Form 9-331 C
(May 1963)

SUBMIT IN TRIP ATE*
(Other instructi on
reverse side)

Form approved.
Budget Bureau No. 42-R1425.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

5. LEASE DESIGNATION AND SERIAL NO.: U-25128

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: ----------

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

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

7. UNIT AGREEMENT NAME: Bridger Creek

8. FARM OR LEASE NAME: Christmann LL&E

2. NAME OF OPERATOR: John J. Christmann & Associates

9. WELL NO.: LL&E Federal 1-20

3. ADDRESS OF OPERATOR: P.O. Box 238, Pinedale, Wy 82941

10. FIELD AND POOL, OR WILDCAT: Wild Cat Madison

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.*)
At surface: 3,300' FWL 1,980' FSL
At proposed prod. zone: same

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec. 20, T10N, R8E

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*: 6 miles from Woodruff, Utah

12. COUNTY OR PARISH: Rich

13. STATE: Utah

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. unit line, if any): 1,989'

16. NO. OF ACRES IN LEASE: 2,560.00

17. NO. OF ACRES ASSIGNED TO THIS WELL: Wild Cat Spacing

18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT.: 6 Miles NW

19. PROPOSED DEPTH: 16,000'

20. ROTARY OR CABLE TOOLS: Rotary

21. ELEVATIONS (Show whether DF, RT, GR, etc.): 6,514' GR (ungraded)

22. APPROX. DATE WORK WILL START*: June 1, 1981

23. PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT
17 1/4"	13 3/8"	54.5#	1,000'	cmt to surface
12 1/4"	9 5/8"	47# 48.5 40#	9,000'	1,200 sks
8 3/4"	7"	32#	16,000'	1,200 sks

Set 13 3/8" surface pipe @ 1,000'.
Drill to approx. 9,100', Arkarn red beds, log and set 9 5/8" casing.
Drill through Madison to 16,000', log and if productive run 7" CSG to T.D.
Attempt completion in any zone of interest.

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

24.

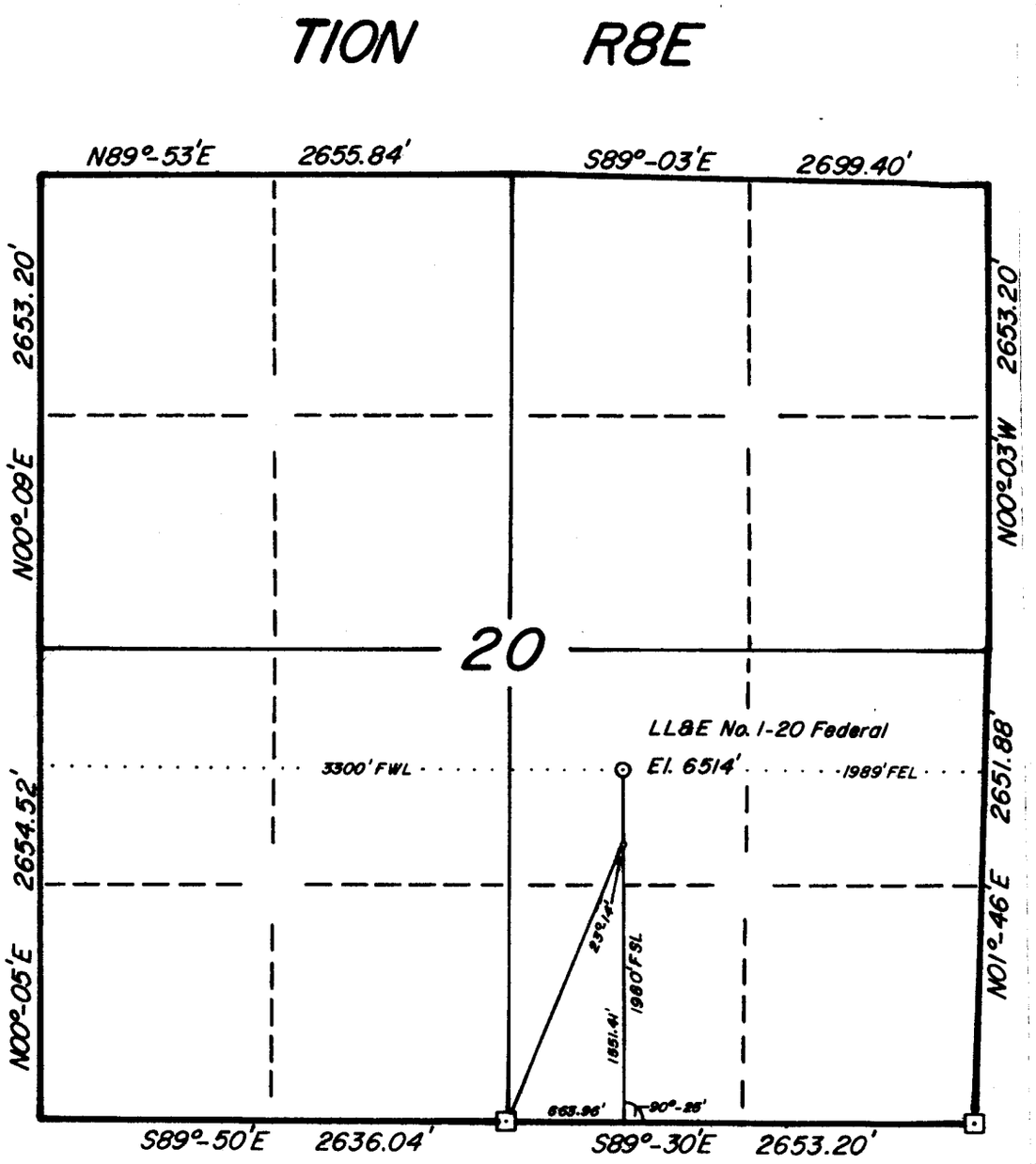
SIGNED Joe C. Hugo TITLE Engineer DATE 2/17/81

(This space for Federal or State office use)

PERMIT NO. _____ APPROVAL DATE _____

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:



⊡ *indicates a Certified Land Corner Recordation Certificate filed.*

Elevation is based upon a knoll in the NW1/4SE1/4, Section 20, TION, R8E on the USGS WOODRUFF NARROWS, UTAH QUADRANGLE MAP.

F.R.S.
Reference: ZU32 pp. 22-23

CERTIFICATE OF SURVEYOR

State of Wyoming)
County of Sublette) ss. . .

I, Paul N. Scherbel of Big Piney, Wyoming hereby certify that this map was made from notes taken during an actual survey made by me or under my supervision, and that it correctly represents the location described thereon with the section dimensions of record on the official survey plat.

Land Surveyor —— Registration No. 164. – Utah – No. 1670.
Date surveyed —— 19 January 1981
Surveyed by —— Scott A. Scherbel and Robert C. Priddis
Official plat used —— Dependent Resurvey Plat of TION R8E.
(Dated 16 April 1980)

CHRISTMANN AND ASSOCIATES

LL&E NO. 1-20 FEDERAL

NW1/4SE1/4 SECTION 20 TION R8E SLB&M

RICH COUNTY, UTAH

Scale 1" = 1000'

Form 9-331 C
(May 1963)

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

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UNITED STATES
DEPARTMENT OF THE INTERIOR
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b. TYPE OF WELL: OIL WELL [x] GAS WELL [x] OTHER — SINGLE ZONE [ ] MULTIPLE ZONE [x]

2. NAME OF OPERATOR: John J. Christmann & Associates

3. ADDRESS OF OPERATOR: P.O. Box 238, Pinedale, Wy 82941

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.*)
At surface: 3,300' FWL 1,980' FSL NWSE
At proposed prod. zone: same

RECEIVED
FEB 19 1981
DIVISION OF OIL, GAS & MINING

5. LEASE DESIGNATION AND SERIAL NO.: U-25128

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: ----------

7. UNIT AGREEMENT NAME: ~~Bridger Creek~~

8. FARM OR LEASE NAME: Christmann LL&E

9. WELL NO.: LL&E Federal 1-20

10. FIELD AND POOL, OR WILDCAT: Wild Cat Madison

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12. COUNTY OR PARISH: Rich

13. STATE: Utah

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Attempt completion in any zone of interest.

APPROVED BY THE DIVISION OF OIL, GAS, AND MINING
DATE: 3-5-81
BY: M. J. Minder

Provided proper BOP equipment is employed min of 5000# and H2S trim if penetrating H2S zones

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

24.

SIGNED Joe C. Hugo TITLE Engineer DATE 2/17/81

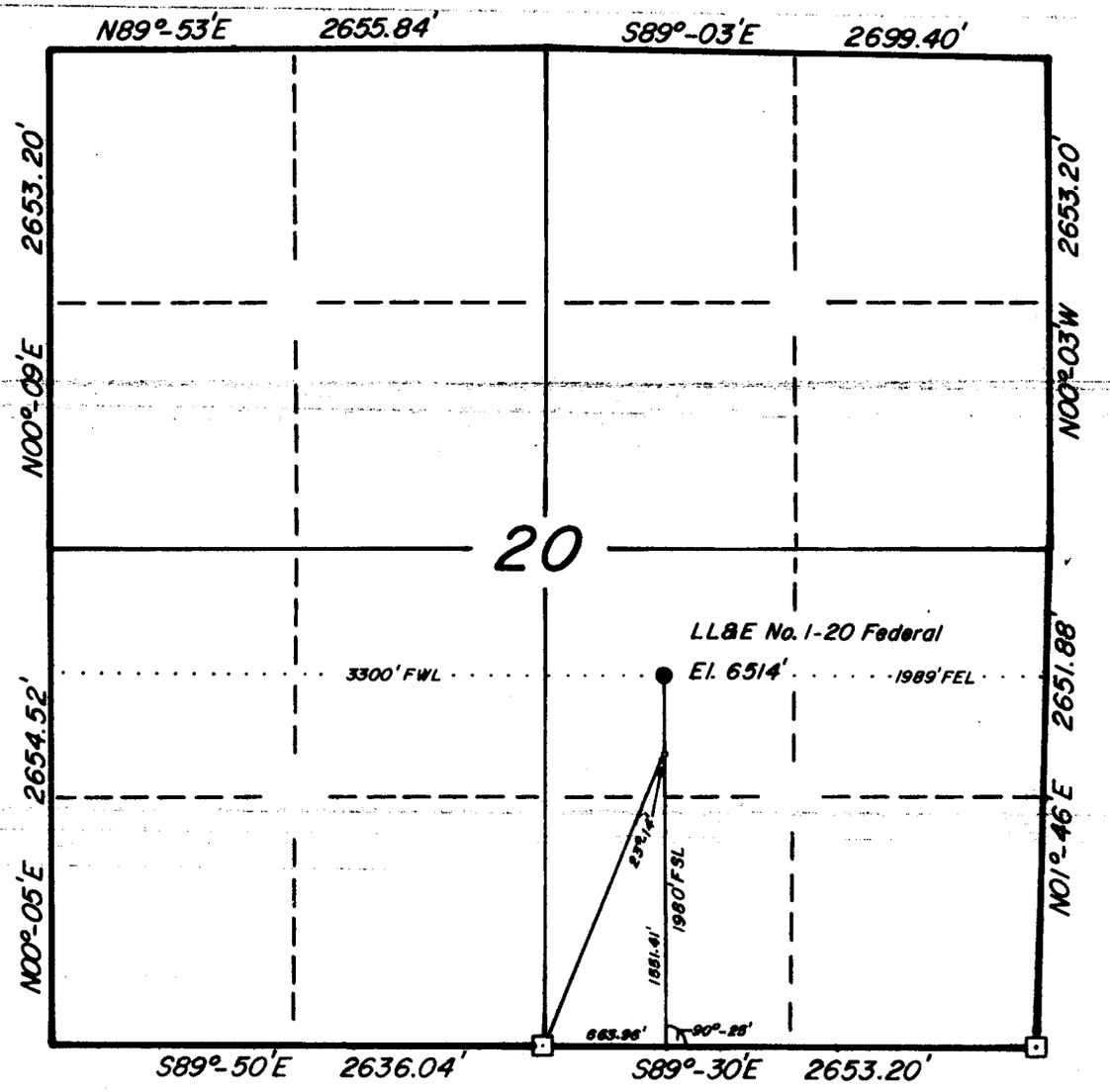
(This space for Federal or State office use)

PERMIT NO. _____ APPROVAL DATE _____

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

TION R8E



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Reference: ZU32 pp. 22-23

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County of Sublette) ss. . .

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Date surveyed —— 19 January 1981
Surveyed by —— Scott A. Scherbel and Robert C. Priddis
Official plat used —— Dependent Resurvey Plat of T10N R8E.
(Dated 16 April 1980)

CHRISTMANN AND ASSOCIATES

LL&E NO. 1-20 FEDERAL

NW1/4SE1/4 SECTION 20 T10N R8E SLB&M

RICH COUNTY, UTAH

Scale 1" = 1000'

** FILE NOTATIONS **

DATE: Feb. 23, 1981

OPERATOR: John L. Christmann & Assoc.

WELL NO: LL & E Federal 1-20

Location: Sec. 20 T. 10N R. 3E County: Rich

File Prepared: ☐ Entered on N.I.D: ☐

Card Indexed: ☐ Completion Sheet: ☐

API Number 43-033-30031

CHECKED BY:

Petroleum Engineer: M.J. Minder 3-5-81
Providing proper BOP equipment is employed

Director:

ok as per C-3 spacing

Administrative Aide: C-3 spacing - ok on bndrys - ok on any other oil & gas wells.

APPROVAL LETTER:

Bond Required: ☐ Survey Plat Required: ☐

Order No. ____ O.K. Rule C-3 ☐

Rule C-3(c), Topographic Exception - company owns or controls acreage within a 660' radius of proposed site ☐

Lease Designation Fed. Plotted on Map ✓

Approval Letter Written ✓

Hot Line ✓ P.I. ✓

March 6, 1981

John J. Christmann & Associates
P. O. Box 238
Pinedale, Wyoming 82941

Re: Well No. LL&E Federal #1-20
Sec. 20, T. 10N, R. 8E, NE SE,
Rich County, Utah

Insofar as this office is concerned, approval to drill the above referred to o/g well is hereby granted in accordance with Rule C-3, General Rules and Regulations and Rules of Practice and Procedure. However, this approval is granted provided proper BOP equipment is employed.

Should you determine that it will be necessary to plug and abandon this well, you are hereby requested to immediately notify the following:

MICHAEL T. MINDER - Petroleum Engineer
Office: 533-5771
Home: 876-3001

Enclosed please find Form OGC-8-X, which is to be completed whether or not water sands (acquifers) are encountered during drilling. Your cooperation in completing this form will be appreciated.

Further, it is requested that this Division be notified within 24 hours after drilling operations commence, and that the drilling contractor and rig number be identified.

The API number assigned to this well is 43-033030031.

Sincerely,

DIVISION OF OIL, GAS, AND MINING

Michael T. Minder
Petroleum Engineer

MTM/ko
cc: USGS

DUPLICATE

Form 9-331 C
(May 1963)

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 42 R1425.

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24.

SIGNED Joe C. Hugo TITLE Engineer DATE 2/17/81

(This space for Federal or State office use)

PERMIT NO. _____ APPROVAL DATE _____

APPROVED BY _____ TITLE FOR E. W. GUYNN DISTRICT ENGINEER DATE APR 16 1981

CONDITIONS OF APPROVAL, IF ANY:

NOTICE OF APPROVAL

Utah State 046

CONDITIONS OF APPROVAL ATTACHED TO OPERATOR'S COPY

FLARING OR VENTING OF GAS IS SUBJECT TO NTL 4-A DATED 1/1/80

Identification No. 327-81

United States Department of the Interior
Geological Survey
2000 Administration Building
1745 West 1700 South
Salt Lake City, Utah 84104

NEPA CATEGORICAL EXCLUSION REVIEW

PROJECT IDENTIFICATION

Operator John J. Christmann & Associates

Project Type Oil or Gas well (WILDCAT)

Project Location 3300' FWL, 1980' FSL, SEC 20, T10N, R8E

Well No. 1-20 Lease No. U-25128

Date Project Submitted 2-19-81

FIELD INSPECTION Date 3-30-81

Field Inspection Participants

GEORGE DWACHAK	USGS
DAN WASHINGTON	BLM
JOE HUGO	JOHN J. CHRISTMANN & ASSOC.
WACT HAGER	" " " "
LEE WRIGHT	Sulento Construction Co

I have reviewed the proposal in accordance with the categorical exclusion review guidelines. This proposal would not involve any significant effects and, therefore, does not represent an exception to the categorical exclusions.

4/15/81
Date Prepared

George J Dwachak
Environmental Scientist

I concur

4/15/81
Date

District Supervisor

CATEGORICAL EXCLUSION REVIEW INFORMATION SOURCE

Criteria 516 DM 2.3.A	Federal/State Agency: Correspondence (date)	Federal/State Agency: Phone check (date)	Federal/State Agency: Meeting (date)	Local and private correspondence (date)	Previous NEPA	Other studies and reports	Staff expertise	Onsite inspection (date)	Other
1. Public health and safety					11	2	6	6	4, 9
2. Unique characteristics	1				10, 11	2	6	6	4,8,9
3. Environmentally controversial	1				10, 11		6	6	4,8,9
4. Uncertain and unknown risks	1				11		6.	6	4,8.9
5. Establishes precedents	1				11		6	6	4,8,9
6. Cumulatively significant							6	6	4, 9
7. National Register historic places	1								
8. Endangered/ threatened species	1				10				
9. Violate Federal, State, local, tribal law	1						6		4, 8

PLEASE REFER TO ATTATCHED REFERENCE-LEGEND

CATEGORICAL EXCLUSION REVIEW COMMON REFERENCE LEGEND

1. Surface Management Agency Input (INCLUDING REVISED OPERATING PLAN AND STAFF REPORT OF 4/14/81)
2. Reviews Reports, or information received from Geological Survey (Conservation Division, Geological Division, Water Resource Division, Topographic Division)
3. Lease Stipulations/Terms
4. Application for Permit to Drill
5. Operator Correspondence
6. Field Observation (ONSITE DATE – 3-30-81) SEE FIELD NOTES
7. Private Rehabilitation Agreement
8. RECOMMENDED STIPULATIONS (USGS)
9. SUMMARY OF ENVIRONMENTAL IMPACT EVALUATION
10. DRAFT ENVIRONMENTAL ASSESSMENT REPORT, OIL AND GAS LEASING, RICH COUNTY, UTAH, BLM, SALT LAKE DISTRICT 1979., 79p.
11. EA. No 440-80, APD FOR MARATHON OIL CO. No 1-35 SEC35, T10N, R7E, RICH COUNTY, UT. U-25097, USGS, SLC DISTRICT, 10p.

SUMMARY OF ENVIRONMENTAL IMPACT EVALUATION

Operator John J Christmann & Assoc

Well No. 1-20
Sec. 20 T. 10N R. 8E
Lease No. U-25128
County Rich
EA No. 327-81

KEY

0 - Enhances
1 - No Impact
2 - Minor Impact
3 - Moderate Impact
4 - Major Impact
5 - N/A

		Construction				Pollution				Drilling Production					Transport Operations			Accidents		Other
		Roads, bridges, crossings	Drill pad, pits	Transmission lines, pipelines	Others (pump stations, compressor stations, etc.)	Burning, trash disposal, sewage	Noise/Obstruction of Scenic Views	Subsurface disposal	Others (toxic gases, noxious gas, air pollutants, etc.)	Well drilling	Fluid removal (Prod. wells, facilities)	Secondary Recovery	Mineral processing (ext. facilities)	Others	Trucks	Pipelines	Others	Spills and Leaks	Operational failure	
Land Use	Forestry	5																		
	Grazing	2	2	2	5	2	2	5	5	2	2	5	5	5	2	2	5	2	2	
	Wilderness	5							3	5										
	Agriculture	2	2	2	5				2	5										
	Residential-Commercial	2	2	2	5										2	2	5			
	Mineral Extraction	5																		
	Recreation	2	2	2	5	2	2	5	3	2	2	5	5	5	2	2	5	2	2	
	Scenic Views	2	2	2	5	1	2	3	5	2	2	5	5	5	2	2	5	2	2	
	Parks, Reserves,	5																		
	Monuments	5																		
	Historical Sites	5																		
	Unique Physical Features	5																		
Flora&Fauna	Birds	2	2	2	5	2	2	5	3	2	2	5	5	5	2	2	5	2	3	5
	Mammals																			
	Reptiles																			
	Fish																			
	Endangered Species																			
	Vegetation								2											
Phy. Char.	Surface Water	2	2	2	2	2	5	5	5	2	2	5	5	5	2	2	5	2	2	
	Ground Water	5				2	5	5	5	2	2	5	5	5	5	5	5	2	2	
	Air Quality	2				2	2	5	3	2	2	5	5	5	2	1	5	2	3	
	Erosion	2	2	2	2	1	1	1	5	1	1	1	1	1	2	2	5	2	2	
	Soils	2	2	2	2	1	1	1	5	1	1	1	1	1	2	2	5	3	2	
	Land Stability	1	1						5	1										
	Other Minerals	5							5											
	Effect on Local Economy	2	2	2	2	2	2	5	5	2	2	5	5	5	2	2	5	2	2	
	Cumulative Impacts	2							3	2	2	5	5	5	2	2	5	2	2	
	Safety & Health	2	2	2	2	2	2	5	3	2	2	5	5	5	2	2	5	3	3	
	Others	5							5											

RECOMMENDED STIPULATIONS

THE FOLLOWING STIPULATIONS INCLUDE THE REVISED OPERATING PLAN SUBMITTED BY BLM ON 4/14/81.

1. DUE TO LOAD LIMITATIONS ON THE COUNTY ROAD FROM WOODRUFF, LOADS OVER 20 TONS SHALL USE THE RECENTLY IMPROVED SPRING HOLLOW ROAD FOR ACCES.

2. THE NEW ACCESS ROAD AND THE UPGRADED JEEP TRAIL FROM THE COUNTY ROAD WILL BE DITCHED ON BOTH SIDES, PROPERLY DRAINED WITH CULVERTS AND HAVE A GRAVELLED 18 FOOT CROWN

3. IF A WATER WELL IS DRILLED ON LOCATION, PROPER APPLICATION MUST BE MADE TO USGS AND THE STATE OF UTAH.

4. IF WATER IS OBTAINED FROM THE BEAR RIVER, APPLICATION FOR USE MUST BE MADE TO THE STATE OF UTAH

5 ANY GRAVEL OBTAINED FROM BLM ADMINISTERED SOURCES MUST BE APPLIED FOR

6. SEWAGE DISPOSAL WILL REQUIRE A COUNTY PERMIT AND ALL PERMIT STIPULATIONS MUST BE ADHERED TO.

6. TRASH BURNING WILL REQUIRE A STATE PERMIT. ALL Remaining debris and Non-Burnable trash will be hauled to a sanitary LANDFILL.

7. A REVISED H_2S CONTINGENCY PLAN WILL BE SUBMITTED FOR APPROVAL PRIOR TO DRILLING OUT THE SURFACE PIPE AT 1000 Ft. THE CONTINGENCY PLAN WILL FOLLOW THE "GUIDELINES FOR H_2S CONTINGENCY PLAN PREPARATION" PROVIDED AT THE ONSITE INSPECTION THE PLAN SHALL ALSO ADDRESS THE CREW CAMP ON LOCATION.

8. THE H_2S CONTINGENCY PLAN AS APPROVED OR REVISED BY USGS SHALL BE IMPLEMENTED, INCLUDING THE INSTALLATION OF ALL SAFETY EQUIPMENT, WHEN DRILLING reaches 1000 feet above OR WITHIN 7 DAYS OF PENETRATING (WHICHEVER IS LESSER) THE PHOSPHORIA FORMATION EXPECTED AT 13,586 Feet. THE CONTINGENCY PLAN AND SAFETY EQUIPMENT SHALL REMAIN IN USE TO T.D.

9. ADEQUATE SUPPLIES of H_2S mud SCAVENGERS SHALL BE ON LOCATION THROUGHOUT DRILLING

10. IF H_2S is discovered PRIOR to CONTINGENCY PLAN IMPLEMENTATION, OPERATIONS WILL CEASE UNTIL ALL SAFETY EQUIPMENT AND PLAN PROCEDURES ARE OPERATIONAL.

11. ALL SHOWS OF H_2S SHALL BE REPORTED to USGS

12. THE TOP 12 inches of topsoil will be Stripped and Stockpiled seperately from spoil piles

13. IF THE WELL IS PRODUCIBLE, Rehabilitation of Areas no longer necessary for production will be coordinated with the BLM

14. Upon completion of activities at the location, topsoil will be redistributed over the recontoured pad site and then seeded with the following mixture:

3 lb./acre	Bluebunch wheatgrass
3 lb/acre	Intermediate wheatgrass
1 lb/acre	Small burnet
1/2 lb/acre	Bitterbrush
1 lb/acre	Rambler alfalfa
1/2 lb/acre	Perenial rye

ALL seed is to be certified as having a germination of 90% or better. Seeding is to be done in the fall (September 1 - October 30) following site preparation for abandonment. SEED SHALL BE planted to a depth of 1/4 to 1/2 inch and shall be repeated seasonally until a satisfactory ground cover is obtained as determined by the BLM District Manager or his delegate.

15. THE BLM REPRESENTATIVE FOR surface disturbance/reclamation is DAN WASHINGTON, SALT LAKE DISTRICT (801) 524-5348.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

Salt Lake District Office
2370 South 2300 West
Salt Lake City, Utah 84119

IN REPLY REFER TO
3000
O&G 1003
U-25128
(U-201)

APR 14 1981

U. S. Geological Survey
Oil and Gas Section
Attn: Mr. George Diwachak
2000 Administration Bldg.
1745 West 1700 South
Salt Lake City, Utah 84119

Dear Sir:

Enclosed is a staff report and revised operating plan for John J. Christmann & Associates LL&E Federal 1-20 well site located in T. 10 N., R. 8 E., Section 20, Rich County, Utah.

I concur with approval of the application for permit to drill, and the surface development and operating plan as amended.

Sincerely yours,

Daniel B. Washington

for Jack C. Peterson
Bear River Resource Area Manager

Enclosures

STAFF REPORT

An on-site inspection was conducted on Monday, March 30, 1981, of a proposed drilling location for John J. Christmann & Associates, LL&E Federal 1-20, located in T. 10 N., R. 8 E., Section 20, SLBM, Rich County, Utah.

Those present for the inspection were George Diwachak, USGS; Dan Washington, BLM: Joe Hugo, and Walt Hager, John J. Christman & Associates; Lee Wright, Sulenta Construction Co., Inc.

The proposed location lies about eight miles northeast of Woodruff, Utah, in the Bear River drainage. Topography consists mainly of gently rolling hills and valleys adjacent to the Crawford Mountains with a pad elevation of 6,514 feet above mean sea level. A variety of wildlife frequents the area including mule deer, antelope, coyotes, rabbits, ground squirrels, raptors, sage hens, and other small game and non-game animals. Sheep and cattle graze the area during the spring, summer, and fall. The biome is a sagebrush-wheatgrass-forb type on a sandy loam soil type. Annual precipitation ranges from 10 to 12 inches. There are no records to indicate that any threatened or endangered species inhabit the area, although, some raptors use the area for hunting in the winter months. An archaeological clearance was completed by Senco-Phoenix for the location and access areas and no cultural resources of either historic or prehistoric structures or sites were found.

Water for drilling will be purchased and hauled to site on roads indicated as access in the APD.

O&G 1003
U-25128

REVISED OPERATING PLAN

John J. Christman & Associates, LL&E Federal 1-20 (U-25128)

1. Due to some load limitations on the county road from Woodruff, which is indicated as primary access, it is recommended that loads over 20 tons use the recently improved Spring Hollow Road for access.

2. All new road constructed should be ditched on both sides and properly drained with culverts and have a graveled 18 foot crown.

3. No change.

4. Our office will submit necessary rehabilitation information when needed.

5. Due to success on adjacent wildcat location, it is suggested that a water well on site might be used for a water supply.

6. BLM gravel may be applied for.

7. Part D - Sewage will be disposed as per county permit stipulations.

   Part F - Trash burning may only occur with proper permit and the remaining debris will be hauled to a sanitary land fill.

8. Will be a camp at location.

9. No change

10. Topsoil will be considered to the top 12 inches of surface material and this will be stockpiled separately from spoil pile as indicated in the APD. Upon completion of activities at the location, the topsoil will be redistributed over the recontoured pad site and then seeded with the seed mixture listed below. All seed is to be certified as having a germination of 90% or better. Seeding is to be done in the fall (September 1 - October 30) following site preparation for abandonment. Seed shall be planted to a depth of ¼" to ½" and shall be repeated seasonally until a satisfactory ground cover is obtained as determined by the District Manager or his delegate. The seed mixture is:

3 lbs/acre	Bluebunch wheatgrass
3 lbs/acre	Intermediate wheatgrass
1 lb/acre	Small burnet
½ lb/acre	Bitterbrush
1 lb/acre	Rambler alfalfa
½ lb/acre	Perenial rye

11. No change

12. No change

13. No change

14. The BLM representative for surface disturbance/reclamation is Dan Washington, Salt Lake District (801) 524-5348.

U. S. GEOLOGICAL SURVEY - CONSERVATION DIVISION

FROM: : DISTRICT GEOLOGIST, ME, SALT LAKE CITY, UTAH

TO : DISTRICT ENGINEER, O&G, SALT LAKE CITY, UTAH

SUBJECT: APD MINERAL EVALUATION REPORT LEASE NO. U-25128

OPERATOR: John J. Christmann WELL NO. Fed 1-20

LOCATION: C W½ SW¼ NW¼ sec. 20, T. 10 N., R. 8 E., SLM

Rich County, Utah

1. Stratigraphy:

Tertiary Alluvium

Stump	~5000'	Weber	14,000'
Preuss	~5425'	Amsden	14,400'
Twin Creek	~6650'	Madison	15,200'
Nugget	8200'	TD	16,000'
Dinwoody	13,325'		
Phosphoria	13,754'		

2. Fresh Water:

Fresh water may be present in near-surface alluvium.

3. Leasable Minerals:

Oil/Gas: 8200' to TD

4. Additional Logs Needed: Adequate

5. Potential Geologic Hazards:

Possible H_2S in Phosporia & TD

6. References and Remarks:

Signature: Gregory W Wood Date: 3-20-81

DIVISION OF OIL, GAS AND MINING

SPUDDING INFORMATION

NAME OF COMPANY: John J. Christmann Company

WELL NAME: L L & E Fed. 1-20

SECTION NWSE20 TOWNSHIP 10N RANGE 8E COUNTY Rich

DRILLING CONTRACTOR Lord Drilling

RIG # 3

SPUDDED: DATE 5-22-81 ✓

TIME 12:00 Noon

HOW Rotary

DRILLING WILL COMMENCE _____

REPORTED BY Joe Hugo

TELEPHONE # 307-367-2144

DATE December 23, 1981 ✓ SIGNED AS

Phone
713-790-9132

LYNES, INC

Box 12486
Houston, TX 77017

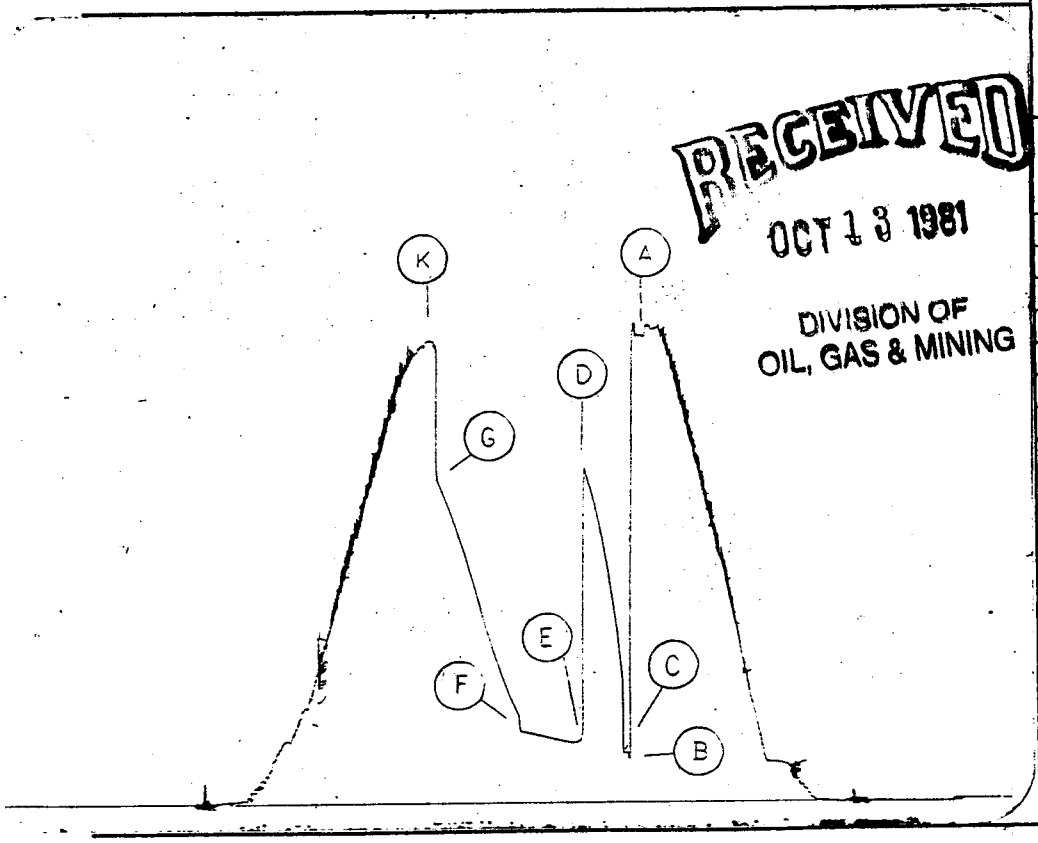
Operator John J. Christmann & Associates
Address See Distribution
Well Name and No. L.L. & E. Federal #1-20
Ticket No. 31021
Date 10-2-81
No. Final Copies 26

Contractor	Lord Drilling Company Inc.	Top Choke	3/8"
Rig No.	3	Bottom Choke	9/16"
Spot	NW-SE	Size Hole	8 1/2"
Sec.	20	Size Rat Hole	8 1/2"
Twp.	10 N	Size & Wt. D. P.	4 1/2" 16.60
Rng.	8 E	Size Wt. Pipe	4 1/2"
Field	Wildcat	I. D. of D. C.	2 1/4"
County	Rich	Length of D. C.	528'
State	Utah	Total Depth	10,795'
Elevation	6538' K.B.	Interval Tested	10,705-10,795'
Formation	Thaynes	Type of Test	Bottom Hole Conventional

Flow No. 1	10	Min.
Shut-in No. 1	60	Min.
Flow No. 2	90	Min.
Shut-in No. 2	120	Min.
Flow No. 3	--	Min.
Shut-in No. 3	--	Min.

Bottom Hole Temp.	178°F
Mud Weight	8.9
Gravity	--
Viscosity	53

Tool opened @ 4:12 PM



Outside Recorder

PRD Make Kuster AK-1
No. 10240 Cap. 8300 @ 10,728'

		Press Corrected
Initial Hydrostatic	A	4913
Final Hydrostatic	K	4870
Initial Flow	B	458
Final Initial Flow	C	517
Initial Shut-in	D	3491
Second Initial Flow	E	656
Second Final Flow	F	748
Second Shut-in	G	3466 ✓
Third Initial Flow	H	--
Third Final Flow	I	--
Third Shut-in	J	--

Lynes Dist.: Rock Springs, Wy.
Our Tester: Jerry Gorden
Witnessed By: Don Bowden

Did Well Flow – Gas NO Oil NO Water NO

RECOVERY IN PIPE:
- 1900' Total Fluid (Ran 1000' water, 55 gals. ammonia.)
- 930' Mud cut ammonia water cushion = 13.20 bbl.
- 70' Saltwater cut ammonia water cushion = 0.99 bbl.
- 900' Saltwater = 7.7 bbl.

Top Sample R. W. : 0.80 @ 72°F = 7,350 ppm. Cl.
Middle Sample R.W.: 0.17 @ 76°F = 39,000 ppm. Cl.
Bottom Sample R.W.: 0.22 @ 82°F = 26,500 ppm. Cl.

Blow Description:

1st Flow: Tool opened with weak surface blow, increased to 6 1/2" at end of flow period.

2nd Flow: Tool opened with 1/4" blow, increased to 7 1/2 oz. in 45 minutes, then decreased to 7 oz. in 85 minutes and remained thru flow period.

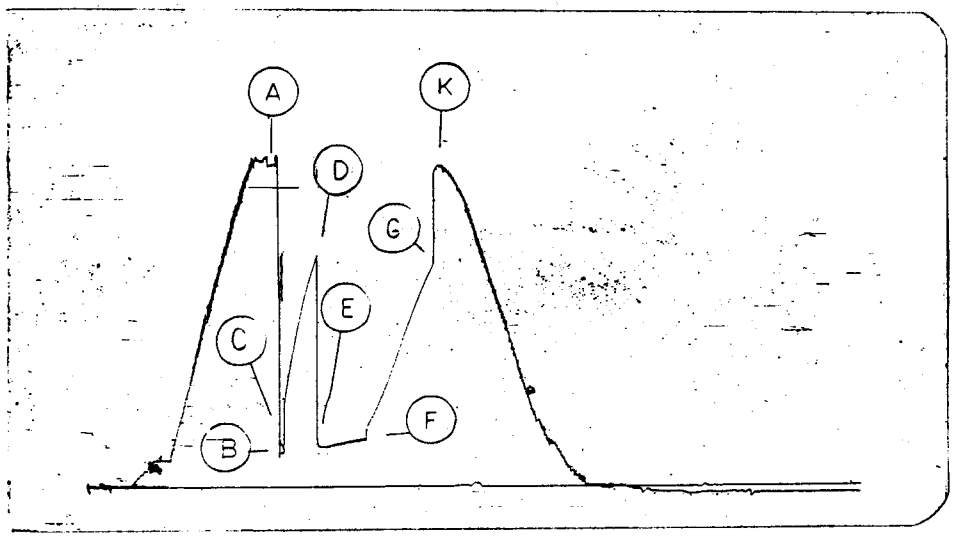
TIGHT HOLE

Form 1

LY-230
np

LYNES, INC.

John J. Christmann & Associates	L.L. & E. Federal #1-20	1
Operator	Well Name and No.	DST No.

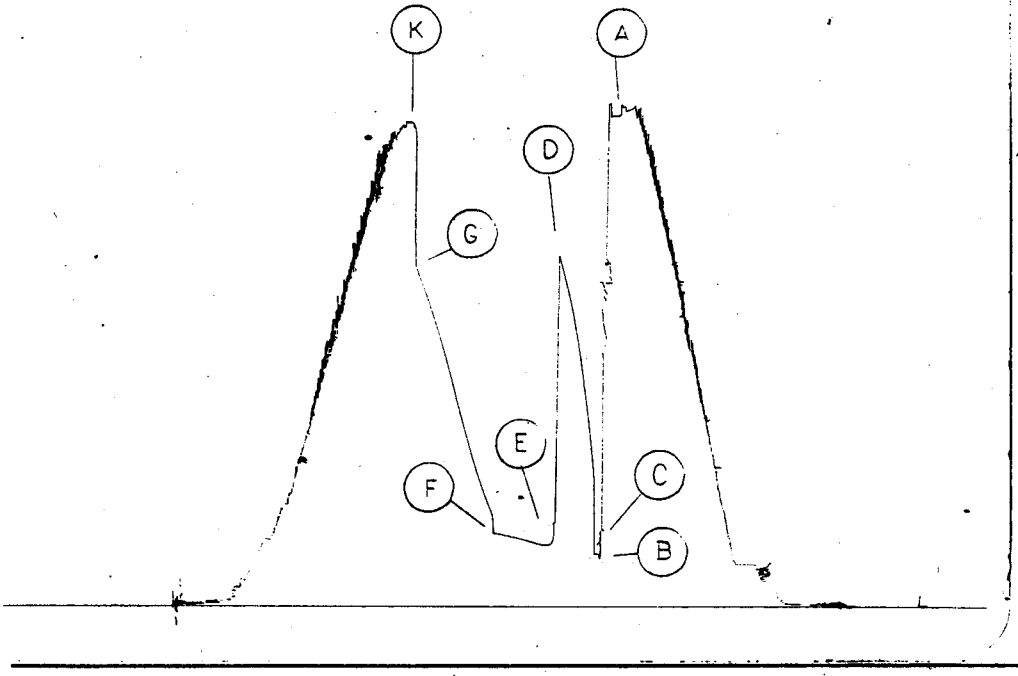


Inside Recorder

PRD Make Kuster K-3

No. 16835 Cap. 7075 @10,689

Press		Corrected
Initial Hydrostatic	A	4908
Final Hydrostatic	K	4884
Initial Flow	B	448
Final Initial Flow	C	516
Initial Shut-in	D	3514
Second Initial Flow	E	635
Second Final Flow	F	741
Second Shut-in	G	3402
Third Initial Flow	H	--
Third Final Flow	I	--
Third Shut-in	J	--
Pressure Below Bottom Packer Bled To		



Inside Recorder

PRD Make Kuster AK-1

No. 973 Cap. 7900 @10,712

Press		Corrected
Initial Hydrostatic	A	5023
Final Hydrostatic	K	4952
Initial Flow	B	513
Final Initial Flow	C	561
Initial Shut-in	D	3569
Second Initial Flow	E	691
Second Final Flow	F	783
Second Shut-in	G	3466
Third Initial Flow	H	--
Third Final Flow	I	--
Third Shut-in	J	--
Pressure Below Bottom Packer Bled To		

WELL NAME: L.L.&E. FEDERAL 1-

DST NUMBER: 001

RECORDER NUMBER: 010240

INTERVAL TESTED: 10705FT TO 10795FT

RECORDER DEPTH: 10728.000FT

TOTAL FLOW TIME: 10.0MIN

FIRST SHUT IN PRESSURE (LIQUID)

TIME (MIN) PHI	(T+PHI) /PHI	PRESSURE (PSI)
.0	.0000	517.0
1.0	11.0000	1319.0
2.0	6.0000	1369.0
3.0	4.3333	1436.0
4.0	3.5000	1486.0
5.0	3.0000	1563.0
6.0	2.6667	1620.0
7.0	2.4286	1677.0
8.0	2.2500	1720.0
9.0	2.1111	1787.0
10.0	2.0000	1850.0
12.0	1.8333	1942.0
14.0	1.7143	2025.0
16.0	1.6250	2117.0
18.0	1.5556	2196.0
20.0	1.5000	2296.0
22.0	1.4545	2373.0
24.0	1.4167	2447.0
26.0	1.3846	2533.0
28.0	1.3571	2605.0
30.0	1.3333	2689.0
35.0	1.2857	2851.0
40.0	1.2500	3009.0
45.0	1.2222	3150.0
50.0	1.2000	3267.0
55.0	1.1818	3386.0
60.0	1.1667	3491.0

BOTH SHUT-IN CURVES HAVE BEEN INCREMENTED AND PLOTTED, BUT EXTRAPOLATED PRESSURES HAVE NOT BEEN MADE DUE TO INSUFFICIENT CHARACTER

WELL NAME: L.L.&E. FEDERAL 1-

DST NUMBER: 001

RECORDER NUMBER: 010240

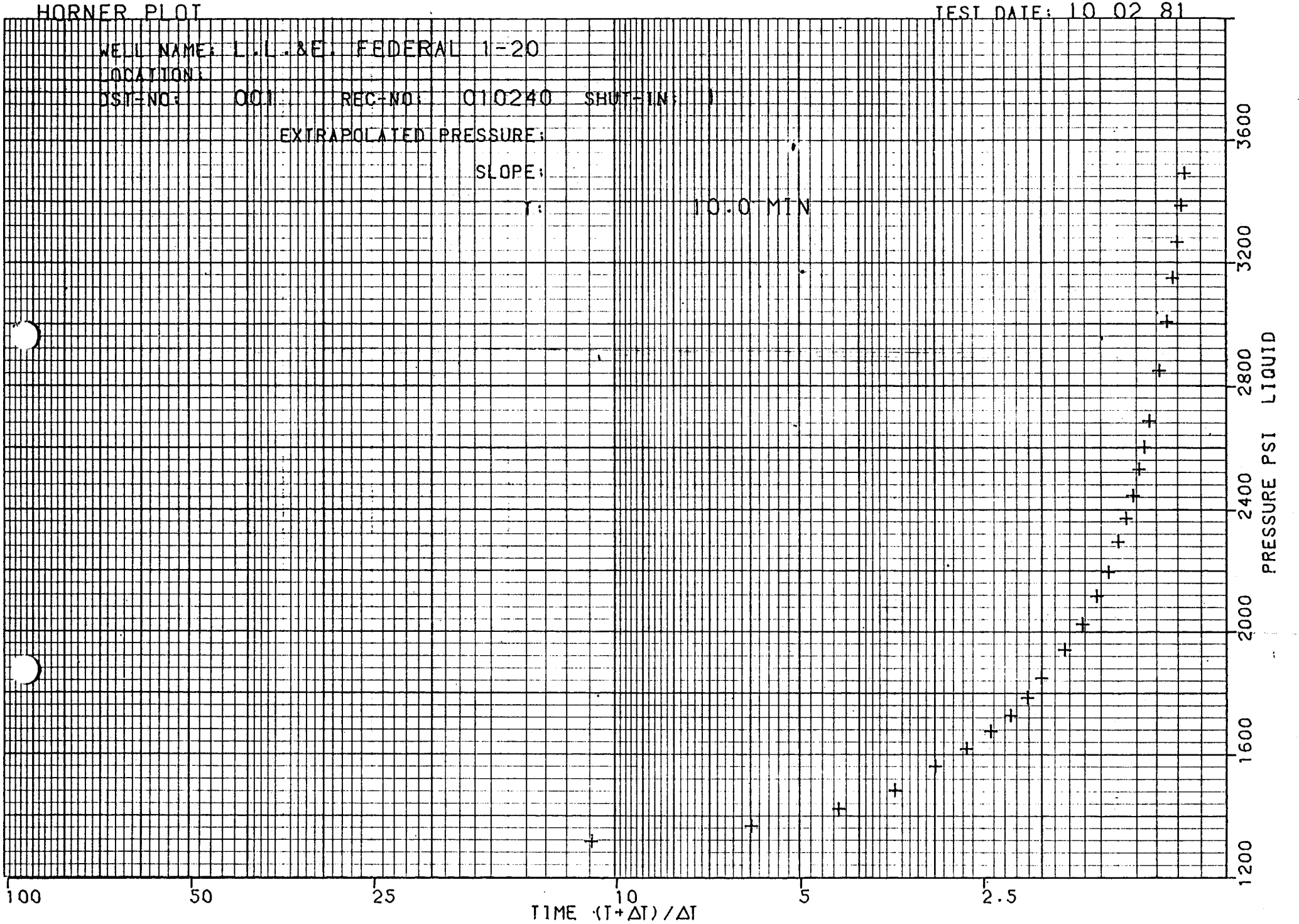
INTERVAL TESTED: 10705FT TO 10795FT

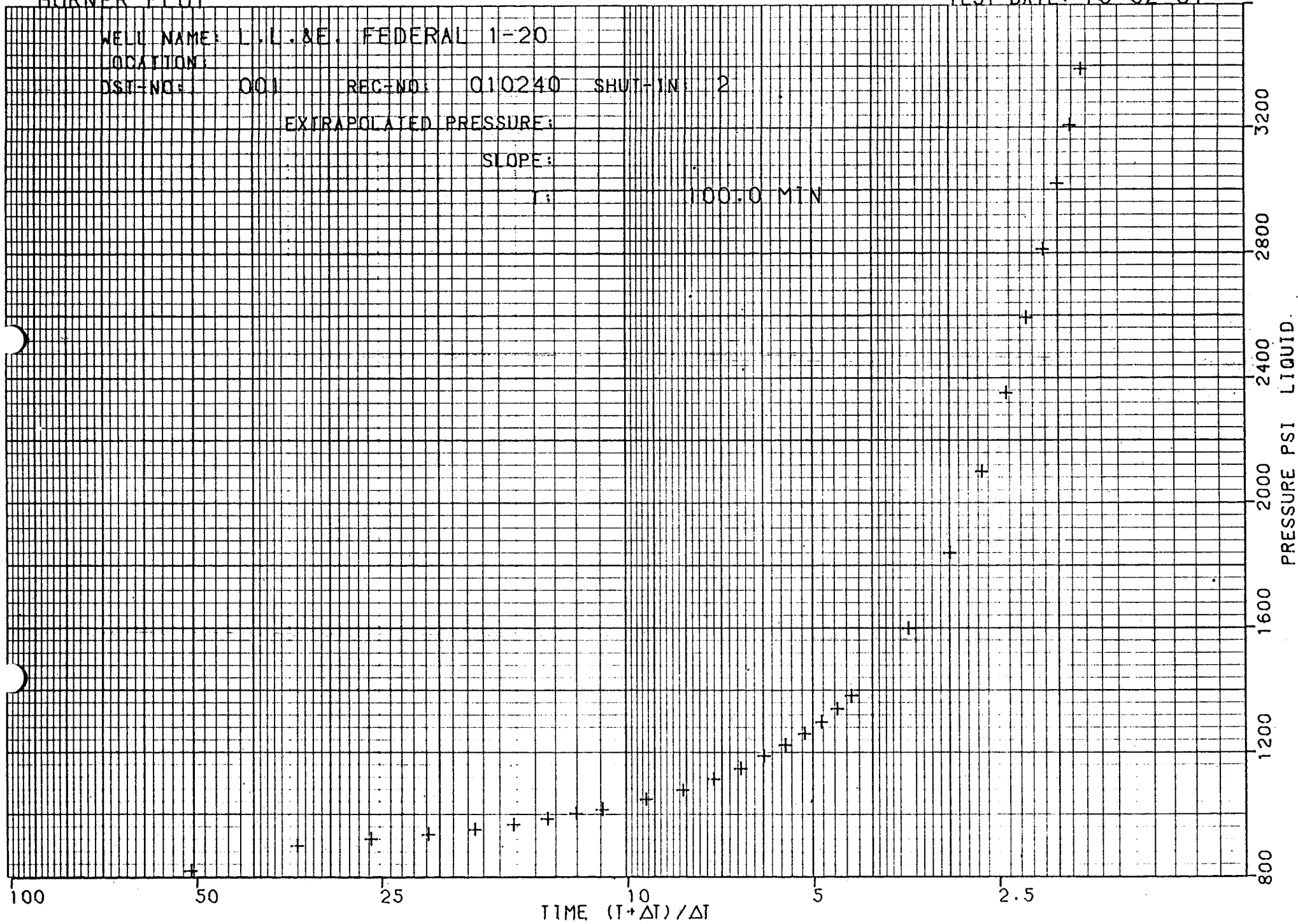
RECORDER DEPTH: 10728.000FT

TOTAL FLOW TIME: 100.0MIN

SECOND SHUT IN PRESSURE (LIQUID)

TIME (MIN) PHI	(T+PHI) /PHI	PRESSURE (PSI)
.0	.0000	748.0
1.0	101.0000	761.0
2.0	51.0000	820.0
3.0	34.3333	901.0
4.0	26.0000	923.0
5.0	21.0000	937.0
6.0	17.6667	953.0
7.0	15.2857	969.0
8.0	13.5000	987.0
9.0	12.1111	1004.0
10.0	11.0000	1016.0
12.0	9.3333	1048.0
14.0	8.1429	1078.0
16.0	7.2500	1115.0
18.0	6.5556	1149.0
20.0	6.0000	1189.0
22.0	5.5455	1224.0
24.0	5.1667	1260.0
26.0	4.8462	1297.0
28.0	4.5714	1339.0
30.0	4.3333	1381.0
40.0	3.5000	1596.0
50.0	3.0000	1838.0
60.0	2.6667	2098.0
70.0	2.4286	2351.0
80.0	2.2500	2592.0
90.0	2.1111	2810.0
100.0	2.0000	3019.0
110.0	1.9091	3206.0
120.0	1.8333	3388.0


HORNER PLOT
TEST DATE: 10 02 81
WELL NAME: L.L.&E. FEDERAL 1-20
LOCATION:
DST-NO: 001 REC-NO: 010240 SHUT-IN: 1
EXTRAPOLATED PRESSURE:
SLOPE:
T: 10.0 MIN
3600
3200
2800
2400
2000
1600
1200
PRESSURE PSI LIQUID
100
50
25
10
5
2.5
TIME (T+ΔT)/ΔT


HORNER PLOT
TEST DATE: 10-02-87
WELL NAME: L.L.&E. FEDERAL 1-20
LOCATION:
DST-NO: 001 REC-NO: 010240 SHUT-IN: 2
EXTRAPOLATED PRESSURE:
SLOPE:
T: 100.0 MIN
3200
2800
2400
2000
1600
1200
800
PRESSURE PSI LIQUID
100
50
25
10
5
2.5
TIME (T+ΔT)/ΔT

LYNES, INC.

Sampler Report

Company: John J. Christmann & Associates — Date: 10-2-81

Well Name & No.: L.L. & E. Federal #1-20 — Ticket No.: 31021

County: Rich — State: Utah

Test Interval: 10,705' - 10,795' — DST No.: 1

Total Volume of Sampler: 2150 cc.

Total Volume of Sample: 2150 cc.

Pressure in Sampler: 245 psig

Oil: NONE cc.

Water: 2150 saltwater cc.

Mud: -- cc.

Gas: NONE cu. ft.

Other: NONE

Sample R.W.: 0.18 @ 62°F = 45,000 ppm. Cl.

Resistivity

Make Up Water R.W. 1.4 @ 64°F of Chloride Content 4,600 ppm.

Mud Pit Sample R.W. 0.3 @ 83°F of Chloride Content 18,300 ppm.

Gas/Oil Ratio _____ Gravity _____ °API @ _____ °F

Where was sample drained on location.

Remarks:

Form 5

LY-234

LYNES, INC.

Distribution of Final Reports

John J. Christmann & Associates (Operator) | L.L. & E. Federal #1-20 (Well Name and No.) |

Original: Christmann Associates, P. O. Box 238, Pinedale, Wyoming 82941

1 Copy: H. G. Hutton, P. O. Box 386, Woodruff, Utah 84086

1 Copy: Division of Oil, Gas & Mining, 1588 West, North Temple, Salt Lake City, Utah 84116

1 Copy: U.S.G.S., 1745 W. 1700 South Street 2000, Salt Lake City, Utah 84104

1 Copy: Chuck Christmann, 1500 Broadway, Suite 800, Lubbock, Texas 79401

1 Copy: Flag-Redfern Oil Company, 1200 Wall Towers West, Midland, Texas 79702
Attn: Byron Graves

1 Copy: Cooper Petroleum Company, 7510 W. Mississippi Ave., Lakewood, Colorado 80226
Attn: Jack Garhart

1 Copy: American Quasar, 1700 Broadway, Suite 707, Denver, Colorado 80290

1 Copy: Buffalo Royalty, P. O. Box 5084, Borger, Texas 79007

1 Copy: Marathon Oil Company, P. O. Box 120, Casper, Wyoming 82602
Attn: Robert L. Lantz

1 Copy: Elpaso Exploration Company, P. O. Box 289, Farmington, New Mexico 87401
Attn: Dave Poage

1 Copy: Stuart McKinley, P. O. Box 88, Daniel, Wyoming 83115

2 Copies: Doyle Hartman, 500 N. Main, P. O. Box 10426, Midland, Texas 79702

3 Copies: Louisiana Land & Exploration, 1675 Broadway, Suite 2100, Denver, CO 80202

1 Copy: Leede Exploration, 1675 Bradway, Suite 2420, Denver, CO 80202
Attn: Carl Perner

1 Copy: Leede Exploration, 516 Building of the Southwest, Midland, Texas 79701
Attn: Tom Morgan

LYNES, INC.

Distribution of Final Reports

John J. Christmann & Associates (Operator) | L.L. & E. Federal #1-20 (Well Name and No.) |

1 Copy: Quintana Production, P. O. Box 3331, Houston, Texas 77001

Attn: C. M. Frick

1 Copy: Mid-America Petroleum Company, 1675 Broadway, Suite 2330, Denver, CO 80202

Attn: Larry Manion

1 Copy: Mid-America Petroleum Company, P. O. Box 2515, Midland, Texas 79702

1 Copy: Arkla Exploration, 410 17th Street, Suite 1917, Denver, CO 80202

2 Copies: Patrick Petroleum Company, Colorado National Bank Bldg.

950 17th Street, Denver, CO 80202

1 Copy: Towner Petroleum Company, 16801 Greens Point Park Drive, Suite 160

Houston, Texas 77060

Attn: Richard Smith

December 22, 1981

John J. Christmann and Assoc.
P. O. Box 238
Pinedale, Wyoming 82941

Re: Well No. LL & E FEderal #1-20
Sec. 20, T. 10N, R. 8E
Rich County, Utah

Gentlemen:

In reference to the above mentioned well, considerable time has gone by since approval was obtained from this office.

This office has not received any notification of spudding. If you do not intend to drill this well, please notify this Division. If spudding or any other activity has taken place, please send necessary forms. If you plan to drill this location at a later date, please notify as such.

Your prompt attention to the above will be greatly appreciated.

Very truly yours,

DIVISION OF OIL, GAS AND MINING

Cari Furse

Cari Furse
Clerk Typist

HAROLD E. HUTTON
CONSULTING GEOLOGIST
P. O. BOX
CASPER, WYO. 82602

317 GOODSTEIN BLDG.

TELEPHONE:
307-266-6108

February 11, 1982

Mr. Cleon B. Feight
Oil Gas & Mining Division
1588 West, North Temple
Salt Lake City, Utah 84116

Re: Christmann & Associates
Christmann L L & E Federal 1-20
Sec. 20-T10N-R8E
Rich County, Utah

Dear Mr. Feight:

Enclosed is your copy of the geologic well report on the referenced well.

The drill time logs are not yet back from the reproduction shop and they will be forwarded at a later date.

Respectfully yours,

H. E. Hutton

H. E. Hutton
Consulting Geologist

HEH/gh
Enc.

GEOLOGICAL WELL REPORT

Christmann & Associates
Christmann L L & E Federal 1-20
3300' FWL & 1980' FSL (NW/4 SE/4)
Sec. 20-T10N-R8E
Rich County, Utah

Submitted by:
H. E. Hutton
317 Goodstein Bldg.
P. O. Box 1138
Casper, Wyoming 82602
Phone: (307) 266-6108
Mobile Phone: (307) 265-4190

Harold E. Hutton
Harold E. Hutton, Cosulting Geologist

I N D E X

WELL DATA

OPERATOR:	Christmann & Associates P. O. Box 238 Pinedale, Wyoming 82941
WELL NAME:	Christmann L L & E Federal 1-20
LEGAL LOCATION:	3300' FWL & 1980' FSL (NW/4 SE/4) Sec. 20-T10N-R8E
COUNTY AND STATE:	Rich County, Utah
ELEVATIONS	Ground Level 6514'; KB Elevation: 6538'
CONTRACTOR:	Lord Drilling Company Inc. 14618 W. 6th Ave. Golden, Colorado 80401
TOOL PUSHERS:	Oak Sanford; G. L. Brummond; "Pee Wee" King; Gary Merwe
EQUIPMENT:	Lord Rig #3 - 860 Oilwell
COMMENCED:	Spudded beneath conductor pipe @ 12:00 Hours, May 22, 1981
CONDUCTOR PIPE:	20" Conductor Pipe @ 42' GL / Ready mix cement by Dryhole Digger
SURFACE CASING:	13 3/8" - 61# - K55 @ 1177' KB / 900 sxs Lite, various additives 1st stage; & 150 sxs thickset - 150 sxs Neat / various additives, 2nd stage
INTERMEDIATE CASING:	9 5/8" - 53½# - 43½# @ 9302' KB / 600 sxs Poz, 200 sxs "G" various additives / 1st stage; 700 sxs Poz, various additives 2nd stage
PRODUCTION CASING OR PLUGS:	7" - 38# - 35# - L80 @ 17975' / 300 sxs "G", various additives & 175 sxs Poz, various additives
HOLE SIZE:	17½" Below conductor to 1180; 12¼" from 1180' to 9305'; 8½" 9305' to T.D.
DRILLING FLUID & CONTRACTOR:	Milchem - Dispersed Solids
MUD ENGINEER:	Kraig Phelps; Relief as assigned

WELL DATE (continued)

DRILL STEM TEST: DST #1 - 10707' - 10795'

LOGGING: Schlumberger

	RUN #1	RUN #2
DIL-SFL-GR	1171' - 66'	9298' - 1173'
BHC-GR-TTI	1171' - 66'	9268' - 1163'
FDC-CNL-GR	1172' - 66'	9299' - 1163'
CON. DIPMETER	1172' - 73'	9297' - 1171'
CYBDIP	1171' - 73'	9297' - 1171'
CYBLOOK	1171' - 66'	9299' - 1163'
FRAC. I.D.		9297' - 1171'
TRUE VERT DEPTH-DIRECTIONAL		9297' - 1171'

	RUN #3	RUN #4
DDL-MSFL-GR	17076' - 9292'	18053' - 9292'
BHC-GR-TTI	17064' - 9292'	18048' -16930'
FDC-CNL-GR	17072' - 9292'	
CON. DIPMETER	17070' - 9292'	
CYBDIP	17070' - 9292'	
CYBLOOK	17055' -10600'	
FRAC. I.D.	17070' - 9292'	
TRUE VERT DEPTH-DIRECTIONAL	17073' - 9292'	

MUD LOGGING: Brown Hydrocarbon Well Logging
Box 341
Woodruff, Utah 84086

MUD LOGGERS: Keith Brown (Owner)
Mike Freif

CORES: NONE

WELL DATE (continued)

CORE ANALYSIS:	None
VELOCITY SURVEYS:	Lloyd Powell Evanston, Wyoming
DRILLING TIME:	Martin Decker 24 hour Recorder
TOTAL DEPTH:	18054' Geolograph; 18066' SLM; 18054' Logger
CEASED DRILLING:	06:48 Hrs, January 14, 1982
SAMPLES DELIVERED:	Am Strat, Casper
SAMPLE INTERVALS:	10' Below Conductor to T.D. (30' ad dicated by drilling rate)
Geologist:	H. E. Hutton, Casper, Wyoming; Relief by Vic Gras, Salt Lake City, Utah; Dick Welch, Lakewood, Colorado; H. W. Merrell, Moab, Utah
DRILLING FORMAN:	Don Bowden, Vernal Utah; Joe Hugo, Pinedale, Wyoming Bob Rafferty, Grand Junction, Colorado
STATUS:	Waiting on Completion Tools

SUMMARY

The Christmann L L & E Federal 1-20 was spudded beneath conductor pipe on May 22, 1981 and reached a total depth of 18054' on January 14, 1981.

A seven inch long string was landed and cemented at 17975'; the rig was released and the well is presently awaiting completion tools.

One drill stem test was completed in the Thaynes formation but no attempts were made to test other observed shows because of deviated hole and depth considerations.

Typical crooked hole problems were encountered. In addition to minor uphole fishing problems there was a zone in which the pipe was differentially stuck and a major fishing job resulted from a twist off after log run #3.

Gas detector shows were unspectacular but similar to other shows encountered in nearby overthrust wells. The gas detector shows have been carefully tabulated and plans have been made to utilize the tabulations when perforating.

An anomalous trip gas show was observed near 13400' but it was believed to have occured when the hole was not kept full during the trip.

The logs are not entirely definitive in two zones and it will be necessary to carefully evaluate all zones by perforating and testing to prevent overlooking possible production.

On run #3 and #4 the MSFL curve is questionable and intermittent. Disucssions with various Schlumberger personel after run #3 led to the conclusion that no one was satisfied with the MSFL curve and Schlumberger agreed to rerun that curve free of charge when run # 4 was made. The MSFL did still not function entirely satisfactory on run #4 but some improvement can be seen. An estimated eighty % of run #3 is probably invalid while and estimated thirty % of run #4 is invalid. It is possible the poorer MSFL observations are the result of rugose hole, fractures, or diesel on the pads preventing a good pad to hole pickup. It is known that similar MSFL observations occured in at least one other overthrust hole.

In the Nugget interval which has low porosity, cross over was observed thru nearly the whole interval. Some Schlumberger personel believe the cross over may be due in part to a more calcitic matrix while others believe there may be gas present in Nugget fractures. The Nugget log observations have also occured in other holes.

Below the ?subthrust? there are possibly more splay faults and the lower most reddish section may be Three Forks but it also is very similar looking to the Preuss-Stump section.

In conclusion the prognosis for completing the hole as a gas well is good. Gas detector shows are not high but they are associated with fractures in most and are similar to shows which have historically yeilded production in the area.

BIT RECORD

BIT NO	MFGR	SIZE	TYPE	DEPTH OUT	FOOTAGE	HOURS	AVG. FT/HR	ROTARY RPM	1000# WEIGHT	PUMP PRESS	DULL T	DULL B	COND. G	REMARKS
1	HTC	17½	OSCIG	732	692	42	16.5	54	4/20	1200	4	E	I	In @40' below conductor pipe
2	RTC	17½	Y13J	1040	308	52	5.9	54	10/24	1400	5	E	I	
1 RR	HTC	17½	OSCIG	1140	100	28½	3.5	75	15/24	1050	5	E	I	#1 rerun
3	HTC	12¼	OWV	1170	30	5	6.0	75	5/10	1250	1	1	I	
1RR	HTC	17½	OSCIG	1180	10	1 3/4	5.7	75	5/10	1050	5	4	1/16	#1 reun - 30' reaming
Set 13 3/8" casing @ 1178'														
3 RR	HTC	12¼	OWV	1440	260	31	8.4	75	10/15	1350	4	4	I	#3 rerun
4	STC	12¼	F2	2088	648	70¼	9.2	80	7/10	1600	3	3	1/16	
5	SEC	12¼	S84F	2535	447	79 3/4	5.6	84	8/20	1800	4	E	1/16	
6	RTC	12¼	FP53J	3069	534	58¼	9.2	55/89	20/35	1950	3	E	1/8	
7	STC	12¼	F4	3863	794	75	10.6	56	35/50	1950	3	E	I	
8	STC	12¼	F4	4496	633	67½	9.4	56/72	35/50	1950	3	3	1/8	
9	STC	12¼	F4	5031	535	58	9.2	56	25	1900	5	4	1/8	

BIT RECORD (continued)

BIT NO	MFGR	SIZE	TYPE	DEPTH OUT	FOOTAGE	HOURS	AVG. FT/HR	ROTARY RPM	1000# WEIGHT	PUMP PRESS	DULL COND. T	B	G	REMARKS
10	SEC	12¼	S86F	5112	81	26	3.1	88	25	1750	5	4	3/8	
11	STC	12¼	F4	5207	95	21½	4.4	300	18	1000	5	8	3/8	Dynadrill
12	RTC	12¼	FP62J	5313	106	25¼	4.2	56	55	1750	8	4	1/8	
13	HTC	12¼	J55R	5587	274	51	5.4	56	45	1800	5	E	1/16	
14	HTC	12¼	J44R	5869	282	54 3/4	5.1	56	35/45	1800	4	E	1/8	
15	STC	12¼	F4	5916	47	18	2.6	300+	10/22	1000	8	8	¼	Dynadrill
16	STC	12¼	F7	5996	80	20 3/4	3.9	300+	25	1000	8	8	¼	Dynadrill
17	RTC	12¼	FP63	6434	438	68½	6.4	56	45	1700	3	E	1/16	
18	STC	12¼	F7	6542	108	27½	3.9	300+-	18	1000	-	-	-	Dynadrill - Dynadrill twisted off - fished
19	STC	12¼	F4	6542	--	--	---	----	-----	----	-	-	-	Cleaned out hole after fishing
20	SEC	12¼	M89TF	6608	66	24 3/4	2.7	300+-	10/12	1200	2	4	I	Dynadrill
21	RTC	12¼	HS51	6653	45	28	1.6	300+-	10	1200	2	3	I	Dynadrill
22	STC	12¼	F4	6849	196	49	4	300+-	15/18	1200	5	8	I	Dynadrill
23	STC	12¼	F4	6927	78	22½	3.5	300+-	10/25	1250	3	4	I	Dynadrill
19 RR	STC	12¼	F4	7418	491	109½	4.5	56	28	1700	5	4	1/8	

BIT RECORD (continued

BOT NO	MFGR	SIZE	TYPE	DEPTH OUT	FOOTAGE	HOURS	AVG. FT/HR	ROTARY RPM	1000# WEIGHT	PUMP PRESS	DULL T	COND B	G	REMARKS
24	HTC	12¼	J33	7867	449	101¼	4.4	56	40	1900	6	8	¼	Required 24 hours of reaming before drilling ahead
25	STC	12¼	F4	7913	46	22	2.1	300+-	30	1700	8	8	¼	Dynadrill
26	SEC	12¼	M89F	7932	19	10½	1.8	56	30/40	2200	2	E	1/16	
27	HTC	12¼	J55R	7962	30	22	1.4	54/78	15/45	2200	2	E	I	
28	RTC	12¼	FP52	8098	136	39	3.5	54	35	2200	6	E	1/8	
29	STC	12¼	F7	8157	59	19¼	3.1	54	40/50	2100	7	E	3/8	
30	STC	12¼	F9	8303	146	40½	3.6	45	45/48	2000	8	E	1/16	
31	SEC	12¼	H100	8418	115	30 3/4	3.7	56	38/55	2000	6	4	1/16	
32	RTC	12¼	S83	8593	175	43 3/4	4.0	40	50/53	2000	5	E	1/16	
33	RTC	12¼	S83	8653	60	20	3.0	40	40/48	1500	5	E	1/8	
34	SEC	12¼	H100	8696	43	11 3/4	3.7	56	40	1500	3	3	1/8	
35	SEC	12¼	H100	8885	189	32 3/4	5.8	56	40	1500	5	3	1/8	
36	STC	12¼	F7	8973	88	21	4.2	45	45	1500	8	3	1/8	
37	SEC	12¼	H100	9055	82	29¼	2.8	50	50	1500	3	4	1/8	
38	STC	12¼	F5	9122	67	26½	2.5	56	45/55	1500	3	E	I	

BIT RECORD (continued)

BIT NO	MFGR	SIZE	TYPE	DEPTH OUT	FOOTAGE	HOURS	AVG. FT/HR	ROTARY RPM	1000# WEIGHT	PUMP PRESS	DULL COND. T	B	G	REMARKS
39	RTC	12¼	FP62	9237	115	32½	3.5	40	60	2200	8	1	I	
40	STC	12¼	F5	9305	68	28	2.4	56	50/55	2100	2	E	I	
41	RTC	8½	S21GJ	9347*	45	7¼	6.2	55	30	2500	4	4	1/16	*Depth correction after logs to 9302' Drilled 1989' cement
42	STC	8½	F4	9710	363	74	4.9	46/66	18/40	2000	6	8	1/16	
43	STC	8½	F4	9867*	167	62¼	2.7	185	16	1500	8	2	1/16	*Depth correction to 9700' before Dynadrill run
44	STC	8½	F3	9876	9	4½	2.0	185	10	1700	8	8	I	Dynadrill
45	HTC	8½	J77	10074	198	53½	3.7	56	35	2000	3	2	I	
46	STC	8½	F5	10138	64	24¼	2.6	68	13/15	2000	3	2	I	
47	CHR	8½	ND331	10297	159	46½	3.4	450	15/18	2400	-	-	-	Dynadrill - twisted off at shank shot up & milled up
#1 Mill		8½	Mill	10297	---	---	----	---	-----	----	-	-	-	
45 RR	HTC	8½	J77	10299	2	10½	0.2	---	-----	----	-	-	-	Drilled up junk
#2 Mill		8½	Mill	10299	---	---	----	---	-----	----	-	-	-	

BIT RECORD (continued)

BIT NO	MFGR	SIZE	TYPE	DEPTH OUT	FOOTAGE	HOURS	AVG. FT/HR	ROTARY RPM	1000# WEIGHT	PUMP PRESS	DULL T	DULL B	COND. G	REMARKS
48	RTC	8½	FP63	10456	157	51	3.1	66	25/30	2250	3	2	I	
49	STC	8½	F4	10795	339	62 3/4	5.4	70/72	25	1900	7	2	I	
50	STC	8½	F4	11016	221	48 3/4	4.5	55	25/40	2000	7	2	I	
51	STC	8½	F5	11273	257	56	4.6	60	20/30	2100	7	3	I	
52	SEC	8½	M89TF	11537	264	54 3/4	4.8	60	20/30	2050	2	4	I	
53	SEC	8½	M89TF	11915	378	86	4.4	65	25/35	2000	7	4	1/16	
54	STC	8½	M89TF	12414	499	100½	5.0	65	25/35	2000	8	4	I	
55	STC	8½	F-5	12679	265	78 3/4	3.4	65	30	2000	7	4	I	
56	SEC	8½	M89TF	12952	273	63¼	4.3	55/60	25/35	2000	8	4	1/8	
57	STC	8½	F5	13153	201	52	3.9	45/60	30/35	2000	8	4	1/8	
58	HTC	8½	J77	13195	42	12¼	3.4	45/60	30/35	2000	8	8	1	
59	STC	8½	F9	13325	130	31 3/4	4.1	44/50	40/45	2000	8	8	1/8	
60	STC	8½	F9	13467	142	33	4.3	42	45	2000	8	4	1/16	
61	HTC	8½	J99	13596	129	33	3.9	43	45/50	1900/2000	8	4	I	
62	HTC	8½	J99	13847	251	54 3/4	4.6	43/48	40/50	2000/2300	8	8	1/16	

BIT RECORD (continued)

BIT NO	MFGR	SIZE	TYPE	DEPTH OUT	FOOTAGE	HOURS	AVG. FT/HR	ROTARY RPM	1000# WEIGHT	PUMP PRESS	DULL T	DULL B	DULL G	REMARKS
63	STC	8½	F7	14507	660	108½	6.1	45	28/32	2200/2250	4	3	1/16	
64	HTC	8½	J77	14889	382	82 3/4	4.6	43	30/35	2100	8	4	3/16	
65	STC	8½	F7	15542	653	130¼	5.0	43	35/37	2100	5	5	1/16	
66	STC	8½	F57	15950	408	64½	6.3	43	30/35	2000	5	4	1/8	Pulled for wshed out jet
67	STC	8½	F7	16541	591	108 3/4	5.4	42	28/35	2000/2150	3	3	1/8	
68	RTC	8½	FP63	16894	353	82¼	4.3	56	30/35	2000/2200	2	E	1/16	
69	STC	8½	F4	17080	186	29 3/4	6.3	60	28	1400	4	2	1/8	25 3/4 hrs. reaming
70	RTC	8½	FP62J	17077	---	0	----	---	-----	----	-	-	-	Depth correction after SLM & Logs to 17077' Twisted off
71	HTC	8½	J55R	17373	296	59 3/4	5	60	25	1350	8	8	3/8	
72	HTC	8½	J77	17573	200	50¼	4	43	25/35	1785	2	E	I	
73	STC	8½	F4	17616	43	17	2.5	43	30/37	1785	8	E	1/8	
74	HTC	8½	J55	17816	200	58¼	3.4	43	30/35	1900/1950	3	4	I	
75	HTC	8½	J55R	18054	238	75 3/4	3.1	42	35	1800	3	4	I	

Christmann & Associated
Christmann L L & E Federal 1-20
#4303330031
10N 8E 20

FORMATION TOPS

SYSTEM	FORMATION	LOG DEPTH	DATUM (6538KB)
Tertiary	Tertiary	Surface	+ 6538
	Transition	518	+ 6020
Cretaceous	Undivided	----	------
Jurassic	Preuss-Stump	4893	+ 1645
	Salt	6102	+ 436
	Twin Creek	6210	+ 328
	Gypsum Springs	7857	- 1319
Triassic	Nugget	8056	- 1518
	Ankara	9052	- 2514
	Thaynes	10070	- 3532
	Woodside	11600	- 5062
	Dinwoody	?12295?	- 5757
Permian	Phosphoria	12572	- 6034
Pennsylvanian	Weber	13079	- 6541
	Amsden	13444	- 6906
Mississippian	Madison	13840	- 7302
Devonian	Three Forks	15233	- 8695
	Jefferson	15420	- 8822
Ordovician	Big Horn	15820	- 9282
Cambrian?	?Cambrian?	16357	- 9819
	Subthrust	17570	-11032
	Total Depth	18054	-11516

DRILL STEM TEST RECORD

DST # 1
Thaynes
10705' - 10795' T. D. (90' Interval)
Conventional Bottom Hole DST
Field Data - October 2, 1981
To Test Drilling Breaks from 10711' to 10717'

Outside Recorder At 10728'	Minutes Duration (time)	Pressures
IH		4913
FH		4870
FP #1	10 mins	458-517
SIP #1	60 mins	3491
FP #2	90 mins	656-748
SIP #2	120 mins	3466
BHT		178°F

No Gas To Surface

1000' Fresh Water & Ammonia Cushion

Surface Choke: 3/8" Bottom Hole Choke: 9/16"

#1 Flow: Opened with weak surface blow and increased to 6½" at end of flow period.

#2 Flow: Opened with ¼" blow and increased to 7½ oz. in 45 mins. then decreased to 7 oz. in 85 mins. and remained static for remainder of test.

Pipe Recovery: 1900' Total Recovery Consisting of
930'(13.2 Bbls.) Mud Cut Ammonia Water Cushion
70'(0.99 Bbls.) Saltwater Cut Ammonia Water Cushion
900"(7.7 Bbls.) Saltwater

Sampler Recovery: 2150 cc Saltwater @ 245 P.S.I.
Rw Makeup Water: 1.4 @ 64°F - 4600 PPM
Rw Mud Pit Sample: 0.3 @ 83°F - 18300 PPM
Rw sample: 0.18 @ 62°F - 45000 PPM

WELL HISTORY

Date 1981	06:00 A.M. Depth	Hrs. Drlg.	Last 24 hours Activity
5/22	Base of Conductor	0	Nippling up - Preparing to Spud @ 40'
5/23	231	14	Nippling up - spudded - drilling - deviation surveys - drilling - pull into conductor pipe - repair torn up #2 pump
5/24	590	18½	Pump repairs - drilling - deviation surveys
5/25	770	15 3/4	Drilling - deviation surveys - trip #1 out - #2 in - drilling - trip for hole in pipe (cracked pin drilling fractures) - drilling
5/26	834	12½	Drilling - trip out - into repair pump - drilling - pump repair - drilling - deviation surveys - drilling
5/27	973	23¼	Drilling - deviation surveys - drilling
5/28	1068	17½	Drilling - deviation surveys - drilling - trip out #2 - pick up stabilizers - trip in #1 RR - drilling
5/29	1130	17½	Drilling - surveys - tail shaft repair - drilling
5/30	1180	12½	Drilling - surveys - trip #1 RR out - #3 in - drilling - trip #3 out - #1 RR in - reaming - drilling - circulate for logs
5/31	1180	0	Circulate for logs - trip #1 RR out - rig up Schlumberger - log & rid down - rig up run & cement surface casing - rig down casing & cement crews - wait on cement
6/1	1180	0	Wait on cement - nipple down 20" cut of 13 3/8" surface - weld on casing head - test - reweld test -

WELL HISTORY (continued)

Date 1981	06:00 A.M. Depth	Hrs. Drlg.	Last 24 hours Activity
			nipple up 13 3/8" BOP
6/2	1220	5	Nipple up - test - pick up bottom hole assembly - trip in bit # 3 RR - drill shoe & cement - drilling - surveys
6/3	1438	21¼	Drilling - deviation surveys
6/4	1498	5 3/4	Drilling - deviation surveys - trip #3 RR out - pick up bottom hole assembly - trip #4 in - drilling - stand pipe repair - surveys
6/5	1736	21¼	Drilling - deviation surveys - drilling - circulate & condition sitcky hole
6/6	1836	9 3/4	Drilling - deviation surveys - drilling - trip #4 out - change bottom hole assembly - trip #4 in - repair rotary table lock
6/7	1884	6	Trip #4 in with changed bottom hole assembly - reaming - drilling ahead
6/8	2088	19½	Drilling - deviation surveys - repairs - trip #4 out
6/9	2160	12½	Trip #4 out - changed over bottom hole assembly - trip #5 in - drilling - deviation surveys
6/10	2233	17 3/4	Drilling - reaming - deviation surveys - drilling
6/11	2338	23	Drilling - deviation surveys
6/12	2526	21	Drilling - deviation surveys - drilling
6/13	2587	9	Drilling - trip #5 out - #6 in - reaming - drilling
6/14	2778	20	Drilling - deviation surveys - repairs - drilling - survey
6/15	3007	22½	Drilling - deviation surveys

WELL HISTORY (continued)

Date 1981	06:00 A.M. Depth	Hrs. Drlg.	Last 24 hours Activity
6/16	3122	13¼	Drilling - deviation surveys - trip #6 out - Magna Flux Drill Collars - trip #7 in - drilling - trip out to recover lost survey go-devil
6/17	3362	20¼	Recovery lost survey tool - trip #7 in - drilling - deviation survey
6/18	3620	23½	Drilling - deviation survey
6/19	3828	21½	Drilling - deviation survey
6/20	3992	16	Drilling - deviation surveys - trip #7 out - replace reamers - trip #8 in - reaming - drilling - deviation surveys
6/21	4214	22¼	Drilling - deviation surveys
6/22	4404	21¼	Drilling - deviation surveys
6/23	4504	13¼	Drilling - deviation surveys - trip # 8 out - #9 in - reaming - drilling
6/24	4747	23	Drilling - deviation surveys
6/25	4967	23½	Drilling - deviation surveys
6/26	5035	12½	Drill - pull # 9 - #10 in - ream
6/27	5108	23	Drill - surveys
6/28	5176	15	Drill - pull #10 - pick up Dynadrill - run #11 - ream
6/29	5207	7½	Drilling - ream - pull #11 lay down Dynadrill - run #12
6/30	5310	23½	Drilling - surveys
7/1	5389	15¼	Drilling - trip pull #12 - run #13
7/2	5512	23	Drill - survey
7/3	5590	14½	Drill - trip #14 & #15 - survey
7/4	5737	22¼	Drill - survey

WELL HISTORY (continued)

Date 1981	06:00 A.M. Depth	Hrs. Drlg.	Last 24 hours Activity
7/5	5831	22¼	Drill - survey
7/6	5869	9	Drill - survey - test BOP - pull #14 - run #15 on Dynadrill
7/7	5916	18	Dynadrill - pull #15
7/8	5986	17¼	Run #16 - Dynadrill
7/9	6045	12	Pull #16 - run #17 - drill
7/10	6183	22	Drilling - surveys
7/11	6340	22	Drilling - surveys
7/12	6440	16	Drilling - surveys - trip #17 out - #18 in - drilling
7/13	6535	23	Drilling - surveys
7/14	6542	3½	Drilling - left fish in hole - fishing
7/15	6542	0	Fishing
7/16	6542	0	Fishing
7/17	6582	14 3/4	Lay down fish - pick up BHA - trip in #20 - drilling
7/18	6613	13¼	Drilling - trip #20 out - #21 in - drilling
7/19	6651	23½	Drilling
7/20	6699	13½	Drilling - trip #21 out - #22 in - drilling
7/21	6788	22¼	Drilling - survey - lost 60+- Bbls mud
7/22	6849	14½	Drilling - survey - trip #22 out - #23 in - wash to bottom
7/23	6927	22½	Drilling - survey - trip out #23
7/24	6937	2½	Trip out @23 - check collars - trip in #18 RR - drilling
7/25	7046	23½	Drilling - surveys - drilling

WELL HISTORY (continued

Date 1981	06:00 A.M. Depth	Hrs. Drlg.	Last 24 hours Activity
7/26	7145	23	Drilling - surveys - drilling
7/27	7245	23	Drilling - surveys - drilling
7/28	7364	23½	Drilling - surveys - drilling
7/29	7418	14	Drilling - Trip RR #19 out - #24 in reaming
7/30	7419	¼	Reaming - drilling
7/31	7496	21	Drilling - surveys - drilling
8/1	7609	20¼	Drilling - surveys
8/2	7700	23	Drilling
8/3	7811	22	Drilling - surveys
8/4	7867	14 3/4	Drilling - surveys - trip #24 out - #25 & Dynadrill in
8/5	7892	13	Trip #25 & Dynadrill in
8/6	7917	9½	Drilling - trip #25 out - #26 in- reaming - drilling
8/7	7943	16½	Drilling - trip #26 out - #27 in - drilling
8/8	7966	17	Drilling - trip #27 out - #28 in- drilling
8/9	8050	23 3/4	Drilling
8/10	8098	12 3/4	Drilling - circulate samples - survey- trip #28 out - check drill collars - trip #29 in
8/11	8157	19¼	Reaming - drilling - circulate samples
8/12	8186	9½	Trip #29 out - #30 in - reaming - drilling
8/13	8283	23¼	Drilling
8/14	8319	12¼	Drilling - trip #30 out - change BHA & stabilizers - trip #31 in - drilling

WELL HISTORY (continued)

Date 1981	06:00 A.M. Depth	Hrs. Drlg.	Last 24 hours Activity
8/15	8410	22 3/4	Drilling - survey - drilling
8/16	8452	13½	Drilling - survey - trip #31 out - #32 in - drilling
8/17	8539	22½	Drilling - survey
8/18	8593	11 3/4	Drilling - survey - trip #32 out - stuck going in hole - kelly up - got loose - reaming bridges to bottom
8/19	8652	19½	Reaming - drilling
8/20	8678	8	Drilling - SLM #33 out - #34 in - drilling
8/21	8716	9	Drilling trip #34 out - #35 in - reaming - drilling
8/22	8869	22½	Drilling - survey
8/23	8916	14½	Trip #35 out - #36 in - drilling - survey
8/24	8973	21	Drilling - trip #36 out
8/25	9034	18 3/4	Trip #36 out - #37 in - reaming - drilling
8/26	9062	11 3/4	Drilling - trip #37 out - #38 in - reaming
8/27	9121	23½	Drilling
8/28	9169	13	Trip #38 out - #39 in - reaming - drilling
8/29	9237	20½	Drilling - trip #39 out
8/30	9276	15½	Trip #39 out - #40 in - reaming - drilling
8/31	9305	12½	Drilling - C&C logs - survey - short trip - C&C logs - SLM #40 out
9/1	9305	0	SLM #40 out - rig up Schlumberger - logging

WELL HISTORY (continued)

Date 1981	06:00 A.M. Depth	Hrs. Drlg.	Last 24 hours Activity
9/2	9305	0	Rig down Schlumberger - trip in hole - C&C casing - trip out - lay down D C's - rig up & run intermediate casing
9/3	9305	0	Run & cement casing - mipple down - WOC
9/4	9305	0	Nipple down BOP's - cut off - nipple up - pressure test all systems
9/5	9305	0	PUDC's - trip in #41 - put on drill pipe - rubbers - drill stage collars pressure up test - drill cement
9/6	9305	0	Drill cement - correct TD to 9302'
9/7	9313	2	Drill cement - drill formation
9/8	9347	5¼	Drilling - ream - C&C bond log - trip out #41 - run bond log - PUBHA - BHA wouldn't go - trip out
9/9	9414	12	Mix mud - trip in #42 - reaming - drilling
9/10	9536	22½	Drilling - survey - drilling
9/11	9638	21 3/4	Drilling - survey - drilling
9/12	9710	17 3/4	Drilling - survey - drilling - trip #42 out SLM out
9/13	9730	13½	Trip in #43 on Dynadrill - make depth correction from 9710' to 9700' - Dynadrilling
9/14	9799	22 3/4	Dynadrill - survey
9/15	9860	23	Dynadrill - survey
9/16	9876	7½	Dynadrill - trip #43 out - #44 in - Dynadrill - trip #44 out
9/17	9936	17	Trip #45 in - reaming - drilling
9/18	10021	22½	Drilling - surveys - drilling

WELL HISTORY (continued)

Date 1981	06:00 A.M. Depth	Hrs. Drlg.	Last 24 hours Activity
9/19	10074	14	Drilling - survey - drilling - trip #45 out - #46 in
9/20	10131	21¼	Drilling - surveys
9/21	10176	12¼	Drilling - survey - trip #46 out - W. O. tools - trip #47 in - reaming - Dynadrilling
9/22	10246	23¼	Drilling - survey
9/23	10297	14	Dynadrill - survey - trip out - twisted Diamond Bit off @ shank
9/24	10297	0	W. O. tools - trip in mill & junk basket - no go - trip out - lay down IBS - pick up remaer - mill on bit
9/25	10297	0	Mill on junk - trip out - trip in line shot & blos up Diamond bit - trip in #45 RR - ream to fish - drill junk
9/26	10299	10½	Drill junk - trip out #45 RR - mill in - mill on junk
9/27	10337	13¼	Trip out mill - trip in #48 - reaming - drilling
9/28	10409	23	Drill - survey - drill
9/29	10456	14 3/4	Drill - survey - trip #48 out - #49 in
9/30	10584	22 3/4	Drill - survey - drill
10/1	10695	22	Drill - survey - drill
10/2	10795	18	Drill - survey - C&C DST #1 - SLM out for DST # 1
10/3	10795	0	Trip in DST #1 - testing - trip out DST # 1 - inspect drill collars
10/4	10850	11	Lay down & pick up 35 jts. drill pipe - trip in #50 - drilling
10/5	10944	23	Drill - survey - drill

WELL HISTORY (continued)

Date 1981	06:00 A.M. Depth	Hrs. Drlg.	Last 24 hours Activity
10/6	11016	14 3/4	Drill - survey - trip #50 out - #51 in
10/7	11116	20	Trip in #51 - drill - survey - drill
10/8	11242	22½	Drill - survey - drill
10/9	11293	13½	Drill - survey - trip #41 out - #52 in - reaming - drill
10/10	11387	22½	Drill
10/11	11519	22	Drill - survey - drill
10/12	11571	14¼	Drill - survey - trip #52 out - #53 in - ream - drill
10/13	11654	23½	Top woodside 11630
10/14	11752	21 3/4	Drilling - survey
10/15	11878	22 3/4	Drilling - survey
10/16	11921	14¼	Drilling to 11915 - pull bit #55 - in #56
10/17	12058	23½	Drilling
10/18	12149	20¼	Drilling
10/19	12252	22 3/4	Drilling
10/20	12370	23¼	Drilling
10/21	12414	9	Drilling - trip & test BOP
10/22	12414	0	Test BOP - pull plug bit - reaming to 7450 - out with reamer
10/23	12466	12 3/4	Trip in hole - drilling
10/24	12558	23½	Drilling
10/25	12642	22½	Drilling
10/26	12679	11	Drilling - trip for bit
10/27	12710	23¼	Drilling
10/28	12882	22 3/4	Drilling

WELL HISTORY (continued)

Date 1981	06:00 A.M. Depth	Hrs. Drlg.	Last 24 hours Activity
10/29	12952	16¼	Trip for bit
10/30	13020	16½	Trip - drilling
10/31	13114	23 3/4	Drilling
11/1	13153	11 3/4	Drilling - trip for bit
11/2	13195	12¼	Drilling - trip for bit
11/3	13276	20 3/4	Drilling - finish going in with new bit
11/4	13325	11	Drilling - trip for bit
11/5	13417	19½	Trip #60 in - drilling
11/6	13467	13	Drilling - trip #60 out - #61 in - drilling
11/7	13558	22¼	Drilling - survey - drilling
11/8	13596	10 3/4	Drilling - trip #61 out - #62 in - wash to bottom
11/9	13697	22	Drilling
11/10	13807	22½	Drilling - survey - drilling
11/11	13847	10¼	Drilling - circulate for trip - trip #62 out - change bottom hole assembly - trip in #63 to shoe - inspect drill collars
11/12	13900	9 3/4	Change drilling line spool - trip #63 out in - stuck - got loose - ream to bottom - drilling
11/13	14007	22	Drilling - survey - drilling
11/14	14140	23 3/4	Drilling
11/15	14300	22 3/4	Drilling - survey - drilling
11/16	14452	22	Drilling - survey - drilling
11/17	14509	8 3/4	Drilling - survey - trip #63 out - change out 15 jts. drill pipe - trip #64 in - drilling

WELL HISTORY (continued)

Date 1981	06:00 A.M. Depth	Hrs. Drlg.	Last 24 hours Activity
11/18	14612	22 3/4	Drilling
11/19	14737	22 3/4	Drilling
11/20	14839	23½	Drilling
11/21	14889	12¼	Drilling - trip #64 out - #65 in
11/22	14959	15¼	Trip #65 in - remaing - drilling - survey - drilling
11/23	15079	23½	Drilling
11/24	15211	23½	Drilling
11/25	15320	23½	Drilling
11/26	15428	23 3/4	Drilling
11/27	15542	20 3/4	Drilling - trip #65 out
11/28	15570	6½	Trip #65 out - inspect collars - trip #66 in - reaming - drilling
11/29	15696	21 3/4	Drilling - survey - drilling
11/30	15842	23 3/4	Drilling
12/1	15950	12½	Drilling - trip #66 out for washed jet - trip #67 in
12/2	16019	11	Trip #67 - intermittant reaming from 12385' to T.D. - drilling
12/3	16163	22	Drilling - survey - drilling
12/4	16266	21 3/4	Drilling - survey - drilling
12/5	16400	23½	Drilling
12/6	16514	23½	Drilling
12/7	16541	7	Drilling - survey - trip #67 out - change BHA - trip #68 in
12/8	16590	17 3/4	Trip #68 in - drilling
12/8	16663	22¼	Drilling - survey - drilling
12/9	16792	20 3/4	Drilling - survey - drilling

WELL HISTORY (continued)

Date 1981	06:00 A.M. Depth	Hrs. Drlg.	Last 24 hours Activity
12/10	16792	20 3/4	Drilling - survey - drilling
12/11	16894	21½	Drilling - survey - work tight hole - drilling - circulate for trip - survey
12/12	16894	0	Stuck - circulate & condition - jar stuck pipe - retrieve survey - spot diesel & mil free - run free point - jar bottom hole assembly
12/13	16894	0	Jarred stuck bottom hole assembly
12/14	16894	0	Jar stuck bottom hole assembly - pumped nitrogen - got free - worked pipe - restuck - pumped nitrogen - trip out to 16249' - circulate gas out - losing mud - restuck bottom hole assembly - circulate & condition - wait on Halliburton
12/15	16894	0	Work pipe - condition & circulate - pump nitrogen - trip out - circulate & condition mud (thru gas buster
12/16	16894	0	Circulate & condition - trip #68 out - change bottom hole assembly - trip #69 in - reaming tight hole
12/17	16894	0	Trip #69 in - ream tight hole as required
12/18	16967	16	Reaming - drilling - broke down rotary drive - short trip 52 strands - repairs.
12/19	17018	4 3/4	Repairs - reaming back to bottom - drilling
12/20	17080	9	Drilling - circulate & condition logs - survey - short trip 53 stands - circulate & condition for logs
12/21	17080	0	SLM #69 out for logs - rig up logger - logging
12/22	17077	0	SLM & logger T.D. both 17077' - made correction

WELL HISTORY (continued)

Date 1981	06:00 A.M. Depth	Hrs. Drlg.	Last 24 hours Activity
12/23	17077	0	Logging - rearrange BHA - trip #70 in - break circulation - reaming to bottom - twisted off - trip out - W.O. fishing tools
12/24	17077	0	Fishing - trips with fishing tools - unable to catch fish
12/25	17077	0	Fishing - trips - caught fish - dropped fish after pulling 17 stands - trips - caught fish - lay down fish #1
12/26	17077	0	Fishing - trips - caught fish - lay down fish #2 - inspect and straighten drill pipe
12/27	17077	0	Fishing - trips - caught fish - lay down fish #3 - inspect and straighten drill pipe
12/28	17077	0	Inspect & straighten drill pipe
12/29	17077	0	Fishing - trips - caught fish - lay down fish #4 - unload new drill pipe
12/30	17078	1	Trip in #71 - break circulation - trip #71 in - ream to bottom - drilling
12/31	17192	23 3/4	Drilling
1982			
1/1	17325	24	Drilling
1/2	17373	11	Drilling - circulate bottoms up - survey - trip #71 out - work tight hole - trip # 71 out
1/3	17384	2 3/4	Trip #71 out - #72 in - reaming - drilling
1/4	17452	19	Drilling - survey - short trip - drilling
1/5	17554	23½	Drilling

WELL HISTORY (continued)

Date 1982	06:00 A.M. Depth	Hrs. Drlg.	Last 24 hours Activity
1/6	17573	5	Drilling - circulate bottoms up - survey - trip #72 out #73 in - reaming
1/7	17616	17	Drilling - trip #73 out
1/8	17646	8	Trip #73 out - #74 in - reaming - drilling
1/9	17725	23½	Drilling
1/10	17807	23¼	Drilling
1/11	17831	8½	Drilling - survey - trip #74 in - reaming - drilling
1/12	17902	22 3/4	Drilling
1/13	17975	24	Drilling
1/14	18052	23½	Drilling
1/15	18054	½	Drilling - circulate & condition logs - shor trip for logs - circulate & condition logs - survey - SLM #75 out for logs - riggin up Schlumberger
1/16	18054	0	Trip in DLL - MSFL - GR - logs no go - with or without centralizers - trip in drill pipe circulate & condition for logs - trip out for logs
1/17	18054	0	Trip out for logs - rig up Schlumberger - logging
1/18	18054	0	Logging velocity surveys - rig down logger - trip in with drill pipe - rem 35' to bottom - circulate & condition for logs - trip out laying down drill pipe
1/19	18054	0	Laid down drill pipe & drill collars - string up 12 lines - rup up casing crew - running long string

WELL HISTORY (continued)

Date 1982	06:00 A.M. Depth	Hrs. Drlg.	Last 24 hours Activity
1/20	18054	0	Ran long string - rig down - casing crew - rig up Halliburton - cement casing - displace with water - realse rig - rigging down rotary tools

DEVIATION SURVEY

DEPTH	DEVIATION
40'	½°
131'	1°
229'	3/4°
326'	3/4°
400'	1°
474'	½°
511'	½°
574'	½°
636'	½°
730'	½°
816'	3/4°
879'	3/4°
973'	3/4°
1040'	2½°
1071	2½°
1106'	2 3/4°
1138'	3°
1160'	2°
1174'	2½°
1195	2¼°N69°E
1252'	2¼°N71°E
1283'	2¼°N75°E
1345'	2½°N78°E
1376'	2 3/4°N74°E
1423'	3°N78°E
1451	2½°N73°E
1483'	2½°N83°E
1575'	3¼°N77°E
1637'	3½°N69°E
1731'	3½°N70°E
1810'	4°N68°E

DEVIATION SURVEY (continued)

DEPTH	DEVIATION
1873'	4¼°N68°E
1927'	4 1/8°N69°E
1990'	4¼°N72°E
2071'	4½°N74°E
2136'	4¼°N77°E
2163'	4¼°N78°E
2228'	4°N77°E
2289'	3¼°N83°E
2320'	2 3/4°N77°E
2352'	2 7/8°N79°E
2383'	2 5/8°N77°E
2414'	M.R.
2446'	2 3/8°N74°E
2477'	2 3/8°N78°E
2518'	2 3/4°N73°E
2535'	2¼° Dropped
2547'	2°-N74°E
2578'	2 1/8°N70°E
2609'	2¼°N75°E
2640'	2 3/8°N73°E
2703'	2½°N74°E
2734'	2½°N82°E
2827'	2½°N76°E
2919'	2 5/8°N79°E
2982'	2 3/4°N81°E
3014'	2 3/4°N84°E
3109'	2 3/4°N81°E
3205'	M.R.
3211'	2 3/4°N81°E
3301'	2 3/4°N77°E
3425'	2 3/4°N84°E
3613'	2 3/4°N81°E
3734'	2 3/4°+N81°E
3798'	2 3/4°N83°E
3893'	3°N83°E

DEVIATION SURVEY (continued)

DEPTH	DEVIATION
3985'	3°N84°E
4109'	3½°N85°E
4170'	3 3/4°N87°E
4231'	3½°N89°E
4324'	3 3/4°N89°E
4436'	4° Due E
4496'	4° Totco Drop
4559'	4°+ Due E
4683'	4¼°N88°E
4835'	4 7/8°S86°E
4927'	5¼°E
4986'	5 3/4°N89°E
4986'	5¼°
5053'	6°N89°E
5085	5 3/4°
5107'	6°N83°E
5138'	5 3/4°N83°E
5163'	5 3/4°N83°E
5225'	5 3/4°N82°E
5269'	5½°N82°E
5362'	5 3/4°N83°E
5454'	6°N84°E
5544'	6¼°N83°E
5648'	6¼°N84°E
5735'	6½°N86°E
5793'	6½°N83°E
5812'	7° Dropped
5884'	6 3/4°N83°E
5925'	6½°N84°E
5950'	6¼°N83°E
6045'	6°N83°E
6135'	5½°N83°E
6230'	6°N83°E
6323'	6 3/4°N81°E
6386'	7¼°N86°E

DEVIATION SURVEY (continued)

DEPTH	DEVIATION
6467'	8½°N87°E
6500'	8 3/4°N87°E
6560'	9½°N88°E
6625'	8 3/4°N88°E
6661'	8½°N88°E
6723'	8°N89°E
6789'	7 3/4°S89°E
6811'	7 3/4°N89°E
6889'	7¼°N88°E
6979'	7 3/4°N87°E
7061'	8°N89°E
7155'	8¼°N89°E
7247'	8½°N87°E
7340'	8½°N89°E
7373'	M.R.
7443'	9°N89°E
7489'	3° Misruns
7519'	M.R.
7551'	9 3/4°N85°E
7675'	10¼°N83°E
7801'	11½°N86°E
7830'	11½°N87°E
7870'	11°N88°E
7934'	11°N85°E
8053'	11°N86°E
8132'	11°
8247'	12° Due E
8278'	12¼° Due E
8349'	12½° Due E
8437'	12¼° Due E
8549'	M.R.
8609'	13° Due E
8788'	12¼°N87°E
8856'	11 3/4° Due E
8934'	11¼° Due E

DEVIATION SURVEY (continued)

DEPTH	DEVIATION
9011'	11½°N88°E
9078'	10 3/4°N88°E
9194'	M.R.
9267'	11¼°N82°E
9439'	11½°N77°E
9551'	13°N77°E
9635'	13 3/4°N80°E
9695'	14¼°+N79°E
9756'	14 3/4°N82°E
9803'	14 3/4°N83°E
9837'	15°N82°E
9842'	14 3/4°N82°E
9891'	15¼°N82°E
10027'	16¼°+N83°E
10050'	16¼°N80°E
10092'	16 3/4°N83°E
10113'	16½°N85°E
10142'	16°N80°E
10202'	16°N80°E
10262'	16°N80°E
10332'	16¼°N80°E
10400'	16½°N80°E
10487'	17°N80°E
10573'	16 3/4°N77°E
10689'	17°N80°E
10770'	16 3/4°N80°E
10836'	17°N80°E
10929'	17°N80°E
10970'	17°N80°E
11050'	17¼°N81°E
11175'	17 3/4°N79°E
11228'	17½°N80°E
11330'	17 3/4°N82°E
11454'	18°

DEVIATION SURVEY (continued)

DEPTH	DEIVATION
11492'	18°N80°E
11615'	17 3/4°N80°E
11742'	17 3/4°N81°E
11865'	17 3/4°N83°E
12024'	18 3/4°N87°E
12085'	18½°N87°E
12209'	17½°N80°E
12364'	17 3/4°NWW?
12391'	19¼°N90°E
12504'	19 3/4°N90°E
12594'	20°N90°E
12634'	20°N90°E
12750	19 3/4°N90°E
12900'	20°S88°E
13093'	20°S83°E
13195'	19 3/4°S88°E
13275'	M.R.
13422'	M.R
13430'	18¼°S89°E
13551'	17½°S89°E
13690'	18 3/4°N89°E
13827'	20¼° Due E
13941'	20¼°S85°E
14210'	M.R.
14252'	M.R.
14300'	20¼°S87°E
14497'	20¼°S87°E
14879'	M.R.
14913'	18¼°S86°E
15502'	M.R.
15564'	18°
15974'	17½°
16185'	16½°

DEVIATION SURVEY (continued)

DEPTH	DEVIATION
16523'	16½°
16570'	16°S89°E
16650'	14 3/4°S86°E
16880'	13¼°S88°E
17074'	14°S89°E
17425'	11°S89°E
17568'	9 3/4°S86°E
17811'	M.R.
18027'	8¼°N55°E
18054'	8°N67°E

MUD CHECKS

DATE 1981	DEPTH CHECKED	WT.	VIS.	P.V.	Y.P.	pH	W.L.	32nd FILTER CAKE	PPM SALT	PPM CHLORIDE	% OIL	PPM CALCIUM
5/23	231'	8.9	51	10	8	10.0	26	2	--	1250	---	---
5/24	245'	8.9	48	13	18	10.5	13	3	--	1500	---	---
5/25	630'	9.0	50	12	21	9.0	17	3	--	1800	---	---
5/26	777'	9.0	40	10	16	9.5	13	3	--	1800	---	---
5/27	845'	8.9+	40	9	10	10.0	11	3	--	2000	---	---
5/28	1003'	9.0	51	14	21	10	10	3	--	2100	---	---
5/29	1130'	9.0	57	17	20	8.5	13	3	--	2400	---	---
5/30	1139'	9.0	50	16	13	10.5	13	3	--	2200	---	---
5/31	No Report - Logging Surface Hole											
6/1	No Report - Nippling Up Survace Casing											
6/2	1180'	9.0	44	19	17	10.5	16	3	--	2100	---	---
6/3	1239'	9.0	43	20	18	10	15	3	--	2200	---	---
6/4	1437'	9.0	41	13	9	9.5	13	3	--	2300	---	---
6/5	1568'	9.0	43	13	9	10.	13	2	--	2300	---	---
6/6	1773'	9.0	52	12	12	10	13	3	--	2300	---	---
6/7	1836'	9.0+	50	10	10	10	12.5	3	--	2200	---	---
6/8	1898'	9.0	51	11	13	10	13	3	--	2200	---	---
6/9	2086'	9.0	47	11	15	10	11	3	--	2400	---	---
6/10	2169'	8.9+	50	13	14	10	10.5	3	--	2450	---	---

MUD CHECKS (continued)

DATE 1981	DEPTH CHECKED	WT.	VIS.	P.V.	Y.P.	pH	W.L.	32nd FILTER CAKE	PPM SALT	PPM CHLORIDE	% OIL	PPM CALCIUM
6/11	2245'	8.8+	47	12	15	10	11	3	--	2400	---	---
6/12	2360'	8.9	51	12	11	10	11	2	--	2600	---	---
6/13	2530'	9.0	41	12	10	9.0	11	3	--	2950	---	---
6/14	2589'	8.8+	48	11	18	9.5	10	2	--	2850	---	---
6/15	2795'	8.9	47	12	19	10.0	10	2	--	2500	---	---
6/16	3028'	8.8+	50	12	17	10.0	10.4	2	--	2400	---	---
6/17	3137'	8.8+	44	11	15	9.3	11.4	3	--	2850	---	---
6/18	3407'	8.9+	40	10	12	9.5	12.8	3	--	2550	---	---
6/19	3653'	8.9+	52	14	18	10.0	12.5	3	--	2450	---	---
6/20	3863'	9.1	47	13	16	10.0	13.2	3	--	2500	---	---
6/21	4026'	9.0+	47	14	15	9.5	13	3	--	2750	---	---
6/22	4228'	9.0	49	14	12	10	14	3	--	2800	---	---
6/23	4427'	9.1	53	14	15	10	12.5	2	--	2900	---	---
6/24	4427'	9.0+	46	12	16	10	9.0	2	--	2500	---	---
6/25	4790'	8.9+	50	14	17	9.5	10	2	--	2700	---	---
6/26	4984'	8.8	47	13	16	9.3	12	3	--	2550	---	---
6/27	5046'	8.8	41	10	10	9	13.5	3	--	2700	---	---
6/28	5125'	8.8	48	12	14	10.5	10.5	3	--	5600	---	---
6/29	5207'	8.8	48	12	11	10	11.3	2	--	7300	---	---
6/30	5245'	8.8	46	11	11	12	10	2	--	7300	---	---
7/1	5313'	8.8	48	13	12	10	11	2	--	7300	---	---
7/2	5407'	8.9	47	12	12	10	12	2	--	7000	---	---

MUD CHECKS (continued)

DATE 1981	DEPTH CHECKED	WT.	VIS.	P.V.	Y.P.	pH	W.L.	32nd FILTER CAKE	PPM SALT	PPM CHLORIDE	% OIL	PPM CALCIUM
7/3	5535'	9	42	12	11	10	11.3	2	--	6800	---	---
7/4	5605'	9	46	11	13	10	12	2	--	6000	---	---
7/5	5748'	8.9	46	10	12	10	11	2	--	5600	---	---
7/6	5838'	8.8	44	10	11	10	11.5	2	--	4800	---	---
7/7	5869'	8.8	44	10	10	9.5	10.5	2	--	5000	---	---
7/8	5916'	8.9	50	12	15	10	13	2	--	6800	---	---
7/9	5987'	8.8	49	12	16	10	11.5	2	--	9600	---	---
7/10	6045'	8.9	49	11	19	10	11.5	2	--	10050	---	---
7/11	6191'	8.8	58	12	26	10	14	2	--	15200	---	---
7/12	6344'	8.9	55	15	21	10	12	2	--	16500	---	---
7/13	6448'	8.8	64	15	25	9	13	2	--	19500	---	---
7/14	6542'	8.8	54	15	18	10	11	2	--	20500	---	---
7/15	6542'	8.8	58	18	21	9.5	9.5	2	--	20000	---	---
7/16	6542'	8.7	58	14	26	10.0	10.5	2	--	20000	---	---
7/17	6542'	8.7	55	13	22	10.0	12.5	2	--	20000	---	---
7/18	6548'	8.6	47	13	12	10.0	9.8	2	--	21000	2.0	---
7/19	6616'	8.7	50	13	13	10.0	10.0	2	--	20000	3.5	---
7/20	6652'	8.7	49	12	14	10.0	9	2	--	21000	2.0	---
7/21	6708'	8.8	46	12	14	10.0	9	2	--	19500	2.6	---
7/22	6800'	8.8	49	13	13	9.5	9.5	2	--	30000	3.0	---
7/23	6852'	8.6	59	11	29	9.7	8	3	--	30000	3.0	----
7/24	6927'	9.4	47	8	29	10.0	9	3	--	31000	3.0	---
7/25	6946'	8.5	47	5	28	10.0	8.5	2	--	31000	3.0	---

MUD CHECKS (continued)

DATE 1981	DEPTH CHECKED	WT.	VIS.	P.V.	Y.P.	pH	W.L.	32nd FILTER CAKE	PPM SALT	PPM CHLORIDE	% OIL	PPM CALCIUM
7/26	7055'	8.7	45	6	25	9.7	8.3	3½	--	31000	3.0	---
7/27	7154'	8.9	52	11	16	9.5	9.0	3	--	28500	3.0	---
7/28	7264'	8.8	45	11	9	9.5	8.5	2.5	--	27000	3.5	---
7/29	7372'	8.9	44	10	8	10	9	2.5	--	25000	4.0	---
7/30	----	---	--	--	--	----	----	---	--	-----	---	---
7/31	7426'	9.0	55	15	18	11.0	10.0	2	--	22000	3.5	---
8/1	7507'	8.9	56	14	18	10.5	10.5	2	--	20133	3.2	---
8/2	7621'	8.9	50	15	15	10.0	9.5	2	--	18000	4	---
8/3	7709'	8.0	49	14	15	9.5	10.0	2	--	15000	3.6	---
8/4	7822'	8.8	48	14	16	9.5	10.0	2	--	16500	3.5	---
8/5	7867'	9.0	59	17	18	10	11.0	2.5	--	16500	3.5	---
8/6	7898'	9.0	49	17	13	10.5	9.5	2	--	19000	3.2	---
8/7	7924'	9.1	49	16	16	10.0	10.5	2.5	--	19500	3.0	---
8/8	7948'	9.0	53	15	14	10.5	10.5	2	--	19000	3.0	80
8/9	7981'	9.1	40	14	11	10.5	11	2	--	19000	3.0	240
8/10	8065'	9.2	46	14	6	10.5	15	2	--	19500	2.0	400
8/11	8083'	9.0	51	16	7	10.5	11	2	--	18000	2	80
8/12	8157'	9.0	53	16	12	10	12	2	--	17000	1.5	320
8/13	8188'	9.0	54	16	14	10.5	10	2	--	16500	3.5	140
8/14	8290'	9.0	54	16	21	10.5	11	2	--	16500	4	200
8/15	8330'	9.0	57	16	21	10.5	10.8	2	--	16500	4	180
8/16	8417'	9.1	54	16	17	10.5	10.8	2	--	16500	4	220
8/17	8455'	9.1	55	15	15	10,5	11	2	--	16500	3.7	180

MUD CHECKS (continued)

DATE 1981	DEPTH CHECKED	WT.	VIS.	P.V.	Y.P.	pH	W.L.	32nd FILTER CAKE	PPM SALT	PPM CHLORIDE	% OIL	PPM CALCIUM
8/18	8556'	8.9	57	17	20	10.0	9.5	2	--	16500	3.7	200
8/19	8594'	9.0	48	13	16	10.5	8.8	2	--	17000	3.0	150
8/20	8653'	9.0	53	15	15	10.0	8.0	2	--	17000	3.0	140
8/21	8690'	9.0	56	14	16	10.5	7.5	2	--	17500	3.0	60
8/22	8723'	8.9	55	14	18	10.0	7.6	2	--	14000	3.0	110
8/23	8878'	8.9	51	13	14	10.0	7.0	2	--	16000	3.0	trace
8/24	8921'	9.0	48	13	13	10.0	8.2	2	--	17000	3.0	trace
8/25	8973'	9.5	47	13	20	10.3	9.2	2	--	16000	3.0	trace
8/26	9043'	9/4	47	10	25	10.0	11.0	2	--	16000	3.0	0
8/27	9085'	8.7	47	11	14	10.1	8.0	3	--	15000	3.0	0
8/28	9122'	9.0	43	11	10	9.0	7.4	2	--	15000	3.0	120
8/29	9175'	9.1	46	12	11	9.5	8.2	2	--	15500	3.0	140
8/30	9236'	9.1+	51	18	17	9.5	7.0	2	--	16000	3.0	100
8/31	9305'	9.2	63	16	17	9.5	6.8	2	--	16000	3.0	80
9/1	9305'	Logging - Intermediate Casing Point										
9/2	9305'	Intermediate Casing Point - No Mud Checks										
9/3	9305'	Intermediate Casing Point - No Mud Checks										
9/3	9305'	Intermediate Casing Point - No Mud Checks										
9/4	9305'	Intermediate Casing Point - No Mud Checks										
9/5	9305'	Intermediate Casing Point - No Mud Checks										
9/6	9305'	Intermediate Casing Point - No Mud Checks										
9/7	9311'	9.1	40	--	--	11.5	13.8	2	--	8800	---	---
9/8	9347'	9.1	40	--	--	11.5	13.8	2	--	5669	---	---

MUD CHECKS (conitnued

DATE 1981	DEPTH CHECKED	WT.	VIS.	P.V.	Y.P.	pH	W.L.	32nd FILTER CAKE	PPM SALT	PPM CHLORIDE	% OIL	PPM CALCIUM
9/9	9414'	8.8+	49	--	--	10.5	9.5	2	--	2600	---	---
9/10	9430'	8.9	59	23	8	10.5	8.8	2	--	3100	2.5	20
9/11	9549'	8.9	46	15	6	10.0	10.0	2	--	3200	2.0	20
9/12	9651'	8.8	48	16	8	10.0	9.0	2	--	3100	2.0	20
9/13	9710'	8.9	49	17	9	10.0	9.2	2	--	3100	2.0	60
9/14	9739'	8.9	45	11	7	10.0	9.5	2	--	2900	2.0	80
9/15	9808'	8.9	44	11	8	10.0	8.8	2	--	2900	2.0	100
9/16	9867'	8.9	44	13	9	10.0	9.0	2	--	3000	2.0	120
9/17	9876'	9.0	40	9	8	9.5	10.0	2	--	3000	2.0	120
9/18	9945'	9.1	41	12	7	9.3	12.	2	--	3000	2.0	80
9/19	10035'	9.0	41	11	5	9.5	11	2	--	3000	2.0	trace
9/20	10131'	9.0	39	11	4	9.3	10.5	2	--	3000	2.0	40
9/21	10138'	9.0	41	11	7	10.0	10.0	2	--	3000	1.5	100
9/22	10184'	9.0	39	11	7	10.0	9.0	1	--	3100	2.0	120
9/23	10254'	9.0	43	13	9	10.0	8.4	1.5	--	3100	2.0	120
9/24	10297'	9.1	46	--	--	9.8	8.5	2	--	3000	---	---
9/25	10297'	9.1	45	--	--	10.0	9.4	1.5	--	3100	---	---
9/26	10299'	9.1	48	--	--	9.3	8.6	1.5	--	3100	---	---
9/27	10299'	9.1	44	16	8	9.2	8.2	1.5	--	3100	2	160
9/28	10348'	9.1	45	16	8	9.5	8.6	1.5	--	3100	2	130
9/29	10419'	9.0	44	16	8	9.8	8.8	1	--	3100	2.5	80
9/30	10472'	9.0	44	14	9	10	8.8	1.5	--	3200	2.0	60
10/1	10603'	8.9	35	8	2	8.7	10.2	2	--	3200	1.0	I65

MUD CHECKS (continued)

DATE 1981	DEPTH CHECKED	WT.	VIS.	P.V.	Y.P.	pH	W.L.	32nd FILTER CAKE	PPM SALT	PPM CHLORIDE	% OIL	PPM CALCIUM
10/2	10708'	9.0	42	12	7	10.0	9.0	1.5	--	3200	1.5	100
10/3	10795'	9.1	53	19	10	10.2	8.8	1.5	--	3200	1.0	80
10/4	10795'	9.2	54	19	9	10	8.4	1.5	--	3200	1.0	80
10/5	10863'	9.0	42	11	7	10	9.2	2	--	3200	1.0	40
10/6	10961'	8.9	45	13	9	10	9.4	2	--	3200	0.5	40
10/7	11111'	8.9	51	19	9	9.1	9.0	2	--	3100	2.0	40
10/8	11111'	8.9	51	19	9	9.1	9.0	2	--	3100	2.0	40
10/9	11252'	9.0	44	18	8	9.7	8.8	2	--	3000	2.0	40
10/10	11297'	9.0	44	19	9	9.9	8.5	2	--	3400	2.0	40
10/11	11417'	8.9	42	17	8	9.4	9.4	2	--	3200	2.0	30
10/12	11531'	9.0	41	14	6	9.4	9.5	2	--	3400	2.0	30
10/13	11580'	9.0	46	15	9	10.2	10	2	-	3400	2.0	30
10/14	11668'	9.0	40	13	6	10	9	2	--	3500	2.5	30
10/15	11765'	9.0	44	15	9	9.8	8.6	2	--	3500	2.5	30
10/16	11889'	9.0	53	20	10	9.2	9.6	2	--	4200	2.5	30
10/17	11984	9.1	54	19	10	10.2	10.2	2	--	4300	2.5	160
10/18	12073	9.1	46	18	6	10.2	9.0	2	--	4000	2.5	140
10/19	12156'	9.0	49	20	8	10.2	8.0	2	--	4000	3.0	180
10/20	12258'	9.0	43	14	6	9.2	7.8	2	-	4400	2.0	220
10/21	12377'	9.0	41	12	7	9.0	8.5	2	--	4200	1.5	240
*10/22	12414'	9.3	62	27	8	10.2	7.2	2	--	5000	2.5	140
10/23	12423'	9.1	48	16	8	8.6	8.2	2	-	5000	2.5	240

*Pit Check Not Valid

MUD CHECKS (continued)

DATE 1981	DEPTH CHECKED	WT.	VIS.	P.V.	Y.P.	pH	W.L.	32nd FILTER CAKE	PPM SALT	PPM CHLORIDE	% OIL	PPM CALCIUM
10/24	12470'	9.1	41	14	7	9.2	8.2	2	--	4500	2.5	160
10/25	12565'	9.1	41	14	7	9.3	8.2	2	--	4400	2.5	140
10/26	12660'	9.4	44	13	8	9.4	6.5	2	-	4400	2.5	100
10/27	12710'	9.1	45	17	8	9.8	8.0	2	--	4400	2.5	120
10/28	12802	9.1	43	18	9	9.8	6.8	2	00	4500	2.0	150
10/29	12887'	9.0	45	16	10	9.4	8.2	2	-	4500	2	140
10/30	12952'	9.2	48	19	11	9.6	7.5	2	--	4900	2.5	80
10/31	13025'	9	41	12	8	9.5	7.4	2	--	4800	2.5	100
11/1	13120'	9	40	13	7	9.5	7.4	2	--	4900	2.0	120
11/2	13157'	9	47	17	9	9.5	7.4	2	--	4900	2.5	160
11/3	13195'	9.2	46	16	10	9.5	7.4	2	--	5000	2.5	80
11/4	13282'	9.1	41	15	8	10	7.4	2	--	4600	2.5	120
11/5	13325'	9.2	43	15	7	9.6	7.4	2	--	4800	2.5	180
11/6	13425'	9.1	44	17	8	10.4	7.8	2	--	4800	2.0	100
11/7	13471'	9.2	48	20	10	10.3	7.8	2	--	5000	2.0	140
11/8	13565'	9.1	43	16	10	10.2	7.2	2	--	4900	2.5	140
11/9	13597'	9.2	45	17	8	9.9	7.8	2	--	5000	2.5	140
11/10	13721'	9.2	44	18	9	9.8	7.4	22	-	5000	2.5	140
11/11	13828'	9.2	44	17	9	9.7	7.5	2	--	5100	2.5	120
11/12	13847'	9.3	52	29	12	9.8	7.6	2	--	4700	2.5	120
11/13	13914'	9.0	45	17	8	10.2	6.8	2	--	4900	3.0	170
11/14	14106'	9.4	47	19	8	10.5	7.2	2	--	5000	3.0	180
11/15	14150'	9.6	45	21	10	9.4	7.2	2	--	4600	3.0	240
11/16	14303'	9.3	43	18	9	9.5	7.2	2	--	4800	3.0	240

MUD CHECKS (continued)

DATE 1981	DEPTH CHECKED	WT.	VIS.	P.V.	Y.P.	pH	W.L.	32nd FILTER CAKE	PPM SALT	PPM CHLORIDE	% OIL	PPM CALCIUM
11/17	14464'	9.1+	47	20	9	10.3	6.8	3	--	5100	3.0	160
11/18	14513'	9.4+	51	20	14	9.6	7.0	2	--	4600	3.0	170
11/19	14620'	9.2+	47	20	12	9.8	7.4	2	--	4800	3.0	160
11/20	14744'	9.4	46	18	9	9.1	7.2	2	--	5100	3.0	140
11/21	14843'	9.5	44	17	8	9.0	7.4	2	--	4800	2.5	160
11/22	14889'	9.9	52	21	15	8.9	7.6	2	--	5000	3.0	180
11/23	14964'	9.3+	44	17	9	9.4	7.2	2	--	5100	3.0	140
11/24	15092'	9.3+	43	17	8	9.8	7.0	2	--	5200	3.0	100
11/25	15218'	9.4	44	18	8	9.8	7.0	2	--	5000	3.0	120
11/26	15350'	9.5	54	20	20	8.8	6.2	2	--	5200	3.0	200
11/27	15454'	9.3	40	18	11	9.8	6.8	2	--	5000	2.5	160
11/28	15542'	9.3+	39	17	9	9.4	6.6	2	--	5100	2.5	180
11/29	15696'	9.3+	38	14	6	9.4	7.8	2	--	4800	2.5	180
11/30	15702	9.1+	42	16	8	9.6	8.6	2	--	5100	2.0	140
12/1	15859'	9.1	44	18	8	9.7	7.8	1	--	5000	2.0	140
12/2	15950'	9.5	52	20	12	9.4	7.8	2	--	4700	2.5	200
12/3	16019'	9.4	41	14	8	9.3	7.6	2	--	4800	2.5	200
12/4	16173	9.5	43	16	9	9.4	7.4	2	--	4700	2.5	140
12/5	16280'	9.5	42	17	8	9.1	7.2	2	--	4600	2.5	170
12/6	16408'	9.4	44	18	10	8.96	7.0	1	--	4600	2.5	180
12/7	16527'	9.4	43	17	8	9.2	6.8	1	--	4600	2.5	200
12/8	16541'	9.9	50	21	14	8.5	7.0	2	--	5000	2.5	220

MUD CHECKS (continued

DATE 1981	DEPTH CHECKED	WT.	VIS.	P.V.	Y.P.	pH	W.L.	32nd FILTER CAKE	PPM SALT	PPM CHLORIDE	% OIL	PPM CALCIUM
12/9	16591'	9.6	41	19	7	9.0	6.6	1	--	4900	2.5	200
12/10	16668'	9.6	43	18	9	9.2	6.8	1	--	5100	2.5	220
12/11	16812'	9.5	45	19	9	9.2	7.4	1	--	4700	2.0	180
12/12	16894	9.6	44	20	10	9.1	7.2	2	--	5000	2.0	190
12/13	16894'	9.0	64	23	13	8.5	7.5	2	--	5000	2.0	320
12/14	16894'	9.4	59	22	16	9.6	7.0	2	--	4500	2.5	160
12/15	16894'	9.4	51	22	8	9.3	6.2	1	--	5200	2.5	200
12/16	16894'	9.3	43	15	8	9.4	6.2	1	--	5200	2.5	180
12/17	16894'	9.4	46	20	8	9.2	5.2	1	--	5400	2.5	160
12/18	16894'	9.2	42	17	7	9.2	6.0	1	--	5100	3.0	160
12/19	17006'	9.1	43	17	7	9.2	6.0	2	00	5000	4.0	160
12/20	17080'	9.1	67	27	18	10.1	6.0	1	--	5000	4.0	160
12/21	17080'	No Check - Logging										
12/22	17080'	No Check - Logging										
12/23	17080'	Finish Logging - Twisted Off - Fishing - 17077' Corrected T.D.										
12/23	17077'	9.5	68	26	18	9.6	6.0	1	--	5000	2.0	160
12/24	17077'	9.2	59	25	15	9.3	5.2	1	--	4800	3.5	320
12/25	17077'	9.2	53	24	15	9.5	5.3	2	--	4800	3.5	300
12/26	17077'	9.1	48	16	5	9.0	5.5	1	--	4000	2.0	480
12/27	17077'	9.0	49	17	8	11.0	5.8	1	--	3900	1.5	120
12/28	17077'	9.0	53	17	9	10.7	5.9	2	--	4100	2.0	240
12/29	17077'	9.2	45	15	5	9.4	6.2	1	--	5000	2.0	200
12/30	17077'	9.0	55	24	12	9.2	7.2	2	--	5000	3.0	220
12/31	17077'	9.0	55	24	12	9.2	7.2	2	-	5000	3.0	220

MUD CHECKS (conitnued)

DATE 1982	DEPTH CHECKED	WT.	VIX.	P.V.	Y.P.	pH	W.L.	32nd FILTER CAKE	PPM SALT	PPM CHLORIDE	% OIL	PPM CALCIUM
1/1	17321'	8.8	62	31	14	9.8	7.6	2	--	3800	4.0	220
1/2	17372'	8.9	50	20	10	10.2	7.0	2	--	4000	4.4	280
1/3	17379'	8.9	57	27	18	9.6	6.4	2	--	4200	3.5	200
1/4	17450'	8.8	64	37	21	9.9	6.6	2	--	4400	3.0	240
1/5	17549'	8.9	52	28	11	9.8	6.0	2	--	4000	3.5	240
1/6	17573'	9.0	46	19	8	9.6	5.9	2	--	4400	3.0	200
1/7	17616'	9.0	50	29	9	9.7	5.8	2	--	4400	3.0	200
1/8	17648'	8.9	62	30	10	10.3	6.4	2	--	4300	2.0	180
1/9	17725'	9.0	59	35	10	10.0	6.2	2	--	4500	2.5	180
1/10	17805'	9.0	48	20	9	10.1	5.8	2	--	4600	2.0	220
1/11	17829'	9.1	49	22	9	9.9	6.2	2	--	4700	2.0	180
1/12	17899'	9.0	46	20	10	10.2	6.4	2	--	4600	1.5	160
1/13	17972'	9.0	47	20	10	10.1	6.4	2	--	4900	1.0	160
1/14	18049'	9.0	50	23	12	10.0	6.0	2	--	4800	1.0	160
1/15	18054'	9.0	60	23	12	10.0	6.0	2	--	4800	1.0	160

LITHOLOGIC DESCRIPTIONS

Unlagged Samples begin @ 70'

70-110	Sandstone, medium gray-frosted part, fine-very fine, subangular-subround, calcareous, loose-soft, good intercrystalline porosity with dark carbonaceous inclusions and some varicolored inclusions; clayey siltstone, dull ochre yellow, calcareous, soft, some good matrix porosity, NOSCF with very minor traces pyrite.
110-130	No samples.
130-140	As above with very minor traces, mottled pink and light gray, cherty sandstone.
140-150	With admixed green gray claystone, firm, blocky, non calcareous.
150-160	Claystone, green gray, firm, blocky, non calcareous.
160-170	Sandstone, green gray, fine-very fine, subangular-subround, calcareous, loose-soft, good intercrystalline porosity, with some dark and varicolored accessory inclusions, pyritic, NOSCF.
170-180	No samples.
180-190	Sandstone, grading to siltstone, green gray, fine-very fine, subangular-subround, calcareous, some intercryatlline porosity, NOSCF; shales, green gray, firm, non calcareous, blocky.
190-200	As above with trace sandstone, white-frosted, fine-very fine, subangular-subround, friable, intercrystalline porosity, NOSCF.
200-220	As above with abundant loose sand grains.
220-230	Sand-sandstone, gray-green gray, fine-very fine, subangular-subround, calcareous, loose-friable, intercrystalline porosity; with some admixed gravel fragments, gray-red angular, cherty, loose; claystone, ochre yellow-gray, soft; calcareous-non calcareous with scattered pyrite crystals, NOSCF.
230-270	As above becoming predominantly claystone.

270-290	Claystone, pale green-pale pink, mottled part, slightly silty part, varicolored with some admixed light gray claystone and sticky admixed clay.
290-310	As above, increased siltstone with traces admixed pyrite crystals and some loose sandstone.
310-330	Claystone, pale green-pale pink-light gray, mottled part, slightly silty part, varicolored, with some very minor admixed sandstone and siltstone.
330-370	Claystone as above and sandstone predominantly green gray, very fine-fine, subangular-subround, calcareous, loose-friable, good intercrystalline porosity, with some admixed loose quartz shaded greens, frosted fine, subangular NOSCF.
370-410	Predominantly claystone, light gray-light gray green, calcareous, soft, slightly silty part, with minor sandstone and siltstone as above.
410-430	As above with slightly increased siltstone and sandstone, with slightly increased gas on Hot Wire of 20/12 units. (Hot Wire Calibration 100 Units = 1% Total Gas or 10000 PPMs)
430-450	Some Change (Probable Top Transition) Predominantly claystone, pale green-pale lavender, firm, blocky, varicolored with very very minor traces chert, dark smokey gray-amber, angular, dense and sandstone, white-frosted, very fine-fine, subangular, very calcareous, tight, grades to siltstone and carbonaceous shales grading to coal, black, firm poor coal or lignite with trace bright yellow pin-point flourescence, ? contanination.
450-470	As above with sandstone, as above and loose quartz sand grains, frosted, subround, very very minor and very very minor trace white calcite crystals.
470-490	Claystone, pale green-pale pink-lavender, blocky, hard, calcareous; very siliceous limestone, white-gray-tan gray, angular fragments, very dense, hard, tight and with very minor, sandstone, white-frosted, very fine, calcareous-quartzitic, tight, dense, no visible porosity, NOSCF, (Good Tertiary-Cretaceous Transition?)
490-570	No samples - 80 feet.
570	Good Cretaceous
570-610	Sandstone, dark gray-medium gray, salt and pepper, very fine-fine, subround-subangular, calcareous, fairly tight, not much visible porosity with admixed carbonaceous shale and coal fragments, NOSCF, shales, dark gray, non calcareous

	most, carbonaceous, slightly silty part; coal, black, silty, tight, with rare admixed pyrite crystal.
610-630	Sandstone, medium-dark gray, salt and pepper, very fine-fine, subround-subangular, calcareous with minor carbonaceous shale inclusions, hard, dense, tight most, not much visible porosity, NOSCF; sandstone, gray-amber-lime yellow, very fine-fine, subround-subangular, calcareous, resin? limonite trace chlorite, hard, dense, tight most, not much visible porosity, NOSCF, with few scattered loose quartz sand grains, fine, angular; carbounaceous shale, black, non calcareous, slightly silty; with very rare rare trace dark brown, fibrous, calcite filled fractures.
630-650	Sandstone as above with admixed shale, dark gray; carbonaceous, silty, firm, slightly calcareous-non calcareous.
650-690	Predominalty shales, dark gray, carbonaceous; silty, firm, slightly calcareous-non calcareous; coal, black, vitreous, conchoidal fractures with interlaminated sandstone, light-dark gray, salt and pepper, very fine-fine, subround-subangular, calcareous, hard, dense, tight most, no visible porosity, NOSCF.
690-710	As above becoming predominantly coal, black, viterous, hard, conchoidal fractures.
710-730	As above with decreased coal, increased carbonaceous shales and salt and pepper sandstone and with traces brown calcite.
732	Trip #1 Out - #2 In.
730-770	As above with moderate calcite filled, scattered, fractures; fractured formation, (nearly twisted off in fractures @ 759' and had a cracked pin).
770	Begin 10; samples.
770-780	Shale, dark gray, carbonaceous, firm, calcareous-non calcareous with calcite filled fractures; siltstone, light gray, very fine, calcareous, dense, tight; with traces pyrite.
780-790	As above with admixed coal and carbonaceous shales.
790-800	Siltstone, light gray, very fine, dense, tight, siliceous calcareous, no visible porosity; sandstone, gray salt and pepper, very fine-fine, subangular-subround, calcareous, fairly tight, dense, no visible porosity, NOSCF; shale, dark gray, carbonaceous, calcareous-non calcareous, firm.
806	Trip out to Repair Pump Tail Shaft and change out liners.

800-810	Predominantly sandstone, light-medium gray, salt and pepper, very fine-fine, subangular-subround, calcareous, tight, dense, no visible porosity, NOSCF; silty limestone-limestone, light gray, microcrystalline,dense, tight, slight dull yellow mineral flourescence, NOSCF; calcite, light gray-brown, fibrous, filling fractures, trace pyrite.
810-820	As above with shale, dark gray, firm, calcareous-non calcareous.
820-830	As above with very minor admixed shales.
830-840	Predominantly 85%, sandstone grading-siltstone, light medium gray, salt and pepper, very fine-fine, subangular-subround, calcareous, well sorted, tight, dense, no visible porosity, NOSCF; shale dark gray, firm, calcareous-non calcareous with rare trace carbonaceous fragment inclusions; limestone grading-slightly limestone, light gray, firm-soft, argillaceous, trace mineral flourescense, NOSC; with scattared rare trace, pyrite and scattered trace sandstone light tan, very fine, subangular, siliceous, tight, dense, NOSCF.
836	Trip to Repair Pump.
840-850	As above with moderate friable calcite filled fractures, white-gray and with increased shale as above with traces white clay admixed.
850-860	As above becoming more shaly. (50% silty shale - 50% sandstone grading-siltstone).
860-890	Predominantly shale, 60% dark-medium gray, firm, calcareous non calcareous, slightly silty, firm, traces carbonaceous inclusions; 25% sandstone, light-medium gray, salt and pepper, very fine-fine, subangular-subround, calcareous, well sorted, tight,dense, no visible porosity, NOSCF; limy siltstone, light-medium gray, firm-soft, argillaceous part, trace mineral flourescense, NOSC; trace sloughed coal, fragments, black, vitreous, conchoidal fracture and trace calcite filled fractures.
890-900	Predominantly 25% limestone, dark brown, microgranular-microcrystalline, slightly silty part, dense, tight, platy, trace dull yellow mineral flourescense, NOSC with traces fibrous calcite filled fractures, white-gray; 15% sandstone grading siltstone as above; 10% shale as above.
900-920	58% limestone as above, 35% sandstone as above and shales as above with very noticable coal-carbonaceous shales, black, silty, firm, calcareous-non calcareous.

920-930	Predominalty sandstone, gray, salt and pepper, fine-very fine, subround-subangular, calcareous, grading to siltstone part, hard, tight, dense, no visible porosity, NOSCF; shales, dark gray, carbonaceous-non carbonaceous, calcareous-non calcareous, firm, slightly silty; with minor admixed, silty limestone, coal and very minor traces reddish brown, siltstone, hard, sloughed?
930-940	Becoming more shaly.
940-970	50% sandstone, gray, salt and pepper, fine-very fine, subround-subangular, calcareous, grading to siltstone part, hard, dense, tight, no visible porosity, NOSCF; silty shale-shaly siltstone, medium-dark gray, firm, carbonaceous part, calcareous most, non calcareous with minor limestone as above.
	(Samples to 06:00 a.m. - May 27, 1981
970-1000	As above with slightly increased silty shales, dark gray, calcareous most, non calcareous part and decreased sandstone.
1000-1020	Predominalty shale, 85%, dark-medium gray, slightly silty, calcareous, carbonaceous with hairline interlams of coal, black, vitreous and trace calcite, white-clear; 15% sandstone grading-siltstone, gray, salt and pepper, fine-very fine, subangular-subround, calcareous, friable dark carbonaceous accessory, tight most, no visible porosity, NOSCF with traced disseminated pyrite and very very minor traces, siltstone, white-gray, very siliceous-slightly argillaceous.
1020-1030	As above with abundant admixed calcite filled fractures, dark brown-tan fibrous-crystalline.
1030-1050	As above with increased sandstone-siltstone, 25% and decreased shales with not much noticable coal.
1050-1080	As above 40-50% sandstone grading-siltstone; 50-60% shales with very very minor traces, coal, calcite and pyrite.
1080-1100	As above becoming more shaly.
1100-1110	60% sandstone, white-gray, fine-very fine, subangular-subround, calcareous cement with minor white clay, fair sorting, dark accessory, tight-some intercrystalline porosity, NOSCF with sandstone grading-siltstone part, 40% shales, dark-medium gray, slightly silty, calcareous carbonaceous part, firm.

1110-1120 As above increased carbonaceous shales 80% with very minor coal fragment inclusions and decreased sandstone-siltstone with traces inoceramus?

1120-1130 Predominantly shales, 80%, dark-medium gray, firm, calcareous, carbonaceous, with traces admixed coal 15% sandstone, grading-siltstone, gray fine-very fine, subround-subangular, calcareous, dark accessory, tight most, no visible porosity, NOSCF; 5% limestone, brown-tan, microcrystalline, very calcitic, traces brachiopod? fossil, tight, dense, no visible porosity, NOSCF.

1130-1140 As above with greatly increased limestone, 50%, brown microcrystalline-arenaceous, firm, dense, tight, no visible porosity, NOSCF.

1140-1150 As above with decreased limestone and increased shales.

1150-1170 Predominantly shales, 45%, dark gray, firm, carbonaceous, calcareous with traces admixed coal fragments and 40% shale, medium gray, firm, calcareous; 10% limestone, brown, microcrystalline-arenaceous, firm, dense, tight, no visible porosity, NOSCF; 5% siltstone, gray, very fine, subangular-subround calcareous firm.

1170-1180 As above with very slightly decreased shale and with admixed sandstone 5%, gray, slightly salt and pepper, very fine-fine, subangular-subround, calcareous, dark accessory, tight, dense, no visible porosity, NOSCF.

1180 End 17½" Hole - Log - Run Surface Casing.
Begin 12¼" Hole Out From Under Surface Casing.

1180-1220 50-60% sandstone, gray brown, very fine-fine, subangular-subround, calcareous most with some admixed white clay matrix, dark accessory, fairly well sorted; shales, dark gray, firm, slightly silty, calcareous most with slight trace calcitic sandstone; no visible porosity, NOSCF.

1120-1230 As above with increased shales, dark gray, firm, slightly very carbonaceous part and decreased sandstone 20-30%.

1230-1280 With trace admixed coal, black, vitreous, firm with pyritic stringers disseminated.

1280-1330 Predominantly shales, 80%, dark gray, firm, slgihtly silty, carbonaceous with rare admixed coal gragments, with admixed limestone, light tan, microcrystalline, platy,grades to calcite crystals in part, arenaceous part; sandstone, gray, slightly salt and pepper, to brown, very fine-fine, subangular-subround, caclcareous, most with some admixed white clay matrix, dark accessory, no visible porosity, NOSCF; (limestone filled fractures?)

1130-1350 Shales, 70%, predominantly dark gray-medium gray part, firm, carbonaceous part, slightly silty, calcareous-non calcareous; sandstone, gray-frosted-tan, fine-very fine, subround-subangular, fair sorting, slightly friable, with trace intercrysatlline porosity, NOSCF; limestone, light tan, microcrystalline, platy as above.

1350-1370 70% shales, black, firm, silty, calcareous, carbonaceous as above with admixed sandstone, grading to siltstone, medium gray, fine-very fine, subangular-subround, calcareous, tight, no visible porosity, NOSCF.

1370-1380 60% sandstone, grading-siltstone, gray-frosted, fine-very fine, subangular-subround, calcareous, fair sorting, dark accessory, tight, no visible porsosity, NOSCF; with some admixed white clay matrix; shales, dark gray, firm, carbonaceous, calcareous, slightly silty.

1380-1420 As above with sandstone becoming predominantly siltstone.

1420-1450 As above becoming more sandy.

Changing

1450-1460 Shales, black-brown black, fissile, firm, blocky part, non calcareous most; with admixed bentonite? light green gray, soft.

1460-1620 Predominantly shales 95%, black-brown black, fissile-blocky, firm, silty, non calcareous most with some admixed bentonite, light gray-green gray, soft with occasional rare siltstone, gray, very fine, subround, very slightly calcareous.

1620-1630 60% shale, black-brown-black, fissile-blocky, firm, silty, non calcareous, most, with some admixed bentonite, light gray-green gray, soft with admixed 40% siltstone-grading sandstone, gray very fine-fine, subround-sub-angular, calcareous, firm, dense, tight, no visible porosity, NOSCF.

1630-1660 As above predominantly shales, dark gray-balck, fissile-blocky, firm, silty, non calcareous most with traces bentonite and minor admixed siltstones as above.

1660-1680 As above with some minor admixed sandy limestone, gray, very fine, subround-microcrystalline, dense, tight, no visible porosity, NOSCF.

1680-1690 95% shales, black, fissile-blocky, carbonacerous, firm, silty, non calcareous most, with traces admixed bentonite fragments and limestone fragments.

1690-1700 As above with noticable limestone and calcite (fractures filling?), light yellow tan-white, microcrystalline-slightly fibrous, firm, dense with traces fossilifeous

brachiopod?, very carbonaceous.

1700-1710 As above with noticable admixed limestone and calcite fracture filling.

1710-1720 As above with one coal fragment.

1720-1760 As above with minor trace sandstone.

1760-1770 Shales, dark gray, very carbonaceous, non calcareous most, silty, firm, fissile with admixed coal fragments and limestone-calcite fragments, fracture filling, tan-white platy-fibrous.

1770-1790 95% shales, dark gray, very carbonaceous, non calcareous most silty, firm-fissile with traces admixed coal and abundant limestone and calcite filled fractures, yellow tan-white fibrous in part, hard with very minor sandstone fragments, gray, fine-very fine, subround, calcareous with traces white clay matrix, firm, dense, tight, no visible porosity, NOSCF, grades to siltstone in part.

1790-1800 As above with trace inoceramus? fossil.

1880-1820 As above with fairly noticable coal interlams with shale.

1820-1830 As above with decreased coal, still very carbonaceous.

1830-1900 Shales, dark gray-black, very carbonaceous most, silty, fissile-blocky with traces admixed coal fragments and trace dis. pyrite, very rare trace fossil Gastropod? with fairly noticable limestone-calcite filled fragments, white-yellow tan, microcrystalline-fibrous, firm, some dull yellow mineral fluorescence.

1900-1910 Shales, dark gray-black, very carbonaceous most, silty, calcareous-non calcareous, fissile-blocky, with traces admixed coal fragments and disseminated pyrite crystals with noticable limestone-calcite filled fractures, white-yellow tan, microcrystalline-fibrous, firm.

1910-1950 As above with increased limestone 15-20%.

1950-2030 80% shales, dark gray-black, very carbonaceous most, silty, calcareous-non calcareous, fissile-blocky, with admixed coal gragments and disemminated pyrite crystals; 20% limestone-calcite, brown-tan, microcrystalline, hard, dense, tight, no visible porosity, fracture filling, with very slight mineral fluorescence.

2030-2090 As above with decreased limestone and calcite filled fractures.

2090-2100 As above 95% shales, dary gray-black and 5% limestone and calcite.

2100-2130	As above predominantly shales 100%.
2130-2140	As above with trace sandstone.
2140-2150	80% shales, dark gray-black, silty, firm, very carbonaceous, calcareous-non calcareous, fissile-blocky, trace coal admixed; 20% sandstone, frosted gray, fine-very fine, subangular-subround, faily well sorted, fairly calcareous cement, fairly clean, dense-friable, no visible porosity most? with loose intercrystalline porosity part? NOSCF with admixed pyrite fragments and crystals.
2150-2170	As above, 60% sandstone.
2170-2190	As above with decreased sandstone 20%.
2190-2210	60% shales, dark gray-black, silty, firm, very carbonaceous, calcareous-non calcareous, fissile-blocky; 30% sandy limestone, green gray, micro-crypto-crystalline, hard, dense, tight, no visible porosity, NOSCF; 10% sandstone, frosted-gray, fine-very fine, subangular-subround, fairly well sorted and fairly calcareous cement, failry clean, dense-friable, not much visible porosity, NOSCF with admixed pyrite fragments and crystals.
2210-2240	As above with increased sandy limestone grading-limy sandstone, white-frosted, fine-very fine, subangular-subround, fairly well sorted, calcareous and clean, dense-friable, not much visible porosity, NOSCF with traces white clay. Changing - (Hales Chalk Creek Member?)
2240-2260	40% limestone, sandy-silty, medium gray, very fine, subangular-subround, very calcareous, firm, hard, dense, tight, no visible porosity, NOSCF; 40% shales, dark gray-black, silty, firm, non calcareous most, fissile-blocky; 15% shales, medium gray-very slightly medium green gray, calcareous, grades to argilite limestone; 5% limestone, light tan-light brown, cryptocrystalline, hard, dense, tight no visible porosity, NOSCF with traces, white, slightly chalky, argillaceous limestone.
2260-2270	As above with increased green gray, calcareous shales.
2270-2280	As above with some varicolored (maroon-green gray) calcareous silty shales grading-argillaceous limestone.
2280-2290	As above with very coarse calcite fragments and crystals, white-clear.

2290-2300	As above becoming fairly shaly in part with brownish red-green gray slightly lavender, mottled in part.
2300-2350	60% limestone, gray, sandy-silty, fine-very fine, dense, hard, tight, no visible porosity, NOSCF; 40% shales, dark gray-black-very slightly varicolored, very limy, hard, dense, tight, very carbonaceous in part with rare traces coal fragment and pyrite crystals, grades to argillaceous limestone part.
2350-2370	60% sandstone, frosted-clear-gray-white, fine with some very fine, subangular most, calcareous cement, failry well sorted and fairly clean, not many accessory, trace intercrystalline porosity?-tight, friable, NOSCF; 40% shales predominantly varicolored, maroon-green gray-black, calcareous-non calcareous, silty, firm-soft, carbonaceous part with traces limestone, tan, crypto-crystalline, dense, tight, no visible porosity, NOSCF.
2370-2390	As above with sandstone becoming fine grained in most, subround-subangular, frosted, loose most - friable part, clean, 75% sandstone with shales varicolored, (marooon-green gray-brownish pink-dark gray-black), carbonaceous part, calcareous-non calcareous, with traces pyrite and some scattered white clays.
2390-2430	As above with decreased, more firm, sandstone (60% sandstone).
2430-2450	60% shales, dark gray-black, firm, silty, carbonaceous, non calcareous most, fissile-blocky; 40% sandstone, frosted-gray, fine with some very fine, subangular most, calcareous cement, fairly well sorted, fairly clean, not many accessory, hard, dense, tight most, friable part, no visible porosity, NOSCF with trace mineral fluorescence only with very minor traces varicolored, calcareous shale, as above.
2450-2550	As above with 75% shales, varicolored (reddish brown-maroon-dark gray-black) silty, very limy, firm; 25% sandstone, frosted-gray, fine with some very fine, subangular most, calcareous cement, fairly well sorted, fairly clean, not many accessory, hard, dense, tight most, friable part, no visible porosity, NOSCF with traces mineral fluorescence only with some scattered, loose, medium, clear-white, calcite crystals.
2550-2590	50% shales, varicolored, predominantly reddish brown, silty, very limy, firm; 50% sandstone grading-siltstone, brown-reddish brown, very fine-fine, subround calcareous cement, fairly well sorted, argillaceous with admixed sandstone, frosted-gray, fine, subangular most, calcareous cement, friable part, no visible porosity, NOSCF.

2590-2620 70% sandstone, frosted-gray, fine-medium, subangular-angular, calcareous, loose-friable, some dark accessory, becoming more trashy, no visible porosity, NOSCF: 30% shales, dark red-black, silty, carbonaceous, calcareous-non calcareous with traces admixed white clay.

2620-2660 As above with decreased sandstone, predominantly silty shales, 90% vaircolored, black-gray-reddish brown with some maroon calcareous most, carbonaceous part.

2660-2680 60% silty shales as above; 40% sandstone, gray-frosted, fine-very fine with some admixed medium, subangular-angular, calcareous cement, fairly well sorted-trashy and poorly sorted part, some dark grains, hard, dense, tight, no visible porosity, NOSCF.

2680-2730 As above decreased sandstone with fairyly noticable maroon-reddish brown silty shales, ± 80% varicolored shales with some gray, clays, bentonite? and minor traces limestone, bronw-gray, microcrystalline, hard, dense.

2730-2740 As above with increased sandstone, 30%, frosted-gray-clear, fine-medium, subangular-angular calcareous cement, loose-unconsolidated fairly well sorted, medium dark accessory, fairly clean most, slightly trashy part, intercrystalline? porosity?; NOSCF with traces white clays and occasional corse white calcite crystals.

2740-2790 As above with 80% sandstone, predominantly loose and 20% admixed dark gray-black-medium red, silty, calcareous-non calcareous shales with rare traces chert inclusions in sandstone, dark brown, angular.

2790-2800 As above with abundant pyrite crystals.

2800-2860 As above sandstone becoming slightly finer and grading-siltstone in part.

2860-2900 As above with maroon-purple shales and some minor rare green shales with noticable dark gray carbonaceous shales in part and with some carbonaceous inclusions in sand-stone.

2900-2960 90% sandstone-siltstone, light gray-frosted, very fine-fine, subround-subangular, calcareous, firm, fairly well sorted, fairly clean, not much visible porosity, NOSCF; shales, black-dark gray, silty, firm, carbonaceous, non calcareous most and shales, reddish brown-lavender, firm, silty with small Hot Wire Show from carbonaceous shales.

2960-2980	Siltstone-sandstone, light gray-frosted, very fine-fine, subangular-subround, calcareous, firm, fairly well sorted, carbonaceous interlams part, no visible porosity, NOSCF; shales, black, carbonaceous, silty, non calcareous most with traces pyrtie.
2980-3020	Predominantly shales, reddish brown, firm-soft, silty, very calcareous and shales, black, carbonaceous, silty non calcareous, firm, siltstone-sandstone as above.
3020-3030	As above with some increased sandstone.
3030-3040	50% shales, reddish brown, soft-firm, silty, very, calcareous and minor admixed dark gray, carbonaceous shales, non calcareous most; 50% sandstone grading to siltstone, gray-frosted, very fine-fine, subround-subangular, calcareous only fair sorting, few scattered dark accessory, no visible porosity, NOSCF with some admixed light gray soft clay.
3040-3060	As above with very decreased sandstone (15-20% sandstone) and increased shales 80-85%.
3060-3090	Predominantly shales, reddish brown, soft-firm, very calcareous and minor admixed dark gray, non calcareous carbonaceous shales with very minor admixed sandstone and siltstone.
3090-3120	As above with increased 30% sandstone-silstone, light gray tan, very fine, subround-subangular, calcareous, firm, tight, dense, no visible porosity, NOSCF.
3120-3140	As above with decreased sandstone and with very abundant dark gray-black, firm, splintery, carbonaceous, calcareous, shales.
3140-3170	50% shales, varicolored (reddish brown-black-dark gray with minor silty green gray and maroon), firm, calcareous most, non calcareous-splintery and carbonaceous in part; 50% sandstone grading siltstone, very fine-fine, subround-subangular, calcareous. fairly well sorted with few dark accessory and rare trace carbonaceous interlams, friable-loose part, no visible porosity, NOSCF trashy formation with some scattered white clays, calcite crystals and pyrite crystlas.
3170-3180	As above with decreasing sandstone.
3180-3250	Predominantly 95% shales, reddish brown, silty, very calcareous, soft-firm with very minor green gray and rare dark gray-black, silty, firm, carbonaceous, calcareous shales with traces maroon shales.

3250-3280	As above with very rare trace very slightly mottled red and green gray shales.
3280-3290	Predominantly 95% shales, reddish brown most with minor admixed green gray-gray, firm calcareous with minor traces maroon with very minor trace siltstone, tan, very fine, subround, calcareous and very minor calcite? filled fractures? tan-gray firm.
3290-3300	Predominantly as above.
3300-3310	Sandier.
3310-3360	Predominantly shales, varicolored, (reddisth brown-dark black gray-maroon-tan-light gray-green gray with trace ochre, green), calcareous and firm most, silty part with traces admixed limestone, tan-gray, micro-crystalline, hard, dense.
3360-3370	As above with admixed sandstone, light tan-gray, very fine-fine, subround-subangular, abundant white calcareous cement, friable part, tight, no visible porosity, NOSCF with slight trace mottled shales.
3370-3390	As above with sandstone increased to 30% with very rare trace mottled limy shales.
3390-3400	As above with decreased sandstone.
3400-3410	With one piece bright orange siltstone (one piece only - may not be a legitimate piece of formation) non calcareous firm.
3410-3530	Predominantly vaircolored shales 90-95% with admixed sandstone 5-10% as above with rare trace pyrite crystals.
3530-3630	95%+ varicolored shales predominantly reddish brown-maroon with some dark gray black with less tans-light grays and green grays, firm, calcareous, slightly with traces admixed limestone, tan-gray, hard, microcrystalline, dense and with traces sandstone, light tan-gray, very fine-fine, subround-subangular, abundant white calcareous cement part, friable part, tight, no visible porosity, NOSCF.
3630-3640	As above with trace frosted? brach?.
3640-3700	95% shales, varicolored, predominantly reddish brown-with some maroon-blue gray and very minor trace mottled, silty and calcareous most; minor admixed sandstone, light tan-gray, very fine-fine, subround-subangular, some white calcareous matrix, some dark gray, quartz grain inclusions part, failry tight and fairly well sorted no visible porosity, NOSCF and minor admixed limestone, gray-tan, microcrystalline, hard, dense, tight, NOSCF.

3700-3740	95% varicolored shales, predominantly reddish brown, silty, firm, calcareous with admixed minor maroon and dark gray shales with very minor admixed sandstone and very minor admixed limestone as above.
3740-3810	As above and slightly sandier in part.
3810-3820	As above with very slight trace sandstone, white, fine, subround, calcareous, hard, dense, tight, no visible porosity, NOSCF.
3820-3850	As above with very slightly increased sandstone (5%) as above and with very slightly increased limestone, gray-red, microcrystalline, hard, dense, tight no visible porosity; with some shales, dark gray-black, firm shales.
3850-3870	As above with slightly increased traces sandstone.
3870-3890	As above with slightly increased gray and black shale with still noticable sandstone as above.
3890-3950	95% shales, varicolored, reddish brown predominantly with admixed green gray-dark gray with minor maroon shale, calcareous, silty, firm; minor-moderate sandstone, gray-tan, fine-very fine, subround most, calcareous cement, moderately well sorted, firm, dense, tight, no visible porosity, NOSCF; minor limestone, gray-reddish brown, microcrystalline, dense, no visible porosity; rare scattered trace fossil brachiopod? fossil and rare trace mottled shale with some very minor light gray-white clay.
3950-3990	As above with traces calcite filled fragments.
3990-4110	As above with slightly increased calcite filled fractures and with slightly increased (+-5%) sandstone with very slightly increased limestone (fossil Gastropod? @4070-4080).
4110-4160	Shales, predominantly reddish brown with admixed dark gray green, very limy, silty, firm; with minor sandstone tan-gray, very fine-fine, subround-subangular with white varicolored cement, hard, dense, tight no visible porosity, NOSCF; limestone, gray-brown, microcrystalline, hard, dense, tight, no visible porosity, NOSCF.
4160-4210	As above with increased 5%+- limestone, predominantly dark gray-dark reddish brown, microcrystalline, argillaceous, dense, tight, no visible porosity, NOSCF with noticable white crystal calcite filled fractures.

4210-4220	As above with increased argillaceous limestone and fairly noticable calcite filled fractures.
4220-4280	Becoming more shaly.
4280-4290	As above with very minor trace dark gray-tan, cherty limestone.
4290-4330	95% shales, reddish brown predominantly, calcareous, hard silty with minor traces maroon, dark gray and green gray; limestone, dark red-gray, microcryatlline dense, no visible porosity, NOSCF; sandstone, red tan, very fine-fine, subround subangular, firm, white calcareous cement, no visible porsoity, tight, NOSCF with trace traces scattered white clay.
4330-4340	As above with slightly increased limestone.
4340-4430	As above more shaly.
4430-4440	70% shales, predominantly reddish brown, silty, calcareous, firm with some admixed dark green gray-gray-maroon limy shales, 30% sandstone brown-gray-frosted with some clear quartz grains, medium-fine with few course grains, subround-subangular calcareous slightly silicaeous in part, moderately well-moderatly poor sorted, hard, dense, tight, no visible porosity, NOSCF with some admixed sandstone, reddish brown, very fine, subround-subangular with white calcite cement, no visible porosity, NOSCF.
4440-4470	As above with increased sandstone up to 70% with traces brown-yellow green chert fragments.
4470-4480	As above with sandstone decreasing slightly.
4480-4500	As above with slightly increased sandstone and with limestone, medium gray, cryptocrsytalline, hard, dense, tight, no visible porosity, NOSCF.
4500-4510	As above with lots of trip slough.
4510-4520	50% sandstone, reddish brown-tan with some frosted grains, fine-medium, subround-subangular, white calcareous-slightly silicaeous, moderate fair sorting, hard, dense, tight, no visible porosity, NOSCF; 45% shales, predominantly reddish brown, firm, silty calcareous with admixed dark gray, green gray and minor maroon shales; 5% limestone, dark gray-medium gray, microcrystalline, hard, dense, tight, no visible porosity, NOSCF.
4520-4550	As above becoming more sandy with some calcite filled fractures.

4560-4570	As above with trace frosted brachiopod? and becoming more shaly.
4570-4620	80% shales, predominantly reddish brown, firm, silty, calcareous with admixed minor maroon, dark gray and gray green, firm; 15% sandstone, reddish brown-tan, some frosted, fine-medium, subround-subangular, white calcareous cement-siliceacous part, moderate fair sorting, hard, dense, tight, no visible porosity, NOSCF: 5%+- limestone, dark purple gray, firm, argillaceous and gray, cryptocrystalline, dense with traces yellow green chert fragments.
4620-4630	As above with increased sandstone 35%; becoming friable and loose in part, intercrystalline porosity? (drilled up), slight gas show-NOSCF with abundant clear-white calcite crystals.
4630-4640	As above-60% sandstone, becoming more frosted and with traces clear quartz grain fine-medium, loose-firm, calcareous-siliceaeous, hard, dense, tight, intercrystalline porosity-no visible porosity, NOSCF with calcite filled fractures and mineral fluorescence only in calcite.
4640-4650	60% sandstone, light reddish brown-tan-clear-frosted, fine-medium with some coarse subangular-subround with some angular, loose-calcareous-siliceaeous, slightly glassy looking part, some intercrystalline porosity, hard, dense, tight most, NOSCF with some admixed conglomeritic fragments; 40% shales, reddish brown predominantly, silty, firm, calcareous with some maroon and dark gray shales, shales grading to argillaceous limestone in part with some very noticable light gray-white admixed clay.
4650-4660	As above with increased 80% sandstone with rare dark shale inclusions, conglomeritic.
4660-4690	As above with abundant loose quartz sand grains and sandstone, clear-frosted-tan, medium-coarse, angular-subangular, siliceous-calcareous, hard, some intercrystalline porosity, NOSCF.
4690-4700	Chert, shales and sandstone, conglomerate, varicolored, white-gray-maroon-lavender-red brown, hard, siliceaeous most, with minor silty calcareous shale and shot thru with chert fragments, varicolored, fine-coarse, angular-subangular, hard, dense; sandstone, reddish brown-tan-white-frosted-clear, fine-medium, subround-subangular, siliceaeous most poorly sorted, hard, dense, tight most, traces intercrystalline porosity, NOSCF with some dark inclusions.

4700-4730	As above with some dark gray shales increases, still very siliceous.
4730-4740	As above becoming more reddish brown slightly decreased chert and sandstone.
4740-4750	As above, more shaly and with increased reddish brown and dark-medium gray, splintery shale, non calcareous.
4750-4770	+-80% shales, dark-light reddish brown, firm, silty, calcareous and shales, dark gray-black, firm, splintery, non calcareous with minor maroon and green gray shales with some scattered thin, calcite filled, fractures with abundant scattered varicolored chert fragments, medium-coarse, angular-subangular, 15% sandstone, white-frosted-reddish brown with minor maroon and some minor frosted-clear quartz grains, fine-medium, subround-sub-angular, clear-white calcareous cement most moderate fair sorting; limestone 5% gray-dark red, crypto-crystalline, dense, hard with still traces conglomerate.
4770-4780	With abundant chert fragments.
4780-4800	As above with increased sandstone 85%+- and very noticable, admixed white crystals and decreased chert.
4800-4850	With very abundant chert fragments and siliceous sand-stone, hard, dense with traces some clear, quartz, crystals intergrowth in fractures with frosted Gastropod? 4840-4850.
4850-4900	Predominantly siliceous sandstone, chert and calcareous shales as above, (80%+- sandstone).
4900-4920	50% sandstone, brown-off purple-light gray-frosted with admixed light gray white fragments (give sandstone a slight salt and pepper look), fine-medium with some coarse, siliceous and quartzitic most poorly sorted, trashy, light gray white, siliceous, angular, clay inclusions and some darker inclusions, hard, dense, tight, no visible porosity most, NOSCF; 50% shales, dark brownish red predominantly, silty, calcareous, firm with minor dark gray-green gray shales with still some chert fragments.
4920-4930	As above with decreased sandstone.
4930-4950	Predominantly 80%+- shales as above.
4950-4960	Predominantly shales dark purplish brown, firm, fissile, calcareous and shales, dark brownish red as above silty, firm, calcareous with minor dark gray and green gray shales.

4960-5030	As above with 80-85% shales, with shale becoming predominantly dark chocolate brown, firm, fissile, calcareous; slightly silty part with admixed dark brownish red, minor dark gray and green gray shales; sandstone, predominantly gray-white-tan, quartzitic as above..
5031	Bit Trip.
5030-5070	Shales reddish brown, firm, silty, calcareous; shales, chocolate brown, fissile, calcareous, splintery; shales, medium gray green-gray-dark gray, calcareous-non calcareous, firm, blocky; (gray shales slight change) sandstone, tan-brown, fine-very fine, calcareous, hard, calcareous-siliceous part, poor-fair sorting, hard, dense, tight, no visible porosity, NOSCF; limestone, borwn-light gray tan, cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF.
5070-5080	As above with increased sandstone and siltstone with traces limestone.
5080-5100	As above with admixed minor white clays.
5100-5110	As above with increased sandstone 50%.
5112	Bit Trip - Pick up Dynadrill.
5110-5140	+-50% shales, chocolate brown, fissile, non calcareous-calcareous, firm, splintery-blocky; shales, light-medium green gray-dark gray, calcareous-non calcareous, firm, blocky; +-50% sandstone, tan-brown with clear-frosted greens, fine-very fine, calcareous, poorly sorted, hard, dense, tight, no visible porosity, NOSCF; limestone, brown-gray, cryptocrystalline, dense, with slight trace mineral fluorescence with trace frosted ?Gastropod? 5110-5120.
5140-5170	As above with increased sandstone 70%, tan-brown with clear-frosted grains, very fine-medium with rare coarse grains calcareous, poorly sorted, very minor dark inclusions, hard, dense, tight, no visible porosity, NOSCF with shales and limestone as above.
5170-5200	As above increased sandstone to 80%.
5207	Bit Trip - Lay down Dynadrill - Bottom sample.
5200-5210	Sandstone, 80% tan-light brown, very fine, calcareous, hard, no visibile porosity, NOSCF considerable shale cavings.
5210-5240	Shale, brown, green, slight calcite, hard 60% sandstone as above.

5240-5270	Sandstone, light brown, very fine-medium, no sorting, abundant calcite cement, no visible porosity, with scattered black-brown grains and larger frosted grains, round, grades to siltstone part.
5270-5300	Shale, brown-green, hard with rare limestone pellet inclusions with stringer sandstone as above.
5300-5340	Silstone-sandstone, light brown, very fine, calcareous, hard, tight, no visible porostiy with occasional black grains; shale, brown, slightly calcareous, hard.
5340-5420	As above with traces pyrite.
5420-5440	As above with laminated thin beds.
5440-5500	Sandstone, tan-light brown, very fine with occasional larger round frosted and black grains, slightly calcareous, hard, no visible porosity; siltstone, brown, very slightly calcareous hard; shale, brown, slightly calcareous, hard.
5500-5550	As above.
5550-5580	As above with trace sandstone, tan, very fine-medium, unsorted, calcareous hard, no visible porosity, with black and tan grains.
5580-5620	As above with abundant shale cavings.
5620-5670	Siltstone-sandstone, light brown, very fine-medium, slightly calcareous, hard, no visible porosity, some black and some frosted quartz grains; shale, brown, hard.
5670-5730	As above.
5730-5740	With some loose quartz grains, frosted, medium, angular-round, NOSCF.
5740-5780	As above, no loose quartz grains.
5780-5840	Siltstone, brown, calcareous, hard; sandstone, light brown-light gray, very fine, occasional round frosted and black grains, calcareous hard, no porosity with occasional fragment gray-orange chert; shale, brown, calcareous, hard; all with trace calcite filled fractures.
5840-5860	As above with increased shale.
5860-5910	As above with more siltstone.

5910-5920	As above with some sandstone, grading-siltstone, light gray-white-brown, very fine.
5920-5980	Siltstone, brown, calcareous, hard with black specs; shale, brown, calcareous, hard, some calcite filled fractures with orange chert clast @5960'.
5980-6040	As above with some anhydrite filled fractures.
6040-6180	As above with considerable orange chert clasts in clear quartz.
6102	Top of Salt.
6102-6105	Salt Interval - None in Cuttings.
6121-6143	Salt Interval - None in Cuttings.
6143	Base of Salt.
6180-6210	Siltstone and shale as above.
6210-6220	Limestone, gray, cryptocrystalline, argillaceous, hard, no porosity, NOSCF, Sample Top Twin Creek.
6220-6240	As above with siltstone, light gray-white, very calcareous, soft with black specs, no porosity.
6240-6400	Limestone, gray, cryptocrystalline, very argillaceous, hard, no visible porosity, no fluorescence.
6400-6450	Limestone as above but becoming dark gray part.
6450-6480	As above.
6480-6550	Predominantly limestone, light-medium-dark gray, cryptocrystalline, dense, argillaceous, no visible prosity, NOSCF with occasional admixed, reddish brown, firm-soft, siltstone.
6550-6600	Predominantly limestone as above with occasional, light gray, calcite micro veinlets.
6600-6680	Limestone, light-medium gray-dark gray-tan, cryptocrystalline, hard, dense, no visible porosity, NOSCF with some admixed siltstone, reddish brown, soft-firm, calcareous-non calcareous with traces pink sandstone.
6680-6700	As above with minor trace calcite filled fractures, light gray, with one fossile Brachiopod? @6700?
6700-6750	As above with rare traces sandy limestone and very rare traces microcrystalline limestone and very rare trace orange chert slough?

6750-6800 Limestone, predominantly dark gray, firm, crypto-crystalline, dense, no visible porosity, NOSCF, and limestone, light-medium gray, firm, cryptocrystalline with traces microcrystalline limestone and some scattered calcite filled fractures, no visible porosity, NOSCF.

6800-6850 As above with noticable oolite limestone.

6850-6900 Predominantly limestone, dark gray-medium light gray, cryptocrystalline with minor traces microcrystalline, hard, dense, tight, no visible porosity, NOSCF with very minor trace siltstone-sandstone, light gray-gray, very fine, subround, siliceous-calcareous hard, dense, tight, no visible porosity, NOSCF.

6900-6920 As above with fairly noticable calcite filled fractures.

Trip @ 6927'

6920-6940 As above with abundant Trip Slough with some gray shales and some reddish brown silstone and shales.

6940-6950 As above with very minor trace pelletoids with limestone.

6950-7000 Predominantly limestone, dark-medium gray-light gray tan, crypto-microcrystalline, firm, dense, tight, no visible porosity, NOSCF with very minor traces gray, hard, calcareous shale and very minor traces slightly sandy limestone.

7000-7020 Limestone, dark gray predominantly cryptocrystalline, hard, dense and limestone, gray tan, microcrystalline, firm, dense, tight, no visible porosity, NOSCF with noticable calcite filled fractures, microcrystalline crystalls.

7020-7060 Limestone as above with siltstone-sandstone, light tan, very fine, subround, calcareous cement, fair sorting, argillaceous, tight, firm, no visible porosity, NOSCF.

7060-7140 As above with fairly noticable calcite filled fractures.

7140-7210 Predominantly limestone, dark gray, cryptocrystalline, hard, dense, argillaceous, tight, no visible porosity, NOSCF and limestone, gray tan, micro-cryptocrystalline, firm, argillaceous, very slightly chalky part, no visible porosity, NOSCF with some scattered calcite filled fractures and very minor trace sandy limestone.

*Note: Fractures are Indicated Beginning @7200 - Drill String Torgue.

7210-7220 As above with traces pyrite crystals. Tourging Badly.

7220-7250 Predominantly limestone, dark gray, cryptocrystalline, hard, dense, argillaceous, tight, no visible porosity,

NOSCF; limestone, gray tan, microcrystaline with traces micro pelletodal, limestone part, tight, hard, no visible porosity, NOSCF with some disseminated, microcrystalline pyrite.

7250-7260 As above becoming slightly sandy in part with fairly noticable disseminated pyrite.

7260-7290 As above with some admixed sandy siltstone, gray-green gray, very fine, subround, calcareous, well sorted, firm, dense, tight, no visible porosity, NOSCF.

72907330 As above with very very minor trace pelletoidal limestone as above and with very very minor trace calcite filled fractures with decreased sandy limestone.

7330-7350 Predominantly limestone dark gray, cryptocrystalline, hard, dense, tight, slight argillaceous, no visible porosity, NOSCF; limestone, gray tan, microcrystalline with traces pelletoidal limestone-sligthly oolite part, tight, hard, no visible porosity, NOSCF with increased calcite filled fractures and sandy siltstone, light gray-green gray, very fine, subround, calcareous, well sorted, tight, hard, dense, no visible porosity, NOSCF.

7350-7380 As above with slightly increased sandstone.

Formation Change

7380-7400 Predominantly limestone, dark gray, cryptocrystalline, hard, dense, tight, slightly argillaceous, no visible porosity, NOSCF; limestone, gray tan, microcrystalline, hard, tight, no visible porosity, NOSCF; shales, red to red brown, calcareous-non calcareous, silty, firm, no porosity, NOSCF.

7400-7410 As above becoming predominantly, red-reddish brown, silty, calcareous, firm, shales.

7418 Bit Trip.

7410-7440 As above with some slough, trace, oolite limestone and traces calcite filled fractures.

7440-7450 As above with traces dense pyrite crystals.

7450-7480 Predominantly shales, red-reddish brown, firm, silty with some calcite filled fractures and limestone, dark gray, cryptocrystalline, hard, dense, some conchodial blocky fracture, tight, no visible porosity, NOSCF.

7480-7500 Predominantly limestone, dark gray, cryptocrystalline, very hard, dense, tight, no visible porosity, NOSCF and limestone, gray tan, microcystalline-very slightly chalky, very slightly oolite, firm, dense, tight, no

visible porosity, NOSCF; shales, red-reddish brown, very slightly calcareous-non calcareous, hard, dense, tight with calcite filled fractures; trace sandstone-siltstone, gray-white, very fine, calcareous cement, subround, well sorted, clean, hard, dense, not much porosity, NOSCF.

7500-7530 As above with increased limestone and sandstone and with decreased shale.

7530-7550 Predominantly limestone dark gray, cryptocrystalline, very hard, dense, tight, no visible porosity, NOSCF and some limestone, gray tan, microcrystalline-very slightly chalky, firm, dense, tight, no visible porosity, NOSCF; sandstone-siltstone, gray-white, very fine, subround, calcareous, hard, dense, not much porosity, NOSCF; minor shales, reddish brown-red, silty, calcareous-non calcareous, hard with noticable calcite filled fractures.

7550-7620 As above with decreased sandstone and becoming predominantly limestone, dark gray, cryptocrystalline, slightly platy-slightly shaly, argillaceous, dense, tight, no visible porosity, NOSCF with fairly noticable calcite filled fractures.

7620-7640 As above but with increased sandstone.

7640-7650 As above with traces pyrite crystals.

7650-7760 Predominantly limestone, dark gray, cryptocrystalline, very hard, dense, tight and limestone, medium gray, firm, argillaceous-slightly shaly, dense, tight, no visible porosity, NOSCF; with some minor sandstone as above with abundant admixed calcite crystals and calcite filled fractures.

7760-7770 As above with traces disseminated pyrite.

7770-7810 Predominantly limestone, dark gray, cryptocrystalline, very hard, dense, tight and limestone medium gray, firm, argillaceous-slightly shaly, dense, tight, no visible porosity, NOSCF; trace sandstone, and very abundant calcite filled fractures, (Drill String Torgue).

7810-7820 As above with very minor trace siltstone, gray, very fine, subround, calcareous, firm, no visible porosity, NOSCF.

7820-7830 As above with traces disseminated pyrite.

7830-7867 Predominantly limestone as above with abundant calcareous filled fractures.

7867 Bit Trip.

7867	Made 17' SLM Correction From 7868' to 7850' Before Navi-drill run with bit #25.
7850-7860	Predominantly limestone, dark gray, cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF; shales, red-reddish brown, firm, silty with traces sandstone-siltstone, gray-green gray, very fine, subround, slightly calcareous, hard, dense.
7860-7880	As above with traces platy developed oolitic limestone and traces pin point vugular porosity, NOSCF and traces disseminated pyrite.
7880-7913	Predominantly limestone, dark gray, cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF; 20% shales, red-reddish brown, firm, very slightly calcareous-non calcareous, firm, dense, sandstone-siltstone, gray-green gray, very fine, subround, calcareous, trace intercrystalline porosity-no visible porosity, NOSCF; dolomite, light cream, hard, dense, tight, trace pin point vugular porosity-no visible porosity, NOSCF; very rare trace, gray shale, white-orange chert fragments and disseminated pyrite crystals trashy dirty formation with traces anhydrite (black scatteres specs).
7913	Bit Trip.
7913-7930	As above very trashy formation, limestone, shales, traces sandstone, anhydrites, traces pyrite disseminated.
7932	Bit Trip.
7930-7940	40% estimated limestone, predominantly dark gray-gray tan, cryptocrystalline-pelletoidal, hard, dense, tight, no visible porosity, anhydritic part; 40% shales, red-reddish brown, firm, silty, calcareous-non calcareous; sandstone, white-brown, very fine, subround calcareous, hard, dense, tight, NOSCF; fair amount of calcite filled fractures and noticable gray-greenish gray anhydritie.
7940-7960	As above with traces shale dark gray-medium gray, slightly waxy, very minor traces only very slow penetration, believed to be probably drilling soft, sticky, red shales, gypsum and anhydrite, not visible in samples, dispersed into mud because of mud pretreatment. Slow penetration due to bits balling up?
7962	Bit Trip.
7962-7970	Mostly Trip Slough.

7970-7990	Predominantly limestone (40%), dark gray, crypto-crystalline, blocky-platy, hard, dense, tight, no visible porosity, NOSCF; shales (40%), red-reddish brown, firm, silty, calcareous-non calcaerous, hard, dense, no visible porosity, NOSCF; 10% shales, dark gray, firm, non calcareous most, platy; anhydrite and gypsum (10%), gray-gray green-off white, firm, granular-amorphous, trace black mica? specks admixed; dolomite, light cream gray, firm silty sugary, trace sugary porosity, NOSCF.
7990-8050	As above with very increased 20% white-light pink-gray, anhydrite-gypsum, granular-amorphous, firm.
8050-8060	As above, very minor trace shale with some dolomite, gray, firm, shaly, no visible porosity, NOSCF.
8060-8070	As above with some admixed sandstone, white-clear-frosted, very fine, subangular-subround, siliceous, slightly glassy, no visible porosity, NOSCF with scattered loose coarse grains (porosity)?
8070-8080	As above with increased sandstone.
8080-8090	Predominantly sandstone, white-clear-frosted, very fine-medium, subangular-subround, siliceous most, glassy-cherty, hard, dense, tight, no porosity, NOSCF with scattered tan grains and very slight trace very light green (chlorite?) accessory minerals.
8098'	Circulated Samples Out Before Trip. Sandstone as above, hard, dense, tight, no visible porosity, NOSCF.
8090-8100	Mostly trip slough.
8100-8150	Predominantly good nugget sandstone as above with lots of admixed slough from uphole stabilizers. Predominantly sandstone, white-light orange white, frosted-clear and glassy grains with some minor medium, siliceous most, scattered traces dark tan and orange accessory grains, hard, dense, tight, no porosity, NOSCF.
8150-8157	With trace hairline open fracture (1 fragment only).
8157'	Bit Trip - Circulates Samples Out Prior to Trip.
8157-8170	Predominantly sandstone, light orange white, frosted-clear-glassy, very fine most, some minor medium, siliceous most, trace dark tan-orange accessory grains, hard, dense, tight no visible porosity, NOSCF.

*Slightly porous beginning at 8170'.

8170-8180	As above with traces intercrystalline porosity-no porosity with scattered trace loose quartz sand grains, frosted-clear, medium, subangular. (20% slough? limestone as above and reddish brown shale).
8180-8190	As above with very slightly less consolidated sandstone with very slight trace intercrystalline porosity and with very slight trace sandstone as above with admixed light white clay matrix part.
8190-8220	As above with slight traces intercrystalline porosity and traces loose medium sand grains as above NOSCF and with slightly increased white clay matrix part.
8220-8230	As above with very slight trace admixed green gray clay pellets in sandstone and trace glauconite or green chlorite? accessory minerals with fair intercrystalline porosity (still 15-20% dark gray limestone and reddish brown shale slough).
8230-8240	With slight trace open hairline fracture and with fair intercrystalline porosity with sandstone becoming friable part.
8240-8280	As above.
8280-8300	As above with sandstone more friable and porous with noticalbe loose sand grians, some Hot Wire Gas - no chromatagraph gas.
8303'	Bit Trip.
8300-8310	Sandstone as above with abundant trip slough with traces sandstone, clear-frosted, medium, subround-subangular, siliceous, glassy, hard, dense, tight, no visible porosity, NOSCF and sandstone with white clay matrix part.
8310-8340	As above with decreased trip slough.
8340-8418	Predominantly sandstone light tan, frosted, very fine-medium, subround-subangular, moderate sorting, siliceous cement, hard, dense, tight, no visible porosity NOSCF; slightly glassy looking grains part, very minor trace white clay part (5% slough).
8418'	Bit Trip.
8418-8430	Sandstone as above with admixed trip slough.
8430-8450	As above with decreased trip slough.
8450-8470	Sandstone, light gray, clear-frosted, medium, subround, siliceous, very minor glauconite? and dark tan accessory, traces intercrystalline porosity,

	NOSCF and sandstone, light tan-light pinkish tan, frosted, very fine-fine, subround-subangular, siliceous most, some gray clay part, hard, dense, tight, no visible porosity, NOSCF.
8470-8500	As above with very minor accessory minerals with dark (looks like micro crystals of gun powder) in part.
8500-8560	As above with very slightly increased medium sandstone, some intercrystalline porosity, NOSCF.
8560-8590	With traces dark accessory as above and with some medium intercrystalline porosity, NOSCF.
8593'	Bit Trip.
8590-8620	Sandstone, light tan, frosted, very fine-medium, subround-subangular, moderate sorting, siliceous-cherty, hard, dense, tight, no visible porosity, NOSCF, and sandstone, light gray, clear-frosted, medium, subround, siliceous, traces intercrystalline porosity, NOSCF with some scattered dark accessory, hard, dense, tight.
8620-8640	As above with scattered chert fragments.
8640-8653	As above, more dense.
8653'	Bit Trip.
8650-8580	Sandstone, salmon-light tan, fine-good, subround-well rounded, siliceous cement, some intergranular porosity, hard, tight, quartzitic, NOSCF with some medium grain frosted sandstone in fine good matrix. Traces black shale, gray limestone and orange brown shale slough.
8680-8690	More quartzitic.
8690-8700	Sandstone as above with traces varicolored shales as above.
8700-8710	As above with abundant uphole slough.
8710-8750	As above with traces light gray chert.
8750-8770	Sandstone, salmon-light tan, fine-good, subround, siliceous cement, well sorted, traces light orange subangular chert with some admixed sandstone, tan-frosted, medium-fine grained quartzitic.
8770-8800	Sandstone, salmon-light tan, very fine, subround, well sorted, siliceous cement, platy quartzitic fragments in part with trace calcite stringers,

light gray cryptocrystalline with very poor intergranular porosity, slight friable, NOSCF with admixed slough.

8800-8820 Sandstone, light tan, fine-very fine, subround-subangular, good sorted, fair intergranular porosity, friable part, hard, dense, quartzitic part with trace medium grain, frosted floating, sandstone with trace chert, white.

8820-8840 Sandstone as above, grading to sandstone, white, fine-very fine, fair siliceous cement, (poor samples) traces chert and intergranular porosity, NOSCF, lots of slough.

8840-8850 With some light gray-white claystone with trace bright red chert.

8850-8870 Sandstone, white-light tan, fine-very fine, subround, fair-well cement with siliceous cement, hard, quartzitic part; traces claystone, white, soft, floating sand grains part; traces intergranular porosity, NOSCF; trace shale, light brown stringers.

8870-8890 As above with trace limestone, light gray, sublithographic, dense with sloughed shale.

8900-9000 Sandstone, white-light tan, very fine-fine, subround-subangular, well cemented, siliceous cement, well sorted, quartzitic part, some medium grain, frosted, sand, floating; traces calcite, white; rhombic; traces claystone, white, silty; traces light brown shale splinters and orange chert.

9000-9050 As above with sandstone becoming salmon and with some admixed slough.

*Changing 9050-9060 (?Ankara? Transition?).

9050-9060 Predominantly sandstone, salmon pink-tan, very fine, subangular-subround, siliceous, hard dense, tight, no visible porosity, NOSCF with traces frosted, medium, quartz grains admixed; (uphole slough) very very rare trace shale, dark reddish brown, hard, dense, no calcareous.

9060-9070 As above with slightly increased dark reddish brown shales as above.

9070-9080 As above becoming slightly trashy with some speckled white and reddish brown shales (white calcite crystals) and nugget sandstone.

9080-9100	40% sandstone, pink-light gray, very fine, subangular-subround, siliceous-very slight dolomitic, well sorted, hard, dense, tight, no visible porosity, NOSCF; 60% shales, dark reddish brown, slightly silty, firm, fissile, non calcareous most with traces speckled white calcite crystals part and with very rare traces gray green mottled shales, firm, non calcareous, trashy firm.
9100-9120	As above increased red bed shales.
9122'	Bit trip.
9120-9130	Trip Slough.
9120-9150	Shale, dark reddish-reddish brown, firm, fissile, non calcareous most, white calcite crystals part, speckled part; trace siltstone, green gray, firm. calcareous; some nugget slough.
9150-9160	As above with very slight trace calcite filled fractures, traces pyrite nodules with rare traces admixed varicolored, dense, limy, silty, shale; very trashy formation.
9160-9210	As above, no pyrite.
9210-9230	Predominantly shales as above and with some admixed sandy shales, purple, very fine, subangular, siliceous very slightly, calcareous, dense, slightly cherty part.
9237'	Bit Trip.
9230-9240	As above with abundant trip slough, nugget sandstone and Twin Creek limestone with noticable chert, dark purple sandy shales and reddish brown silty shales as above.
9240-9240	Predominantly shales, reddish brown, silty, firm, non calcareous most; sandy shales, purple, very fine, subangular, siliceous-very slightly calcareous, dense, silty, chert part; siltstone, white-green gray, very fine, siliceous most, dense, tight, no visible porosity, NOSCF with traces nugget sandstone and Twin Creek limestone slough.
9240-9250	As above with some sandstone-siltstone, reddish-reddish brown, siliceous, firm, dense, tight, no visible porosity NOSCF with traces gray siltstone, very fine, dense, tight.

9250-9280	Shales, reddish brown, silty, firm, non-very slightly calcareous; siltstone, purple-gray purple very fine, siliceous most, very slightly calcareous part, hard, dense, tight, some reddish brown and white calcite speckled shales; limestone, dark gray, crypto-crystalline, hard, dense, tight, no visible porosity; traces light gray chert; some minor sandstone, white, very fine, subangular, siliceous, hard, dense, tight, no visible porosity, NOSCF; (nugget sandstone slough) trashy formation.
9280-9305	As above.
9305'	Intermediate casing point.
9300-9310	Shale, reddish brown, firm, non calcareous most, silty; shales, lavender, firn, non calcareous most, hard, dense; trace dolomite, white, firm, dense, tight, hard; trashy, abundant slough.
9310-9350	With admixed calcite stringers, white; traces quartz, clear, very fine, angular.
9350-9400	As above with minor admixed soft, white, clay and some white-frosted, chert fragments with shales becoming very slightly and micaceous with traces dark green calcite.
9400-9420	Shales, dark reddish brown, firm, silty, non calcareous most, slightly micaceous, with traces, shale, dark green, limy, dense with traces dark firm purple waxy shales.
9420-9430	As above with sandstone, light purple-white-light tan, fine-very fine, subround, calcareous, firm, desne, no visible porosity, NOSCF, slightly mottled appearance, dark green in light matrix.
9430-9460	As above becoming predominantly sandstone as above, pearly sorted most, darker brown-tan-purple grains in lighter matrix, dense, tight, no visible porosity, NOSCF.
9460-9470	Sandstone as above and abundant shaly limestone, dark gray, cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF and some lighter gray, cryptocrystalline limestone.
9470-9530	Predominantly shales, dark, reddish brown, firm, slightly, fissile, very finely micaceous and with admixed quartz crystal, clear, very fine, scattered through out shales; calcite, white soft; shaley limestone fragments, dark green-gray, as above, (sloughed limestone) traces only calcite filled fractures and micro slickensided fragments.

9350-9540	Becoming sandier and siltier.
9540-9550	As above with traces green gray limestone, slightly sandy part with traces white chert.
9550-9600	As above with traces green gray limestone, part still very silty-very sandy.
9600-9610	Predominantly shales, reddish brown, firm, fissile, non calcareous with traces scattered quartz grains, clear, very fine, angular; some minor mottled shales, green-gray green and reddish brown; shales, green gray, firm, slightly waxy part, calcareous part.
9610-9630	As above with admixed silty-sandy shale, dark pinkish tan-reddish brown, very fine-fine, shaly, dense, firm, with noticable calcite filled fractures.
9630-9640	Predominantly shales, reddish brown, firm, fissile, non calcareous most with traces scattered, quartz grains, clear, very fine, angular, floating in shale matrix and very minor traces frosted? fragments? replaced with calcite (micro clover leaf shaped outline); minor medium gray, limestone, cryptocrystalline, dense, tight, traces shale, green gray, silty-slightly waxy, calcareous very, minor traces, siltstone, soft, calcareous; very minor traces mottled green-red shales.
9640-9670	As above with increased limestone and green gray shales with some calcite filled fractures and with moderate +-10% sandstone-siltstone, pinkish tan, very fine, calcareous cement, tight, firm, no visible porosity, NOSCF.
9670-9680	Predominantly sandstone grading to siltstone part, tan-very slightly pinkish tan-gray, very fine most with rare scattered, quartz grain inclusion, frosted, medium, subround, calcareous cement, hard, dense, tight, no visible porosity, NOSCF with admixed minor shales and traces limestone as above.
9680-9690	Predominantly shales, reddish brown as above.
9690-9700	As above with fairly noticable admixed cement slough.
9700-9710	Shales, reddish brown, firm, fissile, non calcareous most, silty-sandy part with traces scattered quartz grains, clear, very fine, angular floating in shale matrix and with very minor trace red-green, mottled shales; sandstone, grades to siltstone part, light-dark gray, very fine, subround, with sorted, calcareous cement, hard, dense, tight, no visible porosity, NOSCF; grades to silty, dense, limestone, part; silty calcite, white-light gray, soft.

9710'	Bit Trip for Dynadrill - SLM Correction to 9700' Before Dynadrill.
9700-9710	Predominantly limy sandstone and siltstone, dark gray, very fine, subround, very limy, hard, dense, tight, no visible porosity, NOSCF, traces calcite filled fractures; trace reddish brown shale as above.
9710-9720	Predominantly sandstone grading to siltstone, tan-pink tan, very fine, subround, calcareous, hard, dense, tight, no visible porosity, NOSCF.
9720-9730	Predominantly shales reddish brown, firm, non calcareous very slightly calcareous, silty-sandy part with traces scattered floating quartz grains with some shales green gray, slightly mottled part, hard, dense, tight, no visible porosity, NOSCF; siltstone, white-gray, calcareous.
9730-9760	As above with becoming sandier.
9760-9770	As above with pyrite crystals and minor calcite filled fractures.
9770-9780	Siltstone, reddish brown as above and limy sandstone grading to siltstone, dark gray, very fine subround calcite, hard, dense, tight, no visible porosity, NOSCF, some minor traces calcite filled fractures; minor traces dolomite, light gray cryptocrystalline, hard, dense.
9780-9790	As above with increased reddish brown silty shales as above with traces calcite fracture fillings, mottled gray-limonite yellow, dense, cryptocrystalline, firm, traces calcite filled fractures.
9790-9800	Shales reddish brown, firm, fissile, non calcareous most, silty-sandy, traces floating quartz grains; sandstone, dark gray-light gray, clear-frosted quartz grains, very fine, subround, limy-dolomitic matrix, hard, dense, tight, no visible porosity, NOSCF; traces calcite fracture filling, mottled gray-limonite yellow, cryptocrystalline, firm; shales, rare trace only, light blue gray, firm.
9800-9810	As above with some increased sandstone.
9810-9820	Predominantly sandstone, dark-light gray, clear-frosted quartz grains, very fine, subround, limy-dolomitic cement, hard, dense, tight, no visible porosity, NOSCF; some shales, reddish brown as above and some calcite filled fractures, mottled gray and yellow to gray.

9820-9840	Predominantly shales, reddish brown-purple, firm, fissille, non calcareous most with floating clear quartz sand grains, very fine, subangular, sandy-silty part.
9840-9850	Becoming slightly sandy with fracture white angular chert fragment.
9850-9867	Predominantly sandstone grading-siltstone, clear quartz grains in tan-white matrix, very fine with traces pearly sorted sandstone with medium grains, calcite-limy cement, slightly argillaceous part shales, reddish brown-brown, firm, fissile, non calcareous most, slightly-sandy part, some floating quartz sand grains part.
9867'	Bit Trip.
9867-9876	Predominantly sandstone, light tanish white-medium gray, clear-frosted quarts grains with dolomitic-limy cement, very fine, subround, fair sorting, very slightly siliceous and cherty part, hard, dense, tight, no visible porosity, NOSCF; some shales, reddish brown-purple, firm, silty, non calcareous most, few floating quartz sand grains, clear, very fine, angular, minor trace slickensided; very minor trace shale, green gray, siliceous hard.
9876'	Bit Trip.
9876-9880	Sandstone grading siltstone, gray-green gray, tan-pinkish tan, mottled part, very fine-fine, subround-subangular, limy, hard, dense, tight, no visible porosity, NOSCF; waxy siliceous shales, lavender-white, mottled cherty, fracture filling lots of trip slough.
9880-9890	Conglomerate, sandstone, siltstone and shales, sandstone, white-tan, very fine, subangular-subround, dolomitic-quzrtitic, hard, dense, tight, no visible porosity, NOSCF; sandstone, dark gray-black, very fine, subangular-subround, dolomitic-limy, cherty part, no visisble porosity, NOSCF, hard, dense, tight; shales, lavender-white mottled part, waxy looking, siliceous and cherty, traces sliceknsided, with traces dark lavender gray iron? streaked coating in part, shales, reddish brown-brown, firm, fissile, silty part with traces floating quartz grains, clear, very fine, subangular-subround. (Transition Ankara to Thaynes?)
9890-9900	Sandstone, white, very fine, subangular-subround, dolomitic-quartizitic, hard, dense, tight, no visible porosity, NOSCF, grading to sandstone, light-medium gray; shales, reddish brown-brown, firm, fissile, silty part with traces floating quartz grains as above.

9900-9960	Siltstone-shale, reddish brown-brown, silty, very fine, firm, non calcareous most with floating quartz grains, clear, very fine, angular and traces sandstone, as above white-gray, very fine, subangular, limy-quartzitic, hard, dense, tight.
9960-9970	As above with traces calcite filled fractures.
9970-10000	As above with traces lavender and white, mottled, siliceous, shales, cherty and non calcareous, slightly conglomeritic as above @ 9880 with trace green gray siliceous shales.
10000-10030	Siltstone-shale, reddish brown-brown, silty, very fine, firm; non calcareous most with floating quartz grains, clear, very fine, angular with traces white quartzitic sandstone, very fine, subangular and moderate traces siliceous shale, green gray, firm, conglomeritic.
10030-10040	As above with very minor trace shale, gray green, very slightly silty, non calcareous, firm.
10040-10050	Shale, reddish brown-dark red, silty, firm, non calcareous with floating quartz grains; siltstone grading-sandstone, light pink-reddish brown, very fine, subround-subangular, calcareous, fine-medium, tight, hard, dense, tight, no visible porosity, NOSCF; siltstone, medium gray, very fine, subangular-subround, calcareous, hard, dense, tight, no visible porosity, NOSCF; shale, dark gray, platy, hard, dense, dolomitic-limy, dense, Changing Formation?
10050-10074	Shale and siltstone, reddish brown-pinkish-reddish brown as above with only very very minor trace dark gray, shale and siltstone as above.
10074'	Bit Trip.
10070-10080	As above some Trip Slough.
10080-10090	Shale and siltstone, reddish brown-pinkish, very fine, non calcareous-calcareous, firm, fissile; chert, maroon-white, mottled, hard, siliceous, dense, tight, dense, no visible porosity, NOSCF.
10090-10100	Shale and siltstone, as above and limestone, medium gray, microcrystalline, hard, dense, tight and limestone, gray tan, cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF; sandstone gray, very fine, subangular, calcareous, hard, dense, tight, no visible porosity, NOSCF; conglomeritic chert as above, Changing @ 10090 - Possible Thaynes Top.

10100-10110	Shales, reddish brown, firm, slightly calcareous part, non calcareous most; siltstone grading sandstone, pinkish, slightly shaly, very fine, subround-subangular, calcareous, hard, dense, tight, no visible porosity, NOSCF; dolomitic limestone, medium gray-cream gray, crypto-microcrystalline, hard, dense, tight, no visible porosity, NOSCF.
10110-10138	As above and becoming predominantly dolomitic limestone, medium gray-cream gray, micro-cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF with some admixed, shale, dark gray, limy, hard, dense; moderate sandy, limestone dark gray, very fine, subround-subangular, calcareous, hard, dense, tight, no visible porosity, NOSCF.
10138'	Bit Trip.
10138-10150	Sandstone and limestone as above with abundant red-reddish brown uphole slough. Poor Samples - Drilling with diamond bit and Navidrill.
10150-10160	No Sample.
10160-10250	Predominantly slough with some minor admix limestone and sandstone as above.
10250-10260	No Sample.
10260-10290	Predominantly uphole reddish brown silty shales.
10297'	Twisted Off and Left Diamond Bit in Hole.
10297-10299	2 Days Milling Up Diamond Bit.
10299-10370	Dolomitic limestone, dark gray, crypto-microcrystalline, sandy part, hard, dense, tight, no visible porosity, NOSCF; limestone light tan-gray tan, microcrystalline, slight chalky part, no visible porosity most with very slight traces intercrystalline porosity, NOSCF; with some platy calcite, medium gray, traces limestone with sucrosic texture-slightly silty in part.
10370-10400	As above with admixed shale, firm, fissile-platty, non calcareous with floating quartz crystals with limestone and dolomitic limestone becoming slightly sandy-silty in part.
10400-10410	As above becoming predominantly limestone, light tan-gray tan, microcrystalline slightly argillaceous, slightly chalky-slightly silty, tight, dense, NOSCF.
10410-10450	As above with becoming predominantly dark gray dolomitic limestone and with admixed limestone, light tan-light gray tan as above NOSCF.

10456'	Trip for Bit.
10450-10480	Predominantly, dolomitic limestone, dark gray, crypto-microcrystalline, sandy part, hard, dense, tight, no visible porosity, NOSCF; limestone, light tan-gray tan, microcrystalline slightly argillaceous-slightly chalky part, no visible porosity with very slight traces intercrystalline porosity no visible porosity, NOSCF with some platy limestone and traces calcite filled fractures.
10480-10510	Poorer Samples - Shaker Out - Light Plant Blew Up - As above with abundant slough.
10510-10520	Predominantly dolomitic limestone, dark gray as above and limestone, light tan-gray tan, as above with Sample Quality Improved - light plant back on line.
10520-10530	Light tan limestone increases.
10530-10580	Predominantly dolomitic limestone, dark gray, micro-cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF; limestone light tan-gray tan, micro-crystlline, slightly argillaceous-slightly chalky, firm, tight, no visible porosity, NOSCF; minor trace uphole reddish slough; minor trace calcite filled fractures, medium gray-white, platy.
10580-10640	As above with traces sandy limestone.
10640-10710	Predominantly dolomitic limestone, dark gray, micro-cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF; limestone, light tan-gray tan, micro-crystalline, slightly argillaceous-chalky, firm, tight, no visible porosity, NOSCF with very rare trace sandy inclusion and very rare trace calcite filled fractures, murky gray-milky gray with traces scattered calcite.
10710-10717	Drilling Break - 11 minutes to 5 minutes. Slight trace Torque 10712' - 10714' Fractures? Predominantly (60%) dolomitic limestone, dark gray-black, microcrystalline, silty-very slightly shaly, hard, dense, tight, no visible porosity, NOSCF; (40%-) limestone, light tan-gray tan, slightly argillaceous-slightly chalky, firm, traces admixed calcite gray-white and traces calcite filled fractures, no visible porosity, NOSCF with very minor trace reddish brown uphole shale slough with traces micro-mottled limestone.
10710-10730	As above with some micro-mottled limestone, light tan-gray tan matrix with admixed dark gray dolomitic limestone crystals, microcrystalline, argillaceous, tight, tryce intercrystalline Porosity?, NOSCF.

10730-10740	As above but becoming predominantly dolomitic limestone, black.
10740-10770	Predominantly limestone, black, microcrystalline, very slightly argillaceous, hard, dense, tight, no visible porosity, NOSCF.
10770-10795	Predominantly limestone, light tan-gray tan, micro-crystalline, slightly argillaceous-slightly chalky, firm traces admixed calcite, gray-white and traces calcite filled fractures, no visible porosity, NOSCF; limestone, black, microcrystalline, hard, dense, tight, no visible porosity, NOSCF.
10795'	DST #1
10795-10820	Predominantly limestone, black, micrpcrystalline most, firm, slightly earthy; limestone, light tan-gray tan, micro-cryptocrystalline, slightly argillaceous, firm, tight, no visible porosity, NOSCF; with trip slough, shales, reddish brown.
10820-10900	Becoming predominantly black limestone.
10900-10930	Predominantly limestone, light tan, microcrystalline, argillaceous, firm, no visible porosity, NOSCF; and limestone, black, micro-cryptocrystalline, earthy, hard, dense, tight, no visible porosity, NOSCF; calcite crystals, white-gray.
10930-10940	As above with increased black limestone.
10940-10960	As above with more light limestone.
10960-11000	Limestone, black, microcrystalline, firm, slightly, earthy; limestone, light tan-gray tan, micro-crypto-crystalline, slightly argillaceous, firm, tight, no visible porosity, NOSCF.
11000-11016	Limestone, light gray, crypto-microcrystalline, hard, dense, tight, no visible porosity, NOSCF; minor dark, gray limestone.
11016'	Bit Trip.
11016-11030	As above with admixed limestone trip slough, black, earthy as above.
11030-11050	Limestone, light gray-medium gray, cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF; and limestone, black, cryptocrystalline, earthy, hard, dense, tight, no visible porosity, NOSCF.

11050-11070	As above with some light gray tan, argillaceous limestone and with very rare trace pelletoial limestone fragments and traces calcite filled fractures.
11070-11080	As above with traces siltstone, red-reddish brown, very fine, subround, slightly calcareous, firm.
11080-11100	Becoming predominantly siltstone, red-reddish brown as above.
11100-11110	Siltstone, red-reddish brown, very fine, subround, slightly calcareous, firm; dolomitic limestone, black, cryptocrystalline, slightly earthy, firm, dense, tight, dolomitic limestone, light gray, cryptocrystalline, hard, dense, tight, limestone, light gray tan, slightly argillaceous-chalky, firm, no visible porosity, NOSCF; some calcite filled fractures, white.
11110-11120	Siltstone, pink light grayish pink, very fine, subround, calcareous and shaly matrix.
11120-11140	Siltstone, as above and dolomitic limestone, black-gray-cream, cryptocrystalline, siliceous, cherty, hard, dense, tight, no visible porosity, NOSCF; very slight trace anhydrite, gray.
11140-11190	Predominantly dolomite, dark gray, cryptocrystalline, siliceous-cherty, hard, dense, tight, no visible porosity, NOSCF; limestone, white, microcrystalline-granular, firm, tight, no visible porosity, NOSCF.
11190-11270	Dolomitic limestone, black, cryptocrystalline, hard, dense, tight, no visible porosity and limestone, light tan-gray tan, micro-cryptocrystalline, slightly argillaceous, no visible porosity, NOSCF.
11270-11360	Predominantly limestone, black, micro-cryptocrystalline, very slightly earthy looking, hard, dense, tight, no visible porosity, NOSCF with some traces admixed calcite filled fractures, white with very minor admixed, limestone, light tan, crypto-microcrystalline, firm, tight, no visisble prosoity, NOSCF.
11360-11420	Limestone, black as above and increased limestone, light gray-tan, micro-cryptocrystalline, firm, tight, no visible porosity, NOSCF with rare traces pelletoidal limestone.

Some Changes.

11420-11440	Limestone, light gray, crypto-microcrystalline, very slightly silty, firm, tight, hard no visible porosity, NOSCF with very minor traces balck pelletodial inclusions; limestone, black, crypto-microcrystalline, slightly earthy, trace pyrite inclusions, no porosity, NOSCF; siltstone, pink, very fine, calcareous and argillaceous, firm, traces gray calcity slickensided.
11440-11500	As above with very slight increased traces red siltstone. (slough)
11500-11537	Predominantly limestone, light tan-gray tan, micro-cryptocrystalline, slightly argillaceous, firm, no visible porosity, NOSCF; limestone, dark gray, crypto-microcrystalline, hard, dense, tight, no visible porosity, NOSCF with some calcite filled fractures; some red silty shales. (slough?)
11537'	Bit Trip.
11580-11630	Limestone, as above with siltstone grading-sandstone, red-brown, very fine, non calcareous, trace mica, very hard; shale, red-brown, trace only; limestone, black, dolomitic and limestone, light gray-medium gray.
11630-11670	Shale and siltstone, red brown-brown, massive, micas, non calcareous, brittle, hard. (shales tend to be brown)
11670-11690	As above with increased siltstone, red-brown-reddish white, non calcareous with micropyrite, micas, very hard, grading sandstone, very fine; limestone, light gray-medium gray; minor shale and sandstone, red-white, anhydritic with some anhydrite fracture filling.
11690-11720	Less sandy and with increased red-brown shale and siltstone and with thin interlams of white anhydrite.
11720-11780	Increased siltstone, sandstone and anhydritic shale, reddish white, massive, medium hard.
11780-11790	Siltstone with lesser shale (red-brown with mainly brown shale) massive, micas, hard; dolomitic limestone, medium-dark gray, cryptocrystalline, hard; with some red-white, anhydritic, sandy shales.
11790-11800	As above with sandstone, white-red white with trace orange-balck grains, very fine, pearly sorted, non calcareous, very hard and tight, NOSCF: with minor anhydrite filled fractures.
11800-11860	As above with trace sandstone, shale and siltstone.

11860-11870	Sample much lighter colored. dolomite, cream-buff with some red tinted fragments, mainly cryptocrystalline with lesser sandy fragments; shale and siltstone, brown-red; sandstone, red white-white, very fine. dolomitic, very hard and tight; very minor dark gray dolomite and anhydritic shale with anhydrite filled fractures.
11870-11920	Shale and siltstone, red brown-brown, massive, non calcareous, micas, hard and brittle with minor anhydrite filled fractures; dolomitic limestone, medium-dark gray, cryptocrystalline, hard, and dense; very minor anhydritic sandstone, white, very fine; limestone fragments, red-white mottled.
11920-11970	Lighter Colored Sample; Dolomitic limestone, red white-off white, sucrosic, very slightly calcareous, tight, NOSCF; shale, red-brown, massive micas, non calcareous, some anhydite coating and fracture filling, brittle, hard, grades to red white siltstone.
11970-11980	Lighter Colored.
11980-11990	Shale and siltstone as above.
11990-12140	With very minor dolomite, medium-dark gray, crypto-crystalline, very dense and hard.
12140-12310	Shale and siltstone, redbrown-brown with associated anhydrite; limestone, dark gray, very dense and limestone, white, cryptocrystalline with some rosy anhydrite.
12310-12320	Dolomitic, limestone, cream-buff, cryptocrystalline, arenaceous, initial slow reaction in acid, very hard, no porosity, NOSCF; dolomite, medium-dark gray, crypto-crystalline, very hard, no porosity, NOSCF; shale and siltstone, red brown-brown, as above; with minor dolomitic limestone, light tan-off white, some mottled limestone, sandy, very hard, NOSCF with black accessory specks.
12310'	Sample Dinwoody Top.
12320-12330	Increased red brown-brown Woodside shales and siltstone; Dinwoody limestone has a slight red tint.
12330-12340	Dolomite, tan-white-light gray, (white cryptocrystalline most: gray and tan sucrosic most) no visible porosity, very hard, NOSCF; shale and siltstone, red brown with trace black-gray; dolomite, red tinted (Woodisde influence); trace dolomitic limestone, very sandy, fine-medium, angular-subangular, slightly calcareous matrix; trace pisolitic dolomitic limestone and trace pyrite coating.

12340-12350	Dolomite, light gray-tan, cryptocrystalline-sucrosic part, very hard, no visible porosity, NOSCF; very minor black dolomite.
12350-12360	Increased black dolomite, microcrystalline-sucrosic, very hard, tight, no visible porosity, NOSCF.
12360-12380	Decreased black dolomite and increased lighter colors.
12380-12390	No Sample.
12390-12400	Decreased blacks; dolomitic shale, dull brown; massive, hard, earthy looking.
12400-12410	Increased dolomitic limestone, light-medium gray-off white, crypto-microcrystalline; shale, dull brown; shale and siltstone, red brown, trace chalky limestone.
12410-12420	Decreased brown and red brown; dolomite, light-medium gray, very dense; dolomite, off white-light gray, chalky, anhydritic.
12420-12430	Decreased red-brown; dolomite off white-light gray, sucrosic, very hard, tight, NOSCF.
12430-12440	Dolomite, more reddish, sucrosic, loose and micro-crystalline, dense dolomite.
12440-12450	Lighter colored; dolomite, light gray-white, sucrosic part, cryptocrystalline most, very hard and dense, NOSCF; trace oolitic dolomite.
12450-12470	Increased light-medium gray dolomite; sandstone, white, dolomitic, very fine, quartzitic looking, trace rounded grains (orange-red-brown), trace mica, very hard and tight, NOSCF.
12470-12480	Increased sandstone as above with pyrite clusters grades to sucrosic dolomite.
12480-12500	Increased dolomite, medium gray, cryptocrystalline; trace sandstone; dolomite light colored as above.
12500-12510	Lighter colored sediments with trace silver colored crystal cube; minor dolomitic limestone, white, chalky, soft with very noticiable disseminated pyrite.
12510-12530	Increased dolomite, light-medium gray, cryptocrystalline; pyritic, very dense, hard.
12530-12600	Darker dolomite.

12600-12610	Much darker sample (minor Phosphoria sediments) trace pyritic dolomite.
12610'	Sample Phosphoria Top.
12610-12620	Dolomitic limestone, dark gray-black, often mottled with white and gray, phosphatic, arenaceous, medium hard, no visible porosity, NOSCF, no gas detector show, traces loose cyrstalline anhydrite and traces pyrite.
12620-12640	Lighter with decreased phosphatic sediments; still very dense, dark gray, dolomite cryptocrystalline; trace chert, light gray, angular; some pyrite crystals and coating very minor anhydrite crystals, brown-white; shales, red-brown.
12640-12680	Dolomitic shale, very black, silty-sandy, massive, brittle, hard, some anhydrite and calcite coating, trace scattered pyrite fragments; dolomite light gray-gray white, cryptocrystalline, trace scattered phosphate fragments, hard, brittle; traces chalky dolomite red brown shale, gray white chert and loose anhydrite crystals.
12680-12690	Increased dolomite, buff-light tan, very massive and dense no porosity, hard.
12690-12700	Decreased black dolomitic shale; dolomite, light-medium gray, often mottled, shaly part, phosphatic part, no porosity NOSCF with trace pyrite; dolomite, tan; very minor loose chert; very minor shale and siltstone, red-red brown.
12700-12720	Increased medium gray-gray black, dolomite, crypto-crystalline, NOSCF.
12720-12740	Dolomitic limestone, medium-dark gray, mottled with lighter colors, cryptocrystalline, phosphatic, arenaceous, no porosity, NOSCF; minor chert, light gray-off white, coarse, angular, fragments; anhydrite, white, tubular, loose; shale, black, phosphatic.
12740-12810	Increased dolomitic limestone, gray black-off gray, micro-cryptocrystalline-granular, shaly inclusions part, phosphatic inclusions part, no visible porosity, hard; coarse chert fragments.
12810-12820	Decreased dolomitic limestone as above; oolitic-granular limestone; trace crystalline anhydrite.
12820-12840	Dolomitic limestone - cryptocrystalline limestone, very dense; pisolite? or phosphatic? pellet.

12840-12850	Dolomite, white, cryptocrystalline-chalky, dense, no porosity, hard; admixed chert.
12850-12870	White dolomite as above with shale, black, massive, hard, blocky.
12870-12900	Shale; as above, very black, phosphatic; minor admixed chert and dolomite, gray-white, cryptocrystalline most, sucrosic part with traces calcite crystales, white, loose and trace pyrite.
12900-12910	Increased dolomite and dolomitic limestone.
12910-12980	Increased shale, lighter colored dolomite-dolomitic limestone, trace limestone; traces anhydrite and calcite filled fractures; minor sandstone clusters, rose-off white, very fine-fine, calcareous, part porosity, hard, tight.
12980-12990	Shale grading to shaly dolomite, cryptocrystalline, very hard.
12990-13000	Black shale as above.
13000-13022	Shaly dolomite, black, some very sandy appearing, very hard, no visible porosity, NOSCF, trace loose coal?
13022-13038	Decreased shale, drilling break 13022-13038, dolomitic limestone, black-dark gray, microcrystalline, sucrosic part, shaly part, slightly calcareous-non calcareous, tight no porosity, NOSCF; lighter colors; trace pyrite.
13040-13060	Lighter colored samples, dolomitic limestone-dolomite, light-medium gray, microcrystalline-slightly sucrosic, very slightly calcareous, no visible porosity, NOSCF; very minor sandstone, gray-off white, very fine-fine, very slightly calcareous, dirty poor porosity, tight, NOSCF.
13060-13070	Increased sandstone, gray-white, very fine-fine with conglomeritic clusters, subanugular-subround with some coarse rounded clear quartz and light gray chert grains, poor-fair sorting, siliceous, hard, tight, quartzitic, sand clusters are broken across individual grians.
13070-13120	As above with siltstone-shale, red brown, mottled with anhydrite, calcareous, poorly consolidated; shale, black, phosphatic; minor loose chert; dolomitic limestone, light gray, microcrystalline; trace pyrite in some sand clusters.
13120-13130	As above with quartz sandstone, well, medium-coarse, subround-round, loose with traces pyrite coating.

13130-13140	Sandstone hard and tight as above with decreased loose sandstone; shale and siltstone, dull red brown, massive; siltstone micaceous, non calcareous, hard; dolomite, dark gray-black, cryptocrystalline, hard; shale, black, very minor chert.
13140-13160	Decreased red brown shale and siltstone; sandstone unconsolidated most, very hard, tight, quarzitic looking with admixed pyrite and anhydrite coatings.
13160-13190	Sandstone, white, fine-medium with minor coarse, siliceous-very slightly calcareous, secondary quartz overgrowth part, quartzitic, very hard and tight, pyritic part, NOSCF, no colored grians in sand clusters.
13190-13210	Sandstone as above; shale and siltstone, red brown, siliceous, medium hard; dolomite dark-light gray, some grades to dolomitic limestone; minor anhydritic shale.
13210-13280	Predominantly sandstone
13280-13310	Drilling time increased; dolomite, off white-light gray, cryptocrystalline most with minor sucrosic part, trace pyrite, no visible porosity, NOSCF; sandstone, red siltstone and shale and with minor chert as above.
13310-13320	Increased sandstone.
13320-13350	As above with admixed shale dark reddish brown, hard, non calcareous and shale, black, firm, fissile, hard, silty, calcareous.
13350-13360	No Sample.
13360-13460	Sandstone, clear-frosted-white with trace brown, very fine-fine, subangular-subround, quartzitic, very pyritic, hard, dense, tight, no visible porosity, NOSCF with some admixed light gray-white chert with scattered brown intercrystalline stain in sandstone with very minor admixed shales and very rare trace clear loose sandstone grains.
13467'	Bit Trip.
13460-13500	Sandstone, clear-frosted-white with trace brown, very fine-fine, subangular-subround, quartzitic, very pyritic hard, dense, tight, no visible porosity, NOSCF with minor admixed light gray-dark gray-white chert (sandstone has brown intercrystalline stain with some admixed shales and very rare trace clear loose sandstone grains) very minor trace white clay fillings.
13500-13510	As above with slightly increased dark gray chert.

13510-13520	As above with trace brechiated chert, dark gray and black shale with traces friable sandstone and very minor trace intercrystalline porosity, NOSCF.
13520-13530	With fairly noticable admixed white clay slickensided fracture fillings.
13530-13596	As above with some friable sandstone and very very rare trace limestone, black, cryptocrystalline, hard, dense, tight becoming very slightly trashy.
13596'	Bit Trip.
13590-13620	Sandstone, clear-frosted predominantly, very fine with some fine, subround-subangular, very quartzitic-very slighlty calcareous, pyritic, hard, dense, tight, no visible porosity, NOSCF with very minor traces intercrystalline brown; very rare quartz grains, grading to chert, smokey-frosted, very course; angular, loose; shales, reddish brown-black, non calcareous-very slightly calcareous, slough? and limestone dark gray, cryptocrystalline, hard, dense, tight, slough?
13620-13630	As above with very rare trace silty shales, light bluish gray-gray, firm, non calcareous.
13630-13650	As above with traces sandy dolomite, light gray-light tan, sucrosic, firm, no visible porosity, NOSCF, and limestone dark gray, cryptocrystalline, hard, dense, tight no visible porosity, NOSCF.
13650-13700	As above, more dolomitic with occasional chert, still predominantly very quartzitic sandstone.
13700-13710	Limy dolomite, gray-tan, cryptocrystalline-sucrosic, occasional sandy, hard, dense, tight, no visible porosity, NOSCF; chert, milky-white-smokey, medium coarse, angular, hard; sandstone, clear-frosted, very fine, subangular-subround, quartzitic, hard, dense, tight, no visible porosity, NOSCF.
13710-13720	As above with becoming mostly chert with some admixed shaley siltstone, limonite stained? and traces sandy dolomite.
13720-13730	As above with admixed shale, blue gray, firm, non calcareous.
13730-13740	Dolomitic sandstone, tan-gray, very fine, subround quartz grains with dolomite cement, hard, dense, tight, no visible porosity, NOSCF; chert, milky-smokey, medium-coarse, angular fragments; limestone, tan microcrystalline, firm, dense, tight, no visible

porosity, NOSCF; shale, blue gray, firm, non calcareous with abundant disseminated pyrite thruout.

13740-13750 More limy and trashy.

13750-13830 Dolomitic sandstone, tan-gray, very fine, subround quartz grains with dolomite cement, hard, dense, tight, no visible porosity, NOSCF; limestone, tan-gray, micro-cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF; chert, milky-smokey, medium-coarse, angular fragments; shales, blue gray-black, firm, non calcareous; abundant disseminated pyrite thruout.

13830-13840 As above with admixed dolomitic siltstone, salmon pink, argillaceous, firm, dense, no visible porosity, NOSCF.

13846' Bit Trip.

18340-18350 As above with quite a bit of trip slough after being stuck.

18350-13890 Dolomite, tan-pinkish tan, cryptocrystalline-sucrosic, argillaceous, hard, dense, tight, no visible porosity, NOSCF; limestone, tan-gray, micro-cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF; with traces admixed chert as above and very minor traces shale as above.

13890-13900 As above with admixed sandstone dolomitic-quartzitic, cement part, no visible porosity, NOSCF.

13900-13920 Predominantly dolomite, light pinkish tan, crypto-crystalline, hard, dense, tight, no visible porosity, NOSCF; limy dolomite, medium gray, cryptocrystalline with admixed disseminated pyrite and pyrite crystals; trace dolomite, white cryptocrystalline, hard, dense, tight, sandstone, clear-frosted, very fine-fine, quartzitic-dolomitic as above.

13920-13950 As above with increased quartzitic sandstone and increased darker gray, dolomite with decreased tan, dolomite.

13950-13980 Dolomite, very dark gray-medium gray-tan, crypto-crystalline, hard, dense, tight, no visible porosity, NOSCF; sandstone clear-frosted-tan, very fine, subangular-subround, quartzitic-dolomitic cement, no visible porosity, NOSCF; trashy formation.

13980-14020 As above with admixed siltstone-sandstone, reddish brown, very fine, dolomitic cement, trashy, very sandy.

14020-14030	With increased dolomite, dark gray, cryptocrystalline with very noticable brownish-white accesssory, fragment inculsions, slightly oolotic looking to pisolitic looking in part, ferruginous part, calcitic part.
14030-14060	Limy dolomite, very dark gray-nearly black crypto-crystalline, argillaceous, hard, dense, tight, no visible porosity, NOSCF; some admixed sandstone and siltstone as above.
14060-14100	As above with very slightly increased sandstone, clear-frosted-tan, very fine, subangular-subround, quartzitic-dolomitic cement, no visible porosity, NOSCF, trashy.
14100-14120	Limy dolomite, very dark gray-black-very dark brown, cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF; sandstone, tan-frosted-white, very fine-fine, subangular-subround, quartzitic-dolomitic, no visible porosity, NOSCF.
1412014130	As above with admixed dolomite, light gray tan, crypto-crystalline-very slightly sucrosic, hard, dense, tight, no visible porosity, NOSCF, trace calcite filled fractures.
14130-14140	As above with increased gray tan dolomite, crypto-crystalline-very slightly sucrosic, hard, dense, very slight trace pinpoint vugular porosity, trace calcite filled fractures, NOSCF.
14140-14150	As above with some dark rusty red lime water stain and calcite filled fractures.
14150-14250	Predominantly dolomite, medium gray-dark gray, micro-cryptocrystalline, hard, dense, tight, no visible porosity-very very rare trace of pinpoint vugular porosity, NOSCF with some minor light gray, soft, calcite and traces calcite filled fractures.
14250-14280	As above with admixed light gray tan dolomite, crypto-crystalline-very slightly sucrosic, hard, dense, tight, no visible porosity, NOSCF.
14280-14300	As above with traces noticable pinpoint vugular porosity, NOSCF with traces styloite and becoming predominantly light gray tan, very slightly sucrosic dolomite, hard, dense trace sulphur ordor? and traces pyrite cyrstals, no fluorescence, stain, or cut.
14300-14350	Dolomite, light gray tan, microcrystalline-sucrosic, hard, dense, very noticable pinpoint vugular porosity, NOSCF with traces microcrystalline free dolomite rhomb and very very minor traces, white-frosted quartz fragments.

14350-14380	As above with some admixed dolomite, medium gray, microcrystalline-sucrosic, dense not much porosity, NOSCF.
14380-14420	As above with dolomite becoming more light gray tan, no visible porosity-traces intercrystalline porosity.
14420-14440	Dolomite, light gray tan, microcrystalline-sucrosic, hard, dense, no visible porosity-traces intercrystalline porosity; dolomite, dark medium gray, micro-crypto-crystalline, hard, dense, tight, no visible porosity, NOSCF, with very minor trace calcite filled fractures, light tan.
14440-14470	As above with very slight traces intercrystalline porosity, NOSCF.
14470-14480	As above with traces calcite filled fractures.
14480-14500	As above with slightly increased calcite filled fractures.
14507'	Bit Trip.
14500-14560	Limy dolomite, black-dark gray, microcrystalline, hard, dense, tight, no visible prosotiy, NOSCF; sandy dolomite, frosted white, quartz sand grains, fine-very fine, with dolomite matrix, limestone, light gray-tan, crypto-crystalline, chalky, soft, no visible porosity, NOSCF; with traces calcite filled fractures; sandstone, clear-frosted, very fine, subangular, quartzitic, slough?
14560-14590	Predominantly limy dolomite-dolomitic limestone, black-dark gray, microcrystalline, hard, dense, tight, no visible porosity, NOSCF; traces limestone, light gray-tan, cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF; dolomite light gray-tan, crypto-crystalline, hard, dense, tight, no visible porosity, hard, dense, tight, no visible porosity, NOSCF; sand-stone, clear-frosted, very fine, subangular, quartzitic-dolomitic, hard, dense, tight, no visible porosity, NOSCF with trace siltstone dark red.
14590-14620	As above with very very minor traces black shale, very slightly calcareous, hard, blocky, shaly dolomite part.
14620-14650	Limy dolomite, medium gray-gray tan, crypto-micro-crystalline, hard, dense, tight, no visible porosity and limy dolomite, black-dark gray, microcrystalline, hard, dense, tight, no visible porosity, NOSCF; with traces siliceous limy dolomite with some admixed calcite filled fractures with traces black shaly, dolomite; sandstone, clear-frosted, very fine, subangular, quartzitic-dolomitic.

14650-14660	As above with slightly increased sandstone, clear-frosted, very fine, subangular, quartzitic-dolomitic, hard dense, tight, no visible porosity, NOSCF; slightly more shaly, occasional traces chert fragment, gray-milky.
14660-14760	Dolomite, gray, cryptocrystalline, hard, dense, tight and dolomite grading to limestone, brown-gray, micro-cryptocrystalline, firm, dense, tight, trace inter-crystalline porosity?-no visible porosity, NOSCF; becoming sucrosic looking part; traces blackish and traces sandstone as above.
14760-14770	As above with noticable dolomitic sandstone, frosted-white very fine, subangular quartz grains with dolomitic cement matrix, siliceous and cherty part.
14770-14780	As above with traces very minor green gray shales, non calcareous, firm.
14780'	Changes.
14780-14800	Limestone, light tan, microcrystalline-microgranular, slightly chalky, firm, dense, trace only intercrystalline porosity, NOSCF: trace limestone breccia, hard, dense, tight, no visible porosity, NOSCF; traces shale; sand-stone as above.
14800-14820	Dolomite-limy dolomite, dark gray, microcrystalline, very slightly argillaceous, hard, dense, tight, no visible porosity, NOSCF: limestone, light tan, micro-crystalline-micrograunlar, slightly chalky, firm, dense, tight, no visible porosity, NOSCF: trace dolomite, white, cryptocrystalline, hard, dense, tight, minor dolomitic sandstone, frosted, very fine, subangular quartz grains, with dolomitic cement matrix, hard, tight NOSCF; very very minor trace shale, green gray, hard, non calcareous and trace shale, black with trace slough? reddish brown siltstone, chert fragments part.
14820-14889	Becoming predominantly limestone light tan with traces breccia limestone and dolomite with traces very rare chert fragments, very fine, angular with traces calcite filled fractures and red silty shale.
14889'	Bit Trip.
14890-14920	Dolomitic limestone, dark gray, micro-cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF; lime-stone, tan, crypto-microcrystalline, chalky part, siliceous part, firm, dense, tight, no visible porosity, NOSCF; trace sandstone, frosted-white, very fine, sub-angular quartz grains with dolomitic cement, no visible

porosity, NOSCF: chert, milky, angular, dense.

14920-14950 As above with admixed breccia limestone, slighlty mottled looking, with dark gray, medium limestone with light gray tan limestone matric, cryptocrystalline, slightly chalky, trace black shale fragments, no visible porosity, NOSCF; still traces chert, milky white angular, fragments.

14950-15000 Limestone, tan-light gray-dark gray, finely-medium-crystalline, slightly chalky part, some dark and light limestone, (dark limestone grains and light limestone matrix), dense, tight, no visible porosity, NOSCF, very siliceous part, cherty part, angular, smoky-milky; minor traces sandstone as above.

15000-15030 Limestone, tan-light gray-dark gray, finely-medium-crystalline, slightly chalky most, siliceous part, cherty part, no visible porosity, NOSCF.

15030-15080 As above with admixed limestone dark gray, crypto-microcrystalline, hard, dense, tight, no visible porosity, NOSCF; more siliceous and cherty in part.

15080-15100 As above becoming very slightly dolomite in part with dark limestone fairly siliceous.

15100-15130 Limy dolomite, light gray sucrosic-cryptcrystalline, hard, dense, tight, no visible porosity, NOSCF; limy dolomite, cryptocrystalline, siliceous in part, hard, dense, tight, no visible porosity, NOSCF; chert fragments, milky-smoky, angular, hard, dense, brittle.

15130-15150 As above with traces calcite filled fractures.

15150-15190 Dolomite, very dark gray, crypto-microcrystalline, siliceous in most, with admixed black chert fragments, hard, angular, brittle, hard, dense, tight, no visible porosity, NOSCF; limy dolomite tan-light gray, crypto-microcrystalline, hard, dense, tight, siliceous most; chert fragments milky, angular; some calcite filled fractures.

15190-15250 As above with admixed limestone, light gray tan, microcrystalline, very slightly chalky, firm, dense, tight, no visible porosity, NOSCF.

15250-15270 Dolomite, very dark gray, crypto-microcrystalline, very siliceous most with admixed chert, black, hard, angular, brittle, limy dolomite, tan-light gray, crypto-microcrystalline, hard, dense, tight, no visible porosity, NOSCF; traces calcite filled fractures.

15270-15280 As above becoming lighter gray and very slightly greenish gray; with abundant admixed limestone.

Slight Changes

15280-15300 Limestone, light tan-gray, cryptocrystalline, firm, slightly chalky-agillaceous, no visible porosity, NOSCF; dolomite, greenish gray, cryptocrystalline, very argillaceous, hard, dense, tight, no visible porosity, NOSCF; dolomite, black, cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF; sandstone, frosted, very fine, subangular quartz grains with dolomitic matrix, hard, dense, tight, no visible porosity, NOSCF with siltstone, light salmon pink, soft, very calcareous and siltstone, dark reddish, very firm.

15300-15320 Dolomite, greenish gray, cryptocrystalline, very argillaceous, hard, dense, tight, no visible porosity, NOSCF; siltstone-shale, dark reddish, very firm, limy-very slightly calcareous, traces mottled green gray and red; shale, salmon pink, soft, calcareous; limy dolomite, light tan-gray, slightly sucrosic, hard, dense, tight, no visible porosity, NOSCF; dolomite, black, cryptocrystalline, hard, dense, tight, trace pyrite, no visible porosity, NOSCF.

15320-15360 As above becoming predominantly siltstone-shale, dark reddish and greenish gray, argillaceous, dolomite as above with admixed limy tan-gray tan dolomite as above.

15360-15390 Predominantly shale-siltstone, dark red-medium brick red, limy-very slightly calcareous, firm-hard with traces mottled red and green gray; shale, green gray, hard, non calcareous most, very slightly calcareous part; sandstone conglomerate, frosted-light gray tan, frosted quartz grains, fine, subround most with limy cement with traces loose subround loose quartz grains and traces frosted chert fragments; limestone light gray-light gray tan cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF; dolomite, black cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF; very very trashy formation, traces pyrite inclusions in part.

15390-15410 As above with some slight traces loose sand grains, frosted, fine-medium subround.

15410-15440 As above with increased gray green-green limestone and shales and decreased reddish shale and siltstone.

15440-15490 Dolomite, dark gray-very slightly purple gray, cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF; dolomite, medium gray, cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF; with disseminated pyrite fragments in both dark and medium

gray dolomite,sandstone, white-frosted, very fine-fine, subround-subangular, frosted quartz grains with dolomite cement, siliceous part, hard, dense, tight, no visible porosity, NOSCF; shale and siltstone, dark red-medium brick red, firm-soft, calcareous most; with very slight trace anhydrite? crystal filled fractures and some calcite filled fractures.

15490-15540 Predominantly dolomite, dark gray, crypto-microcrystalline, hard, dense, tight, no visible porosity, NOSCF; dolomite-limy dolomite, light gray, cryptocrystalline hard, dense, tight, no visible porosity, NOSCF; sandstone, frosted-white, subround, subangular, frosted, quartz sand grains, with siliceous-dolomitic cement, hard, dense, tight, no visible porosity, NOSCF; siltstone and shale medium brick red, soft-firm, calcareous; traces anhydrite? filled fractures and some calcite filled fractures with very minor trace milky chert fragments.

15542' Bit Trip.

15540-15550 Predominantly as above with very abundant trip slough.

15550-15570 Predominantly dolomite, very dark gray, micro-crypto-crystalline, hard, dense, tight, no visible porosity, NOSCF; shale and siltstone, medium brick red-dark red, slightly calcareous, soft-firm, (possible slough); limy dolomite, medium gray-gray tan, cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF; sandstone, white-frosted, frosted quartz grains with dolomitic-siliceous cement, hard dense, tight, no visible porosity, NOSCF with minor traces milky chalk; with admixed traces calcite and anhydirte? filled fractures.

15570-15580 With greatly increased siltstone and shale, medium brick red-dark red, slightly-very calcareous, traces mottled red-greenish gray very calcareous shales.

15580-15600 As above with decreased red siltstone and shales.

15600-15610 Dolomite, very dark gray, micro-cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF; sand-stone, frosted-white, very fine-fine, subround-sub-angular, quartz grains with dolomitic-siliceous cement with admixed chert milky angular fragments; silstone and shale medium brick-dark red, firm, very calcareous most; with traces calcite and anhydrite? filled fractures; tracesy shale green gray, non calcareous pyrite; shales dark gray, waxy; firm.

15610-15630 As above with increased siliceous-dolomitic, sandstone-siltstone with very abundant admixed angular chert fragments and moderately increased shales, light green-gray-dark gray and minor black with some disseminated pyrite crystals in light green gray shales and sandstone.

15630-15670 Dolomite, very dark gray, microcrystalline hard, dense, tight, no visible porosity, NOSCF; dolomite, light gray tan, slightly sucrosic-microcrystalline, hard, dense, tight, no visible porosity, NOSCF; with minor siliceous streaks as above and red siltstone and shale as above.

15670-15680 Dolomite dark gray as above and shales, dark gray, splintery, firm, non calcareous-very slightly calcareous, and very dark reddish brown, calcareous, firm, dirty, (iron stained shales?) with traced unidentified pencil lead shapled fossil? with admixed siliceous dolomitic sandstone as above, extremely trashy firm.

15680-15700 As above with admixed dolomite very dark gray-very dark brown, cryptocrystalline, angular-shaly, dense, tight, no visible porosity, blocky, NOSCF.

15700-15730 Dolomite, medium gray-dark gray, microcrystalline-slightly sucrosic, hard, dense, tight, no visible porosity, NOSCF; dolomite, light grayish tan, slightly sucrosic-microcrystalline, hard, dense, tight, no visible porosity, NOSCF; with some admixed reddish and dark gray shale fragments, some sandstone, siliceous-dolomitic as above and traces unidentified penicl lead shaped fossil casts, conchoidal like, dark reddish shell and anhydrite? filled? with traces filled fractures.

15730-15740 As above with very very minor trace pinpoint vugular porosity in gray tan, dolomite with dark dolomite more shaly.

15740-15750 As above with traces filled fractures.

15750-15820 Dolomite, dark gray, crypto-microcrystalline, slightly shaly-argillaceous and dolomite, medium gray, crypto-crystalline very slightly sucrosic, hard, dense, tight no visible porosity with very rare trace pinpoint vugular porosity, NOSCF; sandstone grading to sand-stone and dolomite, frosted-clear, sand grains, very fine-fine, angular with admixed dark gray dolomite, fragment cement with traces breccia filled fractures and calcite filled fractures with traces pyrite crystals.

15820-15840 As above with very abundant limestone, light tannish red with traces green gray mottled, cryptocrystalline, platy, hard, dense, tight and fairly abundant angular dolomite, green gray, fissile, splintery, hard, dense.

15840-15850 As above with traces dolomite, light gray-very slightly greenish gray, cryptocrystalline, very slightly sucrosic part with very minor traces fine disseminated pyrite,

crystals, very rare trace black styloite, no visible porosity, NOSCF;

15850-15870 As above with dolomite becoming slightly cream colored in part.

Some Change.

15780-15910 Predominantly limy dolomite, light cream tan, crypto-crystalline, firm, dense, tight, traces rare disseminated pyrite crystals and rare trace blocky stylolite, dolomite, medium gray-green gray, cryptocrystalline-very slightly sucriosc, hard, dense, tight, no visible porosity, NOSCF;.

15910-15930 As above very very rare pinpoint vugular porosity with dark stain lining, sulfide: NOSCF.

15930-15940 Samples Caught After Trip Because of Washed out Bit Jet.

15950' Bit Trip For Hole in Pipe.

15940-15950 Caught After Trip- as above with abundant trip slough, trip required intermittent reaming from approximantely 12000' to T.D. to get back to bottom.

15950-15970 As above with very abundant trip slough.

15970-16000 Predominantly dolomite, light tan, grading to light green gray, micro-cryptocrystalline, very slight trace black stylolite very rare trace dissmeinated pyrite crystals, firm-hard, dense, tight, no visible porosity, with very rare trace pinpoint vugular porosity, NOSCF; very very minor trace green gray dolomitic shale.

16000-16040 As above with very very rare trace sandy dolomite with trace sucrosic dolomite.

16040-16050 As above with admixed dolomite, dark gray, crypto-micro-crystalline, hard, dense, tight, argillaceous, slightly siliceous, no visible porosity, NOSCF; dolomite, light tan, microcrystalline-slightly sucrosic in part, slightly breccia, trace intercrystalline porosity, no visible porosity, NOSCF.

16050-16060 Dolomite, light tan, micro-cryptocrystalline, very slightly sucrosic in part, hard, dense, tight, no visible porosity, NOSCF; dolomite, light gray-medium gray, cryptocrystalline-very slightly sucrosice, traces stylolite rare traces disseminated pyrite crystals, very rare trace pinpoint vugular porosity part, no visible porosity most, NOSCF; still traces dark reddish siltstone, green gray shale and blackish; some breccia part, slightly siliceous part.

16060-16080 As above with some dolomite becoming darker brown, slightly sucrosic-cryptocrystalline, very very rare trace pinpoint vugular porosity, no visible porosity, NOSCF; slightly breccia part, slightly sliceous part, few individual dolomite rhombs.

16080-16090 As above with decreased dark dolomite and with traces light green accessory flakes not exactly right color for glauconite but might be and with traces micro-cyrstalline disseminated pyrite crystals still some breccia, light gray and darker dolomite, sucrosic with very very slight traces pinpoint vugular porosity, NOSCF.

16090-16140 Dolomite, predominantly light tan-light gray, micro-crystalline-slightly sucrosic, firm, no visible, porosity, trace microcrystalline porosity?, NOSCF; very minor traces dolomite breccia, light greenish gray, and darker gray, cryptocrystalline, hard, dense, stylolite, traces pyrite, no visible porosity, NOSCF.

16140-16170 Deolomite, light tan-light gray microcrystalline-slightly sucrosic part, very minor trace stylolite, very very minor trace pinpoint vugular porosity-no visible porosity most, NOSCF, very very minor trace disseminated pyrite crystals; some dolomite, very dark gray-light gray, cryptocrystalline, very slightly breccia, hard, dense, tight, no visible porosity, NOSCF; traces siliceous dolomite, and traces uphole slough.

16170-16190 As above with traces increased stylolite and very very minor trace dolomite, dark gray-black, very angular.

16190-16200 As above but with some admixed breccia dolomite, dark gray-dark brown, microcrystalline, hard, dense, tight, with abundant scattered disseminated pyrite and traces limestone, black-dark gray, argillaceous.

Changing Note red silty shales.

16200-16210 Dolomite, dark-medium gray, cryptocrystalline, siliceous cherty part, argillaceous part, hard, dense, tight, no visible porosity, NOSCF with traces admixed, black, stylolite shales; dolomite, light tan-light gray, cryptocrystalline, siliceous, hard, dense, tight, no visible porosity, NOSCF; shales, dark reddish-reddish brown, grading-siltstone, calcareous, firm; traces sandstone grading-siltstone, frosted, very fine, sub-round, siliceous-dolomitic, hard, dense, tight with some traces milky chert fragment, fine angular.

16210-16300 Predominantly dolomite, dark gray, micro-crypto-crystalline, hard, dense, tight, no visible porosity, NOSCF; dolomite, medium gray-light gray tan, micro-cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF; traces limy dolomite, light tan microcrystalline, hard, dense, tight, no visible porosity, NOSCF and with some brecciated dolomite and filled fractures with occasional traces disseminated pyrite crystals.

16300-16350 As above predominantly dolomite, dark gray, micro-cryptocrystalline and grading to dolomite medium gray-light gray tan, becoming slightly chalky part.

16350-16370 Dolomite, very dark gray, crypto-microcrystalline, hard, dense, tight, no visible porosity, NOSCF; limy dolomite-dolomitic limestone, light gray tan, firm, slightly chalky, no visible porosity, NOSCF; some filled fractures.

Changing.

16370-16390 Limy dolomite-dolomitic limestone, speckled light tan gray and darker brown, microcrystalline with lighter cryptocrystalline matrix, no visible porosity, NOSCF; dolomite, very dark gray, crypto-microcrystalline, hard, dense, tight, no visible porosity, NOSCF with traces filled fractures, traces siliceous dolomite.

16390-16400 As above with becoming very slightly dolomitic limestone.

16400-16450 Limestone suboolitic speckled dark brown-gray micro-crystalline limestone crystals with light gray tan, cryptocrystalline-slightly chalky-micritic matrix, firm, no visible porosity, NOSCF; dolomite, very dark gray, crypto-microcrystalline, hard, dense, tight, no visible porosity, NOSCF; with very minor traces filled fractures.

Changing.

16450-16460 Dolomite grading limy dolomite, very dark gray, crypto-crystalline argillaceous-shaly part, hard, dense, tight, no visible porosity, NOSCF; oolite-suboolitic, clastic? limestone dark brown-light gray tan, dark brown ooliths with light gray tan micritic matrix, hard, dense, tight, no visible porosity, NOSCF; shales, dark reddish brown-brown, dolomitic-calcareous most, hard; sandstone-siltstone, frosted-very slightly pinkish, very fine, sub-round, siliceous, hard, dense, tight with very minor admixed chert fragments, milky-smoky, fine angular, hard, dense, tight, no visible porosity, NOSCF; traces only shales, light green gray, non calcareous cherty, pyrite, hard and very rare trace dolomitic shale, black firm with very rare traces scattered, pyrite, crystals.

16460-16470 As above with decreasing shales.

16470-16480 As above with unidentified fossil, Pelecypod? or Brachiopod?

16480-16490 As above.

16490-16540 As above with increased oolite-suboolite limestone and decreased dark gray dolomites.

16541' Bit Trip.

16540-16560 As above with abundant admixed reddish siltstone, shales, chert and sandstone mostly slough? could be partly bottom hole shales.

16560-16580 Shaly dolomite grading dolomitic shale, very dark gray, firm, hard, dense, tight, no visible porosity, NOSCF; limestone light gray tan, crypto-microcrystalline, firm, no visible porosity, NOSCF; limestone becomes siliceous part; sandstone grading siltstone, clear-frosted, very fine, subangular, very siliceous cement most; very slightly calcareous part; very rare trace glauconite? with traces admixed milky-smoky chert, hard, dense, tight, no visible porosity, NOSCF; very very trashy formation.

16580-16600 As above with fairly noticable calcite fracture fillings, white most.

16600-16660 Dolomite, very dark gray, firm, no visible porosity, NOSCF; dolomite, light gray tan, cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF; shale, gray-greenish gray, non calcareous-very slightly dolomitic; slightly waxy look; sandstone-siltstone, clear-frosted, very fine, subangular, siliceous-dolomitic cement, trace glauconite with admixed smoky-milky chert fragments; trashy firm; shales rusty reddish, firm, silty, non calcareous-very slgihtly calcareous, traces micaceous looking faces; maybe slough in part; scattered pyrite.

16660-16700 As above with admixed limestone, light tannish gray, cryptocrystalline, firm, no visible porosity, NOSCF with fairly noticable, greenish gray, micaceous looking, slightly greasy shales and fairly noticable rusty red, silty, micaceous looking shales as above.

Some Change.

16700-16740 Slightly dolomitic limestone, light gray tan, crypto-crystalline most, hard, dense, tight, no visible porosity, NOSCF; dolomite, very dark gray, crypto-crystalline most, hard, dense, tight, no visible porosity, NOSCF; sandstone-siltstone, frosted-white,

	very fine, subangular-subround, dolomitic-siliceous cement, hard, dense, tight, no visible porosity, NOSCF; shales and siltstones, rust red-reddish brown, non calcareous most-very slightly calcareous part; some minor argillaceous limestone, dark gray, crypto-crystalline, slight greasy text part; slight micaceous looking part, no visible porosity, NOSCF; fairly noticable disseminated pyrite thruout.
16740-16750	As above with one fragment of pinpoint vugular porosity, NOSCF.
16750-16770	Slightly dolomitic limestone, light gray tan as above becoming slightly more dolomitic part and dolomite very dark gray, cryptocrystalline as above; shales, rust reds-brownish, red, silty, non calcareous most, firm, very minor shales, pale green, non calcareous, slightly waxy; rare trace shale, black, dolomitic, slightly waxy, pyrite; some disseminated pyrite thruout sample.
16770-16800	As above with increased very dark gray dolomite, crypto-crystalline, hard, dense, tight, no visible porosity, some calcite filled fractures and with very minor trace slightly brecciated filled fractures.
16800-16830	Predominantly dolomite, very dark gray, cryptocrystalline-slightly microcrystalline, very slightly limy part, fairly noticable calcite and slightly breccia filled fractures, hard, dense, tight, no visible porosity, NOSCF; minor shales, rust red-brownish red with very rare pale green, shale, non calcareous most, firm.
16830-16840.	As above with admixed limestone, light gray tan crypto-crystalline, firm, no visible porosity, NOSCF.
16840-16890	As above with greatly increased limestone as above and moderate amounts of shale.
16894'	Bit Trip.
16894'	Got Sutck Differentially - Used Nitrogen to get loose. Stuck three Different Times Before Finally Getting Out of Hole. Five Days Down Time.
16894-16950	Predominantly limestone, dark gray crypto-microcrystalline, hard, dense, traces calcite filled fractures, and lime-stone, gray tan, crypto-microcrystalline, hard, dense, tight, traces calcite filled fractures, no visible porosity, NOSCF; minor sandstone, frosted-white, very fine, subangular-subround, dolomitic-siliceous cement, no visible porosity, NOSCF; minor shales, rust-reddish brown, slightly calcareous-non calcareous trace shale.

Change.

16950-16967	Predominantly dolomite, light tannish gray, crypto-crystalline, slightly siliceous part, very hard, very dense, tight, no visible porosity, NOSCF; limestone, dark gray-gray tan as above with only very rare trace sandstone and shales as above.
16917'	Short Trip 52 stands - Broke Down.
16960-16970	As above with traces disseminated pyrite in dolomite and with slightly increased red and greenish gray shales but still very minor.
16970-17000	As above with increased limestone.
17000-17040	Dolomite, predominantly dark gray with admixed light tannish gray, micro-cryptocrystalline, traces only fine disseminated pyrite crystals, some trace calcite filled fractures, firm, dense, tight, no visible porosity most with trace intercrystalline porosity?, NOSCF, with some gas on detector (Fracture gas?); very very minor admixed sandstone, white-frosted, very fine, subangular-subround, dolomitic-siliceous cement, hard, dense, tight, no visible porosity, NOSCF; very very minor shales, rust dark red, firm, slightly silty, slightly calcareous and shales, pale green, firm, non calcareous most.
17040-17050	As above with slightly increased shales.
17050-17080	Dolomite, dark gray-light tannish gray, micro-crypto-crystalline, limy part-siliceous part, traces only fine disseminated pyrite crystals, some calcite filled fractures, firm, dense, tight, no visible porosity, NOSCF; shales, rust-dark red, firm, slightly silty, slightly calcareous.
17080'	Circulate Bottoms Up - Short Trip 53 Stands. Trip Back to Bottom C & C For Logs Logging Run #3 17077' SLM - 17077' Logger.
17077'	Corrected T.D. after logs and fishing.
17077-17150	Predominantly limestone-dolomitic limestone, dark-medium gray, microcrystalline most, firm, no visible porosity, NOSCF with very noticable admixed slough and shales as above.
17150-17200	Predominantly limestone, dark-medium gray, micro-crypto-crystalline, firme, dense, tight, no visible porosity, NOSCF; some shales, minor amounts, rust-reddish brown, silty, calcareous-non calcareous; very minor trace

	sandstone, frosted-white, very fine, subround, dolomitic-siliceous cement, hard, dense, tight, no visible porosity, NOSCF; very minor traces shale, pale green, hard, very slightly dolomitic cement and with scattered calcite filled fractures with very very minor trace brown silty limestone.
17200-17250	Predominantly limestone, black-dark gray-medium gray with very minor trace brown limestone stain, micro-cryptocrystalline, very slightly silty part, firm, dense, tight, trace calcite filled fractures, no visible porosity, NOSCF; very rare trace shales as above and sandstone as above (brown limestone stain appears to be on jointing surfaces).
17250-17280	As above with black limestone becoming dolomite, black, cryptocrystalline-very slightly argillaceous, hard, dense, tight, no visible porosity.
17280-17340	Predominantly limestone, black-medium gray, micro-cryptocrystalline, very slightly silty part, firm, dense, tight, trace calcite filled fractures and some brown stained limestone on fracture faces; rare trace admixed shale, rust, non calcareous, firm, rare trace sandstone, frosted, very fine, subround, dolomitic, cement, hard, dense, tight, no visible porosity, NOSCF.
17340-17350	As above with very slight trace pink limestone.
17350-17373	Predominantly limestone, black-gray as above.
17373'	Bit Trip.
17370-17380	Missed Sample - Flow Line Frozen Up to Sample Sluice Box During Trip.
17380-17400	Predominantly limestone, black-medium gray-gray tan, micro-cryptocrystalline, firm, dense, tight, calcite filled fractures, minor traces dolomite, light tan, microcrystalline, slightly limy, dense, tight, very rare trace black shales, slightly calcareous-non calcareous with trace milky chert fragment.
17400-17440	As above with very noticable calcite filled fractures and very noticable, brown stained fracture faces.
17440-17460	With admixed shales rust-reddish, calcareous-non calcareous with very minor trace sandstone, white-frosted, very fine, subround, dolomitic cement.
17360-17470	Traces black, waxy, stylolitic shales.
17470-17490	As above with some admixed rust and reddish shales.

17490-17520	Limestone, black-grayish tan, micro-cryptocrystalline, firm, no visible porosity, NOSCF; failry noticable calcite filled fractures and brown stained fracture faces; traces disseminated pyrite crystals scattered; fair amount shales rust-reddish, firm, non calcareous-calcareous.
17520-17573	As above with slightly increased rust-reddish shales as above and with very rare trace black stylolite shales with very minor admixed pyrite.
17573'	Bit Trip - Circulated Samples Out.
17573'	Circulated samples as above with still noticable black stylolite shales and pyrite.
17570-17580	Limestone, black-grayish tan-gray, crypto-micro-crystalline, hard, slightly dolomitic part, dense, no visible porosity, NOSCF; traces cherty limestone; shales, rust-reddish, firm, calcareous-non calcareous, hard; traces shale, grayish green, slightly waxy looking, non calcareous, hard; sandstone, trace only, frosted-white, very fine, subround, siliceous, cherty, quartzitic, hard, dense, tight, angular fragments, no visible porosity, NOSCF; quite a bit of admixed trip slough; some calcite filled fractures; scattered rare traces disseminated microcrystalline pyrite.
17580-17616	Sandstone, white-milky-frosted,very fine, subround-subangular, siliceous-quartzitic-cherty, disseminated pyrite crystals, hard, dense, angular fragments, tight, no visible porosity, NOSCF; limestone, black-gray, crypto-microcrystalline, hard, dense, tight, no visible porosity, NOSCF; shales, rust-reddish brown, calcareous-non calcareous, firm with some interbed sandstone veinlets; traces black waxy shale and very minor traces green, non calcareous waxy shale. (may be conglomerate).
17616'	Bit Trip.
17616-17640	Trip Slough - Very Poor Samples - Slough Contaminated.
17640-17660	Predominantly limestone; black gray-medium gray with some brown surface stain on fractures, micro-crypto-crystalline, hard argillaceous part, dense, tight, traces calcite filled fractures; shales, rust-dark reddish brown as above with some admixed silty shales; moderate-minor, white-frosted, quartzitic sandstone as above with very minor traces waxy shale stylolite.
17660-17690	As above becoming fairly argillaceous part.

17690-17700	As above slightly increased calcite filled fractures and siltstone stringers.
17700-17770	Limestone, gray, crypto-microcrystalline, hard, dense, tight, argillaceous, no visible porosity, NOSCF; limestone, tannish gray, microcrystalline slightly silty, firm; sandstone traces only, white-frosted, siliceous, disseminated pyrite crystals (uphole slough?); shales, rust-reddish, non calcareous-calcareous, hard; traces shales, gray-dark gray, very slightly calcareous. (Checked Against Uphole Cretaceous section - not the same.)
17770-17780	As above with some traces admixed sandy oolite limestone.
17780-17800	Limestone, dark gray, crypto-microcrystalline, slightly dolomitic, argillaceous, hard, dense, tight, no visible porosity, NOSCF; limestone, gray-grayish tan-brown, microcrystalline, silty firm; limestone dark gray-tan gray oolitic, very slightly sandy part, well rounded oolites, hard, dense, tight, no visible porosity, NOSCF; scattered calcite filled fractures thruout limestone; shales, rust-reddish, calcareous-non calcareous, firm; shale, black, waxy, stylolite, traces only; very rare trace chert fragment.
17800-17810	As above with argillaceous limestone becoming limy shales in part, medium gray, hard.
17810-17820	As above - samples contaminated by Trip Slough - Caught After Trip.
17816'	Bit Trip.
17820-17830	As above with still very noticable admixed trip slough.
17830-17860	Predominantly limestone, dark-medium gray, crypto-microcrystalline, argillaceous, hard, dense, tight, no visible porosity, NOSCF with abundant calcareous filled fractures and with traces dolomitic limestone; limestone, gray-grayish tan with minor brown, microcrystalline, silty, firm; limy shale, medium gray, hard; shales, rust-reddish, non calcareous-calcareous, hard, firm; traces only, white quartzitic sandstone and traces only rare, angular chert fragment.
17860-17870	As above, becoming silty and with very minor admixed shale, dark gray-black, waxy, firm, non calcareous.
17870-17900	As above with admixed siltstone, tan, very fine, subround, firm, very calcareous, hard, dense, tight, no visible porosity, NOSCF.

17900-17940	Limy siltstone grading-sandstone, light grayish tan, very fine, subround, argillaceous, hard, dense, tight, no visible porosity, NOSCF; limy shale-shaly limestone, gray cryptocrystalline, firm, argillaceous, tight, oolitic limestone, gray-tan, microcrystalline, hard, dense, tight, no visible porosity, NOSCF; limestone, brown-gray, crypto-microcrystalline, hard, dense, tight, no visible porosity, NOSCF; dolomite, dark brown, cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF: with calcite filled fractures thruout siltstone and limestone with minor shales, black waxy gray green, non calcareous most and shales, reddish-rust, firm, non calcareous-calcareous.
	Changing.
17940-17950	As above with greatly increased silty shales, reddish with traces orange chert fragments.
17950-18000	Limy siltstone-sandstone, light grayish tan-pinkish tan, very fine, subround, argillaceous, hard, dense, tight, no visible porosity, NOSCF; limesonte, gray-brown, crypto-microcrystalline, oolitic and sandy part, argillaceous-shaly part, hard, dense, tight, no visibile porosity; shales, rust-reddish brown, silty part, very calcareous-nearly non calcareous with minor orange chert fragments; shales, green gray, waxy, firm with traces purplish gray waxy shales with waxy shales very slightly calcareous; very minor trace only limy gray siltstone only with glauconite inclusions.
18000-18010	As above with increased reddish brown-rust siltstone and shales as above.
18010-18054	Predominantly shaly siltstone and shale reddish brown-rust, calcareous-non calcareous, firm, no visible porosity, admixed traces orange chert and with calcite filled fractures; limestone, black-dark gray, crypto-microcrystalline, hard, dense, tight, no visible porosity, NOSCF; minor shales, gray-black, waxy, non calcareous traces only; traces only dolomite, brown, cryptocrystalline, hard, dense, tight, no visible porosity, NOSCF.
18054'	T.D.

STATE OF UTAH
NATURAL RESOURCES & ENERGY
Oil, Gas & Mining

4241 State Office Building • Salt Lake City, UT 84114 • 801-533-5771

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Cleon B. Feight, Division Director

April 6, 1983

John J. Christmann & Associates
P. O. Box 238
Pinedale, Wyoming 82941

Re: Well No. L L & E Fed. # 1-20
Sec. 20, T. 10N, R. 8E.
Rich County, Utah

Gentlemen:

According to our records, a "Well Completion Report" filed with this office July 29, 1982, from above referred to well, indicates the following electric logs were run: Dual Later-log, CNL-Density, BHC-Sonic, Dipmeter. As of todays date, this office has not received these logs.

Rule C-5, General Rules and Regulations and Rules of Practice and Procedure, requires that a well log shall be filed with the Commission together with a copy of the electric and radioactivity logs.

We will be happy to acknowledge receipt of your response to this notice if you will include an extra copy of the transmittal letter with a place for our signature, and a self addressed envelope for the return. Such acknowledgement should avoid unnecessary mailing of a firm second notice from our agency.

Your prompt attention to the above will be greatly appreciated.

Respectfully,

DIVISION OF OIL, GAS AND MINING

Cari Furse

Cari Furse
Well Records Specialist

CF/cf

STATE OF UTAH
NATURAL RESOURCES & ENERGY
Oil, Gas & Mining
4241 State Office Building • Salt Lake City, UT 84114

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Cleon B. Feight, Division Director

4 71

April 6, 1983

P&A

John J. Christmann & Associates
P. O. Box 238
Pinedale, Wyoming 82941

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Respectfully,

DIVISION OF OIL, GAS AND MINING

Cari Furse

Cari Furse
Well Records Specialist

Sent out 4-21-83
Cert.
mail except
field copies

CF/cf

STATE OF UTAH
NATURAL RESOURCES & ENERGY
Oil, Gas & Mining

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Cleon B. Feight, Division Director

4241 State Office Building • Salt Lake City, UT 84114 • 801-533-5771

May 7, 1982

John T. Christmann & Associates
P. Box 238
Pinedale, Wyoming 82941

Re: Well No. LL & E Federal #1-20
Sec. 20, T. 10N, R. 8E.
Rich County, Utah
(February - April 1982)

Gentlemen:

Our records indicate that you have not filed the monthly drilling reports for the months indicated above on the subject well.

Rule C-22, General Rules and Regulations and Rules of Practice and Procedure, requires that said reports be filed on or before the sixteenth (16) day of the succeeding month. Thsi report may be filed on Form OGC-1B, (U.S. Geological Survey Form 9-331) "Sundry Notices and Reports on Wells", or on company forms containing substantially the same information. We are enclosing forms for your convenience.

Your prompt attention to the above will be greatly appreciated.

Very truly yours,

DIVISION OF OIL, GAS AND MINING

Cari Furse

Cari Furse
Clerk Typist

,73

Form Approved.
Budget Bureau No. 42-R1424

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUNDRY NOTICES AND REPORTS ON WELLS

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

1. oil well ☒ gas well ☒ other

2. NAME OF OPERATOR
John J. Christmann & Associates

3. ADDRESS OF OPERATOR
P.O. Box 238, Pinedale, Wyoming 82941

4. LOCATION OF WELL (REPORT LOCATION CLEARLY. See space 17 below.)
AT SURFACE: 3100' FWL, 1980' FSL
AT TOP PROD. INTERVAL:
AT TOTAL DEPTH:

5. LEASE
U-25128

6. IF INDIAN, ALLOTTEE OR TRIBE NAME
---

7. UNIT AGREEMENT NAME
Bridger Creek

8. FARM OR LEASE NAME
Christmann LL&E Federal

9. WELL NO.
1-20

10. FIELD OR WILDCAT NAME
Wildcat

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Sec. 20, T10N, R8E

12. COUNTY OR PARISH
Rich

13. STATE
Utah

14. API NO.
43-033-30031

15. ELEVATIONS (SHOW DF, KDB, AND WD)
6520' GR (ungraded)

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

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

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

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

Reached T.D. 18,054' 01-14-82
Started logging on 01-14-82, ran DILL, RXO, Sonic GR & Velocity Survey.

01-20-82 Ran 7"csg. landed as follows:

Top:	7"	38#	L80 Vam	3,566.64'	100jnts.
	7"	38#	L80 Butt	862.16'	26jnts.
Btm:	7"	35#	L80 Butt	13,541.96'	35jnts.

Landed @17,974.96'

01-20-82 Cmt w/300 sks class G, 30% Silica flour, 40% diocel D, ¼# cello flake w/5#/bbl gilsonite, tailed w/175 sks 50/50 poz, 4% Gel, 30% silica flour, w/5#/bbl gilsonite, ¼# cello flake, 4/10th of 1% retarder, displace w/ 556bbls water. RELEASE RIG 12:00 mid-night 01-21-82
Will proceed with completion when weather permits.

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

SIGNED Joe C. Hugo TITLE ENGINEER DATE 6-8-82

(This space for Federal or State office use)

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

APPROVED BY THE STATE
OF UTAH DIVISION OF
OIL, GAS, AND MINING
DATE: 6/18/82
BY:

*See Instructions on Reverse Side

Christmann LL&E Federal 1-20
Sec. 20: NE¼SE¼, T10N, R8E
3,300' FWL, 1,980' FSL
Rich County, Utah

Christmann & Associates
P.O. Box 238
Pinedale, Wyoming 82941
(307) 367-2144
****
1500 Broadway, Suite 800
Lubbock, Texas 79401
(806) 747-4542

01/16/82 Day #241, T. for logs @18,054'T.D., Stab.:Bit, 3pt, d.c., 3pt, d.c., IBS, 6d.c., Jars, 2d.c., 1jnt HW d.p. MW9#, vis 50, WL5.8, Solids 5%, Ch 4600, 9.5PH. DC$23,724., CC$5,494,864.
Rigged up Schlumberger, ran DILL, stopped @11,400', P.O. ran tool w/no centralizers, stopped @9,500' stuck, worked tool loose P.O.H. P.U. new B.H.A. & T.I.H. Reamed 25' to btm, no fill. Cir 4½hrs. T.O. to log.
@18,027' T.V.D. 17,574' Closure N87.29° E 3,391.08' from surface loc.

01/17/82 Day #242, Logging T.D. @18,054' MW9.5#, vis 50, WL5.8, Solids 5%, Ch 4200, 9.5PH. DC$11,086., CC$5,505,950.
T.O. Rigged up Schlumberger, ran DILL, RXO, Sonic GR, & Velocity survey.

01/18/82 Day #243, l.d. d.p. @18,054'T.D. MW9#, vis 51, WL6, Solids 6%, Ch 4100, 9.3PH. DC$52,004., CC$5,557,954.
Finish running logs, T.I. slip d.l., finish T.I. Reamed 35' to btm.2' fillup, made 12stnds short trip. Cir. & cond. mud. Now l.d. d.p.

01/19/82 Day #244, 18,054'T.D. Running long string. MW9#, vis 51, WL6, Solids 5%, Ch 4800, 9.3PH. DC$20,731., CC$5,578,685.
L.d. d.p. & collars, cut d.l., string 12 lines. R.U. to run csg, ran 170Jnts 7" 35# L80 Butt.

01/20/82 Day #245, Rig down rotary tools. DC$735,979., CC$6,314,664.
Ran 7" csg, landed as follows:

Top-	7" 38#	L80Vam	3,566.64'	100jnts
	7" 38#	L80Butt.	862.16'	26jnts
Bottom-	7" 35#	L80Butt.	13,541.96'	351jnts
	Landed @17,974.96'			

Cir 2½hrs., R.U. Halliburton, cmt w/300sks class G, 30% Silica flour, 40% Diocel D, ¼# Cello flake w/5# per bbl Gilsonite. Tailed in w/175sks 50/50 pos, 4% Gel, 30% Silica flour w/5# per bbl Gilsonite, ¼# Cello flake, 4/10th of 1% retarder. Displaced w/556bbl water.

01/21/82 Day #246, DC$17,634., CC$6,332,298.
Nippled down BOP's & clean mud tanks. Release rig @12:00 Mid-night.

01/22/82 Rigging down rotary tools, drop from report until completion.
DC$13,388., CC$6,345,686.

05/12/82 Moving in with completion tools, should moved in and break tower, Friday or Saturday.

Form Approved.
Budget Bureau No. 42-R1424

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUNDRY NOTICES AND REPORTS ON WELLS

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

1. oil well ☒ gas well ☒ other

2. NAME OF OPERATOR
John J. Christmann & Associates

3. ADDRESS OF OPERATOR
P.O. Box 238, Pinedale, Wyoming 82941

4. LOCATION OF WELL (REPORT LOCATION CLEARLY. See space 17 below.)
AT SURFACE: 3100' FWL, 1980' FSL
AT TOP PROD. INTERVAL:
AT TOTAL DEPTH:

5. LEASE
U-25128

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

7. UNIT AGREEMENT NAME
Bridger Creek

8. FARM OR LEASE NAME
Christmann LL&E Federal

9. WELL NO.
1-20

10. FIELD OR WILDCAT NAME
Wildcat

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Sec. 20, T10N, R8E

12. COUNTY OR PARISH
Rich

13. STATE
Utah

14. API NO.
43-033-30031

15. ELEVATIONS (SHOW DF, KDB, AND WD)
6520' GR (ungraded)

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

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

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

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

Move in workover rig 05-17-82.

Proceed to drill out cement and perforate and test Big Horn for commercial production.
Chronological reports submitted every week to E.W. Guynn, District Engineer. U.S.G.S. Salt Lake City, Utah.

APPROVED BY THE STATE
OF UTAH DIVISION OF
OIL, GAS, AND MINING
DATE: 5/18/82
BY: [signature]

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

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

SIGNED Joe C. Hugo TITLE ENGINEER DATE 6-8-82

(This space for Federal or State office use)

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

*See Instructions on Reverse Side

STATE OF UTAH
NATURAL RESOURCES & ENERGY
Oil, Gas & Mining

Scott M. Matheson, Governor
Temple A. Reynolds, Executive Director
Cleon B. Feight, Division Director

4241 State Office Building • Salt Lake City, UT 84114 • 801-533-5771

May 7, 1982

RECEIVED JUN 3 1982

John J. Christmann & Associates
P. O. Box 238
Pinedale, Wyoming 82941

Re: Well No. LL & E Federal #1-20
Sec. 20, T. 10N, R. 8E.
Rich County, Utah
(February - April 1982)

Gentlemen:

Our records indicate that you have not filed the monthly drilling reports for the months indicated above on the subject well.

Rule C-22, General Rules and Regulations and Rules of Practice and Procedure, requires that said reports be filed on or before the sixteenth (16) day of the succeeding month. Thsi report may be filed on Form OGC-1B, (U.S. Geological Survey Form 9-331) "Sundry Notices and Reports on Wells", or on company forms containing substantially the same information. We are enclosing forms for your convenience.

Your prompt attention to the above will be greatly appreciated.

Very truly yours,

DIVISION OF OIL, GAS AND MINING

Cari Furse

Cari Furse
Clerk Typist

attachments

RECEIVED
JUN 11 1982
DIVISION OF
OIL, GAS & MINING

9-331
1973

Form Approved.
Budget Bureau No. 42-R1424

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUNDRY NOTICES AND REPORTS ON WELLS

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

1. oil well ☐ gas well ☒ other

2. NAME OF OPERATOR
John J. Christmann & Associates

3. ADDRESS OF OPERATOR
P.O. Box 238, Pinedale, Wyoming 82941

4. LOCATION OF WELL (REPORT LOCATION CLEARLY. See space 17 below.)
AT SURFACE: 3300' FWL, 1980' FSL, Sec. 20
AT TOP PROD. INTERVAL:
AT TOTAL DEPTH: 675' FEL, 2300 FSL Sec. 21,

5. LEASE
Christmann & Associates

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

7. UNIT AGREEMENT NAME
Bridger Creek

8. FARM OR LEASE NAME

9. WELL NO.
1-20

10. FIELD OR WILDCAT NAME
Christmann LL&E Fed.

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Sec. 20, T10N, R8E

12. COUNTY OR PARISH
Rich

13. STATE
Utah

14. API NO.
43-033-30031

15. ELEVATIONS (SHOW DF, KDB, AND WD)
6514' GR

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

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

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

(other) Plug as per U.S.G.S. orders: Assad Raffoul 7/6/82
Ed Guynn 7/10/82

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

1. Set retainer & 15,999' pumped 100sks to plug from 15,995' - 16,372
2. Shot 9-5/8" csg @9,200' and recovered same
3. Plug from 9,303' - 9,096' w/50sks
4. Plug from 8,307' - 8,050' w/70sks
5. Shot 4 holes @4,510' in 9-5/8" csg squeeze 61sks and plug from 4,510' - 4,200' w/77sks
6. Shot 4 holes @1,100' squeeze 70sks
7. Plug from 1,206' - 1,000' squeeze w/52sks
8. Plug 13-3/8" & 9-5/8" annulus from 300' - surface w/1" pipe 20sks
9. 20ksk Plug from 300' to surface

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

SIGNED JOE C. HUGO TITLE ENGINEER DATE 07-28-82

(This space for Federal or State office use)

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

*See Instructions on Reverse Side

8/6/82

Form 9-330
(Rev. 5-63)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN DUPL (See other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R355.

WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

5. LEASE DESIGNATION AND SERIAL NO.: Christmann & Associates

6. IF INDIAN, ALLOTTEE OR TRIBE NAME:

1a. TYPE OF WELL: OIL WELL ☐ GAS WELL ☐ DRY ☒ Other

b. TYPE OF COMPLETION: NEW WELL ☐ WORK OVER ☐ DEEP-EN ☐ PLUG BACK ☐ DIFF. RESVR. ☐ Other P & A

7. UNIT AGREEMENT NAME: Bridger Creek

8. FARM OR LEASE NAME: Christmann LL&E Fed

2. NAME OF OPERATOR: John J. Christmann & Associates

9. WELL NO.: 1-20

3. ADDRESS OF OPERATOR: P.O. Box 238, Pinedale, Wyoming 82941

10. FIELD AND POOL, OR WILDCAT: ~~Christmann LL&E Fed.~~

4. LOCATION OF WELL (*Report location clearly and in accordance with any State requirements*)*

At surface: 3300' FWL, 1980' FSL, Sec. 20, T10N, R8 E NW SE

11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA: Sec. 20, T10N, R8E

At top prod. interval reported below

At total depth: 675'FEL, 2300' FSL, Sec. 21, T10N, R8E

14. PERMIT NO.	DATE ISSUED	12. COUNTY OR PARISH	13. STATE
43-033-30031	3-5-81	Rich	Utah

15. DATE SPUDDED	16. DATE T.D. REACHED	17. DATE COMPL. (*Ready to prod.*)	18. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	19. ELEV. CASINGHEAD
5/22/81	01/16/82	P & A 07/27/82		6541'

20. TOTAL DEPTH, MD & TVD	21. PLUG, BACK T.D., MD & TVD	22. IF MULTIPLE COMPL., HOW MANY*	DRILLED BY	ROTARY TOOLS	CABLE TOOLS
18,054'	Surface		→		

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24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)*: NONE

25. WAS DIRECTIONAL SURVEY MADE: Yes

26. TYPE ELECTRIC AND OTHER LOGS RUN: Dual Later-log, CNL-Density, BHC-Sonic, Dipmeter

27. WAS WELL CORED: No

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

CASING SIZE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13-3/8"	61#/ft	1179'	17-½"	1200sks cmt to surface	None
9-5/8"	43.5-53.5-47	3902'	12-¼"	1580sks cmt	none
7"	35# 38#	17,974'	8-½"	475sks cmt	9200'

29. LINER RECORD

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

30. TUBING RECORD NONE

SIZE	DEPTH SET (MD)	PACKER SET (MD)

31. PERFORATION RECORD (*Interval, size and number*)

17,352' - 17,246'
17,130' - 16,728'
16,450' - 16,310'
8,304' - 8,350'

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

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
17,352' - 17,296'	3500gal. 20%Hcl
17,130' - 16,728'	12000gal. 20%Hcl
16,450' - 16,310'	1500gal. 20%Hcl
NONE	

33.* PRODUCTION

DATE FIRST PRODUCTION	PRODUCTION METHOD (*Flowing, gas lift, pumping—size and type of pump*)	WELL STATUS (*Producing or shut-in*)
		P & A

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

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

SIGNED Joe C. Hugo JOE C. HUGO TITLE ENGINEER DATE 07-29-82

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

INSTRUCTIONS

General: This form is designed for submitting a complete and correct well completion report and log on all types of lands and leases to either a Federal agency or a State agency, or both, pursuant to applicable Federal and/or State laws and regulations. Any necessary special instructions concerning the use of this form and the number of copies to be submitted, particularly with regard to local, area, or regional procedures and practices, either are shown below or will be issued by, or may be obtained from, the local Federal and/or State office. See instructions on items 22 and 24, and 33, below regarding separate reports for separate completions.

If not filed prior to the time this summary record is submitted, copies of all currently available logs (drillers, geologists, sample and core analysis, all types electric, etc.), formation and pressure tests, and directional surveys, should be attached hereto, to the extent required by applicable Federal and/or State laws and regulations. All attachments should be listed on this form, see item 35.

Item 4: If there are no applicable State requirements, locations on Federal or Indian land should be described in accordance with Federal requirements. Consult local State or Federal office for specific instructions.

Item 18: Indicate which elevation is used as reference (where not otherwise shown) for depth measurements given in other spaces on this form and in any attachments.

Items 22 and 24: If this well is completed for separate production from more than one interval zone (multiple completion), so state in item 22, and in item 24 show the producing interval, or intervals, top(s), bottom(s) and name(s) (if any) for only the interval reported in item 33. Submit a separate report (page) on this form, adequately identified, for each additional interval to be separately produced, showing the additional data pertinent to such interval.

Item 29: *"Sacks Cement":* Attached supplemental records for this well should show the details of any multiple stage cementing and the location of the cementing tool.

Item 33: Submit a separate completion report on this form for each interval to be separately produced. (See instruction for items 22 and 24 above.)

37. SUMMARY OF POROUS ZONES:
SHOW ALL IMPORTANT ZONES OF POROSITY AND CONTENTS THEREOF; CORED INTERVALS; AND ALL DRILL-STEM TESTS, INCLUDING DEPTH INTERVAL TESTED, CUSHION USED, TIME TOOL OPEN, FLOWING AND SHUT-IN PRESSURES, AND RECOVERIES

FORMATION	TOP	BOTTOM	DESCRIPTION, CONTENTS, ETC.
Jurassic	6,210'		
Rich	7,224'		
Slide Rock	7,732'		
Gyp Springs	7,857'		
Nugget	8,056'		
Ankarch	9,052'		
Madison	13,640'		
Cambrian	16,357'		

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38. GEOLOGIC MARKERS

NAME	TOP	
	MEAS. DEPTH	TRUE VERT. DEPTH

U.S. GOVERNMENT PRINTING OFFICE: 1963—O-683636
837-497