NATIONAL PETROLEUM RESERVE IN ALASKA

GEOLOGICAL REPORT

EAST SIMPSON TEST WELL NO. 1

HUSKY OIL NPR OPERATIONS, INC.
Prepared by: Harry Haywood
Edited by: R. G. Brockway

For the

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

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COMPOSITE LITHOLOGY LOG (In Pocket)

* Copies and/or reproducibles of all Geological Data are available from:

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

GEOLOGIC SUMMARY

INTRODUCTION

The East Simpson Test Well No. 1 is located in the NW 1/4 of protracted Section 18, T18N, R10W, Umiat Meridian, approximately 54 miles east-southeast of Barrow, Alaska. The wellsite is located approximately 1/2 mile west of the western shoreline of Smith Bay (see Figures 1 and 2).

The well was drilled principally to test the sandstones of the Ivishak Formation near their updip limit. Drilling of the well commenced on February 19, 1979. Total depth of 7,739 feet was reached on April 3, 1979, and the rig was released at midnight April 10, 1979.

Indications of hydrocarbons were limited to minor shows of gas from tight Cretaceous and Jurassic age sandstones and evidence of heavy residual oil in the Ivishak Formation. Analysis of all mechanical log, core and wellsite data indicated no further reservoir evaluation or testing was warranted. The well was plugged and abandoned.

Pre-Drilling Prognosis

The primary target horizon of the East Simpson No. 1 well was the Ivishak sandstone of Triassic-Permian age. The trapping mechanism at this horizon was dependent on the seismically interpreted onlap of the Ivishak onto the Pre-Devonian basement, regional dip, and truncation by the basal Cretaceous unconformity and subsequent deposition of the "Pebble Shale" unit to the north-northeast (see Figure 3). Closure at the Ivishak horizon was estimated to have an areal extent of approximately 66,600 acres. The net potential pay sand thickness of the Ivishak was estimated to be approximately 125 feet. The source of hydrocarbons for the Ivishak reservoir was considered to be the "Pebble Shale". Maturation studies indicated the Ivishak to be both gas and oil prone.

Secondary objective horizons were the sands of the Nanushuk Group, the lower sands of the Torok Formation and possibly the Sag River Sandstone. Trapping mechanism for any of the secondary objectives was dependent upon stratigraphic conditions.

Post-Drilling Summary

The top of the primary target horizon, the Ivishak was penetrated at 7,450 feet, or approximately 310 feet lower than the seismic interpretation forecast. The gross thickness of the Ivishak was 142 feet, most of which was composed of sandstone, conglomeratic sandstone, and conglomerate with interbedded siltstone and some red shale. Hydrocarbon shows were limited to heavy residual oil in the upper part of the unit and some associated gas shows. Average porosity measured from cores at the top of the Ivishak was 11.6%. Permeabilities were very low except for a 2' interval which had an average of 279 millidarcies. Log and core analysis indicates the entire unit is water wet.

Minor shows of gas of up to 60 units were noted in the lower portion of the Torok Formation. The Torok shows were all confined to thin intervals of low permeability sandstone. A poor show of gas was observed in the upper portion of the Triassic age Sag River Sandstone. Log and core analysis of this interval indicated the unit is also water wet. No shows of any significance were noted in the Nanushuk Group interval.

In summary, drilling of the East Simpson No. 1 well confirmed the presence of potential reservoir horizons, namely the Ivishak Formation and the Sag River Sandstone. Well data indicated that although hydrocarbons have been present at the target horizon, as evidenced by the presence of heavy residual oil in the Ivishak, any mobile hydrocarbons have migrated to some structually higher position.

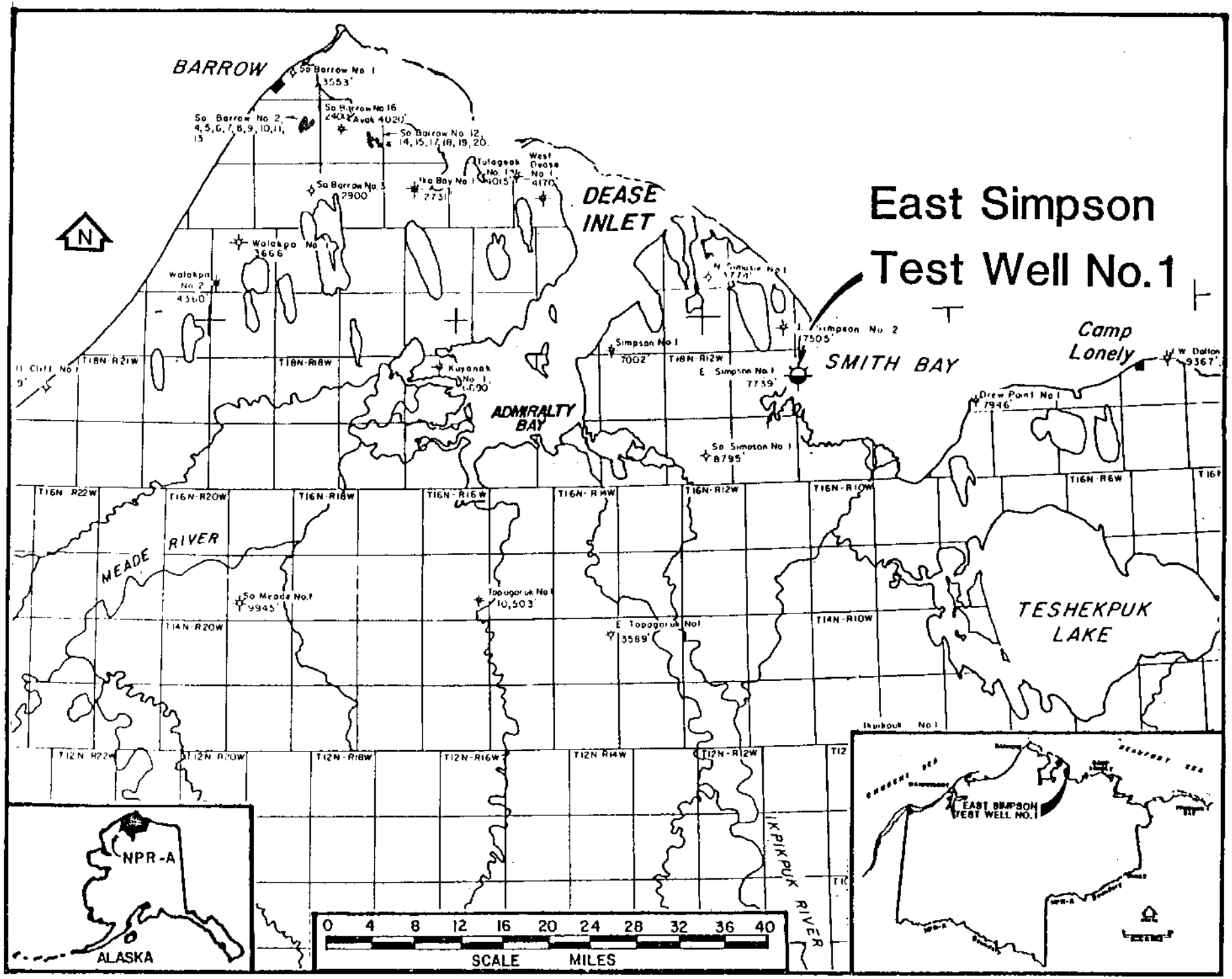
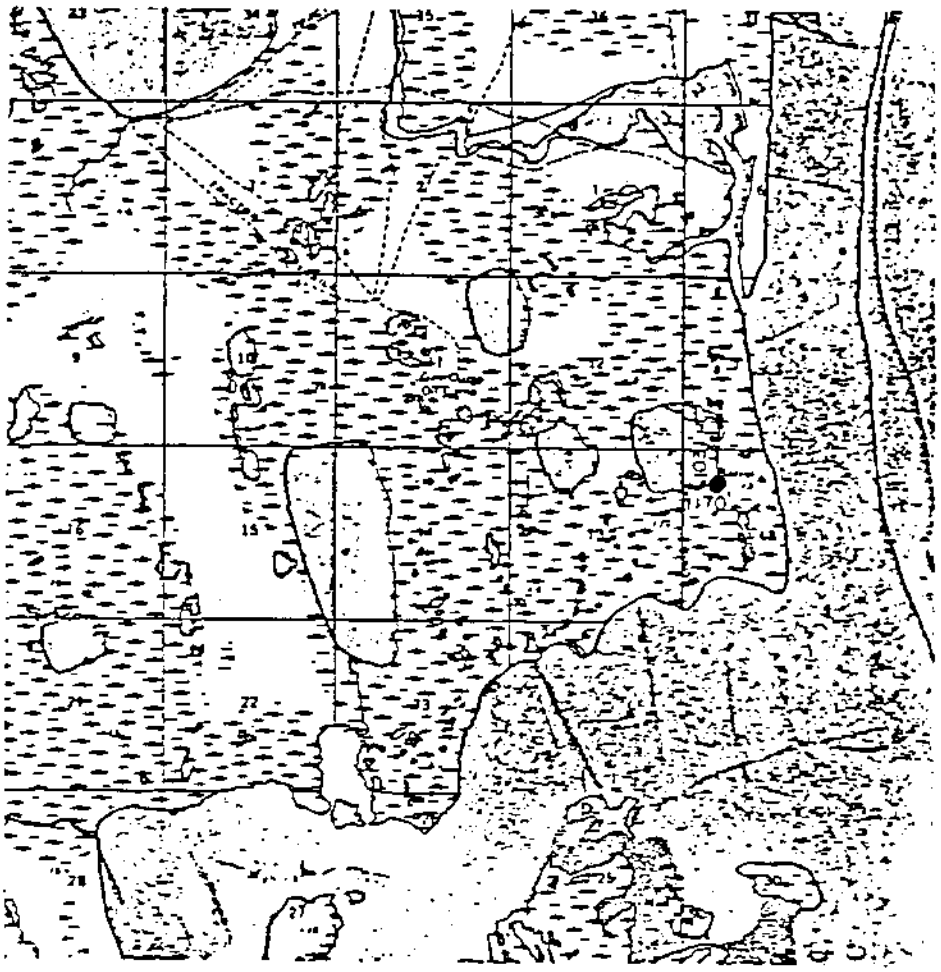


FIGURE 1 - LOCATION MAP - EAST SIMPSON TEST WELL NO. 1



0 1/2 1 2

SCALE IN MILES

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.

JANUARY 4, 1979

STATE OF ALASKA
No. 953-S

EAST SIMPSON

LAT. = 70° 55' 04.01" N
LONG. = 154° 37' 04.75" W
Y = 6,185,783.53
X = 425,996.27
ZONE 5

AS STAKED

EAST SIMPSON

1/4 PROTRACTED SEC 18 T16 N, R 10 W, 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

FIGURE 2 - SURVEYOR'S CERTIFICATE - AS STAKED - EAST SIMPSON TEST WELL NO. 1

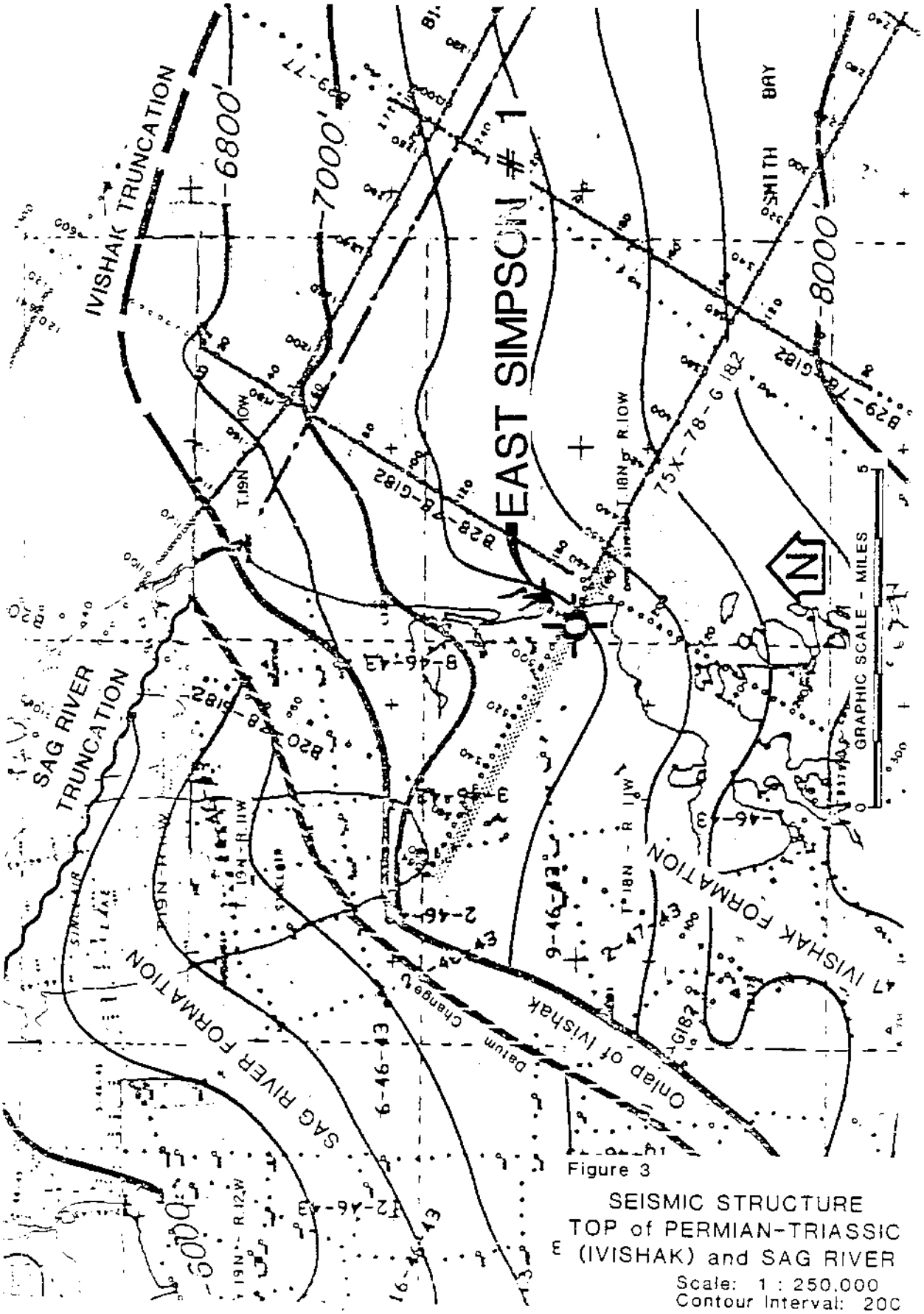


Figure 3

SEISMIC STRUCTURE
TOP of PERMIAN-TRIASSIC
(IVISHAK) and SAG RIVER

Scale: 1 : 250,000
Contour Interval: 200

WELLSITE GEOLOGIST'S REPORT
By: D. O. Bossort
Edited by: Ronald G. Brockway

SUMMARY

The East Simpson Test Well No. 1, drilled to a total depth of 7,739 feet, penetrated a sequence of rocks that varies in age from Cretaceous to Pre-Mississippian. The primary objective of the well was the Ivishak sandstone of the Sadlerochit Group. Secondary objectives were sandstones of the Nanushuk Group and Torok Formation, and the Sag River Sandstone.

Minor hydrocarbon shows were scattered throughout the well. None were considered prominent enough to warrant testing. Good porosities were present in both the Sag River and Ivishak sandstone, but permeabilities were very low with the exception of a few very thin zones in the Ivishak.

All porous sandstones computed in the well were water wet.

Ten conventional cores were cut and 45 sidewall cores shot with 41 recovered. No drill-stem testing was undertaken.

STRATIGRAPHY

WIRELINE LOG TOPS

	Drilled Depth (BKB)	Subsea Depth
CRETACEOUS		
Seabee Formation	100' Samples start	-70'
Nanushuk Group (undivided)	227'	-197'
Torok Formation	2395'	-2365'
"Pebble Shale"	6364'	-6334'
JURASSIC		
Kingak Formation	6579'	-6549'
"Transition" Zone	6760'	-6730'

TRIASSIC		
Sag River Sandstone	6869'	-6839'
Shublik Formation	7026'	-6996'
TRIASSIC-PERMIAN		
Sadlerochit Group Ivishak Formation	7450'	-7420'
PRE-MISSISSIPPIAN		
Argillite	7592'	-7562'
TOTAL DEPTH - SCHLUMBERGER	7743'	-7713'
TOTAL DEPTH - DRILLER	7739'	-7709'

CRETACEOUS

Seabee Formation: 100-227'

The Seabee Formation is composed of a light gray, silty, poorly indurated claystone. Anderson, Warren & Associates, Inc. (AWA) have placed the interval 100-460' into a Cenomanian to Turonian age (AWA Zone F-7). Possibly the base of this unit may be lower because bentonites are present below 227' and bentonite is common to the lower section of the Seabee Formation. Although bentonite was observed below this point, the limestones with which they are associated are not indigenous to the Seabee Formation.

Nanushuk Group (undivided): 227-2395'

The Nanushuk Group occurs between drilling depths of 227' and 2395'. The base of the group is gradational with the underlying Torok Formation and definition of the contact is further complicated by poor samples and poor mechanical log quality. The last samples recovered before setting 13-3/8" casing at 2669' were sands of the Nanushuk Group and were probably cavings. Core No. 1, taken at 2675-2685', recovered Torok shale. Mechanical logs indicate the top of the Torok may have been encountered at 2395'.

Samples of the Nanushuk Group are of poor quality due to the rapid penetration rate and the poorly indurated nature of the sediments.

In the uppermost 730', the Nanushuk Group is an interbedded sequence of gray to dark gray silty limestones and light to dark gray poorly indurated shales with a few very fine to fine grained sandstones. Bentonite and blue-gray bentonitic shales, traces of lignite and buff colored dolomitic mudstones also occur in this upper interval. The contact with the overlying Seabee Formation is marked by abundant fish remains and shell fragments in the first samples of Nanushuk sediments.

Subbituminous coals occur in samples from the interval 1030-1240'. Electric logs indicate the coal sequence is restricted to the interval 990-1090' and the coals are generally thin interbeds in a shaly sequence.

From 1090-1590', the Nanushuk Group is an interbedded sequence of sandstones and shales. The sandstones are light to medium gray, are composed of silt to fine subangular to subrounded quartz grains, and are in part very calcareous, partly poorly cemented and friable. The shales vary from medium gray, chunky, fractured, moderately indurated with shell fragments, calcareous worm tubes and pyrite, to light gray, soft, micaceous and bentonitic.

The interval 1590-2250' is a variable shale sequence. The shales are light gray, soft and bentonitic to dark gray, calcareous and well indurated. Shell fragments and worm tubes are common. Foraminifera are common in the lowermost 100' of this interval.

In the interval 2250-2395' the samples were nearly 100% sandstone; medium gray, very fine to fine quartz and carbonaceous grains, very well cemented, calcareous and tight. Mechanical log characteristics make it questionable as to whether this sandstone sequence is interbedded with shales not recovered in samples. Sandstone persisted in the cuttings, as noted above, to a depth of 2669', probably a function of no sample recovery from the soft uppermost Torok shales.

Anderson, Warren & Associates, Inc. (AWA), micropaleontology determinations from foraminifera, give a Late Cretaceous, Cenomanian to Turonian (Zone F-7) age for 100-460', an Early to Late Cretaceous, Late Albian to Early Cenomanian (Zone F-8) age for 460-670', and an Early Cretaceous, Middle to Late Albian (Zone F-9) age for 670-1960'. Their foraminiferal determinations also give an Early Cretaceous, Late Aptian to Early Albian (Zone F-10) age for the interval 1960-3540' which includes the lower Nanushuk Group and the upper Torok Formation.

Anderson, Warren & Associates, Inc.'s palynology determinations give a Late Cretaceous, Cenomanian (Zonule P-M16) age for 100-460', and an Early Cretaceous, Middle to Late Albian (Zonule P-M17) age for 460-1360'. They have given an Early Cretaceous, Aptian to Early Albian (Zonule P-M18) age for the lower Nanushuk sediments and the Torok sediments to a depth of 6330'.

Torok Formation: 2395-6364'

The Torok Formation occurs between drilling depths 2395-6364', a thickness of 3969' in the East Simpson No. 1 well. In the South Simpson No. 1 (Section 22, T17N, R12W) well the Torok was 3985' in thickness, and in the Drew Point No. 1 (Section 26, T18N, R8W) well, 3755' thick.

For the purposes of this report the Torok is divided into an upper shale unit and a lower predominantly sandstone unit.

The upper unit is 3185' thick and consists primarily of dark gray shale. Silt content and traces of very fine sandstone increase with depth as does the degree of induration; the shales grade downward from weakly fissile to fissile to splintery in part. Inoceramus prisms and pyrite are common in the upper part of the unit.

The lower "sandstone" unit of the Torok is 784' thick and is an interbedded sequence of sandstones and shales. The sandstones are light to medium dark gray and are composed of very fine to fine and silt size, poorly sorted, subangular to subrounded quartz and fine carbonaceous grains in a silty and calcareous matrix. They are generally poorly cemented to friable. Sample recovery from the sandstones was poor, due to their very fine grained and poorly cemented nature, and was additionally complicated by the lost circulation encountered in drilling them. No porosity, staining nor fluorescence was observed in the samples. Gas peaks up to 95 units were encountered while drilling the lower Torok sandstones with trip gas up to 270 units. The Density-Neutron log substantiates the occurrence of gas in the lower Torok sandstones, but also indicates very low porosity. The lost circulation encountered in drilling the lower Torok sandstones may have been a function of over-weighted mud breaking down the formation rather than the loss of drilling fluids into zones of porosity and permeability.

In the lower unit of the Torok, the shales are very dark gray, micaceous, silty to sandy in part, moderately to moderately well indurated and partly fissile to splintery.

Anderson, Warren & Associates, Inc.'s micropaleontology determinations from foraminifera give an Early Cretaceous, Aptian (Zone F-11) age for the Torok rocks in the interval 3540-6420'.

Palynology determinations give an Early Cretaceous, Aptian to Early Albian (AWA Zonule P-M18) age for the Torok and lower Nanushuk Group rocks (1360-6330').

"Pebble Shale": 6364-6579'

The "Pebble Shale" occurs in the East Simpson No. 1 well between drilling depths 6364-6579', a thickness of 215'. The "Pebble Shale" is very dark gray to black, micaceous, fissile to "papery", and moderately well indurated. In the uppermost 20', inclusions of carbonaceous material and fish remains are common, and glauconitic inclusions are rare. In the succeeding 30', the carbonaceous inclusions and fish remains also become rare; floating, frosted, well rounded, fine to coarse quartz grains are common; and black manganese pellets are rare. In the lower 165', scattered floating black polished chert pebbles, frosted quartz pebbles and fish remains occur. Floating frosted quartz sand grains and manganese pellets are very rare.

Micropaleontology determinations from foraminifera give an Early Cretaceous, Neocomian (AWA Zones F-12 to F-13) age for the interval 6420-6620'.

Palynology determinations give a probable Neocomian (AWA Zonules P-M20 to P-M19) age for the interval 6330-6602'.

JURASSIC

Kingak Formation: 6579-6869'

In the East Simpson No. 1 well, the Kingak occurs between the drilling depths of 6579-6869' for a total thickness of 290'. In this report the Kingak is divided into an upper shale unit occurring between drilling depths 6579-6760', and a lower, or "transition" zone, occurring at 6760-6869'.

The Jurassic Kingak lies unconformably beneath the Early Cretaceous "Pebble Shale" and is truncated and regionally bevelled by the Pre-Cretaceous unconformity. In the South Simpson No. 1 well, the Kingak is 1008' thick. In the Drew Point well the "Pebble Shale"-Kingak contact is not well defined, but total Kingak section is probably not much in excess of 100' thick.

The upper shale unit is 109' thick in the East Simpson No. 1 well and is a very dark gray fissile, micaceous, moderately well indurated shale, becoming interbedded with some medium dark gray, moderately well indurated siltstone near the base of the unit.

Correlation of the lower, or "transition", zone is somewhat problematical. A marker on the gamma ray curve of the log of the South Simpson No. 1 well at 7408' and of the Drew Point well at 6898' appears to correlate with 6760', the top of the "transition" zone in the East Simpson No. 1 well. The "transition" beds appear to develop at a depth of 7470' in the South Simpson No. 1 well and are not identifiable on the logs of the Drew Point well.

Anderson, Warren & Associates, Inc.'s foraminifera determinations give a probable Early Jurassic (Zone F-18) age for the depth interval 6620-6900' in the East Simpson No. 1 well. Their palynology determinations give a probable Jurassic age for depth interval 6602-6897'. For this reason, the "transition" bed or zone is included with the Jurassic Kingak shales in this report rather than with the underlying Sag River Sandstone, identified as Triassic by the Anderson, Warren & Associates, Inc.'s reports. They note that a fine grained sandstone at 6740' may be a Sag River Sandstone equivalent.

In the East Simpson No. 1 well, the contact of the "transition" beds with the overlying shale is marked by the occurrence of clay and glauconite pellets in a soft clay matrix. The clay pellets vary in color from light buff to brown to black. The glauconite pellets are a dark green color. The pellets are round to elliptical and vary from fine to coarse grained size. The clay matrix is soft and dark gray to black. The pellets were abundant in samples and were recovered in a sidewall core at a depth of 6764'.

The "transition" beds are an interbedded sequence of sandstone, silty shales, and siltstone. Core No. 5 (6810-6870') was taken in the lowermost 60' of the zone. The sandstones are light to medium gray in color, and are composed of very fine to silt size quartz grains, with rare carbonaceous and glauconite grains. The grain size occasionally grades to fine grained with glauconite grains common. Secondary quartz growth on the quartz grains is common. The sandstones are very well compacted and tight with the lowermost sandstone bed having a calcareous cement. No staining, cut, or fluorescence was observed. Gas peaks up to 65 units were recorded while drilling and coring the "transition" beds.

The sandstone beds of the "transition" zone are interbedded with dark to very dark gray, well indurated, fissile, silty shale and medium to dark gray, argillaceous, well indurated siltstones. Partially pyritized worm borings and black carbonaceous inclusions occur in the siltstones and shales. Ammonites and pelecypods were noted in the core.

TRIASSIC

Sag River Sandstone: 6869-7026'

The Sag River Sandstone occurs between drilling depths 6869-7026' and is 157' thick.

The Sag River Sandstone is 148' thick in the South Simpson No. 1 well, and 105' thick in the Drew Point No. 1 well; thus the East Simpson No. 1 well encountered a thick, well developed Sag River Sandstone.

Twenty-four feet of the Sag River Sandstone was cored (Core No. 6). The Sag River Sandstone is medium gray, and is composed of very fine to fine, subangular to subrounded quartz grains in a silty calcareous matrix with scattered black carbonaceous grains. Fine to coarse glauconite grains are abundant. Poorly defined, irregular, brown to black laminations are developed throughout. The sandstone is moderately cemented and has poor porosity. There are questionable traces of spotty brown oil(?) staining that did not cut nor give fluorescence, with the exception of one dark straw fluorescent cut obtained after boiling in chloroethane. A gas peak of 60 units was recorded while drilling in the upper 20' of the Sag River Sandstone.

A one-foot thick bed of very dark gray, fissile shale containing abundant fish remains and pelecypods occurred at the top of Core No. 6, indicating the otherwise massive appearing Sag River Sandstone may contain a few thin shale breaks.

Core analysis of the Sag River Sandstone indicated good porosities averaging 17.5%, with a maximum of 22.1%; unfortunately, permeabilities are uniformly low, averaging 0.2 millidarcies with a maximum reading of 0.6 millidarcies (Appendix E).

Anderson, Warren & Associates, Inc.'s foraminifera determinations give a Triassic (Zone F-19) age for the interval 6900-7460'. Their palynology determinations give a Triassic (Zonules P-T16 to P-T15) age for the interval 6897-7729'.

Shublik Formation: 7026-7450'

The Shublik Formation occurs between drilling depths 7026-7450', for a thickness of 424'. The Drew Point No. 1 well encountered 511' of Shublik and the South Simpson No. 1 well, 533'. The thinning of the Shublik in the East Simpson No. 1 well is apparently due to nondeposition in relation to the well's proximity to the Barrow Arch.

In this report, the Shublik is divided into three units.

The upper unit of the Shublik occurs from 7026' to 7118' and is composed of, in descending order: a dark brownish-gray calcareous and in part white speckled shale; a mottled light to medium gray, fine granular fragmental limestone, containing thin elongated shell shards; a dark brownish-gray, calcareous, silty shale, containing rare shell fragments, interbedded with minor thin beds of brownish-gray, very fine granular and fragmental limestone; and a medium brown to brownish-gray calcareous siltstone.

The middle unit of the Shublik (7118-7406') consists of dark brownish-gray to very dark gray, calcareous, silty, fissile shale containing shell imprints. The shales become very calcareous with abundant shell fragments in the lower 80' of the middle unit and are silty to sandy in the lower 30'.

The lower or phosphatic unit of the Shublik occurs from 7406' to 7450', with Core No. 7 taken of the interval 7426-7435'. This lower unit consists of limestone which is argillaceous to shaly in the upper few feet and contains abundant medium to coarse black phosphate pellets, partially pyritized. The main portion of the lower unit is a dark brownish-gray to very dark gray fragmental limestone sequence; in part fine to coarse grained size angular shell fragments, sandy with very fine to fine, subangular quartz grains and abundant secondary calcite; and partly very fine to fine grained size, subangular to subrounded shell fragments and very fine to fine quartz grains in an argillaceous matrix. The limestone sequence is well cemented and tight, but has a petroliferous appearance and exhibits weak oil staining with a straw fluorescent cut.

TRIASSIC-PERMIAN

Sadlerochit Group

Ivishak Formation: 7450-7592'

The Ivishak Formation of the Sadlerochit Group extended from 7450' to 7592'; a thickness of 142' which has been divided into three units. The pronounced thinning of the Ivishak in comparison to the South Simpson well (531') is again a function of the well's location on the Barrow Arch and nondeposition of the formation.

The upper unit (7450-7538'), has an 11' noncalcareous siltstone at the top which is underlain by sandstones and conglomerates. This siltstone is medium to brownish-gray and is composed of quartz grains in a petroliferous, argillaceous and siliceous matrix. It is poorly to moderately cemented, and has poor porosity with weak oil staining giving a straw fluorescent cut. Immediately below the siltstone is a thin very light gray, very fine grained quartz sandstone, which is poorly indurated and has fair to good porosity, but exhibits no staining, cut, or fluorescence. This sandstone was present in a circulation sample from the depth of 7463'.

Core No. 8 was cut from the interval 7463-7523'. The uppermost 34.6' of the cored interval is interbedded sandstone and conglomerate. The conglomerates are made up of very fine to coarse, poorly sorted, subangular to subrounded chert grains and pebbles (maximum 4" in diameter) and some contain "tripolite" grains. They are moderately cemented with a white, patchy, silty, kaolinitic and in part tripolitic(?) matrix. They exhibit scattered poor to fair porosity, but effective permeabilities may be very low due to the matrix material. The origin, nature and distribution of the matrix material could be of considerable importance in the search for a reservoir in the Ivishak Formation. Spotty light brown, live oil staining occurs in scattered good porosity in a conglomerate at 7466.4-7467.7'. The staining has a dark straw fluorescence and a strong dark straw fluorescent cut.

The sandstones of the upper unit are light to medium gray. They are composed of very fine to fine, with scattered medium, subangular to subrounded quartz grains, tripolite grains and rare coarse, subrounded quartz grains and chert pebbles. These sandstones are moderately to well cemented with a white, kaolinitic and tripolitic(?) matrix. They become partially siliceous and very well cemented in the lower beds. The sandstones are generally tight, but occasionally develop fair to good porosity. A zone of good porosity in a sandstone, at 7472.7-7473.6', has traces of light brown oil staining with a dark straw fluorescence and a dark straw fluorescent cut. This zone had an average of 13.7% porosity and 279 millidarcies permeability (Appendix E).

Sixteen feet (7464-7480') of Core No. 8 was analyzed on one-foot intervals and had an average of 11.6% porosity and 48 millidarcies permeability. The remainder of the core was sampled at longer intervals and shows much lower porosities and permeabilities.

Samples from 7523-7538' showed lithologies similar to those described in Core No. 8.

The middle unit of the Ivishak Formation occurs from 7538-7559' and consists of red, fissile, moderately indurated shale, and light gray, very fine to fine grained quartz sandstone with prominent red to buff staining.

The lower unit of the Ivishak Formation occurs between 7559' and 7592'. Core No. 9 was taken from 7564-7593' and includes the contact with the underlying pre-Mississippian metamorphics. The lower Ivishak is a sequence of medium light to medium gray and sometimes "salt and pepper"

sandstones. These sandstones are composed of very fine to fine, occasionally medium, subangular to subrounded quartz, tripolite and glauconite grains and rare black subrounded chert pebbles, very well cemented with silica. Black gilsonite(?) is very abundant. The sandstones are tight, but exhibit weak oil staining with a weak straw fluorescent cut. A gas peak of 90 units was recorded while drilling the interval 7573-7576'. In the lowermost 1.6' the sandstone becomes fine to medium grained, with scattered black chert pebbles. Immediately above the unconformable basal contact, the sandstone contains angular inclusions (maximum 2.5" in diameter) of the underlying metamorphics.

Core No. 9 was analyzed, at 3 foot intervals, through the interval 7565-7586' and had an average porosity of 6%. One sample gave 17 millidarcies permeability; the remainder of the core analyzed was impermeable (Appendix E).

The black mineral reported as gilsonite occurs as discreet very fine to medium size grains interspersed with quartz grains and as thin interbeds up to 2" thick. It is a black, vitreous carbon compound that crushes to a combustible fine flaky powder. The writer suggests that this could possibly be some other type mineral such as anthraxolite (graphitic coal) or fragments of vitrain derived from erosion of outcrops of upper Devonian coal beds at the pre-Lisburne unconformity. Without further testing, identification of this mineral is strictly conjectural.

Anderson, Warren & Associates, Inc. found no new foraminifera in the ditch samples from the interval 7460-7620' and the cored interval 7565-7593' was barren, but a probable Triassic-Permian age was suggested, based on lithology. Their palynology report has Triassic age specimens (AWA Zonules P-T16 to P-T15) to a depth of 7729', but also notes occurrences of taxa that range downward into the Permian that are not typical or restricted to that period.

PRE-MISSISSIPPIAN

Argillite: 7592-7740'

The unconformable contact between the Ivishak rocks and the Pre-Lisburne metamorphics occurred at a depth of 7589.6' measured depth (7592' electric log). A total of 3.4 feet of submetamorphics with a dip of 75° were recovered in the bottom of Core No. 9 (7564-7593').

The submetamorphics recovered in the core are a thinly interbedded sequence of very fine grained quartz sandstones, siltstones, and slightly dolomitic mudstone, all very light gray in color, with weak bedding planes.

The very light gray sandstones, with the quartz grains becoming fine grained and subrounded, continue in samples to a depth of 7624' (electric log). A medium light gray clay occurs in the samples from 7620-7630' that is soft, slightly schistose and contains siderite pellets; perhaps marking an unconformity.

The interval 7630-7670' consists of shale that is very dark gray to black, silty, micaceous, well indurated, with traces of dull submetallic luster and schistosity and interbedded sandstone that is very dark gray, mottled with white specks, very fine grained, argillaceous, very well indurated and contains minute quartz veinlets. Fragments of milky and clear fractured quartz are common in this interval.

From 7670-7729', the shales grade to argillite, and the sandstones to quartzite. The dull submetallic luster increases and the fractured quartz fragments persist.

A core of the interval 7729-7739' recovered argillite that is very dark gray to black, micaceous, very well indurated, and has subconchoidal fracture in part, scattered poorly defined, very thin dark gray quartzite laminations, and rare minute pyritic quartzite veinlets. Schistose and slickenside surfaces are common. The bedding is nearly vertical with a strong fracture system at 45° to the bedding.

Anderson, Warren & Associates, Inc. report recovering no indigenous foraminifera from the interval 7620' to total depth and Core No. 10 at 7729'-7739' total depth was barren of palynomorphs.

CONCLUSIONS

The drilling of the East Simpson Test Well No. 1 confirmed the presence of potential hydrocarbon reservoirs. Good porosity zones were found in the Ivishak Formation, Sag River Sandstone, and scattered sandstones of the Torok Formation. Unfortunately, permeabilities were low and all sandstones were water wet. Only very minor hydrocarbon shows were noted.

Possibly hydrocarbon accumulations may be present in an updip direction from the East Simpson No. 1 location.

All information from the well was examined and it was concluded that no zones warranted additional testing, therefore, the well was plugged and abandoned.

PERTINENT DATA AND APPENDICES

* Data available from:

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

SUMMARY OF PERTINENT DATA*

WELL NAME:	East Simpson Test Well No. 1
API NO.:	50-279-2005
OPERATOR:	Husky Oil NPR Operations, Inc.
LOCATION:	1031' FNL; 1170' FWL NW 1/4, protracted Section 18, T18N, R10W Umiat Meridian, Alaska
COORDINATES:	Latitude: 70°55'04.01" North Longitude: 154°37'04.75" West X = 425,996.27 Y = 6,185,783.53 Zone 5
ELEVATION:	30' KB; 13.5' Pad
CASING:	20" @ 90' KB 13-3/8" @ 2661' KB 9-5/8" @ 7167' KB
DATE SPUDDED:	February 19, 1979
FINAL TOTAL DEPTH:	7739' Driller; 7743' Schlumberger
DATE REACHED FINAL TOTAL DEPTH:	April 3, 1979
DATE RIG RELEASED:	Midnight April 10, 1979

LOGGING RECORD (Open hole):

Run No. 1	
DIL/GR/SP	92-2668'
BHCS/GR/TTI	0-2666'
Run No. 2	
DIL/GR/SP	2660-7180'
BHCS/GR/TTI	2660-7176'
CNL/FDC/GR/CAL	2661-7186'
HRD Dipmeter	2679-7173'
Run No. 3	
Temperature Survey (2 runs)	82-7734'
DIL/GR/SP	7000-7734'
BHCS/GR/CAL/TTI	7150-7743'
CNL/FDC/GR/CAL	7174-7738'
HDT Dipmeter	7172-7738'
Birdwell Velocity Survey	220-7739' (Total Depth)

COMPUTED & OTHER LOGS:

Mudlog (Petro Tec)	95-9943'
Dc Exponent	200-7739'
Geogram Survey	0-7690'
Stratigraphic Dipmeter	6651-7150'
Computation, etc.	7199-7594'
Saraband	6700-7730'

SIDEWALL CORES: 3750-7150', 45 shot, recovered 41 shots

CONVENTIONAL CORES:

No.	Interval	Recovery	Description
1	2674.5-2685.0'	10.5'	Torok Formation
2	3739.0-3749.0'	No recovery.	
3	3749.0-3759.0'	No recovery.	
4	5120.0-5130.0'	10.0'	Torok Formation
5	6810.0-6870.0'	60.0'	Kingak Formation
6	6898.0-6922.0'	24.0'	Sag River Sandstone
7	7426.0-7436.0'	10.0'	Shublik Formation
8	7463.0-7523.0'	58.2'	Ivishak Formation
9	7564.0-7593.0'	28.2'	Ivishak Formation & Argillite
10	7729.0-7739.0'	8.0'	Argillite

TESTS: None

STATUS: Dry and abandoned.

WELLSITE GEOLOGIST: D. O. Bossort

DRILLING CONTRACTOR: Nabors Alaska Drilling - Rig 1

MUDLOGGERS: Petro Tec Geological Wellsite Service

BIOSTRATIGRAPHIC ANALYSIS: Anderson, Warren & Associates, Inc.

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

EAST SIMPSON TEST WELL NO. 1
DRILL CUTTINGS AND CORE DESCRIPTIONS
BY
D. BOSSORT - 100 - 7739'

DEPTH DRILLED (FEET BELOW KELLY BUSHING)	
0 - 100	No recovery.
100 - 220	Clay: light gray, silty, poorly indurated.
220 - 250	Shale: medium gray, poorly indurated, fish remains abundant, shell fragments rare, with Bentonite: white to gray, Calcite: milky white to clear; Shale: medium dark and very light gray, very finely varved, trace coal.
250 - 280	Shale: blue-gray, bentonitic, fissile to papery, very poorly indurated; Bentonite: very light gray, abundant coarse mica flakes.
280 - 340	Limestone: gray, argillaceous to silty, well cemented, with Shale: as above.
340 - 400	Sandstone: very fine to fine grained, subangular to subrounded quartz grains with rare glauconite grains, very poorly consolidated to loose, lignite to subbituminous coal; Shale: dark brownish-gray, fissile, poorly indurated.
400 - 430	Limestone: gray, argillaceous to silty, well cemented; Mudstone: buff, dolomitic, well indurated; Shale: dark brownish-gray, fissile, bituminous, grades to lignite.
430 - 460	Shale: dark brownish-gray, fissile, moderately indurated, lignite; Bentonite: very light gray, abundant coarse mica flakes, trace Limestone: as above.
460 - 520	Limestone: gray, silt to very fine sand grains, well cemented; Limestone: gray-brown, very fine crystalline to dense, slightly argillaceous, well indurated; Mudstone: buff, dolomitic, dense, well indurated.
520 - 550	Limestone: sandy, as above, grades in part to Sandstone: very light gray, subangular to subrounded quartz and chert grains, poorly consolidated to loose, calcareous; Mudstone: light buff to buff, earthy to dense, well indurated.
550 - 670	Shale: dark gray to very dark brownish gray, carbonaceous to bituminous, poorly indurated, traces of coal.

670 - 730	Shale: light gray to medium gray, calcareous, moderately indurated, shell fragments common.
730 - 760	Limestone: medium dark gray, very silty, quartz and very fine black carbonaceous grains, well cemented.
760 - 820	Limestone: as above; Shale: medium to medium dark gray, calcareous, well indurated.
820 - 850	Limestone: as above, with Mudstone: buff, dolomitic, well indurated.
850 - 880	Sandstone: very fine quartz grains, calcareous in part, poorly cemented.
880 - 910	Sandstone: as above, traces shale and lignite.
910 - 970	Shale: medium gray, moderately indurated, rare shell fragments, traces of lignite.
970 - 1030	Shale: as above, rare worm tube.
1030 - 1090	Coal: subbituminous.
1090 - 1120	Coal: as above; Mudstone: light buff, dolomitic, trace of pyrite.
1120 - 1150	Coal: as above; Mudstone: light to dark buff, well indurated, pyrite abundant.
1150 - 1180	Coal and Mudstone: as above; Shale: medium gray, fissile, abundant shell fragments and calcareous worm tubes, trace of loose, fine, subangular to subrounded quartz grains.
1180 - 1210	Coal: subbituminous.
1210 - 1240	Coal: as above; Mudstone: light to medium buff, dolomitic, abundant shell fragments and calcareous worm tubes, abundant loose, fine, subangular to subrounded quartz grains.
1240 - 1270	Coal: as above; Mudstone: light buff, dolomitic; Shale: gray, chunky, moderately well indurated, shell fragments common, abundant loose, very fine to fine subangular to subrounded quartz grains.
1270 - 1300	Mudstone, Shale, and loose Sand: as above, shell fragments and calcareous worm tubes common.

1300 - 1330	Mudstone and Shale: as above, shell fragments rare; Sandstone: gray, very fine grained, very calcareous, very pyritic in part, very fine quartz and carbonaceous grains.
1330 - 1360	Shale: medium gray, chunky, moderately well indurated, shell fragments common, pyrite common, trace of loose sand grains, as above.
1360 - 1390	Shale: as above; Siltstone: medium gray, calcareous, well cemented; Mudstone: dark buff to reddish-brown, dolomitic, well indurated, shell fragments and pyrite common.
1390 - 1420	Sandstone: medium light gray, very fine to silt size quartz grains, very calcareous, moderately cemented, abundant loose, very fine quartz grains; Shale: as above, shell fragments and calcareous worm tubes common, well preserved gastropod.
1420 - 1480	Sandstone: light gray, very poorly consolidated to loose, clay matrix.
1480 - 1510	Shale: light gray, clayey, micromicaceous, soft.
1510 - 1540	Shale: light to medium gray, bentonitic, micromicaceous, poorly indurated, with Sandstone: light gray, very fine grained, grading to Siltstone: argillaceous.
1540 - 1570	Shale: as above, with abundant loose very fine quartz grains, trace of Mudstone: buff, dolomitic, earthy.
1570 - 1600	Shale and Sandstone: as above.
1600 - 1630	Shale and Sandstone: as above, with Shale: medium dark gray, pyrite abundant, shell fragments common.
1630 - 1660	Shale: medium gray, very sandy to silty, poorly indurated.
1660 - 1750	Shale: light gray, waxy, soft, micaceous.
1750 - 1810	Limestone: dark gray, very argillaceous to shaly, well cemented, fossil fragments common, with Mudstone: buff to brown, dolomitic, well indurated.
1810 - 1840	Limestone: as above, with traces of Shale: light gray, and Sandstone: very fine grained to silty, argillaceous.
1840 - 1870	Shale: light gray, micaceous, soft.

1870 - 1900	Shale: as above; with Limestone: dark gray, very argillaceous, well cemented; fossil fragments abundant, pyrite common.
1900 - 1930	Shale: light gray, chunky to fissile, micaceous; Shale: medium light gray, silty to sandy, shell fragments and worm tubes common; traces of Mudstone: buff, dolomitic; and Limestone: dark gray, argillaceous to shaly.
1930 - 1960	Shale: dark gray, calcareous, well indurated.
1960 - 1990	Shale: as above, fossil fragments common.
1990 - 2020	Shale: light gray, micaceous, poorly indurated, fossil fragments common.
2020 - 2050	Shale: as above, with Mudstone: light buff to dark brownish-buff, dolomitic, shell fragments and worm tubes common.
2050 - 2080	Shale: as above, with Sandstone: gray, very fine grained, very calcareous, pyrite common, trace of lignite.
2080 - 2140	Shale: light gray to light blue-gray, poorly indurated, waxy, micaceous, weakly fissile.
2140 - 2170	Shale: light gray to light blue-gray to medium gray, smooth to waxy, poorly indurated; Shale: medium gray, very silty to sandy, moderately indurated; Mudstone: light buff, dolomitic; Limestone: gray, silty to sandy, shell fragments and worm tubes abundant, well preserved foraminifera common.
2170 - 2200	Shale: as above, with Shale: light gray, micaceous, weakly fissile, poorly indurated.
2200 - 2230	Shale: light gray, splintery to fissile, partly with very dark brownish-gray petroliferous(?) discoloration or dead staining on surfaces and throughout some chips.
2230 - 2260	Sandstone: loose, fine, subangular to subrounded quartz grains, with Shale: light to medium gray, shell fragments, worm tubes and foraminifera common. Gas increase from background of 50 units at 2265' to 80 units at 2275'.
2260 - 2641	Sandstone: medium gray, very fine to fine quartz and carbonaceous grains, very calcareous, very well cemented, tight, no cut, no fluorescence.

2641 - 2670	29' depth correction on pipe tally.
2670 - 2674.5	100% caving and cement.
2674.5 - 2685	Core No. 1, Cut 10.5', Recovered 10.5'
	2674.5-2679.6' (5.1') Shale: medium dark gray, micromicaceous, weakly fissile, very finely silty, very poorly indurated, occasional carbonaceous plant fragment.
	2679.6-2680.0' (0.4') Siltstone: medium dark gray, very fine grained to shaly, calcareous, poorly indurated.
	2680.0-2685.0' (5.0') Shale: as above, occasional interbed, very silty, slightly calcareous, poorly indurated.
2685 - 2910	99.9% cuttings from mud system and tanks, virtually nil recovery from bottom of hole; presume Shale: as above with pyrite common.
2910 - 3030	Shale: as above.
3030 - 3240	Shale: medium gray to medium brownish-gray, very poorly indurated, pyrite abundant, traces of Limestone: gray to brownish-gray, very finely granular to dense, well indurated; traces of Mudstone: buff, dolomitic, traces of loose, very fine quartz grains; approximately 25% of samples from bottom.
3240 - 3270	Shale: medium brownish-gray, micromicaceous, weakly fissile, very poorly indurated; some improvement in sample recovery.
3270 - 3540	Shale: gray to medium brownish-gray, micromicaceous, weakly fissile, poorly indurated, rare interbed of silty shale, Inoceramus prisms rare, pyrite common.
3540 - 3570	Shale: as above, with Siltstone: medium gray, shaly, moderately indurated.
3570 - 3720	Shale: as above, Inoceramus abundant, loose, very fine quartz grains common, 3600-3630'.
3720 - 3739	Shale: medium dark gray, micromicaceous, weakly fissile, poorly indurated, Inoceramus common, pyrite abundant.

3739 - 3749	Core No. 2, Cut 10', Recovered 0'.
3749 - 3759	Core No. 3, Cut 10', Recovered 0'.
3759 - 3810	Shale: as above.
3810 - 3840	Shale: as above, traces of Mudstone: buff, dolomitic.
3840 - 3870	Shale: as above, pyrite common.
3870 - 3960	Shale: as above, pyrite and Inoceramus common.
3960 - 4110	Shale: as above, pyrite and Inoceramus common, trace of loose, very fine quartz grains.
4110 - 4170	Shale: as above, traces of Shale: very dark gray, very silty.
4170 - 4290	Shale: dark gray, micromicaceous, fissile, moderately well indurated, silty in part, trace of Sandstone: very fine grained, argillaceous, gray, poorly indurated, pyrite common.
4290 - 4530	Shale: as above, with Sandstone: medium gray, very fine quartz and carbonaceous grains, calcareous, poorly to well cemented, loose very fine quartz grains.
4530 - 4590	Shale: as above, loose quartz grains common.
4590 - 4660	Shale: as above, loose quartz grains rare.
4660 - 5120	Shale: dark to very dark gray, micromicaceous, fissile, moderately well indurated, silty to sandy in part, with minor Sandstone: gray, very fine quartz and carbonaceous grains, calcareous, poor to moderately well cemented, tight, no shows, loose, very fine quartz grains.
5120 - 5130	Core No. 4, Cut 10', Recovered 10'
5120.0-5128.7' (8.7')	Shale: very dark gray, fissile and poker chip, micromicaceous, poorly indurated, scattered silty laminations, rare pelecypod imprint.
5128.7-5130.0' (1.3')	Sandstone: medium dark gray, very fine to silt size grains, subangular to subrounded quartz and carbonaceous grains, calcareous, well cemented, tight, no shows, argillaceous, with scattered mica in upper 0.5'; interbedded with Shale: as above.

5130 - 5190	Shale: very dark gray, micromicaceous, fissile to splintery, silty to sandy in part, moderately well indurated, with interbedded Sandstone: medium gray, very fine quartz and carbonaceous grains, calcareous, poor to well cemented, no visible porosity, no shows, with loose, very fine quartz grains.
5190 - 5565	Shale: as above, with traces of Sandstone and loose sand grains, as above.
5565 - 5595	Shale: as above, interbedded Sandstone: as above.
5595 - 5685	Shale: as above, interbedded minor Sandstone: as above.
5685 - 5700	Poor samples, partial lost circulation.
5700 - 5775	Shale: as above, traces of Sandstone and loose sand grains, as above.
5775 - 5800	Lost circulation, gas increased from 30 to 80 units.
5800 - 5865	Shale: as above, interbedded minor Sandstone and loose sand grains, as above.
5865 - 5920	Shale: as above.
5920 - 5945	No samples recovered - lost circulation.
5945 - 5950	Lost circulation.
5950 - 5970	Shale: very dark gray, micromicaceous, fissile to splintery, becoming very silty to sandy in part, interbedded minor sandstone, and loose sand grains, as above.
5970 - 5980	Shale: as above, gas increased from 40 to 60 units.
5980 - 6120	Shale: very dark gray, micromicaceous, fissile to splintery, very silty, grades to shaly siltstone in part, with Sandstone: light gray, very fine to silt size quartz and carbonaceous grains, slightly calcareous, moderately well cemented, tight, no shows, loose very fine quartz grains.
6120 - 6140	Shale: as above, becoming silty to sandy in part with sandstone, and loose sand grains, as above; 160 units gas.
6140 - 6160	Sandstone: light gray, very fine to fine grained, silty, subangular to subrounded quartz and carbonaceous grains, poorly sorted, slightly calcareous, well cemented, tight, no shows.

6160 - 6195	Samples left in hole while tripping and repairing rig 12 hours.
6195 - 6269	Shale and Sandstone: as above, trace of glauconite grains at 6230', trace of Shale: very dark gray to black, very carbonaceous, samples badly contaminated; lost circulation material.
6269	Lost circulation.
6269 - 6300	No sample recovery.
6300 - 6360	Shale: dark to very dark gray, fissile, micaceous, silty to sandy in part, moderately well indurated, with Sandstone: medium light gray, very fine to silt size quartz and carbonaceous grains, moderately well cemented, tight, with Siltstone: medium to medium dark gray, argillaceous to shaly, well indurated.
6360 - 6370	Shale: as above.
6370 - 6390	Shale: very dark gray to black, micaceous, fissile to papery, occasionally sandy, poorly indurated, rare glauconite inclusions, carbonaceous inclusions and fish remains common.
6390 - 6410	Shale: very dark gray to black, micaceous, fissile to papery, poorly to moderately indurated, occasionally sandy, with rare glauconite grains, rare carbonaceous inclusions and fish remains, free floating frosted and well rounded fine to coarse quartz grains common, with Shale: very dark gray to black, fissile, micaceous, silty, moderately well indurated, very rare manganese pellets.
6410 - 6560	Shale: very dark gray to black, fissile to papery in part, moderately to moderately well indurated, free floating frosted and well rounded fine to coarse quartz grains common, very rare manganese pellets, rare black polished chert pebbles and frosted quartz pebbles, scattered fish remains.
6560 - 6650	Shale: very dark gray, fissile, mica, moderately well indurated.
6650 - 6690	Shale: very dark gray, fissile, micaceous, silty in part, well indurated, grades to or interbedded with Siltstone: medium dark gray, argillaceous, moderate to well indurated.

6690 - 6730	Shale: as above, Siltstone: medium to medium dark gray, moderately well indurated, Sandstone: dark gray, very fine to silt size grains, moderately indurated, tight, no shows.
6730 - 6740	As above with abundant loose, very fine quartz grains.
6740 - 6750	Shale: as above; Sandstone/Siltstone: dark gray, very fine to silt quartz grains, rare glauconite grains, argillaceous to shaly in part, moderately indurated, tight, no cut, no fluorescence.
6750 - 6755	Shale: as above; Siltstone: medium dark gray, argillaceous, moderately well indurated.
6755 - 6760	Shale and Siltstone: as above, with black clay pellets and green glauconite pellets, loose and in black clay matrix.
6760 - 6770	Shale: medium dark gray, silty, well indurated, with Siltstone: medium light gray, quartz grains, slightly calcareous in part, well cemented, with glauconite and light buff, brown to black clay pellets, loose and in dark gray to black clay matrix.
6770 - 6780	Sandstone/Siltstone: medium light and medium dark gray, very fine to silt size quartz grains, argillaceous in part, slightly calcareous in part, trace of siderite cement, rare glauconite grains, well cemented, tight, no cut, no fluorescence, abundant glauconite and clay pellets, as above.
6780 - 6795	Sandstone/Siltstone: as above, with clusters and loose very fine quartz grains.
6795 - 6810	Shale and Sandstone/Siltstone: as above, abundant glauconite and clay pellets, as above, and also in light gray clay matrix.
6810 - 6870	<u>Core No. 5, Cut 60', Recovered 60'</u>

6810.0-6820.0' (10.0')	Siltstone: very dark gray, very argillaceous and shaly, subconchoidal fracture, very well indurated, worm borings, in part pyritized.
6820.0-6830.0' (10.0')	Siltstone: medium dark to dark gray, very finely sandy, argillaceous in part, worm borings and black carbonaceous inclusions, very well indurated; ammonite at 6825'.

6830.0-6833.0' (3.0') Shale: very dark gray, mica, very silty, well indurated.

6833.0-6840.0' (7.0') Siltstone: medium to dark gray, argillaceous, argillaceous laminations, shaly in part, very well indurated, pyritized worm borings, pelecypod at 6834.5, vertical fracture 6834.7-6836'.

6840.0-6845.0' (5.0') Sandstone: medium gray, very fine quartz grains, rare carbonaceous and glauconite grains, streaks of fine grained sandstone with abundant glauconite, secondary quartz overgrowth common, very well cemented, siliceous cement, tight, no cut, no fluorescence.

6845.0-6854.8' (9.8') Sandstone: medium light gray, very fine to silt size quartz grains, occasional carbonaceous grains, rare glauconite grains, secondary quartz overgrowth common, very well cemented, siliceous cement, no fluorescence or cut.

6854.8-6867.7' (12.9') Shale: very dark gray, fissile to poker chip in lower part, silty in part, scattered thin siltstone laminations, moderately well indurated.

6867.7-6870.0' (2.3') Sandstone: light to medium gray, very fine to silt size quartz grains, rare glauconite grains, calcareous, very well cemented, tight, no cut, no fluorescence.

6870 - 6898 Sandstone: light gray, very fine to silt size quartz grains, calcareous, rare glauconite grains, moderately well cemented, abundant loose grains at 6894', circulation sample, fair to good porosity, no cut, no fluorescence.

6898 - 6922 <u>Core No. 6, Cut 24, Recovered 24'</u>

6898.0-6899.0' (1.0') Shale: very dark gray, fissile, micaceous, very silty, well indurated, abundant fish remains, pelecypods common.

6899.0-6922.0' (23.0') Sandstone: medium gray, very fine to fine, subangular to subrounded quartz grains, silty, calcite cement, occasional black carbonaceous grains, abundant fine to coarse glauconite grains, friable to moderately indurated, poor to fair porosity, weak irregular brown to

black laminations, and questionable traces of brown patchy dead oil staining, no cut, no fluorescence, excepting one dark straw fluorescent cut from crushed sample in boiling chloroethane, rare pelecypod.

6922 - 7030 Sandstone: medium light gray, very fine to silt size quartz grains, scattered black carbonaceous grains, glauconite common, friable to moderately indurated, poor to fair porosity, as in core above.

7030 - 7050 Shale: dark brownish-gray, calcareous, moderately indurated, with Shale: dark brownish-gray, mottled, white specks, very calcareous, poorly indurated.

7050 - 7090 Shale: dark brownish-gray, calcareous, silty, moderately well indurated, with Shale: very dark gray, slightly calcareous, fissile, moderately indurated, rare pelecypod imprints, and Limestone: brownish-gray, very finely granular and fragmental, argillaceous, well cemented.

7090 - 7100 Limestone: medium to dark brownish-gray, finely granular, very silty in part, grades to calcareous Siltstone: argillaceous, moderately to moderately well indurated; Limestone: medium to medium dark gray, fine to medium grain size fragments, moderately well cemented, with Shale: as above.

7100 - 7140 Siltstone: medium gray to medium brownish-gray, very finely sandy in part, very calcareous, argillaceous to shaly, rare fossil fragments, with Limestone and Shale: as above.

7140 - 7186 Shale: dark brownish-gray, calcareous, silty, well indurated, with interbedded Shale: very dark gray, fissile, slightly calcareous in part.

Intermediate casing point.

7186 - 7230 Contaminated samples - probably as below.

7230 - 7290 Shale: dark brownish-gray to dark gray to very dark gray, fissile to chunky, calcareous in part, silty, well indurated, pelecypod imprints common, rare ostracods, and pyrite.

7290 - 7320 Shale: dark brownish-gray to dark gray, fissile to chunky, calcareous to very calcareous, silty, well indurated, rare pelecypod imprints and pyrite.

7320 - 7340 Shale: as above, becoming in part very dark gray, very calareous, with shell fragments and partly coarsely silty, traces of loose silt size quartz grains and rare loose glauconite grains.

7340 - 7370 Shale: as above, with siltstone: very dark gray, calcareous, glauconitic, argillaceous to shaly, moderately well indurated, and Shale: mottled light and dark gray, very calcareous, poorly indurated, traces of loose silt size quartz grains.

7370 - 7380 Shale: mottled light and medium gray, very calcareous, poorly indurated, with Sandstone: brown, very fine to silt size quartz grains, scattered glauconite grains, argillaceous, calcareous, well cemented, tight, no shows loose very fine to fine, subangular quartz grains and trace of glauconite grains; Shale: as above.

7380 - 7390 Shale: as above, sandstone abundant.

7390 - 7410 Limestone: buff to brown, very fine crystalline, silty to sandy in part, trace of glauconite, moderately cemented, with interbedded Limestone: very dark gray, silty to sandy, argillaceous, moderately well cemented, grades to calcareous shale with abundant medium to coarse black phosphate pellets, in part pyritized.

7410 - 7415 Limestone: light to medium gray, mottled, fragmental, very fine to medium grained size, sandy, poor to moderately cemented, abundant clear and milky calcite, 7390-7415'.

7415 - 7426 No sample.

7426 - 7436 Core No. 7, Cut 10', Recovered 10'

7426.0-7430.0' (4.0') Limestone: dark brownish-gray, fine to coarse shell fragments and secondary calcite crystals, in part grades to coquina, in part sandy with very fine to fine subangular quartz grains, scattered coarse pellets, very well cemented, petroliferous, weak oil stain, tight, straw fluorescent cut.

7430.0-7436.0' (6.0') Limestone: very dark gray to very dark brownish-gray, very fine to fine subangular to subrounded shell fragments, scattered medium to coarse shell fragments, very fine to fine subangular quartz grains in argillaceous

matrix, scattered pellets, very well cemented, tight, interbedded with Limestone: dark brownish-gray, very fine to medium and some coarse grain size shell fragments and secondary calcite crystals, partly sandy with very fine to fine subangular quartz grains, scattered fine to medium pellets, very well cemented, tight, weakly oil stained, straw fluorescent cut.

7436 - 7450 Limestone: as in core above.

7450 - 7460 Siltstone: medium brownish-gray, quartz grains in petroliferous, argillaceous and siliceous matrix, poorly to moderately well cemented, poor porosity, weak oil stain, no visible cut, no visible fluorescence, straw fluorescent cut.

7460 - 7463 Sandstone: very light gray, very fine subangular to subrounded quartz grains, poorly cemented, fair to good porosity, no stain, cut, or fluorescence.

7463 - 7523 Core No. 8, Cut 60', Recovered 58.2'

7463.0-7464.8' (1.8') No recovery.

7464.8-7466.0' (1.2') Conglomerate: medium to dark gray, fine to coarse, subangular to subrounded quartz and chert grains and pebbles (maximum dimension 4 inches) soft white kaolinitic matrix, pyrite common, trace of gilsonite, tight, no visual stain, scattered dark straw fluorescence, dark straw fluorescent cut.

7466.0-7466.2' (0.2') Siltstone: light gray, very fine to shaly, moderately indurated, no shows.

7466.2-7466.4' (0.2') Sandstone: medium light gray, very fine to silt size quartz grains, white kaolinitic matrix, moderately indurated, tight, no shows.

7466.4-7467.7' (1.3') Conglomerate: gray, medium to coarse, subangular to subrounded quartz and chert grains and abundant subrounded chert pebbles in patchy white kaolinitic matrix, moderately cemented, patchy good

	porosity, spotty light brown live oil stain, visual dark straw fluorescence, no visible cut, strong dark straw fluorescent cut.
7467.7-7468.5' (0.8')	Sandstone: very light gray, fine, subangular to subrounded quartz grains and rare subrounded quartz pebble, white kaolinitic matrix, well cemented, tight, no visible stain or cut, very weak light straw fluorescent cut.
7468.5-7470.0' (1.5')	Conglomerate: gray, medium to coarse, subangular to subrounded quartz and rare chert grains, abundant subrounded chert pebbles (maximum dimension one inch), abundant tripolite grains, moderately cemented, fair porosity, no visual stain, no cut or fluorescence.
7470.0-7471.9' (1.9')	Sandstone: light gray, very fine to fine subangular to subrounded quartz grains, white kaolinitic matrix, well cemented, tight, no shows.
7471.9-7472.5' (0.6')	Conglomerate: gray, medium to coarse, subangular to subrounded quartz and chert grains, abundant chert pebbles (maximum dimension 2 inches), white kaolinitic matrix, moderately cemented, tight, no shows.
7472.5-7472.7' (0.2')	Sandstone: very light gray, fine to medium, subangular to subrounded quartz grains, occasional tripolite grain, white kaolinitic matrix, well cemented, tight, no shows.
7472.7-7473.6' (0.9')	Sandstone: medium light gray, medium to coarse subrounded quartz, milky chert, and scattered black chert grains, some subrounded chert pebbles, coarse tripolite grains common, poorly sorted, minor kaolinite and silt matrix, moderately well cemented, fair to good porosity, trace of visual light brown oil stain, visual dark straw fluorescence, no visual cut, dark straw fluorescent cut.

7473.6-7474.0' (0.4')	Sandstone: light gray, fine to medium, with some coarse subrounded quartz grains, scattered tripolite grains, well cemented, tight, no shows.
7474.0-7475.6' (1.6')	Conglomerate: medium gray, very fine to coarse, subangular to subrounded quartz and chert grains and subrounded chert pebbles (maximum dimension 1 inch), coarse tripolite grains common, angular pebble (maximum dimension 4 inches) and clay inclusions at base, well cemented, tight, trace of brown stain, no cut or fluorescence.
7475.6-7478.9' (3.3')	Sandstone: light gray, very fine to fine subangular to subrounded quartz grains, scattered chert pebbles, tripolite common, poorly sorted, well cemented, tight, no shows; interbedded Siltstone: very fine and shaly.
7478.9-7479.6' (0.7')	Conglomerate: mottled · medium dark gray, very fine to medium, subangular to subrounded quartz grains, abundant subrounded quartz and chert pebbles (maximum dimension .25 inch), poorly sorted, well cemented, tight, trace of brown stain, no visual fluorescence or cut, no fluorescent cut.
7479.6-7486.8' (7.2')	Sandstone: medium light gray, very fine to fine, subangular to subrounded quartz grains, some coarse subrounded quartz and chert grains, well cemented, siliceous, tight, no shows, rare light gray shaly partings.
7486.8-7488.8' (2.0')	Sandstone: medium gray, very fine to medium subangular to subrounded quartz grains, scattered subrounded coarse quartz and chert grains and pebbles, tripolite common, light gray kaolinitic inclusions, well cemented with silica, tight, no shows, interbedded Sandstone: medium dark gray, conglomeratic, coarse to very coarse, subangular to subrounded quartz and chert grains, well cemented, fair porosity, no shows.

7488.8-7497.1' (8.3')	Conglomerate: mottled gray, fine to coarse, subangular to subrounded quartz and chert grains and subrounded chert pebbles, tripolite common, fine silt and kaolinite matrix, moderately well cemented, scattered poor porosity, with streaks of good porosity, no shows.
7497.1-7497.6' (0.5')	Siltstone and very fine grained Sandstone: light gray quartz grains, scattered medium to coarse subrounded quartz grains, well cemented, siliceous cement, tight, no shows.
7497.6-7500.4' (2.8')	Conglomerate: gray, fine to coarse, subangular to subrounded quartz and chert grains, subrounded chert pebbles (maximum dimension 0.75 inch) white kaolinitic matrix, moderately cemented, tight, no shows; dark gray linear quartzite (maximum 3") and angular chert (maximum 2") pebbles near base.
7500.4-7523.0' (22.6')	Conglomerate: mottled gray, very fine to coarse, subangular to subrounded quartz and chert grains, subrounded chert pebbles (maximum dimension 2.5 inches) (pebbles are major constituent), silty and kaolinitic matrix, coarse tripolite grains, moderately cemented, scattered poor porosity with streaks of fair porosity, no shows.
7523 - 7540	Shale: brick red to dark maroon, fissile, moderately indurated, with interbedded Sandstone: light gray with prominent red and buff stains, very fine to fine, and rarely medium grained, subangular to subrounded quartz grains, abundant secondary quartz, well cemented with silica, tight, no shows.
7540 - 7550	Sandstone: light gray, trace of reddish-brown stains, very fine to fine, subangular to subrounded quartz grains, occasionally grading to medium quartz and chert grains, abundant secondary quartz, well cemented with silica, tight, no shows.
7550 - 7564	Sandstone: very light gray, fine to subangular to subrounded quartz grains, minor dark chert, minor medium black carbonaceous grains, occasional tripolite

grains, moderately well cemented with silica, abundant secondary quartz, very poor porosity.

7564 - 7593 Core No. 9, Cut 29', Recovered 28.2'

7564.0-7564.8' (0.8') No recovery.

7564.8-7580.7' (15.9') Sandstone: medium light gray, very fine to fine and occasional medium subangular to subrounded quartz grains, tripolite grains common, glauconite and black subrounded chert pebbles very rare, abundant gilsonite, occurs as discrete grains, thin laminations and interbeds up to 0.2 inch in thickness, siliceous, very well cemented, tight, weak visual oil stain, no visual cut, weak straw fluorescent cut. Nearly horizontal bedding with prominent crossbedding highlighted by gilsonite laminations.

7580.7-7583.0' (2.3') Sandstone: medium gray, very fine to silt size quartz grains, abundant fine to medium gilsonite grains, thinly laminated gilsonite, very well cemented, siliceous cement, tight, weak oil stain, no visual cut, weak straw fluorescent cut, weakly and thinly bedded, nearly horizontal.

7583.0-7588.0' (5.0') Sandstone: medium gray, salt and pepper, very fine, subangular to subrounded quartz and fine to medium gilsonite grains, minor silty kaolinitic and tripolitic matrix, siliceous, very well cemented, tight, weak visual oil stain, no visual cut, very weak straw fluorescent cut, massive.

7588.0-7589.6' (1.6') Sandstone: as above, becoming fine to medium grained with scattered black chert pebbles (maximum dimension 1.5 inches), irregular unconformable contact with underlying beds, inclusions (maximum dimension 2.5 inches) of underlying beds near base.

7589.6-7593.0' (3.4') Sandstone: very light gray and very well compacted, very fine, subangular to subrounded quartz grains

in very slightly dolomitic, kaolinitic and very fine silty matrix, thinly interbedded with siltstone and slightly dolomitic mudstone; weak bedding dip, estimated at 75°, fracture parallel to bedding, weakly developed schistosity on bedding planes.

7593 - 7610 Sandstone: very light gray to white, fine, subrounded quartz grains, white kaolinitic, slightly dolomitic matrix, well cemented, tight, no shows.

7610 - 7620 Sandstone: very light gray, fine subrounded quartz grains, white kaolinitic, slightly dolomitic matrix, well cemented, fragments of fractured milky and clear quartz common, tight, no shows.

7620 - 7630 Sandstone: as above, becoming fine to medium grained in part with Clay: medium light gray, soft, slightly schistose, contains siderite pellets, and loose fine to coarse siderite pellets.

7630 - 7670 Shale: very dark gray to black, silty, micaceous, well indurated, traces of dull submetallic luster, traces of weak schistosity, interbedded Sandstone: very dark gray, mottled white specks, very fine grained, argillaceous, very well cemented, minute veinlets and laminations, fragments of milky and clear fractured quartz common.

7670 - 7729 Shale/Argillite: very dark gray to black, fissile, slightly schistose, micaceous, very well indurated, 10-15% develops submetallic luster, interbedded with Sandstone/Quartzite: very dark gray, very fine grained, argillaceous, (breaks across grains in part), minute quartz veinlets and laminations, fragments of milky and clear fractured quartz, traces of Shale: brownish-gray, fissile, slightly schistose, micaceous, well indurated.

7729 - 7739 Core No. 10, Cut 10', Recovered 8'

7729.0-7737.0' (8.0') Argillite: very dark gray to black, micaceous, very well indurated, subconchoidal fracture in part, some weak very thin dark gray quartzite laminations, rare minute pyritic quartzite veinlets, schistose surfaces and slickenside common, nearly vertical bedding, fractures 45° to bedding.

7737.0-7739.0' (2.0') No recovery.

7,739 Feet -Total Measured Depth Driller.

A3

HUSKY OIL NPR OPERATIONS, INC.
U.S. GEOLOGICAL SURVEY ONPRA

LOGGING REPORT

WELL NAME EAST SIMPSON #1

Date February 22, 1979 Driller Depth 2670'

Elevation KB 30' Logger Depth 2674'

Logs Run and Intervals

Dual Induction Laterolog 100 - 2674'

Borehole Compensated Sonic 92 - 2674'

Additional Logs to Run

Zones of Interest NONE

Depth	Gross Thickness	Net Feet of Porosity	Lith	Porosity	Probable Fluid Content

Discussion:

Log Tops & Correlations:

Top Nanushuk 225'

Bottomed in Nanushuk

Dallas Bossort

Wellsite Geologist

Log Analyst

12/77

45

HUSKY

HUSKY OIL NPR OPERATIONS, INC.
U.S. GEOLOGICAL SURVEY ONPRA

LOGGING REPORT

Well Name: EAST SIMPSON NO. 1

Date: 3-20 - 3-21-79 Driller Depth: 7186'

Elevation: 30' KB Logger Depth: 7186'

Logs Run and Intervals

GR/SP/DIL	2660-7180'
GR/CAL/CNL/FDC	2661-7186'
GR/CAL/BHC	2660-7176'
HRD Dipmeter	2661-7185'
CST Sidewall Cores	

Additional Logs to Run

Zones of Interest

Depth	Gross Thickness	Net Feet of Porosity	Lith	* Av. Porosity	Av S_w	Probable Fluid Content
6874-7014'	140	120	Sandstone	19.6%	94%	Water

*Averages computed from analysis of 15 individual intervals.
Density porosity range: 17-27%

Discussion:

Sw computations in Sag River Based on Rw (SP) = .14 R_{wa} from sonic = .16
Numerous Torok Sands show consistent density porosity of 15%, R_t from 7-10 ohms and are of no interest.

Log Tops & Correlations:

	EAST SIMPSON	SOUTH SIMPSON
Torok	2665'	2350'
Pebble Shale	6365'	6340'
Kingak	6579'	6525'
Sag River Zone	6766'	7485'
Sag River Sand	6870'	7530'
Shublik	7026'	7675'

Other Formation Tops:

DALLAS BOSSORT
Wellsite Geologist

ARMOUR KANE
Log Analyst

12/77

HUSKY

HUSKY OIL NPR OPERATIONS, INC.
U.S. GEOLOGICAL SURVEY/ONPRA

LOGGING REPORT

WELL NAME EAST SIMPSON #1

Date April 4 - 5, 1979 Driller Depth 7739'

Elevation 30 KB Logger Depth 7743'

Logs Run and Intervals

Temperature Survey (2 runs)	82 - 7734'
GR/SP/DIL	7000 - 7734'
GR/CAL/BHC	7150 - 7743'
GR/CAL/CNL/FDC	7174 - 7738'
HRD-Dipmeter	7172 - 7738'
Birdwell Velocity Survey	220 - TD

Additional Logs to Run

Zones of Interest

Depth	Gross Thickness	Net Feet of Porosity	Lith	Porosity	Probable Fluid Content
NO ZONES OF INTEREST					

Discussion:

Sadlerochit all of low porosity: 0-9%

Log Tops & Correlations:

	E. Simpson	So. Simpson
Sadlerochit	7454'	8220'
Pre-Lisburne	7572'	
Argillite	7625'	8750'

Post Evaluation Plans:

DALLAS BOSSORT - HARRY HAYWOOD

ARMOUR KANE Wellsite Geologist

Log Analyst

Log Analysis

ARMOUR KANE

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

Formation Evaluation

March 27, 1979

Mr. S. L. Hewitt
Husky Oil/NPR Operations, Inc.
2525 C Street
Anchorage, Ak 99503

Dear Mr. Hewitt:

Schlumberger began logging operations on East Simpson No. 1 at 0830 hours March 20, 1979, and successfully completed Dual Induction, Neutron-Density, Sonic Log, Dipmeter and sidewall cores at 0800 hours March 21, 1979, Engineer Chuck Mallary's efforts resulting in very good quality logs with no equipment failures or lost rig time. Of 45 sidewall cores selected 41 were recovered.

Identifiable log tops were: Torok 2665; Pebble Shale 6365; Kingak 6579; Sag River zone 6765; Sag river sand 6870 and Shublik 7026. Correlations with the South Simpson well were very good. The transition from the top of the Sag River zone to the main sand was considerably longer in East Simpson: 104 feet vs. 45 feet in South Simpson.

Numerous sands in the Torok exhibited remarkably uniform porosities of 13% to 15% and resistivities of 7 to 10 ohms and are of no interest. Fifteen individual intervals computed in the Sag River sand (see attached tabulation) showed a porosity range of 17% to 27% with a weighted average of 19.6% and water saturation of 79% to 100% with a weighted average of 91%. Water saturations were calculated using an Rw value of 0.14 derived from the unusually good SP. Rw_a from Sonic-Resistivity cross-plot was 0.16 which is reasonable confirmation. Again, two intervals, 6760-68 and 7025-34 indicated a high glauconite content, confirmed by ditch samples (and possibly dawsonite) in which ϕ values were negative (bulk density of 2.75 and 2.8 g/cc) and ϕ_N in the order of 45% or more.

None of the shows or log-calculated values would warrant drill-stem testing.

Very truly yours,

Armour Kane

Armour Kane

Log Analysis

COMPANY: Husky Oil/NPR Operations Inc. | WELL: East Simpson #1
FIELD: North Slope | COUNTY | STATE: Alaska

DEPTH	Rt	ϕ_D	ϕ_N	ΔT	ϕ_s	S_w	REMARKS
6874-80	3.5	19	31	83	20	95	
6880-90	2.3	23	36	84	23	97	R_w From SP: 0.14; R_{wa} = 0.16
6890-6900	3.3	18	34	85	22	100	
6902-06	4.2	20	33	78	19	86	
6910-20	3.5	23	35	85	22	99	
6926-30	2.8	22	37	90	26	92	
6930-34	2.3	27	37	93	28	82	
6934-40	3.5	21	34	84	21.5	86	
6940-50	3.0	20	39	88	24	97	
6950-60	2.5	21	33	90	26	100	
6960-70	2.5	21	32	88	24	100	
6970-80	2.8	22	34	88	24	92	
6980-90	3.2	17	29	85	22	100	
6990-96	3.0	20	33	86	23	97	
7004-14	4.0	18	32	84	21.5	94	

Log Analysis

ARMOUR KANE

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

Formation Evaluation

April 16, 1979

Mr. S. L. Hewitt
Husky Oil/NPR Operations, Inc.
2525 C Street
Anchorage, Ak 99503

Dear Mr. Hewitt:

At 0600 hours on April 4, 1979, Schlumberger began logging operations on East Simpson Well No. 1 and at 0600 hours on April 5 had completed two Temperature Surveys, DIL, CNL/FDC, BHC, Dipmeter and Birdwell Velocity Survey. Quality of all logs was good and no lost rig time was incurred by Engineer Nathert. No Sidewall Cores were shot due to the nature of the formations and lack of any interesting zones.

Log tops were: Sadlerochit at 7454; Pre-Lisburne at 7572 and Argillite at 7625. The Pre-Lisburne top was found within a core taken across the Sadlerochit-Pre-Lisburne interface.

Water resistivity calculated from the SP was 0.17 and from a number of Rw_a values at 0.16 which may or may not be too fresh at that depth. The Rw_a value was used in the water saturations listed on the enclosed tabulation. The column headed ϕ_c is derived from cross-plotting bulk density and neutron limestone porosity. The ϕ_N column is sandstone neutron response corrected to a limestone matrix by subtracting four porosity units from the log-recorded sandstone matrix. Some of the calculated Sw values indicate an Sw in excess of 100% which suggests the water is not as fresh as the computed Rw values used. In other wells where no other information was available we have assumed an Rw of 0.12 to good advantage. If this is done here the Sw values would drop as shown in the last column to the right. The interval 7566-70 shows a "cross-over" which may be legitimate although the two curves are not moving in opposite directions as in the classic case. If it is correct, then the interval would indicate the presence of gas.

Very truly yours,

Armour Kane

Log Analysis

COMPANY: HUSKY OIL/NPR OPERATIONS, INC. | WELL: EAST SIMPSON Nº 1

FIELD: NORTH SLOPE | COUNTY: | STATE: ALASKA

DEPTH	R_T	ρ_B	ϕ_N	ϕ_c	ΔT	ϕ_s	$R_w = .16$ S_w	$R_w = .12$ S_w	REMARKS
7469-75	7	2.48	12	13	73	15	100	91	
7481-87	10	2.55	12	10.5	70	13.5	100	94	
7487-97	9	2.53	11	10.5	69	13	100	99	
7510-20	11	2.54	10	10	67	11.5	100	94	
7520-27	8.5	2.52	10	10.5	70	13.5	100	101	
7566-70	21	2.38	12	15	75	17	54	45	Poss. Gas

NOTES: ALL DEPTHS ARE FROM DIL

ϕ_N HAS BEEN CORRECTED TO LIMESTONE MATRIX FROM RECORDED SANDSTONE

ϕ_c IS FROM ρ_B-$\phi_{N_{LS}}$ CROSS-PLOT

R_w OF 0.16 FROM SP AND R_{wa} APPEARS TOO HIGH RESULTING IN S_w > 100%

RIGHT HAND COLUMN IS S_w BASED ON R_w = 0.12, A FIGURE WHICH HAS BEEN USED TO GOOD EFFECT IN OTHER WELLS WHEN NO OTHER INFORMATION WAS AVAILABLE.

Schlumberger

SCHLUMBERGER OFFSHORE SERVICES
5000 GULF FREEWAY P.O. BOX 2175
HOUSTON, TEXAS 77001, (713) 928-4000

PLEASE REPLY TO
5700 RALSTON STREET - SUITE 306
VENTURA, CALIFORNIA 93003

May 21, 1979

Husky Oil NPR Operations
2525 "C" Street - Suite 400
Anchorage, Alaska 99503

Gentlemen:

This report is intended to summarize our interpretation of the Continuous Dipmeter from your East Simpson #1 well located on the North Slope of Alaska. Included in this report are the Dipmeter arrow plot and a series of azimuth frequency diagrams, the interpretation of which is discussed below.

The basis for this interpretation is a series of dip patterns which are identified on the arrow plot by connecting various dip groupings with either a red line or a blue line. The sediments in the intervals covered by a pattern of dips connected with a red line will become thicker in the direction of dip. The red lines connect those dips that have nearly a consistent azimuth and where the dip magnitude increases with increasing depth. This pattern describes a wedge shaped system with steeper dip at the bottom than at the top. This wedge will open up, or stated another way, the sediments covered by a red pattern will become thicker in the direction of dip. Those dips connected by a blue line identify a dip pattern of decreasing dip magnitude with increasing depth. These dips in the blue patterns then are used to identify foresetting and therefore the direction of sediment transport. These two types of dip patterns then when studied together result in our interpretation.

The sand in the interval 7460-7540 should become thicker to the SW from this well. This sand was transported from north to south during deposition.

The sand in the interval 7558-7592 will become thicker to the SW from this well and during deposition the sediments were transported from north to south.

A DIVISION OF SCHLUMBERGER LIMITED

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 4 of our General Terms and Conditions as set out in our current Price Schedule.

Thank you for using Schlumberger on this well. If we can be of further assistance, please feel free to call at any time.

Sincerely yours,

J. B. Vohs

JBV:me
Enclosure

Schlumberger

SCHLUMBERGER OFFSHORE SERVICES
5000 GULF FREEWAY. P.O. BOX 2175
HOUSTON, TEXAS 77001, (713) 928-4000

PLEASE REPLY TO
500 W. INTERNATIONAL AIRPORT ROAD
ANCHORAGE, ALASKA 99502

November 27, 1979

HUSKY OIL, NPR OPERATIONS
2525 C St.
Suite 400
Anchorage, Alaska 99503

Gentlemen:

This report is intended to summarize our interpretation of the Dipmeter on your East Simpson #1 Well on the North Slope of Alaska. The interpretation of this Dipmeter is based on the Dipmeter Arrow Plot, and a series of Dip Frequency Polar Plots, a copy of which are included with this report.

Structural dip in this well is around 2° to the west.

Interval 6651-6857 - Sediment transport in this interval is to the SSW and the sediments should also be thicker in that direction. The dip magnitude in this interval is low, so I consider this interpretation to be somewhat weak.

Interval 6868-7031 - The sediments in this interval should be thicker to the SW from this well. The sediments appear to have been transported from SE to the NW at the time of deposition.

Interval 7032-7150 - The sediments in this interval display some evidence that they will be thicker to the SW from this well. The sediments in this interval appear to have been transported from SW to the NW at the time of deposition.

Interval 7400-7465 - The sediments in this interval were transported from the SE to the NW at the time of deposition.

A small unconformity or time break is indicated by the Dipmeter at a depth of 7654 feet.

Interval 7465-7590 - The sediments in this interval were transported from north to south during deposition, and the sediments should be thicker to the SW from this well.

All interpretations are opinion based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 4 of our General Terms and Conditions as set out in our current Price Schedule.

Thank you for using Schlumberger on this well. If we can be of further assistance with this interpretation or any other matter please feel free to call any time.

Respectfully yours,

J. B. Vohs

JBV:vm

Encl.

516 E. 18TH STREET BAKERSFIELD, CALIFORNIA 93305 · 805/324-4818

CORE LABORATORIES, INC.

June 13, 1979

USGS/Husky Oil Company, Opr.
2525 "C" Street
Anchorage, AK 99502

Attention: Mr. Sam Hewitt

Subject: Core-Analysis Data
East Simpson #1 Well
Wildcat Field
North Slope, Alaska

Gentlemen:

Diamond core equipment and water base drilling fluid were used in extracting core from the subject well. These cores were submitted to our Anchorage laboratory for permeability, Boyle's Law porosity, and grain density determinations. The results of these analyses are presented in the accompanying report.

We sincerely appreciate this opportunity to serve you and hope these data prove beneficial in the development of this reservoir.

Very truly yours,

CORE LABORATORIES, INC.

James A. Cusator

James A. Cusator
District Manager

Enclosures
JAC:smc

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Company USGS/HUSKY OIL COMPANY, OPR Formation _____ Page 1 of _____
Well EAST SIMPSON #1 Cores DIAMOND File BP-3-532
Field WILDCAT Drilling Fluid WBM Date Report JUNE 6, 1979
County NORTH SLOPE State ALASKA Elevation _____ Analysts WSP
Location _____ Remarks PERM & BOYLES LAW POROSITY

CORE ANALYSIS RESULTS

(Figures in parentheses refer to footnote remarks)

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYS			POROSITY PERCENT	GRAIN DENSITY	RESIDUAL SATURATION		REMARKS
		Horizontal Maximum	Horizontal 90°	Vertical			Oil % Pore	Total Water % Pore	
1	5128	0.2			10.4	2.67			ss,vfg,slty,calc
2	5129	0.1			11.6	2.71			same

516 E. 18TH STREET BAKERSFIELD CALIFORNIA 93305 · 805/324-4915

CORE LABORATORIES, INC.

May 10, 1979

USGS/Husky Oil Company, OPR.
2525 "C" Street
Anchorage, AK 99503

Attention: Mr. Sam Hewitt

Subject: Core-Analysis Data
E. Simpson #1 Well
Wildcat Field
North Slope, Alaska

Gentlemen:

Diamond core equipment and water base drilling fluid were used in extracting core from the subject well. These cores were submitted to our Anchorage laboratory for horizontal and vertical permeability, porosity, grain density, and fluid saturation determinations. The results of these analyses are presented in the accompanying report.

Also included is a core gamma correlation log taken of the entire cored interval.

We sincerely appreciate this opportunity to serve you and hope these data prove beneficial in the development of this reservoir.

Very truly yours,

CORE LABORATORIES, INC.

James A. Cusator
District Manager

Enclosures
JAC:smc

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Company USGS/HUSKY OIL CO., OFR Formation _____ Page 1 of _____
Well EAST SIMPSON #1 Cores DIAMOND File BP-3-515
Field WILDCAT Drilling Fluid WBM Date Report 4/16/79
County NORTH SLOPE State AK Elevation _____ Analysts WSP
Location _____ Remarks BOYLES LAW POROSITY

CORE ANALYSIS RESULTS

(Figures in parentheses refer to footnote remarks)

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYS			POROSITY PERCENT	GRAIN DENSITY	RESIDUAL SATURATION		REMARKS	
		Horizontal Maximum	Horizontal 90°	Vertical			Oil % Pore	Total Water % Pore		
1	6898	0.0			5.3	2.74			ss,vfg,calc,slty	
2	99	0.1			20.9	2.71			ss,vfg,slty	
3	6900	0.1			16.4	2.74			same	
4	01	0.2			20.8	2.70			same	
5	02	0.2			20.9	2.69			same	
6	03	0.2			18.9	2.71			same	
7	04	0.1			22.1	2.89			same	
8	05	0.3			20.8	2.68			same	
9	06	0.1			11.3	2.71			same	
10	07	0.0			7.1	2.73			same	
11	08	0.3			15.2	2.71			same	
12	09	0.2			16.4	2.70			same	
13	10	0.3			18.8	2.70			same	
14	11	0.4			20.3	2.68			same	
15	12	0.4			21.6	2.67			same	
16	13	0.6			21.6	2.67			same	
17	14	0.4			19.8	2.68			same	
18	15	0.4			18.7	2.70			same	
19	16	0.3			19.7	2.72			same	
20	17	0.0			9.5	2.80			same	
21	18	0.3			19.3	2.74			same	
22	19	0.2			17.7	2.74			same	
23	20	0.4			19.7	2.68			same	
24	21	0.3			16.6	2.70			same	
25	7465	---			8.5*	2.66*	3.7	81.8	cong	*sum. fluids
26	66	15		1.3	12.6	2.66	6.9	74.3	same	
27	67	112		78	9.4	2.68	14.1	78.5	same	
28	68	8.2		55	13.9	2.74	2.9	75.0	ss,mg,pyr	
29	69	---			10.2*	2.64*	2.3	65.6	cong	*sum. fluids
30	70	0.8		1.6	12.5	2.70	3.4	83.9	ss,vf-fg	

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Company HUSKY OIL CO. Formation Page 2 of
Well EAST SIMPSON #1 Cores File BP-3-515
Field Drilling Fluid Date Report 4/16/79
County State Elevation Analysts
Location Remarks

CORE ANALYSIS RESULTS

(Figures in parentheses refer to footnote remarks)

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYS			POROSITY PERCENT	GRAIN DENSITY	RESIDUAL SATURATION		REMARKS
		Horizontal Maximum	Horizontal 90°	Vertical			Oil % Pore	Total Water % Pore	
31	7471	1.6		1.6	12.2	2.67	1.9	67.8	ss,vf-fg
32	72	353		10	14.4	2.61	2.6	62.3	ss,mg
33	73	205			13.0	2.70	4.7	74.9	ss,f-mg,peb
34	74	31		181	16.3	2.76	2.0	74.8	cong
35	75	29		0.9	16.2	2.72	3.5	57.5	ss,f-mg
36	76	0.6		0.0	13.3	2.79	0.0	80.7	ss,f-cg,cong
37	77	0.1		0.0	7.4	2.77	3.6	57.8	ss,vfg,slty
38	78	0.0		0.0	7.1	2.73	0.0	76.9	same
39	79	0.0		0.5	7.0	2.70	3.4	58.8	ss,vfg,slty,peb
40	80	8.8		0.0	11.5	2.76	3.0	77.5	cong
41	7483	0.4		0.2	11.2	2.68			ss,vfg,slty
42	7486	0.3		0.1	10.6	2.72			same
43	7489	8.9		5.2	12.3	2.67			cong
44	7492	73			9.5	2.67			same
45	7495	- no analysis -							
46	7498	0.2			5.4	2.67			cong,sdy
47	7515	0.3			9.6	2.76			same
48	7522	8.5			13.4	2.70			same
49	7565	0.1		0.0	7.8	2.65			ss,vf-fg,slty
50	7568	17		0.0	4.5	2.51			ss,vf-mg,slty,v carb
51	7571	0.0		0.0	6.7	2.65			ss,vfg,slcy,carb lam
52	7574	0.0		0.0	6.3	2.65			ss,vfg,slty
53	7577	0.0		0.0	5.3	2.65			same
54	7580	0.0		0.0	6.1	2.67			same
55	7583	0.0		0.0	5.9	2.63			ss,vfg,slty,carb lam
56	7586	0.0		0.0	6.5	2.65			ss,vfg,slty

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Company USGS/HUSKY OIL COMPANY, OPR. Formation _____ Page 3 of _____
Well EAST SIMPSON NO. 1 Cores DIAMOND File BP-3-515
Field WILDCAT Drilling Fluid WBM Date Report 5/2/79
County NORTH SLOPE State ALASKA Elevation _____ Analysts WSP, KR
Location _____ Remarks FULL DIAMETER ANALYSIS

CORE ANALYSIS RESULTS

(Figures in parentheses refer to footnote remarks)

SAMPLE NUMBER	DEPTH FEET	PERMEABILITY MILLIDARCYS			POROSITY PERCENT	GRAIN DENSITY	RESIDUAL SATURATION		REMARKS
		Horizontal Maximum	Horizontal 90°	Vertical			Oil % Pore	Total Water % Pore	
57	7498	1.2	0.7		7.9	2.73			cong,sdy
58	7499	0.1	0.1	0.1	6.9	2.72			same
59	7500	0.1	0.1	0.1	5.1	2.68			same
60	7501	no analysis							same
61	7502	2.1	1.9	1.2	9.0	2.72			cong
62	7502	3.9	3.6	0.6	9.3	2.79			same, sid
63	7504	2.4	1 4	1.2	8.5	2.68			same
64	7505	7.4	7.1	3.5	11.1	2.79			same
65	7506	4.3	2.9	2.9	8.0	2.70			same
66	7507	15	11	5.6	10.5	2.70			same
67	7508	8.6	7.1	3.5	10.7	2.74			same
68	7509	3.9	3.4	2.0	10.6	2.71			same
69	7510	3.3	3.1	1.9	10.0	2.70			same
70	7511	5.1	3.4	1.6	7.9	2.75			same
71	7512	2.6	2.4	1.5	8.0	2.72			same
72	7513	6.2	4.6	2.2	9.7	2.73			same
73	7514	no analysis							same
74	7515	no analysis							same
75	7516	5.6	4.8	4.5	11.1	2.71			same
76	7517	6.8	6.3	5.3	11.3	2.72			same
77	7518	8 1	8.1	5.9	11.7	2.71			same
78	7519	3.6	3.5	1.8	10.1	2.75			same
79	7520	16	12	5.6	12.5	2.73			same
80	7521	7 2	5.7	2.5	11.5	2.72			same

LISTING OF OTHER AVAILABLE GEOLOGICAL DATA AND SOURCE OF OTHER AVAILABLE DATA*

1. Final Micropaleontology Report by Anderson, Warren & Associates, Inc.

2. Final Palynology Report by Anderson, Warren & Associates, Inc.

* Copies and/or reproducibles of all Geological Data are available from:

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