

FILE NOTATIONS

Entered in NID File

Entered on USR 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 8-29-77

Location Inspected _____

OW WW _____ TA _____

Bond released _____

GW _____ OS _____ PA

State of Fee Land _____

LOGS FILED

Driller's Log

Electric Logs (No. 1)

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

Lat _____ Mi-L _____ Sonic _____ Others _____

Compensated Density log
 Log - Cased Hole
 Dual Induction Guard Log

8-29-77.

Suspended

7-26-78-

Subsequent report of abandonment
(P & A'd - 7/7/78)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

1a. TYPE OF WORK
 DRILL DEEPEN PLUG BACK

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

2. NAME OF OPERATOR
Willard Pease Oil & Gas Co.

3. ADDRESS OF OPERATOR
570 Kennecott Bldg., Salt Lake City, Utah 84111

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.)*
 At surface **NW.SW.Sec.3, T.20 S., R.2i E., S.L.M.**
 At proposed prod. zone **996' from W-line & 1393' from S-line**

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*
Approx. 16 miles NW. of Cisco, Utah

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. unit line, if any)
996'

16. NO. OF ACRES IN LEASE
354.50 ac.

17. NO. OF ACRES ASSIGNED TO THIS WELL
80.00 ac.

18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT.
3000'

19. PROPOSED DEPTH
3800'

20. ROTARY OR CABLE TOOLS
Rotary tools

21. ELEVATIONS (Show whether DF, RT, GR, etc.)
5796' grd.; 5807' K.B.

22. APPROX. DATE WORK WILL START*
June 15, 1977

5. LEASE DESIGNATION AND SERIAL NO.
U-11620

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

7. UNIT AGREEMENT NAME

8. FARM OR LEASE NAME
Federal- Anschutz

9. WELL NO.
Calf Canyon #2

10. FIELD AND POOL, OR WILDCAT
Wildcat

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
NW.SW.Sec.3-20S-21E S.L.M.

12. COUNTY OR PARISH
Grand

13. STATE
Utah

PROPOSED CASING AND CEMENTING PROGRAM

| SIZE OF HOLE | SIZE OF CASING | WEIGHT PER FOOT | SETTING DEPTH | QUANTITY OF CEMENT |
|--------------|----------------|-----------------|---------------|----------------------------|
| 11" | 7-5/8" | 24.00# | 250' | 110 sks circulated to sur. |
| 6-3/4" | 4 1/2" | 10.50# | to production | Cemented 200' above Dakota |

It is planned to drill a well at the above location to test the oil and/or gas potential of the Dakota, Cedar Mountain, and Morrison formations. (The Entrada will be tested if there is no good production prior.) The well will be drilled 50 ft. below the top of the Entrada unless good and sizable production is obtained at a lesser depth. Mancos formation is at the surface and well will be spudded in the Mancos. The top of the Dakota is expected at 3050'; the Cedar Mountain at 3170'; the Morrison at 3225'; the Summerville at 3675'; and the Entrada at 3725'. The well will be drilled with rotary tools using air for circulation. In the event excessive gas, oil or water is encountered, it may become necessary to convert to mud. The surface casing will be set and cemented with returns to the surface. A blowout preventer (hydraulic plus manual back-up) will be installed on top of the casing head and a rotating head on top of the B.O.P. These will be tested to 2000# for leaks initially. Fill & kill lines (2") will be connected to the casing head below the B.O.P. rams. In the event of production

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. **4 1/2", 10.50#, casing will be run thru the production zone and cemented with sufficient cement to bring the cement top about 200' above the Kd.**

SIGNED *H. Don Grayley* TITLE Cons. Geol. DATE May 23, 1977

(This space for Federal or State office use)

PERMIT NO. _____ APPROVAL DATE _____

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

*See Instructions On Reverse Side

SURFACE USE AND OPERATIONS PLAN
FOR
WILLARD PEASE OIL & GAS CO.
ANSCHUTZ CC.#2 WELL
NW.SW.SEC.3-20S-21E
GRAND COUNTY, UTAH

1. Location and Lease: A survey plat showing the exact location of the well site is attached. See Plat No.1. The location is on a gently sloping plateau about 3000' NW. of the Calf Canyon #1 well. The location is on the west side of Calf Canyon in fairly rugged topography. The well is on a federal lease, U-11620, and will be the second well drilled on this lease.
2. Access Road: The access road is an extension to the Calf Canyon road to the CC#1 well. This road is extended down into the wash and then follows the wash southward for $\frac{1}{2}$ mile and then swings westward to the base of the plateau. Here the road will have two switchbacks to get up onto the plateau. The grade will be kept below 10 degrees, if possible. The plateau is gently sloping to the southeast and once the road is on top, there will be no cuts or grades to the location. The washes are all dry now and no culverts or deep fills will be required until wet weather and after it is determined whether or not the well is productive. The access road will be about $\frac{3}{4}$ mile long and will take a fair amount of cat work to build.
3. Location of Existing Wells: See attached maps. The proposed well is about 3000' northwest of the CC #1 well.
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 reseeded. In the event the production is oil, it may be advisable to run a pipeline to the tank battery at the CC #1 well rather than have to haul the oil down off the plateau. This will be decided later.
5. Water Supply:Water for rig use and drilling operations will be obtained from Nash wash at a water hole built by the State Road Commission and hauled to the location by truck. This will be a distance of about ten miles.
5. Road Material:No additional road material, gravel, culverts will be required for the time being.

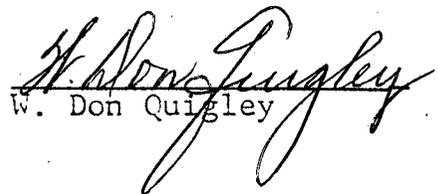
or
7. Waste Disposal: A reserve pit(unlined) and a burn pit will be constructed at the well site as shown on Plat No. 3. All excess water, mud and drill cuttings will be deposited into the reserve pit. Burnable material and garbage will be put into the burn pit which will be fenced with chicken wire to prevent spreading of debris by the wind.

8. Camp Facilities: and Airstrips: No camp facilities other than two or three house trailers at the well site will be needed. No airstrips will be required.
9. Well Site Plan: A plan for the drilling equipment layout required for the drilling operations is submitted on Plat No.3. The approximate dimensions of the drill site are shown. The site will be levelled for this equipment and the pits dug as shown. The reserve pit will have 4-ft.banks and will be made from the dozed material from the pit. The pit will be unlined.
10. Restoration: After drilling operations have been completed and the equipment removed, the well site will be cleaned, levelled, and restored to normal. The pits will be covered and the area r reseeded, if the well is not successful. Otherwise, the site will be levelled and prepared for the placement of the production equipment. This work will be accomplished within 30 days after the drilling equipment has been removed.
11. Land Description: The proposed well site is on a plateau or mesa on the west side of Calf Canyon. The area is quite rugged and is cut by numerous canyons and washes. Suitable locations for well sites are limited. Access routes are circuitous and sometimes steep. The surface of the well site has sage brush and grass with some small juniper and cedar trees on the edges. No big cuts or fills will be required in the preparation of the site. The surface is gravel and debris from Mancos and Mesaverde cliffs, and the plateau is composed of sands and shales of the Mancos formation.
12. Representative: The operator's representative at the well site will probably be W. Don Quigley. The location and road work will probably be done by company equipment of Willard Pease Drilling Company and by its personnel.

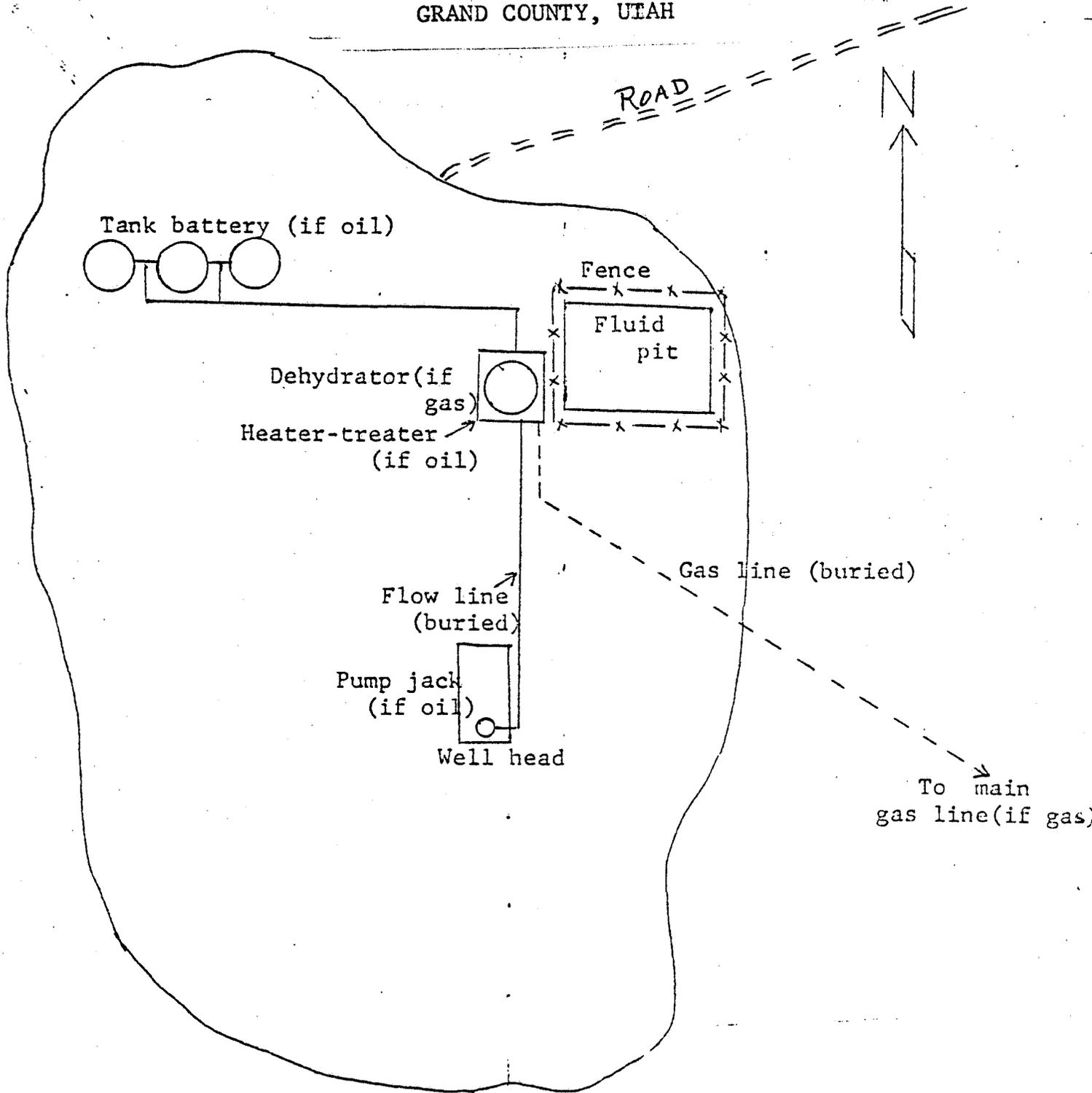
13. Certification:

I hereby certify that I, or persons under my direction 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 herein will be performed by Willard Pease Oil & Gas Co. and its contractors in conformity with this plan and terms and conditions under which it is approved.

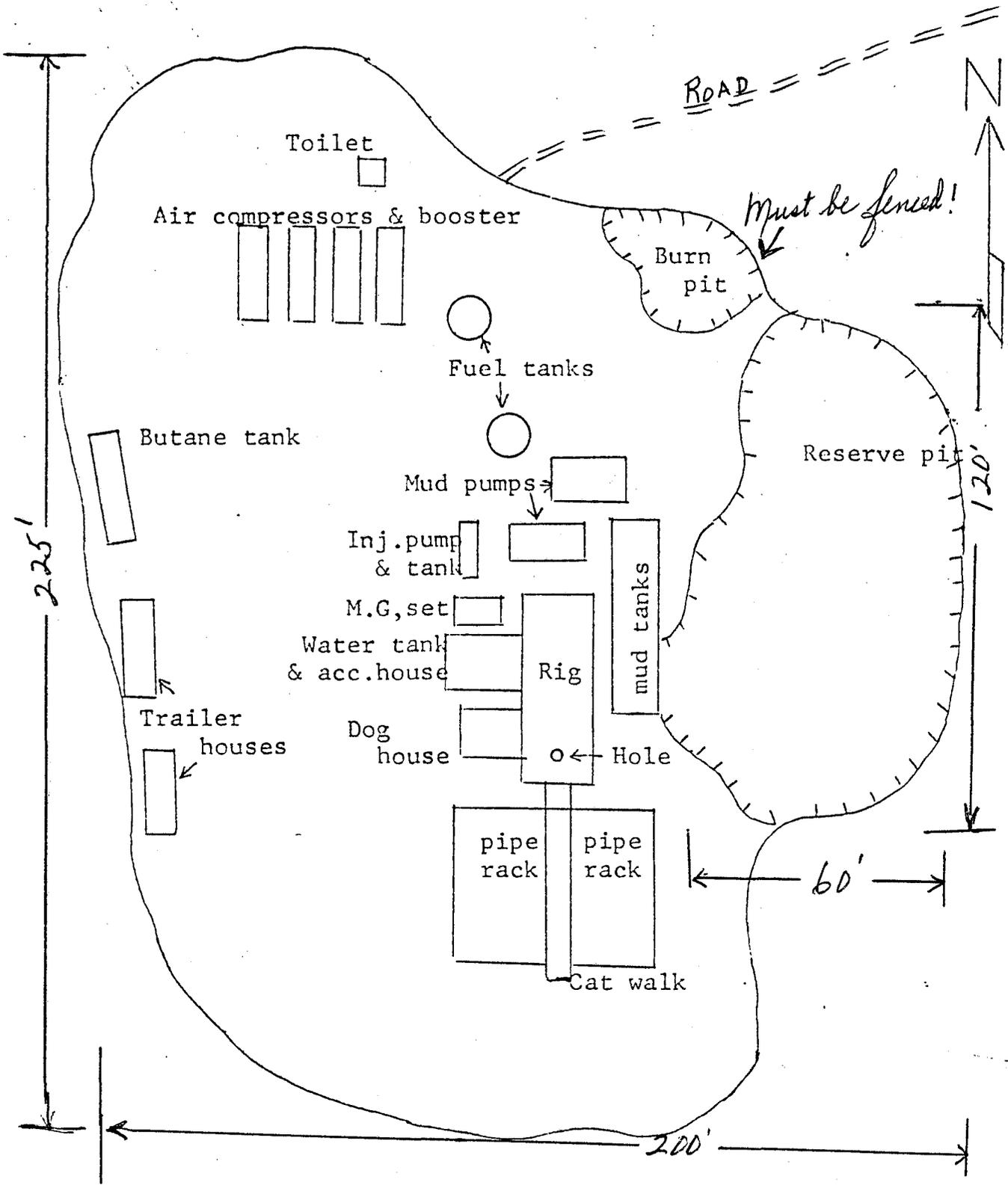
Date: May 23, 1977


W. Don Quigley

PLAN FOR PRODUCTION EQUIPMENT
WILLARD PEASE OIL & GAS CO.
ANSCHUTZ CC #2 WELL
NW.SW.SEC.3-20S-21E
GRAND COUNTY, UTAH



LOCATION PLAN FOR
WILLARD PEASE OIL & GAS CO.
ANSCHUTZ CC #2 WELL
NW.SW.SEC.3-20S-21E
GRAND COUNTY, UTAH



Scale: 1 in. = approx 35 ft.

WELL CONTROL EQUIPMENT FOR
WILLARD PEASE OIL & GAS CO.
ANSCHUTZ FED. CC # 2
GRAND COUNTY, UTAH

The following control equipment is planned for the above designated well: See attached schematic diagram:

1. Surface Casing:
 - A. Hole size for surface casing is 11".
 - B. Setting depth for surface casing is approx. 250 ft.
 - C. Casing specs. are: 7 5/8" D.D., J-55, 26.40#, 8 rd. thread, new or used.
 - D. Anticipated pressure at setting depth is approx. 60 lbs.
 - E. Casing will be run using three centralizers and a guide shoe, and will be cemented with 110 sks of cement with returns to the surface.
 - F. Top of the casing will be at ground level.
2. Casing Head:

Flange size: 10", A.P.I. Pressure rating: 2000# W.P., Series 600; Cameron, OCT, or equivalent; new or used; equipped w/two 2" ports with nipples and 2", 2000# W.P. ball or plug valves. Casing head and valves set above ground level.
3. Intermediate Casing:

None.
4. Blowout Preventors:
 - A. Double rams; hydraulic; one set of blind rams; one set of rams for 3 1/2" or 4" drill pipe; 10" flange; 2000# or greater W.P.; Series 900; equipped with mechanical wheels and rod for back-up; set on top of casing head flange and securely bolted down, and pressure tested for leaks up to 2000# p.s.i.
 - B. Rotating Head:

Shaffer, Grants or equivalent; set on top of blowout preventor and bolted securely; complete with kelly drive, pressure lubricator; 3 1/2" or 4" rubber for 2000# W.P.; need not have hydril assembly on bottom.
 - C. Fill and Kill Lines:

The fill and kill lines (2" tubing or heavy duty line pipe) are to be connected thru the 2" valves on the casing head.
5. Auxillary Equipment:

A float valve is to be used in the bottom drill collar at all times. A string float will also be used in the drill pipe and kept within 200'-300' of the surface.
6. Anticipated Pressures:

The shut-in pressures of the Dakota, Cedar Mountain, and Morrison formations at depths of 3000' to 4000' in the area have been measured at about 1000# to 1500# maximum.
7. Drilling fluids:

Air-soap-water mist will be used to drill the subject well. In case of excessive caving problems, it may be

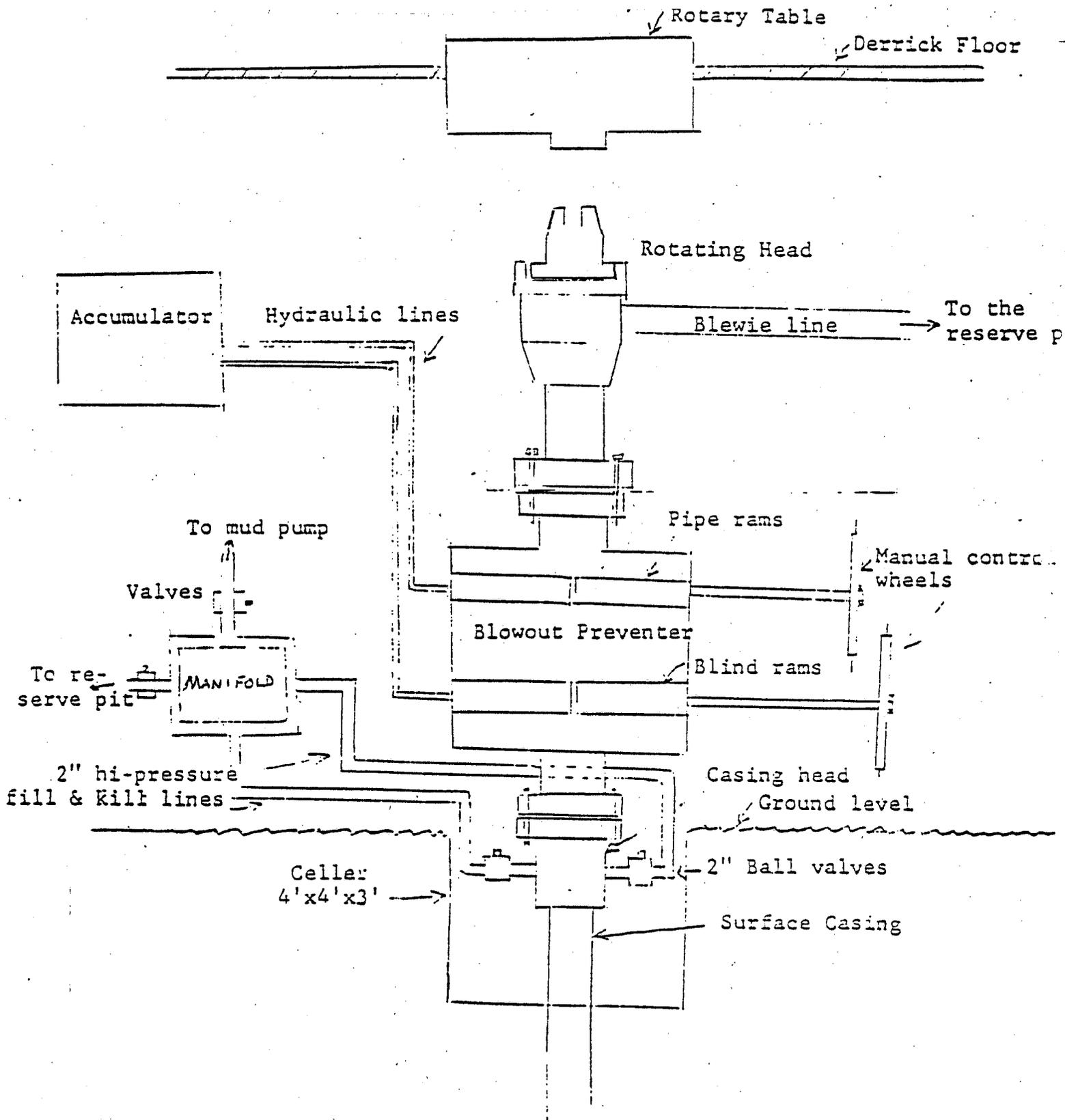
necessary to convert to mud.

8. Production Casing:

- A. Hole size for production casing will be 6 3/4".
- B. Approx. setting depth will be about 3800'
- C. Casing Specs. are: 5 1/2" O.D.; J-55; 15.50#; 8-rd thread; new or used.
- D. Casing will be run with about six centralizers and a Lynes packer and DV tool set above the production zone. There will be sufficient casing to extend thru the production zone below the Lynes packer and a blind guide shoe on the bottom. The casing will be cemented above the packer with about 85 sks of cement (sufficient to cement thru the Dakota formation). The cement will be allowed to cure at least 48 hrs. The plug can then be drilled out and the casing perforated below the packer. Two inch tubing will be run and secured in the tubing head prior to perforating. Pump and rods can be run after the well is swabbed-in.

An alternate completion plan would be to set the 4 1/2" casing thru the pay section and cement with sufficient cement to bring the cement top about 200' above the top of the Dakota formation. The well would then be perforated in the productive zones, broken down, and fracture-treated, if required.

SCHEMATIC DIAGRAM
OF
CONTROL EQUIPMENT
FOR
WILLARD PEASE OIL & GAS CO.
ANSCHUTZ CC #2 WELL
GRAND COUNTY, UTAH



UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

1a. TYPE OF WORK
 DRILL DEEPEN PLUG BACK

b. TYPE OF WELL
 OIL WELL GAS WELL OTHER

SINGLE ZONE MULTIPLE ZONE

2. NAME OF OPERATOR
 Willard Pease Oil & Gas Co.

3. ADDRESS OF OPERATOR
 570 Kennecott Bldg., Salt Lake City, Utah 84111

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.)*
 At surface NW.SW.Sec.3, T.20 S., R.21 E., S.L.M.
 At proposed prod. zone 996' from W-line & 1393' from S-line

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*
 Approx. 16 miles NW. of Cisco, Utah

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drig. unit line, if any)
 996'

16. NO. OF ACRES IN LEASE
 354.50 ac.

17. NO. OF ACRES ASSIGNED TO THIS WELL
 80.00 ac.

18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT.
 3000'

19. PROPOSED DEPTH
 3800'

20. ROTARY OR CABLE TOOLS
 Rotary tools

21. ELEVATIONS (Show whether DF, RT, GR, etc.)
 5796' grd.; 5807' K.B.

22. APPROX. DATE WORK WILL START*
 June 15, 1977

5. LEASE DESIGNATION AND SERIAL NO.
 U-11520

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

7. UNIT AGREEMENT NAME

8. FARM OR LEASE NAME
 Federal - Anschutz

9. WELL NO.
 Calf Canyon #2

10. FIELD AND POOL, OR WILDCAT
 Wildcat

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
 NW.SW.Sec.3-20S-21E S.L.M.

12. COUNTY OR PARISH
 Grand

13. STATE
 Utah

23. PROPOSED CASING AND CEMENTING PROGRAM

| SIZE OF HOLE | SIZE OF CASING | WEIGHT PER FOOT | SETTING DEPTH | QUANTITY OF CEMENT |
|--------------|----------------|-----------------|---------------|----------------------------|
| 11" | 7-5/8" | 24.00# | 250' | 110 sks circulated to sur. |
| 5-3/4" | 4 1/2" | 10.50# | to production | Cemented 200' above Dakota |

It is planned to drill a well at the above location to test the oil and/or gas potential of the Dakota, Cedar Mountain, and Morrison formations. (The Entrada will be tested if there is no good production prior.) The well will be drilled 50 ft. below the top of the Entrada unless good and sizable production is obtained at a lesser depth. Mancos formation is at the surface and well will be spudded in the Mancos. The top of the Dakota is expected at 3050'; the Cedar Mountain at 3170'; the Morrison at 3225'; the Summerville at 3675'; and the Entrada at 3725'. The well will be drilled with rotary tools using air for circulation. In the event excessive gas, oil or water is encountered, it may become necessary to convert to mud. The surface casing will be set and cemented with returns to the surface. A blowout preventer (hydraulic plus manual back-up) will be installed on top of the casing head and a rotating head on top of the B.O.P. These will be tested to 2000# for leaks initially. Fill & kill lines (2") will be connected to the casing head below the B.O.P. rams. In the event of production

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SIGNED W. Don Jingley TITLE Cons. Geol. DATE May 23, 1977

(This space for Federal or State office use)

PERMIT NO. 43-01-36366 APPROVAL DATE _____

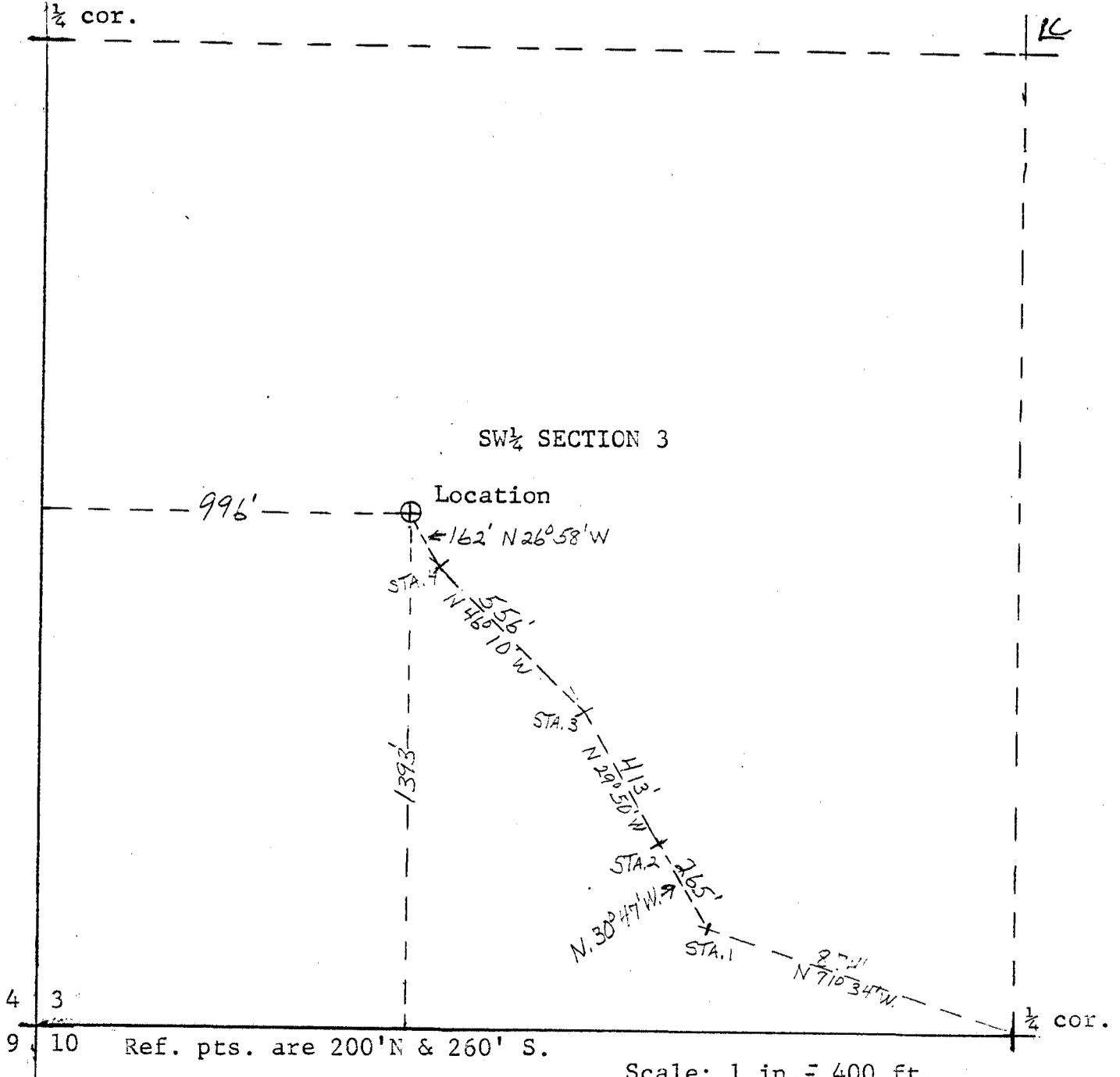
APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

*See Instructions On Reverse Side



LOCATION PLAT FOR
 WILLARD PEASE OIL & GAS COMPANY
 ANSCHUTZ CC #2 WELL
 NW.SW.SEC.3-20S-21E
 GRAND COUNTY, UTAH
 Elev.:5796'grd.



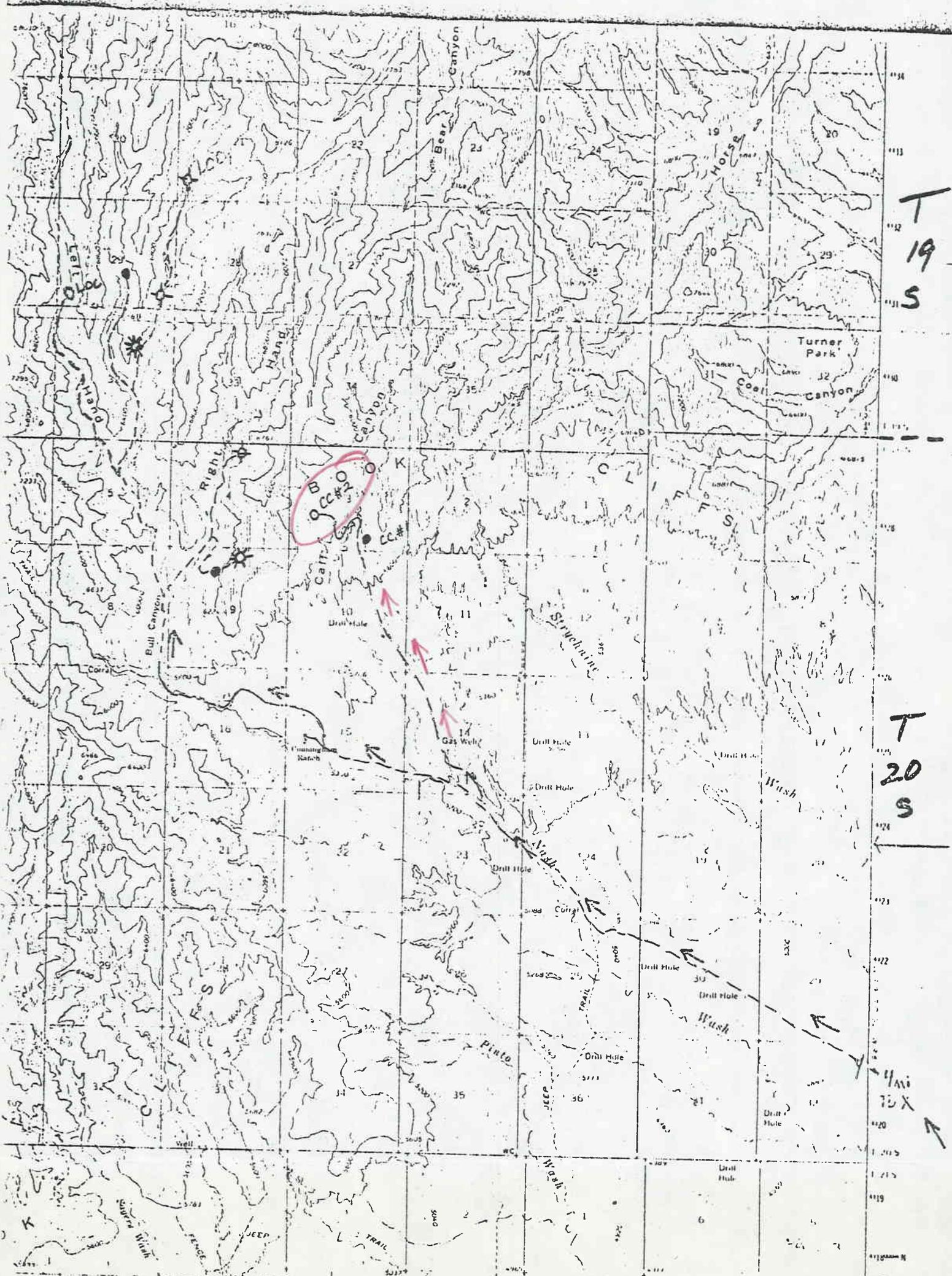
4 3
 9 10 Ref. pts. are 200' N & 260' S.

Scale: 1 in. = 400 ft.
 Date: May 23, 1977
 Surveyed by: W. Don Quigley

I, W. Don Quigley, certify that
 this plat was plotted from notes
 of a field survey made by me on
 May 21, 1977,

W. Don Quigley
 W. Don Quigley

PLAT NO. 1



T
19
S

T
20
S

R21E

R22E

MAP NO. 1

THOMPSON
SCALE 1:25000

FOUR INTERVAL 80 FEET
AS REPRESENTED BY CONTOURS
ELEVATION MEANS SEA LEVEL

ROAD CLASSIFICATION

Light duty

Unimproved dirt

State Route

SEGO CANYON, UTAH

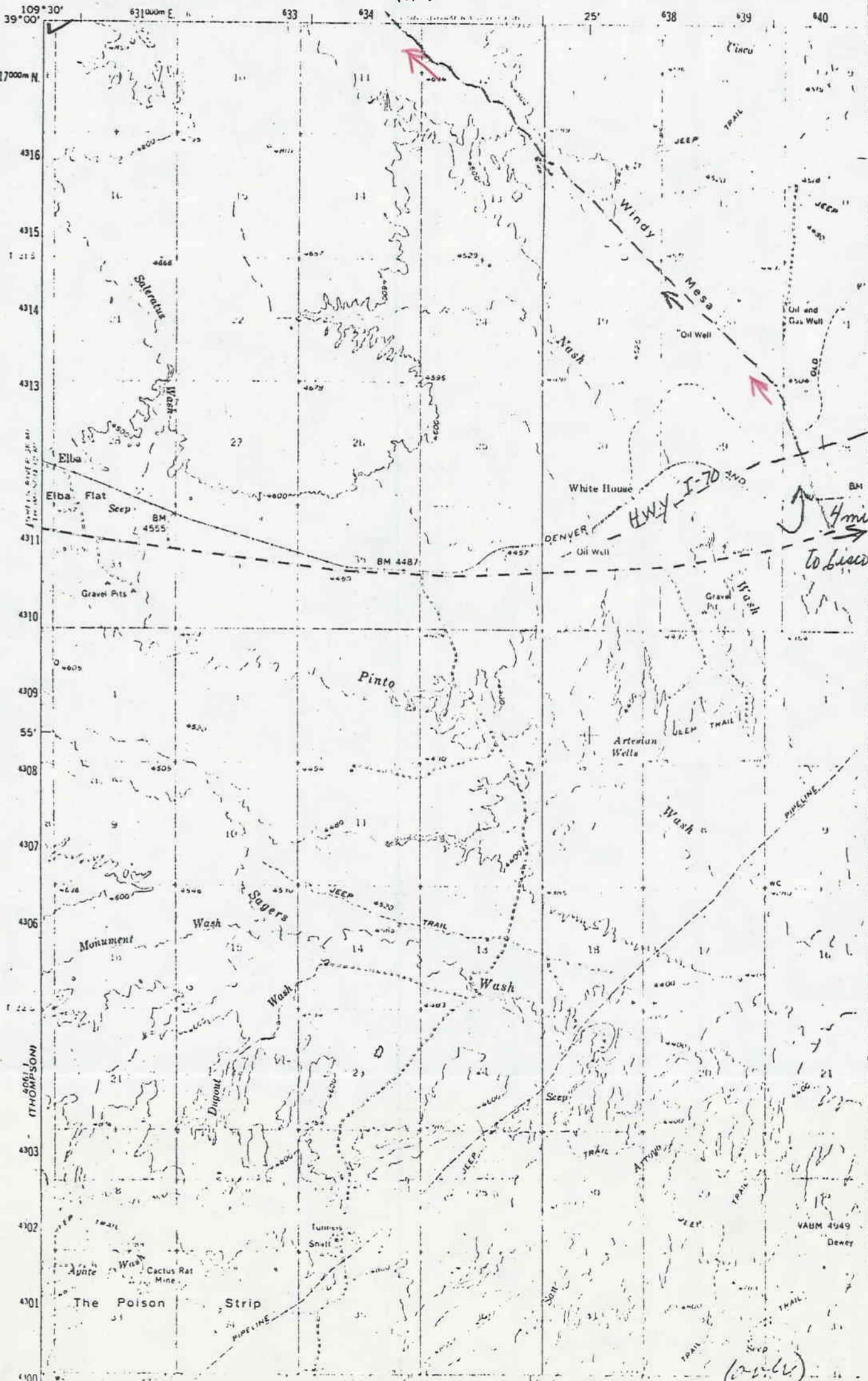
WITH NATIONAL MAP ACQUISITION STANDARDS
GEOGRAPHIC INFORMATION SYSTEMS
GPO, WASHINGTON 20540



MAP NO. 1

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

UNITED
ATOMIC ENERGY

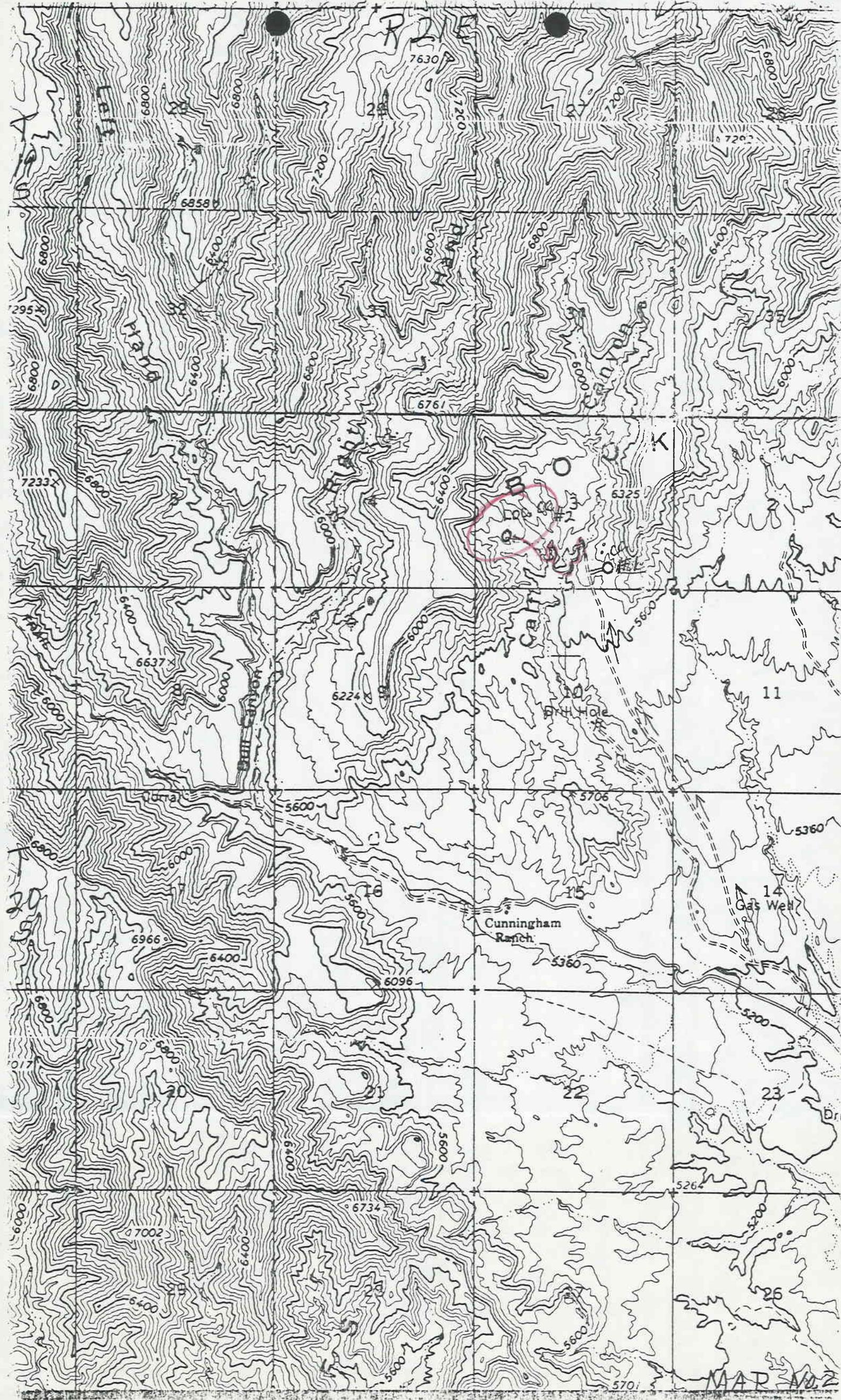


T.
21
S.

T
22
S

R 22 E

R 23 E



R21E

7630

2

7200

6889

6889

6889

6858

7200

6800

295

6889

6889

6889

6761

6800

6400

6000

7233

6600

6000

6000

6325

K

Log #1

6000

6637

6224

6000

11

6000

5600

5706

5360

20

6966

6400

6096

Cunningham Ranch

5360

14 Gas Well

20

6400

5600

23

6000

7002

6000

6734

526

25

5600

5600

5701

MAR 1902

STATE OF UTAH
DIVISION OF OIL, GAS, AND MINING

** FILE NOTATIONS **

Date: May 15-
Operator: Willard Pease
Well No: Fed. Calf Canyon #2
Location: Sec. 3 T. 20S R. 21E County: Grand

File Prepared

Entered on N.I.D.

Card Indexed

Completion Sheet

CHECKED BY:

Administrative Assistant [Signature]

Remarks: site is located where Fed. CC located in SWSE Sec. 35
537 ESK & 2103 FE

Petroleum Engineer [Signature]

Remarks:

Director 7

Remarks:

Oil To
324' From 1/4 1/4 line.
no explanation given for
exception to Rule C-3
to be held.

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

W. DON QUIGLEY

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

June 2, 1977

Re: Well Permit Application
For CC#2 Well-Sec.3
20S-21E, Grand, County

Mr. Cleon Feight
Oil & Gas Division
Dept. of Natural Resources
1588 West N. Temple
Salt Lake City, Utah 84116

Dear Jack:

Reference is made to the well permit application filed recently for Willard Pease Oil & Gas Co. for The CC #2 well in the NW.SW. Sec.3-20S-21E, Grand County, Utah. This location is in an unorthodox position due to topographic limitations. As you will note from the map submitted, the location is on a narrow topographic peninsula with canyons on either side, thus limiting the position of the well site.

It is therefore requested that an exception to Rule 3 regarding the location of well sites be granted. The well is on Oil & Gas Lease # 11620 which covers Lots 3 & 4, S $\frac{1}{2}$ NW $\frac{1}{4}$, SW $\frac{1}{4}$, & S $\frac{1}{2}$ SE $\frac{1}{4}$ of Section 3 and all of the lease is under a farmout agreement between Pease Oil & Gas Co. and The Anschutz Corp.

Sincerely yours,

W. Don Quigley
W. Don Quigley

CIRCULATE TO:

- DIRECTOR _____
 - PETROLEUM ENGINEER _____
 - MINE COORDINATOR _____
 - ADMINISTRATIVE ASSISTANT _____
 - ALL _____
- RETURN TO *Schick*
FOR FILING

2 P

June 6, 1977

Willard Pease Oil & Gas Co.
570 Kennecott Building
Salt Lake City, Utah 84111

Re: Well No. Fed. Anschutz-
Calf Canyon #2
Sec. 3, T. 20 S, R. 21 E,
Grand County, Utah

Gentlemen:

Insofar as this office is concerned, approval to drill the above referred to well is hereby granted in accordance with Rule C-3(c), General Rules and Regulations and Rules of Practice and Procedure.

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

PATRICK L. DRISCOLL - Chief Petroleum Engineer
HOME: 582-7247
OFFICE: 533-5771

Enclosed please find Form OGC-8-X, which is to be completed whether or not water sands (aquifers) are encountered during drilling.

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

The API number assigned to this well is 43-019-30366.

Very truly yours,

CLEON B. FEIGHT
Director

cc: U.S. Geological Survey

**UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY**

APPLICATION FOR PERMIT TO DRILL, DEEPEN, OR PLUG BACK

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 DRILL DEEPEN PLUG BACK

B. TYPE OF WELL
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 996' 354.50 ac.

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20. ROTARY OR CABLE TOOLS
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 5796' grd.; 5807' K, B. June 15, 1977

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 Federal - Anschutz

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 Galf Canyon #2

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 NW.SW, Sec. 3-20S-21E
 S.L.M.

12. COUNTY OR PARISH **13. STATE**
 Grand Utah

23. PROPOSED CASING AND CEMENTING PROGRAM

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| 6-3/4" | 4 1/2" | 10.50# | to production | Cemented 200' above Dakota |

It is planned to drill a well at the above location to test the oil and/or gas potential of the Dakota, Cedar Mountain, and Morrison formations. (The Entrada will be tested if there is no good production prior.) The well will be drilled 50 ft. below the top of the Entrada unless good and sizable production is obtained at a lesser depth. Mancos formation is at the surface and well will be spudded in the Mancos. The top of the Dakota is expected at 3050'; the Cedar Mountain at 3170'; the Morrison at 3225'; the Summerville at 3675'; and the Entrada at 3725'. The well will be drilled with rotary tools using air for circulation. In the event excessive gas, oil or water is encountered, it may become necessary to convert to mud. The surface casing will be set and cemented with returns to the surface. A blowout preventer (hydraulic plus manual back-up) will be installed on top of the casing head and a rotating head on top of the B.O.P. These will be tested to 2000# for leaks initially. Fill & kill lines (2") will be connected to the casing head below the B.O.P. rams. In the event of production

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. 4 1/2", 10.50#, casing will be run thru the production zone and ce-

24. mented with sufficient cement to bring the cement top about 200' above the Kd.

SIGNED: H. Don Gungley TITLE: Cons. Geol. DATE: May 23, 1977

PERMIT NO. _____ APPROVAL DATE: JUL 12 1977

APPROVED BY: (ORIG. SGD.) E. W. GUYNN TITLE: DISTRICT ENGINEER DATE: JUL 11 1977

CONDITIONS OF APPROVAL, IF ANY:
Approval granted Utah State Oil and Gas

ATTACHMENT 2-A

SUMMARY OF ENVIRONMENTAL IMPACT EVALUATION

EIA NO. 534
DATE 6-15-77

OPERATOR W. Pease Oil & Gas

LEASE # U-11620

WELL NO. 2

LOC. NW 1/4 SW SEC. 3

T. 26S R. 21E

COUNTY Grand STATE UT

FIELD Calf Canyon

USGS ALEXANDER

BLM Curmett

REP: Quigley

DIRT Pease

- ENHANCES
- NO IMPACT
- MINOR IMPACT
- MAJOR IMPACT

| Construction | Pollution | Drilling Production | Transport Operations | Accidents | Others |
|---|---|---|----------------------|---------------------|--------|
| Roads, bridges, airports | Burning, noise, junk disposal | Well drilling | Trucks | Spills and leaks | |
| Transmission lines, pipelines | Liquid effluent discharge | Fluid removal (Prod. wells, facilities) | Pipelines | Operational failure | |
| Dams & impoundments | Subsurface disposal | Secondary Recovery | Others | | |
| Others (pump stations, compressor stations, etc.) | Others (toxic gases, noxious gas, etc.) | Noise or obstruction of scenic views | | | |
| | | Mineral processing (ext. facilities) | | | |
| | | Others | | | |

| Land Use | Construction | Pollution | Drilling Production | Transport Operations | Accidents | Others |
|----------------------------|--------------|-----------|---------------------|----------------------|-----------|--------|
| Forestry | NA | / | / | / | / | / |
| Grazing | LO | / | / | / | / | / |
| Wilderness | NA | / | / | / | / | / |
| Agriculture | NA | / | / | / | / | / |
| Residential-Commercial | NA | / | / | / | / | / |
| Mineral Extraction | NA | / | / | / | / | / |
| Recreation | LO | / | / | / | / | / |
| Scenic Views | LO | / | / | / | / | / |
| Parks, Reserves, Monuments | NA | / | / | / | / | / |
| Historical Sites | NA | / | / | / | / | / |
| Unique Physical Features | NA | / | / | / | / | / |
| Flora & Fauna | | | | | | |
| Birds | L | / | / | / | / | / |
| Land Animals | L | / | / | / | / | / |
| Fish | NA | / | / | / | / | / |
| Endangered Species | None Known | / | / | / | / | / |
| Trees, Grass, Etc. | L | / | / | / | / | / |
| Surface Water | NA | / | / | / | / | / |
| Underground Water | ? | / | / | / | / | / |
| Air Quality | L | / | / | / | / | / |
| Erosion | L | / | / | / | / | / |
| Other | | | | | | |
| Effect On Local Economy | LO | D | D | D | / | / |
| Safety & Health | L | / | / | / | / | / |
| Others | | | | | | |

Pease Oil & Gas

(3) WILDLIFE: DEER ANTELOPE ELK BEAR SMALL
MAMMAL BIRDS ENDANGERED SPECIES OTHER *All Very Sparse*

(4) LAND USE: RECREATION LIVESTOCK GRAZING AGRICULTURE
 MINING INDUSTRIAL RESIDENTIAL OIL & GAS OPERATIONS

REF: BLM UMBRELLA EAR
USFS EAR
OTHER ENVIRONMENTAL ANALYSIS

3. Effects on Environment by Proposed Action (potential impact)

1) EXHAUST EMISSIONS FROM THE DRILLING RIG POWER UNITS AND SUPPORT TRAFFIC ENGINES WOULD ADD MINOR POLLUTION TO THE ATMOSPHERE IN THE LOCAL VICINITY.

2) MINOR INDUCED AND ACCELERATED EROSION POTENTIAL DUE TO SURFACE DISTURBANCE AND SUPPORT TRAFFIC USE.

3) MINOR VISUAL IMPACTS FOR A SHORT TERM DUE TO OPERATIONAL EQUIPMENT AND SURFACE DISTURBANCE.

4) TEMPORARY DISTURBANCE OF WILDLIFE AND LIVESTOCK.

5) MINOR DISTRACTION FROM AESTHETICS FOR SHORT TERM.

6)

4. Alternatives to the Proposed Action

1) NOT APPROVING THE PROPOSED PERMIT -- THE OIL AND GAS LEASE GRANTS THE LESSEE EXCLUSIVE RIGHT TO DRILL FOR, MINE, EXTRACT, REMOVE AND DISPOSE OF ALL OIL AND GAS DEPOSITS.

2) DENY THE PROPOSED PERMIT AND SUGGEST AN ALTERNATE LOCATION TO MINIMIZE ENVIRONMENTAL IMPACTS. NO ALTERNATE LOCATION ON THIS LEASE WOULD JUSTIFY THIS ACTION.

~~3) LOCATION WAS MOVED _____ TO AVOID _____
 LARGE SIDEHILL CUTS NATURAL DRAINAGE OTHER _____~~

4)

5. Adverse Environmental Effects Which Cannot Be Avoided

1) MINOR AIR POLLUTION DUE TO EXHAUST EMISSIONS FROM RIG ENGINES AND SUPPORT TRAFFIC ENGINES.

2) MINOR INDUCED AND ACCELERATED EROSION POTENTIAL DUE TO SURFACE DISTURBANCE AND SUPPORT TRAFFIC USE.

3) MINOR AND TEMPORARY DISTURBANCE OF WILDLIFE.

4) TEMPORARY DISTURBANCE OF LIVESTOCK.

5) MINOR AND SHORT-TERM VISUAL IMPACTS.

6)

6. DETERMINATION:

(THIS REQUESTED ACTION ~~DOES~~ (DOES NOT) CONSTITUTE A MAJOR FEDERAL ACTION SIGNIFICANTLY AFFECTING THE ENVIRONMENT IN THE SENSE OF NEPA, SECTION 102(2) (C).

DATE INSPECTED 6-15-77

E. S. Johnson

INSPECTOR

[Handwritten signature]

U. S. GEOLOGICAL SURVEY
CONSERVATION DIVISION - OIL & GAS OPERATIONS
SALT LAKE CITY DISTRICT

U.S. GEOLOGICAL SURVEY, CONSERVATION DIVISION

FROM: DISTRICT GEOLOGIST, SALT LAKE CITY, UTAH

TO: DISTRICT ENGINEER, SALT LAKE CITY, UTAH

| Well | Location | Lease No. |
|--|---|-----------|
| Willard Pease Oil & Gas Co. CAIF CANYON # 2 | 996' FWL, 1393' FSL, SEC. 3 T 20 S R 21 E S 1/4 M, GRAND CO, UTAH GREL 5796' | U-11620 |
| <p>1. Stratigraphy and Potential Oil and Gas Horizons. <i>Surface rock Mancos Shale. Toledo Mining well #1 Bull Canyon, Sec. 4, same township, reported the following tops: Dakota - 3270', Morrison - 3454', Summerville - 3970', Entrada - 3997'. T.D. 4071'.</i></p> <p>2. Fresh Water Sands. <i>See WRD report on page 2.</i></p> <p>3. Other Mineral Bearing Formations. <i>Within lands prospectively valuable for geothermal and coal.</i></p> <p>4. Possible Lost Circulation Zones. <i>Toledo Mining Co. #1 in Sec. 4, same township, reports lost circulation at 95', 800', 1628', 1815'. The ground elevation of the well 5967'.</i></p> <p>5. Other Horizons Which May Need Special Mud, Casing, or Cementing Programs. <i>Protect any fresh water aquifers encountered.</i></p> <p>6. Possible Abnormal Pressure Zones and Temperature Gradients. <i>Unknown.</i></p> <p>7. Competency of Beds at Proposed Casing Setting Points. <i>Probably adequate.</i></p> <p>8. Additional Logs or Samples Needed. <i>Sufficient logs to identify coal & fresh water aquifers.</i></p> <p>9. References and Remarks <i>1/4 mile from Bull Canyon N.S.S.</i></p> | | |

Date: 6-2-77

Signed: Ellen Pera

Depths of fresh-water zones:

Toledo Mining Co., Toledo Bull Canyon #1, Wildcat
2,563' fwl, 751' fnl, sec. 4, T 20S, R 21 E, Grand Co., Utah
Elev 5,967 ft; proposed depth 4,100 ft

| <u>Stratigraphic units</u> | <u>Tops, approx.</u> | <u>Quality of water</u> |
|----------------------------|----------------------|-------------------------|
| Mancos Shale | surface | useable(?)/saline/brine |
| Dakota Sandstone | 3,250 ft | brine |
| Morrison Formation | 3,350 ft | brine |
| Entrada Sandstone | 3,950 ft | brine |

There are no water wells in the near vicinity of the proposed test. Thin lenticular sandstone units in the Mancos Shale may contain useable(?) water at depths of less than 500 feet.

USGS - WRD
12-28-71

July 22, 1977

Memo to File

CIRCULATE TO:

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

RETURN TO *Kathy D.*
FOR FILING

Re: Willard Pease
CC #2
Sec. 3, T. 20 S., R. 21 E.

This office was notified as of July, 22, 1977, that Willard Pease, as a contractor on this hole, has ~~signed~~ in with Rig #2.

Spelled

PATRICK L. DRISCOLL
CHIEF PETROLEUM ENGINEER

PLD/src

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN DUPLICATE

(See other instructions on reverse side)

Utah State
Form approved.
Budget Bureau No. 42-R355.4

5. LEASE DESIGNATION AND SERIAL NO.

U-11620

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

7. UNIT AGREEMENT NAME

8. FARM OR LEASE NAME

Federal-Anschutz

9. WELL NO.

Calf Canyon #2

10. FIELD AND POOL, OR WILDCAT

Wildcat

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

NW.SW.Sec.3-20S-21E
S.L.M.

12. COUNTY OR PARISH

Grand

13. STATE

Utah

WELL COMPLETION OR RECOMPLETION REPORT AND LOG *

1a. TYPE OF WELL: OIL WELL OR GAS WELL DRY Other _____

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

2. NAME OF OPERATOR
Willard Pease Oil & Gas Company

3. ADDRESS OF OPERATOR
570 Kennecott Bldg., Salt Lake City, Utah 84111

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

At surface NW.SW.SEC.3,T20S,R21E,S.L.M.
At top prod. interval reported below 996' from W-line & 1393' from S-line
At total depth

14. PERMIT NO. DATE ISSUED

43-019-30366

15. DATE SPUNDED Jul 22-77 16. DATE T.D. REACHED Jul 27-77 17. DATE COMPL. (Ready to prod.) Aug 29-77 18. ELEVATIONS (DF, RKB, RT, GR, ETC.)* 5796'grd;5807'K.B. 19. ELEV. CASINGHEAD 5797'

20. TOTAL DEPTH, MD & TVD 3805' 21. PLUG, BACK T.D., MD & TVD 3610' 22. IF MULTIPLE COMPL., HOW MANY* 23. INTERVALS DRILLED BY 24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)* Dakota 3010'-3018' 25. WAS DIRECTIONAL SURVEY MADE no

26. TYPE ELECTRIC AND OTHER LOGS RUN Dual-Induction; gamma-density; neutron porosity 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 |
|-------------|-----------------|----------------|-----------|------------------|---------------|
| 8-5/8" | 32.00# | 210' | 12 1/2" | 100 sks. | none |
| 4 1/2" | 10.50-13.50# | 3610' | 7-7/8" | 300 sks | none |

| 29. LINER RECORD | | | | | 30. TUBING RECORD | | |
|------------------|----------|-------------|---------------|-------------|-------------------|----------------|-----------------|
| SIZE | TOP (MD) | BOTTOM (MD) | SACKS CEMENT* | SCREEN (MD) | SIZE | DEPTH SET (MD) | PACKER SET (MD) |
| none | | | | | | | |

31. PERFORATION RECORD (Interval, size and number) 3011'-3015' (12 holes) Other zones were tested
32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC. DEPTH INTERVAL (MD) AMOUNT AND KIND OF MATERIAL USED 3010-3352' 2500 gal of 7 1/2% acid w/N₂

33.* PRODUCTION DATE FIRST PRODUCTION none PRODUCTION METHOD (Flowing, gas lift, pumping—size and type of pump) Flowing WELL STATUS (Producing or shut-in) Suspended

DATE OF TEST Aug.20 HOURS TESTED 7 hrs. CHOKE SIZE XXX 1 1/2" PROD'N. FOR TEST PERIOD → OIL—BBL. GAS—MCF. WATER—BBL. GAS-OIL RATIO small amt (tstm)
FLOW. TUBING PRESS. 0 CASING PRESSURE 0 CALCULATED 24-HOUR RATE → OIL—BBL. GAS—MCF. WATER—BBL. OIL GRAVITY-API (CORR.) ? (tstm)

34. DISPOSITION OF GAS (Sold, used for fuel, vented, etc.) vented TEST WITNESSED BY W. Don Quigley

35. LIST OF ATTACHMENTS Drilling & Completion History and Geologic Report

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

SIGNED W. Don Quigley TITLE Cons. Geol. DATE Sept.22-77

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



DRILLING AND COMPLETION HISTORY
AND
GEOLOGIC REPORT
ON
CALF CANYON #2 WELL
GRAND COUNTY, UTAH

Operator: Willard Pease Oil & Gas Co.
570 Kennecott Bldg., Salt Lake City, Utah 84111

Contractor: Willard Pease Drilling Co.
P.O. Box 548, Grand Junction, Colorado 81501

Location: NW $\frac{1}{4}$ SW $\frac{1}{4}$, Sec. 3, T 20S., R 21E., S.L.M., Grand
County, Utah (996' from W-line and 1393' from S-line).

Elevations: 5796' grd; 5807' K.B.

Spudded in: July 22, 1977

Finished Drlg: July 27, 1977

Total Depth: 3805'

Surface Casing: 8 5/8", 32#, H-40, STC set at 210'K.B. and
cemented with 100 sks type G cement with 3% CaCl.
Had good returns to surface.

Production Casing: 4 $\frac{1}{2}$ ", 10.50# - 11.00# - 13.50#, casing set
at 3610' and cemented with 100 sks of 50-50 Pozmix
and 200 sks of R.F.C. cement. Cement top at 2230'.

Logs Run: Dual-Induction; Gamma-Density; Neutron Porosity.

Production Formations: Dakota

Production Zones: Gas at 3010'-3018'.

Completed Gas Zones: 3010'-3018'

Completion Date: Aug. 20, 1977

Initial Production Rate: Undetermined (Init. rate was 3,750
MCF/D.). Well is suspended and shut-in.

DRILLING AND COMPLETION HISTORY
CC #2 WELL
GRAND COUNTY, UTAH

July 20-21: Moving rig and rigging up.

July 22: Finished rigging up. Drilled rat hole and mouse hole. Spudded in at 10 P.M. and began drilling 12 $\frac{1}{4}$ " surface hole. Drilled to 76 ft.

July 23: Drilled 76' to 210' (134'). Ran 6 jts. of 8 5/8", 32# casing and landed at 210'. Cemented casing with 100 sks of class G cement with 3% CaCl. Plug down at 5 P.M. Had good returns to surface. Survey at 210' was 1 $^{\circ}$.

July 24: Drilled 210' to 707' (497'). Waiting on cement. Riggged up blowout preventers, nipped up and began drilling ahead with 7 7/8" bit and using air for circulation. Drilling at rate of 80 ft/hr. Survey at 700' was 1 $\frac{1}{2}$ $^{\circ}$. Bit #1 (HTC-R.R.-12 $\frac{1}{2}$ "") made 210' (0'-210') in 6 hrs. Drilled at avg. rate of 35' per hr. Dusting good.

July 25: Drilled 707' to 2555' (1848'). Drilling at rate of 100 ft. per hr. Made rd. trip at 2118' for new bit. Bit #2 (HTC-OW4-J) made 1908' (210'-2118') in 18 $\frac{1}{2}$ hrs. Drilled at avg. rate of 105 ft/hr. Survey at 1400' was 1 3/4 $^{\circ}$. Began 30-ft. samples at 1500'. Survey at 1930' was 2 $^{\circ}$.

July 26: Drilled 2555' to 3438' (883'). Drilling at rate of 80 ft/hr. Hit gas at 3010'. Drilled to 3032' and shut down to test gas flow. Tested flow for 6 hrs. Rate stabilized at 3.785 MMCF. Gauged rates are as follows based on pitot tube measurements:

| | |
|-------|-------------------|
| 0830: | Opened well |
| 0835: | 50# - 6160 MCFPD. |
| 0845: | 30# - 4260 MCFPD. |
| 0900: | 29# - 4150 MCFPD. |
| 0915: | 27# - 3960 MCFPD. |
| 0930: | 26# - 3880 MCFPD. |
| 0945: | 25# - 3785 MCFPD. |
| 1000: | 25# - 3785 MCFPD. |

Checked with Anschutz about drilling ahead. They wanted to drill ahead to Salt Wash. Began drilling ahead at 12:45 P.M. Encountered fluid at 3040' had spray of oil and then water

at 3050'. Had to start mist-drilling at this point. Drilling ahead at rate of 45 ft/hr. Est. top of Dakota at 3010' and Morrison at 3140'. Had several sands in Dakota with good shows, and excellent fluorescence. Had a good sand in Salt Wash at 3335'-3355' with good shows.

- July 27: Drilled 3438' to 3805' (367'). Drilled to 3525' and decided that all the good potential sands in Morrison had been penetrated. Quit drilling and began circulating with air-mist in preparation to log. Tried to call Anschutz at 2 P.M. and couldn't make contact. Waited till 8 A.M. and called. Anschutz had changed their mind and insisted on drilling ahead to Entrada; so began drilling ahead. Drilled to 3805' which was 70 feet below top of Entrada at 3735'. Had no shows or good sands in lower interval drilled. Killed well with mud in preparation to log. Circulated hole for 2½ hrs. and came out of hole. Bit #3 (HTC-J33) made 1687' (2118' to 3805') in 30 hrs. Drilled at avg. rate of 56 ft/hr.
- July 28: Logged hole. Rigged up Welex and ran Dual-Induction, Gamma-Density, and Neutron Porosity logs. Finished logging at 7 A.M. Went in hole with drill collars and drill pipe. Came out of hole laying down drill pipe and collars. Finished at 4 P.M. and began running 4½", 10.50#, 11.00#, and 13.50# casing (mixed). Ran guide shoe on bottom with float collar 38 feet above shoe. Ran centralizers on top of 1st, 7th, 13th, 14th, 15th, and 16th joints. Landed casing at 3610' K.B. Finished running casing at 7 P.M. Cemented casing with 100 sks of 50-50 Pozmix cement with 200 sks of RFC cement on bottom. Plug down at 8 P.M. Waiting on cement.
- July 29: Waiting on cement. Removed BOP's. Welded 4½" casing to 8 5/8" surface casing. Picked up tubing (105 jts.) 3306' (2 3/8" tubing) and stood tubing in derrick.
- July 30: Had Welex run gamma-bond log. Finished logging at 11 A.M. Log shows excellent bond. Top of cement at 2230'. Started in hole with tubing and Guiberson packer. Ran in 11 stds (660') and packer wouldn't go. Came out of hole and took packer off and went back in hole with tubing alone. Landed tubing at 2985'. Blew hole dry in stages on way in with tubing. Rigged up well head and valves. Rigged Welex to perforate. Perforated zone at 3010' to 3018' with 2 shots per foot. Well began flowing gas immediately. Tested rate of flow for 2½ hrs. (1800 to 2030). Flow stabilized at 20# on ½" orifice. Gauged flow rates with orifice tester (½"

plate) are as follows:

| | | | | | |
|-----------|-------|-------|-------|-----|-------|
| 6:00 P.M. | ----- | 5# | ----- | 120 | MCFPD |
| 6:15 P.M. | ----- | 7.5# | ----- | 140 | MCFPD |
| 6:30 P.M. | ----- | 15.0# | ----- | 190 | MCFPD |
| 6:45 P.M. | ----- | 16.0# | ----- | 200 | MCFPD |
| 7:00 P.M. | ----- | 16.5# | ----- | 207 | MCFPD |
| 7:15 P.M. | ----- | 18.0# | ----- | 215 | MCFPD |
| 7:30 P.M. | ----- | 19.0# | ----- | 220 | MCFPD |
| 7:45 P.M. | ----- | 19.5# | ----- | 222 | MCFPD |
| 8:00 P.M. | ----- | 20.0# | ----- | 225 | MCFPD |
| 8:15 P.M. | ----- | 20.0# | ----- | 225 | MCFPD |
| 8:30 P.M. | ----- | 20.0# | ----- | 225 | MCFPD |

2045-2400: Shut well in. Tubing pressure built up to 440# in 1½ hrs.; to 580# in 3¼ hrs. Casing pressure was 750# and surface casing pressure was 345#. Must have leak in 4½" casing somewhere near surface. (Probably at about 500' below surface).

✓ Called DOTCO at 1:30 P.M. for casing roller. They had not arrived by midnight so called again and found that they had not left Vernal since they did not have proper size of roller. Called several other companies and was unable to find a roller.

July 31: Went to Grand Junction to pick up reamer. Ran reamer in hole and it wouldn't go beyond 8 stds in (500'). Couldn't turn reamer to ream casing, so had to go to Grd. Junction to pick up pup joints and small kelly. Tried to ream out casing for several hours but couldn't get beyond a few feet. Came out of hole and took reamer to Grd. Junction to turn it down. Reduced size to 3.810" O.D. Went back in hole with reamer and reamed thru 8th std; but hung up on 11th std.

Aug. 1: Reamed on spot 11 stds in (670') for several hours and made about 6 inches. Came out of hole with reamer and took reamer and packer into Grd. Junction to turn down again. Turned reamer down to 3.75" O.D. and packer to 3.625 O.D.; also picked up second reamer (3.375 O.D.) and ran it in hole first. Reamed thru 11th std. in and hit another tight spot on 12th std. Reamed thru 12th std and then reamer went to 3306' without touching anything. Came out of hole and picked up second reamer. Reamed 8th stand in and began reaming on 11th stand.

Aug. 2: Reamed on 11th stand for 6 hrs. and made 6 inches. Came out of hole. Called welder to build up first reamer to an

intermediate size (3.625"). Started in hole with first reamer at 11 A.M. Reamed out a spot on 6th stand in, a 6 ft. section on eight stand in, and a 32 ft. section on 11th stand in. Came out and picked up second reamer. Reamed on spot on 6th stand in; reamed thru 6 ft. section on 8th stand; and reamed on 11th stand. Reamer gave up. Put on 1st reamer and reamed down thru all spots.

Aug. 3: Came out and checked O.D. Measured 3.5", so went in hole with second reamer (O.D. 3.875). Reamed down thru spot on 6th stand and 8th stand and started on 11th when reamer began binding. Came out and found reamer was 3.75" O.D. Decided to run packer to check hole in pipe. Ran packer in to about 670' and set; but sheared safety plugs and came out of hole. Tried to repair and set again without success. Had to have some new set screws made.

Aug. 4: Went in hole with tubing and packer and set packer at 640'. Tested annulus between 4½" and 8 5/8" casings. Found leak in 4½" casing above 640'. Unseated packer and blew hole dry. (Bottom of tubing is at 2970'.) Reset packer at 640' to test upper gas zone. Gas flow estimated at 50 MCF. Let flow for 1 hr. No apparent increase.

0530: Perforated zone 3332' to 3352' with 1 shot per foot. (Go. Wireline Service)

1000: Finished perforating. Had to make 5 runs before gun went off. Had definite increase in gas. Gauged as follows on ½" orifice:

| | | | | |
|-------|-------|-----|-------|---------|
| 10:30 | ----- | 10# | ----- | 160 MCF |
| 10:45 | ----- | 10# | ----- | 160 MCF |
| 11:00 | ----- | 10# | ----- | 160 MCF |
| 11:30 | ----- | 10# | ----- | 160 MCF |
| 12:30 | ----- | 11# | ----- | 175 MCF |
| 1:30 | ----- | 11# | ----- | 175 MCF |

Shut well in at 1:30 and gauged shut-in pressure as follows:

| | | |
|-------------|-------------|-------------|
| 1:30 = 60# | 2:30 = 350# | 3:30 = 525# |
| 1:45 = 130# | 2:45 = 400# | 3:45 = 550# |
| 2:00 = 200# | 3:00 = 450# | 4:00 = 560# |
| 2:15 = 275# | 3:15 = 500# | 6:00 = 600# |

At 6:10 - Opened well to flow for 1 hr.; then shut well in for 2 hrs. and then opened for 1 hr., etc. for rest of night. Shut-in pressures are as follows:

| | | |
|------------------|------------------|-------------------|
| 7:10 P.M. = 0# | 8:40 P.M. = 420# | 10:55 P.M. = 200# |
| 7:25 P.M. = 80# | 8:55 P.M. = 460# | 11:10 P.M. = 320# |
| 7:40 P.M. = 110# | 9:10 P.M. = 480# | 11:25 P.M. = 380# |
| 7:55 P.M. = 230# | Open for 1 hr. | 11:40 P.M. = 420# |
| 8:10 P.M. = 280# | 10:25 P.M. = 0# | 11:55 P.M. = 440# |
| 8:25 P.M. = 360# | 10:40 P.M. = 80# | 12:10 P.M. = 500# |

Aug. 5: Alternately flowing well for 1 hr. and then shut-in for 2 hrs. Flow gauge was as follows on $\frac{1}{2}$ " orifice:

| |
|----------------------------|
| 12:15 A.M. = 50# = 425 MCF |
| 12:30 A.M. = 30# = 290 MCF |
| 12:45 A.M. = 20# = 230 MCF |
| 1:00 A.M. = 20# = 230 MCF |
| 1:10 A.M. = 20# = 230 MCF |

Shut-in Pressures read as follows:

| | |
|------------------|------------------|
| 1:10 A.M. = 0# | 4:10 A.M. = 80# |
| 1:25 A.M. = 100# | 4:25 A.M. = 110# |
| 1:40 A.M. = 175# | 4:40 A.M. = 200# |
| 1:55 A.M. = 220# | 4:55 A.M. = 250# |
| 2:10 A.M. = 300# | 5:10 A.M. = 280# |
| 2:25 A.M. = 375# | 5:25 A.M. = 340# |
| 2:40 A.M. = 400# | 5:40 A.M. = 380# |
| 2:55 A.M. = 420# | 5:55 A.M. = 400# |
| 3:10 A.M. = 500# | 6:10 A.M. = 425# |

Flow gauge as follows:

| | | | |
|-----------------|-------|---------|-----------------------|
| 7:00 A.M. = 18# | ----- | 210 MCF | (Carrying some fluid) |
| 7:15 A.M. = 18# | ----- | 210 MCF | " " " |
| 7:30 A.M. = 18# | ----- | 210 MCF | " " " |
| 7:45 A.M. = 18# | ----- | 210 MCF | " " " |
| 8:00 A.M. = 18# | ----- | 210 MCF | " " " |

Found another hole in casing below packer; so unseated packer and came out of hole after killing well with water. Picked up first reamer (O.D. 3.75") and went in hole to ream. Reamed thru spot on 6th stand, thru the 8th stand and nearly thru the 11th stand; (lacked about 6 ft.) when reamer twisted off. Ordered an overshot from DOTCO. Waiting on overshot.

Aug. 6-7: Fishing for reamer. Finally jarred it loose with a set of jars. Built up reamer to 3.70 and cut threads on the shank and welded on collar. Went back in hole with No. 1 reamer to ream thru tight spots.

- Aug. 8: Reamed about 28 ft. on 11th and 12th stds and then reamer went all the way. Came back out and calipered reamer. Calipered 3.60". Went in hole with Lynes packer. Set packer at 2970' to 2975'. Filled tubing with diesel and inflated packer with 2000# pressure. Set with 5000# pull. Pumped plug out. Began acid-nitrogen treatment at 8:30 P.M. Pumped in 2500 gal. of 7½% acid with 750 cu. ft. nitrogen per bbl. Pumped in at 3 bbl/min. rate at 2500# pressure. Dropped 1 ball per bbl. Dropped 50 balls and got several good breaks and pressure gradually increased to a maximum of 3000#. Displaced with 16 bbl diesel and nitrogen. Instant shut-in was 2000#. 15 min. shut-in was 1200#. Finished at 9:15 P.M. Opened well to flow back at 9:50 P.M. Well flowed back by spurts for 1 hr. and then died.
- Aug. 9: Well still dead. Arranged for a swabbing unit from Cisco (Ralph Hall). Began swabbing about 2 P.M. Pulled about 10 swab runs (½ bbl fluid each) and unit broke down. Released the unit. Called for another swab unit from Rangely. Waiting on swab unit.
- Aug. 10: Swab unit (Frank Hale) arrived at 3:00 A.M. Rigged up unit and began swabbing at 5:00 A.M. Swabbed continuously till 10 A.M. Lowered fluid some and lots of gas coming in but well refuses to kick off. Shut down for 2 hrs. Began swabbing again at noon. Swabbed till 3:00 P.M. Well began flowing at 3:30 P.M. Flowing acid water and gas. At 5:00 P.M. well was flowing gas, oil and brine water. Fluid rate was about 20 bbl/hr. with about 5% oil. Gas flow was strong - a 20 ft. stream of gas and vapor. Let well flow the rest of the night.
- Aug. 11: Well still flowing steady stream of gas, oil, and water. Rate may have increased some. Obviously the acid destroyed the cement bond between the gas zone at 3010' to 3018' and the water zone below at 3045' to 3065'. Decided to squeeze the upper perforated section. Released packer and came out of hole with tubing. Went back in hole with tubing and placed cement plug (10 sks of RFC cement at 3320' to 3140'). Came back out of hole with tubing. Waiting on plugs for packer.
- Aug. 12: Dressed packer and went in hole with packer (Lynes) and set at 2645'. Pumped in 25 sks of cement (RFC). Break down pressure was 1600# and cement pumped in at 2000# at a rate of 2½ bbl/min. Pressure gradually increased to 2200#. Cement displaced at 3:00 A.M. Waited 30 minutes and pumped

against squeeze. Pumped up to 2500# and cement didn't move. Should have about 100' of cement left in casing. Held pressure for 1 hr. and released. Finished at 4:15 A.M. Released packer and came out of hole with tubing.

0600 A.M.: Cut 4½" casing loose from surface casing and found 9 jts loose (306'). Pulled them out of hole. Called for overshot to go back in with drill pipe. Waiting on overshot.

1:30: Went in hole with overshot and drill pipe. Caught hold of fish. Had Go Wireline Service free-point casing. Found it free down to 1800'. Tried to back off at 1237' and backed off at 520' (5 more jts). Came out of hole with fish and laid down the five joints. Found that casing had been stretched and was actually small in diameter. Threads were tapered and small and had pulled out of collar. Went back in hole and caught hold of fish. Worked pipe and couldn't back off manually. Go Wireline ran a spring shot at 1237' and backed off casing. Came out of hole and laid down 21 joints of casing. Bottom joint was bulged and split; so had to go back in and try to get one more joint.

- Aug. 13: Went in hole with overshot (4 7/8" slips) and caught fish. Backed off manually and came out of hole. Found only a collar in overshot. Got smaller slips (4½") and went back in hole and caught fish. Couldn't back off manually, so had Go Wireline run a light spring shot on 2nd collar below top of fish (1308'). Backed off and came out of hole with two more joints of casing. Laid down fish (2 jts) and released Go Wireline. Laid down drill pipe. Ran 40 joints of new casing and screwed into collar at 1308'. Night crew didn't show up so shut down rig.
- Aug. 14: 0800 - No crew. Rigged up mist-pump to casing and filled it with water and pressured up to 1200#. No leaks. Welded surface casing to 4½" casing. (Note: There is a small volume of gas behind casing; probably coming from previous gas leaks.) Cut 4½" casing off and welded on collar. Installed rotating head and blowie line. Put on 3 7/8" bit and went in hole with tubing.
- Aug. 15: Hit bridge at 1890' and drilled thru it. It was iron shavings from previous reaming. Encountered cement at 2950' and drilled cement to 3020'. Had stringers down to 3087'. Had continuous cement from 3087' to 3325'. Unloaded hole and had no entry of fluids or gas from perms. at 3332' to 3352'. Decided to break perms down again with 500 gal. of mud acid and diesel. Called Dowell and swabbing unit operator.

Loaded hole with crude oil and came out of hole with tubing and bit. Picked up Guiberson packer and started in hole.

- Aug. 16: Set packer at 3280'. Treated perfs. with 13 bbl diesel, 500 gal. mud acid (12 bbl), and 15 bbl diesel. Formation broke at 2500# p.s.i. at 4 bbl/min. rate. Dropped 20 ball sealers in acid (2 balls per bbl). Had three different pressure breaks. Fluid pumped in at 2000# p.s.i. at 4 bbl/min. rate. Instant shut-in pressure was 800# decreasing to 600# in 5 minutes.
Rigged Dowell down and began swabbing. Swabbed back about 35 bbls of the 40 bbls of fluid pumped in; and then swabbed about $\frac{1}{2}$ bbl of fluid (diesel and acid water) per half hour for next three hours. Finally ran out of fluid. Had no gas recovery at all. Decided to perforate next zone 3090' to 3134'. Called Go Wireline Service. Reset packer at 3075'.
- Aug. 17: Perforated the above zone with 1 shot/ft. at 3100' to 3125' thru tubing. Swabbed out about 5 bbl of load oil in 3 runs and swabbed dry. Shut down for 1 hr. and ran swab again. Recovered about $\frac{1}{4}$ bbl oil. Ran swab every 90 mins. from 3 A.M. to 10:30 A.M. and recovered about $\frac{1}{2}$ bbl of fluid each time. Last two runs were mostly water. Decided to plug zone. Called for cement. Reset packer at 3028'. Pumped in a 40 sk cement plug (Type G cement w/3% CaCl.) at 3350' to 3060'.
Tried to reset packer at 2970', but packer wouldn't reset. Came out of hole. Packer stuck at 1890' and had to work it thru a tight spot. Found packer torn up when it came out. Ordered a new Guiberson packer.
- Aug. 18: Went in hole with tubing (without a packer) and swabbed hole dry. Reperforated zone at 3011' to 3015' with tubing gun with 12 shots. Swabbed hole dry and recovered small amount of oil (10 gals or less) each swab with a little gas. Could be residual load oil left in hole. Decided to break zone down with crude oil. Loaded hole with crude oil (43 bbls). Pumped in 65 bbls of crude oil. Pressure broke at 3000# and crude oil pumped in at 2500# at $\frac{1}{4}$ bbl to $\frac{3}{4}$ bbl/min. rate. Began swabbing crude oil back.
- Aug. 19: Swabbed about 85 bbls back and well was dry. Ran swab once per hour and recovered a few gallons of oil plus small amount of gas each time. (Probably load oil and gas.) About 25 bbl of load oil still unrecovered. Decided to come out of hole and run packer (new Guiberson packer) and set at 3000' and break perfs. down with 500 gal. mud acid and

swab back. Ran packer in hole to 1890' and it wouldn't go any further. Came out with packer and went in with 3 7/8" bit to 1890' and drilled and reamed for 4 ft and bit fell thru. Came out of hole with bit and went in to 3000' and tried to set packer; but it wouldn't set; so came out of hole with packer.

Aug. 20: Dressed packer (found slips were binding the reset sleeve). Went back in hole with packer and set at 3000' K.B. Swabbed hole dry. Pumped in acid. Formation broke at 2500# p.s.i. and pumped in acid at 2100# p.s.i. at 2 bbl/min. rate. Final pressure was 1950#. Instant shut-in pressure was 1600#; 5 min. pressure was 400#; and 15 min. pressure was 200#. Rigged down Dowell and began swabbing well back at 4 A.M. Swabbed down to bottom by 5:15 A.M. Pulled swab every hour thereafter until 12:15 P.M.; and recovered 300' to 200' of fluid (oil and acid water) plus small amount of gas on each run. Last two runs recovered only about 1/4 bbl fluid each. Released rig at noon and shut well in. Suspended operations for the time being, hoping that the gas will finally break thru. The well will be checked periodically to watch the pressure build-up. If it builds up to 500 or 600# at the surface, there is a good chance that it will unload some fluid and the gas flow may gradually increase.

Note: The packer (Guiberson) is set at 3000' and there should be no pressure build-up on the casing.

GEOLOGIC REPORT
ON
CALF CANYON #2 WELL

Introduction

The Calf Canyon #2 well is located on the northwest plunging flank of the Cisco Dome structure at the base of the Book Cliffs. The well was designed to test the oil and gas production possibilities of lenticular sand reservoirs in the Dakota, Cedar Mountain, and Morrison formations. The well was drilled into the Entrada formation and found water. Production from the Entrada has been quite unpredictable and unsuccessful in the area. Only one well in the whole area has been completed in the Entrada. The subject well was drilled to a depth of about 3805', which was 70 ft. below the top of the Entrada formation.

The well is located about $\frac{1}{2}$ mile northwest of the CC #1 well, which was completed as a producing oil well from the Dakota formation early in 1977. This well, the CC #1 well, is producing at a steady rate of 50 to 70 bbls. of oil daily.

The CC #2 well is also located about $\frac{3}{4}$ mile northeast of a well, the Bull Canyon #3 well, which was completed as a productive gas well from the Morrison formation in July, 1975. The Bull Canyon #3 well has not been connected to a pipeline yet, but the well was gauged at 254 MCFPD based on a 4-point pressure test by Northwest Pipeline Co.

Likewise the CC #2 well is located about 1 mile north of a well, the #3 Union Gov't, which was completed as a gas producing well from the Morrison formation in 1958. This well gauged 8,500 MCF per day. The well has produced about 400,000 MCF of gas to date.

The area has thus been established as a productive area and the subject well was drilled to extend the production. The well was drilled on a farmout arrangement with the Anschutz Corporation, which is subject to a $12\frac{1}{2}\%$ overriding royalty until payout and then half of this, or $6\frac{1}{4}\%$ may be converted into 40% working interest. In other words, the interest in the well to be earned by Willard Pease Oil & Gas Co. and associates, is 75% net interest until payout and then this interest drops to about 50% net interest.

The Calf Canyon #2 well was drilled with air and air-mist for circulation media; and was drilled in five days; but it took

24 days to complete the well due to unusual and many mechanical problems. The well is now actually suspended because of these difficulties and may require additional work or an offset well to recover the obvious production capabilities of the well; but it was deemed advisable to suspend operations for the time being with the possibility of resuming work on the well later, if additional favorable information developed.

General Geology

As noted above, the CC #2 well is located on the northwest plunging nose of the Cisco Dome structure. Drilling on Cisco Dome began in the early 1920's and has continued intermittently during several different periods in the ensuing years. The original drilling and development in the 1920's resulted in quantities of natural gas being produced from the Dakota and Cedar Mountain formations for the purpose of making carbon black. This exploitation was halted in the 1930's by the government after over 3 billion cubic feet of gas had been produced. More recent drilling in the 1960's and 1970's has developed a number of gas wells on the structure which are producing into the pipeline.

The hydrocarbons in the area of Cisco Dome and other structures along the Book Cliffs are found in lenticular sands in the Dakota, Cedar Mountain, and Morrison formations. These sand lenses form their own trapping mechanisms without dependence on structure. Thus production and success may be found in wells located in an unfavorable structural position; but experience and past drilling have shown that success is more likely and more favorable on and around anticlinal features; primarily because the sand development is better across the anticlines.

The size of the sand reservoirs is problematical and unpredictable. Thus normal parameters used in figuring reserves are sometimes misleading. The most reliable parameter is the shut-in pressure of the reservoir. Experience with past production has permitted the development of a pressure table related to producible reserves of natural gas which has been quite reliable.

The general area is quite highly faulted and proposed well sites must be located some distance away from these faults. The faults have tended to destroy the natural porosity and characteristics of the sand reservoirs near the fault zone by the introduction of clay minerals and gouge material. The faults have effected the hydrocarbon accumulations very little since most of the faults are younger; but they certainly effect the drainage of the reser-

voirs a great deal. The fault zones are also often flooded with fresh water.

The trend and continuity of the sand lenses are quite irregular in the area. In general, the sand lenses trend northeastward; but are very erratic. The size and occurrence are not uniform. Their position in the stratigraphic section is variable. A different set of sand lenses can be found in wells located on adjacent 40-acre tracts. Nevertheless, the success ratio of wells drilled in the area is high due to the multiplicity of sands. As many as eight different sand lenses can be found in the section. Thus if one sand is not present, another may be found a few feet deeper.

Drilling and Completion History

A complete and detailed history of the drilling and completion work on the subject well precedes this portion of the report. No difficulty was encountered in the drilling of the well. The well was drilled with air for circulation to a depth of 3050 ft. Water and oil were encountered at 3040 ft., necessitating conversion to air-mist with soap and water for further drilling. The well was drilled to a depth of 3525' which was thru the potential producing sands in the Salt Wash section of the Morrison formation. However, Anschutz insisted on drilling into the Entrada formation, so the well was deepened to 3805' which was 70 feet below the top of the Entrada. This allowed a great deal more water to come into the hole and cause potential damage to the productive zones.

The well was killed with 100 viscosity mud and logged. Casing, 4½", mixed weight 10.50# to 13.50#, was run and landed at 3610' and cemented with 300 sacks of cement.

Completion work was begun on the well on July 29, and was finished on Aug. 20, 1977. The completion work was accomplished by the drilling rig and was plagued with problems. The first and biggest problem was the casing string run in the well. About 2/3's of the string was used-casing which had been dropped and fished out of a previous well. Externally and superficially the casing looked good; but when carefully calipered, it was found that the casing had bulges and thin spots and some of the threads were oversized and some undersized. Considerable effort and expense were expended in trying to ream, repair, and correct the casing problems in the hole without success. Finally about 1308 feet of casing were pulled out and replaced with new casing. It was found that the old casing was actually parted in the hole at one point and leaking around the collars at other points.

The other major completion problem encountered was due to using acid on the Dakota and Morrison gas production zones and not being able to swab it back in a short time, because of lack of swabbing facilities on the drilling rig. This allowed the acid to destroy the cement seal around the casing and the cement between the production zone and the water zone in the Dakota permitting communication between the zones. The water tended to kill the gas flow. It was then necessary to squeeze the water zone off and try to bring the gas zone back in without opening up the water zone again.

Prior to squeezing off the water zone at 3045' to 3065', and prior to the acid treatment, the potential gas zone at 3332' to 3352' was perforated and tested. This zone tripled the flow of gas from the well (prior to any treatment (50 MCF from the Dakota gas zone at 3010' to 3018' and 160 MCF from the Morrison gas zone at 3332' to 3352')). After the acid treatment, both these zones were watered out by the Dakota water zone. After getting the water shut-off this lower gas zone was again tested and treated with 500 gal. of mud acid to break down the perforations and swabbed dry with no recovery of gas. The gas had been completely killed.

It was then decided to perforate the lower Dakota sand at 3100' to 3134' which is the producing oil sand in the CC #1 well. The sand was perforated at 3100' to 3125' and swabbed for a period of 12 hrs. The zone was quickly swabbed dry initially and gave up a very small amount of oil and finally went to all water. The amount of water was quite small, less than $\frac{1}{2}$ bbl. per hour. This zone was not treated. Due to the difficulty with the casing, normal tools and treatment methods could not be used. There was also the chance that the water flow would be increased. Accordingly, a cement plug was set at 3350' to 3360' shutting off the lower perforations.

Finally, the gas zone at 3010' to 3018' was reperforated and broken down with 65 barrels of crude oil. About 75% of the oil was swabbed back. A small amount of gas was recovered on each swab. The zone was then treated with 500 gal. of mud acid to make sure that the perforations were open. This was swabbed back and swabbing continued for 7 hrs. thereafter. A swab run was made once each hour and about 300' to 200' of fluid (about 1 bbl.) was recovered on each run. The fluid was about 50% oil and 50% acid water. A small amount of gas was present on each run; but the gas would not flow continuously between runs. The last two runs only recovered about $\frac{1}{4}$ bbl. of fluid each, indicating that most of the load fluid had been recovered. The completion work was discontinued and the well was suspended at this

point. Time could assist in removing the block in the reservoir which is preventing the gas from entering the well bore. The well will be checked periodically for pressure build-up and further work on the well will be accomplished or an offset well drilled, if the information justifies further expenditure.

Stratigraphy and Hydrocarbon Shows

The stratigraphic section encountered in the subject well was quite normal and comparable to that found in the CC #1 well. The upper Dakota sands were better developed in the subject well than in the CC #1 well, and the upper sand (3010' to 3018') had a gauged gas flow of 3.75 million cubic feet per day. The second sand at 3035' to 3068' contained oil and water. The oil was probably at the top of the sand and may have been separated from the water by a 2 ft. thick shale bed. However, when the cement bond was destroyed it was not feasible to try to produce it at this time.

The Dakota also had a third and lower sand in the subject well comparable to that found in the CC #1 but with much less porosity (4% to 12%) with an average of 7%. This sand had good shows when drilled; but when perforated, it gave up very little oil and appeared to go to water, but the amount of water was small. This zone might have responded favorably to a K-2 fracture treatment; but the condition of the casing prevented the use of a normal packer and retrievable bridge plug thus making treatment of the zone separately a very expensive task.

Unlike the CC #1 well, the Cedar Mountain formation was missing in the subject well. Of course, there was only about 36 feet of Cedar Mountain in the CC #1 well; but its absence in the subject well quite dramatically indicates that the CC #2 area was positive during this period of time. Likewise it tends to indicate the favorability for hydrocarbon accumulations in any sands found in the well.

There were no sands or shows found in the Brushy Basin section of the Morrison formation in the subject well. The upper sand, 3332' to 3352', in the Salt Wash, however, had excellent shows when drilled. Later perforating and testing confirmed the presence of gas; but after the acid treatment, the gas was thoroughly blocked off. There is no doubt as to the presence of gas in this sand; but an offset well may have to be drilled to produce the gas.

There were four other sands in the Salt Wash section, but all of these sands were tight, quartzitic, low in porosity, and had no shows.

The Curtis-Summerville section in the subject well was about 70 ft. thick and contained no shows or good reservoir sands.

The Entrada formation was topped at 3735 feet and consisted of clear, medium grained, loosely consolidated sand with rounded grains and chert inclusions. The sand was water wet and copious quantities of water entered the well bore. The later logs, however, only indicated a porosity of about 8%, which is unusually low for the Entrada sand.

The formations with their tops, thicknesses, and datum points which were encountered in the subject well as determined from the electric logs are as follows:

| <u>Formation</u> | <u>Depth to Top</u> | <u>Thickness</u> | <u>Datum</u> |
|-------------------------|---------------------|------------------|--------------|
| Mancos | Surface | 3004' | 5807' |
| Dakota | 3004' | 140' | 2803' |
| Morrison (Brushy Basin) | 3144' | 188' | 2663' |
| (Salt Wash) | 3332' | 332' | 2475' |
| Curtis-Summerville | 3664' | 71' | 2143' |
| Entrada | 3735' | — | 2072' |
| Total Depth | 3805' | | |

Comparison with similar data on the CC #1 well reveals that the CC #2 well was about 63 feet structurally lower on the top of the Dakota formation; 27 feet lower on the top of the Morrison formation; and 8 feet higher on the top of the Salt Wash section of the Morrison. This is clear evidence that the CC #2 area was positive and probably higher structurally during Morrison and Cedar Mountain time, and possibly while the lower Dakota sediments were being deposited. However, later faulting probably changed the relationship somewhat.

A sample log of the cuttings from the well, from 2500' to total depth, is attached hereto.

Reservoir Characteristics and Reserves

As noted above, the reservoir rock in the Calf Canyon area is lenticular sandstones in the Dakota, Cedar Mountain, and Morrison formations. There are as many as eight different sand reservoir

possibilities in these formations in the area. The sands vary in thickness from 8 feet to 40 feet. Porosity varies from 8% to 24% with the average being around 14%. Water saturations in the productive sands vary from 27% to 70% according to log analyses. The average is probably around 55%.

The biggest problem with figuring reserves in the area is estimating the areal extent and thickness of the reservoir sand. A well bore can tap the lensing edge of the sand where it is only 8 feet thick or it might hit the center, where the sand is 40 ft. thick. It can be readily seen how much difference there would be in the calculated reserves using these two figures; yet the actual reserves would be about the same in both cases. It is much safer to assume an average sand thickness of 20 feet for each sand regardless of the thickness penetrated by the well bore.

A single well in the area may have as many as 4 or 5 productive sands. If these sands are in different formations they can't be co-mingled. It is, therefore, common practice to produce the lower sands first, leaving the upper sands in a different formation for later perforating and production. In general, most of the wells have at least two different sands that can be perforated for the initial production. The subject well had two potential productive sands in the Dakota and one in the Morrison.

Production histories of wells in the area plus histories of wells in similar fields in the region are important and give further data on what to expect in way of sustained production and life of wells in the region. Production from many of the gas wells in the region have been continuous since 1957.

The reservoir pressures of the productive sands vary somewhat thru-out the area, but are not widely different. The normal initial reservoir pressure of the gas sands in the 3500' to 4000' depth range is about 1000 lbs. p.s.i. Oil sands in the same depth range should have about the same shut-in pressure. The shut-in pressure of the gas zone in the Dakota in the subject well at 3000' is probably about 850# and about 1000# in the gas zone in the Morrison.

Because of the lenticularity of the reservoir sands, it is not believed that drainage patterns would extend much beyond an area of 160 acres per gas well, and probably no more than 40 acres for an oil well. This is also the spacing which has been established by the Utah State agency for the area immediately south of the CC #2 location.

Volumetric calculations of the natural gas reserves that can be expected in the CC #2 well using the above averaged figures for

porosity (14%), water saturation (55%), sand thickness (2 sands, 20 ft. thick each), shut-in pressure of 1000# p.s.i., and 85% recovery, provide approximately 6,500 MCF of recoverable gas reserves per acre. Based on experience in many similar areas in the region and on actual measurements of the dimensions of the sand bodies, it can be safely assumed that only $\frac{1}{2}$ of the spaced area is underlain by the sand reservoirs. Therefore, the recoverable natural gas reserves that can quite reasonably be expected from the CC #2 well would be approximately 525,000 MCF. This figure is quite compatible with the reserves predicted by the pressure table devised for the region. This table suggests that recoverable natural gas reserves from reservoirs at 3500' to 4000' with 1000# shut-in pressure should be about 2 billion cubic feet per section or about 500,000 MCF per quarter section.

The production of oil from the lenticular sands in the region has been much less common; but oil production is found in both the Dakota and Morrison sands. In general, the oil is confined to only one sand in a well. In one case, however, in the Calf Canyon area, a well had three productive oil sands in the Morrison. Thus it is difficult to establish a rule or average; but, in general, oil production would be confined to one sand. The CC #1 well, approximately $\frac{1}{2}$ mile east of the CC #2 location has one oil productive sand which is 30 feet thick, and which has 15% porosity, and water saturation of 50%. Recoverable reserves are estimated at 90 bbl/acre ft. in this well, making a total of 108,000 bbls. of recoverable oil.

Conclusion

The final results of the CC #2 well were terribly disappointing in view of the obviously good well indicated by the gas and oil recovery while drilling. The difficulties encountered in the completion of the well prevented the successful completion of an obviously good well.

The data and information obtained from the drilling of the well confirmed its favorable position structurally, the presence of well developed sands in the Dakota and Morrison formations, and the presence of hydrocarbons in producible amounts in some of these sands. It is probable that the CC #2 well has two gas producing sands and one oil producing sand; but it is doubtful that they can be successfully completed and utilized thru the present well bore. The CC #2 well will probably have to be offset by another well at some later date. The well is presently shut-in and time could cure some of the damage to the producing zones. The well will be checked periodically for pressure build-

up and gas flow. 'What to do about the well' will depend on the information that develops with time and thru the drilling of additional wells in the area.

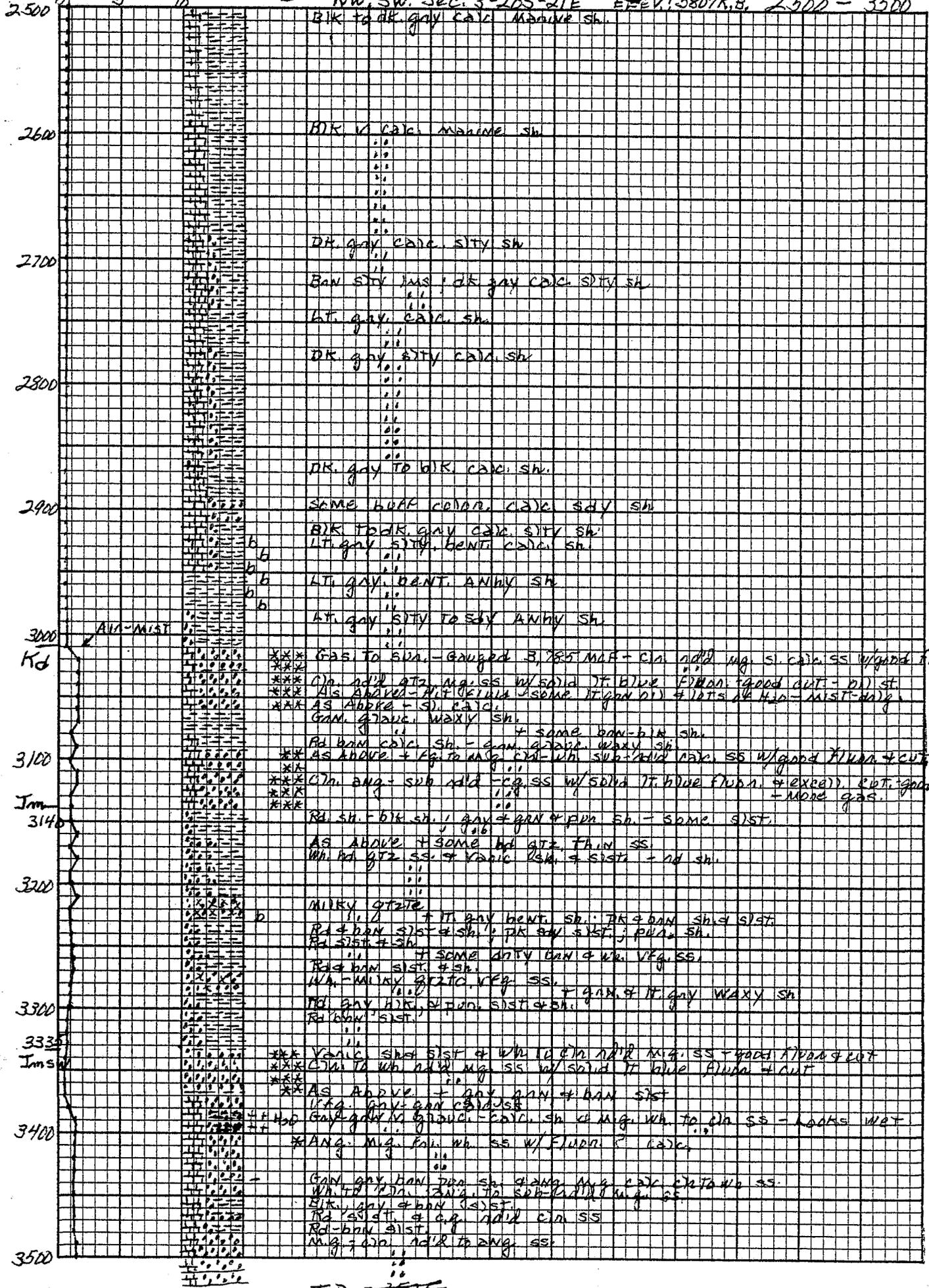
W. Don Quigley

W. Don Quigley
Consulting Geologist
A.A.P.G. Cert. #1296
A.P.G.S. Cert. #3038

Dr. Time
min/ft

Please drill to 3500' Well
NW, SW, SEC. 3-20S-21E ELEV. 5807' K.B. 2500' - 3500'

KE 5 x 5 TO 1/2 INCH 46 0863
7 x 10 INCHES
MADE IN U.S.A.
KEUFFEL & ESSER CO.

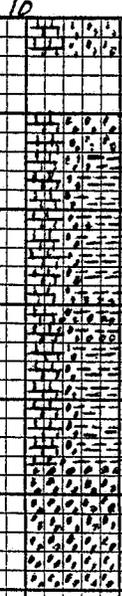


Dip Line
min/ft

W. Peace Oil & Gas Co. C#2 Well

3500'

3500



Mg. calc. to wh. with to avg. ss

NO SAMPLES

Gray to blk. calc. sist + some gray blk. ss

Gray to blk. calc. sist + some gray blk. ss + rd. of gray sist + sh

Gray to blk. calc. sist + sh + some gray blk. ss

Gray to blk. calc. sist + sh + some gray blk. ss + rd. of gray sist + sh

Rd. gray calc. sist + sh + some gray blk. ss

+ ORANGE CR.

Gray to blk. calc. sist + sh + some gray blk. ss

+ rd. of pur. sh.

Rd. calc. sh + sist.

Black med. calc. sist.

blk. med. calc. sist. + blk. med. calc. sist. + some gray blk. ss w/ orange ch. frags.

blk. med. calc. sist. + some gray blk. ss

3600

3770
Icu. ss.

3700

3735'
Jr

3800

3800 T.D.

3900

4000

K+E 5 X 5 TO 1/2 INCH 46 0863
7 X 10 INCHES
MADE IN U.S.A.
KEUFFEL & ESSER CO.

DRILLING AND COMPLETION HISTORY

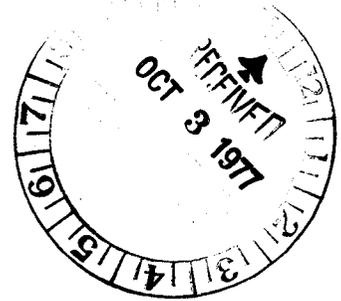
AND

GEOLOGIC REPORT

ON

CALF CANYON #2 WELL

GRAND COUNTY, UTAH



By

W. Don Quigley

Consulting Geologist
Salt Lake City, Utah

September 20, 1977

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN TRIPLICATE
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1424.

5. LEASE DESIGNATION AND SERIAL NO.
U-11620

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

7. UNIT AGREEMENT NAME

8. FARM OR LEASE NAME
Federal- Anschutz

9. WELL NO.
Calf Canyon 2

10. FIELD AND POOL, OR WILDCAT
Wildcat

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
NW SW Sec 3-20S-21E SLM

12. COUNTY OR PARISH
Grand

13. STATE
UTAH

SUNDRY NOTICES AND REPORTS ON WELLS

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

1. OIL WELL GAS WELL OTHER PLUGGED AND ABANDONED

2. NAME OF OPERATOR
WILLARD PEASE OIL & GAS COMPANY

3. ADDRESS OF OPERATOR
570 Kennecott Building, Salt Lake City, Utah 84133

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.* See also space 17 below.)
At surface
996'FWL & 1393' FSL Sec 3, T20S, R21E SLM

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.)
5807 RKB

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

| | | | |
|--|---|---|--|
| NOTICE OF INTENTION TO: | | SUBSEQUENT REPORT OF: | |
| TEST WATER SHUT-OFF <input type="checkbox"/> | PULL OR ALTER CASING <input type="checkbox"/> | WATER SHUT-OFF <input type="checkbox"/> | REPAIRING WELL <input type="checkbox"/> |
| FRACTURE TREAT <input type="checkbox"/> | MULTIPLE COMPLETE <input type="checkbox"/> | FRACTURE TREATMENT <input type="checkbox"/> | ALTERING CASING <input type="checkbox"/> |
| SHOOT OR ACIDIZE <input type="checkbox"/> | ABANDON* <input type="checkbox"/> | SHOOTING OR ACIDIZING <input type="checkbox"/> | ABANDONMENT* <input checked="" type="checkbox"/> |
| REPAIR WELL <input type="checkbox"/> | CHANGE PLANS <input type="checkbox"/> | (Other) <u>Swab Tested Well Prior to P&A</u> | |
| (Other) <input type="checkbox"/> | | (NOTE: Report results of multiple completion on Well Completion or Recompletion Report and Log form.) | |

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

Swab tested perfs 3011-15, Rec. 4 Bbls; 50% oil, 50% water
 Reperf 3007-22 and swab tested at final rate of 0.2 Bbl/hr 50% water and gas T.S.T.M.
 Received verbal permission to P&A well from E. A. Guyann, USGS 7-7-78.

Set 30 sx cement plug 3040' - 2900'
 Set 25 sx cement plug 2400' - 2300'
 Ran free point and recovered 2000' of 4 1/2" Csg. Circ. w/water.
 Set 35 sx cement plug 2100' - 1950'
 Set 40 sx cement plug 310' - 150'
 Will cut off 8 5/8" Csg below ground level & install dry hole marker in cement when location is restored prior to 11-15-78.

APPROVED BY THE DIVISION OF
OIL, GAS, AND MINING
DATE: July 29
[Signature]



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

SIGNED *[Signature]* TITLE Vice-President DATE July 26, 1978

(This space for Federal or State office use)

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

*See Instructions on Reverse Side