NATIONAL PETROLEUM RESERVE IN ALASKA

GEOLOGICAL REPORT

SOUTH BARROW WELL NO. 16

HUSKY OIL NPR OPERATIONS, INC.
Prepared by: Gordon W. Legg

For the

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

TABLE OF CONTENTS

GEOLOGIC SUMMARY

INTRODUCTION

The South Barrow Well No. 16 is located in the SE 1/4 of protracted Section 1, T22N, R18W, Umiat Meridian, North Slope Borough, Alaska. The surveyor's plat locates the well 150' FEL and 450' FSL of the section. Although designated as "South Barrow Well No. 16", which would indicate a field well classification, the well is actually a "new-field wildcat", located on a separate structure from any of the previous South Barrow wells. This structure is located 1.8 miles northeast of the South Barrow Gas Field and nearly 6 miles northwest of the East Barrow Gas Field. The well was drilled in early 1978 to test the prospectiveness of Jurassic sandstones postulated to lie above the argillite basement, and secondarily, to possibly test the argillite if it were found to be fractured and containing hydrocarbon shows.

Drilling operations commenced on January 28, 1978. The well was plugged and abandoned and the rig released on February 17, 1978.

In each of the South Barrow wells drilled after South Barrow No. 13, an inhibitive mud system, containing calcium-chloride, was used below intermediate casing (commonly 9-5/8" to about 1,500 feet). This was done to minimize damage to potential reservoirs caused by swelling clays, which are present in the Barrow sandstones and the Sag River Sandstone (determined by water susceptibility tests on cores from the South Barrow Nos. 12 and 13). The high concentrations of calcium-chloride used below the intermediate casing necessitated running a dual laterolog, as the high calcium and chloride ion concentration in the mud adversely affects the measurement of conductivity by the dual induction log. The dual induction log was run in the upper part of each well where fresh-water-mud was used.

Slight, visible shows were present in several thin, shaly sandstones in the "Pebble Shale" from 1961' to 2332'. The porosity in the best developed of these sandstones was only 6-7%, and its thickness was only 6'. The argillite core had a good, gassy odor on parting planes, but the lack of open fracturing in the essentially non-porous argillite negated any attempt at further evaluation.

PRE-DRILLING PROGNOSIS

The South Barrow No. 16 was a "wildcat" well drilled on a separate structure on the north side of the Avak disturbed zone. The structure was interpreted to be fault controlled. The primary objective in drilling the well was to test a postulated 45 feet of Jurassic sandstones just above the argillite basement. A secondary objective was to core and test the argillite, to ascertain if it, when fractured, was capable of yielding hydrocarbon production. Another objective in testing the argillite was to determine if a water zone is present in the fractured argillite. Finally, several thin sandstones in the "Pebble Shale" had exhibited good, visual

shows in other South Barrow wells. These sandstones, if present and containing good shows and porosities, were to be tested in order to determine whether they would yield gas or oil.

POST-DRILLING SUMMARY

South Barrow No. 16 had no Jurassic rocks, and the "Pebble Shale" overlies the argillite. Erosional processes which caused the basal Cretaceous unconformity have apparently truncated all the sedimentary strata below the "Pebble Shale" and above the argillite. There is a possibility that this section was faulted-out, but that is unlikely because of the known truncation which can be observed on the Barrow Arch at the base of the Cretaceous.

The argillite had good, gassy odor on parting planes. The pre-existing fractures were secondarily filled with calcite and pyrite, thus effectively sealing the only source of argillite porosity.

The thin sandstones of the "Pebble Shale" had low porosities. A decision was made not to test these sands, since the likelihood of obtaining any fluid from such a tight sandstone would be marginal at best.

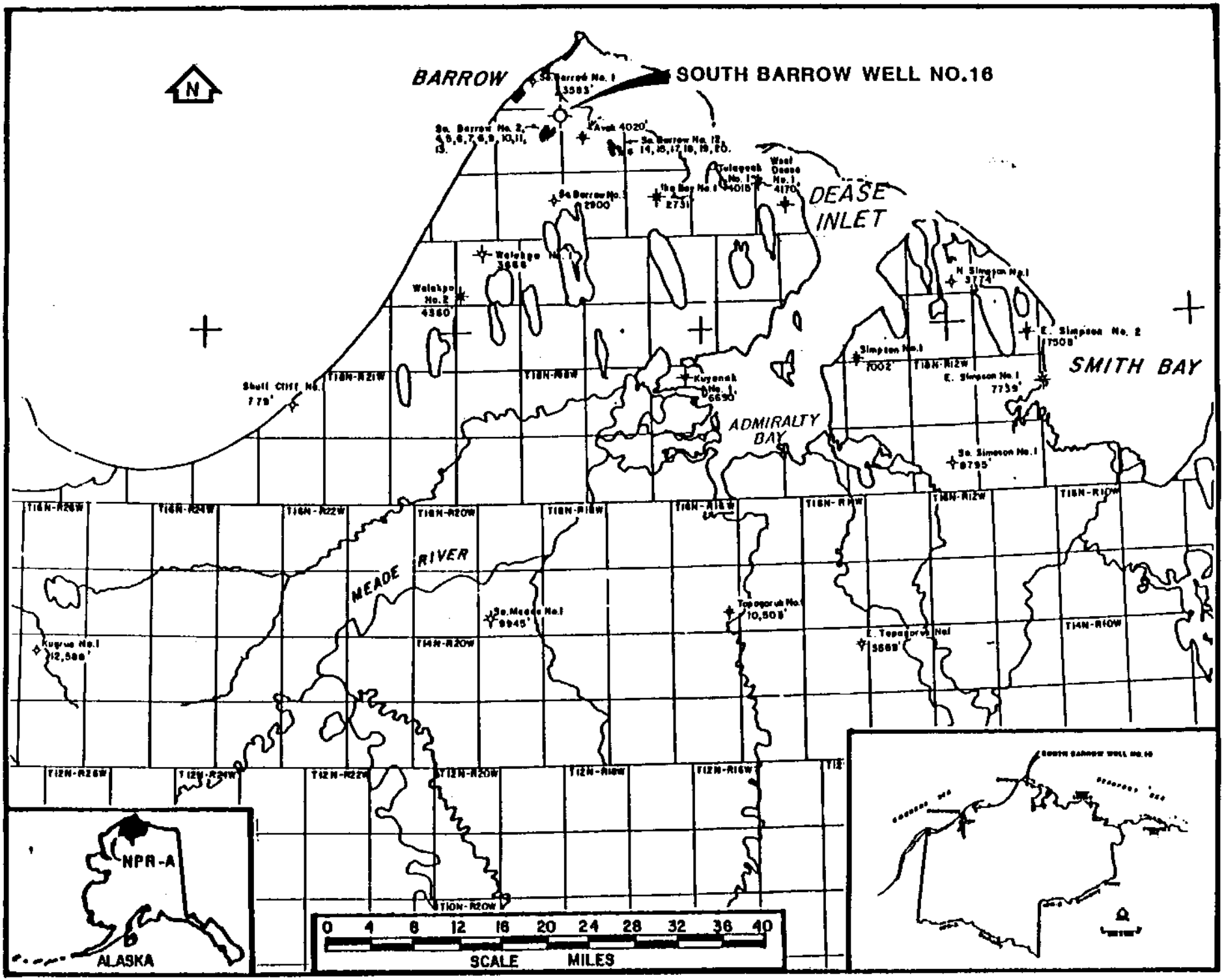
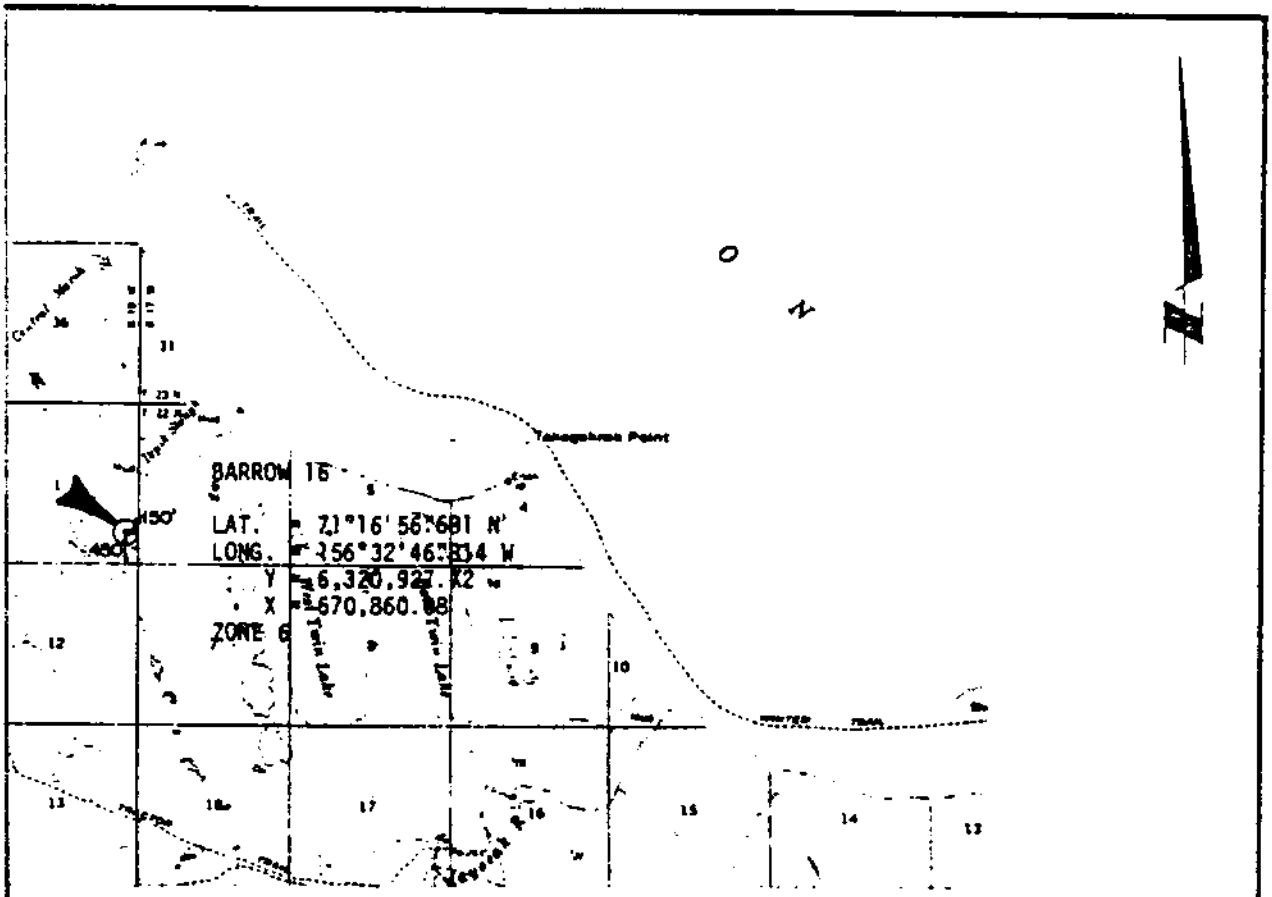


FIGURE 1 - LOCATION MAP - SOUTH BARROW WELL NO. 16



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
JOHN W. HERRING
No. 953-S
REGISTERED PROFESSIONAL LAND SURVEYOR

AS STAKED

BARROW 16

LOCATED IN

SE 1/4 PROTRACTED SEC. 1 T22 N, R18W UMIAT MERIDIAN, A

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

FIGURE 2 - CERTIFICATE OF SURVEYOR - SOUTH BARROW WELL NO. 16

WELLSITE GEOLOGIST'S REPORT
BY: DAVE YOUNG
EDITED BY: GORDON W. LEGG

INTRODUCTION

South Barrow Well No. 16 was drilled as a "new-field wildcat". The well is located approximately 1.8 miles northeast of the South Barrow Gas Field, nearly 6 miles northwest of the East Barrow Gas Field, and on a separate seismically mapped closure. The well was drilled to a depth of 2400', penetrating sediments of Recent to Early Cretaceous age and terminating in the argillite of indeterminate age. Small shows of gas were noted in the Early Cretaceous Torok Formation and in the "Pebble Shale". The primary objective, Barrow gas sand, was not encountered. A secondary objective, the Sag River Sandstone of Jurassic age, was also missing, and is thought to have been stripped by erosional forces which caused the basal Cretaceous unconformity. This erosion has apparently removed any pre-existing section from the argillite to the "Pebble Shale". No suitable reservoir rocks were encountered in this well.

STRATIGRAPHY

WIRELINE TOPS

No samples caught	0-80'
PLEISTOCENE(?)	80'
CRETACEOUS	
Torok Formation	120'
"Pebble Shale"	1930'
INDETERMINATE	
Argillite	2332'

PLEISTOCENE(?)

Pleistocene(?): 80-120'

There is no paleontological verification for the age classification of this interval. A probable Pleistocene age has been assigned from projection of upper-hole sediments (above the Torok) in other Barrow wells. The lithology of this interval consisted of clay, which was light to medium gray, bentonitic, gummy, and, in part, silty.

CRETACEOUS

Torok Formation: 120-1930'

The top of the Torok Formation is based on a change in log character and lithology from clay to sandstone.

Lithology of the interval from 120-666' is interbedded claystone, siltstone and sandstone, commonly carbonaceous, pyritic, and with rare microfossils. From 666' down to 1320', the lithology is predominantly soft, light gray claystone that hydrates and disperses into the drilling mud. Occasional beds of siltstone, sandstone, and coal also occur. From 1320' down to 1550', a marked increase in sandstone and siltstone, with common carbonaceous material, indicates a higher energy deposition, with close proximity to a distributary stream. From 1550', down to 1782', the lithology is predominantly medium gray, soft claystone. An argillaceous, light gray, silty sand which gave a gas reading of 160 units occurs from 1782-1814'.

Sharp dip reversal indicated by the dipmeter, from 1800' down to 1830', is interpreted as a probable thrust fault, with approximately 70' of throw. Paleontological evidence does not verify this conclusion; however, the similarity of the zone from 1756-1784' with the normal "Pebble Shale" gamma-ray zone from 1930' to 1960', makes it seem probable. No disconformity is suggested by the dipmeter between the Torok Formation and the "Pebble Shale".

Age determinations for the Torok Formation indicate a range from Aptian-Albian (AWA Zones F-9 to F-11). The suggested environment of deposition ranges from inner to middle neritic, in the upper part, to open marine in the lower part.

Bulk lithology make-up for the Torok Formation is: shale 67%; siltstone 26%; and sandstone 7%.

"Pebble Shale": 1930-2332'

The "Pebble Shale" was topped at 1930' by log correlation and continued to a depth of 2332' for a total thickness of 402'. The "Pebble Shale" is believed to be bounded by unconformities. Paleontological evidence suggests Neocomian fauna as high as 1900'. These fauna are possibly reworked from the "Pebble Shale", or perhaps the basal part of the Torok is Neocomian in age. The pick used for correlation purposes to determine the top of the "Pebble Shale", is based on a "hot" gamma-ray zone of 30' thickness, which persists throughout the Barrow area.

Two sidewall cores from the "hot" gamma-ray zone indicate the lithology is very fine grained argillaceous sandstone. Sample quality through this zone was poor, due to bulky lost-circulation material recovered from the shale shaker. A 6' sand bed was penetrated from 1961-1967' and gave a 300-unit gas reading. The sand is very fine to fine grained, light gray, friable to medium hard, glauconitic and argillaceous. Yellow fluorescence and yellow cut fluorescence was noted. Log analysis indicated less than 3 feet of net porosity (21%).

From 1967' to 2070', the lithology is predominantly dark gray shale, grading to siltstone, and with occasional sandstone stringers. At 2070', pebbles of quartz, varicolored chert, and medium sized frosted quartz grains become common as "floaters" in the shale.

A sidewall core cut at 2247' contained worm burrows filled with pyrite. At 2266' a color change from dark gray to dark brown-gray occurred, and at 2280', a light apple-green shale stringer was encountered. This shale stringer was associated with a dark green, glauconitic siltstone, indicating marine deposition. Rocks from 2280' to 2332' are shale with a few chert pebbles and traces of hard, quartzitic sandstone.

In the South Barrow No. 16 well, the Kingak Formation (Jurassic), including the Barrow sandstones, has been stripped off, and the Neocomian unconformity rests directly on the argillite. A sidewall core cut at 2334' (3' correction to 2331'), contained a sandstone which was white, fine grained, and kaolinitic, with inclusions of angular chert and reworked argillite fragments, interbedded with a soft brown shale of Neocomian age.

The age of the "Pebble Shale" is considered to be Early Cretaceous (Neocomian), possible AWA Zones F-12 to F-13. Environment of deposition was open marine-neritic.

Bulk lithology composition of the "Pebble Shale" is approximately 70% shale; 23% siltstone; and 7% sandstone.

INDETERMINATE

Argillite: 2332-2400'

The argillite was encountered at 2332' by log pick. The argillite is black, very hard to moderately hard, with quartz-filled fractures and lenses of quartz. The rock contains fine euhedral pyrite, and becomes foliated and graphitic, from 2350' down to the bottom of the cored interval at a depth of 2399' (total depth was 2400'). The core exhibited near horizontal dips. The age and environment of deposition are indeterminate.

CORE AND SAMPLING DATA

One conventional core was taken at a depth of 2395-2399' in the argillite to check on fracturing and hydrocarbon occurrence. There was an inclusion of soft, white, anhydrite, which had bright yellow-white fluorescence, and a good gassy odor. This slight show gives some support to the hypothesis of possible gas production from the argillite, if it should prove to be highly fractured at other locations.

Eighty-six sidewall cores were shot, with 76 being recovered. Thirty were shot for potential reservoir analysis, 36 for paleontological analysis, and 20 for geochemical purposes.

STRUCTURE

A Schlumberger 4-arm high resolution dipmeter was run from 1487' to 2393' to aid in interpreting the structure.

Dipmeter data starts from within the Torok Formation. From a depth of 1500' down to 1630', dips decrease with depth from 15° to 5°, trending south-southeast to south. From 1630' to 1670', dips average 3°, in a

generally northwesterly direction. From 1670' to 1796', dips average 4°, in a south-southeasterly direction. A thrust fault is postulated at 1800', where a sharp dip reversal occurs, with dips changing from 1° to 21°, and the azimuth changing from south-southeast to north-northwest over the interval from 1800-1830'. Additional supportive evidence lies in the similarity of the gamma-ray log between 1756' and 1784', which has similar log characteristics to the normal "hot" gamma-ray zone of the "Pebble Shale" from 1930' to 1960'. Approximately 70' of throw is postulated on this fault. Dipmeter readings from 1880' down to 1980' are consistently in a south-southeast direction, with dips averaging 8°. From 1980' to 2030', data is considered poor. From 2030' to 2100', dips indicate an average of 4°, with orientation shifting from south-southeast to south-southwest. From 2100' to 2330', dipmeter readings are somewhat random in nature, favoring a northwest orientation. In the vicinity of the argillite top at 2332', dips average 6° in a south-southeasterly direction. The dipmeter data suggests a possible fault at 2340'. A core taken from 2395-2399' in the argillite exhibited near horizontal dips, a departure from the 6° dips observed near the "Pebble Shale"/argillite contact.

OIL AND GAS INDICATIONS

A standard ultraviolet lightbox, chloroethane cut, and microscope were used for visible hydrocarbon detection. Additionally, a continuous gas-in-air, hot-wire device and gas-chromotograph were in operation at all times to record kicks and give a gas component breakdown. As a further back-up, a cuttings-gas analysis was run on each sample collected for preservation.

The first indications of gas in this well were at 820' in the Torok Formation. This may be the base of the permafrost layer, which is believed to act as a barrier to the migration of gas toward the surface. A small gas reading of 160 units was recorded at 1800' from a thin argillaceous sand that was without visible hydrocarbons.

A zone of lost-circulation was encountered at 1850'. Sidewall cores revealed a lithology of only claystone, indicating that the mud losses must have occurred in a zone above 1850', possibly 1800', where the small gas reading was noted.

A thin bed of clean to argillaceous sand occurred from 1961' to 1967', which gave a reading of 320 units of methane, with no other components. Sidewall cores of this sand indicate effective porosities ranging from 4.4% to 7.1%, with horizontal permeability ranging from 1.6 to 3.4 millidarcies. Cuttings exhibited yellow fluorescence and gave a slow streaming cut with a yellow cut fluorescence.

From 1967' to around 2300', only rare stringers of sand, 2' to 3' thick, occur, giving small gas readings of 100 units, or less, total gas.

The 4' core taken in the argillite from 2395-2399', had a good gassy odor on partings. There was a white, amorphous, soft anhydrite, or clay mineral observed in the core, which had a bright yellow-white

fluorescence, and gave an immediate yellow-white cut fluorescence. The argillite is generally tight, with no open fracturing observed, but with many quartz-filled, closed fractures.

While no significant gas shows were encountered, it is nevertheless encouraging to find some hydrocarbon indications in the argillite. Should a zone of intense fracturing be found, in a structurally favorable position, the argillite could possibly be productive.

CONCLUSIONS

1. The hydrocarbon potential of this well was fully evaluated.

2. No potentially economic zones of hydrocarbons were encountered in the well. The best zone of show encountered was a 6' thick sand stringer, with a measured effective porosity of only 6%, and a permeability of only 3.4 millidarcies.

PERTINENT DATA AND APPENDICES

Appendix

SUMMARY OF PERTINENT DATA *

WELL NAME:	South Barrow Well No. 16
API NO.:	50-023-20010
OPERATOR:	Husky Oil NPR Operations, Inc.
LOCATION:	150' FEL, 450' FSL, SE 1/4, protracted Section 1, T22N, R18W, Umiat Meridian, North Slope Borough, Alaska
COORDINATES:	Latitude: 71°16'56.681"N Longitude: 156°32'46.814"W X = 670,860.08 Y = 6,320,927.72 Zone 6
ELEVATION:	30' Kelly Bushing, 12' Pad, 8' Ground
DATE SPUDDED:	January 28, 1978
TOTAL DEPTH:	2400' (driller) 2392' (Schlumberger)
DATE REACHED TOTAL DEPTH:	February 13, 1978
RIG RELEASED:	February 17, 1978
STATUS:	Plugged and abandoned.
CASING:	13-3/8" @ 80' 9-5/8" @ 1487'

LOGGING RECORD:

DIL/SP	89-1486'
DLL/SP	1487-2392'
BHC/GR/CAL	89-1492'
	1488-2390'
CNL/FDC/GR/CAL	1487-2392'
HDT	1487-2393'
HDT Arrow Plot	1504-2386'
Temperature Log (Run No. 1); 8 hours after circulation	60-2392'
Temperature Log (Run No. 2); 37 hours after circulation	58-2393'
Saraband	1490-2380'
Mudlog	200-2399'
Geologist's Lithology Log	80-2399'

SIDEWALL CORES: ** 86 shot; 76 recovered

CONVENTIONAL CORES:

No.	Interval	Recovery	Rock Unit
1	2395-2399'	3.0'	Argillite

DRILL-STEM TESTS: None taken.

WELLSITE GEOLOGIST: Dave Young

LOG ANALYST: Armour Kane

DRILLING CONTRACTOR: Brinkerhoff Signal, Inc., Rig 31

MUDLOGGERS: Borst and Giddens

BIOSTRATIGRAPHIC ANALYSIS: Anderson, Warren & Associates, Inc.

* Copies and/or reproducibles of all geologic data are available from:

National Oceanic and Atmospheric Administration
EDIS/NGSDC (D62)
325 Broadway
Boulder, CO 80303

** Sidewall Cores were utilized for various analyses, including: lithology, paleontology, and geochemistry.

SOUTH BARROW WELL NO. 16
DRILL CUTTINGS AND CORE DESCRIPTIONS
BY: DAVE YOUNG

DRILLED DEPTH (FEET BELOW KELLY BUSHING)	
0- 80	No samples collected.
80- 170	Claystone: light to medium gray, bentonitic, gummy; in part, silty.
170- 230	Sandstone: fine to medium grained, compacted, angular, quartz, varicolored, carbonaceous, pyritic; Siltstone: light gray, hard, argillaceous, carbonaceous, calcareous; claystone stringers.
230- 380	Claystone: gray, bentonitic, gummy; siltstone stringers.
380- 410	Siltstone: light gray, carbonaceous; Sandstone: fine grained, white to gray, compacted, angular, well sorted, few chert pebbles.
410- 470	Claystone: buff, gray, silty, kaolin, rare fossils.
470- 530	Siltstone: light gray, argillaceous, hard, calcareous, carbonaceous, pyritic; Sandstone stringers: fine grained, white to gray, well sorted, tight, micaceous, pyritic, trace of chert.
530- 560	Siltstone: as above; Claystone: gray, soft, silty.
560- 680	Sandstone: fine to medium grained, white to gray, well sorted quartz, rounded, tight; in part, friable, carbonaceous, pyritic; Siltstone: as above, grades to sandstone.
680- 830	Siltstone: light gray, pyritic, slightly calcareous; interbedded Sandstone: fine grained, tight, argillaceous; Claystone: buff, silty, kaolinitic.
830- 890	Siltstone: as above; Claystone: dark gray, gummy, silty; trace of sandstone with biotite.
890- 950	Siltstone: as above; claystone and sandstone stringers.
950-1010	Claystone: dark gray, gummy, tan, silty, kaolinitic.

1010-1160	Sandstone: fine grained, light gray, argillaceous, well sorted, rounded, hard quartz, tight, carbonaceous, calcareous, pyritic; siltstone grades to sandstone; brown fragments of chert; rare pelecypods and microfossils.
1160-1190	Siltstone: light gray, hard, pyritic; poor sample quality.
1190-1220	Sandstone: fine grained, light gray, clean quartz, subangular, well sorted, hard, tight, calcareous, pyritic.
1220-1250	Shale: brown, bituminous laminae, lignitic; Claystone: light gray, silty, soft; Siltstone: as above.
1250-1370	Sandstone: fine grained, light gray to white quartz, well sorted, rounded, calcareous, pyritic, carbonaceous, mafic minerals.
1370-1410	Coal: black, blocky; Siltstone: light gray, pyritic.
1410-1460	Siltstone: light gray, highly argillaceous, pyritic; lignite stringers.
1460-1510	Sandstone: very fine grained, light gray, argillaceous, pyritic, medium hard, slightly calcareous. NOTE: Samples above 1510' are unreliable due to very poor recoveries. Below 1510', sample recoveries and reliability are fair to good.
1510-1560	Claystone: light gray, silty, carbonaceous, slightly calcareous, up to 10% free well rounded quartz pebbles.
1560-1670	Claystone: as above, becoming medium gray, noncalcareous.
1670-1690	No returns.
1690-1770	Claystone: medium gray, soft, noncalcareous.
1770-1800	Claystone: as above; in part, silty.
1800-1840	Sandstone: light gray, fine grained, friable, argillaceous, very finely carbonaceous; interbedded Claystone: as above.
1840-1890	Shale: dark gray, medium hard, flaky; interbedded with and grading to Claystone: medium gray, slightly silty.
1890-1910	Sandstone: fine grained, light gray, well rounded, friable, argillaceous.

1910-1930	Shale and Claystone interbedded.
1930-1950	Sandstone: light gray, fine grained, well rounded, friable, argillaceous.
1950-1955	Shale: dark gray, medium hard, laminated, fissile, micaceous.
1955-1970	Sandstone: fine to medium grained, light gray, medium hard, friable, glauconitic, well rounded, argillaceous; in part, clean quartz, dull yellow fluorescence, slow streaming cut, fair yellow ring; Limestone: tan, microfossiliferous stringers.
1970-1980	Shale: medium to dark gray.
1980-1990	No sample.
1990-2010	Siltstone: dark gray, highly argillaceous, micaceous.
2010-2040	Sandstone: very fine to fine grained, light to medium gray, hard, argillaceous, well rounded, well sorted, pyritic in part, clean, friable, fair porosity, 20% dull yellow-gold fluorescence, slow cut.
2040-2070	Siltstone: interbedded with shale, few thin sandstone stringers, tight with oil odor, spotty yellow fluorescence, fair cut, no visible stain, few varicolored chert pebbles.
2070-2110	Shale: dark to medium gray-brown, soft, silty, fissile, flaky, micaceous.
2110-2120	Sandstone: very fine grained, light gray, medium hard, argillaceous, carbonaceous.
2120-2140	Siltstone grading to Shale: dark gray, soft, micaceous.
2140-2250	Siltstone grading to Shale: as above; few thin sandstone stringers.
2250-2280	Sandstone: fine grained, clean, rounded, well sorted quartz with common dark mineral grains; in part, clay filled; dull yellow, spotty fluorescence, good crush cut; contaminated fluorescence from spersene.
2280-2330	Shale: light green with mica, interlaminated with Shale: brown-gray, fissile, and Siltstone: green to gray, a few chert pebbles; trace of very hard quartz sandstone.
2330-2360	Argillite: black, hard, subconchoidal fracture, blocky, with rare large (0.5-2 mm) quartz-filled fractures.

2360-2395	Argillite: black, becoming foliated, trace of graphite, few pieces with quartz laminae, rare, large (2 mm) drusy vugs.	
2395-2399	Core No. 1, Cut 4', Recovered 3'	
	2395.0-2398.0' (3.0')	Argillite: black, graphitic, hard, blocky, with thin interlaminations of quartz and pyrite; random fractures filled with quartz; occasional anhydrite inclusions below 2397'; gassy odor on fresh breaks, occasional oil stain on horizontal bedding planes; yellow-white cut fluorescence from crushed sample 2397-2398'.
	2398.0-2399.0' (1.0')	No recovery.
2399-2400	No sample.	

2,400 Feet Total Depth

Log Analysis

ARMOUR KANE
Well Log Analyst
18360-6 Cantara St.
Reseda, Ca. 91335
(213) 993-0586

Formation Evaluation

February 20, 1978

Mr. Gordon W. Legg
Husky Oil/NPR operations, Inc.
2525 C Street
Anchorage, AK 99503

Dear Mr. Legg:

On February 13 and 14 Schlumberger logged Barrow #16 running Dual Laterolog, Neutron-Density, Sonic Log, Dipmeter and Sidewall Cores. Log quality as finally obtained was good except for the failure of the SFL on the DLL although an excessive amount of time was consumed in the recordings due to equipment failure and engineer inexperience and misjudgment.

Correlation with Barrow #9 was excellent. Markers were K-2 (Gruy's nomenclature) at 2054 in Barrow #16 vs. 2104 in Barrow #9, K-3 at 2126 vs. 2153, K-8 at 2266 vs. 2302 and the unconformity at 2332 vs. 2380 in Barrow #9. In Barrow #16 the Argillite was encountered directly beneath the unconformity, cutting out all of the expected sands. One sand at 1961-67 exhibited a gas kick during drilling but only three feet of the sand indicated a porosity of about 21%, the other three feet being 13% or less. Since the well was drilled with a high concentration of CaCl and NaCl mud the spontaneous potential was useless in determining the interstitial water resistivity (Rw) which is essential to quantitative analysis of water saturation. The only assumption that can be made (and it's a dangerous one) is that Rw is about the same as mud-filtrate resistivity. If this assumption is made it would result in a water salinity of between 50,000 and 60,000 ppm which may or may not be too high but would result in a 50% Sw in the lower three feet of the sand. This Rw problem is one for which we must find some kind of solution for quantitative analysis of the logs of future wells.

Very truly yours,

Armour Kane

CHEMICAL & GEOLOGICAL LABORATORIES OF ALASKA, INC.
TELEPHONE (907) 279-4014 P.O. BOX 4-1276 46469 Business Park Blvd.
ANCHORAGE, ALASKA 99509

CORE ANALYSIS REPORT

Company Husky Oil Company Date February 27, 1978 Lab. No. 7432
Well No. South Barrow No. 16 Location
Field NPR #4 Formation
County Depths
State Alaska Drilling Fluid

LEGEND
C—Crack, F—Fracture, H—Horizontal, O—Open
NF—No Fracture
IS—Insufficient Sample
S—Slight, St—Stale, V—Vertical, Vu—Vugs

SAMPLE NO.	LEGEND	DEPTH, FEET	EFFECTIVE POROSITY PERCENT	PERMEABILITY MILLIDARCIES HORIZONTAL	PERMEABILITY MILLIDARCIES VERTICAL	SATURATIONS % PORE SPACE RESIDUAL OIL	SATURATIONS % PORE SPACE TOTAL WATER	CONNATE WATER	SOLUBILITY MUD ACID	SOLUBILITY 15 % ACID
		SIDEWALL CORES								
1		1961	6.0	3.40						
2		1962	4.4	1.61						
3		1963	7.1	3.44						
4		2033	3.8	0.20						