MICROPALEO CONSULTANTS, INC.

PHILLIPS ALASKA (ARCO)

CABOT NO. 1 (OCS-Y-0747)

API #55-262-00001

BEAUFORT SEA, ALASKA

Prepared by:

Michael B. Mickey - Foraminifera

Hideyo Haga - Palynomorphs

BIOSTRATIGRAPHY REPORT

M.C.I. Job No. 99-111 **December, 2000**

TABLE OF CONTENTS

TEXT ILLUSTRATIONS

PLATES

(In pockets at back of report)

INTEGRATED SUMMARY

330-3250'

Early Cretaceous
Middle to Late Albian

3250-7355'

Early Cretaceous
Aptian to Early Albian

7355-9150'

Early Cretaceous
Valanginian
KE_V

9150-10,110'

Late Jurassic
Kimmeridgian
JL_K

10,110-10,910'

Late Jurassic
Oxfordian
JL_O

10,910-11,190'

Middle Jurassic
Aalenian
JM_{A}

11,190-11,420'

Early Jurassic
Possible Toarcian
$JE_{T?}$

11,420-11,712'

Early Jurassic
Pliensbachian
JE_{P}

11,712-12,020'

Early Jurassic
Hettangian? to Sinemurian
$JE_{H?S}$

12,020-12,230'T.D.

Indeterminate Age

Discussion. Argillite, phyllite and quartzite? basement rocks.

FORAMINIFERA REPORT

Interpreted by:

Michael B. Mickey

FORAMINIFERA SUMMARY

330-3210'

Age.	Early Cretaceous Middle to Late Albian	
Zones.	F-9 to F-10	
Environment.	330-2850':	Nonmarine to Inner Neritic (Alluvial Plain to Inner Shelf)
	2850-3210':	Middle Neritic to Upper Bathyal (Middle Shelf to Upper Slope)

3210-7380'

Age.	Early Cretaceous Aptian to Early Albian	
Zones.	F-10 to F-11	
Environment.	3210-4200':	Middle Neritic to Upper Bathyal (Middle Shelf to Upper Slope)
	4200-7350':	Middle to Lower Bathyal (Middle to Lower Slope)

7380-9150'

Age.	Early Cretaceous Valanginian
Zone.	F-13a
Environment.	Middle Neritic (Middle Shelf)

9150-10,140'

Age.	Late Jurassic Kimmeridgian
Zone.	F-16a
Environment.	Middle Neritic to Upper Bathyal (Middle Shelf to Upper Slope)

10,140-10,850'

Age.	Late Jurassic Oxfordian
Zone.	F-16b
Environment.	Outer Neritic to Middle Bathyal (Outer Shelf to Middle Slope)

10,850-11,120'

Age.	Middle Jurassic Aalenian
Zone.	F-17
Environment.	Outer Neritic to Upper Bathyal (Outer Shelf to Upper Slope)

11,120-11,390'

Age.	Early Jurassic Possible Toarcian
Zone.	F-18a?
Environment.	Probable Outer Neritic to Upper Bathyal (Probable Outer Shelf to Upper Slope)

11,390-11,720'

Age.	Early Jurassic Pliensbachian
Zone.	F-18b
Environment.	Upper Bathyal (Upper Slope)

11,720-12,060'

Age.	Early Jurassic Hettangian? to Sinemurian
Zone.	F-18c
Environment.	Middle Neritic to Upper Bathyal (Middle Shelf to Upper Slope)

12,060-12,230'T.D.

Age.	Indeterminate
Environment.	Indeterminate
Discussion.	Argillite, phyllite and quartzite? basement rocks.

INTRODUCTION

Scope

Micropaleo Consultants, Inc. processed, picked and analyzed for Foraminifera 177 ditch samples and seven (7) conventional core samples from the Phillips Alaska (ARCO) Cabot No. 1 (OCS-Y-0747) well. These samples covered the interval 330 to 12,230 feet total depth. This report was done as part of M.C.I. Job No. 99-111.

Procedures

Standard techniques were used to process the material. All samples were boiled in Quaternary-O and washed over 20 and 200 mesh screens. Frequency symbols correspond to the following numerical values: very rare (1), rare (2 - 4), frequent (5 -25), common (26 - 100), abundant (101 - 999) and prolific (1000+). The picked foram slides and residues are reposited at the State of Alaska Geological Materials Center in Eagle River, Alaska.

Certain factors such as shelf widths, basin configuration and overall basin depths associated with Arctic Mesozoic basins are not completely understood at present. The paleoenvironments presented in this report reflect relative basinal position only and should not be tied to specific water depths. Generally, neritic corresponds to shelf or deltaic environments, while bathyal corresponds to slope or prodelta environments and bathyal (starved basin) corresponds to distal (far from the source) deposition. As an example, prodelta deposits could represent deposition as shallow as middle neritic or as deep as bathyal (slope) depending on the delta type and shelf width. With a narrow shelf, a river-dominated deltaic system could build across the shelf and the prodelta deposits would be in a bathyal (slope) depth. A tide-dominated deltaic system associated with a wide shelf could result in middle neritic prodelta deposition.

Format

A listing of the age, environment, fauna and occasional lithology comments for each biostratigraphic interval follows. A generalized summary of the well is presented in the Conclusions section at the end of the Foraminifera Report. A Foraminifera Distribution Chart (Figure F-1) and a High Resolution Biostratigraphy Plot (Figure B-1) containing foram diversity/abundance plots, a cumulative faunal plot and a graphic paleoenvironmental display are in pockets at the back of this report.

RESULTS

330-3210'

Age.	Early Cretaceous Middle to Late Albian	
Zones.	F-9 to F-10	
Environment.	330-2850':	Nonmarine to Inner Neritic (Alluvial Plain to Inner Shelf)
	2850-3210':	Middle Neritic to Upper Bathyal (Middle Shelf to Upper Slope)
Fauna.	*Valvulineria loetterlei, Quadrimorphina ruckerae, Praebulimina nannina, Haplophragmoides excavatus, H. linki, H. kirki, H. gigas, H. topagorukensis, Hippocrepina barksdalei, Lenticulina macrodisca, Miliammina manitobensis,* shell fragments, fish debris, megaspores, *Inoceramus* prisms, *Ditrupa cornu*, tar, pyrite, and well cement between 1680 to 1860 feet.	

3210-7380'

Age.	Early Cretaceous Aptian to Early Albian	
Zones.	F-10 to F-11	
Environment.	3210-4200':	Middle Neritic to Upper Bathyal (Middle Shelf to Upper Slope)
	4200-7350':	Middle to Lower Bathyal (Middle to Lower Slope)
Fauna.	*Miliammina manitobensis, Haplophragmoides linki, H. excavatus, H. topagorukensis, Glomospirella arctica, Lenticulina macrodisca, Saccammina lathrami, Bathysiphon vitta, Eurycheilostoma grandstandensis, Verneuilinoides borealis, Inoceramus* prisms, megaspores, pelmatozoan fragments, shell fragments, echinoid spines, pyrite, and rare to common pyritized radiolaria with rare pyritized *Lithocampe* N occurring at 6720 to 6810 feet.	

7380-9150'

Age.	Early Cretaceous Valanginian
Zone.	F-13a
Environment.	Middle Neritic (Middle Shelf)
Fauna.	Arenaceous spp. (large, coarse), *Haplophragmoides coronis, H. duoflatis, H. goodenoughensis, H. inflatigrandis, Gaudryina tailleuri, G. leffingwelli, G. milleri, Oolina apiculata, Ammobaculites erectus, A. reophacoides, Globulina prisca, Lenticulina* sp. (raised sutures), *L. muensteri, Trochammina squamata, Saracenaria projectura, Glomospirella arctica, Recurvoides turbinatus, Reophax tundraensis, Epistomina* aff. *anterior, Marginulina planiuscula, Glomospira subarctica, Inoceramus* prisms, pyrite, rare to common rounded frosted quartz floating sand grains, and common paper shale below 8490 feet.

9150-10,140'

Age.	Late Jurassic Kimmeridgian
Zone.	F-16a
Environment.	Middle Neritic to Upper Bathyal (Middle Shelf to Upper Slope)
Fauna.	*Gaudryina leffingwelli, G. milleri,* arenaceous spp. (large, coarse), *Glomospira subarctica, Lenticulina audax, L. quenstedti, Dentalina pseudocommunis, Thuramminoides* sp., *Recurvoides turbinatus, Trochammina* cf. *oxfordiana, T. rostovzevi, T. elevata, T.* sp. (small, high-spired), *Haplophragmoides* spp., *H. canui, Ammobaculites alaskensis, A. barrowensis, Globulina topagorukensis, Saracenaria oxfordiana, Eoguttulina metensis, Inoceramus* prisms, pyrite, rare to common scattered rounded frosted quartz floating sand grains, frequent to common paper shale, rare to frequent glauconite below 9420 feet, and possible oil staining at 9510 to 9690 feet.

10,140-10,850'

Age. Late Jurassic
Oxfordian

Zone. F-16b

Environment. Outer Neritic to Middle Bathyal
(Outer Shelf to Middle Slope)

Fauna. *Trochammina elevata, T. kosyrevae, T. canningensis, T. rostovzevi, Recurvoides turbinatus, Globulina topagorukensis, Ammobaculites alaskensis, A. barrowensis, Haplophragmoides* spp., *H. canui, Lenticulina audax, L. quenstedti, Trochamminoides* sp. (small, thin), *Frondicularia lustrata, Ammodiscus asperus, Ammomarginulina* sp. 1 (of Wall), *Saracenaria topagorukensis, S. oxfordiana*, pyrite, rare scattered rounded frosted quartz floating sand grains, frequent to abundant paper shale and frequent to abundant tar.

10,850-11,120'

Age. Middle Jurassic
Aalenian

Zone. F-17

Environment. Outer Neritic to Upper Bathyal
(Outer Shelf to Upper Slope)

Fauna. *Ammobaculites alaskensis, A. barrowensis, Lenticulina audax, Haplophragmoides* spp., *H. canui, Trochammina canningensis*, pyrite, common to abundant loss of circulation material, and frequent well cement in basal sample.

11,120-11,390'

Age.	Early Jurassic Possible Toarcian
Zone.	F-18a?
Environment.	Probable Outer Neritic to Upper Bathyal (Probable Outer Shelf to Upper Slope)
Fauna.	Poorly sampled interval. Two (2) intervals (11,210-11,390') not sampled.

11,390-11,720'

Age.	Early Jurassic Pliensbachian
Zone.	F-18b
Environment.	Upper Bathyal (Upper Slope)
Fauna.	Rare occurrences of *Haplophragmoides* spp., *Ammobaculites* sp., *Cenosphaera* spp. (pyritized), pyrite, tar and common to abundant loss of circulation material.

11,720-12,060'

Age.	Early Jurassic Hettangian? to Sinemurian
Zone.	F-18c
Environment.	Middle Neritic to Upper Bathyal (Middle Shelf to Upper Slope)
Fauna.	Rare occurrences of *Haplophragmoides* spp., *Vaginulina sherborni*, *Ammobaculites* sp., *Cenosphaera* spp. (pyritized), rare to frequent pyrite and rare to abundant paper shale.

12,060-12,230'T.D.

Age.	Indeterminate
Environment.	Indeterminate
Fauna.	Barren of indigenous Foraminifera. Common to abundant argillite, and frequent vein quartz below 12,060 feet.
Discussion.	Argillite, phyllite and quartzite? basement rocks.

CONCLUSIONS

The Phillips Alaska (ARCO) Cabot No. 1 (OCS-Y-0747) well penetrated the following biostratigraphic sequence based on foraminiferal analysis:

- 7050+ feet (330-7380') of Aptian to Albian age (Early Brookian) alluvial plain to lower slope deposition.

- 4680 feet (7380-12,060') of Early Jurassic (Hettangian? or Sinemurian) to Valanginian age (Beaufortian) middle shelf to middle slope sandstones, siltstones and shales.

- 170+ feet (12,060-12,230'T.D.) of indeterminate age (Franklinian) argillite, phyllite and quartzite?.

PALYNOLOGY REPORT

Interpreted by:

Hideyo Haga

PALYNOLOGY SUMMARY

330-3300'

Age.	Early Cretaceous Middle - Late Albian
Zone.	P-M17
Environment.	Marginal Marine - Marine

3300-7350'

Age.	Early Cretaceous Aptian - Early Albian
Zone.	P-M18
Environment.	Marine

7350-9180'

Age.	Early Cretaceous Valanginian
Zone.	P-M20
Environment.	Marginal Marine

9180-10,140'

Age.	Late Jurassic Possible Kimmeridgian
Zone.	P-M21?
Environment.	Marine

10,140-11,030'

Age.	Late Jurassic Oxfordian
Zone.	P-M22
Environment.	Marine
Remarks.	Possibly in Callovian - Early Oxfordian zonule P-M22a.

11,030-12,060'

Age.	Early - Middle Jurassic Undifferentiated
Zones.	P-M24? to P-M23
Environment.	Marine - Marginal Marine
Remarks.	Base of the interval may include some Triassic strata.

12,060-12,230'T.D.

Age.	Indeterminate
Environment.	Indeterminate
Remarks.	In argillite basement.

INTRODUCTION

Purpose and Scope

Micropaleo Consultants, Inc. (M.C.I.) conducted palynological analyses on a total of 186 samples from the Phillips Alaska (ARCO) Cabot No. 1 (OCS-Y-0747) well. This total consisted of 179 ditch cutting composites and seven conventional core samples taken between 330 feet and the total depth of 12,230 feet.

The thermal maturation of selected samples was also analyzed. These analyses included 28 visual thermal alteration (T.A.I.) samples and ten vitrinite reflectance (V.R.) samples.

The samples were cut from material made available by the State of Alaska Department of Natural Resources, Geologic Materials Center in Eagle River, Alaska. All processed material is on reposit at that facility.

Procedures

The samples were processed by M.C.I. in San Diego, California. The preparation method employed standard palynological techniques using hydrochloric, hydrofluoric and nitric acid treatments. The resultant kerogen residues were concentrated with heavy liquid separation, sonification and a sieving/panning procedure. Each palynology slide has a mount of two square coverslips. These slips isolate the greater than 20 micron and 10 - 20 micron fractions.

During the processing steps a fraction of the kerogen material was not treated with nitric acid and separated for the maturation analyses. These non-oxidized slurries were used to make T.A.I. slides and polished V.R. plugs.

As each sample was examined, an estimate of abundance was recorded for each taxon. These data were entered into a desktop PC which produced the basic elements for a palynomorph species distribution chart (Figure P-1).

Based on the palynomorph assemblages observed, an age and generalized environment of deposition are interpreted for the palynostratigraphic subdivisions. The environments, as interpreted from the palynological preparations, are simply categorized as nonmarine, marginal marine or marine. These categories are based on the absence or presence and diversity of microplankton cysts.

RESULTS

The species distribution chart (Figure P-1) is located in the pocket. This chart provides the palynostratigraphic subdivisions, and the occurrences and estimated frequencies of observed taxa. Additionally, curves displaying the diversity and abundance of the spore-pollen and microplankton cyst assemblages in each sample are included. These curves comprise a quick reference showing intervals where an influx of marine or nonmarine assemblages may be significant.

330-3300'

Age.	Early Cretaceous Middle - Late Albian
Zone.	P-M17
Environment.	Marginal Marine - Marine
Palynomorphs.	The uppermost interval is marked by a spore-pollen assemblage that includes the spores *Klukisporites foveolatus, Trilobosporites apiverrucatus* and *T. perverulentus*. The dinocyst assemblage includes the species *Cyclonephelium distinctum, Odontochitina operculata, Oligosphaeridium complex* and *Luxadinium propatulum*. This last species, *L. propatulum*, is an important marker form for the Middle - Late Albian section; however, it only occurred very rarely in this well.
Discussion.	A reworked assemblage consisting mainly of Paleozoic spores is seen in the entire well. The diversity of this reworked assemblage increases significantly through the Late Jurassic intervals below.

3300-7350'

Age. Early Cretaceous
Aptian - Early Albian

Zone. P-M18

Environment. Marine

Palynomorphs. The palynomorph assemblage remains essentially unchanged from the above interval. Absent, however, is the Middle - Late Albian form *Luxadinium propatulum*.

7350-9180'

Age. Early Cretaceous
Valanginian

Zone. P-M20

Environment. Marginal Marine

Palynomorphs. The Valanginian section is characterized by the dominance of spore-pollen. Consistently represented are the forms *Classopollis classoides, Coronatispora valdensis, Pilosisporites trichopapillosus* and numerous species of *Trilobosporites*.

Some important dinocyst markers appear in this interval. These include *Gochteodinia villosa, G. judilentiniae, G. verrucosa, Nelchinopsis kostromiensis, Sirmiodinium grossi* and *Tubotuberella apatela*.

Discussion. No evidence for the presence of younger Neocomian (Hauterivian) age strata was seen.

9180-10,140'

Age. Late Jurassic
Possible Kimmeridgian

Zone. P-M21?

Environment. Marine

Palynomorphs. The Late Jurassic interval is marked by a change in the dinocyst assemblage. This change includes the appearance of *Chytroeisphaeridia pericompsa, Gonyaulacysta jurassica* and *Pareodinia osmingtonensis*. Single specimens of ?*Adnatosphaeridium caulleryi, Dingodinium cerviculum* and *Pareodinia alaskaensis* were also recorded in scattered occurrences.

Discussion. The Kimmeridgian age is qualified because the assignment is based primarily on the absence of the dinocyst species *Nannoceratopsis pellucida*. This species is seen in the subjacent interval.

The reworked spore assemblage, as mentioned above, increases in diversity through this interval and into the Oxfordian interval below.

10,140-11,030'

Age.	Late Jurassic Oxfordian
Zone.	P-M22
Environment.	Marine
Palynomorphs.	The dinocyst assemblage remains similar to the interval above with the added occurrences of *Acanthaulax senta, Meiourogonyaulax, Nannoceratopsis pellucida* and *Stephanelytron redcliffense*.
Discussion.	The presence of *Stephanelytron redcliffense* suggests that this section may be in the Callovian - Early Oxfordian P-M22a zonule.

11,030-12,060'

Age. Early - Middle Jurassic
Undifferentiated

Zones. P-M24? to P-M23

Environment. Marine - Marginal Marine

Palynomorphs. The overall palynomorph recoveries decrease relative to the Jurassic interval above. The Early to Middle Jurassic interval is separated by the base of Oxfordian dinocysts and the appearance of the species *Nannoceratopsis gracilis* and *N. senex*. Two single specimens of the dinocysts *Mancodinium (Dapcodinium) semitabulatum* and *Parvocysta bullula* were also recorded.

Discussion. Although the upper boundary is placed at the apparent base of the Late Jurassic assemblage, the first Early - Middle Jurassic evidence appears lower in the interval.

By 11,480 feet the strata are probably as old as Toarcian.

The bottom sample of the interval recovered a few more spore specimens, which may be indicating the presence of some Triassic strata at the base.

12,060-12,230'T.D.

Age. Indeterminate

Environment. Indeterminate

Palynomorphs. No indigenous palynomorphs were recovered.

Discussion. Black organic and mineral (carbon?) material was observed in the samples. This material is typically associated with argillite basement lithology.

CONCLUSIONS

Palynological analysis of the Phillips Alaska (ARCO) Cabot No. 1 (OCS-Y-0747) well provides the following generalized palynostratigraphic succession:

- Marine and marginal marine strata of Aptian and Albian age occur from 330 feet to 7350 feet.

- Marginal marine strata of Valanginian age occur from 7350 feet to 9180 feet. No evidence for Hauterivian age was seen.

- Marine Late Jurassic, possible Kimmeridgian and Oxfordian age, strata are seen between 9180 feet and 11,030 feet. Below 10,040 feet the strata may be as old as Callovian - Early Oxfordian.

- Marine strata of undifferentiated Early - Middle Jurassic age are placed between 11,030 feet and 12,060 feet. The section may be as old as Toarcian by 11,480 feet.

- Weak evidence was seen to suggest that nonmarine Triassic strata may occur in the basal part of the section designated as Early - Middle Jurassic.

- The section below 12,060 feet and extending to the total depth of 12,230 feet is argillite basement lithology and of indeterminate age.

KEROGEN MATURATION REPORT

Interpreted by:

Hideyo Haga

KEROGEN MATURATION

The maturation levels of kerogen residues from the Phillips Alaska (ARCO) Cabot No. 1 (OCS-Y-0747) well were determined by visual means, Thermal Alteration Index (T.A.I.) and by vitrinite reflectance (V.R.) measurements. A chart correlating the two methods with hydrocarbon generation is given in Figure 1.

An unoxidized fraction of selected kerogen samples were used to make T.A.I. slides and V.R. resin mounts. The V.R. resin "plugs" were cut and polished in preparation for the reflectance measurements.

Thermal Alteration Index

The T.A.I. and percentage estimates for the major organic constituents are presented in Table I. A generalized organic classification scheme is used and the terminology employed may be equated to the following categories:

■	Amorphous	=	Alginite	=	Type I
■	Herbaceous	=	Exinite	=	Type II
■	Woody	=	Vitrinite	=	Type III
■	Fusinitic	=	Inertnite	=	Type IV

The T.A.I. estimates indicate that the well section down to about 11,400 feet is in the immature/mature transition facies for hydrocarbon generation. Between 11,400 feet and 12,000 feet a mature level is indicated. This mature alteration level occurs in the Early Jurassic and Triassic? interval. Below 12,000 feet overmature organics were encountered in the argillitic basement.

The organic constituents are mainly gas-prone, except through the Late Jurassic and Neocomian intervals. These latter intervals have a dominance of oil-prone organic material.

Vitrinite Reflectance

A Leitz MPV-II photometer system and Leitz Orthoplan microscope were used to make the V.R. measurements. This equipment was integrated with desktop computer for data recording and manipulation.

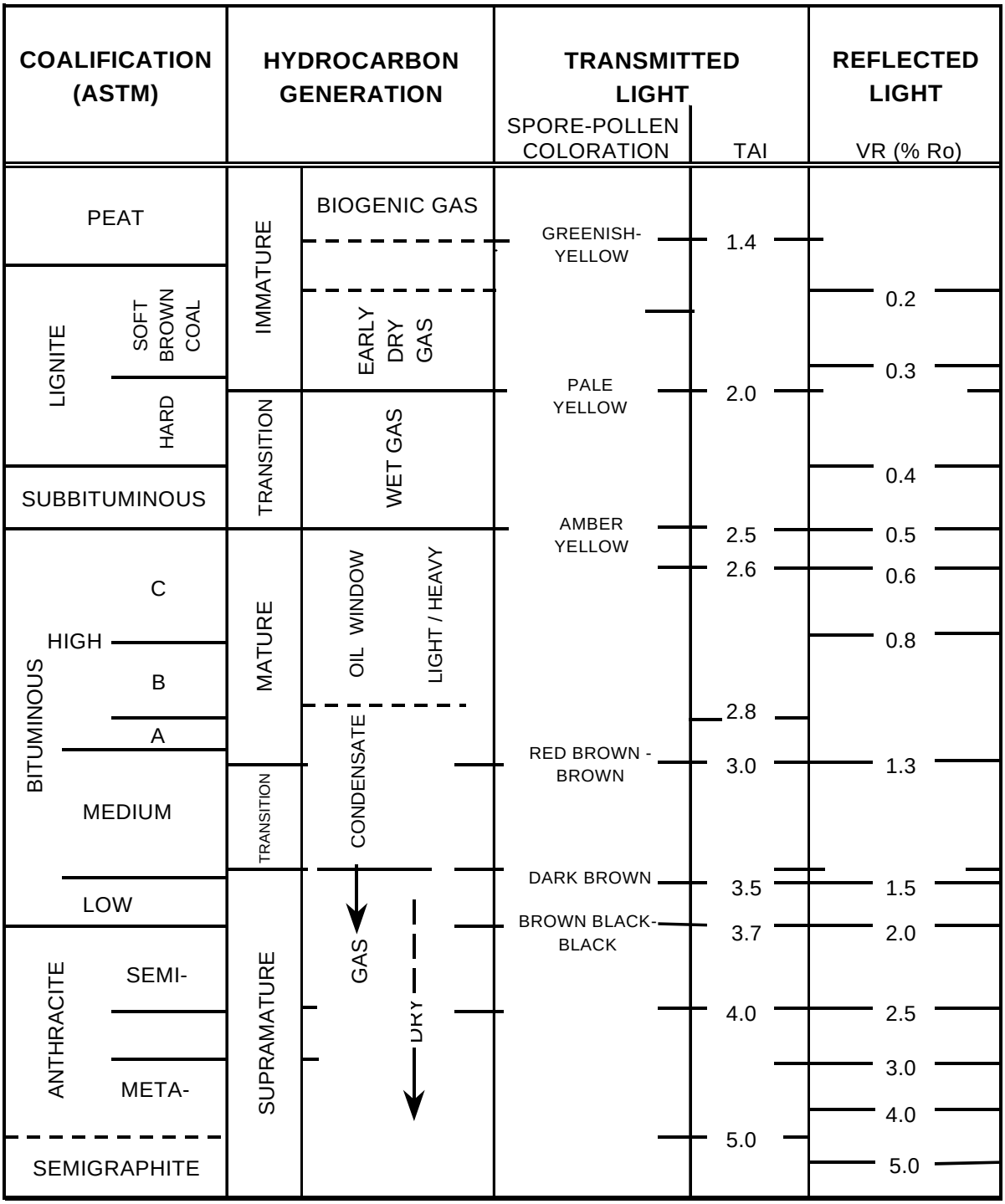


Figure 1. Correlation of Thermal Alteration Index (TAI) and Vitrinite Reflectance (VR) values to hydrocarbon generation. Modified from Heroux, Y., Chagnou, A. and Bertrand, R., (1979).

PHILLIPS ALASKA (ARCO) Cabot No.1 (OCS-Y-0747)

	SAMPLE (Feet)	TAI	KEROGEN TYPES (%) A	H	W-F	VR (Avg Ro)	REMARKS
1	1230-1320	2.3	T	10	90		
2	1770-1860	2.3	T	20	80	0.34	
3	2220-2340	2.3		10	90		
4	2760-2850	2.3		20	80	0.34	
5	3300-3390	2.3		5	95		
6	3750-3840	2.3	T	10	90	0.35	
7	4200-4290	2.3		10	90		
8	4650-4740	2.3		10	90		
9	5100-5190	2.3		10	90		
10	5550-5640	2.3	T	20	80	0.39	
11	6090-6180	2.3	10	20	70		
12	6630-6720	2.3		30	70	0.39	
13	7170-7260	2.3-2.5	10	30	60		
14	7500-7530	2.3-2.5	10	60	30	0.39	
15	7769-7788C	2.3	10	80	10	0.29?	Sparse vitrinite
16	7800-7830	2.3	10	70	20		
17	8100-8130	2.3	10	80	10		
18	8400-8430	2.3	10	80	10	?	Insufficient vitrinite
19	8700-8730	2.3	10	80	10		
20	9000-9030	2.3	15	75	10		
21	9300-9330	2.3	10	75	25		
22	9600-9690	2.3	20	60	20	0.36??	Sparse vitrinite
23	9960-10050	2.3	50	20	30		
24	10490-10580	2.3	60	10	30	?	Insufficient vitrinite
25	11030-11120	2.3?	40	T	60		Much mud additives
26	11480-11560	2.5-3.0	10	20	70	0.51??	Sparse organics
27	11790-11880	2.5-3.0	10	60	30		
28	12150-12230	4.0		10	90	2.13	

A = amorphous, H = herbaceous (includes palynomorphs), W-F = woody-fusinitic, T = trace

Table 1 Thermal Alteration Index (TAI), percent of kerogen types, and Vitrinite Reflectance (VR).

The V.R. measurements for ten samples are given in Appendix A. Although 12 V.R. "plugs" were made for analysis, some samples yielded insufficient organics or vitrinite fragments for valid measurements. The average V.R. (R_o) values of the measured samples are also included in Table I. Some of the average values are questionable. The question marks are due to the sparse measurements obtained.

Figure 2 displays the average V.R. for each sample in a semi-log plot. This plot corroborates the T.A.I. results. The abrupt shift to a very high V.R. average was obtained from the argillitic sample at the bottom of the well.

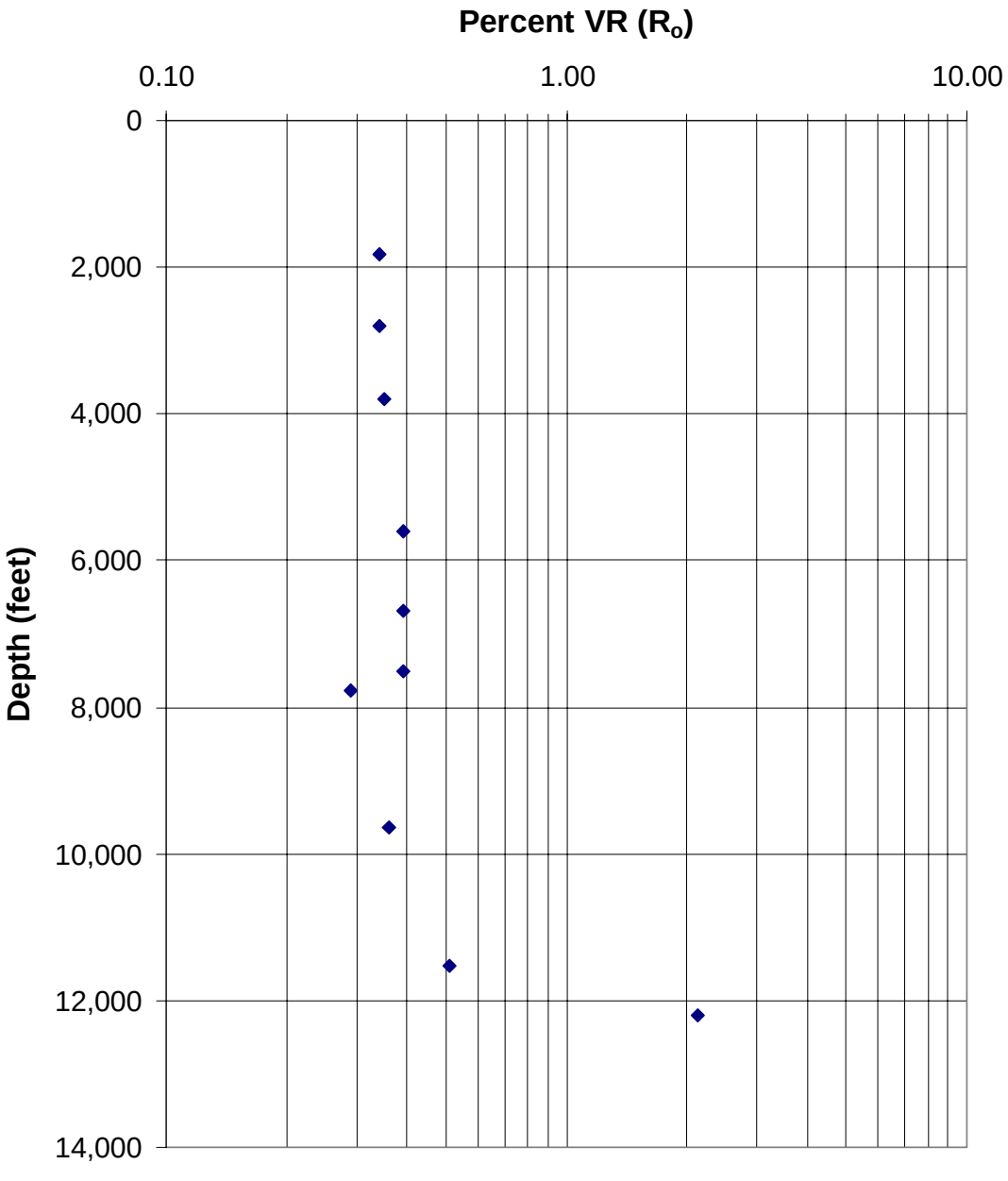


Figure 2. Plot of average R_o (%) verses depth,
PHILLIPS ALASKA (ARCO) Cabot No.1 (OCS-Y-0747) well.

REFERENCE

Heroux, Y., Chagnou, A. and Bertrand, R., 1979. Compilation and correlation of major thermal maturation indicators: Bull. Am. Assoc. Petr. Geol., 63: pp. 2128-2144.

APPENDIX

VITRINITE REFLECTANCE DATA

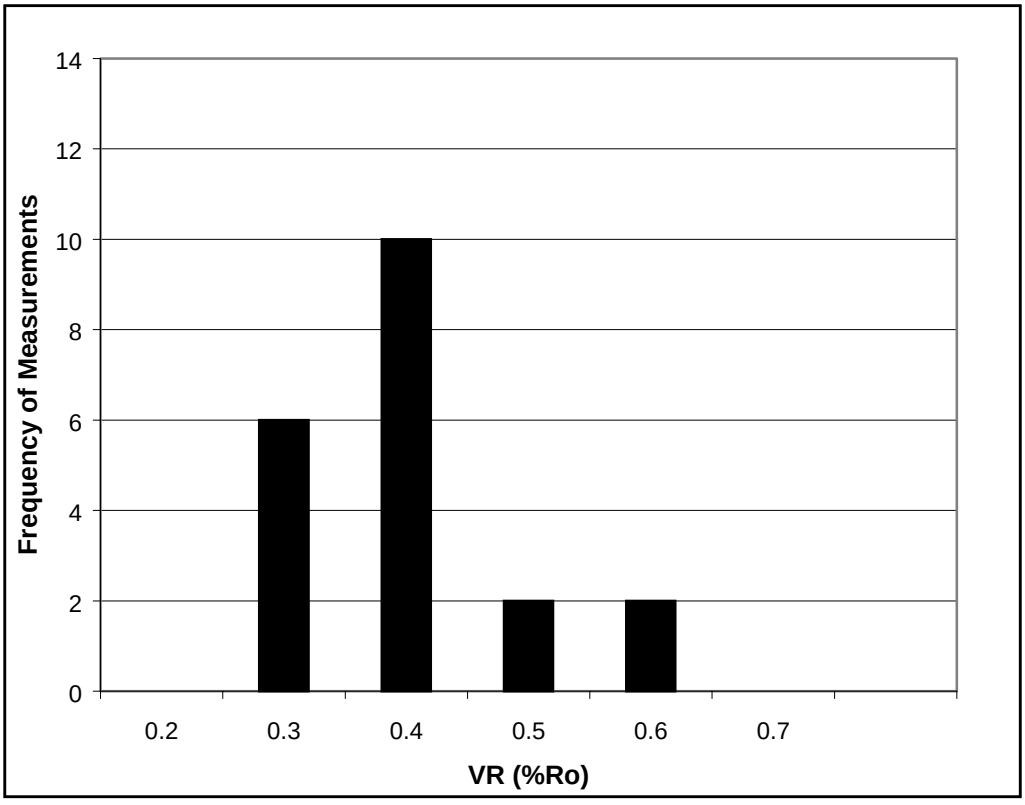
PHILLIPS ALASKA (ARCO) Cabot No.1 (OCS-Y-0747)

Sample Depth: 1770-1860' Ditch

VR Measurements:

0.20	0.33				
0.24	0.35				
0.24	0.35				
0.26	0.36				
0.27	0.38				
0.29	0.39				
0.30	0.41				
0.31	0.44				
0.31	0.50				
0.32	0.58				

Number of meas:	20	**Median:**	0.33
Average:	0.34	**Stand. Dev:**	0.09



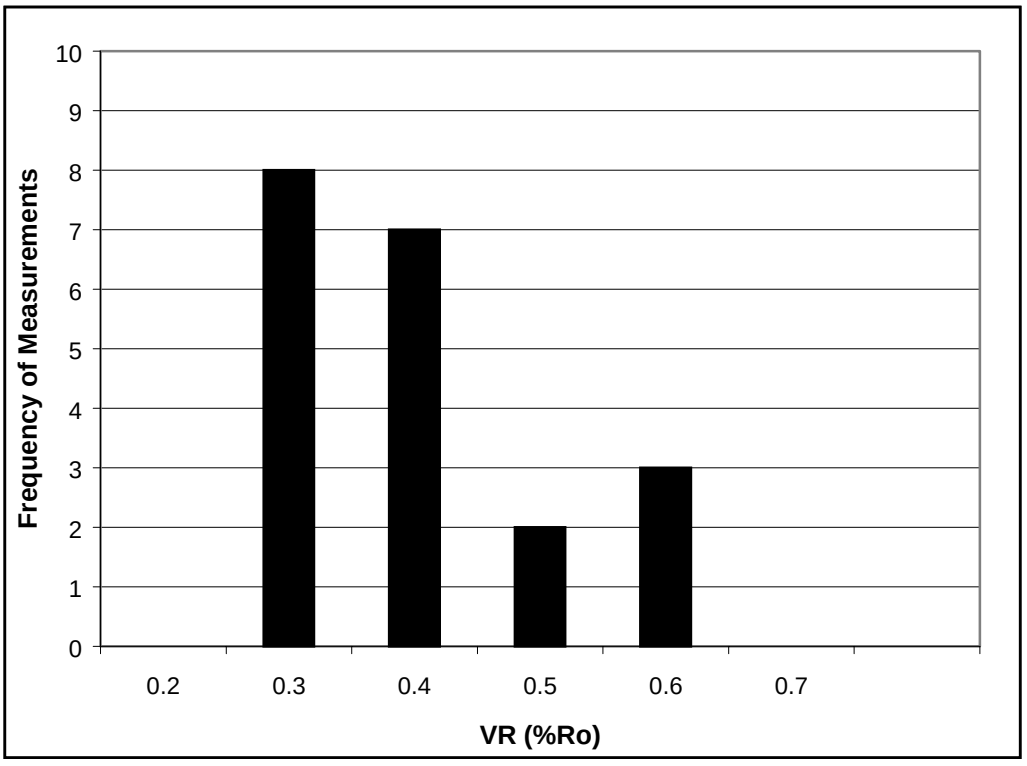
PHILLIPS ALASKA (ARCO) Cabot No.1 (OCS-Y-0747)

Sample Depth: 2760-2850' Ditch

VR Measurements:

0.20	0.34				
0.23	0.34				
0.25	0.36				
0.25	0.38				
0.25	0.39				
0.25	0.42				
0.25	0.42				
0.29	0.52				
0.32	0.54				
0.32	0.56				

Number of meas:	20	**Median:**	0.33
Average:	0.34	**Stand. Dev:**	0.11



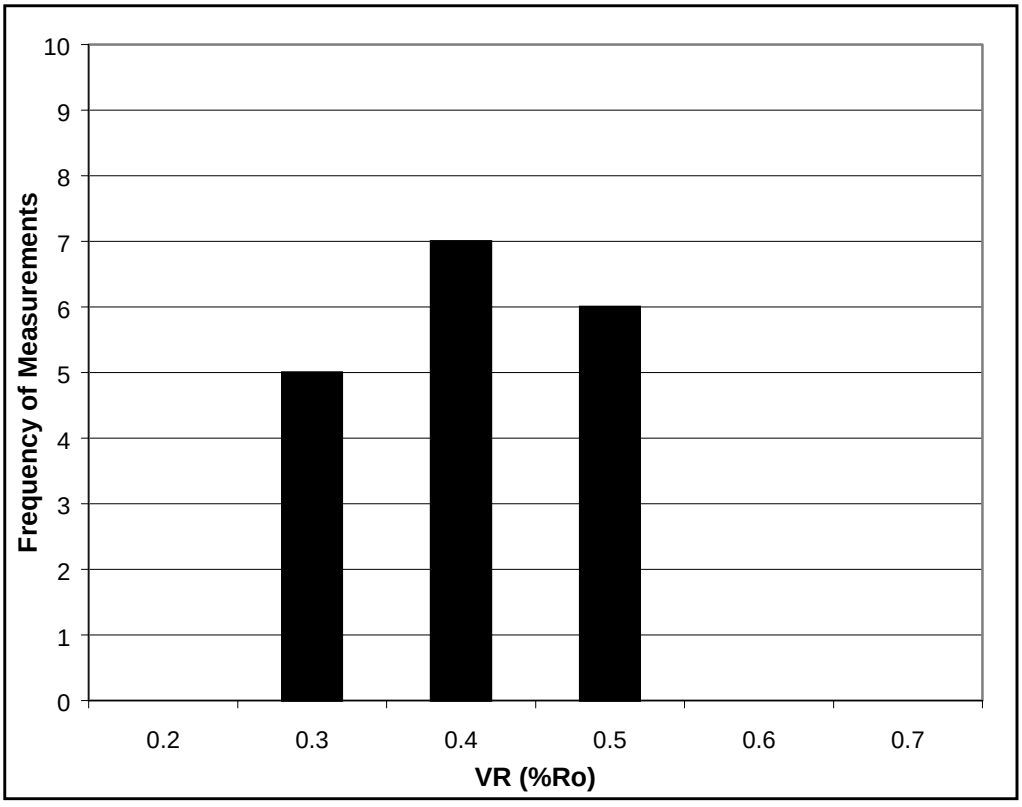
PHILLIPS ALASKA (ARCO) Cabot No.1 (OCS-Y-0747)

Sample Depth: 3750-3840' Ditch

VR Measurements:

0.22	0.36				
0.23	0.37				
0.25	0.41				
0.27	0.42				
0.29	0.42				
0.30	0.45				
0.30	0.48				
0.30	0.48				
0.33					
0.35					

Number of meas:	18	**Median:**	0.34
Average:	0.35	**Stand. Dev:**	0.08



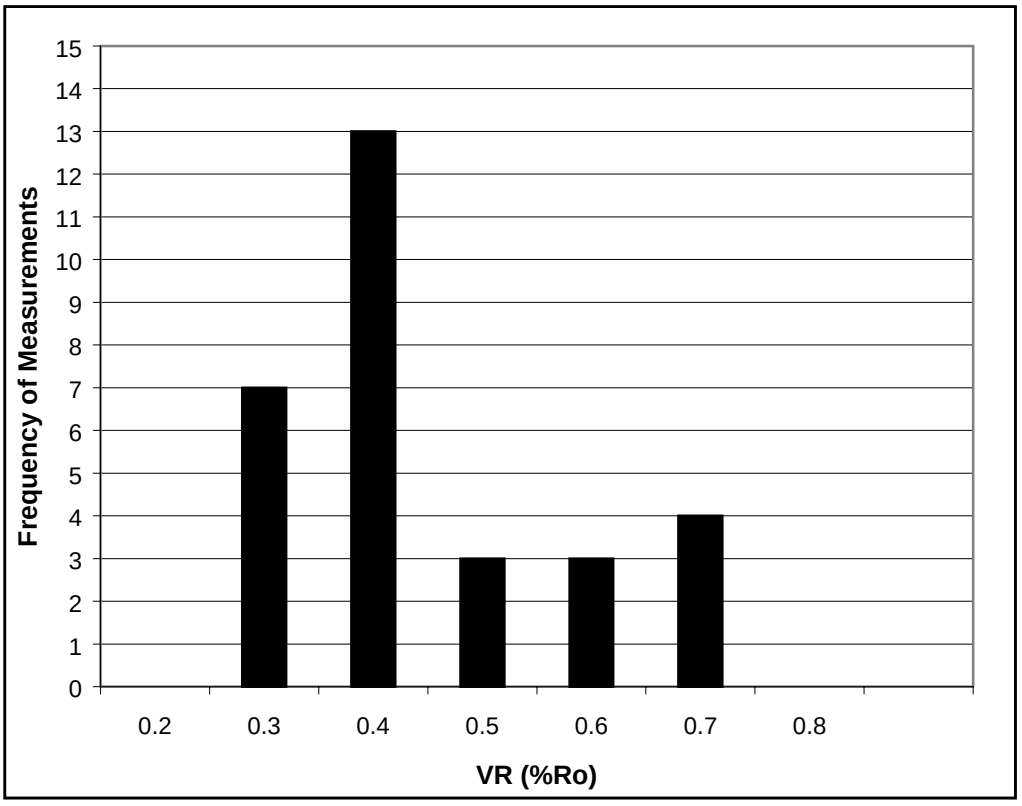
PHILLIPS ALASKA (ARCO) Cabot No.1 (OCS-Y-0747)

Sample Depth: 5550-5640' Ditch

VR Measurements:

0.20	0.32	0.40			
0.25	0.32	0.40			
0.28	0.32	0.42			
0.28	0.33	0.54			
0.28	0.33	0.56			
0.29	0.34	0.57			
0.29	0.35	0.60			
0.30	0.35	0.61			
0.30	0.36	0.65			
0.32	0.38	0.69			

Number of meas:	30	**Median:**	0.34
Average:	0.39	**Stand. Dev:**	0.13



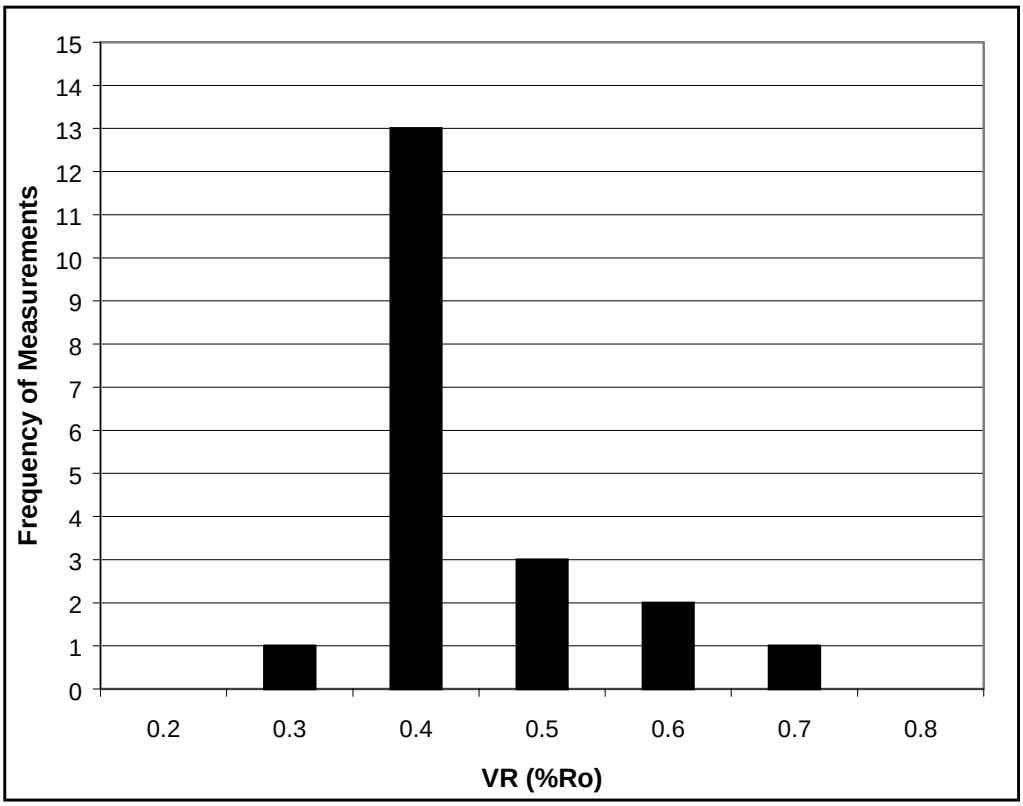
PHILLIPS ALASKA (ARCO) Cabot No.1 (OCS-Y-0747)

Sample Depth: 6630-6720' Ditch

VR Measurements:

0.28	0.39				
0.30	0.39				
0.31	0.39				
0.32	0.39				
0.34	0.40				
0.34	0.40				
0.37	0.42				
0.38	0.51				
0.38	0.52				
0.38	0.66				

Number of meas:	20	**Median:**	0.39
Average:	0.39	**Stand. Dev:**	0.09



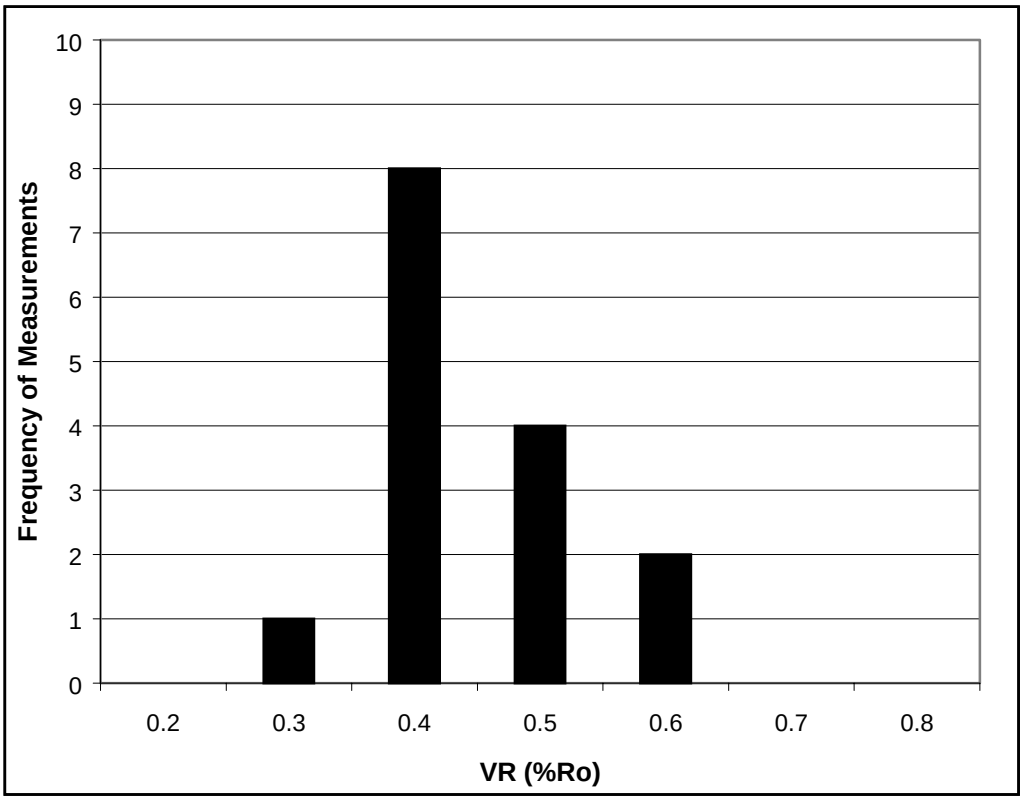
PHILLIPS ALASKA (ARCO) Cabot No.1 (OCS-Y-0747)

Sample Depth: 7500-7530' Ditch

VR Measurements:

0.28	0.41				
0.32	0.44				
0.32	0.45				
0.32	0.56				
0.34	0.59				
0.35					
0.35					
0.35					
0.39					
0.40					

Number of meas:	15	**Median:**	0.35
Average:	0.39	**Stand. Dev:**	0.09



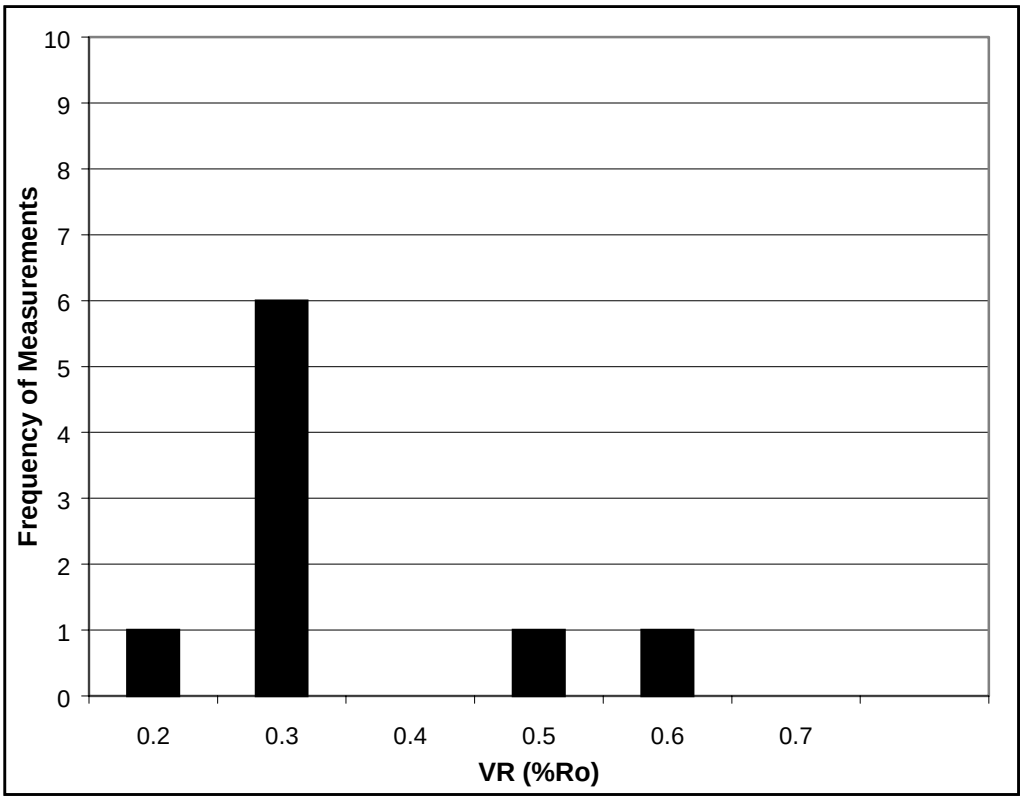
PHILLIPS ALASKA (ARCO) Cabot No.1 (OCS-Y-0747)

Sample Depth: 7769-7788' Core

VR Measurements:

0.19					
0.20					
0.21					
0.21					
0.24					
0.28					
0.29					
0.45					
0.51					

Number of meas:	9	**Median:**	0.24
Average:	0.29	**Stand. Dev:**	0.12



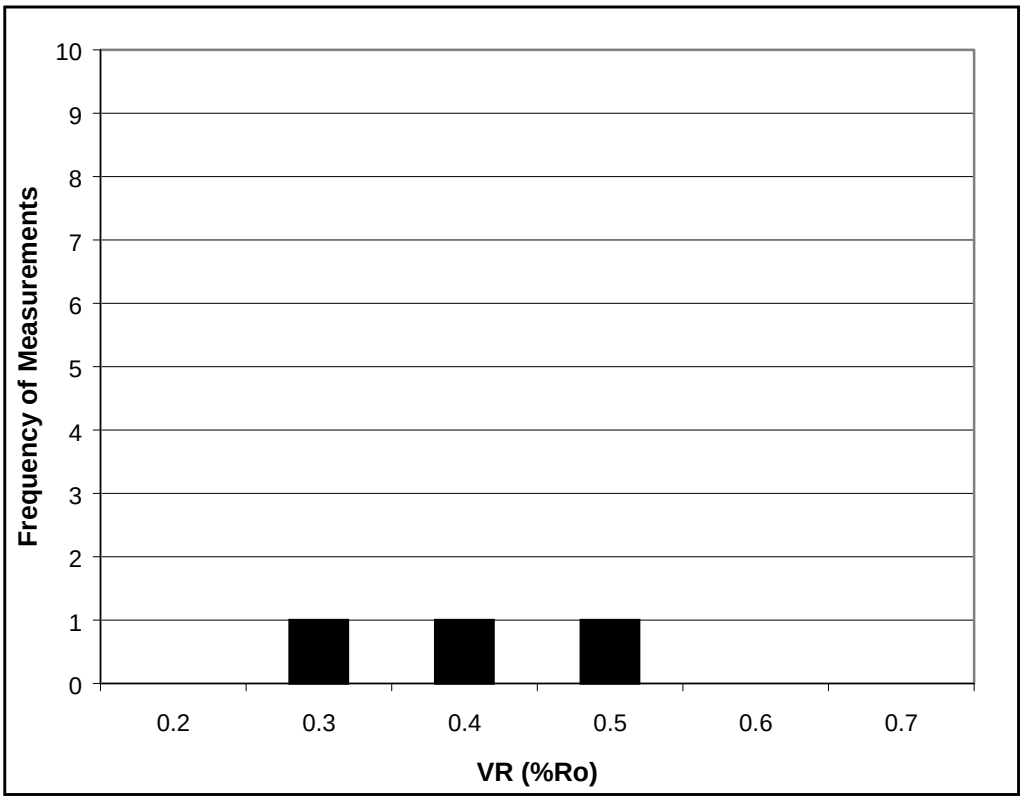
PHILLIPS ALASKA (ARCO) Cabot No.1 (OCS-Y-0747)

Sample Depth: 9600-9690' Ditch

VR Measurements:

0.29 0.33 0.46					

Number of meas:	3	**Median:**	0.33
Average:	0.36	**Stand. Dev:**	0.09



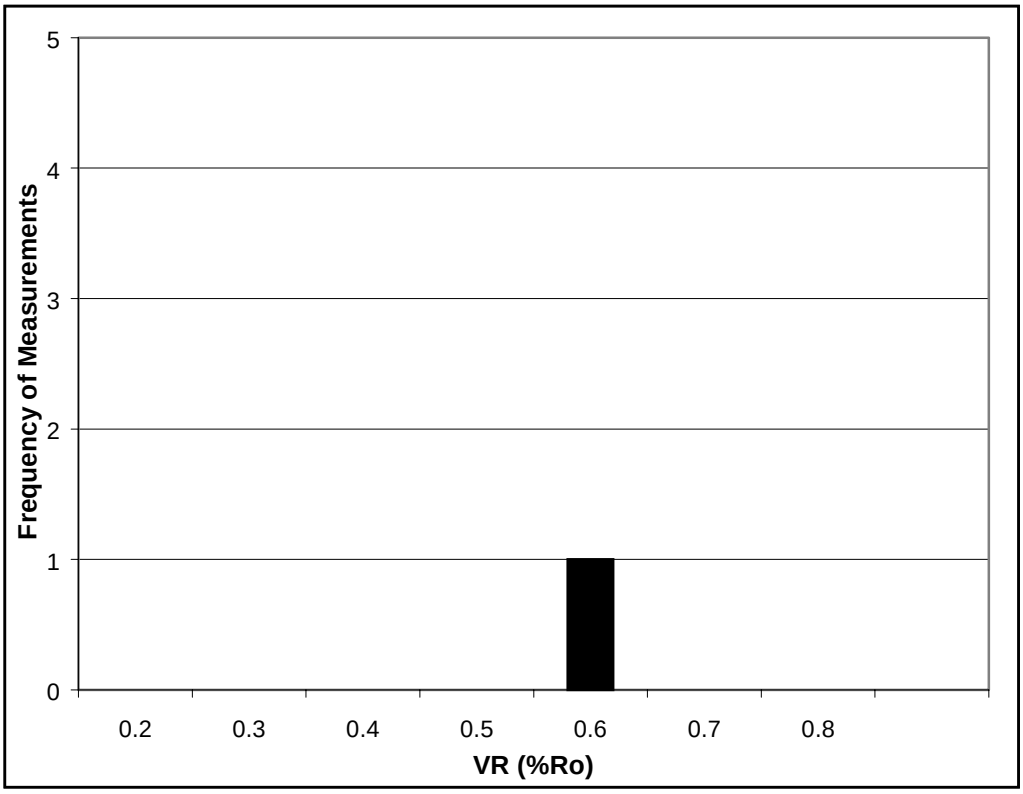
PHILLIPS ALASKA (ARCO) Cabot No.1 (OCS-Y-0747)

Sample Depth: 11480-11560' Ditch

VR Measurements:

0.51					

Number of meas:	1	**Median:**	0.00
Average:	0.51	**Stand. Dev:**	0.00



PHILLIPS ALASKA (ARCO) Cabot No.1 (OCS-Y-0747)

Sample Depth: 12150-12230' Ditch
VR Measurements:

1.70	2.04	2.33			
1.85	2.04	2.36			
1.86	2.05	2.37			
1.87	2.07	2.42			
1.90	2.07	2.67			
1.92	2.08	2.85			
1.96	2.18				
1.97	2.23				
1.99	2.23				
2.00	2.30				

Number of meas:	26	**Median:**	2.06
Average:	2.13	**Stand. Dev:**	0.26