v rr ANHY xl-incl,scat CHT frag,v sl alg,tt-fr intxl-tr alg POR,tr-fr dull yel FLOR,tr scat ltbrn STN,v rr blk dd o STN,n-fr slow dif-mod fast stmg CUT"

DEPTH	LITHOLOGY

5417.00 5430.00 "DOL tan,occ off wh-crm,micxl-micsuc,vfxl-crpxl,DOL GRNST/scat PKST,rthy,chky,occ sl slty,tr tan crpxl LS incl,scat trnsl-wh xln ANHY,rr brn CHT,tt-tr intxl POR,fr-g even dull /tr scat bri yel FLOR,g-fr ltbrn/tr brn STN,fr dif/tr slow strmg CUT"

5430.00 5440.00 "DOL AA,incr DOL PCKST,POR-FLOR-STN-CUT AA"

5440.00 5450.00 "DOL brn,ltbrn-ltbrngy,micxl-micsuc,vfxl-crpxl,occ agl,GRNST-scat PKST,rthy,sl slty,dns,cln,chky,tr AHHY AA,tr scat crm-off wh crpxl LS frag,rr mic fos,tt-fr intxl/tr agl POR,fr-g dull yel /tr scat bri yel FLOR,fr ltbrn-brn STN,fr-p dif CUT"

5450.00 5460.00 "DOL AA,incr DOL PKST,decr intxl-alg POR,tr dull-bri yel FLOR,n-v rr ltbrn STN,fr-mod fast stmg CUT"

5463.00 5470.00 "DOL tan smtan-brn,smwh drm,sbplty,rthy ip,micxln occ foss tr dull yel FLUO immed strmg CUT"

5470.00 5480.00 "DOLtan,ltbrn,occ crpto,GRNST ip,tan-brn iptr FOSS CRIN tr dull yel FLUO,tr yel strmg CUT,w/ SH mgy,mfrm,sbplty,sl slty,calc & LS wh, crpxl,sfr ip,dns"

5480.00 5490.00 "SH mgy,mfrm,sbplty,calc occ slty ,w/ DOL gy tan,ltbrn,cryptoxln,mott ip,fr CUT,g STN, decr-n FLUO "

5490.00 54500.00 "DOL gy mgy,occ gytan,micxln-cryptoxln,PKSTN dns sbblky-blky,hd,sl slty,occ ANHy,FLUO masked by oil-emulsion in mud"

5500.00 5520.00 "DOL gy-tan,mfrm,,micxln,dns,ip,sm gy PKSTN,dns,slty,lmy ip,occ lttan-wh,plty,sft,chky,GRSTN tan,micxl,occ micsuc,tr yel FLUO tr yel CUT rr lt brn STN"

5520.00 5530.00 "DOL gy ltgy,cryptoxln,smmicxln,dns,occ slty sm tan micxln,PKSTN gy,dns,occ rthy,tr yel FLUO,tr yel CUT,tr brn-yel STN"

5530.00 5540.00 "DOL gy gytan,dns,cryptxln,sm micxln,PKSTNm GYSTN,micxln,tr rthy,tr yel FLUO,tr yelCUT,tr yel STN"

5550.00 5560.00 "DOL m-ltgybrn,dkbrngy,occ ltbrn-brn,micxl-crpxl,vfxl,dns,rthy,occ sl slty,calc-lmy ip,tr scat ltgy micxl LS frag/rr tan crpxl LS incl,occ grdg to dol LS,tt-tr intxl POR,n-rr scat spty dull yel FLOR,no vis-rr brn STN,p-mod p dif CUT"

5550.00 5560.00 "DOL AA,incr scat LS AA,POR-FLOR-STN-CUT AA"

5560.00 5570.00 "LS lt-mgy,occ dkgy,brn,micxl-vfxl-crpxl,rthy,dns,sl slty/tr v slty-sl sdy strk,chky,occ dol ip,cln,tt-tr intxl POR,n-tr even dull yel FLOR,n-rr brn STN,p-fr dif CUT"

5570.00 5580.00 "DOL lt-mbrn,m-ltbrngy,occ dk gy,micxl-crpxl,vfxl-micsuc-gran,DOL PCKST/tr scat GRNST,rthy,chky,sl-occ v calc-lmy,sl slty ip,dns,tt-tr intxl POR,n-tr scat dull spty yel FLOR,n-rr brn STN,p-vp dif CUT"

5580.00 5590.00 "LS lt-mgy,occ dkgy,brn,micxl-vfxl-crpxl,rthy,dns,sl slty/tr v slty-sl sdy strk,chky,occ sl -v dol ip,cln,rr trnsl-bf CHT frag /tr PYR incl,POR-FLOR-STN-CUT AA"

DEPTH	LITHOLOGY

5590.00 5600.00 "DOL lt-mgy,lt-mgybrn,occ brn,micxl-vfxl-crpxl,rthy,sl shy ip,occ arg,calc-lmy ip,tr tan-ltbrn LS incl,dns,tt-tr intxl POR,n-tr scat dull even-spty yel FLOR,n-rr brn STN,p-fr di f CUT"

5600.00 5610.00 "DOL & LS AA,PRO-FLOR-STN- CUT AA"

5610.00 5620.00 "DOL lt-mgy,lt-mgybrn,occ dkgy,tan-brn,micxl-vfxl-crpxl,rthy,sl shy ip,occ arg,calc-lmy ip,chky,tr tan-ltbrn LS incl,rr dism PYR,dns,tt-tr intxl POR,n-tr scat dull even-spty yel FLOR,n-rr brn STN,p-fr di f CUT"

5620.00 5640.00 "DOL crm-off wh,tan-brn,occ lt-mgybrn,micxl-vfxl,crpxl-gran,rthy,chky,plty-shy ip,occ arg,sl calc,tr scat trnsl xln ANHY,tr tan-ltbrn LS incl,rr mic fos,tt-tr intxl/rr agl POR,tr scat dull even-spty yel FLOR,tr brn STN,p fr dif CUT"

5640.00 5650.00 "DOL AA,occ ltgy-gybrn,micxl-vfxl,crpxl-gran,DOL PCKST/scat GRNST,chky,plty-sl shy,occ sl calc,cln,tr mic fos,tr LS incl AA,rr bf CHT,fr-tr intxl/rr agl POR,fr even dull/scat spty bri yel FLOR,scat fr ltbrn STN,fr dif/tr slow strmg CUT"

5650.00 5660.00 "DOL brn,occ ltbrngy-crm,gran-micxl,agl-vfxl-micsuc,crpxl ip,DOL GRNST,tr mic & CRIN & GAST fos,tr tan crpxl LS,rr trnsl-wh ANHY incl,fr intxl/tr agl POR,g ltbrn-brn/rr pp blk dd o STN,g even dull-mod bri/scat bri yel FLOR,g dif/tr mod fast strmg CUT"

5670.00 5680.00 "DOL AA,incr gran,incr agl,DOL GRNST,tr scat PCKST,g-fr intxl/tr agl POR,g even dull/tr scat spty bri yel FLOR,g brn/tr pp blk dd o STN,g dif/fr mod slow strmg CUT"

5680.00 5690.00 "DOL brn,occ m-dk brn,gran-agl-micsuc,micxl-vfxl,pred DOL GRNST/tr scat PCKST,rthy,tr mic & GAST & CRIN fos,rr ANHY incl AA,g intxl/fr agl POR,g brn/tr scat blk dd o STN,g-fr mod fast strmg CUT"

5690.00 5700.00 "DOL brn,occ tan-ltbrngy,gran-micsuc,agl-micxl,pred DOL GRNST,tr scat PCKST/v calc-lmy cmt-fl,rthy,cln,dns,tr fos AA,rr trnsl-wh sil-chty incl,POR-FLOR-STn CUT AA"

5700.00 5710.00 "DOL ltbrn-tan-brn,occ ltgybrn-crm,gran-micsuc,micxl-agl,occ crpxl,DOL GRNST/scat PCKST,cln,dns,chky,sl anhy,tr mic & GAST & CRIN fos,tt-fr intxl/rr agl POR,g even dull/tr scat spty bri yel FLOR,g brn STN,g mod fast strmg CUT"

5710.00 5720.00 "DOL AA,POR-FLOR-STN-CUT AA"

5720.00 5730.00 "DOL brn,occ ltgybrn-crm,gran-micxl,vfxl-micsuc-agl,pred DOL GRNST/scat PCKST frag,tr mic & GAST fos,tr trnsl xln ANHY POR fl-scat frag,tr wh-bf CHT incl,tr tan crpxl incl,fr-g intxl/tr agl POR,FLOR-STN-CUT AA"

5730.00 5740.00 "DOL AA,DOL GRNST/OCC PCKST strk,fr-g intxl POR,rr agl POR,g even dull/tr scat spty bri yel FLOR,g brn/tr scat blk dd o STN,g mod fast strmg CUT"

5740.00 5750.00 "DOL AA,gran-micxl,vfxl-micsuc-agl,pred DOL GRNST/scat PCKST frag,tr mic & CRIN & GAST fos,tr scat wh-trnsl xln ANHY frag,tr wh-bf CHT,tr tan crpxl LS incl,fr-g intxl/tr agl POR,FLOR-STN-CUT AA"

5750.00 5760.00 "DOL AA,DOL GRNST/OCC PCKST strk,fr-g intxl POR,rr agl POR,g even dull/tr scat spty bri yel FLOR,g brn STN,g mod fast strmg CUT"

DEPTH	LITHOLOGY
5760.00 5770.00	"DOL ltbrn-tan-brn,occ ltgybrn-crm,gran-micsuc,micxl-agl,occ crpxl,DOL GRNST/scat PCKST,cln,dns,chky,sl anhy,tr mic & GAST fos,rr CRIN fos,fr intxl/tr agl POR,g even dull/tr scat spty bri yel FLOR,g brn STN,g mod fast strmg CUT"
5770.00 5780.00	"DOL grstn, scat anhy inclu,occ PKSTN gran, vfxln,yel FLUO,fast strmg yel CUT,tr brn STN"
5780.00 5790.00	"DOL predtan,dns ,PKSTN sm yel FLUO,fast yel strmg CUT,tr STN occ CRIN frag,occ BYRfoss,occ vug "
5790.00 57800.00	"DOL tan,PKSYN,dns,scat ANHY,nod,foss sm yel FLUO.fast trmg CUT,sm brn STN"
5800.00 5810.00	"DOLO tan occ vug-poro,dns,sm GRSTN,vug yrl F,fast strmg CUT,tr brn STN,tr CRIN BYR foss"
5810.00 5820.00	"DOLO tan,GRSTN,micxln ip,gy ltgy,rthy ip,yel FLUO,fast strmg CUT,sm brn STN"
5820.00 5830.00	"DOLO tan gytan,PKSTN,dns cryptoxln,dns,occ CRIN,"
5830.00 5840.00	"DOL,tan gytan,occ ltbrn-crm,gran,dns,occ cryptoxln,scat ANHY,yel FLUO,strmg yrl CUT,sm brn STN sm GRSTN, micxln,occ vug occ CRIN,"
5840.00 5850.00	"DOL DOL pred GRSTN,tan,lt brn,crm,CRIN,sm PKSTN,dns,crypxln,yel FLUO,fast strmg CUT,sm brn STN"
5850.00 5860.00	"DOL tan crm,GRSTN,gran,micxln,dns ip,occ foss,scat ANHY,yel FLUO,yel CUT,sm brn STN"
5860.00 5870.00	"DOL tan crm,gran micxln,dns ip GRSTN,foss,CRIN ip,yel FLUO,fast yel CUT tr brn STN"
5870.00 5880.00	"DOLtan,crm,GRSTN,micxln,dns ip occ PKSTN,occ CRIN yel FLUO,fast strmg yel CUT,sm brn STN,occ carb STYL"
5880.00 5890.00	"DOL tan crm,GRSTN,micxln-cryptxln,foss,CRIN,tr carb STYL,yel FLUO,yel strmg CUT,sm brn STN"
5890.00 5899.00	"DOL tan crm,gran-cryptxln,dns ip GRSTN,yel FLUO,immed yel CUT,brn STN,sm carb STYL"
5900.00 5910.00	"DOL tan GRSTN,suc ip micxln,occ cryptxln,tr CRIN,yel FLUO thruout,immed yel CUT,tr brn STN"
5910.00 5920.00	"DOL AA pred GRSTN,occ micxln,occ gran,tan,FLUO CUT STN AA"
5920.00 5930.00	"DOL tan crm,micxln,occ suc,GRSTN,scat CRIN,occ PKSTN,dns,yel FLUO,strmg yel CUT,brn STN"
5930.00 5940.00	"DOL tan,crm,micxln,GRSTN,sl foss, sm PKSTN,cryptxln,rr carb STYL,yel FLUO,strmg yel CUT,sm brn STN"
5940.00 5950.00	"DOL tan-crm,cryptxln,GRSTN occ micxl,tr CRIN,FLUO<CUT<STN AA"
5950.00 5960.00	"DOL tan crm,crypxln-micxln ip,GRSTN,occ sl vug,CRIN,FLUO,CUT,STN AA"

DEPTH	LITHOLOGY

5960.00 5970.00 "DOL ltbrn,occ ltbrngy,tan,crm-off wh,brn,micxl-gran,vfxl-micsuc,crpxl,DOL GRNST,scat PCKST/tr calc cmt & occ rr crpxl LS incl,rthy,occ slty,occ calc-sl lmy,tt-fr intxl/tr agl POR,g even mod bri yel FLOR,g ltbrn/tr blk dd o STN,g dif/mod fast strmg CUT"

5970.00 5980.00 "DOL AA,tr mic fos & CRIN,tr BRY & GAST,tr trnsl-wh sil-CHT incl,rr trnsl xln ANHY incl-POR fl,tt-fr intxl/rr agl POR,g even mod bri yel FLOR,g ltbrn-tr brn/scat blk dd o STN,g dif/mod fast strmg CUT"

5980.00 5990.00 "DOL AA,incr micsuc,pred DOL GRNST/tr scat PCKST AA,fos AA,tt-fr intxl/rr agl POR,FLOR-STN-CUT AA"

5990.00 6000.00 "DOL lt-mbrn,occ ltbrngy,micxl-gran,vfxl-micsuc,DOL GRNST,scat PCKST/tr tan crpxl LS incl & tr lmy cmt,tr CHT AA,tr fos AA,occ calc-sl lmy,tt-fr intxl/tr agl POR,g even mod bri yel FLOR,g ltbrn/tr blk dd o STN,g dif/mod fast strmg CUT"

6000.00 6010.00 "DOL AA,micsuc-micxl,gran-vfxl,occ crpxl,DOL GRNST,scat PCK AA,tr CRIN & GAST fos,tr mic fos,tr trnsl-bf-ltgy CHT incl,rr trnsl xln ANHY incl-frag,tt-fr intxl POR,g even mod bri yel FLOR,g dif/tr slow strmg CUT"

6010.00 6020.00 "DOL AA,pred DOL GRNST,sl incr PCKST/sl incr tan crpxl LS,incr scat tan fos LS frag,fos AA,rr CHT AA,rr ANHY AA,fr intxl/tr agl POR,g even dull/mod bri yel FLOR,g lt brn/scat brn STN,rr pp blk STN,g dif/mod fast strmg CUT"

6020.00 6030.00 "DOL AA,incr micsuc,pred DOL GRNST/tr scat PCKST AA,fos AA,tt-fr intxl/rr agl POR,FLOR-STN-CUT AA"

6030.00 6040.00 "DOL ltbrn-brn,occ mbrn,micsuc-micxl-gran,vfxl,DOL GRNST,tr PCKST/tr tan crpxl LS & tr lmy cmt,tr CRIN fos,rr trnsl-wh-bf CHT,rr trnsl xln ANHY,tr-fr intxl/rr agl POR,g mod bri yel FLOR,g ltbrn/occ brn STN,rr blk dd o STN,g strmg mod fast CUT"

6040.00 6050.00 "LS tan-bf,crm-off wh,crpxl-micxl,cln,dns,sl chky,intbd in DOL AA,pred scat CRIN fos frag,sl ANHY,tt-rr mic frac POR,tr-fr dull/rr scat mod bri yel FLOR,p dif/sl tr res ring CUT"

6050.00 6060.00 "DOL AA,micsuc-gran-micxl,vfxl-agl,pred GRNST-grdg to PCKST/tr tan crpxl fos LS incl & tr lmy cmt,incr scat LS AA,sl slty,tr CRIN fos,tr CHT AA,fr-g intxl POR,FLOR-STN-CUT AA"

6060.00 6070.00 "DOL AA,incr micsuc,pred DOL GRNST/tr scat PCKST AA,tr CRIN fos,scat LS AA,fr-g intxl POR,FLOR-STN-CUT AA"

6070.00 6080.00 "DOL lt-mbrn,occ ltbrngy,dkbrn,micsuc-gran-micxl,GRNST/tr PCKST AA,tr trnsl-wh-ltgy CHT incl,tr GAST & CRIN fos,fr-g intxl/rr agl POR,g even dull-mod bri yel FLOR,g ltbrn/scat brn STN,g mod fast strmg CUT"

6080.00 6090.00 "LS tan-bf,crm-off wh,crpxl-micxl,cln,dns,sl chky,intbd in DOL AA,tr CRIN fos frag,sl ANHY,tt-rr mic frac POR,tr-fr dull/rr scat mod bri yel FLOR,p dif/sl tr res ring CUT"

6090.00 6100.00 "DOL AA,incr micsuc,pred DOL GRNST/tr scat PCKST AA,fos AA,tt-fr intxl/rr agl POR,FLOR-STN-CUT AA"

DEPTH	LITHOLOGY

6100.00 6110.00 "DOL brn-ltbrn,occ ltbrngy,gran-micsuc-micxl,DOL GRNST,tr PCKST/scat tan-crm crpxl LS incl & frag/occ lmy cmt,tr CRIN fos,tr wh-bf-ltgy CHT incl,rr trnsl xln ANHY,tr-fr intxl/rr agl POR,g-fr even yel FLOR,g ltbrn/scat brn STN,g mod fast strmg CUT"

6110.00 6120.00 "DOL lt-mbrn,dkbrn,occ ltbrngy,micsuc-gran,micxl-vfxl,agl,DOL PCKST,rr scat PCKST,rthy,sl slty,scat LS AA,incr CHT AA,fr intxl/tr agl POR,g even mod bri-dull yel FLOR,g brn-dkbrn /tr blk dd o STN,g mod fast strmg CUT"

6120.00 6130.00 "DOL AA,incr micsuc,DOL GRNST AA,fos AA,tr-fr intxl/rr agl POR,FLOR-STN-CUT AA"

6130.00 6140.00 "DOL AA/scat LS AA,tr trnsl-wh-ltgy CHT,tr mic & CRIN fos,tr ANHY incl,tt-fr intxl /rr agl POR,g even dull/mod bri yel FLOR,g lt-m brn/occ dkbrn STN,g mod fast strmg CUT"

6140.00 6150.00 "DOL ltbrn-brn,occ dkbrn,micsuc-gran-micxl,DOL GRNST,rthy,sl slty,tr tan crpxl LS incl & frag,tr GAST & mic fos,tr trnsl xln ANHY,incr CHT frag AA,fr-p intxl/vrr agl POR,FLOR-STN-CUT AA"

6150.00 6160.00 "LS tan-bf,crm-off wh,crpxl-micxl,cln,dns,sl chky,intbd in DOL AA,tr CRIN fos frag,sl ANHY,tt-rr mic frac POR,tr-fr dull/rr scat mod bri yel FLOR,p dif/sl tr res ring CUT"

6160.00 6170.00 "DOL lt-mbrn,dkbrn,occ ltbrngy,micsuc-gran,micxl-vfxl,DOL PCKST,rr scat PCKST,rthy,sl slty,scat LS AA,incr CHT AA,fr intxl POR,g even mod bri-dull yel FLOR,g brn-dkbrn STN,g mod fast strmg CUT"

6180.00 6190.00 "DOL gytan,dns,crytxln,gran ip,occ LS nod,wh,cyrptxln,dns PKSTN ip ,pred GRSTN,micxln,dull yel-yel FLUO thruout,immed yel CUT,sm brn STN"

6190.00 6201.00 "DOL tan-crm,occ mott,pred GRSTN,gran-micxln,dns,LS,wh-clr,nod,tr CRIN,ALGAE,dull yel FLUO,immed yel CUT,tr brn STN"

6210.00 6220.00 "DOL tan-brn,GRSTN,cyrptoxln-micxln ip,occ LS inclu,nod,ip,tr CRIN,yel FLUO,immed yel CUT,tr brn STN"

6220.00 6230.00 "DOL tan-brn,cyrptoxln-micxln ip,occ LS inclu,nod,ip,tr CRIN,yel FLUO,immed yel CUT,tr brn STN GRSTN occ PKSTN"

6230.00 6240.00 "DOL tan brn,vfxln-micxln,GRSTN dns ip,occ CHT,occ LS nod,yel FLUO,immed yel CUT, sm brn STN"

6240.00 6250.00 "DOL tan-brn,sm crm,GRSTN,micxln-cryptoxln,occ LS nod FLUO,CUT,STN AA"

6250.00 6260.00 "DOL tan-brn,cryptxln-micxln,GRSTN,gran,ip,occ alg,sm grdg to PKSTN,yel FLUO,immed yel CUT,sm brn STN"

6260.00 6270.00 "DOL AA grstn,GRAN aa OCC TR crin,sm alga,occ mic-vfxln,sm LS clr-wh,nod,yel FLUO,yel CUT AA"

6270.00 6280.00 "DOL lttan-brn,gran,vfxln,GRSTN,FLUO,CUT,STN AA"

6280.00 6290.00 "DOL tan brn,gran,micxl,GRSTN,occ CRIN,FLUO,CUT,AA"

6290.00 6300.00 "DOL tan ltbrn,vfxln-micxln,GRSTN,fxln ip,gran-suc ip,"

DEPTH	LITHOLOGY

6300.00 6310.00 "DOL ltbrn,tan,vfxln-micxln,gran-suc ip,GRSTN,occ mott LS wh-clr,yel FLUO,immed yel CUT,sm brn STN,occ CRIN"

6310.00 6320.00 "DOL ltbrn,tan,vfxln-micxln,gran-suc ip,GRSTN,occ mott LS wh-clr,yel FLUO,immed yel CUT,sm brn STN,occ CRIN"

6330.00 6340.00 "DOL ltbrn-tan,occ crm,vfxln-miccxln,GRSTN,occ mott,FLUO,CUT,STN AA"

6340.00 6350.00 "DOL tan-brn,gran,vfxln,occnmicxln,GRSTN,occ lmy,nod,foss,CRIN,sm LS wh-clr,mott,yel FLUO,immed yel CUT,brn STN"

6350.00 6360.00 "DOL tan-brn,micxln-vfxln,gran,GRSTN,suc ip,algip,sm mott LS nod,rr CRIN,yel FLUO,immed yel CUT,sm brn STN,tt"

6360.00 6370.00 "DOL tan-brn,micxln-vfxln,gran,GRSTN,suc ip,algip,sm mott LS nod,rr CRIN,yel FLUO,immed yel CUT,sm brn STN,tt"

6370.00 6380.00 "DOL tan-brn,micxln-vfxln,gran,GRSTN,suc ip,algip,sm mott LS nod,rr CRIN,yel FLUO,immed yel CUT,sm brn STN,tt"

6380.00 6390.00 "DOL tan-brn,micxln-vfxln,gran,GRSTN,suc ip,algip,sm mott LS nod,rr CRIN,yel FLUO,immed yel CUT,sm brn STN,tt"

6390.00 6400.00 "DOL tan-brnmicxln,gran,occ wh mott,GRSTN,occ lmy,brit ywel FLUO,immed yel CUT,sm brn STN"

6400.00 6410.00 "DOL dkbrn-brn,ltbrn-tan,micsuc,gran-micxl-agl,GRNST/tr scat PCKST,tr CRIN fos,tr scat wh-ltgy CHT,fr-g intxl/rr agl POR,g even mod bri/scat bri yel FLOR,g dkbrn-brn/tr blk dd o STN,g mod fast-fast strmg CUT"

6410.00 6420.00 "DOL brn-dkbrn,tan,occ crm-ltgybrn,micsuc-micxl,vfxl-gran,DOL GRNST,occ PCKST/tr tan crpxl LS & lmy cmt,sl slty,tr CRIN & GAST fos,tr scat wh-trnsl-ltgy CHT frag,tr-fr intxl POR,g even mod bri yel FLOR,g brn-ltbrn/tr blk dd o STN,g mod fast strmg CUT"

6420.00 6430.00 "LS crm-off wh-tan,crpxl,cln,dns,v fos,intbd/DOL AA,dol-v dol,occ grdg to calc DOL,tr scat CHT AA,tt,g even-spty mod bri yel FLOR,n-tr ltbrn STN,g mod fast strmg CUT"

6430.00 6440.00 "DOL AA,micsuc-micxl-gran,DOL GRNST,rr PCKST AA,sl slty,tr CRIN & mic fos,incr scat wh-trnsl-ltgy CHT frag,tr-fr intxl/rr agl POR,g even mod bri-dull yel FLOR,g brn-ltbrn/tr blk dd o STN,g mod fast strmg CUT"

6440.00 6450.00 "DOL AA/LS & CHT AA,tr CRIN fos,POR-FLOR-STN-CUT AA"

6450.00 6460.00 "DOL brn-ltbrn,occ ltgybr,dkbrn,micsuc-gran-micxl,DOL GRNST,tr scat PCKST/tr tan crpxl LS incl & lmy cmt,tr CHT AA,tr CRIN fos,fr intxl/rr agl POR,g even mod bri-dull yel FLOR,STN AA,g blooming-fast strmg CUT"

6460.00 6470.00 "DOL AA/incr LS & CHT frag AA,tr CRIN fos,POR-FLOR-STN-CUT AA"

DEPTH	LITHOLOGY

6480.00 6490.00 "DOL brn-ltbrn,occ dkbrn,ltgybrn,micsuc-micxl-gran,rr agl,DOL GRNST,occ PCKST/tr tan crpxl LS & lmy cmt,sl slty,tr CRIN fos,scat wh-trnsl-ltgy CHT frag,fr intxl/rr agl POR,g even mod bri yel FLOR,g brn-ltbrn STN,g dif/mod fast strmg CUT"

6490.00 6500.00 "DOL AA/incr LS & CHT frag AA,tr CRIN fos,POR-FLOR-STN-CUT AA"

6500.00 6510.00 "DOL ltbrn-brn,dkbrn,occ ltbrngy,micsuc-gran,micxl-vfxl,agl,DOL PCKST,tr scat PCKST,rthy,sl slty,scat LS AA,incr CHT AA,fr intxl/tr agl POR,g even mod bri-dull yel FLOR,g brn-dkbrn/rr blk dd o STN,g mod fast strmg CUT"

6510.00 6520.00 "LS tan-crm-off wh,crpxl,cln,dns,sl chky,v fos,dol,occ grdg to calc DOL,occ intbd/DOL AA/scat CHT AA,tt,g even-spty mod bri yel FLOR,n-tr ltbrn STN,g mod fast strmg CUT,poss cvgs"

6520.00 6530.00 "DOL brn-ltbrn,occ dkbrn,ltgybrn,micsuc-micxl-gran,rr agl-crpxl,DOL GRNST,occ PCKST/tr tan crpxl LS incl & lmy cmt,slty,tr CRIN fos,scat wh-trnsl-ltgy CHT frag,fr intxl/rr agl POR,g even mod bri-dull yel FLOR,g brn-ltbrn STN,g mod fast strmg-blooming CUT"

6530.00 6550.00 "DOL brn-tan,occ dkbrn,,micsuc-micxl-gran,rr agl-crpxl,DOL GRNST,occ PCKST/tr tan crpxl LS incl & lmy cmt,slty,tr CRIN fos,scat wh-trnsl-ltgy CHT frag,fr intxl/rr agl POR,d bri-dull yel FLUOR,g brn-ltbrn STN,g mod fast strmg CUT"

6550.00 6570.00 "DOL brn-tan,ltgybrn,micsuc-micxl-gran,rr agl-crpxl,DOL GRNST,/tr tan,occ trnsl-clr, xl LS incl & lmy cmt,slty,tr CRIN fos,scat wh-trnsl-ltgy CHT frag,fr intxl/rr agl POR,g even mod bri-dull yel FLOR,g brn-ltbrn STN,g mod fast strmg-blooming CUT"

6570.00 6590.00 "DOL lt tan,crm,off wh,PKSTN,tt,cryptoxln,GRSTN,cryptoxln-,occ anhy,tan,sucr ip,scat LS wh,tan,bri yel FLUO,immed strmg CUT brn STN"

6590.00 6610.00 "DOL ltbrn,occ tan,ltgybrn,micsuc-micxl-gran,DOL GRNST,occ PCKST/tr tan crpxl LS lmy cmt,slty,scat wh-trnsl-ltgy CHT frag,fr intxl bri-dull yel FLOR,g brn-ltbrn STN,g mod fast strmg-blooming CUT"

6610.00 6620.00 "DOL brn-ltbrn,occ dkbrn,ltgybrn,micsuc-micxl-gran,rr agl-crpxl,DOL GRNST,occ PCKST/tr tan crpxl LS incl & lmy cmt,slty,scat wh-trnsl-ltgy CHT frag,fr intxl/rr agl POR,g even mod bri-dull yel FLOR,g brn-ltbrn STN,g mod fast strmg-blooming CUT"

6470.00 6480.00 "LS tan-crm-off wh,crpxl,cln,dns,sl chky,v fos,dol,occ grdg to calc DOL,occ intbd/DOL AA/scat CHT AA,tt,g even-spty mod bri yel FLOR,n-tr ltbrn STN,g mod fast strmg CUT,poss cvgs"

6620.00 6640.00 "DOL tan-wh,lttan,cryptoxln,sm tan micxln,suce,lmy,sl CHTY,sil ip,modbri yel FLUO,yel strmg CUT,brn-dkbrn STN"

6640.00 6650.00 "DOL ltbrn,occ tan,ltgybrn,micsuc-micxl-gran,DOL GRNST,occ PCKST/tr tan crpxl LS lmy cmt,slty,scat wh-trnsl-ltgy CHT frag,fr intxl bri-dull yel FLOR,g brn-ltbrn STN,g mod fast strmg-blooming CUT"

6650.00 6670.00 "DOL ltbrn,occ tan,ltgybrn,micsuc-micxl-gran,PKSTN,occ GRSTN,tr tan crpxl LS lmy cmt,slty,scat wh-trnsl-ltgy ANHYfrag, bri yel FLOR, brn-ltbrn STN,g mod fast strmg- CUT"

DEPTH	LITHOLOGY

6670.00 6680.00 "DOL ltbrn,tan,ltgybrn,micsuc-micxl-gran, GRNST,occ PCKST/tr tan crpxl LS,\lmy cmt,slty,scat wh-trnsl-ltgy ANH frag,bcm granmicxln-vfxln, bri-dull yel FLOR,g brn-ltbrn STN,g mod fast strmg-blooming CUT"

6680.00 6710.00 "DOL ltbrn,tan,ltgybrn,micsuc-micxl-gran,DOL GRNST,tan crpxl LS,lmy cmt,slty,scat wh-trnsl-ltgy ANHY frag,bri yel FLOR yel strmg CUT,brn STN,inter,"

6710.00 6730.00 "DOL lttan,tan,ltgytanbrn,micsuc-micxl-gran,GRNST,tan crpxl LS,occ ANHY ,scat wh-trnsl-ltgy,CHTY frag,bri yel FLOR yel strmg CUT,brn STN,inter,"

6730.00 6750.00 "DOL lttan,tan,ltgytanbrn,micsuc-micxl-gran,GRNST,tan crpxl LS,occ ANHY ,scat wh-trnsl-ltgy,CHTY frag,bri yel FLOR yel strmg CUT,brn STN,inter,"

6750.00 6760.00 "DOL lttan,cryptxln,dns,PKSTN,hd,occ ANBHY,sm trnsl-clr,CHTY frag,dull-bri yel FLOR,immed strng CUT,dk-lt brn STN thruout"

6760.00 6770.00 "DOL crm-tan,occ off wh-ltbrn,micsuc-gran-micxl,crpxl,DOL GRNST,tr scat PCKST/tr crpxl LS & lmy cmt,tr trnsl-wh CHT,occ calc,sl anhy,tr CRIN fos,tt-tr intxl POR,g even dull/scat mod bri yel FLOR,fr scat ltbrn STN,fr dif CUT"

6770.00 6780.00 "DOL ltbrn-brn,tan-crm-off wh,micsuc-gran,micxl-crpxl-vfxl,GRNST/tr PCKST AA,occ sl calc,tr CHT AA,tr trnsl-wh scat xln-amor ANHY,cln,dns,tr-fr intxl POR,g even dull/scat mod bri yel FLOR,fr ltbrn/scat brn STN,fr dif/tr slow strmg CUT"

6780.00 6790.00 "DOL AA,pred DOL GRNST/tr PCKST AA,occ sl calc,tr ANHY & CHT AA,POR-FLOR-STN-CUT AA"

6790.00 6800.00 "DOL ltbrn-crm-off wh,micsuc-gran,micxl-crpxl,DOL GRNST,cln,sl slty,occ v sl calc-chky,tr PCKST/crpxl calc DOL incl & sl calc cmt,tr scat CHT & ANHY AA,fr intxl POR,g even dull-scat mod bri yel FLOR,g ltbrn/tr brn STN,g-fr dif/tr slow strmg CUT"

6800.00 6810.00 "DOL AA,micsuc-gran,micxl-crpxl,DOL GRNST,cln,sl slty,occ v sl calc-chky,tr PCKST/AA/incl & sl calc cmt,tr scat CHT & ANHY AA,rr CRIN fos,fr intxl POR,g even dull-scat mod bri yel FLOR,g ltbrn/tr brn STN,g-fr dif CUT"

6810.00 6820.00 "DOL AA,pred DOL GRNST/tr PCKST AA,occ sl calc,tr ANHY & CHT AA,POR-FLOR-STN AA,g-fr dif/tr slow strmg CUT"

6820.00 6830.00 "DOL AA,DOL GRNST,cln,sl slty,occ v sl calc-chky,tr PCKST/AA/incl & sl calc cmt,tr scat CHT & ANHY AA,tr CRIN fos,fr intxl POR,g even dull/tr mod bri yel FLOR,g ltbrn/tr brn STN,rr pp blk dd o STN,fr dif/tr slow strmg CUT"

6830.00 6840.00 "DOL ltbrn-crm-off wh,micsuc-gran,micxl-crpxl,DOL GRNST,cln,sl slty,occ v sl calc-chky,tr PCKST/crpxl calc DOL incl & sl calc cmt,tr scat CHT & ANHY AA,fr intxl POR,g even dull-scat mod bri yel FLOR,g ltbrn/tr brn STN,g-fr dif/tr slow strmg CUT"

6840.00 6850.00 "LS crm-tan-off wh,crpxl,cln,sl chky,scat frag-occ intbd/DOL AA,occ dol-sl dol,dns,tt,tr-fr dull-mod bri yel FLOR,n-tr ltbrn STN,tr-p v fnt res ring CUT "

DEPTH	LITHOLOGY

6850.00 6860.00 "DOL AA,pred DOL GRNST/tr PCKST AA,incr calc,tr ANHY & CHT AA,POR-FLOR-STN-CUT AA"

6860.00 6870.00 "DOL ltbrn-tan-crm,occ offwh,brn,micsuc-gran-crpxl,DOL GRNST,cln,sl slty,scat PCKSTcln,dns,calc-lmy,tr tan crpxl LS incl-frag,sl chky,occ grdg to dol LS,fr-g even dull-mod bri spty FLOR,fr ltbrn STN,-"

6870.00 6880.00 "DOL AA,DOL GRNST,cln,sl slty,occ calc-lmy,tr PCKST/AA/incl & calc cmt,tr scat CHT & rr ANHY AA,tr-fr intxl POR,g even dull/tr mod bri yel FLOR,g ltbrn/tr brn STN,vrr pp blk dd o STN,fr dif/tr slow strmg CUT"

6880.00 6890.00 "LS crm-tan-off wh,crpxl,cln,sl chky,scat frag,occ intbd/DOL GRNST AA,occ dol-sl dol,dns,tt,tr-fr dull-mod bri yel FLOR,n-tr ltbrn STN,tr-p v fnt res ring CUT "

6890.00 6900.00 "DOL ltbrn-brn,ltbrngy-crm-off wh,micsuc-gran,micxl-crpxl,DOL GRNST,cln,sl slty,occ v calc-calc,chky,tr PCKST/crpxl calc DOL-LS incl & calc cmt,occ grdg to lmy-calc DOL,tr scat CHT & ANHY AA,POR-FLOR-STN-CUT AA"

6900.00 6910.00 "LS crm-tan-off wh,crpxl,cln,sl chky,LS PCKST,occ intbd/DOL GRNST AA,occ sl dol,dns,tt,fr dull/tr spty mod bri yel FLOR,n-tr ltbrn STN,fr dif/tr slow strmg CUT "

6910.00 6920.00 "DOL ltbrn-brn,tan,occltgybrn,off wh-crm,micsuc-gran,micxl-crpxl,pred GRNST,scat PCKST/tan crpxl DOL incl,occ sl calc-lmy,sl chky,occ grdg to dol LS,tr-fr intxl POR,FLOR AA,g-fr ltbrn/occ brn STN,rr ppblk dd o STN,g dif/tr slow strmg CUT"

6920.00 6930.00 "LS & DOL AA,POR-FLOR-STN-CUT AA"

6930.00 6940.00 "DOL ltbrn-brn,tan,occ crm-off wh,micsuc-gran,micxl-crpxl,"

6940.00 6950.00 "LS crm-tan-off wh,crpxl,cln,sl chky,scat frag,occ intbd/DOL GRNST AA,occ dol-sl dol,dns,tt,tr-fr dull-mod bri yel FLOR,n-tr ltbrn STN,tr-p v fnt res ring CUT "

6950.00 6960.00 "DOL ltbrn-brn,ltbrngy-crm-off wh,micsuc-gran,micxl-crpxl,DOL GRNST,tr trnsl-wh-ltgy CHT,chky,scat PCKST/crpxl calc DOL-LS incl,occ grdg to dol LS,POR-FLOR-STN-CUT AA"

6960.00 6970.00 "DOL ltbrn-brn,tan,occ crm-off wh,crpxl-micxl,micsuc-gran,pred PCKST,cln,dns,occ sl calc-lmy ip,w/scat GRNST AA,tr CRIN fos,tt-tr intxl POR,fr even dull/spty mod bri FLOR,fr dif/tr slow strmg CUT"

6970.00 6980.00 "DOL AA/LS AA,POR-FLOR-STN-CUT AA"

6980.00 6990.00 "LS crm-tan-off wh,crpxl,cln,sl chky,scat frag,occ intbd/DOL GRNST AA,occ dol-sl dol,dns,tt,tr-fr dull-mod bri yel FLOR,n-tr ltbrn STN,tr-p v fnt res ring CUT "

6990.00 7000.00 "DOL AA/LS AA,POR-FLOR-STN-CUT AA"

7000.00 7010.00 "DOL ltbrn-brn,tan,occ crm-off wh,crpxl-micxl,micsuc-gran,pred PCKST,cln,dns,occ sl calc-lmy ip,w/scat GRNST tt-tr intxl POR,fr even dull/spty mod bri FLOR,fr dif/tr slow strmg CUT"

DEPTH	LITHOLOGY

7010.00 7020.00 "DOL ltbrn-brn,tan,occ crm-off wh,crpxl-micxl,micsuc-gran,pred PCKST,cln,dns,occ sl calc-lmy ip,w/scat GRNST AA,tt-tr intxl POR,occ xl face,fr even dull/spty mod briyel FLOR,fr dif/tr strmg yel CUT,brn STN,occ tr DOD"

7020.00 7030.00 "DOL ltbrn-brn,tan,occ crm-off wh,crpxl-micxl,micsuc-gran,pred PCKST,cln,dns,occ sl calc-lmy ip,w/scat GRNST AA,fos,tt-tr intxl POR,fr even dull/spty mod bri yel,FLOR,fr dif/tr slow strmg yel CUT"

7030.00 7040.00 "DOL PCKSTN AA,occ GRSTN, POR-FLOR-STN-CUT AA"

7040.00 7050.00 "DOL PCKSTN AA,occ GRSTN,micxln,vfxln,occ xln,tr ANHY,LS wh-crm,dolo ip,bri yel FLOR,immed yel CUT,brn STN,occ DOD"

7050.00 7060.00 "DOL ltbrn-brn,tan,occ crm-off wh,crpxl-micxl,micsuc-gran,pred PCKST,cln,dns,occ sl calc-lmy ip,w/scat GRNST AA,tr CRIN fos,tt-tr intxl POR,fr even dull/spty mod bri FLOR,fr dif/tr slow strmg CUT"

7060.00 7070.00 "DOL ltbrn-brn,tan,occ crm-off wh,crpxl-micxl,micsuc-gran,pred PCKST,cln,dns,occ sl calc-lmy ip,w/scat GRNST AA,tr CRIN fos,tt-tr intxl POR,fr even dull/spty mod briyel FLOR,fr dif/tr slow strmg yel CUT"

7070.00 7080.00 "DOL ltbrn-brn,tan,occ crm-off wh,crpxl-micxl,micsuc-gran,pred PCKST,cln,dns,occ sl calc-lmy ip,w/scat GRNST AA,tr CRIN fos,tt-tr intxl POR,fr even dull/spty mod bri FLOR,fr dif/tr slow strmg CUT"

7080.00 7090.00 "DOL AA,POR-FLOR-STN-CUT AA"

7090.00 7100.00 "DOL ltbrn-brn,tan,occ crm-off wh,crpxl-micxl,micsu cpred PCKST,cln,dns,occ sl calc-lmy ip,w/scat GRNSAA tt-tr intxl POR,fr even dull/spty mod bri yel FLOR,fr dif slow strmg yel CUT sm brn STN"

7100.00 7110.00 "DOL ltbrn-brn,tan,occ crm-off wh,crpxl-occ micxl,micsuc occ gran,pred PCKST,cln,dns,occ sl calc-lmy ip,w/scat GRNST AA,tt-tr intxl POR,fr even dull/spty mod bri yel FLOR,fr dif/tr slow strmg yel CUT"

7110.00 7120.00 "DOL ltbrn-brn,tan,occ crm-off wh,crpxl-occ micxl, occ gran,pred PCKST,cln,dns,occ sl calc-lmy ip,w/scat GRNST AA,tt-tralg tr PORR,FLOR,CUT,STN,AA"

7120.00 7130.00 "DOL ltbrn-brn,tan,occ crm-off wh,crpxl- occ gran,pred PCKST,cln,dns,occ sl calc-lmy ip,w/scat GRNST AA,tt-tr intxl POR,occ tr ALG dull mod bri yel FLOR,fr tr slow strmg yel CUT brn STN"

7130.00 7140.00 "DOL AA,POR-FLOR-STN-CUT AA"

7140.00 7150.00 "DOL ltbrn,tan,occ crm-off wh,crpxl occ gran,pred PCKST,cln,dns,occ sl calc-lmy ip,w/ GRNST AA,tt-tr intxl POR,occ xl, dull mod bri yel FLOR, slow strmg yel CUT brn STN"

7150.00 7160.00 "DOL ltbrn-brn,tan,occ crm-off wh,crpxl- occ gran,pred PCKST,cln,dns,occ sl calc-lmy ip,w/scat GRNST AA,tt-tr intxl POR,occ tr ALG dull mod bri yel FLOR,fr tr slow strmg yel CUT brn STN"

7160.00 7170.00 "DOL ltbrn-brn,tan,occ crm-off wh,crpxl- occ gran,pred PCKST,cln,dns,occ sl calc-lmy ip,w/scat GRNST AA,tt-tr intxl POR,occ tr ALG dull mod bri yel FLOR,fr tr slow strmg yel CUT brn STN"

7170.00 7175.00 " DOL AA,POR-FLOR-STN-CUT AA"

FORMATION TOPS

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #13-11 SE UPPER 1-A/B HORIZONTAL LATERAL LEG #2

FORMATION NAME		SAMPLES	SAMPLES	DATUM
		MEASURED DEPTH	TRUE VERTICAL DEPTH	KB:4558
LOWER ISMAY		5284'	5281'	-723'
GOTHIC SHALE		5320'	5313'	-757'
DESERT CREEK		5349'	5332'	-775'
DC 1-A ZONE		5377'	5345'	-787'

GEOLOGICAL SUMMARY

AND

ZONES OF INTEREST

The Mobil Exploration and Production U.S. Inc., Ratherford Unit #13-11 Horizontal LEG #2, Section 13, T41S, R23E, was a re-entry of the Mobil Ratherford Unit #13-11 injection well, a sidetrack in a southeasterly direction from 5255' measured depth, 5255' true vertical depth, on March 12, 1997. LEG #2 reached a measured depth of 7157', a true vertical depth of 5349.4', a horizontal displacement of 1700.6' and true vertical plane 137.1 degrees at total depth, on March 19, 1997. There was a delay starting the lateral, as the whipstock from lateral #1 was stuck and after several attempts to retrieve it, the decision was made to set a new packer and whipstock above the whipstock for lateral #1 and begin milling the window for lateral leg #2. Lateral leg #2 was to be a 1400' lateral to the northwest in the 1-A zone, but after the whipstock was misoriented, the decision was made to drill the southeast 1-A/B zone lateral originally planed for leg #3. The curve was drilled to a measured depth of 5417', 5352' true vertical depth, with a horizontal displacement of -14.08'. The drill pipe and curve bottom hole assembly became stuck while trying to trip out of the hole and required oil and then acid to be spotted to free the pipe. The lateral section of leg #2 was begun on March 14, 1997, and was drilled with no significant problems. An 18 stand wiper trip was made at 6527', true vertical depth of 5343.25' and a horizontal displacement of 1060', to help with the sliding and rotating. The decision to terminate the lateral was made at 7175' measured depth on March 19, 1997.

The primary objective of the Ratherford Unit #13-11Horizontal Lateral LEG #2 was the upper 1-A/B Porosity Bench, to identify, define and if possible determine the lateral extent of the porosity bench, it's effective porosity, staining and reservoir properties in the Desert Creek Member of the Upper Paradox Formation.

The Lower Ismay, Gothic Shale, the transition zone at the top of the Desert Creek were encountered while drilling LEG #2. Kick off point for this lateral was in the base of the Upper Ismay Member, with only minor gas increases but no shows of staining or porosity were noted. The top of the Lower Ismay was picked at 5255' measured depth, 5253' true vertical depth, at the base of the very thin Hovenweep shale. The base of the Upper Ismay was predominately a cream to white, tan to light gray, cryptocrystalline to microcrystalline, chalky, tight, anhydritic limestone, grading to very argillaceous, brown to gray brown, cryptocrystalline to microcrystalline dolomite. The dolomite graded into the very thin, carbonaceous, dolomitic shale of the Hovenweep. The top of the Lower Ismay was a picked at a measured depth of 5284' and a true vertical depth of 5281'. The lithology was a white to cream to tan, to light gray to light gray brown , cryptocrystalline to microcrystalline, chalky to clean, slightly dolomitic to very anhydritic, slightly cherty limestone with a trace of scattered micro fossils, no to a trace of intercrystalline porosity, with no visible fluorescence, stains or cuts in the upper 6' above a 10' thick anhydrite. The anhydrite was from a measured depth of 5290', 5288' true vertical depth , to 5298' measured depth, 5295' true vertical depth. The basal 15' of the Lower Ismay was interbedded light to dark gray brown, brown to dark brown limestones and gray to gray brown, cryptocrystalline, very marly dolomites. The dolomites were cryptocrystalline, very slightly cherty, very argillaceous, very slightly anhydritic, tight and graded to very dolomitic marlstone. The limestones were light to dark gray brown, brown to dark brown, occasionally cream to tan to white to light gray, cryptocrystalline to microcrystalline, slightly silty to clean, dolomitic in part, with very rare scattered micro fossils. Some dark brown to brown cherts were noted in this basal section. The dolomites increased with depth and graded into the Gothic Shale. The dolomites and limestones had no visible porosity, fluorescence, stain, or cut.

The top of the Gothic Shale is at 5320' measured depth, 5313' true vertical depth. The Gothic Shale was predominantly dark gray to black, silty, carbonaceous, brittle to firm, subblocky to blocky to platy, calcareous to slightly dolomitic and slightly micaceous. The top of the Gothic was gradational from the very thin interbedding of very argillaceous, carbonaceous limestone and very argillaceous, limy dolomite, with the dolomite grading into very dolomitic, carbonaceous shale. The top of the Gothic was picked on the decrease in penetration rate, the increased percentage of shale in the samples and the very slight increase in back ground gas.

Between the Gothic Shale and Desert Creek Porosity Members is a transitional zone, which appears to be gradational. The top of the Desert Creek is commonly picked at the Gothic Shale to transition zone facies change, which in this well occurred at a measured depth of approximately 5349' and a true vertical depth of 5332'. In this well the zone was an interbedded very silty limestone; which was gray to white to light brown, cryptocrystalline to microcrystalline, with some granular limestone, very slightly sandy, and a very thinly interbedded dolomite which was white to cream to light gray, occasionally gray brown to brown, microcrystalline to granular, slightly limy and very silty. The limestone was predominately tight with very rare intercrystalline porosity that showed some anhydrite fillings. Through this transitional zone there appeared to be some interbedding or possibly cyclic deposits consisting of slightly calcareous, black, carbonaceous shales and very dolomitic to slightly limy siltstones. There were no visible porosities, staining, fluorescence or cut.

The top of the Desert Creek 1-A zone was picked at 5377' measured depth, 5345' true vertical depth. The pick is based on the increase in rate of penetration and sample interpretation. The top was picked in this lateral on the first significant increase in dolomite porosity below the Desert Creek top and the occurrence of a light brown to medium brown, microcrystalline to very finely crystalline to microsucrosic, dolomite, with thinly interbedded limestones near the top of the dolomite. The limestone was predominately tight with very rare streaks of intercrystalline porosity, some chert fragments, and no visible fluorescence, stain or cut.

The top of the main objective, the 1-A porosity zone, was in a microcrystalline to sucrosic, slightly algal dolomite. As the curve was being completed in the 1-A zone the dolomite became cleaner and increasing granular. While drilling curve through the section, it appeared that the 1-A porosity bench was possibly defined by the interval from 5345' true vertical depth to a possible 5357' true vertical depth. The top of the porosity Bench was marked by facies change, which was somewhat sharp as the drilling rate increased rapidly. The top of the best porosity in the 1-A bench was at 5478' measured depth, 5347' true vertical depth, and was marked by increase in rate of penetration and an increase in intercrystalline porosity. The base of the porosity zone was not encountered while landing the curve. Of note was that while landing the curve, the well bore was inadvertently turned upwards to a 94 degree angle due to lower build rates reported by the gyro steering tool, than what the MWD tool reported.

At a measured depth of 5417', 5353' true vertical depth , with a horizontal displacement of -14' in the slightly algal, dolomite grainstones of the 1-A porosity horizon, a trip was made to change the bottom hole assembly from the curve assembly to the lateral bottom hole assembly and pick up the MWD tool. Upon reentering the well after the trip, the well bore was immediately oriented downward at a sharp angle. For the 57' of the lateral to a measured depth of 5474', true vertical depth of 5348.5', with a horizontal displacement of 35', the lithology was predominately a light brown to brown dolomite grainstone, with very thin dolomite packstone inclusion. This dolomite showed fair intercrystalline porosity, fluorescence, stain and cut. A change in lithology to a tighter dolomite packstone with very thin interbedded dolomite grainstone was noted from a measured depth of 5474' to 5552', true vertical depths of 5348.5' to 5347.6' with horizontal displacements from 35' to 102'. This dolomite packstone had noticeable amounts of anhydrite crystals, chert fragments, very thin platy limestones and intbedded dolomite grainstones which was interpreted as the top of the 1-A zone. These dolomite packstones and grainstones showed a decrease in porosity, fluorescence, stain and cut.

At a measured depth of 5552', 5347.5' true vertical depth, 102' horizontal displacement, as the well bore was turned downward below the target line, and was continued at a slight downward angle and was turned slowly upwards, the lithology returned to a light brown to brown dolomite grainstone, microcrystalline to microsucrosic, some very finely crystalline, becoming slightly algal with scattered translucent to clear chert fragments and anhydrite crystals to some anhydrite cement. This dolomite grainstone had fair to good intcrystalline to scattered algal porosity, fair to good fluorescence, stain and cut to a measured depth of 5893', 5345.7' true vertical depth, and a horizontal displacement of 330'. As well bore was oriented toward the horizontal and then downward, the dolomite grainstones began showing decreasing algal and intercrystalline porosity and graded to a tight dolomite packstone from a measured depth of 5893', 5345.7' true vertical depth and a horizontal displacement of 330' to 5854' measured depth, 5345' true vertical depth and a horizontal displacement of 395', as the top of the 1-A porosity zone was again encountered.

As the well bore was continued downward from a measured depth of 5854' to 6650' measured depth , 5342' true vertical depth, 1180' horizontal displacement , the slightly algal dolomite grainstones were light to dark brown, microcrystalline to finely crystalline, granular to microsucrosic to sucrosic, with varying amounts of cherts, some anhydrite crystals to inclusions, micro fossils, with scattered rare thin cryptocrystalline, tight dolomite packstones and very thin cryptocrystalline, tan to cream, dense, dolomitic limestone inclusions. The samples through this interval had good sample shows. During this interval at a measured depth of 6526', 5343' true vertical depth, and a horizontal displacement of 1060', on March 17,1997, an eighteen stand wiper trip was made to help clean and ream the well bore as the drill pipe was becoming difficult to slide and drilling was resumed also on the 17th.

From a measured depth of 6650', 5342' true vertical depth and a horizontal displacement of 1180', to 6880' measured depth, 5346' true vertical depth, and a horizontal displacement of 1390', decrease in the penetration rate was noted as the well bore was being oriented slightly upward at a very shallow angle to move away from the presumed base of the 1-A zone. This decrease in penetration rate was due to the increase in light brown to brown, microcrystalline, tight dolomite packstones, and very thin dense, platy, cream to tan, limestone. This appeared to be the tighter dolomites in the very top of the 1-A zone and at a measured depth of 7129' , 5348' true vertical depth and a horizontal displacement of 1655' the well bore was oriented very slightly downward at a shallow angle and the penetration rate increased as the lithology returned to an algal dolomite grainstone.

As the well bore was continued at a slightly downward angle from a measured depth of 7129' to a total depth of 7175' measured depth, 5349' true vertical depth, with a horizontal displacement of 1700'. The lithology was predominately a remained brown to light brown, occasionally cream to off-white mottled, microcrystalline to cryptocrystalline, occasionally microsucrosic to granular, dolomite grainstone, with traces of dolomite grainstone and very rare, very dolomitic, platy limestones, scattered anhydrite inclusions and crystals, very rare micro fossils and buff to translucent chert fragments. The dolomites had no to a trace of intercrystalline to very rare algal to rare pin point vuggular porosity, a trace to fair dull yellow fluorescence, rare to a trace of very light brown stain, rare spotty scattered black dead oil stain and an increasingly poor slow diffuse to slow streaming cut. A decrease in over all porosity was noted through this interval to leg #2 termination at 7175' measured depth.

In tracking the well bore through the upper bench, there were several facies changes with in the dolomites, predominately vertical, as the well bore approached and penetrated the tight dolomites at the top of the 1-A zone. The base of the 1-A zone was never encountered while drilling this lateral. This apparent vertical then horizontal facies occurred gradually, as the algal dolomite grainstones became increasingly limy and graded vertically into a slightly limy, tight dolomite packstone. The 1-A zone was projected to gradually thin slightly as the lateral continued toward the RU# 13-22 well. Based on where the top of the best porosity was encountered, the projected target line was used as the top of the 1-A zone, until reaching a horizontal displacement of 1180' at which time the 1-A zone

turned downward, almost mirroring the 1-C zone below. From a horizontal displacement of approximately 1390', to termination at 1700' of horizontal displacement, the base of the 1-A zone was used as the target line for the lateral. Even though this placed the lateral 6' below the proposed target line, the well bore was maintained in the best porosity and the 1-B zone was never encountered and it appears that the porosity zone turned upward toward the 13-22 well at a point beyond the termination of lateral leg #2.

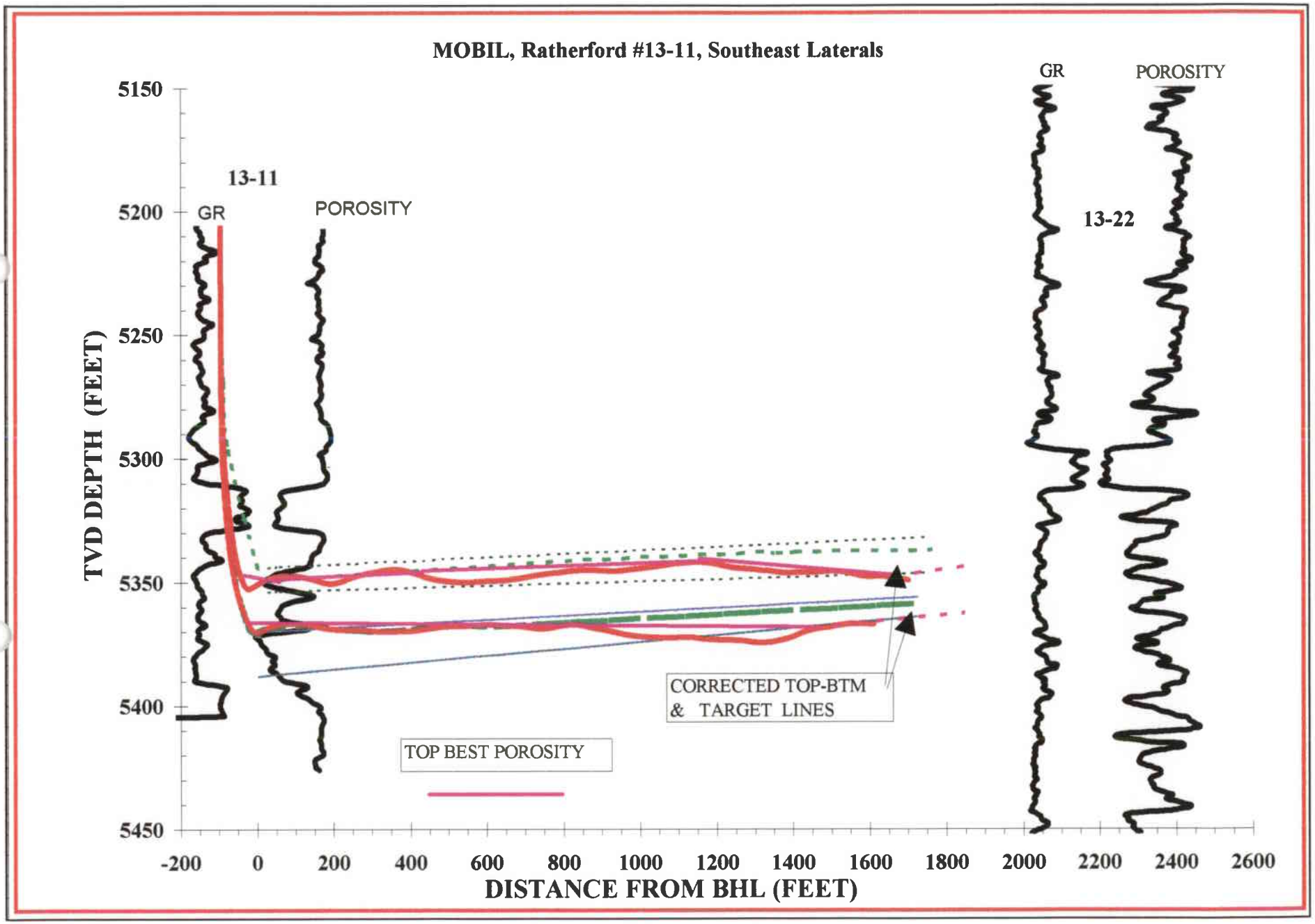
Predominant facies changes were associated with the rock classification with in the dolomites and a lateral change to a very slightly limy dolomite packstone, with very minor changes in the depositional environment. The environment of deposition changes noted when encountering the top of 1-A zone, and as the well bore neared the base of the 1-A zone. Even with these minor classification changes, porosity in the dolomites encountered was continuous through the 1-A zone laterally penetrated, with the effective or the better porosity being associated with the granular dolomites facies which had fair to good, intercrystalline to algal porosities, and the absence of any major anhydrite plugging. The dolomite packstone had porosities which were predominately tighter, with very poor permabilities as well bore encountered the upper limit of the 1-A zone.

From the top of the 1-A porosity bench to termination of the lateral at a measured depth of 7175', 5349' true vertical depth and a horizontal displacement of 1700', the dolomite lithology was consistent, ranging from light brown to medium brown, rare dark brown, microcrystalline to very fine crystalline, occasionally microsucrosic to granular, with scattered, tighter dolomite packstone and some anhydrite matrixes. The dolomites had fair to good intercrystalline and algal porosities and a good constant dull to bright yellow fluorescence, with noticeable decreases when noticeable amounts of tight dolomite packstone was present. The staining in the dolomites ranged from trace to good light brown to traces of black dead oil stain and the associated cuts being trace to good slow to fast streaming and occasion slow diffuse cuts. The staining in the dolomite, fair to moderate to occasionally good, however remained rather consistent and continuous through out the dolomite porosites penetrated in the 1-A bench. Fluorescence, like the staining was consistent and continuous, and was a dull to bright yellow gold, with cuts ranging from moderate to good ring (diffuse) to moderate to good steady fast streaming cut. The lateral showed very good, decreasing to fair sample shows in the dolomite packstones encountered at and near the top of the porosity zone.

The conclusion drawn from the southwest 1-A porosity bench Lateral Leg #2, is that in this area the primary dolomitization (due to the lack of limestone cements in the framework), was enhanced by the algal porosity. Also, having and effect on the porosity, were the cryptocrystalline dolomite packstones which graded to and were thinly interbedded with microcrystalline to granular dolomites. The lateral used the a proposed projected target line as a reference point through the bench, drilling tried to parallel the target line, approximately 2' below the line in order to remain in the best porosity when possible. It appears that the effective porosity is continuous through the entire lateral, and if any thinning occurred it was beyond the termination of the Lateral Leg #2.

While drilling, oil emulsion was added to the mud system to help slick the hole to facilitate in the sliding of the drill string when correction were needed. This oil emulsion reach approximately 18% of the fluid volume and had some effect on the sample shows. No noticeable H_2S was encountered while drilling, and circulating the well bore. This lateral can be interpreted to have good reservoir qualities through out the lateral. It appears that the porosities encountered are well enough developed to enhance the overall performance of the zone.

*The black residual staining has been called by Dr. Dave Eby & others as "bitchimum" and is also known as "dead oil" ("dd o stn" on mud logs). This staining is associated with the movement of oil over long periods of time and is a good indicator of producible hydrocarbons when associated with productive porosities, but can also be found in porosities that have been filled by anhydrites and other material at later dates.


MOBIL, Ratherford #13-11, Southeast Laterals
13-11
GR
POROSITY
13-22
GR
POROSITY
TVD DEPTH (FEET)
5150
5200
5250
5300
5350
5400
5450
-200
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
DISTANCE FROM BHL (FEET)
CORRECTED TOP-BTM
& TARGET LINES
TOP BEST POROSITY

RECEIVED
APR 16 1997
DIV. OF OIL, GAS & MINING

MOBIL

RATHERFORD UNIT #13-11
HORIZONTAL LATERAL LEG #3
UPPER 1-C POROSITY BENCH DESERT CREEK
SECTION 13, T41S, R23E
SAN JUAN, UTAH

GEOLOGY REPORT
by
DAVE MEADE / MARVIN ROANHORSE
ROCKY MOUNTAIN GEO-ENGINEERING CORP.
GRAND JUNCTION, COLORADO
(970) 243-3044

MICROFICHE

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WELL SUMMARY

OPERATOR:	MOBIL EXPLORATION & PRODUCTION U.S. INC.
NAME:	RATHERFORD UNIT #13-11 NW UPPER HORIZONTAL LATERAL LEG #3 IN 1-C UPPER POROSITY BENCH, DESERT CREEK
LOCATION:	SECTION 13, T41S, R23E
COUNTY/STATE:	SAN JUAN, UTAH
ELEVATION:	KB:4542' GL:4555'
SPUD DATE:	3/21/97
COMPLETION DATE:	3/29 /97
DRILLING ENGINEER:	LEWIS SIMONS
WELLSITE GEOLOGY:	DAVE MEADE / MARVIN ROANHORSE
MUDLOGGING:	
ENGINEERS	DAVE MEADE /MARVIN ROANHORSE/JOE SHIMKO
CONTRACTOR:	BIG "A" RIG 25
TOOLPUSHER:	J. DEES
HOLE SIZE:	4 3/4"
CASING RECORD:	SIDETRACK IN WINDOW AT 5275' MEASURED DEPTH
DRILLING MUD:	M-I
ENGINEER:	DANNE BEASON / CHARLES CIBBS
MUD TYPE:	BRINE WATER/POLYMER SWEEPS
DIRECTIONAL DRILLING CO:	SPEERY-SUN
ELECTICAL LOGGING:	NA
ENGINEER:	NA
TYPE LOGS:	NA
TOTAL DEPTH:	6532' MEASURED DEPTH TVD-5448'
STATUS:	TOH & PREPARE TO RETRIEVE WHIPSTOCK & SET NEW WHIPSTOCK FOR LEG #4

DRILLING CHRONOLOGY

MOBIL
RATHERFORD UNIT #13-11
NW UPPER 1-C HORIZONTAL LATERAL LEG # 3

DATE	DEPTH	DAILY	ACTIVITY
3/21/97	5232'	0'	TOH-LAY DOWN WHIPSTOCK & JARS-TIH-CLEAN OUT HOLE & PACKER-LATCH @ 5260'-TOOH-LAY DOWN CLEANOUT TOOLS-MAKE UP 6 1/8" STARTING MILL & WHIPSTOCK & ORIENTATE-TIH W/WHIPSTOCK & 6 1/8" STARTING MILL-SET & SHEAR WHIPSTOCK @ 5260'-PICK UP SWIVEL & BREAK CIRC.-MILL W/ 6 1/8" STARTING MILL-TOOH-TIH-FILL PIPE & BREAK CIRC.-MILL W/STARTER MILL 5232'-5234'-PUMP & CIRC. SWEEP-TOOH W/STARTER MILL
3/22/97	5232'	0'	TOOH W/ STARTER MILL-BREAK DOWN STARTER MILL & MAKE UP WINDOW MILLS-TIH W/ WINDOW MILL-PICK UP SWIVEL & 1 JNT PIPE & BREAK CIRC.-MILL WINDOW FROM 5232'-5242'-PUMP 2 SWEEPS & CIRC. HOLE CLEAN-LAY DOWN 11 JNTS-WORK ON DRLG RIG'S TRANSMISSION-TOOH-BREAK DOWN & LAY DOWN & LOADED OUT TOOLS & MILL
3/23/97	5242'	10'	PICK UP MTR-TEST MTR & RUN 1 STD MONEL DRLG COLLARS-CHANGE GASKET ON SCAVENGER PUMP-PICK UP, MAKE UP & RE-BREAK & MAKE UP PH-6 TUBING -TIH W/DRLG COLLARS & PIPE-PICK UP SWIVEL & BREAK CIRC. & PICK UP PUP JNT-RIG UP WIRELINE & GYRO-TIME DRLG 5242'-5260'-DRLG 5260'-5267'-PULL GYRO & SET WET CONNECTION-RUN STEERING TOOL & SET WET CONN.@ 70 STDS-DRGL 5267'-5305'-PULL STEERING TOOL
3/24/97	5305'	63'	PULL & CHANGE OUT STEERING TOOL-RIH W/STEERING TOOL & CHECK TOOL FACE READING-DRLG & DIR SUVEY-REHEAD WET CONN.-DRLG & DIR SURVEY-PUMP CIRC. SWEEPS @ 5445'-WORK TIGHT HOLE @ 5385"
3/25/97	5445'	140'	LAY DOWN 47 JNTS DRLG PIPE-TOOH W/MTR-BREAK & LAY DOWN MTR & BIT-TIH W/PH-6 TUBING 31 STDS-LAY DOWN 2 NM DRLG COLLARS-PICK UP & MAKE UP 2 NEW NM DC-INSPECT FLOAT SUB-PICK UP NEW TUBING & MAKE UP-BREAK & RE MAKE UP-PICK UP & MAKE UP NEW PH6, BREAK MAKE UP AGAIN-INSPECT & TIH W/DC-TIH & PICK UP 12 JNTS ADH-SWIVEL UP & BREAK CIRC.-NO MWD PULSE-CHANGE PUMPS-LAY DOWN 9 JNTS & TOOH

DRILLING CHRONOLOGY

DATE	DEPTH	DAILY	ACTIVITY
3/26/97	5445'	0'	TOOH & CHANGE MWD-CHANGE OUT MWD & TEST MTR-TIH W/PH6 & DC & 1 STD DP-CUT DRLG LINE-TIH W/DP-PICK UP SWIVEL & 9 JNTS-BREAK CIRC. & SURVEY-DRLG & DIR SURVEYS
3/27/97	5870'	425'	DRLG & DIR SURVEYS
3/28/97	6180'	310'	DRLG & DIR SURVEYS -SURVEY & CIRC. OUT SAMPLES @ 6532'(TD)-CIRC. & CONDITION HOLE-LAY DOWN 9 JNTS-TOOH
3/29/97	6532'	0'	TIH-WASH 14' TO BTM-DRLG & DIR SURVEYS- CIR. SPLS & PUMP 25 BBL SWEEP OUT-TOH-HANG & BLOWOUT SWIVEL-LAY DOWN 10 JNTS-POOH-REPAIR HYDR HOSE-POOH-TEST & CHECK MWD & MOTOR-LAY DOWN MWD & MOTOR-MAKE UP HOOK-RIG REPAIR ON "DRUM CLUTCH"-TIH & PICKUP 21 JNTS DP-HOOK IN & PULL WHIPSTOCK FREE-LAY DOWN 1 JNT DP-POOH W/WHIPSTOCK-LAY DOWN WHIPSTOCK & RETRIEVE HOOK-MAKE UP NEW WHIPSTOCK & EXTENSION & ORIENTATE-TIH W/WHIPSTOCK-SET WHIPSTOCK @ 5220'-POOH-

DAILY ACTIVITY

Operator: MOBIL
Well Name: RATHERFORD UNIT #13-11 NW UPPER 1-C HORIZONTAL LATERAL LEG #3

DATE	DEPTH	DAILY	DATE	DEPTH	DAILY
3/21/97	5232'	0'			
3/22/97	5232'	0'			
3/23/97	5242'	10'			
3/24/97	5305'	63'			
3/25/97	5445'	140'			
3/26/97	5445'	0'			
3/27/97	5870'	425'			
3/28/97	6180'	310'			
3/29/97	6380'	200'			
TD	6532'				

BIT RECORD

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #13-11 NW UPPER 1-C HORIZONTAL LATERAL LEG #3

RUN	SIZE	MAKE	TYPE	IN/OUT	FTG	HRS	FT/HR
#1(RR) BIT	4 3/4"	STC	MF3P	5242'/ 5445'	203'	24.0	8.46
#2 BIT	4 3/4"	HTC	STR-20	5445'/ 6532'	1,087'	59.5	18.27

SPERRY-SUN DRILLING SERVICES
SURVEY DATA

Customer ... : MOBIL
Platform ... : CA-MJ-70077
Slot/Well .. : LEG3/R.U. #13-11, 3A1

MEASURED DEPTH	ANGLE DEG	DIRECTION DEG	TVD	NORTHINGS FEET	EASTINGS FEET	VERTICAL SECTION	DOG LEG
5200.00	0.42	58.75	5198.62	56.37 N	77.69 W	94.21	0.00
5232.00	0.42	58.75	5230.62	56.49 N	77.49 W	94.16	0.00
5240.00	3.30	329.50	5238.61	56.71 N	77.58 W	94.38	41.51
5247.00	6.90	328.98	5245.59	57.24 N	77.90 W	94.99	51.43
5257.00	11.90	328.52	5255.45	58.64 N	78.75 W	96.59	50.01
5267.00	18.10	328.06	5265.10	60.84 N	80.11 W	99.13	62.01
5277.00	24.40	327.60	5274.42	63.90 N	82.04 W	102.69	63.02
5287.00	30.00	327.14	5283.31	67.75 N	84.51 W	107.18	56.04
5297.00	33.80	326.68	5291.80	72.17 N	87.39 W	112.39	38.08
5307.00	35.80	326.22	5300.01	76.93 N	90.55 W	118.02	20.17
5317.00	36.80	325.76	5308.07	81.84 N	93.86 W	123.86	10.36
5327.00	38.30	325.30	5316.00	86.86 N	97.31 W	129.89	15.26
5337.00	39.40	324.84	5323.78	92.00 N	100.90 W	136.10	11.37
5347.00	43.00	324.38	5331.31	97.37 N	104.71 W	142.63	36.13
5357.00	46.40	323.92	5338.41	103.07 N	108.83 W	149.61	34.15
5367.00	50.50	323.46	5345.04	109.10 N	113.27 W	157.04	41.14
5377.00	55.50	323.00	5351.06	115.49 N	118.05 W	164.97	50.13
5387.00	61.10	322.54	5356.31	122.27 N	123.19 W	173.44	56.14
5397.00	67.70	322.08	5360.63	129.40 N	128.70 W	182.41	66.13
5407.00	72.70	321.62	5364.02	136.79 N	134.51 W	191.78	50.19
5417.00	78.90	321.16	5366.47	144.37 N	140.56 W	201.44	62.16
5445.00	82.60	320.70	5370.97	165.82 N	157.98 W	229.01	13.31
5476.67	83.10	321.40	5374.91	190.25 N	177.73 W	260.36	2.70
5508.42	85.30	321.30	5378.12	214.92 N	197.46 W	291.85	6.94
5540.18	88.40	320.80	5379.87	239.58 N	217.39 W	323.48	9.89
5571.95	89.40	321.00	5380.48	264.23 N	237.42 W	355.17	3.21
5603.71	88.10	319.00	5381.17	288.55 N	257.83 W	386.88	7.51
5635.34	87.50	318.30	5382.38	312.28 N	278.71 W	418.47	2.91
5666.52	87.60	317.60	5383.72	335.41 N	299.58 W	449.62	2.27
5698.30	88.90	317.10	5384.69	358.77 N	321.10 W	481.38	4.38
5729.25	88.50	316.80	5385.39	381.39 N	342.22 W	512.32	1.62
5760.21	88.20	315.70	5386.28	403.74 N	363.62 W	543.27	3.68
5792.02	88.30	315.70	5387.25	426.50 N	385.83 W	575.05	0.31
5823.82	87.60	314.30	5388.39	448.97 N	408.30 W	606.81	4.92
5855.70	87.10	313.90	5389.86	471.13 N	431.17 W	638.62	2.01
5887.44	85.60	313.80	5391.88	493.07 N	454.01 W	670.24	4.74
5919.29	85.30	314.50	5394.41	515.19 N	476.79 W	701.95	2.38
5951.10	85.10	313.90	5397.07	537.29 N	499.51 W	733.61	1.98

SPERRY-SUN DRILLING SERVICES
SURVEY DATA

Customer ... : MOBIL
Platform ... : CA-MJ-70077
Slot/Well .. : LEG3/R.U. #13-11, 3A1

MEASURED DEPTH	ANGLE DEG	DIRECTION DEG	TVD	NORTHINGS FEET	EASTINGS FEET	VERTICAL SECTION	DOG LEG
5982.76	85.50	314.50	5399.67	559.28 N	522.14 W	765.13	2.27
6014.54	87.60	316.20	5401.58	581.85 N	544.43 W	796.84	8.50
6045.53	88.20	316.00	5402.71	604.16 N	565.90 W	827.80	2.04
6077.30	83.60	313.80	5404.99	626.53 N	588.34 W	859.46	16.04
6109.00	83.00	312.50	5408.68	648.06 N	611.31 W	890.87	4.49
6140.74	85.80	314.80	5411.78	669.86 N	634.16 W	922.40	11.39
6172.56	86.70	317.80	5413.86	692.81 N	656.09 W	954.14	9.82
6204.21	86.60	317.80	5415.71	716.22 N	677.32 W	985.74	0.32
6235.30	86.70	318.00	5417.53	739.25 N	698.12 W	1016.77	0.72
6265.37	85.80	317.80	5419.50	761.51 N	718.24 W	1046.77	3.07
6297.15	84.10	317.30	5422.29	784.87 N	739.61 W	1078.43	5.57
6328.88	83.40	316.80	5425.75	807.95 N	761.10 W	1109.97	2.71
6360.73	83.80	316.80	5429.30	831.03 N	782.76 W	1141.62	1.26
6392.43	82.50	316.20	5433.08	853.86 N	804.43 W	1173.09	4.51
6424.29	84.80	316.80	5436.60	876.82 N	826.22 W	1204.75	7.46
6456.17	84.90	317.10	5439.46	900.03 N	847.90 W	1236.50	0.99
6488.03	83.10	316.60	5442.79	923.14 N	869.57 W	1268.19	5.86
6501.00	83.10	316.90	5444.35	932.52 N	878.39 W	1281.06	2.30
6532.00	83.10	316.90	5448.08	954.99 N	899.42 W	1311.84	0.00

THE DOGLEG SEVERITY IS IN DEGREES PER 100.00 FEET.
N/E COORDINATE VALUES GIVEN RELATIVE TO WELL SYSTEM REFERENCE POINT.
TVD COORDINATE VALUES GIVEN RELATIVE TO WELL HEAD.
THE VERTICAL SECTION ORIGIN IS WELL HEAD.
THE VERTICAL SECTION WAS COMPUTED ALONG 317.00 (TRUE).
CALCULATION METHOD: MINIMUM CURVATURE.

LAST SURVEY ENTERED IS A PROJECTION
TO THE BIT AT TD OF LEG #3/R.U.#13-11,3A1

MUD REPORT

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #13-11 NW UPPER 1-C HORIZONTAL LATERAL LEG #3

DATE	DEPTH	WT	VIS	PLS	YLD	GEL	PH	WL	CK	CHL	CA	SD	SOL	WT R
3/21/97	5232'	8.2	34	–	–	–	11.5	N/C	N/C	5700	200	–	–	100
3/22/97	5238'	8.2	34	–	–	–	11.6	N/C	N/C	6000	200	–	–	100
3/23/97	5249'	8.2	34	–	–	–	11.6	N/C	N/C	5600	20	–	–	100
3/24/97	5335'	8.2	34	–	–	–	11.6	N/C	N/C	5600	40	–	–	100
3/25/97	5443'	8.0	36	–	–	–	11.5	N/C	N/C	5600	40	–	–	100
3/26/97	5600'	8.0+	37	–	–	–	11.0	N/C	N/C	6000	80	–	–	100
3/27/97	5940'	8.1+	35	–	–	–	11.0	N/C	N/C	5000	120	–	–	100
3/28/97	6320'	8.0+	34	–	–	–	12.0	N/C	N/C	4800	120	–	–	100
3/29/97	6532'	8.0+	34	–	–	–	12.0	N/C	N/C	4800	120	–	–	100

SAMPLE DESCRIPTIONS

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #13-11 NW UPPER 1-C HORIZONTAL LATERAL LEG #3

DEPTH	LITHOLOGY

5242.00 5260.00 " ABNT METAL & CMT FRAG IN SMPL
"LS tan-ltbrn,crm-off wh,occ brn,crpxl-micxl,occ micsuc-gran,cln,dns,chky,tr scat trnsl-mlky CHT frag/occ LS strk,occ sl slty,sl anhy,tt-rr intxl POR,fr even dull yel FLOR,n-p v fnt res ring CUT"

5260.00 5270.00 "SPARSE SMPLS ABNT METAL"
"LS tan-ltbrn,crm-off wh,occ brn,crpxl-micxl,occ micsuc-gran,cln,dns,chky,tr scat trnsl CHT frag/occ LS strk,occ sl slty,sl anhy,tt-rr intxl POR,fr even dull yel FLOR,n-p v fnt res ring CUT"

5270.00 5280.00 "DOL brn,micxl,sft,sl slty,rthy,lmy,tt,crpxl,LS tan-gy,crpxl,rthy,sft,chky,anhy ip,dol ip,ANHY wh,suc,fr even dull yel FLOR,n-p fnt CUT tr trnsl CHT frag"

5280.00 5290.00 "DOL AA/LS AA,POR-FLOR-STN-CUT AA"

5290.00 5300.00 "LS tan-crm-wh,smltgy,crpxl-micxl,rthy,chky ip,sft,arg,dol ip ,occ wh-trnsl ANHY,occ trnsl CHT frag,tr scat dull yel FLOR,n-p v fnt yel CUT sm stain from oil in mud"

5300.00 5310.00 "LS tan-crm-wh,smltgy,crpxl-micxl,rthy,chky ip,sft,arg,dol ip DOL gy gytan,crpxln-micxlarg,lmy,occ trnsl CHT frag,tr scat dull yel FLOR,p v fnt slo yel CUT tr brn STN in POR"

5310.00 5320.00 "LS m-ltgybrn,tan,occ dkbrn,off wh-crm,crpxl-micxl,rthy,cln-chky,occ mot,tr scat dkbrn-brnblk CHT frag,occ shy-sl dol ip,rr trnsl-wh ANHY incl,tr intxl POR,tr fnt spty-even dull yel FLOR,fr-p dif CUT"

5320.00 5330.00 "LS AA/incr scat CHT AA,POR-FLOR-STN-CUT AA"

5330.00 5340.00 "LS AA/ SH dkbrnblk-blk,sbblky-sbplty-plty,rthy,carb,sl slty,calc-sl calc,sooty"

5340.00 5350.00 "SH dkbrnblk-blk,sbblky-sbplty-plty,rthy,carb,sl slty,calc-sl calc,sooty"

5350.00 5360.00 "LS lt-mgybrn/occ brn strk,ltgy,occ off wh,crpxl-micxl,pred cln-occ mot/blk carb SH ip,chky,occ sl slty/rr sdy strk,rr ANHY incl,tt-rr intxl POR,tr spty dull yel FLOR,p dif CUT"

5360.00 5370.00 "DOL m-ltbrngy,occ dkbrngy-brn,ltgy-off wh,crpxl-micxl-vfxl,occ gran-micsuc,DOL GRNST/scat PCKST,chky,sl anhy,calc-sl lmy,sl arg,occ grdg to dol LS,tt-rr intxl POR,rr spty dull yel FLOR,tr ltbrn STN,n CUT"

5370.00 5380.00 5371.13 0 "DOL AA,/rr scat dkbrnblk CHT,POR-FLOR-STN AA,fr-g blooming CUT"

5380.00 5390.00 "DOL lt-mgybrn,ltgy,occ brn,micxl-crpxl,gran,rthy,chky,occ sl-v slty-sdy ip/lmy cmt,rr scat wh amor ANHY,tt-tr intxl POR,fr scat dull/tr spty mod bri yel FLOR,n-tr ltbrn/rr brn STN,n-v p dif CUT"

5390.00 5400.00 "DOL ltgybrn-ltgy,mgybrn,occ brn,micxl-crpxl,gran,rthy,chky,occ v sl slty,tr wh amor/rr trnsl xln ANHY,rr trnsl & dkbrnblk CHT frag,tt-tr intxl POR,fr scat dull/tr mod bri yel FLOR,n-rr ltbrn STN,n CUT"

DEPTH	LITHOLOGY

5400.00 5410.00 "DOL ltgybrn,mgybrn,micxl-crpxl,gran,rthy,chky,occ v sl slty,rr trnsl xln ANHY LS gy gybrn,sft,chky,dol,slty,amorph,crpxln,tt-tr intxl POR,fr scat dull/tr mod bri yel FLOR,n-rr ltbrn STN,n CUT"

5410.00 5420.00 "DOL AA,POR-FLOR-STN-CUT AA"

5420.00 5430.00 "DOL ltgybrn,mgybrn,micxl-crpxl,gran,rthy,chky,occ v sl slty,rr trnsl xln ANHY LS gy gybrn,sft,chky,dol,slty,amorph,crpxln,tt-tr intxl POR,fr scat dull/tr mod bri yel FLOR,n-rr ltbrn STN,n CUT"

5430.00 5440.00 "DOL ltgybrn,mgybrn,micxl-crpxl,rthy,chky,occ v sl slty,rr trnsl xln ANHY LS gy gybrn,sft,chky,dol,slty,amorph,crpxln,tt fr scat dull/tr mod bri yel FLOR,n-rr ltbrn STN,n CUT"

5440.00 5450.00 "DOL gy gytan crpxl-micxl,gran GRSTN,slty,chky ip,v lmy ip,occ sl POR bri yel FLOR,dull-bri immed yel CUT,sm brn STN"

5450.00 5460.00 "DOL AA,POR-FLOR-STN-CUT AA"

5460.00 5470.00 "DOL m-ltgybrn,occ ltbrn-brn,ltgy-tan,micxl-gran,crpxl-vfxl,DOL GRNST,tr scat PCKST,occ sl slty/lmy cmt,chky,scat blk SH cvgs,tr-rr intxl POR,fr scat dull yel FLOR,tr-fr brn-ltbrn STN,g dif/fr strmg CUT"

5470.00 5480.00 "DOL AA,DOL GRNST,tr lmy cmt,v sl chky,rr trnsl-wh-tan LS incl,vrr mlky CHT frag,tt-tr intxl POR,fr-g even dull yel FLOR,fr ltbrn/tr brn STN,g dif/fr slow strmg CUT"

5480.00 5490.00 "DOL AA,POR-FLOR-STN-CUT AA"

5490.00 5500.00 "DOL AA,bcmg incr brn,DOL GRNST,sl slty,sl chky,rr calc-lmy cmt,dns,tr CRIN fos,tt-fr intxl POR,g even dull-mod bri FLOR,fr ltbrn/tr brn-dkbrn STN,fr-g slow strmg CUT"

5500.00 5510.00 "DOL brn,m-ltgybrn,occ tan-ltgy,gran-micsuc-micxl,occ crpxl,DOL GRNST,sl slty,tr calc-lmy cmt/rr LS incl,rr trnsl ANHY incl,fr-g intxl POR,g even dull-mod bri yel FLOR,g-fr brn/tr dkbrn STN,g fast strmg-blooming CUT"

5510.00 5520.00 "DOL AA,POR-FLOR-STN-CUT AA"

5520.00 5530.00 "DOL brn,lt-mgybrn,occ choc-dk brn,gran-micsuc,micxl-vfxl,GRNST,rthy-sl slty,dns,tr scat ltgy-tan LS frag,tr trnsl xln & wh amor ANHY,fr intxl/rr agl POR,g ltbrn-brn/tr dkbrnblk STN,g slow-mod fast strmg CUT"

5530.00 5540.00 "DOL AA,incr scat LS AA,POR-FLOR-STN-CUT AA"

5540.00 5550.00 "DOL brn-ltbrn-choc,occ lt-mgybrn,gran-micsuc,vfxl,GRNST,rthy-sl slty,dns,tr scat ltgy-tan LS frag,tr trnsl xln ANHY,fr intxl/rr agl POR,g brn/tr dkbrnblk STN,g slow-mod fast strmg CUT"

5550.00 5560.00 "DOL mbrn-choc-brn,occ ltbrn,DOL GRNST,sl slty,tr scat ltgy-tan LS,sl chky,dns,tr CRIN fos,fr intxl POR,g even dull-mod bri FLOR,fr ltbrn/tr brn-dkbrn STN,g slow-mod fast strmg CUT"

5560.00 5570.00 "DOL AA/incr m-ltgybrn,POR-FLOR-STN-CUT AA"

5570.00 5580.00 "DOL lt-mgybrn,brn,occ choc-dk brn,gran-micsuc,micxl-crpxl,GRNST AA,tr scat PCKST/ltgy-tan LS incl,tr trnsl xln ANHY,fr intxl/rr agl POR,g ltbrn-brn/tr dkbrnblk STN,g slow-mod fast strmg CUT"

DEPTH	LITHOLOGY

5580.00 5590.00 "DOL AA,POR-FLOR-STN-CUT AA"

5590.00 5600.00 "DOL brn,m-ltgybrn,occ choc,gran-micsuc-micxl,DOL GRNST,sl slty,tr scat ltgy-tan LSfrag,tr trnsl ANHY,fr-g intxl/rr agl POR,g even dull-mod bri yel FLOR,g-fr brn/tr dkbrn STN,g fast strmg-blooming CUT"

5600.00 5610.00 "DOL dk-choc brn,occ mbrn,gran-vfxl,micxl-crpxl,DOL GRNST/occ strk PCKST,rthy,cln,dns,tt-tr intxl POR,vrr agl POR,fr even dull yel FLOR,g dif/slow strmg CUT"

5610.00 5620.00 "DOL AA,pred DOL GRNST,sl slty,tr trnsl xln ANHY,tt-tr intxl POR,rr agl POR,g even dullyel FLOR,g dkbrn-brn STN/occ dkbrnblk-blk dd o STN,fr-g slow strmg CUT"

5620.00 5630.00 "DOL AA,POR-FLOR-STN-CUT AA"

5630.00 5640.00 "DOL dk-choc brn,occ mbrn,gran-micsuc,vfxl-micxl-crpxl,DOL GRNST/rr scat PCKST,rthy,cln,dns,tr mlky CHT frag,tr-fr intxl POR,rr agl POR,fr even dull yel FLOR,g dif/slow strmg CUT"

5640.00 5650.00 "DOL AA,GRNST,sl slty,tr trnsl xln ANHY,tt-tr intxl POR,incr agl POR,g even dullyel FLOR,g dkbrn-brn STN/occ dkbrnblk-blk dd o STN,fr-g slow strmg CUT"

5650.00 5660.00 "DOL AA,POR-FLOR-STN-CUT AA"

5660.00 5670.00 "DOL pred GRNST,sl slty,tr trnsl xln ANHY,tt-tr intxl POR,rr agl POR occ PCKSTN dns,hd,g even dullyel FLOR,g dkbrn-brn STN/occ dkbrnblk-blk dd o STN,fr-g slow strmg CUT"

5670.00 5680.00 "DOL AA,pred DOL GRNST,sl slty,tr trnsl xln ANHY,tt-tr intxl POR,rr agl POR,g even dullyel FLOR,g dkbrn-brn STN/occ dkbrnblk-blk dd o STN,fr-g slow strmg CUT"

5680.00 5690.00 "DOL pred GRNST,sl slty,tr trnsl xln ANHY,tt-tr intxl POR,rr agl POR occ PCKSTN,brn-tan,dns,tt, even dullyel FLOR,g dkbrn-brn STN/occ dkbrnblk-blk dd o STN,fr-g slow strmg CUT"

5690.00 5700.00 "DOL AA,pred DOL GRNST,sl slty,tr trnsl xln ANHY,tt-tr intxl POR,rr agl POR,g even dullyel FLOR,g dkbrn-brn STN/occ dkbrnblk-blk dd o STN,fr-g slow strmg CUT"

5700.00 5710.00 "DOL AA,pred DOL GRNST,sl slty,tr trnsl xln ANHY,tt-tr intxl POR,rr agl POR,g even dullyel FLOR,g dkbrn-brn STN/occ dkbrnblk-blk dd o STN,fr-g slow strmg CUT"

5710.00 5720.00 "DOL AA,POR-FLOR-STN-CUT AA"

5720.00 5730.00 "DOL AA,pred DOL GRNST,sl slty,tr trnsl xln ANHY,tt-tr intxl POR,rr agl POR,g even dullyel FLOR,g dkbrn-brn STN/occ dkbrnblk-blk dd o STN,fr-g slow strmg CUT"

5730.00 5740.00 "DOL AA, DOL GRNST,sl slty,tr ANHY trnsl xln,tt-tr intxl POR,rr agl POR,g even dullyel FLOR,g dkbrn-brn STN/occ dkbrnblk-blk dd o STN,fr-g immed strmg CUT"

5740.00 5750.00 "DOL AA,POR-FLOR-STN-CUT AA"

5750.00 5760.00 "DOL AA,pred DOL GRNST,sl slty ANHY tr trnsl xln micxl-intxl POR,g even dullyel FLOR,g dkbrn-brn STN/occ dkbrnblk-blk dd o STN,fr-g immed-slow strmg CUT"

DEPTH	LITHOLOGY
5760.00 5770.00	"DOL AA,pred DOL GRNST,sl slty,tr trnsl xln ANHY,tt-tr intxl POR,rr agl POR,g even dullyel FLOR,g dkbrn-brn STN/occ dkbrnblk-blk dd o STN,fr-g slow strmg CUT"
5770.00 5780.00	"DOL AA,pred DOL GRNST,sl slty ANHY tr trnsl xln micxl-intxl POR,g even dullyel FLOR,g dkbrn-brn STN/occ dkbrnblk-blk dd o STN,fr-g immed-slow strmg CUT"
5780.00 5790.00	"DOL AA,pred DOL GRNST,sl slty ANHY tr trnsl xln micxl-intxl POR,g even dullyel FLOR,g dkbrn-brn STN/occ dkbrnblk-blk dd o STN,fr-g immed-slow strmg CUT"
5790.00 5800.00	"DOL AA,pred DOL GRNST,sl slty ANHY tr trnsl xln micxl-intxl POR,g even dullyel FLOR,g dkbrn-brn STN/occ dkbrnblk-blk dd o STN,fr-g immed-slow strmg CUT"
5800.00 5810.00	"DOL AA,POR-FLOR-STN-CUT AA"
5810.00 5820.00	"DOL AA,pred DOL GRNST,sl slty ANHY tr trnsl xln micxl-intxl POR,g even dullyel FLOR,g dkbrn-brn STN/occ dkbrnblk-blk dd o STN,fr-g immed-slow strmg CUT"
5820.00 5830.00	"DOL AA,POR-FLOR-STN-CUT AA"
5830.00 5840.00	"DOL GRNST sl slty micxl-crypxl,dns,occ gran,occ dd o STN,occ sl ANHY, dull yel,even,FLUO,spotty immed yel CUT,sm dkbrn STN LS gy ltgytan,chky-crypxln, to lmy DOL"
5840.00 5850.00	"DOL pred GRNST,sl slty,lmy,gran.micxln,crypxln ip,occ PCKSTN,dnns,tr ANHY,micxln-suc, tr trnsl xln even dull yel FLOR,fr-g immed-sloe yel CUT,dkbrn-brn STN/occ dkbrnblk-blk dd o STN"
5850.00 5860.00	"DOL pred GRNST,sl slty,lmy,gran.micxln,crypxln ip,occ PCKSTN,dns,tr ANHY,micxln-suc, tr trnsl xln,even dull yel FLOR,fr-g immed-slo yel CUT,dkbrn-brn STN/occ dkbrnblk dd o STN"
5860.00 5870.00	"DOL pred GRNST,sl slty,lmy,gran.micxln,crypxln ip,occ PCKSTN,dns,tr ANHY,micxln-suc,trnsl xln dull yel FLOR,fr-g immed-slo yel CUT,brn STN/occ dkbrnblk-blk dd o STN"
5870.00 5880.00	"DOL AA,POR-FLOR-STN-CUT AA"
5880.00 5890.00	"DOL gytan-tan,GRNST,sl slty,lmy,gran.micxln,crypxln ip,occ PCKSTN,dnns,micxln-suc, xln even dull yel FLOR,fr-g immed-sloe yel CUT,dkbrn-brn STN/occ dkbrnblk-blk dd o STN"
5890.00 5900.00	"DOL gytan-tan,brn,GRNST,sl slty,lmy,gran.micxln,crypxl ip,incr POR,dns,micxln-suc, xln even dull yel FLOR,g immed-slo yel CUT,dkbrn-brn STN/occ dkbrnblk dd o STN"
5900.00 5910.00	"DOL lt-mbrn,occ ltgy-gybrn,choc brn,micsuc-micxl-gran,occ vfxl-crpxl,DOL GRNST,tr scat PCKST,rr trnsl sl sdy strk/rr calc-lmy cmt,fr intxl/rr pp vug POR,g scat even dull-mod bri yel FLOR,fr scat brn/tr drkbrn-brnblk STN,rr blk dd o STN,g bloomingCUT"
5910.00 5920.00	"DOL AA,POR-FLOR-STN-CUT AA"
5920.00 5930.00	"DOL AA,pred GRNST/tr scat PCKST,rr ltgy-wh sil-cht incl,rr AHNY AA,tt-tr intxl POR,g scat even dull-mod bri yel FLOR,fr ltbrn/tr dkbrn-brnblk STN,rr blk dd o STN,g slow blooming-mod fast strmg CUT"

DEPTH	LITHOLOGY

5930.00 5940.00 "DOL lt-mbrn,occ ltgy-tan,micsuc-gran-micxl,vfxl,DOL GRNST,tr ltgy-gybrn slty-sl sdy strk/lmy cmt-fl,tr ANHY AA,tr scat PCKST AA,POR-FLOR-STN-CUT AA"

5940.00 5950.00 "DOL brn,ltbrn-ltgybrn,micsuc-gran,micxl,GRNST,rr PCKST,occ sl slty/rr calc cmt,v sl chky,rr trnsl xln AHNY incl,tt-fr intxl/tr pp vug POR,g even dull-mod bri yel FLOR,g-fr brn-ltbrn/occ dkbrn-brnblk STN,tr blk dd o STN,g blooming-mod fast strmg CUT"

5950.00 5960.00 "DOL AA,POR-FLOR-STN-CUT AA"

5960.00 5970.00 "DOL AA,POR-FLOR-STN-CUT AA"

5970.00 5980.00 "DOL ltgy-gybrn,mgybrn,occ brn,vfxl-micxl-micsuc,crpxl-gran,pred DOL GRNST/occ lmy cmt & strk,tr scat PCKST/tr tan-crm-wh-ltgy crpxl LS frag & incl,sl chky,rr ANHY AA,POR-FLOR-STN-CUT AA"

5980.00 5990.00 "DOL AA,micsuc-vfxl-gran,micxl-crpxl,pred DOL GRNST AA,tr scat PCKST AA,sl-v chky,bcmg arg ip,tr CRIN fos,rr mlky CHT frag,rr ANHY AA,tt-fr intxl POR,fr scat even/tr spty dull-mod bri yel FLOR,fr ltbrn/scat brn STN,CUT AA"

5990.00 6000.00 "DOL AA,POR-FLOR-STN-CUT AA"

6000.00 6010.00 "DOL AA,POR-FLOR-STN-CUT AA"

6010.00 6020.00 "DOL dkbrn-brn,choc brn,ltbrn,gran-micsuc,agl,DOL GRNST,sl slty-occ v sl sdy ip,cln,tr scat tan-wh sl chky LS frag/rr calc-lmy fl,tr ANHY POR fl,fr-g intxl POR,g dkbrn-brnblk STN,tr blk dd o STN,g blooming CUT"

6020.00 6030.00 "DOL dkbrn-brn,choc brn,ltbrn,gran-micsuc,agl,GRNST,cln,tr scat tan-wh LS frag-incl,tr ANHY POR fl,tr mic fos,fr-g intxl-agl POR,g dkbrn-brnblk STN,tr blk dd o STN,g blooming CUT"

6030.00 6040.00 "DOL AA,w/LS frag-incl,tr ANHY POR fl,tr mic fos,fr-g intxl-agl POR,g dkbrn-brnblk STN,tr blk dd o STN,g blooming CUT"

6040.00 6050.00 "DOL lt-dkbrn,occ crm,micxl-fxl,occ crpxl,micsuc-suc,alg,pred DOL GRNST,occ DOL PKST,w/scat ANHY incl-xl,occ ANHY cmt,sl lmy,rr crm crpxlrthy dol LS frag,tr-g intxl-alg POR,fr-g dull-rr bri yel FLOR,g ltbrn-rr blk STN,fr-g mod fast-fast stmg mlky CUT"

6050.00 6060.00 "DOL AA,w/rr LS frag AA,POR-FLOR-STN-CUT AA"

6060.00 6070.00 "DOL lt-m brn,occ dkbrn,micxl-f xl,gran,micsuc-suc,alg,rr crpxl ip,pred alg DOL GRNST,scat crpxl,rthy LS frag,POR-FLOR-STN-CUT AA"

6070.00 6080.00 "DOL lt-mbrn,occ dkbrn,micxl-fxl,gran,micsuc,occ suc,alg ip,pred DOL GRNST w/DOL PKST,v rr wh-ltgy crpxl rthy-chk LS frag,scat ANHY xl-incl-occ cmt-POR fl,fr-g dull-bri yel FLOR,fr-g intxl-tr alg POR,fr brn-occ blk STN,fr-g mod fast-fast CUT"

6080.00 6090.00 "DOL AA,pred DOL GRNST w/scat DOL PKST,scat ANHY xl-incl-occ cmt-POR fl,POR-FLOR-STN-CUT AA"

DEPTH	LITHOLOGY

6090.00 6100.00 "DOL AA,incr DOL PKST,v rr wh CHT frag,decr POR-FLOR-STN-CUT"

6100.00 6110.00 "DOL pred ltbrn,occ m-dkbrn,crpxl-vfxl,micsuc-suc-alg ip,occ gran,incr to pred DOL PKST,incr LS rich cmt-scat chk LS frag,scat Crin-mic fos,incr tt,tt-fr intxl-tr alg POR,tr-fr dull-yel FLOR,tr-fr ltbrn STN,occ blk dd o STN,tr-g mod fast-fast stmg cut"

6110.00 6120.00 "DOL AA,POR-FLOR-STN-CUT AA"

6120.00 6130.00 "DOL pred lttan-crm,micxl,crpxl ip DOL PKST,w/LS rich cmt,scat mic fos,rr-tr intxl POR,fr dull yel FLOR,n-rr ltbrn STN,fr slow-mod fast CUT,w/intbd DOL GRNST AA,POR-FLOR-STN-CUT AA & v thn plty dol LS incl"

6130.00 6140.00 "DOL AA,pred DOL PKST w/LS rich cmt,scat LS frag sl dol,tt-tr intxl-tr alg POR,fr dull yel FLOR,scat lt-dkbrn STN,fr slow-fast CUT"

6140.00 6150.00 "DOL AA, sl incr DOL GRNST,rr offwh-crm plty crpxl LS frag,POR-FLOR-STN-CUT AA"

6150.00 6160.00 "DOL GRNST m-dkbrn-brn,micxl-fxl,gran,suc-micsuc,rr ANHY xl-incl-rr POR fl,alg,fr-gintxl-alg POR,tr-fr dull-bri yel FLOR,fr-g lt-dkbrn STN,rr blk dd o STN,fr-g mod fast-fast CUT,w/intbd ltbrn-crm,crpxl-micxl,fos DOL PKST,rr-tr intxl POR,rr FLOR-STN-CUT"

6160.00 6170.00 "PRED tan-crm crpxl-micxl,v fos,occ alg DOL PKST,w/scat Crin-mic-poss Bryz fos,tt-rr intxl-v rr alg POR,n-rr dull yel FLOR,n-v rr vis ltbrn STN,n-p slow CUT,w/intbd DOL GRNST AA"

6170.00 6180.00 "DOL PKST & GRNST AA,v rr trnsl CHT frag,POR-FLOR-STN-CUT AA"

6180.00 6190.00 "DOL crm-tan,ltbrn,crpxl-micxl,occ vfxl-micsuc,alg ip,pred DOL PKST,abnt mic fos,poss Bryz,anhy-rr ANHY incl,scat intbd DOL GRNST v alg-sl suc,n-g intxl-scat alg POR,tr-g dull yel FLOR,n-scat dkbrn-brn STN,rr dd o STN,n-g slow-fast CUT"

6190.00 6200.00 "DOL AA,POR-FLOR-STN-CUT AA"

6200.00 6210.00 "DOL ltbrn-crm,occ m-dkbrn,crpxl-micxl,vfxl ip,occ gran-micsuc,suc ip,occ alg,tr ANHY xl-incl-occ cmt & POR fl,intbd DOL GRNST & PKST,abnt mic-tr Crin-rr Bryz fos,tt-g intxl-occ alg POR,fr dull yel FLOR,n-fr lt-dkbrn STN,n-g slow-fast stmg CUT"

6210.00 6220.00 "DOL pred DOL PKST,decr m-dkbrn DOL GRNST,occ alg-suc,POR-FLOR-STN-CUT AA"

6220.00 6230.00 "DOL AA,POR-FLOR-STN-CUT AA"

6230.00 6240.00 "DOL ltbrn-crm-offwh,occ brn,crpxl-vfxl,micsuc-gran-suc ip,incr ltbrn DOL GRNST,pred DOL PKST,abnt mic fos,rr poss Bryz fos,sl anhy,occ ANHY cmt,incr LS rich cmt,tt-g intxl-tr g alg POR,fr dull yel FLOR,n-fr ltbrn STN,rr blk dd o STN,n-g mod fast-fast CUT"

6240.00 6250.00 "DOL AA,POR-FLOR-STN-CUT AA,w/tr wh-crm crpxl-micxl rthy-chk plty LS frag"

DEPTH	LITHOLOGY

6250.00 6260.00 "DOL ltbrn-brn,occ crm,crpxl-vfxl,micsuc-gran,occ rthy-chk,plty ip,incr DOL GRNST,w/tr fr amnt DOL PKST,occ LS rich cmt,alg ip,rr ANHY xl,tr mic fos,v rr scat trnsl CHT frag,tt-g intxl-tr alg POR,fr dull-rr bri yel FLOR,tr-fr ltbrn STN,tr-g slow-fast CUT"

6260.00 6270.00 "DOL AA,POR-FLOR-STN-CUT AA,w/incr wh-crm crpxl-micxl rthy-chk plty LS frag"

6270.00 6280.00 "DOL tan-ltbrn,occ ltbrngy-crm-ltgy,gran-micsuc,agl-crpxl,GRNST/tr wh-ltgy chy lmy-calc cmt & strk,tr AHNY POR fl,tr PCKST,tr chky wh plty LS frag,tr mic fos,fr intxl POR,fr scat dull even-mod bri spty yel FLOR,fr-g ltbrn STN,fr dif/tr v slow strmg CUT "

6280.00 6290.00 "DOL AA,POR-FLOR-STN-CUT AA"

6290.00 6300.00 "DOL AA/LS tan-ltbrngy,occ crm-ltgy,crpxl-micxl,LS PCKST/occ DOL GRNST strk-incl,sl-dol,tr mic fos-agl,chky,tr anhy,grdg to calc DOL,tt-tr intxl POR,fr scat dull yel FLOR,n-tr ltbrn STN,n-tr p dif CUT"

6300.00 6310.00 "DOL AA,DOL GRNST/tr chky lmy cmt & prtg,occ grdg to calc DOL,tr ANHY fl & incl,tt-fr intxl/rr agl POR,fr-g scat even-spty mod bri-dull yel FLOR,g ltbrn/tr brn,vrr pp blk dd o STN,fr slow dif CUT"

6310.00 6320.00 "DOL AA,POR-FLOR-STN-CUT AA

6320.00 6330.00 "DOL ltbrn-brn,occ crm,micsuc-gran,vfxl-crpxl,sl chky/scat plty LS,incr DOL GRNST,tr DOL PKST/occ LS cmt,alg ip,tr mic fos,v rr scat trnsl CHT frag,tt-g intxl-tr alg POR,fr-g dull/tr spty bri yel FLOR,tr-fr ltbrn STN,g dif/slow strmg CUT"

6330.00 6340.00 "DOL ltbrn,occ mbrn,tan,micsuc-gran,agl-vfxl,occ crpxl,pred DOL GRNST/tr intbd PCKST,tr mic fos,rr BRY fos,fr-g intxl/tr agl POR,g even dull/scat mod bri yel FLOR,g ltbrn/occ brn STN,g dif/tr slow strmg CUT"

6340.00 6350.00 "DOL AA,tr chky plty calc-lmy frag,rr trnsl CHT,POR-FLOR-STN AA,g mod fast strm CUT"

6350.00 6360.00 "LS ltbrngy-crm-ltgy,occ tan,crpxl-micxl,LS PCKST/tr DOL GRNST & PCKST strk-incl,pred plty,v chky,sl dol,tr trnsl CHT frag,rr anhy,occ grdg to calc DOL,tt POR,fr scat dull yel FLOR,n-rr ltbrn STN,n-tr p dif CUT"

6360.00 6370.00 "DOL ltbrn-brn,occ crm,vfxl-crpxl,crpxl-micsuc,chky-scat plty chky LS,pred DOL PKST/occ LS cmt,occ GRNST,alg ip,tr mic fos,v rr scat trnsl CHT frag,tt-g intxl-tr alg POR,fr-g scat dull/tr spty bri yel FLOR,tr-fr ltbrn STN,g dif/slow strmg CUT"

6370.00 6380.00 "DOL AA/LS AA,POR-FLOR-STN-CUT AA"

6380.00 6390.00 "DOL AA/LS AA,POR-FLOR-STN-CUT AA"

6390.00 6400.00 "DOL AA,micsuc-gran,micxl-crpxl,DOL GRNST/tr chky lmy cmt & prtg,occ grdg to calc DOL,tr ANHY fl & incl,tt-fr intxl/rr agl POR,fr-g scat even-spty mod bri-dull yel FLOR,g ltbrn/tr brn,vrr pp blk dd o STN,fr slow dif CUT"

DEPTH	LITHOLOGY

6400.00 6410.00 "DOL AA,pred GRNST AA,scat PCKST frag/tr chky lmy cmt & fl,tr mic fos,rr agl,fr-tr intxl POR,fr even dull/rr mod bri yel FLOR,g ltbrn/occ brn STN,rr blk dd o STN,g dif/tr slow strmg CUT"

6410.00 6420.00 "DOL brn,ltbrn,gran-crpxl,micxl-micsuc,pred GRNST/scat PCKST,tr lmy cmt & fl,rr trnsl xln ANHY,tr mic fos,sl agl,POR-FLOR-STN-CUT AA"

6420.00 6430.00 "DOL ltbrn-tan,occ brn,micxl-micsuc-gran,vfxl-crpxl,incr DOL PCKST/tr crm-wh chky plty LS fl-prtg & frag,tr trnsl xln ANHY,tt-tr intxl/rr agl POR,FLOR-STN-CUT AA"

6430.00 6440.00 "DOL brn,ltbrn,occ dkbrn,tan,gran-micsuc,micxl-suc,occ crpxl,GRNST,tr scat PCKST/lmy fl & prtg,tr mic fos/rr agl,sl slty ip,g-fr intxl/tr agl POR,g even mod bri-dull yel FLOR,g brn-dkbrn/tr dkbrnblk STN,rr blk dd o STN,g mod slow strmg CUT"

6440.00 6450.00 "DOL AA,POR-FLOR-STN-CUT AA"

6450.00 6460.00 "LS ltbrn-tan-crm,occ ltbrngy,crpxl-micxl,LS PCKST/tr scat DOL GRNST & PCKST,dns-occ plty,chky,sl-v sl dol,tr trnsl CHT frag,tr trnsl xln ANHY,tt-rr intxl POR,fr scat spty-even dull-occ mod bri yel FLOR,tr ltbrn STN,n-tr p dif CUT"

6460.00 6470.00 "DOL AA/LS AA,POR-FLOR-STN-CUT AA"

6470.00 6480.00 "DOL ltbrn-tan,occ brn,crpxl-gran,vfxl-micsuc,pred DOL PCKST/tan-crm-wh chky LS AA,tr trnsl xln ANHY,tt-tr intxl/rr agl POR,FLOR-STN-CUT AA"

6480.00 6490.00 "DOL ltbrn-crm,occ brn,crpxl-micxl,rthy-cln,occ alg-vfxl,tr micsuc,pred DOL PKST,w/thn DOL GRNST tr alg-fr intxl POR,tr-fr dull-bri yel FLOR,spty ltbrn-rr dkbrn STN,tr fr-g mod fast CUT,grdg to crm-tan crpxl-micxl dol LS w/v rr intxl POR,rr FLOR-STN-CUT"

6490.00 6500.00 "LS crm-tan,occ wh,crpxl-micxl,v rr micsuc-v sl alg,dol-v dol,pred dol LS PKST,w/v rr mic fos,v rr intxl-alg POR,rr spty bri yel FLOR,n-v rr spty brn STN,rr mod fast stmg CUT,w/intbd thn DOL PKST & GRN STN AA,sl anhy,w/v rr trnsl CHT frag"

6500.00 6510.00 "LS AA,pred LS PKST-WKST,tt,w/v thn DOL PKSTN & v rr DOL GRNST,n-v rr vis POR-FLOR-STN & CUT"

6510.00 6520.00 "DOL AA/LS AA,POR-FLOR-STN-CUT AA"

6520.00 6532.00 "LS crm-tan,occ wh,crpxl-micxl,occ micsuc,pred dol LS PKST,v sl anhy,tr mic fos,w/scat trnsl-wh-brn mot CHT frag,rr scat ltbrn-brn DOL GRNST & PKST,w/scat intxl POR,tr dull-bri yel FLOR,ltbrn-rr blk STN,tr fr slow-mod fast CUT in DOL GRNST"

FORMATION TOPS

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #13-11 NW UPPER 1-C HORIZONTAL LATERAL LEG #3

FORMATION NAME		SAMPLES	SAMPLES	DATUM
		MEASURED DEPTH	TRUE VERTICAL DEPTH	KB:4555
LOWER ISMAY		5285'	5281'	-730
GOTHIC SHALE		5325'	5314'	-770
DESERT CREEK		5345'	5332'	-777
DC 1-A		5365'	5344'	-810
DC 1-B		5390'	5357'	-835
DC 1-C		5415'	5306'	-860
1-C POROSITY		5434'	5368'	-879

GEOLOGICAL SUMMARY

AND

ZONES OF INTEREST

The Mobil Exploration and Production U.S. Inc., Ratherford Unit #13-11 Horizontal LEG #3, Section 13, T41S, R23E, was a re-entry of the Mobil Ratherford Unit #13-11, a sidetrack in a northwesterly direction from 5232' measured depth, 5232' true vertical depth, on March 21, 1997. LEG #3 reached a measured depth of 6532', true vertical depth of 5448' at total depth, horizontal displacement of 1312' and true vertical plane 317 degrees, on March 29, 1997. The lateral was drilled with no problems. Since this well used live oil in an emulation while drilling, the background gases noted on the accompanying mud log remained high, as well as the samples being contaminated to a certain extent with live oil through out the well.

The primary objective of the Ratherford Unit #13-11 Horizontal Lateral LEG #3 was the upper 1-C Porosity Bench, to identify and define the porosity bench, it's effective porosity, staining and reservoir properties in the Desert Creek Member of the Upper Paradox Formation.

The Lower Ismay, Gothic Shale, the transition zone at the top of the Desert Creek, as well as the 1-A and 1-B porosity zones were encountered while drilling LEG #3. Kick off point for this lateral was in the lower 1/3 of the Upper Ismay Member. The base of the Upper Ismay was predominately white to cream, occasionally tan, cryptocrystalline to microcrystalline, chalky, fossiliferous limestone, occasionally limestone grainstone, and grading to and having interbedded very thin, very argillaceous, brown to gray brown, microcrystalline to microsucrosic dolomite. The dolomite graded into the very thin, carbonaceous, dolomitic shale of the Hovenweep.

The top of the Lower Ismay was picked at 5285' measured depth, 5282' true vertical depth, at the base of the very thin Hovenweep shale. The Lower Ismay was a white to cream to tan, some light gray to rare light gray brown, cryptocrystalline to microcrystalline, chalky to clean, slightly dolomitic to anhydritic, slightly cherty limestone with a trace of scattered micro fossils, no to a trace of intercrystalline porosity, with a trace of spotty dull to bright yellow fluorescence, none to very rare light brown stain, and only a trace of very poor slow diffuse cut. This limestone was below an 8' thick, white to translucent, massive, crystalline anhydrite, which had very thin streaks of black carbonaceous shales and gray brown, microcrystalline dolomite. Interbedded in the basal 30' of the Lower Ismay were light to medium gray to gray brown dolomites, which were cryptocrystalline to microcrystalline, with some microsucrosic streaks, very slightly cherty, clean to argillaceous. The dolomite increased with depth and graded into the Gothic Shale. These very thin dolomites had no to a trace of intercrystalline vuggular porosity with scattered dull yellow fluorescence, none to rare light brown staining, and only very poor slow diffuse to residual ring cut.

The top of the Gothic Shale is at 5325' measured depth, 5316' true vertical depth. The Gothic Shale was predominantly dark gray to black, silty, carbonaceous, brittle to firm, subblocky to blocky to platy, calcareous to slightly dolomitic and slightly micaceous. The top of the Gothic was gradational from the very thin interbedding of very argillaceous, carbonaceous limestone and very argillaceous, limy dolomite, with the dolomite grading into very dolomitic, carbonaceous shale. The top of the Gothic was picked predominantly by the decrease in penetration rate and the increased percentage of shale in the samples.

Between the Gothic Shale and Desert Creek Porosity Members is a transitional zone, which appears to be gradational. The top of the Desert Creek is commonly picked at the Gothic Shale to transition zone facies change, which in this well occurred at a measured depth of 5345' and a true vertical depth of 5332'. In this well the zone was predominantly a limestone; which was gray to white to light brown, cryptocrystalline to microcrystalline, with some granular limestone, very slightly sandy, with very thinly interbedded dolomite which was brown to light gray brown, microcrystalline to granular, slightly limy and occasionally silty. The limestone was predominately tight with very rare intercrystalline porosity that showed some anhydrite fillings. This limestone graded into and had cyclic deposits consisting of very silty light brown to gray brown dolomite packstones to grainstones, with rare intercrystalline porosity and poor fluorescence, stain or cut; and dolomitic to slightly calcareous, black, carbonaceous mudstones. The porosities ranged from none to very poor intergranular, with traces of calcite to anhydrite fillings. The limestones had no visible staining was noted and had predominately a very rare spotty, very poor, faint dull yellow fluorescence, with no to very rare residue ring cut.

The top of the Desert Creek 1-A zone was picked at 5365' measured depth, 5346' true vertical depth. The pick is base on the increase in rate of penetration and sample interpretation. The top was picked in this lateral mainly based on the first dolomite grainstone porosity below the Desert Creek top and the occurrence of a light brown to medium brown, microcrystalline to very finely crystalline to microsucrosic, dolomite grainstone, with thinly interbedded dolomitic limestone packstone near the top of the zone. The limestone was predominately tight with very rare streaks of intercrystalline to very rare algal porosity, some chert fragments, and no to very rare visible fluorescence, but no visible stain or cut. The dolomites had fair intercrystalline to very poor algal porosities, rare dull orange mineral to very rare dull yellow fluorescence, very poor spotty brown stain and only a poor slow diffuse cut.

The top of the Desert Creek 1-B zone occur at 5390' measured depth, 5357' true vertical depth. The pick is base on the changes in the rate of penetration, and by sample interpretation. The top was picked in this lateral mainly based on the overall consistent decrease penetration rate in the very thin dolomitic, chalky tight limestones below the Desert Creek top of the 1-A. The limestone was predominately tight with very rare, very thin streaks of intercrystalline porosity, some scattered dark brown to dark gray brown chert fragments, and no visible fluorescence, stain or cut. The limestones graded into brown to light brown, microcrystalline to very finely crystalline dolomite grainstone and packstones. The 1-B porosity zone was in a brown to tan, microcrystalline to very finely crystalline, microsucrosic, slightly algal dolomite, which had scattered anhydrite crystals and rare scattered chert fragments. The intercrystalline porosity was fair, with a trace of fluorescence, scattered traces of brown stain, rare black dead oil stain (bitchimum), and a moderate cut. No significant increase in the background gas was noted while drilling the 1-B porosity zone.

The top of the Desert Creek 1-C zone was picked at 5415' measured depth, 5371' true vertical depth. The pick is based on an increase in the rate of penetration, as well as sample interpretation. The top was picked in this lateral mainly based on the first significant increase in the dolomite grainstone below a thin, tight light gray, dolomitic limestone packstone the base of the Desert Creek 1-B zone. As the curve was being completed in the 1-C zone the dolomite became cleaner and increasing granular. While drilling curve through the section, it appeared that the 1-C porosity bench was possibly defined by the interval 5434' measured depth, 5375.5' true vertical depth to a possible 5481' measured depth, 5392' true vertical depth. The top of the porosity Bench was marked by facies change, which was somewhat gradational since the drilling rate increased rather slowly. The base of the porosity zone was not encountered while landing the curve.

At a measured depth of 5445', 5377' true vertical depth, with a horizontal displacement of 222' in the dolomite grainstones of the 1-C porosity horizon, a trip was made to change the bottom hole assembly and pick up the MWD tool. While drilling the 1-C lateral to a horizontal displacement of approximately 578', as the well bore was slowly turned upwards, the porosity was predominately in a light to dark brown dolomite grainstone. This dolomite was microcrystalline to very fine crystalline, microsucrosic to occasionally sucrosic, slightly anhydritic with traces of anhydrite crystals to rare inclusions, rare scattered cryptocrystalline limestone fragments to inclusions and occasionally slightly limy cement, scattered chert fragment, rare micro fossils, traces of algal material, traces of scattered dark brown stain and very rare black oil stain residue* in the intercrystalline matrix. The dolomite had predominantly fair to good intercrystalline and traces of pin point vuggular porosity, with rare anhydrite and very rare dolomitic limestone mud filling and cement in the intercrystalline and vuggular porosity. Through the interval the fluorescence was fair to good, the staining was moderate to fair and cuts ranging from moderate slow diffuse to good moderately fast to slow steady streaming. A gradual decrease in porosity and penetration was noted at 5800' measured depth, 5387' true vertical depth, with a horizontal displacement of 578'. An increase in dolomitic limestone, dolomite packstone, was noted in the samples. The decrease in penetration rate was due to a vertical facies change as the well bore encountered the upper boundary of the best porosity zone and neared the upper limit of the 1-C zone. The facies change encountered was from the algal dolomite grainstones, to the dolomite packstones and the thin cream to light gray, cryptocrystalline to microcrystalline, dolomitic, slightly anhydritic, tight limestone, and very thin anhydrites and tight crinoidal, cherty, light brown to brown dolomite packstones were at the upper limit of the best porosity in the 1-C zone, just below the basal 1-B zone. After a series of slides and rotates to turn the bore hole to a downward angle, to move away from the upper limit of the best porosity, the penetration rated gradually increased with the lithology again returning to algal dolomite grainstone, at 5927' measured depth, 5395' true vertical depth, and a horizontal displacement of 715', as the top of the porosity zone with in the 1-C zone was again encountered.

As the well bore was continued very slowly upward, the dolomites from 5927' measured depth to 6060' measured depth, 5403' true vertical depth, 840' horizontal displacement, were predominately brown to light brown, occasionally dark brown to mottled, cryptocrystalline to microcrystalline, occasionally microsucrosic to algal, with traces of dolomite packstone, anhydrite inclusions and crystals, scattered crinoid fossils, very thin scattered clean, tan to cream to white, cryptocrystalline to microcrystalline, slightly cherty, dolomitic limestone fragments and limestone rich cement, with no visible porosity. The dolomites had fair to good intercrystalline to pin point vuggular porosity, fair to good dull yellow fluorescence, a fair to good brown stain, scattered black dead oil stain and a good slow diffuse to moderately fast streaming cut.

The well turned sharply downwards at 6060' measured depth after encountering the base of best porosity zone. At this point the well bore was turned upwards. From 6060' to 6251' measured depth, 5418' true vertical depth, with a horizontal displacement of 1033'. Through this interval the lithology remained brown to light brown, occasionally dark brown to mottled, cryptocrystalline to microcrystalline, occasionally microsucrosic to algal, dolomite, with traces of dolomite packstone, anhydrite inclusions and crystals, scattered crinoid fossils, very rare, thin, scattered dolomitic limestone fragments and increasingly limestone rich cement. The dolomites had fair intercrystalline to a trace of algal porosity, fair dull yellow fluorescence, a trace to fair brown stain, scattered black dead oil stain and a fair amount of good slow diffuse to moderately fast streaming cut. A scattered decreases in porosity was also noted through this interval.

At a measured depth of 6251 a facies change was noted as the well bore was turned downward to follow the increasingly steeper downward dip the zone. The zone appeared to be dipping downward at approximately 84 degrees. The change was noted to a measured depth of 6448', 5439' true vertical depth, with a horizontal displacement of 1236', and was a vertical change to increasing amounts of very tight dolomite packstone and having scattered thin, tan to gray brown tight limestone packstone as the 1-C zone dipped downward and thinned. These tighter dolomites showed poor visible porosity, fluorescence, stain and cut. The limestone packstones showed no visible porosity, stain or cut.

As the well bore was continued at its downward angle, from a measured depth of 6448' to its total measured depth of 6532', 5448' true vertical, and a horizontal displacement of 1312', the lithology became predominately a limestone packstone with thin interbedded dolomite packstones and rare scattered dolomite grainstones. The limestones were cream to tan, occasionally light gray, cryptocrystalline to microcrystalline, chalky, anhydritic, slightly dolomitic and very cherty with depth; with no to very rare intercrystalline to slightly algal porosity, no to rare, spotty fluorescence, stain and cut. The dolomites were light brown to very rare brown to gray brown, cryptocrystalline, some microcrystalline to very finely crystalline, anhydritic, increasing lime rich cement, and scattered intercrystalline to rare algal porosity, poor fluorescence, stains and cuts.

At a total measured depth of 6532', true vertical depth 5448' and a horizontal displacement of 1312', the lateral was terminated. The lateral was terminated in a tight dolomitic limestone packstone, with very thin slightly limy dolomite packstone, rare scattered dolomite grainstones and becoming very cherty.

In tracking the well bore through the upper bench, there were several facies changes with in the dolomites. The changes noted were predominately vertical, as the well bore approached the top and base of the 1-C zone, and a horizontal facies change was noted near the end of the lateral, as the lithology changed from dolomite to limestone. The 1-C zone was projected to thin and dip downward as the lateral continued toward the RU# 11-44 well. Tracking where the top and base of the 1-C zone were encountered, it appears that the dip sharply toward the 1-D zone increased at a horizontal displacement of 650' and the thinning increased at a horizontal displacement of 850'.

Predominant facies changes were associated with the rock classification with in the dolomites and occasionally the depositional environment, as the environment of deposition changed when encountering the top of 1-C zone. With the classification changes, porosity in the dolomites encountered of primary deposition and were continuous through out most of the 1-C zone penetrated, until a horizontal displacement of 1236', with the effective or the better porosity being associated with the granular dolomite facies which had fair to good, intercrystalline to algal porosities, and the absence of any major anhydrite plugging. The dolomite packstone had porosities which were predominately tighter and with very poor permabilities. The predominately limestone packstone from a horizontal displacement of 1236' to 1312' had no to very poor porosities.

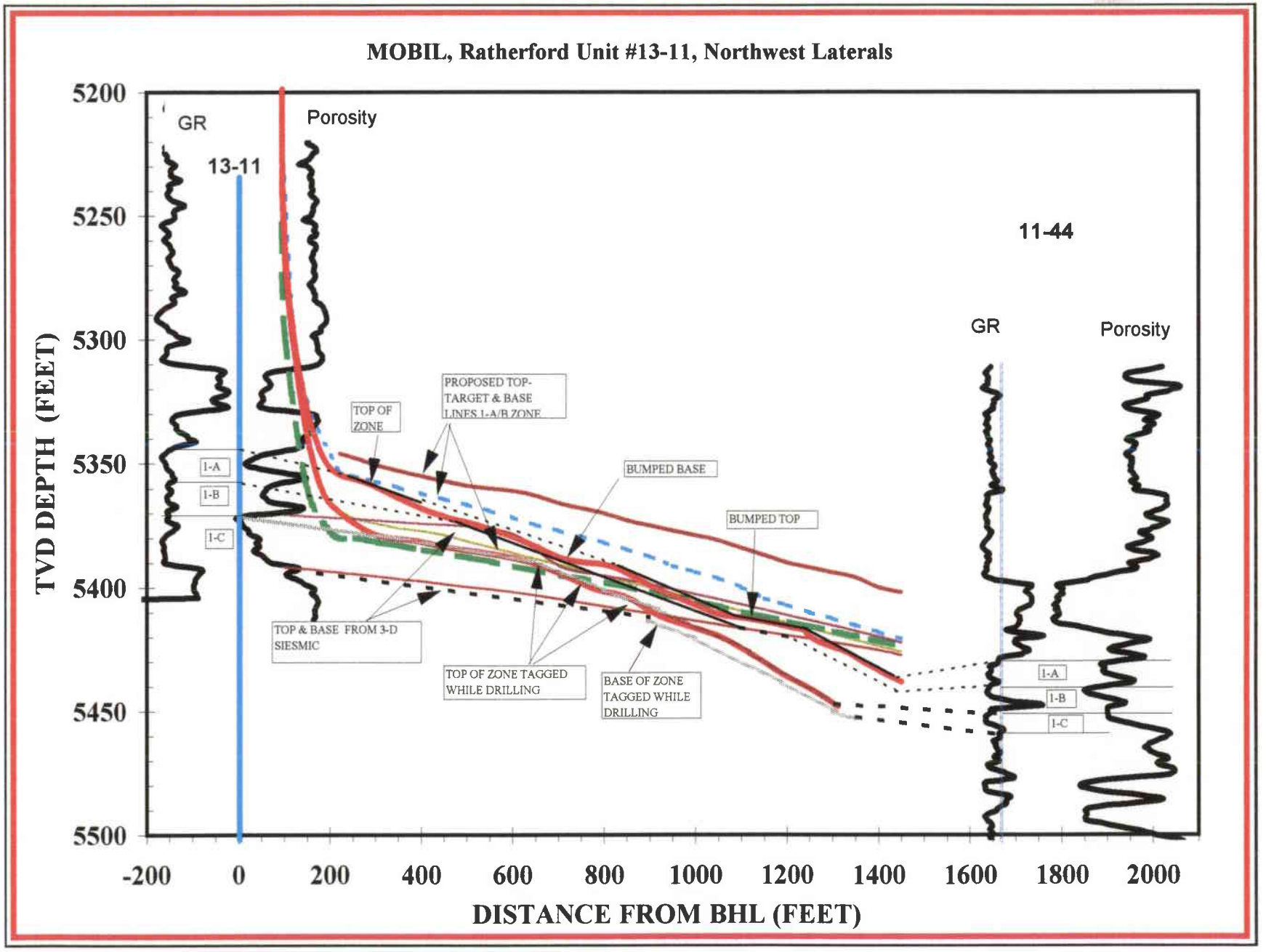
From the top of the 1-C porosity bench to a total measured depth of 6448', the dolomite lithology was consistent, ranging from light brown to medium brown, rare dark brown, microcrystalline to very fine crystalline, occasionally microsucrosic to granular, with scattered, tighter dolomite packstone and some anhydrite matrixes. The dolomites had fair to good intercrystalline and algal porosities and a good constant dull to bright yellow fluorescence, with noticeable decreases when noticeable amounts of tight dolomite packstone was present. The staining in the dolomites ranged from trace to good light brown to traces of black dead oil stain and the associated cuts being trace to good slow to fast streaming and occasion slow diffuse cuts. The staining in the dolomite grainstone was fair to good, and remained rather consistent and continuous through out the porosites in the 1-C dolomites penetrated. Fluorescence, like the staining was consistent and continuous, and was a dull to bright yellow gold, with cuts ranging from moderate to good ring (diffuse) to moderate to good steady fast streaming cut. The lateral showed no to very poor sample shows in the limestones and very thin tight

dolomites from a horizontal displacement of 1236' to the termination of the lateral at a horizontal displacement of 1312'. The sample shows were affected in part due to the presence of the oil emulsion in the drilling fluid used through out the curve and lateral sections.

The conclusion drawn from the northwesterly 1-C porosity bench in Lateral Leg 3, is that in this area the primary dolomitization (due to the lack of limestone cements in the framework), was enhanced by the algal porosity. Also, having and effect on the porosity, were the cryptocrystalline dolomite packstones which were thinly interbedded in the dolomite grainstones, which in turn graded laterally into dolomitic limestone packstone. Staining was fair to moderate and there were significant sections where staining was moderately good, with some black dead oil staining was trapped in the matrix and along the anhydrite to dolomite contact surfaces. The lateral used the a proposed projected target line as a reference point through the bench, drilling how ever was forced to follow the line of best porosity which was well below the target line beginning at a horizontal displacement of 700'. It appears that the effective porosity is continuous through most of the lateral, becoming very thin and of possibly less than 3' in thickness below and prior to termination of the lateral.

While drilling, the lateral the high background gas was predominately due to the oil emulsion used in the drilling fluid, which was indicated by the significant amounts of heavies noted on the chromatograph (C_3 and C_4). This lateral can be interpreted to have good reservoir qualities through most of the lateral. It appears that the porosities are well enough developed to enhance the overall performance of the zone.

*The black residual staining has been called by Dr. Dave Eby & others as "bitchimum" and is also known as "dead oil" ("dd o stn" on mud logs). This staining is associated with the movement of oil over long periods of time and is a good indicator of predicible hydrocarbons when associated with productive porosities, but can also be found in porosities that have been filled by anhydrites and other material at later dates.


MOBIL, Ratherford Unit #13-11, Northwest Laterals
GR
Porosity
13-11
11-44
GR
Porosity
TVD DEPTH (FEET)
5200
5250
5300
5350
5400
5450
5500
1-A
1-B
1-C
TOP OF ZONE
PROPOSED TOP-TARGET & BASE LINES 1-A/B ZONE
BUMPED BASE
BUMPED TOP
TOP & BASE FROM 3-D SIESMIC
TOP OF ZONE TAGGED WHILE DRILLING
BASE OF ZONE TAGGED WHILE DRILLING
-200
0
200
400
600
800
1000
1200
1400
1600
1800
2000
DISTANCE FROM BHL (FEET)

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MOBIL

RATHERFORD UNIT #13-11
HORIZONTAL LATERAL LEG #4
UPPER 1-A/B
POROSITY BENCH DESERT CREEK
SECTION 13, T41S, R23E
SAN JUAN, UTAH

GEOLOGY REPORT
by
DAVE MEADE / MARVIN ROANHORSE
ROCKY MOUNTAIN GEO-ENGINEERING CORP.
GRAND JUNCTION, COLORADO
(970) 243-3044

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WELL SUMMARY

OPERATOR:	MOBIL EXPLORATION & PRODUCTION U.S. INC.
NAME:	RATHERFORD UNIT #13-11 NW UPPER HORIZONTAL LATERAL LEG #4 IN 1-A/B UPPER POROSITY BENCH, DESERT CREEK
LOCATION:	SECTION 13, T41S, R23E
COUNTY/STATE:	SAN JUAN, UTAH
ELEVATION:	KB:4558' GL:4546'
SPUD DATE:	3/29/97
COMPLETION DATE:	4/4/97
DRILLING ENGINEER:	LEWIS SIMONS / BENNY BRIGGS
WELLSITE GEOLOGY:	DAVE MEADE / MARVIN ROANHORSE
MUDLOGGING:	
ENGINEERS	DAVE MEADE / MARVIN ROANHORSE
CONTRACTOR:	BIG "A" RIG 25
TOOLPUSHER:	J. DEES / M. SMITH
HOLE SIZE:	4 3/4"
CASING RECORD:	SIDETRACK IN WINDOW AT 5275' MEASURED DEPTH
DRILLING MUD:	M-I
ENGINEER:	DANNE BEASON / CHARLES CIBBS
MUD TYPE:	BRINE WATER/POLYMER SWEEPS
DIRECTIONAL DRILLING CO:	SPEERY-SUN
ELECTICAL LOGGING:	NA
TOTAL DEPTH:	6659' MEASURED DEPTH TVD-5438.93'
STATUS:	TOH & PREPARE TO RIG TO R.U. #13-41 LOCATION

DRILLING CHRONOLOGY
RATHERFORD UNIT #13-11
NW UPPER 1-A/B HORIZONTAL LATERAL LEG # 4

DATE	DEPTH	DAILY	ACTIVITY
3/29/97	5220'	2'	TIH-WASH 14' TO BTM-DRLG & DIR SURVEYS- CIR. SPLS & PUMP 25 BBL SWEEP OUT-TOH-HANG & BLOWOUT SWIVEL-LAY DOWN 10 JNTS-POOH-REPAIR HYDR HOSE-POOH-TEST & CHECK MWD & MOTOR-LAY DOWN MWD & MOTOR-MAKE UP HOOK-RIG REPAIR ON "DRUM CLUTCH"-TIH & PICKUP 21 JNTS DP-HOOK IN & PULL WHIPSTOCK FREE-LAY DOWN 1 JNT DP-POOH W/WHIPSTOCK-LAY DOWN WHIPSTOCK & RETRIEVE HOOK-MAKE UP NEW WHIPSTOCK & EXTENUATION & ORIENTATE-TIH W/WHIPSTOCK-SET WHIPSTOCK @ 5220'-POOH-LAY DOWN HOOK & STARTER MILL-TIH W/STARTER MILL -MILL 5220'-5222' -CIRC.-TOH-PICK UP WINDOW MILL & WATER MELON -MILL-TIH
3/30/97	5222'	9'	CIRC.-MILL WINDOW FROM 5222'-5228'-DRLG FORMATION 5228'-5230'-PUMP 25 BBL SWEEP & CIRC. OUT-LAY DOWN 14 JNTS DP & POOH 68 JNTS SINGLE BREAK(TIGHT JNTS)-LAY DOWN MILLS-MAKE UP BIT, MTR & BHA-ORIENTATE-TIH W/BHA-PICK UP 3 JNTS DP & SWIVEL-RIG UP WIRELINE & RUN GYRO-TIME DRLG 5230-5231'
3/31/97	5231'	109'	TIME DRLG 5231'-5235'-DLRG & SURVEYS 5235'-5352'-PULL GYRO & RUN STEERING TOOL-DLRG & DIR. SURVEYS-PULL TO WET CONN.-PULL STEERING TOOL FOR REPAIRS-RUN STEERING TOOL IN HOLE-TIH-DRLG & DIR SURVEYS
4/01/97	5340'	85'	DRLG & DIR SURVEYS 5340'-5352'-TOH TO WET CONN. LAY DOWN STEERING TOOL-TOH-LAY DOWN CRACKED MONEL & BIT-PICK UP NEW MONEL & BIT-TOH TO WET CONN.-RUN IN STEERING TOOL-TIH-DRLG & DIR SURVEYS-CIRC SMPLS & BTMS UP @ 5425'-CIRC & CONDITION HOLE-TOH TO WET CONN-RIG DOWN STEERING TOOL-TOH-LAY DOWN CURVE BHA -PICK UP LATERAL BHA & BIT & TIH
4/02/97	5425'	1,234'	LAY DOWN MONEL & MTR & PICK UP LATERAL MTR & MWD & TEST-TIH-BREAK CIRC. & SURVEY-DRLG & DIR SURVEYS
4/03/97	6659'	0'	DRLG & DIR SURVEYS-SURVEY & CIRC. OUT SMPLS @ 6659' (TD)-CIRC. & CONDITION HOLE
4/04/97	6659'	0'	CIRC. & CONDITION HOLE-LAY DOWN 47 JNTS W/SWIVEL -TOH LAYING DOWN-PREPARE TO MOVE RIG

DAILY ACTIVITY

Operator: MOBIL
Well Name: RATHERFORD UNIT #13-11 NW UPPER 1-A/B HORIZONTAL LATERAL LEG #4

DATE	DEPTH	DAILY	DATE	DEPTH	DAILY
3/29/97	6532'	2'			
3/30/97	5222'	9'			
3/31/97	5231'	109'			
4/01/97	5340'	85'			
4/02/97	5425'	417'			
4/03/97	6659'	1,234'			
TD	6659'				

BIT RECORD

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #13-11 NW UPPER 1-A/B HORIZONTAL LATERAL LEG #4

RUN	SIZE	MAKE	TYPE	IN/OUT	FTG	HRS	FT/HR
#1(RR) BIT	4 3/4"	STC	MF3P	5232'/ 5352'	120'	20	6.0
#2(RR) BIT	4 3/4"	HTC	STR-20	5352'/ 5425'	73'	4	18.25
#3 BIT	4 3/4"	HTC	STR-30	5425'/ 6659'	1,234'	42.5	29.04'

SPERRY-SUN DRILLING SERVICES
SURVEY DATA

Customer ... : MOBIL
Platform ... : CA-MJ-70095
Slot/Well .. : LEG4/R.U.#13-11, 4A1

MEASURED DEPTH	ANGLE DEG	DIRECTION DEG	TVD	NORTHINGS FEET	EASTINGS FEET	VERTICAL SECTION	DOG LEG
5200.00	0.42	58.75	5198.62	56.37 N	77.57 W	95.88	0.00
5220.00	0.42	58.75	5218.62	56.45 N	77.45 W	95.82	0.00
5230.00	3.10	321.60	5228.61	56.68 N	77.58 W	96.07	31.80
5240.00	6.30	319.50	5238.58	57.31 N	78.11 W	96.87	32.04
5250.00	10.10	317.40	5248.48	58.37 N	79.06 W	98.27	38.11
5260.00	15.10	315.20	5258.23	59.94 N	80.57 W	100.42	50.22
5270.00	20.30	313.10	5267.76	62.05 N	82.76 W	103.44	52.38
5280.00	25.40	311.00	5276.97	64.65 N	85.64 W	107.30	51.64
5290.00	30.50	312.40	5285.80	67.77 N	89.14 W	111.97	51.42
5300.00	35.20	309.90	5294.20	71.33 N	93.22 W	117.38	48.91
5310.00	38.70	309.90	5302.19	75.18 N	97.84 W	123.38	35.00
5320.00	42.30	310.70	5309.79	79.38 N	102.79 W	129.86	36.37
5330.00	46.70	311.40	5316.92	83.99 N	108.07 W	136.85	44.27
5340.00	50.50	311.70	5323.53	88.96 N	113.68 W	144.33	38.07
5350.00	53.70	311.50	5329.68	94.20 N	119.58 W	152.19	32.04
5360.00	56.80	312.20	5335.38	99.68 N	125.70 W	160.38	31.53
5370.00	61.80	313.90	5340.48	105.55 N	131.98 W	168.93	52.09
5380.00	66.60	314.70	5344.83	111.84 N	138.42 W	177.85	48.54
5390.00	72.00	315.00	5348.36	118.43 N	145.05 W	187.12	54.07
5400.00	76.50	314.80	5351.08	125.23 N	151.87 W	196.65	45.04
5425.00	87.60	313.90	5354.53	142.51 N	169.55 W	221.17	44.54
5462.19	86.50	311.70	5356.44	167.74 N	196.79 W	258.11	6.61
5493.93	85.50	309.20	5358.66	188.28 N	220.89 W	289.72	8.47
5525.68	84.80	309.40	5361.34	208.32 N	245.37 W	321.33	2.29
5557.43	84.80	308.80	5364.22	228.26 N	269.91 W	352.93	1.88
5589.20	85.50	308.00	5366.91	247.92 N	294.71 W	384.57	3.34
5620.83	86.00	308.00	5369.25	267.34 N	319.57 W	416.11	1.58
5652.02	86.70	308.00	5371.24	286.50 N	344.10 W	447.23	2.24
5683.81	87.50	306.90	5372.84	305.81 N	369.30 W	478.98	4.27
5714.78	87.10	306.20	5374.30	324.23 N	394.15 W	509.91	2.60
5745.74	86.80	306.20	5375.95	342.49 N	419.10 W	540.83	0.97
5777.57	86.50	306.20	5377.81	361.26 N	444.74 W	572.60	0.94
5809.41	86.20	306.40	5379.84	380.07 N	470.35 W	604.37	1.13
5841.23	85.00	305.90	5382.28	398.78 N	495.97 W	636.09	4.08
5873.09	84.70	305.90	5385.14	417.39 N	521.67 W	667.82	0.94
5904.84	85.50	305.30	5387.85	435.81 N	547.40 W	699.44	3.15
5936.62	88.90	305.20	5389.40	454.12 N	573.31 W	731.17	10.70
5968.29	88.90	304.60	5390.01	472.24 N	599.28 W	762.81	1.89

SPERRY-SUN DRILLING SERVICES
SURVEY DATA

Customer ... : MOBIL
Platform ... : CA-MJ-70095
Slot/Well .. : LEG4/R.U.#13-11, 4A1

MEASURED DEPTH	ANGLE DEG	DIRECTION DEG	TVD	NORTHINGS FEET	EASTINGS FEET	VERTICAL SECTION	DOG LEG
6000.06	89.00	304.10	5390.59	490.16 N	625.51 W	794.54	1.60
6031.06	85.40	305.30	5392.11	507.79 N	650.96 W	825.47	12.24
6062.86	84.00	306.60	5395.04	526.37 N	676.59 W	857.13	6.00
6094.60	84.80	306.00	5398.14	545.07 N	702.05 W	888.72	3.15
6126.31	85.00	305.30	5400.96	563.48 N	727.71 W	920.29	2.29
6158.13	85.70	304.80	5403.54	581.70 N	753.68 W	951.99	2.70
6189.88	85.70	304.60	5405.92	599.72 N	779.71 W	983.62	0.63
6220.95	85.00	305.50	5408.44	617.50 N	805.06 W	1014.57	3.66
6252.00	87.10	305.30	5410.58	635.45 N	830.31 W	1045.53	6.79
6283.80	88.50	305.30	5411.80	653.81 N	856.24 W	1077.30	4.40
6315.54	88.80	305.00	5412.55	672.08 N	882.19 W	1109.01	1.34
6347.24	88.20	303.90	5413.38	690.00 N	908.32 W	1140.67	3.95
6379.09	87.50	303.70	5414.57	707.71 N	934.76 W	1172.44	2.29
6410.93	87.80	304.10	5415.88	725.45 N	961.17 W	1204.21	1.57
6442.81	87.30	303.40	5417.24	743.15 N	987.65 W	1236.01	2.70
6474.55	84.60	302.30	5419.48	760.32 N	1014.25 W	1267.59	9.18
6506.42	84.10	302.90	5422.62	777.41 N	1040.97 W	1299.21	2.44
6538.22	83.20	302.20	5426.14	794.41 N	1067.61 W	1330.72	3.58
6570.06	84.20	302.30	5429.63	811.30 N	1094.37 W	1362.25	3.16
6601.81	84.00	301.80	5432.89	828.06 N	1121.14 W	1393.72	1.69
6626.00	84.90	301.60	5435.23	840.71 N	1141.62 W	1417.69	3.81
6659.00	84.90	301.60	5438.17	857.93 N	1169.62 W	1450.42	0.00

THE DOGLEG SEVERITY IS IN DEGREES PER 100.00 FEET.
N/E COORDINATE VALUES GIVEN RELATIVE TO WELL SYSTEM REFERENCE POINT.
TVD COORDINATE VALUES GIVEN RELATIVE TO WELL HEAD.
THE VERTICAL SECTION ORIGIN IS WELL HEAD.
THE VERTICAL SECTION WAS COMPUTED ALONG 307.00 (TRUE).
CALCULATION METHOD: MINIMUM CURVATURE.

LAST SURVEY ENTERED IS A PROJECTION
TO BIT AT TD OF LEG #4 R.U. 13-11 4A1

MUD REPORT

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #13-11 NW UPPER 1-A/B HORIZONTAL LATERAL LEG #4

DATE	DEPTH	WT	VIS	PLS	YLD	GEL	PH	WL	CK	CHL	CA	SD	OIL	WTR
3/29/97	6532'	8.0+	34	4	6	2/12	12.0	5.6	<1/32	4800	120	--	8%	91%
3/30/97	5229'	8.2	36	5	8	2/3	12.0	5.6	<1/32	4800	200	--	8%	90%
3/31/97	5235'	8.2	37	6	9	3/3	11.0	5.6	<1/32	4000	120	--	12%	87%
4/01/97	5352'	8.0	48	12	20	4/6	11.0	5.6	<1/32	3600	120	--	23%	77%
4/02/97	5434'	8.0+	38	4	8	2/3	12.0	5.6	<1/32	3200	120	--	20%	80%
4/03/97	6087'	8.0+	34	3	7	2/3	11.5	5.6	<1/32	3200	80	--	18%	82%
4/04/97	6659'	8.1+	35	3	7	2/3	11.5	5.6	<1/32	3200	80	--	18%	82%

SAMPLE DESCRIPTIONS

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #13-11 NW UPPER 1-A/B HORIZONTAL LATERAL LEG #4

DEPTH	LITHOLOGY

5230.00 5240.00 "LS tan-crm-off wh,occ ltgybrn-dkbrngy,crpxl-micxl,rthy,cln,dns,sl chky,tr scat trnsl-mlky-brn CHT,rr trnsl xln ANHY,tr scat CMT,tt-vrr intxl POR,rr scat v dull yel FLOR,n-tr ltbrn STN.no CUT"

5240.00 5250.00 "LS AA/CHT & CMT,incr m-ltgybrn,brn/occ dkbrnblk-blk strk,bcmg shy-arg,brit,occ grdg to shy-arg DOL,v sl-sl chky,tt-rr intxl POR,n-vrr scat v dull yel FLOR,n-rr ltbrn STN,no CUT"

5250.00 5260.00 "LS crm-tan,occ ltgy-gybrn,crpxl-micxl,occ micsuc,dol,chk-cln,v sl slty,w/scat dkbrn CHT frag,occ gybrn micxl shy DOL incl,tt-v rr intxl POR,spty dull-bri yel FLOR,n-v rr vis STN,tr slow-mod fast CUT,thn carb SH ptgs"

5260.00 5270.00 "LS AA,w/decr DOL AA,scat CHT frag,occ v thn blk carb SH lams"

5270.00 5280.00 "LS tan-brn,occ crm-gybrn,rr wh,crpxl-micxl,rr micsuc,v dol,rthy-chk,occ cln,v rr mic fos,scat CHT frag,tt-tr intxl POR,tr spty dull yel FLOR,n-v rr vis STN,tr slow-mod fast CUT,v rr v thn blk carb SH ptgs,w/intbd thn,gybrn,micxl,rthy,lmy DOL,tt-vrr F-S-C"

5280.00 5290.00 "LS AA,incr DOL AA,w/brn-dkbrn CHT frag,POR-FLOR-STN-CUT AA"

5290.00 5300.00 "LS & DOL AA,incr dol MRLST,strky POR-FLOR-STN,tr fr mod fast CUT,incr gybrn CHT frag,scat carb SH ptgs,w/trnsl-clr xl ANHY"

5300.00 5310.00 "DOL ltgy-dkbrn,dkgybrn,crpxl-micxl,micsuc ip,slty,lmy ip,grdg to dol MRLST,rr intxl POR,spty yel FLOR,n-v rr ltbrn STN,tr slow-mod fast CUT,w/tan-ltgybrn,cprxl,arg LS,tt,scat dkgybrn-dk brn CHT frag,v thn ANHY,occ blk carb SH"

5310.00 5320.00 "DOL AA,scat CHT frag,tr LS incl,scat blk carb SH,POR-FLOR-STN-CUT AA"

5320.00 5330.00 "LS & DOL AA,incr dol MRLST,POR-FLOR-STN AA,tr fr mod fast CUT,scat CHT frag,scat carb SH ptgs,w/trnsl-clr xl ANHY"

5340.00 5350.00 "SH dkbrnblk-blk,sbblky-sbplty,frm-sft,occ brit,carb,v sl-sl mica,mrly-occ sl slty,calc-sl calc,sooty"

5349.00 5357.00 "LS crm-tan,occ wh,crpxl-micxl,dol,rr ANHY xl-incl,v rr CHT frag,w/thn intbd ltbrn,micxl,crpxl ip,lmy DOL,scat blk carb SH,rr intxl POR,tr spty dull yel FLOR,n-v rr vis STN,p slow-mod fast CUT in DOL"

5360.00 5370.00 "SH pred cvgs,dkgybrn,blk,sbblky,rthy-v sl slty,carb,dol-sl calc,sooty,mica,w/v thn tan crpxldns LS & ltgybrn-brn,micxl,rthy,sl lmy,arg tt DOL"

5370.00 5380.00 "LS,inr bcmg slty,tt,NFSOC,incr DOL PKST,bcmg v slty ip,w/abnt blk carb SH cvgs,AA"

DEPTH	LITHOLOGY

5380.00 5390.00 "DOL crm-tan,micxl,occ crpxl,v rthy-v slty,arg,grdg to v dol SLTST,tt-tr intxl POR,rr-tr dull yel FLOR,v rr ltbrn STN,n-v rr slow dif CUT,w/thn blk carb SH,scat v slty tt dol LS,v rr dkbrn CHT frag"

5390.00 5400.00 "DOL crm-tan,mgybrn,micxl-vfxl,rthy,v slty,v sl lmy,w/v rr scat CHT frag,occ thn intbd tt LS & blk carb SH,tr-fr dull yel flor,rr-tr intxl POR,n-v rr ltbrn STN,p slow dif-slow stmg CUT"

5400.00 5410.00 "DOL AA,tr intxl POR,tr-fr dull yel FLOR,v rr spty ltbrn-blk STN,tr slow dif-v rr slow stmg CUT,w/v rr intbd SH & LS AA,v rr trnsl CHT frag"

5410.00 5420.00 "DOL AA,v arg-v slty,v rr lt-dkbrn,micxl-vfxl,micsuc DOL GRNST,v rr xl ANHY incl,rr-tr intxl POR,tr-mfr dull-bri yel FLOR,n-v rr vis STN,slow-rr slow stmg CUT,w/decr LS & SH AA,v rr scat ltgy-trnsl CHT frag"
5410.00 5420.00 "DOL AA,v arg-v slty,v rr lt-dkbrn,micxl-vfxl,micsuc DOL GRNST,v rr xl ANHY incl,rr-tr intxl POR,tr-mfr dull-bri yel FLOR,n-v rr vis STN,slow-rr slow stmg CUT,w/decr LS & SH AA,v rr scat ltgy-trnsl CHT frag"

5430.00 5440.00 "DOL ltgy-gy,occ tan-ltbrn,micxl-vfxl,gran,occ crpxl DOL PKST incl,pred DOL GRNST,sl slty,LS rich cmt ip,occ grdg to dol LS GRNST,scat CHT frag,tr intxl POR,fr dull yel FLOR,spty ltbrn-v rr blk STN,rr slow stmg-fr slow dif CUT"

5440.00 5450.00 "DOL AA,decr ltbrn,incr slty-arg,decr POR-FLOR-STN-CUT,v rr LS frag "

5450.00 5460.00 "DOL pred ltgy-occ ltgybrn,rr brn,micxl-vfxl,v slty-v arg,v rr mica,grdg to v dol SLTST ip,w/scat tt crpxl chk dns ltgy-brn dol LS frag,scat tr intxl POR,tr-fr dull yel FLOR,n-v p vis brn STN,p slow dif-sl ow stmg CUT"

5460.00 5470.00 "DOL AA,w/scat tan crpxl-slty LS AA,POR-FLOR-STN-CUT AA"

5470.00 5480.00 "DOL AA,slty-v slty,v rr mica,grdg to dol SLTST,LS frag AA,decr POR-FLOR-STN-CUT"

5480.00 5490.00 "DOL AA,incr ltbrn-brn DOL GRNST,scat ltbrn anhy dol LS PKST frag,sl incr DOL POR-FLOR-STN-CUT"

5490.00 5500.00 "DOL AA,POR-FLOR-STN-CUT AA,incr ltgy-gy crpxl-micxl,occ vfxl,gran-v slty,dol LS-sl anhy,arg,v sl mica,grdg to v lmy SLTST ip,rr intxl POR,n-v rr spty bri yel FLOR,n vis STN,v p slow dif CUT"

5500.00 5510.00 "LS AA,incr LS GRNST-PKST,v slty,dol,POR-FLOR-STN-CUT AA,occ grdg to v slty DOL GRNST-PKST,w/LS rich cmt,scat ltbrn CHT frag,rr-tr intxl POR,n vis STN,n-v p slow dif CUT"

5510.00 5520.00 " LS & DOL AA,v p POR-FLOR-STN-CUT"

5520.00 5530.00 "DOL ltgy-gy,occ ltbrn-brn,crpxl-vfxl,gran ip,v slty,sl anhy,occ LS rich cmt,rr scat CHT frag,incr DOL PKST,tt-tr intxl POR,tr spty dull yel FLOR,n-v rr vis STN,n-v p slow dif CUT,w/scat slty LS GRNST & PKST,tt"

5530.00 5540.00 "DOL AA,incr ltbrn DOL PKST,sl incr LS rich cmt,rr CHT frag,occ ltgy-tan crpxl-micxl,chk,slty,dol,sl anhy LS,tt-vrr intxl POR,n-v rr vis FLOR,n vis STN,n-v p slow dif CUT"

DEPTH	LITHOLOGY

5540.00 5550.00 "DOL tan,occ ltbrn-ltgy-crm,crpxl-micxl,occ vfxl-micsuc,pred DOL PKST,w/v rr scat DOL GRNST,sl slty ip,incr LS rich cmt,w/thn intbd tan crpxl dol LS PKST frag,w/rr-tr intxl POR,tr dull yel FLOR,tr slow stmg-slow dif CUT in DOL"

5550.00 5560.00 "DOL AA,incr ltbrn & ltgy-crm plty frag,sl-v sl chky,tr tan CHT frag,POR-FLOR-STN-CUT AA"

5560.00 5570.00 "DOL brn,ltbrn-tan,agl,micsuc-gran,vfxl-crpxl,DOL GRNST/thin intbd PCKST,tr plty chky dol frag,tr trnsl xln ANHY & bf CHT frag,tr mic fos & CRIN,fr-g intxl/tr agl POR,g-fr even dull-mod bri yel FLOR,g brn-tr dkbrn/rr blk dd o STN,g dif/tr slow strmg CUT"

5570.00 5580.00 "DOL AA,POR-FLOR-STN-CUT AA"

5580.00 5590.00 "DOL AA,gran-micsuc-agl,pred DOL GRNST,tr-rr scat PCKST frag,rr tan-crm LS frag,tr CRIN & mic fos,tr ANHY AA,fr-g intxl/agl POR,fr-g even dull-mod bri yel FLOR,g ltbrn/scat brn-dkbrn STN,rr blk dd o STN,g dif/v slow strmg CUT"

5590.00 5600.00 "DOL GRNST AA/scat tr PCKST,g-fr intxl/tr agl POR,g even mod bri yel FLOR,g ltbrn/tr brn STN,g mod fast strmg CUT "

5600.00 5610.00 "DOL ltbrn,occ brn,tan,micsuc-gran,crpxl-vfxl,DOL GRNST/rr thin intbd PCKST,cln,v sl chky,tr trnsl-mlky CHT incl,rr trnsl xln ANHY frag-incl,rr CRIN fos,g-fr intxl/agl POR,g even mod bri yel FLOR,tr-fr ltbrn-brn STN,g mod fast CUT"

5610.00 5620.00 "DOL AA,occ LS rich cmt,tr ltbrn-crm DOL PKST,POR-FLOR-STN-CUT AA"

5620.00 5630.00 "DOL pred ltbrn-brn DOL GRNST,w/scat trnsl-spec wh-trnsl CHT frag,occ DOL PKST,POR-FLOR-STN-CUT AA"

5630.00 5640.00 "DOL ltbrn-brn,micxl-vfxl,gran,micsuc-suc,sl alg,rr ANHY xl-incl,pred DOL GRNST,occ tan crpxl DOL PKST,rr Crin fos,scat trnsl-wh occ mot CHT frag,fr-g intxl-alg POR,g dull yel FLOR,fr-g ltbrn-brn STN,fr-g slow-mod fast stmg CUT"

5640.00 5650.00 "DOL ltbrn-brn,micxl-vfxl,gran,micsuc-suc,sl alg,rr ANHY xl-incl,pred DOL GRNST,occ tan crpxl DOL PKST,rr Crin fos,scat trnsl-wh occ mot CHT frag,fr-g intxl-alg POR,g dull yel FLOR,fr-g ltbrn-brn STN,fr-g slow-mod fast stmg CUT"

5650.00 5660.00 "DOL ltbrn,occ brn,tan,micsuc-gran,agl,occ vfxl-crpxl,DOL GRNST,rr-tr scat PCKST,tr trnsl-clr xln ANHY,rr-tr bf-tan scat CHT,g-fr intxl/occ agl POR,g even mod bri-dull yel FLOR,g ltbrn/scat brn STN,rr pp blk dd o STN,g mod fast-fast strmg CUT"

5660.00 5670.00 "DOL AA/decr CHT AA,POR-FLOR-STN-CUT AA"

5670.00 5680.00 "DOL AA,DOL GRNST,rr scat PCKST,tr scat ltgy-wh CHT,tr trnsl-clr xln ANHY frag-rr incl,rr CRIN fos,g intxl-agl POR,g even mod bri-dull yel FLOR,fr-g ltbrn-brn STN,rr blk dd o STN,g blooming CUT"

5680.00 5690.00 "DOL AA,vfxl-gran,micsuc-suc,sl alg,rr ANHY AA,pred DOL GRNST,rr-tr tan crpxl DOL PKST,rr scat trnsl-wh CHT frag,fr-g intxl-alg POR,g even mod bri-dull yel FLOR,fr-g ltbrn-brn STN,g blooming-fast strmg CUT"

DEPTH	LITHOLOGY

5690.00 5700.00 "DOL AA,DOL GRNST,POR-FLOR-STN-CUT AA"

5700.00 5710.00 "DOL pred brn-ltbrn DOL GRNST,vrr ltgy-wh-trnsl CHT-sil frag/tr sil cmt,g intxl-tr agl POR,g even mod bri-dull yel FLOR,g-fr brn STN,g fast-mod fast strmg CUT"

5710.00 5720.00 "DOL brn-ltbrn,vfxl-gran-micsuc,alg-sl suc,vrr ANHY AA,DOL GRNST,vrr scat trnsl-wh CHT frag,fr-g intxl-alg POR,g even mod bri-dull yel FLOR,fr-g ltbrn-brn STN,g fast-mod fast strmg CUT"

5720.00 5730.00 "DOL AA,DOL GRNST,POR-FLOR-STN-CUT AA"

5730.00 5740.00 "DOL AA,DOL GRNST,vrr scat PCKST,tr scat ltgy-wh CHT,tr trnsl-clr xln ANHY frag-rr incl,rr CRIN fos,g intxl-agl POR,g even mod bri-dull yel FLOR,fr-g ltbrn-brn STN,rr blk dd o STN,g blooming CUT"

5740.00 5750.00 "DOL brn-ltbrn,occ tan,micsuc-gran,agl,occ vfxl-crpxl,DOL GRNST,rr trnsl-clr xln ANHY,tr-rr wh-tan scat CHT,g-fr intxl/occ agl POR,g even mod bri-dull yel FLOR,g ltbrn/scat brn STN,g mod fast-fast strmg CUT"

5750.00 5760.00 "DOL AA,DOL GRNST,POR-FLOR-STN-CUT AA"

5760.00 5770.00 "DOL GRNST AA/vrr scat crpxl PCKST,g-fr intxl/tr agl POR,g even mod bri-dull yel FLOR,g brn STN,g mod fast strmg CUT "

5770.00 5780.00 "DOL brn,occ ltbrn,tan,micsuc-gran,agl,occ vfxl-crpxl,DOL GRNST,rr scat crpxl PCKST,rr trnsl-clr xln ANHY,tr-rr wh-tan scat CHT,g-fr intxl/occ agl POR,g even mod bri-dull yel FLOR,g brn STN,g blooming-fast strmg CUT"

5780.00 5790.00 "DOL AA,DOL GRNST,POR-FLOR-STN AA,g mod fast strmg CUT"

5790.00 5800.00 "DOL GRNST AA/incr scat tan-bf crpxl PCKST,tr trnsl-clr ANHY frag,tr CRIN fos,rr trnsl-wh CHT,g-fr intxl/tr agl POR,g even mod bri-dull yel FLOR,g brn STN,g mod fast strmg CUT "

5800.00 5810.00 "DOL ltbrn-brn,micsuc-gran,micxl-vfxl,sl alg,pred DOL GRNST,tr tan crpxl DOL PKST,tr scat trnsl-wh occ mot CHT frag,tr trnsl xln ANHY frag & incl,fr-g intxl/tr alg POR,g mod bri yel FLOR,fr-g ltbrn-brn STN,g dif/slow stmg CUT"

5810.00 5820.00 "DOL AA,pred DOL GRNST/tr scat-intbd tan crpxl PCKST,tr scat ltgy-trnsl-wh CHT frag,fr-g intxl/tr agl POR,FLOR-STN-CUT AA"

5820.00 5840.00 "DOL ltbrn-brn,occ tan-crm,micsuc-micxl-gran,agl-crpxl,occ crpxl,pred GRNST/tr scat PCKST,trnsl-wh CHT frag,rr AHNY AA,rr CRIN fos,fr-g intxl/tr agl POR,g even mod bri-dull yel FLOR,g ltbrn-brn STN,g mod fast strmg CUT"

5840.00 5850.00 "DOL AA,micsuc-micxl-gran,agl-crpxl,occ crpxl,pred GRNST/tr scat PCKST,tr CHT frag AA,rr AHNY AA,rr CRIN fos,POR-FLOR-STN AA,g dif/tr slow strmg CUT"

5850.00 5860.00 "DOL brn-ltbrn,occ tan,micsuc-gran,agl-vfxl,occ crpxl,GRNST,tr scat PCKST frag-occ intbd/GRNST,tr CHT AA,rr ANHY AA,fr-g intxl/rr agl POR,g even dull-mod bri yel FLOR,g brn/rr blk dd o STN,g dif/mod fast strmg CUT"

DEPTH	LITHOLOGY

5860.00 5870.00 "DOL pred brn,occ ltbrn-tan,AA,pred GRNST/PCKST AA,POR-FLOR-STN-CUT AA"

5870.00 5880.00 "DOL brn-ltbrn,occ tan,micsuc-gran,agl-micxl-crpxl,occ crpxl,pred GRNST/scat PCKST,tr CHT frag & incl AA,tr CRIN fos,rr AHNY AA,fr-g intxl/tr agl POR,FLOR AA,g brn-ltbrn STN,g dif-slow strmg CUT"

5880.00 5890.00 "DOL AA,DOL GRNST/scat PCKST frag-occ intbd GRNST,tr CRIN fos,tr CHT AA,rr ANHY AA,fr-g intxl/tr agl POR,g even dull/tr mod bri yel FLOR,g brn-ltbrn STN,g dif-slow strmg CUT"

5890.00 5900.00 "DOL pred brn,occ ltbrn-tan,AA,pred GRNST/PCKST AA,POR-FLOR-STN-AA,g-fr mod fast-fast strmg CUT"

5900.00 5910.00 "DOL brn,micsuc-gran,micxl-suc,agl-vfxl,occ suc,DOL GRNST,rr scat crpxl PCKST,tr trnsl-clr anhy frag-occ incl,g-fr intxl-agl POR,g even dull-mod bri yel FLOR,g brn/tr scat pp blk dd o STN,"

5910.00 5920.00 "DOL GRNST AA,incr agl,rr ANHY AA,g-fr intxl-agl,g even dull-mod bri yel FLOR,g brn/blk dd o STN,g blooming/fast strmg CUT"

5920.00 5940.00 "DOL brn,occ ltbrn,tan,micsuc-gran,micxl-vfxl-agl,occ crpxl,GRNST,tr intbd PCKST/occ scat frag,tr trnsl xln ANHY incl & frag,rr scat crm crpxl LS frag,fr-g intxl POR,g even dull-mod bri yel FLOR,g brn/scat blk dd o STN,g mod fast-fast strmg CUT"

5940.00 5950.00 "DOL AA,DOL GRNST,POR-FLOR-STN-CUT AA"

5950.00 5970.00 "DOL brn,rr ltbrn,tan,micsuc-gran,micxl-vfxl-agl,occ crpxl,GRNST,rthy,sl slty,rr intbd PCKST/occ scat frag,rr trnsl xln ANHY incl & frag,fr-g intxl/occ agl POR,g even dull-mod bri yel FLOR,g brn/scat blk dd o STN,g fast-blooming strmg CUT"

5970.00 5980.00 "DOL AA,DOL GRNST,rr intbd GRNST,rr CRIN fos,rr CHT AA,rr ANHY AA,fr-g intxl/tr agl POR,g even dull-mod bri yel FLOR,g brn/scat blk dd o STN,g blooming-mod fast strmg CUT"

5980.00 5990.00 "DOL GRNST AA,rr ANHY AA,g-fr intxl/tr agl POR,g even dull-mod bri yel FLOR,g brn/ scat blk dd o STN,g blooming/fast strmg CUT"

5990.00 6000.00 "DOL brn,occ ltbrn,micsuc-micxl,vfxl-crpxl,occ sl agl,GRNST,rr intbd PCKST,rr trnsl-clr xln ANHY,rr CHT AA,g-fr intxl/rr agl POR,g even dull-mod bri yel FLOR,g brn/occ scat blk dd o STN,g blooming-fast strmg CUT"

6000.00 6010.00 "DOL GRNST AA,tr ANHY incl AA,rr CHT AA,POR-FLOR-STN AA,g mod fast -fast strmg CUT"

6010.00 6020.00 "DOL brn-mbrn,occ dkbrn,micxl-vfxl,gran,micsuc-suc,alg,w/scat ANHY incl-POR fl,tr ltbrn-brn DOL PKST,pred DOL GRNST,fr-g intxl-alg POR,mod g dull yel FLOR,g brn STN,occ blk dd o STN,fr-g mod fast-fast stmg CUT"

6020.00 6030.00 "DOL pred DOL GRNST AA,sl incr ANHY,POR-FLOR-STN-CUT AA"

6030.00 6040.00 "DOL AA,sl incr ANHY cmt,incr alg,POR-FLOR-STN-CUT AA"

DEPTH	LITHOLOGY

6040.00 6050.00 "DOL brn-mbrn,occ dkbrn,micxl-vfxl,gran,micsuc-suc,alg,tr ltbrn-brn DOL PKST,pred DOL GRNST,occ scat ANHY xl-incl-rr POR fl,fr-g intxl-alg POR,mod g dull yel FLOR,g brn STN,occ blk dd o STN,fr-g mod fast-fast stmg CUT"

6050.00 6060.00 "DOL AA,scat tr DOL PKST w/tr intxl POR-FLOR-STN-CUT,pred DOL GRNST w/fr-g alg-intxl POR,mod g dull yel FLOR,fr-g brn STN,occ scat blk dd o STN,fr-g mod fast-fast stmg CUT"

6060.00 6070.00 "DOL AA,POR-FLOR-STN-CUT AA"

6070.00 6080.00 "DOL brn-mbrn,occ dkbrn,micxl-vfxl,gran,micsuc-suc,alg,tr ltbrn-brn DOL PKST,pred DOL GRNST,occ scat ANHY xl-incl-rr POR fl,fr-g intxl-alg POR,mod g dull yel FLOR,g brn STN,occ blk dd o STN,fr-g mod fast-fast stmg CUT"

6080.00 6090.00 "DOL AA,POR-FLOR-STN-CUT AA"

6090.00 6100.00 "DOL AA,sl incr ANHY cmt,incr alg,POR-FLOR-STN-CUT AA"

6100.00 6120.00 "DOL brn-mbrn,occ dkbrn,micxl-vfxl,gran,micsuc-suc,alg,tr ltbrn-brn DOL PKST,pred DOL GRNST,occ scat ANHY xl-incl-rr POR fl,v rr scat trnsl CHT FRAG,fr-g intxl-alg POR,mod g dull yel FLOR,g brn STN,occ blk dd o STN,fr-g mod fast-fast stmg CUT"

6110.00 6120.00 "DOL AA, decr ANHY xl-incl,v rr DOL PKST,POR-FLOR-STN-CUT AA"

6120.00 6130.00 "DOL ltbrn-brn,rr dkbrn,micxl-vfxl,gran,suc,alg,pred DOL GRNST,rr ANHY incl-xl,v rr trnsl CHT frag,scat tr DOL PKST,fr-g intxl-alg POR,fr-g dull yel FLOR,fr-g lt brn STN,g mod fast-fast stmg CUT"

6130.00 6140.00 "DOL AA,sl incr alg POR,n-v rr CHT frag,POR-FLOR-STN-CUT AA"

6140.00 6150.00 "DOL AA,sl incr ANHY xl-incl,incr CHT,POR-FLOR-STN-CUT AA"

6150.00 6160.00 "DOL brn-mbrn,occ dkbrn,micxl-vfxl,gran,micsuc-suc,alg,tr ltbrn-brn DOL PKST,pred DOL GRNST,occ scat ANHY xl-incl-rr POR fl,v rr scat trnsl CHT FRAG,fr-g intxl-alg POR,mod g dull yel FLOR,g brn STN,n-v rr blk dd o STN,fr-g mod fast-fast stmg CUT"

6160.00 6170.00 "DOL AA,n-v rr CHT frag,incr blk dd o STN,POR-FLOR-STN-CUT AA"

6170.00 6180.00 "DOL AA,pred v alg DOL GRNST,v rr ANHY xl-incl,abnt blk dd o STN,POR-FLOR-STN-CUT AA"

6180.00 6190.00 "DOL AA,sl incr DOL PKST,decr blk dd o STN,fr-g intxl-fr alg POR,fr-g dull yel FLOR,fr-g ltbrn STN,rr blk dd o STN,fr-g mod fast-fast stmg mlky CUT"

6190.00 6200.00 "DOL ltbrn-brn,micxl-vfxl,gran,suc ip,alg,pred DOL GRNST,occ DOL PKST,scat ANHY xl-incl,v rr styl,POR-FLOR-STN-CUT AA"

6200.00 6210.00 "DOL ltbrn-brn,occ dkbrn,micxl-vfxl,gran,micsuc-suc,pred DOL GRNST,alg ip,v rr scat ANHY xl-incl-rr cmt,occ scat DOL PKST,tr-g intxl-fr alg POR,fr-mod g dull yel FLOR,fr-g ltbrn STN,rr spty blk dd o STN,fr-g mod fast-fast stmg CUT"

6210.00 6220.00 "DOL AA,sl incr alg,decr DOL PKST,POR-FLOR-STN-CUT AA"

DEPTH	LITHOLOGY

6220.00 6230.00 "DOL AA,rr Crin fos,POR-FLOR-STN-CUT AA"

6230.00 6240.00 "DOL brn-ltbrn,occ mbrn,micxl-vfxl,gran,micsuc-suc,alg,tr ltbrn-brn DOL PKST,pred DOL GRNST,tr ANHY xl-incl-rr POR fl,v rr scat trnsl CHT FRAG,fr-g intxl-alg POR,mod g dull yel FLOR,g brn STN,n-v rr blk dd o STN,fr-g mod fast-fast stmg CUT"

6240.00 6250.00 "DOL AA,rr Crin fos,POR-FLOR-STN-CUT AA"

6250.00 6260.00 "DOL brn-ltbrn,occ mbrn,micxl-vfxl,gran,micsuc-suc,alg,rr ltbrn DOL PKST,pred DOL GRNST,rr ANHY xl-incl-rr POR fl,v rr scat trnsl CHT FRAG,occ Crin-Cor fos,fr-g intxl-alg POR,mod g dull yel FLOR,g brn STN,n-v rr blk dd o STN,fr-g mod fast-fast stmg CUT"

6260.00 6270.00 "DOL AA,sl incr Crin fos & DOL PKST,POR-FLOR-STN-CUT AA"

6270.00 6280.00 "DOL AA,sl incr alg,decr DOL PKST,POR-FLOR-STN-CUT AA"

6280.00 6290.00 "DOL AA,POR-FLOR-STN-CUT AA,v rr scat wh-trnsl mot CHT FRAG,w/v rr crm-tan,crpxl LS PKST frag,NFSOC"

6290.00 6300.00 "DOL lt-mbrn,micxl-vfxl,gran-suc,occ tr tan DOL PKST,pred alg DOL GRNST,rr ANHY xl-incl,occ LS rich cmt,tr Crin fos,rr mot CHT frag,fr-g intxl-fr alg POR,fr-mod g dull yel FLOR,fr-g ltbrn STN,n-v rr spty blk dd o STN,fr-g mod fast-fast stmg CUT"

6300.00 6310.00 "DOL AA,incr LS rich cmt-v rr scat LS PKST frag,scat wh-mot CHT frag,w/rr DOL PKST frag,POR-FLOR-STN-CUT AA"

6310.00 6320.00 "DOL AA,pred DOL GRNSTN,occ LS rich cmt,POR-FLOR-STN-CUT AA"

6320.00 6330.00 "DOL,AA,w/incr DOL PKST,scat tan-crm crpxl sl dol LS PKST frag,scat Crin fos,tr-fr intxl-alg POR,fr dull yel FLOR,tr-fr ltbrn STN,fr-g mod fast-fast stmg CUT"

6330.00 6350.00 "DOL ltbrn-brn,occ tan,crpxl-vfxl,gran-micsuc ip,occ suc,DOL GRNST w/thn intbd DOL PKST & LS PKST,alg ip,scat Crin fos,occ trnsl-wh CHT frag,fr-g intxl-tr alg POR,tr-fr dull yel FLOR,tr-fr ltbrn STN,fr mod fast-fast stmg CUT"

6350.00 6360.00 "DOL AA,w/occ crm-tan crpxl dol LS PKST incl,tr intbd DOL PKST,rr CHT frag,scat Crin fos,POR-FLOR-STN-CUT AA "

6360.00 6370.00 "DOL AA,w/incr dol LS PKST incl,tr intbd DOL PKST,rr CHT frag,scat Crin fos,decr POR-FLOR-STN-CUT AA "

6370.00 6380.00 "DOL ltbrn-tan,brn-mbrn,crpxl-vfxl,occ gran-suc,sl alg,pred intbd DOL GRNST-PK,w/tr thn wh-crm-tan,crpxl,dol LS PKST,incr Crin fos,scat CHT frag,sl anhy,tt-fr intxl-rr alg POR,tr-fr dull yel FLOR,tr brn-m brn STN,tr of fr slow-mod fast stmg CUT"

6380.00 6390.00 "INTBD DOL & LS AA,POR-FLOR-STN-CUT AA"

6390.00 6400.00 "DOL brn-mbrn,occ ltbrn,micxl-vfxl,occ crpxl,rthy-v sl slty,alg,scat wh CHT frag,occ ltbrn DOL PKST incl,v rr intbd wh-tan LS PKST,scat Crin fos,tt-fr intxl-tr alg POR,tr-fr dull yel FLOR,rr-tr ltbrn-dkbrn STN,tr of fr-g slow-mod fast stmg CUT"

DEPTH	LITHOLOGY

6400.00 6410.00 "INTBD DOL & LS AA,POR-FLOR-STN-CUT AA"

6410.00 6420.00 "DOL ltbrn-tan,brn-mbrn,crpxl-vfxl,occ gran-suc,sl alg,pred intbd DOL GRNST-PK,w/tr thn wh-crm-tan,crpxl,dol LS PKST,tr Crin fos,incr scat CHT frag,sl anhy,tt-fr intxl-rr alg POR,tr-fr dull yel FLOR,tr brn-m brn STN,tr-fr dif-slow stmg CUT"

6420.00 6430.00 "DOL AA,w/decr dol LS PKST incl,incr intbd DOL PKST,scat CHT frag,scat CRIN fos,POR-FLOR-STN-CUT AA "

6440.00 6460.00 "DOL ltbrn,tan,occ mbrn-dkbrn,crm,vfxl-micsuc-micxl,crpxl,DOL GRNST/intbd crpxl PCKST,rr-tr scat tan-crm crpxl LS,cln,dns,v sl chky,tr scat CHT,tr-rr xln ANHY,fr-tr intxl POR,fr even dull yel FLOR,fr-g ltbrn/rr brn STN,g dif/tr slow strmg CUT"

6460.00 6470.00 "DOL AA,w/sl decr DOL PKST frag & rr incl,vrr LS PKST,scat CHT frag,scat CRIN fos,tr trnsl-clr-wh xln ANHY,POR-FLOR-STN-CUT AA "

6470.00 6480.00 "DOL ltbrn-tan-crm,occ wh-trnsl,m-brn,micxl-micsuc,crpxl-vfxl,pred GRNST/scat PCKST frag-rr incl,occ sl lmy-calc,ANHY & CHT AA,POR-FLOR-STN-CUT AA"

6480.00 6490.00 "DOL AA,pred GRNST w/sl incr crpxl PCKST frag-tr intbd incl,tr scat bf-wh CHT frag,tr trnsl-wh-clr ANHY,tr CRIN fos,cln,fr intxl POR,g even dull yel FLOR,g ltbrn-rr mbrn STN,g slow-mod fast strmg CUT"

6490.00 6500.00 "DOL ltbrn-tan,brn,occ crm-wh,micxl-crpxl.micsuc-vfxl,pred GRNST w/ scat crpxl PCKST frag-occ intbd in GRNST,occ sl calc,tr CRIN fos,tr scat trnsl-wh CHT frag,rr trnsl-clr-wh ANHY,cln,dns,tr intxl/vrr agl POR,fr-g even dull yel FLOR,STN-CUT AA"

6500.00 6510.00 "DOL AA,GRNST/scat PCKST,ANHY & CHT AA,rr CRIN fos,POR-FLOR-STN-CUT AA"

6510.00 6530.00 "DOL ltbrn-tan-crm,micxl-crpxl-micsuc,vfxl-gran,GRNST/scat crpxl PCKST frag-incl,occ grdg to dol LS ip,cln,rr bf-mlky-trnsl CHT frag-incl,tr trnsl-wh ANHY,fr-tr intxl POR,g even dull-mod bri yel FLOR,g ltbrn STN,g fast strmg CUT"

6530.00 6540.00 "DOL AA,pred GRNST/scat crpxl PCKST frag-incl,occ grdg to dol LS ip,cln,tr CHT fragAA,rr trnsl-wh ANHY,fr-g intxl/rr vug POR,g even dull-mod bri yel FLOR,g ltbrn STN,g blooming/tr fast strmg CUT"

6540.00 6550.00 "DOL ltbrn-tan-crm,occ brn,micxl-crpxl,micsuc-vfxl,gran,pred GRNST/tr calc cmt,scat PCKST frag-incl sl lmy-calc crpxl,occ grdg to dol LS ip,cln,rr bf-mlky-trnsl CHT frag-incl, rr trnsl xln ANHY,fr-tr intxl POR,g even dull-mod bri yel FLOR,g blooming CUT"

6550.00 6570.00 "DOL AA,pred GRNST w/sl lmy-calc crpxl PCKST frag & rr intbd incl,tr scat wh-trnsl-bf CHT frag,rr trnsl-clr xln ANHY,tr CRIN fos,cln,fr-tr intxl POR,g even dull yel FLOR,g ltbrn-mbrn STN,g-fr dif-v slow strmg CUT"

6570.00 6580.00 "DOL - GRNST AA,w/scat PKST frag-incl,scat CHT frag & ANHY AA,rr CRIN fos,POR-FLOR-STN AA,fr-g mod fast strmg CUT "

DEPTH	LITHOLOGY

6580.00 6600.00 "DOL ltbrn-tan-crm,micsuc-micxl,crpxl-vfxl,gran,pred GRNST/rr calc cmt,scat PCKST frag sl lmy-calc crpxl,occ grdg to dol LS ip,tr scat CRIN fos,incrCHT frag AA,rr ANHY,fr intxl/rr agl POR,g even dull-mod bri yel FLOR,g ltbrn STN,fr-g dif/slow strmg CUT"

6600.00 6610.00 "DOL ltbrn-tan,brn,occ crm,micxl-micsuc-vfxl,crpxl-vfxl,GRNST/rr lmy cmt,scat sl lmy-calc crpxl PCKST,scat wh-trnsl-occ dkbrn CHT frag,tr trnsl-clr xln ANHY,fr-g intxl/tr agl POR,g even dull/tr spty mod bri yel FLOR,g ltbrn-brn STN,g dif-slow strmg CUT"

6610.00 6630.00 "DOL mbrn-brn-ltbrn,occ tan-crm,micsuc-gran-micxl,suc-crpxl,sl agl,DOL GRNST/decr-occ crpxl PCKST,scat mlky-wh-trnsl CHT frag,rr ANHY AA,occ sl slty,g intxl-tr agl POR,g even dull yel FLOR,g dk brn/tr blk dd o STN,g fast strmg-blooming CUT"

6630.00 6640.00 "DOL AA,decr agl,pred GRNST/sl incr of sl lmy-calc crpxl PCKST,scat CHT AA,rr trnsl-clr xln ANHY,g intxl/rr agl POR,g even dull-mod dull yel FLOR,g brn-ltbrn/tr blk dd o STN,fr-g blooming/mod fast strmg CUT"

6640.00 6660.00 "DOL GRNST AA/scat PCKST AA occ intbd in GRNST,scat CHT AA,rr trnsl-clr xln ANHY,g-fr intxl/rr agl POR,fr-g even dull yel FLOR,g ltbrn-brn/rr blk dd o STN,fr-g slow strmg CUT"

FORMATION TOPS

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #13-11 NW UPPER 1-A/B HORIZONTAL LATERAL LEG #4

FORMATION NAME		SAMPLES MEASURED DEPTH	SAMPLES TRUE VERTICAL DEPTH	DATUM KB:4558
LOWER ISMAY		5286'	5280.5'	-722.5
GOTHIC SHALE		5327'	5315'	-757
DESERT CREEK		5351'	5331'	-773
DC 1-A		5419'	5352'	-894

GEOLOGICAL SUMMARY

AND

ZONES OF INTEREST

The Mobil Exploration and Production U.S. Inc., Ratherford Unit #13-11 Horizontal LEG #4, Section 13, T41S, R23E, was a re-entry of the Mobil Ratherford Unit #13-11, a sidetrack in a northwesterly direction from 5232' measured depth, 5232' true vertical depth, on March 29, 1997. LEG #4 reached a measured depth of 6659', true vertical depth of 5438' at total depth, horizontal displacement of 1450.4' and true vertical plane 301.6 degrees, on April 3, 1997. The lateral was drilled with no problems. Since this well used live oil in an emulation while drilling, the background gases noted on the accompanying mud log remained high, as well as the samples being contaminated to a certain extent with live oil through out the well.

The primary objective of the Ratherford Unit #13-11 Horizontal Lateral LEG #4 was the upper 1-A/B Porosity Benches, to identify and define the porosity benches, their effective porosity, staining and reservoir properties in the Desert Creek Member of the Upper Paradox Formation.

The Lower Ismay, Gothic Shale, the transition zone at the top of the Desert Creek, zones were encountered while drilling LEG #4. Kick off point for this lateral was in the lower 1/3 of the Upper Ismay Member. The base of the Upper Ismay was predominately white to cream, occasionally tan, cryptocrystalline to microcrystalline, chalky, cherty, fossiliferous limestone, occasionally limestone grainstone, and grading to and having interbedded very thin, very argillaceous, brown to gray brown, microcrystalline to microsucrosic dolomite. The dolomite graded into the very thin, carbonaceous, dolomitic shale of the Hovenweep.

The top of the Lower Ismay was picked at 5286' measured depth, 5281' true vertical depth, at the base of the very thin Hovenweep shale. The Lower Ismay was a white to cream to tan, some light gray to rare light gray brown, cryptocrystalline to microcrystalline, chalky to clean, slightly dolomitic to anhydritic, slightly cherty limestone with a trace of scattered micro fossils, no to a trace of intercrystalline porosity, with a trace of spotty dull to bright yellow fluorescence, none to very rare light brown stain, and only a trace of very poor slow diffuse cut. This limestone was below an 8' thick, white to translucent, massive, crystalline anhydrite, which had very thin streaks of black carbonaceous shales and gray brown, microcrystalline dolomite. Interbedded in the basal 30' of the Lower Ismay were light to medium gray to gray brown dolomites, which were cryptocrystalline to microcrystalline, with some microsucrosic streaks, very cherty, and clean to argillaceous. The dolomite increased with depth and graded into the Gothic Shale. These very thin dolomites had a trace of intercrystalline vuggular porosity with scattered dull yellow fluorescence, none to rare light brown staining, and only very poor slow diffuse to residual ring cut.

The top of the Gothic Shale is at 5327' measured depth, 5315' true vertical depth. The Gothic Shale was predominantly dark gray to black, silty, carbonaceous, brittle to firm, subblocky to blocky to platy, calcareous to slightly dolomitic and slightly micaceous. The top of the Gothic was gradational from the very thin interbedding of very argillaceous, carbonaceous limestone and very argillaceous, limy dolomite, with the dolomite grading into very dolomitic, carbonaceous shale. The top of the Gothic was picked predominantly by the decrease in penetration rate and the increased percentage of shale in the samples.

Between the Gothic Shale and Desert Creek Porosity Members is a transitional zone, which appears to be gradational. The top of the Desert Creek is commonly picked at the Gothic Shale to transition zone facies change, which in this well occurred at a measured depth of 5327' and a true vertical depth of 5331'. In this well the zone was predominantly a very limy dolomite; which was gray to white to rare dark brown, cryptocrystalline to microcrystalline, with some granular dolomite and dolomite marlstone, very slightly sandy, with very thinly interbedded limestone which was light gray to occasionally gray brown, cryptocrystalline to rarely microcrystalline, slightly dolomitic and occasionally silty to very silty and sandy in part, and occasionally graded to dolomitic siltstone. The dolomite was predominately tight with very rare intercrystalline porosity that showed some anhydrite fillings. This dolomite graded into and had cyclic deposits consisting of very silty light gray limestone packstones to rare grainstones, with rare intercrystalline porosity and poor fluorescence, stain or cut; and dolomitic to slightly calcareous, black, carbonaceous mudstones. The porosities ranged from none to very poor intergranular, with traces of calcite to anhydrite fillings. The dolomite had no visible staining was noted and had predominately a very rare spotty, very poor, faint dull yellow fluorescence, with no to very rare residue ring cut.

The top of the Desert Creek 1-A zone was picked at 5419' measured depth, 5352' true vertical depth. The pick is base on the increase in rate of penetration and sample interpretation. The top was picked in this lateral mainly based on the first dolomite grainstone porosity below the Desert Creek top and the first occurrence of a light brown to medium brown, microcrystalline to very finely crystalline to microsucrosic, dolomite grainstone, with thinly interbedded dolomitic limestone packstone near the top of the zone. The limestone was predominately tight with very rare streaks of intercrystalline to very rare algal porosity, some chert fragments, and no to very rare visible fluorescence, but no visible stain or cut. The dolomites had fair intercrystalline to very poor algal porosities, very rare dull yellow fluorescence, very poor spotty brown stain and a poor slow diffuse to moderately fast streaming cut.

As the curve was being completed in the 1-A zone the dolomite became cleaner and increasing granular. While drilling curve through the section, it appeared that the 1-A porosity bench was possibly defined by the interval 5419' measured depth, 5352' true vertical depth to a possible 5445' measured depth, 5357' true vertical depth. The top of the porosity Bench was marked by facies change, which was somewhat gradational since the drilling rate increased rather slowly. The base of the porosity zone was not encountered while landing the curve.

At a measured depth of 5425', 5355' true vertical depth, with a horizontal displacement of 221' in the dolomite grainstones of the 1-A porosity horizon, a trip was made to change the bottom hole assemblies and pick up the MWD tool. While drilling the 1-A lateral to a horizontal displacement of approximately 353', as the well bore was turned downwards to try to require the 1-A porosity. At this time it was unclear whether the 1-A porosity zone had either thinned drastically or turned downward at a sharp angle, as the transition zone was encountered immediately upon starting the lateral section. The interval from 221' to 353 was predominately the light gray to gray brown, occasionally brown, silty to very silty, sandy dolomite of the transition zone. The porosity was not required until 5555' measured depth, 5364' true vertical depth, and a horizontal displacement of 353'.

From a measured depth of 5555', to a measured depth of 5840', 5388' measured depth, 669' horizontal displacement, the dolomite of the porosity zone was a light brown to brown, micro to very fine crystalline, microsucrosic to occasionally sucrosic, algal dolomite grainstone. The dolomites were slightly anhydritic with traces of anhydrite crystals to rare inclusions, rare scattered cryptocrystalline limestone fragments to inclusions and occasionally slightly limy cement, scattered chert fragment, rare micro fossils, traces of algal material, traces of scattered dark brown stain and very rare black oil stain residue* in the intercrystalline matrix. The dolomite had predominantly fair to good intercrystalline and traces of pin point vuggular porosity, with rare anhydrite and very rare dolomitic limestone mud filling and cement in the intercrystalline and vuggular porosity. Through this interval the fluorescence was fair to good, the staining was moderate to fair and cuts ranging from moderate slow diffuse to

good moderately fast to slow steady streaming. A slight decrease in porosity was noted at 5840' measured depth, 5388' true vertical depth , with a horizontal displacement of 669'. An increase in dolomite packstone, was noted in the samples. The increase in packstone was due to a vertical facies change as the well bore approached the base of the best porosity zone and neared the lower limit of the zone. The facies change encountered was from the algal dolomite grainstones, to the light brown to brown, dolomite packstones at the lower limit of the best porosity in the zone, just above the 1-C zone. After a series of slides and rotates to turn the bore hole to a slight upward angle, to move away from the lower limit of the best porosity, the lithology again returning to predominately algal dolomite grainstone, to a measured depth of 6000', 5390' true vertical depth, and a horizontal displacement of 795', as the top of the porosity zone with in the zone was approached and an increase in light brown, dolomite packstone was noted.

As the well bore was continued very slowly downward, the dolomites from 6000' measured depth to 6245' measured depth, 5409' true vertical depth, 1035' horizontal displacement, were predominately brown to light brown, occasionally dark brown to mottled, cryptocrystalline to microcrystalline, occasionally microsucrosic to algal, with scattered very thin dolomite packstone, anhydrite inclusions and crystals, with increasing amounts of crinoid fossils. The algal dolomite grainstones had fair to good intercrystalline to pin point vuggular porosity, fair to good dull yellow fluorescence, a fair to good brown stain, scattered black dead oil stain and a good slow diffuse to moderately fast streaming cut.

The well was turned away from the base of the zone and oriented a shallower downward angle. From 6245' to 6320' measured depth, 5412' true vertical depth, with a horizontal displacement of 1114'. Through this interval the lithology remained brown to light brown, occasionally dark brown to mottled, cryptocrystalline to microcrystalline, occasionally microsucrosic to algal, dolomite, with traces of dolomite packstone, anhydrite inclusions and crystals, scattered crinoid fossils, and increasing amounts of limestone rich cement. The dolomites had fair intercrystalline to a trace of algal porosity, fair dull yellow fluorescence, a trace to fair brown stain, scattered black dead oil stain and a fair amount of good slow diffuse to moderately fast streaming cut. A slight decrease in porosity was also noted through this interval.

At a measured depth of 6320' a facies change was noted as the well bore was turned downward to follow the increasingly steeper downward dip the zone. The zone appeared to be dipping downward at approximately 86 to 84 degrees. The change was noted to a measured depth of 6450', 5418' true vertical depth, with a horizontal displacement of 1242', and was a vertical change to increasing amounts of very tight dolomite packstone and having scattered thin, tan to gray brown tight limestone packstone as the zone dipped downward. These tighter dolomites showed poor visible porosity, fluorescence, stain and cut. The limestone packstones showed no visible porosity, stain or cut.

As the well bore was continued at its downward angle, from a measured depth of 6450' to its total measured depth of 6659', 5438' true vertical, and a horizontal displacement of 1450', the lithology was interbedded dolomite packstones and dolomite grainstones. The dolomites were light brown to tan to brown, occasionally cream, cryptocrystalline to microcrystalline, very finely crystalline to granular, anhydritic, some limestone rich cement, and intercrystalline to algal porosity, which increases with depth, trace to fair fluorescence, stains and cuts.

At a total measured depth of 6659', true vertical depth 5438' and a horizontal displacement of 1450', the lateral was terminated. The lateral was terminated in an algal dolomite grainstone with scattered dolomite packstone which become increasingly cherty.

In tracking the well bore through the 1-A/B bench, there were facies changes with in the dolomites and an increase in limestone. The changes noted were vertical, as the well bore approached the top and base of the 1-A/B zone. The 1-A/B zone was projected to thin and dip downward as the lateral continued toward the RU# 11-44 well. In tracking the top and base of the zone, it appears that the dip sharply toward the 1-C zone increased at a horizontal displacement of 800' and the thinning increased from a horizontal displacement of 450' to 1000'.

Predominant facies changes were associated with the rock classification with in the dolomites and occasionally the depositional environment, as the environment of deposition changed when encountering the top or base of the 1-A/B zone. With the classification changes, the porous dolomites encountered were of primary deposition and were continuous through out most of the 1-A/B zone penetrated, with the effective or the better porosity being associated with the granular dolomite facies which had fair to good, intercrystalline to algal porosities, and the absence of any major anhydrite plugging. The dolomite packstone had porosities which were predominately tighter and with very poor permabilities. The limestone packstones noted from a horizontal displacement of 1114' to 1242' had no to very poor porosities.

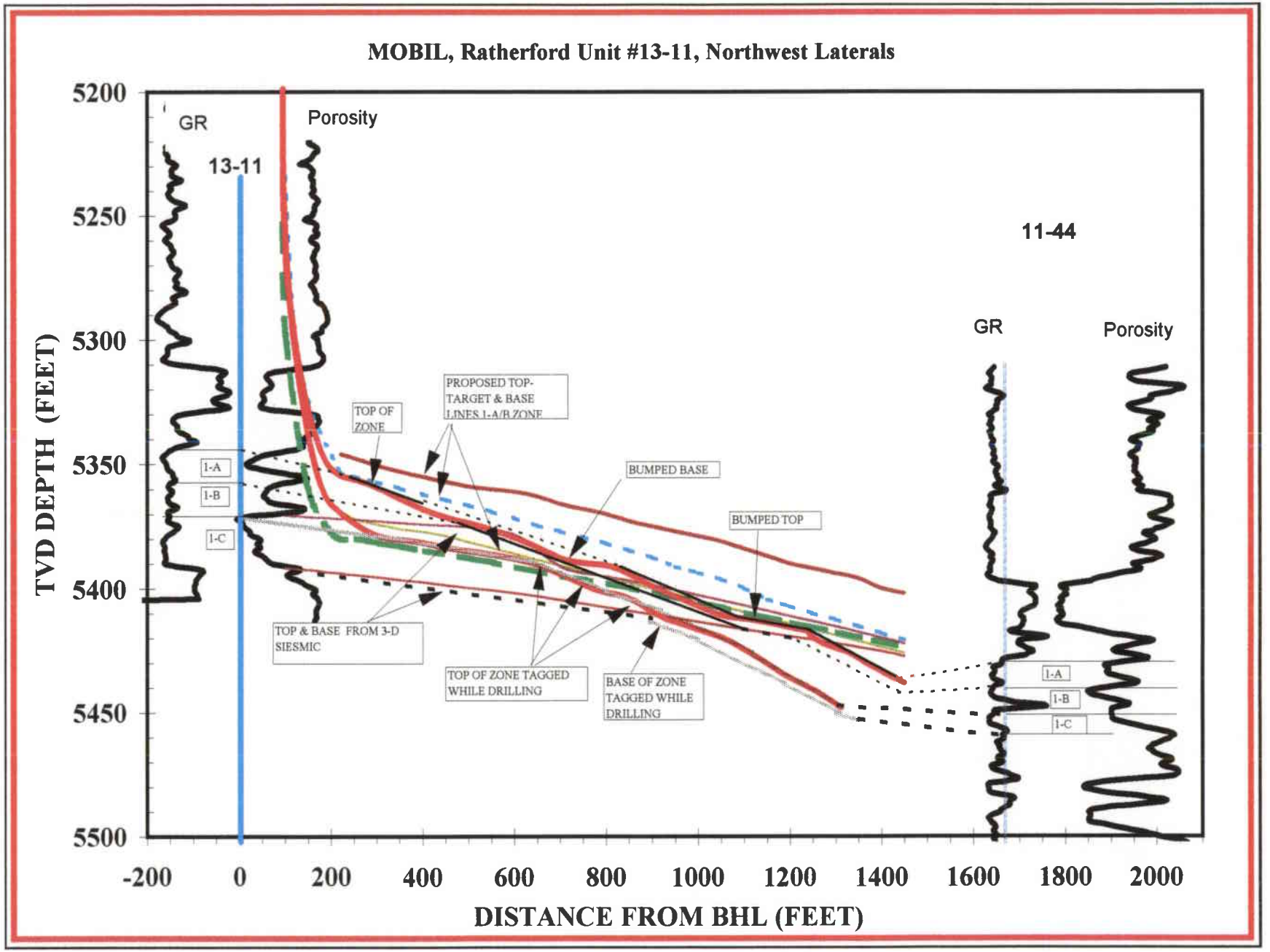
From the top of the 1-A/B porosity bench to a total measured depth of 66659', the dolomite lithology was consistent, ranging from light brown to medium brown, rare dark brown, micro crystalline to very fine crystalline, occasionally microsucrosic to granular, with scattered, tighter dolomite packstone and some anhydrite matrixes. The dolomites had fair to good intercrystalline and algal porosities and a good constant dull to bright yellow fluorescence, with noticeable decreases when noticeable amounts of tight dolomite packstone was present. The staining in the dolomites ranged from trace to good light brown to traces of black dead oil stain and the associated cuts being trace to good slow to fast streaming and occasion slow diffuse cuts. The staining in the dolomite grainstone was fair to good, and remained rather consistent and continuous through out the porosites in the 1-A/B dolomites penetrated. Fluorescence, like the staining was consistent and continuous, and was a dull to bright yellow gold, with cuts ranging from moderate to good ring (diffuse) to moderate to good steady fast streaming cut. The sample shows were affected in part due to the presence of the oil emulsion in the drilling fluid used through out the curve and lateral sections.

The conclusion drawn from the northwesterly 1-A/B porosity bench in Lateral Leg 4, is that in this area the primary dolomitization (due to the lack of limestone cements in the framework), was enhanced by the algal porosity. Also, having and effect on the porosity, were the cryptocrystalline dolomite packstones which were thinly interbedded in the dolomite grainstones, which in turn graded laterally into dolomitic limestone packstone. Staining was fair to moderate and there were significant sections where staining was moderately good, with some black dead oil staining was trapped in the matrix and along the anhydrite to dolomite contact surfaces. The lateral used the a proposed projected target line as a reference point through the bench, drilling how ever was forced to follow the line of best porosity which was well below the target line beginning at a horizontal displacement of 221'.

It appears that the upon completion of the lateral, that the lateral was probably drilled to completion in the 1-B zone. At one point the lateral passed with in approximately 3' of the 1-C zone top and was approaching the projected 1-C top near the termination. The effective porosity was continuous through the lateral, becoming very thin as the probable 1-B zone approached the 1-C zone and was increasing near the termination of the lateral.

While drilling, the lateral the high background gas was predominately due to the oil emulsion used in the drilling fluid, which was indicated by the significant amounts of heavies noted on the chromatograph (C_3 through C_5). This lateral can be interpreted to have good reservoir qualities through most of the lateral. It appears that the porosities are well enough developed to enhance the overall performance of the zone.

*The black residual staining has been called by Dr. Dave Eby & others as "bitchimum" and is also known as "dead oil" ("dd o stn" on mud logs). This staining is associated with the movement of oil over long periods of time and is a good indicator of predicible hydrocarbons when associated with productive porosities, but can also be found in porosities that have been filled by anhydrites and other material at later dates.


MOBIL, Ratherford Unit #13-11, Northwest Laterals
GR
Porosity
13-11
11-44
GR
Porosity
TVD DEPTH (FEET)
5200
5250
5300
5350
5400
5450
5500
1-A
1-B
1-C
TOP OF ZONE
PROPOSED TOP-TARGET & BASE LINES 1-A/B ZONE
BUMPED BASE
BUMPED TOP
TOP & BASE FROM 3-D SIESMIC
TOP OF ZONE TAGGED WHILE DRILLING
BASE OF ZONE TAGGED WHILE DRILLING
-200
0
200
400
600
800
1000
1200
1400
1600
1800
2000
DISTANCE FROM BHL (FEET)

Form 3160-5
(June 1990)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
Budget Bureau No. 1004-0135
Expires: March 31, 1993

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to deepen or reentry to a different reservoir.
Use "APPLICATION FOR PERMIT - " for such proposals

SUBMIT IN TRIPLICATE

5. Lease Designation and Serial No.: 14-20-603-246A
6. If Indian, Allottee or Tribe Name: NAVAJO TRIBAL
7. If Unit or CA, Agreement Designation: RATHERFORD UNIT
8. Well Name and No.: RATHERFORD 13-11
9. API Well No.: 43-037-31152
10. Field and Pool, or exploratory Area: GREATER ANETH
11. County or Parish, State: SAN JUAN UT

1. Type of Well: [X] Oil Well [ ] Gas Well [ ] Other SIDETRACK
2. Name of Operator: Mobil Exploration & Producing U.S. Inc. as Agent for Mobil Producing TX & NM Inc.
3. Address and Telephone No.: P.O. Box 633, Midland, TX 79702 915-688-2585
4. Location of Well (Footage, Sec., T., R., M., or Survey Description): 500' FNL & 660 FWL SEC.13, T41S, R23E

12. CHECK APPROPRIATE BOX(s) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION	
[ ] Notice of Intent	[ ] Abandonment	[ ] Change of Plans
[X] Subsequent Report	[ ] Recompletion	[ ] New Construction
[ ] Final Abandonment Notice	[ ] Plugging Back	[ ] Non-Routine Fracturing
	[ ] Casing Repair	[ ] Water Shut-Off
	[ ] Altering Casing	[ ] Conversion to Injection
	[X] Other SIDETRACK	[ ] Dispose Water

(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

13. Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

LEG #1 BOTTOM HOLE LOCATION:
DISTANCE: 1189' FROM SOUTH AND 1153' FROM THE EAST / SURFACE LOCATION.
LEG #2 BOTTOM HOLE LOCATION:
DISTANCE: 1031' FROM SOUTH AND 1363' FROM THE EAST / SURFACE LOCATION.
LEG #3 BOTTOM HOLE LOCATION:
DISTANCE: 955' FROM NORTH AND 899' FROM THE WEST / SURFACE LOCATION.
LEG #4 BOTTOM HOLE LOCATION:
DISTANCE: 858' FROM NORTH AND 1170' FROM THE WEST / SURFACE LOCATION.

SEE ATTACHMENT.

14. I hereby certify that the foregoing is true and correct
Signed Shirley Houchens Title ENV. & REG. TECHNICIAN Date 05-19-97

(This space for Federal or State office use)
Approved by _____ Title _____ Date _____
Conditions of approval, if any:

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

* See Instruction on Reverse Side

WO tax credit 7/98

7/22/97
JRB

Rutherford Unit # 13-W-11
Drilled Footage Calculations

Surface location: 500' FNL, 660' FWL 13-41S-23E

Lateral #1:
KOP MD = 5265'
TVD = 5263.62'

EOL MD = 7114'
TVD = 5359.65

Footage drilled = 1849'

Lateral #2:
KOP MD = 5245'
TVD = 5243.62'

EOL MD = 7175'
TVD = 5342.01'

Footage drilled = 1930'

Lateral #3:
KOP MD = 5232'
TVD = 5230.62'

EOL MD = 6532'
TVD = 5448.08'

Footage drilled = 1300'

Lateral #4:
KOP MD = 5220'
TVD = 5218.62'

EOL MD = 6659'
TVD = 5438.17'

Footage drilled = 1439'

Total footage drilled = 6518'
Deepest point (TVD) = 5448.08

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

sperry-sun DRILLING SERVICES

Well: 13-11

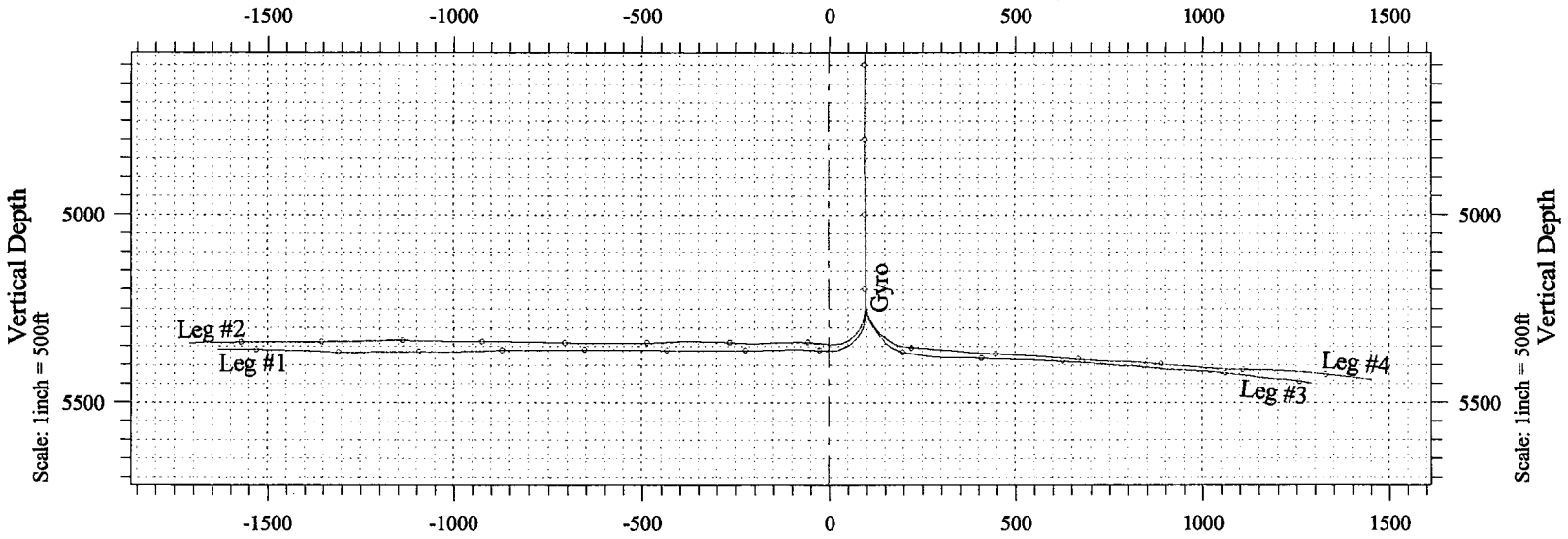
DrillQuest™

Customer: Mobil
Folder: Mobil
Field: San Juan County
Project: Utah
Structure: Sec.13-T41S-R23E
Well: 13-11

Vertical Section

Scale: 1inch = 500ft

Section Azimuth: 306.258 (True North)



Scale: 1inch = 500ft

Section Azimuth: 306.258 (True North)

Vertical Section

Prepared:	Checked:	Approved:

Sperry-Sun DRILLING SERVICES

Well: 13-11

DrillQuest

Customer: Mobil
Folder: Mobil
Field: San Juan County
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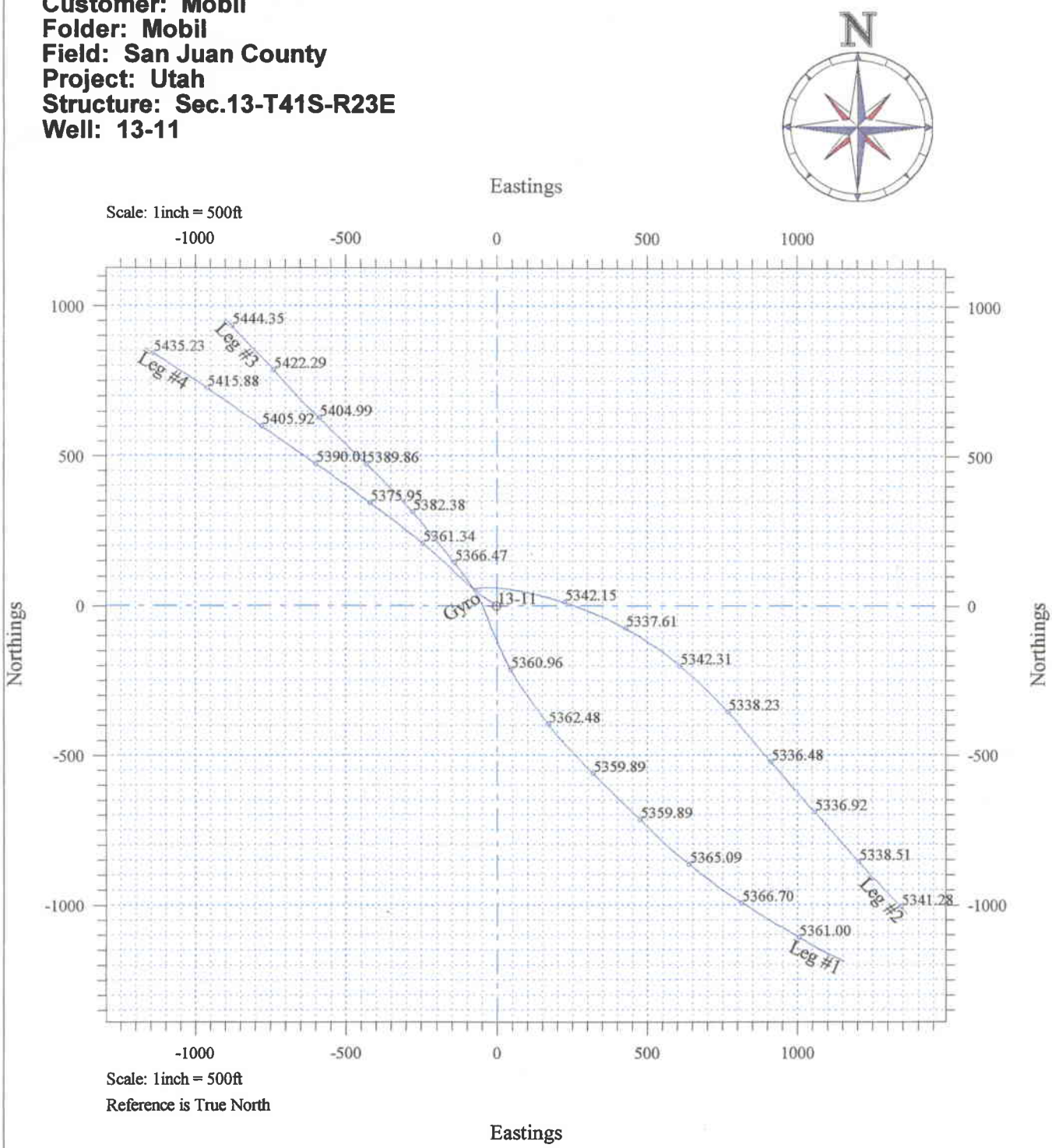
Structure: Sec.13-T41S-R23E
Well: 13-11



Prepared:	Checked:	Approved:

ATTACHMENT - FORM 3160-5
RATHERFORD UNIT #13-W-11
14-20-603-247A
NAVAJO TRIBAL
SAN JUAN, UTAH

02-20-97	MIRU PU, WELL ON VACUUM, CSG DEAD. ND WELLHEAD, NU BOPS, READY TO UNSET PKR. POOH & LD TBG.
02-21-97	UNSET OTIS INTERLOCK PKR. SET 5285'. POOH & LD TBG & PKR. RIH W/BIT & SCRAPER, TAG FILL @ 5330'. RU SWIVEL, CIRC WELL, CLEAN OUT TO 5384'. POOH & STAND BACK WS. SWI, SDFN.
02-22-97	RIH W/7" RBP, SET @ 5300'. TEST CASING TO 1000 PSI FOR 30 MIN. OK. CIRC WELL CLEAN. POOH & LD WS. ND BOPS, NU NEW TBG HD. TEST OK TO 1000 PSI. WELL PREP COMPLETE, READY FOR DRILLING RIG.
02-25-97	RIGGING UP RIG #25.
02-26-97	FINISH RIGGING UP RIG #25. NU BOP STACK & TEST SAME. TIH W/DP AND RETRIEVE RBP. RU WL UT. RAN GR/JB & WL SET TIW PKR @ 5280'. RIH W/LATCH ASSY. STING INTO PKR. RAN GYRO SURVEYS.
02-27-97	LATERAL #1, PU WHIPSTOCK ASSY. LATCH INTO PKR. SHEAR STARTING MILL. MILL WINDOW W/STARTING MILL F/5265-5267, POOH LAY DOWN STARTING MILL. PU & RIH W/CSG WINDOW MILL & WATERMELON MILL TO 5270' RU SWIVEL. BREAK CIRC TOP OF WINDOW @ 5264' MILLING @ 5269'.
02-27-97	RIH W/GYRO, POOH. LAY DOWN TOOLS, PREPARE TO PU WHIPSTOCK. FINAL REPORT FOR RE-ENTRY
02-28-97	LATERAL #1A1** CUT DRILLING LINE, RIH W/CURVE DRILLING ASSEMBLEY, RIH W/GYRO TO 5250'.
02-28-97	CUT WINDOW F/5264-5274 & FORMATION F/5274-5276'@120 DEG. AZ.
03-01-97	TIME DRILL CURVE 1A1 F/5276-5421'.
03-02-97	CONTINUE TO DRILL CURVE FOR LATERAL 1A1 F/5421-5439', PUMP SWEEP & CIRC HOLE CLEAN POH W/CURVE ASSEMBLEY, RIH W/LATERAL ASSEMBLY, SLIDE DRILL LATERAL 1A1 F/5439-5565'.
03-03-97	CONTINUE SLIDE & ROTATE LATERAL 1A1 F/5565-5918'.
03-04-97	CONTINUE SLIDE & ROTATE LATERAL 1A1 F/5918-6188'.
03-05-97	CONTINUE SLIDE & ROTATE LATERAL 1A1 F/6188-6682'.
03-06-97	CONTINUE SLIDE & ROTATE DRILL LATERAL 1A1 F/6682-6726'. PUMPED SWEEP & CIRC HOLE CLEAN. ORIENT TOOL FACE & SLIDE & ROTATE DRILL LATERAL 1A1 IN DESERT CREEK 1B ZONE F/6726-6900'.
03-07-97	CONTINUE SLIDE & ROTATE LATERAL 1A1 F/6900-7114'.
03-08-97	RIH W/WHIPSTOCK HOOK, LATCHED IN WHIPSTOCK @ 5266', POH W/WHIPSTOCK HOOK, CUT DRILLING LINE. RIH W/6" BOXTAP, TAP & JAR, LATCH ON TO WHIPSTOCK.

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03-09-97 POH W/2.875" AOHDP, D'S, LD 59 JTS. 2 7/8" PHT TBG, MWD & MM FINAL REPORT LATERAL 1A1**.

03-09-97 WAITING ON WL TRUCK & TIW PKR.

03-10-97 WAIT ON TIW WHIPSTOCK PKR & BASIN WL CO. TO RUN GYRO.

03-11-97 RAN GYRO ORIENT PKR KEYWAY @ 90 DEG. AZ, POH W/STINGER, RIH W/WHIPSTOCK & SET @ 317 DEG. AZ. RU SWIVEL & MILL WINDOW F/5246-5248', POH W/STARTING MILL, RIH W/ WINDOW & WATERMELLON MILLS ON SAME BHA, MILL WINDOW F/5245-5253', CUT FORMATION TO 5255'. PUMP SWEEP & CIRC HOLE CLEAN**LATERAL #2**.

03-12-97 RIH W/CURVE DRILLING ASSY. DRILL CURVE LATERAL 1A1 F/5255-5280'.

03-13-97 FINISH DRILLING CURVE F/5280-5417'. PUMP SWEEP & CIRC CLEAN.POH W/BIT TO 5392' & HANG UP. SPOT 250 GALS 15% NEFE HCL ACID TO 5382'. WORK PIPE & PUMP EVERY 10 MIN.

03-14-97 WORKED DRILL PIPE FREE, POH W/CURVE ASSY. RIG UP POWER SEIVEL & WORK THRU CURVE F/5253-5417'. SLIDE DLRG. LATERAL **2A1** F/5417-5444'. ORIENTATE & TROUGH HOLE F/5417-5444' TO DROP ANGLE. SLIDE DRLG. LATERAL 2A1 F/5444-5449' SERVICE RIG.

03-15-97 SLIDE & ROTATE DRILL LATERAL 2A1 F/5449-5785'.

03-16-97 SLIDE & ROTATE DRILL LATERAL 2A1 F/5785-6170'.

03-17-97 SLIDE & ROTATE DRILL LATERAL 2A1 F/6170-6526'. PUMP & ROTATE OUT THE HOLE TO 5370'. TIGHT 5400-5370', SURVEY @ 5340': ANGLE = 52 DEG AZ = 84.50. PREP TO CONTINUE DRLG.

03-18-97 SLIDE & ROTATE DRILL LATERAL #2A1 F/6526-6974'.

03-19-97 SLIDE & ROTATE DRILL LATERAL #2A1 F/6974-7175' TD. POOH W/DIRECTIONAL TOOLS, LD BHA NAD MOTOR, PU HOOK FOR RETRIEVE WHIPSTOCK TOOLS.

03-20-97 FINISH TIH W/HOOK & CATCH WHIPSTOCK, CONTINUE TO JAR ON WHIPSTOCK.

03-21-97 FINISHED FISHING OUT WHIPSTOCK TOOLS, POOH & LD SAME.

03-21-97 PICK UP 7" RET. WHIPSTOCK, ORIENT KEY WAY FOR PKR. TIH W/SAME.

03-22-97 LATERAL #3 MADE STARTER MILL CUT F/5232-5234', SWEEP HOLE. POOH W/STARTER MILL ASSM. TIH W/ MILL AND WATERMELON MILL ASSY. BREAK CIRC. CUT WINDOW FOR LATERAL #3 F/5234-5241.

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03-23-97 FINISH CUTTING WINDOW FOR LATERAL #3 TO 5240' & FORMATION TO 5242'. PUMP & SWEEP, POOH W/MILLS, RIG REPAIR.

03-23-97 TIH W/CURVE DRILLING ASSY., RU GYRO DATA & BASIN WIRELINE, TIME DRILL LATERAL #3 CURVE F/5242-5267'.

03-24-97 DRILL LATERAL #3 CURVE F/5267-5436', TAKE SURVEYS W/STEERING TOOL.

03-25-97 FINISH DRILLING CURVE FOR LATERAL #3 @ 5445'. SURVEY. RD GYRO DATA, POOH & LD MOTOR ASSY. TIH W/LATERAL DRILLING ASSEMBLY.

03-26-97 FINISH TIH W/LATERAL DRILLING ASSEMBLY. CUT DRILLING LINE, DRILLING LATERAL #3A1, SLIDE & ROTATE F/5445-5635'.

03-27-97 DRILLING LATERAL #3A1, SLIDE & ROTATE F/5635'-6014'.

03-28-97 DRILLING LATERAL #3A1, SLIDE & ROTATE F/6014-6455'.

03-29-97 DRILLING LATERAL #3A1, TD @ 6532'. POOH & LAY DOWN DIRECTIONAL TOOLS, PU HOOK FOR WHIPSTOCK, TIH W/HOOK FOR WHIPSTOCK, CATCH WHIPSTOCK FOR LATERAL #3, POOH LD WHIPSTOCK & LOAD OUT SAME.

03-30-97 TIH W/WINDOW MILL ASSM. CUT WINDOW F/5222-5228' & FORMATION TO 5230'. PUMP SWEEP & CIRC OUT. POOH W/MILL ASSM & LD SAME.

03-31-97 LATERAL #4--RIH W/CURVE ASSM. RU GYRO DATA, TIME DRILL TO 5235' PULL GYRO RIH W/STEERING TOOL/TIME DRILL CURVE F/5230-5253'. DRILL LATERAL F/5253-5302' W/CURVE DRILL ASSM.

04-01-97 DRILL CURVE LATERAL #4A1 W/STEERING TOOL F/5302-5370'.

04-02-97 DRILL CURVE LATERAL #4A1 F/5370-5425. POOH LD CURVE DRILL ASSM, RIH & DRILL LATERAL 4A1 F/5425-5526'.

04-03-97 LATERAL #4A1, ROTATE & SLIDE DRILL F/5526-6360'.

04-04-97 LATERAL #4A1, ROTATE & SLIDE DRILL F/6360-6659' TD.

COMPLETION

04-07-97 MIRU MONTEZUMA WELL SERVICE RIG #36. NIPPLE DOWN WELL HEAD. NIPPLE UP BOPE. PICK-UP & RIH W/11 JOINTS OF PH6 TAIL PIPE, X/O SUB, & PKR RUN ON 2.875" TBG TO 5052'. SWIFN.

04-10-97 SHUT IN CSG. PRESSURE @ 7:30 WAS 0 PSI. FIH W/2.875" TBG TO 5089.34, PKR DEPTH. END OF PH6 TAIL PIPE @ 5432.09. SET PACKER. TEST TO 750 PSI. OK RIG UP COILED TBG. UT. SWIFN.

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04-11-97 SHUT IN TBG. PRESS. @ 7:30 WAS @ 0 PSI. SHUT IN CSG. PRESS. @ 7:30 WAS @ 0 PSI. RIH W/1.5" COILED TBG. TO 6659'. DOWELL ACIDIZED LATERAL 4A1 W/24000 GALS 15% HCL ACID. POH W/COILED TBG. RIG DOWN RIG UP FLOW TEE. OPEN TO TEST TANK WITH 75 PSI ON TBG.

04-12-97 FLOWING TBG. PRESS. F/75 PSI TO 0 RECV. DRY GAS. RU & PUMP 10 BBLS OF 10# BRINE DOWN TBG. WELL DEAD. RELEASE PKR. POH STAND BACK PH6 TAIL PIPE. PU RETV. TOOLS F/WHIPSTOCK. RIH TO 5220'. LATCH INTO WHIPSTOCK. COULD NOT FREE WHIPSTOCK. SIFN.

04-13-97 SIP @ 7:30 WAS 25 PSI. BLEED WELL DOWN TO 0 PSI. JAR ON WHIPSTOCK, WHIPSTOCK FREE. POH W/2.875" TBG. & WHIPSTOCK. LAY DOWN WHIPSTOCK. RIH TO 5260' (TOP OF PACKER) WHIPSTOCK @ 5235' SET WHIPSTOCK. RIH W/PH6 TAIL PIPE TO 5432.09' END OF TAIL PIPE. SET PKR. & TEST TO 500 PSI OK. MIRU COILED TBG. UT. PUMP TRUCKS & FLOW LINE. SIFN.

04-14-97 05:30 AM SITP 0#, CP 0#, RIH W/CT TO 6532'. DOWELL ACIDIZE LATERAL #3A1 W/22000 GALS 15% HCL.

04-15-97 10 1/2HRS SITP 100# CP 0#. BLOW DOWN DRY ACID GAS - REL. & POH W/PKR. RIH W/SHIPSTOCK RET. TOOL - ENGAGE, RELEASE & POH W/SAME - ORIENT WHIPSTOCK - TIH & SET SAME @ 5246' - POH W/SETTING TOOL - RIH W/PH6 TAILPIPE & PKR ON WORK STRING TBG TO 5276'. TBG SET DOWN. WORK EOT DOWN TO 5375'. SET PKR @ 5043'. PLACING EOT @ 5369'. LOAN ANNULUS & TEST SAME TO 500# - OK. RU 1.5" CTU - SHUT IN, SDFN.

04-16-97 RIH W/CT TO 7175'. DOWELL ACIDIZE LATERAL #2A1 W/34000 GAL HCL - POH W/CT TO 3000'. RU N2.

04-17-97 JET WELL W/N2 WHILE RIH W/CT TO 5350' W/O MORE N2, CONT. JETTING WELL W/N2 UNTIL RETURNS HAD PH6, POH W/CT - RD SAME. REL. & POH W/PKR LD W/2 7/8" TAILPIPE SDFN.\

04-18-97 SICP 70#, RIHW/DEFLECTION FISHING TOOL - UNABLE TO CATCH SAME - POH, WP WASH SHOE, RIH W/SAME - WORK SHOE OVER TOP OF DEFLECTION TOOL - POH ABOVE PERFS - SDFN.

04-19-97 SICP 50#, TP 50#, BLED DOWN, ASSURE WASH SHOE PASSES OVER TOP FO DEFLECTION TOOL - POH W/SHOE RIH W/5 3/4" GRAPPLE ON WORKSTRING TUBING, SHEAR TOOL FREE & POH LD SAME, PU STAND IN DERRICK 2 3/8" PH6 TAILPIPE, SDFN.

04-20-97 SICP 50# - RIH W/ 2 3/8" PH6 TAILPIPE & PKR, SET PKR @ 5111', EOT @ 5465'. PREP TO RIG UP COILED TUBING.

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04-21-97 SITP 50#, RU 1.5" CTU, RIH TO 7114', ACIDIZE LATERAL #1 W/16,000 GALS 15% HCL. W/O N2 TRUCK, BLOW WELL W/N2.

04-22-97 CONTINUE TO BLOW WELL DOWN W/N2 F/3000' TO 5100' UNTIL PH=7. POH W/CT. RDMO DOWELL. OPEN WELL TO TANK @ 50# PSI. TOTAL LOAD RECOVERD 80 BBLS. POOH & LD 2 7/8" WS & 2 3/8" PH6. SWIFN.

04-23-97 WO/FLOAT W/WS. RIH W/2 3/8" PH6, TREATING PKR. 2 7/8" TBG THRU CURVE. SET PKR @ 5100'. (LATERAL #1). SWIFN. READY TO RUN INJ. TBG.

04-24-97 RIH W/INJ PKR ASSY & 162 JTS CMT LINED TBG SET @ 5117'. ND BOBS, RU TREE, SET PKR W/16,000 COMP. CIRC PKR FLUID, NU TREE, TEST TO 1050 PSI, OK FOR 30 MIN. SDFN

04-25-97 RDMO BIG A RIG #36. CLEAN OUT DIRT PITS. TOTP. NOTIFIED ARLENE LEE IN PRODUCTION ON FRI 4/25/97 @ 1:30 PM THAT WELL WAS COMPLETE & READY FOR MIT TEST. LAST REPORT THIS JOB.

sperry-sun
DRILLING SERVICES
A DRESSER INDUSTRIES, INC. COMPANY

Mobil
San Juan County
Utah
Sec.13-T41S-R23E
13-11 - Leg #1

SURVEY REPORT

1 May, 1997

Survey Ref: svy1639

Sperry-Sun Drilling Services

Survey Report for 13-11 - Leg #1

Mobil **Utah**
San Juan County **Sec.13-T41S-R23E**

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
0.00	0.000	0.000	0.00	0.00 N	0.00 E	0.00	
200.00	1.140	313.140	199.99	1.36 N	1.45 W	-1.99	0.570
400.00	0.960	308.210	399.95	3.76 N	4.22 W	-5.64	0.101
600.00	1.260	311.290	599.92	6.24 N	7.19 W	-9.49	0.153
800.00	1.910	301.120	799.84	9.42 N	11.69 W	-14.90	0.353
1000.00	2.350	305.070	999.70	13.50 N	17.90 W	-22.15	0.232
1200.00	2.460	300.730	1199.52	18.05 N	24.95 W	-30.32	0.106
1400.00	2.310	303.680	1399.35	22.47 N	31.99 W	-38.41	0.097
1600.00	1.840	311.830	1599.22	26.85 N	37.74 W	-45.55	0.277
1800.00	1.280	303.390	1799.14	30.22 N	42.00 W	-50.93	0.302
2000.00	1.310	300.510	1999.09	32.61 N	45.83 W	-55.32	0.036
2200.00	1.370	301.130	2199.04	35.01 N	49.85 W	-59.84	0.031
2400.00	1.850	315.660	2398.96	38.55 N	54.15 W	-65.38	0.313
2600.00	2.100	310.620	2598.84	43.25 N	59.19 W	-72.25	0.152
2800.00	1.500	311.150	2798.74	47.36 N	63.94 W	-78.51	0.300
3000.00	1.100	333.890	2998.69	50.80 N	66.76 W	-82.95	0.323
3200.00	0.510	311.400	3198.67	53.12 N	68.27 W	-85.66	0.329
3400.00	0.640	304.490	3398.66	54.34 N	69.86 W	-87.64	0.074
3600.00	0.430	335.990	3598.65	55.65 N	71.08 W	-89.44	0.177
3800.00	0.210	25.430	3798.65	56.67 N	71.23 W	-90.27	0.167
4000.00	0.380	235.620	3998.65	56.63 N	71.62 W	-90.51	0.286
4200.00	0.460	268.180	4198.64	56.23 N	72.97 W	-91.17	0.124
4400.00	0.320	281.240	4398.64	56.31 N	74.32 W	-92.17	0.082
4600.00	0.400	235.780	4598.63	56.03 N	75.45 W	-92.75	0.144
4800.00	0.610	259.540	4798.63	55.44 N	77.07 W	-93.46	0.146
5000.00	0.220	345.220	4998.62	55.62 N	78.22 W	-94.38	0.316
5200.00	0.420	58.750	5198.62	56.37 N	77.69 W	-94.55	0.208
KOP 5265.00	0.420	58.750	5263.62	56.62 N	77.28 W	-94.45	0.000
5274.00	4.600	144.380	5272.61	56.34 N	77.04 W	-94.08	50.968
5282.00	8.300	146.300	5280.56	55.60 N	76.53 W	-93.20	46.322
5292.00	13.700	147.260	5290.37	54.00 N	75.49 W	-91.32	54.029
5302.00	19.500	148.220	5299.95	51.59 N	73.97 W	-88.53	58.063
5312.00	26.800	149.180	5309.14	48.23 N	71.94 W	-84.70	73.095
5322.00	33.300	150.140	5317.79	43.90 N	69.41 W	-79.84	65.176
5332.00	39.600	151.100	5325.83	38.73 N	66.50 W	-74.10	63.256
5342.00	45.900	152.060	5333.17	32.76 N	63.27 W	-67.57	63.335
5352.00	52.300	153.020	5339.71	26.06 N	59.79 W	-60.33	64.409
5362.00	59.100	153.980	5345.34	18.67 N	56.11 W	-52.47	68.460
5372.00	66.000	154.940	5349.95	10.66 N	52.29 W	-44.06	69.523
5382.00	70.300	155.900	5353.67	2.22 N	48.43 W	-35.32	43.913
5392.00	70.600	156.860	5357.02	6.41 S	44.66 W	-26.49	9.531
5402.00	76.400	157.820	5359.86	15.25 S	40.97 W	-17.57	58.725
5411.00	81.400	158.780	5361.59	23.46 S	37.70 W	-9.41	56.532
5429.00	88.900	159.800	5363.11	40.22 S	31.36 W	7.04	42.047
5439.00	93.300	159.600	5362.92	49.60 S	27.90 W	16.18	44.045

Continued...

Sperry-Sun Drilling Services

Survey Report for 13-11 - Leg #1

Mobil **Utah**
San Juan County **Sec.13-T41S-R23E**

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5460.74	93.500	158.900	5361.63	69.89 S	20.21 W	36.10	3.343
5492.56	91.900	157.400	5360.13	99.39 S	8.38 W	65.51	6.889
5524.35	90.500	156.400	5359.46	128.62 S	4.09 E	95.18	5.412
5556.20	89.200	155.500	5359.55	157.71 S	17.07 E	125.09	4.964
5587.96	88.700	153.600	5360.13	186.38 S	30.72 E	155.17	6.185
5619.82	88.300	151.100	5360.96	214.59 S	45.49 E	185.71	7.944
5651.49	88.600	148.700	5361.82	241.98 S	61.37 E	216.42	7.634
5683.29	90.800	147.300	5361.99	268.94 S	78.22 E	247.51	8.200
5715.13	89.600	145.200	5361.88	295.41 S	95.91 E	278.83	7.596
5746.89	89.000	144.600	5362.26	321.40 S	114.17 E	310.19	2.672
5777.87	89.800	143.900	5362.59	346.54 S	132.27 E	340.84	3.431
5809.62	90.100	143.200	5362.62	372.08 S	151.13 E	372.31	2.399
5841.37	90.400	143.200	5362.48	397.50 S	170.15 E	403.80	0.945
5873.20	90.400	142.200	5362.26	422.82 S	189.44 E	435.40	3.142
5906.28	91.800	138.300	5361.62	448.24 S	210.58 E	468.37	12.524
5937.97	91.000	137.100	5360.85	471.67 S	231.90 E	500.03	4.550
5969.67	90.000	136.600	5360.57	494.80 S	253.58 E	531.73	3.527
6001.48	90.000	136.200	5360.57	517.83 S	275.52 E	563.54	1.257
6032.44	91.300	135.700	5360.22	540.08 S	297.04 E	594.49	4.499
6064.05	89.900	135.300	5359.89	562.63 S	319.20 E	626.10	4.606
6095.22	88.900	134.400	5360.21	584.61 S	341.29 E	657.26	4.316
6127.00	90.400	135.000	5360.41	606.96 S	363.88 E	689.03	5.084
6158.05	88.700	134.100	5360.65	628.74 S	386.01 E	720.07	6.195
6189.86	88.900	135.000	5361.32	651.05 S	408.67 E	751.87	2.898
6221.67	90.900	134.400	5361.37	673.43 S	431.28 E	783.67	6.564
6252.75	92.300	134.300	5360.51	695.14 S	453.49 E	814.72	4.516
6284.58	89.900	134.800	5359.89	717.47 S	476.17 E	846.54	7.702
6315.56	88.300	135.300	5360.38	739.39 S	498.06 E	877.51	5.411
6347.40	88.200	134.600	5361.35	761.87 S	520.58 E	909.33	2.220
6379.05	88.200	133.900	5362.35	783.95 S	543.24 E	940.95	2.211
6410.78	88.200	132.300	5363.34	805.62 S	566.39 E	972.63	5.040
6442.50	88.200	130.000	5364.34	826.48 S	590.27 E	1004.22	7.247
6474.27	89.700	129.300	5364.92	846.75 S	614.72 E	1035.80	5.210
6506.01	89.700	128.800	5365.09	866.74 S	639.37 E	1067.31	1.575
6537.79	90.100	127.800	5365.14	886.44 S	664.31 E	1098.82	3.389
6569.54	90.500	127.600	5364.98	905.85 S	689.43 E	1130.24	1.409
6601.27	89.200	127.100	5365.06	925.10 S	714.65 E	1161.62	4.390
6633.05	88.600	126.000	5365.67	944.03 S	740.18 E	1192.97	3.942
6664.77	89.900	124.800	5366.09	962.40 S	766.03 E	1224.17	5.577
6696.56	89.500	123.000	5366.25	980.13 S	792.42 E	1255.26	5.801
6722.40	88.500	123.400	5366.70	994.27 S	814.03 E	1280.46	4.168
6754.12	89.900	122.800	5367.15	1011.59 S	840.60 E	1311.40	4.802
6785.88	90.800	121.800	5366.95	1028.56 S	867.45 E	1342.27	4.236
6817.61	91.900	121.100	5366.21	1045.12 S	894.51 E	1372.99	4.109
6849.39	93.300	121.300	5364.76	1061.56 S	921.66 E	1403.70	4.450

Continued...

Sperry-Sun Drilling Services

Survey Report for 13-11 - Leg #1

Mobil **Utah**
San Juan County **Sec.13-T41S-R23E**

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
6881.15	93.300	121.300	5362.94	1078.03 S	948.76 E	1434.39	0.000
6912.88	91.300	120.900	5361.66	1094.41 S	975.90 E	1465.04	6.428
6944.67	91.100	120.600	5361.00	1110.66 S	1003.22 E	1495.72	1.134
6976.42	91.800	120.000	5360.19	1126.67 S	1030.62 E	1526.30	2.903
7008.21	90.300	118.100	5359.61	1142.11 S	1058.40 E	1556.72	7.614
7039.96	89.600	116.900	5359.64	1156.77 S	1086.57 E	1586.85	4.376
7071.61	90.100	115.500	5359.72	1170.74 S	1114.96 E	1616.65	4.697
7114.00	90.100	115.500	5359.65	1188.99 S	1153.22 E	1656.39	0.000

All data is in feet unless otherwise stated. Directions and coordinates are relative to True North.
Vertical depths are relative to Structure. Northings and Eastings are relative to Structure.

The Dogleg Severity is in Degrees per 100ft.
Vertical Section is from Well and calculated along an Azimuth of 135.875° (True).
Coordinate System is UT-S. Grid Convergence at Surface is -4.170°.

Based Upon Minimum Curvature type calculations, at a Measured Depth of 7114.00ft.,
The Bottom Hole Displacement is 1656.39ft., in the Direction of 135.875° (True).

sperry-sun
DRILLING SERVICES
A DRESSER INDUSTRIES, INC. COMPANY

Mobil
San Juan County
Utah
Sec.13-T41S-R23E
13-11 - Leg #2

SURVEY REPORT

1 May, 1997

Survey Ref: svy1641

Sperry-Sun Drilling Services

Survey Report for 13-11 - Leg #2

Mobil **Utah**
San Juan County **Sec.13-T41S-R23E**

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
0.00	0.000	0.000	0.00	0.00 N	0.00 E	0.00	
200.00	1.140	313.140	199.99	1.36 N	1.45 W	-1.98	0.570
400.00	0.960	308.100	399.95	3.75 N	4.22 W	-5.63	0.101
600.00	1.260	311.290	599.92	6.24 N	7.19 W	-9.50	0.153
800.00	1.910	301.120	799.84	9.41 N	11.70 W	-15.01	0.353
1000.00	2.350	305.070	999.70	13.49 N	17.91 W	-22.42	0.232
1200.00	2.460	300.730	1199.52	18.04 N	24.95 W	-30.78	0.106
1400.00	2.310	303.680	1399.35	22.47 N	32.00 W	-39.07	0.097
1600.00	1.840	311.830	1599.22	26.85 N	37.74 W	-46.30	0.277
1800.00	1.280	303.390	1799.14	30.22 N	42.00 W	-51.73	0.302
2000.00	1.310	300.510	1999.09	32.61 N	45.84 W	-56.23	0.036
2200.00	1.370	301.130	2199.04	35.00 N	49.85 W	-60.88	0.031
2400.00	1.850	315.660	2398.96	38.55 N	54.15 W	-66.45	0.313
2600.00	2.100	310.620	2598.84	43.24 N	59.19 W	-73.30	0.152
2800.00	1.500	311.150	2798.74	47.35 N	63.95 W	-79.56	0.300
3000.00	1.100	333.890	2998.69	50.80 N	66.76 W	-83.89	0.323
3200.00	0.510	311.400	3198.67	53.11 N	68.27 W	-86.49	0.329
3400.00	0.640	304.490	3398.66	54.33 N	69.86 W	-88.49	0.074
3600.00	0.430	335.990	3598.65	55.65 N	71.09 W	-90.27	0.177
3800.00	0.210	25.430	3798.65	56.67 N	71.24 W	-91.00	0.167
4000.00	0.380	235.620	3998.65	56.62 N	71.63 W	-91.28	0.286
4200.00	0.460	268.180	4198.64	56.22 N	72.98 W	-92.12	0.124
4400.00	0.320	281.240	4398.64	56.31 N	74.33 W	-93.25	0.082
4600.00	0.400	235.780	4598.63	56.02 N	75.45 W	-93.97	0.144
4800.00	0.610	259.540	4798.63	55.44 N	77.08 W	-94.91	0.146
5000.00	0.220	345.220	4998.62	55.61 N	78.22 W	-95.93	0.316
5200.00	0.420	58.750	5198.62	56.37 N	77.69 W	-95.97	0.208
KOP 5245.00	0.420	58.750	5243.62	56.54 N	77.41 W	-95.84	0.000
5253.00	4.200	74.400	5251.61	56.63 N	77.10 W	-95.66	47.466
5262.00	9.100	77.280	5260.55	56.88 N	76.09 W	-95.00	54.553
5272.00	15.100	78.720	5270.32	57.31 N	74.04 W	-93.62	60.071
5282.00	21.800	80.160	5279.80	57.88 N	70.93 W	-91.48	67.150
5292.00	28.200	81.600	5288.86	58.54 N	66.76 W	-88.56	64.284
5302.00	34.400	83.040	5297.40	59.23 N	61.61 W	-84.87	62.446
5312.00	40.800	84.480	5305.32	59.89 N	55.55 W	-80.43	64.596
5322.00	46.200	85.920	5312.57	60.46 N	48.69 W	-75.30	54.899
5332.00	50.200	87.360	5319.24	60.89 N	41.25 W	-69.63	41.413
5342.00	53.500	88.800	5325.41	61.15 N	33.39 W	-63.52	34.887
5352.00	58.100	90.240	5331.03	61.22 N	25.13 W	-56.96	47.515
5362.00	64.000	91.680	5335.87	61.07 N	16.38 W	-49.89	60.328
5372.00	70.000	93.120	5339.78	60.68 N	7.19 W	-42.33	61.445
5382.00	75.900	94.560	5342.71	60.04 N	2.35 E	-34.33	60.583
5389.00	80.500	96.000	5344.14	59.41 N	9.17 E	-28.51	68.729
5407.00	90.900	96.700	5345.49	57.43 N	26.98 E	-13.11	57.907
5417.00	95.900	97.700	5344.89	56.18 N	36.88 E	-4.45	50.986

Continued...

Sperry-Sun Drilling Services

Survey Report for 13-11 - Leg #2

Mobil **Utah**
San Juan County **Sec.13-T41S-R23E**

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5450.81	93.700	99.800	5342.06	51.05 N	70.18 E	25.20	8.980
5482.53	92.500	102.100	5340.35	45.03 N	101.27 E	53.63	8.169
5514.40	89.700	103.300	5339.74	38.03 N	132.35 E	82.65	9.558
5546.17	89.100	105.100	5340.07	30.24 N	163.15 E	111.91	5.972
5577.93	88.200	107.000	5340.82	21.46 N	193.66 E	141.55	6.618
5609.77	87.000	108.300	5342.15	11.81 N	223.97 E	171.54	5.554
5641.67	88.900	110.000	5343.29	1.36 N	254.09 E	201.87	7.990
5673.50	94.200	110.700	5342.43	9.70 S	283.91 E	232.33	16.795
5705.30	92.300	112.300	5340.63	21.34 S	313.45 E	262.91	7.806
5737.07	91.800	114.600	5339.49	33.97 S	342.57 E	293.76	7.404
5768.79	91.900	115.500	5338.47	47.40 S	371.29 E	324.77	2.853
5800.66	90.800	117.600	5337.72	61.64 S	399.79 E	356.09	7.437
5832.38	89.600	118.800	5337.61	76.63 S	427.74 E	387.43	5.350
5864.13	86.600	120.700	5338.66	92.37 S	455.29 E	418.89	11.182
5895.90	87.400	122.100	5340.32	108.90 S	482.37 E	450.46	5.070
5927.66	88.200	123.900	5341.54	126.18 S	508.99 E	482.12	6.198
5959.28	88.900	125.300	5342.34	144.13 S	535.00 E	513.70	4.949
5990.46	89.500	126.400	5342.78	162.39 S	560.27 E	544.87	4.018
6021.44	90.900	128.800	5342.67	181.29 S	584.82 E	575.84	8.968
6053.23	90.400	130.800	5342.31	201.64 S	609.24 E	607.59	6.484
6085.03	90.500	130.900	5342.06	222.44 S	633.29 E	639.32	0.445
6116.85	90.800	132.700	5341.70	243.64 S	657.01 E	671.03	5.734
6148.72	91.700	133.400	5341.00	265.39 S	680.29 E	702.72	3.577
6180.47	91.500	134.400	5340.11	287.40 S	703.16 E	734.23	3.211
6212.34	90.800	136.200	5339.47	310.05 S	725.57 E	765.77	6.059
6244.00	91.300	137.100	5338.89	333.07 S	747.30 E	796.98	3.251
6275.76	91.100	138.500	5338.23	356.59 S	768.63 E	828.18	4.452
6306.74	90.400	139.200	5337.82	379.91 S	789.01 E	858.51	3.195
6338.49	89.800	139.400	5337.77	403.98 S	809.72 E	889.54	1.992
6370.18	89.200	139.500	5338.04	428.06 S	830.32 E	920.49	1.919
6401.94	90.400	139.700	5338.16	452.25 S	850.90 E	951.50	3.830
6433.79	91.300	139.900	5337.68	476.57 S	871.46 E	982.56	2.895
6465.55	91.100	139.400	5337.02	500.77 S	892.02 E	1013.56	1.695
6496.52	90.900	139.400	5336.48	524.28 S	912.17 E	1043.81	0.646
6527.62	91.300	139.000	5335.88	547.82 S	932.49 E	1074.21	1.819
6559.44	91.300	140.200	5335.16	572.05 S	953.10 E	1105.27	3.770
6590.49	90.400	139.700	5334.70	595.81 S	973.08 E	1135.54	3.316
6622.30	90.200	139.900	5334.53	620.11 S	993.61 E	1166.57	0.889
6654.03	88.500	139.000	5334.89	644.21 S	1014.24 E	1197.56	6.062
6685.89	87.600	138.300	5335.98	668.12 S	1035.27 E	1228.75	3.578
6717.63	89.000	137.800	5336.92	691.71 S	1056.48 E	1259.90	4.683
6749.49	89.500	138.700	5337.33	715.48 S	1077.69 E	1291.15	3.231
6781.33	89.100	138.700	5337.72	739.40 S	1098.71 E	1322.34	1.256
6812.31	88.500	138.800	5338.37	762.68 S	1119.13 E	1352.67	1.963
6844.01	89.500	138.800	5338.93	786.53 S	1140.01 E	1383.71	3.155

Continued...

Sperry-Sun Drilling Services

Survey Report for 13-11 - Leg #2

Mobil **Utah**
San Juan County **Sec.13-T41S-R23E**

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
6875.86	91.100	139.200	5338.76	810.57 S	1160.90 E	1414.87	5.178
6907.51	89.300	138.300	5338.65	834.36 S	1181.77 E	1445.86	6.358
6939.24	91.200	138.800	5338.51	858.14 S	1202.77 E	1476.96	6.192
6971.03	90.000	138.300	5338.18	881.97 S	1223.81 E	1508.11	4.089
7002.75	88.600	137.300	5338.56	905.47 S	1245.12 E	1539.28	5.424
7034.48	87.300	135.000	5339.70	928.33 S	1267.08 E	1570.59	8.322
7066.26	90.000	136.400	5340.45	951.07 S	1289.27 E	1602.00	9.569
7098.02	90.100	137.400	5340.42	974.26 S	1310.97 E	1633.29	3.164
7129.80	88.300	136.900	5340.86	997.55 S	1332.58 E	1664.58	5.878
7145.00	88.600	137.100	5341.28	1008.66 S	1342.94 E	1679.55	2.372
7175.00	88.600	137.100	5342.01	1030.63 S	1363.36 E	1709.08	0.000

All data is in feet unless otherwise stated. Directions and coordinates are relative to True North.
Vertical depths are relative to Structure. Northings and Eastings are relative to Structure.

The Dogleg Severity is in Degrees per 100ft.
Vertical Section is from Well and calculated along an Azimuth of 127.088° (True).
Coordinate System is UT-S. Grid Convergence at Surface is -4.170°.

Based Upon Minimum Curvature type calculations, at a Measured Depth of 7175.00ft.,
The Bottom Hole Displacement is 1709.08ft., in the Direction of 127.088° (True).

sperry-sun
DRILLING SERVICES
A DRESSER INDUSTRIES, INC. COMPANY

Mobil
San Juan County
Utah
Sec.13-T41S-R23E
13-11 - Leg #3

SURVEY REPORT

1 May, 1997

Survey Ref: svy1643

Sperry-Sun Drilling Services

Survey Report for 13-11 - Leg #3

Mobil **Utah**
San Juan County **Sec.13-T41S-R23E**

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
0.00	0.000	0.000	0.00	0.00 N	0.00 E	0.00	
200.00	1.140	313.140	199.99	1.36 N	1.45 W	1.99	0.570
400.00	0.960	308.100	399.95	3.75 N	4.22 W	5.63	0.101
600.00	1.260	311.290	599.92	6.24 N	7.19 W	9.47	0.153
800.00	1.910	301.120	799.84	9.41 N	11.70 W	14.87	0.353
1000.00	2.350	305.070	999.70	13.49 N	17.91 W	22.10	0.232
1200.00	2.460	300.730	1199.52	18.04 N	24.95 W	30.24	0.106
1400.00	2.310	303.680	1399.35	22.47 N	32.00 W	38.29	0.097
1600.00	1.840	311.830	1599.22	26.85 N	37.74 W	45.42	0.277
1800.00	1.280	303.390	1799.14	30.22 N	42.00 W	50.79	0.302
2000.00	1.310	300.510	1999.09	32.61 N	45.84 W	55.16	0.036
2200.00	1.370	301.130	2199.04	35.00 N	49.85 W	59.66	0.031
2400.00	1.850	315.660	2398.96	38.55 N	54.15 W	65.19	0.313
2600.00	2.100	310.620	2598.84	43.24 N	59.19 W	72.06	0.152
2800.00	1.500	311.150	2798.74	47.35 N	63.95 W	78.31	0.300
3000.00	1.100	333.890	2998.69	50.80 N	66.76 W	82.75	0.323
3200.00	0.510	311.400	3198.67	53.11 N	68.27 W	85.47	0.329
3400.00	0.640	304.490	3398.66	54.33 N	69.86 W	87.45	0.074
3600.00	0.430	335.990	3598.65	55.65 N	71.09 W	89.25	0.177
3800.00	0.210	25.430	3798.65	56.67 N	71.24 W	90.09	0.167
4000.00	0.380	235.620	3998.65	56.62 N	71.63 W	90.33	0.286
4200.00	0.460	268.180	4198.64	56.22 N	72.98 W	90.96	0.124
4400.00	0.320	281.240	4398.64	56.31 N	74.33 W	91.95	0.082
4600.00	0.400	235.780	4598.63	56.02 N	75.45 W	92.51	0.144
4800.00	0.610	259.540	4798.63	55.44 N	77.08 W	93.20	0.146
5000.00	0.220	345.220	4998.62	55.61 N	78.22 W	94.11	0.316
5200.00	0.420	58.750	5198.62	56.37 N	77.69 W	94.30	0.208
KOP 5232.00	0.420	58.750	5230.62	56.49 N	77.49 W	94.25	0.000
5240.00	3.300	329.500	5238.61	56.70 N	77.58 W	94.47	41.514
5247.00	6.900	328.980	5245.59	57.24 N	77.90 W	95.07	51.432
5257.00	11.900	328.520	5255.45	58.63 N	78.75 W	96.67	50.005
5267.00	18.100	328.060	5265.10	60.83 N	80.11 W	99.21	62.011
5277.00	24.400	327.600	5274.42	63.90 N	82.04 W	102.76	63.022
5287.00	30.000	327.140	5283.31	67.74 N	84.51 W	107.25	56.039
5297.00	33.800	326.680	5291.80	72.17 N	87.39 W	112.45	38.077
5307.00	35.800	326.220	5300.01	76.92 N	90.55 W	118.08	20.171
5317.00	36.800	325.760	5308.07	81.83 N	93.86 W	123.92	10.364
5327.00	38.300	325.300	5316.00	86.86 N	97.31 W	129.94	15.260
5337.00	39.400	324.840	5323.78	92.00 N	100.90 W	136.15	11.372
5347.00	43.000	324.380	5331.31	97.37 N	104.72 W	142.67	36.127
5357.00	46.400	323.920	5338.41	103.07 N	108.83 W	149.65	34.153
5367.00	50.500	323.460	5345.04	109.09 N	113.27 W	157.07	41.144
5377.00	55.500	323.000	5351.06	115.49 N	118.05 W	165.01	50.135
5387.00	61.100	322.540	5356.31	122.26 N	123.19 W	173.46	56.136
5397.00	67.700	322.080	5360.63	129.39 N	128.70 W	182.43	66.130

Continued...

Sperry-Sun Drilling Services

Survey Report for 13-11 - Leg #3

Mobil **Utah**
San Juan County **Sec.13-T41S-R23E**

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5407.00	72.700	321.620	5364.02	136.79 N	134.51 W	191.80	50.187
5417.00	78.900	321.160	5366.47	144.36 N	140.56 W	201.46	62.160
5445.00	82.600	320.700	5370.97	165.81 N	157.98 W	229.02	13.313
5476.67	83.100	321.400	5374.91	190.25 N	177.73 W	260.35	2.702
5508.42	85.300	321.300	5378.12	214.92 N	197.46 W	291.83	6.936
5540.18	88.400	320.800	5379.87	239.58 N	217.39 W	323.45	9.886
5571.95	89.400	321.000	5380.48	264.23 N	237.42 W	355.13	3.210
5603.71	88.100	319.000	5381.17	288.55 N	257.83 W	386.83	7.509
5635.34	87.500	318.300	5382.38	312.27 N	278.71 W	418.42	2.914
5666.52	87.600	317.600	5383.72	335.41 N	299.58 W	449.56	2.266
5698.30	88.900	317.100	5384.69	358.77 N	321.10 W	481.32	4.383
5729.25	88.500	316.800	5385.39	381.38 N	342.22 W	512.26	1.615
5760.21	88.200	315.700	5386.28	403.74 N	363.62 W	543.21	3.681
5792.02	88.300	315.700	5387.25	426.49 N	385.83 W	575.00	0.314
5823.82	87.600	314.300	5388.39	448.96 N	408.30 W	606.76	4.920
5855.70	87.100	313.900	5389.86	471.12 N	431.17 W	638.58	2.008
5887.44	85.600	313.800	5391.88	493.07 N	454.01 W	670.21	4.736
5919.29	85.300	314.500	5394.41	515.18 N	476.79 W	701.93	2.385
5951.10	85.100	313.900	5397.07	537.28 N	499.52 W	733.60	1.982
5982.76	85.500	314.500	5399.67	559.28 N	522.14 W	765.12	2.272
6014.54	87.600	316.200	5401.58	581.84 N	544.43 W	796.83	8.495
6045.53	88.200	316.200	5402.71	604.20 N	565.86 W	827.80	1.936
6077.30	83.600	313.800	5404.99	626.60 N	588.26 W	859.46	16.321
6109.00	83.000	312.500	5408.68	648.13 N	611.23 W	890.88	4.491
6140.74	85.800	314.800	5411.78	669.93 N	634.08 W	922.42	11.394
6172.56	86.700	317.800	5413.86	692.88 N	656.01 W	954.17	9.824
6204.21	86.600	317.800	5415.71	716.29 N	677.24 W	985.76	0.316
6235.30	86.700	318.000	5417.53	739.32 N	698.05 W	1016.79	0.718
6265.37	85.800	317.800	5419.50	761.58 N	718.16 W	1046.79	3.066
6297.15	84.100	317.300	5422.29	784.94 N	739.53 W	1078.44	5.574
6328.88	83.400	316.800	5425.75	808.03 N	761.02 W	1109.98	2.706
6360.73	83.800	316.800	5429.30	831.10 N	782.69 W	1141.63	1.256
6392.43	82.500	316.200	5433.08	853.93 N	804.35 W	1173.10	4.511
6424.29	84.800	316.800	5436.60	876.90 N	826.14 W	1204.77	7.458
6456.17	84.900	317.100	5439.46	900.10 N	847.82 W	1236.52	0.988
6488.03	83.100	316.600	5442.79	923.21 N	869.49 W	1268.20	5.861
6501.00	83.100	316.900	5444.35	932.59 N	878.31 W	1281.08	2.296
6532.00	83.100	316.900	5448.08	955.06 N	899.34 W	1311.85	0.000

Continued...

Sperry-Sun Drilling Services

Survey Report for 13-11 - Leg #3

Mobil **Utah**
San Juan County **Sec.13-T41S-R23E**

All data is in feet unless otherwise stated. Directions and coordinates are relative to True North.
Vertical depths are relative to Structure. Northings and Eastings are relative to Structure.

The Dogleg Severity is in Degrees per 100ft.
Vertical Section is from Well and calculated along an Azimuth of 316.721° (True).
Coordinate System is UT-S. Grid Convergence at Surface is -4.170°.

Based Upon Minimum Curvature type calculations, at a Measured Depth of 6532.00ft.,
The Bottom Hole Displacement is 1311.85ft., in the Direction of 316.721° (True).

sperry-sun
DRILLING SERVICES
A DRESSER INDUSTRIES, INC. COMPANY

Mobil
San Juan County
Utah
Sec.13-T41S-R23E
13-11 - Leg #4

SURVEY REPORT

1 May, 1997

Survey Ref: svy1645

Sperry-Sun Drilling Services

Survey Report for 13-11 - Leg #4

Mobil **Utah**
San Juan County **Sec.13-T41S-R23E**

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5200.00	0.420	58.750	5198.62	56.37 N	77.69 W	95.98	
KOP 5220.00	0.420	58.750	5218.62	56.44 N	77.57 W	95.93	0.000
5230.00	3.100	321.600	5228.61	56.67 N	77.70 W	96.17	31.797
5240.00	6.300	319.500	5238.58	57.30 N	78.23 W	96.97	32.041
5250.00	10.100	317.400	5248.48	58.37 N	79.18 W	98.36	38.112
5260.00	15.100	315.200	5258.23	59.94 N	80.69 W	100.51	50.221
5270.00	20.300	313.100	5267.76	62.05 N	82.88 W	103.52	52.382
5280.00	25.400	311.000	5276.97	64.64 N	85.76 W	107.39	51.640
5290.00	30.500	312.400	5285.80	67.76 N	89.26 W	112.05	51.417
5300.00	35.200	309.900	5294.20	71.32 N	93.35 W	117.45	48.908
5310.00	38.700	309.900	5302.19	75.18 N	97.96 W	123.45	35.000
5320.00	42.300	310.700	5309.79	79.38 N	102.91 W	129.93	36.372
5330.00	46.700	311.400	5316.92	83.98 N	108.19 W	136.91	44.272
5340.00	50.500	311.700	5323.53	88.96 N	113.80 W	144.38	38.066
5350.00	53.700	311.500	5329.68	94.20 N	119.70 W	152.23	32.039
5360.00	56.800	312.200	5335.37	99.68 N	125.82 W	160.41	31.529
5370.00	61.800	313.900	5340.48	105.55 N	132.10 W	168.94	52.090
5380.00	66.600	314.700	5344.83	111.83 N	138.54 W	177.86	48.537
5390.00	72.000	315.000	5348.36	118.43 N	145.17 W	187.10	54.073
5400.00	76.500	314.800	5351.08	125.22 N	151.99 W	196.61	45.041
5425.00	87.600	313.900	5354.53	142.50 N	169.67 W	221.09	44.542
5462.19	86.500	311.700	5356.44	167.73 N	196.91 W	257.99	6.607
5493.93	85.500	309.200	5358.66	188.27 N	221.01 W	289.56	8.465
5525.68	84.800	309.400	5361.34	208.31 N	245.49 W	321.15	2.292
5557.43	84.800	308.800	5364.22	228.25 N	270.03 W	352.73	1.882
5589.20	85.500	308.000	5366.91	247.92 N	294.83 W	384.37	3.339
5620.83	86.000	308.000	5369.25	267.34 N	319.69 W	415.89	1.581
5652.02	86.700	308.000	5371.24	286.50 N	344.22 W	447.01	2.244
5683.81	87.500	306.900	5372.84	305.80 N	369.42 W	478.75	4.275
5714.78	87.100	306.200	5374.30	324.23 N	394.27 W	509.68	2.601
5745.74	86.800	306.200	5375.95	342.49 N	419.22 W	540.60	0.969
5777.57	86.500	306.200	5377.81	361.25 N	444.86 W	572.37	0.943
5809.41	86.200	306.400	5379.84	380.06 N	470.47 W	604.15	1.132
5841.23	85.000	305.900	5382.28	398.78 N	496.09 W	635.88	4.084
5873.09	84.700	305.900	5385.14	417.39 N	521.79 W	667.61	0.942
5904.84	85.500	305.300	5387.85	435.80 N	547.52 W	699.24	3.145
5936.62	88.900	305.200	5389.40	454.12 N	573.43 W	730.97	10.703
5968.29	88.900	304.600	5390.01	472.23 N	599.40 W	762.63	1.894
6000.06	89.000	304.100	5390.59	490.16 N	625.63 W	794.37	1.605
6031.06	85.400	305.300	5392.11	507.78 N	651.08 W	825.32	12.239
6062.86	84.000	306.600	5395.04	526.37 N	676.71 W	856.98	5.996
6094.60	84.800	306.000	5398.14	545.07 N	702.17 W	888.57	3.145
6126.31	85.000	305.300	5400.96	563.48 N	727.83 W	920.15	2.287
6158.13	85.700	304.800	5403.54	581.69 N	753.80 W	951.86	2.700
6189.88	85.700	304.600	5405.92	599.71 N	779.83 W	983.51	0.628

Continued...

Sperry-Sun Drilling Services

Survey Report for 13-11 - Leg #4

Mobil **Utah**
San Juan County **Sec.13-T41S-R23E**

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
6220.95	85.000	305.500	5408.44	617.50 N	805.18 W	1014.47	3.662
6252.00	87.100	305.300	5410.58	635.44 N	830.43 W	1045.44	6.794
6283.80	88.500	305.300	5411.80	653.80 N	856.36 W	1077.21	4.403
6315.54	88.800	305.000	5412.55	672.07 N	882.31 W	1108.94	1.336
6347.24	88.200	303.900	5413.38	690.00 N	908.44 W	1140.61	3.952
6379.09	87.500	303.700	5414.57	707.70 N	934.88 W	1172.41	2.286
6410.93	87.800	304.100	5415.88	725.45 N	961.29 W	1204.19	1.569
6442.81	87.300	303.400	5417.24	743.14 N	987.77 W	1236.01	2.697
6474.55	84.600	302.300	5419.48	760.31 N	1014.37 W	1267.61	9.182
6506.42	84.100	302.900	5422.62	777.40 N	1041.09 W	1299.26	2.444
6538.22	83.200	302.200	5426.14	794.41 N	1067.73 W	1330.80	3.577
6570.06	84.200	302.300	5429.63	811.29 N	1094.49 W	1362.37	3.156
6601.81	84.000	301.800	5432.89	828.05 N	1121.26 W	1393.87	1.688
6626.00	84.900	301.600	5435.23	840.70 N	1141.74 W	1417.87	3.810
6659.00	84.900	301.600	5438.17	857.93 N	1169.74 W	1450.63	0.000

All data is in feet unless otherwise stated. Directions and coordinates are relative to True North.
Vertical depths are relative to Structure. Northings and Eastings are relative to Structure.

The Dogleg Severity is in Degrees per 100ft.
Vertical Section is from Well and calculated along an Azimuth of 306.258° (True).
Coordinate System is UT-S. Grid Convergence at Surface is -4.170°.

Based Upon Minimum Curvature type calculations, at a Measured Depth of 6659.00ft.,
The Bottom Hole Displacement is 1450.63ft., in the Direction of 306.258° (True).

sperry-sun DRILLING SERVICES

Well: 13-11

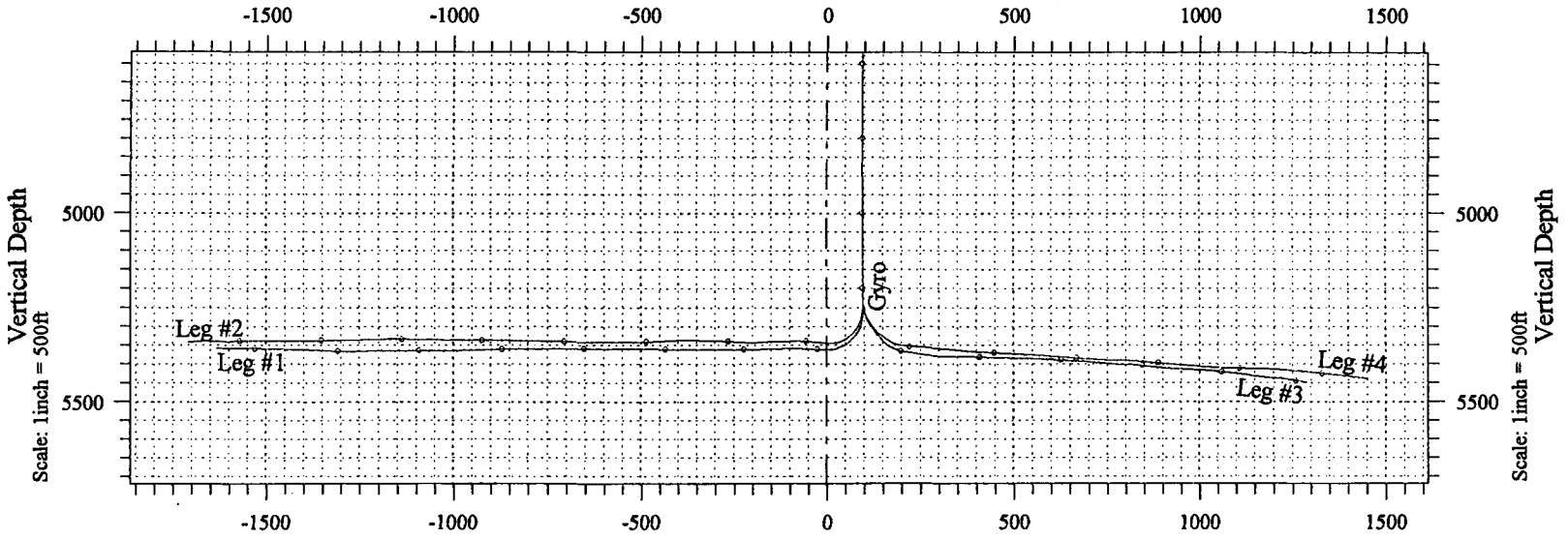
DrillQuest

Customer: Mobil
Folder: Mobil
Field: San Juan County
Project: Utah
Structure: Sec.13-T41S-R23E
Well: 13-11

Vertical Section

Scale: 1inch = 500ft

Section Azimuth: 306.258 (True North)



Scale: 1inch = 500ft

Section Azimuth: 306.258 (True North)

Vertical Section

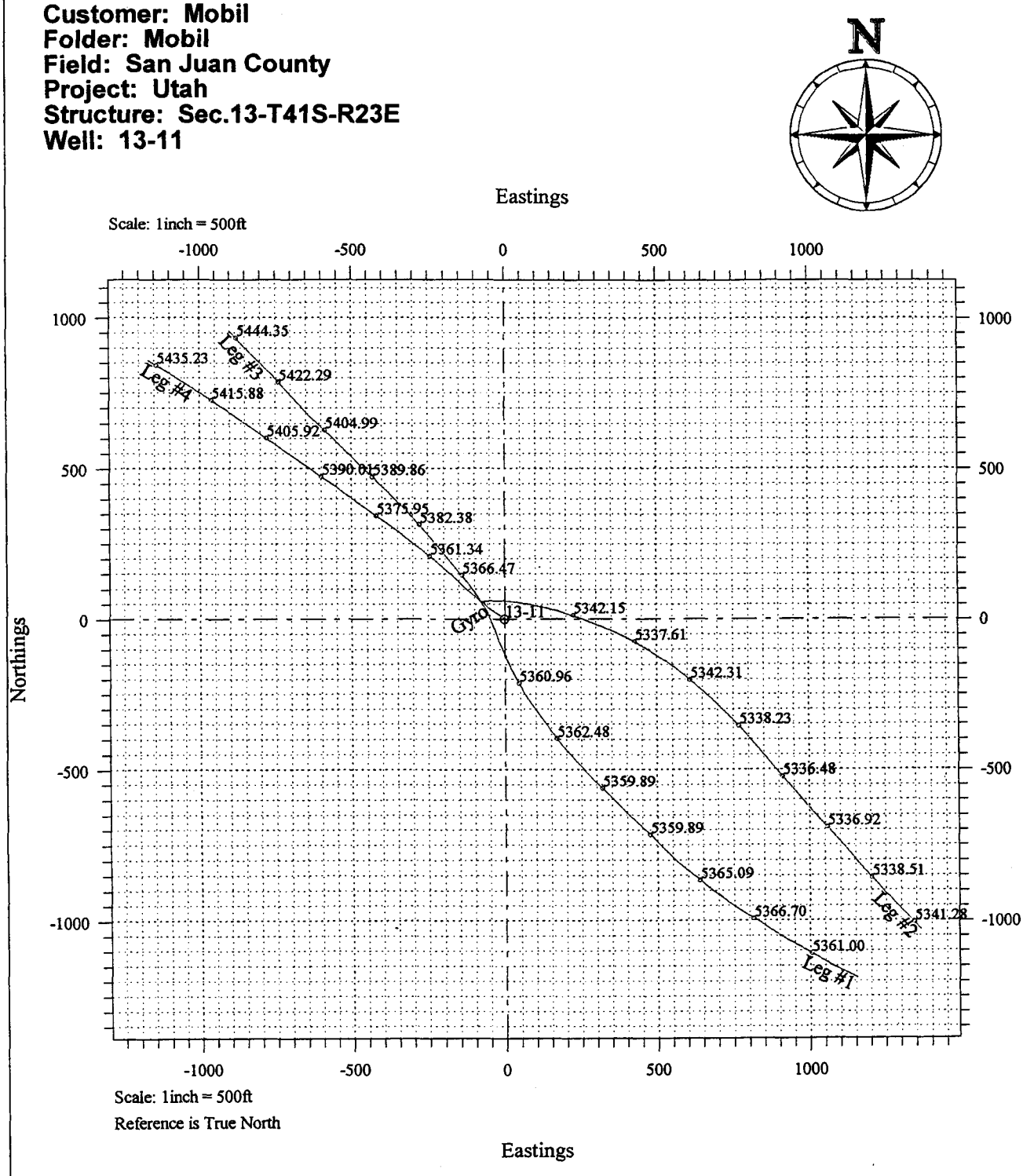
Prepared:	Checked:	Approved:

Sperry-Sun DRILLING SERVICES

Well: 13-11

DrillQuest

Customer: Mobil
Folder: Mobil
Field: San Juan County
Project: Utah
Structure: Sec.13-T41S-R23E
Well: 13-11



Prepared:	Checked:	Approved:

STATE OF UTAH
DIVISION OF OIL, GAS AND MINING

ENTITY ACTION FORM - FORM 6

OPERATOR MOBIL PRODUCING TX & NM, INC.
ADDRESS P. O. BOX 633
MIDLAND, TEXAS 79702

OPERATOR ACCT. NO. N 7370

ACTION CODE	CURRENT ENTITY NO.	NEW ENTITY NO.	API NUMBER	WELL NAME	WELL LOCATION QQ	SC	TP	RG	COUNTY	SPUD DATE	EFFECTIVE DATE
B	99999	6280	43-037-31152	RATHERFORD 13-W-11		13	41S	23E	SAN JUAN	2-20-97	5-14-97

WELL 1 COMMENTS: Entity added 5-28-97. (Rathersford Unit) fec

WELL 2 COMMENTS:

WELL 3 COMMENTS:

WELL 4 COMMENTS:

WELL 5 COMMENTS:

ACTION CODES (See instructions on back of form)
- A - Establish new entity for new well (single well only)
- B - Add new well to existing entity (group or unit well)
- C - Re-assign well from one existing entity to another existing entity
- D - Re-assign well from one existing entity to a new entity
- E - Other (explain in comments section)

NOTE: Use COMMENT section to explain why each Action Code was selected.

(3/89)

RECEIVED
MAY 27 1997
DIV. OF OIL, GAS & MINING

Shirley Houchins
Signature SHIRLEY HOUCHINS
ENV. & REG. TECH
Title
5-12-97
Date
Phone No. 915 688-2585

RECEIVED MAY 27 1997 DIV. OF OIL, GAS & MINING

(Form 3160-4 (July 1992))

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN DUPLICATE (See other instructions on reverse side)

FORM APPROVED
OMB NO. 1004-0137
Expires: February 28, 1995

WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

1a. TYPE OF WELL: OIL WELL ☐ GAS WELL ☐ DRY ☐ Other INJECTOR

b. TYPE OF COMPLETION: NEW WELL ☐ WORK OVER ☐ DEEP-EN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ Other SIDETRACK

2. NAME OF OPERATOR Mobil Exploration & Producing U.S. Inc. as Agent for Mobil Producing TX & NM Inc.

3. ADDRESS AND TELEPHONE NO. P.O. Box 633, Midland, TX 79702 (915) 688-2585

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements)*
At surface 500' FROM NORTH LINE & 660' FROM WEST LINE.
At top prod. interval reported below
At total depth * #37 THIS FORM

5. LEASE DESIGNATION AND SERIAL NO. 14-20-603-247A
6. IF INDIAN, ALLOTTEE OR TRIBE NAME NAVAJO TRIBAL
7. UNIT AGREEMENT NAME RATHERFORD UNIT
8. FARM OR LEASE NAME, WELL NO. RATHERFORD 13-W-11
9. API WELL NO. 43-037-31152
10. FIELD AND POOL, OR WILDCAT GREATER ANETH
11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA SEC. 13, T41S, R23E
12. COUNTY OR PARISH SAN JUAN
13. STATE UTAH
14. PERMIT NO.
DATE ISSUED 12-30-1996

15. DATE SPUDDED	16. DATE T.D. REACHED	17. DATE COMPL. (Ready to prod.)	18. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	19. ELEV. CASINGHEAD
2-20-97	4-4-97	4-25-97		

20. TOTAL DEPTH, MD & TVD	21. PLUG, BACK T.D., MD & TVD	22. IF MULTIPLE COMPL., HOW MANY*	23. INTERVALS DRILLED BY	ROTARY TOOLS	CABLE TOOLS
** #37	** #37	NO	→	X	

24. PRODUCING INTERVAL(S), OF THIS COMPLETION - TOP, BOTTOM, NAME (MD AND TVD)*
** #37 DSCR

25. WAS DIRECTIONAL SURVEY MADE YES

26. TYPE ELECTRIC AND OTHER LOGS RUN
MUD LOG LEGS 1,2,3,4 4-16-97

27. WAS WELL CORED NO

28. CASING RECORD (Report all strings set in well)

CASING SIZE/GRADE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	TOP OF CEMENT, CEMENTING RECORD	AMOUNT PULLED
13 3/8"	54.5#	119'		SURFACE	
9 5/8"	36#	1551'		SURFACE	
7"	23#	5424'		TOC @ 2000'	

29. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)

30. TUBING RECORD

SIZE	DEPTH SET (MD)	PACKER SET (MD)
2 7/8"	5117'	5100'

31. PERFORATION RECORD (Interval, size and number)

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
5425-6659'	ACIDIZE LATERAL 4A1 W/24000
	GALS 15% HCL ACID
5445-6532'	ACIDIZE LATERAL 3A1 W/22000
*** #37	GALS 15% HCL ACID

33.* PRODUCTION

DATE FIRST PRODUCTION
PRODUCTION METHOD (Flowing, gas lift, pumping - size and type of pump)
WELL STATUS (Producing or shut-in) injecting

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD	OIL - BBL.	GAS - MCF.	WATER - BBL.	GAS - OIL RATIO
5-14-97	24		→			1258	

FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE	OIL - BBL.	GAS - MCF.	WATER - BBL.	OIL GRAVITY - API (CORR.)
-0-	-0-	→				

34. DISPOSITION OF GAS (Sold, used for fuel, vented, etc.)

TEST WITNESSED BY

35. LIST OF ATTACHMENTS
DIRECTIONAL SURVEY REPORT

36. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records

SIGNED Shirley Houchins TITLE ENV. & REG. TECHNICIAN DATE 05-19-97

*(See Instructions and Spaces for Additional Data on Reverse Side)

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdicton.

37. SUMMARY OF POROUS ZONES: (Show all important zones of porosity and contents thereof; cored intervals; and all drill-stem, tests, including depth interval tested, cushion used, time tool open, flowing and shut-in pressures, and recoveries):

FORMATION	TOP	BOTTOM	DESCRIPTION, CONTENTS, ETC.
*#4			LAT #1A1-1189' FSL & 1153' FEL, SURFACE SPOT
			LAT #2A1-1031' FSL & 1363' FEL, SURFACE SPOT
			LAT #3A1- 955' FNL & 899' FWL, SURFACE SPOT
			LAT #4A1- 859' FNL & 1170' FWL, SURFACE SPOT
**#20			LAT #1A1(5363-5359' TVD)(5439-7114' TMD)
			LAT #2A1(5345-5342' TVD)(5417-7175' TMD)
			LAT #3A1(5371-5448' TVD)(5445-6532' TMD)
			LAT #4A1(5355-5438' TVD)(5425-6659' TMD)
***#32	5417'	7175'	LAT #2A1, ACIDIZE W/34000 GALS 15% HCL ACID.
	5439'	7114'	LAT #1A1, ACIDIZE W/16000 GALS 15% HCL ACID.

38. GEOLOGIC MARKERS

NAME	TOP	
	MEAS. DEPTH	TRUE VERT. DEPTH

U.S. GOVERNMENT PRINTING OFFICE: 1992-774-672

Form 3160-5
(November 1994)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
Budget Bureau No. 1004-0135
Expires November 30, 2000

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on reverse side

5. Lease Serial No.: 14-20-603-247A
6. If Indian, Allottee or Tribe Name: NAVAJO TRIBAL
7. If Unit or CA/Agreement, Name and/or No.: RATHERFORD UNIT
8. Well Name and No.: RATHERFORD 13-W-11
9. API Well No.: 43-037-31152
10. Field and Pool, or Exploratory Area: GREATER ANETH
11. County or Parish, State: SAN JUAN UT

1. Type of Well: [ ] Oil Well [ ] Gas Well [X] Other
2. Name of Operator: MOBIL PRODUCING TX & NM INC.*
*MOBIL EXPLORATION & PRODUCING US INC. AS AGENT FOR MPTM
3a. Address: P.O. Box 633, Midland TX 79702
3b. Phone No. (*include area code*): (915) 688-2585
4. Location of Well (*Footage, Sec., T., R., M., or Survey Description*)
SEC. 13, T41S, R23E
500' FNL & 660' FWL

12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
[X] Notice of Intent	[ ] Acidize	[ ] Deepen	[ ] Production (Start/Resume)	[ ] Water Shut-Off
[ ] Subsequent Report	[ ] Alter Casing	[ ] Fracture Treat	[ ] Reclamation	[X] Well Integrity
[ ] Final Abandonment Notice	[ ] Casing Repair	[ ] New Construction	[ ] Recomplete	[X] Other SCHEDULED MIT
	[ ] Change Plans	[ ] Plug and Abandon	[ ] Temporarily Abandon	
	[ ] Convert to Injection	[ ] Plug Back	[ ] Water Disposal	

13. Describe Proposed or Coommpleted Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the final site is ready for final inspection.)

SCHEDULED MIT & CHART ATTACHED.

RECEIVED
AUG 30 1999
DIV. OF OIL, GAS & MINING

14. I hereby certify that the foregoing is true and correct
Name (*Printed/Typed*): Joe Moseley for
Title: SHIRLEY HOUCHINS/ENV & REG TECH
Date: 8-25-99

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by | Title | Date

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon. | Office

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Instructions on reverse)

ANNULAR PRESSURE TEST
(Mechanical Integrity Test)

Operator MOBIL E. & P., INC. Date of Test 8-12-99
Well Name RATHERFORD UNIT WELL #13-11 EPA Permit No.
Location SEC 13, T41S, R23E Tribal Lease No. 14206032474
State and County SAN JUAN COUNTY, UTAH

Continuous Recorder? YES ☑ NO ☐ Pressure Gauge? YES ☑ NO ☐
Bradenhead Opened? YES ☑ NO ☐ Fluid Flow? YES ☐ NO ☑

TIME	ANNULUS PRESSURE, psi 0-1500 psi gauge	0-1500 psi recorder	TUBING PRESSURE, psi 0-3000 psi gauge
12:45 PM	1079	1100	2850
12:50 PM	1079	1100	2850
12:55 PM	1079	1100	2850
1:00 PM	1078	1100	2850
1:05 PM	1075	1100	2850
1:10 PM	1065	1100	2850
1:15 PM	1061	1100	2850

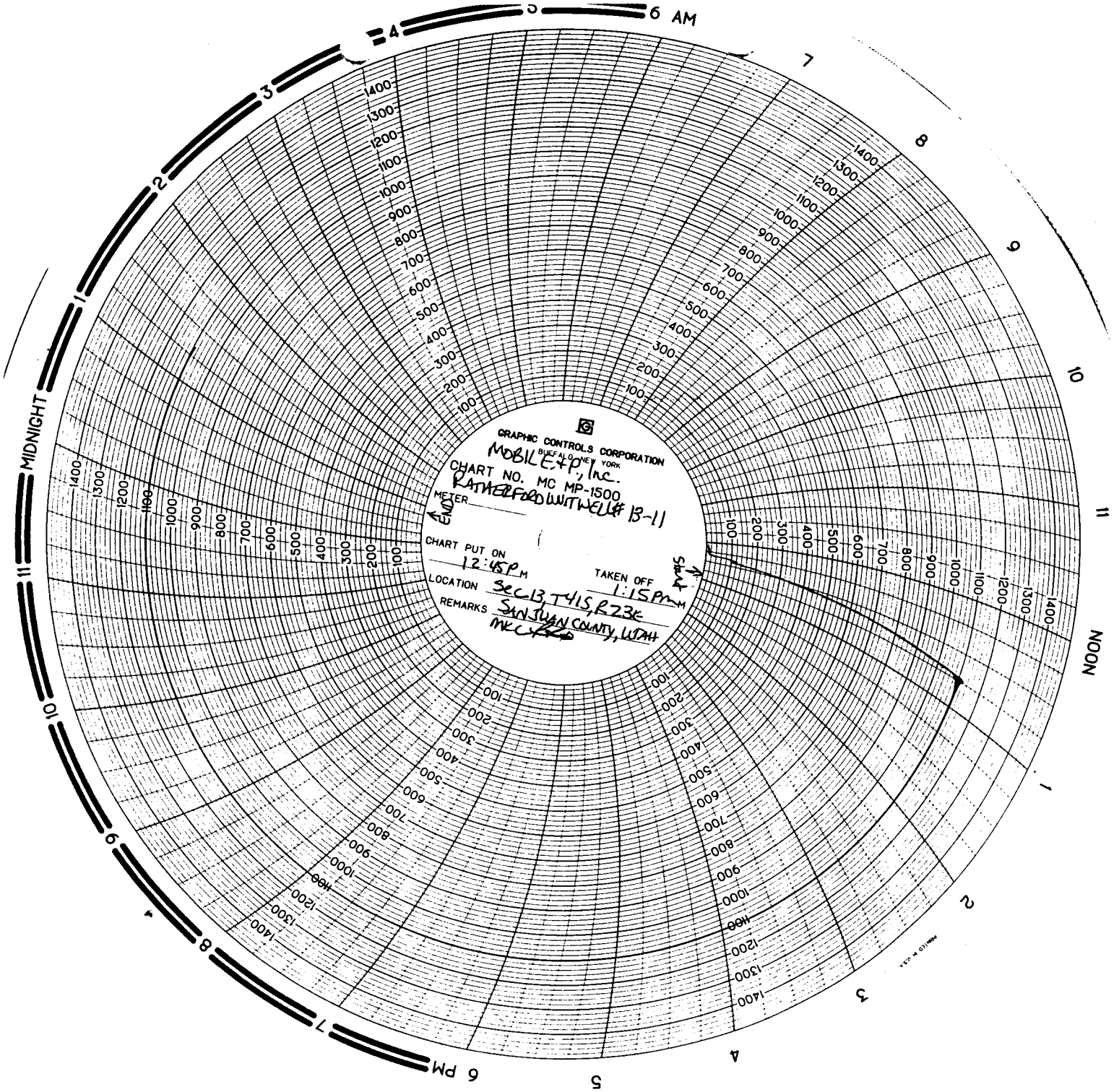
MAX. INJECTION PRESSURE: 3000 PSI
MAX. ALLOWABLE PRESSURE CHANGE: 53.95 PSI (TEST PRESSURE X 0.05)
REMARKS: Passed? Failed? If failed, cease injection until well passes MIT (40CFR§144.21(c)(6)).

Injecting - active.
Passed MIT

BENJAMIN B. SILAS Benjamin B. Silas 8-12-99
COMPANY REPRESENTATIVE: (Print and Sign) DATE

MELVINA K. CLAH Melvina K. Clah 8-12-99
INSPECTOR: (Print and Sign) DATE

REGION-IX-FORM-935 (6/13/96) *USEPA - Region IX (White)* *NEPA-GPCP (Yellow)* *Operator (Pink)*


GRAPHIC CONTROLS CORPORATION
BUFFALO NEW YORK
MOBIL E&P, Inc.
CHART NO. MC MP-1500
RATHERFORD UNIT WELL # 13-11
METER
END
CHART PUT ON
12:45 P.M.
TAKEN OFF
1:15 P.M.
LOCATION
Sec 13, T41S, R23E
REMARKS
SAN JUAN COUNTY, UTAH
MIDNIGHT
NOON
6 AM
6 PM

Form 3160-5
(November 1994)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB No. 1004-0135
Expires: July 31,1996

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other Instructions on reverse side

5. Lease Serial No.
14-20-603-355 247A

6. If Indian, Allottee or Tribe Name
NAVAJO TRIBAL

7. If Unit or CA/Agreement, Name and/or No.
RATHERFORD UNIT

1. Type of Well
☐ Oil Well ☐ Gas Well ☒ Other INJECTION WELL

8. Well Name and No.
RATHERFORD UNIT 13W11

2. Name of Operator
Mobil Producing TX. & N.M. Inc.

9. API Well No.
43-037-31152

3a. Address P.O. Box 4358
Houston TX 77210-4358

3b. Phone No. *(include area code)*
(713) 431-1197

10. Field and Pool, or Exploratory Area
GREATER ANETH

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)
Sec. 13, T41S, R23E 500' FNL & 660' FWL

11. County or Parish, State
SAN JUAN UT

12. CHECK APPROPRIATE BOX(es) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other Pressure
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multitiple completion or recompletion in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including recalmation, have been completed, and the operator has determined that the site is ready for final inspection.)

Backside casing pressure of 2400 psi was encountered on this well on 6/22/00 and the well was shut-in. The pressure indicates a possible tubing leak. The Navajo EPA and US EPA were verbally notified on 6/23/00.

We interpret the due date for repair of this well to be 12/22/00 for EPA requirements.

RECEIVED
JUN 28 2000
DIVISION OF
OIL, GAS AND MINING

14. I hereby certify that the foregoing is true and correct
Name *(Printed/Typed)* Ellen M. Carroll
Signature Ellen M Carroll
Title Sr. Staff Office Assistant
Date 06/26/2000

ExxonMobil Production Company,
A division of Exxon Mobil Corporation,
acting for Mobil Producing
Texas & New Mexico Inc.

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by | Title | Date

Conditions of approval, if any, are attacheed. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon. | Office

Accepted by the
Utah Division of
Oil, Gas and Mining
FOR RECORD ONLY

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Instructions on Reverse)

COPY SENT TO OPERATOR
06-29-00
CHD

Federal Approval of this Action Is Necessary

Form 3160-5
(November 1994)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB No. 1004-0135
Expires: July 31,1996

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other Instructions on reverse side

5. Lease Serial No.
14-20-603-247A

6. If Indian, Allottee or Tribe Name
NAVAJO TRIBAL

7. If Unit or CA/Agreement, Name and/or No.
RATHERFORD UNIT

1. Type of Well
☐ Oil Well ☐ Gas Well ☒ Other **INJECTION WELL**

8. Well Name and No.
Ratherford Unit 13W11

2. Name of Operator
Mobil Producing TX. & N.M. Inc.

9. API Well No.
43-037-31152

3a. Address **P.O. Box 4358 Houston TX 77210-4358**

3b. Phone No. *(include area code)* **(713) 431-1197**

10. Field and Pool, or Exploratory Area
GREATER ANETH

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)
Sec. 13, T41S, R23E 500' FNL & 660' FWL

11. County or Parish, State
SAN JUAN UT

12. CHECK APPROPRIATE BOX(es) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☐ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☒ Subsequent Report	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other **MIT Results**
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multitple completion or recompletion in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including recalmation, have been completed, and the operator has determined that the site is ready for final inspection.)

Attached are the results of the MIT that was performed on 7/10/00 after a workover. This well had been shut in due to a possible tubing leak.

Another Sundry Notice will be filed indicating the work that was performed on the well.

14. I hereby certify that the foregoing is true and correct
Name *(Printed/Typed)* **Ellen M. Carroll**

Title **Sr. Staff Office Assistant**

ExxonMobil Production Company, A division of Exxon Mobil Corporation, acting for Mobil Producing Texas & New Mexico Inc.

Signature *Ellen M Carroll*

Date **07/19/2000**

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by	Title	Date
Conditions of approval, if any, are attacheed. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.	Office	

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(Instructions on Reverse)

Permits

ANNULAR PRESSURE TEST

JUL 1 4 2000

(Mechanical Integrity Test)

Operator Exxon Mobil US West **Date of Test** 7-10-2000

Well Name Rutherford Unit Well #13W~~8~~11 mkc **EPA Permit No.**

Location NW/NW SEC13, T41S, R23E **Tribal Lease No.** 1420603247A

State and County SAN JUAN COUNTY, UTAH

Continuous Recorder? YES ☑ NO ☐ **Pressure Gauge?** YES ☑ NO ☐

Bradenhead Opened? YES ☑ NO ☐ **Fluid Flow?** YES ☑ NO ☐

TIME	ANNULUS PRESSURE, psi 0-1500psi gauge	ANNULUS PRESSURE, psi 0-1500psi recorder	TUBING PRESSURE, psi 0-3000psi gauge psi
12:45pm	1019	1000	0
12:50pm	~~1020~~ 1019 mkc	1000	
12:55pm	1018	1000	
1:00pm	1018	1000	
1:05pm	1018	1000	
1:10pm	1018	1000	
1:15pm	1018	1003	

MAX. INJECTION PRESSURE: 3000 **PSI**

MAX. ALLOWABLE PRESSURE CHANGE: 50.95 **PSI (TEST PRESSURE X 0.05)**

REMARKS: Passed? Failed? If failed, cease injection until well passes MIT (40CFR§144.21(c)(6)).

Small amount of fluid on bradenhead.
Well just had workover, was SI.
Passed MIT

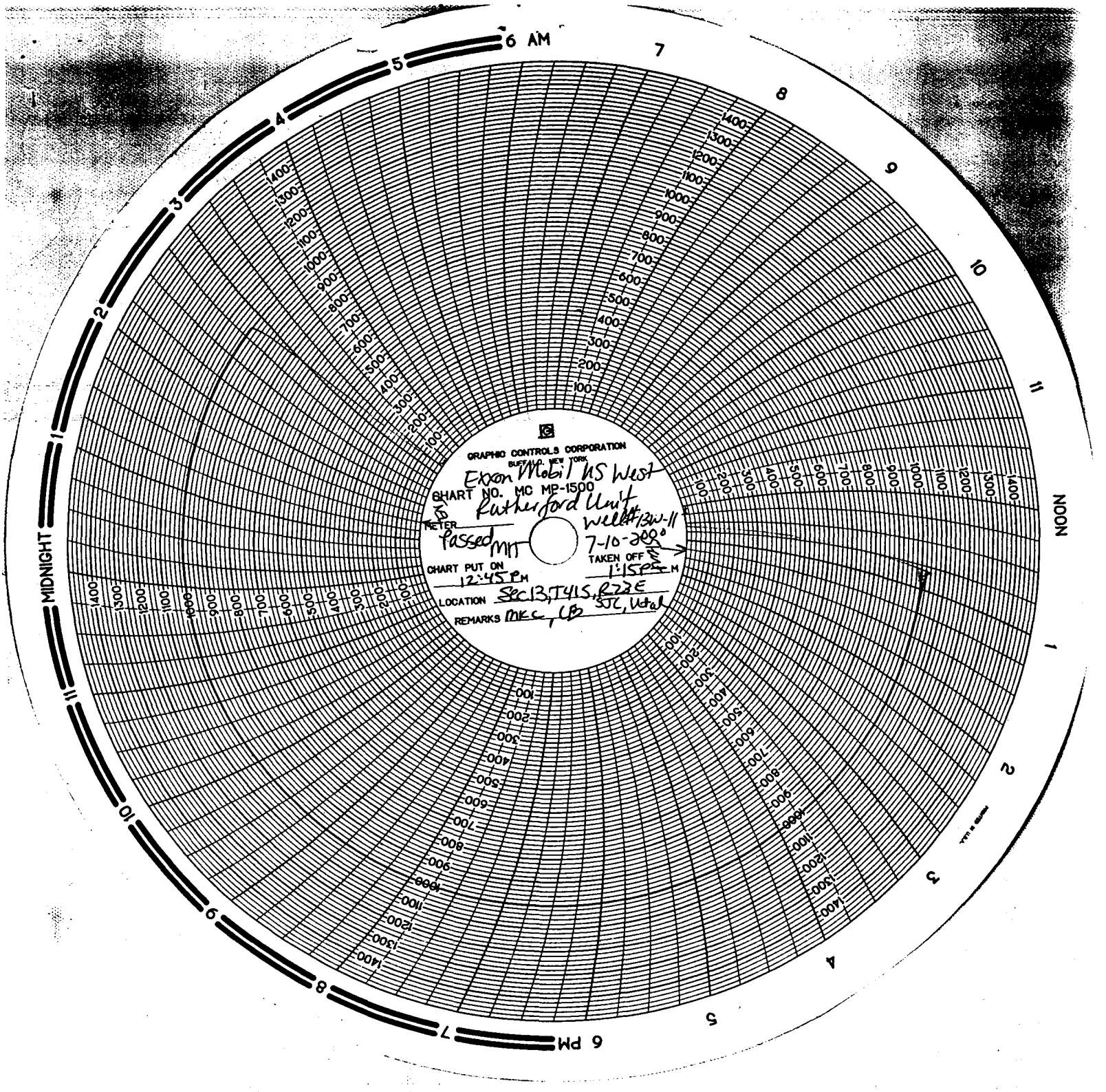
LARRISON BLACKGOAT [signature] 7/10/2000

COMPANY REPRESENTATIVE: (Print and Sign) **DATE**

MELVINA K. CLAH Melvina K. Clah 7-10-2000

INSPECTOR: (Print and Sign) **DATE**

REGION-IX-FORM-935 (6/13/96) *USEPA - Region IX (White)* *NEPA-GPCP (Yellow)* *Operator (Pink)*


GRAPHIC CONTROLS CORPORATION
BUFFALO NEW YORK
Exxon Mobil US West
CHART NO. MC MP-1500
Rutherford Unit
METER
Well #13W-11
Passed MIT
7-10-2000
CHART PUT ON
12:45 PM
TAKEN OFF
1:15 PM
LOCATION Sec 13, T41S, R22E
SJC, Utah
REMARKS MKC, LB
MIDNIGHT
NOON
6 AM
6 PM

Form 3160-5
(November 1994)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB No. 1004-0135
Expires: July 31,1996

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other Instructions on reverse side

5. Lease Serial No.
14-20-603-247A

6. If Indian, Allottee or Tribe Name
NAVAJO TRIBAL

7. If Unit or CA/Agreement, Name and/or No.
RATHERFORD UNIT

1. Type of Well
☐ Oil Well ☐ Gas Well ☒ Other **INJECTION WELL**

8. Well Name and No.
Ratherford Unit 13W11

2. Name of Operator
Mobil Producing TX. & N.M. Inc.

9. API Well No.
43-037-31152

3a. Address **P.O. Box 4358**
Houston TX 77210-4358

3b. Phone No. *(include area code)*
(713) 431-1197

10. Field and Pool, or Exploratory Area
GREATER ANETH

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)
Sec. 13, T41S, R23E 500' FNL & 660' FWL

11. County or Parish, State
SAN JUAN UT

12. CHECK APPROPRIATE BOX(es) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☐ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☒ Subsequent Report	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other **Repair annular pressure**
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multitple completion or recompletion in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including recalmation, have been completed, and the operator has determined that the site is ready for final inspection.)

Attached is a summary of work performed on Ratherford Unit #13W11 from 7/3/00 to 7/8/00.

Apparent cause of annular pressure was a leak in the on/off tool seal.

Accepted by the Utah Division of Oil, Gas and Mining
FOR RECORD ONLY

RECEIVED
JAN 24 2001
DIVISION OF
OIL, GAS AND MINING

14. I hereby certify that the foregoing is true and correct
Name *(Printed/Typed)* **Ellen M. Carroll**
Title **Sr. Staff Office Assistant**
ExxonMobil Production Company, A division of Exxon Mobil Corporation acting for Mobil Producing Texas & New Mexico, Inc.
Signature *Ellen M Carroll*
Date **01/22/2001**

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by	Title	Date
Conditions of approval, if any, are attacheed. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.	Office	

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(Instructions on Reverse)

RATHERFORD UNIT #13W11
SAN JUAN COUNTY, UTAH
43-037-31152

7/3/00
MIRU WSU. Spot pump, pit, and BOPE.

7/4/00
SD for Holiday

7/5/00
RU hardline from pump to wellhead. Pumped 60 bbls of 10 ppg down tubing. Initial TP was 350 psi. Final TP was 0 psi. MIRU slickline. RIH and set a 1.78 'F' nipple in the profile of the on/off tool. Tested good. NDWH and NU and test BOPE. Release from on/off tool and strip wrap-around from wellhead. POOH with 162 joints. Lay down on/off tool and RIH with kill string. On/off tool seal indicated the leak was most likely coming form this area. SDFN

7/6/00
Shut down for Funeral

7/7/00
Open well and POOH with killstring. RU Campbell's Hydrotesters and test tubing in the hole. Did not find any tubing leaks. Space out tubing and ND BOPE. NUWH. Release from on/off tool and circulate the well with 210 bbls of packer fluid. Land tubing and flange up wellhead. Pressure test packer to 1050 psi for 30 minutes. No leaks. Will leave the pressure on the well overnight. SD and prepared to RDMO.

7/8/00
SITP 0 SICP at 1080 psi. Gained about 30 psi overnight, probably from heating. MIRU slickline. RIH pressure up on tubing to 1000 psi. Sheared plug. Well on a vacuum. POOH. MU and rih with retrieving tool. Latch onto plug and POOH. RD slickline and WSU. MO. Contacted field office to have MIT and PSSR performed. Job complete.

RECEIVED
JAN 2 2001
DIVISION OF
OIL, GAS AND MINING

ExxonMobil Production Comp
U.S. West
P.O. Box 4358
Houston, Texas 77210-4358

June 27, 2001

ExxonMobil
Production

Mr. Jim Thompson
State of Utah, Division of Oil, Gas and Mining
1549 West North Temple
Suite 1210
Salt Lake City, UT 84114-5801

Change of Name – Mobil Oil Corporation to
ExxonMobil Oil Corporation

Dear Mr. Thompson

Effective June 1, 2001, Mobil Oil Corporation (MOC) changed its name to ExxonMobil Oil Corporation (EMOC). This was a name change only; EMOC is the same corporation as Mobil Oil Corporation, but with a new name. No facility or other asset was transferred from one corporation to another by virtue of the name change. Specifically, EMOC will remain the owner and operator of its existing exploration and production oil and gas properties and facilities, as well as relevant permits.

There is no change to the name of Exxon Mobil Corporation, the ultimate shareholder of EMOC.

Please note the change of name of MOC to ExxonMobil Oil Corporation in your records pertaining to any MOC permits.

The Federal Identification Number for MOC (13-5401570) will remain the same for EMOC.

A copy of the Certification, Bond Rider and a list of wells are attached.

If you have any questions please feel free to call Joel Talavera at 713-431-1010

Very truly yours,

Charlotte H Harper

Charlotte H. Harper
Permitting Supervisor

ExxonMobil Production Company
a division of Exxon Mobil Corporation,
acting for ExxonMobil Oil Corporation

RECEIVED
JUN 2001
DIVISION OF
OIL GAS AND MINING

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
XXXXXXXXXXXXXXX
Navajo Area Office
NAVAJO REGION
P.O. Box 1060
Gallup, New Mexico 87305-1060

IN REPLY REFER TO:

RRES/543

AUG 30 2001

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Charlotte H. Harper, Permitting Supervisor
Exxon Mobil Production Company
U. S. West
P. O. Box 4358
Houston, TX 77210-4358

Dear Ms. Harper:

This is to acknowledge receipt of your company's name change from Mobil Oil Corporation to ExxonMobil Oil Corporation effective June 1, 2001. The receipt of documents includes the Name Change Certification, current listing of Officers and Directors, Listing of Leases, Financial Statement, filing fees of $75.00 and a copy of the Rider for Bond Number 8027 31 97. There are no other changes.

Please note that we will provide copies of these documents to other concerned parties. If you need further assistance, you may contact Ms. Bertha Spencer, Realty Specialist, at (928) 871-5938.

Sincerely,

DENNI DENETSONE

Regional Realty Officer

cc: BLM, Farmington Field Office w/enclosures
Navajo Nation Minerals Office, Attn: Mr. Akhtar Zaman, Director/w enclosures

MINERAL RESOURCES
ADM 1 DBM
NATV AM MIN COORD
SOLID MIN TEAM
PETRO MGMT TEAM 2
O & G INSPECT TEAM
ALL TEAM LEADERS
LAND RESOURCES
ENVIRONMENT
FILES

ExxonMobil Production Company
U.S. West
P.O. Box 4358
Houston, Texas 77210-4358

BS 7/12/2001 GN 543 File

June 27, 2001

ExxonMobil Production

Certified Mail
Return Receipt Requested

RECEIVED #477 JUL 9 - 2001 Navajo Region Office RES - Minerals Section

Ms. Genni Denetsone
United States Department of the Interior
Bureau of Indian Affairs, Navajo Region
Real Estate Services
P. O. Box 1060
Gallup, New Mexico 87305-1060
Mail Code 543

Change of Name –
Mobil Oil Corporation to
ExxonMobil Oil Corporation

Dear Ms. Denetsone:

Effective June 1, 2001, Mobil Oil Corporation (MOC) changed its name to ExxonMobil Oil Corporation (EMOC). This was a name change only; EMOC is the same corporation as Mobil Oil Corporation, but with a new name. No facility or other asset was transferred from one corporation to another by virtue of the name change. Specifically, EMOC will remain the owner and operator of its existing exploration and production oil and gas properties and facilities, as well as relevant permits.

There is no change to the name of Exxon Mobil Corporation, the ultimate shareholder of EMOC.

Please note the change of name of MOC to ExxonMobil Oil Corporation in your records pertaining to any MOC permits.

The Federal Identification Number for MOC (13-5401570) will remain the same for EMOC.

Attached is the Name Change Certification, Current listing of Officers and Directors, Filing Fee of $75/-, Listing of Leases, Financial Statement and a copy of the Rider for Bond number 8027 31 97. The original Bond Rider has been sent to Ms. Barbar Davis at your Washington Office.

If you have any questions , please contact Alex Correa at (713) 431-1012.

Very truly yours,

Charlotte H. Harper

Charlotte H. Harper
Permitting Supervisor

Attachments

RECEIVED JUL 05 2001 NAVAJO REGION OFFICE BRANCH OF REAL ESTATE SERVICES

ExxonMobil Production Company
a division of Exxon Mobil Corporation,
acting for ExxonMobil Oil Corporation

NOTE: Check forwarded to Ella Isasi

Bureau of Indian Affairs
Navajo Region Office
Attn: RRES - Mineral and Mining Section
P.O. Box 1060
Gallup, New Mexico 87305-1060

Gentlemen:

The current listing of officers and director of ExxonMobil Oil Corporation (Name of Corporation), of New York (State) is as follows:

OFFICERS

President	F.A. Risch	Address	5959 Las Colinas Blvd. Irving, TX 75039
Vice President	K.T. Koonce	Address	800 Bell Street Houston, TX 77002
Secretary	F.L. Reid	Address	5959 Las Colinas Blvd. Irving, TX 75039
Treasure	B.A. Maher	Address	5959 Las Colinas Blvd. Irving, TX 75039

DIRECTORS

Name	D.D. Humphreys	Address	5959 Las Colinas Blvd. Irving, TX 75039
Name	P.A. Hanson	Address	5959 Las Colinas Blvd. Irving, TX 75039
Name	T.P. Townsend	Address	5959 Las Colinas Blvd. Irving, TX 75039
Name	B.A. Maher	Address	5959 Las Colinas Blvd. Irving, TX 75039
Name	F.A. Risch	Address	5959 Las Colinas Blvd. Irving, TX 75039

Sincerely,

Alex Correa

This is to certify that the above information pertaining to ExxonMobil Oil Corporation (Corporation) is trust and correct as evidenced by the records and accounts covering business for the State of Utah and in the custody of Corporation Service Company (Agent), Phone: 1 (800)927-9800, whose business address is One Utah Center, 201 South Main Street, Salt Lake City, Utah 84111-2218

(CORPORATE SEAL)

Signature

AGENT AND ATTORNEY IN FACT

Title

SAL

CERTIFICATION

I, the undersigned Assistant Secretary of ExxonMobil Oil Corporation. (formerly Mobil Oil Corporation), a corporation organized and existing under the laws of the State of New York, United States of America, DO HEREBY CERTIFY, That, the following is a true and exact copy of the resolutions adopted by the Board of Directors on May 22, 2001:

CHANGE OF COMPANY NAME

WHEREAS, the undersigned Directors of the Corporation deem it to be in the best interest of the Corporation to amend the Certificate of Incorporation of the Corporation to change the name and principal office of the Corporation:

NOW THEREFORE BE IT RESOLVED, That Article 1st relating to the corporate name is hereby amended to read as follows:

"1st The corporate name of said Company shall be,

ExxonMobil Oil Corporation",

FURTHER RESOLVED, That the amendment of the Corporation's Certificate of Incorporation referred to in the preceding resolutions be submitted to the sole shareholder of the Corporation entitled to vote thereon for its approval and, if such shareholder gives its written consent, pursuant to Section 803 of the Business Corporation Law of the State of New York, approving such amendment, the proper officers of the Corporation be, and they hereby are, authorized to execute in the name of the Corporation the Certificate of Amendment of Certificate of Incorporation, in the form attached hereto;

FURTHER RESOLVED, That the proper officers of the Corporation be and they hereby are authorized and directed to deliver, file and record in its behalf, the Certificate of Amendment of Certificate of Incorporation, and to take such action as may be deemed necessary or advisable to confirm and make effective in all respects the change of this Company's name to EXXONMOBIL OIL CORPORATION.

WITNESS, my hand and the seal of the Corporation at Irving, Texas, this 8th day of June, 2001.

S. A. Millican
Assistant Secretary

COUNTY OF DALLAS)
STATE OF TEXAS)
UNITED STATES OF AMERICA)
Sworn to and subscribed before me at Irving, Texas, U. S. A. on this the 8th day of June, 2001.

Janice M. Phillips
Notary Public

LISTING OF LEASES OF MOBIL OIL CORPORATION

	Lease Number
1)	14-20-0603-6504
2)	14-20-0603-6505
3)	14-20-0603-6506
4)	14-20-0603-6508
5)	14-20-0603-6509
6)	14-20-0603-6510
7)	14-20-0603-7171
8)	14-20-0603-7172A
9)	14-20-600-3530
10)	14-20-603-359
11)	14-20-603-368
12)	14-20-603-370
13)	14-20-603-370A
14)	14-20-603-372
15)	14-20-603-372A
16)	14-20-603-4495
17)	14-20-603-5447
18)	14-20-603-5448
19)	14-20-603-5449
20)	14-20-603-5450
21)	14-20-603-5451

6/1/01

CHUBB GROUP OF INSURANCE COMPANIES

[illegible] South, Suite [illegible], Houston, Texas [illegible]
[illegible] (713) 297-4600 • Facsimile (713) 297-4750

NW Bond

FEDERAL INSURANCE COMPANY RIDER
to be attached to and form a part of

BOND NO 8027 31 97
wherein
Mobil Oil Corporation and Mobil Exploration and Producing U.S., Inc. is named as Principal and

FEDERAL INSURANCE COMPANY AS SURETY,

in favor of United States of America, Department of the Interior Bureau of Indian Affairs

in the amount of **$150,000.00**
bond date: 11/01/65

IT IS HEREBY UNDERSTOOD AND AGREED THAT effective **June 1, 2001** the name of the Principal is changed

FROM: **Mobil Oil Corporation and Mobil Exploration and Producing U.S., Inc.**

TO : **ExxonMobil Oil Corporation**

All other terms and conditions of this Bond are unchanged.

Signed, sealed and dated this 12th of June, 2001.

ExxonMobil Oil Corporation
By :

FEDERAL INSURANCE COMPANY
By: Mary Pierson
Mary Pierson, Attorney-in-fact

Chubb Surety	POWER OF ATTORNEY	Federal Insurance Company Vigilant Insurance Company Pacific Indemnity Company	Attn.: Surety Department 15 Mountain View Road Warren, NJ 07059

Know All by These Presents, That FEDERAL INSURANCE COMPANY, an Indiana corporation, VIGILANT INSURANCE COMPANY, a New York corporation, and PACIFIC INDEMNITY COMPANY, a Wisconsin corporation, do each hereby constitute and appoint R.F. Bobo, Mary Pierson, Philana Berros, and Jody E. Specht of Houston, Texas----------

each as their true and lawful Attorney-in-Fact to execute under such designation in their names and to affix their corporate seals to and deliver for and on their behalf as surety thereon or otherwise, bonds and undertakings and other writings obligatory in the nature thereof (other than bail bonds) given or executed in the course of business, and any instruments amending or altering the same, and consents to the modification or alteration of any instrument referred to in said bonds or obligations.

In Witness Whereof, said FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY have each executed and attested these presents and affixed their corporate seals on this 10th day of May, 2001.

Kenneth C. Wendel, Assistant Secretary

Frank E. Robertson, Vice President

STATE OF NEW JERSEY
County of Somerset } ss.

On this 10th day of May, 2001, before me, a Notary Public of New Jersey, personally came Kenneth C. Wendel, to me known to be Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY, the companies which executed the foregoing Power of Attorney, and the said Kenneth C. Wendel being by me duly sworn, did depose and say that he is Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY and knows the corporate seals thereof, that the seals affixed to the foregoing Power of Attorney are such corporate seals and were thereto affixed by authority of the By-Laws of said Companies; and that he signed said Power of Attorney as Assistant Secretary of said Companies by like authority; and that he is acquainted with Frank E. Robertson, and knows him to be Vice President of said Companies; and that the signature of Frank E. Robertson, subscribed to said Power of Attorney is in the genuine handwriting of Frank E. Robertson, and was thereto subscribed by authority of said Companies in deponent's presence.

Notarial Seal

Karen A. Price
Notary Public State of New Jersey
No. 2231647
Commission Expires Oct. 28, 2004

Karen A. Price
Notary Public

CERTIFICATION

Extract from the By-Laws of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY:

"All powers of attorney for and on behalf of the Company may and shall be executed in the name and on behalf of the Company, either by the Chairman or the President or a Vice President or an Assistant Vice President, jointly with the Secretary or an Assistant Secretary, under their respective designations. The signature of such officers may be engraved, printed or lithographed. The signature of each of the following officers: Chairman, President, any Vice President, any Assistant Vice President, any Secretary, any Assistant Secretary and the seal of the Company may be affixed by facsimile to any power of attorney or to any certificate relating thereto appointing Assistant Secretaries or Attorneys-in-Fact for purposes only of executing and attesting bonds and undertakings and other writings obligatory in the nature thereof, and any such power of attorney or certificate bearing such facsimile signature or facsimile seal shall be valid and binding upon the Company and any such power so executed and certified by such facsimile signature and facsimile seal shall be valid and binding upon the Company with respect to any bond or undertaking to which it is attached."

I, Kenneth C. Wendel, Assistant Secretary of FEDERAL INSURANCE COMPANY, VIGILANT INSURANCE COMPANY, and PACIFIC INDEMNITY COMPANY (the "Companies") do hereby certify that

(i) the foregoing extract of the By-Laws of the Companies is true and correct,
(ii) the Companies are duly licensed and authorized to transact surety business in all 50 of the United States of America and the District of Columbia and are authorized by the U. S. Treasury Department; further, Federal and Vigilant are licensed in Puerto Rico and the U. S. Virgin Islands, and Federal is licensed in American Samoa, Guam, and each of the Provinces of Canada except Prince Edward Island; and
(iii) the foregoing Power of Attorney is true, correct and in full force and effect.

Given under my hand and seals of said Companies at Warren, NJ this 12th day of June, 2001.

FEDERAL INSURANCE COMPANY · INDIANA · PACIFIC INDEMNITY COMPANY · WISCONSIN · VIGILANT INSURANCE COMPANY · NEW YORK

Kenneth C. Wendel, Assistant Secretary

IN THE EVENT YOU WISH TO NOTIFY US OF A CLAIM, VERIFY THE AUTHENTICITY OF THIS BOND OR NOTIFY US OF ANY OTHER MATTER, PLEASE CONTACT US AT ADDRESS LISTED ABOVE, OR BY
Telephone (908) 903-3485 Fax (908) 903-3656 e-mail: surety@chubb.com

F010601000187

CSC 45

CERTIFICATE OF AMENDMENT

OF

CERTIFICATE OF INCORPORATION

OF

MOBIL OIL CORPORATION

(Under Section 805 of the Business Corporation Law)

Pursuant to the provisions of Section 805 of the Business Corporation Law, the undersigned President and Secretary, respectively, of Mobil Oil Corporation hereby certify:

FIRST: That the name of the corporation is MOBIL OIL CORPORATION and that said corporation was incorporated under the name of Standard Oil Company of New York.

SECOND: That the Certificate of Incorporation of the corporation was filed by the Department of State, Albany, New York, on the 10th day of August, 1882.

THIRD: That the amendments to the Certificate of Incorporation effected by this Certificate are as follows:

(a) Article 1st of the Certificate of Incorporation, relating to the corporate name, is hereby amended to read as follows:

"1st The corporate name of said Company shall be,

ExxonMobil Oil Corporation",

(b) Article 7th of the Certificate of Incorporation, relating to the office of the corporation is hereby amended to read as follows:

The office of the corporation within the State of New York is to be located in the County of Albany. The Company shall have offices at such other places as the Board of Directors may from time to time determine.

FOURTH: That the amendments to the Certificate of Incorporation were authorized by the Board of Directors followed by the holder of all outstanding shares entitled to vote on amendments to the Certificate of Incorporation by written consent of the sole shareholder dated May 22, 2001.

IN WITNESS WHEREOF, this Certificate has been signed this 22nd Day of May, 2001.

F. A. Ritch, President

STATE OF TEXAS)
COUNTY OF DALLAS)

F. L. REID, being duly sworn, deposes and says that he is the Secretary of MOBIL OIL CORPORATION, the corporation mentioned and described in the foregoing instrument; that he has read and signed the same and that the statements contained therein are true.

F. L. REID, Secretary

SUBSCRIBED AND SWORN TO before me, the undersigned authority, on this the 22nd day of May, 2001.

[SEAL]

NOTARY PUBLIC, STATE OF TEXAS

JANICE M. PHILLIPS
MY COMMISSION EXPIRES
May 16, 2002

CSC
CSC

5184334741

06/01 '01 09:01 NO.411 02/02
06/01 '01 09:06 NO.139 04/04

F010601000187

CSC 45

CERTIFICATE OF AMENDMENT

OF

MOBIL OIL CORPORATION

Under Section 805 of the Business Corporation Law

SAC

100 cc

STATE OF NEW YORK
DEPARTMENT OF STATE
FILED JUN 01 2001
TAX $
BY: SAC
NY | Albany

Filed by: EXXONMOBIL CORPORATION
(Name)

5959 Las Colinas Blvd.
(Mailing address)

Irving, TX 75039-2298
(City, State and Zip code)

Cust Ref # 165578MPJ

RECEIVED
JUL 05 2001
DIVISION OF REAL ESTATE SERVICES

010601000195

State of New York } ss:
Department of State }

I hereby certify that the annexed copy has been compared with the original document in the custody of the Secretary of State and that the same is a true copy of said original.

Witness my hand and seal of the Department of State on JUN 01 2001

STATE OF NEW YORK ★ DEPARTMENT OF STATE ★

Special Deputy Secretary of State

DOS-1266 (7/00)

Division of Oil, Gas and Mining

OPERATOR CHANGE WORKSHEET

ROUTING
1. GLH
2. CDW
3. FILE

Change of Operator (Well Sold) — Designation of Agent

X Operator Name Change — Merger

The operator of the well(s) listed below has changed, effective: **06-01-2001**

FROM: (Old Operator):	**TO:** (New Operator):
MOBIL EXPLORATION & PRODUCTION	EXXONMOBIL OIL CORPORATION
Address: P O BOX DRAWER "G"	Address: U S WEST P O BOX 4358
CORTEZ, CO 81321	HOUSTON, TX 77210-4358
Phone: 1-(970)-564-5212	Phone: 1-(713)-431-1010
Account No. N7370	Account No. N1855

CA No. **Unit:** **RATHERFORD**

WELL(S)

NAME	SEC TWN RNG	API NO	ENTITY NO	LEASE TYPE	WELL TYPE	WELL STATUS
1-24	01-41S-23E	43-037-15839	6280	INDIAN	WI	A
N DESERT CR 44-2 (2-44)	02-41S-23E	43-037-16386	99990	INDIAN	WI	A
11-42	11-41S-23E	43-037-15841	6280	INDIAN	WI	A
11-44	11-41S-23E	43-037-15842	6280	INDIAN	WI	A
12-11	12-41S-23E	43-037-15843	6280	INDIAN	WI	A
RATHERFORD 12-W-22	12-41S-23E	43-037-15845	6280	INDIAN	WI	A
12-31	12-41S-23E	43-037-15847	6280	INDIAN	WI	A
RATHERFORD 12-W-33	12-41S-23E	43-037-15848	6280	INDIAN	WI	A
12-42	12-41S-23E	43-037-15850	6280	INDIAN	WI	A
N DESERT CR 13-12 (12-13)	12-41S-23E	43-037-16404	99990	INDIAN	WI	A
RATHERFORD U 12-24	12-41S-23E	43-037-31151	6280	INDIAN	WI	A
RATHERFORD U 12-W-44A	12-41S-23E	43-037-31543	6280	INDIAN	WI	A
13-W-13	13-41S-23E	43-037-15851	6280	INDIAN	WI	A
13-22	13-41S-23E	43-037-15852	6280	INDIAN	WI	A
13-24	13-41S-23E	43-037-15853	6280	INDIAN	WI	A
13-31	13-41S-23E	43-037-15854	6280	INDIAN	WI	A
RATHERFORD 13-W-33	13-41S-23E	43-037-15855	6280	INDIAN	WI	A
13-42	13-41S-23E	43-037-15857	6280	INDIAN	WI	A
N DESERT CR 44-13 (13W44)	13-41S-23E	43-037-16407	99990	INDIAN	WI	A
RATHERFORD U 13-W-11	13-41S-23E	43-037-31152	6280	INDIAN	WI	A

OPERATOR CHANGES DOCUMENTATION

Enter date after each listed item is completed

1. (R649-8-10) Sundry or legal documentation was received from the **FORMER** operator on: 06/29/2001
2. (R649-8-10) Sundry or legal documentation was received from the **NEW** operator on: 06/29/2001
3. The new company has been checked through the **Department of Commerce, Division of Corporations Database on:** 04/09/2002
4. Is the new operator registered in the State of Utah: YES Business Number: 579865-0143
5. If **NO**, the operator was contacted contacted on: N/A

6. **Federal and Indian Lease Wells:** The BLM and or the BIA has approved the merger, name change, or operator change for all wells listed on Federal or Indian leases on: BIA-06/01/01

7. **Federal and Indian Units:**
The BLM or BIA has approved the successor of unit operator for wells listed on: 06/01/2001

8. **Federal and Indian Communization Agreements ("CA"):**
The BLM or BIA has approved the operator for all wells listed within a CA on: N/A

9. **Underground Injection Control ("UIC")** The Division has approved UIC Form 5, **Transfer of Authority to Inject,** for the enhanced/secondary recovery unit/project for the water disposal well(s) listed on: N/A
NOTE: EPA ISSUES UIC PERMIT

DATA ENTRY:

1. Changes entered in the **Oil and Gas Database on:** 04/09/2002
2. Changes have been entered on the **Monthly Operator Change Spread Sheet on:** 04/9/2002
3. Bond information entered in RBDMS on: N/A
4. Fee wells attached to bond in RBDMS on: N/A

STATE WELL(S) BOND VERIFICATION:

1. State well(s) covered by Bond Number: N/A

FEDERAL WELL(S) BOND VERIFICATION:

1. Federal well(s) covered by Bond Number: N/A

INDIAN WELL(S) BOND VERIFICATION:

1. Indian well(s) covered by Bond Number: 80273197

FEE WELL(S) BOND VERIFICATION:

1. (R649-3-1) The **NEW** operator of any fee well(s) listed covered by Bond Number N/A
2. The **FORMER** operator has requested a release of liability from their bond on: N/A
The Division sent response by letter on: N/A

LEASE INTEREST OWNER NOTIFICATION:

3. (R649-2-10) The **FORMER** operator of the fee wells has been contacted and informed by a letter from the Division of their responsibility to notify all interest owners of this change on: N/A

COMMENTS:

Division of Oil, Gas and Mining

OPERATOR CHANGE WORKSHEET

ROUTING
1. DJJ
2. CDW

X Change of Operator (Well Sold) Operator Name Change/Merger

The operator of the well(s) listed below has changed, effective: **6/1/2006**

FROM: (Old Operator):	**TO:** (New Operator):
N1855-ExxonMobil Oil Corporation	N2700-Resolute Natural Resources Company
PO Box 4358	1675 Broadway, Suite 1950
Houston, TX 77210-4358	Denver, CO 80202
Phone: 1 (281) 654-1936	Phone: 1 (303) 534-4600

CA No. **Unit:** **RATHERFORD (UIC)**

OPERATOR CHANGES DOCUMENTATION

Enter date after each listed item is completed

1. (R649-8-10) Sundry or legal documentation was received from the **FORMER** operator on: 4/21/2006
2. (R649-8-10) Sundry or legal documentation was received from the **NEW** operator on: 4/24/2006
3. The new company was checked on the **Department of Commerce, Division of Corporations Database on:** 6/7/2006
4. Is the new operator registered in the State of Utah: YES Business Number: 5733505-0143
5. If **NO**, the operator was contacted contacted on:

6a. (R649-9-2)Waste Management Plan has been received on: requested

6b. Inspections of LA PA state/fee well sites complete on: n/a

6c. Reports current for Production/Disposition & Sundries on: ok

7. **Federal and Indian Lease Wells:** The BLM and or the BIA has approved the merger, name change, or operator change for all wells listed on Federal or Indian leases on: BLM n/a BIA not yet
8. **Federal and Indian Units:**
   The BLM or BIA has approved the successor of unit operator for wells listed on: not yet
9. **Federal and Indian Communization Agreements ("CA"):**
   The BLM or BIA has approved the operator for all wells listed within a CA on: n/a
10. **Underground Injection Control ("UIC")** The Division has approved UIC Form 5, **Transfer of Authority to Inject,** for the enhanced/secondary recovery unit/project for the water disposal well(s) listed on: 6/12/2006

DATA ENTRY:

1. Changes entered in the **Oil and Gas Database on:** 6/22/2006
2. Changes have been entered on the **Monthly Operator Change Spread Sheet on:** 6/22/2006
3. Bond information entered in RBDMS on: n/a
4. Fee/State wells attached to bond in RBDMS on: n/a
5. Injection Projects to new operator in RBDMS on: 6/22/2006
6. Receipt of Acceptance of Drilling Procedures for APD/New on: n/a

BOND VERIFICATION:

1. Federal well(s) covered by Bond Number: n/a
2. Indian well(s) covered by Bond Number: PA002769
3. (R649-3-1) The **NEW** operator of any fee well(s) listed covered by Bond Number n/a

a. The **FORMER** operator has requested a release of liability from their bond on: n/a
The Division sent response by letter on: n/a

LEASE INTEREST OWNER NOTIFICATION:

4. (R649-2-10) The **FORMER** operator of the fee wells has been contacted and informed by a letter from the Division of their responsibility to notify all interest owners of this change on: n/a

COMMENTS:

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

UIC FORM 5

TRANSFER OF AUTHORITY TO INJECT

Well Name and Number See attached list	API Number Attached
Location of Well Footage : See attached list County : San Juan QQ, Section, Township, Range: State : UTAH	Field or Unit Name Ratherford Unit Lease Designation and Number See attached list

EFFECTIVE DATE OF TRANSFER: 6/1/2006

CURRENT OPERATOR

Company: Exxon Mobil Oil Corporation
Address: PO Box 4358
city Houston state TX zip 77210-4358
Phone: (281) 654-1936
Comments: Exxon Mobil has submitted a separate, signed copy of UIC Form 5

Name:
Signature:
Title:
Date:

NEW OPERATOR

Company: Resolute Natural Resources Company
Address: 1675 Broadway, Suite 1950
city Denver state CO zip 80202
Phone: (303) 534-4600
Comments: A list of affected UIC wells is attached.
New bond numbers for these wells are:
BIA Bond # PA002769 and US EPA Bond # B001252

Name: Dwight E Mallory
Signature:
Title: Regulatory Coordinator
Date: 4/20/2006

(This space for State use only)

Transfer approved by:
Title: Field Operations Manager
Approval Date: 6/12/06

Comments:

RECEIVED
APR 24 2006
DIV. OF OIL, GAS & MINING

(5/2000)

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

FORM 9

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill new wells, significantly deepen existing wells below current bottom-hole depth, reenter plugged wells, or to drill horizontal laterals. Use APPLICATION FOR PERMIT TO DRILL form for such proposals.

5. LEASE DESIGNATION AND SERIAL NUMBER: See attached list
6. IF INDIAN, ALLOTTEE OR TRIBE NAME: Navajo Tribe
7. UNIT or CA AGREEMENT NAME: Ratherford Unit
8. WELL NAME and NUMBER: See attached list
9. API NUMBER: Attached
10. FIELD AND POOL, OR WILDCAT: Greater Aneth

1. TYPE OF WELL: OIL WELL ☐ GAS WELL ☐ OTHER Unit Agreement

2. NAME OF OPERATOR: Resolute Natural Resources Company N2700

3. ADDRESS OF OPERATOR: 1675 Broadway, Suite 1950 CITY Denver STATE CO ZIP 80202 PHONE NUMBER: (303) 534-4600

4. LOCATION OF WELL
FOOTAGES AT SURFACE: See attached list COUNTY: San Juan
QTR/QTR, SECTION, TOWNSHIP, RANGE, MERIDIAN: STATE: UTAH

11. CHECK APPROPRIATE BOXES TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION		
☐ NOTICE OF INTENT (Submit in Duplicate)	☐ ACIDIZE	☐ DEEPEN	☐ REPERFORATE CURRENT FORMATION
Approximate date work will start:	☐ ALTER CASING	☐ FRACTURE TREAT	☐ SIDETRACK TO REPAIR WELL
	☐ CASING REPAIR	☐ NEW CONSTRUCTION	☐ TEMPORARILY ABANDON
	☐ CHANGE TO PREVIOUS PLANS	☑ OPERATOR CHANGE	☐ TUBING REPAIR
	☐ CHANGE TUBING	☐ PLUG AND ABANDON	☐ VENT OR FLARE
☑ SUBSEQUENT REPORT (Submit Original Form Only)	☐ CHANGE WELL NAME	☐ PLUG BACK	☐ WATER DISPOSAL
Date of work completion:	☐ CHANGE WELL STATUS	☐ PRODUCTION (START/RESUME)	☐ WATER SHUT-OFF
	☐ COMMINGLE PRODUCING FORMATIONS	☐ RECLAMATION OF WELL SITE	☐ OTHER:
	☐ CONVERT WELL TYPE	☐ RECOMPLETE - DIFFERENT FORMATION	

12. DESCRIBE PROPOSED OR COMPLETED OPERATIONS. Clearly show all pertinent details including dates, depths, volumes, etc.

Effective June 1, 2006 Exxon Mobil Oil Corporation resigns as operator of the Ratherford Unit. Also effective June 1, 2006 Resolute Natural Resources Company is designated as successor operator of the Ratherford Unit.

A list of affected producing and water source wells is attached. A separate of affected injection wells is being submitted with UIC Form 5, Transfer of Authority to Inject.

As of the effective date, bond coverage for the affected wells will transfer to BIA Bond # PA002769.

NAME (PLEASE PRINT) Dwight E Mallory TITLE Regulatory Coordinator
SIGNATURE DATE 4/20/2006

(This space for State use only)

APPROVED 6/27/06
Earlene Russell
Division of Oil, Gas and Mining
Earlene Russell, Engineering Technician

RECEIVED
APR 24 2006
DIV. OF OIL, GAS & MINING

(5/2000) (See Instructions on Reverse Side)

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

FORM 9

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill new wells, significantly deepen existing wells below current bottom-hole depth, reenter plugged wells, or to drill horizontal laterals. Use APPLICATION FOR PERMIT TO DRILL form for such proposals.

5. LEASE DESIGNATION AND SERIAL NUMBER:

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: Ship Rock

7. UNIT or CA AGREEMENT NAME: UTU68931A

8. WELL NAME and NUMBER: Ratherford

9. API NUMBER: attached

10. FIELD AND POOL, OR WILDCAT: Aneth

1. TYPE OF WELL: OIL WELL ☐ GAS WELL ☐ OTHER Injection

2. NAME OF OPERATOR: ExxonMobil Oil Corporation N1855

3. ADDRESS OF OPERATOR: P.O. Box 4358 CITY Houston STATE TX ZIP 77210-4358 PHONE NUMBER: (281) 654-1936

4. LOCATION OF WELL

FOOTAGES AT SURFACE:

COUNTY: San Juan

QTR/QTR, SECTION, TOWNSHIP, RANGE, MERIDIAN:

STATE: UTAH

11. CHECK APPROPRIATE BOXES TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION		
☑ NOTICE OF INTENT (Submit in Duplicate)	☐ ACIDIZE	☐ DEEPEN	☐ REPERFORATE CURRENT FORMATION
Approximate date work will start:	☐ ALTER CASING	☐ FRACTURE TREAT	☐ SIDETRACK TO REPAIR WELL
6/1/2006	☐ CASING REPAIR	☐ NEW CONSTRUCTION	☐ TEMPORARILY ABANDON
	☐ CHANGE TO PREVIOUS PLANS	☑ OPERATOR CHANGE	☐ TUBING REPAIR
	☐ CHANGE TUBING	☐ PLUG AND ABANDON	☐ VENT OR FLARE
☐ SUBSEQUENT REPORT (Submit Original Form Only)	☐ CHANGE WELL NAME	☐ PLUG BACK	☐ WATER DISPOSAL
Date of work completion:	☐ CHANGE WELL STATUS	☐ PRODUCTION (START/RESUME)	☐ WATER SHUT-OFF
	☐ COMMINGLE PRODUCING FORMATIONS	☐ RECLAMATION OF WELL SITE	☐ OTHER:
	☐ CONVERT WELL TYPE	☐ RECOMPLETE - DIFFERENT FORMATION	

12. DESCRIBE PROPOSED OR COMPLETED OPERATIONS. Clearly show all pertinent details including dates, depths, volumes, etc.

ExxonMobil Oil Corporation is transferring operatorship of Greater Aneth field, Ratherford lease to Resolute Natural Resources Company. All change of operator notices should be made effective as of 7:00 AM MST on June 1, 2006.

Attached please find a listing of injection wells included in the transfer.

NAME (PLEASE PRINT) Laurie Kilbride TITLE Permitting Supervisor

SIGNATURE Laurie O. Kilbride DATE 4/19/2006

(This space for State use only) APPROVED 6/27/06
Earlene Russell
Division of Oil, Gas and Mining
Earlene Russell, Engineering Technician

(See Instructions on Reverse Side)

RECEIVED
APR 21 2006
DIV. OF OIL, GAS & MINING

(5/2000)

GREATER ANETH FIELD UIC WELL LIST
Ratherford lease, San Juan County, Utah

Reg Lease Name	Well ID	API Num	Status	Reg Lease #	Surface Location						
					Qtr 1	Qtr 2	Sec	TN	RNG	NS Foot	EW Foot
RATHERFORD UNIT	1W24	430371583900S1	Shut-in	14-20-603-246A	NE	SE	1	41S	23E	0651FSL	3300FEL
RATHERFORD UNIT	2W44	430371638600S1	Active	14-20-603-246A	SE	SE	2	41S	23E	0810FSL	**0510FEL**
RATHERFORD UNIT	11W42	430371584100S1	Active	14-20-603-246A	SE	NE	11	41S	23E	3290FSL	4617FWL
RATHERFORD UNIT	11W44	430371584200S1	Shut-in	14-20-603-246A	SE	SE	11	41S	23E	0660FSL	0558FEL
RATHERFORD UNIT	12W11	430371584300S1	Active	14-20-603-246A	NW	NW	12	41S	23E	0678FNL	4620FEL
RATHERFORD UNIT	12W13	430371640400S1	Active	14-20-603-246A	NW	SW	12	41S	23E	1980FSL	4620FEL
RATHERFORD UNIT	12W22	430371584501S1	Active	14-20-603-246A	SE	NW	12	41S	23E	1920FNL	2080FWL
RATHERFORD UNIT	12W24	430373115101S1	Active	14-20-603-246A	SE	SW	12	41S	23E	0775FSL	1980FWL
RATHERFORD UNIT	12W31	430371584700S1	Active	14-20-603-246A	NW	NE	12	41S	23E	0661FNL	1981FEL
RATHERFORD UNIT	12W33	430371584800S1	Active	14-20-603-246A	NW	SE	12	41S	23E	1958FSL	3300FEL
RATHERFORD UNIT	12W42	430371585000S1	Active	14-20-603-246A	SE	NE	12	41S	23E	3275FSL	0662FEL
RATHERFORD UNIT	12W44A	430373154300S1	Shut-in	14-20-603-246A	SE	SE	12	41S	23E	0772FSL	0807FEL
RATHERFORD UNIT	13W11	430373115201S1	Active	14-20-603-247A	NW	NW	13	41S	23E	0500FNL	0660FWL
RATHERFORD UNIT	13W13	430371585100S1	Active	14-20-603-247A	NW	SW	13	41S	23E	1980FSL	4620FEL
RATHERFORD UNIT	13W22	430371585200S1	Active	14-20-603-247A	SE	NW	13	41S	23E	1988FNL	3300FEL
RATHERFORD UNIT	13W24	430371585300S1	Active	14-20-603-247A	SE	SW	13	41S	23E	0660FSL	3300FEL
RATHERFORD UNIT	13W33	430371585501S1	Active	14-20-603-247A	NW	SE	13	41S	23E	1970FSL	1979FEL
RATHERFORD UNIT	13W42	430371585700S1	Shut-in	14-20-603-247A	SE	NE	13	41S	23E	2139FNL	0585FEL
RATHERFORD UNIT	13W44	430371640700S1	Active	14-20-603-247A	SE	SE	13	41S	23E	0653FSL	0659FEL
RATHERFORD UNIT	14-31	430373171700S1	Active	14-20-603-247A	NW	NE	14	41S	23E	0754FNL	1604FEL
RATHERFORD UNIT	14W42	430371586001S1	Active	14-20-603-247A	SE	NE	14	41S	23E	1976FNL	653FEL
RATHERFORD UNIT	24W31	430371586200S1	Shut-in	14-20-603-247A	NW	NE	24	41S	24E	0560FNL	1830FEL
RATHERFORD UNIT	24W42	430371586300S1	Shut-in	14-20-603-247A	SE	NE	24	41S	24E	1980FNL	0660FEL
RATHERFORD UNIT	17W12	430371572601S1	Active	14-20-603-353	SW	NW	17	41S	24E	1980FNL	510FWL
RATHERFORD UNIT	17W14	430371572700S1	Active	14-20-603-353	SW	SW	17	41S	24E	0610FSL	0510FWL
RATHERFORD UNIT	17W21	430371641601S1	Active	14-20-603-353	NE	**NW**	17	41S	24E	0510FNL	1830FWL
RATHERFORD UNIT	17W23	430371572801S1	Active	14-20-603-353	NE	SW	17	41S	24E	1880FSL	1980FWL
RATHERFORD UNIT	17W32	430371572900S1	TA'd	14-20-603-353	SW	NE	17	41S	24E	1830FNL	2030FEL
RATHERFORD UNIT	17W34	430371573000S1	Active	14-20-603-353	SW	SE	17	41S	24E	0560FSL	1880FEL
RATHERFORD UNIT	17W41	430371573100S1	Shut-in	14-20-603-353	NE	NE	17	41S	24E	0610FNL	0510FEL
RATHERFORD UNIT	17W43	430371641701S1	Active	14-20-603-353	NE	SE	17	41S	24E	1980FSL	0660FEL
RATHERFORD UNIT	18-43B	430373171801S1	Active	14-20-603-353	NE	SE	18	41S	24E	2023FSL	0651FEL
RATHERFORD UNIT	18W12	430373115301S1	Active	14-20-603-353	SW	NW	18	41S	24E	1980FNL	560FWL
RATHERFORD UNIT	18W14	430371573501S1	Active	14-20-603-353	SW	SW	18	41S	24E	0810FSL	0600FWL
RATHERFORD UNIT	18W21	430371641801S1	Active	14-20-603-353	NE	NW	18	41S	24E	660FNL	1882FWL
RATHERFORD UNIT	18W23	430373024400S1	Shut-in	14-20-603-353	NE	SW	18	41S	24E	2385FSL	2040FWL
RATHERFORD UNIT	18W32	430371573601S1	Active	14-20-603-353	SW	NE	18	41S	24E	2140FNL	1830FEL
RATHERFORD UNIT	18W34	430371573701S1	Active	14-20-603-353	SW	SE	18	41S	24E	780FSL	1860FEL
RATHERFORD UNIT	18W41	430371573800S1	TA'd	14-20-603-353	NE	NE	18	41S	24E	0660FNL	0660FEL
RATHERFORD UNIT	19-12	430371573901S1	Active	14-20-603-353	SW	NW	19	41S	24E	1980FNL	0600FWL
RATHERFORD UNIT	19-32	430371574301S1	Active	14-20-603-353	SW	NE	19	41S	24E	2717FNL	2802FEL
RATHERFORD UNIT	19-34	430371574401S1	Active	14-20-603-353	SW	SE	19	41S	24E	0660FSL	1980FEL
RATHERFORD UNIT	19W21	430371574100S1	Shut-in	14-20-603-353	NE	NW	19	41S	24E	0660FNL	1860FWL
RATHERFORD UNIT	19W23	430371574200S1	Shut-in	14-20-603-353	NE	SW	19	41S	24E	2080FSL	1860FWL
RATHERFORD UNIT	19W43	430371642000S1	Shut-in	14-20-603-353	NE	SE	19	41S	24E	1980FSL	0760FEL
RATHERFORD UNIT	20-12	430371574601S1	Active	14-20-603-353	SW	NW	20	41S	24E	0709FNL	0748FEL
RATHERFORD UNIT	20-14	430371574701S1	Active	14-20-603-353	SW	SW	20	41S	24E	0660FSL	0660FWL
RATHERFORD UNIT	20-32	430371574901S1	Active	14-20-603-353	SW	NE	20	41S	24E	0037FNL	0035FWL
RATHERFORD UNIT	20-34	430371575001S1	Active	14-20-603-353	SW	SE	20	41S	24E	0774FNL	0617FWL
RATHERFORD UNIT	20-67	430373159000S1	Active	14-20-603-353	NE	SW	20	41S	24E	2629FSL	1412FWL
RATHERFORD UNIT	20W21	430371642300S1	Active	14-20-603-353	NE	NW	20	41S	24E	0660FNL	1880FWL
RATHERFORD UNIT	20W23	430371574800S1	Active	14-20-603-353	NW	SW	20	41S	24E	2080FSL	2120FWL
RATHERFORD UNIT	20W41	430371575100S1	Active	14-20-603-353	NE	NE	20	41S	24E	0660FNL	0660FEL
RATHERFORD UNIT	20W43	430371642400S1	TA'd	14-20-603-353	NE	SE	20	41S	24E	2070FSL	0810FEL
RATHERFORD UNIT	16W12	430371572000S1	Active	14-20-603-355	SW	NW	16	41S	24E	1880FNL	0660FWL

GREATER ANETH FIELD UIC WELL LIST
Ratherford lease, San Juan County, Utah

Reg Lease Name	Well ID	API Num	Status	Reg Lease #	Surface Location						
					Qtr 1	Qtr 2	Sec	TN	RNG	NS Foot	EW Foot
RATHERFORD UNIT	16W14	430371572100S1	Shut-in	14-20-603-355	SW	SW	16	41S	24E	0660FSL	0660FWL
RATHERFORD UNIT	16W21	430371641400S1	Active	14-20-603-355	NE	NW	16	41S	24E	0660FNL	1880FWL
RATHERFORD UNIT	16W23	430371572201S1	Active	14-20-603-355	NE	SW	16	41S	24E	1980FSL	1980FWL
RATHERFORD UNIT	16W43	430371641501S1	Active	14-20-603-355	NE	SE	16	41S	24E	2140FSL	0820FEL
RATHERFORD UNIT	21-14	430371575301S1	Active	14-20-603-355	SW	SW	21	41S	24E	0660FSL	0460FWL
RATHERFORD UNIT	21-67	430373175301S1	Active	14-20-603-355	NE	SW	21	41S	24E	2560FSL	1325FWL
RATHERFORD UNIT	21W21	430371642501S1	Active	14-20-603-355	NE	NW	21	41S	24E	0660FNL	2030FWL
RATHERFORD UNIT	**6W14**	430371598400S1	Active	14-20-603-368	NE	SE	6	41S	24E	0660FSL	0660FWL
RATHERFORD UNIT	7W12	430371598500S1	Active	14-20-603-368	NE	SE	7	41S	24E	2140FNL	0585FWL
RATHERFORD UNIT	7W14	430371598600S1	Active	14-20-603-368	NE	SE	7	41S	24E	1065FSL	0660FWL
RATHERFORD UNIT	7W21	430371639400S1	Active	14-20-603-368	**NE**	NW	7	41S	24E	0710FNL	1820FWL
RATHERFORD UNIT	7W34	430371598900S1	Active	14-20-603-368	SW	SE	7	41S	24E	0710FSL	2003FEL
RATHERFORD UNIT	7W43	430371639500S1	Active	14-20-603-368	NE	SE	7	41S	24E	2110FSL	0660FEL
RATHERFORD UNIT	**8W14**	430371599200S1	Active	14-20-603-368	SW	NE	8	41S	24E	0745FSL	0575FWL
RATHERFORD UNIT	10W43	430371640300S1	TA'd	14-20-603-4037	NE	SE	10	41S	24E	1980FSL	0550FEL
RATHERFORD UNIT	29-12	430371533701S1	Active	14-20-603-407	SW	**NW**	29	41S	24E	2870FNL	1422FWL
RATHERFORD UNIT	29-32	430371533901S1	Active	14-20-603-407	SW	NE	29	41S	24E	0694FNL	0685FWL
RATHERFORD UNIT	29W21	430371643200S1	Active	14-20-603-407	NE	NW	29	41S	24E	0667FNL	2122FWL
RATHERFORD UNIT	29W41	430371643300S1	Active	14-20-603-407	NE	NE	29	41S	24E	0557FNL	0591FEL
RATHERFORD UNIT	29W43	430371643400S1	Shut-in	14-20-603-407	NE	SE	29	41S	24E	1980FSL	0660FEL
RATHERFORD UNIT	30W41	430371534300S1	Shut-in	14-20-603-407	NE	NE	30	41S	24E	0660FNL	0660FEL
RATHERFORD UNIT	28-12	430371533601S1	Active	14-20-603-409	SW	SE	28	41S	24E	2121FNL	0623FWL
RATHERFORD UNIT	28W21	430371643100S1	Shut-in	14-20-603-409	NE	NW	28	41S	24E	0660FNL	2022FWL
RATHERFORD UNIT	9W23	430371639800S1	Active	14-20-603-5046	NW	SE	9	41S	24E	1980FSL	1980FWL

FEDERAL APPROVAL OF THIS ACTION IS NECESSARY

FORM 9

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS, AND MINING

5.LEASE DESIGNATION AND SERIAL NUMBER: 14-20-603-247A

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill new wells, significantly deepen existing wells below current bottom-hole depth, reenter plugged wells, or to drill horizontal laterals. Use APPLICATION FOR PERMIT TO DRILL form for such proposals.

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: NAVAJO

7.UNIT or CA AGREEMENT NAME: RATHERFORD

1. TYPE OF WELL Water Injection Well

8. WELL NAME and NUMBER: RATHERFORD U 13-W-11

2. NAME OF OPERATOR: RESOLUTE NATURAL RESOURCES

9. API NUMBER: 43037311520000

3. ADDRESS OF OPERATOR: 1700 Lincoln Street, Suite 2800 , Denver, CO, 80203 4535

PHONE NUMBER: 303 534-4600 Ext

9. FIELD and POOL or WILDCAT: GREATER ANETH

4. LOCATION OF WELL
FOOTAGES AT SURFACE: 0500 FNL 0660 FWL
QTR/QTR, SECTION, TOWNSHIP, RANGE, MERIDIAN: Qtr/Qtr: NWNW Section: 13 Township: 41.0S Range: 23.0E Meridian: S

COUNTY: SAN JUAN

STATE: UTAH

11. CHECK APPROPRIATE BOXES TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION

- ✓ NOTICE OF INTENT — Approximate date work will start: 10/10/2014
- ☐ SUBSEQUENT REPORT — Date of Work Completion:
- ☐ SPUD REPORT — Date of Spud:
- ☐ DRILLING REPORT — Report Date:

TYPE OF ACTION

✓ ACIDIZE	☐ ALTER CASING	☐ CASING REPAIR
☐ CHANGE TO PREVIOUS PLANS	☐ CHANGE TUBING	☐ CHANGE WELL NAME
☐ CHANGE WELL STATUS	☐ COMMINGLE PRODUCING FORMATIONS	☐ CONVERT WELL TYPE
☐ DEEPEN	☐ FRACTURE TREAT	☐ NEW CONSTRUCTION
☐ OPERATOR CHANGE	☐ PLUG AND ABANDON	☐ PLUG BACK
☐ PRODUCTION START OR RESUME	☐ RECLAMATION OF WELL SITE	☐ RECOMPLETE DIFFERENT FORMATION
☐ REPERFORATE CURRENT FORMATION	☐ SIDETRACK TO REPAIR WELL	☐ TEMPORARY ABANDON
☐ TUBING REPAIR	☐ VENT OR FLARE	☐ WATER DISPOSAL
☐ WATER SHUTOFF	☐ SI TA STATUS EXTENSION	☐ APD EXTENSION
☐ WILDCAT WELL DETERMINATION	☐ OTHER	OTHER:

12. DESCRIBE PROPOSED OR COMPLETED OPERATIONS. Clearly show all pertinent details including dates, depths, volumes, etc.

Resolute Natural Resources respectfully submits this sundry as notice of acidizing the above well. Attached are the procedure and schematic

Accepted by the Utah Division of Oil, Gas and Mining

Date: October 07, 2014

By: Dark K Quist

NAME (PLEASE PRINT)	PHONE NUMBER	TITLE
Erin Joseph	303 573-4886	Sr. Regulatory Analyst

SIGNATURE	DATE
N/A	10/7/2014

RECEIVED: Oct. 07, 2014

RATHERFORD UNIT # 13-11
GREATER ANETH FIELD
Surface Loc: 500' FNL & 660' FWL
SEC 13-T41S-R23E
SAN JUAN COUNTY, UTAH
API 43-037-31152
PRISM 0042999

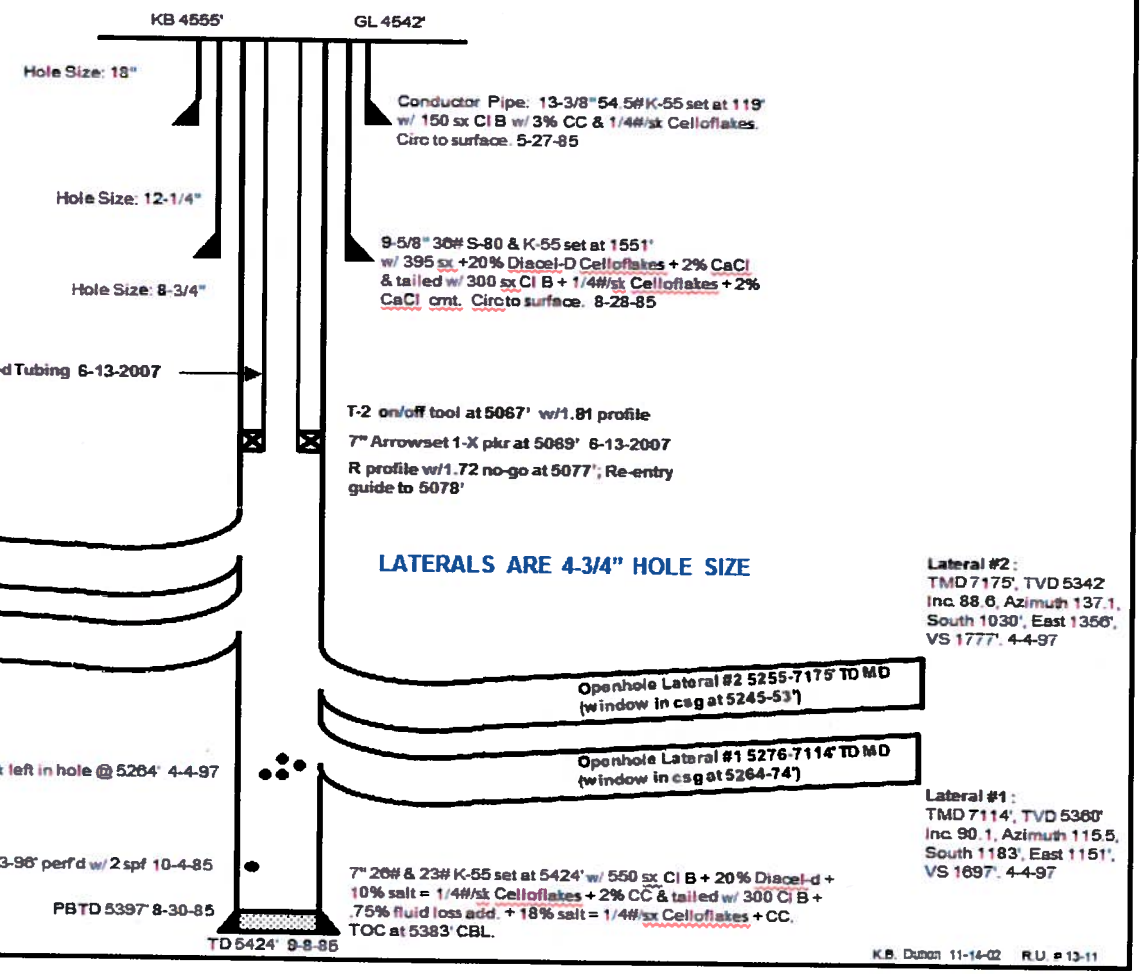
B.H. Location Lateral #1:
1183' S & 1151' E of Surface Location

B.H. Location Lateral #2:
1030' S & 1356' E of Surface Location

B.H. Location Lateral #3:
955' N & 899' W of Surface Location

B.H. Location Lateral #4:
858' N & 1170' W of Surface Location

INJECTOR



RESOLUTE
NATURAL RESOURCES

RU Injection Wells Bullhead Acid Treatments

Well Summary Table

	RU Well No.	Well Type	Current BWIPD @ TP	Current Pattern BOPD	Tbg - Csg Sizes	Tubing Run Date	Last Acid	Bbls Wtr Displ After Acid	Comment
1	12W-33	Vertical	909 @ 2910	160	2-3/8 - 4	Dec 2013	Nov 2013	30	
2	29W-32	Sgl Lateral	717 @ 3000	137	2-3/8 - 4	Jul 2013	Jun 2013	30	
3	12W-22	Tri Lateral	1045 @ 2950	129	2-3/8 - 5-1/2	Feb 1997	Feb 1997	40	
4	14W-42	Sgl Lateral	1598 @ 2950	123	2-3/8 - 4	Nov 2011	Mar 2013	30	
5	17W-14	Vertical	2402 @ 2710	104	2-7/8 - 5-1/2	Jun 2012	Oct 2006	45	
6	13W-11	Quad Lateral	892 @ 2850	101	2-7/8 - 7	Jun 2007	< 2000	45	
7	21W-14	Dual Lateral	1006 @ 2950	44	2-7/8 - 5-1/2	Jun 2003	Oct 2006	45	Tubing cmtd in csg Jul 2003.
8	19W-12	Tri Lateral	2295 @ 2610	44	2-3/8 - 5-1/2	Sept 1997	Sept 1997	45	
9	9W-23	Vertical	1461 @ 2800	32	2-3/8 - 5-1/2	Jul 1998	Aug 2007	35	
10	16W-23	Dual Lateral	1003 @ 3000	61	2-7/8 - 5-1/2	Dec 2007	Oct 2006	45	

Procedure

Horsley Witten: Not Applicable

1. Check crown valve & wing valve for integrity to ensure pump truck can rig up to well. (All wells checked by 10-2-14; New wing valves being installed at 12W-22, 14W-42 & 19W-12)
2. MIRU frac tank, manifold & hard line for flowback. RU ABC shower trailer.
3. Backflow the well for ~400 bbls or until significant gas appears, then shut in.
4. RU pumping equipment to wellhead & PT lines. Record TP, CP, Bradenhead P (BHP).
5. Pump 400 gal xylene, 2500 gal inhibited 15% HCl, produced water displacement (see table above). **Pump at maximum rate possible, staying under 3000 psi TP.** Monitor CP and BHP while pumping.
6. Rig down pumping equipment.
7. Notify Pierce Benally (435) 619-7227 that the well is ready to return to injection.
8. Open the well to injection; Record the initial injection rate and tubing pressure.

FORM 9

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS, AND MINING

5.LEASE DESIGNATION AND SERIAL NUMBER: 14-20-603-247A

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill new wells, significantly deepen existing wells below current bottom-hole depth, reenter plugged wells, or to drill horizontal laterals. Use APPLICATION FOR PERMIT TO DRILL form for such proposals.

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: NAVAJO

7.UNIT or CA AGREEMENT NAME: RATHERFORD

1. TYPE OF WELL Water Injection Well

8. WELL NAME and NUMBER: RATHERFORD U 13-W-11

2. NAME OF OPERATOR: RESOLUTE NATURAL RESOURCES

9. API NUMBER: 43037311520000

3. ADDRESS OF OPERATOR: 1700 Lincoln Street, Suite 2800 , Denver, CO, 80203 4535

PHONE NUMBER: 303 534-4600 Ext

9. FIELD and POOL or WILDCAT: GREATER ANETH

4. LOCATION OF WELL
FOOTAGES AT SURFACE: 0500 FNL 0660 FWL
QTR/QTR, SECTION, TOWNSHIP, RANGE, MERIDIAN: Qtr/Qtr: NWNW Section: 13 Township: 41.0S Range: 23.0E Meridian: S

COUNTY: SAN JUAN

STATE: UTAH

11. CHECK APPROPRIATE BOXES TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION

- ☐ NOTICE OF INTENT — Approximate date work will start:
- ✓ SUBSEQUENT REPORT — Date of Work Completion: 10/23/2014
- ☐ SPUD REPORT — Date of Spud:
- ☐ DRILLING REPORT — Report Date:

TYPE OF ACTION

✓ ACIDIZE	☐ ALTER CASING	☐ CASING REPAIR
☐ CHANGE TO PREVIOUS PLANS	☐ CHANGE TUBING	☐ CHANGE WELL NAME
☐ CHANGE WELL STATUS	☐ COMMINGLE PRODUCING FORMATIONS	☐ CONVERT WELL TYPE
☐ DEEPEN	☐ FRACTURE TREAT	☐ NEW CONSTRUCTION
☐ OPERATOR CHANGE	☐ PLUG AND ABANDON	☐ PLUG BACK
☐ PRODUCTION START OR RESUME	☐ RECLAMATION OF WELL SITE	☐ RECOMPLETE DIFFERENT FORMATION
☐ REPERFORATE CURRENT FORMATION	☐ SIDETRACK TO REPAIR WELL	☐ TEMPORARY ABANDON
☐ TUBING REPAIR	☐ VENT OR FLARE	☐ WATER DISPOSAL
☐ WATER SHUTOFF	☐ SI TA STATUS EXTENSION	☐ APD EXTENSION
☐ WILDCAT WELL DETERMINATION	☐ OTHER	OTHER:

12. DESCRIBE PROPOSED OR COMPLETED OPERATIONS. Clearly show all pertinent details including dates, depths, volumes, etc.

Resolute Natural Resources submits this sundry as notice that the acidizing on the above well was completed on 10/23/2014 please see attached activity summary for details.

Accepted by the Utah Division of Oil, Gas and Mining
FOR RECORD ONLY
December 09, 2014

NAME (PLEASE PRINT)	PHONE NUMBER	TITLE
Erin Joseph	303 573-4886	Sr. Regulatory Analyst

SIGNATURE	DATE
N/A	12/8/2014

RECEIVED: Dec. 08, 2014

RESOLUTE
NATURAL RESOURCES

Daily Activity Summary

Well Name: RU 13-11

API Number	Section	Township	Range	Field Name	County	State/Province
4303731152	13	41S	23E	Ratherford	San Juan	Utah

Ground Elevation (ft)	Original KB Elevation (ft)	KB-Ground Distance (ft)	Regulatory Spud Date	Rig Release Date/Time	First Production Date
4,546.00	4,559.00	13.00	8/26/1985 00:00	4/4/1997 00:00	

Job Category	Primary Job Type	AFE Number
Workover	W/O Injection Well	

Start Date	End Date	Total AFE Amount (Cost)
10/23/2014	10/23/2014	

Objective

Job Scope: Backflow the well, RU to wellhead and pump 400 gals xylene or specified solvent,~2500 gal 15% inhibited HCl acid, and displacement water. Return to injection.

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Contractor	Rig Number	Rig on Report Date	Rig off report date

Report Number	Start Date	End Date	Summary
1	10/23/2014 13:45	10/23/2014 19:30	FTP 2,800 psig, SICP 0 psig, flow back tbg to flowback tank. Flowed back 400 BPW. SWI @ 2,100 psig. SITP 2,310 psig, SICP 0 psig, BH 35 psig. Ppd 1/2 BFW, PT lines to 4,000 psig. Ppd 9.5 bbls xylene (400 gallons) and 36.9 bbls of 15% HCL acid @ 16 gal/m @ 2,850 psig. SD for 20 min. Xylene below tbg. Continue to pump 15% HCL. After starting to pump acid again, rate press drpd to 2,600 psig. Increased rate to 3.8 b/m @ 2,950 psig. Rate held steady @ 30.8 b/m. Displaced w/45 BFW. Did not have any increase in csg or BH pressure during pumping operations. ISIP 2,950 psig, 5 min - 15 min 2,600 psig. RDMO H&M acid truck. Left well SI for 2 hrs. Pumped a total of 2,500 gallons 15% HCL & 400 gallons of Xylene.

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