Form 3160-3
(July 1992)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN TRIPLICATE (Other instructions on reverse side)

RECEIVED OCT 23 1995 DIV. OF OIL, GAS & MINING

FORM APPROVED
OMB NO. 1004-0136
Expires: February 28, 1995

APPLICATION FOR PERMIT TO DRILL OR DEEPEN

1a. TYPE OF WORK: DRILL [X] DEEPEN [ ]

b. TYPE OF WELL: OIL WELL [X] GAS WELL [ ] OTHER HORIZONTAL SINGLE ZONE [X] MULTIPLE ZONE [ ]

2. NAME OF OPERATOR: Mobil Exploration & Producing U.S. Inc. as Agent for Mobil Producing TX & NM Incx.

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: 2587' FSL, 2410' FWL
At proposed prod. zone: BHL 70' FSL 90' FWL SEC.9

5. LEASE DESIGNATION AND SERIAL NO.: 14-20-603-355

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

7. UNIT AGREEMENT NAME: RATHERFORD UNIT

8. FARM OR LEASE NAME, WELL NO.: RATHERFORD 16-77

9. API WELL NO.: NA

10. FIELD AND POOL, OR WILDCAT: GREATER ANETH

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: SEC. 16, T41S, R24E

12. COUNTY OR PARISH: SAN JUAN

13. STATE: UT

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*: 3 MILES SE OF MONTEZUMA CREEK, UT

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. unit line, if any): 6000'SE COR OF S.22

16. NO. OF ACRES IN LEASE: 2161

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.: 744' SW OF 16-23

19. PROPOSED DEPTH: TVD-5520' MD-8901'

20. ROTARY OR CABLE TOOLS: ROTARY

21. ELEVATIONS (Show whether DF,RT, GR, etc.): GL: 4705'

22. APPROX. DATE WORK WILL START*: MARCH 1996

23. PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	GRADE, SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT
17 1/2"	13 3/8"	48#	80'	110 SX
12 1/4"	9 5/8"	36#	1600'	690 SX
8 3/4"	7"	23#	5750'	750 SX

SEE ATTACHED 8 POINT WELL CONTROL FOR ADDITIONAL DRILLING INFORMATION.
THIS PRODUCTION AREA HAS H2S; THEREFORE MONITORING AND SAFETY EQUIPMENT ARE REQUIRED.
SAFETY EQUIPMENT WILL BE RIGGED UP BY 3000'. FEDERAL REQUIREMENTS FOR EQUIPMENT ON THIS WELL ARE AS FOLLOWS:

1. FLARE LINE AND MEANS OF IGNITION
2. REMOTE CONTROLLED CHOKE
3. ESCAPE BREATHING APPARATUS FOR ALL CREW MEMBERS
4. H2S SENSORS AND ASSOCIATED AUDIBLE/VISUAL ALARMS(S)
5. AT LEAST ONE (1) PORTABLE H2S MONITOR
6. WIND DIRECTION INDICATORS
7. CAUTION/DANGER SIGN(S) AND FLAG(S)
8. MUD-GAS SEPARATOR
9. COMMUNICATION FROM WELLSITE

APPROXIMATE H2S LEVELS FOR THE FOLLOWING ZONES:
ISMAY 80 PPM DESERT CREEK 60 PPM

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen, 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 Shirley Robertson TITLE ENV. & REG. TECHNICIAN DATE 10-20-95

(This space for Federal or State office use)

PERMIT NO. 43-037-31768 APPROVAL DATE

Application approval 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.

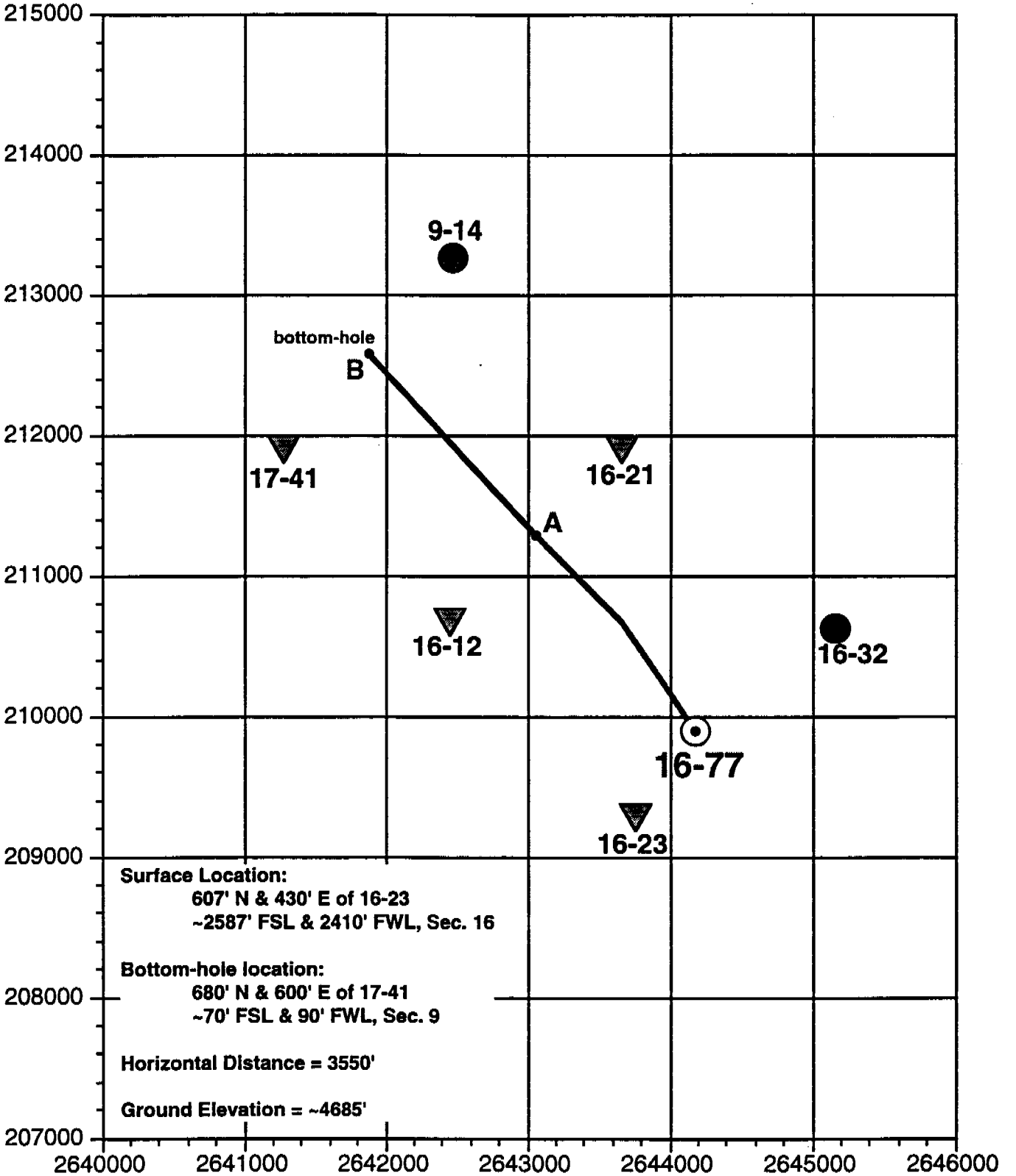
CONDITIONS OF APPROVAL, IF ANY:

APPROVED BY John R. Baza TITLE Petroleum Engineer DATE 4-1-97

*See Instructions On Reverse Side

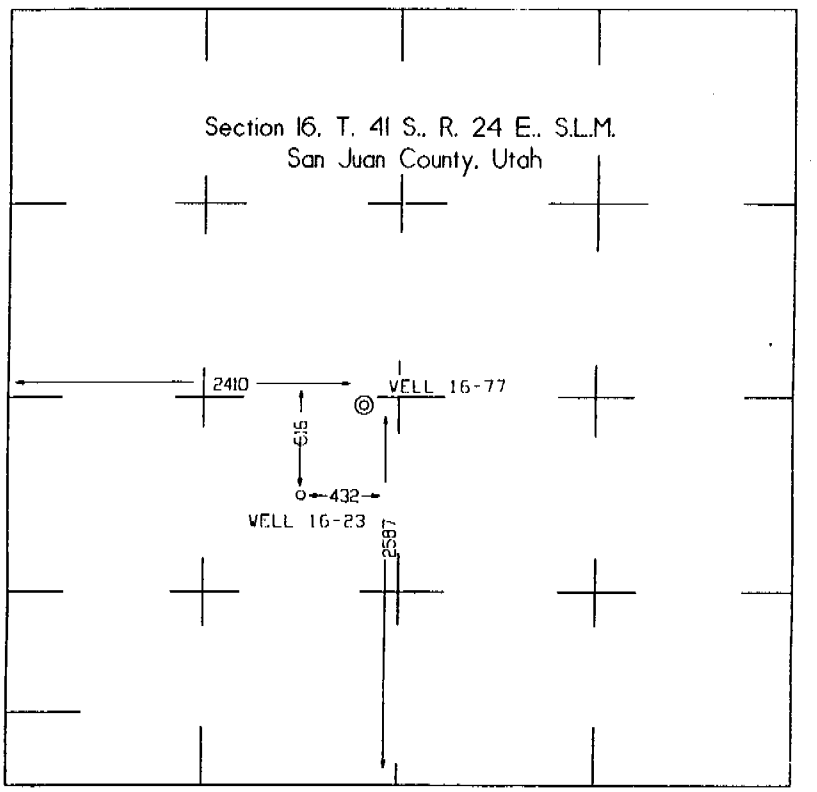
Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

Ratherford Unit 16-77
New Medium-radius Producer
1996 Horizontal Development Program



MOBIL OIL COMPANY
WELL 16-77
RATHERFORD UNIT.
T.41S., R.24E., S.L.M., SAN JUAN COUNTY, UTAH
JULY 24, 1995

MOBIL OIL COMPANY
Well 16-77
Ratherford Unit. Section 16



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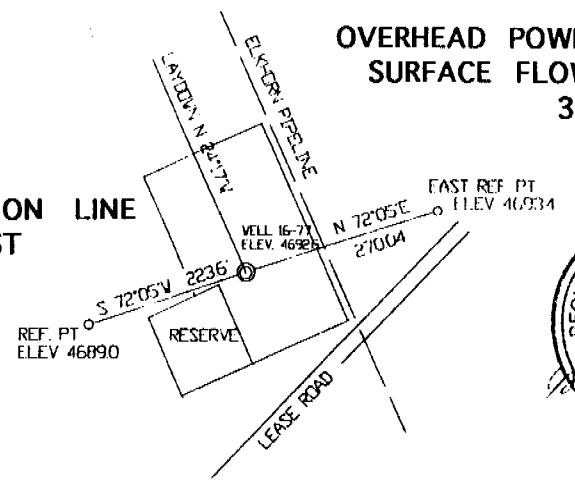


REGISTERED LAND SURVEYOR
GERALD G. HUDDLESTON
No. 161297
STATE OF UTAH

Scale: 1" = 200'

State Plane Coordinates, Utah
South Zone As derived from
1989 USGS Map "White Mesa Village
Utah"
Northing - 209550
Easting - 2638900

MANESS & Associates Inc.
REGISTERED LAND SURVEYORS
P.O. BOX 1163 - 190 NORTH MILDRED - CORTEZ, CO. 81321 - PHONE: 970/565-6815

Mobil Oil Corporation
Ratherford Unit #16-77
2587' FSL and 2410' FWL
Section 16, T-41-S, R-24-E
San Juan County, Utah

4. CASING & CEMENTING

Hole Size	O.D.	Weight	Grade	Conn.	Age	Setting Depth (GL)
17-1/2"	13-3/8"	48#	H40	ST&C	New	0000' - 0080'
12-1/4"	9-5/8"	36#	J55	ST&C	New	0000' - 1600'
8-3/4"	7"	23#	K55	LT&C	New	0000' - 5100'
8-3/4"	7"	23#	L80	LT&C	New	5100' - ±5750'

Surface Casing (0' to 80'): Cement to surface with 110sx (131 ft^3). Volume calculated with 100% excess. Class "B" + 2% $CaCl_2$ + 0.25 pps Flocele (Density = 15.61 ppg, Yield = 1.19 ft^3/sx).

Intermediate Casing (0' to 1600'): Cement to surface with 690 sx (1027 ft^3). Volume calculated with 100% excess. **Lead** with 410 sx (694 ft^3) of 65:35 Class "B":Poz + 6% gel + 2% $CaCl_2$ + 0.25 #/sk Flocele (Density = 12.8 ppg, Yield= 1.73 ft^3/sx). **Tail** with 280 sx (333 ft^3) Class "B" + 2% $CaCl_2$ (Density = 15.61 ppg, Yield = 1.19 ft^3/sx). Total of 11 centralizers and one stop collar. One on the shoe joint and one every fourth collar to 200' from surface. Actual cement volumes to be based on the OH caliper plus 30% excess.

Production Casing (0' to 5800'): Cement to surface with 1201 ft^3 in two stages using stage tool. Volume calculated with 100% excess .

Stage 1: **Lead** with 230 sx (419 ft^3) of class G + 6% gel + 0.25 pps Flocele + 5 #/sx gilsonite (Density = 12.54 ppg, Yield= 1.82 ft^3/sx). **Tail** with 150 sx (173 ft^3) of class G + 0.4% Halad-344 + 0.3% VERSASET (Density = 15.79ppg, Yield= 1.15 ft^3/sx). Actual cement volumes to be based on the OH caliper plus 30% excess.

Stage 2: **Lead** with 270 sx (491 ft^3) of class G + 6% gel + 0.25 pps Flocele + 5 #/sx gilsonite (Density = 12.54 ppg, Yield= 1.82 ft^3/sx). **Tail** with 100 sx (118 ft^3) of class G + 2% $CaCl_2$ (Density = 15.61 ppg, Yield = 1.19 ft^3/sx)

Total of 38 centralizers and 1 stop collar. One centralizer on the float shoe then every fourth collar.

5. MUD PROGRAM

Depth	Type	Weight	Viscosity	Fluid Loss
0000' - 1600'	FW/Spud Mud	8.8-9.2	45-50	NC
1600' - 5733'	FW/PHPA	9.3-9.8	36 - 48	NC
5733' - TD	FW/XCD	8.7-8.9	30-32	10 - 15

6. CORING, TESTING, AND LOGGING

No cores are currently planned. Neutron, Dual Induction, and Sonic logs may be run. A few RFT tests may also be run.

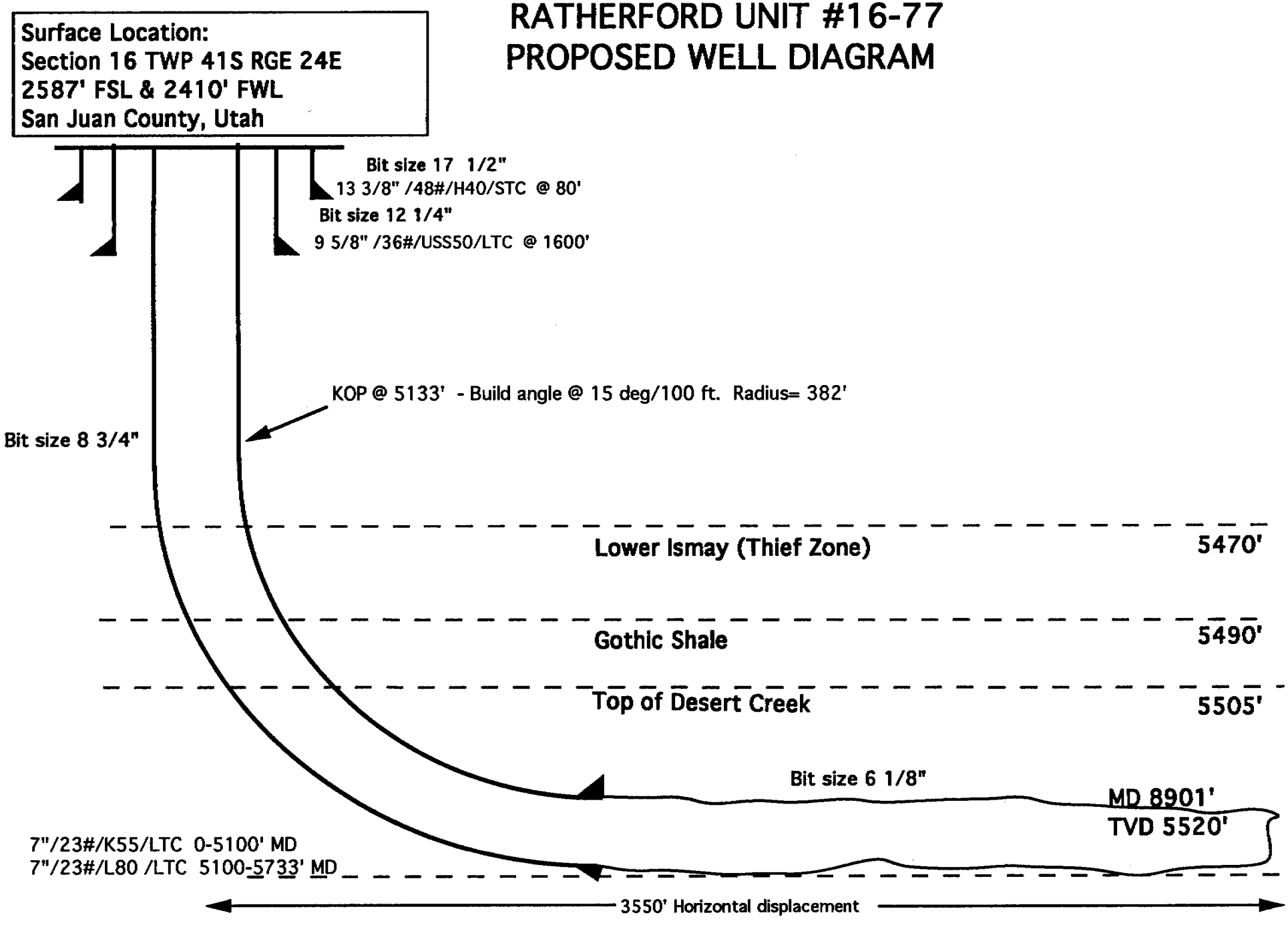
7. DOWNHOLE CONDITIONS

Possible water flows in the DeChelly formation may be encountered.

8. MISCELLANEOUS

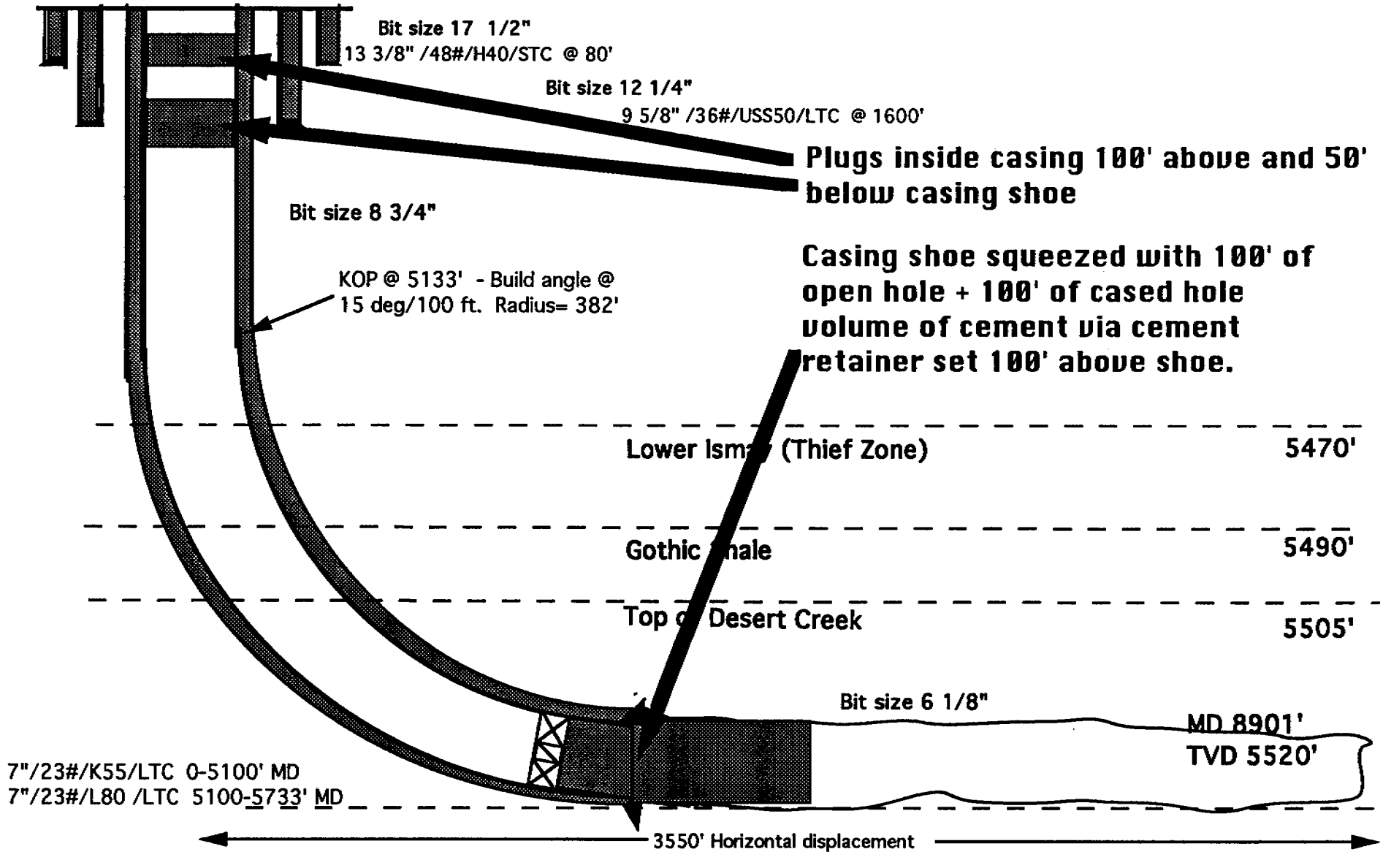
It is expected to take +/- 30 days to drill the well and 10 days to complete the well.

RATHERFORD UNIT #16-77
PROPOSED WELL DIAGRAM



Surface Location:
Section 16 TWP 41S RGE 24E
2587' FSL & 2410' FWL
San Juan County, Utah

RATHERFORD UNIT #16-77
PROPOSED P&A DIAGRAM



Mobil Oil Corporation
Ratherford Unit #16-77
2587' FSL and 2410' FWL
Section 16, T-41-S, R-24-E
San Juan County, Utah

Eight Point Drilling Program

1. ESTIMATED FORMATION TOPS*

Formation Name	Depth from GL	Depth from KB	Subsea Depth
Chinle	1409'	1421'	3174'
DeChelly SS	2610'	2623'	1973'
Hermosa LS	4540'	4553'	43'
Ismay LS	5350'	5363'	-767'
L. Ismay LS	5470'	5483'	-887'
Gothic Shale	5490'	5503'	-907'
Desert Creek I	5505'	5518'	-922'
Total Depth (TD)	5520'(8901' MD)	5538'	-937'

* All true vertical depths (TVD) based on ground level of 4583'.

2. NOTABLE ZONES

The estimated formation top depths from GL at which water, oil, gas, or other mineral bearing zones may be encountered are:

Possible Water Zone	Possible Coal Zone	Possible Oil or Gas Zones
DeChelly SS 2610'		Desert Creek I 5505' (TVD)

Propose to drill, complete, and equip an oil producer in the Desert Creek formation.

The well will be cased throughout its length and cemented to the surface, if possible.

3. PRESSURE CONTROL (See "5" on Page 3)

Examples of a typical BOP and choke manifold are on Page 4. Maximum anticipated surface pressure will be 2,000 psi.

Once out from under the surface casing, a minimum 11" 3,000 psi system will be used with two hydraulic rams (blind/pipe). The choke manifold will have a minimum 3,000 psi rating.

BOP's will be tested to their working pressure after nippling up and after any use under pressure. Pipe rams will be function tested daily. Blind rams will be function tested after each trip out of the hole. BOP tests will be recorded on IADC reports.

Upper and lower kelly valves, floor safety valve, and drill string inside BOP rated at a minimum 3,000 psi will be maintained on the floor at all times. Upper and lower kelly valves with handler available will be in use at all times. Back pressure and full opening drill string safety valves to fit all drill strings in use will be available on the rig floor at all times.

Mobil Exploration & Producing U.S. Inc.
Ratherford Unit 16-77
2587' FSL & 2410' FWL (Surface)
Sec. 16, T. 41 S., R. 24 E.
San Juan County, Utah

1. DIRECTIONS & EXISTING ROADS

From the Montezuma Creek Post Office, go S 0.6 mi. on BIA Road N-5064.
Then turn left and go SE 2.75 mi. on paved BIA Road N-35.
Then turn left and go E 0.5 mi. on the dirt White Mesa Road.
Then turn left and go N 0.3 mi. to the wellsite.

Roads will be maintained to a standard at least equal to their present condition. Existing roads need no upgrading.

2. ROAD TO BE BUILT OR UPGRADED

No new road will be built. A surface Mobil pipeline between the road and pad will be wrapped with tape and buried beneath a dirt ramp to protect it from denting.

3. EXISTING WELLS

There are 16 oil, 13 injection, and 2 P&A wells within a mile. All wells are within the Ratherford Unit and are shown on an attached map. There are no gas or water wells.

4. PROPOSED PRODUCTION FACILITIES

The well initially will be an oil well. Later, the oil well may be converted to an injection well. A coated (internal and external) injection pipeline will be laid ≈450' southwest to an existing injection line at the Ratherford Unit 16-23 well. All of it is within the unit. The ≈3-1/2" OD welded steel or coiled steel tubing injection line will operate at ≈1500 to ≈3500 psi, be tested to ≈5800 psi, has a burst

rating of ≈7200 psi, and will be buried ≥30" deep. Fill will be removed from all drainages. Drainages will be returned to a natural form.

An uncoated surface flowline of the same type will run northeast ≈300' (all within the unit) to an existing Mobil header. Surface disturbance will be limited to that necessary for pipeline construction.

A raptor proof three phase powerline will be built ≈300' northeast (all within the unit) to an existing Mobil powerline.

Above ground structures and equipment (only a pumpjack is planned) will be painted with non-glare sand (federal standard 595a-30277) or Mobil beige 12-F-38 color.

5. WATER SUPPLY

Water will be trucked from off the reservation. Mobil has permission from the land/well owner and State Engineer.

6. CONSTRUCTION MATERIALS & METHODS

The top 6" of soil will be stripped and stockpiled south of the reserve pit. A minimum 12 mil plastic liner will be installed in the reserve pit.

7. WASTE DISPOSAL

The reserve pit will be fenced sheep tight on 3 sides with woven wire fence topped with barbed wire. The 4th side will be fenced once the rig moves off. The fence will be kept in good repair while the pit dries. Once dry, contents of the reserve pit will be buried in place. An

overhead net will be installed after drilling and completion are finished.

All trash will be placed in a portable trash cage. It will be hauled to an approved landfill. Human waste will be disposed of in 10' deep ratholes under trailers or in chemical toilets. Ratholes will be filled when the trailers are removed.

8. ANCILLARY FACILITIES

There will be no air strips or camps. Camper trailers will be on location for the company man, tool pusher, and mud loggers.

9. WELL SITE LAYOUT

See attached pages for depictions of the well pad, cross sections, cut and fill diagrams, reserve pit, trash cage, access road onto the location, parking, living facilities, soil stockpile, and rig orientation.

10. RECLAMATION

Reclamation starts once the reserve pit is dry. It usually takes a year for a reserve pit to fully evaporate. All disturbed areas will be recontoured to a natural shape to blend with the surrounding topography. Stockpiled topsoil will be evenly spread. Compacted areas will be plowed or ripped to a depth of 12"-16" before seeding. Seeding will be done between July 1 - August 31 or October 15 - November 30. No seeding will be done when the ground is muddy or frozen. Seed will be drilled 0.5" to 0.75" deep. If broadcast, the rate will be 150% of that shown below and the seed covered with a drag. If the well is a producer,

then the injection pipeline, reserve pit, and any other areas not needed for workovers will be reclaimed in the same manner.

SPECIES	*lbs/acre PLS*
Indian ricegrass *(Oryzopsis hymenoides)*	3
Giant dropseed *(Sporobolus giganteus)*	2
Needle & thread *(Stipa comata)*	2
Yellow sweetclover *(Melilotus alba)*	1
Four wing saltbush *(Atriplex canescens)*	2

The injection pipeline will be blocked, water barred, and reclaimed in the same manner as the wellsite. Berms will be built at the top of all slopes. Water bars will be spaced as follows:

% Slope	Spacing
1% - 5%	200 feet
6% - 15%	100 feet
>15%	50 feet

11. SURFACE OWNER

The well, road, powerline, and pipelines are all on Navajo Tribal Trust land in the Red Mesa Chapter. Any changes in the surface use plan must be approved by the BIA Indian Minerals Service Office, 1400 LaPlata Highway, Farmington, NM 87499. Call (505) 599-8100.

12. OTHER INFORMATION

The nearest hospital is a ≈75 minute drive away in northwest Monticello. It is 3 blocks northwest of the intersection of US 666 and US 191. Hospital phone number is (801) 587-2116. Or dial 1-800-332-

1911 from anywhere in San Juan County, Ut. The closest medical helicopter is in Farmington NM. Farmington hospital phone number is (505) 325-5011.

13. REPRESENTATION

Anyone having questions concerning the APD should contact:

Shirley Robertson, Technician
Mobil Exploration & Producing U. S. Inc.
P.O. Box 633
Midland, Tx. 79702
(915) 688-2585

Brian Wood, Consultant
Permits West, Inc.
37 Verano Loop
Santa Fe, NM 87505
(505) 466-8120

The field representative will be:
Ed Barber, Production Foreman
Mobil Exploration & Producing U. S. Inc.
P.O. Drawer G
Cortez, Co. 81321
(303) 565-9049

Mobil Exploration & Producing U. S. Inc. has the necessary consents from the proper lease owners to conduct lease operations in conjunction with this well. Bond coverage pursuant to 43 CFR 3104 for lease activities and operations is being provided by Mobil Exploration & Producing U. S. Inc.

I hereby certify that I, or persons under my direct supervision, have inspected the proposed drill site and access route; that 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

Mobil Exploration & Producing U.S. Inc.
Ratherford Unit 16-77
2587' FSL & 2410' FWL (Surface)
Sec. 16, T. 41 S., R. 24 E.
San Juan County, Utah

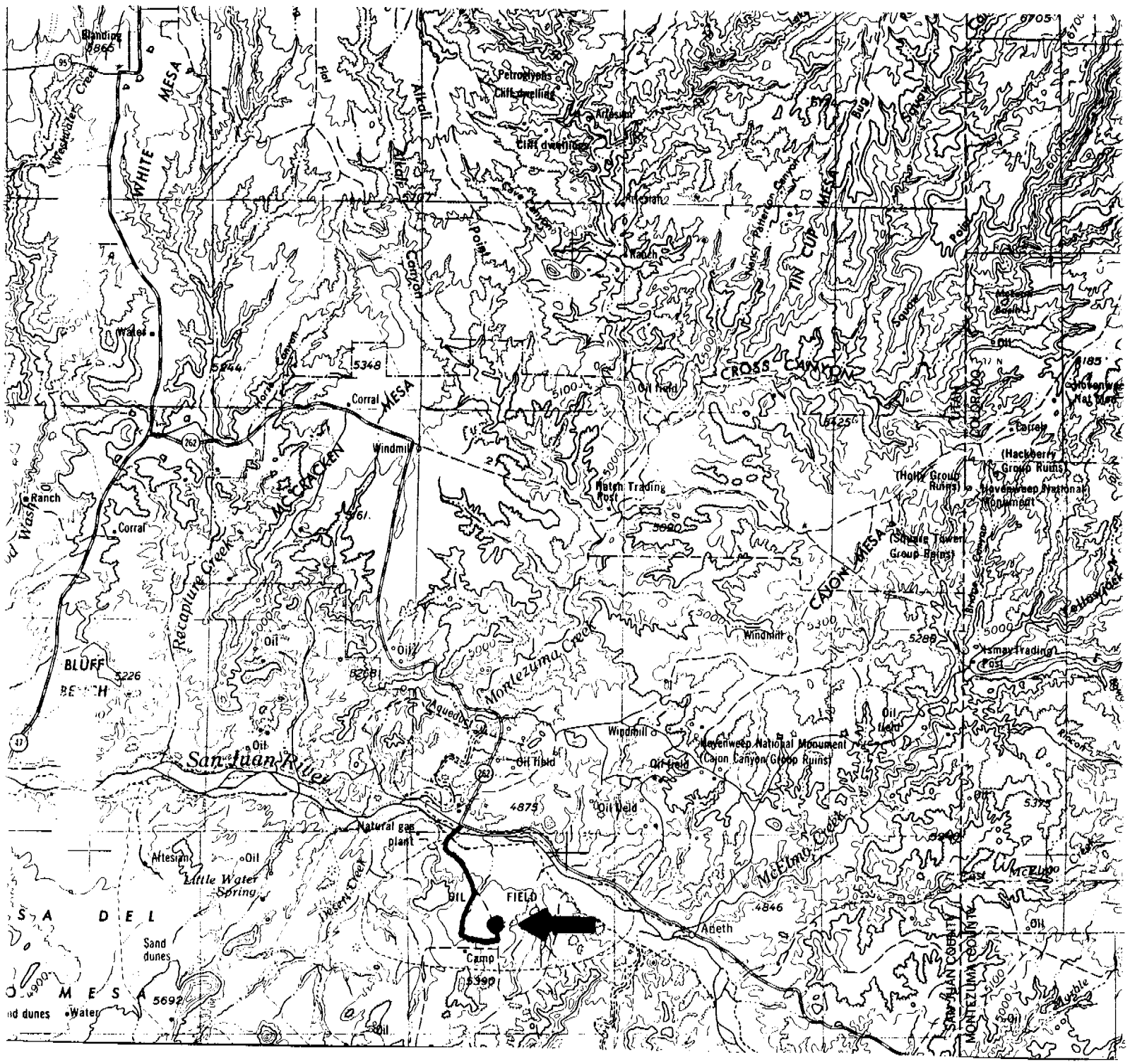
by Mobil Exploration & Producing U. S. Inc. and its contractors and subcontractors in conformity with this plan and the terms and conditions under which it is approved. This statement is subject to the provisions of 18 U.S.C. 1001 for the filing of a false statement.

Shirley Robertson

Shirley Robertson, Technician
Environmental & Regulatory Dept.
Mobil Exploration & Producing U. S. Inc.

10-20-95
Date

Mobil Exploration & Producing U.S. Inc.
Ratherford Unit 16-77
2587' FSL & 2410' FWL (Surface)
Sec. 16, T. 41 S., R. 24 E.
San Juan County, Utah

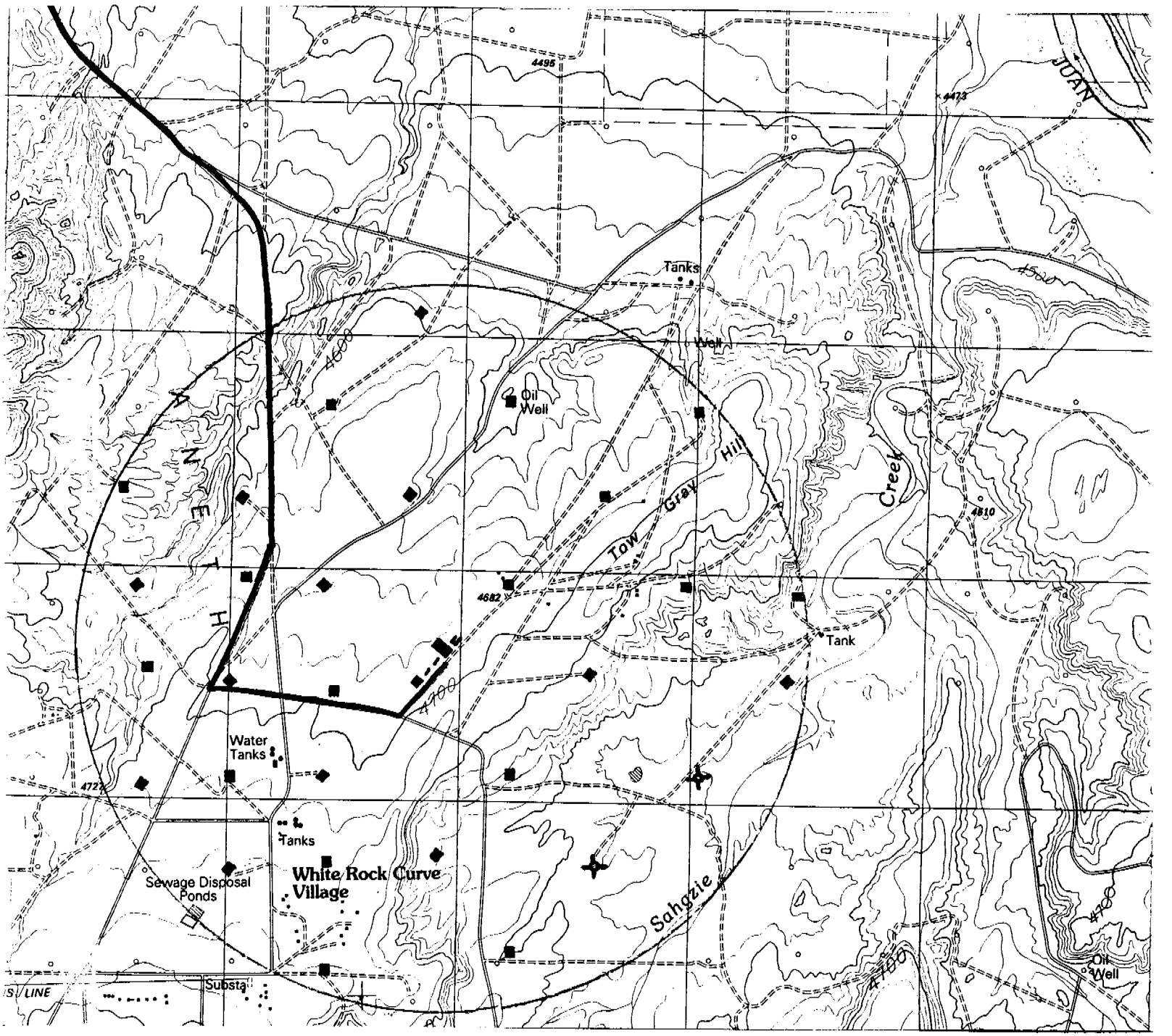


PROPOSED WELL: ●

ACCESS ROUTE: ~

PERMITS WEST, INC.
PROVIDING PERMITS for LAND USERS

Mobil Exploration & Producing U.S. Inc.
Ratherford Unit 16-77
2587' FSL & 2410' FWL (Surface)
Sec. 16, T. 41 S., R. 24 E.
San Juan County, Utah



PROPOSED WELL: ◆

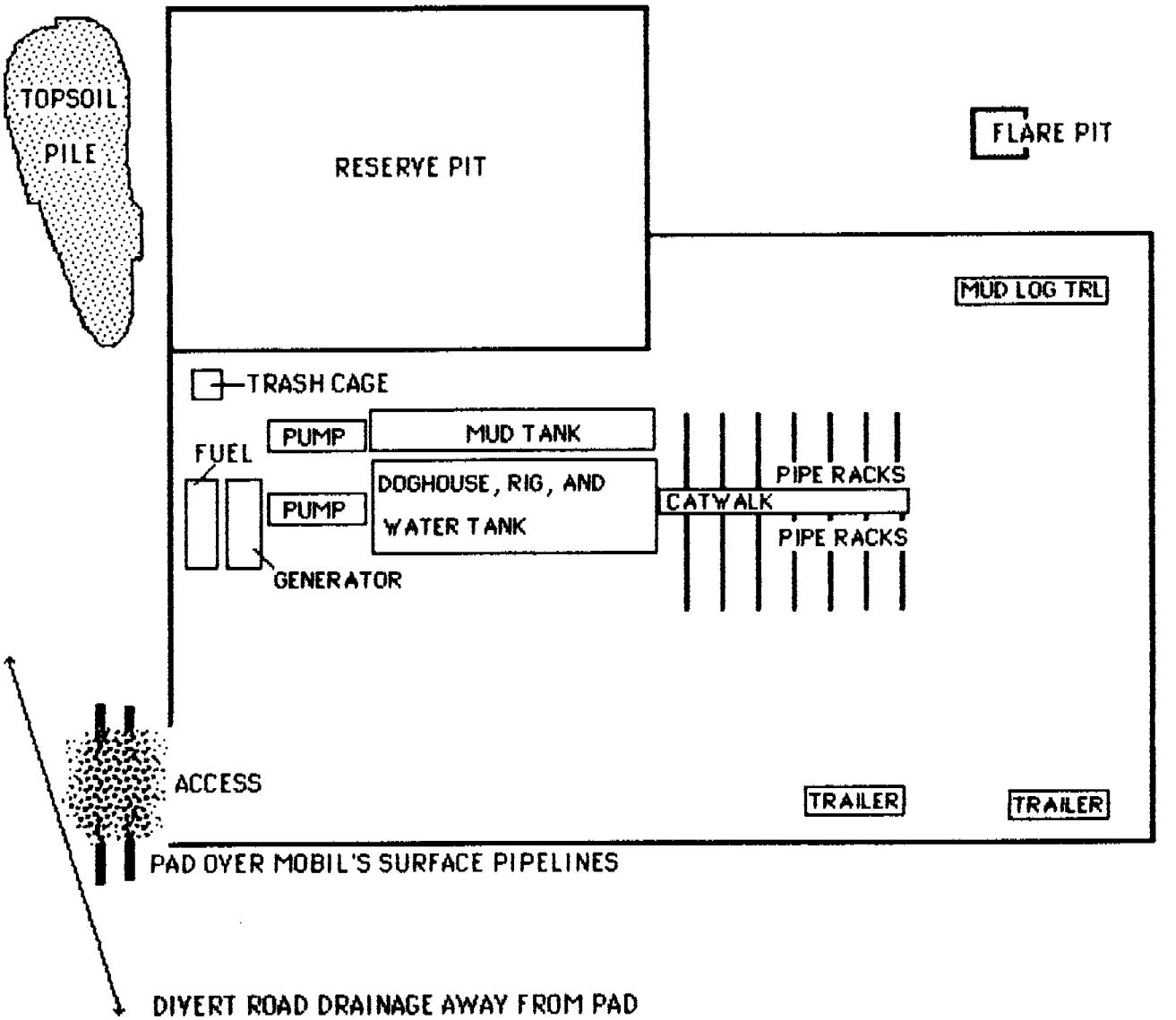
EXISTING WELL: ■ ◆

EXISTING ROAD: ~

PROPOSED POWERLINE OR PIPELINE: — — —

PERMITS WEST, INC.
PROVIDING PERMITS for LAND USERS

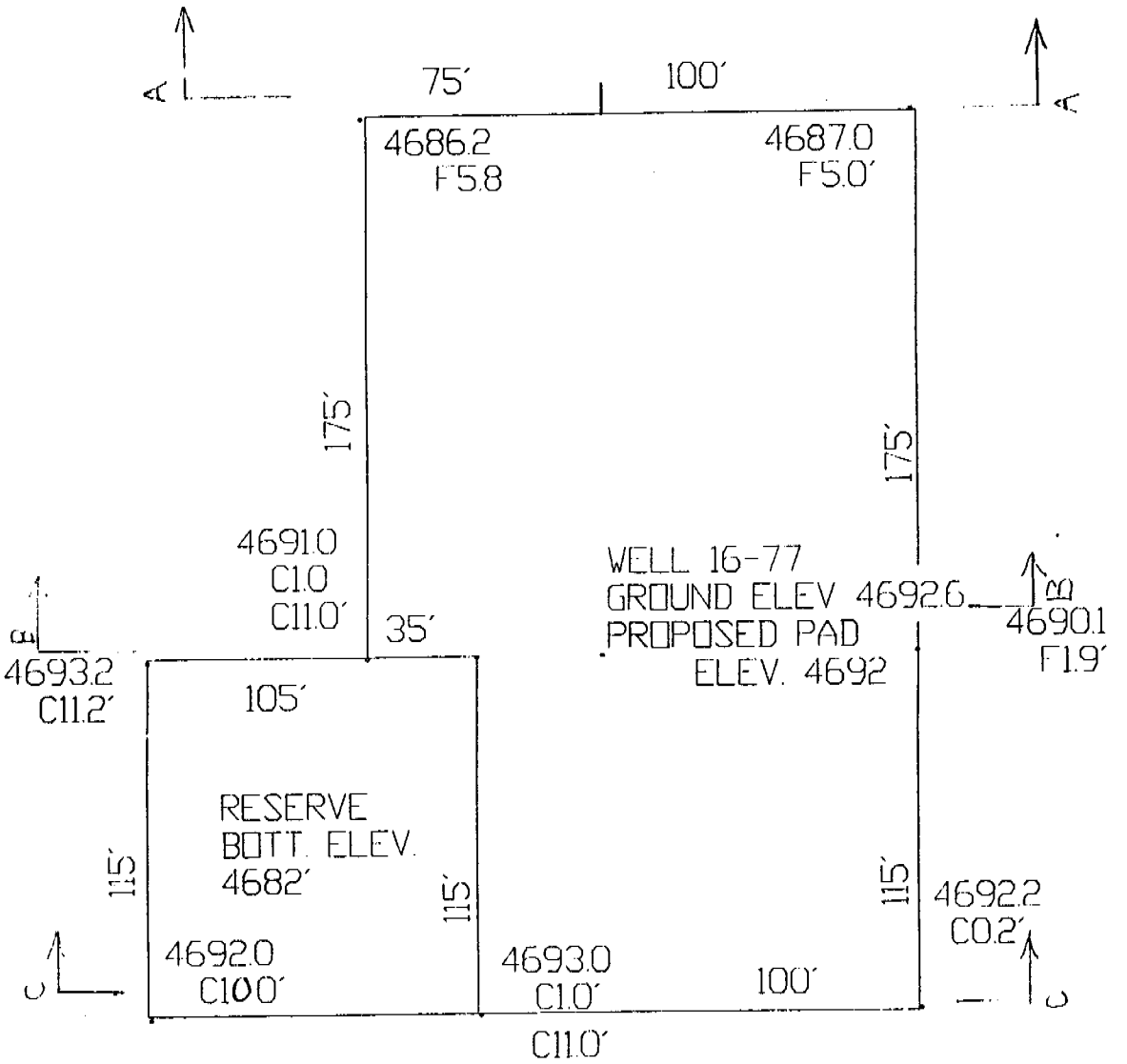
Mobil Exploration & Producing U.S. Inc.
Ratherford Unit 16-77
2587' FSL & 2410' FWL (Surface)
Sec. 16, T. 41 S., R. 24 E.
San Juan County, Utah

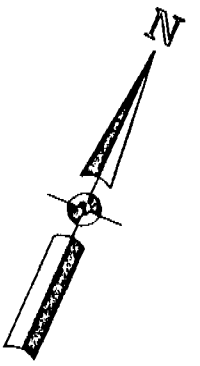


NORTH

PERMITS WEST, INC.
PROVIDING PERMITS for LAND USERS

MOBIL OIL COMPANY
WELL 16-77
RATHERFORD UNIT, SECTION 22
T.41S., R.24E., S.L.M., SAN JUAN COUNTY, UTAH
JULY 24, 1995
PAGE 2 OF 3



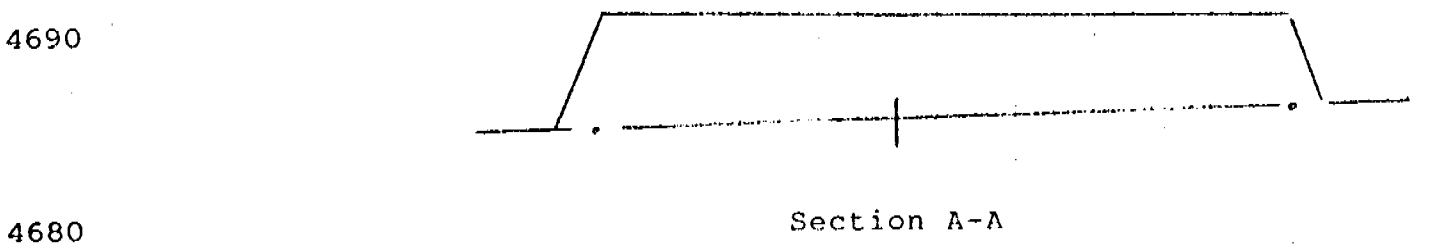


Scale: 1" = 50'

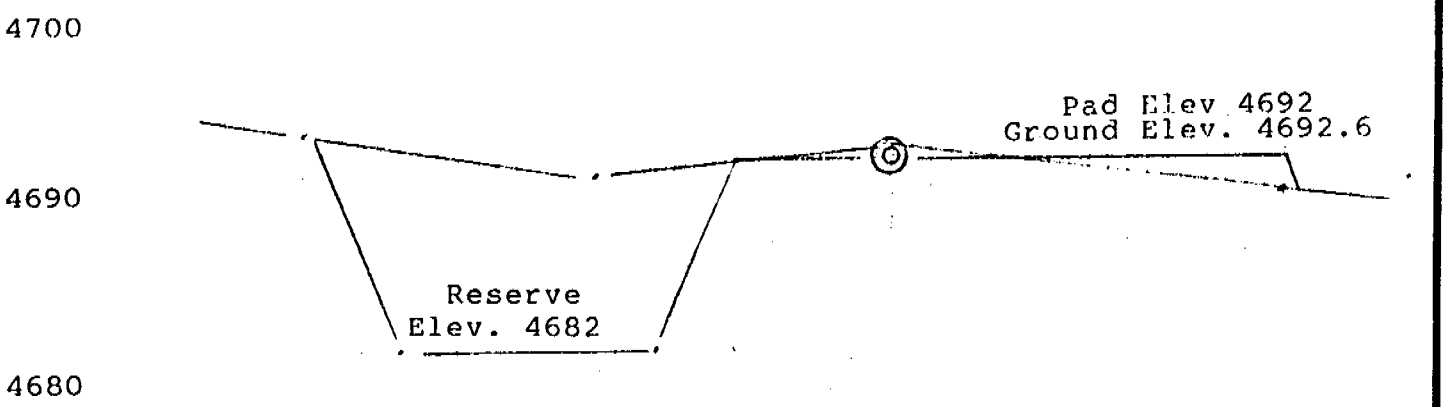
MANESS & Associates Inc.
REGISTERED LAND SURVEYORS

P.O. BOX 1183 - 198 NORTH MILDRED - CORTEZ, CO. 81321 - PHONE: 970/565-8815

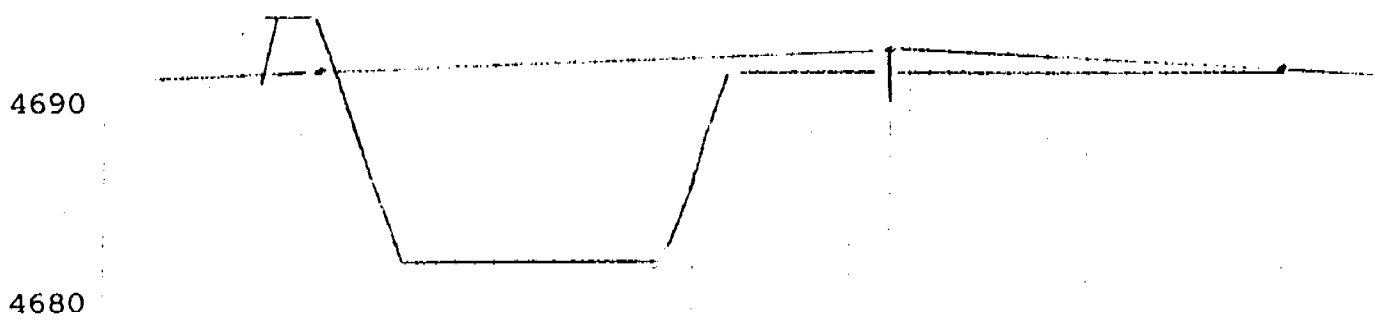
Mobil Oil Company - Well 16-77 Ratherford Unit July 28, 1995
SE¼NW¼ Section 22, T.41S., R.24E., S.L.M., San Juan County, Utah



Section A-A



Section B-B



Section CC

Horiz. Scale - 1"=50'
Vertical Scale - 1"=10'

WORKSHEET
APPLICATION FOR PERMIT TO DRILL

APD RECEIVED: 10/23/95

API NO. ASSIGNED: 43-037-31768

WELL NAME: RATHERFORD 16-77
OPERATOR: MOBIL EXPL & PROD US (N7370)

PROPOSED LOCATION:
NESW 16 - T41S - R24E
SURFACE: 2587-FSL-2410-FWL
BOTTOM: 0070-FSL-0090-FWL
SAN JUAN COUNTY
GREATER ANETH FIELD (365)

LEASE TYPE: IND
LEASE NUMBER: 14-20-603-355

PROPOSED PRODUCING FORMATION: DSCR

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

RECEIVED AND/OR REVIEWED:

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

LOCATION AND SITING:

✓ R649-2-3. Unit: Ratherford

___ R649-3-2. General.

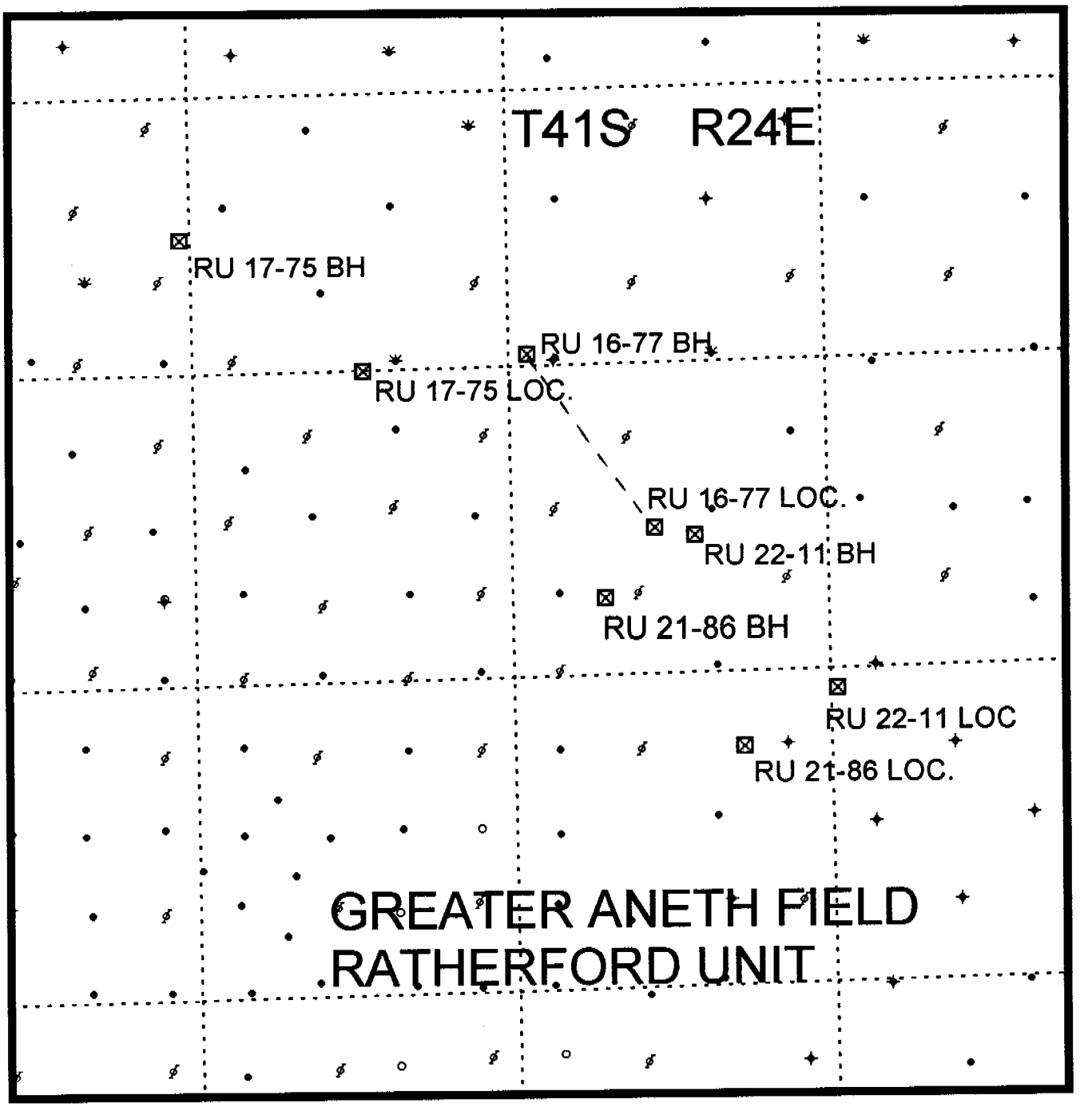
___ R649-3-3. Exception.

___ Drilling Unit.
Board Cause no: _____
Date: _____

COMMENTS: Horizontal well

STIPULATIONS: Directional well stip.

MOBIL EXPL & PROD
GREATER ANETH HORIZONTAL INFILL
RATHERFORD UNIT
SAN JUAN COUNTY, UNIT SPACING



UNIT SPACING
UNIT No.: UTU68931A
UAC R649-2-3

PREPARED:
DATE:10/27/95

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

1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, Utah 84114-5801
801-538-5340
801-359-3940 (Fax)
801-538-7223 (TDD)

April 1, 1997

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

Re: Ratherford 16-77 Well, 2587' FSL, 2410' FWL, NE SW, Sec. 16, T. 41 S., R. 24 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 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 43-037-31768.

Sincerely,

Lowell P. Braxton
Deputy Director

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

Operator: Mobil Exploration & Producing

Well Name & Number: Ratherford 16-77

API Number: 43-037-31768

Lease: 14-20-603-355

Location: NE SW Sec. 16 T. 41 S. R. 24 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 John R. Baza (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.

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.: 14-20-603-355
6. If Indian, Allottee or Tribe Name: NAVAJO TRIBAL
7. If Unit or CA, Agreement Designation: RATHERFORD UNIT
8. Well Name and No.: RATHERFORD 16-77
9. API Well No.: 43-037-31768
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): 2587' FSL & 2410 FWL SEC.16, T41S, R24E

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.)*

BHL: 70' FSL & 90' FWL, SEC. 9
MOBIL REQUEST AN EXTENSION ON THE PERMIT TO DRILL.

THIS APPROVAL EXPIRES MAR 07 1998

Deem Approved
APD on 4/1/97
PTS

RECEIVED
APR 04 1997
DIV. OIL, GAS & MIN.

RECEIVED
BLM
97 MAR 20 PM 12:47
070 FARMINGTON, NM

14. I hereby certify that the foregoing is true and correct
Signed Shirley Houchins Title ENV. & REG. TECHNICIAN Date 03-18-97

(This space for Federal or State office use)
Approved by [signature] Title Team Lead - PMT Date 3/24/97
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

OPERATOR

Form 3160-5
(June 1990)

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7. If Unit or CA, Agreement Designation: RATHERFORD UNIT
8. Well Name and No.: RATHERFORD 16-77
9. API Well No.: 037-31768
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 [X] Other
2. Name of Operator: MOBIL PRODUCING TX & NM INC.*
*MOBIL EXPLORATION & PRODUCING US INC. AS AGENT FOR MPTM
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)
2587 ~~2857~~' FSL & 2410' FWL
SEC. 16, T41S, R24E

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AMEND ORIGINAL BOTTOM HOLE LOCATION TO:

BHL: LATERAL #1 2680' NORTH & 2250' WEST F/SURFACE SPOT (ZONE 1a).
BHL: LATERAL #2 2507' SOUTH & 2988' EAST F/SURFACE SPOT (ZONE 1a).

ATTACHED WHIPSTOCK PLAN

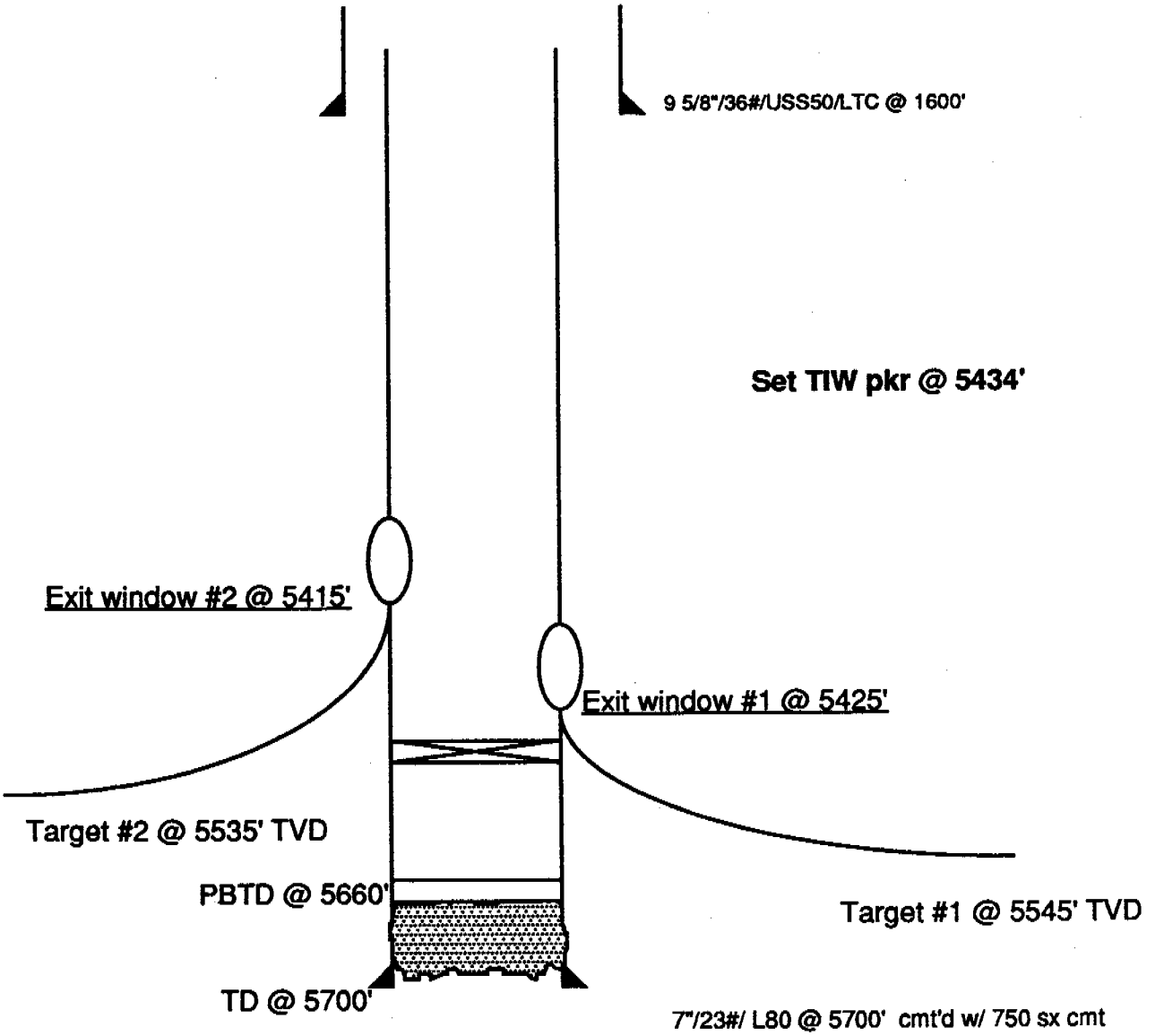
14. I hereby certify that the foregoing is true and correct
Signed Joe Moseley for Title SHIRLEY HOUCHINS/ENV & REG TECH Date 10-29-97

(This space for Federal or State office use)
Approved by John R. Baza Title Associate Director Utah DOGM Date 11/6/97
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

Whipstock plan for Ratherford #16-77



Window	Btm-Top of window	Extension length	Curve radius	Bearing	Horiz Displ
1	5425-17	-	120	320	3500
2	5415-07	10	120	130	3900

*The double spline is 2.42 ft long and the bottom of the whipstock, latch, and debris sub and shear sub are 8.68 ft long. These lengths must be added to the extension lengths to determine the entire whipstock assembly length.

DIVISION OF OIL, GAS AND MINING

SPUDDING INFORMATION

Name of Company: MOBIL E & P

Well Name: RATHERFORD 16-77 (SIDETRACK)

Api No. 43-037-31768

Section 16 Township 41S Range 24E County SAN JUAN

Drilling Contractor BIG "A"

Rig # 41

SPUDDED:

Date 2/1/98

Time

How ROTARY

Drilling will commence

Reported by MARK

Telephone # 1-801-651-3473

Date: 2/2/98 Signed: JLT

√

Form 3160-5
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BUREAU OF LAND MANAGEMENT

FORM APPROVED
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2. Name of Operator: MOBIL PRODUCING TX & NM INC.*
*MOBIL EXPLORATION & PRODUCING US INC. AS AGENT FOR MPTM
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)
2857' FSL & 2410' FWL
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02-03-98 MIRU BIG A 41; SPUD 12 1/4" SURFACE HOLE @ 0500 MST, DRILL TO 145'. CALLED JIM THOMPSON W/BLM 2-1-98/ANSWERING MACHINE. ATTEMPT CALL TO NAVAJO EPA/ANETH OFFICE/DIRECTED TO SHIPROCK OFFICE NO ANSWER.

SEE ATTACHMENT - 2-10-98

FEB 17 1998

14. I hereby certify that the foregoing is true and correct
Signed Sue Mosley for Title SHIRLEY HOUCHINS/ENV & REG TECH Date 2-10-98

(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**

ATTACHMENT - FORM 3160-5
RATHERFORD UNIT - WELL #16-77
14-20-603-355
NAVAJO TRIBAL
SAN JUAN, UTAH

02-03-98	MIRU BIG A 41, SPUD 12 1/4" SURFACE HOLE @ 0500 MST DRILL TO 145' SURVEY = .50 DEGREES, DRILL TO 473' SURVEY = .75 DEGREES., CALLED JIM THOMPSON W/BLM 2-1-98, ATTEMPT CALL TO NAVAJO EPA @ ANETH, OFFICE MESSAGE DIRECTED CALLS TO SHIPROCK, NO ANSWER.
02-04-98	CONTINUE DRILLING AHEAD TO SURFACE TD @ 1615' @ 1130 MST, MIX & PUMP SWEEP @ TD.
02-05-98	RU & RUN 9 5/8" SURFACE CSG TO 1617.47' W/FE & DV TOOL=1621.84'., CIRC PRIOR TO CMT JOB. CMT W/DOWELL - 2 STAGES, 1ST ST. LEAD = 205 SKS CL-G 50/50 POZ. TAIL W/65 SXS CL , 2ND ST. 120 SXS LEAD, 65 SXS TAIL PLUGDN, 0400 MST LOST RETURNS END OF STAGE. WOC, WOO, START CMT ON ANNULUS 1415 MST 2-5-98 AFTER RUNNING TEMP SURVEY. TALK W/ EARL BECHARD W/BLM-FARMINGTON (3 TIMES) BEFORE PROCEEDING W/TOP JOB.
02-06-98	RUN 1" ANN CMT SURFACE PIPE, 1ST TAG 205', 2ND @ 85', THEN CMT TO SURF TOTAL PUMPED 195 SXS +/-, CUT OFF CSG WELD ON HEAD, NIPPLE TP BOP & RELATED EQUIP. PRESSURE TEST CSG & ANNULAR-1500-30 MINS-GOOD, TEST BOP, CHOKE MANIFOLD & ALL SAFETY VALVES-INCLUDING CHOKE MANIFOLD TO 3000# HELD GOOD.
02-07-98	TIH TAG @ 1517', TEST CSG TO.1000# - HELD 30 MINS, DRILL OUT SHOE JT, DRILL AHEAD START DRLG FORMATION @ 1900 MST, SURVEY @ 2058' - .75 DEGREES, CONT TO DRILL AHEAD TO 2592'-1 DEGREE.
02-08-98	CONTINUE TO DRILL AHEAD, SURVEY @ 3044' - .5 DEGREES
02-09-98	CONTINUE TO DRILL AHEAD, SURVEY @ 3798' - .75 DEGREES. CONT. TO DRILL AHEAD, TO 3798', CIRCULATE & DROP SURVEY, TRIP OUT OF HOLE TO CK BIT.
02-10-98	MAIL SUNDRY & ATTACHMENT TO BLM, STATE OF UTAH & NAVAJO EPA.

ROCKY MOUNTAIN GEO-ENGINEERING

Electronic Rig Monitoring Systems • Well Logging • Consulting Geology • Coal Bed Methane Services

PASON ROCKY MOUNTAIN GEO-ENGINEERING CORP.

2450 INDUSTRIAL BLVD. • GRAND JUNCTION, CO 81505

(970) 243-3044 • (FAX) 241-1085

Thursday, February 26, 1998

Division of Oil & Gas Mining
State of Utah
1594 West North Temple
3 Triad Center, Ste. 1210
Salt Lake City, UT 84116

Re: Ratherford Unit#16-77
Sec. 16, T41S, R24E DRL
San Juan County, Utah 43 037 31768

Dear Sirs:

Enclosed is the final computer colored log for the above referenced well.
IN LOG FILE

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

cc Letter Only; Dana Larson; Mobil E & P U.S., Inc.; Midland, TX

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

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SEE ATTACHMENT / SUNDRY THROUGH SETTING OF 7" CASING 2-22-98.

RECEIVED
MAR 05 1998
DIV. OF OIL, GAS & MINING

14. I hereby certify that the foregoing is true and correct
Signed: Joe Moseley for Title: SHIRLEY HOUCHINS/ENV & REG TECH Date: 3-4-98

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

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14-20-603-355
NAVAJO TRIBAL
SAN JUAN, UTAH

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02-10-98	MAIL SUNDRY & ATTACHMENT TO BLM, STATE OF UTAH & NAVAJO EPA.
02-10-98	POOH W/BIT #2, DRLG 8 3/4" OPEN HOLE F/3764-4030', SURVEY @ 3984' 2.75 DEG F/3044'@ .5 DEG.
02-11-98	CONTINUE DRILLING F/4030-4307'.
02-12-98	CONTINUE DRILLING F/4307-4485'.
02-13-98	CONTINUE DRILLING F/4485-4764'.
02-14-98	CONTINUE DRILLING F/4764-4915', SURVEY @ 4679' @ .75 DEG.
02-15-98	RIH TO 4907', RIG REPAIR, CONTINUE DRILLING F/4915-5110'.
02-16-98	CONTINUE DRILLING F/5110-5343'.
02-17-98	CONTINUE DRILLING F5343-5512', POH, SURVEY @ 5512', @ 5512' @ .75 DEG.
02-18-98	RIH W/CORE BIT & CORE BARREL'S FOR CORE #1, KELLY UP PICK-UP 15' PUP JOINT. (FULL KELLY) RIH TO 5512'. CORE #1 F/5512-5573' (61' OF CORE), CIRC. BOTTOM'S UP. WEIGHT UP F/9.9 PPG TO 10.3 PPG., POH W/CORE #1 (CHAIN OUT OF HOLE) LD CORE BARREL 60'. 53' OF CORE RECOVERED.
02-19-98	FIN. ORIENT CORE BARREL'S, PU JARS, & MONEL DRLG. COLLAR F/CORE #2, RIH TO 5453', CIRC. F/5453'-5566', CIRC OUT FILL F/5566-5573', (7' OF FILL) CORE #2 5573-5634' (61' OF CORE). LAY DOWN 60' CORE, MAKE-UP JARS, MONEL DRLG COLLAR, RIH TO 5633', CIRC & COND. MUD.

ATTACHMENT - FORM 3160-5
RATHERFORD UNIT - WELL #16-77
14-20-603-355
NAVAJO TRIBAL
SAN JUAN, UTAH
PAGE 2

02-20-98	CIRC. & COND. MUD. CORE #3 8.75" x 4" F/5633-5693', CIRC. BOTTOMS UP. POOH W/CORE #3. LAY DOWN 60' OF CORE BARREL. (RECOVER 60' OF CORE #3) LD CORE TOOLS. MAKE-UP RE-RUN BIT #4. RIH TO 5633', WASH 60' TO BOTTOM @ 5693', NO FILL. CONTINUE DRILLING 8.75" OPEN HOLE F/5693-5735'. TD 8.75" OPEN HOLE @ 5735'. CIRC & COND MUD FOR LOGGING TOOLS.
02-21-98	DROP TOTCO. POH F/LOGGING. NO SURVEY. RU SCHLUMBERGER LOGGING UT. RIH W/INDUCTION, NEUTRON, DENSITY, MIRO-LOG TO 5735'. LOG F/5735-4545'. POH RIH W/DIPLE SHEAR SONIC LOG TO 5735', LOG F/5735-5000'. POOH, RIH W/FULLBORE FORMATION MICRO-IMAGE LOG TO 5735'. LOG F/5735-5400', POOH RDMO SCHLUMBERGER LOGGING UT. RIH W/8.75' BIT TO 5735'. CIRC & COND. HOLE TO RUN CSG. DROP TOTCO. POOH, LD DRLG STRING.
02-22-98	CHANGE RAMS & RIG UP CSG CREW. RUN F/S, 1JT 7", F/C 66 JTS 7" D/V TOOL, 69 JTS 7" TOTAL PIPE 5743.90' W F/E, PIPE SET @ 5741', CIRC & COND. RIG DOWN CSG CREW, RIG UP DOWELL, MIX & PUMP 1ST STAGE AS FOLLOWS: LEAD-630 SXS CL-G 50/50 POZ 3% D79, 3#/SK D42, .25#/SK D29; TAIL-85 SXS CL G .4% B14, .25#/SK D65 PLUG DOWN & BUMPED @ 300 MST 2-22-98 DROP BOMP OPEN DV TOOL AT 0330 MST. CIRC. BETWEEN STAGES. CMT 2ND STAGE AS FOLLOWS: LEAD-139 SXS CL-G 50/50 POZ 3 .25#/SK D 29, PLUG DOWN & CLOSED DV TOOL @ 9:00 MST CIRC. MOVE RIG, RELEASE RIG @ 1500 MST 2-22-98

7" CASING @ 5741.00 MD, 5741.00 TVD.

ATTACHMENT FOR SUNDRY DATED 3-04-98.

Form 3160-5
(June 1990)

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DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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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): 2587' FSL & 2410 FWL SEC.16, T41S, R24E

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.)*

BHL: 70' FSL & 90' FWL, SEC. 9
MOBIL REQUEST AN EXTENSION ON THE PERMIT TO DRILL.

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

Signed Shirley Houchins Title ENV. & REG. TECHNICIAN Date 03-18-97

(This space for Federal or State office use)

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

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.

*See Instruction on Reverse Side

Pason

ROCKY MOUNTAIN GEO-ENGINEERING

Electronic Rig Monitoring Systems • Well Logging • Consulting Geology • Coal Bed Methane Services

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2450 INDUSTRIAL BLVD. • GRAND JUNCTION, CO 81505

(970) 243-3044 • (FAX) 241-1085

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APR 01 1998
DIV. OF OIL, GAS & MINING

Friday, March 27, 1998

Division of Oil & Gas Mining
State of Utah
1594 West North Temple
3 Triad Center, Ste. 1210
Salt Lake City, UT 84116

Re: Ratherford Unit#16-77 Legs 1 & 2
Sec. 16, T41S, R24E
San Juan County, Utah
43 037 31768

DRL

Dear Sirs:

Enclosed is the final computer colored log for the above referenced well.
10 LOG FILE

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 and Geology Report For Each Leg

cc Letter Only; Dana Larson; Mobil E & P U.S., Inc.; Midland, TX

RECEIVED
APR 01 1998
DIV. OF OIL, GAS & MINING

MOBIL

RATHERFORD UNIT #16-77
NW HORIZONTAL LATERAL LEG #1
1-A POROSITY BENCH
DESERT CREEK MEMBER
PARADOX FORMATION
SECTION 16, T41S, R24E
SAN JUAN, UTAH

GEOLOGY REPORT
by

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

TABLE OF CONTENTS

WELL SUMMARY 3

DAILY WELL CHRONOLOGY 4

DAILY ACTIVITY 5

BIT RECORD 5

MUD RECORD 5

SAMPLE DESCRIPTIONS 6

FORMATION TOPS 18

GEOLOGIC SUMMARY AND ZONES OF INTEREST 19

WELL PLOTS 23

WELL SUMMARY

OPERATOR:	MOBIL EXPLORATION & PRODUCTION U.S. INC.
NAME:	RATHERFORD UNIT #16-77 NW HORIZONTAL LATERAL LEG #1 IN 1-A POROSITY BENCH, DESERT CREEK
LOCATION:	SECTION 16, T41S, R24E
COUNTY/STATE:	SAN JUAN, UTAH
ELEVATION:	KB: 4706' GL: 4693'
SPUD DATE:	2/25/98
COMPLETION DATE:	3/03/98
DRILLING ENGINEER:	SIMMON BERRARA
WELLSITE GEOLOGY:	JASON G. BLAKE
MUDLOGGING ENGINEERS:	JASON BLAKE / MARVIN ROANHORSE
CONTRACTOR:	BIG "A" RIG 25
TOOLPUSHER:	J. DEES
HOLE SIZE:	4 3/4"
CASING RECORD:	7" PRODUCTION CASING SET TO 5741'
DRILLING MUD:	M-I DRILLING FLUIDS
ENGINEER:	RON WESTENBERG / DANNE BEASON
MUD TYPE:	BRINE WATER W/ POLYMER SWEEPS / OIL EMULSION
DIRECTIONAL DRILLING CO:	SPERRY-SUN
ELECTICAL LOGGING:	NA
TOTAL DEPTH:	8829' MEASURED DEPTH; 5536.91' TRUE VERTICAL DEPTH
STATUS:	TOH & LAY DOWN TOOLS - PREPARE FOR LEG 2

DRILLING CHRONOLOGY
RATHERFORD UNIT #16-77
1-A NW HORIZONTAL LATERAL LEG #1

DATE	DEPTH	DAILY	ACTIVITY
2/25/98	5416'	9'	RU & run gyro. PU & Orient whipstock #1. TIH & set whipstock, break circ., mill with starter mill 5416'-5417.5'. Circ. out, TOH & LD starter mill. PU window mills, TIH, break circ. and mill 5417.5'-5425'. Pump 10 bbl sweep & circ. out. LD 2 Jts. AOH & TOH. LD mill assembly.
2/26/98	5425'	180'	PU Curve motor assembly & TIH. RU & run gyro, time drill 5425-5427'. Drlg curve with wireline surveys to 5451'. Pull wireline. Dir drlg & surveys to 5605', end of curve. Pump 10 bbl sweep & circ. out. LD 7 jts AOH, displace hole with brine & TOH. LD 114 jts AOH.
2/27/98	5605'	659'	Finish TOH & LD curve motor assembly. PU lateral motor assembly & test. PU 106 jts PH-6 tubing and TIH. Dir drlg and surveys 5605'-6264'.
2/28/98	6264'	824'	Dir drlg and surveys 6264'-7088'.
3/1/98	7088'	869'	Dir drlg and surveys 7088'-7957'.
3/2/98	7957'	516'	Dir drlg and surveys 7957'-8194'. Pump 10 bbls brine to slug hole. Hang swivel, LD 4 jts drill pipe and pull 44 stand wiper trip. Run back in hole, swivel up and break circ. Dir drlg and surveys 8194'-8473'.
3/3/98	8473'	356'	Dir drlg and surveys 8473'- 8829' TD. Total depth reached at 2:15 PM. Pump sweep, displace hole with brine, hang swivel & TOH 27 stands. Pump 10 bbl sweep and circulate out. TOH to casing and displace hole with brine (120 bbls). Finish TOH and lay down lateral motor assembly.
3/4/98	8829'	0'	PU retrieving hook & TIH. Circulate bottoms up. Latch onto whipstock, pull free and TOH. Lay down whipstock assembly.

DAILY ACTIVITY

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #16-77 NW 1-A HORIZONTAL LATERAL LEG #1

DATE	DEPTH	DAILY	DATE	DEPTH	DAILY
2/24/98	5416'	0'			
2/25/98	5424'	1'			
2/26/98	5425'	180'			
2/27/98	5605'	659'			
2/28/98	6264'	824'			
3/1/98	7088'	869'			
3/2/98	7957'	516'			
3/3/98	8473'	356'			
3/4/98	8829' TD	0'			

BIT RECORD

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #16-77 NW 1-A HORIZONTAL LATERAL LEG #1

RUN	SIZE	MAKE	TYPE	IN/OUT	FTG	HRS	FT/HR
#1 (RR)	4 3/4"	STC	MF-3P	5425'/ 5605'	180'	13.0	13.85
#2	4 3/4"	STC	MF-3P	5605'/ 8829'	3224'	80.0	40.3

MUD REPORT

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #16-77 NW 1-A HORIZONTAL LATERAL LEG #1

DATE	DEPTH	WT	VIS	PLS	YLD	GEL	PH	WL	CK	CHL	CA	SD	OIL	WTR
2/25/98	5418'	8.5	26	–	–	–	9.0		–	13 K	1600	–	0%	100%
2/26/98	5462'	8.8	26	–	–	–	10.0	–	–	24K	2320	–	2%	98%
2/27/98	5694'	8.8	26	–	–	–	11.0	–	–	48K	1800	–	2%	98%
2/28/98	6479'	8.7	27	–	–	–	11.0	–	–	48k	2000	–	8%	92%
3/1/98	7289'	8.4	27	–	–	–	11.5	–	–	72K	2000	–	12 %	88%
3/2/98	8164'	8.25	27	–	–	–	11.0	–	–	80K	2000	–	20 %	80%
3/3/98	8644'	9.3	27	–	–	–	11.5	–	–	135K	1000	–	9%	91%

SAMPLE DESCRIPTIONS

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #16-77 NW 1-A HORIZONTAL LATERAL LEG #1

DEPTH	LITHOLOGY

5425.00 5440.00 "LS crm-tan-ltbrn,bcmg gybrn,crpxl-micxl,rthy-chky,sl chty,arg,tt,NFSOC,scat thn intbd brn-gybrn micxl rthy lmy DOL tt NFSOC,w/rr clr-trnsl-brn CHT frag & v rr thn dkgy-blk sbplty mica rthy lmy-sl dol SH lams-occ CMT cvgs"

5440.00 5450.00 "LS crm-tan-ltbrn,crpxl-micxl,rthy-cln,chky-sl arg,occ dol,w/scat bf-brn CHT frag,dns,rr mic fos,tt,NFSOC,occ thn intbd mbrn micxl arg-rthy DOL tt NFSOC,v rr v thn dkgy-blk mica v sl carb SH lams-prts"

5450.00 5460.00 "LS brn-mbrn,occ crm-gybrn,crpxl-micxl,rthy,arg-mrly ip,occ dol,anhy ip,chty,tt,NFSOC,w/thn intbd blk-dkgy carb sbplty sl dol SH & mbrn-mgybrn micxl rthy lmy arg sl anhy DOL lams-incl,scat smky gy-gybrn CHT frag"

5460.00 5480.00 "LS brn-mbrn,occ crm-wh,crpxl-micxl,rthy,arg-mrly ip,sl dol,anhy ip,chty,bcmg slty & grdg to v lmy wh-ltgy SLTST w/depth,v rrintxl POR,NFSOC,w/thn dkgy carb sbplty sl dol SH & tt mbrn-brn micxl rthy lmy arg sl anhy rr mic fos DOL ptgs & smky gy-brn CHT"

5480.00 5490.00 "LS AA,pred crm-wh-ltgy plty-slty crpxl-micxl,rthy-chk,tt-rr intxl POR,NFSOC,thn intbd micxl-sl gran DOL AA,NFSOC,v rr dkgybrn thn SH lams,scat CHT frag"

5490.00 5510.00 "LS wh-crm,ltgy,micxl,occ crpxl,rthy-chk,v sl slty,occ sl anhy,tt-rr intxl POR,n-tr bri yel FLOR,v p ltbrn STN,v p slow stmg CUT,w/v rr mbrn micxl rthy DOL AA"

5510.00 5520.00 "DOL ltbrn,micxl-vfxl,rhty-sl slty-arg,rr sdy gr,occ lmy/tr LS cmt,dns,tt-rr intxl POR,bri yel FLOR,tr ltbrn STN,g mod fast stmg mlky CUT,w/LS AA"

5520.00 5530.00 "LS tan-crm-wh,crpxl-micxl,shy-sl slty-arg,chky-anhy,tt-rr intxl POR,fnt yel FLOR,STN-CUT AA,w/SH blk-dkbrnblk-dkbrngy,sft-frm,occ brit,carb,calc-sl lmy,occ sl slty,sooty,w/LS & DOL AA"

5530.00 5540.00 "SH AA,frm-sft-occ brit,carb,calc-sl lmy,sl slty,sooty,w/scat LS AA,tt-tr intxl POR,n-rr fnt yel & orng mnrl FLOR,STN-CUT AA,rr DOL AA,NFSOC"

5540.00 5560.00 "LS tan-ltbrn-crm,occ wh,brn,ltgybrn,crpxl-micxl,sl gran ip,pred PKST/tr GRNST prtgs,dns-sl slty-shy,chky-anhy/tr xln ANHY incl & POR fl,rr trnsl-tan CHT,tt-tr intxl POR,fr scat spty bri-mod bri yel FLOR,fr lt brn-tr brn STN,fr-g slow stmg mlky CUT"

5560.00 5580.00 "LS ltbrn-tan,occ crm-ltgybrn-wh,brn,crpxl-micxl,gran,pred dns-sl chky PKST/tr sl dol ool-alg mat GRNST,sl anhy/tr POR fl,rr xln calc incl,fr intxl-ool POR/rr pp vug,fr-g scat bri-mod bri yel FLOR,fr ltbrn-tr brn/rr blk STN,g mod fast stmg mlky CUT "

5580.00 5590.00 "LS AA,incr gran,pred ool-sl alg GRNST/scat PKST AA,sl chky-anhy/tr POR fl,g-fr ool-intxl POR,sl incr FLOR AA,STN-CUT AA"

5590.00 5605.00 "LS ltbrn-brn-tan,tr crm-ltgybrn-wh,micxl-crpxl-gran,ool-sl alg GRNST,tr scat PKST AA,sl chky-anhy/tr POR fl,v rr CHT AA,v sl dol ip,g ool-intxl POR,g even mod bri-bri yel FLOR,g ltbrn-brn/rr blk STN,g blooming-fast stmg mlky CUT"

DEPTH	LITHOLOGY

5605.00 5630.00 "LS tan-brn,occ ltbrn-gybrn,crpxl-micxl,vfxl-gran ip,rr micsuc,pred sl ooc-oom GRNST,sl alg,occ anhy-rr ANHY xl-POR fl,v rr ltbrn CHT frag,occ DOL cmt,rr thn sl ool PKST incl,tt-g ool-tr intxl POR,mfr bri yel FLOR,tr spty brn STN,tr-fr mod fast-fast CUT,w/v rr thn DOL & SH cvgs"

5630.00 5650.00 "LS tan-brn,occ crm-wh,crpxl-vfxl,gran-sl micsuc ip,pred ooc-oom v sl alg GRNST,w/v thn sl ool occ plty-chk PKST,occ DOL rich cmt,rr ANHY xl-POR fl,rr scat tan-smky gy CHT frag,tt-g ool-intxl POR,fr-g bri yel FLOR,fr brn-rr blk STN,fr-g mod fast-fast CUT"

5650.00 5660.00 "LS AA,scat ltgy-tan occ plty-chk PKST frag,fr ool-tr intxl POR,fr-g bri yel FLOR,tr-fr brn STN,rr blk dd o STN,fr-g mod fast-fast stmg mlky CUT"

5660.00 5680.00 "LS AA,fr-g ool-tr intxl POR,fr-g dull-bri yel FLOR,g brn-rr blk STN,fr-g fast stmg CUT"

5680.00 5700.00 "LS tan-ltbrn,occ crm-wh,crpxl-vfxl,gran-sl micsuc ip,intbd ooc-oom sl alg GRNST & thn sl ool plty-chk dns PKST,occ DOL rich cmt,rr ANHY xl-POR fl,rr scat tan-trnsl CHT frag,tt-fr intxl-tr POR,fr bri yel FLOR,fr brn-rr blk STN,fr-g mod fast-fast CUT"

5700.00 5720.00 "LS crm-tan-ltbrn,occ brn-wh,crpxl-vfxl,gran-micsuc ip,pred ooc-oom GRNST,w/v thn scat dns occ plty-chk sl rthy PKST incl,v rr CHT frag,occ DOL cmt,rr ANHY xl-POR fl,fr-g intxl-ool POR,fr bri yel FLOR,fr brn-ltbrn STN,v rr blk STN,fr-g mod fast-fast CUT"

5720.00 5740.00 "LS tan-brn,occ crm-wh,crpxl-vfxl,gran-micsuc ip,pred ooc-oom GRNST,w/sl incr occ plty-chk-sl rthy occ ool PKST incl,rr CHT frag,occ DOL cmt,rr ANHY xl-POR fl,fr-g intxl-ool POR,fr bri yel FLOR,fr brn-ltbrn STN,rr dd o blk STN,fr-g mod fast-fast stmg CUT"

5740.00 5770.00 "LS AA,pred sl ooc-oom v sl alg GRNST,v rr sl ool PKST,fr-g intxl-fr ool POR,fr-g bri-dull yel FLOR,g ltbrn-brn STN,rr-tr blk dd o STN,fr-g mod fast-fast stmg CUT"

5770.00 5800.00 "LS tan-brn,occ crm-wh,crpxl-vfxl,gran-micsuc ip,pred ooc-oom GRNST,w/v sl incr scat plty-chk sl rthy PKST frag AA,v rr CHT frag,sl DOL rich cmt,rr ANHY xl-POR fl,fr-g intxl-ool POR,fr bri yel FLOR,fr-g brn-ltbrn STN,v rr blk STN,fr-g mod fast-fast CUT"

5800.00 5850.00 "LS tan-ltbrn-brn,occ wh-crm,micxl-vfxl,gran-suc,pred sl ooc-oom GRNST,w/v rr thn scat dns occ plty-chk sl ool PKST frag,n-v rr CHT frag,sl DOL cmt,rr ANHY xl-POR fl,g intxl-tr ool POR,fr bri yel FLOR,g brn-ltbrn STN,rr blk STN,fr-g mod fast-fast stmg CUT"

5850.00 5870.00 "LS tan-ltbrn,occ brn-crm,micxl-vfxl,gran-suc,pred sl ooc-oom GRNST,v rr scat sl ool rr plty-chk dns PKST AA,POR-FLOR-STN-CUT AA"

5870.00 5900.00 "LS tan-ltbrn-brn,occ wh-crm,micxl-vfxl,gran-suc,pred sl ooc-oom GRNST,w/v rr thn scat dns occ plty-chk sl ool PKST frag,n-v rr CHT frag,sl DOL cmt,rr ANHY xl-POR fl,g intxl-fr ool POR,fr dull-tr bri yel FLOR,g ltbrn-rr blk STN,fr-g mod fast stmg CUT"

5900.00 5930.00 "LS tan-ltbrn,occ brn-crm,micxl-vfxl,gran-suc,pred sl ooc-oom GRNST,v rr scat sl ool rr plty-chk dns PKST AA,POR-FLOR-STN-CUT AA"

5930.00 5960.00 "LS tan-ltbrn-brn,occ wh-crm,micxl-vfxl,gran-suc,pred sl ooc-oom GRNST,w/v rr thn scat dns occ plty-chk sl ool PKST frag,n-v rr CHT frag,sl DOL cmt,rr ANHY xl-POR fl,g intxl-fr ool POR,fr dull-tr bri yel FLOR,g ltbrn-rr blk STN,g mod fast stmg CUT"

DEPTH	LITHOLOGY

5960.00 5980.00 "LS ltbrn-tan-brn/tr ltgybrn-crm incl,gran-vfxl,sl mic suc,rr crpxl,ooc-oom GRNST/tr intbd-scat PKST AA,chky-sl anhy/tr POR fl-rr xln ANHY,rr tan-ltbrn CHT incl,g ool-tr intxl/rr pp vug POR,FLOR AA,g brn-ltbrn/rr blk STN,g slow stmg mlky CUT "

5980.00 5990.00 "LS AA,POR AA,fr-g scat dull-mod bri FLOR-STN-CUT AA"

5990.00 6000.00 "LS AA,pred ool GRNST/tr PKST AA,chky-sl anhy/tr POR fl-rr xln ANHY,tr CHT AA,POR-FLOR-STN-CUT AA"

6000.00 6020.00 "LS ltbrn-brn-tan,occ ltgybrn-ltgy incl,gran-vfxl,micxl-mic suc,occ crpxl,oom-ooc GRNST,tr scat dns sl ool PKST,chky-sl anhy/tr POR fl-xln ANHY,tr brn-tan CHT incl,sl dol,g-fr ooc-oom-intxl POR,g dull-mod bri yel FLOR,g ltbrn-brn/tr blk STN,CUT AA"

6020.00 6050.00 "LS AA/occ ltgybrn-ltgy incl,gran-vfxl,micxl-mic suc,occ crpxl,oom-ooc GRNST,tr scat PKST AA,chky-sl anhy/tr POR fl-xln ANHY,tr brn-tan CHT incl,sl dol,g-fr ooc-oom-intxl/rr pp vug POR,FLOR AA,g ltbrn-brn/tr blk STN,g mod fast-slow stmg mlky CUT"

6050.00 6090.00 "LS ltbrn-brn-tan,occ ltgybrn-ltgy incl,gran-vfxl,micxl-mic suc,occ crpxl,oom-ooc GRNST,tr scat dns sl ool PKST,chky-sl anhy/tr POR fl-xln ANHY,tr tan CHT,sl dol,POR,g dull-mod bri yel FLOR,g ltbrn-brn/tr blk STN,g slow stmg mlky CUT"

6090.00 6120.00 "LS ltbrn-tan,occ brn,tr ltgybrn-crm incl,gran-vfxl,micxl-sl mic suc,crpxl,oom-ooc GRNST,tr scat-intbd PKST AA,incr chky-anhy/tr POR fl-xln ANHY,tr brn-tan CHT incl,sl dol,POR-FLOR AA,fr-g ltbrn-tr brn-rr blk STN,g-fr slow stmg mlky CUT"

6120.00 6140.00 "LS AA,vfxl-gran,micxl-sl mic suc,crpxl,pred ooc-oom GRNST,tr chky plty-dns sl ool PKST,chky-anhy/tr POR fl-xln ANHY,tr CHT AA,v sl dol,g-fr ool-tr intxl POR,fr-g dull-scat bri yel FLOR,g ltbrn-brn/tr blk STN,g-fr slow stmg mlky CUT"

6140.00 6180.00 "LS tan-ltbrn,occ brn,ltgybrn,tr ltgy-wh,gran-vfxl,micxl-mic suc,occ crpxl,pred GRNST AA,tr scat chky plty-sl incr dns sl ool PKST,chky-anhy/tr POR fl-rr xln ANHY,rr CHT,sl dol,g-fr ooc-oom-intxl POR,FLOR AA,g-fr ltbrn-brn/rr blk STN,CUT AA"

6180.00 6210.00 "LS AA,gran-vfxl,micxl-crpxl,occ sl mic suc,pred GRNST AA,sl incr scat chky plty-dns sl ool PKST,chky-anhy/tr POR fl-rr xln ANHY,rr CHT,sl dol,fr ooc-oom-intxl POR,fr scat dull-tr mod bri spty yel FLOR,fr-g ltbrn-tr brn STN,fr-g slow stmg mlky CUT"

6210.00 6230.00 "LS AA,gran-vfxl-micxl,crpxl,sl mic suc,pred GRNST AA/scat dns sl ool-rr chky plty PKST,chky-anhy/tr POR fl-rr xln ANHY,rr tan-ltbrn CHT,v rr blk SH lam-incl v sl dol,POR-FLOR AA,fr-g ltbrn-brn/rr blk pp dd o STN,CUT AA"

6230.00 6240.00 "LS AA,sl decr ool GRNST/sl incr dns sl ool-tr chky plty PKST,chky-anhy AA,POR-FLOR-STN-CUT AA"

6240.00 6250.00 "LS AA,micxl-vfxl-gran,crpxl,incr dns sl ool-tr chky plty PKST intbd/thn oom-ooc GRNST prtgs,chky-anhy/POR fl-tr xln ANHY,tr tan CHT,v sl dol,fr-g intxl-ool POR/v rr pp vug POR,fr-g dull-mod bri/scat bri yel FLOR,STN-CUT AA"

DEPTH	LITHOLOGY

6250.00 6270.00 "LS tan-ltgybrn,occ ltbrn-brn,tr ltgy-wh,vfxl-gran-micxl,crpxl,occ sl mic suc,sl incr GRNST AA/scat chky plty-dns sl ool PKST,v chky-sl anhy/tr POR fl-rr xln ANHY,rr CHT,sl dol,POR-FLOR AA,fr ltbrn-tr brn/rr blk pp dd o STN,fr-mg slow stmg mlky CUT"

6270.00 6290.00 "LS ltbrn-tan,occ brn,crm,tr wh,vfxl-micxl-gran,crpxl,ooc-oom GRNST/scat dns sl ool-rr chky plty PKST frag,chky-sl anhy/tr POR fl-rr xln ANHY,tr mic fos,rr tan CHT,v sl dol,fr-g ool-intxl POR,sl incr FLOR,STN-CUT AA"

6290.00 6320.00 "LS tan-ltbrn-crm,occ wh,tr brn,micxl-crpxl,vfxl-gran,ooc-oom GRNST/incr scat dns sl ool-chky plty PKST frag,chky-sl anhy/tr POR fl-xln ANHY,tr tan CHT & calc xl,v sl dol,fr-g intxl-ool POR,fr-g dull-mod bri/tr scat bri yel FLOR,fr ltbrn-brn STN,CUT AA"

6320.00 6330.00 "LS AA,incr ooc-oom GRNST/sl decr dns sl ool-chky plty PKST,sl chky-anhy AA,POR-FLOR-STN-CUT AA"

6330.00 6350.00 "LS tan-ltbrn-crm,occ wh,tr brn,micxl-crpxl,vfxl-gran,ooc-oom GRNST/incr scat dns sl ool-chky plty PKST frag,chky-sl anhy/tr POR fl-xln ANHY,tr tan CHT & calc xl,v sl dol,fr-g intxl-ool POR,fr-g dull-mod bri/tr scat bri yel FLOR,fr ltbrn-brn STN,CUT AA"

6350.00 6370.00 "LS grd to DOLO LS ip,crm-tn-lt brn,occ dk brn,occ wht,mic-vfn xln,ool GRNSTN,sl suc-grny tex,sl anhy,rr lt tn-gr transl CHT,scat ool PKSTN,crm-tn,dens,tt mtrx;fr-gd oomold-sec intrxln/ppt vug POR,fr-gd even brn-dk brn,occ blk stn,mod yel-gld FLUOR,fr cut"

6370.00 6400.00 "LS grd to DOLO LS ip,crm-tn-lt brn,occ dk brn,occ wht,mic-vfn xln,ool GRNSTN,sl suc-grny tex,sl anhy,sl foss,rr lt tn transl CHT,rr ool PKSTN,crm-tn,dens;gd oomold-sec intrxln/ppt vug POR,fr even brn,occ blk stn,fr-mod yel-gld FLUOR,sl-fr strm-diff cut"

6400.00 6420.00 "pred LS,occ sl dolo,crm-tn-lt brn,vfn-mic xln,grny-sl suc tex,ool GRNSTN,sl anhy,scat sl chky,scat ool PKSTN,crm,tt,dens;fr oomoldic,sec intrxln/introol POR,lt brn-brn-occ blk STN,scat-com mod yel-gld FLUOR,sl strm-diff CUT"

6420.00 6440.00 "LS,occ sl dolo,crm-tn-lt brn,vfn-mic xln,grny-sl suc tex,ool GRNSTN,sl anhy,scat sl chky,sl incr ool PKSTN,crm,tt,dens,sl chky;pr-fr oomoldic,pr intrxln/introol POR,lt brn-brn-occ blk STN,scat mod yel-gld FLUOR,sl strm-diff CUT"

6440.00 6460.00 "LS,sl dolo ip,crm-tn-lt brn,vfn-mic xln,grny-sl suc tex,ool GRNSTN,sl anhy,scat sl chky,com ool PKSTN,crm,tt,dens;pr-no oomoldic fabic,pr-fr intrxln/introol POR,lt brn-brn-occ blk STN,scat-com mod yel-gld FLUOR,fr strm-bloom CUT"

6460.00 6480.00 "LS,sl dolo ip,tn-lt brn,occ crm-brn,vfn-mic xln,grny tex,ool GRNSTN,sl anhy,sl ool PKSTN,crm,tt,dens,sl chky tex;fr-gd introol-intr xln,sl oomoldic POR,lt brn-brn-occ blk STN,gd even mod yel-gld FLUOR,fr-gd strm-bloom CUT"

6480.00 6500.00 "LS,sl dolo ip,tn-lt brn,occ crm-brn,vfn-mic xln,grny tex,ool GRNSTN,sl anhy,sl ool PKSTN,crm,tt,dens,sl chky tex;fr-gd introol-intr xln,sl oomoldic POR,lt brn-brn-occ blk STN,gd even mod yel-gld FLUOR,gd strm-bloom CUT"

6500.00 6530.00 "LS,sl dolo ip,tn-lt brn,occ crm,occ brn,vfn-mic xln,grny tex,oolitic GRNSTN,sl anhy;gd intr ool/intrxln w sec oomold POR,gd brn-lt brn STN,even dull-mod yel-gld FLOUR,gd strm-bloom CUT"

DEPTH	LITHOLOGY

6530.00 6550.00 "LS,sl dolo aa,lt brn-tn,occ brn-crm,vfn-mic xln,grny,oolitic GRNSTN,sl anhy + scat LS PCKSTN,off wht-crm,mic-crypto xln,dens,sl oolitic;pred gd introol/intrxln-sl oomold POR,even lt brn-brn STN,even dull-mod yel-gld FLUOR,fr strm-bloom CUT"

6550.00 6570.00 "LS,sl dolo aa,lt brn-tn,occ brn-crm,vfn-mic xln,grny,oolitic GRNSTN,sl anhy + scat LS PCKSTN,off wht-crm,mic-crypto xln,dens,sl oolitic;pred gd introol/intrxln-sl oomold POR,even lt brn-brn STN,even dull-mod yel-gld FLUOR,fr strm-bloom CUT"

6570.00 6590.00 "LS,sl dolo,lt brn-tn,occ brn-crm,vfn-mic xln,grny,oolitic GRNSTN,sl anhy + scat PCKSTN aa,off wht-crm,mic-crypto xln,dens,sl oolitic;pred gd introol/intrxln-sl oomold POR,even lt brn-brn STN,even dull-mod yel-gld FLUOR,fr strm-bloom CUT"

6590.00 6610.00 "LS,sl dolo,lt brn-tn-occ crm,vfn-mic xln,grny,oolitic GRNSTN,sl anhy + incr LS PCKSTN,off wht-crm,mic-crypto xln,dens,sl oolitic,com xln calc;pred pr intrxln-sl introol POR,com sptty lt brn-brn STN,even dull-mod yel-gld FLUOR,fr-gd strm-bloom CUT

6610.00 6640.00 "LS,sl dolo,lt brn-tn-crm-off wht,vfn-mic-crypto xln,sl anhy,pred LS PCKSTN,dens,sl ool,dens chky-slty tex ip,grny tex ip,scat DOLO LS,lt gr,slty,dens;pred pr intrxln-sl introol POR,com sptty lt brn-brn STN,even dull-mod yel-gld FLUOR,fr-gd strm-bloom CUT"

6640.00 6660.00 "LS,sl dolo ip,off wht-crm-tn-lt brn,mic-crypto xln,tt chky-sl slty tex to sl grny tex ip,sl ool ip,scat anhy;pr-no intrxln-scat introol/minor oomold POR,spotty lt brn STN,spotty yel-gld to blu-wht min FLOUR,sl strm-diff CUT"

6660.00 6670.00 "LS off wh-crm-wh,ltbrn-tan,occ brn,crpxl-micxl-vfxl,occ gran-sl mic suc,pred thn chky plty-dns PKST/scat GRNST,sl anhy/tr xln ANHY frag,tr tan CHT incl,fr intxl-ool POR,fr-g dull/scat mod bri yel FLOR,fr ltbrn-tr brn STN,fr dif-tr slow stmg mlky CUT"

6670.00 6680.00 "LS AA,incr chky plty PKST/scat GRNST AA,POR-FLOR-STN-CUT AA,w/tr scat ltgy-gy slty SH frag"

6680.00 6690.00 "LS AA,decr chky plty PKST,pred dns sl ool chky-sl anhy PKST/sl incr ool GRNST,POR-FLOR-STN-CUT AA,w/incr gy slty-sl arg SH"

6690.00 6700.00 "LS ltbrn-tan-brn,crm-off wh,gran-suc-micxl,occ vfxl,crpxl,ool GRNST/scat PKST AA,sl anhy/tr POR fl-rr xln ANHY,rr trnsl CHT,v sl dol,g-fr ool-intxl POR,fr-g mod bri-dull/tr bri yel FLOR,g-fr ltbrn-brn/tr pp blk dd o
STN,fr-g slow stmg mlky CUT"

6700.00 6720.00 "LS AA/decr crm-off wh,gran-suc-micxl,occ vfxl,crpxl,ool GRNST/tr dns-chky plty PKST,sl anhy/tr POR fl-rr xln ANHY,rr CHT,v sl dol,POR AA,g even mod bri-dull/tr bri yel FLOR,STN AA,g fast stmg-blooming mlky CUT"

6720.00 6730.00 "LS AA,pred ooc-oom GRNST/tr PKST AA,sl chky-anhy/tr POR fl-rr xln ANHY,rr CHT,g ooc-oom/tr intxl POR,g even mod bri-dull/scat bri yel FLOR,g brn-ltbrn/tr blk pp dd o STN,g fast stmg-sl blooming mlky CUT "

6730.00 6760.00 "LS ltbrn-tan-brn,crm-off wh,gran-suc-micxl,occ vfxl,crpxl,ool GRNST/scat PKST AA,sl anhy/tr POR fl-rr xln ANHY,rr trnsl CHT,v sl dol,g-fr ool-intxl POR,fr-g mod bri-dull/tr bri yel FLOR,g-fr ltbrn-brn/tr pp blk dd o STN,fr-g slow stmg mlky CUT"

DEPTH	LITHOLOGY

6760.00 6790.00 "LS ltbrn-tan-brn,crm-off wh,gran-suc-micxl,occ vfxl,crpxl,ool GRNST/scat PKST AA,sl anhy/tr POR fl-rr xln ANHY,rr trnsl CHT,v sl dol,g-fr ool-intxl POR,fr-g mod bri-dull/tr bri yel FLOR,g-fr ltbrn-brn/tr pp blk dd o STN,fr-g slow stmg mlky CUT"

6790.00 6800.00 "LS AA,pred oom-ooc GRNST/tr dns sl ool-chky plty PKST,sl anhy/v rr xln ANHY,tr tan-trnsl CHT,sl dol/tr DOL cmt,POR-FLOR-STN-CUT AA"

6800.00 6830.00 "LS ltbrn-tan,occ brn,crm-off wh,gran-suc-vfxl,occ crpxl,ool GRNST/tr PKST AA,sl chky-anhy/tr POR fl-rr xln ANHY,tr tan-trnsl CHT,v sl dol,g ool-intxl POR,g even mod bri-bri yel FLOR,g-fr ltbrn-tr brn/vrr pp blk dd o STN,g fast stmg-sl blooming mlky CUT"

6830.00 6860.00 "LS AA,ooc-oom GRNST/tr dns-rr cky plty PKST,sl chky-anhy/tr POR fl-rr xln ANHY,tr tan-trnsl CHT,v sl dol,g ooc-oom/tr intxl POR,g even mod bri-dull/scat bri yel FLOR,g ltbrn-brn/vrr blk pp dd o STN,g mod fast-fast stmg mlky CUT "

6860.00 6870.00 "LS AA,pred ooc-oom GRNST/tr dns sl ool-rr chky plty PKST,POR-FLOR-STN-CUT AA"

6870.00 6900.00 "LS ltbrn-tan,occ brn,rr crm-off wh,gran-suc-vfxl,occ crpxl,GRNST AA/tr PKST AA,sl chky-anhy,tr POR fl-rr xln ANHY,tr CHT AA,v sl dol,g ool-intxl POR,g even mod bri-bri yel FLOR,g-fr ltbrn-tr brn/vrr pp blk dd o STN,g fast-mod fast stmg mlky CUT"

6900.00 6930.00 "LS ltbrn-brn-tan,tr crm-off wh,gran-vfxl-suc,occ micsuc,crpxl,GRNST AA/tr PKST AA,sl chky-anhy,tr POR fl-rr xln ANHY,mod incr scat tan-ltbrn CHT,v sl dol,g ool-intxl POR,g-fr dull-mod bri/scat bri yel FLOR,g-fr ltbrn-brn/vrr pp blk dd o STN,CUT AA"

6930.00 6950.00 "LS AA,pred ooc-oom GRNST/tr dns sl ool-rr chky plty PKST,CHT AA,sl dol ip,POR-FLOR-STN-CUT AA"

6950.00 6970.00 "LS AA,ooc-oom GRNST/tr dns-rr cky plty PKST,sl chky-anhy/tr POR fl-rr xln ANHY,tr tan-trnsl CHT,v sl dol,g ooc-oom/tr intxl POR,g even mod bri-dull/scat bri yel FLOR,g ltbrn-brn/vrr blk pp dd o STN,g mod fast-fast stmg mlky CUT "

6970.00 6990.00 "LS ltbrn-brn-tan,tr crm-off wh,gran-vfxl-suc,occ micsuc,crpxl,GRNST AA/tr PKST AA,sl chky-anhy,tr POR fl-rr xln ANHY,mod incr scat tan-ltbrn CHT,v sl dol,g ool-intxl POR,g-fr dull-mod bri/scat bri yel FLOR,g-fr ltbrn-brn/vrr pp blk dd o STN,CUT AA"

6990.00 7020.00 "LS AA,ooc-oom GRNST/tr dns-rr cky plty PKST,sl chky-anhy/tr POR fl-rr xln ANHY,tr tan-trnsl CHT,v sl dol,g ooc-oom/tr intxl POR,g even mod bri-dull/scat bri yel FLOR,g ltbrn-brn/vrr blk pp dd o STN,g mod fast-fast stmg mlky CUT "

7020.00 7050.00 "LS ltbrn-tan,occ brn,tr crm-off wh,vfxl-gran,micsuc-micxl,occ crpxl,ooc-oom GRNST/tr scat dns sl ool-rr chky plty PKST,sl anhy/tr chk-anhy POR fl,v rr xln ANHY,v sl dol,tr tan-ltbrn CHT,g ool-intxl POR,FLOR-STN-CUT AA"

7050.00 7080.00 "LS AA,pred oom-ooc GRNST,tr dns sl ool-sl incr chky plty PKST,sl anhy/tr POR fl-rr xln ANHY,tr CHT AA,g-fr ool-intxl POR,g-fr mod bri-dull/tr scat bri yel FLOR,g-fr ltbrn-tr scat brn/rr blk pp dd o STN,g mod fast stmg mlky CUT"

DEPTH	LITHOLOGY

7080.00 7110.00 "LS tan-ltbrn,occ brn,tr crm-off wh,vfxl-gran,micsuc-micxl,crpxl,GRNST AA/tr scat dns sl ool-chky plty PKST,sl anhy/tr chk-anhy POR fl,v rr xln ANHY,tr tan-ltbrn CHT,v sl dol,g ool-intxl POR,g-fr mod bri-dull/scat bri yel FLOR,STN-CUT AA"

7110.00 7130.00 "LS,tn-lt brn,occ crm-brn,vfn-mic xln,suc-grny tex,oolitic GRNSTN,sl anhy,rr lt tn transl CHT,rr off wht-crm plty PKSTN;pred gd introol/intrxln POR,poss sl oomold POR,fr lt brn STN,even bri yel-gld FLUOR,immed bloom-gd strm CUT"

7130.00 7150.00 "LS,tn-lt brn,occ crm-brn,vfn-mic xln,suc-grny tex,oolitic GRNSTN,sl anhy,rr lt tn transl CHT,rr off wht-crm plty PKSTN;pred gd introol/ intrxln POR,scat oomold POR,fr lt brn STN,even bri yel-gld FLUOR,immed bloom-gd strm CUT"

7150.00 7180.00 "LS AA,tn-lt brn,occ crm-brn,vfn-mic xln,suc-grny tex,oolitic GRNSTN,sl anhy,rr lt tn transl CHT,rr off wht-crm plty PKSTN;pred gd introol/ intrxln POR,scat oomold POR,fr lt brn STN,even bri yel-gld FLUOR,immed bloom-gd strm CUT AA"

7180.00 7200.00 "LS,lt brn-med brn,occ tn-crm-brn,mic-vfn xln,grny tex,oolitic GRNSTN,sl anhy,scat tn transl CHT,rr pcs off wht-crm,tt,sl chky PCKSTN;gd intrxln/introol POR,scat oomold POR,even lt brn STN,br yel-gld FLUOR,gd strm-bloom CUT,abund FO & ODOR"

7200.00 7220.00 "LS aa,tn-lt brn,occ crm-brn,vfn-mic xln,suc-grny tex,oolitic GRNSTN,sl anhy,rr lt tn transl CHT,rr off wht-crm plty PKSTN;pred gd introol/ intrxln POR,scat oomold POR,fr lt brn STN,even bri yel-gld FLUOR,immed bloom-gd strm CUT AA"

7220.00 7250.00 "LS,lt brn-med brn,occ tn-crm-brn,mic-vfn xln,grny tex,oolitic GRNSTN,sl anhy,scat tn transl CHT,rr pcs off wht-crm,tt,sl chky PCKSTN;gd intrxln/introol POR,scat oomold POR,even lt brn STN,br yel-gld FLUOR,gd strm-bloom CUT,abund FO & ODOR"

7250.00 7270.00 "LS,tn-lt brn,occ crm-brn,vfn-mic xln,suc-grny tex,oolitic GRNSTN,sl anhy,rr lt tn transl CHT,rr off wht-crm plty PKSTN;pred gd introol/ intrxln POR,scat oomold POR,fr lt brn STN,even bri yel-gld FLUOR,immed bloom-gd strm CUT"

7270.00 7290.00 "LS,tn-lt brn,vfn-mic xln,gry-sub suc tex,oolitic GRNSTN,sl anhy,rr cht AA, sl incr off wht-crm,mic-crypto xln,dens-sl chky PCKSTN;fr-gd intrxln/introol POR,fr lt brn STN,fr-gd yel gld FLUOR,gr-gd strm-bloom CUT,abund FO & ODOR in smp"

7290.00 7310.00 "LS,lt brn-hon brn-tn,vfn xln,grny-sl sub suc tex,oolitic GRNSTN,sl anhy,rr tn CHT,scat off wht-crm PKSTN aa;gd intrxln/introol POR aa-sl evid of oomold POR,lt brn STN,even bri yel-gld FLOUR,gd strm-bloom CUT,FO & ODOR in smp"

7310.00 7340.00 "LS,tn-lt brn,occ crm-brn,vfn-mic xln,suc-grny tex,oolitic GRNSTN,sl anhy,rr lt tn transl CHT,rr off wht-crm plty PKSTN;pred gd introol/ intrxln POR,scat oomold POR,fr lt brn STN,even bri yel-gld FLUOR,immed bloom-gd strm CUT"

7340.00 7370.00 "LS,lt brn-hon brn-tn,vfn xln,grny-sl sub suc tex,oolitic GRNSTN,sl anhy,rr tn CHT,scat off wht-crm PKSTN aa;gd intrxln/introol POR aa-sl evid of oomold POR,lt brn STN,even bri yel-gld FLOUR,gd strm-bloom CUT,FO & ODOR in smp"

DEPTH	LITHOLOGY

7370.00 7390.00 "LS,lt brn-tn-crm,vfn xln,grny-sl sub suc tex,oolitic GRNSTN,sl anhy,rr tn CHT,scat off wht-crm PKSTN aa;gd intrxln/introol POR aa-sl evid of oomold POR,lt brn-occ spty blk STN,even bri yel-gld FLOUR,fr-gd strm-bloom CUT,FO & ODOR in smp"

7390.00 7420.00 "LS,lt brn-tn,vfn xln,grny-sl sub suc tex,oolitic GRNSTN,sl anhy,rr tn CHT,scat off wht-crm PKSTN aa;gd intrxln/introol POR aa-sl evid of oomold POR,lt brn STN,even bri yel-gld FLOUR,gd strm-bloom CUT,FO & ODOR in smp"

7420.00 7440.00 "LS,tn-lt brn,occ crm-brn,vfn-mic xln,suc-grny tex,oolitic GRNSTN,sl anhy,rr lt tn transl CHT,rr off wht-crm plty PKSTN;pred gd introol/ intrxln POR,fr lt brn STN,even bri yel-gld FLUOR,immed bloom-gd strm CUT"

7440.00 7450.00 "LS aa,tn-lt brn-crm,vfn-mic xln,grny tex,oolitic GRNSTN aa,sl anhy,rr lt tn transl CHT,scat off wht-crm plty PKSTN;pred gd introol/intrxln POR,fr lt brn STN,even bri yel-gld FLUOR,immed bloom-gd strm CUT"

7450.00 7470.00 "LS,tn-lt brn,occ crm-brn,vfn-mic xln,suc-grny tex,oolitic GRNSTN,sl anhy,rr lt tn transl CHT,rr off wht-crm plty PKSTN;pred gd introol/ intrxln POR,fr lt brn STN,even bri yel-gld FLUOR,immed bloom-gd strm CUT"

7470.00 7490.00 "LS,lt brn-tn,vfn xln,grny-sl sub suc tex,oolitic GRNSTN,sl anhy,rr tn CHT,scat off wht-crm PKSTN aa;gd intrxln/introol POR aa-sl evid of oomold POR,lt brn STN,even bri yel-gld FLOUR,gd strm-bloom CUT,FO & ODOR in smp"

7490.00 7510.00 "LS aa,tn-lt brn-crm,vfn-mic xln,grny tex,oolitic GRNSTN aa,sl anhy,rr lt tn transl CHT,scat off wht-crm plty PKSTN;pred gd introol/intrxln POR,fr lt brn STN,even bri yel-gld FLUOR,immed bloom-gd strm CUT"

7510.00 7530.00 "LS GRNSTN,tn-lt brn-occ crm,mic-vfn xln,gry tex,oolitic,sl anhy,rr lt tn transl CHT,scat offwht-crm,mic-cryptoxln,dens tt PCKSTN;gd intrxln/introol POR,lt brn STN,even mod bri yel-gld FLUOR,fr strm-bloom CUT"

7530.00 7550.00 "LS,lt brn-tn,vfn xln,grny-sl sub suc tex,oolitic GRNSTN,sl anhy,rr tn CHT,scat off wht-crm PKSTN aa;gd intrxln/introol POR aa-sl evid of oomold POR,lt brn STN,even bri yel-gld FLOUR,gd strm-bloom CUT,FO & ODOR in smp"

7550.00 7570.00 "LS aa,tn-lt brn-crm,vfn-mic xln,grny tex,oolitic GRNSTN aa,sl anhy,rr lt tn transl CHT,scat off wht-crm plty PKSTN;pred gd introol/intrxln POR,fr lt brn STN,even bri yel-gld FLUOR,immed bloom-gd strm CUT"

7570.00 7590.00 "LS GRNSTN,tn-lt brn-occ crm,mic-vfn xln,gry tex,oolitic,sl anhy,rr lt tn transl CHT,scat offwht-crm,mic-cryptoxln,dens tt PCKSTN;gd intrxln/introol POR,lt brn STN,even mod bri yel-gld FLUOR,fr strm-bloom CUT"

7590.00 7610.00 "LS GRNSTN,tn-lt brn-crm,vfn-mic xln,grny-sub suc tex,sl anhy,rr lt tn transl CHT,scat off wht-crm,cryptoxln,dens,sl chky PCKSTN;gd intrxln/introol POR,fr lt brn STN,even mod bri yel gld FLUOR,fr strm-gd bloom CUT,abund FO & ODOR in smp"

DEPTH	LITHOLOGY

7600.00 7630.00 "LS AA,occ brn,crm-wh,vfxl-gran,micsuc-micxl,suc,crpxl,pred ool GRNST/scat dns sl ool-tr chky plty PKST,sl anhy/tr POR fl-rr xln ANHY,rr tan CHT,g ool-intxl POR,g even mod bri-dull/scat bri yel FLOR,g-fr ltbrn/tr brn-rr blk pp dd o STN,g mod fast stmg CUT"

7630.00 7670.00 "LS tan-ltbrn,occ brn,crm-wh,gran-vfxl-mic suc,occ micxl-crpxl,ool GRNST/tr PKST AA,sl anhy/tr POR fl-rr xln ANHY frag,rr CHT AA,POR-FLOR-STN-CUT AA"

7670.00 7690.00 "LS ltbrn-tan-brn,occ crm-wh,gran-vfxl-mic suc,occ micxl-crpxl,ool GRNST/tr scat dns sl ool-chky plty PKST,sl anhy-chky/sl incr POR fl-rr xln ANHY,rr crm-trnsl CHT,g ool-intxl POR,g even mod bri-dull/scat bri yel FLOR,STN AA,g mod fast-slow stmg CUT"

7700.00 7730.00 "LS ltbrn-tan,occ brn,crm-wh,vfxl-micsuc-gran,occ crpxl,ool GRNST/scat dns sl ool-chky plty PKST,sl anhy/tr POR fl-rr xln ANHY,rr crm-tan CHT,g ool-fr intxl POR,g even mod bri/scat bri yel FLOR,g-fr lt brn-tr scat brn/rr blk pp STN,g fast stmg-blooming mlky CUT"

7730.00 7770.00 "LS AA/sl decr crm-wh,vfxl-gran-micsuc,micxl,crpxl,pred ool GRNST/tr dns-sl incr plty chky PKST,sl anhy/tr POR fl-xln ANHY,tr tan CHT,g ool-intxl POR,g even mod bri-dull/scat bri yel FLOR,g-fr ltbrn/tr brn-rr blk pp dd o STN,g fast stmg CUT"

7770.00 7810.00 "LS AA,vfxl-gran-micsuc,micxl-crpxl,pred ool GRNST/scat dns sl ool-tr chky plty PKST,sl anhy/tr POR fl-rr xln ANHY,rr tan CHT,POR AA,g even mod bri-dull/scat bri yel FLOR,g-fr ltbrn/tr brn-rr blk pp dd o STN,g mod fast-slow stmg mlky CUT"

7810.00 7830.00 "LS ltbrn-tan,occ brn,crm-wh,vfxl-gran-mic suc,crpxl,ool GRNST/scat dns-tr chky plty PKST,sl anhy AA-rr xln ANHY,rr crm-tan CHT,g ool-fr intxl POR,g even mod bri/scat bri yel FLOR,g-fr lt brn-tr scat brn/rr blk pp STN,g fast-sl blooming mlky CUT"

7830.00 7860.00 "LS AA,pred ool GRNST/scat dns-chky plty PKST,sl anhy/tr POR fl-rr xln ANHY,tr tan-trnsl CHT frag,g ool-intxl POR,g-fr mod bri-dull/scat bri yel FLOR,g-fr ltbrn/scat brn-rr blk pp dd o STN,g mod fast-slow stmg mlky CUT"

7860.00 7890.00 "LS ltbrn-tan,occ brn,tr crm-wh,vfxl-gran-micsuc,crpxl,ool GRNST/scat dns-decr thn chky plty PKST,sl anhy AA,rr xln ANHY,tr crm-tan CHT,g ool-fr intxl POR,g-fr mod bri-dull/scat bri yel FLOR,g-fr lt brn-tr scat brn/rr blk pp STN,CUT AA"

7890.00 7920.00 "LS AA,pred ool GRNST/scat dns-tr thn chky plty PKST,sl anhy/tr POR fl-rr xln ANHY,,tr crm-off wh-tan CHT,g ool-fr intxl POR,g mod bri-dull/scat bri yel FLOR,g-fr ltbrn-tr scat brn/rr blk pp STN,g-fr slow-mod faststmg mlky CUT"

7920.00 7950.00 "LS AA,vfxl-gran-micsuc,micxl-crpxl,pred ool GRNST/scat dns-sl incr thn chky plty PKST,sl anhy/tr POR fl-rr xln ANHY,tr CHT AA,g ool-intxl POR,FLOR AA,g-fr ltbrn/scat brn-rr blk pp dd o STN,g-fr slow-mod fast mlky CUT"

7950.00 7980.00 "LS ltbrn-tan-brn,occ crm-wh,vfxl-gran-micsuc,crpxl,ool GRNST/tr dns sl ool-thn chky plty PKST,sl anhy/tr POR fl-rr xln ANHY,incr crm-tan CHT,g ool-fr intxl POR,g-fr mod bri-dull/scat bri yel FLOR,g-fr lt brn-tr scat brn/rr blk pp STN,CUT AA"

7980.00 8000.00 "LS GRNSTN,tn-lt brn-crm,vfn-mic xln,grny-sub suc tex,sl anhy,occ lt tn-wht transl-opache CHT,scat off wht-crm,cryptoxln,dens,sl chky PCKSTN;gd intrxln/introol POR,fr lt brn STN,even mod bri yel gld FLUOR,fr strm-gd mlky bloom CUT,abund FO & ODOR in smp"

DEPTH	LITHOLOGY

8000.00 8020.00 "LS,tn-lt brn,occ crm,vfn-mic xln,grny-sl sub suc tex,poss oolitic GRNSTN,sl anhy,rr lt tn CHT,scat off wht,dns,sl chky PKSTN;gd intrxln/introol POR,fr-gd lt brn-occ sptty blk STN,even mod bri yel gld FLUOR,sl-fr strm-gd mlky bloom CUT,abund FO & ODOR"

8020.00 8050.00 "LS GRNSTN,tn-lt brn-crm,vfn-mic xln,grny-sub suc tex,sl anhy,occ lt tn-wht transl-opache CHT,scat off wht-crm,cryptoxln,dens,sl chky PCKSTN;gd intrxln/introol POR,fr lt brn STN,even mod bri yel gld FLUOR,fr strm-gd mlky bloom CUT,abund FO & ODOR in smp"

8050.00 8070.00 "LS,lt brn-tn,vfn xln,grny-sl sub suc tex,oolitic GRNSTN,sl anhy,rr tn CHT,scat off wht-crm PKSTN aa;gd intrxln/introol POR aa-sl evid of oomold POR,lt brn STN,even bri yel-gld FLOUR,gd strm-bloom CUT,FO & ODOR in smp"

8070.00 8100.00 "LS,tn-lt brn,occ crm,vfn-mic xln,grny-sl sub suc tex,poss oolitic GRNSTN,sl anhy,rr lt tn CHT,scat off wht,dns,sl chky PKSTN;gd intrxln/introol POR,fr-gd lt brn-occ sptty blk STN,even mod bri yel gld FLUOR,sl-fr strm-gd mlky bloom CUT,abund FO & ODOR"

8100.00 8130.00 "LS GRNSTN,tn-lt brn-crm,vfn-mic xln,grny-sub suc tex,sl anhy,occ lt tn-wht transl-opache CHT,scat off wht-crm,cryptoxln,dens,sl chky PCKSTN;gd intrxln/introol POR,fr lt brn STN,even mod bri yel gld FLUOR,fr strm-gd mlky bloom CUT,abund FO & ODOR in smp"

8130.00 8150.00 "LS,crm-tn-lt brn,vfn-mic xln,grny-sl sub suc tex,prob oolitic GRNSTN,sl anhy,rr-no lt tn CHT,scat off wht,dns,sl chky PKSTN;gd intrxln/introol POR,fr-gd lt brn-occ sptty blk STN,even mod bri yel gld FLUOR,sl-fr strm-gd mlky bloom CUT,abund FO & ODOR"

8150.00 8170.00 "LS,lt brn-tn,vfn xln,grny-sl sub suc tex,oolitic GRNSTN,sl anhy,no vis CHT,scat off wht-crm PKSTN aa;gd intrxln/introol POR aa-scat oomold POR,lt brn-occ blk sptty STN,even bri yel-gld FLOUR,gd strm-bloom CUT,FO & ODOR in smp"

8170.00 8200.00 "LS,crm-tn-lt brn,vfn-mic xln,grny-sl sub suc tex,prob oolitic GRNSTN,sl anhy,rr-no lt tn CHT,scat off wht,dns,sl chky PKSTN;gd intrxln/introol POR,fr-gd lt brn-occ sptty blk STN,even mod bri yel gld FLUOR,sl-fr strm-gd mlky bloom CUT,abund FO & ODOR"

8200.00 8220.00 "LS GRNSTN,pred crm-tn,occ lt brn,vfn-mic xln,grny-sub suc tex,oolitic,sl anhy,no vis CHT,scat off wht-crm,cryptoxln,dens,sl chky PCKSTN;gd intrxln/introol POR,fr lt brn STN,even mod bri yel gld FLUOR,fr strm-gd mlky bloom CUT,abund FO & ODOR in smp"

8220.00 8240.00 "LS GRNSTN,prob oolitic,crm-tn,occ lt brn,vfn-mic xln,grny-sl sub suc tex,sl anhy,scat PKSTN,wht-crm,dens,tt,sl chky tex ip; gd intrxln/introol POR,fr-gd lt brn STN,even mod-bri yel gld FLUOR, fr strm-gd milky bloom CUT,FO & ODOR"

8240.00 8270.00 "LS,crm-tn-occ lt brn,vfn-mic xln,grny-sl sub suc tex,prob oolitic GRNSTN,sl anhy,rr-no lt tn CHT,scat off wht,dns,sl chky PKSTN;gd intrxln/introol POR,fr-gd lt brn-occ sptty blk STN,even mod bri yel gld FLUOR,sl-fr strm-gd mlky bloom CUT,abund FO & ODOR"

8270.00 8310.00 "LS tan-crm,ltbrn,occ mbrn,wh,vfxl-gran,micsuc,occ crpxl,pred ool GRNST/scat dns sl ool-tr chky plty PKST,sl amhy/tr POR fl-rr xln ANHY,rr tan-crm CHT,g even mod bri-dull/tr bri yel FLOR,fr-g lt brn/tr brn-rr blk pp dd o STN,g fast-mod fast stmg mlky CUT"

DEPTH	LITHOLOGY

8310.00 8340.00 "LS AA,vfxl-gran,micsuc,occ crpxl,pred ool GRNST/scat dns sl ool-tr chky plty PKST,sl anhy/tr POR fl-rr xln ANHY,rr tan-crm CHT,FLOR AA,fr-g lt brn/tr brn-rr blk pp dd o STN,g mod fast-fast stmg mlky CUT"

8340.00 8380.00 "LS tan-crm,ltbrn,occ mbrn,wh,vfxl-gran,micsuc,occ crpxl,pred ool GRNST/scat dns sl ool-tr chky plty PKST,sl amhy/tr POR fl-rr xln ANHY,rr tan-crm CHT,g even mod bri-dull/tr bri yel FLOR,fr-g lt brn/tr brn-v rr blk pp dd o STN,g-fr slow-mod fast stmg/tr slow dif CUT"

8380.00 8420.00 "LS tan-crm-off wh,occ trnsl-wh,ltbrn,tr brn,vfxl-gran-micsuc,micxl,crpxl,ool GRNST/scat dns-rr chky plty PKST,sl anhy/tr por fl-rr xln ANHY,rr tan-crm CHT,v sl dol,g ool-intxl POR,g-fr mod bri-dull/scat bri yel FLOR,fr-g ltbrn/tr brn STN, fr-g dif/fr-mod bri res ring CUT,tr slow stmg mlky CUT"

8420.00 8430.00 "LS AA,pred ool GRNST/incr scat dns sl ool-thn chky plty PKST,sl anhy/tr xln ANHY-POR fl,rr trnsl-crm CHT,g ool-intxl POR,fr-g mod bri-dull/scat bri yel FLOR,fr-g ltbrn/tr brn-v rr blk pp dd o STN,g fast stmg-sl blooming mlky CUT"

8430.00 8450.00 "LS AA,vfxl-gran-micsuc,micxl-crpxl,pred GRNST AA/incr scat thn chky plty-dns sl ool PKST,POR-FLOR-STN AA,g-fr mod fast-fast stmg mlky CUT"

8450.00 8470.00 "LS tan-crm-wh,ltbrn,occ brn,crpxl-micxl-vfxl,gran-micsuc,dns sl ool-thn chky plty PKST/scat ool GRNST,sl anhy/tr POR fl-rr xln ANHY,rr trnsl-crm CHT,fr-g ool-intxl POR,fr-g mod bri-dull/scat bri yel FLOR,STN AA,fr dif/fnt res ring-tr slow stmg mlky CUT"

8470.00 8490.00 "LS AA,crpxl-vfxl-gran,micxl-micsuc,pred PKST AA/scat GRNST AA,POR-FLOR-STN-CUT AA"

8490.00 8510.00 "LS,tn-lt brn-crm,vfn-mic xln,occ crypto xln,grny-sub suc tex GRNSTN ip-dens,flky,tite PCSTN ip,sl anhy,xln calc;fr-gd intrxln POR in grnstn,spty brn-blk STN,fr mod yel gld FLUOR,sl-fr strm-diff CUT,ODOR & FO in smp"

8510.00 8530.00 "LS GRNSTN,tn-lt brn-crm,mic-vfn xln,grny-sl sub suc tex,sl anhy,oolitic?,rr lt gr-tn-wht transl CHT,xln calc,scat LS PKSTN,off wht-crm,dens,flky;fr intrxln POR,fr brn-dk brn STN,even dull-mod yel gld FLUOR,fr strm-dif CUT"

8530.00 8560.00 "LS,tn-lt brn-crm,vfn-mic xln,grny-sub suc tex GRNSTN,sl anhy,xln calc,scat,flky,tite PCSTN ip,sl anhy;fr-gd intrxln POR,fr spty brn-blk STN,fr mod yel gld FLUOR,sl-fr strm-diff CUT,decr ODOR & FO in smp"

8560.00 8590.00 "LS GRNSTN,tn-lt brn-crm,mic-vfn xln,grny-sl sub suc tex,sl anhy,sl evid oolites,rr lt gr-tn-wht transl CHT,xln calc,rr LS PKSTN,off wht-crm,dens,flky;fr intrxln/introol POR,lt brn-sptty dk brn STN,even dull-mod yel gld FLUOR,fr strm-mlky diff CUT"

8590.00 8610.00 "LS,tn-lt brn-crm,vfn-mic xln,grny-sub suc tex. sl oolitic GRNSTN,sl anhy,scat PCKSTN,flky,tite ip,sl anhy,scat xln calc;fr-gd intrxln/intr ool,tr oomold POR,fr lt brn-spty brn-blk STN,fr mod yel gld FLUOR,fr strm-diff CUT,com FO & ODOR in smp"

8610.00 8640.00 "LS GRNSTN,tn-lt brn-crm,mic-vfn xln,grny-sl sub suc tex,sl anhy,sl evid oolites,rr lt gr-tn-wht transl CHT,scat xln calc,rr LS PKSTN,off wht-crm,dens,flky;fr intrxln/introol-tr oomold POR,lt brn-sptty dk brn STN,mod yel gld FLUOR,fr strm-mlky diff CUT"

DEPTH	LITHOLOGY

8640.00 8660.00 "LS GRNSTN,crm-tn,occ lt brn,vfn-mic xln,grny-sub suc tex,sl anhy,sl xln calc,rr pcs PCKSTN,crm-off wht,dens,chky,tite;fr intrxln POR,lt brn-sptty dk brn-blk STN,sptty fr yel gld FLUOR,mod strm-diff CUT,FO & ODOR in smp"

8660.00 8690.00 "LS aa,tn-crm-occ lt brn,vfn-mic xln,grny-sub suc tex. GRNSTN,sl anhy,oolitic?,scat PCKSTN,flky,tite ip,sl anhy,scat xln calc;fr-gd intrxln POR,fr lt brn-spty brn-blk STN,fr mod yel gld FLUOR,fr strm-diff CUT,com FO & ODOR in smp"

8690.00 8720.00 "LS GRNSTN,tn-lt brn-crm,mic-vfn xln,grny-sl sub suc tex,sl anhy,sl evid oolites,rr lt gr-tn-wht transl CHT,scat xln calc,rr LS PKSTN,off wht-crm,dens,flky;fr intrxln/introol-tr oomold POR,lt brn-sptty dk brn STN,mod yel gld FLUOR,fr strm-mlky diff CUT"

8720.00 8740.00 "LS GRNSTN,crm-tn,occ lt brn,vfn-mic xln,grny-sub suc tex,sl anhy,sl xln calc,rr pcs PCKSTN,crm-off wht,dens,chky,tite;fr intrxln POR,lt brn-sptty dk brn-blk STN,sptty fr yel gld FLUOR,mod strm-diff CUT,FO & ODOR in smp"

8740.00 8760.00 "LS aa,tn-crm-occ lt brn,vfn-mic xln,grny-sub suc tex. GRNSTN aa,scat PCKSTN aa,flky,tite ip,sl anhy,scat xln calc; POR, STN,FLUOR, CUT aa, FO & ODOR in smp"

8760.00 8790.00 "LS GRNSTN,tn-lt brn-crm,mic-vfn xln,grny-sl sub suc tex,sl anhy,oolitic?,rr lt gr-tn-wht transl CHT,scat xln calc,rr LS PKSTN,off wht-crm,dens,flky;fr intrxln/introol-tr oomold POR,lt brn-sptty dk brn STN,mod yel gld FLUOR,fr strm-mlky diff CUT"

8790.00 8810.00 "LS GRNSTN,crm-tn,occ lt brn,vfn-mic xln,grny-sub suc tex,sl anhy,sl xln calc,sl incrs PCKSTN aa,crm-off wht,dens,chky,tite;fr intrxln POR,lt brn-sptty dk brn-blk STN,sptty-even yel gld FLUOR,sl-mod strm-diff CUT,FO & ODOR in smp"

8810.00 8829.00 "LS GRNSTN aa,tn-crm-occ lt brn,vfn-mic xln,grny-sub suc tex,scat PCKSTN aa,flky,tite ip,sl anhy,scat xln calc; POR, STN,FLUOR, CUT aa, FO & ODOR in smp"

FORMATION TOPS

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #16-77 NW 1-A HORIZONTAL LATERAL LEG #1

FORMATION NAME		SAMPLES MEASURED DEPTH	SAMPLES TRUE VERTICAL DEPTH	DATUM KB:4978'
LOWER ISMAY		5446'	5445'	-739'
GOTHIC SHALE		5523'	5509'	-803'
DESERT CREEK		5540'	5518'	-812'
DC 1-A POROSITY ZONE		5545'	5521'	-815'
TOP 1-A POROSITY ZONE AT 2975' VS		8425'	5531'	-825'
BOTTOM 1-A POROSITY ZONE AT 3350' VS		8800'	5537'	-831

GEOLOGICAL SUMMARY

AND

ZONES OF INTEREST

The Mobil Exploration and Production U.S. Inc., Ratherford Unit #16-77 Northwest Horizontal Lateral Leg 1 was a re-entry of the Mobil Ratherford Unit #16-77 recently drilled in Section 16, T41S, R24E. The northwest lateral leg #1 was started on February 25, 1998. The curve section was completed on February 27, 1998 at a measured depth of 5605', 5535.5', 14 feet into the 1-A porosity zone of the Desert Creek. The lateral reached a total measured depth of 8829', true vertical depth of 5536.91', with a horizontal displacement of 3378.98' and true vertical plane of 315.2 degrees, on March 3, 1998 in the Desert Creek 1-A zone. There were no mechanical problems encountered while drilling this lateral. There were no water flows but significant quantities of oil and gas were produced while drilling. This lateral used produced water and then an oil and water emulsion with polymer sweeps as the drilling fluid. Background gas registered from 1400 to 1500 PPM from the kick off point to the top of the Gothic Shale. Through the Gothic, the background gas increased to 2500 to 2750 PPM. Once the 1-A porosity zone of the Desert Creek was penetrated, background gas increased significantly to 5000 PPM and steadily increased to an average of about 9500 PPM for much of the lateral. The drilling fluid was run through the gas buster starting at a depth of 5760' with an associated intermittent 10 foot flare which gradually increased as the lateral progressed. When circulating out after trips, the flare increased to 20'-30'. Background gas readings of as high as 12,500 PPM were noted at times. The samples essentially had good oil shows throughout.

The primary objective of the Ratherford Unit #16-77 Leg 1 horizontal lateral was the 1-A zone of the Desert Creek Member of the Upper Paradox Formation. The objective was to identify, quantify and log the effective porosity, permeability, staining and gas throughout the lateral within the 1-A porosity zone. The lower portion of the Upper Ismay, the Lower Ismay, the Gothic Shale and the transition zone at the top of the Desert Creek were penetrated while drilling the curve section. The curve was landed 14 feet into the 1-A porosity horizon. Kick off point for this lateral was at a measured depth of 5425', 5424.22' true vertical depth.

The Upper Ismay seen in the curve section of this well was predominately limestone, cream to tan to light brown, to slightly gray brown in part, cryptocrystalline to microcrystalline, earthy to chalky, tight and slightly argillaceous. Within the section were thin interbedded dolomite, brown to gray brown, dense, tight, microcrystalline, earthy with thin shale laminae. Scattered clear to brown to translucent chert was also noted. No porosity, no staining or fluorescence and no gas increases were noted. The Hovenweep marker between the Upper Ismay and Lower Ismay was essentially non-existent in this lateral with only minor amounts of shale laminae present.

The top of the Lower Ismay was picked at a measured depth of 5446', true vertical depth of 5545', essentially flat with the log from the original vertical well bore. The upper 40 feet of the section was predominately limestone, brown to gray brown, occasionally cream to white, cryptocrystalline to microcrystalline, earthy to clean in part, chalky to slightly argillaceous and occasionally dolomitic with scattered buff to brown chert, dense, rarely micro fossiliferous and tight with no shows. Thin interbeds of slightly carbonaceous shales and medium brown to medium gray silty limestones grading to very limy siltstones were also encountered. From a measured depth of 5486', true vertical depth of 5480', to the top of the Gothic, the lithology changed slightly to a limestone grading to dolomite in part, white to cream to medium brown, microcrystalline to occasionally cryptocrystalline, earthy, chalky, very slightly silty and

slightly anhydritic with traces of intercrystalline porosity, very poor light brown stain, traces of bight yellow fluorescence and poor slow streaming cuts.

The top of the Gothic Shale was encountered at 5523' measured depth, 5509' true vertical depth and was predominantly black to dark brown black, soft to firm, occasionally brittle, sooty, carbonaceous, calcareous to slightly dolomitic and slightly micaceous. Scattered within the Gothic were very thin, crypto-crystalline to microcrystalline, earthy, limestone and dolomite partings and inclusions, with rare scattered anhydrite crystals. Both the top and the base of the Gothic were fairly abrupt with a decrease in penetration rate noted throughout. The top of the Gothic was marked by an abrupt increase in shale in the samples

The top of the Desert Creek is commonly picked at the Gothic Shale to transition zone facies change, which in this lateral occurred at a measured depth of 5540' and a true vertical depth of 5518' and was marked by an increase in penetration rate and occurrence of transition zone limestones facies in the samples. The lithology of the transition zone was primarily limestone, tan to light brown to cream, occasionally white to light gray, cryptocrystalline to microcrystalline, slightly granular in part, predominately packstone with a trace of grainstone partings, dense to slightly silty, chalky and anhydritic with anhydrite inclusions and anhydrite porosity fill. Rare tan translucent chert was also noted. The zone was predominately tight with only a trace of intercrystalline porosity, fair scattered spotty bright to moderate yellow fluorescence, fair light brown to brown stain and fair to good slow streaming milky cuts

The top of the Desert Creek 1-A zone was picked at 5545' measured depth, 5521' true vertical depth and was based on sample identification as well as the usual significant increase in the penetration rate. The top of the 1-A zone was about 2 feet high to the top on the porosity log for the 16-77 well. The portion of the 1-A zone drilled in the curve section of the hole exhibited slightly algal to oolitic limestone grainstone, tan to brown to occasionally cream, cryptocrystalline to microcrystalline, slightly dolomitic with a grainy to slightly sucrosic texture and slightly anhydritic. These grainstones exhibited fair inter-crystalline to interoolitic porosity with secondary pinpoint vuggy porosity and had fair light brown to brown stain, fair to good scattered bright to moderate yellow fluorescence and a good moderate fast steaming to milky cut. The grainstones were interbedded with limestone packstones, light brown to tan to occasionally cream to light gray brown to white, cryptocrystalline to microcrystalline, slightly granular to dense to slightly chalky in texture with only trace porosity and shows.

The curve section was completed at a measured depth of 5605', 5535.38' true vertical depth, and a vertical section (horizontal displacement) of 160.05', just on top of the hard streak present in the middle of the 1-A zone and in the oolitic limestone facies. The complete lateral section was drilled within the 1-A porosity zone. The lithology of the zone through out the length of the lateral remained fairly consistent with very minor variations of porosity type and rock classification being noted. The most significant variations were encountered when the hard streak within the zone, or either the top or base of the 1-A was encountered where increased amounts of tight, platy packstones were observed.

From the bottom of the curve section of the hole to a measured depth of 5640', the wellpath was oriented in a downward direction so as to acquire the target line. The lithology of this interval was as seen above, being an oolitic to slightly algal limestone grainstone with fair to good inter-crystalline to inter-oolitic porosity, fair staining and good fluorescence and cut. The tight streak within the middle of the 1-A porosity zone was encountered at 5640' measured depth, 5636' true vertical depth where the penetration rate slowed somewhat and samples displayed a slight increase in platy chalky packstones. The bit "bounced" of this tight streak and oriented itself into and upward direction. The lower portion of the 1-A porosity zone below this tight streak was never penetrated.

The wellpath proceeded in an upward direction from a measured depth of 5650' to 6180', true vertical depth of 5535.5' to 5525' where the upper portion of the 1-A porosity was encountered. The lithology of this interval was primarily an oolitic limestone grainstone, tan to brown, occasionally cream to white, microcrystalline to very fine crystalline with a granular to subsucrosic texture, scattered anhydrite

and rare light tan chert fragments. Also present were scattered platy to chalky packstones, off white to cream in color with poor to no porosity. The grainstones exhibited good intercrystalline and interoolitic porosity with scattered oomoldic porosity. Shows were fair to good with light brown and scattered spotty dark brown to black stain, fair to good bright yellow gold fluorescence and fair to good moderately fast streaming bloom cuts.

The penetration rate slowed down from a measured depth of 6080' through 6250' at a true vertical depth of 5525.5'. This interval appeared to be the upper limits of the 1-A porosity zone as there was an increase in packstone, off white to cream, tight, dense, slightly chalky and slightly anhydritic. The samples still displayed an abundance of oolitic grainstone limestone, with porosity and shows as above.

From 6250' to 6640' measured depth, 5527' to 5537.6' true vertical depth, the wellpath was oriented downward. The lithology of this interval was a very homogenous limestone grainstone, tan to light brown to cream, microcrystalline to very fine crystalline with a granular to subsucrosic texture and scattered anhydrite and rare pieces light tan translucent chert. Only scattered amounts of packstone, off white to cream, dense, tight and slightly anhydritic was observed. Generally fair to good intercrystalline to interoolitic porosity with secondary oomoldic to pinpoint vuggy porosity was noted. Within this section were areas, which displayed primarily oomoldic fabric type porosity. Staining was fair to good even light brown to spotty dark brown to black with moderately bright yellow gold fluorescence and slow to fair streaming to milky bloom cuts.

The penetration rate once again slowed down and the bit "bounced" off a tight streak within the 1-A zone at a measured depth of 6644'-6693' at a true vertical depth of 5638'. This section was characterized by abundant off white to cream to tan, platy limestone packstone, microcrystalline to crypto-crystalline, tight with a slightly chalky texture, scattered oolites and slightly anhydritic with a trace of crystalline anhydrite. Only minor amounts of porosity was developed with poor to no staining, spotty fluorescence and slow streaming milky cuts.

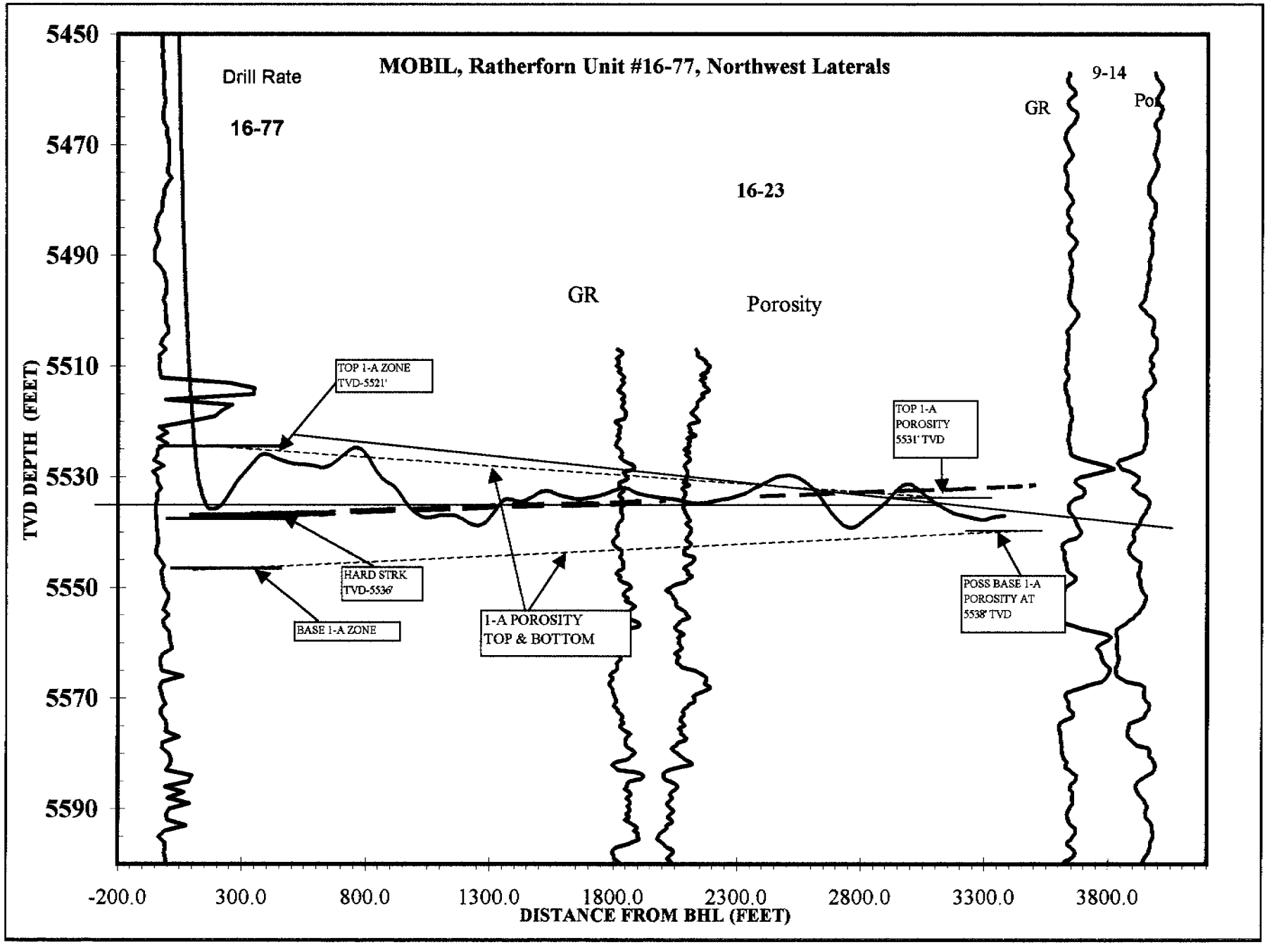
After drilling the tight streak described above, the wellpath stayed quite flat from 6694' through 8424' measured depth, 5538.5'-5531.5' true vertical depth (the wellpath only went from the 5538'-5537' TVD range up to the 5531' TVD at 8300'-8424' MD). This interval displayed a distinct increase in the amount of staining and shows with common to abundant free oil in the samples, and an increase in background gas. The lithology was once again quite homogenous limestone grainstone, light brown to tan to occasionally cream to brown, very fine crystalline to microcrystalline with a grainy to subsucrosic texture, oolitic and slightly anhydritic with traces of tan to off white translucent to opaque chert fragments. The whole interval displayed a fast penetration rate reflecting the good to excellent interoolitic to inter-crystalline and oomoldic porosity development. Good to fair light brown to rare pinpoint black staining with even moderately bright yellow gold fluorescence and fair to good streaming to bloom cuts were noted. Starting within this section and continuing to the end of the lateral, the samples became very fine ground, which made porosity classification difficult. Direct evidence of oolites was sometimes lacking, but inferred from the occasional oolite fragment and/or oomoldic fabric. It may be possible that this whole interval had excellent oomoldic porosity development, and all that was seen in the samples was the recrystallized granular matrix.

What was interpreted to be the top of the 1-A porosity zone was penetrated from a measured depth of 8425' to 8480', at a TVD of 5531'. This interval displayed an increase in microcrystalline to crypto-crystalline, dense, platy slightly chalky packstones that were off white to cream to occasionally light gray in color. The wellpath did not penetrate far enough up into this horizon to really recognize any transition zone lithology. Shows remained generally fair to good, which may be a direct reflection of the amount of oil and gas being continually carried in the circulation system by this time.

The bit "bounced" off the hard top above and oriented the wellpath in a downward direction from 8480' to 8796' measured depth (5531'-5537' TVD) where the base of the 1-A porosity was encountered. This interval from 8480'-8796' displayed the same type of limestone grainstone, cream to tan to light

brown, very fine crystalline to microcrystalline, slightly anhydritic with minor chert as seen above. Once again, the samples displayed only a grainy intercrystalline type porosity, but excellent oomoldic porosity is inferred. Shows appeared to drop off a little with a possible slight reduction in staining in the rocks themselves. The samples still continued to have abundant free oil in them. A slowing of the penetration rate and an increase in packstone constituent in the samples at 8800' MD was interpreted to be the base of the 1-A porosity zone. Also, the wellpath once again "bounced" off this tight streak.

In tracking the well bore through the 1-A porosity bench, the intercrystalline to interoolitic, and the oomoldic and minor algal porosity was very good, with only minor variations in rock classification. Generally from predominately inter-crystalline and oolitic porosities in the limestone grainstones to tight limestone packstones near the top and base of the 1-A zone. The tight streak seen within the 1-A zone in the vertical 16-77 well also displayed these tight dense, slightly chalky packstones. Sample shows were generally quite good, becoming good to excellent in the interval from 6694'-8424' MD, except where the lateral penetrated either the top of bottom of the 1-A zone or the tight streak within. The well produced significant quantities of oil and gas while drilling.


MOBIL, Ratherforn Unit #16-77, Northwest Laterals
Drill Rate
16-77
16-23
GR
Porosity
9-14
GR
Po
TOP 1-A ZONE
TVD-5521'
TOP 1-A
POROSITY
5531' TVD
HARD STRK
TVD-5536'
BASE 1-A ZONE
1-A POROSITY
TOP & BOTTOM
POSS BASE 1-A
POROSITY AT
5538' TVD
TVD DEPTH (FEET)
5450
5470
5490
5510
5530
5550
5570
5590
-200.0
300.0
800.0
1300.0
1800.0
2300.0
2800.0
3300.0
3800.0
DISTANCE FROM BHL (FEET)

1998
DIV OF OIL, GAS & MINING

MOBIL

RATHERFORD UNIT #16-77
SE HORIZONTAL LATERAL LEG #2
1-A POROSITY BENCH
DESERT CREEK MEMBER
PARADOX FORMATION
SECTION 16, T41S, R24E
SAN JUAN, UTAH

GEOLOGY REPORT
by

DAVE MEADE
ROCKY MOUNTAIN GEO-ENGINEERING CORP.
GRAND JUNCTION, COLORADO
(970) 243-3044

TABLE OF CONTENTS

WELL SUMMARY 2

DAILY WELL CHRONOLOGY 3

DAILY ACTIVITY 5

BIT RECORD 6

SURVEY RECORD 7

MUD RECORD 10

SAMPLE DESCRIPTIONS 11

FORMATION TOPS 22

GEOLOGIC SUMMARY AND ZONES OF INTEREST 23

WELL PLOTS 25

WELL SUMMARY

OPERATOR:	MOBIL EXPLORATION & PRODUCTION U.S. INC.
NAME:	RATHERFORD UNIT #16-77 SE HORIZONTAL LATERAL LEG #2 IN 1-A POROSITY BENCH, DESERT CREEK
LOCATION:	SECTION 16, T41S, R24E
COUNTY/STATE:	SAN JUAN, UTAH
ELEVATION:	KB: 4706' GL: 4693'
SPUD DATE:	3/04/98
COMPLETION DATE:	3/18/98
DRILLING ENGINEER:	SIMMON BERRARA
WELLSITE GEOLOGY:	JASON BLAKE / DAVE MEADE
MUDLOGGING ENGINEERS:	JASON BLAKE / MARVIN ROANHORSE / DAVE MEADE / JOE SCHIMCO
CONTRACTOR:	BIG "A" RIG 25
TOOLPUSHER:	J. DEES
HOLE SIZE:	4 3/4"
CASING RECORD:	7" PRODUCTION CASING SET TO 5741'
DRILLING MUD:	M-I DRILLING FLUIDS
ENGINEER:	RON WESTENBERG / DANNE BEASON
MUD TYPE:	BRINE WATER W/ POLYMER SWEEPS / OIL EMULSION
DIRECTIONAL DRILLING CO:	SPERRY-SUN
ELECTICAL LOGGING:	NA
TOTAL DEPTH:	7813' MEASURED DEPTH; 5559.07?' TRUE VERTICAL DEPTH
STATUS:	

DRILLING CHRONOLOGY
RATHERFORD UNIT #16-77
1-A SE HORIZONTAL LATERAL LEG #2

DATE	DEPTH	DAILY	ACTIVITY
3/04/98	5306'	14'	PU WHIPSTOCK #2-ORIENT-TIH AND LATCH INTO ANCHOR-SHEAR OFF, SWIVEL UP, BEAK CIRC AND MILL WITH STARTER MILL 5306' TO 5308'-CIRC. OUT AND TOH-LAY DOWN STARTER MILL AND PICK UP WINDOW MILLS-TIH-SWIVEL UP & BREAK CIRC AND MILL CASING 5308' TO 5320'
3/05/98	5320'	97'	PUMP AND CIRC SWEEPS AND DISPLACE HOLE WITH 120 BBLS BRINE-LAY DOWN 2 JOINTS DRILL PIPE AND TOH- LAY DOWN MILL ASSEMBLY & PICK UP CURVE MOTOR ASSEMBLY AND TEST- TIH-SWIVEL UP AND CIRC OUT THROUGH CHOKES-RIG UP AND RUN GYRO-TIME DRILL 5320' TO 5327'-DIR DRLLING WITH WIRELINE SURVEYS 5327' TO 5356'-PULL & RIG DOWN GYRO-DIR DRILLING AND SURVEYS
3/06/98	5417'	209'	DIR DRLG AND SURVEYS 5417' TO 5465'-POH TO 5293' & DISPLACE HOLE WITH BRINE-TOH & ADJUST CURVE MOTOR- TEST & TIH-CIRC OUT THROUGH CHOKE-GO TO BOTTOM- DIR DRLG AND SURVEYS 5465' TO 5626'-CIR SPLS & SWEEP-L.D. 10 JTS PIPE-TOH TO CASING
3/07/98	5526'	661'	DISPLACE HOLE W/10# BRINE-TOH-L.D. CURVE ASSEMBLY-P.U. LATERAL ASSEMBLY-ORIENT & TEST MWD & MUD MOTOR-WELL FLOWING-RUN 10 STDS PH-6 & PUMP 10# BRINE-CIR THRU CHOKE-RUN IN TUBING & PUMP 11.6 ppg CaCl-TIH TO WINDOW-CIR OUT THUR CHOKE-DLRG & DIR SURVEYS
3/08/98	6187'	1073'	DIR DLRG & SURVEYS
3/09/98	7260'	0'	H2S DETECTED (15-30 ppm)-CIR THRU CHOKE & WT UP MUD SYSTEM W/11.5ppg CaCl-SHUT IN WELL & CHK PRESS.-SHUT IN WELL & W.O. MUD-PUMP & CIR 11.5ppg CaCl-CHECK FOR FLOW-L.D. 69 JTS PIPE-SHUT IN & CHECK PRESS.-CIR 11.2ppg CaCl-KILL PUMP & CHECK FOR FLOW (WELL FLOWING)-SHUT IN WELL & CHECK PRESS.(140 psi)-CIR 11.5ppg CaCl-CHECK FOR FLOW (WELL FLOWING)-SHUT IN WELL W/140 psi-RIG UP HOPPER & MIX MUD
3/10/98	7260'	0'	CIR & COND MUD-SHUT IN WELL & MIX MUD
3/11/98	7260'	0'	CIR & COND MUD-CIR 13ppg MUD THRU CHOKE-SHUT IN WELL-CIR. & COND MUD-DISPLACE HOLE W/13.5ppg MUD-PUMP SLUG-TOH TO 5120'-CIR W/13.5ppg MUD

DRILLING CHRONOLOGY
RATHERFORD UNIT #16-77
1-A SE HORIZONTAL LATERAL LEG #2

3/12/98	7260'	0'	CIR & COND MUD-PUMP PILL-TOH (SLOW OFF BTM & CK FOR FLOW)-CHANGE OUT MWD & MUD MOTOR & BIT-ORIENT & TEST-WORK ON MWD & TEST-TIH TO WINDOW-CIR-TOH-CHANGE OUT & WORK ON MWD-TEST
3/13/98	7260'	0'	TEST & WORK ON MWD-TRY TO GET PULSE-TIH W/35 STDS PH6 TUBING-W.O. MWD TOOLS-SHUT IN WELL & CHECK FOR FLOW- NO FLOW OR PRES.-TOH W/PH6 TUBING-MAKE UP & TEST MWD-L.D. MWD-TIH W/PH6 TO 5306' & CIR-WASH DOWN FROM 5306' TO 5800'-CIR & SHAKE OUT SOLIDS-TOH
3/14/98	7260'	0'	TOH-P.U. LATERAL ASSEMBLY & TEST MWD-TIH W/PH6-CIR & TEST MWD (MWD FAILED)-TOH-L.D. MWD PROBE-TIH TO 5320' & CIR-RIG UP GYRO DATA
3/15/98	7260'	232'	RIG UP GYRO DATA-TIH W/AOH DRL PIPE TO 7146' & WORK THRU TITE SPOTS-L.D. 3 JTS DRL PIPE-RUN IN HOLE W/D.P. FROM DERRICK-P.U. SWIVEL & WASH TO 7260'-CIR BTMS UP-CIR & COND HOLE-DRLG TO 7269'-RIG UP WET CONN.-DRLG & DIR. SURVEY-WK ON GYRO DATA OVERSHOT
3/16/98	7492'	63'	DRLG & DIR. SURVEYS-WORK ON WIRE LINE (GETTING INTMITTENT SURVEYS-DIR. DRLG- RIG DOWN GYRO DATA TRUCK-CIR. BTMS UP & PUMP PILL-PULL 1 STD OFF BTM-TOH TO WINDOW W/SWIVEL THRU TITE HOLE-TOH TO ROCKET SUB-WORK ON WIRE LINE STEERING TOOL-CIR OUT & W.O. WIRE LINE TRUCK-RIG UP BASIN WIRE LINE TRUCK& RUN IN HOLE W/GYRO DATA STEERING TOOL-SET WET CONN. @ 5313' & TEST-TIH-RIG UP BASIN WIRE LINE TRUCK & RUN IN HOLE W/STEERING TOOL
3/17/98	7555'	234'	DIR. DRLG & SURVEYS
3/18/98	7789'	24'	DIR DRLG & SURVEYS W/STEERING TOOL TO 7813'-CIR & PUMP SWEEP-POH-W/WIRE LINE-L.D. 8 JTS PIPE W/SWIVEL-CIR & WRK TITE HOLE-TOH & RIG DOWN BASIN WIRE LINE TRUCK-TOH-RETRIVE WHIPSTOCK & PREPARE TO MOVE RIG TO 17-13 LOCATION

DAILY ACTIVITY

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #16-77 SE 1-A HORIZONTAL LATERAL LEG #2

DATE	DEPTH	DAILY	DATE	DEPTH	DAILY
3/04/98	5306'	14'			
3/05/98	5320'	97'			
3/06/98	5417'	209'			
3/07/98	5626'	661'			
3/08/98	6187'	1073'			
3/09/98	7260'	0'			
3/10/98	7260'	0'			
3/11/98	7260'	0'			
3/12/98	7260'	0'			
3/13/98	7260'	0'			
3/14/98	7260'	0'			
3/15/98	7260'	232'			
3/16/98	7492'	63'			
3/17/98	7555'	234'			
3/18/98	7789'	24'			
TD	7813'				

BIT RECORD

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #16-77 SE 1-A HORIZONTAL LATERAL LEG #2

RUN	SIZE	MAKE	TYPE	IN/OUT	FTG	HRS	FT/HR
1	4 3/4"	STC	MF3P	5320'/ 5626'	306'	28	10.9
2 (RR#1)	4 3/4"	STC	MF3P	5626'/ 7260'	1634'	37	44
3	4 3/4"	STC	MF3P	7260'/ 7813'	533'	52	10.25

SPERRY-SUN DRILLING SERVICES
SURVEY DATA

Customer ... : Mobil (Utah)
Platform ... : RATHERFORD UNIT
Slot/Well .. : BA25/16-77, 2A1

MEASURED DEPTH	ANGLE DEG	DIRECTION DEG	TVD	NORTHINGS FEET	EASTINGS FEET	VERTICAL SECTION	DOG LEG
5200.00	0.26	22.85	5199.23	59.49 N	9.27 E	-31.14	0.00
5306.00	0.31	16.16	5305.23	59.99 N	9.44 E	-31.32	0.06
5320.00	2.40	130.00	5319.22	59.84 N	9.68 E	-31.05	18.15
5330.00	4.60	128.50	5329.21	59.45 N	10.15 E	-30.44	22.02
5340.00	7.20	127.00	5339.15	58.82 N	10.97 E	-29.41	26.04
5350.00	9.50	125.50	5349.04	57.97 N	12.14 E	-27.96	23.10
5360.00	11.50	124.00	5358.88	56.93 N	13.64 E	-26.15	20.18
5370.00	13.90	122.50	5368.63	55.73 N	15.48 E	-23.96	24.22
5380.00	16.30	121.00	5378.29	54.36 N	17.69 E	-21.39	24.31
5390.00	18.40	119.50	5387.83	52.86 N	20.27 E	-18.45	21.47
5400.00	20.90	118.00	5397.25	51.25 N	23.22 E	-15.15	25.50
5410.00	23.40	122.40	5406.51	49.34 N	26.47 E	-11.44	29.99
5420.00	26.00	125.40	5415.59	47.01 N	29.94 E	-7.28	28.86
5430.00	28.90	126.00	5424.47	44.32 N	33.68 E	-2.69	29.13
5440.00	31.40	126.60	5433.11	41.34 N	37.73 E	2.32	25.18
5450.00	33.90	127.10	5441.53	38.11 N	42.04 E	7.71	25.14
5460.00	36.40	127.10	5449.71	34.64 N	46.63 E	13.46	25.00
5470.00	39.10	126.70	5457.61	30.96 N	51.53 E	19.57	27.11
5480.00	41.80	126.30	5465.22	27.10 N	56.75 E	26.05	27.12
5490.00	45.10	124.70	5472.48	23.11 N	62.34 E	32.90	34.78
5500.00	47.80	125.00	5479.37	18.97 N	68.29 E	40.12	27.09
5510.00	50.60	124.40	5485.90	14.66 N	74.51 E	47.66	28.37
5520.00	53.90	124.20	5492.03	10.21 N	81.05 E	55.52	33.04
5530.00	57.30	123.60	5497.67	5.61 N	87.89 E	63.73	34.36
5540.00	60.30	123.20	5502.85	0.90 N	95.03 E	72.22	30.19
5550.00	62.70	123.20	5507.63	3.91 S	102.39 E	80.95	24.00
5560.00	65.20	122.80	5512.02	8.80 S	109.92 E	89.86	25.26
5570.00	68.70	122.90	5515.93	13.80 S	117.65 E	98.99	35.01
5580.00	71.90	122.60	5519.30	18.89 S	125.57 E	108.33	32.12
5590.00	76.00	122.70	5522.07	24.07 S	133.66 E	117.86	41.01
5600.00	80.30	122.90	5524.12	29.37 S	141.88 E	127.57	43.04
5626.00	90.50	127.20	5526.20	44.24 S	163.06 E	153.35	42.55
5660.00	88.40	130.00	5526.53	65.45 S	189.63 E	187.33	10.29
5692.00	90.20	130.30	5526.92	86.08 S	214.08 E	219.33	5.70
5722.00	89.10	130.00	5527.10	105.42 S	237.01 E	249.33	3.80
5754.00	89.80	130.10	5527.41	126.01 S	261.51 E	281.32	2.21
5786.00	90.60	130.10	5527.30	146.62 S	285.99 E	313.32	2.50
5818.00	90.90	130.30	5526.88	167.27 S	310.43 E	345.32	1.13

SPERRY-SUN DRILLING SERVICES
SURVEY DATA

Customer ... : Mobil (Utah)
Platform ... : RATHERFORD UNIT
Slot/Well .. : BA25/16-77, 2A1

MEASURED DEPTH	ANGLE DEG	DIRECTION DEG	TVD	NORTHINGS FEET	EASTINGS FEET	VERTICAL SECTION	DOG LEG
5849.00	90.20	130.30	5526.58	187.32 S	334.07 E	376.32	2.26
5881.00	90.30	130.10	5526.44	207.98 S	358.51 E	408.32	0.70
5913.00	89.50	129.80	5526.50	228.52 S	383.04 E	440.32	2.67
5945.00	88.10	128.90	5527.17	248.81 S	407.78 E	472.31	5.20
5977.00	87.80	128.70	5528.31	268.85 S	432.70 E	504.28	1.13
6009.00	86.70	128.40	5529.85	288.77 S	457.70 E	536.23	3.56
6040.00	87.00	128.20	5531.55	307.95 S	481.99 E	567.17	1.16
6071.00	88.20	128.60	5532.85	327.19 S	506.26 E	598.13	4.08
6103.00	89.60	128.00	5533.46	347.02 S	531.37 E	630.11	4.76
6135.00	88.30	129.30	5534.05	367.00 S	556.36 E	662.10	5.74
6167.00	87.80	130.30	5535.14	387.47 S	580.93 E	694.08	3.49
6198.00	91.40	131.40	5535.36	407.74 S	604.37 E	725.07	12.14
6229.00	91.10	132.10	5534.68	428.38 S	627.49 E	756.04	2.46
6260.00	89.80	131.00	5534.44	448.94 S	650.69 E	787.03	5.49
6291.00	88.50	130.10	5534.90	469.09 S	674.24 E	818.03	5.10
6323.00	88.20	129.40	5535.82	489.54 S	698.83 E	850.01	2.38
6355.00	88.80	129.60	5536.65	509.89 S	723.52 E	882.00	1.98
6387.00	88.10	130.50	5537.52	530.47 S	748.00 E	913.99	3.56
6418.00	88.80	130.90	5538.36	550.68 S	771.50 E	944.97	2.60
6450.00	87.50	130.10	5539.39	571.45 S	795.82 E	976.95	4.77
6482.00	89.90	130.10	5540.12	592.06 S	820.29 E	1008.94	7.50
6514.00	88.90	131.00	5540.45	612.86 S	844.60 E	1040.94	4.20
6545.00	89.70	130.70	5540.83	633.14 S	868.05 E	1071.93	2.76
6576.00	90.10	130.30	5540.89	653.27 S	891.62 E	1102.93	1.82
6608.00	90.30	130.30	5540.77	673.97 S	916.02 E	1134.93	0.63
6641.00	88.50	129.40	5541.12	695.11 S	941.36 E	1167.93	6.10
6673.00	88.70	128.70	5541.90	715.26 S	966.20 E	1199.91	2.27
6704.00	88.90	128.90	5542.55	734.68 S	990.35 E	1230.90	0.91
6736.00	89.00	129.30	5543.14	754.86 S	1015.18 E	1262.89	1.29
6768.00	90.40	130.00	5543.30	775.28 S	1039.82 E	1294.89	4.89
6799.00	91.10	130.30	5542.90	795.27 S	1063.51 E	1325.89	2.46
6831.00	91.20	130.00	5542.26	815.89 S	1087.97 E	1357.88	0.99
6863.00	89.60	129.30	5542.03	836.31 S	1112.61 E	1389.88	5.46
6894.00	89.40	128.70	5542.30	855.82 S	1136.70 E	1420.87	2.04
6926.00	87.90	129.10	5543.06	875.91 S	1161.59 E	1452.85	4.85
6958.00	88.50	129.10	5544.06	896.08 S	1186.41 E	1484.83	1.87
6990.00	89.20	130.10	5544.70	916.47 S	1211.06 E	1516.83	3.81
7022.00	86.40	128.60	5545.93	936.75 S	1235.79 E	1548.80	9.92

SPERRY-SUN DRILLING SERVICES
SURVEY DATA

Customer ... : Mobil (Utah)
Platform ... : RATHERFORD UNIT
Slot/Well .. : BA25/16-77, 2A1

MEASURED DEPTH	ANGLE DEG	DIRECTION DEG	TVD	NORTHINGS FEET	EASTINGS FEET	VERTICAL SECTION	DOG LEG
7053.00	87.20	129.30	5547.66	956.20 S	1259.86 E	1579.74	3.43
7085.00	87.80	130.90	5549.06	976.80 S	1284.31 E	1611.71	5.34
7116.00	88.40	132.10	5550.09	997.33 S	1307.52 E	1642.68	4.33
7148.00	88.90	132.40	5550.84	1018.83 S	1331.20 E	1674.65	1.82
7179.00	90.70	133.70	5550.95	1040.00 S	1353.85 E	1705.60	7.16
7211.00	91.50	133.70	5550.34	1062.10 S	1376.98 E	1737.53	2.50
7234.00	91.70	132.30	5549.69	1077.78 S	1393.79 E	1760.49	6.15
7266.00	90.00	131.10	5549.22	1099.06 S	1417.68 E	1792.47	6.50
7297.00	86.80	131.40	5550.08	1119.49 S	1440.98 E	1823.45	10.37
7329.00	87.30	130.90	5551.73	1140.52 S	1465.04 E	1855.40	2.21
7361.00	88.60	131.10	5552.88	1161.50 S	1489.17 E	1887.37	4.11
7393.00	88.70	131.00	5553.63	1182.51 S	1513.30 E	1919.36	0.44
7425.00	89.10	131.90	5554.24	1203.69 S	1537.28 E	1951.34	3.08
7488.00	89.00	131.20	5555.29	1245.47 S	1584.42 E	2014.31	1.12
7520.00	87.70	129.00	5556.21	1266.07 S	1608.89 E	2046.29	7.98
7552.00	86.50	128.10	5557.83	1285.99 S	1633.88 E	2078.24	4.69
7583.00	88.30	130.10	5559.23	1305.52 S	1657.91 E	2109.20	8.67
7615.00	89.10	132.00	5559.96	1326.52 S	1682.03 E	2141.19	6.44
7647.00	88.50	133.40	5560.63	1348.22 S	1705.55 E	2173.14	4.76
7678.00	88.80	129.70	5561.36	1368.77 S	1728.74 E	2204.12	11.97
7710.00	90.30	131.40	5561.61	1389.57 S	1753.05 E	2236.11	7.08
7742.00	90.80	131.30	5561.31	1410.71 S	1777.07 E	2268.10	1.59
7774.00	92.10	130.90	5560.50	1431.74 S	1801.17 E	2300.09	4.25
* 7813.00	92.10	130.90	5559.07	1457.26 S	1830.63 E	2339.06	0.00 *

THE DOGLEG SEVERITY IS IN DEGREES PER 100.00 FEET.
N/E COORDINATE VALUES GIVEN RELATIVE TO WELL HEAD.
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.

7813 PROJECT,5200 TIEON,TO 7211 MWD,TO 7774STR-TOOL
5306 INTERPOLATED GYRO, 5400-5600 MAG.INTERFERENCE
5320 MWD INC,GYRO TF FOR AZI, 5320-5414 INTERP AZI

MUD REPORT

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #16-77 SE 1-A HORIZONTAL LATERAL LEG #2

DATE	DEPTH	WT	VIS	PLS	YLD	GEL	PH	WL	CK	CHL	CA	SD %	SOL %	OIL %	WTR &
03/04/98	5308'	9.4	27	--	--	--	11.5	--	--	155K	1000	--	--	8	92
03/05/98	5325'	9.5	27	--	--	--	11.0	--	--	143K	800	--	--	2	98
03/06/98	5472'	9.5	27	1	1	0/0	11.0	--	--	143K	800	--	--	2	98
03/07/98	5896'	9.8	26	1	1	0/0	11.0	--	--	152K	6000	--	--	2	98
03/08/98	6530'	9.7	26	1	1	0/0	11.5	--	--	143K	6000	--	--	2	98
03/09/98	7260'	11.6	26	1	0	0/0	7.0	--	--	270K	200K	--	--	1	99
03/10/98	7260'	11.6	70	34	28	8/15	7.0	4	1/32	220K	200K	1	8	1	91
03/11/98	7260'	13.5	76	36	24	10/18	7.0	4	1/32	210K	200K	1	37	2	67
03/12/98	7260'	13.9	67	33	22	8/15	7.0	5.6	1/32	198K	110K	1	36.2	6	60.8
	7260'	13.7	66	31	20	8/13	7.0	5.8	1/32	198K	110K	1	34	3	63
03/13/98	7260'	13.7	68	28	23	5/15	7.0	4.2	1/32	198K	110K	1	34	3	63
03/14/98	7260'	13.4	60	37	33	7/17	7.0	4.8	1/32	190K	110K	1	24	3	73
03/15/98	7270'	13.2	57	37	31	7/14	7.5	6.0	1/32	180K	110K	1	24	4	72
03/16/98	7526'	13.2	50	33	28	6/9	8.5	10.0	1/32	195K	110K	1	24	4	72
03/17/98	7591'	13.25	47	32	27	6/9	8.5	10.0	1/32	179K	110K	1	24	4	72
03/17/98	7526'	13.2	45	31	27	6/9	8.5	10.2	1/32	174K	110K	1	24	3	73

SAMPLE DESCRIPTIONS

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #16-77 SE 1-A HORIZONTAL LATERAL LEG #2

DEPTH	LITHOLOGY
5320.00 5330.00	"LS,tn-lt brn-crm,mhd,crypxln,dens xln mtrx-chky ip,sl dolo cem,sl grny-sndy tex ip,sl mic pyr,no vis POR,STN or CUT"
5330.00 5340.00	"LS lt-mbrngy,ltgy,occ gy,off wh,ltbrn,crpxl-micxl,vfxl-gran-sl suc,rthy-slty/tr sdy strk,arg,sl chky/tr POR fl,tr trns sil-op-CHT incl-grdg to sil cmt,dns,tt-rr intxl POR,v rr dull spty yel-orng mnrl FLOR,n vis-rr fnt ltbrn STN,v p dif CUT "
5340.00 5350.00	"LS AA,chky/tr POR fl,sl anhy,tr op-sil-chty incl,POR-FLOR-STN-CUT AA,w/tr DOL m-dkbrn,crpxl,sl shy,dns,tt,NFSOC"
5350.00 5360.00	"SH dk-mbrngy,dk-mgy,rr blk,sbplty-sbblky-irreg,frm-brit-occ hd,rthy-sl slty,calc-sl dol,occ grdg to shy LS,tr scat tan-ltbrn CHT,w/LS & DOL AA"
5360.00 5380.00	"LS m-dkgybrn,incr tan-crm-off wh/depth,crpxl-micxl,decr vfxl,sl shy,occ rthy-sl slty,pred dns/chky-sl anhy prtgs,tr brngy CHT,tt,NFSOC,w/DOL brn-mbrn,crpxl,dns,sl-occ v shy,sl chky,occ lmy-grdg to dol shy LS ip,tt,NFSOC,tr SH AA"
5380.00 5390.00	"SH dk-mbrngy,blk,mfrm-brit-sft,sbblky-plty-sl splty,rthy,occ v carb,sl slty,calc-sl dol,occ grdg to shy LS,occ v sooty"
5390.00 5400.00	"LS tan,ltbrn,lt-mbrngy,occ ltgy-crm-off wh,crpxl-micxl,pred dns,tt/tr chky-anhy prtgs,occ shy-sl arg,n vis POR,NFSOC,w/tr SH & DOL AA,NFSOC"
5400.00 5410.00	"LS lt-mgybrn-tan,occ crm-ltgy-off wh,crpxl-micxl,vfxl,rhty,sl slty/rr sdy strk,chky prtgs/tr POR fl,sl anhy,tr dkgybrn CHT,tr blk SH lam-thn prtgs,rr dkbrn slty-arg frag,tt,NFSOC,w/scat SH AA"
5410.00 5420.00	"LS tan-crm-wh,occ lt-mgybrn,crpxl,micxl-occ vfxl,pred dns/chky-sl anhy prtgs,rr sl slty-rhty prtgs,tr POR fl & xln ANHY,rr CHT AA,v rr GAST fos,tt-rr intxl POR,NFSOC,w/scat m-dkgyblk-blk SH frag & rr DOL AA"
5420.00 5430.00	"LS AA,tt-v rr intxl POR,NFSOC,w/decr SH & DOL AA"
5440.00 5450.00	"LS,crm-brn,mic-crypxln,dens-chky/rthy,sl foss ip,sl pyr,scat tn-brn CHT,tr anhy,LS bcm slty ip grd to scat lmy SLTSTN,lt gr,sft,calc;no-vpr rthy POR,no vis STN,v spty FLUOR,no CUT"
5450.00 5470.00	"LS,sl dolo ip,mic-cryp xln,dens-chky/rthy mtrx,argil ip grd to calc SLTSTN ip,scat tn-lt brn CHT,scat xln anhy,scat dk gr SHL & shl ptgs;vpr-no rthy POR,no vis STN,sptty min FLUOR,no CUT"

DEPTH	LITHOLOGY

5470.00 5480.00 "LS grd to DOLO LS,crm-lt brn-brn,mott ip,mic-crypxln,dens-sl chky/rthy,com lt tn-lt brn transl CHT,scat anhy;NSFSOC,rr shl aa"

5480.00 5490.00 "LS,tn-brn-dk gr,vfn-mic xln,dens-slty tex,argil ip,scat tn-gr CHT,anhy,sl foss,scat lt brn,calc SLTSTN;no-vpr intrxln/rthy POR,no FLOR,STN or CUT"

5490.00 5500.00 "LS aa,crm-brn-dk gr,dns-rthy-slty tex,argil,sl incr CHT aa;pr intrxln/rthy POR,no STN,FLUOR or CUT"

5500.00 5510.00 "LS crm-tan,ltgy,crpxl-micxl,rthy,occ chky,dns ip,slty-v slty,occ grdg to v lmy sl sdy SLTST,rr bf-brn CHT frag,occ micxl brn-gybrn rthy DOL lams,tt-v rr intxl POR,NFSOC,v rr dkgy-blk SH ptgs"

5510.00 5520.00 "LS AA,incr chky,sl plty,sl-v slty ip,tt,NFSOC,w/v thn ltgy v lmy sl sdy SLTST lams,bcmg ltbrn micxl-vfxl,calc DOL w/tr intxl POR,v rr dull yel FLOR,n vis STN,rr p slow dif CUT,rr CHT frag"

5520.00 5530.00 "DOL ltbrn-brn,micxl-vfxl,rthy,sl calc-calc,slty ip,fr intxl POR,fr bri yel FLOR,tr ltbrn STN,g slow-mod fast CUT,w/LS slty AA,v rr bf CHT frag"

5530.00 5550.00 "LS wh-crm-ltbrn,crpxl-micxl,rthy-chk,occ dns,slty-v slty ip,occ grdg to ltgy lmy SLTST,scat arg ltbrn micxl lmy DOL-occ shy grdg to dol SH,rr trnsl-bf CHT frag,bcmg dkgy-blk calc-carb sooty dol SH"

5550.00 5560.00 "SH dkgy-blk,sbblky-sbplty,slty,calc-dol,carb-sooty,mica ip,w/v rr thn ltbrn-crm crpxl LS & lt-mbrn micxl arg rthy DOL incl"

5560.00 5570.00 "SH AA,bcmg crm-ltbrn-tan crpxl-micxl,cln-dns,occ rthy-chk,LS rr mic fos,dns,tt,w/v thn intbd lt-mbrn micxl,dns,rthy DOL incl,tt,NFSOC"

5570.00 5580.00 "LS pred crm-tan-bf,crpxl-micxl,rthy-chk,v rr micfos,dns,tt,NFSOC,w/v rr DOL gybrn-brn,micxl,v lmy,sl shy,tt,NFSOC,w/scat SH cvgs AA,v rr trnsl-bf CHT "

5580.00 5600.00 "LS crm-tan-brn,crpxl-vfxl,dns-gran,occ micsuc,intbd ooc-oom GRNST & rthy-chk occ plty sl ool PKST,tt-fr ool-intxl POR,n-fr bri yel FLOR,v rr-fr ltbrn-rr blk STN,n-fr mod fast stmg CUT,w/scat v rr mbrn micxl DOL lams & scat blk carb SH cvgs"

5600.00 5610.00 "LS AA,pred ooc-oom GRNST,w/scat crm-wh dns crpxl-micxl occ plty sl fos-Crin PKST incl,tt-g ool-intxl POR,mfr-fr bri yel FLOR,tr-g ltbrn STN-rr spty blk dd o STN,n-g mod fast stmg mlky CUT,v rr scat bf CHT frag,rr rthy mbrn fos micxl lmy DOL lams,rr ANHY "

5610.00 5626.00 "LS lt-mbrn,crpxl-vfxl,gran-misuc ip,pred ooc-oom GRNST,rr scat dns PKST incl,AA,occ DOL rich cmt,fr-g POR-FLOR-CUT AA,incr brn STN & blk dd o STN,occ ANHY fl POR"

DEPTH	LITHOLOGY
5626.00 5640.00	"LS AA,pred ooc-oom GRNS,scat rr dns PKST incl,fr-g intxl-ool POR,fr bri yel FLOR,tr-fr ltbrn-brn STN,tr blk dd o STN,fr slow-fast stmg mlky CUT,scat tr DOL AA & SH AA cvgs"
5640.00 5650.00	"LS tan-ltbrn-brn,occ crm,micxl-vfxl,gran-micsuc ip,rr dns,pred ooc-oom GRNST,tr sl ool occ chk-plty PKST,v rr trnsl-bf CHT frag,occ DOL rich cmt,v rr ANHY xl-POR fl,scat DOL-SH CVGS AA,POR-FLOR-STN-CUT AA"
5650.00 5670.00	"LS lt-mbrn-brn,occ crm-tan,micxl-vfxl,gran-suc ip,pred ooc-oom GRNST,scat crpxl dns chky-plty ip PKST incl,scat dkbrn-smky gy CHT frag,tr-g ool-intxl POR,fr bri yel FLOR,fr-g ltbrn-brn-tr blk STN,fr-g mod fast-fast stmg mlky CUT,tr SH & DOL cvgs AA"
5670.00 5680.00	"LS AA,pred ooc-oom GRNST,w/sl incr sl oolplty-chk ip v sl chty dns crpxl-micxl PKST,sl decr POR,FLOR-STN-CUT AA,scat CVGS AA"
5680.00 5700.00	"LS ltbrn-brn,occ crm-wh,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,scat crpxl dns rthy-chk sl fos PKST,occ DOL rich cmt,scat ANHY xl-occ POR fl,rr bf CHT frag,v rr carb SH cvgs,fr intxl-ool POR,g bri yel FLOR,mg ltbrn-brn STN,tr blk dd o STN,fr fast CUT"
5700.00 5720.00	"LS AA,pred ooc-oom GRNST AA,rr scat tt PKST AA,fr-g intxl-ool POR,g bri yel FLOR,fr ltbrn-brn STN,tr-fr blk dd o STN,fr-g mod fast-fast stmg mlky CUT"
5720.00 5740.00	"LS ltbrn-brn,occ crm-wh,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,rr-tr crpxl dns rthy-chk sl fos PKST,occ DOL rich cmt,scat ANHY xl-occ POR fl,rr bf CHT frag,v rr carb SH cvgs,fr intxl-ool POR,g bri yel FLOR,mg ltbrn-brn STN,tr blk dd o STN,fr fast CUT"
5743.00 5759.00	"LS ltbrn-brn,occ crm-wh,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,rr-tr crpxl dns rthy-chk sl fos PKST,occ DOL rich cmt,xl-occ POR fl,rr bf,v rr carb SH cvgs,fr intxl-ool POR,g bri yel FLOR,mg ltbrn-brn STN,tr blk dd o STN,fr fast CUT"
5760.00 5773.00	"LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,rr-tr crpxl dns rthy-chk sl fos PKST,occ POR fl,v rr carb SH cvgs,fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"
5780.00 5800.00	"LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,rr-tr crpxl dns rthy-chk sl fos PKST,occ POR fl,v rr carb SH cvgs,fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"
5799.00 5817.00	"LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST, sl fos PKST,occ POR fl,v rr carb SH cvgs,fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"
5821.00 5838.00	"LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,rr-tr clr-whCALCtr dns rthy-chk sl fos occ POR fl,v rr carb SH cvgs,fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"

DEPTH	LITHOLOGY

5851.00 5858.00 "LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,rr-tr clr-whCALCtr dns rthy-chk sl fos occ POR fl,v rr carb SH cvgs,fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"

5880.00 5892.00 "LS ltbrn-brn,gy-tan ip,micxl-vfxl,gran,suc ip,rr-tr crpxl dns sl fos occ POR fl,fr intxl-ool POR,g bri yel FLOR,mg ltbrn-brn STN,tr blk dd o STN,fr fast CUT"

5900.00 5917.00 "LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,rr-tr clr-whCALCtr dns rthy-chk sl fos occ POR fl,v rr carb SH cvgs,fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"

5921.00 5941.00 "LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,rr-tr clr-whCALCtr dns rthy-chk sl fos occ POR fl,v rr carb SH cvgs,fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"

5950.00 5968.00 "LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,rr-tr clr-whCALCtr dns rthy-chk sl fos occ POR fl,v rr carb SH cvgs,fr intxl-ool POR incr,g bri yel FLOR,decr ltbrn-brn STN,decr blk dd o STN,fr fast CUT"

5970.00 5990.00 "LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,rr-tr clr-whCALCtr dns rthy-chk sl fos occ POR fl,v rr carb SH cvgs,fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"

5990.00 6010.00 "LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,rr clr-whCALC tr dns rthy-chk sl dol,v fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"

6020.00 6040.00 "LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,rr clr-whCALC tr dns rthy-chk sl dol,v fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"

6040.00 6060.00 "LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,rr clr-whCALC tr dns rthy-chk sl dol,v fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"

6061.00 6077.00 "LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,rr clr-whCALC dol,v fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"

6083.00 6095.00 "LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,rr clr-whCALC tr dol ip,v fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"

6100.00 6120.00 "LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,rr clr-whCALC tr dol ip,v fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"

DEPTH	LITHOLOGY

6121.00 6136.00 "LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,rr clr-whCALC tr dol ip,v fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"

6140.00 6153.00 "LS ltbrn-brn,occ gy-tan crm,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,scat PKSTN tr dol ip,v fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"

6160.00 6175.00 "LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,rr clr-whCALC tr dol ip,v fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"

6180.00 6190.00 "LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,rr clr-whCALC tr dol ip,v fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"

6200.00 6212.00 "LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST, tr dol ip,v fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"

6230.00 6250.00 "LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,rr clr-wh CALC tr dol ip,occ PKSTN v fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"

6250.00 6270.00 "LS AA,scat tt thn PKST stks-incl,POR-FLOR-STN-CUT AA"

6270.00 6290.00 "LS AA incr wh CALC,incr FLOR & dd o STN,POR-CUT AA "

6291.00 6299.00 "LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,clr-wh CALC tr dol ip,v fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"

6306.00 6316.00 "LS ltbrn-brn,occ crm-wh,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST, sl fos PKST,occ DOL rich cmt,xl-occ POR fl,fr intxl-ool POR,g bri yel FLOR,mg ltbrn-brn STN,tr blk dd o STN,fr fast CUT"

6321.00 6334.00 "LS ltbrn-brn,occ gy-tan,micxl-vfxl,gran,suc ip,pred ooc-oom GRNST,clr-wh CALC tr dol ip,v fr intxl-ool POR incr,g bri yel FLOR,incr ltbrn-brn STN,incr blk dd o STN,fr fast CUT"

6340.00 6360.00 "LS tan-ltbrn-ltgybrn,crpxl-vfxl,gran-micsuc ip,pred ooc-oom GRNST,scat dns tt sl ool occ plty PKST incl-frag,sl DOL cmt,scat ANHY xl-POR fl,v rr trnsl CHT frag,fr-g intxl-fr ool POR,fr dull-bri yel FLOR,fr ltbrn-tr blk STN,fr-g slow-fast stmg mlky CUT"

6360.00 6380.00 "LS AA,sl decr PKST AA,POR-FLOR-STN-CUT AA"

6380.00 6410.00 "LS tan-ltbrn-rr ltgybrn,micxl-vfxl,gran-micsuc ip,pred ooc-oom GRNST,tr crpxl sl ool occ plty PKST incl-frag,occ DOL cmt,scat ANHY xl-POR fl,rr trnsl CHT frag,fr-g intxl-ool POR,tr-fr dull-bri yel FLOR,fr ltbrn-tr blk STN,fr-g mod fast-fast stmg mlky CUT"

DEPTH	LITHOLOGY

6410.00 6450.00 "LS pred ooc-oom GRNST AA,w/scat crm-tan occ wh rr chk-plty sl ool PKST frag-incl,fr-g intxl-tr ool POR,mfr-fr dull-bri yel FLOR,fr ltbrn-rr brn STN-tr blk dd o STN,fr-g mod fast-fast stmg mlky CUT"

6450.00 6470.00 "LS AA,sl incr plty-chk PKST,POR-FLOR-CUT AA,incr blk dd o STN"

6470.00 6500.00 "LS tan-ltbrn-rr ltgybrn,micxl-vfxl,gran-micsuc ip,pred ooc-oom GRNST,tr crpxl sl ool occ plty PKST incl-frag,occ DOL cmt,scat ANHY xl-POR fl,rr trnsl CHT frag,fr-g intxl-ool POR,tr-fr dull-bri yel FLOR,fr ltbrn-tr blk STN,fr-g mod fast-fast stmg mlky CUT"

6500.00 6530.00 "LS AA,pred ooc-oom GRNST,scat rr PKST AA,fr-g intxl-fr ool POR,fr dull-bri yel FLOR,fr ltbrn-brn STN,rr-tr spty blk dd o STN,mfr-g mod fast-tr fast stmg mlky CUT"

6530.00 6550.00 "LS tan-ltbrn-rr ltgybrn,micxl-vfxl,gran-micsuc ip,pred ooc-oom GRNST,tr crpxl sl ool occ plty PKST incl-frag,occ DOL cmt,scat ANHY xl-POR fl,rr trnsl CHT frag,fr-g intxl-ool POR,tr-fr dull-bri yel FLOR,fr ltbrn-tr blk STN,fr-g mod fast-fast stmg mlky CUT"

6550.00 6580.00 "LS pred ooc-oom LS AA,w/scat crpxl-micxl dns tt sl ool PKST frag-incl,fr-g intxl-fr ool POR,fr dull-tr spty bri yel FLOR,fr-mg ltbrn STN-tr spty blk dd o STN,fr-g mod fast-fast stmg mlky CUT"

6580.00 6610.00 "LS tan-ltbrn-rr ltgybrn,micxl-vfxl,gran-micsuc ip,pred ooc-oom GRNST,rr dns sl ool occ plty PKST incl-frag,occ DOL cmt,scat ANHY xl-POR fl,rr trnsl CHT frag,fr-g intxl-ool POR,fr dull-tr spty bri yel FLOR,fr ltbrn-tr blk STN,fr-g slow-fast stmg mlky CUT"

6610.00 6640.00 "LS AA,pred ooc-oom GRNST,sl incr dns PKST AA,fr-g intxl-fr ool POR,fr dull-bri yel FLOR,fr ltbrn-brn STN,rr-tr spty blk dd o STN,mfr-g mod fast-tr fast stmg mlky CUT"

6640.00 6670.00 "LS tan-ltbrn-rr ltgybrn,micxl-vfxl,gran-micsuc ip,pred ooc-oom GRNST,rr dns sl ool occ plty PKST incl-frag,occ DOL cmt,v rr ANHY xl-POR fl,rr trnsl CHT frag,fr-g intxl-ool POR,fr dull-tr spty bri yel FLOR,fr ltbrn-tr blk STN,fr-g slow-fast stmg mlky CUT"

6670.00 6700.00 "LS AA,pred ooc-oom GRNST,scat dns occ ool PKST AA,fr-g intxl-fr ool POR,fr dull-bri yel FLOR,fr ltbrn-brn STN,tr spty blk dd o STN,fr-g mod fast-tr fast stmg mlky CUT"

6700.00 6730.00 "LS tan-ltbrn,occ brn-rr crm-wh,crpxl-vfxl,gran-micsuc,occ suc,pred ooc-oom GRNST w/scat dns sl ool occ plty PKST,v sl DOL rich cmt,occ ANHY xl-rr POR fl,v rr bf-clr CHT frag,g intxl-tr-fr ool POR,fr dull-tr bri yel FLOR,fr-g brn-rr blk STN,g mod fast CUT"

6730.00 6750.00 "LS AA,pred ltbrn-brn sl ooc-oom GRNST,scat thn sl ool occ plty PKST incl-lams,fr-g intxl-fr ool POR,FLOR-STN-CUT AA"

DEPTH	LITHOLOGY

6750.00 6770.00 "LS AA,w/sl incr dns sl ool anhy PKST,decr intxl POR,fr dull-tr-fr bri yel FLOR,fr ltbrn STN-spty blk dd o STN,fr-g slow-mod fast-tr fast stmg mlky CUT"
6770.00 6800.00 "LS tan-ltbrn,occ brn,crpxl-vfxl,gran-micsuc,occ suc,pred ooc-oom GRNST,tr dns crm-wh-tan sl ool occ plty PKST,v sl DOL rich cmt,occ ANHY xl-rr POR fl,rr scat clr CHT frag,g intxl-tr-fr ool POR,fr dull-tr bri yel FLOR,fr-g brn-rr blk STN,g mod fast CUT"

6810.00 6850.00 "LS AA,pred ooc-oom GRNST,w/sl incr dns occ ool sl anhy PKST incl-frag,occ sl incr ANHY xl,occ ANHY fl POR,fr-g intxl-tr-fr ool POR,fr dull-tr spty bri yel FLOR,fr-mg ltbrn STN,scat tr blk dd o STN,fr-g slow-mod fast-tr-fr fast stmg mlky CUT"

6850.00 6880.00 "LS pred sl ooc-oom GRNST,rr scat dns PKST AA,fr-g intxl-fr ool POR w/tr ANHY xl-POR fl,fr-g dull-tr-fr spty bri yel FLOR,fr ltbrn-rr brn STN,rr-tr spty blk dd o STN,fr-g slow-mod fast-tr fast stmg mlky CUT"

6880.00 6910.00 "LS tan-ltbrn,occ brn,crpxl-vfxl,gran-micsuc,occ suc,pred ooc-oom GRNST,tr dns crm-wh-tan sl ool occ plty tr PKST,v sl DOL rich cmt,occ ANHY xl-rr POR fl,rr scat clr CHT frag,g intxl-tr-fr ool POR,fr dull-tr bri yel FLOR,fr-g brn-rr blk STN,g mod fast CUT"

6910.00 6940.00 "LS tan-ltbrn,occ brn,crpxl-vfxl,gran-micsuc,occ suc,pred ooc-oom GRNS dns crm-wh-tan sl ool occ plty tr PKST,v sl DOL rich cmt,occ ANHY xl-rr POR fl,rr scat clr CHT frag,g intxl-tr-fr ool POR,fr dull-tr bri yel FLOR,fr-g brn-rr blk STN,g mod fast CUT"

6940.00 6970.00 "LS tan-lt brn,occ brn,crpxl-vfxl,gran-msuc,pred ooc-oom GRSTN,tr dns,crm-wh,tan,ool,occ plty PKSTN,v sl DOL,rich cmt,occ ANHY xl,rr POR,rr scat clr CHT frag,g intxl tr-fr ool POR,fr dull,tr bri yel FLOR,fr-g brn-rr blk STN,g-mod fast CUT tr wh CALC"

6970.00 7000.00 "LS tan-gytan,occ brn,crpxl-vfxl,gran-msuc,pred ooc-oom GRSTN,tr dns,crm-wh,tan,ool,occ plty PKSTN,occ ANHY xl,rr POR,g intxl tr-fr ool POR,fr dull,tr bri yel FLOR,fr-g brn-rr blk STN,g-mod fast CUT tr wh CALC"

7000.00 7020.00 "LS tan-lt brn,occ brn,crpxl-vfxl,gran-msuc,pred ooc-oom GRSTN,tr dns,crm-wh,tan,ool,occ plty,v sl DOL,rich cmt,rr POR,rr scat clr CHT frag,g intxl tr-fr ool POR,fr dull,tr bri yel FLOR,fr-g brn-rr blk STN,g-mod fast CUT occ wh-clr CALC"

7020.00 7050.00 "LS tan-lt brn,occ brn,crpxl-vfxl,gran-msuc,pred ooc-oom GRSTN,tr dns,crm-wh,tan,ool,occ plty PKSTN,v sl DOL,rich cmt,rr pp POR,rr scat clr CHT frag,g intxl tr-fr ool POR,fr dull,tr bri yel FLOR,fr-g brn-rr blk STN,g-mod fast CUT tr wh CALC"

7052.00 7068.00 "LS tan-lt brn,occ brn,crpxl-vfxl,gran-msuc,pred ooc-oom GRSTN,tr dns,crm-wh,tan,ool,occ plty PKSTN,v sl DOL,rich cmt,occ ANHY xl,rr POR,rr scat clr CHT frag,g intxl tr-fr ool POR,fr dull,tr bri yel FLOR,fr-g brn-rr blk STN,g-mod fast CUT tr wh CALC occ m"

DEPTH	LITHOLOGY
7080.00 7098.00	"LS tan-lt brn,occ brn,crpxl-vfxl,gran-msuc,pred ooc-oom GRSTN,v sl DOL,rr POR,rr scat clr CHT frag,g intxl tr-fr ool POR,fr dull,tr bri yel FLOR,fr-g brn-rr blk STN,g-mod fast CUT tr wh CALC incr GRSTN"
7102.00 7120.00	"LS tan-lt brn,occ brn,crpxl-vfxl,gran-msuc,pred ooc-oom GRSTN,incr dns,crm-wh,tan,ool,occ plty PKSTN,v sl DOL,xl,rr pp POR,rr scat clr CHT frag,g intxl tr-fr ool POR,fr dull,tr bri yel FLOR,fr-g brn-incr blk STN,g-mod fast CUT tr wh CALC"
7124.00 7143.00	"LS tan-lt brn,occ brn,crpxl-vfxl,gran-msuc,pred ooc-oom GRSTN,incr dns,crm-wh,tan,ool,occ plty PKSTN,v sl DOL,xl,rr pp POR,rr scat clr CHT frag,g intxl tr-fr ool POR,fr dull,tr bri yel FLOR,fr-g brn-incr blk STN,g-mod fast CUT tr wh CALC"
7150.00 7180.00	"LS tan-lt brn,occ brn,crpxl-vfxl,gran-msuc,pred ooc-oom GRSTN,incr dns,crm-wh,tan,ool,occ plty PKSTN,v sl DOL,xl,rr pp POR,rr scat clr CHT frag,g intxl tr-fr ool POR,fr dull,tr bri yel FLOR,fr-g brn-incr blk STN,g-mod fast CUT tr wh CALC"
7180.00 7200.00	"LS tan-lt brn,occ brn,crpxl-vfxl,gran-msuc,pred ooc-oom GRSTN,v sl DOL,rr pp POR,rr scat clr g intxl tr-fr ool POR,fr dull,tr bri yel FLOR,fr-g brn-incr blk STN,g-mod fast CUT tr wh CALC"
7200.00 7240.00	"LS tan-lt brn,occ brn,crpxl-vfxl,gran-msuc,pred ooc-oom GRSTN,incr dns,crm-wh,tan,ool,occ plty PKSTN,v sl DOL,xl,rr pp POR,rr scat clr CHT frag,g intxl tr-fr ool POR,fr dull,tr bri yel FLOR,fr-g brn-incr blk STN,g-mod fast CUT tr wh CALC"
7240.00 7260.00	"LS tan-lt brn,occ brn,crpxl-vfxl,gran-msuc,pred ooc-oom GRSTN,incr dns,crm-wh,tan,ool,occ plty PKSTN,v sl DOL,xl,rr pp POR,rr scat clr CHT frag,g intxl tr-fr ool POR,fr dull,tr bri yel FLOR,fr-g brn-incr blk STN,g-mod fast CUT tr wh CALC"
7260.00 7290.00	"AFTER TRIP-V P SPL ABNT CALC-SH CVGS & TR LS ltbrn-occ brn,crpxl-vfxl,sl gran-occ micsuc,pred sl ooc-oom GRNST,w/scat dns anhy PKST,v rr ANHY xl-POR fl-v rr CHT frag,sl DOL cmt,tr-fr intxl-tr ool POR,tr spty bri yel FLOR,tr-fr ltbrn-rr spty blk STN,tr fr mod fast-fast stmg CUT"
7290.00 7300.00	"ABNT CaCl & SH CVGS" "LS AA,ltbrn,occ brn-mbrn,pred sl ooc-oom GRNST,tr-fr intxl-tr ool POR,scat tr dull-bri yel FLOR,tr-fr ltbrn STN,rr blk dd o STN,fr mod fast-fast stmg mlky CUT; W/TR POLYMER GLOBULARS"
7300.00 7320.00	"LS ltbrn-brn,occ gybrn,crpxl-vfxl,gran-micsuc ip,pred sl ooc-oom GRNST,scat tr dns anhy PKST,v rr ANHY xl-POR fl,tr-fr intxl-tr ool POR,fr dull-bri yel FLOR,tr ltbrn-rr spty blk dd o STN,fr mod fast-tr fast stmg CUT;W/ABNT CaCl & TR blk SH CVGS"
7320.00 7330.00	"LS AA,POR-FLOR-STN-CUT AA,W/SL DECR CaCl & SH CVG"

DEPTH	LITHOLOGY

7330.00 7350.00 "LS crm-tan-ltbrn-brn-gybrn,mott,cryp-vfxln,gran-sl suc ip,pred ooc-oom GRNST,occ mdns PKST,tr ool,rr algal mat,tr anhy,rthy/arg ip,pred intgran-intxln POR,com ooc-oom POR,tr brn-blk o STN,tr spty bri yel FLOR,tr bri yel blmg-slo strmg CUT,bri yel resd "

7350.00 7370.00 "LS AA/decr CaCl in SPL,pred GRNST w/mdns mtx,occ tt PKST,tr ool,tr pel,tr algal mat,tr-mf brn-blk o STN,rthy/arg ip,sl anhy ip,tr spty bri yel FLOR,tr bri yel blmg-slo strmg CUT,bri yel resd ring"

7370.00 7380.00 "LS AA w/incr tan-ltbrn-brn LS,decr CaCl in SPL,POR-FLOR-STN-CUT AA,bri yel resd ring"

7380.00 7400.00 "LS crm-tan-ltbrn-brn-gybrn,sl mott,cryp-vfxln,gran-sl suc ip,pred ooc-oom GRNST,occ mdns PKST,tr ool,rr pel,sl anhy ip,rthy/sl arg ip,pred intgr-intxln POR,com ooc-oom POR,sl tr-tr brn-blk o STN,tr spty bri yel FLOR,tr bri yel blmg CUT,bri yel resd ring"

7400.00 7420.00 "LS crm-tan-ltbrn-brn-gybrn,sl mott,cryp-vfxln,gran-sl suc ip,pred ooc-oom GRNST,occ mdns PKST,tr ool,rr pel,sl anhy ip,rthy/sl arg ip,pred intgr-intxln POR,com ooc-oom POR,tr brn-blk o STN,tr spty bri yel FLOR,tr bri yel blmg CUT,bri yel resd ring"

7420.00 7440.00 "LS crm-tan-ltbrn-brn-gybrn,mott,cryp-vfxln,gran-sl suc ip,pred ooc-oom GRNST,occ mdns PKST,tr ool,rr algal mat,tr anhy,rthy/arg ip,pred intgran-intxln POR,com ooc-oom POR,tr brn-blk o STN,tr spty bri yel FLOR,tr bri yel blmg-slo strmg CUT,bri yel resd "

7440.00 7450.00 "LS AA/decr CaCl in SPL,pred GRNST w/mdns mtx,occ tt PKST,tr dol/calc intracl,tr ool,tr pel,tr algal mat,rthy/sl arg ip,rr carb mat,sl anhy ip,tr brn-blk o STN,pred ooc-oom POR,com intgran-intxln POR,tr spty bri yel FLOR,tr blmg-slo strmg CUT,bri yel resd"

7450.00 7470.00 "LS crm-tan-ltbrn-brn-gybrn,mott,cryp-vfxln,gran-sl suc ip,pred ooc-oom GRNST,occ mdns PKST,tr ool,rr algal mat,tr anhy,rthy/arg ip,pred intgran-intxln POR,com ooc-oom POR,tr brn-blk o STN,tr spty bri yel FLOR,tr bri yel blmg-slo strmg CUT,bri yel resd "

7480.00 7490.00 "LS AA/sl incr intbd tt PKST,pred ooc-oom POR,occ intgran-intxln POR,tr-mf brn-blk o STN,tr-mf bri yel FLOR,mf bri yel blmg-slo strmg CUT,bri yel resd ring"

7490.00 7510.00 "LS AA/mod decr CaCl,pred GRNST w/mdns mtx,occ tt PKST,occ ool,tr pel,tr algal mat,sl anhy ip,tr dol/calc intracl,mf brn-blk o STN,mf even bri yel FLOR,mf bri yel blmg-slo strmg CUT,bri yel resd ring"

7490.00 7510.00 "LS AA/decr PKST,pred GRNST,STN-FLOR-CUT AA,pred ooc-oom POR,com intgran POR,tr intxln POR ip"

7510.00 7520.00 "LS ltbrn,occ brn,rr crm,micxl-vfxl,gran-micsuc-occ suc,pred sl ooc-oom GRNST,rr scat dns anhy v sl ool PKST,occ DOL cmt,scat ANHY xl-incl,fr-g intxl-tr ool POR,fr-g bri-dull yel FLOR,fr ltbrn-rr blk STN,fr-g mod fast-fast stmg CUT"

DEPTH	LITHOLOGY

7520.00 7530.00 "LS AA,sl incr dns PKST,v sl decr POR-FLOR-STN-CUT w/scat rr-tr CaCl FRAG"

7540.00 7555.00 "LS AA,pred sl ooc-oom GRNST,w/rr scat dns tan-crm PKST frag,fr-g intxl-tr ool POR,fr-g bri-dull yel FLOR,fr-g ltbrn STN-tr blk dd o STN,fr-g mod fast-fast stmg mlky CUT W/SCAT TR CaCl FRAG"

7555.00 7580.00 "LS crm-tan-ltbrn-brn-gybrn,mott,cryp-vfxln,gran-sl suc ip,pred ooc-oom GRNST,occ mdns sl ool PKST,tr anhy,rthy-chk ip,pred intxl-sl ool POR,mg bri yel FLOR,mg brn STN-rr spty blk o STN,mg slow-mod fast stmg CUT W/INCR AMNT CaCl FRAG & SH CVG AFTER TRIP"

7580.00 7600.00 "DECR SH CVGS & CaCl FRAGS"
"LS tan-ltbrn,rr brn-crm,micxl-vfxl,gran-micsuc,occ suc,pred sl ooc-oom GRNST,scat dns sl anhy v sl ool occ rthy PKST,rr-tr ANHY xl-incl,occ DOL rich cmt,v rr bf CHT frag,fr-g intxl-tr ool POR,fr-g bri-dull yel FLOR,fr ltbrn-v rr blk STN,fr-g mod fast CUT"

7600.00 7610.00 "LS AA,pred sl ooc-oom GRNST,sl incr dns PKST,POR-FLOR-STN-CUT AA,W/SH & CaCl AA"

7610.00 7630.00 "LS tan-ltbrn,rr brn-crm,micxl-vfxl,gran-micsuc,occ suc,pred sl ooc-oom GRNST,scat dns sl anhy v sl ool occ rthy PKST,rr-tr ANHY xl-incl,occ DOL rich cmt,v rr bf CHT frag,fr-g intxl-tr ool POR,fr-g bri-dull yel FLOR,fr ltbrn-v rr blk STN,fr-g mod fast CUT"

7630.00 7650.00 "LS AA,pred ooc-oom GRNST,w/rr scat tan-ltbrn,rr crm,crpxl-micxl,dns,v sl anhy,v rr ool,fr-g intxl-fr ool POR,fr-g dull-bri yel FLOR,fr-mg ltbrn STN,rr-tr spty blk dd o STN,fr-g mod fast-fast stmg mlky CUT"

7650.00 7660.00 "LS AA,v rr scat trnsl-bf CHT frag, v sl incr PKST,POR-FLOR-STN-CUT AA"

7660.00 7680.00 "LS tan-ltbrn,rr brn-crm,micxl-vfxl,gran-micsuc,occ suc,pred sl ooc-oom GRNST,scat dns sl anhy v sl ool occ rthy PKST,rr-tr ANHY xl-incl,occ DOL rich cmt,v rr bf CHT frag,fr-g intxl-tr ool POR,fr-g bri-dull yel FLOR,fr ltbrn-v rr blk STN,fr-g mod fast CUT"

7680.00 7690.00 "LS AA,v rr scat trnsl-bf CHT frag, v sl incr PKST,fr-mg intxl-tr ool POR,fr dull-bri yel FLOR,tr-fr ltbrn STN-rr spty blk dd o STN,tr-mg slow-fast stmg mlky CUT"

7690.00 7710.00 "LS AA,pred ooc-oom GRNST,scat tr dns-sl ool anhy PKST frag-incl,sl DOL rich cmt,v rr scat trnsl-clr CHT frag,fr-g intxl-fr ool POR,fr-mg dull-bri yel FLOR,fr ltbrn STN-rr blk dd o STN,fr-g mod fast-fast stmg mlky CUT"

7710.00 7730.00 "LS tan-ltbrn,rr brn-crm,micxl-vfxl,gran-micsuc,occ suc,pred sl ooc-oom GRNST,rr scat dns sl anhy sl ool occ rthy PKST,rr-tr ANHY xl-incl,occ DOL rich cmt,v rr bf CHT frag,fr-g intxl-tr ool POR,fr-g bri-dull yel FLOR,fr ltbrn-tr blk STN,fr-g mod fast CUT"

DEPTH	LITHOLOGY

7730.00 7740.00 "LS AA,v rr scat trnsl-bf CHT frag, v sl incr PKST,fr-mg intxl-tr ool POR,fr dull-bri yel FLOR,tr-fr ltbrn STN-rr spty blk dd o STN,tr-mg slow-fast stmg mlky CUT"

7740.00 7750.00 "LS AA,pred ooc-oom GRNST,tr dns anhy sl ool PKST,v rr trnsl CHT frag,occ DOL rich cmt,fr dull-bri yel FLOR,POR-STN-CUT AA"

7750.00 7770.00 "LS AA,pred ooc-oom GRNST w/thn intbd ltbrn-occ crmdns anhy occ rthy PKST,fr intxl-tr ool POR,fr dull-bri yel FLOR,tr-fr ltbrn STN-rr spty blk dd o STN,tr-mg slow-fast stmg mlky CUT"

7770.00 7790.00 "LS crm-tan-ltbrn-brn-gybrn,mott,cryp-vfxln,gran-suc ip,pred dns sl ool occ anhy PKST,w/thn intbd sl ooc-oom GRNST,occ ANHY xl-POR fl,rthy ip,pred tr-fr intxl-rr ool POR,mfr-fr spty bri yel FLOR,tr ltbrn-rr blk dd o STN,fr mod fast-fast stmg mlky CUT"

7790.00 7800.00 "LS AA,pred dns tt sl ool anhy PKST,w/thn intbd stks v sl ooc-oom GRNST,occ DOL cmt,abnt ANHY fl POR,tt-tr intxl-ool POR stks,tr-fr dull-bri yel FLOR,tr ltbrn-rr spty blk STN,tr fr mod fast stmg CUT w/tr CaCl frag & abnt POLYMER globuels"

7800.00 7813.00 "LS tan-ltbrn,occ crm,crpxl-micxl,dns,occ chk-sl rthy,anhy ip,sl dol,chty ip,pred sl ool PKST,w/v thn stks sl ooc-oom GRNST,v stky intxl-rr ool POR,tr spty dull-bri yel FLOR,rr-tr spty brn-blk STN,rr-tr slow-mod fast stmg CUT,W/SCAT CaCl FRAG & RR SH CVGS"

FORMATION TOPS

OPERATOR: MOBIL
WELL NAME: RATHERFORD UNIT #16-77 SE 1-A HORIZONTAL LATERAL LEG #2

FORMATION NAME		SAMPLES MEASURED DEPTH	SAMPLES TRUE VERTICAL DEPTH	DATUM KB:4978'
PARADOX SHALE		5370'	5368'	-390
UPPER ISMAY		5372'	5370'	-392
LOWER ISMAY		5455'	5445'	-467
GOTHIC SHALE		5553'	5509'	-531
DESERT CREEK		5567'	5518'	-540
DC 1-A POROSITY ZONE		5577'	5521'	-543

GEOLOGICAL SUMMARY

AND

ZONES OF INTEREST

The Mobil Exploration and Production U.S. Inc., Ratherford Unit #16-77 Southeast Horizontal Lateral Leg 2 was a re-entry of the Mobil Ratherford Unit #16-77, on which vertical drilled was completed on February 20, 1998 in Section 16, T41S, R24E. The southeast lateral leg #2 was started on March 4, 1998. The curve section was completed on March 7, 1998 at a measured depth of 5626', 5526' true vertical depth, 5 feet into the 1-A porosity zone of the Desert Creek. The lateral reached a total measured depth of 7813', true vertical depth of 5559', with a horizontal displacement of 2339' and true vertical plane of 131degrees, on March 18, 1998 in the Desert Creek 1-A zone. On March 7, 1998, a trip was made to adjust the angle of the bottom hole assembly to obtain the proper build rates for completion of the curve, also of note was that when the curve was landed a minor water flow was noted. There were no mechanical problems encountered while drilling this curve. During the drilling of the lateral section, an H_2S alert occurred on March 6th, when a sensor failed. Another H_2S alert occurred again on March 9th, with 15 ppm to 30 ppm, noted on the monitors and 10 ppm on a drag tube. At this time the well was shut in and circulated, while the mud weight was raised to control the H_2S. Also at this time the well began flowing at rates up to 60+ barrels of fluid per hour. The fluid appeared to be mainly water with minor amounts of oil and gas, with a minor trace of H_2S. The mud weight was raised from 9.7 up 13.7 ppg to control the flow.

During the period from March 9th through March 11, 1998, while getting the flow under control the planned core in the horizontal section was canceled and the MWD tool failed. This was due to the high amounts of CaCl, in the mud system necessitating a trip to add more tubing to the drill string and to change out the MWD tool. From March 12th to March 15, 1998 various combinations of parts on the MWD tool were tried, as well as the reduction of most of the CaCl particles in the mud system, in an attempt to get the MWD tool to function. On March 15th, wire line steering tools were run in the hole and drilling was resumed and continued until the 16th, when due to intermittent response signals, wire line survey trucks were switched out. After a wiper trip was made, drilling was again resumed on March 17, 1998. The lateral was terminated on March 18, 1998, at a measured depth of 7813', 5559' true vertical depth, and a horizontal displacement of 2339'. This lateral used a water based CaCl mud system, with polymer sweeps as the drilling fluid. Background gas registered from 1400 units to 1500 units from the kick off point to the top of the Desert Creek 1-A porosity zone. Once the 1-A porosity zone of the Desert Creek was penetrated, background gas increased significantly to 6000 units, with highs of 11,000 units noted. The drilling fluid was run through the gas buster starting at a depth of 5626' with a 2' to 10' flare noted. The flare steadied to approximately 8' as the lateral progressed. After weighting up the mud system at 7260', no flares were noted. Background gas readings of as high as 12,500 PPM were noted at times, with an average background of 2500 units after 7260'. The samples had good to fair oil shows throughout.

The primary objective of the Ratherford Unit #16-77 Leg 2 horizontal lateral was the 1-A zone of the Desert Creek Member of the Upper Paradox Formation. The objective was to identify and quantify the effective porosity, staining and gas throughout the lateral, within the 1-A porosity zone. As noted earlier the 30' core planned at a horizontal displacement to assist with porosity and permeability was canceled due the water flow problems. The lower portion of the Honaker Trail Limestone, the Paradox Shale[1], the Upper Ismay, the Lower Ismay, the Gothic Shale and the Upper Desert Creek transition zone above the top of the Desert Creek 1-A porosity zone were penetrated while drilling the curve section. The curve was landed 5' feet into the 1-A porosity horizon. Kick off point for this lateral was at a measured depth of 5320', 5319.22' true vertical depth in the basal Honaker Trail Formation of the Hermosa Group.

The basal Honaker Trail was predominately a light to medium brown, some light gray to cream to white, cryptocrystalline to microcrystalline, argillaceous to slightly silty, dense, tight limestone, with scattered very fine grained to slightly sucrosic streaks. The very thin porosity streaks had a very poor sample show with very poor visible porosity. The limestones had some dolomite cement; scattered translucent to clear chert fragments; rare medium to dark brown, microcrystalline, earthy dolomite inclusions. The dolomite and dolomitic limestones near the base of the Honaker Trail graded in to a medium to dark gray brown to dark gray, dolomitic to calcareous shale. This shale, known to some locally as the Paradox Shale, was slightly silty, occasionally carbonaceous, with very thin limestone and dolomite lamination to inclusions is the base of the Honaker Trail Formation. The Honaker Trail overlays the Upper Ismay member of the Upper Paradox Formation with a rather sharp contact between the overlaying shale and the dense limestones of the Upper Ismay.

The Upper Ismay top, in this well, was picked at a measured depth of 5372', with a true vertical depth of 5370'. It was predominately a cream to tan to light brown, some off white to light gray to medium gray brown, cryptocrystalline to microcrystalline, rare very finely crystalline streaks, earthy to chalky, predominately tight, slightly argillaceous to very slightly silty limestone. Within the section were thin interbedded dolomites, which were brown to gray brown, dense, tight, microcrystalline, earthy, and slightly to very calcareous. Thin laminae of dark to medium gray brown to black, slightly silty to dolomitic, calcareous to slightly calcareous shales were also noted. Scattered clear to brown to translucent chert were noted in the limestones and dolomites. Very rare visible streaks of porosity, with no visible staining or fluorescence and no gas increases were noted. The Hovenweep marker between the Upper Ismay and Lower Ismay was essentially non-existent in this lateral with only a very minor increase in the amounts of shale present in the samples noted.

The top of the Lower Ismay was picked at a measured depth of 5455', true vertical depth of 5445', and was essentially flat with the log from the original vertical well bore. The upper 40 feet of the section from 5455' to 5516', measured depth, was predominately a clean, cream to brown to gray brown, light gray to white, cryptocrystalline to microcrystalline, earthy to slightly dolomitic in part, chalky to slightly argillaceous, dense, rarely microfossiliferous, very slightly silty to very silty limestone and was predominately tight with no visible sample shows. This upper limestone had very rare streaks of earthy to intercrystalline porosity. Throughout these upper limestones were scattered buff to brown cherts; thin interbeds of slightly carbonaceous shales; medium brown to medium gray silty limestones grading to very limy, gray siltstones and thin interbedded brown to gray brown, microcrystalline, earthy, limey, slightly shaley dolomites were also encountered. From the measured depth of 5516', true vertical depth of 5489' to the measured depth of 5526', 5495' true vertical depth, the lithology changed to predominately a granular dolomite. The dolomites were a limey light brown to brown, microcrystalline to very finely crystalline, slightly sucrosic dolomite, a limestone rich cement, with a trace of very good intercrystalline porosity, a spotty dull yellow fluorescence, no to trace of light brown stain, with a poor slow diffuse to moderately fast streaming cut. As the curve was continued through the Lower Ismay from a measured depth of 5526' to the top of the Gothic Shale, the lithology was predominately interbedded white to brown, cryptocrystalline to microcrystalline, earthy to chalky, slightly silty limestone, and light to medium brown, microcrystalline, earthy, very slightly silty, argillaceous, limey dolomites. The limestone and dolomites had scattered chert fragments, and very thin dark gray brown, limey to dolomitic shale laminations and partings. These limestones and dolomites graded into the dolomitic to calcareous, slightly carbonaceous shale of the Gothic Shale.

The top of the Gothic Shale was encountered at 5553' measured depth, 5509' true vertical depth and was predominantly black to dark brown black, slightly silty, occasionally sooty, carbonaceous, calcareous to dolomitic and slightly micaceous. Scattered within the Gothic were very thin, cryptocrystalline to microcrystalline, earthy, limestone and dolomite partings and inclusions, with rare scattered anhydrite crystals. Both the top and the base of the Gothic were fairly abrupt with a decrease in penetration rate noted throughout. The top of the Gothic was marked by a sharp increase in shale in the

samples, a marked decrease in the penetration rate, and an increase in the back ground gas from an average of 3000 units to 6500 units.

The top of the Desert Creek is commonly picked in the Gothic Shale to Upper Desert Creek transition zone facies change. In this lateral the top was picked at a measured depth of 5567' and a true vertical depth of 5518' and was marked by an increased penetration rate, a decrease in black carbonaceous shales with an increase in dense, slightly silty limestone and clean to argillaceous dolomite in the samples. The lithology of the transition zone was primarily a tan to light brown to cream, cryptocrystalline to microcrystalline, very slightly fossiliferous limestone packstone with thin gray brown to brown, cryptocrystalline to microcrystalline, occasionally marly, tight limey dolomites. The limestones and dolomites had very rare anhydrite crystals to inclusions and tan to translucent cherts, and very thin black, carbonaceous shale laminations. The zone had no visible porosity or sample shows. The limestone at the base became increasingly oolitic and graded into the very good oolicastic to oolmoldic limestone of the 1-A porosity zone.

The top of the Desert Creek 1-A zone was picked at 5577' measured depth, 5521' true vertical depth and was based on sample identification as well as the usual sharp increase in penetration rate. The top of the 1-A zone in this southeasterly direction was flat with the top of the porosity log for the 16-77 well. The 1-A porosity zone interval drilled in the curve section was predominately a oolitic to very rarely algal limestone grainstone, cream to tan to brown, cryptocrystalline to very finely crystalline, slightly sucrosic, with an occasionally dolomite rich cement and scattered anhydrite crystals to some minor porosity filling. These limestone grainstones exhibited fair intercrystalline to oolicastic to oolmoldic porosity and had a fair light brown to brown oil stain, some minor black bitchimum* staining, fair to good scattered bright to moderate yellow fluorescence and a good moderate fast to fast steaming milky yellow white cut. The grainstones had minor interbedded dense, cryptocrystalline, cream to white to light brown, dense slightly oolitic limestone packstones, which were occasionally slightly chalky in texture with no visible porosity or sample shows.

The curve section was completed at a measured depth of 5626', 5526' true vertical depth, and a horizontal displacement of 153', 5' below the top of the 1-A zone, in the good oolicastic to oolmoldic limestone facies, on March 6, 1998. The lateral section was begun on March 7, 1998, in the upper portion of the 1-A porosity zone. The lateral section, through out its length remained fairly consistent with very minor variations of porosity type and rock classification being noted. The most significant variations were encountered when the hard streak separating the upper and lower 1-A porosity benches was encountered, with increased amounts of tight, platy packstones observed.

The lateral section, from the measured depth of 5626', to a measured depth of 5900', 5626' true vertical depth, with 427' of horizontal displacement, the wellpath was oriented in an approximately level attitude, just above the proposed target line. The lithology of this interval was predominately the oolicastic to oolmoldic limestone grainstone with fair to good intercrystalline to oolitic porosity, fair to good staining, fluorescence and cut. From a measured depth of 5900', the well path dropped angle as it was continued in the good oolitic limestone porosity, until reaching a measured depth of 6185', 5635' true vertical depth, where the tight streak within the middle of the 1-A porosity zone was encountered. At this time the penetration rate slowed somewhat and samples showed a very slight increase in platy chalky packstones, and the inclination angle turned upward. After the bit was deflected upward off this tight streak, the well path again slowly drop angle was it continued until again encountering and penetrating the tight streak at a measured depth of 6380', 5637' true vertical depth, with a horizontal displacement of 907'. The well path was allowed to continue downward at a shallow angle through this thin tight streak within the 1-A. A slight decrease in rate of penetration and sample show, as well as an increase in the amount of tight, very slightly oolitic, platy to chalky packstones were noted in the samples, until reaching a measured depth of 6410', 5638' true vertical depth and a horizontal displacement to 937'. At this time the lower portion of the good 1-A porosity was penetrated, with the lithology being the very good oolicastic to oolmoldic limestones.

The well path proceeded in a shallow downward angle from a measured depth of 6410' to 7035'', 5548.5' true vertical depth, with a horizontal displacement of approximately 1561'. The base of the "tight streak" and top of the lower bench of the 1-A porosity was bumped and scraped on several occasions as the drop in well path was attempted to be leveled off, and turned toward the horizontal. From the measured depth of 6410' to the measured of 7035' the tight streak within the 1-A zone was calculated to be dipping downward at an angle of approximately 89 degrees. The lithology throughout this interval remained the primarily oolicastic to oolmoldic limestone grainstone, tan to light brown, microcrystalline to very fine crystalline, with a granular to microsucrosic texture, some scattered anhydrite and rare light tan chert fragments. When the underside of the tight streak was encountered the samples showed increases in platy to chalky, slightly oolitic packstones, off white to cream to occasionally tan in color with poor to no visible porosity or sample show. The grainstones exhibited fair to good intercrystalline to interoolitic porosity with scattered oomoldic porosity. Shows were fair to good with light brown to some spotty dark brown staining, occasional varying amounts of black bitchimum noted, a fair to good bright yellow gold fluorescence and fair to good moderately fast to fast streaming milky cut.

The well path moved away from the "tight streak", at the measured depth of 7035', and was allowed to drift downward with corrections to control the rate of drop until reaching a measured depth of 170', true vertical depth of 5551', with a horizontal displacement of 1697'. As the base of the 1-A zone was approached, the well path was leveled and turned slightly upward, and was continued until reaching a measured depth of 7260', with a horizontal displacement of approximately 1786'. Throughout this interval, the lithology remained the very good oolicastic to oolmoldic limestone grainstones with fair to good porosity and predominately fair sample shows. Of note, is that beginning at a measured depth of 6530' and continuing to a measured depth of 7260', the fluorescence in the sample had been slowly dimming, from the very bright yellow to a predominately dull yellow, with trace to fair amounts of bright yellow fluorescence.

At approximately 12:00 am on March 9,1998, upon reaching a measured depth of 7260', with a horizontal displacement of approximately 1786', an H_2S alert and increasing water flow, with up to 30ppm H_2S and a flow of over 60 barrels of fluid per hour, necessitated a halt in drilling. At this time the mud weight was raised to control the water flow and the H_2S. The mud weight was incrementally raised until reaching a weight of 13.5ppg on March 12, 1998, at this time the MWD tool ceased to function, making a trip necessary to repair and-or replace the tool. The well flow was killed with 13.7ppg mud prior to making the trip. From March 12th, until March 14, 1998, various MWD configurations were attempted as well as the lowering of the mud weight and the amount of $CaCl^-$ and $CaCo_3$ in an attempt to get the MWD tool to function. On the 14th, after installing a new MWD tool and testing with fresh water, the well was circulated at a measured depth of 5792' through open ended tubing, while the amount of solids in the mud system, was lowered significantly. The MWD tool was retested with the mud system and it again failed due to the amount of solids. Also on the 14th, after circulating the well, Gyro Data's steering tool was rigged up to attempt to complete the lateral. Drilling was resumed on March 15, 1998.

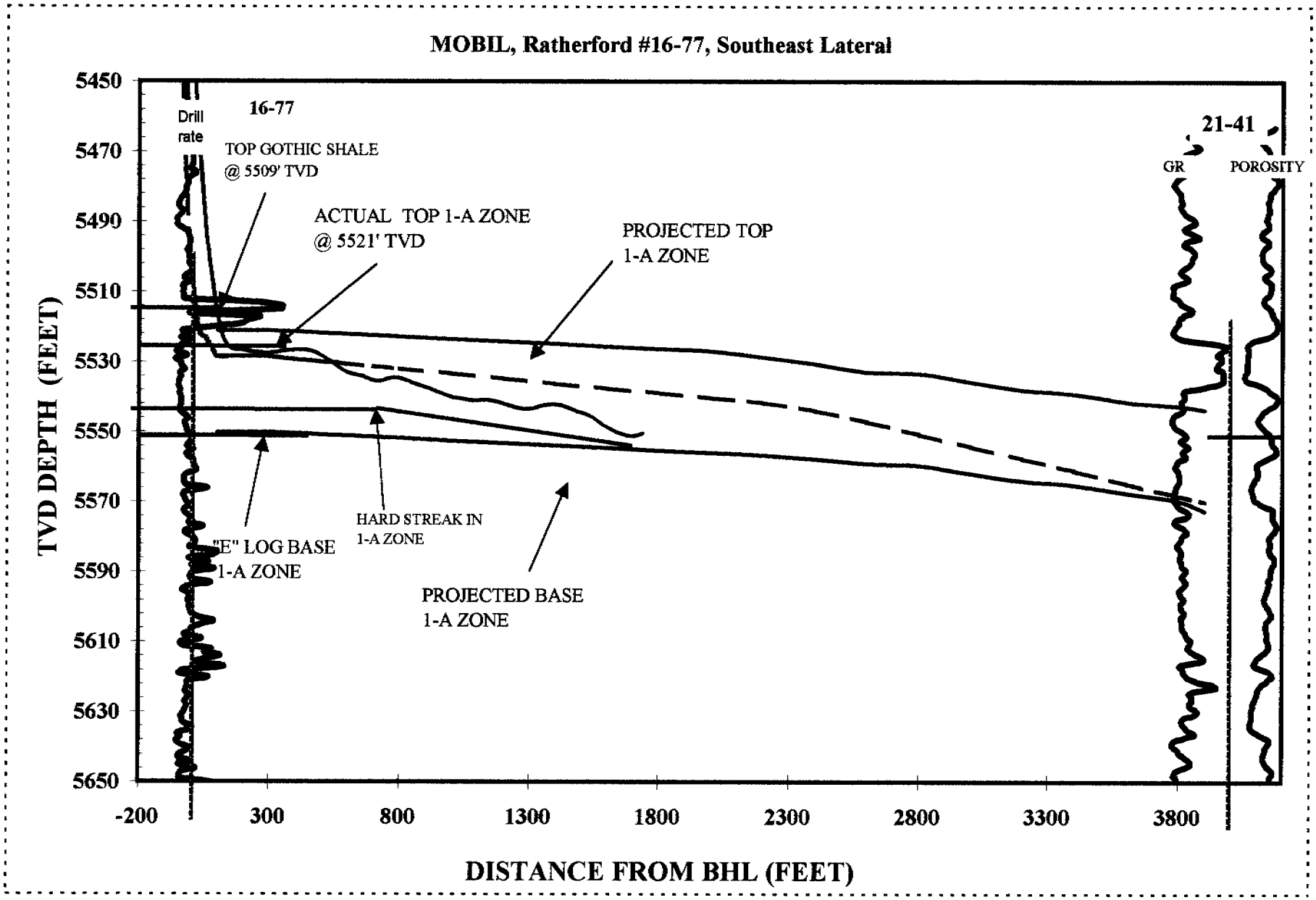
From 7260' to 7762' measured depth, 5561' true vertical depth, the wellpath was oriented downward. The lithology of this interval was the very good oolicastic to oolmoldic limestone grainstones, which were tan to light brown, micro to very fine crystalline with a granular to microsucrosic texture, scattered anhydrite and very rare pieces light tan translucent chert. Only scattered amounts of packstone, off white to cream, dense, tight and slightly anhydritic was observed as the base of the hard streak between the upper and lower 1-A porosity benches was bumped and scraped, pushing the lateral deeper in the section. Generally fair to good intercrystalline to oolitic porosity was noted. Within this section were intervals that displayed primarily intercrystalline with rare oolitic porosity. Staining was fair to good even light brown to spotty dark brown stain, very rare spotty black bitchimun stain, with a moderately bright yellow gold fluorescence and slow to fair streaming milky cut.

The penetration rate slowed down as the bit penetrated the tight streak within the 1-A zone at a measured depth of 7762', true vertical depth of 5561', with a horizontal displacement of 2290'. At this time the decision was made to continue the bit upward to determine if the tight streak was the division between the upper and lower benches of the 1-A zone or yet another tight streak within the lower 1-A zone.

This section was characterized by an increasing amount of off white-cream-tan, dense, limestone packstone, microcrystalline to cryptocrystalline, tight with a slightly chalky texture, scattered oolites and slightly anhydritic with a trace of crystalline anhydrite. Only very minor amounts of streaky intercrystalline to slightly oolitic porosity was developed with poor to fair amounts of staining, spotty fluorescence and slow streaming milky cuts.

As the wellpath was continued at an upward angle, it became apparent that the tight streak was the division between the upper and lower benches of the 1-A zone. The lateral continued until a measured depth of 7813', true vertical depth 5559', with a horizontal displacement of 2339'. At this time the lateral was halted, while deciding whether to sidetrack or terminate the lateral. After pulling 8 joints of pipe off bottom and circulating the lateral the decision was made to terminate the lateral due in part to the amount of lateral left after reacquiring downward dipping porosity, and the water flow previously encountered.

In tracking the well bore through the 1-A porosity bench, the intercrystalline to interoolitic porosity was very good with only minor variations in rock classification, generally from predominately intercrystalline and oolitic porosities in the limestone grainstones to tight limestone packstones near the tight streak seen within the 1-A zone. Although there was no significant tight streak noted, with only a very minor change on the Gamma Ray from the electric logs for the vertical 16-77 well. The drill time log from the vertical well displayed very minor changes, with the samples also displaying scattered tight, slightly chalky packstones. Sample shows were generally quite good, except where the lateral bumped and scraped until finally penetrating either the tight streak within the 1-A zone. Of note was dips encountered in the southeasterly direction, after dropping the lateral below the tight streak. The dips ranged from approximately 89 degrees to a maximum of 88.4 degrees, just prior to the lateral turned upward into the tight streak and being terminated. The well produced significant quantities of oil and gas, with minor amounts of water early in the lateral, with significant amounts of water and some H_2S encountered from 7200' measured depth until weighting up the system at 7260'. This lateral appears to have well developed porosities and permeabilities that will enhance the overall well performance.


MOBIL, Ratherford #16-77, Southeast Lateral
16-77
Drill rate
TOP GOTHIC SHALE @ 5509' TVD
ACTUAL TOP 1-A ZONE @ 5521' TVD
PROJECTED TOP 1-A ZONE
21-41
GR
POROSITY
HARD STREAK IN 1-A ZONE
"E" LOG BASE 1-A ZONE
PROJECTED BASE 1-A ZONE
TVD DEPTH (FEET)
5450
5470
5490
5510
5530
5550
5570
5590
5610
5630
5650
-200
300
800
1300
1800
2300
2800
3300
3800
DISTANCE FROM BHL (FEET)

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 [X] GAS WELL [ ] DRY [ ] Other

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

2. NAME OF OPERATOR MOBIL PRODUCING TX & NM INC.*
*MOBIL EXPLORATION & PRODUCING US INC. AS AGENT FOR MPTM

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
2587' FSL & 2410' FWL
At top prod. interval reported below
LAT #1A1 BHL/2601' FNL & 2157' FWL
At total depth
LAT #2A1 BHL/1457' FSL & 1831' FEL

5. LEASE DESIGNATION AND SERIAL NO.
14-20-603-355

6. IF INDIAN, ALLOTTEE OR TRIBE NAME
NAVAJO TRIBAL

7. UNIT AGREEMENT NAME
RATHERFORD UNIT

8. FARM OR LEASE NAME, WELL NO.
RATHERFORD 16-77

9. API WELL NO.
43-037-31768

10. FIELD AND POOL, OR WILDCAT
GREATER ANETH

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
SEC. 16, T41S, R24E

12. COUNTY OR PARISH: SAN JUAN
13. STATE: UT

14. PERMIT NO.
DATE ISSUED: 4-1-97

15. DATE SPUDDED	16. DATE T.D. REACHED	17. DATE COMPL. (Ready to prod.)	18. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	19. ELEV. CASINGHEAD
2-03-98	3-20-98	5-04-98	4705' GL	

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
*#24	*#24		→	X	

24. PRODUCING INTERVAL(S), OF THIS COMPLETION - TOP, BOTTOM, NAME (MD AND TVD)* ~~[illegible]~~ IS-DC
LAT #1A1 (5605-8829' TMD)(5535-5537' TVD). LAT #2A1 (5626-7813' TMD)(5526-5559' TVD)

25. WAS DIRECTIONAL SURVEY MADE: YES

26. TYPE ELECTRIC AND OTHER LOGS RUN
INDUCTION, NEUTRON, DENSITY, MICRO LOG & MICRO-IMAGE LOG MUD LOG. DIPOLE SHEAR SONIC GR SPECTROSCOPY 2-27-98

27. WAS WELL CORED: YES

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
9 5/8"	36#	1617'	12 1/4"	SURFACE	
7"	23#	5741'	8 3/4"	SURFACE	

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"	5206'	5206'

31. PERFORATION RECORD (Interval, size and number)
LAT #1A1(5605-8829' TMD)(5535-5537' TVD)
LAT #2A1(5626-7813' TMD)(5526-5559' TVD)

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

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
5675-7813'	ACIDIZE LAT #2A1 W/29,998 GALS 15% HCL ACID.
5650-8427'	ACIDIZE LAT #1A1 W/43,554 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)
5-04-98	PUMPING	PRODUCING

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD →	OIL - BBL.	GAS - MCF.	WATER - BBL.	GAS - OIL RATIO

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

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

TEST WITNESSED BY

35. LIST OF ATTACHMENTS
DIRECTIONAL SURVEY

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

SIGNED Sue Moseley for TITLE SHIRLEY HOUCHINS/ENV & REG TECH DATE 6-03-98

*(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.

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.: 14-20-603-355
6. If Indian, Allottee or Tribe Name: NAVAJO TRIBAL
7. If Unit or CA, Agreement Designation: RATHERFORD UNIT
8. Well Name and No.: RATHERFORD 16-77
9. API Well No.: 43-037-31768
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 [X] Other
2. Name of Operator: MOBIL PRODUCING TX & NM INC.*
*MOBIL EXPLORATION & PRODUCING US INC. AS AGENT FOR MPTM
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)
2587' FSL & 2410' FWL
SEC. 16, T41S, R24E

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.)*

BHL: LATERAL #1 2601' NORTH & 2157' WEST F/SURFACE SPOT (ZONE 1a).
BHL: LATERAL #2 1457' SOUTH & 1831' EAST F/SURFACE SPOT (ZONE 1a).

02-03-98 MIRU BIG A 41; SPUD 12 1/4" SURFACE HOLE @ 0500 MST, DRILL TO 145'. CALLED JIM THOMPSON W/BLM 2-1-98/ANSWERING MACHINE. ATTEMPT CALL TO NAVAJO EPA/ANETH OFFICE/DIRECTED TO SHIPROCK OFFICE NO ANSWER.

SEE ATTACHMENT /SUNDRY THROUGH COMPLETION (2-3-98/5-04-98).

RECEIVED
JUN 08 1998
DIV. OF OIL, GAS & MINING

14. I hereby certify that the foregoing is true and correct
Signed Sue Mosely for Title SHIRLEY HOUCHINS/ENV & REG TECH Date 6-03-98

(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

06/11/98
RJK

DRILLED FOOTAGE CALCULATION FOR DIRECTIONAL AND HORIZONTAL WELLS

Unit, Well Name:	Ratherford Unit, Well 16-77
API Well #:	43-037-31768

First leg description:		Lateral #1
Kick Off Point	KOP MD:	5416.00
End of Leg	EOL MD:	8829.00
	Footage drilled:	3413.00
Maximum Recorded Depth		5538.97

Second leg description:		Lateral #2
	KOP MD:	5306.00
	EOL MD:	7813.00
	Footage drilled:	2507.00
Maximum Recorded Depth		5561.36

Total Footage Drilled (MD):	***5920.00***
Deepest point (TVD):	***5561.36***

ATTACHMENT - FORM 3160-5
RATHERFORD UNIT - WELL #16-77
14-20-603-355
NAVAJO TRIBAL
SAN JUAN, UTAH

02-03-98	MIRU BIG A 41, SPUD 12 1/4" SURFACE HOLE @ 0500 MST DRILL TO 145' SURVEY = .50 DEGREES, DRILL TO 473' SURVEY = .75 DEGREES., CALLED JIM THOMPSON W/BLM 2-1-98, ATTEMPT CALL TO NAVAJO EPA @ ANETH, OFFICE MESSAGE DIRECTED CALLS TO SHIPROCK, NO ANSWER.
02-04-98	CONTINUE DRILLING AHEAD TO SURFACE TD @ 1615' @ 1130 MST, MIX & PUMP SWEEP @ TD.
02-05-98	RU & RUN 9 5/8" SURFACE CSG TO 1617.47' W/FE & DV TOOL=1621.84'., CIRC PRIOR TO CMT JOB. CMT W/DOWELL - 2 STAGES, 1ST ST. LEAD = 205 SKS CL-G 50/50 POZ. TAIL W/65 SXS CL , 2ND ST. 120 SXS LEAD, 65 SXS TAIL PLUGDN, 0400 MST LOST RETURNS END OF STAGE. WOC, WOO, START CMT ON ANNULUS 1415 MST 2-5-98 AFTER RUNNING TEMP SURVEY. TALK W/ EARL BECHARD W/BLM-FARMINGTON (3 TIMES) BEFORE PROCEEDING W/TOP JOB.
02-06-98	RUN 1" ANN CMT SURFACE PIPE, 1ST TAG 205', 2ND @ 85', THEN CMT TO SURF TOTAL PUMPED 195 SXS +/-, CUT OFF CSG WELD ON HEAD, NIPPLE TP BOP & RELATED EQUIP. PRESSURE TEST CSG & ANNULAR-1500-30 MINS-GOOD, TEST BOP, CHOKE MANIFOLD & ALL SAFETY VALVES-INCLUDING CHOKE MANIFOLD TO 3000# HELD GOOD.
02-07-98	TIH TAG @ 1517', TEST CSG TO 1000# - HELD 30 MINS, DRILL OUT SHOE JT, DRILL AHEAD START DRLG FORMATION @ 1900 MST, SURVEY @ 2058' - .75 DEGREES, CONT TO DRILL AHEAD TO 2592'-1 DEGREE.
02-08-98	CONTINUE TO DRILL AHEAD, SURVEY @ 3044' - .5 DEGREES
02-09-98	CONTINUE TO DRILL AHEAD, SURVEY @ 3798' - .75 DEGREES. CONT. TO DRILL AHEAD, TO 3798', CIRCULATE & DROP SURVEY, TRIP OUT OF HOLE TO CK BIT.
02-10-98	MAIL SUNDRY & ATTACHMENT TO BLM, STATE OF UTAH & NAVAJO EPA.
02-10-98	POOH W/BIT #2, DRLG 8 3/4" OPEN HOLE F/3764-4030', SURVEY @ 3984' 2.75 DEG F/3044'@ .5 DEG.
02-11-98	CONTINUE DRILLING F/4030-4307'.
02-12-98	CONTINUE DRILLING F/4307-4485'.
02-13-98	CONTINUE DRILLING F/4485-4764'.
02-14-98	CONTINUE DRILLING F/4764-4915', SURVEY @ 4679' @ .75 DEG.
02-15-98	RIH TO 4907', RIG REPAIR, CONTINUE DRILLING F/4915-5110'.
02-16-98	CONTINUE DRILLING F/5110-5343'.
02-17-98	CONTINUE DRILLING F5343-5512', POH, SURVEY @ 5512', @ 5512' @ .75 DEG.
02-18-98	RIH W/CORE BIT & CORE BARREL'S FOR CORE #1, KELLY UP PICK-UP 15' PUP JOINT. (FULL KELLY) RIH TO 5512'. CORE #1 F/5512-5573' (61' OF CORE), CIRC. BOTTOM'S UP. WEIGHT UP F/9.9 PPG TO 10.3 PPG., POH W/CORE #1 (CHAIN OUT OF HOLE) LD CORE BARREL 60'. 53' OF CORE RECOVERED.
02-19-98	FIN. ORIENT CORE BARREL'S, PU JARS, & MONEL DRLG. COLLAR F/CORE #2, RIH TO 5453', CIRC. F/5453'-5566', CIRC OUT FILL F/5566-5573', (7' OF FILL) CORE #2 5573-5634' (61' OF CORE). LAY DOWN 60' CORE, MAKE-UP JARS, MONEL DRLG COLLAR, RIH TO 5633', CIRC & COND. MUD.

ATTACHMENT - FORM 3160-5
RATHERFORD UNIT - WELL #16-77
14-20-603-355
NAVAJO TRIBAL
SAN JUAN, UTAH
PAGE 2

02-20-98	CIRC. & COND. MUD. CORE #3 8.75" x 4" F/5633-5693', CIRC. BOTTOMS UP. POOH W/CORE #3. LAY DOWN 60' OF CORE BARREL. (RECOVER 60' OF CORE #3) LD CORE TOOLS. MAKE-UP RE-RUN BIT #4. RIH TO 5633', WASH 60' TO BOTTOM @ 5693', NO FILL. CONTINUE DRILLING 8.75" OPEN HOLE F/5693-5735'. TD 8.75" OPEN HOLE @ 5735'. CIRC & COND MUD FOR LOGGING TOOLS.
02-21-98	DROP TOTCO. POH F/LOGGING. NO SURVEY. RU SCHLUMBERGER LOGGING UT. RIH W/INDUCTION, NEUTRON, DENSITY, MIRO-LOG TO 5735'. LOG F/5735-4545'. POH RIH W/DIPLE SHEAR SONIC LOG TO 5735', LOG F/5735-5000'. POOH, RIH W/FULLBORE FORMATION MICRO-IMAGE LOG TO 5735'. LOG F/5735-5400', POOH RDMO SCHLUMBERGER LOGGING UT. RIH W/8.75' BIT TO 5735'. CIRC & COND. HOLE TO RUN CSG. DROP TOTCO. POOH, LD DRLG STRING.
02-22-98	CHANGE RAMS & RIG UP CSG CREW. RUN F/S, 1JT 7", F/C 66 JTS 7" D/V TOOL, 69 JTS 7" TOTAL PIPE 5743.90' W F/E, PIPE SET @ 5741', CIRC & COND. RIG DOWN CSG CREW, RIG UP DOWELL, MIX & PUMP 1ST STAGE AS FOLLOWS: LEAD-630 SXS CL-G 50/50 POZ 3% D79, 3#/SK D42, .25#/SK D29; TAIL-85 SXS CL G .4% B14, .25#/SK D65 PLUG DOWN & BUMPED @ 300 MST 2-22-98 DROP BOMP OPEN DV TOOL AT 0330 MST. CIRC. BETWEEN STAGES. CMT 2ND STAGE AS FOLLOWS: LEAD-139 SXS CL-G 50/50 POZ 3 .25#/SK D 29, PLUG DOWN & CLOSED DV TOOL @ 9:00 MST CIRC. MOVE RIG, RELEASE RIG @ 1500 MST 2-22-98

7" CASING @ 5741.00 MD, 5741.00 TVD.

ATTACHMENT TO SUNDRY DATED 3-04-98/ACCEPTED FOR RECORD 3-06-98.

02-23-98	MOVE OFF RIG #41, MOVE IN RIG #25 NAVAJO WEST. NOTIFIED JIM THOMPSON W/STATE OF UTAH @ 8:00 / REFERENCE MOVING OUT & IN.
02-24-98	FIN RIGGING UP ROTARY RIG. NU. BOP STACK & TEST SAME. PU TIH W/6 1/8 BIT, DC'S, AOHDP TO 2910'. D.O. DV TOOL, CONTINUE IN HOLE TO PBD 5680'. CIRC. HOLE. PRESSURE TEST TO 1000#. TOOH.
02-25-98	FIN OUT OF HOLE W/BIT. RU SCHLUMBERGER. RAN GR/CCL F/5678-5000'. POOH RIH W/GUAGE RING TO BELOW DV TOOL @ 2910'. RIH W/TIW PKR & SET PKR @ 7434'. RDWL. PU RIH W/TIW ANCHOR LATCH ASSY. ORIENT SUB. LATCH INTO PKR @ 5434'. CIRC RU GYRO DATA. RIH TAKE READINGS. PKR KEYWAT @ 101 GTF & SURVEY EVERY 200' TO SURFACE. RDWL. TOOH W/ANCHOR LATCH ASSY. FINAL REPORT FOR VERTICAL & HORIZONTAL PREP.
02-26-98	PU ANCHOR LATCH ASSY & WHIPSTOCK ON STARTER MILL. TIH LATCH INTO TIW PKR @ 5434'. SHEAR OFF BOLT. MILL F/5416-5418'. TOOH. RIH W/CSG. WATERMELLON MILL. MILLING WINDOW 5416-5420'. LATERAL #1.
02-27-98	LATERAL 1A1 SLIDE DRILL & SURVEY CURVE SECTION F/5524-5605' TD (5535.38 TVD). LD CURVE ASSY. TIH SLIDE/ROTATE DRILL & SURVEY F/5604-5990'.
02-28-98	SLIDE/ROTATE DRILL & SURVEY F/5990-6700'
03-01-98	SLIDE/ROTATE DRILL & SURVEY F/6700-7695'.

ATTACHMENT - FORM 3160-5
RATHERFORD UNIT - WELL #16-77
14-20-603-355
NAVAJO TRIBAL
SAN JUAN, UTAH
PAGE 3

03-02-98	SLIDE/ROTATE DRILL & SURVEY F/7675-8360'
03-03-98	SLIDE/ROTATE DRILL & SURVEY F/8360-8829'TMD (TD) 5536.91 TVD. LATERAL 1A1.
03-04-98	FIN CIRC. SWEEP OUT. FINAL REPORT LATERAL 1A1.
03-04-98	PU WHIPSTOCK ASSY. TIH & LATCH INTO TIW PKR @ 5434'. MILL W/STARTER MILL F/5306-5308'. TOOH W/STARTER MILL & LD SAME. RIH W/CSG & WATERMELLON MILLS. CIRC TO BEGIN MILLING.
03-05-98	PU CSG & WATERMELON MILL. TIH CONT. TO MILL 7" CSG F/5305.5' TO 5319' +1' FORMATION TO 5320. LD MILLS LATERAL 2A1.
03-05-98	RU GYRO DATA & TIH W/ORIENT WHIPSTOCK. TIME DRILL F/5320-5327'. SLIDE/DRILL W/WT F/5327-5337'.
03-06-98	SLIDE/DRILL & SURVEY F/ 5337-5511'.
03-07-98	SLIDE/DRILL & SURVEY F/5511-5626'. TD CURVE SECTION 5526.20 TVD. TIH W/LAT ASSY. SLIDE/ROTATE DRILL & SURVEY LATERAL 2A1 F/5626-5818'.
03-08-98	SLIDE/ROTATE DRILL & SURVEY LATERAL 2A1 F/5818-6900'
03-09-98	SLIDE/ROTATE DRILL & SURVEY LATERAL 2A1 F/6900-7260'. SWI TO MONITOR PRESSURE
03-10-98	MONITOR SIP. MIXING/WEIGHT UP FLUID TO KILL WELL.
03-11-98	CIRC. & WT UP CACO3 MUD IN SYSTEM HOLDING 250# BACK PRESSURE ON CHOKE. WT. UP TO 13.5 PPG. & CK FOR FLOW.
03-12-98	POOH W/MUD MOTOR, MWD UNABLE TO TURN. PU NEW BIT & MUD MOTOR &MWD. ON 2 7/8" OH6 TBG, STOP @ WINDOW, CK. MWD, NOT WORKING POOH W/2 7/8" AOHDP.
03-13-98	FIN POOH W/MUD MOTOR, WORK ON MWD, WO/NEW MWD. RIH W/ PH6 TBG & AOHDP, WASH OUT CACO3 FILL F/5311-5732'.
03-14-98	UNABLE TO GET MWD WORKING.
03-15-98	POOH LD MWD. RIH W/MUD MOTOR, UBHO SUB, RU GYRO DATA, RUN GYRO & WET CONNECT. RIH W/DP TO 7146', WASH TO BTM. SLIDE & ROTATE DRILL F/7260-7333'.
03-16-98	SLIDE/ROTATE DRILL & SURVEY LATERAL 2A1 F/7333-7555'.
03-17-98	SLIDE/ROTATE DRILL & SURVEY LATERAL 2A1 F/7555-7731'.
03-18-98	SLIDE/ROTATE DRILL & SURVEY LATERAL 2A1 F/7731-7814' TMD (5559' TVD).
03-19-98	FIN POOH TO WET CONNECT, PULLED STERRING TOOL, POOH & LD MUD MOTOR, RIH W/RBP, SET @ 5195'. DISPLACED MUD, POOH & LD DP, PH6 TBG, DCS, NU BOP & CAPPED WELLHEAD.
03-20-98	CLEANED & JETTED PITS, SENT 400 BBLS 13.3# CACO3 MUD TO MI MUD PLANT, RDMO NAVAJO WEST #25. DRILLING FINISHED. WAIT ON COMPLETION.

COMPLETION:

04-06-98	MIRU NAVAJO WEST RIG #36, NIPPLE DOWN WELLHEAD CAP. NIPPLE UP BOPE. PICK-UP ON/OFF TOOL FOR PKR. PICK-UP RIH W/PH6 TBG. TO 5198.55'. SPACE OUT ON PKR. RIH W/RETV TOOLS FOR 'F' NIPPLE PLUG TO 5199'. RECV. SIFN.
04-08-98	MIRU COILED TBG. UT. SHUT INPRESSURE @ 12:00 WAS 950 PSI. RIH W/COILED TBG TO 7813'. DOWELL ACIDIZED LATERAL 2A1 F/5675-7813' W/29,988 GALS OF 15% HCL ACID. POOH. RD DOWELL. SIFN.

ATTACHMENT - FORM 3160-5
RATHERFORD UNIT - WELL #16-77
14-20-603-355
NAVAJO TRIBAL
SAN JUAN, UTAH
PAGE 4

04-09-98	SIP @ 6:30 WAS 1050 PSI. FLOW TO TEST TANK. POOH W/TBG. RIH W/TBG & PERF SUB. DISPLACE HOE W/13.5 KILL MUD. RIH W/RETV TOOL TO 5260'. SIFN
04-10-98	SIP @ 7:30 WAS 0 PSI. RIH W/PH-6 TBG TO 5310'. LATCH ONTO WHIPSTOCK. RELEASE. POOH LD WHIPSTOCK. PICK-UP RETV WHIPSTOCK & ORIENT TO 320 DEG. AZ. FOR WINDOW FACE. 101 DEG AZ FOR PKR. RIH TO 5424'. SET RETV WHIPSTOCK. POOH LD RUNNING TOOLS. PICK-UP RIH W/PH-6 TAILPIPE, GUIBERSON VI PKR AND 2 7/8" PH-6 TBG TO END OF TAILPIPE @ 5644'. SET PKR @ 5199'. RU TO ACIDIZE LATERAL 1A1. SIFN.
04-11-98	SIP @ 3:30 WAS 0 PSI. RU DOWELL COILED TBG UT. RIH W/COILED TBG TO 8829'. ACIDIZE LATERAL 1A1 F/8567-8829' AND 5650-8427' W/43,554 GALS OF 15% HCL ACID. POOH RDMO DOWELL. SIFN.
04-13-98	SITP @ 6:30 WAS 1100 PSI. OPEN TO TEST TANK. RU & KILL WELL W/25 BBLS OF 13.5 PPG KILL FLUID. REL PKR, POOH. RIH & RETV WHIPSTOCK. LD WHIPSTOCK. RIH W/OPEH END TBG. SIFN.
04-14-98	SIP @ 7:30 WAS 0 PSI. POOH & LD PH-6 TBG. TALLY & PICK-UP GUIBERSON PKR. W/PROFILE NIPPLES. PICK-UP 2 7/8" TBG. RIH TO 5206.34'. HANGER IN WELLHEAD. SIFN.
04-15-98	SITP @ 7:30 WAS 0 PSI. SICP @ 7:30 WAS 300 PSI. SET PKR @ 5206.34. REL F/ ON/OFF TOOL. NIPPLE DN BOPE. MAKE UP PROD. TREE. DISPLACE HOLE W/PKR FLUID. NIPPLE UP PROD. TREE. RIH & RECF. 'F' PLUG. POOH. FLOW WELL 1 1/2HRS. RDMO. SIFN.
05-01-98	MIRU NAVAJO WEST #26. RIG UP PUMP & AUX EQUIPT. SIFN.
05-02-98	SITP 50#. KILL TBG. REL. PKR. NU BOP. POH W/PKR. RIH W/BPMA TO 5000' SI & SDFN.
05-03-98	FIN RUNNING TBG. ND BOP & NU WELLHEAD. PICK-UP & RIH W/DOWN HOLE PUMP. RIH W/RODS, SPACE OUT & LAND W/POLISH RODS.. RIG UP PUMP HEAD TO 500 PSI. RIG UP PUMP WELL HEAD. SIFN.
05-04-98	RDMO NAVAJO WEST RIG #26. TURN WELL OVER TO PRODUCTION.

LATERAL #1A1 5605-8829' TMD; 5535-5537' TVD.
LATERAL #2A1 5626-7813' TMD; 5526-5559' TVD

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San Juan County
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RU 16-77 - MWD Survey Leg 1

SURVEY REPORT

7 April, 1998

sperry-sun
DRILLING SERVICES
A DIVISION OF DRESSER INDUSTRIES, INC.

Survey Ref: svy2483

Sperry-Sun Drilling Services

Survey Report for RU 16-77

Mobil
San Juan County

Utah
Ratherford Unit

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Toolface Azimuth
Gyro								
0.00	0.000	0.000	0.00	0.00 N	0.00 E	0.00		
200.00	0.060	76.160	200.00	0.03 N	0.10 E	-0.05	0.030	76.160
400.00	0.370	23.410	400.00	0.64 N	0.46 E	0.20	0.169	299.105
600.00	0.440	17.470	599.99	1.97 N	0.95 E	0.90	0.041	326.051
800.00	0.980	0.150	799.98	4.41 N	1.18 E	2.62	0.288	329.514
1000.00	1.490	344.920	999.93	8.63 N	0.51 E	6.28	0.301	319.465
1200.00	1.990	342.420	1199.84	14.45 N	1.22 W	11.85	0.253	350.116
1400.00	2.110	345.390	1399.71	21.33 N	3.19 W	18.39	0.080	43.010
1600.00	1.890	343.810	1599.59	28.06 N	5.04 W	24.73	0.113	193.282
1800.00	1.620	336.770	1799.49	33.82 N	7.08 W	30.46	0.173	215.126
2000.00	1.240	331.900	1999.43	38.33 N	9.21 W	35.28	0.199	195.311
2200.00	0.460	345.340	2199.41	41.01 N	10.43 W	38.12	0.400	172.317
2400.00	0.250	81.550	2399.41	41.85 N	10.20 W	38.62	0.273	152.965
2600.00	0.500	122.570	2599.40	41.45 N	9.04 W	37.56	0.176	68.806
2800.00	0.500	97.910	2799.39	40.86 N	7.44 W	36.08	0.107	257.670
3000.00	0.210	42.220	2999.39	41.01 N	6.33 W	35.48	0.210	204.443
3200.00	0.480	14.800	3199.39	42.09 N	5.87 W	36.02	0.155	314.349
3400.00	0.650	31.850	3399.38	43.87 N	5.05 W	36.85	0.119	53.420
3600.00	0.960	41.780	3599.36	46.08 N	3.34 W	37.44	0.169	29.248
3800.00	1.180	42.830	3799.32	48.84 N	0.82 W	37.94	0.110	5.618
4000.00	0.910	38.250	3999.29	51.60 N	1.56 E	38.52	0.141	194.909
4200.00	0.660	38.820	4199.27	53.74 N	3.27 E	39.07	0.125	178.496
4400.00	0.780	44.990	4399.25	55.60 N	4.95 E	39.41	0.071	35.977
4600.00	0.540	57.790	4599.24	57.07 N	6.71 E	39.40	0.140	154.729
4800.00	0.410	51.100	4799.23	58.02 N	8.06 E	39.26	0.071	199.783
5000.00	0.220	38.250	4999.23	58.77 N	8.86 E	39.32	0.101	194.050
5200.00	0.260	22.850	5199.23	59.49 N	9.27 E	39.61	0.038	293.948
5400.00	0.360	11.890	5399.23	60.52 N	9.58 E	40.20	0.058	323.776
MWD Survey Leg 1								
5416.00	0.280	4.150	5415.23	60.61 N	9.59 E	40.26	0.567	204.551
5425.00	4.400	320.000	5424.22	60.90 N	9.37 E	40.62	46.707	313.196
5435.00	8.500	320.760	5434.15	61.76 N	8.66 E	41.75	41.008	1.571
5445.00	13.300	321.520	5443.97	63.24 N	7.47 E	43.64	48.020	2.089
5455.00	18.200	322.280	5453.59	65.37 N	5.80 E	46.35	49.042	2.778
5465.00	22.800	323.800	5462.95	68.17 N	3.70 E	49.85	46.303	7.316
5475.00	27.500	321.200	5472.00	71.54 N	1.11 E	54.09	48.271	345.586
5485.00	32.000	320.700	5480.68	75.39 N	2.02 W	59.05	45.068	356.626
5495.00	37.000	320.200	5488.92	79.75 N	5.63 W	64.71	50.080	356.551
5505.00	42.300	319.600	5496.62	84.63 N	9.74 W	71.09	53.138	355.636

Continued...

Sperry-Sun Drilling Services

Survey Report for RU 16-77

Mobil
San Juan County

Utah
Ratherford Unit

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Toolface Azimuth
5515.00	47.500	319.400	5503.70	90.00 N	14.32 W	78.15	52.019	358.373
5525.00	52.200	319.900	5510.15	95.82 N	19.27 W	85.79	47.155	4.811
5535.00	56.500	320.800	5515.97	102.08 N	24.45 W	93.91	43.617	9.917
5545.00	61.100	321.500	5521.15	108.74 N	29.81 W	102.46	46.388	7.600
5555.00	66.400	322.100	5525.57	115.79 N	35.35 W	111.42	53.272	5.932
5565.00	71.900	323.100	5529.13	123.21 N	41.03 W	120.75	55.787	9.825
5575.00	77.100	323.800	5531.80	130.95 N	46.76 W	130.37	52.435	7.487
5605.00	89.200	322.800	5535.37	154.78 N	64.53 W	160.05	40.468	355.240
5631.00	89.500	320.700	5535.67	175.20 N	80.63 W	186.03	8.158	278.118
5662.00	92.800	324.600	5535.05	199.83 N	99.43 W	216.99	16.477	49.734
5694.00	94.900	325.300	5532.90	225.96 N	117.76 W	248.79	6.916	18.374
5726.00	93.000	325.600	5530.69	252.25 N	135.86 W	280.57	6.011	171.038
5757.00	92.800	324.700	5529.13	277.66 N	153.56 W	311.41	2.970	257.479
5789.00	93.700	323.900	5527.31	303.61 N	172.20 W	343.26	3.760	318.434
5820.00	91.500	322.800	5525.91	328.45 N	190.68 W	374.18	7.933	206.569
5852.00	88.500	321.900	5525.91	353.78 N	210.23 W	406.14	9.788	196.701
5883.00	89.000	321.900	5526.58	378.17 N	229.35 W	437.12	1.613	0.000
5915.00	89.200	321.200	5527.08	403.23 N	249.25 W	469.10	2.275	285.942
5946.00	89.400	320.000	5527.46	427.18 N	268.92 W	500.10	3.924	279.455
5977.00	89.900	319.800	5527.65	450.89 N	288.89 W	531.10	1.737	338.198
6009.00	89.900	318.800	5527.71	475.15 N	309.76 W	563.10	3.125	269.999
6041.00	89.200	320.000	5527.96	499.45 N	330.58 W	595.09	4.341	120.261
6072.00	90.000	319.600	5528.18	523.13 N	350.59 W	626.09	2.885	333.434
6104.00	91.600	318.900	5527.73	547.37 N	371.47 W	658.08	5.457	336.377
6136.00	92.100	319.100	5526.70	571.50 N	392.46 W	690.06	1.683	21.788
6168.00	92.500	319.600	5525.41	595.76 N	413.29 W	722.03	2.000	51.308
6199.00	90.400	319.600	5524.63	619.36 N	433.37 W	753.02	6.774	180.000
6231.00	87.900	319.800	5525.10	643.76 N	454.06 W	785.02	7.837	175.428
6262.00	85.300	318.200	5526.94	667.11 N	474.36 W	815.95	9.843	211.519
6293.00	86.400	316.300	5529.18	689.82 N	495.35 W	846.83	7.068	300.062
6325.00	88.400	315.900	5530.64	712.85 N	517.51 W	878.73	6.374	348.692
6357.00	88.300	317.900	5531.56	736.20 N	539.37 W	910.66	6.255	92.892
6389.00	85.700	316.300	5533.23	759.61 N	561.12 W	942.58	9.536	211.534
6420.00	86.700	315.600	5535.29	781.84 N	582.62 W	973.43	3.935	325.043
6452.00	88.600	317.000	5536.60	804.96 N	604.71 W	1005.33	7.373	36.393
6484.00	89.200	319.500	5537.21	828.82 N	626.01 W	1037.31	8.033	76.528
6518.00	91.100	320.200	5537.12	854.81 N	647.94 W	1071.31	5.955	20.225
6548.00	89.900	320.000	5536.86	877.82 N	667.18 W	1101.31	4.055	189.463
6579.00	90.200	319.600	5536.84	901.50 N	687.19 W	1132.31	1.613	306.870
6609.00	89.500	319.100	5536.91	924.26 N	706.73 W	1162.30	2.867	215.537
6641.00	88.000	317.900	5537.61	948.22 N	727.93 W	1194.28	6.002	218.642
6673.00	89.000	318.900	5538.45	972.14 N	749.17 W	1226.26	4.419	45.004
6705.00	90.400	319.800	5538.62	996.42 N	770.01 W	1258.26	5.201	32.738
6737.00	92.500	323.000	5537.81	1021.42 N	789.97 W	1290.23	11.958	56.684
6768.00	94.100	324.200	5536.02	1046.32 N	808.33 W	1321.12	6.448	36.792

Continued...

Sperry-Sun Drilling Services

Survey Report for RU 16-77

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Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Toolface Azimuth
6800.00	92.500	323.900	5534.18	1072.19 N	827.09 W	1352.98	5.087	190.611
6832.00	88.300	322.500	5533.96	1097.80 N	846.25 W	1384.92	13.835	198.444
6864.00	90.000	323.500	5534.43	1123.35 N	865.50 W	1416.87	6.163	30.472
6896.00	91.400	324.600	5534.04	1149.26 N	884.29 W	1448.79	5.564	38.150
6927.00	91.100	324.400	5533.36	1174.49 N	902.29 W	1479.69	1.163	213.686
6959.00	91.800	324.700	5532.56	1200.55 N	920.84 W	1511.58	2.380	23.188
6991.00	88.400	323.200	5532.50	1226.41 N	939.67 W	1543.49	11.613	203.812
7022.00	89.200	323.200	5533.15	1251.23 N	958.23 W	1574.44	2.581	0.000
7054.00	89.500	323.200	5533.51	1276.85 N	977.40 W	1606.39	0.938	0.000
7086.00	89.400	321.700	5533.82	1302.22 N	996.90 W	1638.36	4.698	266.179
7118.00	90.200	322.500	5533.93	1327.47 N	1016.56 W	1670.33	3.536	45.002
7149.00	90.900	322.800	5533.63	1352.11 N	1035.36 W	1701.30	2.457	23.196
7181.00	89.900	321.700	5533.41	1377.41 N	1054.95 W	1733.27	4.646	227.731
7212.00	91.500	321.900	5533.03	1401.77 N	1074.12 W	1764.25	5.201	7.124
7244.00	90.600	320.200	5532.44	1426.65 N	1094.24 W	1796.24	6.010	242.116
7275.00	91.300	320.300	5531.93	1450.49 N	1114.06 W	1827.24	2.281	8.128
7307.00	88.300	319.300	5532.04	1474.92 N	1134.71 W	1859.23	9.882	198.435
7339.00	88.900	319.600	5532.82	1499.23 N	1155.50 W	1891.22	2.096	26.562
7371.00	89.700	319.100	5533.21	1523.51 N	1176.35 W	1923.22	2.948	327.993
7402.00	89.400	318.800	5533.46	1546.88 N	1196.71 W	1954.21	1.369	224.998
7433.00	89.800	318.400	5533.67	1570.14 N	1217.21 W	1985.20	1.825	314.999
7465.00	89.700	318.100	5533.81	1594.01 N	1238.51 W	2017.18	0.988	251.564
7497.00	89.600	317.700	5534.01	1617.75 N	1259.97 W	2049.16	1.288	255.962
7529.00	89.200	316.300	5534.34	1641.16 N	1281.79 W	2081.12	4.550	254.047
7561.00	89.700	315.800	5534.65	1664.19 N	1304.00 W	2113.04	2.210	314.999
7592.00	90.100	315.100	5534.71	1686.28 N	1325.74 W	2143.94	2.601	299.744
7624.00	90.400	314.400	5534.57	1708.81 N	1348.47 W	2175.81	2.380	293.200
7656.00	90.700	314.000	5534.26	1731.12 N	1371.41 W	2207.64	1.562	306.873
7688.00	90.300	316.700	5533.98	1753.88 N	1393.90 W	2239.53	8.529	98.414
7719.00	90.600	317.400	5533.74	1776.57 N	1415.02 W	2270.49	2.457	66.798
7750.00	90.800	317.000	5533.36	1799.32 N	1436.08 W	2301.45	1.443	296.569
7782.00	91.100	315.600	5532.83	1822.45 N	1458.18 W	2333.38	4.474	282.107
7814.00	91.600	315.400	5532.07	1845.26 N	1480.61 W	2365.27	1.683	338.206
7845.00	91.100	316.500	5531.34	1867.54 N	1502.15 W	2396.18	3.897	114.436
7877.00	91.800	316.500	5530.53	1890.74 N	1524.17 W	2428.11	2.187	0.000
7908.00	90.400	318.400	5529.94	1913.57 N	1545.13 W	2459.07	7.612	126.368
7939.00	90.700	319.300	5529.64	1936.92 N	1565.53 W	2490.07	3.060	71.560
7971.00	89.200	319.500	5529.67	1961.21 N	1586.35 W	2522.06	4.729	172.405
8002.00	88.800	320.300	5530.21	1984.92 N	1606.32 W	2553.06	2.885	116.575
8034.00	87.900	320.200	5531.13	2009.51 N	1626.77 W	2585.04	2.830	186.336
8066.00	86.900	320.300	5532.58	2034.09 N	1647.21 W	2617.01	3.141	174.297
8097.00	86.400	319.800	5534.39	2057.81 N	1667.08 W	2647.96	2.279	224.937
8129.00	86.700	318.900	5536.32	2082.05 N	1687.89 W	2679.90	2.960	286.439
8161.00	87.800	318.600	5537.85	2106.08 N	1708.97 W	2711.85	3.563	344.754
8193.00	88.400	318.600	5538.92	2130.07 N	1730.12 W	2743.83	1.875	0.000

Continued...

Sperry-Sun Drilling Services

Survey Report for RU 16-77

Mobil
San Juan County

Utah
Ratherford Unit

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Toolface Azimuth
8225.00	91.400	318.900	5538.97	2154.13 N	1751.21 W	2775.81	9.422	5.712
8256.00	92.300	318.800	5537.97	2177.46 N	1771.60 W	2806.79	2.921	353.665
8287.00	91.800	318.400	5536.86	2200.69 N	1792.09 W	2837.76	2.065	218.649
8320.00	92.100	318.100	5535.74	2225.30 N	1814.05 W	2870.73	1.285	315.022
8352.00	92.700	318.200	5534.40	2249.12 N	1835.38 W	2902.68	1.901	9.452
8383.00	93.100	318.200	5532.83	2272.20 N	1856.02 W	2933.63	1.290	0.000
8415.00	91.600	318.800	5531.52	2296.14 N	1877.20 W	2965.59	5.048	158.202
8447.00	89.500	318.800	5531.21	2320.22 N	1898.28 W	2997.58	6.562	180.000
8478.00	87.400	319.300	5532.05	2343.62 N	1918.59 W	3028.56	6.963	166.618
8510.00	87.700	318.900	5533.42	2367.79 N	1939.52 W	3060.53	1.562	306.886
8542.00	88.500	317.900	5534.48	2391.70 N	1960.75 W	3092.50	4.001	308.658
8573.00	88.600	318.100	5535.26	2414.73 N	1981.49 W	3123.47	0.721	63.430
8605.00	88.500	317.900	5536.07	2438.50 N	2002.89 W	3155.44	0.699	243.425
8637.00	89.200	317.500	5536.72	2462.17 N	2024.43 W	3187.41	2.519	330.256
8669.00	89.700	316.800	5537.02	2485.63 N	2046.19 W	3219.36	2.688	305.535
8701.00	89.300	316.500	5537.30	2508.89 N	2068.15 W	3251.31	1.562	216.868
8732.00	89.500	316.100	5537.63	2531.31 N	2089.57 W	3282.24	1.443	296.564
8764.00	91.100	315.900	5537.46	2554.32 N	2111.80 W	3314.16	5.039	352.875
8795.00	90.300	315.200	5537.08	2576.45 N	2133.50 W	3345.07	3.429	221.189
8829.00	90.300	315.200	5536.90	2600.58 N	2157.46 W	3378.95		

All data is in feet unless otherwise stated. Directions and coordinates are relative to True North.
Vertical depths are relative to Well. Northings and Eastings are relative to Well.

The Dogleg Severity is in Degrees per 100ft.
Vertical Section is from Well and calculated along an Azimuth of 320.000° (True).

Based upon Minimum Curvature type calculations, at a Measured Depth of 8829.00ft.,
The Bottom Hole Displacement is 3379.00ft., in the Direction of 320.321° (True).

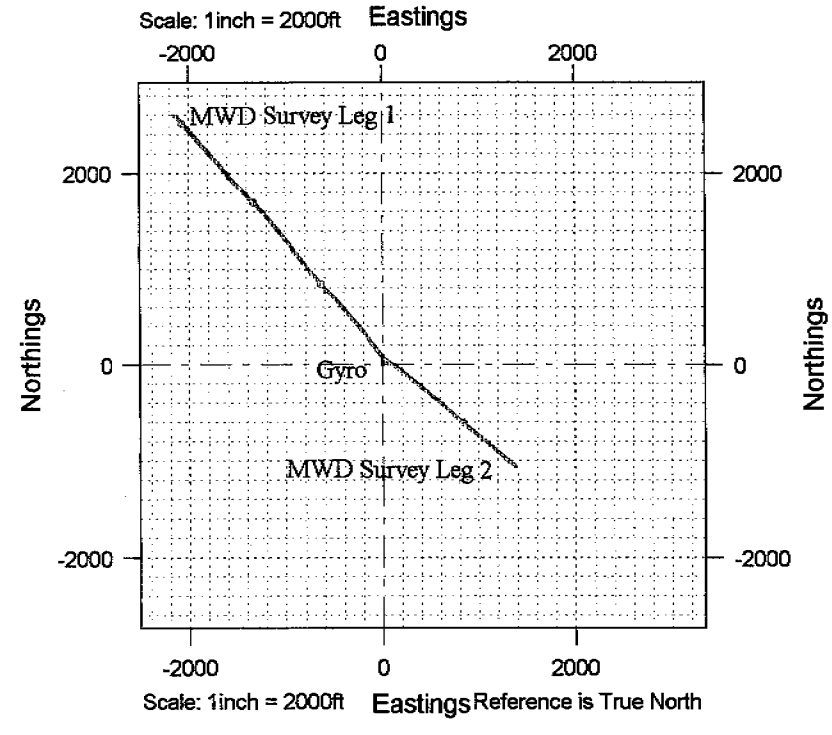
Sperry-Sun DRILLING SERVICES

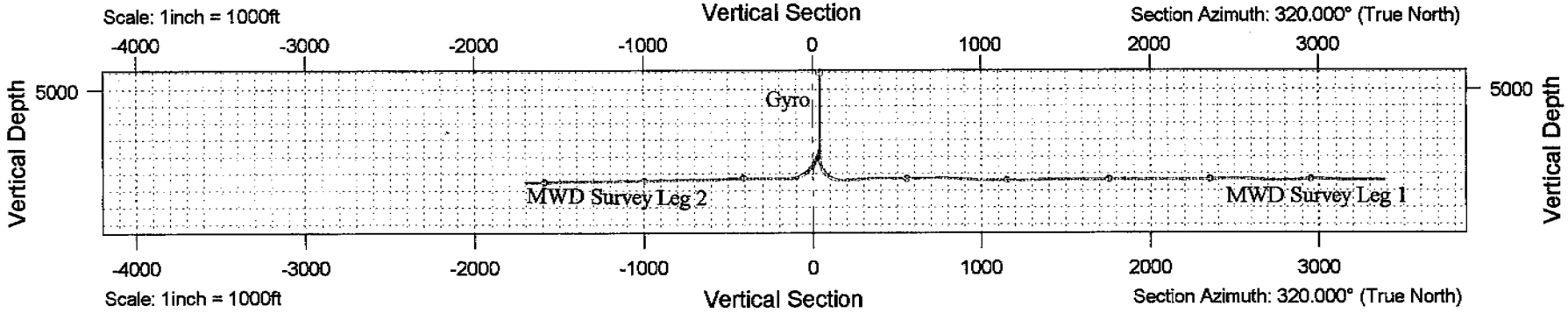
Mobil

DrillQuest

San Juan County
Utah
Ratherford Unit
RU 16-77 Legs #1 & #2

Mobil





Prepared:	Checked:	Approved:

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Mobil

San Juan County
Utah
Ratherford Unit
RU 16-77 - MWD Survey Leg 2

SURVEY REPORT

15 April, 1998

spenny-sun
DRILLING SERVICES

Survey Ref: svy2485

Sperry-Sun Drilling Services

Survey Report for RU 16-77

Mobil
San Juan County

Utah
Ratherford Unit

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Toolface Azimuth
Gyro								
0.00	0.000	0.000	0.00	0.00 N	0.00 E	0.00		
200.00	0.060	76.160	200.00	0.03 N	0.10 E	0.06	0.030	76.160
400.00	0.370	23.410	400.00	0.64 N	0.46 E	-0.06	0.169	299.105
600.00	0.440	17.470	599.99	1.97 N	0.95 E	-0.54	0.041	326.051
800.00	0.980	0.150	799.98	4.41 N	1.18 E	-1.93	0.288	329.514
1000.00	1.490	344.920	999.93	8.63 N	0.51 E	-5.16	0.301	319.465
1200.00	1.990	342.420	1199.84	14.45 N	1.22 W	-10.22	0.253	350.116
1400.00	2.110	345.390	1399.71	21.33 N	3.19 W	-16.15	0.080	43.010
1600.00	1.890	343.810	1599.59	28.06 N	5.04 W	-21.90	0.113	193.282
1800.00	1.620	336.770	1799.49	33.82 N	7.08 W	-27.16	0.173	215.126
2000.00	1.240	331.900	1999.43	38.33 N	9.21 W	-31.69	0.199	195.311
2200.00	0.460	345.340	2199.41	41.01 N	10.43 W	-34.35	0.400	172.317
2400.00	0.250	81.550	2399.41	41.85 N	10.20 W	-34.72	0.273	152.965
2600.00	0.500	122.570	2599.40	41.45 N	9.04 W	-33.57	0.176	68.806
2800.00	0.500	97.910	2799.39	40.86 N	7.44 W	-31.96	0.107	257.670
3000.00	0.210	42.220	2999.39	41.01 N	6.33 W	-31.21	0.210	204.443
3200.00	0.480	14.800	3199.39	42.09 N	5.87 W	-31.55	0.155	314.349
3400.00	0.650	31.850	3399.38	43.87 N	5.05 W	-32.07	0.119	53.420
3600.00	0.960	41.780	3599.36	46.08 N	3.34 W	-32.18	0.169	29.248
3800.00	1.180	42.830	3799.32	48.84 N	0.82 W	-32.02	0.110	5.618
4000.00	0.910	38.250	3999.29	51.60 N	1.56 E	-31.97	0.141	194.909
4200.00	0.660	38.820	4199.27	53.74 N	3.27 E	-32.04	0.125	178.496
4400.00	0.780	44.990	4399.25	55.60 N	4.95 E	-31.95	0.071	35.977
4600.00	0.540	57.790	4599.24	57.07 N	6.71 E	-31.54	0.140	154.729
4800.00	0.410	51.100	4799.23	58.02 N	8.06 E	-31.11	0.071	199.783
5000.00	0.220	38.250	4999.23	58.77 N	8.86 E	-30.99	0.101	194.050
5200.00	0.260	22.850	5199.23	59.49 N	9.27 E	-31.13	0.038	293.948
MWD Survey Leg 2								
5306.00	0.310	16.160	5305.23	59.98 N	9.45 E	-31.32	0.057	322.979
5320.00	2.400	130.000	5319.22	59.83 N	9.68 E	-31.04	18.151	120.243
5330.00	4.600	128.500	5329.20	59.45 N	10.16 E	-30.43	22.017	356.867
5340.00	7.200	127.000	5339.15	58.82 N	10.97 E	-29.41	26.043	355.859
5350.00	9.500	125.500	5349.04	57.97 N	12.14 E	-27.96	23.101	353.847
5360.00	11.500	124.000	5358.88	56.93 N	13.64 E	-26.14	20.184	351.479
5370.00	13.900	122.500	5368.63	55.73 N	15.48 E	-23.96	24.224	351.444
5380.00	16.300	121.000	5378.29	54.36 N	17.70 E	-21.38	24.314	350.027
5390.00	18.400	119.500	5387.83	52.86 N	20.27 E	-18.45	21.469	347.258
5400.00	20.900	118.000	5397.25	51.24 N	23.22 E	-15.15	25.502	347.885

Continued...

Sperry-Sun Drilling Services

Survey Report for RU 16-77

Mobil
San Juan County

Utah
Ratherford Unit

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Toolface Azimuth
5410.00	23.400	122.400	5406.51	49.34 N	26.48 E	-11.43	29.988	35.621
5420.00	26.000	125.400	5415.59	47.01 N	29.94 E	-7.28	28.857	27.111
5430.00	28.900	126.000	5424.47	44.32 N	33.68 E	-2.68	29.131	5.715
5440.00	31.400	126.600	5433.11	41.34 N	37.73 E	2.33	25.181	7.134
5450.00	33.900	127.100	5441.53	38.11 N	42.04 E	7.71	25.145	6.370
5460.00	36.400	127.100	5449.71	34.63 N	46.64 E	13.46	25.000	0.000
5470.00	39.100	126.700	5457.61	30.96 N	51.53 E	19.58	27.111	354.659
5480.00	41.800	126.300	5465.22	27.10 N	56.75 E	26.05	27.124	354.357
5490.00	45.100	124.700	5472.48	23.11 N	62.35 E	32.91	34.784	340.975
5500.00	47.800	125.000	5479.37	18.97 N	68.29 E	40.12	27.087	4.708
5510.00	50.600	124.400	5485.90	14.66 N	74.52 E	47.66	28.366	350.589
5520.00	53.900	124.200	5492.03	10.20 N	81.05 E	55.53	33.038	357.195
5530.00	57.300	123.600	5497.67	5.60 N	87.90 E	63.73	34.358	351.545
5540.00	60.300	123.200	5502.85	0.90 N	95.04 E	72.23	30.194	353.389
5550.00	62.700	123.200	5507.63	3.92 S	102.39 E	80.95	24.000	0.000
5560.00	65.200	122.800	5512.02	8.81 S	109.92 E	89.87	25.257	351.731
5570.00	68.700	122.900	5515.93	13.80 S	117.65 E	99.00	35.012	1.526
5580.00	71.900	122.600	5519.30	18.89 S	125.57 E	108.33	32.124	354.905
5590.00	76.000	122.700	5522.07	24.07 S	133.66 E	117.86	41.011	1.357
5600.00	80.300	122.900	5524.12	29.37 S	141.88 E	127.57	43.045	2.627
5626.00	90.500	127.200	5526.20	44.24 S	163.06 E	153.35	42.545	23.003
5660.00	88.400	130.000	5526.53	65.45 S	189.63 E	187.33	10.293	126.878
5692.00	90.200	130.300	5526.92	86.08 S	214.09 E	219.33	5.703	9.464
5722.00	89.100	130.000	5527.10	105.42 S	237.02 E	249.33	3.801	195.254
5754.00	89.800	130.100	5527.41	126.01 S	261.51 E	281.33	2.210	8.130
5786.00	90.600	130.100	5527.30	146.62 S	285.99 E	313.33	2.500	0.000
5818.00	90.900	130.300	5526.88	167.28 S	310.43 E	345.32	1.127	33.687
5849.00	90.200	130.300	5526.58	187.33 S	334.07 E	376.32	2.258	180.000
5881.00	90.300	130.100	5526.44	207.98 S	358.51 E	408.32	0.699	296.566
5913.00	89.500	129.800	5526.50	228.53 S	383.04 E	440.32	2.670	200.556
5945.00	88.100	128.900	5527.17	248.81 S	407.78 E	472.31	5.201	212.721
5977.00	87.800	128.700	5528.31	268.85 S	432.70 E	504.28	1.127	213.670
6009.00	86.700	128.400	5529.85	288.77 S	457.70 E	536.24	3.563	195.231
6040.00	87.000	128.200	5531.55	307.95 S	481.99 E	567.18	1.163	326.344
6071.00	88.200	128.600	5532.85	327.19 S	506.26 E	598.14	4.080	18.429
6103.00	89.600	128.000	5533.46	347.02 S	531.37 E	630.11	4.760	336.799
6135.00	88.300	129.300	5534.05	367.00 S	556.36 E	662.10	5.745	135.015
6167.00	87.800	130.300	5535.14	387.47 S	580.93 E	694.08	3.492	116.595
6198.00	91.400	131.400	5535.36	407.75 S	604.37 E	725.07	12.143	16.997
6229.00	91.100	132.100	5534.68	428.38 S	627.49 E	756.05	2.456	113.196
6260.00	89.800	131.000	5534.44	448.94 S	650.69 E	787.03	5.493	220.241
6291.00	88.500	130.100	5534.90	469.09 S	674.24 E	818.03	5.100	214.687
6323.00	88.200	129.400	5535.82	489.55 S	698.84 E	850.01	2.379	246.783
6355.00	88.800	129.600	5536.66	509.90 S	723.52 E	882.00	1.976	18.432
6387.00	88.100	130.500	5537.52	530.48 S	748.01 E	913.99	3.562	127.897

Continued...

Sperry-Sun Drilling Services

Survey Report for RU 16-77

Mobil
San Juan County

Utah
Ratherford Unit

Measured Depth (ft)	Incl.	Azim.	Vertical Depth (ft)	Northings (ft)	Eastings (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Toolface Azimuth
6418.00	88.800	130.900	5538.36	550.69 S	771.50 E	944.98	2.600	29.742
6450.00	87.500	130.100	5539.39	571.46 S	795.82 E	976.96	4.769	211.582
6482.00	89.900	130.100	5540.12	592.06 S	820.29 E	1008.95	7.500	0.000
6514.00	88.900	131.000	5540.45	612.86 S	844.60 E	1040.94	4.204	138.018
6545.00	89.700	130.700	5540.83	633.14 S	868.05 E	1071.94	2.756	339.443
6576.00	90.100	130.300	5540.89	653.27 S	891.62 E	1102.94	1.825	315.000
6608.00	90.300	130.300	5540.78	673.97 S	916.03 E	1134.94	0.625	0.000
6641.00	88.500	129.400	5541.12	695.11 S	941.36 E	1167.93	6.098	206.560
6673.00	88.700	128.700	5541.90	715.27 S	966.20 E	1199.92	2.274	285.941
6704.00	88.900	128.900	5542.55	734.69 S	990.36 E	1230.90	0.912	44.996
6736.00	89.000	129.300	5543.14	754.86 S	1015.19 E	1262.89	1.288	75.965
6768.00	90.400	130.000	5543.31	775.28 S	1039.82 E	1294.89	4.891	26.567
6799.00	91.100	130.300	5542.90	795.27 S	1063.52 E	1325.89	2.457	23.195
6831.00	91.200	130.000	5542.26	815.90 S	1087.97 E	1357.88	0.988	288.441
6863.00	89.600	129.300	5542.03	836.32 S	1112.61 E	1389.88	5.458	203.632
6894.00	89.400	128.700	5542.30	855.82 S	1136.70 E	1420.87	2.040	251.562
6926.00	87.900	129.100	5543.06	875.91 S	1161.59 E	1452.86	4.851	165.077
6958.00	88.500	129.100	5544.06	896.08 S	1186.41 E	1484.84	1.875	0.000
6990.00	89.200	130.100	5544.71	916.48 S	1211.07 E	1516.83	3.814	55.013
7022.00	86.400	128.600	5545.93	936.75 S	1235.79 E	1548.80	9.925	208.136
7053.00	87.200	129.300	5547.66	956.21 S	1259.86 E	1579.75	3.427	41.162
7085.00	87.800	130.900	5549.06	976.80 S	1284.31 E	1611.72	5.336	69.462
7116.00	88.400	132.100	5550.09	997.33 S	1307.52 E	1642.69	4.326	63.443
7148.00	88.900	132.400	5550.84	1018.84 S	1331.20 E	1674.65	1.822	30.960
7179.00	90.700	133.700	5550.95	1040.00 S	1353.85 E	1705.61	7.162	35.842
7211.00	91.500	133.700	5550.34	1062.10 S	1376.98 E	1737.53	2.500	0.000
7234.00	91.700	132.300	5549.69	1077.78 S	1393.79 E	1760.49	6.146	278.152
7266.00	90.000	131.100	5549.22	1099.07 S	1417.68 E	1792.47	6.502	215.226
7297.00	86.800	131.400	5550.08	1119.49 S	1440.98 E	1823.45	10.368	174.650
7329.00	87.300	130.900	5551.73	1140.52 S	1465.04 E	1855.40	2.208	315.025
7361.00	88.600	131.100	5552.88	1161.50 S	1489.18 E	1887.38	4.110	8.744
7393.00	88.700	131.000	5553.63	1182.51 S	1513.30 E	1919.36	0.442	315.007
7425.00	89.100	131.900	5554.24	1203.69 S	1537.28 E	1951.34	3.077	66.043
7488.00	89.000	131.200	5555.29	1245.47 S	1584.42 E	2014.31	1.122	261.863
7520.00	87.700	129.000	5556.21	1266.07 S	1608.89 E	2046.30	7.983	239.382
7552.00	86.500	128.100	5557.83	1285.99 S	1633.88 E	2078.24	4.685	216.813
7583.00	88.300	130.100	5559.24	1305.52 S	1657.91 E	2109.21	8.675	48.033
7615.00	89.100	132.000	5559.96	1326.53 S	1682.04 E	2141.19	6.441	67.185
7647.00	88.500	133.400	5560.63	1348.22 S	1705.55 E	2173.15	4.759	113.217
7678.00	88.800	129.700	5561.36	1368.78 S	1728.74 E	2204.12	11.971	274.592
7710.00	90.300	131.400	5561.61	1389.58 S	1753.05 E	2236.12	7.085	48.585
7742.00	90.800	131.300	5561.31	1410.72 S	1777.07 E	2268.11	1.593	348.691
7774.00	92.100	130.900	5560.50	1431.75 S	1801.18 E	2300.09	4.250	342.907
7813.00	92.100	130.900	5559.07	1457.26 S	1830.63 E	2339.06		

Continued...

Mobil
San Juan County

Utah
Ratherford Unit

All data is in feet unless otherwise stated. Directions and coordinates are relative to True North.
Vertical depths are relative to Well. Northings and Eastings are relative to Well.

The Dogleg Severity is in Degrees per 100ft.
Vertical Section is from Well and calculated along an Azimuth of 130.000° (True).

Based upon Minimum Curvature type calculations, at a Measured Depth of 7813.00ft.,
The Bottom Hole Displacement is 2339.84ft., in the Direction of 128.521° (True).

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. N7370

ACTION CODE	CURRENT ENTITY NO.	NEW ENTITY NO.	API NUMBER	WELL NAME	WELL LOCATION QQ	SC	TP	RG	COUNTY	SPUD DATE	EFFECTIVE DATE
A/B	06280 →		43-037-31768	RATHERFORD 16-77		16	T41S	424E	SAN JUAN	2-03-98	2-03-98

WELL 1 COMMENTS: Entity previously added 4-16-98. 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
JUN 08 1998
DIV. OF OIL, GAS & MINING

Sue Moseley for
Signature SHIRLEY HOUCHINS

ENV & REG TECHNICIAN — 5-20-98
Title — Date

Phone No. (915) 688-2585

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.: 14-20-603-355
6. If Indian, Allottee or Tribe Name: NAVAJO TRIBAL
7. If Unit or CA, Agreement Designation: RATHERFORD UNIT
8. Well Name and No.: RATHERFORD 16-77
9. API Well No.: 43-037-31768
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 [X] Other
2. Name of Operator: MOBIL PRODUCING TX & NM INC.*
*MOBIL EXPLORATION & PRODUCING US INC. AS AGENT FOR MPTM
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)
2587' FSL & 2410' FWL
SEC. 16, T41S, R24E

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
[X] Subsequent Report	[ ] Plugging Back	[ ] Non-Routine Fracturing
	[ ] Casing Repair	[ ] Water Shut-Off
[ ] Final Abandonment Notice	[ ] 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.)*

BHL: LATERAL #1 2601' NORTH & 2157' WEST F/SURFACE SPOT (ZONE 1a).
BHL: LATERAL #2 1457' SOUTH & 1831' EAST F/SURFACE SPOT (ZONE 1a).

02-03-98 MIRU BIG A 41; SPUD 12 1/4" SURFACE HOLE @ 0500 MST, DRILL TO 145'. CALLED JIM THOMPSON W/BLM 2-1-98/ANSWERING MACHINE. ATTEMPT CALL TO NAVAJO EPA/ANETH OFFICE/DIRECTED TO SHIPROCK OFFICE NO ANSWER.

SUPPLEMENTAL SUNDRY: PRODUCTION:

TEST / 5-14-98 / 24 HOURS / OIL-239 BBLS / GAS-106 MCF / WTR-32

RECEIVED
JUL 23 1998
DIV. OF OIL, GAS & MINING

14. I hereby certify that the foregoing is true and correct
Signed Joe Moseley for Title SHIRLEY HOUCHINS/ENV & REG TECH Date 7-20-98

(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 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.: 14-20-603-355
6. If Indian, Allottee or Tribe Name: NAVAJO TRIBAL
7. If Unit or CA, Agreement Designation: RATHERFORD UNIT
8. Well Name and No.: RATHERFORD 16-77
9. API Well No.: 43-037-31768
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 [X] Other
2. Name of Operator: MOBIL PRODUCING TX & NM INC.*
*MOBIL EXPLORATION & PRODUCING US INC. AS AGENT FOR MPTM
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)
2587' FSL & 2410' FWL
SEC. 16, T41S, R24E

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.)*

BHL: LATERAL #1 2601' NORTH & 2157' WEST F/SURFACE SPOT (ZONE 1a).
BHL: LATERAL #2 1457' SOUTH & 1831' EAST F/SURFACE SPOT (ZONE 1a).

1998 HORIZONTAL COMPLETION

ATTACHED FORM 15

14. I hereby certify that the foregoing is true and correct
Signed Sue Moseley for Title SHIRLEY HOUCHINS/ENV & REG TECH Date 1-28-99

(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

WTC 2-25-99 RJK

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
[illegible] 2001
DIVISION OF
OIL, GAS AND MINING

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
XXXXXXXXXXXXXXXX
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,

DENNIS 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 PBM
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

PB 7/12/2001

SN
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 Jossie

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 1400, Houston, Texas 77027-3[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

Mary Pierson, Philana Berros, and Jody E. Specht of Houston, Texas R.F. Bobo,

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 that he signed his name thereto subscribed by authority of said Kenneth C. Wendel in deponent's presence.

Karen A. Price

(Notarial Seal)

KAREN A. PRICE NOTARY PUBLIC NEW JERSEY

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 INCORPORATED JAN. 16, 1925 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

15-10-0225 (Ed. 4-99) CONSENT

CSC 5184334741 06/01 '01 08:46 NO.410 03/05
CSC 06/01 '01 09:06 NO.135 02/04
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. Risch, 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

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

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JUL 05 2001
DIVISION OF REAL ESTATE SERVICES

010601000195

State of New York }
Department of State } *ss:*

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
9-34	09-41S-24E	43-037-15711	6280	INDIAN	OW	S
10-12	10-41S-24E	43-037-15712	6280	INDIAN	OW	P
10-14	10-41S-24E	43-037-15713	6280	INDIAN	OW	S
10-32	10-41S-24E	43-037-15714	6280	INDIAN	OW	S
10-44	10-41S-24E	43-037-30451	6280	INDIAN	OW	S
11-14	11-41S-24E	43-037-16167	6280	INDIAN	OW	P
E14-12	14-41S-24E	43-037-15998	6280	INDIAN	OW	S
RATHERFORD 15-12	15-41S-24E	43-037-15715	6280	INDIAN	OW	P
15-32	15-41S-24E	43-037-15717	6280	INDIAN	OW	S
15-33	15-41S-24E	43-037-15718	6280	INDIAN	OW	P
15-41	15-41S-24E	43-037-15719	6280	INDIAN	OW	S
15-42	15-41S-24E	43-037-30448	6280	INDIAN	OW	P
15-22	15-41S-24E	43-037-30449	6280	INDIAN	OW	P
16-32	16-41S-24E	43-037-15723	6280	INDIAN	OW	P
16-41	16-41S-24E	43-037-15725	6280	INDIAN	OW	P
RATHERFORD UNIT 16-13	16-41S-24E	43-037-31168	6280	INDIAN	OW	P
RATHERFORD 16-77	16-41S-24E	43-037-31768	6280	INDIAN	OW	P
17-44	17-41S-24E	43-037-15732	6280	INDIAN	OW	P
RATHERFORD UNIT 17-24	17-41S-24E	43-037-31044	6280	INDIAN	OW	P
RATHERFORD UNIT 17-13	17-41S-24E	43-037-31133	6280	INDIAN	OW	P

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

DATA ENTRY:

1. Changes entered in the **Oil and Gas Database on:** 04/15/2002
2. Changes have been entered on the **Monthly Operator Change Spread Sheet on:** 04/15/2002
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 PO Box 4358 Houston, TX 77210-4358	N2700-Resolute Natural Resources Company 1675 Broadway, Suite 1950 Denver, CO 80202
Phone: 1 (281) 654-1936	Phone: 1 (303) 534-4600

CA No. **Unit:** **RATHERFORD**

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:

FORM 9

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

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 Dwt E Mallory 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)

FORM 9

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

5. LEASE DESIGNATION AND SERIAL NUMBER:

SUNDRY NOTICES AND REPORTS ON WELLS

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: Ship Rock

7. UNIT or CA AGREEMENT NAME: UTU68931A

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.

1. TYPE OF WELL: OIL WELL ☑ GAS WELL ☐ OTHER

8. WELL NAME and NUMBER: Ratherford

2. NAME OF OPERATOR: ExxonMobil Oil Corporation N1855

9. API NUMBER: attached

3. ADDRESS OF OPERATOR: P.O. Box 4358 CITY Houston STATE TX ZIP 77210-4358 PHONE NUMBER: (281) 654-1936

10. FIELD AND POOL, OR WILDCAT: Aneth

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: 6/1/2006	☐ 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.

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 producers and water source wells included in the transfer.

NAME (PLEASE PRINT) Laurie Kilbride TITLE Permitting Supervisor

SIGNATURE Laurie B. 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

RECEIVED
APR 21 2006
DIV. OF OIL, GAS & MINING

(See Instructions on Reverse Side)

(5/2000)

Ratherford Unit - Producer Well List

minus P&A's

Lease	Number	API #	Status	Lease #	Location					
					Sec	T	R	QTR/QTR	NSFoot	EWFoot
Ratherford	01-14	430373116200S1	Producing	1420603246A	1	41S	23E	SWSW	0660FSL	0660FWL
Ratherford	01-34	430371638501S1	SI	1420603246A	1	41S	23E	SWSE	1133FSL	1980FEL
Ratherford	11-41	430373154400S1	Producing	1420603246A	11	41S	23E	NENE	0860FNL	0350FEL
Ratherford	11-43	430373162201S1	Producing	1420603246A	11	41S	23E	NESE	1980FSL	0660FEL
Ratherford	12-12	430373119000S1	Producing	1420603246A	12	41S	23E	SWNW	1850FNL	0660FWL
Ratherford	12-14	430371584400S1	SI	1420603246A	12	41S	23E	SWSW	0660FSL	4622FEL
Ratherford	12-21	430373120100S1	Producing	1420603246A	12	41S	23E	NENW	0660FNL	1980FWL
Ratherford	12-23	430371584601S1	Producing	1420603246A	12	41S	23E	NESW	1958FSL	3300FEL
Ratherford	12-32	430373120300S1	Producing	1420603246A	12	41S	23E	SWNE	1820FNL	1820FEL
Ratherford	12-34	430373112600S1	Producing	1420603246A	12	41S	23E	SWSE	0675FSL	1905FEL
Ratherford	12-43	430373120200S1	SI	1420603246A	12	41S	23E	NESE	2100FSL	0660FEL
Ratherford	13-12	430373112701S1	Producing	1420603247A	13	41S	23E	SWNW	1705FNL	0640FWL
Ratherford	13-14	430373158900S1	Producing	1420603247A	13	41S	23E	SWSW	0660FSL	0660FWL
Ratherford	13-21	430373112801S1	SI	1420603247A	13	41S	23E	NENW	0660FNL	1920FWL
Ratherford	13-23	430373112900S1	Producing	1420603247A	13	41S	23E	NESW	1980FSL	1930FWL
Ratherford	13-34	430373113001S1	Producing	1420603247A	13	41S	23E	SWSE	0660FSL	1980FEL
Ratherford	13-41	430371585601S1	Producing	1420603247A	13	41S	23E	NENE	660FNL	660FEL
Ratherford	13-43	430373113100S1	Producing	1420603247A	13	41S	23E	NESE	1700FSL	0960FEL
Ratherford	14-32	430371585801S1	Producing	1420603247A	14	41S	23E	SWNE	2130FNL	1830FEL
Ratherford	14-41	430373162300S1	Producing	1420603247A	14	41S	23E	NENE	0521FNL	0810FEL
Ratherford	24-32	430373159300S1	Producing	1420603247A	24	41S	23E	SWNE	2121FNL	1846FEL
Ratherford	24-41	430373113200S1	Producing	1420603247A	24	41S	23E	NENE	0660FNL	0710FEL
Ratherford	17-11	430373116900S1	Producing	1420603353	17	41S	24E	NWNW	1075FNL	0800FWL
Ratherford	17-13	430373113301S1	Producing	1420603353	17	41S	24E	NWSW	2100FSL	0660FWL
Ratherford	17-22	430373117001S1	Producing	1420603353	17	41S	24E	SENW	1882FNL	1910FWL
Ratherford	17-24	430373104400S1	Producing	1420603353	17	41S	24E	SESW	0720FSL	1980FWL
Ratherford	17-31	430373117800S1	Producing	1420603353	17	41S	24E	NWNE	0500FNL	1980FEL
Ratherford	17-33	430373113400S1	Producing	1420603353	17	41S	24E	NWSE	1980FSL	1845FEL
Ratherford	17-42	430373117700S1	Producing	1420603353	17	41S	24E	SENE	1980FNL	0660FEL
Ratherford	17-44	430371573201S1	Producing	1420603353	17	41S	24E	SESE	0660FSL	0660FEL
Ratherford	18-11	430371573300S1	SI	1420603353	18	41S	24E	NWNW	0720FNL	0730FWL
Ratherford	18-13	430371573401S1	Producing	1420603353	18	41S	24E	NWSW	1980FSL	0500FWL
Ratherford	18-22	430373123600S1	Producing	1420603353	18	41S	24E	SENW	2200FNL	2210FWL
Ratherford	18-24	430373107900S1	Producing	1420603353	18	41S	24E	SESW	0760FSL	1980FWL
Ratherford	18-31	430373118101S1	Producing	1420603353	18	41S	24E	NWNE	0795FNL	2090FEL
Ratherford	18-33	430373113501S1	Producing	1420603353	18	41S	24E	NWSE	1870FSL	1980FEL
Ratherford	18-42	430373118200S1	Producing	1420603353	18	41S	24E	SENE	2120FNL	0745FEL
Ratherford	18-44	430373104500S1	SI	1420603353	18	41S	24E	SESE	0660FSL	0660FEL
Ratherford	19-11	430373108000S1	Producing	1420603353	19	41S	24E	NWNW	0660FNL	0660FWL
Ratherford	19-13	430373171900S1	Producing	1420603353	19	41S	24E	NWSW	1980FSL	0660FWL
Ratherford	19-22	430373104601S1	Producing	1420603353	19	41S	24E	SENW	1840FNL	1980FWL
Ratherford	19-24	430373175401S1	Producing	1420603353	19	41S	24E	SESW	0600FSL	1980FWL
Ratherford	19-31	430373104701S1	Producing	1420603353	19	41S	24E	NWNE	510FNL	1980FEL
Ratherford	19-33	430373104800S1	Producing	1420603353	19	41S	24E	NWSE	1980FSL	1980FEL
Ratherford	19-42	430373091600S1	Producing	1420603353	19	41S	24E	SENE	1880FNL	0660FEL
Ratherford	19-44	430373108100S1	Producing	1420603353	19	41S	24E	SESE	0660FSL	0660FEL
Ratherford	19-97	430373159600S1	Producing	1420603353	19	41S	24E	SENE	2562FNL	0030FEL
Ratherford	20-11	430373104900S1	Producing	1420603353	20	41S	24E	NWNW	0500FNL	0660FWL
Ratherford	20-13	430373091700S1	Producing	1420603353	20	41S	24E	NWSW	2140FSL	0500FWL
Ratherford	20-22	430373093000S1	Producing	1420603353	20	41S	24E	SENW	2020FNL	2090FWL
Ratherford	20-24	430373091800S1	Producing	1420603353	20	41S	24E	SESW	0820FSL	1820FWL

Ratherford Unit - Producer Well List

minus P&A's

Lease	Number	API #	Status	Lease #	Location					
					Sec	T	R	QTR/QTR	NSFoot	EWFoot
Ratherford	20-31	430373105001S1	Producing	1420603353	20	41S	24E	NWNE	0660FNL	1880FEL
Ratherford	20-33	430373093100S1	Producing	1420603353	20	41S	24E	NWSE	1910FSL	2140FEL
Ratherford	20-42	430373105100S1	Producing	1420603353	20	41S	24E	SENE	1980FNL	0660FEL
Ratherford	20-44	430373091501S1	Producing	1420603353	20	41S	24E	SESE	0620FSL	0760FEL
Ratherford	20-66	430373159201S1	Producing	1420603353	20	41S	24E	SWNW	1369FNL	1221FWL
Ratherford	20-68	430373159100S1	Producing	1420603353	20	41S	24E	NWSW	1615FSL	1276FWL
Ratherford	15-12	430371571501S1	Producing	1420603355	15	41S	24E	SWNW	1820FNL	0500FWL
Ratherford	15-22	430373044900S1	SI	1420603355	15	41S	24E	SENW	1980FNL	2050FWL
Ratherford	15-32	430371571700S1	Producing	1420603355	15	41S	24E	SWNE	1980FNL	1980FEL
Ratherford	15-33	430371571800S1	Producing	1420603355	15	41S	24E	NWSE	1650FSL	1980FEL
Ratherford	15-41	430371571900S1	TA	1420603355	15	41S	24E	NENE	0660FNL	0660FEL
Ratherford	15-42	430373044800S1	Producing	1420603355	15	41S	24E	SENE	2020FNL	0820FEL
Ratherford	16-13	430373116801S1	Producing	1420603355	16	41S	24E	NWSW	1980FSL	660FWL
Ratherford	16-32	430371572300S1	Producing	1420603355	16	41S	24E	SWNE	1980FNL	1980FEL
Ratherford	16-41	430371572500S1	Producing	1420603355	16	41S	24E	NENE	0660FNL	0660FEL
Ratherford	16-77	430373176800S1	Producing	1420603355	16	41S	24E	NESW	2587FSL	2410FWL
Ratherford	21-23	430371375400S1	Producing	1420603355	21	41S	24E	NESW	1740FSL	1740FWL
Ratherford	21-24	430373172001S1	SI	1420603355	21	41S	24E	SESW	487FSL	2064FWL
Ratherford	21-32	430371575500S1	SI	1420603355	21	41S	24E	SWNE	1880FNL	1980FEL
Ratherford	21-77	430373175801S1	SI	1420603355	21	41S	24E	NWSE	2511FSL	2446FEL
Ratherford	07-11	430373116300S1	Producing	1420603368	7	41S	24E	NWNW	0660FNL	0710FWL
Ratherford	07-13	430373116400S1	Producing	1420603368	7	41S	24E	NWSW	2110FSL	0740FWL
Ratherford	07-22	430373116500S1	Producing	1420603368	7	41S	24E	SENW	1980FNL	1980FWL
Ratherford	07-24	430373116600S1	Producing	1420603368	7	41S	24E	SESW	0880FSL	2414FWL
Ratherford	07-44	430373118900S1	SI	1420603368	7	41S	24E	SESE	0737FSL	0555FEL
Ratherford	08-12	430371599100S1	Producing	1420603368	8	41S	24E	SWNW	1909FNL	0520FWL
Ratherford	08-21	430371599300S1	Producing	1420603368	8	41S	24E	NENW	0616FNL	1911FWL
Ratherford	08-23	430371599400S1	Producing	1420603368	8	41S	24E	NESW	1920FSL	2055FWL
Ratherford	08-32	430371599500S1	Producing	1420603368	8	41S	24E	SWNE	1980FNL	1980FEL
Ratherford	08-34	430371599600S1	Producing	1420603368	8	41S	24E	SWSE	0660FSL	1980FEL
Ratherford	04-34	430371616400S1	Producing	14206034035	4	41S	24E	SWSE	0660FSL	1980FEL
Ratherford	11-14	430371616700S1	Producing	14206034037	11	41S	24E	SWSW	0660FSL	0660FWL
Ratherford	09-34	430371571100S1	SI	14206034043	9	41S	24E	SWSE	0660FSL	1980FEL
Ratherford	10-12	430371571200S1	Producing	14206034043	10	41S	24E	SWNW	1980FNL	0660FWL
Ratherford	10-14	430371571300S1	Producing	14206034043	10	41S	24E	SWSW	0510FSL	0710FWL
Ratherford	10-32	430371571400S1	TA	14206034043	10	41S	24E	SWNE	2080FNL	1910FEL
Ratherford	10-44	430373045100S1	TA	14206034043	10	41S	24E	SESE	0820FSL	0510FEL
Ratherford	29-11	430373105300S1	Producing	1420603407	29	41S	24E	NWNW	0770FNL	0585FWL
Ratherford	29-22	430373108200S1	Producing	1420603407	29	41S	24E	SENW	2130FNL	1370FWL
Ratherford	29-31	430373091401S1	Producing	1420603407	29	41S	24E	NWNE	0700FNL	2140FEL
Ratherford	29-33	430373093200S1	SI	1420603407	29	41S	24E	NWSE	1860FSL	1820FEL
Ratherford	29-34	430371534000S1	SI	1420603407	29	41S	24E	SWSE	0817FSL	2096FEL
Ratherford	29-42	430373093700S1	SI	1420603407	29	41S	24E	SENE	1850FNL	0660FEL
Ratherford	30-32	430371534200S1	Producing	1420603407	30	41S	24E	SWNE	1975FNL	2010FEL
Ratherford	28-11	430373044600S1	Producing	1420603409	28	41S	24E	NWNW	0520FNL	0620FWL

Ratherford Unit - Producer Well List

minus P&A's

Lease	Number	API #	Status	Lease #	Location					
					Sec	T	R	QTR/QTR	NSFoot	EWFoot
Ratherford	09-12	430371512600S1	Producing	14206035045	9	41S	24E	SWNW	1865FNL	0780FWL
Ratherford	09-14	430371512700S1	Producing	14206035046	9	41S	24E	SWSW	0695FSL	0695FWL
Ratherford	04-14	430371616300S1	Producing	14206035446	4	41S	24E	SWSW	0500FSL	0660FWL
Ratherford	03-12	430371562000S1	Producing	14206036506	3	41S	24E	SWNW	2140FNL	0660FWL

Water Source Wells (Feb 2006)

RU	S1	4303700001	Active
RU	S2	4303700002	Active
RU	S3	4303700003	Active
RU	S4	4303700004	Active
RU	S5	4303700005	Active
RU	S6	4303700006	Active
RU	S7	4303700007	Active
RU	S8	4303700008	Active
RU	S9	4303700009	Active
RU	S10	4303700010	Active
RU	S11	4303700011	Active
RU	S12	4303700012	Active
RU	S13	4303700013	Active
RU	S14	4303700014	Active
RU	S16	4303700016	Active
RU	S17	4303700017	Active

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: 14-20-603-355

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 Oil Well

8. WELL NAME and NUMBER: RATHERFORD 16-77

2. NAME OF OPERATOR: RESOLUTE NATURAL RESOURCES

9. API NUMBER: 43037317680000

3. ADDRESS OF OPERATOR: 1675 Boradway Ste 1950 , Denver, CO, 80202

PHONE NUMBER: 303 534-4600 Ext

9. FIELD and POOL or WILDCAT: GREATER ANETH

4. LOCATION OF WELL
FOOTAGES AT SURFACE: 2587 FSL 2410 FWL
QTR/QTR, SECTION, TOWNSHIP, RANGE, MERIDIAN: Qtr/Qtr: NESW Section: 16 Township: 41.0S Range: 24.0E Meridian: S

COUNTY: SAN JUAN

STATE: UTAH

11. CHECK APPROPRIATE BOXES TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION		
✓ NOTICE OF INTENT Approximate date work will start: 5/31/2013	☐ ACIDIZE	☐ ALTER CASING	☐ CASING REPAIR
	☐ CHANGE TO PREVIOUS PLANS	☐ CHANGE TUBING	☐ CHANGE WELL NAME
	☐ CHANGE WELL STATUS	☐ COMMINGLE PRODUCING FORMATIONS	☐ CONVERT WELL TYPE
☐ SUBSEQUENT REPORT Date of Work Completion:	☐ DEEPEN	☐ FRACTURE TREAT	☐ NEW CONSTRUCTION
	☐ OPERATOR CHANGE	☐ PLUG AND ABANDON	☐ PLUG BACK
	☐ PRODUCTION START OR RESUME	☐ RECLAMATION OF WELL SITE	☐ RECOMPLETE DIFFERENT FORMATION
☐ SPUD REPORT Date of Spud:	☐ REPERFORATE CURRENT FORMATION	☐ SIDETRACK TO REPAIR WELL	☐ TEMPORARY ABANDON
	☐ TUBING REPAIR	☐ VENT OR FLARE	☐ WATER DISPOSAL
☐ DRILLING REPORT Report Date:	☐ WATER SHUTOFF	☐ SI TA STATUS EXTENSION	☐ APD EXTENSION
	☐ WILDCAT WELL DETERMINATION	✓ OTHER	OTHER: ESP repair

12. DESCRIBE PROPOSED OR COMPLETED OPERATIONS. Clearly show all pertinent details including dates, depths, volumes, etc.

Resolute proposes to move onto the RU 16-77 to perform an ESP repair, including clean out to TD, possible chemical treatment and replacement of ESP. Attachment is procedure with current wellbore schematic detail.

Accepted by the Utah Division of Oil, Gas and Mining

Date: June 04, 2013

By: Dark K Quist

NAME (PLEASE PRINT)	PHONE NUMBER	TITLE
Sherry Glass	303 573-4886	Sr Regulatory Technician

SIGNATURE	DATE
N/A	5/23/2013

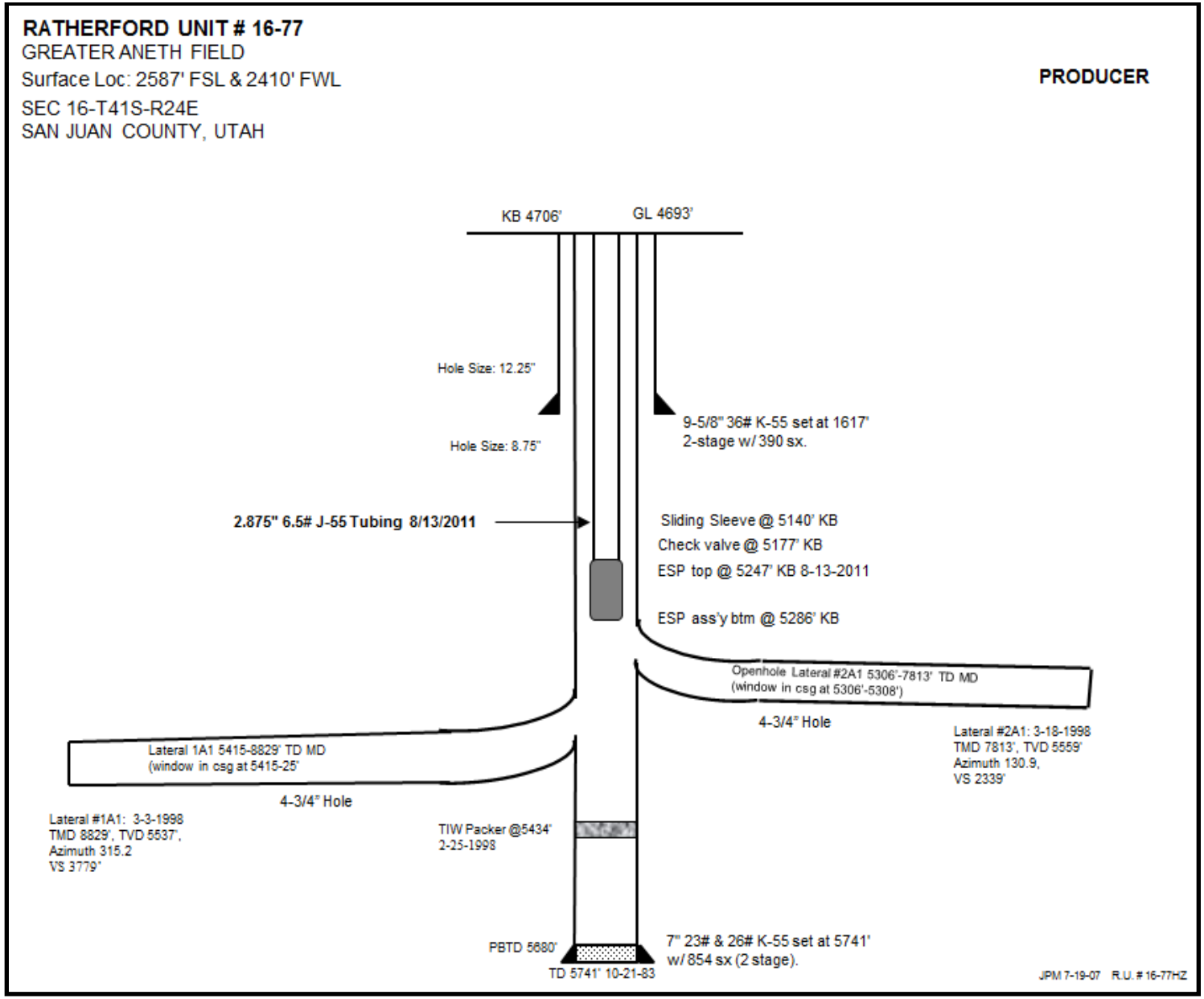
RECEIVED: May. 23, 2013

RESOLUTE
NATURAL RESOURCES

Procedure-ESP repair
Ratherford Unit 16-77
2587' FSL, 2410' FWL
Sec 16, T41S, R24E
43-037-31768

1) MIRU WSU. LOTO equipment. Test rig anchors as required.
2) Kill well as necessary.
3) NDWH. NU & Test BOP.
4) MIRU ESP cable spooler.
5) POOH with the 2 7/8" tubing and ESP assembly, including capillary tube.
6) Stand back tubing. Call Bill Albert for tubing inspection at (970) 371-9682 or if unavailable, call Tech Support: Virgil Holly (435) 444-0020 or Julius Claw (435) 444-0156. Lay down ESP assembly.
7) PU bit & scraper w/scraper 5 joints above bit. RIH & CO to TIW pkr @ 5434'/ scraper to ~5275' (top window 5306' KB). Use Global N2 for nitrified cleanout. POOH w/ B&S, laying down tubing.
8) Make up replacement ESP assembly & RIH with Centinel, ESP assembly, ESP cable, and new 2 7/8" tubing (pending inspection results); include check valve two joints above top of ESP and sliding sleeve w/1.81" X nipple profile 1 joint above the check valve. Run 1/4" capillary tube to top of ESP.
9) Pending inspection, replacement of 2-7/8" tbg to be with FBNAU Seamless if available; regular seamless as 2nd choice.
10) Land tubing with ESP Centinel bottom at ~5286-96' as before, above top of upper window at 5306' KB.
11) Perform WH penetrator cable tie-ins at tubing hanger, including 1/4" capillary stinger for chemical injection, and land tubing.
12) ND BOPE. NUWH. Re-connect to VSD and transformer.
13) Perform necessary tests to ensure that the pump is ready to be returned to production.
14) Notify Operations that the well is ready to return to production.
15) RDMOL.
16) Hook up appropriate chemical treatment equipment.

RECEIVED: May. 23, 2013



RECEIVED: May. 23, 2013

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: 14-20-603-355

SUNDRY NOTICES AND REPORTS ON WELLS

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6. IF INDIAN, ALLOTTEE OR TRIBE NAME: NAVAJO

7.UNIT or CA AGREEMENT NAME: RATHERFORD

1. TYPE OF WELL Oil Well

8. WELL NAME and NUMBER: RATHERFORD 16-77

2. NAME OF OPERATOR: RESOLUTE NATURAL RESOURCES

9. API NUMBER: 43037317680000

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: 2587 FSL 2410 FWL
QTR/QTR, SECTION, TOWNSHIP, RANGE, MERIDIAN: Qtr/Qtr: NESW Section: 16 Township: 41.0S Range: 24.0E 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: 3/10/2016
- ☐ 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: ESP Replacement

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 an ESP Replacement on the above well. Attached are the procedures and schematic

Accepted by the Utah Division of Oil, Gas and Mining

Date: March 10, 2016

By: Dark K Dunt

NAME (PLEASE PRINT)	PHONE NUMBER	TITLE
Erin Joseph	303 573-4886	Sr. Regulatory Analyst

SIGNATURE	DATE
N/A	3/7/2016

RECEIVED: Mar. 07, 2016

Resolute
Natural Resources

Date: March 4, 2016

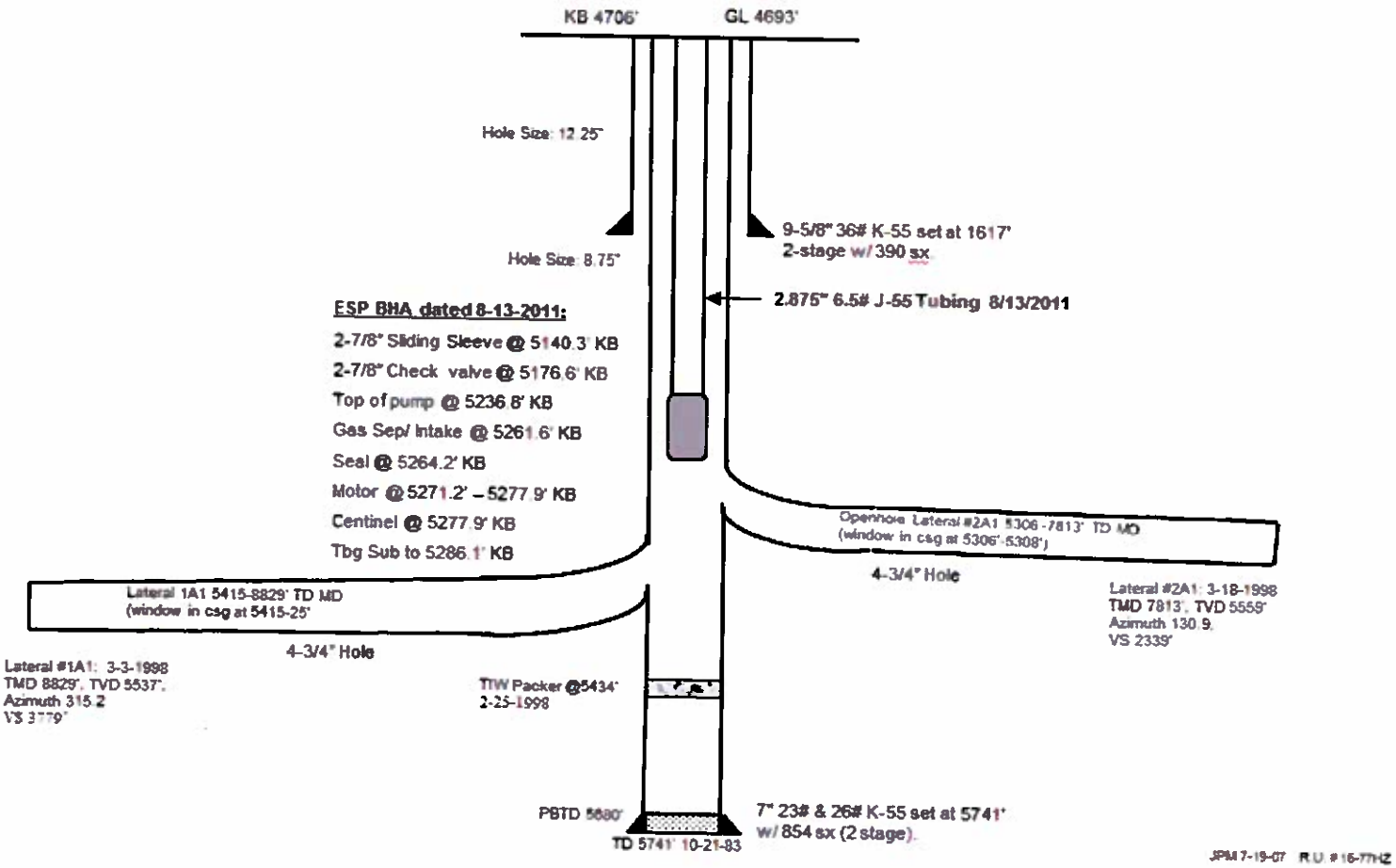
Re: RU 16-77 ESP Replacement

Procedure
Horsley Witten: NO

1) MIRU WSU. LOTO equipment. Test rig anchors as required.
2) RU WL & shift open the sliding sleeve at 5140' KB. Kill well as required with circ down tbg, up casing.
3) NDWH. NU BOP. Test BOP.
4) MIRU ESP cable spooler & cap string spooler. Well has 60' cap string.
5) POOH & lay down 2-7/8 tubing; tbg was run Aug 2011. Call Bill Albert for tubing inspection (970) 371-9682, or Tech Support: Virgil Holly (435) 730-5087 or Nate Dee (435) 730-5442.
6) Lay down & inspect/evaluate failed ESP assembly for any obvious cause of failure.
7) Make spaced bit & scraper trip to TIW at 5434' KB, scraper to ~5300' KB/top window @ 5306'. Circ clean, or bail if necessary.
8) Run new ESP assembly as follows: Centralizer sub, Centinel, ESP plus cable, sliding sleeve w/2.313 'X' profile 2 jts above ESP, **no check valve**, 2-7/8" tubing to surface & cap string to 60' as before. Land near the previous landing depth with bottom of ESP bha at ~5285' KB.
9) Pressure test & re-run the existing cap string if the condition is generally good.
10) Perform WH penetrator tie-ins at tubing hanger for ESP cable & capillary string and land tubing.
11) ND BOPE. NUWH. Re-connect to VSD and transformer.
12) Perform necessary tests to ensure that the pump is ready to be returned to production.
13) Notify Operations Supervisor Alfred Redhouse (435) 619-7227 that the well is ready to return to production.
14) RDMOL.
15) Hook up appropriate chemical treatment.

RATHERFORD UNIT # 16-77
GREATER ANETH FIELD
Surface Loc: 2587' FSL & 2410' FWL
SEC 16-T41S-R24E
SAN JUAN COUNTY, UTAH
API #43-037-31768

PRODUCER



FORM 9

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

5.LEASE DESIGNATION AND SERIAL NUMBER: 14-20-603-355

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6. IF INDIAN, ALLOTTEE OR TRIBE NAME: NAVAJO

7.UNIT or CA AGREEMENT NAME: RATHERFORD

1. TYPE OF WELL Oil Well

8. WELL NAME and NUMBER: RATHERFORD 16-77

2. NAME OF OPERATOR: RESOLUTE NATURAL RESOURCES

9. API NUMBER: 43037317680000

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: 2587 FSL 2410 FWL
QTR/QTR, SECTION, TOWNSHIP, RANGE, MERIDIAN: Qtr/Qtr: NESW Section: 16 Township: 41.0S Range: 24.0E 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: 3/17/2016
- ☐ 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
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☐ WATER SHUTOFF	☐ SI TA STATUS EXTENSION	☐ APD EXTENSION
☐ WILDCAT WELL DETERMINATION	✓ OTHER	OTHER: ESP Replacement

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 that the ESP pump was replaced on 3/17/2016 according to previously approved procedures

Accepted by the Utah Division of Oil, Gas and Mining
FOR RECORD ONLY
March 30, 2016

NAME (PLEASE PRINT)	PHONE NUMBER	TITLE
Erin Joseph	303 573-4886	Sr. Regulatory Analyst

SIGNATURE	DATE
N/A	3/29/2016

RECEIVED: Mar. 29, 2016