

FILE NOTATIONS

Entered in NID File _____

Entered On S R Sheet _____

Location Map Pinned _____

Card Indexed _____

IWR for State or Fee Land _____

Checked by Chief _____

Copy NID to Field Office _____

Approval Letter _____

Disapproval Letter _____

COMPLETION DATA:

Date Well Completed _____

Location Inspected _____

OW _____ WW _____ TA _____

Bond released _____

GW _____ OS _____ PA _____

State of Fee Land _____

LOGS FILED

Driller's Log _____

Electric Logs (No.) _____

E _____ I _____ E-I _____ GR _____ GR-N _____ Micro _____

Lat _____ Mi-L _____ Sonic _____ Others _____

UIC
2-11-92

Utah State

~~XXXXXXXXXXXX~~
~~DEPARTMENT OF THE INTERIOR~~
Department of Natural Resources
~~XXXXXXXXXXXX~~

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

1a. TYPE OF WORK
DRILL DEEPEN PLUG BACK

b. TYPE OF WELL
OIL WELL GAS WELL OTHER
SINGLE ZONE MULTIPLE ZONE

2. NAME OF OPERATOR
Willard Pease Drilling Company

3. ADDRESS OF OPERATOR
P.O. Box 548, Grand Junction, Colorado 81501

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.)*
At surface NE. SE. Sec. 16, T. 22 S., R. 5 E., S. L. M.
At proposed prod. zone 880' from E-line & 1854' from S-line.

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*
Approx. 6 1/2 mi. SW. of Emery, Utah (10 mi. by rd.)

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

16. NO. OF ACRES IN LEASE
640

17. NO. OF ACRES ASSIGNED TO THIS WELL
160

18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT.
none in area

19. PROPOSED DEPTH
9200' *Coconino*

20. ROTARY OR CABLE TOOLS
Rotary

21. ELEVATIONS (Show whether DT, RT, GR, etc.)
6473' grd.; 6485' K.B.

22. APPROX. DATE WORK WILL START*
Mar. 1, 1977

23. PROPOSED CASING AND CEMENTING PROGRAM

| SIZE OF HOLE | SIZE OF CASING | WEIGHT PER FOOT | SETTING DEPTH | QUANTITY OF CEMENT |
|--------------|----------------|-----------------|---------------|--------------------|
| 13 5/8" | 10 3/4" | 40.50# | 250 ft. | 125 sks. |

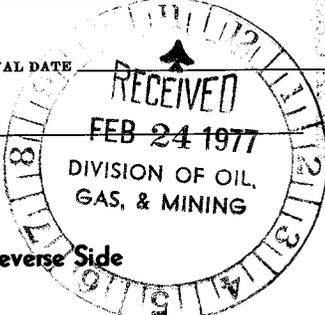
It is planned to drill a well at the above location to test the oil and/or gas production possibilities of the Ferron, Kaibab, Coconino, and possibly Mississippian formations. The well will be drilled with rotary tools using mud for circulation. Approx. 250 ft. of 10 3/4", 40.50#, H-40 casing will be set for surface casing and cemented with returns to the surface. A casing head and blowout preventer will be installed on top of the casing. ~~None~~ Fill and kill lines will be connected below the blind rams of the blowout preventer. An 8 3/4" hole will be drilled below the surface casing. A prognosis for the planned well is attached hereto. In the event of production 5 1/2", 15.50 and 17.00# casing will be run and cemented thru the production zones. See attached 12 pt. plan and plan for control equipment.

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 H. Row Gungley TITLE Cons. Geol. DATE Feb. 19, 1977

(This space for Federal or State office use)
PERMIT NO. 43-0416-30013 APPROVAL DATE _____

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



*See Instructions On Reverse Side

T.
22
S.

200 000
FEET

SHILAKE NATIONAL FOREST
FITS BLAKE NAT

55

1307

1306

1305

1304

Quitcupah

LOC.
TRAIL

Creek

Water

Hollow

Benches

K.D. Given

Quitcupah

8452

6955

706

D7029

6959

7039

6748

6885

6800

6800

6375

6982

7024

6958

6756

7095

7085

7000

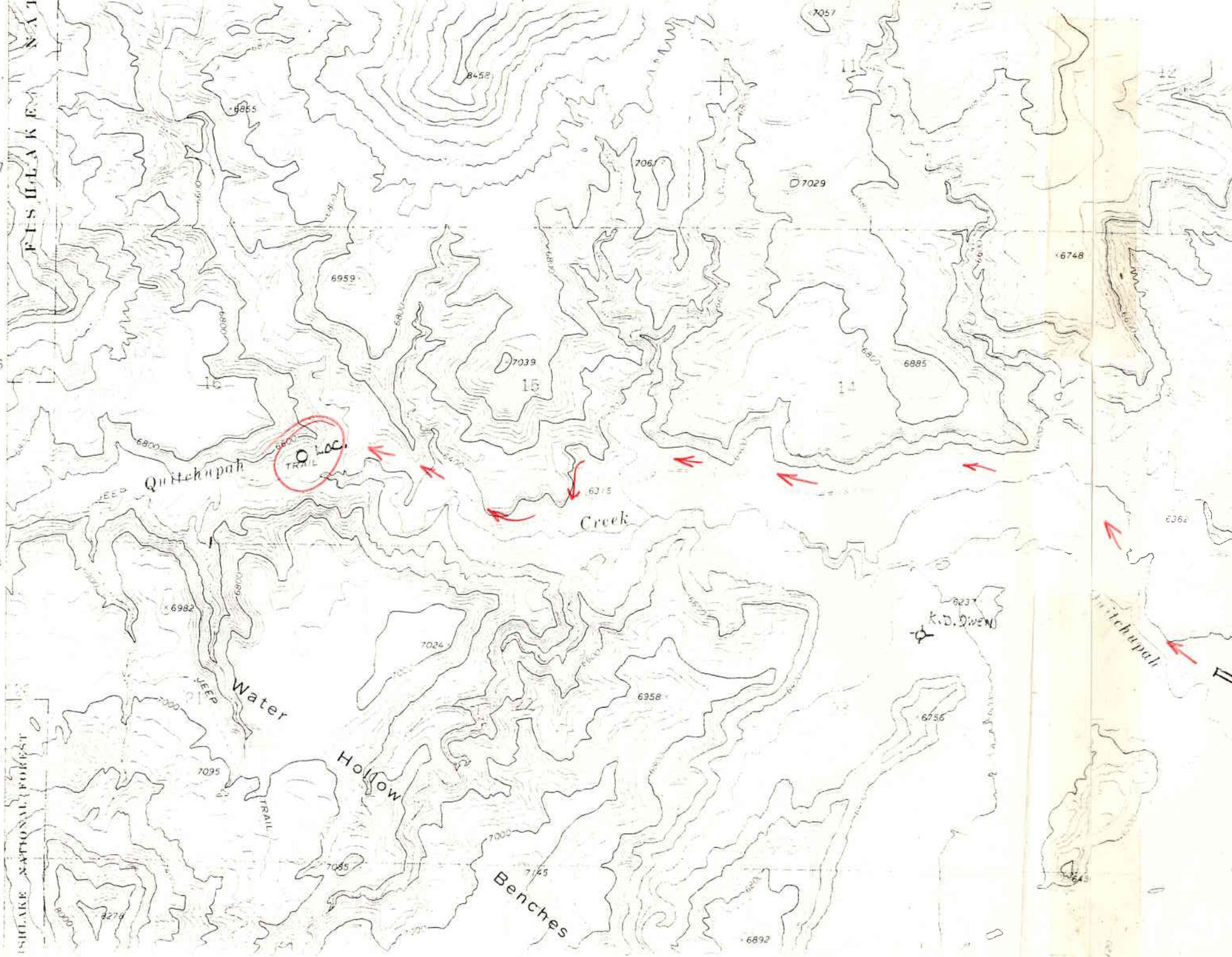
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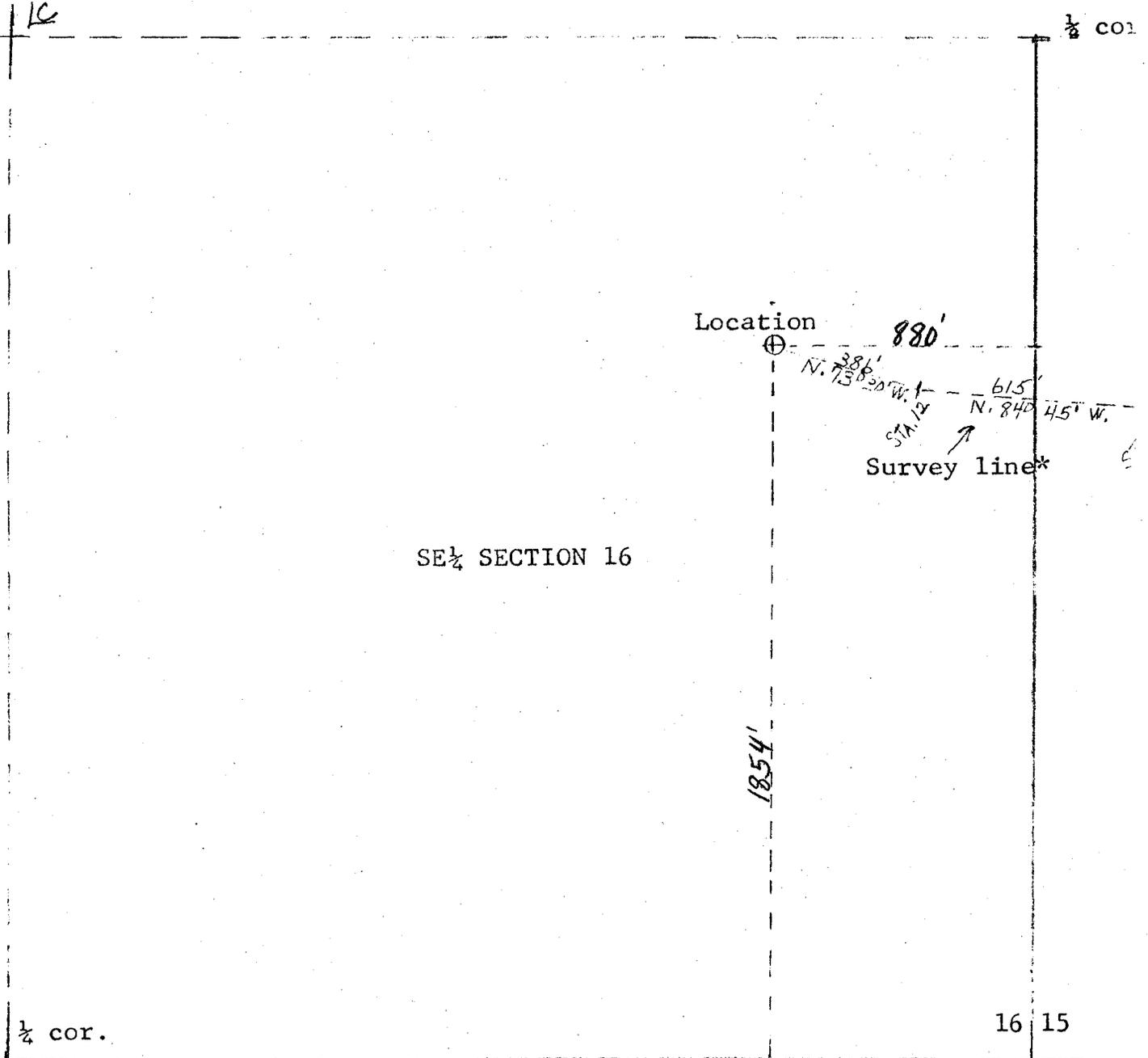
8278

AT

R



LOCATION PLAT FOR
WILLARD PEASE DRILLING COMPANY
STATE-QUITCHUPAH #1 WELL
NE. SE. SEC. 16-22S-5E
SEVIER COUNTY, UTAH
Elev.: 6473' grd.



SE 1/4 SECTION 16

* Survey line had to be run from the NW section 21 22 corner of Section 24, about 2 1/2 miles east of the location, since this was the closest surveyed corner.

I, W. Don Quigley, do hereby certify that this plat was plotted from notes of a field survey made by me on Feb. 19, 1977.

Scale: 1 in. = 400 ft.
Date: Feb. 21, 1977
Surveyed by: W. Don Quigley

W. Don Quigley
W. Don Quigley

PLAT NO. 1

W. DON QUIGLEY

OIL AND MINERALS CONSULTANT
803 PHILLIPS PETROLEUM BLDG. - SALT LAKE CITY, UTAH 84101

February 19, 1977

PROGNOSIS FOR QUITCHUPAH WELL

NE.SE.SEC.16-22S-5E-SLM

SEVIER COUNTY, UTAH

Location: NE.SE. Sec.16, T.22 S.R.5 E., S.L.M., Sevier County,
Utah. (1854' from S-line & 880' from E-line)

Elevation: 6473' grd.; 6485' K.B.

Surface Casing: 250 ft. of 10 3/4", 40.50#, H-40, LTC, new, set
and cemented with returns to the surface.

Expected Formation Tops:

| <u>Formation</u> | <u>Depth to Top</u> | <u>Thickness</u> | <u>Datum</u> |
|------------------|---------------------|------------------|--------------|
| Mancos | Surface | 1925' | 6485' K.B. |
| Ferron* | 1925' | 550' | 4560' |
| Tununk | 2475' | 725' | 4010' |
| Dakota | 3200' | 125' | 3285' |
| Cedar Mountain | 3325' | 500' | 3160' |
| Morrison | 3825' | 500' | 2660' |
| Summerville | 4325' | 375' | 2160' |
| Curtis | 4700' | 250' | 1785' |
| Entrada | 4950' | 525' | 1535' |
| Carmel | 5475' | 925' | 1010' |
| Navajo | 6400' | 650' | 85' |
| Kayenta | 7050' | 150' | -565' |
| Wingate | 7200' | 300' | -715' |
| Chinle* | 7500' | 250' | -1015' |
| Shinarump | 7750' | 75' | -1265' |
| Moenkopi | 7825' | 725' | -1335' |
| Sinbad* | 8550' | 150' | -2060' |
| Lower Moenkopi* | 8700' | 200' | -2210' |
| Kaibab* | 8900' | 140' | -2410' |
| Coconino* | 9040' | 450' | -2550' |
| Molas | 9490' | 30' | -3000' |
| Mississippian* | 9520' | ---- | -3030' |
| T.D. | 9200' (Probably) | | |

* Formations and members which may have hydrocarbons.

1. It is planned to drill an 8 3/4" hole below the surface casing to provide for the possibility of running an intermediate

string of 7" casing. It is not felt that this will be necessary; but in the event of hole trouble or if a decision is made to drill into the Kaibab and Coconino formations with air, it will be possible to do so.

2. The upper part of the hole, from below the surface casing to a depth as far as possible, will be drilled using air for circulation. This should be well into the Ferron member before water in copious quantities is encountered. It will then be necessary to convert to mud. This conversion will be done immediately upon encountering water so as not to endanger the hole. After this conversion normal drilling mud will be used for circulation with attention being paid to water loss, viscosity, weight, and pH. The water loss should be kept below 10 cc. per 15 min. with 100 p.s.i. when not drilling potential pay sections and below 6 cc. when in potential pay zones. Viscosity should be kept in the 45 to 50 range (1 qt. thru viscosity funnel in 45 to 50 seconds); mud weight should be kept below 10#/gal.; and the pH should not run above 10.
3. All hydrocarbon shows are to be drill-stem-tested with initial and final flow and shut-in periods. Final flow periods should not be less than one hour and final shut-in periods should not be less than 1½ hours. It is estimated that four drill-stem-tests may be required.
4. Run IES electric log prior to setting intermediate casing, if it becomes necessary for one reason or another.
5. It is not anticipated that any coring will be necessary. Electric log data should be sufficient, together with the sample and DST data, for proper evaluation of the pay sections.
6. Samples of the cuttings will be taken at 30-ft. intervals below the surface casing while drilling with air. After conversion to mud, samples will be taken at 10-ft. intervals. These samples will be carefully examined and logged by an experienced geologist. To assist in identification of potential hydrocarbon zones, a mud logging trailer will be connected to the mud stream as soon as conversion to mud has been accomplished.
7. Electric logs will include an induction-electrical log from bottom to top of hole; and a gamma-density and compensated neutron porosity log over the potential pay sections.
8. The well will be drilled to the Coconino formation (100 ft. below the top) unless commercial production is obtained above this depth. It is also possible that the well may be drilled to the Mississippian, if everything appears encouraging and good production has not been encountered above. It is anticipated that it will take about 60 days to drill

the well.

9. Anticipated costs of the well are as follows:

| | |
|----------------------------------------------|------------------|
| Surveying and permit costs | \$300.00 |
| Road and location | 4000.00 |
| Surface casing and cementing | 4475.00 |
| Casing head and valves | 1250.00 |
| Drilling contract (60 days at \$3500)&moving | 240,000.00 |
| Water Hauling (probably can be pumped) | 2000.00 |
| Mud and chemicals | 35,000.00 |
| Bits | 25,000.00 |
| Electric logs | 14,000.00 |
| DST's (four) | 12,000.00 |
| Geological & engineering services | 10,000.00 |
| Mud logging services | 15,000.00 |
| Miscellaneous | <u>10,000.00</u> |
| Total estimated cost | \$373,625.00 |

SURFACE USE & OPERATIONS PLAN

FOR

WILLARD PEASE DRILLING COMPANY

STATE- QUITCHUPAH #1

NE. SE. SEC. 16-22S-5E, SLM

SEVIER COUNTY, UTAH

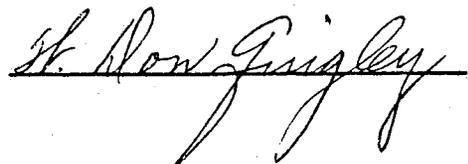
1. A survey plat showing the location of the proposed well site is attached (See Plat No.1). Map No.1 shows the route to the well site from Hwy 10. The access road leaves Hwy 10 at a point which is five miles south of Emery, Utah. The location is about 5 miles from the hiway up Quitchupah Creek. The map shows all the secondary roads which are in present use in the area. The well site is in the bottom of a canyon with steep cliffs on the sides. The location is beside the creek on a gentle slope and will be about 400 ft. from the stream. The surface rocks are Mancos shale and there is only sage brush on the slope.
2. Planned Access Road: The access road to the well site is shown on the map. It is a road which is in present use. The last two miles to the location will have to be widened and graded around the sharp bends and over the steep rises to permit the transport of a rig. Some fills and cuts in this road will be required. It is also planned to build a short landing strip at the position shown on the map if permission from the surface owner can be obtained.
3. Location of Existing Wells: See attached map.
4. Location of Production Equipment: A plan for the anticipated production equipment, if the well is successful, is submitted on Plat No.2. When production ceases this equipment will be removed and the land surface graded, levelled, and cleaned.
5. Water Supply: Water for drilling operations can be obtained from the nearby Quitchupah Creek. See attached map. This creek is about 400 ft. from the well and the water can be pumped to the location.
6. Road Material: No additional road material will be required unless the weather turns severe and the roads get too muddy. Then some gravel may be required on the wet spots.
7. Waste Material: An unlined reserve pit and burn pit will be constructed at the well site as shown on Plat No.3. All excess water, mud, and drill cuttings will be deposited into the reserve pit. Burnable material and garbage will be put into the burn pit, which will be fenced to prevent trash from being blown around the location. Both pits will be folded-in

and covered as soon as feasible after cessation of drilling operations. Since there is no topsoil on the well site, these pits can be folded-in without sorting.

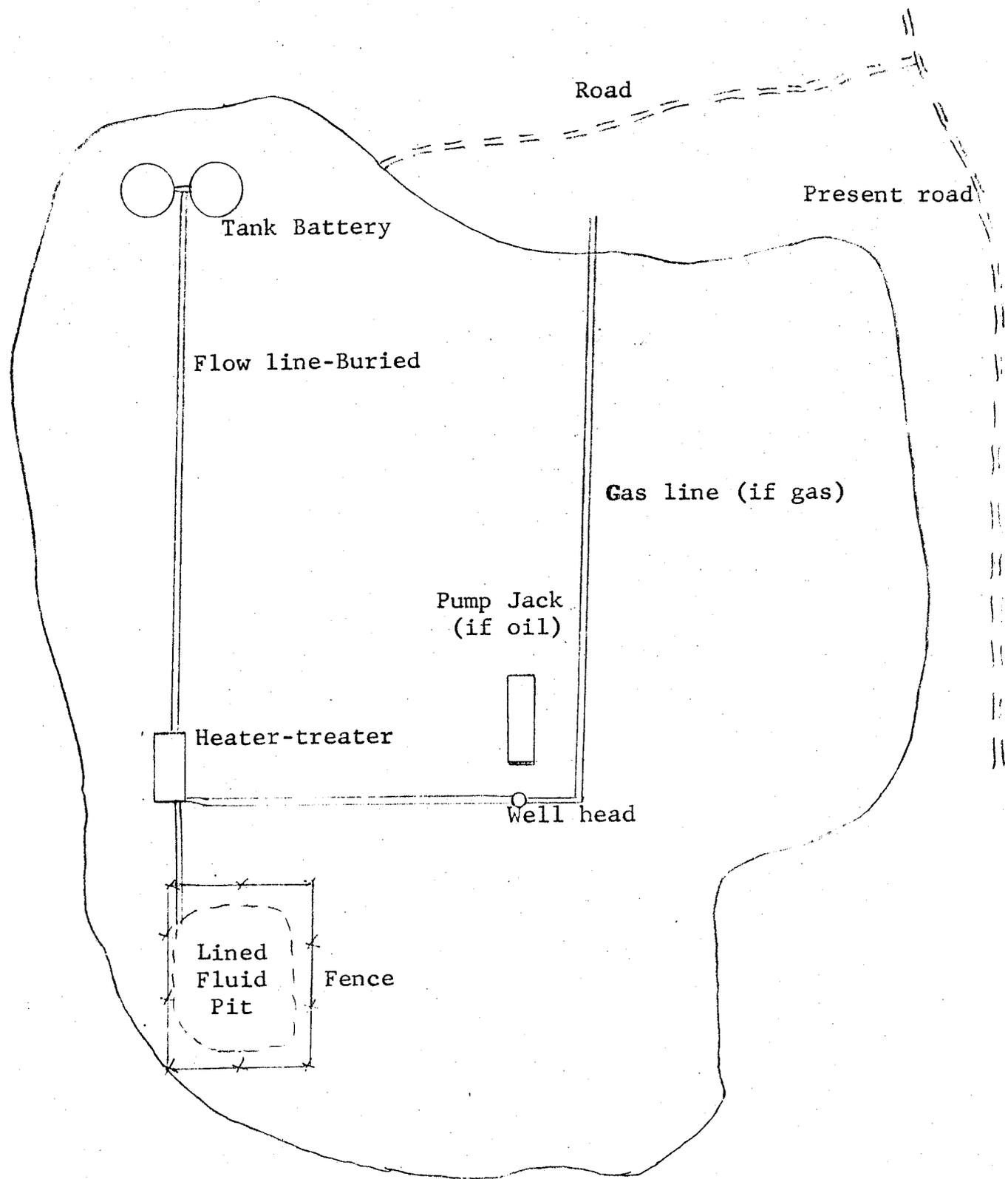
8. Camp Facilities and Airstrips: ~~None will be needed.~~ See #2 above.
9. Well Site Layout: A plan for the drilling equipment layout required for the drilling operations is submitted on Plat No. 3. The approx. dimensions of the drill site are shown. The drill site is quite irregular and rolling and will have to be levelled and filled in. The north and east sides of the location will have about 10' cuts; but this is Mancos shale and should pose no great problem. The pits will be unlined natural pits with about 4-ft. banks.
10. Restoration: After the drilling operations are concluded and the equipment removed, and if the well is not successful, the well site will be cleaned, levelled and restored to normal. The access road will be left in tact for continual use as at present. Reseeding would be useless because of the lack of vegetation. If the well is successful, the site will be prepared for the placement of the production equipment. The road to the site from the main road will have to be gravelled and ditched to make it serviceable all year. In the event the reserve pit is full of mud and water, it will be fenced and allowed to evaporate before covering.
11. Land Description: See items 1 and 9 above.
12. Representative: The operator's representative at the well site will probably be W. Don Quigley, Consultant of Salt Lake City. The drilling contractor will be the same as the operator: namely, Willard Pease Drilling Co. of Grand Junction, Colorado.
13. Certification: I hereby certify that I or persons under my direct supervision, have inspected the drill site and access route; that I am familiar with the conditions which presently exist; that statements made in this plan are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed will be performed by competent contractors engaged by Pease Drilling Company in conformity with this plan and terms and conditions under which it is approved.

Date: ~~Oct. 5, 1976~~

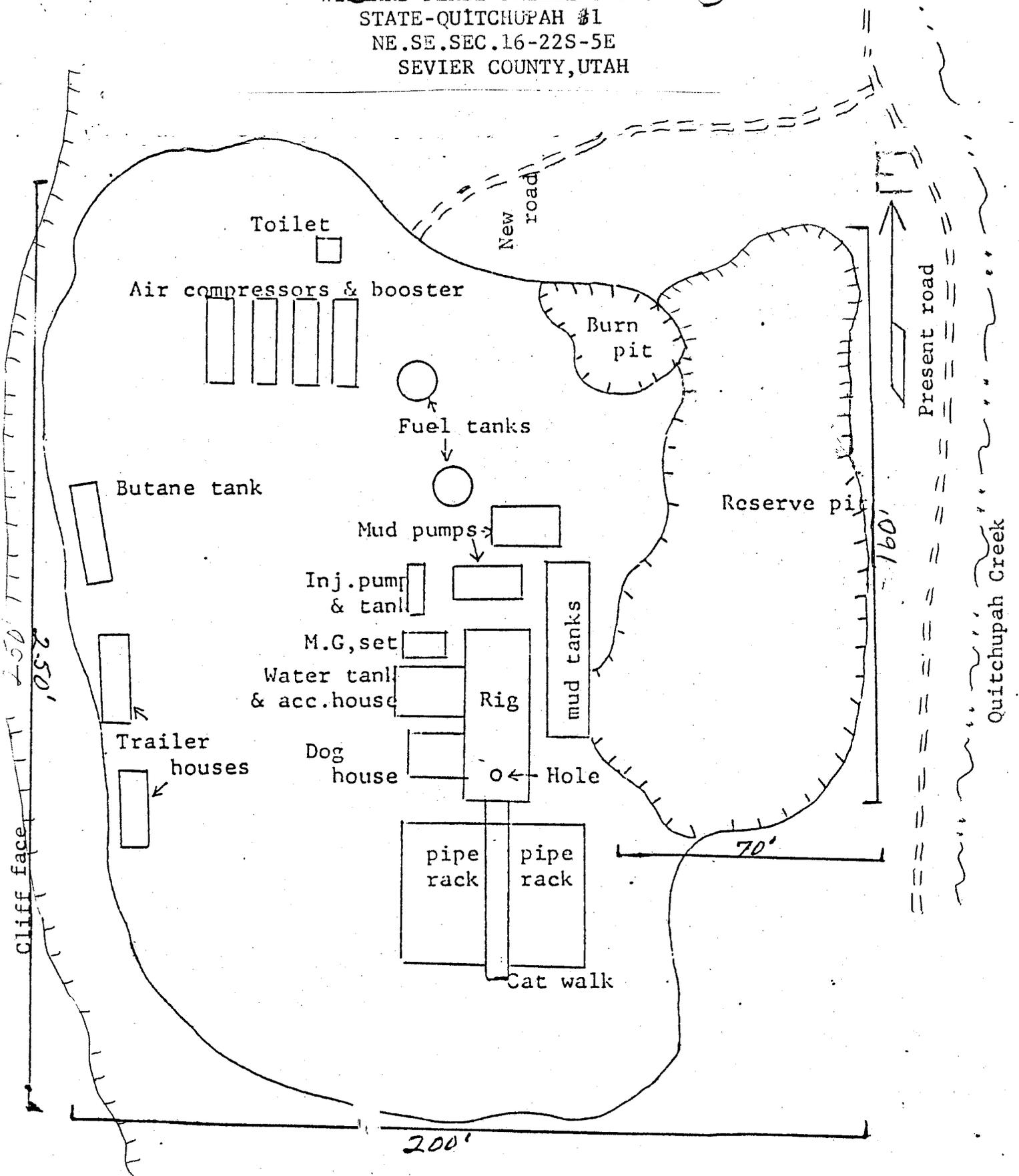
Feb 22, 1977



PLAN FOR COMPLETION EQUIPMENT
WILLARD PEASE DRILLING CO.
STATE-QUITCHUPAH #1 WELL
NE. SE. SEC. 16-22S-5E
SEVIER COUNTY, UTAH



LOCATION PLANS FOR
WILFORD PEASE DRILLING CO.
STATE-QUITCHUPAH #1
NE. SE. SEC. 16-22S-5E
SEVIER COUNTY, UTAH



WELL CONTROL EQUIPMENT
FOR
WILLARD PEASE DRILLING CO.
STATE-QUITCHUPAH #1 WELL

1. Surface Casing:

- A. Hole size for surface casing is 13 5/8".
- B. Setting depth for surface casing is approx. 250 ft.
- C. Casing specs. are: 10 3/4" O.D., H-40, 40.50#, STC
- D. Anticipated pressure at setting depth is approx. 60#.
- E. Casing will be run using three centralizers and a guide shoe, and will be cemented with 100 sks of cement with returns to the surface.
- F. Top of casing will be about 18" below ground level.

2. Casing Head:

- F. Flange size: 10; API pressure rating: 3000# W.P.; Series 900; Cameron, OCT, or equivalent; new or used; equipped with two 2" ports with high pressure nipples and 3000# W.P. ball valves.

3. Intermediate Casing: Probably none.

4. Blowout Preventer:

- A. Double rams, hydraulic, one set of blind rams and one set of pipe rams for 4 1/2" drill pipe; 10" flange, 3000# W.P.; Series 900; equipped with mechanical wheels and rod for back-up; set on top of casing head flange and securely bolted down. Initially rams will be pressure tested for not less than 2000# for leaks and will be checked and closed once a day while drilling operations are underway.
- B. Fill and kill lines (2" tubing or heavy duty line pipe) with manifold are to be connected to the 2" valves on the casing head.

5. Auxilliary Equipment:

A float valve is to be used in the bottom drill collar at all times. The standpipe valve will be kept in good working condition, and a safety valve that can be stabbed into the top of the drill pipe or drill collars will be kept on the derrick floor in a handy position at all times.

6. Anticipated Pressures:

The shut-in pressures of the ~~xxxxxx~~ potential pay zones found in the Ferron, Navajo, Shinarump, Moenkopi, Kaibab, and Coconino formations at the corresponding depths are as follows:

| | | | |
|----------------|-------|-------|-------|
| Ferron----- | 1925' | ----- | 700# |
| Chinle----- | 7500' | ----- | 2500# |
| Sinbad----- | 8550' | ----- | 2750# |
| Moenkopi----- | 8700' | ----- | 2850# |
| Kaibab*----- | 8900' | ----- | 2950# |
| Coconino----- | 9050' | ----- | 3000# |
| Mississippian* | 9500' | ----- | 3250# |

* These pressures are based on DST's taken on other wells in the area.

7. Drilling Fluids:

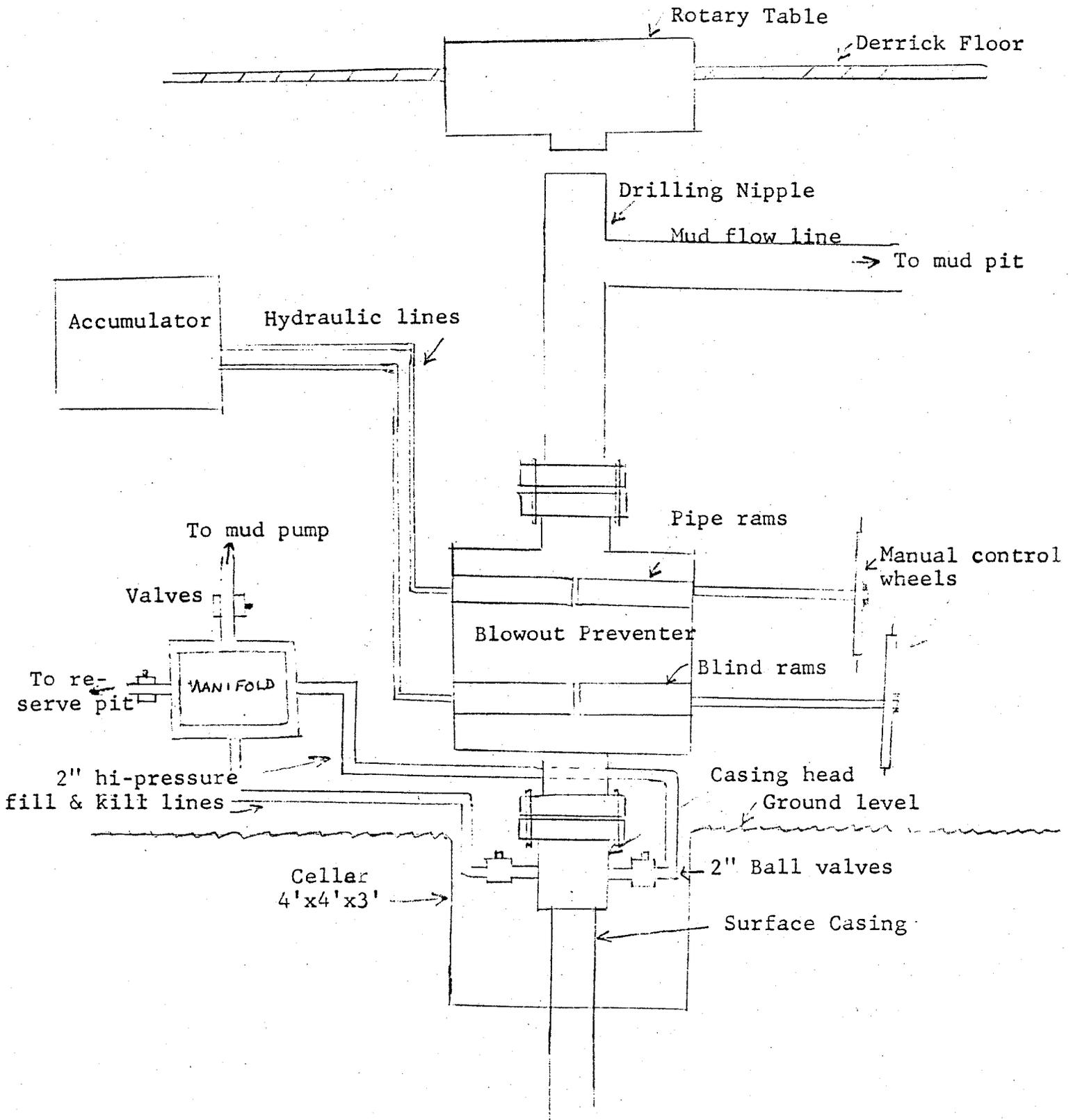
Normal fresh water mud with gel and chemicals will be used for circulation. The mud weight will be kept at about 9-10 lbs./gal.; and the viscosity will be kept around 50 , and the water loss kept below 6 cc., if possible. This weight and associated hydrostatic pressure should keep the well under control. No abnormal pressures are known in the area, nor has there been any indication of sour gas in the nearby wells.

8. Production Casing:

- A. Hole size for the production casing will be 8 3/4"
- B. Approx. setting depth will be about 9200'
- C. Casing specs. are: 3000' of 5 1/2" O.D., 17.00#, N-80 casing, and 6000' of 5 1/2" O.D., 15.50#, J-55 casing with guide shoe and float collar and about ten centralizers at the proper places, cemented with 200 sks of regular, type G cement with 10% salt.
- D. The anticipated pressure at setting depth should not be greater than 3500#.

W. Don Quigley
W. Don Quigley

SCHEMATIC DIAGRAM OF
CONTROL EQUIPMENT FOR THE
WILLARD PEASE DRILLING CO.
STATE-QUITCHUPAH #1 WELL



STATE OF UTAH
DIVISION OF OIL, GAS, AND MINING

** FILE NOTATIONS **

Date: Feb. 25-
Operator: Willard Pease Oil & Gas
Well No: State "A" #1
Location: Sec. 16 T. 22S R. 5E County: Sevier

File Prepared API No
Entered on N.I.D.
Card Indexed Completion Sheet

CHECKED BY:

Administrative Assistant [Signature]

Remarks: Verbal approval 3-8-77 P.D. & C.B.7

Petroleum Engineer [Signature]

Remarks:

See E.I.S. -
Personally, Archeologically
between Area

Director [Signature]

Remarks:

INCLUDE WITHIN APPROVAL LETTER:

Bond Required Survey Plat Required
Order No. Surface Casing Change
to _____

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

O.K. Rule C-3 O.K. In _____ Unit

Other:

Letter Written/Approved

5

DESIGNATION OF OPERATOR

State Land Board

The undersigned is, on the records of the ~~Bureau of Land Management~~ holder of lease

State

~~STATE~~ LAND OFFICE: Salt Lake City

SERIAL No.: ML-29284

P

and hereby designates

Willard Pease Drilling Company

NAME:

P. O. Box 548

ADDRESS:

Grand Junction, Colorado 81501

as his operator and local agent, with full authority to act in his behalf in complying with the terms of the lease and regulations applicable thereto and on whom the supervisor or his representative may serve written or oral instructions in securing compliance with the Operating Regulations with respect to (describe acreage to which this designation is applicable):

T.22 S., R.5 E., S.L.M., Sevier County, Utah
Section 16; SE $\frac{1}{4}$

160 acres

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

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

The lessee agrees promptly to notify the supervisor of any change in the designated operator.

Richard L Moore Attorney-in-Fact
.....
(Signature of lessee)

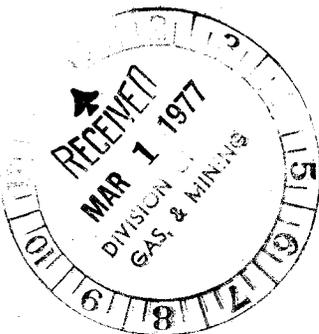
J. Hiram Moore

314 Gulf Bldg., Midland, TX 79701

.....
(Address)

2-25-77

.....
(Date)



April 12, 1977

Willard Pease Oil & Gas Company
P.O. Box 548
Grand Junction, Colorado 81501

Re: Well No. State "Q" #1
Sec. 16, T. 22 S, R. 5 E,
Sevier County, Utah

Gentlemen:

Please be advised that insofar as all requirements under this Division's "General Rules and Regulations and Rules of Practice and Procedure" have been fulfilled relative to the drilling of the above well, approval is granted for same. However, we have been advised that the general area has a high potential for archeological sites and artifacts. Consequently, this approval shall be contingent upon the following:

Extreme care is to be taken during drilling to insure that any archeological sites or artifacts encountered during operations are to be immediately reported to this Division as well as the following:

Mr. Wilson Martin, State Archeologist
Utah Division of History
Phone: (801) 533-5755

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

PATRICK I. DEKSCOLL - Chief Petroleum Engineer
HOME: 582-7247
OFFICE: 533-5771

Willard Pease Oil & Gas
April 12, 1977
Page Two

Enclosed please find Form OGC-S-X, which is to be completed whether or not water sands (aquifers) are encountered during drilling.

The API number assigned to this well is 43-041-30013.

Very truly yours,

DIVISION OF OIL, GAS, AND MINING

CLEON B. FREIGHT
Director

/sv

cc: Division of State Lands
Division of History

CIRCULATE TO:

- DIRECTOR
- PETROLEUM ENGINEER
- MINE COORDINATOR
- ADMINISTRATIVE ASSISTANT
- ALL

RETURN TO Kathy O.
FOR FILING

May 23, 1977

Memo To File:

Re: Willard Pease
State Q#1
Sec. 16, T. 22 S., R. 5 E.
Sevier County, Utah

Verbal permission was given to Mr. Frank Stahl to plug the above well on May 23, 1977.

Pertinent information is as follows:

| | | | |
|--------------------|----------|-------|------------|
| 10 3/4 | casing @ | 385' | |
| Surface | | | Mesa Verde |
| Dakota | | 3,288 | |
| Entrata | | 4,614 | |
| Carmel | | 5,541 | |
| Nugget | | 6,690 | |
| Kayenta | | 6,740 | |
| Wingate | | 7,540 | |
| Chinle | | 7,880 | Isolated |
| <i>M</i> Knoenkopi | | 8,256 | Isolated |
| Sinbad | | 8,981 | |
| Kaibab | | 9,328 | |
| Total Depth | | 9,553 | |

The following abandonment plugs are to be set:

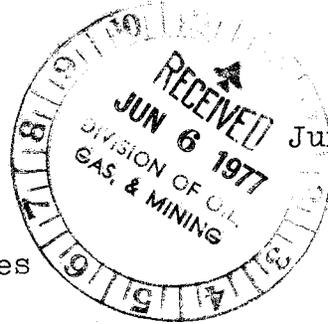
- 50 sacks 8,950 - 9,050
- 50 sacks 8,200 - 8,300
- 50 sacks 7,800 - 7,900
- 50 sacks 7,650 - 7,850
- 50 sacks 4,550 - 4,650
- 50 sacks 1/2 in and 1/2 out of 10 3/4" casing @ 385'
- 10 sacks 20 to surface

A regulation dry hole marker will be set and the location will be regrated and seeded as per local environmental vegetative growth.

Patrick L. Driscoll
PATRICK L. DRISCOLL
CHIEF PETROLEUM ENGINEER

FRANK B. STAHL
Consulting Petroleum Engineer

BUS. PH. (915) 682-5481 / RES. PH. 694-2167 / POST OFFICE BOX 5414
MIDLAND, TEXAS 79701



June 1, 1977

State of Utah
Department of Natural Resources
Oil, Gas & Mining Division
1588 W North Temple
Salt Lake City, Utah

Re: Willard Pease Drilling Company
State of Utah Well No. 1-Q
1854' FSL & 880' FEL
Sec. 16, T22S, R5E, S1M
Sevier County, Utah

Gentlemen:

The subject well was spudded 3-23-77. A 14-3/4" hole was drilled to 385', where 10-3/4" casing was cemented with 450 sacks. An 8-3/4" hole was drilled to 9200' and a 7-7/8" hole was drilled 9200' to TD 9553', 5-21-77. No shows of commercial oil or gas were encountered.

Formation tops were logged as follows:

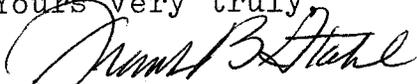
| | | | |
|---------|------|----------|------|
| Dakota | 3288 | Wingate | 7540 |
| Entrada | 4614 | Chinle | 7880 |
| Carmel | 5546 | Moenkopi | 8256 |
| Navajo | 6690 | Sinbad | 8981 |
| Kayenta | 7440 | Kaibab | 9382 |

Plugging procedure as prescribed by your office consisted of placing cement plugs of 50 sacks each in a column of heavy mud at the following intervals: 335-435, 4550-4650, 7650-7750, 7800-7900, 8200-8300, 8950-9050. The top of the hole was plugged with 10 sacks and a regulation 4" iron pipe, appropriately marked, was set. Plugging was completed 5-26-77.

When the pits have dried, the well site will be levelled and your office will be notified.

I hereby certify that the above information is true and correct to the best of my knowledge.

Yours very truly,


Frank B. Stahl
Registered Professional Engineer

FBS/el
cc - Willard Pease Drilling Company
2457 Industrial Blvd
Grand Junction, Colorado 81501

P

July 8, 1977

Memo To File

Re: Willard Pease
State #1-Q
1854 FSL, 880 FEL
Sec. 16, T 22 S., R. 5 E.

The following well was drilled S.E. of Emery. This is in a known coal province, and while drilling this well, the following coal seams were encountered;

1990' - 2000' (10')
2090' - 2110' (20')
2240' - 2270' (numerous coal stringers)
2300' - 2310' (10')
3410' - 3930' (numerous coal stringers)

PATRICK L. DRISCOLL
CHIEF PETROLEUM ENGINEER

PLD/src

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WELL REPORT

for

J. HIRAM MOORE

WELL

WILLARD PEASE DRILLING COMPANY

NO. 1-Q STATE OF UTAH

1854' FSL and 880' FEL

SECTION 16

TOWNSHIP 22 SOUTH, RANGE 5 EAST

SEVIER COUNTY, UTAH

ELEVATION 6485' KB 6473' GL

Prepared by:

James K. Price, Geologist
Lakewood, Colorado

WELL SUMMARY

Operator: Willard Pease Drilling Company

Well Name: No. 1-Q State of Utah

Location: 1854' FSL, 880' FEL, Section 16, Township 22 South, Range 5 East 9

County: Sevier

State: Utah

Elevation: 6473' GL, 6485' KB

Objective: Kaibab formation

Total Depth: Driller: 9553', Logger: 9544'

Commenced: March 23, 1977, 2:00 P.M.

Completed: May 22, 1977, 7:15 A.M.

Type Completion: Dry Hole.

Hole Size: 14 3/4" to 385'
8 3/4" from 385' to 9200'
7 7/8" from 9200' to 9553'

Casing: 10 3/4" casing set at 355' KB with 450 sacks cement

Contractor: Willard Pease Drilling Company
Rig No. 3, Sam Harvey, Toolpusher

Cores: None

Drill Stem Tests: None

Mud: Banks Mud Sale, Don Ackers,
Grand Junction, Colorado

Electric Logs:

Schlumberger

Compensated Neutron-Formation Density

F. R. 5767

L. R. 1650

Dual Laterolog

F. R. 5753

L. R. 385

Gamma Ray - Neutron (through drill pipe
above 8892')

F. R. 9543'

L. R. 1900'

Wellsite Engineer:

Frank B. Stahl, Midland, Texas

Wellsite Geologist:

James K. Price, Lakewood, Colorado

FORMATION TOPS (LOGS)

| <u>FORMATION</u> | <u>DEPTH</u> | <u>ELEVATION</u> | <u>THICKNESS</u> |
|-----------------------|----------------------|-----------------------|------------------|
| Mancos Formation | | | |
| Ferron Sandstone Mbr. | 1973 | + 4512 | 557 |
| Tununk Shale Mbr. | 2530 | + 3955 | 760 |
| Dakota Sandstone | 3290 | + 3195 | 74 |
| Cedar Mountain | 3364 | + 3121 | 301 |
| Morrison | 3665 | + 2820 | 235 |
| Summerville | 3900 | + 2585 | 520 |
| Curtis | 4420 | + 2065 | 156 |
| Entrada | 4576 | + 1909 | 959 |
| Carmel | 5535 | + 950 | 793 |
| Salt Zones: (1) | 5705-5769 | | |
| (2) | 5837-5850 | | |
| (3) | 5929-5940 | | |
| (4) | 5949-5955 | | |
| (5) | 6196-6237 | | |
| (6) | 6260-6284 | | |
| Carmel Limestone | 6328 | + 157 | 360 |
| Navajo | 6688 | - 203 | 762 |
| Kayenta | 7450 | - 965 | 149 |
| Wingate | 7599 | - 1114 | 297 |
| Chinle | 7896 | - 1411 | 310 |
| Moenkopi | 8206 | - 1712 | 750 |
| Sinbad Limestone | 8956 | - 2471 | 175 |
| Lower Sinbad | 9131 | - 2646 | 222 |
| Kaibab | 9353 | - 2868 | 163 |
| Coconino | 9516 | - 3031 | |
| TOTAL DEPTH | 9544 (Logger) | 9533 (Driller) | |

CHRONOLOGICAL HISTORY

| <u>DATE</u> | <u>DEPTH (at 8:00 AM)</u> | <u>DAYS DRILLING</u> | <u>COMMENTS</u> |
|-------------|---------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3-23-77 | | | Rigging Up. |
| 3-24-77 | 284' | 1 | Drilling Surface Hole |
| 3-25-77 | 385' | 2 | Waiting on Cement |
| 3-26-77 | 830' | 3 | Drilling with Air. |
| 3-27-77 | 1933' | 4 | Drilling with Mist |
| 3-28-77 | 2289' | 5 | Drilling with Water |
| | | | Mud up at 1975' <u>T/Ferron at 1973'</u> |
| 3-29-77 | 2489' | 6 | Drilling |
| 3-30-77 | 2677' | 7 | Drilling, Tripped for Bit No. 4 at 2529' <u>T/Tununk Shale at 2530'</u> |
| 3-31-77 | 3046' | 8 | Drilling |
| 4-1-77 | 3320' | 9 | Drilling, <u>T/Dakota at 3290'</u> |
| 4-2-77 | 3535' | 10 | Drilling, <u>T/Cedar Mountain at 3364'</u> |
| 4-3-77 | 3719' | 11 | Drilling, <u>T/Morrison at 3665'</u> |
| 4-4-77 | 3910' | 12 | Drilling, <u>T/Summerville at 3900'</u> |
| 4-5-77 | 4067' | 13 | Drilling, Tripped for Bit No. 5 at 3921' |
| 4-6-77 | 4355' | 14 | Drilling |
| 4-7-77 | 4617' | 15 | Drilling, <u>T/Curtis at 4420', T/Entrada at 4576'</u> |
| 4-8-77 | 4774' | 16 | Drilling |
| 4-9-77 | 4947' | 17 | Drilling |
| 4-10-77 | 5117' | 18 | Drilling, Mud Characteristics: Weight 9.1#, Viscosity 42; Ph 9; W.L. 11.2 |
| 4-11-77 | 5253' | 19 | Drilling, Tripped for Bit No. 6 at 5162' |
| 4-12-77 | 5475' | 20 | Drilling |
| 4-13-77 | 5738' | 21 | Drilling, <u>T/Carmel at 5535' T/1st Salt at 5705'</u> |
| 4-14-77 | 6010' | 22 | Drilling. Drilled 95' cumulative salt from 5705'-5955' Mud Fluffed. Weight 8.9#, Viscosity 40, Ph 8.5; W.L. 20 cc; 30,000 P.P.M. Salt, Deviation 8° at 6006' in Salt, 5 1/2° increase in 250' |

Well Report
No. 1-Q State

| <u>DATE</u> | <u>DEPTH (at 8:00 AM)</u> | <u>DAYS DRILLING</u> | <u>COMMENTS</u> |
|-------------|---------------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4-15-77 | 6136' | 23 | Drilling, 40,000 PPM Salt. Lost 250 barrels Mud at 6115'. Added LCM, Gas Mudlogger: 14 units total, 50 units Hydrogen. |
| 4-16-77 | 6290' | 24 | Drilling. Drilled 63' additional Salt between 6196'-6284'. |
| 4-17-77 | 6382' | 25 | Drilling. Weight 9.4#; Viscosity 48, W.L. 10.4; Ph 75; 49,000 PPM Salt, T/ Carmel Limestone at 6328'; Gas Mudlogger 40 units Total, 130 units Hydrogen. |
| 4-18-77 | 6442' | 26 | Drilling, Tripped for Bit No. 7 at at 6385'. 70,000 PPM Salt |
| 4-19-77 | 6574' | 27 | Drilling |
| 4-20-88 | 6700' | 28 | Drilling, T/Navajo at 6688'. 70,000 PPM Salt |
| 4-21-77 | 7003' | 29 | Drilling |
| 4-22-77 | 7165' | 30 | Tripping for Bit No. 8, Replaced Kelly Hose. |
| 4-23-77 | 7263' | 31 | Drilling |
| 4-24-77 | 7445' | 32 | Drilling |
| 4-25-77 | 7517' | 33 | Drilling. T/Kayenta at 7450'. |
| 4-26-77 | 7596' | 34 | Tripping for Bit No. 9 |
| 4-27-77 | 7661' | 35 | Drilling. 14 1/2 Hours. Tripping at 7596'. Pulled tight through Doglegs. Lost Circul- ation at 7596' prior to drilling ahead. T/Wingate at 7599'. |
| 4-28-77 | 7804' | 36 | Drilling, 32,000 PPM Salt |
| 4-29-77 | 7931' | 37 | Drilling. T/Chinle at 7896'. |
| 4-30-77 | 8010' | 38 | Drilling. 20,000 PPM Salt |
| 5-1-77 | 8085' | 39 | Drilling. Lost 100 bbls Mud. Added LCM. |
| 5-2-77 | 8161' | 40 | Drilling. |
| 5-3-77 | 8168' | 41 | On Bottom After Tripping for Bit No. 10. |
| 5-4-77 | 8262' | 42 | Drilling. T/Moenkopi at 8206'. Weight 8.9#; Viscosity 55; Ph 9.5; W.L. 8. |
| 5-5-77 | 8366' | 43 | Drilling. |

Well Report
No. 1-Q State

| <u>DATE</u> | <u>DEPTH (at 8:00 AM)</u> | <u>DAYS DRILLING</u> | <u>COMMENTS</u> |
|-------------|---------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5-6-77 | 8449' | 44 | Drilling |
| 5-7-77 | 8544' | 45 | Drilling, Weight 9.1; Viscosity 55; Ph 9.5; W.L. 8 |
| 5-8-77 | 8650' | 46 | Drilling |
| 5-9-77 | 8667' | 47 | Tripping for Bit No. 11. Pulled tight through Doglegs at 6005' and 2500'. |
| 5-10-77 | 8757' | 48 | Drilling. Lots 300 barrels Mud at end of trip at 8667'. Weight 8.8#; Visc. 49; Ph 8.5, W.L. 8; 28,000 PPM Salt. |
| 5-11-77 | 8868' | 49 | Drilling |
| 5-12-77 | 8961' | 50 | Drilling. <u>T/Sinbad Ls at 8956'</u> |
| 5-13-77 | 9047' | 51 | Mixing Mud and LCM. Lost 1200 barrels mud. |
| 5-14-77 | 9105' | 52 | Drilling. Weight 8.9; Visc 58; W.L. 6; Ph 9.5; 24,000 PPM Salt. |
| 5-15-77 | 9197' | 53 | Drilling. 16,500 PPM Salt. <u>T/Lower Sinbad at 9131'.</u> |
| 5-16-77 | 9200' | 54 | Tripping for Bit No. 12. |
| 5-17-77 | 9200' | 55 | On Bottom with Bit No. 12. 46 3/4 hours tripping. Hole Tight Through Doglegs. |
| 5-18-77 | 9278' | 56 | Drilling. |
| 5-19-77 | 9354' | 57 | Drilling. <u>T/Kaibab at 9353'.</u> |
| 5-20-77 | 9428' | 58 | Drilling. |
| 5-21-77 | 9495' | 59 | Drilling. |
| 5-22-77 | 9553' | 60 | Total Depth. Prep to Run Logs. |
| 5-23-77 | 9553' | 61 | Tripping Out for Logs. |
| 5-24-77 | 9553' | 62 | Ran DU-Gr and Neutron- Density Logs to bridge at 5765'. Logged out. Ran drill pipe to 8892'. Ran GR-N from Total Depth through drill pipe. Abandoned well as a dry hole. |

BIT RECORD

| <u>BIT NO.</u> | <u>MAKE</u> | <u>SIZE</u> | <u>TYPE</u> | <u>DEPTH OUT</u> | <u>FOOTAGE</u> | <u>HOURS RUN</u> |
|----------------|-------------|-------------|-------------|-------------------------|----------------|------------------|
| 1 | Reed | 9 7/8 | Y13J | (Rathole and Mousehole) | | 4 |
| 2 | Reed | 14 3/4 | Y11J | 385 | 385 | 17 1/4 |
| 3 | Smith | 8 3/4 | F3 | 2529 | 2148 | 81 1/4 |
| 4 | Smith | 8 3/4 | F3 | 3921 | 1392 | 127 1/2 |
| 5 | Reed | 8 3/4 | FP53 | 5162 | 1241 | 135 1/4 |
| 6 | HTC | 8 3/4 | J33 | 6385 | 1223 | 148 3/4 |
| 7 | Smith | 8 3/4 | F4 | 7165 | 780 | 105 1/2 |
| 8 | Reed | 8 3/4 | FP62 | 7596 | 431 | 77 3/4 |
| 9 | Smith | 8 3/4 | F3 | 8168 | 572 | 128 1/2 |
| 10 | Smith | 8 3/4 | F3 | 8667 | 499 | 112 3/4 |
| 11 | Smith | 8 3/4 | F3 | 9200 | 533 | 124 3/4 |
| 12 | Smith | 7 7/8 | F5 | 9553 | 353 | 118 3/4 |

HOLE DEVIATION

| | | |
|-----------------|-----------------|-----------------|
| 1/4° at 188' | 2° at 3514' | 6 1/4° at 6290' |
| 1/4° at 282' | 1 1/2° at 3640' | 5 1/2° at 6383' |
| 1° at 791' | 3/4° at 3766' | 4 1/4° at 6477' |
| 1 1/4° at 1103' | 1° at 3892' | 3 1/4° at 6572' |
| 1 1/4° at 1414' | 1 1/2° at 4045' | 3° at 6667' |
| 1 3/4° at 1724' | 1 1/2° at 4202' | 2 1/2° at 6792' |
| 1° at 2065' | 2 1/4° at 4417' | 2 1/4° at 6977' |
| 4° at 2376' | 2° at 4540' | 1 3/4° at 7133' |
| 4 1/4° at 2466' | 2° at 4666' | 3/4° at 7379' |
| 5° at 2529' | 2 1/2° at 4882' | 3/4° at 7472' |
| 4 1/4° at 2604' | 2 3/4° at 5102' | 1° at 7596' |
| 2 1/2° at 2732' | 2 1/4° at 5319' | 1 1/2° at 8074' |
| 3 1/2° at 2826' | 2 1/4° at 5537' | 2 1/2° at 8258' |
| 3° at 2921' | 2 1/2° at 5755' | 2 1/4° at 8383' |
| 2 1/4° at 3014' | 8° at 6005' | 2 1/2° at 8667' |
| 1 3/4° at 3138' | 7 3/4° at 6068' | 2 3/4° at 9200' |
| 1 3/4° at 3262' | 7 3/4° at 6132' | |
| 1° at 3388' | 7° at 6195' | |

PLUGS

Telephone approval to plug from Mr. Pat Driscoll, Utah Division of Oil and Gas Conservation, Salt Lake City, Utah May 23, 1977.

| | | |
|------------|---------|----------|
| Plug No. 1 | 9050 | 50 Sacks |
| Plug No. 2 | 8300 | 50 Sacks |
| Plug No. 3 | 7900 | 50 Sacks |
| Plug No. 4 | 7750 | 50 Sacks |
| Plug No. 5 | 4650 | 50 Sacks |
| Plug No. 6 | 435 | 50 Sacks |
| Plug No. 7 | Surface | 10 Sacks |

W/Regulation Pipe Marker

SAMPLE DESCRIPTION
(Not Lagged)

| | |
|-----------|--------------------------------------------------------------------------------------|
| 1700-1990 | Siltstone, gray white, very fine grained. (From 1933 to 2690 samples are 34 shallow) |
| 1990-2000 | Coal |
| 200-2020 | Shale, gray black, silty |
| 2020-2030 | Siltstone, gray black to gray white |
| 2030-2040 | Sandstone, gray white, poorly sorted, medium grained, much clay infilling |
| 2040-2050 | Siltstone, gray, slightly sandy with some lignite. |
| 2050-2070 | Sandstone, gray white, very fine grained, very tightly cemented. |
| 2070-2090 | Siltstone, medium gray to gray brown, tight |
| 2090-2110 | As above Coal; Siltstone, as above |
| 2110-2130 | Siltstone, gray, medium to dark gray. |
| 2130-2140 | Sandstone, gray white, very fine grained, clay-filled, tight |

SAMPLE DESCRIPTION (Continued)

| | |
|-----------|-----------------------------------------------------------------------------------------------------------------------------|
| 2140-2150 | Bentonite, gray, soft, plastic |
| 2150-2160 | Sandstone, gray white, very fine grained, tightly cemented |
| 2160-2170 | Siltstone, gray white |
| 2170-2230 | Sandstone, gray white, fine to medium grained, tight |
| 2230-2240 | Sandstone, gray white, medium grained, tight |
| 2240-2270 | Sandstone, as above; Coal |
| 2270-2280 | Sandstone, gray brown, fine to medium grained, tight, clay filled |
| 2280-2300 | Siltstone, gray |
| 2300-2310 | Coal |
| 2310-2320 | Sandstone, gray brown to gray white, medium grained well sorted, porosity filled with Bentonite |
| 2320-2340 | Sandstone, buff, fine to medium grained, Siltstone, buff |
| 2340-2350 | Sandstone, light gray, large to medium grained, sub-rounded, well sorted, clay infilled, fair porosity |
| 2350-2400 | Sandstone, gray white to buff, fine to medium grained, poorly sorted highly clay infilled, poor permeability, trace of Coal |
| 2400-2480 | Sandstone, gray brown medium grained, tightly cemented |
| 2480-2490 | Sandstone, dark brown, fine grained, shaly |
| 2490-2500 | Shale, brown black, silty |
| 2500-2540 | Shale, dark gray; Sandstone, as above buff |
| 2540-2580 | Shale, gray to black; Siltstone, as above |
| 2580-2590 | Sandstone, gray white to buff, very fine grained, clay filled, tight |
| 2590-2690 | Shale, gray black |
| 2690-2730 | DEPTH CORRECTION |

SAMPLE DESCRIPTION (Continued)

- 3230-3280 Shale, dark grey, soft, calcareous, some fine grained sand and silt stringers, calcareous
- 3280-3300 Shale, dark grey, less calcareous than above, Siltstone, medium gray, dense, argillaceous, very calcareous
- 3300-3310 Sandstone, white fine to very-fine grained, tight, calcareous, some clay grains (DAKOTA 3288')
- 3310-3320 Siltstone, light brown, argillaceous, slightly calcareous; Sandstone as above; Coal, conchoidal fracture
- 3320-3330 Siltstone, as above; Shale, dark gray as above
- 3340-3360 Siltstone, as above; Sandstone very fine grained, tight, Coal and very carbonaceous black Shale, increasing
- 3360-3370 Sandstone, fine grained, white, friable, probably some porosity, no shows; carbonaceous Shale and Coal as above (BUCKET SAMPLE unable to use shale shaker, because of lost circulation material in system)
- 3370-3380 Sandstone, very fine grained to silt size, white to tan, tight
- 3380-3390 Sandstone, as above, Shale, medium to dark gray
- 3390-3400 Claystone, gray, silty; Siltstone and Sandstone, as above
- 3400-3410 Mixed sample, Siltstone, Sandstone and sands fine as above, with much Coal cavings and LCM fiber
- 3410-3430 Claystone, light to medium gray; some Coal; some very fine grained Sandstone
- 3430-3440 Cavings
- 3440-3450 Sandstone, very fine grained, tight; Shale dark gray
- 3450-3470 Mixed sample, as above, mostly cavings

SAMPLE DESCRIPTION (Continued)

| | |
|-----------|----------------------------------------------------------------------------------------------------------------|
| 3470-3490 | No sample |
| 3490-3500 | Mixed sample, mostly cavings |
| 3500-3530 | Claystone, pale grey, sandy |
| 3530-3540 | Claystone, pale gray, as above; Limestone, gray-green, pale very clayey, very silty |
| 3540-3550 | Claystone, pale-grey, as above, slightly silty |
| 3550-3560 | Sandstone, very-fine to fine grained, clay-filled, calcareous, tight; Claystone, as above |
| 3560-3570 | Sands fine and Claystone, as above |
| 3570-3580 | Sample, as above, with trace, medium gray mostly siliceous Sandstone, medium grained angular |
| 3580-3590 | Bucket Sample-cavings |
| 3590-3605 | Claystone, as above, Sandstones, as above |
| 3605-3680 | Claystone and Sandstone, as above |
| 3680-3830 | Claystone, as above, some pale lavender; Sandstone, as above |
| 3830-3840 | Claystone, pale white-gray, lavender, purple |
| 3840-3850 | Claystone, as above, trace chert, white translucent |
| 3850-3870 | Claystone, as above, with trace brick-red-brown Shale |
| 3870-3890 | Sample, as above, with trace of pale red, shaly siltstone |
| 3890-3900 | Sample, as above, with Sandstone, very fine to fine grained, clay-filled and calcareous, chert, clear to amber |
| 3900-3910 | Chert, amber, translucent, Sandstone, medium to coarse grained, calcareous, cherty |
| 3910-3920 | Chert, as above; coarse Sandstone, mottled amber white, siliceous and calcareous |
| 3920-3940 | Trip sample |

SAMPLE DESCRIPTION (Continued)

- 3940-3950 Siltstone and very fine grained Sandstone, pink, calcareous, tight; Shales varicolored, red, purple, yellow
- 3950-3960 Siltstone and Sandstone, tight, as above, yellow to white, Shale, as above
- 3960-4000 Sample as above, with increase in Siltstone, pink to mottled red
- 4000-4050 Sample as above, with increase in orange-red and brick-red Shale
- 4050-4160 Shale, orange to brick-red, silty in part; some lavender Shale and Sandstone as above
- 4160-4170 Sample, as above with Siltstone, pink to yellow
- 4170-4200 Sandstone, very fine grained to siltsize, yellow calcareous; red Shale as above
- 4200-4350 Mixed Silts, Sandstone and Shale as above
- 4350-4370 Shales and Siltstone, red-brown, some with slight yellow tint
- 4370-4410 Sample, as above; trace Sand, medium grained, well rounded, with mottled orange-yellow staining.
- 4410-4430 Shale, light to medium grey, slightly calcareous; Siltstone, white and slight carbonaceous, slightly calcareous; some colored Shale, as above
- 4430-4470 Sandstone, very-fine grained to silt size, light gray, slightly carbonaceous, calcareous (CURTIS SANDSTONE T/4430', loose sand grains from de-sander is very-fine grained, subangular, glauconitic); Shale, gray as above
- 4470-4480 Sample, as above, same Sand increased to fine grained.
- 4480-4490 Sandstone, very-fine to fine grained, white to light grey, carbonaceous and slightly glauconitic.
- 4490-4530 Sample, as above, Sandstone, mostly fine grained, some clay-filled.
- 4530-4540 Sandstone, as above, fine to medium grained, much heavily clay-filled, Shale, pale gray, as above

SAMPLE DESCRIPTION (Continued)

- 4540-4560 Siltstone, light gray, calcareous, slightly carbonaceous; Shale as above.
- 4560-4580 Shale, medium gray, carbonaceous, silty; Siltstone, as above
- 4580-4590 Sample, as above with trace Siltstone, brick-red Shale
- 4590-4610 Siltstone and fine sandstone, pink to brick red, Shale, brick-red
- 4610-4630 Sandstone, pink, fine-grained; brick-red Silt and Shale
- 4630-4680 Red Shale, as above, Siltstone and Sandstone, as above
- 4680-4720 Sandstone, poorly sorted, fine-grained to course grained, Calcareous, tight; mottled pink Sandstone, very-fine to fine grained, orange red Siltstone and some red Shale, as above.
- 4720-4740 Siltstone and Sandstone, brick-red and some orange-red, slightly calcareous, some Shale, red, silty.
- 4740-4750 Sample, as above, with increase in dark red Shale
- 4750-4880 Sample, as above, predominantly red-brown, shaly Siltstone
- 4880-4890 Sandstone, orange-pink, dense, calcareous, Siltstone and Shale, brick-red, as above
- 4890-4900 Siltstone, Shale and Sandstone, as above
- 4900-4940 Sample, as above, with loose medium to course rounded sand grains
- 4940-4950 (Desander Sample - orange red fine grained Sandstone, shaly, Siltstone and Shale, orange to brick red) Sample, as above
- 4950-5520 Shale, brick-red, with occasional anhydrite inclusion, white, crystalline; Siltstone and fine grained Sandstone, orange-red to brick-red, tight, calcareous, occasional fine to medium poorly sorted Sandstones, pink-orange to orange red, shaly, tight, calcareous
- 5520-5530 Siltstone, brick-red, Shale, brick and silty, as above
- 5530-5540 Shale and Siltstone, as above
- 5540-5550 No Sample
- 5550-5560 Shale and Siltstone, as above, trace anhydrite white, soft, clayey.

SAMPLE DESCRIPTION (Continued)

- 5560-5570 Shale, red, as above; Shale light gray, anhydrite, white, soft, chert, white to clear; Siltstone, white-gray
- 5570-5580 Shale and Siltstone, light to medium gray; anhydrite white to gray translucent; chert, clear; red Shale
- 5580-5590 Siltstone, light to medium gray, calcareous, tight, Shale, light to medium gray; calcareous chert and anhydrite, as above (red Shale has become minor)
- 5590-5720 Shale and Siltstone, as above, with small amount of anhydrite and chert
- 5720-5760 Poor samples, red Shale, grabbed from shaker box, not valid
- 5760-5790 Shale and Siltstone, gray, as above, with increase in anhydrite, white to gray translucent
- 5790-5960 Sample, as above with orange-red to white laminated chert, opaline appearance
- 5960-6000 Sample, as above with fair increase in medium gray somewhat fissile Shale; decreased in orange opaline chert. (Light gray Shale in sample probably very anhydritic)
- 6000-6010 Shale, light gray, soft, Siltstone, light gray, tight; anhydrite increasing, white-gray, translucent; some chert, orange as above, some irregular angular chert
- 6010-6020 Sample, as above, decrease in anhydrite
- 6020-6040 Sample, as above, anhydrite as above increasing
- 6040-6050 Anhydrite, as above, Shale plus Siltstone, as above
- 6050-6060 Shale, as above, anhydrite, as above
- 6070-6080 Anhydrite, as above, Shale as above
- 6080-6120 Anhydrite, predominantly, as above; some Shale, as above, some orange chert, as above
- 6120-6130 Lost circulation material - no sample
- 6130-6170 Anhydrite and Shale, as above
- 6170-6210 Sample, as above, with some increase in Siltstone, gray, calcareous

SAMPLE DESCRIPTION (Continued)

- 6210-6310 Shale, light gray, calcareous, anhydritic; anhydrite as above, Siltstone, as above, some orange chert, as above
- 6310-6330 Sample, as above, trace of Limestone, gray, anhydritic
- 6330-6370 Sample, as above, with Limestone medium gray, tan, dense, argillaceous, anhydritic (CARMEL LIMESTONE, 6335)
- 6370-6380 Limestone, gray-tan, dense to very finely crystalline, some relict pelletal structure
- 6380-6400 Trip sample
- 6400-6410 Limestone, as above, gray-tan, dense to finely crystalline
- 6410-6440 Limestone, tan-gray, dense, argillaceous-anhydritic increase in soluble residue over above
- 6450-6500 Limestone, tan-gray, dense argillaceous-anhydritic, as above; containing anhydrite, white, soft
- 6500-6520 Limestone, as above, with Limestone, buff, pelletal with dark nuclei, dense, no porosity, no shows
- 6520-6530 Limestone, mixed buff and tan-gray, as above, no visible porosity; still contains approximately 15-20% anhydrite
- 6530-6560 Sample, as above, no shows
- 6560-6570 Mixed sample, Limestone, as above, anhydrite, as above, silty, anhydritic Limestone, tan to gray, no shows
- 6570-6580 Limestone, buff-gray, silty; Limestone tan-gray, dense
- 6580-6590 Limestone, as above, some pelletal and finely crystalline, light buff
- 6590-6600 Sample, as above, some increase in pelletal Limestone, as above
- 6600-6610 Limestone, as above; trace Limestone medium to dark gray, dense, very argillaceous
- 6610-6620 Limestone, as above with further increase in Limestone, medium, dark-gray, argillaceous
- 6620-6670 Limestone, medium to dark gray, very argillaceous; some limestone as above

SAMPLE DESCRIPTION (Continued)

- 6670-6680 Samples, as above, trace increase Siltstone, calcareous
- 6680-6690 Sample, as above, very fine grained to Siltstone, calcareous, some pink; Shale, light gray, anhydritic
- 6690-6700 Sandstone, very fine grained to silt size, purple-pink to pink, some white; Limestone, medium gray, sandy
- 6700-6740 Sample, as above (Desander sample, very heavy with loose sand, very fine to fine grained, subangular to well rounded, frosted grains, some silt size, no staining or cut; light pink cast to sample when dried)
- 6740-6750 Sample, as above, Sand cemented with light clay or anhydrite
- 6750-6780 Sandstone, very fine to fine grained, some medium, buff-pink
- 6780-6830 Sandstone, as above, fine to medium grained, clay or anhydrite infilling, buff-pink, increasingly darker with depth
- 6830-6910 Sandstone, as above, buff-pink becoming darker to salmon pink with depth
- 6910-7000 Sandstone, as above, fine to medium grained, generally well rounded, medium to some poorly sorted, porosity plugged as above, no shows
- 7000-7090 Sandstone, as above, mostly fine grained, mostly salmon-pink, some medium grained sand, moderate to poorly sorted with fine sand, tight, no shows
- 7090-7110 Sandstone, as above, with increase in calcareous, gray shale and anhydrite, white (Carmel Lithology)
- 7110-7250 Gray Shale and anhydrite, as above, some Siltstone, white to buff, clay filled, some Sandstone, as above (Navajo)
- 7250-7260 Sandstone, salmon-pink, very fine to fine grained, tight with interstitial clay or anhydrite, some medium grained rounded sand trains where moderately to poorly sorted
- 7260-7350 Sandstone, as above, slightly calcareous, very dense and hard (siliceous?). (Sample from desander contained very little sand, mostly fine Silt). Samples are still carrying heavy background of anhydrite and gray Shale

SAMPLE DESCRIPTION (Continued)

- 7350-7440 Sandstone, as above, Shale and anhydrite background heavier
- 7440-7450 Sandstone, as above, trace Shale, dense, red-brown
- 7450-7460 Sandstone, as above, increase in red-brown Shale
- 7460-7480 Abrupt decrease in Sandstone; Shale, red to red-brown, as above, Siltstone, red to lavender, dense, larger proportion of cavings
- 7480-7490 Shale, shade of red-brown, some lavender, some Sandstone, as above
- 7490-7510 Sandstone, very-fine grained to silt size, light pink, some orange pink; Shale, as above, Carmel cavings, as above
- 7510-7560 Sandstone, as above, Shale as above, cavings as above
- 7560-7580 Sandstone, mostly pink, fine to medium grained, very tight (siliceous?) as above, trace glauconite, some very heavy light to light-pink clay filling; Siltstone, red, tight, cavings as above
- 7580-7590 Sandstone, as above, except slightly shalier; cavings as above
- 7590-7630 Poor samples. Trip at 7596', went in with keyseat wiper to keep hole free through Carmel evaporites; resulted in Carmel gray Shales and white anhydrite throughout this section
- 7630-7650 Some Sandstone, Silt and Shale, pink to red, tight, mostly cavings as above
- 7650-7690 Sandstone, very fine to fine grained, salmon-pink, very tight; decreasing red Shale and Siltstone; decreasing Carmel Shale background
- 7690-7740 Sandstone, as above, tight
- 7740-7940 Sandstone, as above, tight, slightly finer than above
- 7940-7960 Siltstone, brick-red, shaly, tight; Shale, orange-pink red, very hard, siliceous; Sandstone, as above (CHINLE SAMPLE. DRG. TIME TOP CHINLE 7880')
- 7960-7990 Shale, orange to brick red, very hard, siliceous and silty; Siltstone, brick red, shaly
- 7990-8010 Shale, as above, softer; Shale and Siltstone, as above, hard siliceous.

SAMPLE DESCRIPTION (Continued)

- 8010-8060 Shale, brick-red, with some white, crystalline anhydrite inclusions; Siltstone and very fine grained Sandstone, brick-red, some with abundant black mineral fragments, trace micaceous, tight
- 8060-8070 Shale and Siltstone, as above, mustard-yellow Shale, soft
- 8070-8150 Shale, mustard-yellow, soft (bentonitic?); some red Shale and Siltstone
- 8150-8168 Shale, brick-red some white crystalline anhydrite inclusions, some chert nodules, pink; Shale, mustard-yellow, as above
- 8168-8190 Trip at 8168', sample all cavings
- 8190-8210 Shale, orange to brick red; some fine to very fine, loose sand grains, white to clear
- 8210-8250 Shale, brick red, soft, anhydritic in part; no Sandstone
- 8250-8260 Shale, brick red to red brown (maroon), as above; some loose fine sand
- 8260-8270 Shale, as above; trace Siltstone brown, yellow mottled, fluorescence and good cut, (similar show trace in sample at 8250-8260')
- 8270-8280 Shale, as above, trace Siltstone as above
- 8280-8300 Shale, as above, some Siltstone, purple brown, tight, no shows
- 8300-8400 Shale, as above, brick red to red brown, no shows, some white anhydrite inclusions in Shales.
- 8400-8560 Shale, red-brown, soft, as above, Siltstone, red-brown very shaly, slightly calcareous; some anhydrite inclusions in samples
- 8560-8610 Shale, red-brown to brown, some slightly silty, some with white anhydrite nodules
- 8610-8660 Sample, as above with slightly increasing brown Shale (maroon)
- 8660-8680 Trip sample, no apparent change from above
- 8680-8830 Shale, increasingly brown; still much red-brown as above

SAMPLE DESCRIPTION (Continued)

- 8830-8860 Shale, as above, with trace Siltstone, white to mottled black (asphaltic residue?), slightly calcareous
- 8860-8980 Shale, red brown to brown, as above, trace Siltstone, white to mottled salt and pepper, tight
- 8980-9000 Limestone, gray to gray-green, earthy to finely granular, trace of dead oil stain, no cut or fluorescence. (SINBAD 8981')
- 9000-9020 Limestone, gray to gray-brown, pyritic, earthy to granular, trace of dead oil stain, no cut, no fluorescence, crystal lined vugs, fair porosity
- 9020-9050 Limestone, gray to gray-green, finely granular, crystal lined vugs, some dead oil stain, fair porosity (lost circulation at 9043'); trace orange Shale
- 9050-9110 Limestone, gray to gray white, as above; trace-5% orange Shale and Sandstone, earthy to fine grained, dense, trace of dead oil stain, milky to good cut from tight rock.
- 9110-9120 Limestone, as above, increasingly shaly
- 9120-9130 Limestone, gray to gray-green, less shaly, light, finely crystalline to granular, some chalky, black spots, carbonaceous, fluorescence from dark gray-black Limestone, slow milky cut, poor porosity
- 9130-9140 Limestone, as above, increasingly shaly
- 9140-9200 Limestone, gray-gray white, chalky to earthy to finely crystalline fossiliferous, hashy, spotted dead oil stain, poor porosity, trace spotted, very dull fluorescence
- 9200-9230 Poor samples, after trip at 9200', mostly cavings
- 9230-9240 Limestone, light to medium gray, slightly pyritic, fossiliferous, dense, tight, no shows; "Shale", white to buff-gray, anhydritic, granular texture, dolomitic
- 9240-9250 Shale or Claystone, as above, anhydritic, dolomitic; Limestone, as above, decreasing
- 9250-9280 Claystone, as above; Siltstone, heavily plugged with carbonaceous material, (gilsonite?), no fluorescence or cut, calcareous, slightly dolomitic, some Limestone

SAMPLE DESCRIPTION (Continued)

- 9280-9370 Shale, pale blue-green-gray, slightly wavy texture, finely disseminated pyrite, remaining sample as above
- 9370-9380 Shale, as above; chert, white, clear, trace
- 9380-9400 Chert, white to pale gray-blue pyritic, with disseminated black (carbonaceous?) material; Shale as above, increasingly calcareous and dolomitic; Limestone, pale gray, clayey, slightly dolomitic
- 9400-9420 Limestone, light gray, very dolomitic, dense to cryptocrystalline, finely disseminated pyrite
- 9420-9470 Dolomite, light gray, dense to cryptocrystalline, tight, trace of spotty staining, fluorescence, with very faint cut, some finely disseminated pyrite; chert, light-blue-gray, somewhat translucent
- 9470-9510 Sample, as above, becoming somewhat darker gray, from light to some medium gray shows, as above, some increase in chert, as above
- 9510-9520 Sample, as above, with some dolomite and chert, dark smoky gray; some Siltstone, dense, tight, dolomitic, carbonaceous
- 9520-9550 Siltstone, dark gray mottled with carbonaceous material or a dead hydrocarbon residue, no fluorescence or cut, dense light gray dolomite and blue-gray chert, as above, decreasing
- 9550-9553 T.D. Sample, as above, with trace Sandstone, fine to very fine grained, tight, no shows
- Circ. Spl 2 hrs Sandstone, fine grained, to very fine grained, some carbonaceous streaks, tight, no shows; Siltstone as above