NATIONAL PETROLEUM RESERVE IN ALASKA

HISTORY
OF
DRILLING OPERATIONS

KUGRUA TEST WELL NO. 1

HUSKY OIL NPR OPERATIONS, INC.
Prepared by: Drilling Department
Edited by: S. L. Hewitt and C. C. Livingston

For the

U. S. GEOLOGICAL SURVEY
Office of the National Petroleum Reserve in Alaska
Department of the Interior
SEPTEMBER, 1982

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KUGRUA TEST WELL NO. 1

INTRODUCTION

Kugrua Test Well No. 1 is located in the National Petroleum Reserve in Alaska (Figure No. 1). The well is located 669 feet from the north line and 1,300 feet from the west line of protracted Section 8, Township 14 North, Range 26 West, Umiat Meridian (Latitude: 70°35'13.283" North; Longitude: 158°39'43.258" West). Alaska State Plane Coordinates are X = 419,403.33 and Y = 6,064,780.22, Zone 6. Elevations: Pad 65 feet, Kelly Bushing 85 feet. Drilling related operations started with rig up on January 17, 1978, and terminated on May 29, 1978.

The well was drilled to a total depth of 12,588 feet. The objective of the well was to test a stratigraphic closure within the basal Lisburne Group or Devonian Age sediments. Other zones of interest included the Sadlerochit Group and possibly the Kuparuk River Sandstone.

Husky Oil NPR Operations, Inc. supervised and directed the drilling and support operations as prime contractor to the U. S. Geological Survey, Department of the Interior. Parco, Inc. was the drilling contractor and Parker Rig 95, a National 130, was used to drill the well.

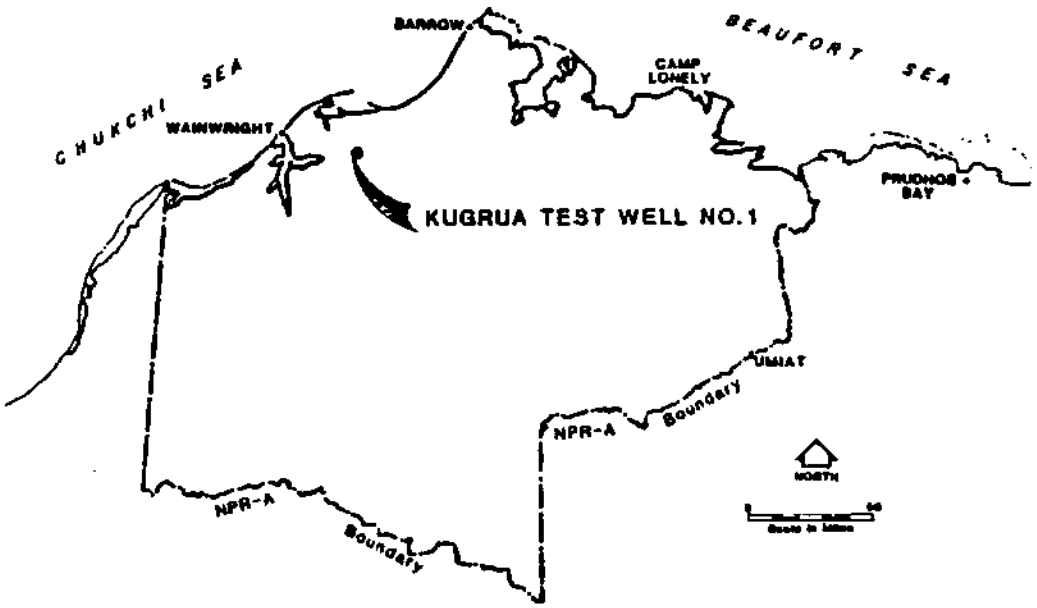

FIGURE NO. 1 - WELL LOCATION MAP - KUGRUA NO. 1

DRILLING SUMMARY

Field operations at the Kugrua Test Well No. 1 location started on November 30, 1977, with the mobilization of construction crews and equipment required to build the drilling pad and an ice airstrip to accommodate C-130 Hercules aircraft. Construction work was completed on January 7, 1978, and the crews and equipment moved to another location.

The rig move, from South Harrison Bay No. 1, was done with aircraft and Rolligons. Rig move-in operations began on January 8, 1978, and were completed on January 27, 1978. Rig-up operations began January 17, 1978, and were completed in 27 days. The well was spudded February 12, 1978, at 3:00 p.m.

During rig-up, a 30" conductor was set at 80' and cemented with Permafrost cement. A 17-1/2" hole was drilled out below the 30" conductor to 512', then the hole was opened to 26". Twenty-inch casing was run and landed at 496'. The casing was then cemented to surface with 1,400 sacks of Permafrost cement. Returns weighed 14.8 ppg. A National weld-on type NSB, 20" starter head was installed.

A 17-1/2" hole was drilled out below the 20" conductor to 2624'. The hole was logged from 2624' to the bottom of the 20" casing at 496' with the DIL/GR and the BHC-Sonic/GR. A bridge was encountered at 2218' while running the logs, which required a second conditioning trip to get the logging tools to bottom. After logging, 13-3/8" casing was set at 2611' and cemented with 2,800 sacks of Permafrost cement. Returns weighed 14.8 ppg.

A National 13-5/8" split unihead and a 13-5/8", 5,000 psi blowout preventer stack (SRRA arrangement) were installed. A 5,000 psi choke manifold and kill line were also installed. The 13-3/8" casing was tested to 2,500 psi and the shoe was drilled out with a 12-1/4" bit. The formation was tested to a 0.70 psi/ft. gradient.

A 12-1/4" hole was drilled from 2611' to 8712'. Core No. 1 was cut from 7197' to 7202' with 5 feet of recovery. While drilling, tight hole was encountered from 3950' to 4690', but after reaming once, there was no further problem. IDEL pore pressures were 9.1 ppg, mud weight was 9.6 ppg. Pore pressures increased from 9.1 ppg at 5250' to 10.9 ppg at 6885'. This interval was drilled with fresh water mud (moderately dispersed) and no significant problems were encountered. However, after being open a few days, the interval from 6650' to 6890' required several reaming passes to stabilize it while drilling below. The pebble shale was drilled from 6890' to 7304', the top of Kingak. Pore pressures increased slightly to 11.0 ppg and mud weight was raised to 11.3 ppg. After drilling and reaming, no problems were encountered in the interval. The Kingak Formation from 7304' to the 9-5/8" casing point at 8712' had increasing pore pressure from 11.0 ppg at 7304' to 11.3 ppg at 8712'. Severe sloughing shale problems were encountered throughout the interval. Mud weights were raised from 11.3 ppg to 12.1 ppg at 8341', where

returns were lost. The hole was stabilized with 12.1 ppg mud. The system was, however, not dispersed after building volume. Drilling continued to 8712', where lost returns occurred at 12.0 ppg and a water flow occurred at 11.8 ppg. The hole was stabilized with 11.8 ppg mud, and extensive reaming was required to keep it open. On several occasions, while drilling from 8341' to 8712', the mud system was run inverted. This was to increase cleaning and carrying capacity to counteract severely sloughing shale.

Due to continued borehole instability, a decision was made to set the 9-5/8" casing higher than programmed. The 12-1/4" hole was logged from 8702' back into the 13-3/8" shoe at 2611' as follows: DIL/GR; FDC/CNL/CAL/GR; BHC-Sonic/GR; HDT-Dipmeter; and Velocity Survey. Shot 90 sidewall cores and recovered 78. After logging, the hole was conditioned and 9-5/8" casing run to 8704', with FOs at 2115' and 2448'. The casing was cemented around the shoe with 1,000 sacks of retard Class "G" cement. A second stage cement job was completed through the FO at 2448' with 150 sacks of Permafrost II cement. After the cement had set, the shoe was drilled out to 8712' and returns were lost, preventing a fracture gradient test of the formation.

An 8-1/2" hole was drilled from 8712' to 12,588' (total depth). Core No. 2 was cut from 10,480' to 10,504' (24' recovered) and Core No. 3 was cut from 11,030' to 11,033' (3' recovered). Lost circulation was a continued problem while drilling this interval, and hole caving problems increased below 10,000'. Because of these drilling problems and the late drilling season, the well was stopped short of the programmed "Argillite". The open hole was logged as follows from 12,588' back into the 9-5/8" casing shoe at 8704': DIL/GR; FDC/CNL/CAL/GR; BHC-Sonic/GR; and Velocity Survey. Other programmed logs (HDT-Dipmeter, High Resolution Temperature Log, Sidewall Cores) were not run due to hole condition.

After evaluation of the wireline logs, a decision was made to plug and abandon the well. Cement plugs were placed across selected intervals in the 8-1/2" open hole as follows: Plug No. 1: 11,200' to 10,900', with 155 sacks of Class "G"; Plug No. 2: 10,200' to 9900', with 180 sacks of Class "G"; Plug No. 3: 9700' to 9400', with 165 sacks of Class "G"; and Plug No. 4: 8900' to 8600', with 135 sacks of Class "G". A cement retainer was set at 8352' in the 9-5/8" casing and 50 sacks of Class "G" cement were placed on top of the retainer from 8352' to 8207'. The 9-5/8" casing was cut at 2055'. A 13-3/8" retainer was set above the 9-5/8" stub at 1950'. Fifty sacks of Class "G" cement were spotted on top of the retainer. The mud was then reversed out to water, then water to diesel at 1800'. The abandonment marker was set and the rig released May 29, 1978, at 9:00 p.m. The rig was rigged down, rolligoned to Peard Bay, and stacked for the summer to await the barges.

Detailed drilling information, in the form of bit records, mud summary, time analysis, and casing and cementing reports, is included in the body of the history.

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 [ ]

7. UNIT AGREEMENT NAME: N/A

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

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.: Kugrua Test Well No. 1

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

10. FIELD AND POOL, OR WILDCAT: Wildcat

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements.*)
At surface: 669' FNL; 1300' FWL
At proposed prod. zone: Same (straight hole)

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA: Sec 8, T14N, R26W, UM

14. DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE*: 33 miles east of Wainwright, Alaska

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

15. DISTANCE FROM PROPOSED* LOCATION TO NEAREST PROPERTY OR LEASE LINE, FT. (Also to nearest drlg. unit line, if any)	16. NO. OF ACRES IN LEASE	17. NO. OF ACRES ASSIGNED TO THIS WELL
99,260'	23,680,000	N/A
18. DISTANCE FROM PROPOSED LOCATION* TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT.	**19. PROPOSED DEPTH**	**20. ROTARY OR CABLE TOOLS**
221,760	12,315'	Rotary

21. ELEVATIONS (Show whether DF, RT, GL, etc.): Ground = 60'; Pad = 65'; KB = 85'

22. APPROX. DATE WORK WILL START*: January 10, 1978

23. PROPOSED CASING AND CEMENTING PROGRAM

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH	QUANTITY OF CEMENT
36"	30" (Conductor)	110.32, X-60	± 100' KB	To surface
26"	20"	133# (K-55)	± 500'	± 800 Sx Permafrost to Surface
17 1/2"	13 3/8"	72# (S-95)	± 2600'	± 1900 Sx Permafrost to Surface
12 1/4"	9 5/8"	53.5# (S-95)	± 9850'	± 250 Sx Class "G", 500' Fill. Second stage: 300 sx Permafrost Down squeeze through FO @ 235
8 1/2"	7"	32# (N-80)	Liner ± 9550' to TD	± 500 Sx Class "G" as required to cement entire liner.

Blowout Preventer Program-

From ± 500' to ± 2600':
20", 2000 psi, SA Diverter Assembly
From ± 2600' to TD:
13 5/8", 5000 psi, SRRA BOP Assembly
w/5000 psi Choke Manifold and Kill Lines

See Drilling Program for details.

RECEIVED
OFFICE OF
JAN
CONSERVATION DIVISION
U.S. GEOLOGICAL SURVEY
ANCHORAGE, ALASKA

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 C Brewer — TITLE: Chief of Operations — DATE: December 15, 1977

(This space for Federal or State office use)

APPROVED BY: _____ — DATE: _____

CONFORMS WITH PERTINENT PROVISIONS 30 CFR 221

CONDITIONS OF CONCURRENCE ATTACHED

TITLE: Oil & Gas Supervisor — DATE: 30 JAN 1978

*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 Wildcat
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: 669' FNL; 1300' FWL
   AT TOP PROD. INTERVAL:
   AT TOTAL DEPTH:
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. Kugrua Test Well No. 1
10. FIELD OR WILDCAT NAME Wildcat
11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA Sec 8, T14N, R26W, UM
12. COUNTY OR PARISH North Slope 13. STATE Alaska
14. API NO.
15. ELEVATIONS (SHOW DF, KDB AND WD) 85' KB

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 notice of spud date.			

(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 at 3:00 PM, February 12, 1978.

RECEIVED
ONSHORE DIST. OFFICE
FEB 17 1978
CONSERVATION DIVISION
U.S. GEOLOGICAL SURVEY
ANCHORAGE, ALASKA

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

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

SIGNED Max S. Brewer TITLE Chief of Operations DATE 15 February 78

(This space for Federal or State office use)

Conforms with pertinent provisions of 30 CFR 222.

TITLE _____ DATE 28 FEB 1978

*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 Wildcat

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: 669' FNL, 1300' FWL
AT TOP PROD. INTERVAL:
AT TOTAL DEPTH:

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 Alas

9. WELL NO.
Kugrua Test Well No. 1

10. FIELD OR WILDCAT NAME
Wildcat

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Sec 8, T14N, R25W, UM

12. COUNTY OR PARISH 13. STATE
North Slope Alaska

14. API NO.

15. ELEVATIONS (SHOW DF, KDB, AND WD)
85' KB

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) Notice of change of wellhead			

RECEIVED
ONSHORE DIST. OFFICE
FEB 17 19[illegible]
CONSERVATION DIV.
U.S. GEOLOGICAL SURVEY
ANCHORAGE, ALASKA

(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.)*

In the original well plan, the intent was to use National thru-bore wellhead arrangements. Certain problems have been encountered relating to machining tolerances and landing procedures from the manufacturer. These problems will require further engineering design work and machining to effect a solution. Timing is such that the operator plans to change wellhead assemblies from National to FMC, Oil Center Tool. The FMC, OCT wellheads were used last season on NPRA and are similar to those used in Prudhoe Bay. These particular wellheads, although used, have been thoroughly checked and reconditioned by the local FMC representative. The National starter head (20", 2000 psi) will still be used along with the 13 3/8" hanger slips and lower pack-off unit. The entire assembly above the 20" starter head will be FMC, OCT. The 20", 2000 psi flanges on both units are API and completely compatible.

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

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

SIGNED J. Alex Sharp TITLE Chief of Operations DATE 15 February 78

(This space for Federal or State office use)

Conforms with pertinent provisions of 30 CFR 221.

APPROVED BY _____ TITLE DISTRICT SUPERVISOR DATE 28 FEB 1978

*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 Wildcat
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: 669' FNL, 1300' FWL
   AT TOP PROD. INTERVAL:
   AT TOTAL DEPTH:

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. Kugrua Test Well No. 1
10. FIELD OR WILDCAT NAME Wildcat
11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA Sec 8, T14N, R26W, UM
12. COUNTY OR PARISH North Slope
13. STATE Alaska
14. API NO.
15. ELEVATIONS (SHOW DF, KDB AND WD) 85' KB

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*	☐		☐

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

(other) Subsequent report of running and cementing 20" shallow surface casing.

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.)*

A 17 1/2" hole was drilled to 512' and opened to 26". Ran 12 joints of 20", 133 lb/ft, K-55, 8rd casing with the duplex float shoe at 496' KB. Installed centralizers on the first four joints. Ran duplex stinger and stabbed in to duplex shoe and condition mud. Cemented to surface with 1400 sacks Permafrost II cement at 15 ppg slurry weight. Good returns throughout with 65 bbls 14.8 ppg slurry to surface. Cement in place at 7:15 AM, 2/15/78. WOC 16 hours. Cut off 20" casing and installed 20" starter head. Tested weld to 750 psi. Nipple up 20", 2000 psi Hydril and tested to 250 psi. Installed diverter system.

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

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

SIGNED Max Völcker TITLE Chief of Operations DATE 21 February 78

(This space for Federal or State office use)

APPROVED TITLE DISTRICT SUPERVISOR DATE 23 FEB 1978

...onforms with ...ertinent ...rovisions of ...0 CFR 222.

*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:
AT TOP PROD. INTERVAL:
AT TOTAL DEPTH:

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.
Kugrua Test Well No. 1

10. FIELD OR WILDCAT NAME
Wildcat

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Sec 8, T14N, R26W, UM

12. COUNTY OR PARISH: North Slope | 13. STATE: Alaska

14. API NO.

15. ELEVATIONS (SHOW DF, KDB, AND WD)
85' KB

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*	☐		☐

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

(other) Subsequent notice of running and cementing 13 3/8" surface casing.

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.)*

A 17 1/2" hole was drilled to 2624' and logged. Ran 64 joints of 13 3/8", 72 lb/ft, S-95 Buttress casing and landed with the float shoe at 2611' and the duplex float collar at 2527'. Cemented with 2800 sacks of Permafrost cement at 15ppg slurry weight. Had 14.8 ppg slurry weight in returns. Good returns throughout job. Cement in place at 10:00 PM, 2/23/78. Installed OCT wellhead and nippled up 13 5/8", 5000 psi, SRRA BOP arrangement. (Poslock system on rams.) Tested Hydril and rams to 5000 psi. Tested BOP manifold, and kelly cocks to 5000 psi. Tested Hydril to 2500 psi. Tested 13 3/8" casing to 2500 psi. Drilled out float collar, float shoe, and 10' of formation. Tested formation to 0.70 psi/ft gradient with no observed leak off.

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

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

SIGNED J May C Brewer TITLE Chief of Operations DATE 9 March 78

(This space for Federal or State office use)

Conforms with pertinent provisions of 30 CFR 222.

APPROVED BY Wm Lee Lilly TITLE DISTRICT SUPERVISOR DATE 14 MAR

*See Instructions on Reverse Side

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

RECEIVED
ONSHORE DIST. OFFICE
APR 5 1978
RESERVATION DIVISION
U.S. GEOLOGICAL SURVEY

5. LEASE
N/A

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

7. UNIT AGREEMENT NAME
N/A

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 [X] gas well [ ] other Wildcat

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: 669' FNL, 1300' FWL
AT TOP PROD. INTERVAL
AT TOTAL DEPTH:

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

9. WELL NO.
Kugrua Test Well No. 1

10. FIELD OR WILDCAT NAME
Wildcat

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Sec. 8, T14N, R26W, UM

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

14. API NO.

15. ELEVATIONS (SHOW OF, KOB, AND WD)
85' KB

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) Request for Variance - BOP Operation		

(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 "Conditions of Concurrence" for this well required actuation of the pipe rams every 24 hours. Often it is not necessary to trip every 24 hours. Therefore, in order to actuate the pipe rams while drilling it is necessary to stop circulation, drain the BOP, and for a short period of time, stop all pipe movement. Hole conditions are such at this well that stopping circulation and pipe movement could easily result in stuck pipe. It is requested that pipe ram actuating every 24 hours be waived. All rams will continue to be actuated on each trip. This has been discussed verbally with Mr. Dale Roberts on March 27, 1978.

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

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

SIGNED Max Brewer TITLE Chief of Operations DATE 6 April 78

(This space for Federal or State office use)

Conforms with pertinent provisions of 30 CFR 221.

TITLE DISTRICT SUPERVISOR DATE

AREA

*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 Wildcat
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: 669' FNL; 1300' FWL AT TOP PROD. INTERVAL: AT TOTAL DEPTH:
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. Kuggua Test Well No. 1
10. FIELD OR WILDCAT NAME Wildcat
11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA Sec 8, T14N, R26W, UM
12. COUNTY OR PARISH North Slope
13. STATE Alaska
14. API NO. 85' KB
15. ELEVATIONS (SHOW DF, KDB, AND WD)
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) Notice of Change – Intermediate Casing Point			

(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.)*

Due to sloughing shale and abnormal lost circulation problems, the operator plans to set 9 5/8" casing at the current depth of 8712', about midway through the Kingak Shale. The original well plan provided for 9 5/8" casing to be set at ± 9850' through the Kingak. The cementing program will be the same as the original plan. It is anticipated that the casing job will begin about April 7, 1978. This was discussed with Mr. Jim Weber on April 3, 1978.

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

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

SIGNED Max Brewer TITLE Chief of Operations DATE 6 April 78

(This space for Federal or State office use)

Conforms with pertinent provisions of 30 CFR 222.

TITLE _____ 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 Wildcat
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: 669' FNL; 1300 FWL
AT TOP PROD. INTERVAL:
AT TOTAL DEPTH:

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. Kugrua Test Well No. 1
10. FIELD OR WILDCAT NAME Wildcat
11. SEC., T., R., M OR BLK AND SURVEY OR AREA Sec 8, T14N, R26W, UM
12. COUNTY OR PARISH North Slope 13. STATE Alaska
14. API NO.
15. ELEVATIONS (SHOW DF, KDB AND WD) 85' KB

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APR 28 1978
ONSHORE DIST. OFFICE
CONSERVATION DIV. U.S. GEOLOGICAL SURVEY ANCHORAGE, ALASKA

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*	☐		☐

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

(other) Subsequent Report of Running and Cementing 9 5/8" Casing

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.)*

A 12 1/4" hole was drilled to 8712' and severe lost circulation problems were encountered which aggravated a sloughing shale problem. When returns were regained and the hole conditioned, logs were run. A total of 217 joints of 9 5/8", 53.5 #/ft, S-95, Buttress casing was run and landed at 8704' with a fluted casing hanger. The float collar was located at 8619'. The FO cementing sleeves were positioned at 2448' and 2115'. Centralizers were not run because of poor hole conditions. The casing was cemented with 1000 sacks of Class "G" cement containing 1% CFR-2 and 0.2% HR7 (15.8 ppg). Full returns throughout cement job and bump plug and pressured to 3000 psi o.k. Released pressure and floats held. CIP at 7:30 PM, 4/9/78. Set mandrel hanger packoff and tested to 5000 psi. Checked FOs. Opened lower FO at 2448' and pumped in 155 sacks of Permafrost cement (15 ppg). Did not down squeeze due to lost circulation problems. Checked FOs to 3000 psi. Pressure tested BOP and choke

(Continued on attached page)

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

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

SIGNED Max Brewer TITLE Chief of Operations DATE April 19, 1978

(This space for Federal or State office use)

Conforms with pertinent provisions of 30 CFR 221

TITLE _____ DATE 5/1/78

*See Instructions on Reverse Side

manifold. Picked up the bottom hole assembly and drilled out cement. Drilled out rat hole to 8712' and lost circulation with 11.8 ppg mud. Lowered mud weight to 11.4 ppg, spotted LCM, and regained circulation. Could not run pump-off test. Resumed drilling.

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 [X] gas well [ ] other Wildcat

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: 669' FNL; 1300' FWL
AT TOP PROD. INTERVAL:
AT TOTAL DEPTH:

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.
Kugrua Test Well No. 1

10. FIELD OR WILDCAT NAME
Wildcat

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Sec 8, T14N, R26W, UM

12. COUNTY OR PARISH North Slope

13. STATE Alaska

14. API NO.

15. ELEVATIONS (SHOW DF KDB, AND WD)
85' KB

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) Notice of Intent to Change Plans		

(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 original Notice of Intent to Drill indicated the proposed TD to be 12,315'. Due to thickened geologic sequences, the objective TD is expected to be deeper. The operator plans to continue drilling. It is expected that final TD will be at or near 12,600'. This has been discussed with Mr. Jim Weber on 5/17/78.

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 17 May 78

(This space for Federal or State office use)

Conforms with pertinent provisions of 30 CFR 222.

[signature] for TITLE DISTRICT SUPERVISOR DATE May 18, 1978

*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: 669' FNL; 1300' FWL
AT TOP PROD. INTERVAL:
AT TOTAL DEPTH:

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.
Kugrua Test Well No. 1

10. FIELD OR WILDCAT NAME
Wildcat

11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA
Sec 8, T14N, R26W, UM

12. COUNTY OR PARISH: North Slope | 13. STATE: Alaska

14. API NO.

15. ELEVATIONS (SHOW DF, KDF AND WD)
85' KB

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)			

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JUL 21 1978
(NOTE: Report results of multiple completion or zone change on Form 9-330.)
CONSERVATION DIVISION
U.S. GEOLOGICAL SURVEY
ANCHORAGE, ALASKA

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 drilled to a total depth of 12,588' and logged. Following log evaluation, the abandonment procedure was developed and verbally approved by Mr. Jim Weber on May 23, 1978. The well was abandoned as follows: Spotted a 155 sack Class "G" plug (15.8 ppg) from 11,200' to ± 10,900' (± 300'). Picked up to 10,200'. Spotted a 180 sack Class "G" plug (15.8 ppg) from 10,200' to ± 9900' (± 300'). Picked up to 9700'. Spotted a 165 sack Class "G" plug (15.8 ppg) from 9700' to ± 9400' (± 300'). Picked up to 8900'. Spotted a 135 sack Class "G" plug (15.8 ppg) from 8900' to ± 8600' (± 300' with ± 104' inside the 9 5/8" casing.) The above plugs were spotted through open ended drill pipe in open hole. After scraping casing, a 9 5/8", 53.5# cement retainer was run and set at 8352'. A 50 sack Class "G" plug (15.8 ppg) was spotted on top of the retainer from 8352' to ± 8207'. The 9 5/8" casing was cut at 2055', leaving the stub 556' above the 13 3/8" shoe. The 9 5/8" was pulled and layed down. After scraping casing and

(Continued on attached page)

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

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

SIGNED Max V. Brewer TITLE Chief of Operations DATE 20 July 78

(This space for Federal or State office use)

Conforms with pertinent provisions of 30 CFR 221.

APPROVED BY James Weber TITLE DISTRICT SUPERVISOR DATE JUL 24 1978

*See Instructions on Reverse Side

conditioning mud, a 13 3/8", 72# cement retainer was run and set at 1950'. A 50 sack Permafrost II plug (14.8 ppg) was spotted on top of the retainer from 1950' to ± 1894'. Picked up to 1800' and reversed out mud with water and water with diesel. The BOP stack was nippled down and the wellhead nippled down to the 20" flange. The abandonment marker was installed and the rig released at 9:00 PM, May 29, 1978.

Form 9-330
(Rev. 5-63)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

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

RECEIVED
Form Approved.
Budget Bureau No. 42-R355.5

WELL COMPLETION OR RECOMPLETION REPORT AND LOG*

5. LEASE DESIGNATION AND SERIAL NO.: N/A
JUN 29 1978
6. IF INDIAN, ALLOTTEE OR TRIBE NAME: N/A
CONSERVATION DIVISION
7. UNIT AGREEMENT NAME: N/A
ANCHORAGE, ALASKA

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

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

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.: Kugrua Test Well No. 1

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

10. FIELD AND POOL, OR WILDCAT: Wildcat

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements)*
At surface: 669' FNL; 1300' FWL
At top prod. interval reported below
At total depth: Same (straight hole)

11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA: Sec 8, T14N, R26W, UM

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

15. DATE SPUDDED	16. DATE T.D. REACHED	17. DATE COMPL. (Ready to prod.)	18. ELEVATIONS (DF, RKB, RT, GR, ETC.)*	19. ELEV. CASINGHEAD
2/12/78	5/21/78	N/A	85' KB	65.5'

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
12,588' MD	1894' MD	N/A	→	All	None

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)*: N/A

25. WAS DIRECTIONAL SURVEY MADE: No

26. TYPE ELECTRIC AND OTHER LOGS RUN: DIL, BHC/GR, FDC/CNL/GR, Velocity Survey, Dipmeter

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
20"	133	496'	26"	1400 Sx Permafrost 15.0	N/A
13 3/8"	72	2611'	17 1/2"	2800 Sx Permafrost 15.0	N/A
9 5/8"	53.5	8704'	12 1/4"	1000 Sx Class "G" 15.8	2055 ft.
				ppg w/155 Sx Permafrost	15.0 ppg

29. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	SACKS CEMENT*	SCREEN (MD)
N/A				

30. TUBING RECORD (through Lower)

SIZE	DEPTH SET (MD)	PACKER SET (MD)
N/A		

31. PERFORATION RECORD (Interval, size and number): N/A

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

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
N/A	

33.* PRODUCTION

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

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

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

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

TEST WITNESSED BY

35. LIST OF ATTACHMENTS: Wellbore Schedmatic

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

SIGNED Max V. Brewer TITLE Chief of Operations, ONPRA DATE 28 June 78

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

INSTRUCTIONS

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

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

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

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

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

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

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

JUN 29 1978

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.
Torok	3320'	6890'	Ss: thin shaly Ss interbedded with Siltstone, light-medium gray, fine to medium grained, poorly-moderately sorted, clay filled in part, very micaceous, calcareous, firm to hard; some dead oil staining, NOSCF; gas shows associated with Ss, 240-1920 units of ditch gas, C_1 through C_4; Ss occurs 6105-6126', 6236-6258', 6274-6284', 6410-6430', 6654-6674'; gross thickness 93', net Ss 85', average Ø 10.2%, average Sw 93%.
Kingak Shale	7304'	9516'	Ss (8720-8830'): very light grey to brown, blocky, very fine-fine grained, well sorted, minor mica, rare bright green glauconite pellets, with clay matrix, nil visible porosity, NOSCF, increasing glauconite toward base; gross thickness 110', net Ss 90', average Ø 12%, average Sw 100%.

38. GEOLOGIC MARKERS

NAME	TOP: MEAS. DEPTH	TOP: TRUE VERT. DEPTH
Torok	3320'(-3235)	
Pebble Shale	6890'(-6805)	
Kingak Shale	7304'(-7219)	
Sag River Sand	9516'(-9431)	
Shublik	9630'(-9545)	
Sadlerochit	9965'(-9880)	
Ivishak	9965'(-9880)	
Echooka	11,004'(-1,919)	
Lisburne	11,160'(-11,075)	

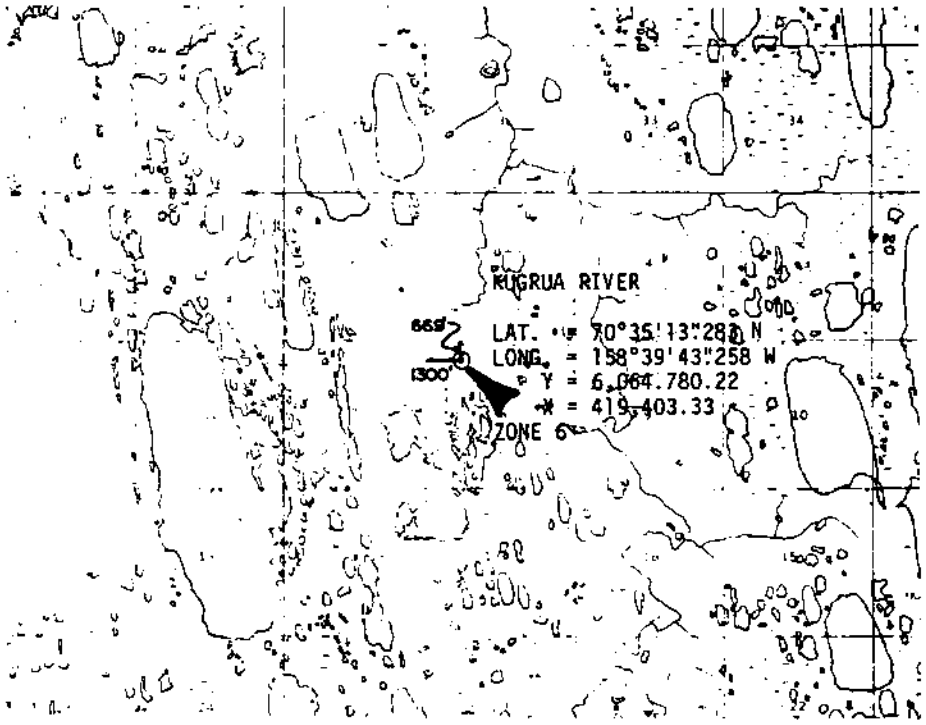
U.S. GOVERNMENT PRINTING OFFICE 1963 O 683636

871-233

Well Completion Report
Kugrua Test Well No. 1
Continuation of Item 37

Formation	Top	Bottom	Description
Sag River Sand	9516'	9630'	Ss: light grey, very fine grained, subrounded-rounded, well sorted, moderately indurated, friable and soft in part, well cemented with calcite, rare galuconite, nil visable porosity, NOSCP; gross thickness 101', net Ss 86', average ϕ 10.8%, average Sw 100%.

RECEIVED
ONSHORE DIST. OFFICE
JUN 28
CONSERVATION DIVISION
U.S. GEOLOGICAL SURVEY
ANCHORAGE, ALASKA



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.

August 17, 1977

STATE OF ALASKA
4013
JOHN E. HERRING
No. 963-S
REGISTERED PROFESSIONAL LAND SURVEYOR

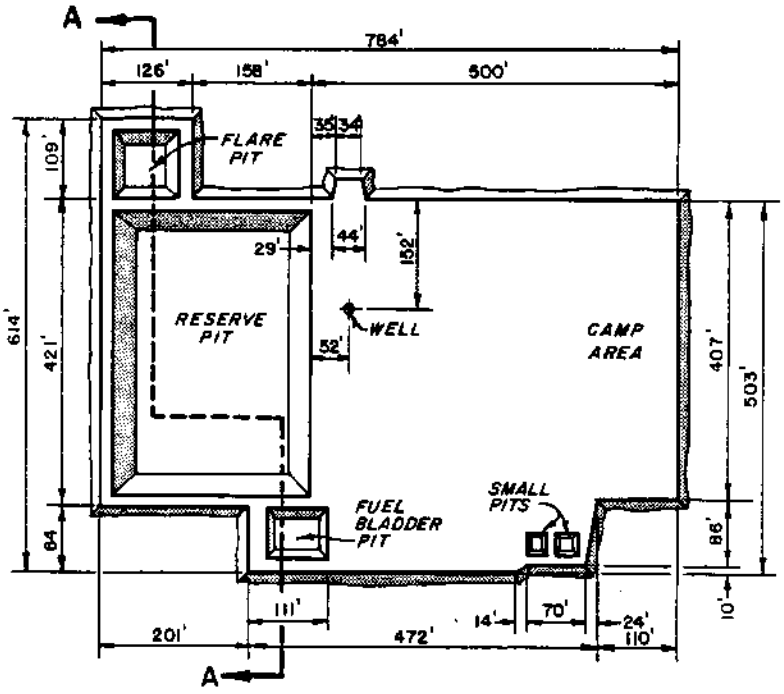
0 1/2 1 2
SCALE IN MILES

AS STAKED
KUGRUA RIVER
LOCATED IN
NW1/4 PROTRACTED SEC. 8 T14 N, R26W, UMIAT MERIDIAN, AK.

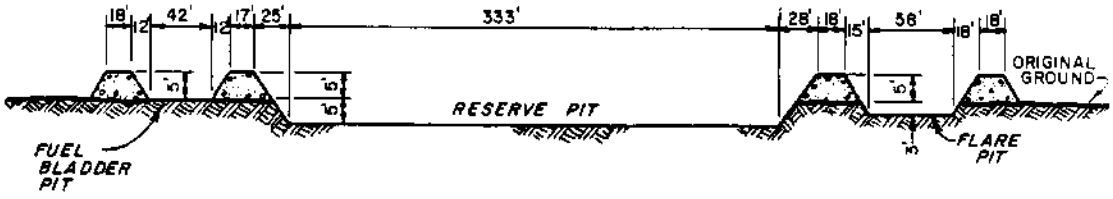
Surveyed for
HUSKY OIL
N.P.R. OPERATIONS INC.

Surveyed by
Bell, Herring and Associates
ENGINEERS AND LAND SURVEYORS
801 West Fireweed, Suite 102
ANCHORAGE, ALASKA 99503

KUGRUA DRILLSITE



PLAN VIEW



SECTION A-A

OPERATIONS HISTORY

DATE AND FOOTAGE DRILLED AS OF 6:00 A.M.	ACTIVITY
1/2/78	Began moving rig and camp by Rolligon from South Harrison Bay well site to airstrip. Moved 24 loads.
1/3/78	Continued rig move to airstrip.
1/4/78	Continued rig move.
1/5/78	Completed rig move to airstrip and began packaging rig into Herc loads.
1/6/78	Continued packaging into Herc loads. Airstrip expected to be ready for check 1/7/78.
1/7/78	Continued packaging rig. Airstrip ready for check.
1/8/78	Waiting on approval of airstrip to begin flying rig.
1/9/78	Began moving camp units by Herc to Kugrua.
1/10/78	Continued movement of camp units. Began rig up of camp.
1/11/78	Airlift temporarily delayed due to weather. Continued building Herc loads.
1/12/78	Continued with camp move. Began airlifting rig components.
1/13/78	Rig move continuing. Twenty-five loads moved to date. Camp 75 percent rigged up.
1/14/78	Continued with rig move; 36 loads moved to date. Camp 80 percent rigged up.
1/15/78	Forty-six loads moved to date; approximately 32 loads yet to be moved. Camp completely rigged up and in operation.
1/16/78	Continued with rig move. Set 17,000 gallon fuel tanks for rig and camp. Began assembling rig equipment.
1/17/78	Continued with rig move. Began rig-up. Fifty-eight loads moved to date; approximately 30 loads yet to be moved.

1/18/78	Continued with rig move and rig-up. Laid matting boards and set sub on location.
1/19/78	Continued with rig move and rig-up.
1/20/78	Rig-up 15 percent complete. Installed derrick pads, steam and water lines, and all compound chains. Laid matting boards for pumps.
1/21/78	Set pumps. Hooked up water and steam lines. Rig-up 20 percent complete.
1/22/78	Resumed movement of rig from South Harrison. Movement 70 percent complete.
1/23/78	Rig-up and rig move continuing. Sixty-one loads moved to date; approximately 28 remaining. Rig-up 25 percent complete. Finished assembly of derrick; assembled shop. RCA equipment installation complete but not operational.
1/24/78	Continued with rig-up and rig move. Seventy loads moved to date; twenty-eight loads still to be moved. Began setting derrick on rig floor. Strung up blocks. Installed containment liner in fuel storage pit. Erected welding shop.
1/25/78	Continued setting derrick on rig floor. Strung drilling line. All RCA equipment in operation. Phone to become operational this date.
1/26/78	Installed handrails and board on derrick. Laid mats for mud pits and set pits. Set top doghouse. Fabricated pit lines and manifolds. Continued moving in rig. Ninety-one loads moved to date; nine remaining at South Harrison.
1/27/78	Set water tanks. Rigged up Tioga heater. Laid out windwalls. Worked on mud system. Movement of rig from South Harrison completed (19 days - 100 loads).
1/28/78	Began rigging up windwalls. Set in suction pit. Hooked up lights and water lines.
1/29/78	Installed pump belts. Continued work on windwalls. Set in Sweco units. Worked on steam, water, and mud lines.
1/30/78	Fired Tioga heater. Worked on windwalls. Installed belt guards on pumps. Began plumbing mud and water lines.

1/31/78	Fabricated new mud system to tie into new pumps. Hooked up boilers. Started one rig engine. Derrick ready to raise. All windwalls in place.
2/1/78	Continued general rig-up. Began fabricating mud system. Started to raise derrick. Bridle broke with derrick approximately three inches off stand. No damage visible.
2/2/78	Continued with general rig-up. Set Halliburton equipment. Worked on electrical system. Worked on water, steam, and mud lines.
2/3/78	Continued with general rig-up. Worked on mud system. Rigged up Sweco units.
2/4/78	Rigged up Halliburton tanks. Continued with installation of steam, water, and mud lines. Installed electrical lines.
2/5/78	Raised derrick. Installed windwalls around rig floor. Set in ramp.
2/6/78	Worked on mud system. Picked up and ran 78 feet of 30" conductor pipe. Rigged up rig floor.
2/7/78	Set 30" conductor at 80' and cemented in place with 108 sacks of Permafrost cement at 14.8 ppg. Rigged up mud system. Magnafluxed rig equipment.
2/8/78	Inspected rig equipment. Began welding the mud system. Hooked up PVT and Flo-Show equipment. Hooked up mud logging trailer.
2/9/78	Built dock for mud mixing. Hooked up centrifugal pumps. Prepared to fill pits with water.
2/10/78	Installed mud mixers. Hooked up desander, desilter, and Sweco unit. Worked on dock over mud mixing area. Filled mud tanks with water. Fixing minor leaks in tanks.
2/11/78	Completed nipple up on 30" conductor. Finished fabricating shale shaker system. Worked on mud mixers, desander, desilter, and Sweco unit. Ran and checked mud system. Mixed spud mud.
2/12/78	Installed rotary chain and guard. Fabricated relief lines on mud pumps. Rig up complete (26 days). Picked up 17-1/2" bit and bottom hole assembly. Circulated and checked mud system.
	Well spudded February 12, 1978, at 3:00 p.m.

2/13/78 283'	TD: 375'; MW: 9.1; Vis: 38. Drilled ahead.
2/14/78 137'	TD: 512'; MW: 9.7; Vis: 37. Drilled 17-1/2" hole to 512'. Circulated and tripped out. Picked up 26" hole opener. Opened hole to 512'. Circulated and conditioned hole. Tripped out.
2/15/78 0'	TD: 512'; MW: 9.7; Vis: 41. Tripped in with bit and hole opener. Conditioned hole and tripped out. Ran 12 joints of 20", 133#/ft., K-55, 8rd casing with duplex float shoe at 496' KB. Ran duplex stinger and stabbed into shoe. Circulated hole clean and started cementing.
2/16/78 0'	TD: 512'; MW: 9.5; Vis: 35. Cemented 20" casing with 1,400 sacks Permafrost II cement at 15 ppg. Good returns throughout, with 65 barrels of cement returns at surface at 14.8 ppg. Cement in place 2/15/78 at 7:15 a.m. Tripped out with drill pipe. Float held OK. Cut off 20" casing and welded on 20" casing head.
2/17/78 0'	TD: 512'; MW: 9.5; Vis: 38. Welded on 20" casing head. Tested weld to 750 psi. Nippled up 20" Hydril. Installed 7" diverter line. Rigged up remote controls to Hydril. Set in rotary table. Installed rotary torque wheel. Tripped in.
2/18/78 220'	TD: 732'; MW: 9.3; Vis: 37. Attempted to test Hydril and casing. Laid down excess pipe in derrick; removed drilling nipple. Made up 20" test plug. Tested Hydril to 250 psi. Installed drilling nipple. Made up bottom hole assembly. Drilled shoe and cement, 496' to 512'. Repaired pump. Drilled ahead.
2/19/78 848'	TD: 1580'; MW: 9.6; Vis: 34. Tripped at 1580' for Bit No. 3.
2/20/78 725'	TD: 2305'; MW: 9.7; Vis: 36. Finished trip with Bit No. 3. Drilled from 1580' to 2305'.
2/21/78 319'	TD: 2624'; MW: 9.8; Vis: 42. Ran DIL/SP to 2218'. Hit bridge. Tripped in with bit. Surveyed 1/2° at 2620'.
2/22/78 0'	TD: 2624'; MW: 9.8; Vis: 43. Ran DIL/SP/GR and BHC-Sonic/GR, 493' to 2624'. Bottom hole temperature: 98°. Rigged up to run 13-3/8" casing.
2/23/78 0'	TD: 2624'; MW: 9.8; Vis: 44. Ran 13-3/8", 72# Buttress casing as follows: Halliburton shoe at 2611',

two joints of casing, Halliburton float collar at 2527', 60 joints of casing to surface with centralizers on nine joints. Circulated hole clean. Cemented with 2,800 sacks of Permafrost cement at 15 ppg. Had returns of 60 barrels at 14.8 ppg. Displaced cement and released pressure. Pulled out of hole with drill pipe and began nippling down 20" Hydril.

2/24/78 0' TD: 2624'. Installed 20" packoff assembly and 13-5/8" x 20" casing spool and tested packoff to 2,000 psi. Nipplad up. Installed Swaco super choke and laid line to burn pit. Cleaned all mud pits. Changed out Hydril rubber.

78 TD: 2624'. Cleaned mud pits. Installed iron roughneck. 2/25/ 0'

78 No report; communications down. 2/26/ 0'

78 TD: 2624'; MW: 9.0; Vis: 37. Rigged up iron roughneck. Tripped in hole with bottom hole assembly. Laid down excess drill pipe in derrick. Tested 13-3/8" casing to 2,500 psi. Top of cement at 2525'. 2/27/ 0'

78 TD: 3137'; MW: 9.1; Vis: 34. Completed rig up of iron roughneck. Drilled float collar and 84 feet of cement and float shoe. Drilled 10 feet to 2634' and conditioned mud. Ran shoe bond test to 0.70 psi/ft. equivalent gradient with no observed leak off. Drilled ahead. 2/28/ 513'

8 TD: 3932'; MW: 9.5; Vis: 35. Drilled 12-1/4" hole. Made short trip to 12-3/8" shoe with 25,000-75,000 pound drag on all stands. 3/1/7 795'

8 TD: 4421'; MW: 9.6; Vis: 34. Drilled to 3951'; tripped for bit. Maximum drag: 75,000 pounds. Drilled to 4421'. Surveyed 1/2° at 3658', 0° at 3911'. 3/2/7 489'

8 TD: 4888'; MW: 9.5; Vis: 33. Drilled to 4888'; tripped for bit. Tight hole: 4690-3950'. 3/3/7 467'

8 TD: 5225'; MW: 9.6; Vis: 34. Drilled to 5225'. Connection on kelly cock began leaking. Repaired shifter in compound; tripped out to replace kelly cock. Rigged up line weight indicator. Repaired air leak in low drum clutch. Tripped in. Cut drilling line. 3/4/7 337'

8 TD: 5766'; MW: 10; Vis: 37. Changed stand pipe union. Drilled ahead. 3/5/7 541'

3/6/78 139'	TD: 5905'; MW: 10.2; Vis: 37. Drilled to 5892'; tripped out. Tested blowout preventer equipment rams to 5,000 psi, Hydril to 2,500 psi, upper and lower kelly cocks to 5,000 psi. Tripped in; reamed 60 feet to bottom.
3/7/78 395'	TD: 6300'; MW: 10.4; Vis: 39. Drilled to 6143'; circulated samples. Had 2,080 units of gas with mud cut from 10.2 to 9.9 ppg. Made ten-stand short trip; tight at 5898'. Drilled to 6290', had drilling break, checked for flow. Had 1,120 units of gas, no gas cut mud.
3/8/78 6'	TD: 6306'; MW: 10.6; Vis: 40. Tripped out. Washed and reamed to 5979'. Tripped out. Tripped in with new bit. Washed and reamed 5583' to bottom.
3/9/78 308'	TD: 6614'; MW: 10.6; Vis: 47. Finished reaming to bottom at 6306'. Drilled to 6614'. Tripped out.
3/10/78 114'	TD: 6728'; MW: 11.0; Vis: 43. Tripped at 6614'. Picked up three 8" drill collars. Cut drilling line. Worked on rotary torque indicator. Tripped in with bit; no tight hole; no fill. Surveyed at 6584'.
3/11/78 131'	TD: 6859'; MW: 11.2; Vis: 46. Drilled from 6728' to 6859'. Lost mud at 15 to 20 barrels per hour while weighting up to 11.2 ppg. Mixed lost circulation material and stabilized hole. Tripped for bit.
3/12/78 266'	TD: 7125'; MW: 11.2; Vis: 40. Washed and reamed 72 feet to bottom. Lost returns at 7044'; lost 185 barrels of mud. Mixed lost circulation material and held weight at 11.2 ppg. Regained circulation.
3/13/78 71'	TD: 7196'; MW: 11.2; Vis: 38. Tripped out of hole; tight at 6318' and 6566'. Tested blowout preventer to 5,000 psi and Hydril to 2,500 psi. Ran in hole, reamed 6663' to 6700'. Reamed and washed through bridge at 6900'.
3/14/78 30'	TD: 7226'; MW: 11.3; Vis: 44. Reamed from 6846' to 6877'. Cut Core No. 1 from 7197' to 7202'. Barrel jammed. Circulated and increased mud weight to 11.3 ppg. Tripped out and recovered five feet of core. Core bit washed out. Tripped in and reamed 7160' to 7196'. Reamed core hole and drilled.
3/15/78 113'	TD: 7339'; MW: 11.4; Vis: 48. Drilled, surveyed, pulled out of hole. Hole tight 7102-7203' and 6847-6878'.

3/16/78 168'	TD: 7507'; MW: 11.6; Vis: 47. Tripped out to change drilling jars and put on Bit No. 13.
3/17/78 84'	TD: 7591'; MW: 11.6; Vis: 50. Drilled to 7519'; tripped for bit. Washed and reamed 73 feet to bottom. Drilled ahead.
3/18/78 13'	TD: 7604'; MW: 11.6; Vis: 60. Tripped out; tight hole 7594-7479'. Tripped in to shoe and cut drilling line. Tripped in to bottom. Washed and reamed 7370-7594'.
3/19/78 111'	TD: 7715'; MW: 11.6; Vis: 57. Drilled to 7667'. Made short trip. Ran back to bottom; no hole problems.
3/20/78 70'	TD: 7785'; MW: 11.6; Vis: 6.8. Tested blowout preventer to 5,000 psi; Hydril to 2,500 psi. Tripped out for bit. Tripped in, washed and reamed 7747-7754'.
3/21/78 234'	TD: 8019'; MW: 11.7; Vis: 63. Drilled ahead. No drag on connections.
3/22/78 172'	TD: 8191'; MW: 11.7; Vis: 52. Tripped for Bit No. 17. Ran in hole; tight hole 7645-7664'. Hit bridge at 7664'. No connection drag.
3/23/78 112'	TD: 8303'; MW: 11.7; Vis: 51. Tripped out for Bit No. 18. Changed out shock sub and jars. Tight hole 7870-7000'. Installed tail shaft on No. 1 pump. Tripped in with bottom hole assembly.
3/24/78 0'	TD: 8303'; MW: 11.9; Vis: 83. Tripped in to 7830'. Attempted to wash through bridge. Laid down single and washed and reamed 7800-8213'. Raised mud weight from 11.7 to 11.9 ppg and viscosity from 53 to 83. Circulated large amounts of shale cavings over shaker.
3/25/78 38'	TD: 8341'; MW: 11.9; Vis: 72. Lost returns at 8341' while weighting up at 12.1 ppg. Mixed and spotted 130 barrel pill with 30 ppb lost circulation material, followed by 275 barrel pill with 20 ppb lost circulation material. No returns. Hole standing full. Mixed 500 barrels of new mud at 11.9 ppg. Spotted 175 barrel pill with 35-40 ppb lost circulation material followed by 118 barrels of new mud. Partial returns after first 100 barrels.
3/26/78 19'	TD: 8360'; MW: 11.9; Vis: 73. Built new mud volume (11.0 ppg). Regained partial returns. Lost about 100 barrels of mud before regaining full returns.

4/5/78
0'

TD: 8712'; MW: 11.8; Vis: 49. Circulated and conditioned mud; made short trip; no drag. Observed with ten stands out; taking mud slowly. Ran in hole. Circulated with full returns. Pulled out of hole; observed well each ten stands. Inspected bottom hole drilling assembly. Pulled wear bushing. Tested blowout preventer.

4/6/78
0'

TD: 8712'; MW: 11.8; Vis: 48. Tested blowout preventer to 5,000 psi and Hydril to 2,500 psi. Tripped in; circulated at shoe, 5000' and total depth. Tripped out to log. Ran DIL/SP/GR, 8702-2611'.

4/7/78
0'

TD: 8712'; MW: 11.8; Vis: 52. Ran FDC/CNL/GR: 8702-2611'; ran BHC-Sonic/GR: 8702' to 2611'. Tripped in. Cut drilling line. Circulated bottoms up at shoe, 5000' and total depth. Tripped out to log.

4/8/78
0'

TD: 8712'; MW: 11.8; Vis: 50. Ran Dipmeter Survey: 8702-2611'. Ran Velocity Survey. Shot 90 sidewall cores; recovered 78. Tripped in. Broke circulation at 2300', 5000' and total depth.

4/9/78
0'

TD: 8712'; MW: 11.8; Vis: 45. Finished running in hole. Circulated and tripped out. Changed rams to 9-5/8". Pulled wear ring. Rigged up to run 9-5/8" casing.

4/10/78
0'

TD: 8712'; MW: 11.8; Vis: 42. Ran 217 joints of 9-5/8", 53.5#, S-95 Buttress casing; shoe at 8704', float collar at 8619', lower FO at 2448', upper FO at 2115'. Landed with fluted hanger; casing load: 370,000 pounds. Circulated, mixed and pumped 50 barrels of water. Released bottom plug. Cemented with 1,000 sacks of Class "G" cement at 15.8 pound slurry. Released top plug and displaced with 616 barrels. Bumped plug with 800 psi, pressured to 3,000 psi. Plug down at 7:30 p.m. Released pressure, floats held. Laid down landing joint. Set 9-5/8" packoff and tested to 5,000 psi. Changed rams. Tripped in with Howco tools; 30 joints HWDP to 2,000'. Tested 9-5/8" FO to 500 psi.

4/11/78
0'

TD: 8712'; MW: 11.8; Vis: 42. Opened upper FO at 2115' and circulated 150 barrels. Closed FO and tested to 3,000 psi. Opened FO at 2448' and circulated 150 barrels. Closed FO and tested to 3,000 psi. Opened lower FO and set RTTS at 2435'. Circulated and cemented with 10 barrels of water and 155 sacks of Permafrost II at 15 ppg. Displaced with two barrels of water and 29 barrels of mud. Cement in place at 10:20 a.m. Closed FO and tested to 3,000 psi. Reversed out three barrels of cement. Moved to

	Circulated and conditioned mud while building volume. Drilled to 8360'. Spotted 130 barrel lost circulation material pill at 7000'. Tripped out; tight on fifth and seventh stands.
3/27/78 0'	TD: 8360'; MW: 11.9; Vis: 68. Tripped out. Tested blowout preventer equipment; repaired blind rams. Tripped in to 7757' and began reaming.
3/28/78 53'	TD: 8413'; MW: 12; Vis: 80. Washed to bottom. Drilled ahead.
3/29/78 46'	TD: 8459'; MW: 12.1; Vis: 85. Drilled to 8459'; tripped out. Tight at 7817'. Laid down stabilizers. Cut drilling line. Tripped in. Reamed from 7811' to 7826'. Lost some mud through seepage.
3/30/78 36'	TD: 8495'; MW: 12.1; Vis: 59. Washed and reamed to bottom. Drilled ahead.
3/31/78 37'	TD: 8532'; MW: 12.1; Vis: 56. Made short trip at 8527' to 7600'. Washed and reamed 110 feet to bottom; no tight spots. Drilled to 8532' and tripped for bit. Washed and reamed 60 feet to bottom.
4/1/78 131'	TD: 8663'; MW: 12.1; Vis: 57. Tripped in. Reamed 8437' to 8532'. Drilled to 8606'. Made short trip; tight at 8580'. Tripped in and drilled ahead.
4/2/78 49'	TD: 8712'; MW: 12; Vis: 60. Drilled to 8712'. Lost complete returns. Mixed mud and lost circulation material. Lost approximately 1,000 barrels of mud.
4/3/78 12 0'	TD: 8712'; MW: 12; Vis: 50. Spotted 750 barrels of pound mud. Circulated out 405 barrels of water/mud. Weighed 9.5 pounds at shaker; 2,900 units of gas. Lost returns; lacked 400 barrels having full circulation. Mixed new surface volume; hole standing full. Well started flowing slowly at 3:30 a.m. Started circulating 11.9 pound mud with 25 pounds per barrel lost circulation material. Bypassed shaker; had full returns at 6:00 a.m.
4/4/78 0'	TD: 8712'; MW: 11.8; Vis: 48. Lost returns. Filled annulus with 68 barrels of water. Displaced water. Circulated with full returns. Shut pump down before short trip; hole standing full. Pulled out of hole eleven stands; no drag. Hole took approximately twice normal volume to fill up. Observed hole with 11 stands out; would not stand full. Ran in hole, washed and reamed 8678' to 8712'. Lost returns. Put 250 barrels of water in annulus; regained circulation. Circulated with full returns.

	upper FO and opened. Circulated out five barrels of cement. Closed FO and tested to 3,000 psi. Tripped out. Laid down Halliburton tools, 8" drill collar, and 12-1/4" tools. Installed HCR valve. Tested blowout preventer, kelly cocks, and choke. Set wear bushing. Picked up bottom hole assembly.
4/12/78 73'	TD: 8785'; MW: 11.4; Vis: 43. Tripped in and tagged cement at 8606'. Laid down 17 singles in derrick. Drilled cement and float shoe at 8619'. Cement firm to 8702'. Drilled shoe and rat hole to 8712'. Lost returns. Hole standing full. Picked up to 7800' to break circulation. No returns. Ran back to 8704' and spotted lost circulation material pill. Pulled out to 5900' to break circulation. No returns. Tripped out to 2750' and circulated with returns. Staged in to 8704' with circulation. Circulated bottoms up. Started drilling 8-1/2" hole at 3:00 a.m. Drilled 8712-8762'. Circulated samples.
4/13/78 180'	TD: 8965'; MW: 11.4; Vis: 46. Tripped for bit at 8875'. Cut drilling line. Lost 70 barrels on trip and circulated bottoms up. Lost 100 barrels while drilling. Stabilized at 11.4 ppg. Six percent lost circulation material in system.
4/14/78 146'	TD: 9111'; MW: 11.4; Vis: 47. Tripped for bit at 9040'. Hole condition OK; no mud loss. Three percent lost circulation material in system.
4/15/78 264'	TD: 9375'; MW: 11.4; Vis: 47. Drilled ahead.
4/16/78 151'	TD: 9526'; MW: 11.4; Vis: 47. Drilling break 9521-9526'. Lost returns. Spotted lost circulation material pill and regained returns. Spotted second lost circulation material pill. Hole standing full. Tripped out. Lost 275 barrels total. Mixed new mud at 11.1 ppg.
4/17/78 174'	TD: 9700'; MW: 10.7; Vis: 61. Tested blowout preventer to 5,000 psi, Hydril to 2,500 psi. Lost 650 barrels of mud while drilling 9526-9625'. Mud stabilized. Lost 500 barrels, 9680-9700'. Mixed lost circulation material pill. Spotted on bottom. Pulled out of hole to casing.
4/18/78 31'	TD: 9731'; MW: 10.7; Vis: 46. Built mud volume. Tripped in; drilled; tripped out. Tripped in to shoe. Cut drilling line. Tripped to bottom. Drilled ahead.

4/19/78 210'	TD: 9941'; MW: 10.7; Vis: 49. Circulated samples at 9912'. Drilled ahead.
4/20/78 111'	TD: 10,052'; MW: 10.8; Vis: 49. Drilled to 10,035'; surveyed. Drilled to 10,045'; tripped for bit. Drilled ahead.
4/21/78 134'	TD: 10,186'; MW: 10.8; Vis: 45. Drilled to 10,186'; tripped for bit. Tight first stand.
4/22/78 138'	TD: 10,324'; MW: 10.8; Vis: 45. Tripped in; washed and reamed 25 feet to bottom. Drilled ahead.
4/23/78 58'	TD: 10,382', MW: 10.8; Vis: 47. Tripped out for bit. Tested blowout preventer to 5,000 psi, Hydril to 2,500 psi. Tripped in with 8-1/2" bit.
4/24/78 92'	TD: 10,474'; MW: 10.8; Vis: 45. Cut drilling line. Ran in hole. Drilled ahead.
4/25/78 6'	TD: 10,480'; MW: 10.8; Vis: 47. Tripped out with drill bit. Tripped in with new button bit to 8700'. Tripped out. Tripped in with new mill tooth prior to core. Drilled six feet. Tripped out for core barrel. Picked up core barrel.
4/26/78 24'	TD: 10,504'; MW: 10.8; Vis: 44. Tripped in with core barrel. Cut Core No. 2: 10,480-10,504'. Recovered 24 feet of core. Tripped in with bit.
4/27/78 91'	TD: 10,595'; MW: 10.9; Vis: 44. Tripped in. Cut drilling line. Reamed core hole. Drilled ahead.
4/28/78 69'	TD: 10,664'; MW: 10.8; Vis: 46. Lost 400 psi pump pressure. Tripped out. Found washout in box, four singles below jars in HWDP. Changed shock sub. Tripped in with new bit.
4/29/78 91'	TD: 10,755'; MW: 10.8; Vis 46. Tripped in, reamed bridge at 10,432'. Drilled ahead.
4/30/78 46'	TD: 10,801'; MW: 10.8; Vis: 43. Tripped out. Tested blowout preventer. Ran in hole.
5/1/78 31'	TD: 10,832'; MW: 10.8; Vis: 44. Drilled ahead. Formation changed to primarily shale. Tripped for new bit. Reamed at 10,292'.
5/2/78 33'	TD: 10,865'; MW: 10.8; Vis: 44. Tripped out with J-55 bit. Cut drilling line. Tripped in with J-44 bit.

5/3/78 90'	TD: 10,955'; MW: 10.8; Vis: 43. Drilled ahead.
5/4/78 75'	TD: 11,030'; MW: 10.8; Vis: 47. Formation changed at 11,030'. Circulated and tripped for core barrel. Bit 1/8" out of gauge. Tripped in with bit to ream hole for core barrel.
5/5/78 0'	TD: 11,030'; MW: 10.8; Vis: 46. Reamed 87 feet with mill tooth bit. Tripped for core barrel. Picked up core barrel. Tripped in to 10,940'. Began reaming and reamed from 10,940' to 10,990'. Cut Core No. 3 from 11,030' to 11,033'.
5/6/78 18'	TD: 11,048'; MW: 10.7; Vis: 45. Tripped out with core barrel; recovered three feet of core. Ran in hole to shoe. Cut drilling line. Bridge at 10,407-10,620'. Washed and reamed to bottom. Drilled ahead.
5/7/78 49'	TD: 11,097'; MW: 10.7; Vis: 43. Drilled to 11,085'. Hole took 65 barrels of mud. Drilled to 11,097'; tripped out. Tested blowout preventer rams to 5,000 psi, Hydril to 2,500 psi.
5/8/78 119'	TD: 11,216'; MW: 10.6; Vis: 44. Tripped in with bit. Washed and reamed 11,007-11,097'. Lost 90 barrels of mud 11,120' to 11,190'. Drilled ahead.
5/9/78 50'	TD: 11,266'; MW: 10.6; Vis: 44. Worked blowout preventers; checked Crown-o-matic. Washed and reamed 11,190-11,250'. Drilled ahead.
5/10/78 181'	TD: 11,447'; MW: 10.6; Vis: 42. Lost 250 barrels of mud 11,330-11,362'. Bypassed shaker 11,330-11,370'. Carrying 15 to 20 percent lost circulation material; lost 150 barrels of mud 11,370-11,390'. Drilled ahead.
5/11/78 81'	TD: 11,528'; MW: 10.6; Vis: 45. Tripped for bit. Checked and worked blowout preventers on trip. Cut drilling line. Drilled ahead.
5/12/78 159'	TD: 11,687'; MW: 10.6; Vis: 40. Lost 30 barrels of mud at 11,655'. Drilled ahead.
5/13/78 100'	TD: 11,787'; MW: 10.6; Vis: 45. Drilled to 11,787' and tripped for bit.
5/14/78 163'	TD: 11,950'; MW: 10.6; Vis: 40. Drilled ahead. Lost 50 barrels of mud on trip at 11,787'. Lost 20 barrels of mud while drilling 11,810-11,850'; lost 50 barrels of mud while drilling 11,850-11,865'.

5/15/78 111'	TD: 12,061'; MW: 10.6; Vis: 45. Drilled to 12,061' and tripped for bit. Tested blowout preventer rams to 5,000 psi and Hydril to 2,500 psi. Tripped in with new bit.
5/16/78 139'	TD: 12,200'; MW: 10.6; Vis: 44. Drilled ahead.
5/17/78 116'	TD: 12,316'; MW: 10.6; Vis: 41. Drilled ahead.
5/18/78 56'	TD: 12,372'; MW: 10.6; Vis: 41. Tripped for bit. Worked blowout preventers while out of hole. Cut drilling line. Tripped in, washed and reamed 12,251-12,325'. Drilled ahead.
5/19/78 50'	TD: 12,422'; MW: 10.6; Vis: 44. Drilled to 12,387'; jet plugged. Tripped out; found metal inside bit. Tripped in with new bit. Washed through bridge 11,741-11,795'. Washed and reamed 12,318-12,387'. Drilled ahead.
5/20/78 149'	TD: 12,571'; MW: 10.6; Vis: 43. Drilled ahead.
5/21/78 17'	TD: 12,588'; MW: 10.6; Vis: 44. Drilled to 12,588'; circulated. Made short trip to 9-5/8" casing shoe. Ran in hole and circulated. Pulled out of hole to log. Ran DIL to 12,592'*; became stuck at 12,380'; worked loose.
5/22/78 0'	TD: 12,588'; MW: 10.6; Vis: 63. Ran wiper trip for logs. Circulated bottoms up. Ran DIL/SP/GR, 12,594*-8697'. Ran FDC/CNL/GR; misrun. Prepared to rerun FDC/CNL/GR.
5/23/78 0'	TD: 12,588'; MW: 10.6; Vis: 63. Reran FDC/CNL/GR, 12,594*-8697'. Ran BHC/GR, 12,590*-8697'. Attempted to run Dipmeter; stuck at 11,068'. Rigged up and cut Schlumberger line. Stripped in with overshot.
5/24/78 0'	TD: 12,588'; MW: 10.6; Vis: 5.3. Stripped in hole to 9771'. Fish came free. Circulated overshot and pulled fish into overshot. Pulled out of rope socket. Rigged down Schlumberger. Pulled out of hole without fish. Dressed overshot. Tripped in; circulated and conditioned mud; worked overshot. Pulled out of hole with fish.
5/25/78 0'	TD: 12,588'; MW: 10.6; Vis: 54. Tripped in hole. Cut drilling line. Circulated and conditioned mud.

* Logger's measurements

Pulled out of hole. Rigged up and ran Schlumberger Velocity Survey. Survey tool stopped at 12,524'. Could not pick up tool, indicating line may have stuck. Pulled out 6,300 pounds over line weight. Cut line and stripped in hole to recover survey tools.

5/26/78 TD: 12,588'; PBTD: 11,002'; MW: 10.6; Vis: 49. Stripped in hole with drill pipe over Schlumberger line. Line came free at 9645'. Spliced line. Took four shots with Velocity Survey: 12,366', 11,182', 10,494' and 9976'. Pulled survey tool into overshot. Pulled out of rope socket. Pulled line. Rigged down Schlumberger. Pulled out of hole with drill pipe; recovered tool. Tripped in open ended to 11,200'. Circulated; set Plug No. 1: 155 sacks of Class "G" with 0.2 percent HR-7, 1 percent CFR 2, 10.6 barrels of water ahead and three barrels of water behind. Displaced plug in place. Pulled out of hole to 10,200' and began circulating for Plug No. 2.

5/27/78 TD: 12,588'; PBTD: 8600'; MW: 10.6; Vis: 48. Conditioned mud at 10,200'. Spotted Plug No. 2: 180 sacks of Class "G" with additives. Picked up to 9700'. Conditioned and spotted Plug No. 3: 165 sacks Class "G" with additives. Picked up to 8900'. Conditioned and spotted Plug No. 4: 135 sacks of Class "G" with additives. Picked up to 8400'. Conditioned mud and tripped out. Tripped in with 8-1/2" bit and 9-5/8" casing scraper to 8400'. Picked up and tripped in with 9-5/8" cement retainer.

5/28/78 TD: 12,588'; PBTD: 8207'. Tripped in and set 9-5/8" cement retainer at 8352'. Spotted 50 sacks of Class "G" cement with additives on top of retainer. Laid down 6-3/4" drill collars, 5" Heavy Wall drill pipe, and 4-1/2" drill pipe. Tripped in with casing cutter and cut 9-5/8" casing at 2055'. Tripped out. Pulled wear bushing. Pulled OCT packoff. Picked up spear and set in casing. Could not pull casing. Rigged up and circulated 9-5/8" x 13-3/8" annulus. Pulled 9-5/8" free; laid down 9-5/8" casing.

5/29/78 TD: 12,588'; PBTD: 1894'. Laid down 9-5/8" casing. Tripped in with 12-1/4" bit and 13-3/8" casing scraper to 430'. Washed and reamed cement stringer to 690'. Tripped in to 2032', circulating every four stands. Circulated bottoms up and tripped out. Picked up and ran 13-3/8" cement retainer. Set retainer at 1950'. Spotted 50 sacks of Permafrost cement on top of retainer. Picked up to 1800'; displaced mud to water to diesel. Tripped out, laid down 4-1/2" drill pipe.

5/30/78	TD: 12,588'; PBTD: 1894'. Finished laying down 4-1/2" drill pipe. Laid down kelly and swivel; set out rotary table. Nippled down blowout preventer equipment and cleaned mud pits. Rig released May 29, 1978, at 9:00 p.m.
5/31/78	Began rigging down in preparation for movement to Peard Bay stack-out area to await summer barges.

DRILLING TIME ANALYSIS

KUGRUA TEST WELL NO. 1

PARCO, INC., RIG 95

Spudded 2/12/78, Rig released 5/29/78

Total Depth: 12,588 Feet

DRILLING TIME ANALYSIS (HOURS) - HUSKY NPR OPERATIONS, INC. KUGRUA TEST WELL No. 1 Page 1 of 11

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
1978 1-2																							12		Began Moving Rig & Camp to Airstrip
1-3																							18		
1-4																							24		Packaging Herc Loads
1-5																							24		
1-6																							24		
1-7																							24		Began Movement of Camp Units to Kugrua
1-8																							24		
1-9																							24		Waiting on Weather
1-10																							24		Began Airlift of Rig
1-11																							24		
1-12																							24		
1-13																							24		
1-14																							24		
1-15																							24		
1-16																							24		

DRILLING TIME ANALYSIS (HOURS) - HUSKY NPR OPERATIONS, INC. KUGRUA TEST WELL NO. 1 Page 2 of 11

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
1-17	24																								Began Rig Up
1-18	24																								Rigging Up
1-19	24																								Rigging Up
1-20	24																								Rigging Up
1-21	24																								Rigging Up
1-22	24																								Rigging Up
1-23	24																								Rigging Up
1-24	24																								Rigging Up
1-25	24																								Rigging Up
1-26	24																								Rigging Up
1-27	24																								Rigging Up
1-28	24																								Rigging Up
1-29	24																								Rigging Up
1-30	24																								Rigging Up
1-31	24																								Rigging Up

UA TEST WELL NO. 1 Page 3 of 11

SQUEEZE CEMENT	DIR. WORK	W O MAT./EQUIP.	OTHER	Operations at 6:00 a.m.	Comments
					Rigging Up
					Rigging Up
					Rigging Up
					Rigging Up
					Rigging Up
					Rigging Up
					Rigging Up; set 30" @ 80'
					Rigging Up
					Rigging Up
					Rigging Up
					Rigging Up
				Conditioning Mud	Spudded Well at 3:00 p. m.
				Drilling	
			2	Tripping	
				Cementing	Set 20" @ 496'

DRILLING TIME ANALYSIS (HOURS) - HUSKY NPR OPERATIONS, INC. KUGRUA TEST WELL NO. 1 Page 4 of 11

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
2-16												24												Nipple Up BOP	
2-17		1½		7½								7	4										4	Testing BOP	
2-18		22½			½		½																½	Drilling	
2-19		12¼		6½	1¼	1	3																	Tripping	
2-20		16¼		4¼	½			2½																Drilling	
2-21				12				2½	9½															Logging	Ran Schlumberger Wireline Logs
2-22				3						21														Running Casing to 2611'	
2-23				2								22												Nipple Up BOP	
2-24												24												Nipple Up BOP	
2-25												9	15											Testing BOP	
2-26				5									1										18	Tripping	Installed Iron Roughneck
2-27		6½		3		½	2	3½															8½	Testing Casing	
2-28		20		2½	1	½																		Drilling	
3-1		14¾		7		½	1	1																Drilling	
3-2		20½		2½	1																			Drilling	

DRILLING TIME ANALYSIS (HOURS) - HUSKY NPR OPERATIONS, INC. KUGRUA TEST WELL NO. 1 Page 5 of 11

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
3-3		8½		12		½	1½																1½	Drilling	
3-4		11		7½	½																		5	Drilling	
3-5		10½		7½			½	1				4½												Drilling	
3-6		16½	2½	3½		½																	1	Drilling	
3-7		5	5½	10		½		2															1	Drilling	
3-8		15	6	2½		½																		Reaming	
3-9		5½		14	1																		3½	Tripping	
3-10		17		2½	½	½	1½	2																Drilling	
3-11		12	1½	8½		½	½																1	Tripping	
3-12		9½		8	½	½		3					2½											Drilling	
3-13			3	15		½		3								2½								Reaming	Core No. 1: 7197' - 7202'
3-14		18½	1½	1	2	½																	½	Drilling	
3-15		10½	1	9½	1	½	½																1	Tripping	
3-16		12	1	7½	½	½		½															2	Drilling	
3-17		7	3½	10½	½	½		½															1½	Drilling	

DRILLING TIME ANALYSIS (HOURS) - HUSKY NPR OPERATIONS, INC. KUGRUA TEST WELL NO. 1 Page 6 of 11

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
3-18		17	4½	1½		½																	½	Drilling	
3-19		14½		6	½								3											Drilling	
3-20		20½		2½		½		½																Drilling	
3-21		13½		8	1	½																	1	Drilling	
3-22		18½		5	½																			Drilling	
3-23			13	5½			5½																	Repairing Rig	
3-24		4	10			½		9½																Reaming	
3-25		1	½					22½																Circulating	
3-26		2½	1	9½			5	1½					2										2½	Tripping	
3-27		6½	15¾			½		1¼																Reaming	
3-28		8¼		8	½	½	3¼																3	Drilling	
3-29		1½	19	2¼																			¾	Reaming	
3-30		15½	3½	3½	½			1																Drilling	
3-31		11½	1½	10				1																Tripping	
4-1		13						11																Drilling	

DRILLING TIME ANALYSIS (HOURS) - HUSKY NPR OPERATIONS, INC. KUGRUA TEST WELL NO. 1 Page 7 of 11

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
4-2								24																Mixing Mud	
4-3								24																Mixing Mud	
4-4			½	7½				15															1	Mixing Mud	
4-5				14½				4	1				3½										1	Tripping	
4-6				4½				2	16½														1	Logging	Ran Schlumberger Wireline Logs
4-7				5	½			2½	16															Circulating	
4-8				11				4½	½	6½													1½	Tripping	
4-9								3½		20½														Running 9 5/8" Casing	
4-10				5						14			5											Running 9 5/8" Casing	to 8704'
4-11		3½		17½				1½					1										½	Tripping	
4-12		11	½	8½	½	½		2															1	Drilling	
4-13		15		7½			½	1																Drilling	
4-14		23					1																	Drilling	
4-15		21½						2½																Drilling	
4-16		9½		9	½			3					2											Testing BOP	

DRILLING TIME ANALYSIS (HOURS) - HUSKY NPR OPERATIONS, INC. KUGRUA TEST WELL NO. 1 Page 8 of 11

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
4-17		9		10	½			4															½	Tripping	
4-18		21½	½	1		½																	½	Drilling	
4-19		16		5½		½		2																Drilling	
4-20		18½	½	4½		½																		Drilling	
4-21		12½	1	9½	½	½																		Tripping	
4-22		17		4½	½	½	1½																	Drilling	
4-23		13½	½	4½		½							4										1	Tripping	
4-24		7	1	15	½																		½	Drilling	
4-25		½	2	12½				½									7						1½	Reaming	Core No. 2: 10480' - 10504'
4-26		13½	1	6½		½																	2½	Tripping	
4-27		21		2		½		½																Drilling	
4-28		13	2	8½		½																		Tripping	
4-29		17		4½	½	½	½						1											Drilling	
4-30		10½	1	6		½	1½	½					4											Tripping	
5-1		10	1½	12		½																		Reaming	

DRILLING TIME ANALYSIS (HOURS) - HUSKY NPR OPERATIONS, INC. KUGRUA TEST WELL NO. 1 Page 9 of 11

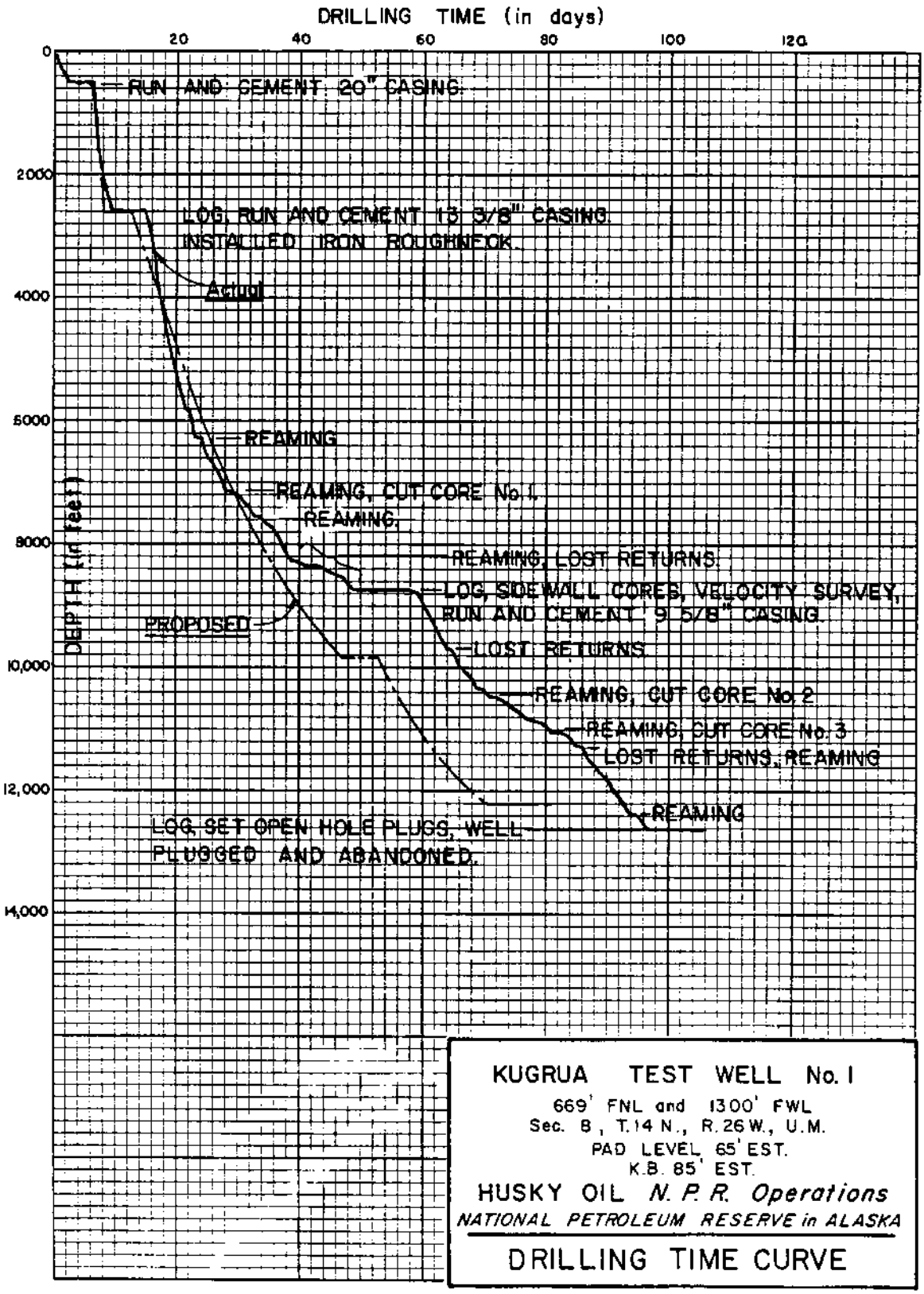
DATE	RIG UP/RIG DOWN	DRILLING	REAMING	TRIP	DEV. SURVEY	RIG MAINT.	RIG REPAIR	CIRC. & COND. MUD	LOGGING	CASING & CEMENT	W O C	NIPPLE UP/DOWN BOP	TEST BOP	CHANGE BHA	LOST CIRC.	FISHING	CORING	DST	PLUG BACK	SQUEEZE CEMENT	DIR. WORK	W O MAT./EQUIP.	OTHER	Operations at 6:00 a.m.	Comments
5-2		19	1	2½		½																	1	Drilling	
5-3		20½			½	½		2½																Drilling	
5-4			4	18			1	½															½	Tripping	
5-5			2½	12½		½		2									5½						1	Coring	Core No. 3: 11030' - 11033'
5-6		16	3	4		½		½																Drilling	
5-7		14½	2	3½		½							3½											Tripping	
5-8		15½		7½		½		½																Drilling	
5-9		21½	½	1½		½																		Drilling	
5-10		15		7	½	1																	½	Drilling	
5-11		22	½	1																			½	Drilling	
5-12		21		2	½	½																		Drilling	
5-13		15½	1	7	½																			Tripping	
5-14		21		2	½	½																		Drilling	
5-15		14	½	6½		½							2½											Tripping	
5-16		23½				½																		Drilling	

DRILLING TIME ANALYSIS (HOURS) - HUSKY NPR OPERATIONS, INC. KUGRUA TEST WELL NO. 1 Page 10 of 11

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
5-17		12	1	9½	½																		1	Drilling	
5-18		11	1½	9	½	½	1	½																Drilling	
5-19		23½					½																	Drilling	
5-20		9½		8		½	½	4	1														½	Drilling	
5-21			½	9				2	12½															Logging	
5-22									24															Logging	Ran Schlumberger Wireline Logs
5-23			½	18				2½	2½														½	Tripping	Retrieved Schlumberger Tool
5-24				13½		½	1	3½	3								1						1½	Tripping	Prepared to Run Velocity Survey Tool Stuck
5-25				6½					17½															Logging	Ran Velocity Survey
5-26				10½				8½											5					Circulating	
5-27				18				2											1				3	Tripping	
5-28				7½				½									15		½				½	Fishing	Casing Stuck
5-29	15½			5														3½						Laying Down Drill Pipe	Rig Released at 9:00 p.m.
5-30	24																								
5-31	24																								

DRILLING TIME ANALYSIS (HOURS) - HUSKY NPR OPERATIONS, INC. KUGRUA TEST WELL NO. 1 Page 11 of 11

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
TOTAL HOURS	693	128¼	21¾		35¾			104		16½		58½		-0-		31		10		-0-		423¾			
	10	22¼	637		26		209½		78½		86		-0-		-0-		-0-	-0-		-0-					


DRILLING TIME (in days)
20
40
60
80
100
120
0
2000
4000
6000
8000
10,000
12,000
14,000
DEPTH (in feet)
RUN AND CEMENT 20" CASING.
LOG, RUN AND CEMENT 13 3/8" CASING.
INSTALLED IRON ROUGHNECK.
Actual
REAMING.
REAMING, CUT CORE No. 1.
REAMING.
REAMING, LOST RETURNS.
LOG, SIDEWALL CORES, VELOCITY SURVEY,
RUN AND CEMENT 9 5/8" CASING.
PROPOSED
LOST RETURNS.
REAMING, CUT CORE No. 2.
REAMING, CUT CORE No. 3.
LOST RETURNS, REAMING.
REAMING.
LOG, SET OPEN HOLE PLUGS, WELL
PLUGGED AND ABANDONED.
KUGRUA TEST WELL No. 1
669' FNL and 1300' FWL
Sec. 8, T. 14 N., R. 26 W., U.M.
PAD LEVEL 65' EST.
K.B. 85' EST.
HUSKY OIL N. P. R. Operations
NATIONAL PETROLEUM RESERVE in ALASKA
DRILLING TIME CURVE

ARCTIC DRILLING SERVICES

DRILLING MUD RECORD

COMPANY Husky Oil NPR Operations, Inc. STATE Alaska

WELL Kugrua Test Well No. 1 COUNTY North Slope

CONTRACTOR Parco, Inc. LOCATION NPRA SEC 8 TWP 14N RNG 26W

CASING PROGRAM: 20 inch at 496 ft.
13 3/8 inch at 2611 ft.
9 5/8 inch at 8704 ft.

TOTAL DEPTH 12,588 ft.

DATE	DEPTH	WEIGHT	VISCOSITY		Yp	GELS	pH	FILTRATION			FILTRATE ANALYSIS				SAND	RETORT			CEC	REMARKS AND TREATMENT
	feet	lb/gal	Sec API @ °F	PV @ °F		lbs/100 sq ft 10 sec / 10 min	Strip □ Meter □	ml API	HTHP @ °F	Cake 32nds	Pf	Mf	Cl ppm	Ca ppm	%	Solids %	Oil %	Water %	Mud, me/ml	
						18/5	7.5	18		3			750	20						Well spudded at 3:00 PM.
2/12	0	8.4	39	6	10	2/16	7.5	18		3			750	20	Tr	6		94		Ran H_2O.
2/13	327	9.7	38	11	11	7/17	7.5	15.5		3			1100	20	1/2	10		90		Ran 20" casing at 496'.
2/14	512	9.7	37	9	9	6/20	7.5	14.2		3			1100	20	1/4	10		90		
2/15	512	9.7	41	12	12	6/18	7.5	16		3			900	20	1/4	9		91		Nipple up 20" casing.
2/16	512	9.5	35	8	6	6/18	7.5	16		3			900	20	1/4	9		91		
2/17	512	9.5	35	8	6	6/18	7.5	16		3			900	20	1/4	9		91		
2/18	512	9.5	35	8	6	6/15	8.5	13		3	.1	.4	600	40	1/4	9		91		Drill out 20" shoe.
2/19	950	9.6	36	8	6	6/12	8.5	13		2	.1	.3	400	20	1/4	11		89		Drilling.
2/20	1850	9.8	36	8	6	6/12	8.5	13		2	.1	.3	450	20	1/4	10		90		Ran H_2O.
2/21	2600	9.7	35	8	6	6/18	9.0	10		2	.3	.6	450	20	1/4	11		89		Ran E logs.
2/22	2624	9.8	45	10	18	4/18	9.0	10		2	.3	.6	450	20	1/4	11		89		Ran 13 3/8" casing.
2/23	2624	9.8	45	10	18	4/														
2/24	Cleaned pits.																			
2/25	Water in pits.					1'11	9.0	19		3	.6	1.2	500	20	-	3		97		Built mud.
2/26	2624	8.7	35	6	8	3/11	9.0	19		3	.6	1.2	500	20	-	3		97		Ran in hole. Tagged cement.
2/27	2624	8.7	34	6	8	3/12	9.0	19		3	.6	1.2	500	20	Tr	4		96		Drilled cement.
2/28	2624	9.0	35	7	9	4/12	8.5	14		2	.1	.4	550	40	Tr	5		95		Ran H_2O.
3/1	3500	9.3	43	6	8	4/11	9.0	12.		2	.2	.5	600	40	Tr	9		91		Ran H_2O.
3/2	4360	9.6	34	9	8	3/4	9.0	12.5		2	.15	.4	600	20	Tr	8		92		Tight hole at 4500'.
3/3	4888	9.5	33	9	6	2/4	9.0	12.5		2	.2	.6	600	10	-	8		92		Ran Sweco.
3/4	5225	9.6	34	10	8	2/5	9.5	8.0		1	.3	.9	600	10	-	10		90		Disperse. Add Lignosulfonate.
3/5	5675	10.0	37	12	9	1/7	10	8.8		2	.35	1.1	600	20	-	13		87		Tight hole.
3/6	5930	10.2	37	14	10	2/5	10.5	5.5		2	.6	1.3	600	20	-	11		89		Tight hole.
3/7	6290	10.4	39	10	7	2/9	10.5	5.7		2	.7	1.5	600	20	-	12		88		Reamed after trip.
3/8	6303	10.6	40	14	10	3/4	9.5	4.5		2	.35	1.4	600	20	Tr	12		88		
3/9	6595	10.6	47	21	15	3/7	9.5	5.0		1	.3	1.3	600	20	-	13		87		Lost mud at 6700'.
3/10	6710	11.0	43	19	10	2/6	9.5	5.0		2	.3	1.2	600	20	-	14		86		Increased weight to 11.2.
3/11	6859	11.2	46	22	13	2/4	10.0	6.5		2	.5	1.6	600	20	-	14		86		Lost returns at 7046'.
3/12	7075	11.2	40	17	11	1/4	10.0	5.2		2	.5	1.5	600	20	-	14		86		Cut core. Tight hole.
3/13	7196	11.2	38	15	10	2/10	10.5	5.1		2	.7	2.2	600	20	-	15		85		3% LCM.
3/14	7204	11.3	44	20	14	3/11	10.0	4.6		2	.5	2.3	600	20	1	16		84		
3/15	7336	11.4	48	22	16	3/12	10.0	4.9		2	.5	2.0	600	20	1	17		83		
3/16	7420	11.5	51	27	13	4/12	9.5	4.8		2	.5	2.0	700	20	1	18		82		Tight hole.
3/17	7540	11.6	46	24	18	5/10	9.5	4.8		2	.6	2.4	750	30	1	17		83		Reamed.
3/18	7594	11.6	49	22	15	4/														

ARCTIC DRILLING SERVICES

DRILLING MUD RECORD

COMPANY Husky Oil NPR Operations, Inc. STATE Alaska

WELL Kugrua Test Well No. 1 COUNTY North Slope

CONTRACTOR Parco, Inc. LOCATION NPRA

SEC 8 TWP 14N RNG 26W

CASING PROGRAM: 20 inch at 496 ft.
13-3/8 inch at 2611 ft.
9-5/8 inch at 8704 ft.
TOTAL DEPTH 12,588 ft.

DATE	DEPTH	WEIGHT	VISCOSITY		Yp	GELS	pH	FILTRATION			FILTRATE ANALYSIS			SAND	RETORT			CEC	REMARKS AND TREATMENT
		lb/gal	Sec/API @ °F	PV @ °F		10-sec/10 min	Strip Meter	ml API	HT/HP & °F	Cake 32nds	Pf	Mf	Cl ppm	Ca ppm	%	Solids %	Oil %	Water %	Mud, me/ml	
3/19	7705																			
3/20	7770	11.6	57	29	26	5/25	10.0	4.7		2	.7	2.4	750	20	1	17		83	22.5	Maintained viscosity at 60.
3/21	8009	11.6	68	32	29	6/26	9.5	4.7		2	.6	2.4	750	20	1	17	-	83	25.0	Drilled ahead.
3/22	8169	11.7	63	27	26	4/26	10.0	4.3		2	.6	2.4	1850	30	1	16	-	84	22.5	
3/23	8302	11.7	52	28	21	6/20	10.0	4.7		2	.5	2.4	000	30	1	16		84	20.0	Added Soltex.
3/24	8303	11.7	51	19	21	5/20	10.0	4.7		2	.8	2.9	800	30	3/4	16		84	20.0	Ran Sweco.
3/25	8340	11.9	83	37	33	6/32	10.0	4.5		2	.5	2.6	750	30	1	17		83	25.0	Raised viscosity and weight.
3/26	8355	11.9	72	24	33	6/22	9.5	7.5		2	.6	1.5	750	30	Tr	17		83		Lost circulation @ 12.2#/gal MW.
3/27	8369	11.9	73	23	30	6/18	9.5	6.5		2	.6	1.6	600	20	1	17		83		Lost 845 barrels of mud.
3/28	8413	11.9	68	26	27	6/16	9.0	5.4		2	.5	1.6	600	20	1	18		82		Washed and reamed to bottom.
3/29	8459	12.0	80	30	30	6/24	9.0	5.5		2	.5	1.6	550	30	1	19		81		Raised mud weight to 12.0 #/gal.
3/30	8532	12.1	85	35	40	6/28	9.0	5.5		2	.5	1.6	550	30	1	20		80		Raised mud weight to 12.1 #/gal.
3/31	8612	12.2	54	30	35	5/24	9.5	4.6		2	.4	1.6	550	20	1/2	18		82		Tight hole.
4/1	8645	12.2	59	28	38	5/21	9.5	4.5		2	.4	1.6	550	20	1/4	18		82		Lost 100 barrels of mud.
4/2	8711	12.1	57	30	40	5/22	9.0	5.0		2	.3	1.6	550	20	1	18		82		Lost all returns.
4/3	8744	12.0	55	30	26	4/18	8.5	5.5		2	.15	1.2	550	20	0	17		83		Mixed mud to 11.8 #/gal.
4/4	8711	12.0	50	28	23	3/15	8.0	6.5		2	.0	1.0	550	20	0	17		83		15-20% LCM. Lost 2100 bbls of mud.
4/5	8711	11.8	48	22	24	9/22	9.0	8.5		3	.15	1.4	550	20	0	16		84		Lost returns.
4/6	8711	11.8	49	23	20	7/15	9.0	7.5		3	.1	1.3	550	40	0	16		84		Lost 50 barrels of mud.
4/7	8711	11.8	48	26	16	3/11	8.5	9.0		3	.05	1.5	550	40	0	16		84		Logging.
4/8	8711	11.8	52	28	22	5/10	8.5	8.0		3	.05	1.6	550	40	0	16		84		Logging.
4/9	8712	11.8	50	25	18	5/9	8.5	7.5		3	.05	1.6	550	20	0	16		84		Ran 9 5/8" casing.
4/10	8704	11.8	45	21	17	3/7	8.5	7.0		3	.05	1.8	550	20	0	16		84		Cemented 9 5/8" casing.
4/11	8704	11.8	42	17	12	2/5	8.0	8.5		3	.0	1.4	550	20	0	16		84		Cemented through FO.
4/12	8759	11.8	42	17	12	2/5	8.0	8.5		3	.0	1.4	550	20	0	16		84		Drilled cement. Lost returns.
4/13	8958	11.5	43	19	13	3/8	10.0	10.0		3	.4	1.3	550	20	0	16		84		Drilling.
4/14	9100	11.4	46	16	14	2/7	9.5	8.2		2	.5	1.8	550	20	0	14		86		Lost 70 barrels of mud.
4/15	9289	11.4	47	19	17	2/7	10.5	7.2		2	.5	1.1	550	40	1/4	14		86		Trip gas: 600 units.
4/16	9528	11.4	47	18	16	2/7	9.5	7.0		2	.5	1.1	550	30	Tr	15		85		Drilling.
4/17	9700	11.4	47	19	14	2/7	10.0	7.0		2	.5	1.1	650	30	1/4	15		85		Lost 275 barrels of mud.
4/18	9726	10.7	61	25	23	7/15	9.5	9.0		3	.4	1.1	650	30	1/4	14		86		Lost 1150 barrels of mud.
4/19	9930	10.7	46	19	13	6/12	9.5	8.0		2	.4	.9	650	30	1/2	12		88		Trip gas: 1360 units.
4/20	10052	10.7	47	18	17	5/11	9.5	6.8		2	.5	1.1	650	30	1/4	11		89		Drilling.
4/21	10186	10.8	49	16	14	4/10	9.5	6.8		2	.4	1.1	600	30	1/4	11		89		Raised mud weight to 10.8.
4/22	10303	10.6	45	17	12	4/9	9.5	6.5		2	.4	1.1	600	30	1/4	11		89		Drilling.
	11	10.8	45	19	17	4/9	10.0	6.5		2	.4	1.1	600	30	1/4	11		89		Tight hole.
													500	20	1/4	12		88		

ARCTIC DRILLING SERVICES

DRILLING MUD RECORD

COMPANY Husky Oil NPR Operations, Inc. STATE Alaska

WELL Kugrua Test Well No. 1 COUNTY North Slope

CONTRACTOR Parco, Inc. LOCATION NPRA SEC 8 TWP 14N RNG 26W

STOCKPOINT _____ DATE _____ BAROID ENGINEER _____

CASING PROGRAM: 20 inch at 496 ft.
13-3/8 inch at 2611 ft.
9-5/8 inch at 8704 ft.

TOTAL DEPTH 12,588 ft.

DATE	DEPTH	WEIGHT	VISCOSITY		Yp	GELS	pH	FILTRATION			FILTRATE ANALYSIS				SAND	RETORT			CEC	REMARKS AND TREATMENT
	feet	lb/gal	Sec API @ °F	PV @ °F		10 sec/10 min	Strip □ Meter □	ml API	MTHP @ °F	Cake 32nds		Ml	Cl ppm	Ca ppm	%	Solids %	Oil %	Water %	Mud, me/ml	
4/23	10383	10.8	47	19	17	4/9	10	6		2	.7	1.9	650	20	1/2	12		88		Tripped.
4/24	10473	10.8	45	15	13	4/9	10	6		2	.7	1.9	600	30	1/2	12		88		Tripped.
4/25	10480	10.8	47	21	13	4/7	9.5	5.7		2	.7	2.9	650	20	1/2	12		88		Drilled ahead.
4/26	10504	10.8	44	17	12	4/8	10	5.5		2	.9	2.9	650	20	1/2	12		88		Cored.
4/27	10595	10.9	44	18	10	2/7	10	6		2	.8	3.0	650	20	Tr	12		88		Drilled ahead.
4/28	10664	10.8	46	19	10	2/6	10.5	5.5		2	.2	3.7	650	20	Tr	12		88		Bridge 260 feet off bottom.
4/29	10755	10.8	46	18	10	2/8	10	5.0		2	1.1	3.7	650	20	1/4	12		88		Drilled ahead.
4/30	10801	10.8	43	17	9	2/5	10	5.2		2	1.0	3.8	650	Tr	1/2	12		88		Drilled ahead.
5/1	10832	10.8	44	17	10	3/6	9.5	5.5		2	.6	3.8	650	Tr	1/4	12		88		
5/2	10866	10.8	44	17	8	2/5	10	5.2		2	.9	3.7	650	Tr	1/2	12		88		Drilled ahead.
5/3	10955	10.8	43	17	8	2/4	10	5.1		2	.9	4.5	650	Tr	1/2	12		88		
5/4	11030	10.8	47	17	13	2/4	10	5.0		2	.7	3.0	700	40	1/2	12		88		Lost 70 barrels of mud.
5/5	11031	10.8	46	18	12	4/6	10	5		2	.8	3.2	750	20	1/2	12		88		Cored.
5/6	11048	10.7	45	17	11	4/6	9.5	5.5		2	.8	3.1	650	30	1/2	12		88		Ran H_2O.
5/7	11097	10.7	43	18	13	4/6	10	5.2		2	.9	3.1	600	20	1/2	12		88		Lost 65 barrels of mud.
5/8	11216	10.6	44	16	11	4/6	10	5.5		2	1.5	2.2	650	20	1/2	11		89		Lost 90 barrels of mud.
5/9	11266	10.6	44	17	13	3/6	9.5	5.5		2	1.5	4.9	600	20	1/2	11		89		Drilled ahead.
5/10	11447	10.6	42	15	11	2/5	10	6		2	.7	2.9	600	20	1/2	11		89		Lost 400 barrels of mud.
5/11	11532	10.6	43	13	10	2/6	10	6.2		2	.7	3.0	600	20	1/2	11		89		Drilled ahead.
5/12	11690	10.6	40	12	6	2/4	10.5	6.0		2	1.2	4.9	600	20	1/2	11		89		64 PPM - H_2S.
5/13	11782	10.6	45	16	10	2/5	11.0	5.5		2	1.8	4.7	600	20	1/2	11		89		Lost 120 barrels of mud.
5/14	11950	10.6	40	12	7	2/4	11	5.5		2	1.6	4.2	600	20	3/4	11		89		
5/15	12061	10.6	45	16	10	2/6	10.5	5.4		2	1.1	4.0	600	20	1/4	10		90		Drilled ahead.
5/16	12200	10.6	44	15	7	2/4	10	5.8		2	.5	3.5	600	20	3/4	11		89		
5/17	12316	10.6	41	14	8	2/4	9.5	5.8		2	.4	3.3	600	20	3/4	11		89		Surface foam.
5/18	12372	10.6	41	14	10	2/4	10	5.5		2	.4	3.2	600	20	3/4	11		89		Tripped.
5/19	12422	10.6	44	16	12	2/4	10	5.2		2	.9	3.7	850	20	3/4	11		89		Surface foam.
5/20	12571	10.6	43	17	11	2/4	10	5.2		2	.9	3.7	800	0	3/4	11		89		Lost 40 barrels of mud.
5/21	12588	10.6	44	18	12	2/4	10.5	5.4		2	.9	3.7	800	20	3/4	11		89		Conditioned hole.
5/22	12588	10.6	63	31	29	3/11	10	5.1		2	.9	3.9	800	20	3/4	11		89		Raised visibility to 60.
5/23	12588	10.6	63	31	29	3/11	10	5.1		2	.9	3.7	800	20	3/4	11		89		Dipmeter became stuck.
5/24	12588	10.6	53	27	11	3/8	10	5.4		2	1.2	4.1	850	20	3/4	11		89		Circulated and conditioned mud.
5/25	12588	10.6	54	21	16	3/7	10	5.4		2	1.3	4.1	850	20	3/4	11		89		Keyseat: Approximately 10,000.
5/26	11200	10.6	49	19	12	3/7	10	5.5		2	1.1	4.2	850	20	3/4	11		89		Cemented.
5/27	8600	10.6	47	15	11	3/8	11	5.8		2	?	8	850	20	3/4	11		89		Cemented.

ARCTIC DRILLING SERVICES

DRILLING MUD RECORD

COMPANY Husky Oil NPR Operations, Inc. STATE Alaska

WELL Kugrua Test Well No. 1 COUNTY North Slope

CONTRACTOR Parco, Inc. LOCATION NPRA

SEC 8 TWP 14N RNG 26W

CASING PROGRAM: 20 inch at 496 ft.
13-3/8 inch at 2611 ft.
9-5/8 inch at 8704 ft.
TOTAL DEPTH 12,588 ft.

DATE	DEPTH	WEIGHT	VISCOSITY		Yp	GELS	pH	FILTRATION			FILTRATE ANALYSIS				SAND	RETORT			CEC	REMARKS AND TREATMENT
	feet	lb/gal	Sec API @ °F	PV @ °F		10 sec/10 min	Strip ☐ Meter ☐	ml API	HTHP @ °F	Cake 32nds	Pf	Mf	Cl ppm	Ca ppm	%	Solids %	Oil %	Water %	Mud, me/ml	
5/28	8207	10.6	48	15	11	3/8	10.5	5.6		2	1.7	7.5	850	20	3/4	11		89		Set E-Z Drill.
5/29	1894	10.5	49	16	12	3/11	10.4	6.4		2	1.1	6.4	850	20	3/4	11		89		Reverse out diesel.

PRINTED IN U.S.A.

BIT RECORD

COMPANY	CONTRACTOR	COUNTY	STATE
	Husky Oil NPR Operations, Inc.	North Slope Borough	Alaska

LEASE	WELL NO	SEC	TOWNSHIP	RANGE	BLOCK	FIELD
	Kugrua Test Well No. 1	8	14N	26W		NPRA

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 T	B	G	REMARKS FORMATION, CIRC FLUID, ETC	DATE
1	17½	Sec.	S3S	780329	14	14	14	420	420	12	12	35	15/20	120	1°	1500	1	6"	50	9.1	47	1	1	I	Pulled casing	
1A	26	STC	HO		OPEN			420	420	14	26	30	15	120	1°	600	½	6"	208	9.1	45	1	1	I		
2	17½	Sec.	S3S	780451	14	14	14	1580	1082	24½	50½	44	45	110	1°	2200	1	6"	116	9.6	50	3	2	I		
3	17½	Sec.	S3S	780686	14	14	14	2624	1044	28½	79	36.6	45	110	½°	2250	1	6"	100	9.7	42	2	4	I		
4	12¼	Sec.	S33S	771973	14	14	14	3951	1327	30	109	44	50	110	0°	2500	½	6"	150	9.6	34	6	6	I		
5	12¼	Sec.	S33S	771974	14	14	14	4888	937	29½	138½	32	50	110	1°	2500	½	6"	150	9.5	33	5	5	I		
6	12¼	Sec.	S33S	771977	14	14	14	5225	337	8½	147	39	50	140	¾°	2500	½	6"	150	9.6	34	1	2	I	Bit is reusable.	
7	12¼	Sec.	S3S	780012	14	14	14	5892	567	21½	168½	26	50	140	½°	2500	½	6"	140	10/2	37	4	7	I	Need sealed bearings.	
8	12¼	Sec.	S3S	781319	14	14	14	6306	414	20½	189	20	50	150	½°	2700	½	6"	130	10/6	40	5	7	I	Need sealed bearings.	
9	12¼	Sec.	S4T	770309	14	14	14	6614	305	18	207	17	50	150	N/P	2700	½	6"	130	10/6	47	6	8	I	Locked.	
10	12¼	Sec.	S4T	770312	14	14	14	6859	245	19½	226½		50	140	1°	2700		6"	130	1½	46	5	8	I		
11	12¼	HTC	XDC	HN172	14	14	14	7196	337	21½	248		50	140	N/P	2500		6"	114	1½	38	4	4	I		
		Christensen MC-20						7201	5																	
12	12¼	HTC	XDC	HP376	14	14	14	7336	138	21½	269½		50	140	1°	2700		6"	117	11/4	48	6	4	I		
13	12¼	Sec.	S3S	780969	14	14	14	7519	180	14½	284		55	120		2500		6"	113	11/6	50	4	5	I		
14	12¼	Sec.	S44	591829	14	14	14	7594	75	12	296		50	120	¾°	2500		6"	113	11/6	60	8	4	I	Reamed 224'.	
15	12¼	Smith	2JS	532EJ	13	13	13	7754	160	31	327	5.3	50	50		2500		6"	100	11/6	60					
16	12¼	HTC	XDG	HX896	13	13	13	8020	266	26½	353½	10.3	40/60	100	1°	2600	1	6"	100	11.7	52	4	3	I		
17	12¼	Smith	SD6H	779NH	13	13	13	8303	283	26	379½	10.9	60	100	½°	2600	1	6"	100	11.7	51	5	4	I		
18	12¼	Smith	SDJ	048JR	13	13	13	8360	57	7½	387	7.6	50	90	-	2500	1	6"	97	11.9	73	7	5	I	Bit too soft.	
19	12¼	HTC	XV	ZC905	15	15	15																			

Compliments of SMITH TOOL
P O BOX 4549 • COMPTON CALIF 90224
DIVISION OF SMITH INTERNATIONAL INC

BIT RECORD

COMPANY

CONTRACTOR: Husky Oil NPR Operations, Inc.

LEASE

WELL NO: Kugrua Test Well No. 1 | SEC: 8 | TOWNSHIP: 14N

COUNTY: North Slope Borough | STATE: Alaska

RANGE: 26W | BLOCK | FIELD: NPRA

TOOL PUSHER | DRILL PIPE | DRAW WORKS

DAY DRILLER | TOOL JOINT: MAKE, SIZE, TYPE | UNDER SURF

EVENING DRILLER | DRILL COLLAR: NO, O.D., I.D., LENGTH | POWER, H.P. | 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	IF SIZE 1	IF SIZE 2	IF SIZE 3	DEPTH OUT	FTGE	HOURS RUN	ACC. HOURS	FT/HR	WEIGHT 1000 LBS	ROTARY R.P.M.	VERT DEV	PUMP PRESS	PUMPS No	PUMPS Liner	PUMPS SPM	MUD Wt	MUD Vis	DULL CODE T	DULL CODE B	DULL CODE G	REMARKS FORMATION CIRC FLUID ETC	DATE
20	12¼	HTC	XV	ZN766	15	15	15	8532	73	17	404	4.2	55	100	¾°	2500	1	6"	105	12.1	56	6	4	I	Reamed 20 hours.	
21	12¼	HTC	X1G	FR419	25	15	15	8712	180	24	428	7.5	50	100	¾°	2600	2	6"	105	11.8	50	3	3	I	Pulled to log.	
22	8½	HTC	X1G	SC01C	13	13	13	8875	163	8½	436½		30/45	90	¾°	2100	1	6"	79	11.4	46	8	6	I	Lost returns.	
23	8½	HTC	X1G	SC013	12	12	12	9040	165	16½	452½		40	65		2900	1	6"	74	11.4	47	5	7	J		
24	8½	Smith	F2	926DK	10	10	10	9526	486	45½	498	10.7	45	60	¾°	2900	1	6"	74	11.4	47	1	4		Lost partial returns. Spotted LCM pill.	
25	8½	Smith	F2	VS229	10	10	10	9708	182	18½	516½		40	60						10.7						
26	8½	Smith	F3	424DX	11	11	11	10045	337	38	554½		45/55	55	2½°	2900	1	6"	74	10.7	46	8	5		Wipe out.	
27	8½	Smith	F2	VS211	10	10	10	10186	141	21½	576	6.5	50	55	2½°	2000	1	6"	70	10.7	49	3	5		Teeth chipped.	
28	8½	HTC	J33	RB978	10	10	10	10382	196	26½	603	7.4	55	60	NP	2750	1	6"	74	10.8	47	8	7	I		
29	8½	Smith	F3	105HF	10	10	10	10474	92	19½	622.5	4.7	50	60	NP	2700	2	6"	72	10.8	45	8	8	I		
30	8½	Smith	W4J	458KE	10	10	10	10480	6	1½	624	4	35	65	1½°	2800	2	6"	75	10.8	47	7	6	I	Cleaned out for CB.	
30A	8½	Christnsn		7S-3369	0	P	E	N	10504	24	7	631	3.4	25	60	1½°	1500	2	6"	70	10.8	45	G	O	O	D	Core No. 2.
31	8½	HTC	J-55	XH501	10	10	10	10664	160	34½	665½	4.6	50	45	1½°	2550	2	6"	72	10.8	46	4	4	1/8		
32	8½	HTC	J-55	SL250	10	10	10	10801	137	30	695½	4.6	50	45		2550	2	6"	72	10.8	43	7	5	1/8		
33	8½	HTC	J-77	JR141	10	10	10	10832	31	10½	705	2.9	55	45		2550	2	6"	72	10.8	44	2	2	1/16		
34	8½	HTC	J-55	XH507	10	10	10	10857	25	10	715	2.5	45/55	65		2550	2	6"	72	10.8	44	2	2	I		
35	8½	HTC	J-44	PE419	10	10	10	11030	173	40½	755	4.3	40/45	65	3	2550	2	6"	72	10.8	44	5	4	1/8	Tripped for Core No. 3.	
36	8½	Smith	W4J	449KE	0	P	E	N	11030	0	-	755½										1	1	I	Reamed for core.	
	8½	Christensen Diamond - Core No. 3																								
37	8½	Smith	F3	OR267	9	10	10	11097	64	16	771.5	4	40/45	45		3000	2	6"	74	10.7	45	8	7	3/16		
38	8½	HTC	J-44	EF271	9	10	10	11250	153	30	801.5	5.1	35	40	4¼°	3000	2	6"	75	10.6	44	4	5	1/16		

Compliments of SMITH TOOL
P.O. BOX 3539 • COMPTON, CALIF. 90224
A DIVISION OF SMITH INTERNATIONAL, INC.

BIT RECORD

COMPANY	CONTRACTOR	COUNTY	STATE
	Husky Oil NPR Operations, Inc.	North Slope Borough	Alaska

LEASE	WELL NO	SEC	TOWNSHIP	RANGE	BLOCK	FIELD
	Kugrua Test Well No. 1	8	14N	26W		NPRA

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	BIT SIZE			DEPTH OUT	FTGE	HOURS RUN	ACC HOURS	FT/HR	WEIGHT 1000 LBS	ROTARY R P M	VERT DEV	PUMP PRESS	PUMPS			MUD		DULL CODE			REMARKS FORMATION CIRC FLUID, ETC	DATE
																	No	Liner	SPM	Wt	Vis	I	B	G		
39	8½	Smith	3JS	CX914	9	10	10	11508	258	36½	838	7.1	40	40	4	2600	2	6	70	10.6	43	5	4	1/8		
40	8½	Smith	F3	212HF	9	10	10	11787	279	39½	877½	7.1	45	45	3¼°	2750		6	70	10.6	45	5	3	3/16		
41	8½	Smith	3JS	699BH	9	10	10	12061	274	36½	914	7.5	40/45	45	3	2900			75	10.6	45	8	8	1/8		
42	8½	Smith	F3	AT594	9	10	10	12325	264	46½	960½	5.6	40/45	40/45		2900		6	73	10.6	44	8	6	1/8		
43	8½	HTC	J-44	RB380	9	10	10	12387	62	14	974½	4.4	40/45	45	3°	3000	1	6	75	10.6	44	2	2	1/16		
44	8½	Smith	F3	243NH	9	10	10	12588	201	33	1007	6.0	45	45	2°	3000	1	6	74	10.6	44	8	4	1/2		

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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.

The casing programmed for Kugrua Test Well No. 1 was as follows: 30" conductor at ±100'; 20" at ±500'; 13-3/8" at ±2600'; 9-5/8" at ±9850'; and a 7" liner from ±9550' to a total depth of 12,315' if needed for evaluation. Actual casing run was 30" at 80', 20" at 496', 13-3/8" at 2611', 9-5/8" at 8704'. The 7" liner was not required. The 9-5/8" casing was run high to forecast due to deteriorating hole conditions caused by overpressured shales.

During abandonment of the well, the 9-5/8" casing was cut off at 2055' and recovered back to the surface. The 13-3/8" annulus was then reversed to diesel from 1894' (top Plug No. 6) back to the surface to allow future temperature measurements by U. S. Geological Survey personnel.

CASING TALLY
SUMMARY SHEET

DATE: February 16, 1978

FIELD National Petroleum Reserve in AK LEASE & WELL NO. Kugrua Test Well No. 1 TALLY FOR 20 "CASING

SUMMARY OF PAGE MEASUREMENTS			
	NO OF JOINTS	FEET	00'S
PAGE 1	15	622	33
PAGE 2			
PAGE 3			
PAGE 4			
PAGE 5			
PAGE 6			
PAGE 7			
PAGE 8			
PAGE 9			
TOTAL	15	622	33

SUMMARY OF DEPTH CALCULATIONS				
		NO OF JOINTS	FOOTAGE FEET	00'S
1	TOTAL CASING ON RACKS	15	622	33
2	LESS CASING OUT (JTS NOS	13	126	05
3	TOTAL (1 - 2)		495	28
4	SHOE LENGTH		2	30
5	FLOAT LENGTH			
6	MISCELLANEOUS EQUIPMENT LENGTH			
7	TOTAL CASING AND EQUIPMENT FROM CEMENT HEAD (3 + 4 + 5 + 6)		497	58
8	LESS WELL DEPTH (KB REFERENCE)		496	00
9	"UP" ON LANDING JOINT		1	58

Weight indicator before cementing: 81 ; after slack-off: 15 , inches slacked off -

SUMMARY OF STRING AS RUN								
WEIGHT	GRADE	THREAD	MANUFACTURER	CONDITION NEW/USED	LOCATION IN STRING	NO. OF JOINTS	FOOTAGE	INTERVAL
133	K-55	8rd		New	JT NO 1 THRU NO 12	12	498-53	-
					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 1

CASING TALLY

DATE: February 16, 1978

FIELD NPRA LEASE & WELL NO. Kugrua Test Well No. 1 TALLY FOR 20 " CASING

JOINT NO.	FIRST MEASUREMENT FEET	.00'S	CHECK MEASUREMENT FEET	.00'S	WT GR.
1	43	20			
2	42	90			
3	39	42			
4	41	00			
5	42	45			
6	36	20			
7	42	40			
8	42	78			
9	41	80			
0	42	55			
TOTAL A	414	70			

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

1	39	05			
2	42	53			
3	42	18			
4	42	37			
5					
6					
7					
8					
9					
0					
TOTAL B	207	63			

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	414	70		
TOTAL B	207	63		
TOTAL C				
TOTAL D				
TOTAL E				
TOTAL PAGE	622	33		

CASING OR LINER CEMENT JOB

Lease N/A Well Kugrua Test Well No. 1 Date February 16, 1978

Size Casing 20" Setting Depth 496' Top (liner hanger) -

Hole Size 26" " Mud Gradient 0.50 psi/ft (9.7 ppg) Viscosity 40

Casing Equipment

Howco Duplex shoe, - float located - feet

above shoe, - (DV, FO) collars located at - feet

and - feet.

Four centralizers located at 451', 409', 370', and 329'

_____ scratchers located (None)

Liner hanger and pack off (describe) (None)

Miscellaneous (baskets, etc.) (None)

Cement (around shoe)

	No. Sacks	Brand	Type	Additives	Slurry Weight	Slurry Volume
(1)	1400	Howco	Permafrost	Preblended	15 ppg	232 Bbls
(2)						

Cement through (DV, FO) Collar at _____ feet

	No. Sacks	Brand	Type	Additives	Slurry Weight	Slurry Volume
(3)						
(4)						

Cementing Procedure (around shoe) (cross out where necessary)

Circulated until clean ~~BPM,~~ pumped in 20 ~~(cu. ft.)~~, (barrels) water

_____ prewash, used bottom plug ~~(yes,~~ no), mixed cement (1) above 60

minutes, cement (2) above - minutes, top plug ~~(yes,~~ no) displaced with
2 water
4 mud ~~(cu. ft.)~~, (barrels) in 1 1/2 minutes at rate of 4 BPM, ~~CFM;~~

~~(Bumped plug) (Did not bump plug)~~. Final Pressure 200 psi. Reciprocated

pipe 0 feet while (mixing) and (displacing) cement. Displacing time 62

minutes. Had full circulation (full, partial,

none, etc.). Completed job at 7:15 a.m., ~~p.m.~~

Cementing Procedure (through (DV, FO) at _____ feet) (cross out where necessary)

Opened (DV, FO) at _____ a.m., p.m., circulated _____ bbls @ _____ BPM, pumped in

_____ (cu. ft.), (barrels) _____ prewash, mixed cement (3) above

_____ minutes, cement (4) above _____ minutes, dropped closing plug, dis-

placed with _____ (cu. ft.), (barrels) in _____ minutes at rate of _____

_____ BPM, CFM. (Bumped plug) (Did not bump plug). Final Pressure _____

Displacing time _____ minutes. Had _____ circulation

(full, partial, none, etc.)

Remarks (Third Stage Job, etc.)

Spotted 20-barrel water spacer, mixed and pumped 232 bbls (1400 sx) 15 ppg Permafrost cement. Had 14.8 ppg returns to surface. Circulated 65 bbls (328 sx) returns. Followed with 2-barrel water spacer. Good circulation throughout job. Cement in place at 7:15 AM.

Ramsey/Williams
Foreman

CASING TALLY
SUMMARY SHEET

DATE: February 22, 1978

FIELD National Petroleum Reserve in AK LEASE & WELL NO. Kugrua Test Well No. 1 TALLY FOR 13 3/8 CASING

SUMMARY OF PAGE MEASUREMENTS			
	NO OF JOINTS	FEET	00'S
PAGE 1	50	2027	28
PAGE 2	25	1037	55
PAGE 3			
PAGE 4			
PAGE 5			
PAGE 6			
PAGE 7			
PAGE 8			
PAGE 9			
TOTAL	75	3064	83

SUMMARY OF DEPTH CALCULATIONS				
		NO OF JOINTS	FOOTAGE FEET	00'S
1	TOTAL CASING ON RACKS	75	3064	83
2	LESS CASING OUT (JTS NOS	11	454	85
3	TOTAL (1 - 2)		2609	98
4	SHOE LENGTH		2	00
5	FLOAT LENGTH		1	82
6	MISCELLANEOUS EQUIPMENT LENGTH			
7	TOTAL CASING AND EQUIPMENT FROM CEMENT HEAD (3 + 4 + 5 + 6)		2613	80
8	LESS WELL DEPTH (KB REFERENCE)		2611	00
9	"UP" ON LANDING JOINT		2	80

Weight indicator before cementing: 160ths ; after slack-off: 15ths ; inches slacked off 3

SUMMARY OF STRING AS RUN								
WEIGHT	GRADE	THREAD	MANUFACTURER	CONDITION NEW-USED	LOCATION IN STRING	NO. OF JOINTS	FOOTAGE	INTERVAL
72	AR-95	Buttress	Armco	New	JT NO. 1 THRU NO. 64	64	2613	
					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: February 20, 1978

FIELD NPRA LEASE & WELL NO. Kugrua Test Well No. 1 TALLY FOR 13 3/8 " CASING

JOINT NO.	FIRST MEASUREMENT FEET	FIRST MEASUREMENT .00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT .00'S	WT GR.
1	42	00			
2	38	46			
3	41	86			
4	35	54			
5	40	36			
6	41	43			
7	42	22			
8	42	25			
9	39	21			
0	42	96			
TOTAL A	406	29			

JOINT NO.	FIRST MEASUREMENT FEET	FIRST MEASUREMENT .00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT .00'S	WT GR.
1	38	22			
2	40	93			
3	42	21			
4	40	70			
5	39	23			
6	42	36			
7	38	41			
8	41	31			
9	37	96			
0	40	52			
TOTAL D	401	85			

1	41	95			
2	40	64			
3	41	71			
4	42	46			
5	42	37			
6	41	80			
7	36	52			
8	39	81			
9	38	90			
0	41	91			
TOTAL B	408	07			

1	40	51			
2	38	66			
3	39	27			
4	41	54			
5	39	72			
6	41	36			
7	39	46			
8	39	64			
9	42	81			
0	41	37			
TOTAL E	404	34			

1	42	92			
2	38	46			
3	39	92			
4	41	75			
5	41	00			
6	42	44			
7	39	53			
8	38	81			
9	40	14			
0	41	76			
TOTAL C	406	73			

TOTAL A	406	29		
TOTAL B	408	07		
TOTAL C	406	73		
TOTAL D	401	85		
TOTAL E	404	34		
TOTAL PAGE	2027	28		

PAGE 2 OF 2 **CASING TALLY** DATE: February 20, 1978

FIELD NPRA LEASE & WELL NO. Kugrua Test Well No. 1 TALLY FOR 13 3/8 " CASING

JOINT NO.	FIRST MEASUREMENT FEET	FIRST MEASUREMENT .00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT .00'S	WT GR.
1	43	32			
2	42	57			
3	40	84			
4	41	83			
5	44	42			
6	42	95			
7	38	63			
8	41	52			
9	39	97			
0	42	20			
TOTAL A	418	25			

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	41	55			
2	41	85			
3	41	33			
4	39	72			
5	41	31			
6	41	46			
7	40	27			
8	42	00			
9	42	23			
0	41	72			
TOTAL B	413	44			

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

1	37	72			
2	42	86			
3	42	21			
4	40	92			
5	42	15			
6					
7					
8					
9					
0					
TOTAL C	205	86			

TOTAL A	418	25		
TOTAL B	413	44		
TOTAL C	205	86		
TOTAL D				
TOTAL E				
TOTAL PAGE	1037	55		

CASING OR LINER CEMENT JOB

Lease N/A Well Kugrua Test Well No. 1 Date February 22, 1978

Size Casing 13 3/8" Setting Depth 2613' * Top (liner hanger) -

Hole Size 17 1/2" " Mud Gradient 0.51 psi/ft (9.8 ppg) Viscosity 44

Casing Equipment

Howco shoe, Howco Duplex float located 82.46 feet

above shoe, - (DV, FO) collars located at - feet

and - feet.

Nine centralizers located at 2601', 2596', 2527', 2490', 2415', 2332', 2251', 2168', and 2077'.

- scratchers located (None)

Liner hanger and pack off (describe) (None)

Miscellaneous (baskets, etc.) (None)

Cement (around shoe)

	No. Sacks	Brand	Type	Additives	Slurry Weight	Slurry Volume
(1)	2800 Sx	Howco	Permafrost	Preblended	15 ppg	464 Bbls
(2)						

Cement through (DV, FO) Collar at - feet

	No. Sacks	Brand	Type	Additives	Slurry Weight	Slurry Volume
(3)						
(4)						

* Casing Report - 2613';
Daily Drilling Report - 2611'.

Cementing Procedure (around shoe) (cross out where necessary)

Circulated 1000 bbls @ – BPM, pumped in 20 ~~(cu. ft.)~~, (barrels) water

_____ prewash, used bottom plug (yes, no), mixed cement (1) above 90

minutes, cement (2) above – minutes, top plug (yes, no) displaced with

2 water
33 mud ~~(cu. ft.)~~, (barrels) in 10 minutes at rate of 3 1/2 BPM, ~~CFM~~,

~~(Bumped plug) (Did not bump plug)~~. Final Pressure 1000 psi. Reciprocated

pipe 0 feet while (mixing) and (displacing) cement. Displacing time 100

minutes. Had full circulation (full, partial,

none, etc.). Completed job at 10:00 ~~a.m.~~, p.m.

Cementing Procedure (through (DV, FO) at _____ feet) (cross out where necessary)

Opened (DV, FO) at _____ a.m., p.m., circulated _____ bbls @ _____ BPM, pumped in

_____ (cu. ft.), (barrels) _____ prewash, mixed cement (3) above

_____ minutes, cement (4) above _____ minutes, dropped closing plug, dis-

placed with _____ (cu. ft.), (barrels) in _____ minutes at rate of _____

_____ BPM, CFM. (Bumped plug) (Did not bump plug). Final Pressure _____ .

Displacing time _____ minutes. Had _____ circulation

(full, partial, none, etc.)

Remarks (Third Stage Job, etc.)

Had 14.8 ppg returns. Circulated 60 barrels (325 sx) returns. Cement in place at

10:00 PM.

Ramsey/Williams
Foreman

CASING TALLY
SUMMARY SHEET

DATE: April 9, 1978

FIELD National Petroleum Reserve in AK LEASE & WELL NO. Kugrua Test Well No. 1 TALLY FOR 9 5/8" CASING

SUMMARY OF PAGE MEASUREMENTS

	NO. OF JOINTS	FEET	00'S
PAGE 1	50	1992	68
PAGE 2	50	2009	62
PAGE 3	50	2010	62
PAGE 4	50	2009	28
PAGE 5	50	1990	49
PAGE 6			
PAGE 7			
PAGE 8			
PAGE 9			
TOTAL	250	10012	69

SUMMARY OF DEPTH CALCULATIONS

		NO. OF JOINTS	FOOTAGE FEET	FOOTAGE 00'S
1	TOTAL CASING ON RACKS	250	10,012	69
2	LESS CASING OUT (JTS NOS	33	1,315	70
3	TOTAL (1 - 2)	217	8,696	99
4	SHOE LENGTH		2	00
5	FLOAT LENGTH		1	80
6	MISCELLANEOUS EQUIPMENT LENGTH		17	90
7	TOTAL CASING AND EQUIPMENT FROM CEMENT HEAD (3 + 4 + 5 + 6)		8,718	69
8	LESS WELL DEPTH (KB REFERENCE)		8,704	06
9	"UP" ON LANDING JOINT		14	23

Weight indicator before cementing: 370Kbs ; 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
5350	C-95	Buttress		New	JT NO 1 THRU NO 217	217	8702.31	
					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 5

CASING TALLY

DATE: April 9, 1978

FIELD NPRA LEASE & WELL NO. Kugrua Test Well No. 1 TALLY FOR 9 5/8 " CASING

JOINT NO.	FIRST MEASUREMENT FEET	FIRST MEASUREMENT .00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT .00'S	WT GR.
1	41	18			
2	41	57			
3	39	00			
4	39	24			
5	45	70			
6	41	80			
7	41	01			
8	41	65			
9	39	50			
0	36	48			
TOTAL A	407	13			

JOINT NO.	FIRST MEASUREMENT FEET	FIRST MEASUREMENT .00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT .00'S	WT GR.
1	39	34			
2	41	72			
3	41	70			
4	38	96			
5	42	00			
6	40	63			
7	39	14			
8	37	31			
9	40	70			
0	41	52			
TOTAL D	403	02			

1	42	17			
2	38	34			
3	37	73			
4	41	60			
5	40	11			
6	38	20			
7	37	90			
8	36	32			
9	41	83			
0	41	80			
TOTAL B	396	00			

1	38	86			
2	34	40			
3	39	18			
4	41	51			
5	41	60			
6	41	70			
7	40	00			
8	40	31			
9	41	00			
0	35	30			
TOTAL E	393	86			

1	36	82			
2	37	80			
3	41	10			
4	41	62			
5	42	13			
6	34	70			
7	41	65			
8	40	53			
9	39	18			
0	37	14			
TOTAL C	392	67			

TOTAL A	407	13		
TOTAL B	396	00		
TOTAL C	392	67		
TOTAL D	403	02		
TOTAL E	393	86		
TOTAL PAGE	1992	68		

PAGE 2 OF 5 **CASING TALLY** DATE: April 9, 1978

FIELD NPRA LEASE & WELL NO. Kugrua Test Well No. 1 TALLY FOR 9 5/8" CASING

JOINT NO.	FIRST MEASUREMENT FEET	FIRST MEASUREMENT .00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT .00'S	WT GR.
1	38	92			
2	36	73			
3	38	87			
4	42	11			
5	39	65			
6	41	71			
7	41	65			
8	41	20			
9	40	10			
0	42	05			
TOTAL A	402	99			

JOINT NO.	FIRST MEASUREMENT FEET	FIRST MEASUREMENT .00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT .00'S	WT GR.
1	42	20			
2	37	20			
3	41	95			
4	36	65			
5	41	90			
6	36	60			
7	41	58			
8	41	20			
9	39	92			
0	37	52			
TOTAL D	396	72			

1	40	48			
2	42	04			
3	41	95			
4	41	64			
5	36	18			
6	40	65			
7	41	64			
8	41	60			
9	39	75			
0	40	75			
TOTAL B	406	68			

1	39	03			
2	40	90			
3	41	66			
4	42	06			
5	41	23			
6	41	38			
7	41	85			
8	38	41			
9	41	94			
0	36	54			
TOTAL E	405	45			

1	41	20			
2	39	70			
3	39	16			
4	37	88			
5	41	58			
6	36	60			
7	41	90			
8	41	73			
9	36	50			
0	41	53			
TOTAL C	397	78			

TOTAL A	402	99		
TOTAL B	406	68		
TOTAL C	397	78		
TOTAL D	396	72		
TOTAL E	405	45		
TOTAL PAGE	2009	62		

PAGE 3 OF 5 **CASING TALLY** DATE: April 9, 1978

FIELD NPRA LEASE & WELL NO. Kugrua Test Well No. 1 TALLY FOR 9 5/8" CASING

JOINT NO.	FIRST MEASUREMENT FEET	FIRST MEASUREMENT .00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT .00'S	WT GR.
1	41	10			
2	35	35			
3	40	37			
4	40	46			
5	41	84			
6	40	72			
7	41	73			
8	41	90			
9	39	64			
0	41	50			
TOTAL A	404	61			

JOINT NO.	FIRST MEASUREMENT FEET	FIRST MEASUREMENT .00'S	CHECK MEASUREMENT FEET	CHECK MEASUREMENT .00'S	WT GR.
1	35	68			
2	41	40			
3	36	73			
4	40	22			
5	41	83			
6	38	88			
7	43	23			
8	41	53			
9	39	28			
0	40	82			
TOTAL D	399	60			

1	40	27			
2	40	82			
3	42	92			
4	41	60			
5	41	41			
6	41	90			
7	41	70			
8	37	18			
9	42	40			
0	38	81			
TOTAL B	409	01			

1	41	60			
2	41	10			
3	35	10			
4	41	90			
5	42	00			
6	39	04			
7	37	62			
8	38	97			
9	39	93			
0	41	70			
TOTAL E	398	96			

1	37	10			
2	40	10			
3	40	31			
4	40	62			
5	40	41			
6	36	20			
7	38	82			
8	41	57			
9	41	71			
0	41	60			
TOTAL C	398	44			

TOTAL A	404	61		
TOTAL B	409	01		
TOTAL C	398	44		
TOTAL D	399	60		
TOTAL E	398	96		
TOTAL PAGE	2010	62		

PAGE 4 OF 5 **CASING TALLY** DATE: April 9, 1978

FIELD NPRA LEASE & WELL NO. Kugrua Test Well No. 1 TALLY FOR 9 5/8" CASING

JOINT NO.	FIRST MEASUREMENT FEET	.00'S	CHECK MEASUREMENT FEET	.00'S	WT GR.
1	42	10			
2	41	48			
3	40	53			
4	38	97			
5	41	40			
6	41	80			
7	42	19			
8	36	98			
9	45	05			
0	42	10			
TOTAL A	412	60			

JOINT NO.	FIRST MEASUREMENT FEET	.00'S	CHECK MEASUREMENT FEET	.00'S	WT GR.
1	38	00			
2	41	32			
3	37	30			
4	38	28			
5	41	80			
6	42	00			
7	39	05			
8	38	22			
9	41	87			
0	41	72			
TOTAL D	399	56			

1	37	02			
2	41	92			
3	41	53			
4	40	60			
5	40	07			
6	41	22			
7	41	72			
8	41	11			
9	42	00			
0	41	65			
TOTAL B	408	84			

1	38	71			
2	39	40			
3	36	18			
4	41	90			
5	38	90			
6	37	75			
7	41	60			
8	38	40			
9	40	90			
0	41	87			
TOTAL E	395	61			

1	37	80			
2	41	81			
3	36	20			
4	41	73			
5	36	85			
6	38	17			
7	41	16			
8	37	75			
9	39	80			
0	41	40			
TOTAL C	392	67			

TOTAL A	412	60		
TOTAL B	408	84		
TOTAL C	392	67		
TOTAL D	399	56		
TOTAL E	395	61		
TOTAL PAGE	2009	28		

PAGE 5 OF 5 **CASING TALLY** DATE: April 9, 1978

FIELD NPRA LEASE & WELL NO. Kugrua Test Well No. 1 TALLY FOR 9 5/8" CASING

JOINT NO.	FIRST MEASUREMENT FEET	.00'S	CHECK MEASUREMENT FEET	.00'S	WT GR.
1	36	65			
2	39	97			
3	40	85			
4	39	70			
5	41	72			
6	40	73			
7	41	82			
8	39	60			
9	37	30			
0	41	91			
TOTAL A	400	25			

JOINT NO.	FIRST MEASUREMENT FEET	.00'S	CHECK MEASUREMENT FEET	.00'S	WT GR.
1	39	20			
2	40	41			
3	41	76			
4	41	60			
5	41	37			
6	41	80			
7	41	65			
8	37	42			
9	41	58			
0	38	39			
TOTAL D	405	13			

1	42	11			
2	41	19			
3	40	00			
4	40	51			
5	38	23			
6	41	62			
7	34	20			
8	38	00			
9	40	55			
0	41	95			
TOTAL B	400	36			

1	41	57			
2	38	82			
3	37	70			
4	34	45			
5	41	44			
6	41	00			
7	41	31			
8	35	89			
9	39	12			
0	40	55			
TOTAL E	391	85			

1	37	03		
2	41	82		
3	36	70		
4	40	89		
5	34	65		
6	38	59		
7	40	81		
8	41	28		
9	43	93		
0	37	20		
TOTAL C	392	90		

TOTAL A	400	25		
TOTAL B	400	36		
TOTAL C	392	90		
TOTAL D	405	13		
TOTAL E	391	85		
TOTAL PAGE	1990	49		

CASING OR LINER CEMENT JOB

Lease N/A Well Kugrua Test Well No. 1 Date April 9, 1978

Size Casing 9 5/8" Setting Depth 8704' Top (liner hanger) -

Hole Size 12 1/4" Mud Gradient 0.61 psi/ft (11.8 ppg) Viscosity 42

Casing Equipment

Halliburton shoe, Halliburton float located 82.75 feet

above shoe, two (BV, FO) collars located at 2115 feet

and 2448 feet.

34 centralizers located per well program.

(None) scratchers located

Liner hanger and pack off (describe) (None)

Miscellaneous (baskets, etc.) (None)

Cement (around shoe)

	No. Sacks	Brand	Type	Additives	Slurry Weight	Slurry Volume
(1)	1,000 Sx	Howco	Class "G"	1% CFR-2 0.2% HR-7	15.8 ppg	210 Bbls
(2)						

Cement through (BV, FO) Collar at 2448 feet

	No. Sacks	Brand	Type	Additives	Slurry Weight	Slurry Volume
(3)	155 Sx	Howco	Permafrost	Preblended	15 ppg	26 Bbls
(4)						

Cementing Procedure (around shoe) (cross out where necessary)

Circulated until clean ~~BPM~~, pumped in 50 ~~(cu. ft.)~~, (barrels) water

_____ prewash, used bottom plug (yes, no), mixed cement (1) above 35

minutes, cement (2) above - minutes, top plug (yes, ~~no~~) displaced with

616 ~~(cu. ft.)~~, (barrels) in 100 minutes at rate of 6.16 BPM, ~~CFM~~,

(Bumped plug) ~~(Did not bump plug)~~. Final Pressure 3000 psi. Reciprocated

pipe 0 feet while (mixing) and (displacing) cement. Displacing time 135

minutes. Had full circulation (full, partial,

none, etc.). Completed job at 7:30 ~~a.m.~~, p.m.

Cementing Procedure (through (DV, FO) at 2448 feet) (cross out where necessary)

Opened (DV, FO) at 8:20 a.m., ~~p.m.~~, circulated 150 bbls @ 5 BPM, pumped in

10 ~~(cu. ft.)~~, (barrels) water prewash, mixed cement (3) above

5 minutes, cement (4) above - minutes, dropped closing plug, dis-

placed with 2 water 29 mud ~~(cu. ft.)~~, (barrels) in 10 minutes at rate of 3

_____ BPM, CFM. (Bumped plug) (Did not bump plug). Final Pressure 0

Displacing time 15 minutes. Had full circulation

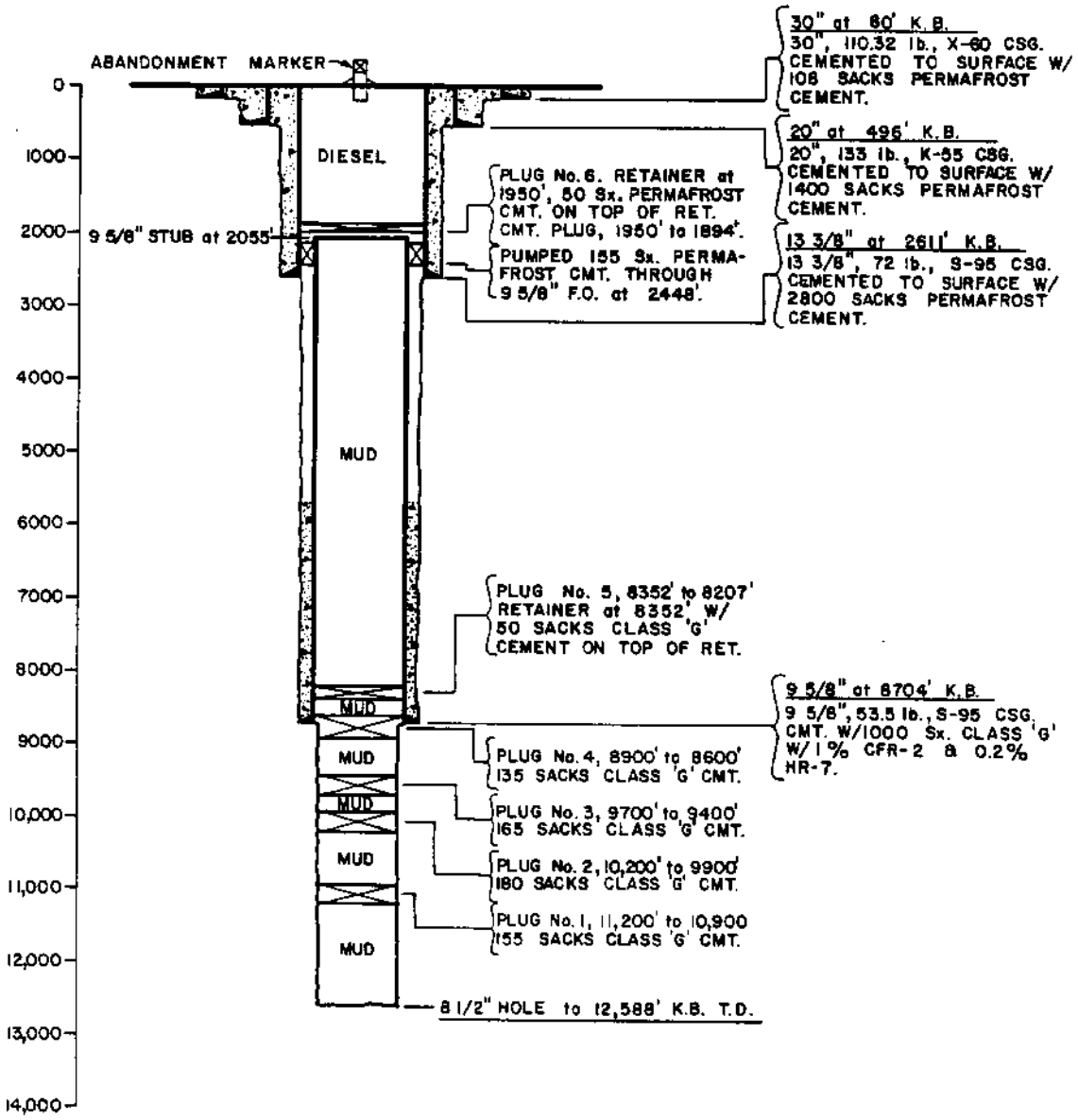
(full, partial, none, etc.)

Remarks (Third Stage Job, etc.)

Reversed out three barrels of cement in drill pipe. Circulated five barrels of cement from top FO at 2115'.

Ramsey/Williams

Foreman



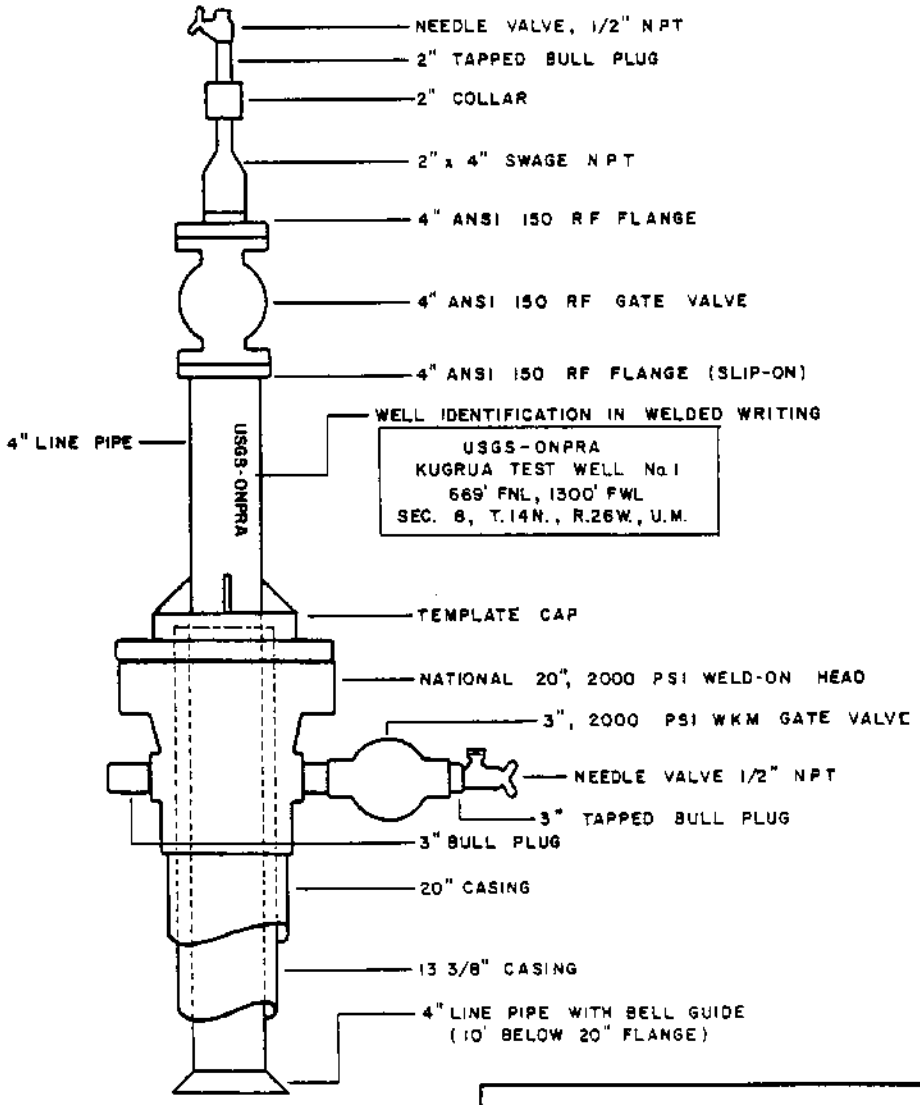
KUGRUA TEST WELL No. 1

669' FNL and 1300' FWL
Sec. 8, T.14 N., R.26 W., U.M.
PAD LEVEL 65' EST.
K.B. 85' EST.

HUSKY OIL *N.P.R. Operations*

NATIONAL PETROLEUM RESERVE in ALASKA

WELLBORE SCHEMATIC



KUGRUA TEST WELL No. 1

669' FNL and 1300' FWL

Sec. 8, T.14 N., R.26 W., U.M.

HUSKY OIL *N.P.R. Operations*

NATIONAL PETROLEUM RESERVE in ALASKA

ABANDONMENT HEAD

RIG INVENTORY

Draw Works

National 130, 25,000 pound, Serial No. 615648.

Hydromatic Brakes

Parkersburg, hydromatic, 60", Serial No. 48173.

Catworks Unit

National 130, Serial No. 438-3.

Compound and Rig Drive

National, B Sec, three engine, 2,000 H.P. with gyro drive.

Drilling Engines

Caterpillar, diesel turbo, D-398, 750 H.P., Serial No. 66B2440.
Caterpillar, diesel turbo, D-398, 750 H.P., Serial No. 66B2436.
Caterpillar, diesel turbo, D-398, 750 H.P., Serial No. 66B2439.

Starting Engines
Three Switzer, air, 40 H.P.

Sheds
Parker, steel, 8' x 30'.

Skids.

Transmissions

Torque Converters.

Rig Lights

GE, vapor proof, 500 WT to 1,500 WT.

No. 1 Light Plant

Caterpillar, diesel turbo AC, 250 KW.

No. 1 Engine
Caterpillar, diesel turbo, D353, 450 H.P., AC power plant, Serial No. 46B2997.

No. 1 AC Generator
Caterpillar, AC electric, 250 KW, AC power plant, Serial No. 250TH1550.

No. 2 Light Plant

Caterpillar, turbo diesel, 250 KW.

No. 2 Engine
Caterpillar, turbo diesel, D-353, 450 H.P., Serial No. 46B2999.

No. 2 AC Generator
Caterpillar/GE, AC electric, 250 KW, Serial No. 250TH1549.

No. 3 Light Plant

Caterpillar/GE

No. 3 Engine
Caterpillar, turbo diesel, D-353, 450 H.P.

No. 3 AC Generator
Caterpillar/GE, AC electric, 250 KW.

Mast and Substructure

L. C. Moore, jackknife, 142' x 1,025M, Serial No. T-2560.
L. C. Moore, box type, 18' x 34' x 32' with engine sub 8' x 32' draw works and engine sub.

Crown
L. C. Moore, 7 x 54", 1 x 60 fast line, 500 ton.

Wire Line Anchor

National, 500 ton, 1-3/8", substructure.

Windwalls

Parker, steel, 25' x 8'.

Catwalks

Parker, steel, 6' x 54'.

Pipe Racks
Parker, drill pipe triangular, 4' x 20'.

Pumps

No. 1 Pump
EMSCO, D-1000 duplex, 1,000 H.P.

Power End
EMSCO, steel, 1,000 H.P.

Pumps (cont.)

Fluid End
EMSCO, steel, 7" x 18", 1,000 H.P.

Pulsation Dampener
EMSCO, PD2, 20 gallon.

No. 2 Pump
EMSCO, DB700 duplex, 700 H.P.

Power End
EMSCO, steel, 700 H.P., 7" x 16".

Pulsation Dampener
EMSCO, PD2, 20 gallon.

Mud Mixing Equipment

Mud Mixing Unit
Mission/Caterpillar/Parker.

Engine
Caterpillar, diesel turbo, D-330, 130 H.P.

Pump
ASH, B-65 centrifugal, 6" x 8".

Mud Mixing Unit
Caterpillar, diesel turbo.

Pump
ASH, B-65, centrifugal, 6" x 8".

Lightening Mixers
Lightening, 73Q80, 7.5' x 32".

Utility Skid

Shale Shaker

Milchem, single decks, 6' x 8'.

Motor
U. S. electric, 10 H.P.

Desander

Dorcone, 12".

Pump
Harrisburg, centrifugal, 5" x 6".

Desander (cont.)

Motor
Newman, electric, 60 H.P., with No. 5 starter and switch gear.

Desilter

DEMCO, 4", 8 cone.

Pump
Harrisburg, centrifugal, 5" x 6".

Motor
Pacemaker, CJ48, electric 60 H.P., with No. 5 starter and switch gear

Degasser

Oliver Door, FAC, 6' x 6'.

Pump
Gorman Rupp, Model No. 1682B, centrifugal, 6" x 6".

Traveling Block

IDECO, UTB Big Shorty, 525 ton.

Hook

IDECO, Big Short, 525 ton.

Swivel

National, N-815, 400 ton.

Tongs-Nonpower

BJ, 2-3/8" x 13-5/8".

Elevators

BJ, MGG, 5", 500 ton.
BJ, MG, 4-1/2", 350.
BJ, side door, A, 6-1/2".
BJ, side door, A, 8-5/8".

Casing Tools-Nonpower

Tubing Tools-Nonpower

Elevator Bails

BJ, forged steel, 106" 350 ton.
BJ, forged steel, 96", 350 ton.

Rotary Table

National, roller bearing, 350 ton, 27-1/2".
National, roller bearing, 20.5.

Master Bushings

Varco, forged steel, 27.5 WI.

Kelly Drive Bushings
Baash Ross, IRH 56, 2' x 5' Hex.

Kelly

Drilco, Hex, 4-1/2" IF x 6-5/8" Reg, 5-1/4" x 45'.

Kelly Cock

Shaffer, ball, 6-5/8" x 10,000.

Air Compressor

Quincy, piston, 390.
Quincy, piston, 350.

Motor
U. S. Electric, 10 H.P.

Air Hoist

Ingersoll Rand, air.
Ingersoll Rand, hoist, K6U.

Drilling Lines

U. S. Steel, Tiger brand WRC, 1-3/8" x 6,000.
Oilwell, WRC, 1-3/8" x 7,500.

Steam Heater

Modene, steam, HL 1250, V-419.

Stove.

Hot Air Blower.

Safety Heater.

Boilers

Cleaver Brooks, steam, 100 H.P.

Boilers (cont.)

Hot Air Heaters
Arctic Air, diesel, C-240-0-F, 2,400,000 BTU.

Hot Air Heaters
T109A, IDF 600,000; 600,000 BTU.

Motors.

Boiler House
Parker, steel 7.5' x 34'.

Rotary Hose

Hewett Robbins, rubber steel, 55' x 7,500#.

Vibrator Hose

Hewett Robbins, rubber steel, 12' x 7,500#.

Tool House

Parker, wood and steel, 8' x 40'.

Dog House

Parker, steel.

Sanitary Facility House

Parker, steel insulated, 16' x 40'.

Sewage Unit
MetPro, 1 PC 140,000; 7,000 GPD.

Clothes House

Light Plant House

Parker, steel, 8' x 34'.

Mud House

Mud Sample House

Parts Storage House

Blowout Preventers

Shaffer, hubbed LWS, 13-5/8" - 5,000#.
Shaffer, LWS, 13-5/8" - 5,000#.

Blowout Preventers (cont.)

Annular Spherical Preventer
Shaffer, hubbed LW, 13-5/8" - 5,000#.

Choke Manifold
Cameron, 2" - 5,000#.
Cameron, 4" - 5,000#.

Tees
Cameron, 4" with 2" outlets.
Cameron, 4 way T with one 4" outlet and two 2" outlets.
Cameron, positive choke.
Cameron, adjustable choke.
Two spacer spools.
One spool, 2" - 10,000# to 2" - 5,000#.

Flanges
Shaffer, 2" - 5,000#.

Drilling Spools
Cameron, 13-5/8" - 5,000#.
Shaffer, clamp to hub, 13-5/8" - 5,000#.
Shaffer, hub to hub.
Double studded 13-5/8" to 12".
Shaffer double, 10" - 1,500# to 13-5/8" - 5,000#.
Shaffer, 13-5/8" - 5,000# x 13-5/8" - 5,000#.

Adapters

Rams
Shaffer, Type 70, 4-1/2" rams.
Shaffer, Type 70, blind rams.
Shaffer, Type 70, 9-5/8" rams.
Shaffer, Type 70, 7" rams.

Kill Line
Steel, 4-1/2" drill pipe.

Gate Valves
Demco, 4" - 5,000#.
Demco, 2" - 5,000#.

Accumulator

Koomey, T315-15-3, 160 gallons.

Water Tanks

PDC, steel, 17,500 gallon.

Tong Torque Gauge

Martin Decker.

Rotary Torque Gauge

Martin Decker.

Mud Pressure Gauge

Cameron.

Drilling Recorder

Totco, 61-A, 4 Pen.

Weight Indicator

Cameron C.
Martin Decker, E, with Type E sensator.

Welding Machine

Lincoln, diesel, 300 AMP.

Motor
GMC, diesel, 2/53.

Wire Line Unit

Halliburton, XLD, 18,000 with Ramsey gear box.

Drill Pipe Slips

Varco, SDL, 4-1/2".

Drill Collar Slips

Baash/Ross.

Clamps
Baash/Ross.

Subs

2 6-5/8" Reg. x 6-5/8" Reg.
1 5" H90 x 6-5/8" Reg.
2 4-1/2" IF x 4" H90.
2 4" H90 x 4-1/2" IF.
1 4-1/2" IF x 4-1/2" IF.
1 4-1/2" IF x 4-1/2" Reg.
2 6-5/8" Reg. x 4-1/2" IF.
2 4-1/2" IF x 6-5/8" Reg.
1 5" H90 x 4-1/2" Reg.
2 6-5/8" Reg. x 7-5/8" Reg.
2 4-1/2" IF x 7-5/8" Reg.
2 Junk Baskets 4-1/2" Reg. x 4-1/2" Reg.

Subs (cont.)

2 Junk Baskets 6-5/8" Reg. x 6-5/8" Reg.
1 6-5/8" x 7-5/8" Reg.
1 4-1/2" Reg. x 4-1/2" Reg.
1 4-1/2" Reg. x 6-5/8" Reg.

Fishing Tools

Overshots
- Top Subs.
- Grapples.
- Jars.
- Basket Subs.
- Bumper Subs.

Rat Hole

Parker, 8-5/8" x 30'.

House Hole
- Parker, 7" x 30'.

Wire Line Guides

Oteco, roller.

Crownomatics

Stewart Stevenson, TCB.

Fire Extinguishers

General, powder, 30#.