CONSULTING MICROPALEONTOLOGY
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February 22, 1977

TO: Tetra Tech, Inc.

RE: Husky/U.S.N.
So. Harrison Bay #1
Sec. 6, 12N/2E, U.B.M.
North Slope, Alaska

FINAL MICROPALEONTOLOGY REPORT

Enclosed you will find a 1" to 100' faunal distribution log and four faunal checklists on the South Harrison Bay #1 well. The conclusions presented in this report are based on the processing, picking and examination of 351 ditch samples, generally composited on 30 to 40 foot intervals, 2 conventional core, and 11 sidewall core samples. Thin sections were prepared on 30 foot ditch intervals below 10,150 feet. A generalized age summary of the well is provided below.

500-950'

Generally barren of foraminifera. Coaly cherty sandstone with frequent to abundant volcanic glass shards. This unit is probably equivalent lithologically to the Kogosukruk Tongue of the Prince Creek Fm.

AGE: Probable Late Cretaceous (Senonian)
Probable Prince Creek Fm.

ENVIRONMENT: Nonmarine to Marginal Marine

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950-2330'

Eoeponidella strombodes, Dorothia smokyensis, Nonionella taylorensis, Praebulimina venusae, Textularia gravenori, Verneuilinoides fischeri, Trochammina ribstonensis, T. whittingtoni, Cenosphaera spp., Spongurus spp., Sethocyrtis spp., Archicorys spp., Theocorys spp., Dictyomitra spp., D. multicostata, Spongodiscus spp., S. cf. renillaeformis, Rhopalodictyum sp., and Spongostaurus sp.

The above assemblage is characteristic of the Senonian Schrader Bluff Formation. Faunas obtained throughout this interval are indicative of oscillating middle neritic to upper bathyal (non-turbid) deposition.

AGE: Late Cretaceous (Senonian) Schrader Bluff Fm.

ENVIRONMENT: Middle Neritic to Upper Bathyal (non-turbid)

2330-3210'

Gaudryina irenensis, Trochammina rutherfordi, T. ribstonensis, Zonodiscus sp. A, Cenosphaera spp., Spongurus spp., and Spongodiscus spp. characterize this interval.

A top on the "Paper Shale" ("cutinized leaves") was found at 2880 feet. This point is probably at the top of or down in the Shale Wall Member of the Seabee Formation. This interval is generally dominated by starved basin deposition as indicated by the high organic content and the lack of preserved calcareous foraminifera associated with the few short pulses of open marine radiolarian bursts.

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2330-3210' (con't.)

AGE: Late Cretaceous (Cenomanian to Turonian)
Seabee Fm.

ENVIRONMENT: Open Marine (starved basin)

3210-3330'

This fauna contains: Gaudryina canadensis, Trochammina rainwateri, T. mcmurrayensis, T. gatesensis, Verneuilinoides cf. borealis, and Haplophragmoides bonanzaensis. This association appears to be a transitional fauna which could be either Albian or Cenomanian in age. These strata probably represent turbid middle to outer neritic deposition.

AGE: Early to Late Cretaceous (Albian to Cenomanian)
Probable Nanushuk Group

ENVIRONMENT: Probable Middle to Outer Neritic (turbid)

3330-5260'

Haplophragmoides topagorukensis, H. cf. linki, H. gigas, H. cf. excavata, Ammobaculites fragmentarius, A. wenonahae, Lenticulina macrodisca, L. erecta, Trochammina umiatensis, T. mcmurrayensis, Miliammina manitobensis, Psamminopelta subcircularis, Saccammina lathrami, Cyclammina cf. pacifica, Globorotalites alaskensis, Praebulimina nanina, Valvulineria loetterlei, Bathysiphon vitta, Verneuilinoides borealis and Ditrupa cornu occur in this interval. The above association

3330-5260' (con't.)

is typical of the Verneuilinoides borealis Faunal Zone and is Albian age. The environments represented by these moderately diverse assemblages were probably of somewhat turbid middle to outer neritic depths with short periods of lesser turbidity.

AGE:	Early Cretaceous (Albian) Nanushuk Group
ENVIRONMENT:	Middle to Outer Neritic (fluctuating turbidity)

5260-7270'

A pyritized radiolarian assemblage characterizes these strata together with rare non-diagnostic agglutinated foraminifera. Lithocampe cf. sp. N occurs in the bottom of this interval, but preservation makes the identification uncertain. According to Ramsey (1970) this zone of pyritized radiolaria separates the Verneuilinoides borealis zone from the Gaudryina tailleuri zone, and is probably Aptian to early Albian in age. Due to the preservation of this fauna, all that can be said about the environment of deposition is that it was marine and open to oceanic currents. It was recently brought to our attention that these strata may represent deep marine (below compensation depth) basal slope deposits. This is certainly a possibility since calcareous foraminifera are very scarce in this interval and could represent caved specimens when they do occur.

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5260-7270' (con't.)

AGE: Early Cretaceous (Aptian to Early Albian)
Torok Fm. or Fortress Mountain Fm.

ENVIRONMENT: Open Marine (possibly Lower Bathyal to Abyssal

7270-7360'

Occurrences of Gaudryina tailleuri, Haplophragmoides canui, Recurvoides turbinatus, Ammobaculites alaskensis, Lenticulina audax, L. quenstedti, Textularia areoplecta, Trochammina instowensis, and T. topagorukensis indicate that these strata are probably pre-Tithonian age. The lack of some of the Oxfordian forms found in the underlying interval suggest that this assemblage could be as young as Kimmeridgian in age. These strata were probably deposited in outer neritic to bathyal water depths.

AGE: Late Jurassic (Oxfordian to Kimmeridgian)
Kingak Fm.

ENVIRONMENT: Outer Neritic to Bathyal

7360-8230'

Marginulina radiata, M. prima, Trochammina canningensis, T. instowensis, T. sp. (sml., high spired), Involutina aspera, Lenticulina audax, L. prima, Ammobaculites alaskensis, A. barrowensis, Marginulinopsis phragmites, Saracenaria topagorukensis, Haplophragmoides canui, H. barrowensis, Vaginulina sherborni, and Astacolus pediacus occur throughout these strata. Based on occurrences in nearby wells,

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7360-8230' (con't.)

the above fauna would indicate an early Late Jurassic age. Also, the occurrence of Saracenaria topagorukensis would suggest the same age. The abundant and diverse faunas of this interval probably represent an outer neritic to upper bathyal environment of deposition associated with fluctuating amounts of turbidity.

AGE: Late Jurassic (Oxfordian)
Kingak Fm.

ENVIRONMENT: Outer Neritic to Upper Bathyal

8230-8970'

Ammobaculites vetusta, A. alaskensis, Bathysiphon anomalocoelia, Trochamminoides spp., T. cf. proteus, Gaudryina dyscrita, Astacolus dubius, Trochammina contornata and common to abundant pyritized radiolaria of the genera Cyrtocapsa, Stichomitra, Cenosphaera, Lithocampe, Spongodiscus, and Dictyomitra occur in these strata. Also diagnostic of this unit is a burst of Tasmanites spp. which appears to be characteristic in this area. These strata are Early to Middle Jurassic in age. They probably represent deposition in middle neritic to upper bathyal depths characterized by fluctuating turbidity. A sandstone occurs at the base of this unit which may be an equivalent to the Sag River Sandstone.

AGE: Early to Middle Jurassic
Kingak Fm.

ENVIRONMENT: Middle Neritic to Upper Bathyal

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8970-9360'

Ammobaculites sthenarus, Astacolus connudatus, Tolypammina glareosa, Nodosaria larina, N. shublikensis, Lingulina borealis, Pseudoglandulina simpsonensis, P. densa, and Monotis fragments among others, occur throughout these beds. The Triassic age of these strata is firmly established on the basis of the above fauna. The Triassic in this well, as in the East Teshekpuk #1 well, appears to be fairly continuously marine. These faunas represent fluctuating inner to outer neritic open marine conditions.

AGE: Triassic
Shublik Fm.

ENVIRONMENT: Inner to Outer Neritic

9360-10,210'

Trochammina sp. (sml., thin), Ammodiscus sp. P, Ammobaculites cf. vetusta, A. cf. barrowensis, A. sp. (sml., thin), and Trochamminoides spp., together with rare to common radiolaria, mark this interval. This assemblage would appear to represent turbid inner to middle shelf deposition. Two samples at the bottom of this unit (10,150-10,210') contain a heavily glauconitic sandstone suggestive of the Echooka Member of the Sadlerochit Formation.

AGE: Permo-Triassic
Sadlerochit Fm.

ENVIRONMENT: Inner to Middle Neritic (turbid)

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10,210-11,290' T.D.

Generally throughout the area westward of the Prudhoe Bay State #1 well, the Lisburne Group can be divided into three lithologic units:

1. Upper Limestone Unit
2. Dolomite Unit
3. Lower Limy Unit

The Upper Limestone Unit is 1,080+ feet thick in this well, and it would appear to be unconformable at its upper boundary.

Strata between 10,210 feet and about 10,720 feet contain Paleotextularia ss. (?), rare Biseriella spp., rare Eoshubertella spp., and frequent Stylocodium sp. These rocks conspicuously lack occurrences of Asteroarchaediscus spp., Neoarchaediscus spp., and Archaediscus spp. These rocks are certainly no older than Zone 21, but could be as young as Zone 22 (see Mamet, 1971, pages 203 and 204)*. These strata probably correlate in part with strata between 9655 feet and 9930 feet in the East Teshekpuk #1 well.

*Mamet, B. L. & Ross, C. A., 1971, in Bamber & Waterhouse, "Carboniferous and Permian Stratigraphy and Paleontology, Northern Yukon Territory, Canada"; Bull. of Can. Petr. Geol., vol. 19, no. 1, pp. 196-205.

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10,210-11,290' T.D. (con't.)

Bursts of Eoshubertella yukonensis, Pseudostaffella sp., and Pseudoendothyra britishensis together with occurrences of Neoarchaediscus spp., Asteroarchaediscus spp., Archaediscus spp., and frequent Stylocodium sp. indicate that the strata between about 10,720 feet and 11,290 feet (total depth) are Zone 21 in age. The following are possible correlative horizons with the East Teshekpuk Lake #1 well:

S. Harrison Bay #1	E. Teshekpuk Lake #1
10,720'	9,930'
10,870'	10,020'
11,170'	10,140'

These strata for the most part represent a carbonate platform suite. Strata below 10,870 feet represent open shelf shales and cherty limestones, and platform edge oolitic and algal "bank" packstones and grainstones. Strata above 10,870 feet probably represent packstones, wackestones, and lime mudstones of the restricted shelf and lagoonal environments.

AGE: Middle Pennsylvanian or younger Lisburne Group (Wahoo Lmst.)

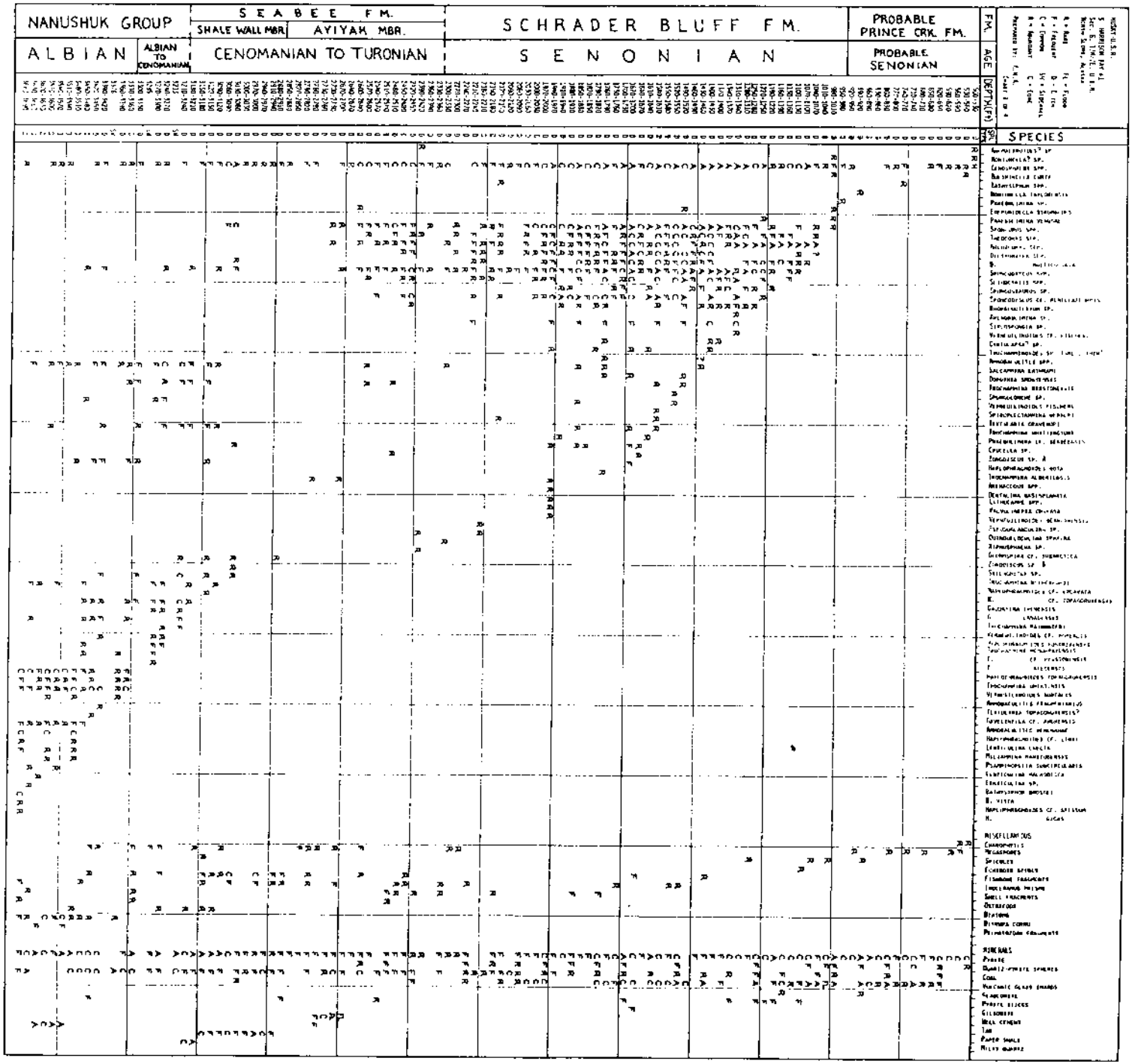
ENVIRONMENT: Neritic (shelf)

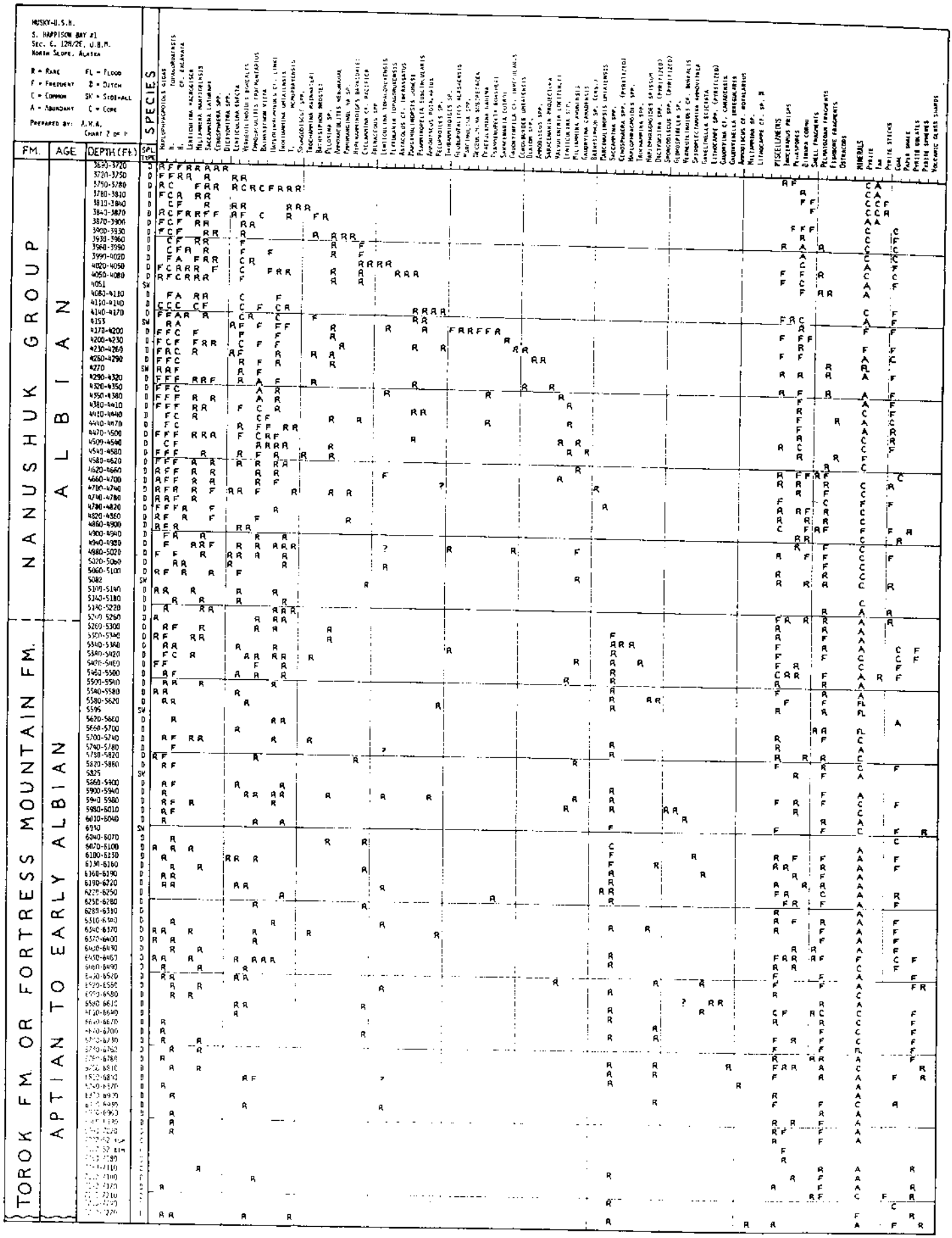
Interpreted by:

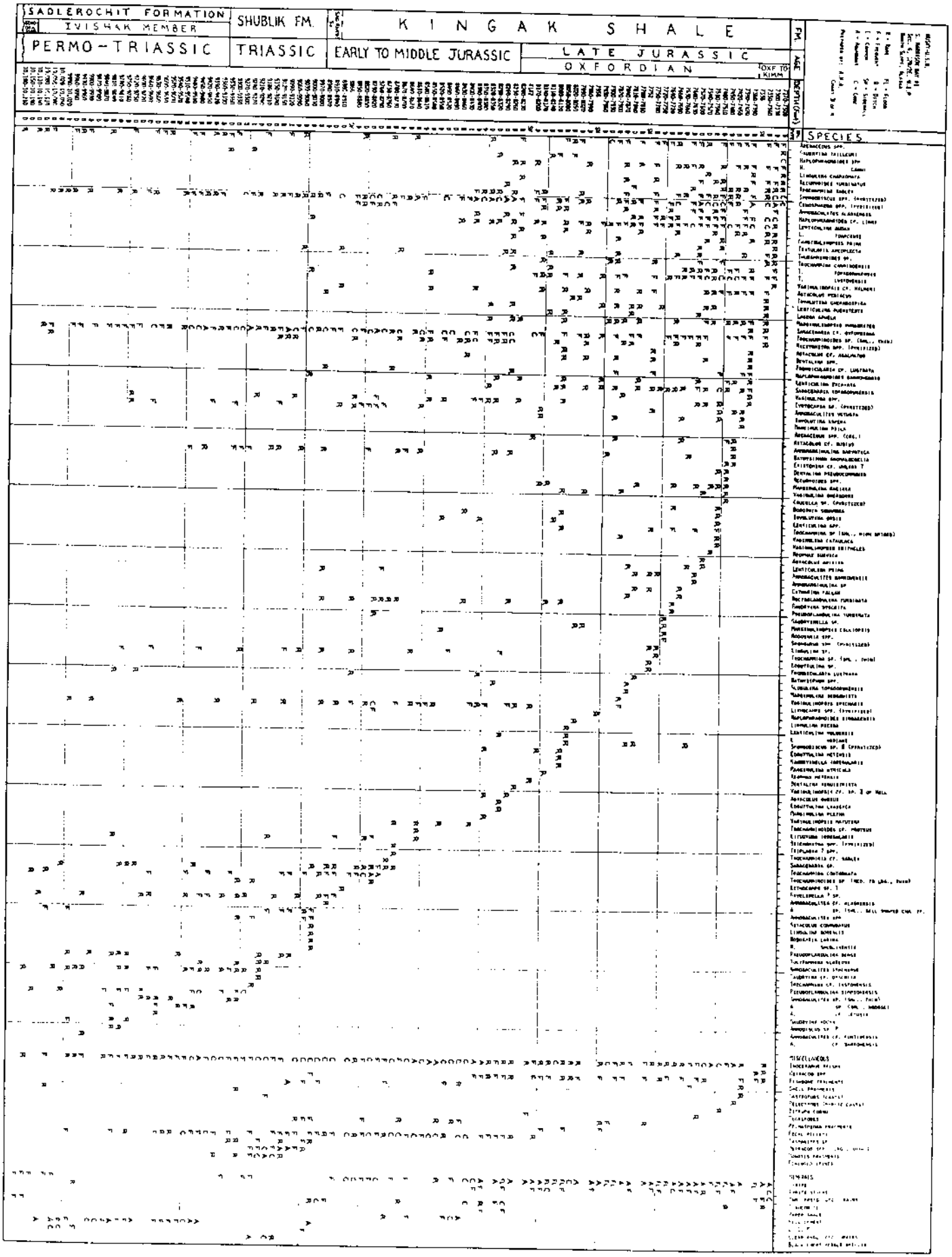
M. B. Mickey

ANDERSON, WARREN & ASSOCIATES, INC.

Richard E. Anderson


NANUSHUK GROUP
SEABEE FM.
SHALE WALL MBR.
AYIYAK MBR.
SCHRADER BLUFF FM.
PROBABLE PRINCE CRK. FM.
ALBIAN
ALBIAN TO CENOMANIAN
CENOMANIAN TO TURONIAN
SENONIAN
PROBABLE SENONIAN
FM.
AGE
DEPTH(FT)
SPECIES
MISCELLANEOUS
SIDERITE
PYRITE
GILSONITE
TAR
PAPER SHALE


HUSKY-U.S.H.
S. HARRISON BAY #1
SEC. 6, T12N/R2E, U.B.M.
NORTH SLOPE, ALASKA
R = RARE
F = FREQUENT
C = COMMON
A = ABUNDANT
FL = FLOOD
D = DITCH
SW = SIDEWALL
C = CORE
PREPARED BY: A.W.A.
CHART 2 OF 11
FM.
AGE
DEPTH (FT.)
SPL TYPE
SPECIES
MINERALS
PYRITE STICKS
PYRITE SMALL
PYRITE GLOBULES
PYRITE SPHERES
VOLCANIC GLASS SHARDS
TOROK FM. OR FORTRESS MOUNTAIN FM.
APTIAN TO EARLY ALBIAN
NANUSHUK GROUP
ALBIAN


SADLEROCHIT FORMATION
IVISHAK MEMBER
PERMO-TRIASSIC
SHUBLIK FM.
TRIASSIC
KINGAK SHALE
EARLY TO MIDDLE JURASSIC
LATE JURASSIC
OXFORDIAN
FM.
AGE
SPECIES
MISCELLANEOUS

HUSKY-U.S.N.
S. HARRISON BAY #1
SEC. 6, T2N/2E, U.B.&M.
NORTH SLOPE, ALASKA

R = RARE C = COMMON
F = FREQUENT D = DITCH

PREPARED BY: A.M.A.

CHART 4 OF 4

LISBURNE GROUP	FM.
WAHOO LIMESTONE	
MIDDLE PENNSYLVANIAN OR YOUNGER	AGE
ZONE 21 / ZONE 21 OR YOUNGER	

DEPTH (Feet)	SPL TYPE	FORAMINIFERA & ALGAE
10,210-10,240	D	EARLANDIA SPP.
10,240-10,270	D	ENDOTHYRA SPP.
10,270-10,300	D	PSEUDOGLOMOSPIRA SP.
10,300-10,330	D	EOSCHUBERTELLA YUKONENSIS
10,330-10,360	D	DIPLOSPHAERA SP.
10,360-10,390	D	TREPEILOPSIS SP.
10,390-10,420	D	STYLOCODIUM SP.
10,420-10,450	D	CALCISPHAERA LAEVIS
10,450-10,480	D	MONOTAXINOIDES MULTIVOLUTUS
10,480-10,510	D	GLOBIVALVULINA SP.
10,510-10,540	D	EARLANDIA ELEGANS
10,540-10,570	D	ZELLERINA SPP.
10,570-10,600	D	ASPHALTINA SP.
10,600-10,630	D	EOTUBERTINA SP.
10,630-10,660	D	KAMAENA SP.
10,660-10,690	D	BISERIELLA SP.
10,690-10,720	D	PALEOTEXTULARIA SS. ?
10,720-10,750	D	STACHEOIDES MEANDRIFORMIS
10,750-10,780	D	BISERIELLA PARVA
10,780-10,810	D	TETRATAXIS SP.
10,810-10,840	D	GIRVANELLA DUCII
10,840-10,870	D	PRISCELLA PRISCA
10,870-10,900	D	PSEUDOSTAFFELLA SP.
10,900-10,930	D	ARCHAEDISCUS KRESTOVNIKOVI
10,930-10,960	D	ASTEROARCHAEDISCUS SPP.
10,960-10,990	D	NEOARCHAEDISCUS INCERTUS
10,990-11,020	D	BRUNSIA ? SP.
11,020-11,050	D	GLOBIVALVULINA BULLOIDES
11,050-11,080	D	NEOARCHAEDISCUS SPP.
11,080-11,110	D	PESUDOENDOTHYRA BRITISHENSIS
11,110-11,140	D	VOLVOTEXTULARIA MISSISSIPPIANA
11,140-11,170	D	MILLERELLA PRESSA
11,170-11,200	D	PLANOENDOTHYRA ROTAYI
11,200-11,230	D	ENDOTHYRA PARAMOSQUENSIS
11,230-11,260	D	GLOBOENDOTHYRA SP.
11,260-11,290	D	PSEUDOENDOTHYRA ORNATA
		MISCELLANEOUS
		CHERT
		OSTRACODS
		OOLITES
		CORAL WALL DEBRIS