NATIONAL PETROLEUM RESERVE IN ALASKA

HISTORY
OF
DRILLING OPERATIONS

SOUTH BARROW WELL NO. 18

HUSKY OIL NPR OPERATIONS, INC.
Edited by: S. L. Hewitt and Gordon W. Legg

For the

U. S. GEOLOGICAL SURVEY
Office of the National Petroleum Reserve in Alaska
Department of the Interior
MARCH 1983

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SOUTH BARROW WELL NO. 18

INTRODUCTION

The South Barrow Well No. 18 is located in the East Barrow Gas Field (Figure 1). The designation "East Barrow Gas Field" is now applied to those wells which were earlier identified as "South Barrow Gas Field, East Area". The South Barrow Gas Field and the East Barrow Gas Field are now recognized as two separate fields. The well is 660 feet from the south line and 1,320 feet from the west line of protracted Section 24, Township 22 North, Range 17 West, Umiat Meridian (Latitude: 71°14'22.98" North; Longitude: 156°18'41.00" West). The Alaska State Plane Coordinates are: Y = 6,306,022.15 and X = 698,905.52, Zone 6. The elevations are 30' Kelly bushing, 12' pad, and 7' ground.

Rig-up started on September 19, 1980, and the well was spudded September 22, 1980, at 11:30 p.m. The primary objective of the well was the Jurassic Lower Barrow sand. The well was drilled to a total depth of 2,135 feet and left as a suspended gas well. The rig was released on October 14, 1980, and was stacked out on the pad.

Husky Oil NPR Operations, Inc. supervised and directed the drilling and support operations as prime contractor to the Department of the Interior, U. S. Geological Survey, Office of the National Petroleum Reserve in Alaska. Brinkerhoff Signal, Inc. was the drilling contractor; Brinkerhoff Rig 31, a National T-20, was used to drill the well.

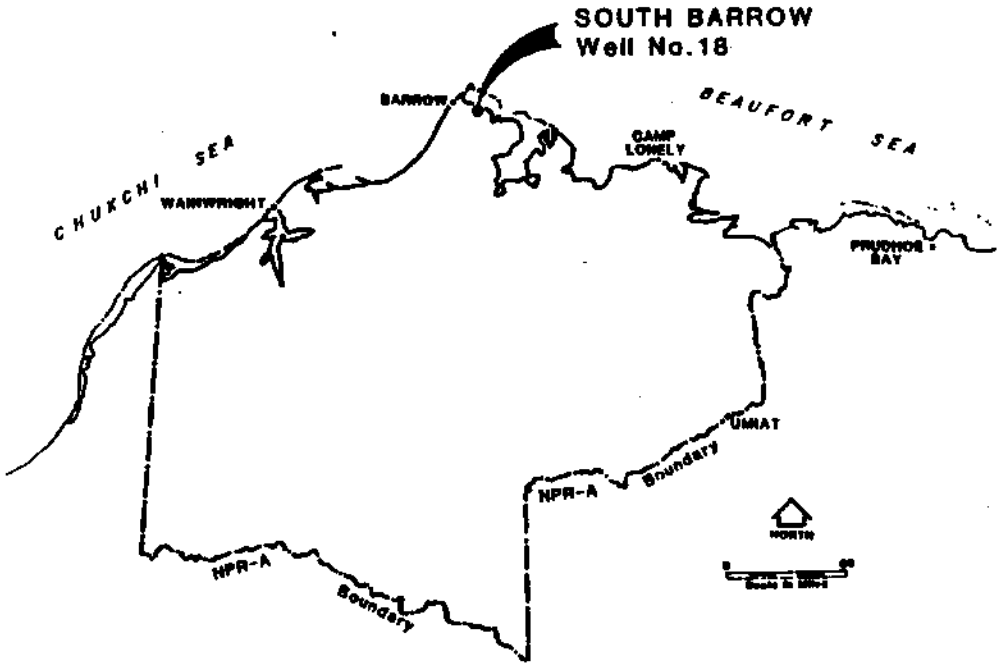


FIGURE 1 - WELL LOCATION MAP - SOUTH BARROW WELL NO. 18

DRILLING SUMMARY

Field operations at the South Barrow Well No. 18 location began on March 5, 1980, with the construction of the drilling pad and camp location. The 13-3/8" conductor pipe was run to 95' and cemented with 230 sacks of Permafrost cement on March 27, 1980. Construction and cleanup were completed on March 28, 1980, and operations ceased on this location until fall. The rig and camp components were moved simultaneously from the South Barrow No. 15 wellsite and rigged up as they arrived on location. Rig-up started on September 19, 1980, and the well was spudded on September 22, 1980, at 11:30 p.m. A twelve-inch annular blowout preventer with diverter lines had been installed and pressure tested prior to spud.

A 12-1/4" hole was drilled to 1350', with mud weights ranging from 8.7 to 9.4 ppg. Core No. 1 was cut from 1350' to 1371', and 12' were recovered. Core No. 2 was cut from 1371' to 1400', and 22.5' were recovered. A 12-1/4" hole was then drilled to 1520' with a 9.3 ppg fresh water drilling fluid. The hole was conditioned and logged from 1513' to 106' with the DIL/GR/SP, 1508' to 106' with the BHC-Sonic/GR, and 1517' to 106' with the HDT.

After logging, 36 joints of 9-5/8", 53.5#, S-95 Buttress casing were run to 1519' and cemented to surface with 900 sacks of 14.9 ppg Permafrost cement. After waiting 24 hours on cement, the 9-5/8" wellhead was installed and tested to 1,000 psi. The 12", 3,000 psi blowout-preventer stack (SRRA arrangement), 3,000 psi choke manifold, and kill lines were nippled up. All the blowout-preventer equipment was tested to 3,000 psi with the exception of the annular preventer, which was tested to 1,500 psi. After converting to a calcium-chloride mud system, the shoe and 10 feet of formation were drilled and the formation tested to 0.61 psi/ft. equivalent gradient.

The Barrow gas sands are known to contain swelling clays, so to minimize possible formation damage, an inhibitive system of calcium chloride-lignosulfonate mud was mixed, and the system was changed over. Permeability damage tests were conducted by both Core Laboratories, Inc. and by Chemical and Geological Laboratories of Alaska, Inc. on core samples selected from the Upper and Lower Barrow gas sands and the Sag River Sandstone from the previously drilled South Barrow No. 12 and No. 13. Both laboratories demonstrated that severe permeability damage resulted from contact with fresh-water filtrate. With calcium-chloride concentrations greater than 25,000 ppm, permeability damage gradually decreased to minor amounts in saturated solutions (above 200,000 ppm calcium-chloride). The mud system below casing (1519') was gradually increased to a maximum of 53,000 ppm chloride and 25,000 ppm calcium, then maintained at 45,000-53,000 ppm chloride and from 21,000-25,000 ppm calcium to total depth.

The 8-1/2" hole was drilled to 2125'. Mud weight was 9.8 ppg at 1529', 10.2 ppg at 1763', and 10.3 ppg at 2125'. The following cores were cut:

Core No. 3, 1703' to 1763', 60' recovered; Core No. 4, 1990' to 2020', 29' recovered; Core No. 5, 2051' to 2072', 15.5' recovered; Core No. 6, 2072' to 2087', 14.5' recovered. Schlumberger wireline logs were run at 2125' as follows: DLL/GR/SP/MSFL, FDC/CNL/GR/CAL, BHC-Sonic/GR/TTI, and HDT.

The 7" casing was run after drilling an additional 10' of rat hole to 2135'. The casing string consisted of 55 joints of 7", 38#/ft., S-95, Buttress casing with the float collar at 2089', packer at 2053-2048', stage collar at 2044' and FO's at 1309' and 1194'. It was landed at 2126' and cemented with 10 sacks of 15.6 ppg Class "G" cement (with 2% $CaCl_2$ and 1% CFR-2). The plug was bumped with 2,800 psi and the packer set. The 7" casing was next cemented through the stage collar at 2044' with 60 sacks 15.6 ppg Class "G" cement (containing 2% $CaCl_2$ and 1% CFR-2). The blowout preventer was nippled down, the slips set with 140,000 pounds, and the tubing spool installed. The blowout preventer was nippled up and tested to 3,000 psi.

Preparations were made to Arctic Pack the 7" x 9-5/8" annulus. The lower FO at 1309' could not be opened, so a CBL/VDL/GR log was run to find the cement behind the 7" casing. An excellent bond existed from the shoe up to 1435', and the lower FO at 1309' was cemented shut. It was decided to Arctic Pack through the upper FO at 1194'. The FO was opened, the 7" x 9-5/8" annulus displaced with 10.2 ppg Arctic Pack, the FO closed and tested to 2,000 psi.

Completion of the well in the Lower Barrow sand was started. The 7" casing was cleaned out to 2085', and the production tubing (2-7/8", 6.5 lb./ft., N-80, 8 round EUE) was picked up and stood back in the derrick. The zone 2056' to 2076' was perforated 4 shots per foot with a GO International DML-23, 4" casing gun. The 2-7/8" tubing was run into the hole, landed at 2076', the blowout-preventer equipment nippled down, and the test tree nippled up. The mud was reversed out and replaced with 9.1 ppg calcium-chloride water. A Hewlett Packard pressure recorder was run on the GO wireline and the well rocked in with gas from South Barrow No. 19, in order to unload the completion fluid, and induce the well to flow.

The well was then flow tested for approximately 7 hours with an estimated rate of 340 MCFPD on a 10/64" choke, at a surface flowing tubing pressure of 500 psi. As this was below expectations, the well was then killed with 10.2 ppg $CaCl_2$ water and tubing pulled. A CBL/VDL log from 2083' to 1200' indicated good bonding above the test zone. The zone 2056.5-2076.5' was reperforated at 4 shots per foot with GO International's DML-23, 4" casing gun. Ran in hole with 69 joints of tubing which was landed at 2076'. The well was then rocked with gas from South Barrow No. 19 to displace $CaCl_2$ water.

The well was again flow tested as summarized below:

> Opened through 16/64" choke with FWHTP 400 psi and calculated 1.05 MMCFGPD, after 10 hours of flow, FBHP 508 psi; changed to 20/64" choke for last two hours of test, recording a FWHTP of 390 psi, and a calculated rate of 1.37 MMCFGPD, FBHP 437 psi; shut in for four hours, with a FSIP of 950 psi; the bottom-hole-temperature was 46°F. The calculated A.O.F. was 1.65 MMCFGPD.

At the conclusion of the test, the well was shut in awaiting a production line. A McEvoy Wellhead and Christmas Tree assembly, 3,000 pounds working pressure, was installed on the well. The rig was released October 14, 1980, at 6:00 a.m. and stacked out on the pad. The camp was drained and left on location. Support equipment was demobilized and operations were terminated on October 16, 1980.

Form 9-331 C
(May 1963)

SUBMIT IN TRIPLICATE*
(Other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R1425.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

NOTICE OF INTENT TO DRILL, DEEPEN, OR PLUG BACK

5. LEASE DESIGNATION AND SERIAL NO.: N/A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: N/A

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

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

7. UNIT AGREEMENT NAME: N/A

2. NAME OF OPERATOR: National Petroleum Reserve in Alaska (through Husky Oil NPR Operations, Inc.)

8. FARM OR LEASE NAME: National Petroleum Reserve in AK

3. ADDRESS OF OPERATOR: 2525 C Street, Suite 400, Anchorage, AK 99503

9. WELL NO.: So. Barrow Well No. 18 (East Area)

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.*) At surface: 660' FSL, 1320' FWL, SW 1/4, Sec 24, T22N, R17W, UM

10. FIELD AND POOL, OR WILDCAT: South Barrow Gas Field

At proposed prod. zone: Same (straight hole)

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec 24, T22N, R17W, UM

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*: 9.8 Miles Southeast of Barrow, Alaska

12. COUNTY OR PARISH: North Slope Borough, AK

13. STATE

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. unit line, if any): 10,000'

16. NO. OF ACRES IN LEASE: 23,680,000

17. NO. OF ACRES ASSIGNED TO THIS WELL: N/A

18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT.: 2,640'

19. PROPOSED DEPTH: ± 2200'

20. ROTARY OR CABLE TOOLS: Rotary

21. ELEVATIONS (Show whether DF, RT, GR, etc.): Ground = 7'; Pad = 12'; KB = 30'

22. APPROX. DATE WORK WILL START*: October 1, 1980

23. PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT
17 1/2"	13 3/8" (Cond)	72# (S-95)	80' KB	± 100 Sx Permafrost to Surface
12 1/4"	9 5/8"	53.5# (S-95)	1500'	± 1000 Sx Permafrost to Surface
8 1/2"	7"	38# (S-95)	2100'	± 10 Sx Class "G" w/Additives around the Shoe Second Stage: ± 60 Sx from 2000' to ± 1600'. Down squeeze through FO @ ± 1300' with ± 50 Sx Permafrost. Arctic Pack 9 5/8" X 7" annulus through FO at ± 1200' with ± 60 barrels Arctic Pack.

Blowout Preventer Program:

From ± 80' KB to ± 1500':
12", 3000 psi, SA Diverter Assembly

From ± 1500' to TD:
12", 3000 psi, SRRA BOP Assembly
w/3000 psi Choke Manifold and Kill Line

See Drilling Program for details.

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 Max Brewer TITLE Chief of Operations, ONPRA DATE 10 Sept. 198

(This space for Federal or State office use)

APPROVED BY Harold J. Hedlund TITLE DISTRICT SUPERVISOR DATE 9-12-80

CONDITIONS OF APPROVAL, IF ANY:

See attached conditions of approval.

*See Instructions On Reverse Side

Amended April 4, 1983

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUNDRY NOTICES AND REPORTS ON WELLS

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

1. oil well ☐ gas well ☒ other

2. NAME OF OPERATOR National Petroleum Reserve in Alaska (through Husky Oil NPR Operations, Inc.)

3. ADDRESS OF OPERATOR 2525 C Street, Suite 400, Anchorage, AK 99503

4. LOCATION OF WELL (REPORT LOCATION CLEARLY. See space 17 below.)
AT SURFACE: 660' FSL; 1320' FWL
AT TOP PROD. INTERVAL:
AT TOTAL DEPTH: Same (straight hole)

5. LEASE N/A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME N/A

7. UNIT AGREEMENT NAME N/A

8. FARM OR LEASE NAME National Petroleum Reserve in Alaska

9. WELL NO. So. Barrow Well No. 18

10. FIELD OR WILDCAT NAME So. Barrow Gas Field (East Area)

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA Sec 24, T22N, R17W, UM

12. COUNTY OR PARISH North Slope Borough, Alaska | 13. STATE

14. API NO.

15. ELEVATIONS (SHOW DF, KDB, AND WD) GL: 7'; Pad 12'; KB: 30'

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

NOTICE OF INTENT TO:		SUBSEQUENT REPORT OF:	
TEST WATER SHUT-OFF	☐		☐
FRACTURE TREAT	☐		☐
SHOOT OR ACIDIZE	☐		☐
REPAIR WELL	☐		☐
PULL OR ALTER CASING	☐		☐
MULTIPLE COMPLETE	☐		☐
CHANGE ZONES	☐		☐
ABANDON*	☐		☐
(other) Subsequent Report of Spud			

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

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

This well was spudded on September 22, 1980, at 11:30 PM. Hole size at spud was 12 1/4". A 13 3/8" conductor pipe was cemented in place at 95' below KB prior to spudding. Conductor was cemented with 230 sacks Class "G" cement with returns to surface. Mr. William Hauser was given verbal notice of spudding on 9/24/80.

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

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

SIGNED _____ TITLE Chief of Operations DATE _____

(This space for Federal or State office use)

Conforms with pertinent provisions of 30 CFR 221.

ACTING DISTRICT SUPERVISOR
TITLE _____ DATE _____

AREA FILE

*See Instructions on Reverse Side

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Amended April 4, 1983

SUNDRY NOTICES AND REPORTS ON WELLS

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

1. oil well ☐ gas well ☒ other

2. NAME OF OPERATOR National Petroleum Reserve in Alaska (through Husky Oil NPR Operations, Inc.)

3. ADDRESS OF OPERATOR
2525 C Street, Suite 400, Anchorage, AK 99503

4. LOCATION OF WELL (REPORT LOCATION CLEARLY. See space 17 below.)
AT SURFACE: 660' FSL; 1320' FWL; SW 1/4
AT TOP PROD. INTERVAL:
AT TOTAL DEPTH: Same (straight hole)

5. LEASE
N/A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME
N/A

7. UNIT AGREEMENT NAME
N/A

8. FARM OR LEASE NAME National Petroleum Reserve in Alaska

9. WELL NO. So. Barrow Well No. 18 (East Area)

10. FIELD OR WILDCAT NAME
South Barrow Gas Field

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Sec 24, T22N, R17W, UM

12. COUNTY OR PARISH 13. STATE
North Slope Borough, Alaska

14. API NO.

15. ELEVATIONS (SHOW DF, KDB, AND WD)
GL: 7'; Pad: 12' KB: 30'

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

NOTICE OF INTENT TO:		SUBSEQUENT REPORT OF:	
TEST WATER SHUT-OFF	☐		☐
FRACTURE TREAT	☐		☐
SHOOT OR ACIDIZE	☐		☐
REPAIR WELL	☐		☐
PULL OR ALTER CASING	☐		☐
MULTIPLE COMPLETE	☐		☐
CHANGE ZONES	☐		☐
ABANDON*	☐		☐
(other) Subsequent Report of Running 9 5/8" Casing			

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

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

Drilled 12 1/4" hole to 1520'. Circulated and conditioned for logs. Ran DIL, BHC/Sonic/GR, and Dipmeter. Tripped in hole and circulated. POH and rigged up to run casing. Ran 36 joints of 9 5/8",53.5# S-95 casing. Casing set at 1519' Cemented with 900 sx of Permafrost cement at 14.9 ppg with 20 barrels of water ahead. Full returns to surface at 14.6 ppg. Cement in place at 11:30 AM, 9/28/80. Installed 9 5/8" wellhead, tested to 1000# OK. Nippled up and tested BOPs.

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

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

SIGNED _____ TITLE Chief of Operations DATE _____

Conforms with pertinent provisions of 30 CFR 221.

(This space for Federal or State office use)

ACTING
_____ TITLE DISTRICT SUPERVISOR DATE _____

*See Instructions on Reverse Side

Amended April 4, 1983

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUNDRY NOTICES AND REPORTS ON WELLS

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

1. oil well ☐ gas well ☒ other

2. NAME OF OPERATOR National Petroleum Reserve in Alaska (through Husky Oil NPR Operations, Inc.)

3. ADDRESS OF OPERATOR
2525 C Street, Suite 400, Anchorage, AK 99503

4. LOCATION OF WELL (REPORT LOCATION CLEARLY. See space 17 below.)
AT SURFACE: 660' FSL; 1320' FWL; SW 1/4
AT TOP PROD. INTERVAL:
AT TOTAL DEPTH: Same (straight hole)

5. LEASE
N/A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME
N/A

7. UNIT AGREEMENT NAME
N/A

8. FARM OR LEASE NAME National Petroleum Reserve in Alaska

9. WELL NO. So. Barrow Well No. 18 (East Area)

10. FIELD OR WILDCAT NAME
South Barrow Gas Field

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Sec 24, T22N, R17W, UM

12. COUNTY OR PARISH North Slope Borough, Alaska

13. STATE

14. API NO.

15. ELEVATIONS (SHOW DF, KDB, AND WD)
Ground: 7'; Pad: 12'; KB: 30'

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

NOTICE OF INTENT TO:		SUBSEQUENT REPORT OF:	
TEST WATER SHUT-OFF	☐		☐
FRACTURE TREAT	☐		☐
SHOOT OR ACIDIZE	☐		☐
REPAIR WELL	☐		☐
PULL OR ALTER CASING	☐		☐
MULTIPLE COMPLETE	☐		☐
CHANGE ZONES	☐		☐
ABANDON*	☐		☐
(other) Subsequent Report of Running 7" Casing			

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

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

Drilled 8 1/2" hole to 2135'. Logged with DLL, FDC/CNL, BHC/Sonic, and Dipmeter. Ran 55 joints of 7", BTC, S-95, 38# casing; landed at 2126'. Nine centralizers were run at 2116', 2007', 1927', 1349', 1273', 1239', 1161', 200', and 120'. Howco FOs were run at 1309' and 1194'. First stage cementing was 10 sacks of Class "G" with 2% $CaCl_2$ and 1% CFR-2 at 15.6 ppg. Second stage through Baker stage collar was 60 sacks of Class "G" with 2% $CaCl_2$ and 1% CFR-2 at 15.6 ppg. Cement was preceeded with a 10 barrel $CaCl_2$ water spacer. Cement in place 10/6/80 at 11:00 AM. RIH; tested and circulated annulus through FO at 1193'. Arctic Packed 9 5/8"X7" annulus. Ran in hole to bottom and polished plug to 2085'. Rigged up Schlumberger and ran VDL/CBL with good coverage to 1435'.

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

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

SIGNED _____ TITLE Chief of Operations DATE _____

(This space for Federal or State office use)

Conforms with pertinent provisions of 30 CFR 221.

ACTING
TITLE DISTRICT SUPERVISOR DATE _____

*See Instructions on Reverse Side

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUNDRY NOTICES AND REPORTS ON WELLS

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

1. oil well ☐ gas well ☒ other

2. NAME OF OPERATOR: National Petroleum Reserve in Alaska (through Husky Oil NPR Operations, Inc.)

3. ADDRESS OF OPERATOR: 2525 C Street, Suite 400, Anchorage, AK 99503

4. LOCATION OF WELL (REPORT LOCATION CLEARLY. See space 17 below.)
AT SURFACE: 660' FSL; 1320' FWL; SW 1/4
AT TOP PROD. INTERVAL:
AT TOTAL DEPTH: Same (straight hole)

5. LEASE: N/A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: N/A

7. UNIT AGREEMENT NAME: N/A

8. FARM OR LEASE NAME: National Petroleum Reserve in Alaska

9. WELL NO.: So. Barrow Well No. 18 (East Area)

10. FIELD OR WILDCAT NAME: South Barrow Gas Field

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec 24, T22N, R17W, UM

12. COUNTY OR PARISH: North Slope Borough, 13. STATE: Alaska

14. API NO.

15. ELEVATIONS (SHOW DF, KDB, AND WD): Ground: 7'; Pad: 12'; KB: 30'

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

NOTICE OF INTENT TO:		SUBSEQUENT REPORT OF:	
TEST WATER SHUT-OFF	☐		☐
FRACTURE TREAT	☐		☐
SHOOT OR ACIDIZE	☐		☐
REPAIR WELL	☐		☐
PULL OR ALTER CASING	☐		☐
MULTIPLE COMPLETE	☐		☐
CHANGE ZONES	☐		☐
ABANDON*	☐		☐
(other) Gas Well Completion Report			

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

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

The final procedure describes the completion of South Barrow Well No. 18 as a gas well. Zone 2052'-2073' of the Lower Barrow Sand was tested through perforations at 2056.5' to 2076.5' through open pipe.

1. After pulling drill pipe, RIH with 69 joints of 2 7/8" tubing and landed at 2076'.
2. All connections were broken, cleaned, redoped, and retorqued when running. Make-up torque was 2300 ft/lbs.
3. Rigged down BOPE and nippled up Xmas tree. Tested tree to 3000 psi.
4. Ran BPV; secured wellhead.

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

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

SIGNED [signature] TITLE Chief of Operations DATE 30 October 80

(This space for Federal or State office use)

Conforms with pertinent provisions of 30 CFR 221.

ACTING
TITLE DISTRICT SUPERVISOR

*See Instructions on Reverse Side

Form 9-330
(Rev. 5-63)

Amended April 4, 1983

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SUBMIT IN DUPLICATE* (See other instructions on reverse side)

Form approved.
Budget Bureau No. 42-R355.5.

WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

5. LEASE DESIGNATION AND SERIAL NO.: N/A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME: N/A

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

7. UNIT AGREEMENT NAME: N/A

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

8. FARM OR LEASE NAME: National Petroleum Reserve in AK

2. NAME OF OPERATOR: National Petroleum Reserve in Alaska (through Husky Oil NPR Operations, Inc.)

9. WELL NO.: So. Barrow Well No. 18

3. ADDRESS OF OPERATOR: 2525 C Street, Suite 400, Anchorage, AK 99503

10. FIELD AND POOL, OR WILDCAT: So. Barrow Gas Field

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements)*
At surface: 1320' FWL; 660' FSL
At top prod. interval reported below: Same (straight hole)
At total depth: Same (straight hole)

11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA: Sec 24, T22N, R17W, UM

14. PERMIT NO.	DATE ISSUED	12. COUNTY OR PARISH	13. STATE
N/A	N/A	North Slope	Borough, AK

15. DATE SPUDDED	16. DATE T.D. REACHED	17. DATE COMPL. (Ready to prod.)	18. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	19. ELEV. CASINGHEAD
9/22/80	10/6/80	10/10/80	GL 7'; Pad 12'; KB 30'	12'

20. TOTAL DEPTH, MD & TVD	21. PLUG, BACK T.D., MD & TVD	22. IF MULTIPLE COMPL., HOW MANY*	23. INTERVALS DRILLED BY	ROTARY TOOLS	CABLE TOOLS
2135' MD & TVD	2085'	-	→	Rotary	

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)*
2052' - 2073' MD & TVD; produced through perforations 2056.5'-2076.5'

25. WAS DIRECTIONAL SURVEY MADE: No

26. TYPE ELECTRIC AND OTHER LOGS RUN
DIL, BHC/GR/Sonic, Dipmeter, DLL, FDC/CNL, CBL/VDL

27. WAS WELL CORED: Yes

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

CASING SIZE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	CEMENTING RECORD	AMOUNT PULLED
13 3/8"	72# (S-95)	95' KB	17 1/2"	230 Sx Cl "G" to Surface	None
9 5/8"	53.5# (S-95)	1519' KB	12 1/4"	900 Sx Pmfst to Surface	None
7"	38# (S-95)	2126' KB	8 1/2"	10 Sx Cl "G" - 1st Stage	None
				60 Sx Cl "G" - 2d Stage	None

29. LINER RECORD

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

30. TUBING RECORD

SIZE	DEPTH SET (MD)	PACKER SET (MD)
2 7/8"	2076'	None

31. PERFORATION RECORD (Interval, size and number)
2056.5'-2076.5'
4" Hyperjet II w/4 SPF through open pipe (no cement behind casing)

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

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
2048'-1435' thru Stage Collar	60 Sx Cl "G" w/2% CaCl and 1% CFR-2

33.* PRODUCTION

DATE FIRST PRODUCTION	PRODUCTION METHOD (Flowing, gas lift, pumping—size and type of pump)	WELL STATUS (Producing or shut-in)
10/13/80	Flowing Gas	Shut In

DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD →	OIL—BBL.	GAS—MCF.	WATER—BBL.	GAS-OIL RATIO
10/13 thru 10/14/80	10	12/64 - 20/64			817 - 12/64 1370 - 20/64	N/A	N/A

FLOW. TUBING PRESS.	CASING PRESSURE	CALCULATED 24-HOUR RATE →	OIL—BBL.	GAS—MCF.	WATER—BBL.	OIL GRAVITY-API (CORR.)
390-491 psi	BHFP			1370 on 20/64	N/A	N/A

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

TEST WITNESSED BY: Dan Lowe

35. LIST OF ATTACHMENTS
Well Completion Schematic

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

SIGNED _____ TITLE Chief of Operations DATE _____

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

INSTRUCTIONS

Amended April 4, 1983

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

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

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

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

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

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

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

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

FORMATION	TOP	BOTTOM	DESCRIPTION, CONTENTS, ETC.
SUMMARY OF CORES ATTACHED			
NO DRILL STEM TESTS WERE PERFORMED			
Summary of Production Tests Attached.			

38. GEOLOGIC MARKERS

NAME	TOP DIL MEAS. DEPTH	TRUE VERT. DEPTH
"GR/Pebble Shale"	1372'	
Kingak Sh	1753'	
Upper Barrow Sd	1968'	
L. Barrow Sd	2051'	
TD (Driller)	2135'	

U.S. GOVERNMENT PRINTING OFFICE 1981 O 683636

871-233

Amended April 4, 1983

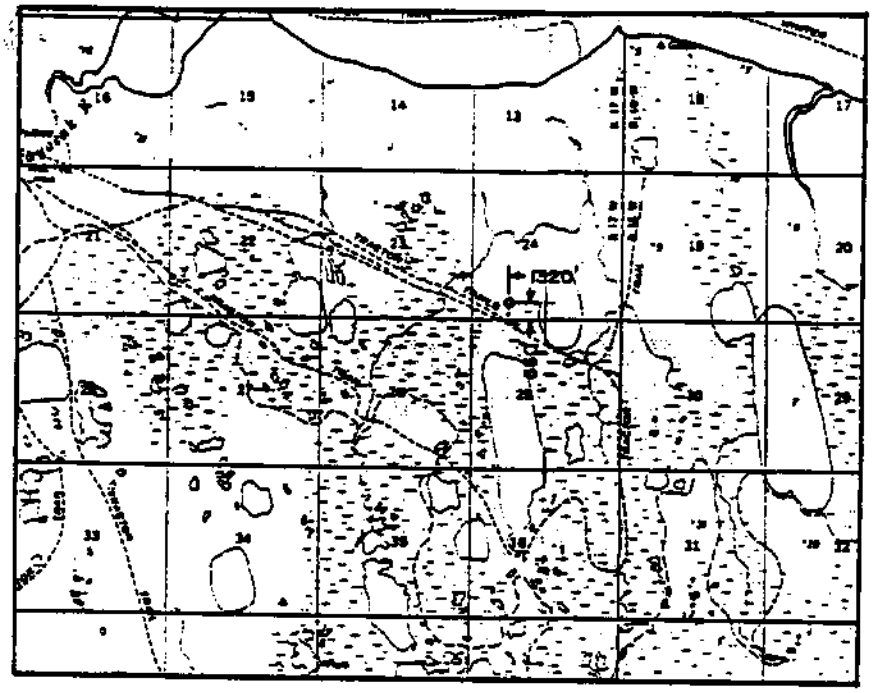
Well Completion Report
National Petroleum Reserve in Alaska
South Barrow Well No. 18

SUMMARY OF CORES

CORE NO.	FORMATION	INTERVAL/ RECOVERY	DESCRIPTION
1	Torok	1350-1371' (Rec 12')	Shale: with thin Siltstone laminae, abundant fractures, no indication of hydrocarbons.
2	"Pebble Shale"	1371-1400' (Rec 22.5')	Shale: very dark brown to gray, with fish fragments, hydrocarbon odor.
3	"Pebble Shale" Kingak	1703'-1763' (Rec 60')	Siltstone, Sandstone, and Shale: interbedded and interlaminated, poor porosity in Sandstone, very poor permeability, very poor oil shows.
4	Upper Barrow Sandstone	1990-2020' (Rec 29')	Sandstone: grading to and interbedded with Siltstone, poor to fair porosity, poor to very poor permeability, poor to fair oil shows.
5	Lower Barrow Sandstone	2051-2072' (Rec 15.5')	Sandstone: fine to medium grained, silty, fair to good porosity, fair to good permeability, poor to fair oil shows.
6	Lower Barrow Sandstone	2072-2087' (Rec 14.5')	Sandstone: as in Core No. 5, grading to Siltstone at 2079', poor to fair porosity, poor to fair oil shows.

Production Test No. 1 Perforated 2056-2076'; flowed an estimated 340 MCFGPD on 10/64" choke with a FTP ranging from 400-500 psi.

Production Test No. 2 Perforated 2056.5-2076.5'; flowed 1.37 MMCFGPD (A.O.F. 1.65 MMCFGPD) on 20/64" choke with FTP ranging from 390-491 psi.



0 1/2 1 2
SCALE IN MILES

BARROW GAS WELL No 18

LAT. = 71° 14' 22.98"
LONG. = 156°18'41.00"
Y = 6,306,022.15
X = 698,905.52
ZONE 6

CERTIFICATE OF SURVEYOR

I hereby certify that I am properly registered and licensed to practice land surveying in the State of Alaska and that this plat represents a location survey made by me or under my supervision, and that all dimensions and other details are correct.

STATE OF ALASKA 49TH
James S. Johnson
No. 3246-S
REGISTERED PROFESSIONAL LAND SURVEYOR

AS STAKED

BARROW GAS WELL No. 18

LOCATED IN

SW 1/4 PROTRACTED SEC. 24, T22N, R17W, UMIAT MERIDIAN, AK.

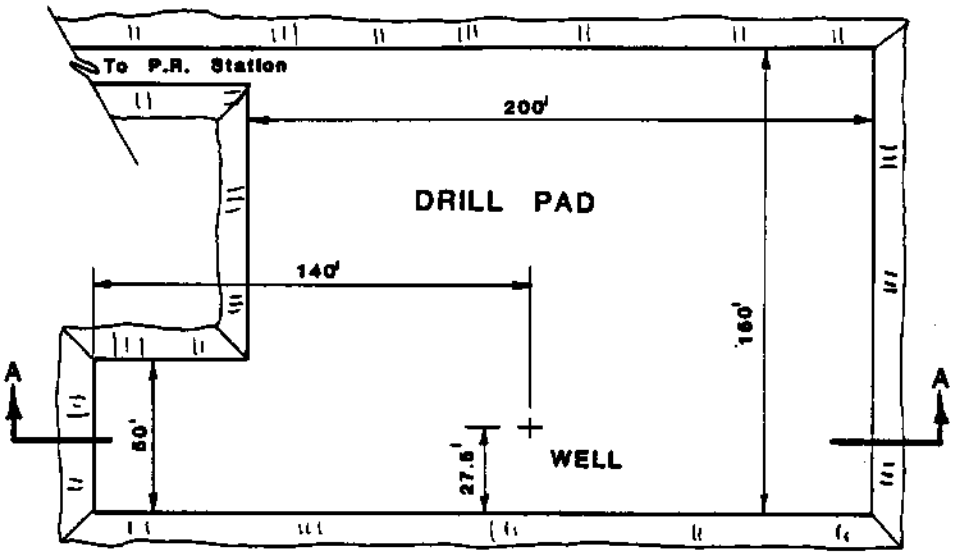
SURVEYED FOR

HUSKY OIL

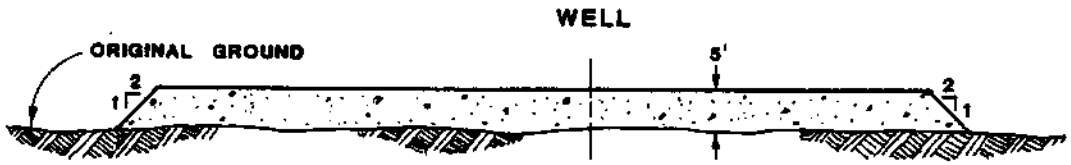
N. P. R. OPERATIONS, INC.

TECTONICS INC.
P.O. BOX 4-2288, ANCHORAGE, AK 99509

CERTIFICATE OF SURVEYOR



PLAN VIEW



SECTION A-A

SOUTH BARROW No. 18 DRILL PAD

OPERATIONS HISTORY

DATE AND FOOTAGE DRILLED AS OF 6:00 A.M.	ACTIVITY
9/23/80 225'	Total Depth: 320'; Mud Weight: 8.7; Viscosity: 30. Completed rig up. Spudded well September 22, 1980, at 11:30 p.m. Drilled to 320'. Conductor pipe had previously been set at 95' on March 27, 1980, and cemented with 230 sacks of Permafrost cement.
9/24/80 597'	TD: 917'; MW: 9.4; Vis: 40. Drilled to 667'; surveyed. Drilled to 917'. Unplugged flow line. Pulled out of hole; unplugged bit. Repaired pump.
9/25/80 437'	TD: 1354'; MW: 9.3; Vis: 42. Drilled to 1232'; tripped for balled bit. Drilled to 1350'; circulated. Pulled out of hole for Core No. 1. Began cutting core at 1350'.
9/26/80 46'	TD: 1400'; MW: 9.2; Vis: 40. Cut Core No. 1, 1350' to 1371'; tripped out with jammed core barrel. Recovered a 12-foot core. Tripped in hole for Core No. 2, 1371' to 1400'. Barrel jammed. Pulled out of hole; recovered 22.5 feet of core. Tripped in hole with bit. Reamed core hole; prepared to drill.
9/27/80 120'	TD: 1520'; MW: 9.3; Vis: 45. Reamed core hole to 1400'; drilled to 1520'. Circulated and conditioned for logs. Rigged up logging unit. Ran DIL/GR/SP, BHCS/GR, and HDT. Tripped in hole; circulated. Pulled out of hole; rigged up and ran casing. Ran 36 joints of 9-5/8" casing and set at 1519'. Mixed string; circulated; prepared to cement.
9/28/80 0'	TD: 1520'. Circulated for cement. Cemented 9-5/8" casing with 900 sacks Permafrost cement at 14.9 ppg. Pumped 20 barrels water ahead. Had full returns to surface at 14.6 ppg. Cement in place at 11:30 a.m.
9/29/80 0'	TD: 1520'. Waited on cement. Cut off 13-3/8" head. Installed 9-5/8" wellhead and tested to 1,000 pounds.
9/30/80 0'	TD: 1520'. Nippled up blowout preventer and manifold and tested same to 3,000 pounds. Drilled out float and 20 feet of cement. Waited on USGS approval of contract before drilling out.

10/1/80
183'

TD: 1703'; MW: 9.1; Vis: 43. Received approval of contract. Drilled out shoe; tested formation to 0.61 psi gradient. Dumped pits; mixed mud. Drilled to 1703'. Pulled out of hole; picked up core barrel. Cleaned to bottom.

10/2/80
110'

TD: 1813'; MW: 9.8; Vis: 43. Cut Core No. 3, 1703' to 1763'. Recovered 60 feet of core. Tripped in hole; drilled to 1813'.

10/3/80
207'

TD: 2020'; MW: 10.2; Vis: 46. Drilled to 1965'; circulated samples. Drilled to 1990'; circulated samples. Pulled out of hole for core barrel. Cut Core No. 4, 1990' to 2020'. Began pulling out of hole.

10/4/80
67'

TD: 2087'; MW: 10.3; Vis: 47. Finished pulling out of hole with Core No. 4; recovered 29 feet. Ran in hole with bit; drilled to 2051'. Pulled out of hole for core barrel. Cut Core No. 5, 2051' to 2072'. Barrel jammed. Pulled out of hole; recovered 15.5 feet of core. Ran in hole with core barrel; cut Core No. 6, 2072' to 2087'. Pulled out of hole; recovered 14.5 feet of core. Tripped in hole with bit; washed and reamed to bottom.

10/5/80
38'

TD: 2125'; MW: 10.3; Vis: 45. Drilled to 2125'; circulated and conditioned for logging. Pulled out of hole, steel-line measuring. Rigged up logging unit. Ran DLL/GR/SP/MSFL, BHCS/GR/TTI, FDC/CNL/GR/CAL, and HDT. Rigged down logging unit.

10/6/80
10'

TD: 2135'; MW: 10.3; Vis: 40. Ran in hole with bit; drilled to 2135'. Circulated and conditioned hole for casing. Ran 55 joints of 7", 38#, S-95, Buttress casing and landed at 2126'. Float at 2089'; packer at 2053' to 2048'; collar at 2044'; centralizers at 2116', 2007', 1927', 1349', 1273', 1239', 1161', 200', and 120'. FOs at 1309' and 1194'. Began circulating casing.

10/7/80
0'

TD: 2135'; MW: 10.3; Vis: 40. Rigged up Howco unit; cemented lower stage around shoe with two barrels of $CaCl_2$ water ahead of 10 sacks of Class "G" cement with 2% $CaCl_2$ and 1% CFR-2 at 15.6 ppg. Bumped plug at 2,800 pounds and set packer. Dropped trip plug; ports were not open. Chased plug with wireline; pressure increased to 1,000 pounds. Opened stage collar; pumped 10 barrels $CaCl_2$ water ahead of 60 sacks of Class "G" cement containing 2% $CaCl_2$ and 1% CFR-2. Bumped plug; closed stage

collar at 2,000 pounds. Nippled down blowout preventer. Set slips with 140,000 pounds. Installed tubing spool. Nippled up blowout preventers.

10/8/80 PBTD: 2085'; MW: 10.3; Vis: 40. Finished nippling up; tested to 3,000 pounds. Picked up RTTS shifting tools and six drill collars. Ran in hole to top FO at 1194'. Cycled FO; circulated annulus. Closed FO; tested. Ran in hole to lower FO at 1309'; FO would not shift. Picked up to top FO. Opened upper FO; pressure increased to 1,800 pounds. Closed FO; pulled out of hole. Rigged up logging unit. Ran CBL/VDL; excellent bond from 1200' to 1435'. Rigged down logging unit. Ran in hole with RTTS. Opened FO at 1194'; set packer and pumped 100 barrels water. Cleaned mud tanks; prepared to Arctic pack.

10/9/80 PBTD: 2085'; MW: 10.2; Vis: 42. Mixed and pumped 50 barrels of Arctic pack with 50 ppb of Geltone. Pulled out of hole; laid down RTTS. Picked up bit and drilled out to 2085'. Circulated clean. Pulled out of hole, laying down drill pipe and drill collars. Changed rams; singled up 2-7/8" tubing. Pulled wear bushing. Rigged up to perforate.

10/10/80 PBTD: 2085'. Perforated with four shots per foot, 2056' to 2076'. Pulled out of hole; rigged down. Ran in hole with 2-7/8" tubing. Ran 1/4" line to 900' and 1200'. Waited on mandrels for tubing hanger. Hung off tubing. Nippled down blowout preventer and nippled up tree.

10/11/80 PBTD: 2085'. Finished nippling up tree. Reversed out mud to $CaCl_2$ water. Installed 16/64" choke. Rocked well in with gas from South Barrow No. 19 in order to unload the completion fluid, and induce the well to flow. Flowed well for one hour; shut-in for 3 hours; flowed one hour; shut-in for 2-1/2 hours; flowed for 1-1/2 hours and cleaned up. Flowed well on 10/64" choke at 400 psi at 11:00 p.m.; built to 470 psi in 10 minutes. Built to maximum of 500 psi at 2:00 a.m. Shut well in at 5:00 a.m. with 500 psi; built to 665 psi in one hour. Estimated 340,000 CFGPD.

10/12/80 PBTD: 2085'. Flowed well; ran Hewlett Packard recorder at 6:50 p.m.; well built to 939 psi at 48°F. Well was shut in at 5:00 a.m. with 500 psi. Killed well with 10.2 $CaCl_2$ water. Nippled down tree; nippled up blowout preventer. Tested to 3,000 pounds; pulled out of hole with tubing. Rigged up logging unit.

Ran CBL, 2083' to 1200'; good bond from 1200' to 1435'. No cement across Lower Barrow sand. Rigged up to perforate. Ran in hole; perforated from 2056.5' to 2076.5', four shots per foot. Ran in hole with tubing.

10/13/80 PBTD: 2085'. Finished running in hole with 69 joints of tubing, landed at 2076'. Nippled down blowout preventer; nippled up tree. Tested to 3,000 pounds. Rocked well in with gas from South Barrow No. 19 to displace calcium-chloride water. Flowed well on 16/64" choke for clean up prior to test; pressure built from less than 15 psi to 440 psi in 1-hour and 50 minutes. Continued to flow on 16/64" choke.

10/14/80 PBTD: 2085'. Flowed on 16/64" choke, changing to 14/64" choke after 5-hours; changed to 6/64" choke after 3-hours; after 30 minutes, changed to 12/64" choke because of icing-up on 6/64" choke; changed to 20/64" choke after 2-1/2 hours, flowed for 2 hours, then shut-in for final pressure build-up. Well flowed at a calculated rate of 1.37 MMCFPD, FBHP 437 psi; the final shut-in pressure was 950 psi. The calculated A.O.F. was 1.65 MMCFGPD. Began rigging down. Released rig October 14, 1980, at 6:00 a.m.

DRILLING TIME ANALYSIS

SOUTH BARROW WELL NO. 18

BRINKERHOFF SIGNAL, INC., RIG 31

Spud 9/22/80, Rig released 10/14/80

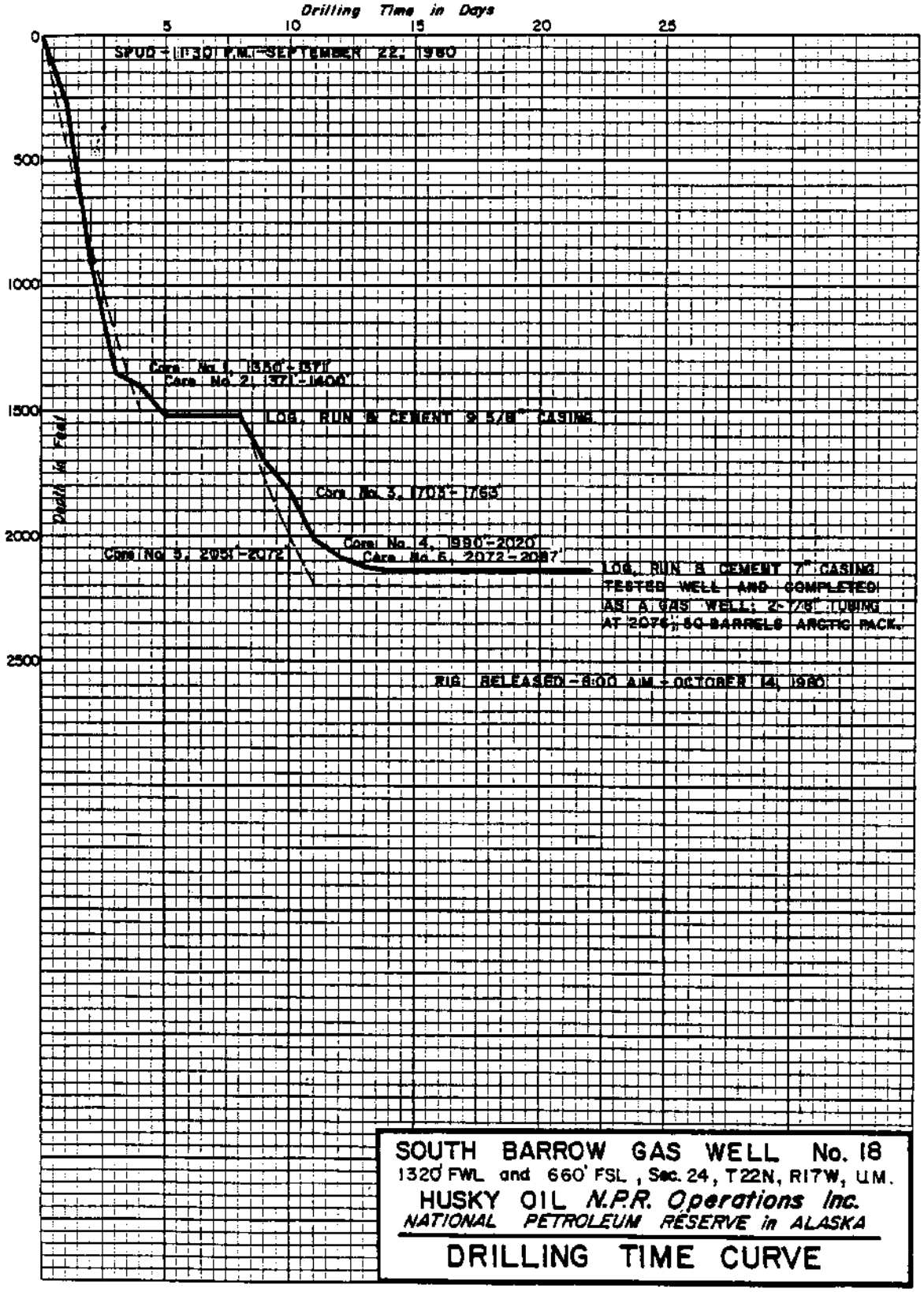
Total Depth: 2,135 Feet

DRILLING TIME ANALYSIS (HOURS) - HUSKY NPR OPERATIONS, INC. SOUTH BARROW WELL NO. 18 Page 1 of 2

DATE	RIG UP/RIG DOWN	DRILLING	REAMING	TRIP	DEV. SURVEY	RIG MAINT.	RIG REPAIR	CIRC. & COND. MUD	LOGGING	CASING & CEMENT	W O C	NIPPLE UP/DOWN BOP	TEST BOP	CHANGE BHA	LOST CIRC.	FISHING	CORING	DST	PLUG BACK	SQUEEZE CEMENT	DIR. WORK	W O MAT./EQUIP.	OTHER	Operations at 6:00 a.m.	Comments
9-20																							24	Moving Rig	
9-21	24																							Rigging Up	
9-22	23½	½																						Rigging Up	Spudded Well at 11:30 p. m.
9-23		22½			1			½																Drilling	
9-24		14½		5			2	½															2	Drilling	
9-25				5			2	1									13						3	Coring	Core No. 1: 1350' - 1371' Core No. 2: 1371' - 1400'
9-26		4	2	7½				1	6	1													2½	Reaming Rat Hole	Running Schlumberger Wireline Logs
9-27				3				1½		8	10												1½	Circulating	Set 9 5/8" at 1519'
9-28											12	12												Waiting on Cement	
9-29		6										16	2											Nipple Up BOP	
9-30		4½		½				½															18½	Circulating	
10-1			1½	4½				½									14½						3	Reaming	Core No. 3: 1703' - 1763' Core No. 4: 1990' - 2020'
10-2		15½	1	3½				1															3	Drilling	
10-3		1¼	2	8¼				2									6½						3	Removing Core From Barrel	Core No. 5: 2051' - 2072' Core No. 6: 2072' - 2087'
10-4		7¼	¼	4½				2	6½								2						1	Drilling	Running Schlumberger Wireline Logs

DRILLING TIME ANALYSIS (HOURS) - HUSKY NPR OPERATIONS, INC. SOUTH BARROW WELL NO. 18 Page 2 of 2

DATE	RIG UP/RIG DOWN	DRILLING	REAMING	TRIP	DEV. SURVEY	RIG MAINT.	RIG REPAIR	CIRC. & COND. MUD	LOGGING	CASING & CEMENT	W O C	NIPPLE UP/DOWN BOP	TEST BOP	CHANGE BHA	LOST CIRC.	FISHING	CORING	DST	PLUG BACK	SQUEEZE CEMENT	DIR. WORK	W O MAT./EQUIP.	OTHER	Operations at 6:00 a.m.	Comments
10-5		1¼		5				2¼	6	3													6½	Logging	
10-6										12		12												Circulating	Set 7" Casing at 2126'
10-7				5½								9½	2										7	Nipple Up BOP	
10-8				2				½	3														18½	Cleaning Mud Tank	Placed Arctic Pack
10-9																							24	Perforating	
10-10												5											19	Nippling Down BOP	
10-11				3					½			7	1										12½	Testing Well	
10-12				2½					4½			2½											14½	Running Tubing	Tubing set at 2076'
10-13																							24	Testing	
10-14	18																						6	Testing	Released Rig at 6:00 a. m.
10-15	12																							Rigging Down	
	77½	6¾		1		4		26½		22		5		-0-		36		-0-		-0-		193½			
TOTAL HOURS		78¼		60¼	-0-			13¼		24		64		-0-		-0-		-0-		-0-		-0-			


Drilling Time in Days
5
10
15
20
25
0
500
1000
1500
2000
2500
Depth in Feet
SPUD - 1:30 P.M. - SEPTEMBER 22, 1980
Core No. 1, 1360' - 1371'
Core No. 2, 1371' - 1400'
LOG, RUN & CEMENT 9 5/8" CASING
Core No. 3, 1703' - 1765'
Core No. 4, 1990' - 2020'
Core No. 5, 2051' - 2072'
Core No. 6, 2072' - 2087'
LOG, RUN & CEMENT 7" CASING
TESTED WELL AND COMPLETED
AS A GAS WELL; 2 7/8" TUBING
AT 2075; 50 BARRELS ARCTIC PACK.
RIG RELEASED - 8:00 A.M. - OCTOBER 14, 1980
SOUTH BARROW GAS WELL No. 18
1320' FWL and 660' FSL, Sec. 24, T22N, R17W, U.M.
HUSKY OIL N.P.R. Operations Inc.
NATIONAL PETROLEUM RESERVE in ALASKA
DRILLING TIME CURVE

DRILLING MUD RECORD

ARCTIC DRILLING SERVICES

COMPANY Husky Oil NPR Operations, Inc. STATE Alaska

WELL South Barrow No. 18 COUNTY North Slope Borough

CONTRACTOR Brinkerhoff-Signal, Inc. LOCATION NPRA SEC 24 TWP 22N RNG 17W

STOCKPOINT _____ DATE October, 1980 BAROID ENGINEER Monroe/Rintoul

CASING PROGRAM: 13-3/8" inch at 95 ft.
9 5/8" inch at 1519 ft.
7 inch at 2126 ft.
2-7/8" @ 2076'

TOTAL DEPTH 2135 ft.

DATE	DEPTH	WEIGHT	VISCOSITY		Yp	GELS	pH	FILTRATION			FILTRATE ANALYSIS				SAND	RETORT			CEC	REMARKS AND TREATMENT
1980	feet	lb/gal	Sec API @ °F	PV @ °F		10 sec/ 10 min	Strip Cl Meter Cl	ml API	HTHP @ °F	Cake 32nds	Pf	Mf	Cl ppm	Ca ppm	%	Solids %	Oil %	Water %	Mud, me/ml	
9/24	917	9.4	40												1/4	7		93		
9/25	1350	9.3	41												Tr	5		95		
9/26	1400	9.2	40												Tr	5		95		
9/27	1500	9.3	45												Tr	5		95		
9/28 - 30	1520																			Setting 9 5/8" casing; cleaning mud pits.
10/1	1704	9.1	43	10	5	2/3	8.5	18		3	Tr	0	46000	22000	Tr	3		97		
10/2	1764	9.3	43	14	7	3/7	8.0	7		3	0	0	50000	23000	Tr	4		96		
10/3	2020	10.2	46	12	10	4/13	8.5	12		3	0	0	49000	22000	3/4	8		92		
10/4	2087	10.3	47	13	11	4/13	8.5	14		3	0	0	48000	23000	1/2	8		92		
10/5	2125	10.3	45	11	9	4/11	8.5	15		3	0	0	49000	24000	1/2	8		92		
10/6	2135	10.3	40	8	9	3/9	8.0	13		3	0	0	48000	24000	1/2	8		92		
10/7	2135	10.3	40	9	9	3/8	8.0	13		3	0	0	48000	24000	1/4	8		92		
*10/8	2135	10.3	40	9	8	3/7	8.0	14		3	0	0	48000	24000	1/4	8		92		
*10/9	2125	10.2	42	9	9	3/7	8.0	9		2	0	0	44000	21000	1/4	8		92		Mixed & placed Arctic pack.
*10/10	2125	9.1		$CaCl_2$ solution																
*10/11	2125	9.1		"		"														Flow tested well.
*10/12	2125	10.2		"		"														Killed well; pulled tubing.
*10/13	2125	9.1		"		"														Perforated; flow tested.
*10/14	2085																			Installed 3,000 psi McEvoy Wellhead and Christmas Tree

* PLUGGED BACK TOTAL DEPTH 2085'

BIT RECORD

COMPANY	CONTRACTOR	COUNTY	STATE
Husky Oil NPR Operations	Brinkerhoff Drilling Company	North Slope Borough	Alaska

LEASE	WELL NO	SEC	TOWNSHIP	RANGE	BLOCK	FIELD
East Barrow Gas Field	South Barrow No. 18	24	22 North	17 West		

TOOL PUSHER	DRILL PIPE	DRAW WORKS	
DAY DRILLER	TOOL JOINT MAKE / SIZE / TYPE	POWER H P	UNDER SURF
EVENING DRILLER	DRILL COLLAR NO / O D / I D / LENGTH	PUMP NO 1 MAKE / MODEL / STROKE	INT DATE
MORNING DRILLER	DRILL COLLAR NO / O D / I D / LENGTH	PUMP NO 2 MAKE / MODEL / STROKE	T D DATE

BIT NO	BIT SIZE	BIT MFGR	BIT TYPE	SERIAL NO OF BIT	JET SIZE 1	2	3	DEPTH OUT	FTGE	HOURS RUN	ACC HOURS	FT/HR	WEIGHT 1000 LBS	ROTARY R P M	VERT DEV	PUMP PRESS	PUMPS No	LINER	SPM	MUD WT	VIS	DULL CODE I	B	G	REMARKS FORMATION CIRC EQUIP, ETC	DATE
1	12¼	Sec	S3SJ	783577	10	10	10	1350	1255	37.5	37.5	33.4	20	80	4°	500		5½	65	9.3	41	2	2	I		
CH1	8½	Chr	Dia	MC201	-	-	-	1371	21	5.5	43	3.8	15	60	4°	600		5½	85	9.2	40	G	D	O	D	
CH1	8½	Chr	Dia	MC201	-	-	-	1400	29	7.5	60.5	3.8	15	60	4°	600		5½	85	9.2	40	G	D	O	D	
RR1	12¼	Sec	S3SJ	783577	10	10	10	1520	120	4	54.5	30	20	80	6°	600		5½	75	9.3	45	3	4	I		
2	8½	HTC	X3A	BS573	10	10	10	1703	183	4.5	59	40.6	20	80	5°	1400		5½	108	9.1	43	I	1	I		
CH1	8½	Chr	Dia	MC201	-	-	-	1763	60	14.5	73.5	4.1	15	60	5°	600		5½	85	9.8	43	G	D	O	D	
RR2	8½	HTC	X3A	BS573	10	10	10	1990	227	15	89	15.1	20	80	4°	1400		5½	106	9.8	43	4	4	I		
CH1	8½	Chr	Dia	MC201	-	-	-	2020	30	3	92	10	15	60	4°	900		5½	116	10.2	46	G	D	O	D	
3	8½	HTC	XDV	NA534	10	10	10	2051	31	2	94	15.1	20	80	4°	1400		5½	116	10.3	46	2	2	I		
CH1	8½	Chr	Dia	OW3449	-	-	-	2072	21	2	96	10.5	15	60	4°	900		5½	85	10.3	46	G	D	O	D	
CH1	8½	Chr	Dia	OW3449	-	-	-	2087	15	2.5	98.5	6	15	60	4°	900		5½	85	10.3	46	G	D	O	D	
RR3	8½	HTC	XDV	NA534	11	11	10	2125	38	4.5	103	8.4	15/20	80	3.5°	1400		5½	55	10.2	46	4	2	I		
4	8½	STC	DSJ	MJ438	11	11	11	2135	10	1.25	104.25	8				1300		5½		10.1	39	2	2	I		

Compliments of SMITH TOOL

SMITH TOOL DIVISION OF SMITH INTERNATIONAL, INC
P O BOX C19511 • IRVINE CALIF 92713

SMITH REPRESENTATIVE _____ PHONE _____

INTRODUCTION

After the 1976 drilling season, casing requirements were reviewed and design of casing strings standardized. Every effort was made to minimize weight and grade changes for simplicity, cost effectiveness, and to reduce chances of error during handling and running operations. Casing sizes were selected to accommodate designs for wells from 2,000' to 20,000'. Steel grade selection was the controlling factor on design with low hardness (Rockwell C24-28) steel being selected for Arctic application and possible H_2S environment. Below is listed casing sizes and design criteria required by Husky:

		YIELD STRENGTH (PSI)		MINIMUM PRESSURE REQUIREMENT (PSI)		
SIZE[1]	WEIGHT	MIN.	MAX.	COLLAPSE	BURST	CONNECTION
20"	133#/ft.	55,000	80,000	1,500	3,050	STC
13-3/8"[2]	72#/ft.	95,000	110,000	3,450	5,350	BTC
9-5/8"[3]	53.5#/ft.	95,000	110,000	8,850	7,900	BTC
9-3/4"[3]	59.2#/ft.	95,000	110,000	9,750	8,540	BTC
7"	38#/ft.	95,000	110,000	12,600	9,200	BTC

(1) OD tolerance to be within API requirements unless adjustment absolutely necessary to meet ID requirements.

(2) Special drift to 12.25".

(3) Special drift to 8.50".

The following are additional requirements primarily to assure that the steel exhibits the metallurgical properties for Arctic applications and resistance to hydrogen embrittlement.

1. All pipe that is 13-3/8" OD and smaller to be quenched and tempered.

2. Run Charpy "V" notch tests on two random samples per 50 tons per heat. Minimum acceptance of 15 ft.-lb.@-50°F. Furnish test reports with order.

3. Perform all testing normally required for API approved pipe.

4. Furnish test reports for ladle analysis, quantitative analysis, and all check tests as per API requirements.

In addition, the following handling requirements were made:

1. Collars must be of same steel grade as pipe body.

2. Apply an API modified thread compound on mill-installed collar before bucking on.

3. Inspect at mill using Tuboscope's Amalog IV or equivalent on 9-3/4" and smaller, and at least magnetic particle on 13-3/8" and 20". All pipe to have special and area inspection together with full length API drifting. (Note special drifting requirements.)

4. Apply Arctic grade grease on all connections before installing thread protectors.

5. Install closed-end type thread protectors. Plastic plugs can be used to secure wrench openings in protectors.

6. Buck up thread protectors with impact wrench. Both mill and third party inspection personnel should observe the installation of thread protectors.

7. Palletize or containerize the tubulars, if possible, prior to shipment from mill. Do not haul pipe like cordwood in gondola railroad cars.

8. All pipe to be Range 3.

9. No "V" notching or metal stenciling on pipe body or collars.

Casing for South Barrow Well No. 18 was programmed as follows: 13-3/8" conductor at ±80; 9-5/8" casing at ±1500'; 7" casing at ±2100'; 2-7/8" production tubing to be run to the producing zone should the well be completed.

Temperatures in the reservoirs in the East Barrow gas field range from the upper 40's to the low 50's, degrees F. Because of the low temperature, production completions have been modified to prevent downhole freeze-off of the wells due to hydrate formation. Husky's usual procedure has been to suspend a 2-7/8" string of production tubing in the 7" casing to the base of the producing zone. In South Barrow No. 18, this procedure was followed, since the tubing was suspended at 2,076 feet (base of perforations are at 2,076.5 feet). The well is then produced through the annular space between the 7" casing and the 2-7/8" tubing. The lesser pressure drop in the larger annulus helps to prevent the formation of hydrates downhole. The 2-7/8" tubing is then used for periodic injection of alcohol in order to prevent freeze-up conditions from occurring.

Casing run in South Barrow No. 18 was 13-3/8" conductor at 95'; 9-5/8" casing at 1519'; and 7" casing at 2126'. Tubing (2-7/8") was run with a mule shoe at 2076' in the final completion.

CASING AND CEMENTING REPORT

WELL NAME South Barrow No. 18

LOCATION East Barrow Gas Field

RAN CASING AS FOLLOWS:

36	Jts	9 5/8"	53.5#	S-95	Buttress	
	Jts					
	Jts					

Shoe @ 1519' Float @ _____ DV @ _____

Centralizers _____

_____

FIRST STAGE

Sx of Cement 900 Type Permafrost Additives _____ % Excess _____

Preflush _____ Initial Pressure _____

Displacement _____ bbls. Final Pressure _____

Plug Down 11:30 AM ~~PM~~

SECOND STAGE - Stage Collar @ _____

Sx of Cement _____ Type _____ Additives _____ % Excess _____

Preflush _____ Initial Pressure _____

Displacement _____ bbls. Final Pressure _____

Plug Down _____ AM PM

Well Depth _____ Overall Casing Tally _____

KB to Top of Cut Off Casing _____ Length of Landing Jt Removed _____

Weight Indicator Before Cementing _____ lbs.

Weight Indicator After Slacking Off _____ lbs.

Inches Slacked Off _____

Remarks:

CASING TALLY
SUMMARY SHEET

DATE: October 7, 1980

FIELD National Petroleum Reserve in Alaska LEASE & WELL NO. South Barrow Well No. 18 TALLY FOR 7 " CASING

SUMMARY OF PAGE MEASUREMENTS			
	NO. OF JOINTS	FEET	.00'S
PAGE 1	55	2106	73
PAGE 2			
PAGE 3			
PAGE 4			
PAGE 5			
PAGE 6			
PAGE 7			
PAGE 8			
PAGE 9			
TOTAL			

SUMMARY OF DEPTH CALCULATIONS				
		NO. OF JOINTS	FOOTAGE FEET	.00'S
1	TOTAL CASING ON RACKS	55	2106	73
2	LESS CASING OUT (JTS NOS			
3	TOTAL (1 - 2)			
4	SHOE LENGTH		1	70
5	FLOAT LENGTH		1	69
6	MISCELLANEOUS EQUIPMENT LENGTH		17	76
7	TOTAL CASING AND EQUIPMENT FROM CEMENT HEAD (3 + 4 + 5 + 6)		2127	88
8	LESS WELL DEPTH (KB REFERENCE)			
9	"UP" ON LANDING JOINT		3	00

Weight indicator before cementing: _____ ; after slack-off: _____ ; inches slacked off _____ .

SUMMARY OF STRING AS RUN								
WEIGHT	GRADE	THREAD	MANUFACTURER	CONDITION NEW-USED	LOCATION IN STRING	NO. OF JOINTS	FOOTAGE	INTERVAL
38	S-95	Buttress		New	JT NO. _____ THRU NO. _____			
					JT NO. _____ THRU NO. _____			
					JT NO. _____ THRU NO. _____			
					JT NO. _____ THRU NO. _____			
					JT NO. _____ THRU NO. _____			
					JT NO. _____ THRU NO. _____			
					JT NO. _____ THRU NO. _____			

PAGE 1 OF 2

CASING TALLY

DATE: October 7, 1980

FIELD NPRA LEASE & WELL NO. So. Barrow No. 18 TALLY FOR 7" CASING

JOINT NO.	FIRST MEASUREMENT FEET	FIRST MEASUREMENT .00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT .00'S	WT GR.
1	34	71			
2	34	65			
3	36	90			
4	40	32			
5	40	42			
6	37	48			
7	37	90			
8	37	61			
9	38	91			
0	38	76			
TOTAL A	377	66			

JOINT NO.	FIRST MEASUREMENT FEET	FIRST MEASUREMENT .00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT .00'S	WT GR.
1	36	21			
2	37	49			
3	36	51			
4	40	50			
5	38	45			
6	40	85			
7	38	06			
8	36	34			
9	38	12			
0	40	83			
TOTAL D	383	36			

1	36	94			
2	37	41			
3	41	59			
4	37	19			
5	36	65			
6	37	23			
7	39	10			
8	39	22			
9	40	66			
0	40	50			
TOTAL B	386	49			

1	37	62			
2	39	78			
3	40	50			
4	41	01			
5	40	96			
6	37	41			
7	39	20			
8	37	50			
9	38	13			
0	37	80			
TOTAL E	389	91			

1	34	58			
2	37	82			
3	34	60			
4	38	83			
5	34	83			
6	39	10			
7	40	78			
8	33	88			
9	38	60			
0	35	89			
TOTAL C	368	91			

TOTAL A	377	66			
TOTAL B	386	49			
TOTAL C	368	91			
TOTAL D	383	36			
TOTAL E	389	91			
TOTAL PAGE	1906	33			

PAGE 2 OF 2 **CASING TALLY** DATE: October 7, 1980

FIELD NPRA LEASE & WELL NO. So. Barrow No. 18 TALLY FOR 7 " CASING

JOINT NO.	FIRST MEASUREMENT FEET	FIRST MEASUREMENT 00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT 00'S	WT GR.
1	39	82			
2	39	80			
3	40	53			
4	41	22			
5	39	03			
6					
7					
8					
9					
0					
TOTAL A	200	40			

JOINT NO.	FIRST MEASUREMENT FEET	FIRST MEASUREMENT 00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT 00'S	WT GR.
1					
2					
3					
4					
5					
6					
7					
8					
9					
0					
TOTAL D					

1					
2					
3					
4					
5					
6					
7					
8					
9					
0					
TOTAL B					

1					
2					
3					
4					
5					
6					
7					
8					
9					
0					
TOTAL E					

1					
2					
3					
4					
5					
6					
7					
8					
9					
0					
TOTAL C					

TOTAL A	200	40		
TOTAL B				
TOTAL C				
TOTAL D				
TOTAL E				
TOTAL PAGE	200	40		

Total Page 1	1906	33
F.O.	3	68
F.O.	1	78
Packer	8	60
Float Collar	1	69
Shoe	1	70
Total	2127	88

Pipe landed three feet above rotary.
Bottom of shoe at 2124.88.

CASING AND CEMENTING REPORT

WELL NAME South Barrow No. 18

LOCATION East Barrow Gas Field

RAN CASING AS FOLLOWS:

55	Jts	7"	38#	S-95	Buttress	
	Jts					
	Jts					

Shoe @ 2126' Float @ 2084.78 DV @ 2041.75

Centralizer @ 2116', 2007', 1927', 1349', 1273', 1239', 1161', 200', 120.

FIRST STAGE

Sx of Cement 10 Type Class G Additives CC & CFR-2 % Excess 0

Preflush Two Barrels Initial Pressure 200

Displacement 71 bbls. Final Pressure 200

Plug Down 8:00 AM PM

SECOND STAGE - Stage Collar @ 2041'

Sx of Cement 60 Type Class "G" Additives C.C. & CFR-2 % Excess 0

Preflush 10 Barrels Initial Pressure 200

Displacement 69 bbls. Final Pressure 200

Plug Down 11:00 AM PM

Well Depth 2135' Overall Casing Tally 2127.88

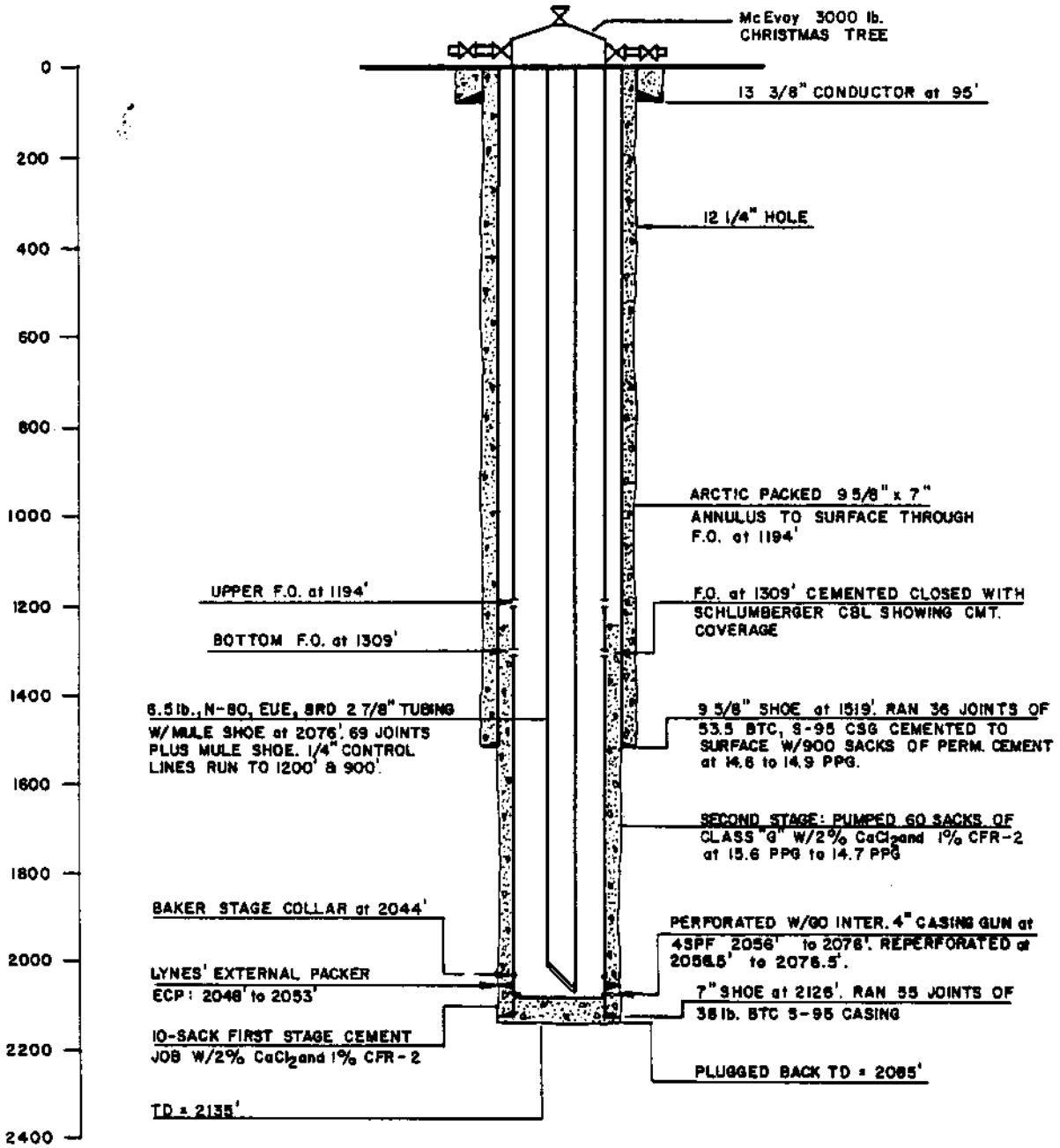
KB to Top of Cut Off Casing 15 Length of Landing Jt Removed 18

Weight Indicator Before Cementing 140,000 lbs.

Weight Indicator After Slacking Off 140,000 lbs.

Inches Slacked Off 0

Remarks: Set casing on slips. Full returns throughout job.



SOUTH BARROW No. 18

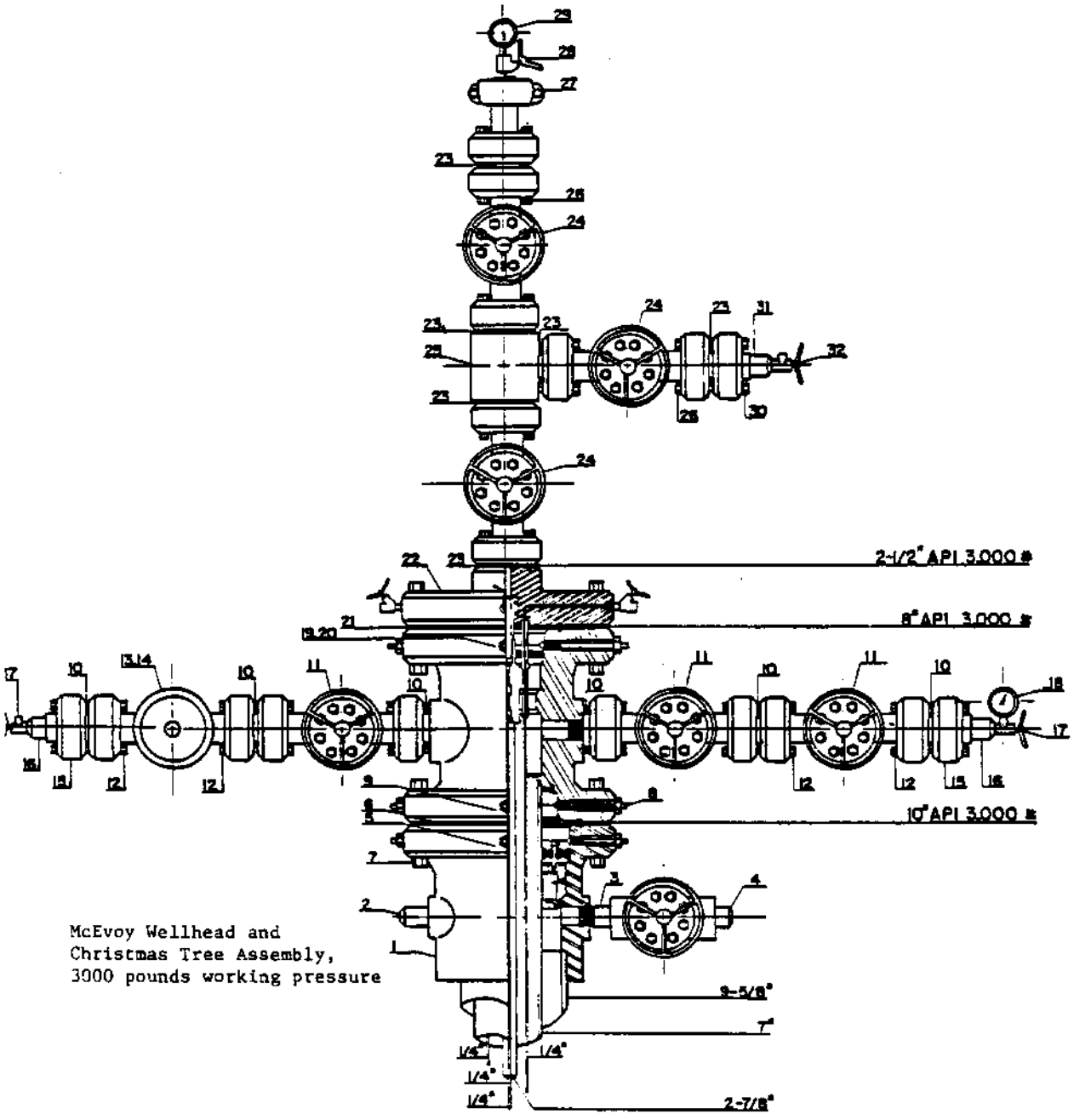
1320' FWL and 660' FSL
Sec. 24, T. 22N., R. 17W., U.M.

HUSKY OIL *N.P.R. Operations*

NATIONAL PETROLEUM RESERVE in ALASKA

WELL COMPLETION SCHEMATIC

WELLHEAD SCHEMATIC



McEvoy Wellhead and
Christmas Tree Assembly,
3000 pounds working pressure

IDENTIFICATION OF WELLHEAD SCHEMATIC PARTS

1. HEAD, CASING, LOWERMOST, TYPE 'S-3', 9-5/8" FEMALE SLIP-ON BTM. x 10" API 3000# FLANGE TOP, W/TWO 2" API L.P.S.O., 10" BOWL, API -75° SPECS

2. PLUG, BULL, SOLID, 2" API L.P. MALE THREAD, API -75° SPECS

3. NIPPLE, PIPE, 2" API L.P. MALE THREAD BOTH ENDS XXH, 6" LONG, API -75° SPECS

4. VALVE, GATE MCEVOY MODEL 'C', FIG. 120, 2" API L.P. FEMALE THREAD ENDS, FULL PORT, RM-13

5. HANGER, CASING, TYPE 'SB-3', NON-AUTOMATIC, 10" BOWL x 7" O.D. CASING, API -75° SPECS

6. GASKET, FLANGE, API #RX-53, 316 S.S.

7. SET, STUDS & NUTS, F/10" API 3000#, API -75° SPECS

8. HEAD, TUBING, TYPE 'SL-1', 10" API 3000# FLANGE BTM. x 8" API 3000# FLANGE TOP, W/TWO 2"API 3000# S.S.O., W/VRT, API -75° SERVICE

9. PACKOFF, CASING, TYPE '-1', 10" FLANGE x 7" O.D. CASING, API -75° SPECS

10. GASKET, FLANGE, API #RX-24, 316 S.S.

11. VALVE, GATE, MCEVOY MODEL 'C', FIG. 125, 2" API 3000# FLANGED ENDS, FULL PORT, RM-13

12. SET, STUDS & NUTS, F/2" API 3000# FLANGE, API -75° SPECS

13. VALVE, GATE, MCEVOY MODEL 'C', FIG. 125, 2" API 3000# FLANGED ENDS, FULL PORT, REVERSE ACTING LESS BONNET & STEM ASSY., RM-13

14. ACUTATOR, VALVE, BAKER, HYDRAULIC, F/2" FIG. 125, RM-13, VALVE COMPLETE W/BONNET ASSEMBLY & MANUAL OVERRIDE

15. FLANGE, COMPANION, THREADED, 2" API 3000# x 2" API L.P. FEMALE THREAD, API -75° SPECS

16. PLUG, BULL, TAPPED, 2" API L.P. MALE THREAD x 1/2" NPT FEMALE, API -75° SPECS

17. VALVE, NEEDLE, ANGLE PATTERN, 1/2" NPT MALE INLET x FEMALE OUTLET, API -75° SPECS

18. GAUGE, PRESSURE, 0-3000#, 1/2" NPT MALE THREAD INLET, API -75° SPECS

19. HANGER, TUBING, TYPE 'SLA-3', 8" BOWL x ONE STRING 2-7/8" EUE TUBING x FOUR SLEP COUPLINGS F/1/4" DHBV CONTROL LINES, API -75° SPECS., COMPLETE W/WRENCH FOR PST COUPLINGS

20. NIPPLE, PACKOFF, TYPE 'PST', 2-7/8" EUE MALE x 2-1/2" NOM., API -75° SPECS., W/WRENCHING SLOTS

21. GASKET, FLANGE, API #RX-49, 316 S.S.

22. ADAPTER, TUBING HEAD, DOUBLE STUDDED, TYPE 'PST', 8" API 3000# BTM. x 2-1/2" API 3000# TOP, W/2-1/2" PST POCKET & FOUR 3/4" NOM. PST POCKETS F/DHBV LINES, W/FOUR 1/2" NPT FEMALE TAPS ON FLANGE O.D. 90° APART FOR CONTROL LINES, COMPLETE W/FOUR 1/2" NPT NEEDLE VALVES, API -75° SPECS

23. GASKET, FLANGE, API #RX-27, 316 S.S.

24. VALVE, GATE, MCEVOY MODEL 'C', FIG. 125, 2-1/2" API 3000# FLANGED ENDS, FULL PORT, RM-13

25. TEE, STUDDED, 3000# W.O.G., 2-1/2" x 2-1/2" x 2-1/2" API 3000# W/VRT IN OUTLET, API -75° SPECS

26. SET, STUDS & NUTS, F/2-1/2" API 3000# FLANGE, API -75° SPECS

27. TOP ASSEMBLY, TREE, 2-1/2" API 3000# FLANGE BTM. x CAP TAPPED 1/2" NPT, W/2-7/8" EUE LIFT THREADS, API -75° SPECS

28. VALVE, NEEDLE, GLOBE PATTERN, 1/2" NPT MALE THREAD INLET x FEMALE OUTLET, API -75° SPECS

29. GAUGE, PRESSURE, 0-3000#, 1/2" NPT MALE INLET, API -75° SPECS

30. FLANGE, COMPANION, THREADED, 2-1/2" API 3000# x 2" API L.P. FEMALE THREAD, API -75° SPECS

31. PLUG, BULL, TAPPED, 2" API L.P. MALE THREAD x 1/2" NPT FEMLE, API -75° SPECS

32. VALVE, NEEDLE, ANGLE PATTERN, 1/2" NPT MALE INLET x FEMALE OUTLET, API -75° SPECS

33. BACK PRESSURE VALVE, CIW, TYPE 'H', 2-1/2" NOM.

34. TESTER, B.O.P., 10" TYPE 'S' OR 'SL' BOWL, 4-1/2" IF TOOL JOINT TOP

35. TESTER, B.O.P., 8" TYPE 'S' OR 'SL' BOWL, 4-1/2" IF TOOL JOINT TOP

36. PROTECTOR, BOWL, F/10" TYPE 'S' BOWL

37. TOOL RUNNING & PULLING, F/10" BOWL PROTECTOR 4-1/2" IF TOOL JOINT TOP

38. PROTECTOR, BOWL, F/8" TYPE 'SL' BOWL

39. TOOL, RUNNING & PULLING F/8", BOWL PROTECTOR, 4-1/2" IF TOOL JOINT TOP

40. PLUG, VALVE, REMOVAL, TYPE 'A', 1-1/2" L.P. THREAD, F/2" OUTLETS

ARCTIC CASING PACK

In production wells, wells suspended through summer months, and wells completed for re-entry with temperature recording tools, Baroid Arctic Casing Pack was used between casing strings. It is a stable, highly viscous fluid which will not freeze and collapse casing set in permafrost zones. Its unique gelling characteristics exhibit excellent thermal properties (heat transfer coefficient of approximately 0.1 BTU per hour per square feet per degree F at 32°F). Composition of Baroid Arctic Casing Pack used is as follows for each 100 barrels mixed:

Diesel	82.0 barrels
Water	5.0 barrels
Salt	60.0 ppb per barrel of water
EZ Mul	12.5 ppb
Gel Tone	50.0 ppb
Barite	103.0 ppb

The 7" x 9-5/8" annulus was Arctic Packed through the FO at 1194' to the surface. This was to protect the 2-7/8" x 7" annulus from casing collapse while the well was being produced through it.

RIG INVENTORY

Draw Works

National T-20, single drum grooved for 1" wireline with 15" double hydromatic brake, automatic breakout and make up catheads, driven by one set GMC diesel twin 671 engines, 300 HP, through Allison torque converter, all mounted on single skid. One Westinghouse 3YC air compressor driven by main PTO.

Mast

Lee C. Moore, 95 feet high with 9 foot wide front by spread cantilever. Gross nominal capacity 290,000 pounds with racking board capacity of 130 stands 4-1/2" drill pipe (doubles). Mast crown block capable of stringing eight 1" wire lines.

Subbase

Three box sections, two at ground level 8 feet high, 9 feet wide, 37 feet long; center section 8 feet 5 inches high, 9 feet wide and 37 feet long. Clear working space from bottom of rotary beam to bottom of subbase is 14 feet 7 inches. Rotary table to bottom of subbase is 17 feet (add four inches for rig matts).

Rig Matts

Ten 4" x 16' long x 8' wide; fifteen 4" x 24' x 8' wide.

Traveling Blocks

IDECO, 160 ton, four 1" sheave combination block and hook.

Swivel

EMSCO L-140, 6-5/8" left hand API regular pin, 140 ton capacity.

Bails

Byron Jackson, 2-1/4" x 108", links 250 ton capacity.

Rotary Table

Oilwell 17-1/2" split square drive master bushing, 275 ton static load capacity.

Mud Tank

Three section, insulated tank. Capacity shale tank: 75 barrels; capacity middle tank: 100 barrels; capacity suction tank: 112 barrels. Shale tank equipped with shale jet and 16 barrel trip tank. Total capacity: 303 barrels.

Shaker

Single Brandt tandem separator driven by 3 HP, three-phase, 440 volt, 1750 RPM explosion proof electric motor.

Degasser

Drilco, see-flo, driven by 7-1/2 HP, three-phase, 440 volt, explosion proof motor with 1/2 HP, three-phase, 440 volt explosion proof blower.

Desander

Pioneer Model S2-12; capacity: 500 GPM.

Desilter

Pioneer Model T8-6; capacity: 500 GPM.

Mud Mixer

One Dreco, driven by 5 HP, three-phase, 440 volt, 1725 RPM explosion proof motor.

Hopper

One low pressure mud mixing hopper.

Generators

One Caterpillar Model 3406, 210 KW; one Caterpillar, skid mounted in Hercable house, 8' 5" high x 8' 2" wide x 29' 5" long; one Caterpillar Model D-333, 100 KW standby.

Boilers

Two Continental, 40 HP, 120 psi diesel fired skid mounted in Hercable house, 8' 4" high x 8' wide x 35' long.

Steam Heaters

Seven Model 90H Trane steam heaters; three Model 96H Trane steam heaters.

Tong

Byron Jackson, Type "C", short lever, with heads.

Indicator

(Weight) Cameron, Type "C", up to 400,000 pounds.

Indicator

(Rotary Torque) Martin Decker hydraulic piston wheel type with remote gauge at Driller's position.

Indicator

(Tong Torque) Martin Decker, hydraulic piston type with remote gauge.

Mud Box

OKE mud box with 3-1/2" and 4-1/2" rubbers.

Slips

One set for 3-1/2" drill pipe. One set for 4-1/2" drill pipe.

Elevators

One set for 3-1/2" drill pipe, 18 degrees taper. One set for 4-1/2" drill pipe, 18 degrees taper.

Kelly

One square, 4-1/4" drive, 4" FH pin, 6-5/8" API regular left hand box. One square, 3-1/2" drive, 3-1/2" IF pin, 6-5/8" API regular left hand box.

Kelly Bushing

VARCO, square drive, 3-1/2" rollers.

Pumps

(Drilling and Cementing) Two Halliburton, HT-400D, single acting piston pumps with Gist Oil Tool API fluid ends, each driven by GMC diesel 8V-71N, 300 HP engines through an Allis-Chalmers torque converter, Model 8FW1801-1 and a twin-disc power shift transmission, Model no. T-A-51-2003. Continuous duty with 5-1/2" API pistons at maximum of 75 SPM will produce 185 GPM for each pump with maximum pressure up to 3000 psi. Both pumps can be run simultaneously if desired. The discharge mud line furnished by contractor from pumps to swivel connection is designed for 3000 psi working pressure. Each pump unit mounted on 8' 4" high x 10' wide x 40' long covered skid.

Air Compressors

One LeRoi 34C mounted on draw works compound. One Ingersoll Rand Model 71-T2-T3011 TM, driven by 10 HP, 440 volt, 1725 RPM explosion proof electric motor.

Water Tanks

One 7' high x 9' wide x 20' long, insulated water tank, mounted in the subbase; capacity: 225 barrels. One 17' 4" long x 6' 4" wide; capacity: 120 barrels.

Fuel Tanks

One 20' long x 8' 6" wide; capacity: 6,000 gallons.

Blowout Preventer Equipment

One - ten-inch, 900 dual Shaffer gate LWS with three-inch flanged side outlet one side.
One - ten-inch 900 GK Hydril.
One - ten-inch 900 drill spool with two-inch flanged outlets both sides.
One set - 4-1/2" pipe rams.
One set - 3-1/2" pipe rams.
One set - blind rams.
One - upper kelly cock TIW 6-5/8" regular LH box to pin.
Two - TIW 10,000 psi lower kelly cocks, 4-1/2" XH joints.
Two - TIW, 10,000 psi lower kelly cocks, 3-1/2" IF joints.
One - inside preventor, 10,000 pound Hydril, 4-1/2" XH.
One - inside preventor, 10,000 pound Hydril, 3-1/2" IF.

Choke Manifold

Three-inch, 3000 pound, with one two-inch OCT adjustable choke; one two-inch OCT positive choke and space for automatic choke.

Closing Unit

One 80-gallon Hydril closing unit with four nitrogen bottle backup. Four-station Koomey control manifold with four-station air operated remote stations.

Drill Pipe

5000 feet, 4-1/2", 16.6 pound, Grade E, 4-1/2" XH joints; 5000 feet, 3-1/2", 15.5 pound, Grade E, 3-1/2" IF joints.

Drill Collars

Nineteen - 6-1/4" x 2-1/4" x 30' four-inch H90 tool joints.
One - 6-1/4" x 2-1/4" x 30' four-inch H90 x 4-1/2" regular bottom collar.
Nineteen - 4-3/4" x 1-3/4" x 30' x 3-1/2" IF x 3-1/2" regular bottom collar.
One - 4-3/4" x 1-3/4" x 30' x 3-1/2" IF x 3-1/2" regular bottom collar.

Subs

Two - 4-1/2" XH kelly savor subs.
Two - 3-1/2" IF kelly savor subs.
Two - 4-1/2" XH box to 4" H90 pin (DC crossover).
Two - 4" H90 box to 4-1/2" regular box (bit sub).
Two - 3-1/2" IF box to 2-7/8" API regular box (bit sub).

Forklift

One 966 Caterpillar, equipped with 60-inch forks.

Pipe Racks

One V door ramp with stairs.
One tail walk section, 6' 1" wide x 43" high x 42 feet long.
Four pipe rack sections, 43" high x 4' wide x 28 feet long.