INTEGRATED WELL-LOG SEQUENCE STRATIGRAPHIC ANALYSIS OF THE LO 14-19 AND LO 16-14 WELLS IN THE LOBITOS BASIN, OFFSHORE PERU

Prepared for: Petro-Tech Peruana S.A.

Project No: MSI 95-393

Date: February 1996

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WELL-LOG SEQUENCE STRATIGRAPHIC ANALYSIS REPORT FOR PETRO-TECH PERUANA S.A. LO14-19 WELL, LOBITOS AREA, OFFSHORE PERU

INTRODUCTION

Cuttings samples from 320 to 9,320 feet T.D. from the LO 14-19 well in the Lobitos Area, offshore Peru were submitted by Petro-Tech Peruana S.A. to IRISSS of Houston, Texas to be analyzed for Planktonic and Benthic Foraminifers (every 30 feet, as requested by Petro-Tech Peruana S.A.) and Calcareous Nannofossils (every 60 feet, as requested by Petro-Tech Peruana S.A.). The paleobathymetry is interpreted as inner Neritic to upper Bathyal. The stratigraphic interval covered by the samples extends from late Eocene to late Paleocene.

This well yields a number of biostratigraphic ‘tops”in the correct stratigraphic order that are recorded in Tables 1 and 2 and on the High Resolution Biostratigraphic Checklist (Figures 4 and 5 - in pocket). Well-log Seismic Sequence Stratigraphic analysis was performed from 320 to 9,320 feet, with the results recorded in Tables 1 and 3 and on the Well-log Sequence Stratigraphic Chart (Figure 6 - in pocket).

Petro-Tech Peruana S.A. contracted with IRISSS for the analysis of these samples.

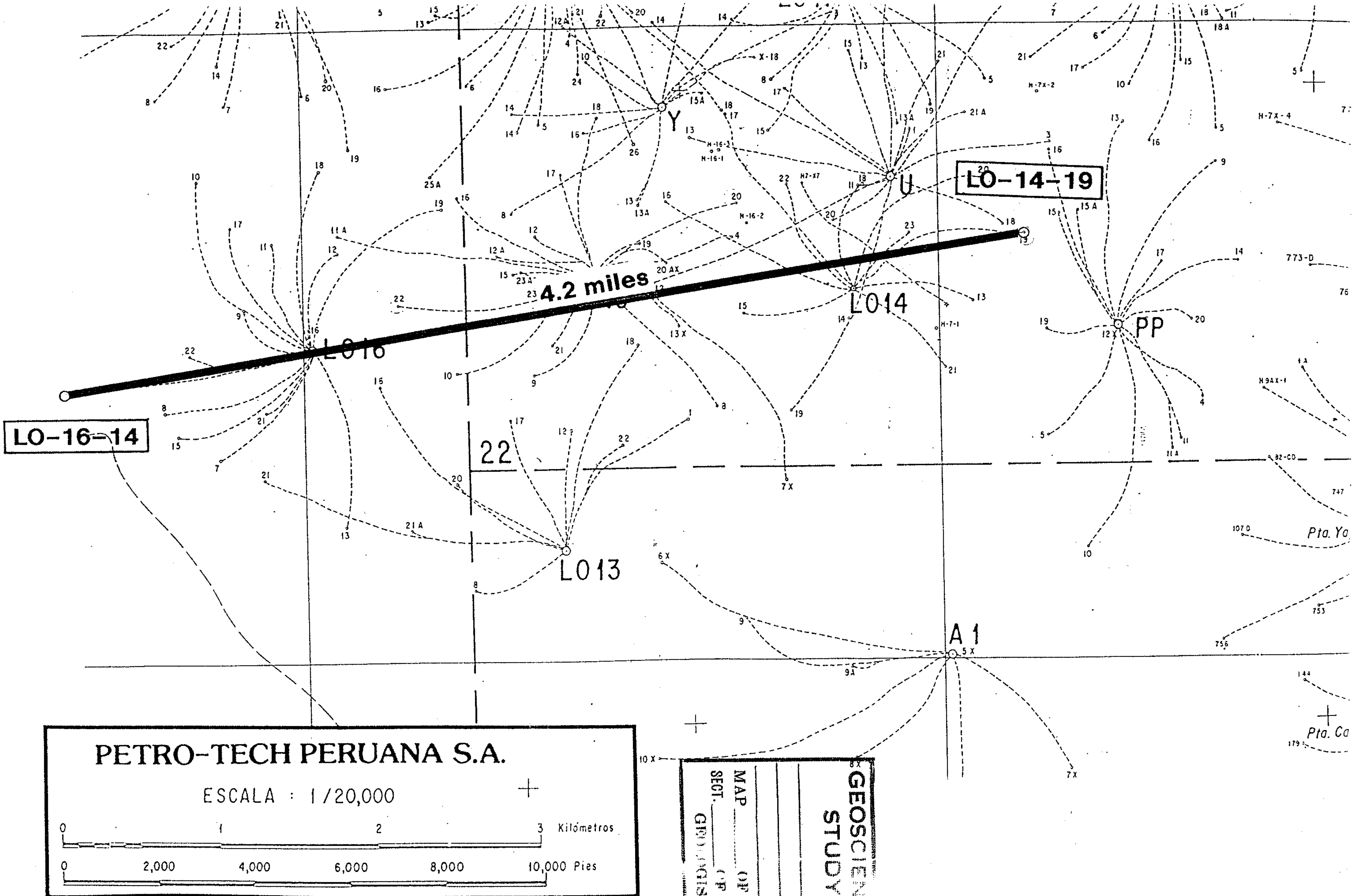

Figure 1: Location Map

GEOSCIENCE STUDY
MAP ___ OF ___
SECT. ___ OF ___
GEOLOGIST

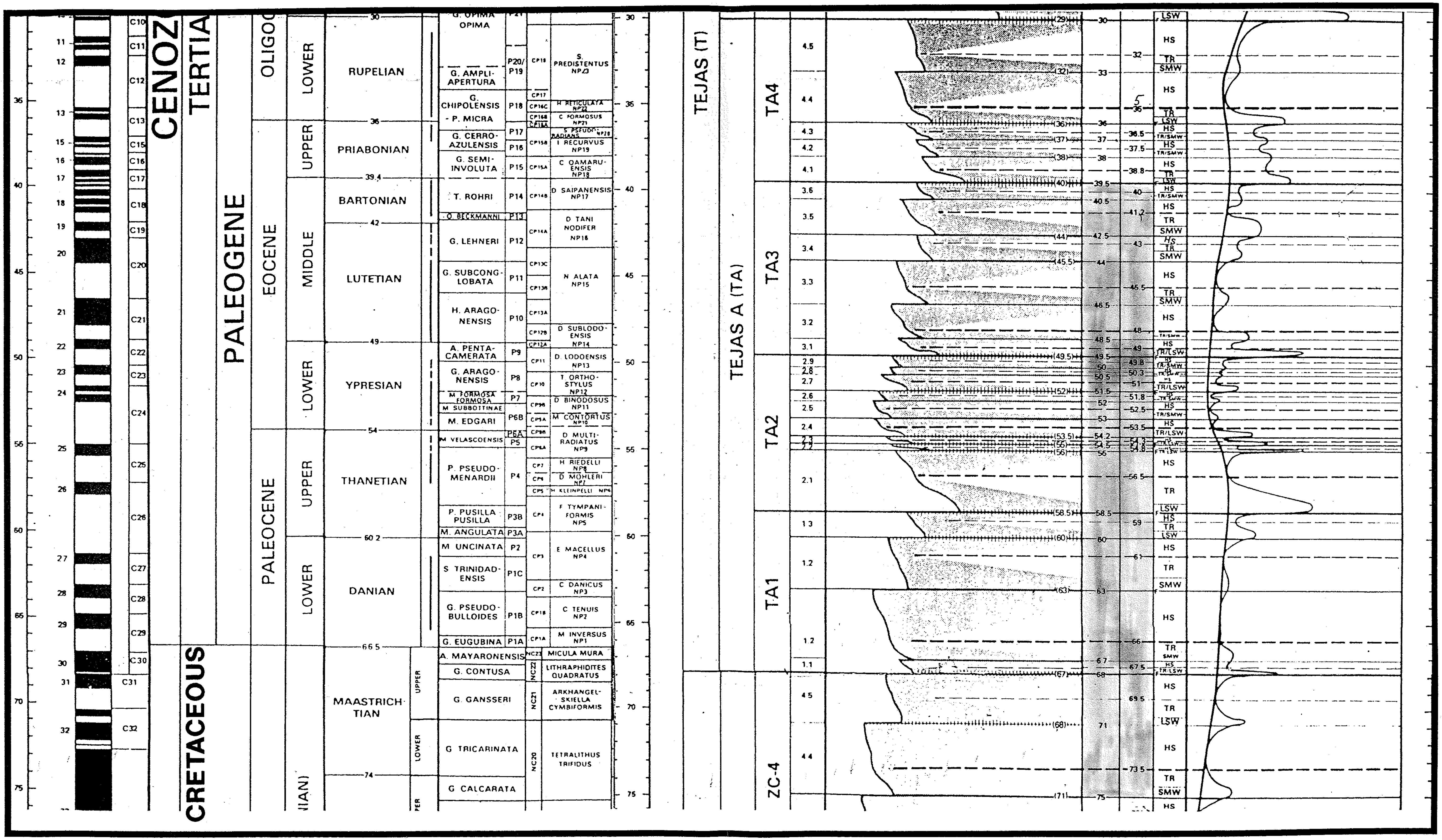

Figure 2: Global Cycle Chart (after Haq et al., 1987)

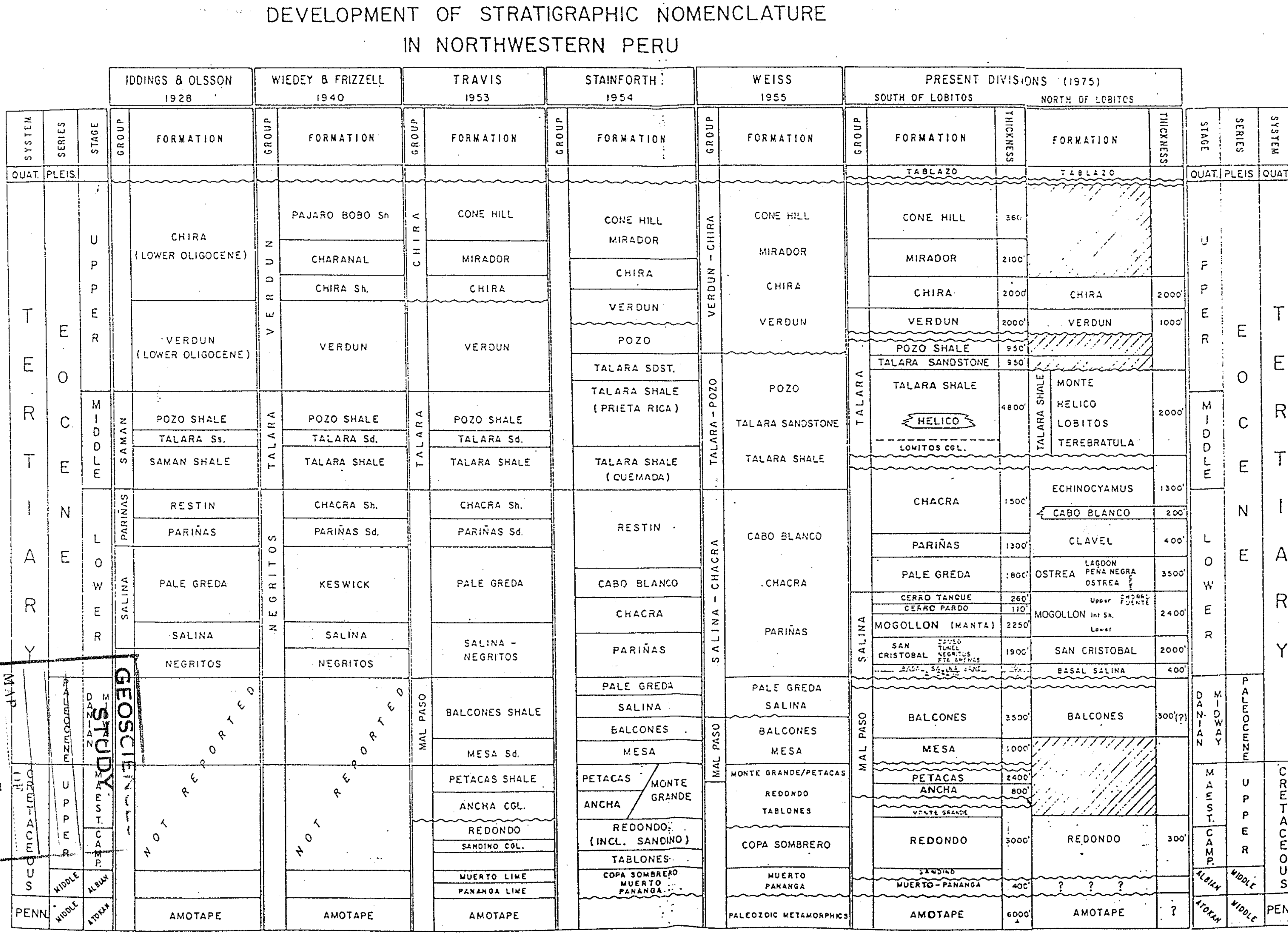

Figure 3: Stratigraphic column.

HIGH RESOLUTION BIOSTRATIGRAPHIC, PALEOBATHYMETRIC AND SEQUENCE STRATIGRAPHIC SUMMARY

TABLE 1

PETRO-TECH PERUANA S.A.

LO14-19 WELL, LOBITOS AREA, OFFSHORE PERU

DEPTH (feet)	FIRST DOWNHOLE OCCURRENCE OF FORAMINIFERS AND CALCAREOUS NANNOFOSSILS	AGE (MA)	FM ZONES	CN ZONES	INFERRED RELATIVE AGE	PALEOBATHYMETRY ECOZONE
320	First Sample Analyzed				Late Eocene	Inner Neritic to Outer Neritic 0-600 Ecozone 1-3
320	*BATHYSIPHON EOCENICA*					
320	*Helicosphaera seminulum*	41.5		NP16		
320	*Campylosphaera dela*	42.5		NP16		
320	*Birkelundia staurion*	41.5		NP16-15		
320	*Sphenolithus spiniger*	43.7		NP15		
320	*Lophodolithus mochloporus*	43.7		NP15		
370	Maximum Flooding Surface	48.0				
380	*HASTIGERINELLA CF. EOCENICA*					
620	*CLAVIGERINELLA JARVISI*		P15			
680					Middle Eocene	
780	Sequence Boundary	48.5				
840	*Discoaster lodoensis*	48.4		NP14		
840	*Discoaster kuepperi*	47.8				
900	*TURBOROTALIA GRIFFINAE*					Outer Neritic to Upper Bathyal 300-1500 Ecozone 4-5
900	*GLOBIGERINA WILSONI*					
970	Maximum Flooding Surface	49.0				
1170						Inner Neritic to Outer Neritic 0-600 Ecozone 1-3
1260	Sequence Boundary	49.5				
1610	*Tribrachiatus orthostylus*	50.6		NP12		
1650	Maximum Flooding Surface	50.3				
1890	Sequence Boundary	50.5				
1990	*GLOBOROTALIA PENTACAMERATA*					
2050						Outer Neritic to Upper Bathyal 300-1500 Ecozone 4-5
2135	Maximum Flooding Surface	51.0				
2170	*TRUNCOROTALOIDES CF. TOPILENSIS*					
2170	*GLOBIGERINETHEKA SP.*					
2750	Sequence Boundary	51.5				
2830						Middle Neritic to Outer Neritic 100-600 Ecozone 2-3
3140	*TROCHAMMINA SAMANICA*					Outer Neritic to Upper Bathyal 300-1500 Ecozone 4-5
3420	Maximum Flooding Surface	52.5				

HIGH RESOLUTION BIOSTRATIGRAPHIC, PALEOBATHYMETRIC AND SEQUENCE STRATIGRAPHIC SUMMARY

TABLE 1

PETRO-TECH PERUANA S.A.

LO14-19 WELL, LOBITOS AREA, OFFSHORE PERU

DEPTH (feet)	FIRST DOWNHOLE OCCURRENCE OF FORAMINIFERS AND CALCAREOUS NANNOFOSSILS	AGE (MA)	FM ZONES	CN ZONES	INFERRED RELATIVE AGE	PALEOBATHYMETRY ECOZONE
3710						
3770	*cf. Fasciculithus*	53.8		NP9	Middle Eocene	
3830	*Discoaster multiradiatus*	53.3		NP10-9		
3940						
4130	Sequence Boundary	53.0				Inner Neritic to
4190	*Fasciculithus?*	53.8		NP9		Outer Neritic
4340	*GLOBOROTALIA WILCOXENSIS*				Early Eocene	0-600
4610	Maximum Flooding Surface	53.5				Ecozone 1-3
4610	*GLOBOROTALIA CRASSA AEGUA*					
4610	*PSEUDOHASTIGERINA WILCOXENSIS*					
4960	Top Lowstand Prograding Complex					
4970	*Chiasmolithus bidens*	53.0		NP10		
5200						
5460						Middle Neritic
6120	Sequence Boundary	54.2				to Transitional
6200	Maximum Flooding Surface	56.5				0-300 Ecozone 3-0
6210						Inner Neritic to
6230	Top Lowstand Prograding Complex					Outer Neritic 0-600
6380	*ROBULUS MIDWAYENSIS*					Ecozone 1-3
7140					Late Paleocene	
7190	Sequence Boundary	58.5				Outer Neritic to
7410	*GLOBOROTALIA WHITEI*					Upper Bathyal
7430	Maximum Flooding Surface	59.0				300-1500
7510	Top Lowstand Prograding Complex					Ecozone 4-5
7650	*GLOBIGERINA PSEUDOTRILOBA*					Upper Bathyal
7980	*Fasciculithus involutus*	53.8		NP9		600-1500
7980	*Fasciculithus tympaniformis*	58.8		NP9-5		Ecozone 4
8040	*Neochiastozygus concinnus*	58.8		NP8-5		
8200						
8950	Sequence Boundary	60.0				
9010	*TRACHAMMINA ONDEGARDOI*					Indeterminate
9010	*HAPLOPHRAGMOIDES ATAHUALLPAI*					
9320	T.D.					

HIGH RESOLUTION BIOSTRATIGRAPHIC AND PALEOBATHYMETRIC SUMMARY

TABLE 2

PETRO-TECH PERUANA S.A.

LO14-19 WELL, LOBITOS AREA, OFFSHORE PERU

DEPTH (feet)	FIRST DOWNHOLE OCCURRENCE OF FORAMINIFERS AND CALCAREOUS NANNOFOSSILS	AGE (MA)	FM ZONES	CN ZONES	INFERRED RELATIVE AGE	PALEOBATHYMETRY ECOZONE
320	First Sample Analyzed				Late Eocene	Inner Neritic to Outer Neritic 0-600 Ecozone 1-3
320	*BATHYSIPHON EOCENICA*					
320	*Helicosphaera seminulum*	41.5		NP16		
320	*Campylosphaera dela*	42.5		NP16		
320	*Birkelundia staurion*	41.5		NP16-15		
320	*Sphenolithus spiniger*	43.7		NP15		
320	*Lophodolithus mochloporus*	43.7		NP15		
380	*HASTIGERINELLA CF. EOCENICA*					
620	*CLAVIGERINELLA JARVISI*		P15			
680					Middle Eocene	
840	*Discoaster lodoensis*	48.4		NP14		
840	*Discoaster kuepperi*	47.8				
900	*TURBOROTALIA GRIFFINAE*					Outer Neritic to Upper Bathyal 300-1500 Ecozone 4-5
900	*GLOBIGERINA WILSONI*					
1170						Outer Neritic 0-600 Ecozone 1-3
1610	*Tribrachiatus orthostylus*	50.6		NP12		
1990	*GLOBOROTALIA PENTACAMERATA*					
2050						Outer Neritic to Upper Bathyal 300-1500 Ecozone 4-5
2170	*TRUNCOROTALOIDES CF. TOPILENSIS*					
2170	*GLOBIGERINETHEKA SP.*					
2830						Middle Neritic to Outer Neritic 100-600 Ecozone 2-3
3140	*TROCHAMMINA SAMANICA*					Outer Neritic to Upper Bathyal 300-1500 Ecozone 4-5

HIGH RESOLUTION BIOSTRATIGRAPHIC AND PALEOBATHYMETRIC SUMMARY
TABLE 2
PETRO-TECH PERUANA S.A.
LO14-19 WELL, LOBITOS AREA, OFFSHORE PERU

DEPTH (feet)	FIRST DOWNHOLE OCCURRENCE OF FORAMINIFERS AND CALCAREOUS NANNOFOSSILS	AGE (MA)	FM ZONES	CN ZONES	INFERRED RELATIVE AGE	PALEOBATHYMETRY ECOZONE
3710					Middle Eocene	Inner Neritic to Outer Neritic 0-600 Ecozone 1-3
3770	*cf. Fasciculithus*	53.8		NP9		
3830	*Discoaster multiradiatus*	53.3		NP10-9		
3940					Early Eocene	
4190	*Fasciculithus?*	53.8		NP9		
4340	*GLOBOROTALIA WILCOXENSIS*					
4610	*GLOBOROTALIA CRASSA AEGUA*					
4610	*PSEUDOHASTIGERINA WILCOXENSIS*					
4970	*Chiasmolithus bidens*	53.0		NP10		
5200					Late Paleocene	
5460						Middle Neritic to Transitional 0-300 Ecozone 2-0
6210						Inner Neritic to Outer Neritic 0-600 Ecozone 1-3
6380	*ROBULUS MIDWAYENSIS*					
7140						Outer Neritic to Upper Bathyal 300-1500 Ecozone 4-5
7410	*GLOBOROTALIA WHITEI*					
7650	*GLOBIGERINA PSEUDOTRILOBA*					Upper Bathyal 600-1500 Ecozone 4
7980	*Fasciculithus involutus*	53.8		NP9		
7980	*Fasciculithus tympaniformis*	58.8		NP9-5		
8040	*Neochiastozygus concinnus*	58.8		NP8-5		
8200						Indeterminate
9010	*TRACHAMMINA ONDEGARDOI*					
9010	*HAPLOPHRAGMOIDES ATAHUALLPAI*					
9320	T.D.					

SEISMIC SEQUENCE STRATIGRAPHIC SUMMARY
TABLE 3
PETRO-TECH PERUANA S.A.
LO 14-19 WELL, LOBITOS AREA, OFFSHORE PERU

Depth (Feet)	Sequences Boundaries, Maximum Flooding Surfaces, Systems Tracts	Age (Ma)	Relative Age
370	Maximum Flooding Surface	48.0	Late Eocene
780	Sequence Boundary	48.5	
970	Maximum Flooding Surface	49.0	
1260	Sequence Boundary	49.5	Middle Eocene
1650	Maximum Flooding Surface	50.3	
1890	Sequence Boundary	50.5	
2135	Maximum Flooding Surface	51.0	
2750	Sequence Boundary	51.5	
3420	Maximum Flooding Surface	52.5	
4130	Sequence Boundary	53.0	
4610	Maximum Flooding Surface	53.5	Early Eocene
4960	Top Lowstand Prograding Complex		
6120	Sequence Boundary	54.2	
6200	Maximum Flooding Surface	56.5	
6230	Top Lowstand Prograding Complex		Late
7190	Sequence Boundary	58.5	
7430	Maximum Flooding Surface	59.0	Paleocene
7510	Top Lowstand Prograding Complex		
8950	Sequence Boundary	60.0	
9320	T.D.		

SEISMIC SEQUENCE STRATIGRAPHIC ANALYSIS

WELL HIGHLIGHTS

- The well highlights are based on the integration of the Foraminiferal and Calcareous Nannofossil analysis.
- Unless otherwise stated, all tops (bioevents) in this well can be considered reliable.
- Planktonic and Benthic Foraminiferal names appear in upper case letters (i.e. *GLOBOROTALIA MIOCENICA*) whereas the Calcareous Nannofossils appear in upper and lower case letters (i.e. *Helicopontosphaera truncata*).
- (In) means that the first downhole occurrence of this species is younger and could be found higher in the section.
- The numerical ages used in this report are from the New Global Cycle Chart of Haq. et al., 1987.
- Numerical ages of a species are given in million of years before present (Ma).
- The numerical age of a species is given when the species is being used to date the sediments in the well.
- Numerical ages may not be given if the first downhole occurrence is not its highest occurrence, its last appearance datum (LAD) or if the species is interpreted as reworked.
- cf= Species is similar to the type species.

Sequence Stratigraphic Basinal Development. Discussion of geological development of the basin using Vail Sequences, age, and paleobathymetry.

The base of the late Paleocene is assigned an age of 60.2 Ma after the Global Cycle Chart of Haq. et al. 1987.

LATE PALEOCENE

9,320 T.D. - 5,200 Feet

63.0 Ma Third Order Depositional Sequence

9,320 T.D. - 8,950 Feet

- The **63.0 Ma Third Order Depositional Sequence** is recognized from the 63.0 Ma Sequence Boundary which is below the T.D. of the well to the 60.0 Ma Sequence Boundary at 8,950 feet.
- The first downhole occurrence of *HAPLOPHRAGMOIDES ATAHUALLPAI* and *TRACHAMMINA ONDEGARDOI* is at 9,010 feet.
- The sediments in this sequence were deposited in an upper Bathyal to inner Neritic environment, Ecozone 4-1, paleowater depths 1500-0 feet.

60.0 Ma Third Order Depositional Sequence

8,950 - 7,190 Feet

- The **60.0 Ma Third Order Depositional Sequence** is recognized from the 60.0 Ma Sequence Boundary at 8,950 feet to the 58.5 Ma Sequence Boundary at 7,190 feet.

- The first downhole occurrence of *Neochiastozygus concinnus* (58.8 Ma) is in the sample at 8,040 in the NP8-5 Calcareous Nannofossil Zone.
- *Fasciculithus tympaniformis* (58.8 Ma) in the NP9-5 Calcareous Nannofossil Zone, and *Fasciculithus involutus* (53.8 Ma) in the Calcareous Nannofossil NP9 Zone make their first downhole occurrence at 7,980 feet.
- *GLOBIGERINA PSEUDOTRILOBA* makes its first downhole occurrence at 7,650 feet.
- The **top Lowstand Prograding Complex** is placed at 7,510 feet.
- The **59.0 Ma Maximum Flooding Surface** is recognized at 7,430 feet.
- The first downhole occurrence of *GLOBOROTALIA WHITEI* is at 7,410 feet.
- The sediments in this sequence were deposited in an upper Bathyal to outer Neritic environment, Ecozone 5-4, paleowater depths 1500-300 feet.

58.5 Ma Third Order Depositional Sequence

7,190 - 6,120 Feet

- The **58.5 Ma Third Order Depositional Sequence** is recognized from the 58.5 Ma Sequence Boundary at 7,190 feet to the 54.2 Ma Sequence Boundary at 6,120 feet.
- The first downhole occurrence of *ROBULUS MIDWAYENSIS* is at 6,380 feet.
- The **top Lowstand Prograding Complex** is placed at 6,230 feet.
- The **56.5 Ma Maximum Flooding Surface** is recognized at 6,200 feet.
- The sediments in this sequence were deposited in a transitional to upper Bathyal environment, Ecozone 4-0, paleowater depths 1500-0 feet.

The base of the early Eocene is assigned an age of 54.0 Ma after the Global Cycle Chart of Haq. et al. 1987.

EARLY EOCENE

5,200 - 3,940 Feet

54.2 Ma Third Order Depositional Sequence

6,120 - 4,130 Feet

- The **54.2 Ma Third Order Depositional Sequence** is recognized from the 54.2 Ma Sequence Boundary at 6,120 feet to the 53.0 Ma Sequence Boundary at 4,130 feet.
- *Chiasmolithus bidens* (53.0 Ma) makes its first downhole occurrence at 4,970. This species is assigned to the NP10 or older Calcareous Nannofossil Zone.
- The **top Lowstand Prograding Complex** is placed at 4,960 feet.
- *PSEUDOHASTIGERINA WILCOXENSIS* and *GLOBOROTALIA CRASSA AEGUA* make their first downhole occurrence at 4,610 feet.
- The **53.5 Ma Maximum Flooding Surface** is recognized at 4,610 feet.
- *GLOBOROTALIA WILCOXENSIS* makes its first downhole occurrence at 4,340 feet.
- The first downhole occurrence of *Fasciculithus?* (53.8 Ma) is at 4,190 feet
- The sediments in this sequence were deposited in an outer Neritic to inner Neritic environment, Ecozone 3-1, paleowater depth 600-0 feet.

The base of the middle Eocene is assigned an age of 49.0 Ma after the Global Cycle Chart of Haq. et al. 1987.

MIDDLE EOCENE

3,940 - 680 Feet

53.0 Ma Third Order Depositional Sequence

4,130 - 2,750 Feet

- The **53.0 Ma Third Order Depositional Sequence** is recognized from the 53.0 Ma Sequence Boundary at 4,130 feet to the 51.5 Ma Sequence Boundary at 2,750 feet.
- The first downhole occurrence of *Discoaster multiradiatus* (53.5 Ma) is in the sample at 3,830 feet. This species is assigned to the NP10-9 Calcareous Nannofossil Zone.
- The first downhole occurrence of *cf. Fasciculithus* (53.8 Ma) is at 3,770 feet in the NP9 Calcareous Nannofossil Zone.
- The **52.5 Ma Maximum Flooding Surface** is recognized at 3,420 feet
- *TROCHAMMINA SAMANICA* makes its first downhole occurrence at 3,140 feet.
- The sediments in this sequence were deposited in an upper Bathyal to inner Neritic environment, Ecozone 4-1, paleowater depths 1500-0 feet.

51.5 Ma Third Order Depositional Sequence

2,750 - 1,890 Feet

- The **51.5 Ma Third Order Depositional Sequence** is recognized from the 51.5 Ma Sequence Boundary at 2,750 feet to the 50.5 Ma Sequence Boundary at 1,890 feet.
- The first downhole occurrence of *GLOBIGERINETHEKA SP.* and *TRUNCOROTALOIDES CF. TOPILENSIS* is at 2,170 feet.
- The **51.0 Ma Maximum Flooding Surface** is recognized at 2,135 feet.
- *GLOBOROTALIA PENTACAMERATA* makes its first downhole occurrence at 1,990 feet.
- The sediments in this sequence were deposited in an upper Bathyal to inner Neritic environment, Ecozone 4-1, paleowater depths 1500-0 feet.

50.5 Ma Third Order Depositional Sequence

1,890 - 1,260 Feet

- The **50.5 Ma Third Order Depositional Sequence** is recognized from the 50.5 Ma Sequence Boundary at 1,890 feet to the 49.5 Ma Sequence Boundary at 1,260 feet.
- The **50.3 Ma Maximum Flooding Surface** is recognized at 1,650 feet.
- The first downhole occurrence of *Tribrachiatus orthostylus* (50.6 Ma) is at 1,610 feet. This species is associated with the NP12 Calcareous Nannofossil Zone.
- The sediments in this sequence were deposited in an outer Neritic to inner Neritic environment, Ecozone 3-1, paleowater depths 600-0 feet.

49.5 Ma Third Order Depositional Sequence

1,260 - 780 Feet

- The **49.5 Ma Third Order Depositional Sequence** is recognized from the 49.5 Ma Sequence Boundary at 1,260 feet to the 48.5 Ma Sequence Boundary at 780 feet.
- *GLOBIGERINA WILSONI* and *TURBOROTALIA GRIFFINAE* make their first downhole occurrence at 900 feet.
- The first downhole occurrence of *Discoaster kuepperi* (47.8 Ma) and *Discoaster lodoensis* (48.4 Ma) in the NP14 Calcareous Nannofossil Zone, is at 840 feet.
- The sediments in this sequence were deposited in an upper Bathyal to inner Neritic environment, Ecozone 4-1, paleowater depths 1500-0 feet.

The base of the late Eocene is assigned an age of 42.0 Ma after the Global Cycle Chart of Haq. et al. 1987.

LATE EOCENE

680 - 320 Feet

48.5 Ma Third Order Depositional Sequence

780 - 320 Feet

- The **48.5 Ma Third Order Depositional Sequence** is recognized from the 48.5 Ma Sequence Boundary at 780 feet to the 46.5 Ma Sequence Boundary which is not recognized in this well.

- The following species make their first downhole occurrence in the sample at 320 feet: *Lophodolithus mochloporus* (43.7 Ma) in the NP15 Calcareous Nannofossil Zone; *Sphenolithus spiniger* (43.7 Ma) in the NP15 Calcareous Nannofossil Zone; *Birkelundia staurion* (41.5 Ma) in the NP16-15 Calcareous Nannofossil Zone; *Campylosphaera dela* (42.5 Ma) in the NP16 Calcareous Nannofossil Zone; *Helicosphaera seminulum* (41.5 Ma) in the NP16 Calcareous Nannofossil zone; and *BATHYSIPHON EOCENICA*.
- The sediments in this sequence were deposited in an outer Neritic to inner Neritic environment, Ecozone 3-1, paleowater depths 600-0 feet.

INTEGRATED WELL-LOG SEQUENCE STRATIGRAPHIC ANALYSIS OF THE LO 16-14 WELL IN THE LOBITOS BASIN, OFFSHORE PERU

Prepared for: Petro-Tech Peruana S.A.

Project No: MSI 95-393

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WELL-LOG SEQUENCE STRATIGRAPHIC ANALYSIS REPORT FOR PETRO-TECH PERUANA S.A.
LO16-14 WELL, LOBITOS AREA, OFFSHORE PERU

INTRODUCTION

Cuttings samples from 5,600 to 10,340 feet T.D. from the LO 16-14 well in the Lobitos Area, offshore Peru were submitted by Petro-Tech Peruana S.A. to IRISSS of Houston, Texas to be analyzed for Planktonic and Benthic Foraminifers (every 30 feet, as requested by Petro-Tech Peruana S.A.) and Calcareous Nannofossils (every 60 feet, as requested by Petro-Tech Peruana S.A.). The paleobathymetry is interpreted as upper Bathyal. The stratigraphic interval covered by the samples extends from Eocene to late Paleocene.

This well yields a number of biostratigraphic "tops" in the correct stratigraphic order that are recorded in Tables 1 and 2 and on the High Resolution Biostratigraphic Checklist (Figures 4 and 5 - in pocket). Well-log Sequence Stratigraphic analysis was performed from 5,600 to 10,340 feet, with the results recorded in Tables 1 and 3 and on the Well-log Sequence Stratigraphic Chart (Figure 6 - in pocket).

Petro-Tech Peruana S.A. contracted with IRISSS for the analysis of these samples.

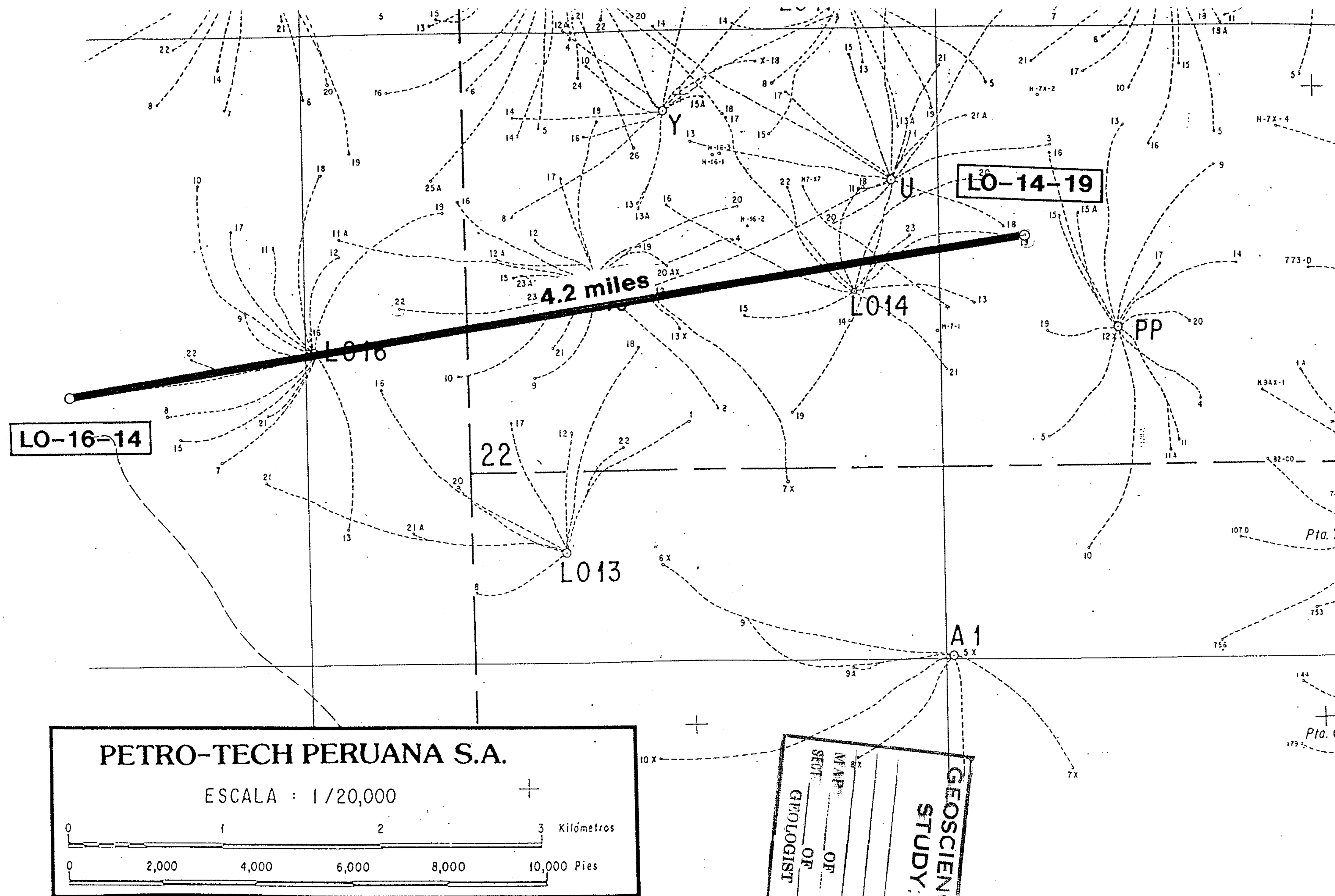

Figure 1: Location Map

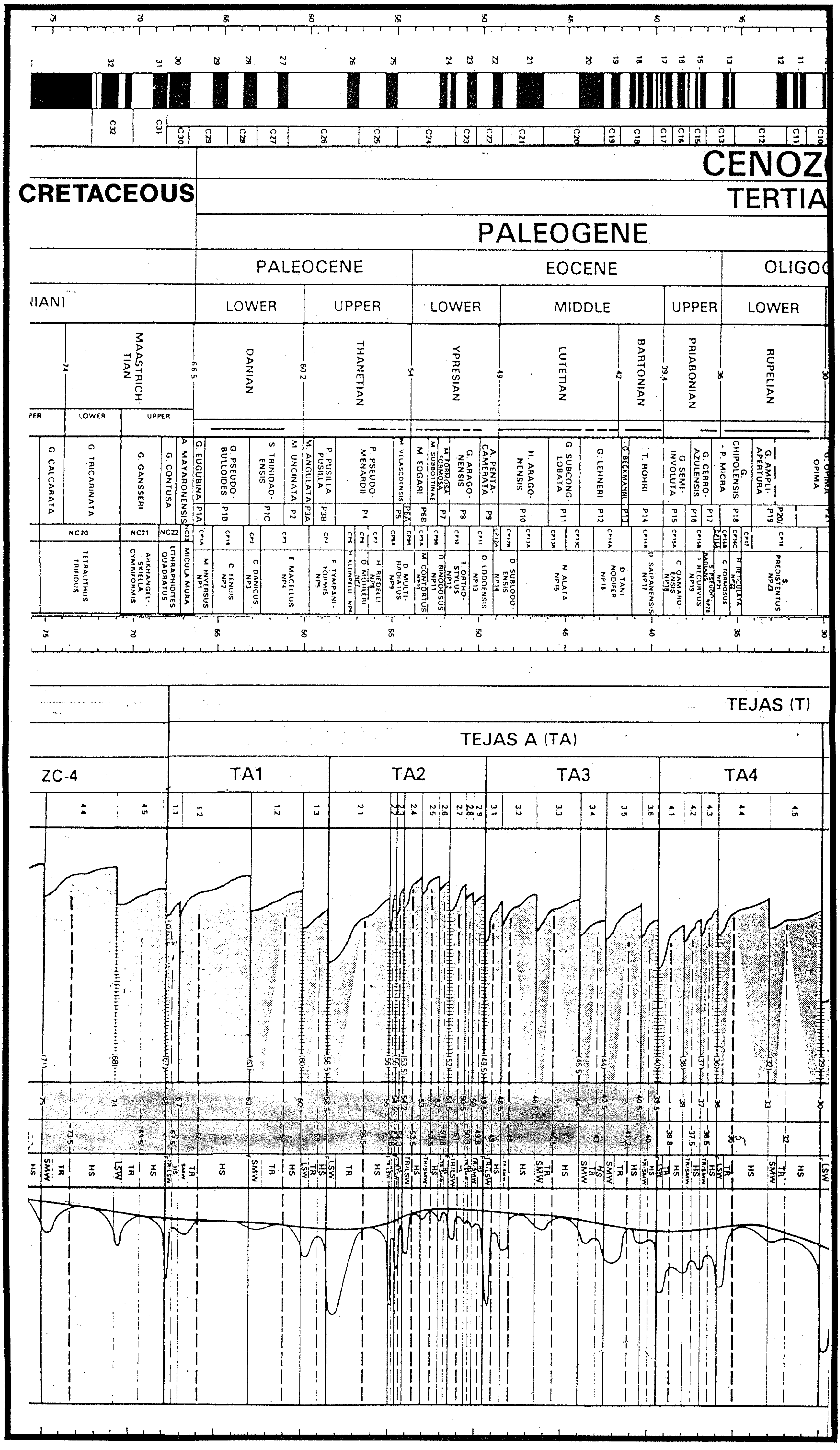

Figure 2: Global Cycle Chart (after Haq et al., 1987)

DEVELOPMENT OF STRATIGRAPHIC NOMENCLATURE IN NORTHWESTERN PERU

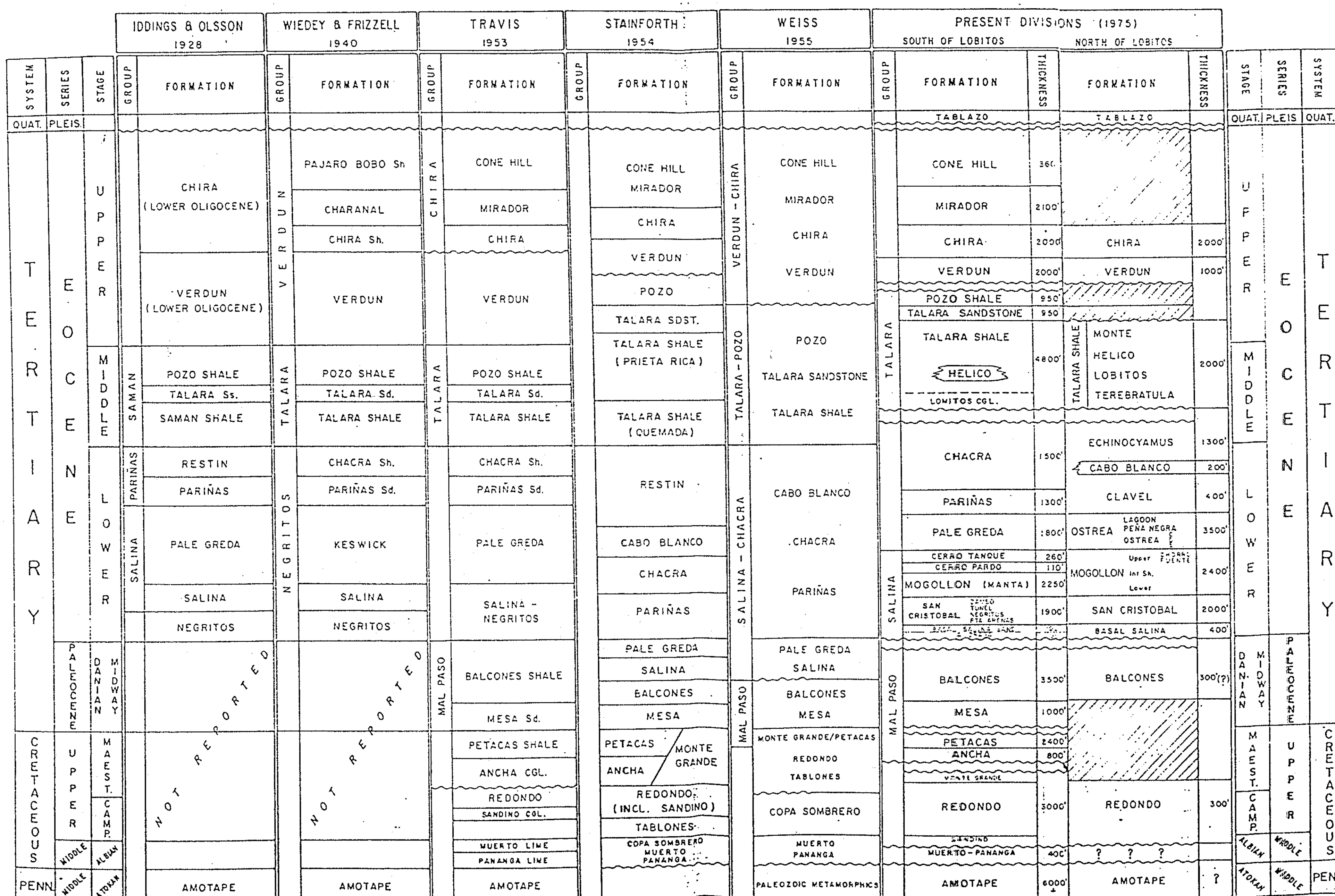

Figure 3: Stratigraphic column.

HIGH RESOLUTION BIOSTRATIGRAPHIC, PALEOBATHYMETRIC AND SEQUENCE STRATIGRAPHIC SUMMARY

TABLE 1

PETRO-TECH PERUANA S.A.

LO16-14 WELL, LOBITOS AREA, OFFSHORE PERU

DEPTH (feet)	FIRST DOWNHOLE OCCURRENCE OF FORAMINIFERS AND CALCAREOUS NANNOFOSSILS	AGE (MA)	FM ZONES	CN ZONES	INFERRED RELATIVE AGE	PALEO-BATHYMETRY ECOZONE
5600	Sequence Boundary	53.0			Eocene	Upper Bathyal 600-1500 Ecozone 4
6080	Maximum Flooding Surface	53.5				
6200	*VALVULINERIA PALEGREDENSIS*					
6200	*Neochiastozygus concinnus*	55.5		NP8		
6260	*GLOBOROTALIA AEQUA*					
6270						
6320	Top Lowstand Prograding Complex					
6320	*Fasciculithus sp.*	54.0		NP9		
6500					Late Paleocene	
6610	Sequence Boundary	54.2				
6650	Maximum Flooding Surface	56.5				
6740	*Discoaster mediosus*	56.5		NP10-7		
6800	*GLOBOROTALIA WILCOXENSIS*					
6860	Top Lowstand Prograding Complex					
7460	*GLOBIGERINA TRILOCULINOIDES*					
7760	*HAPLOPHRAGMOIDES ATAHAULLPAI*					
8180	*GLOBIGERINA PSEUDOTRILOBA*					
8300	*TROCHAMMINA ONDEGARDOI*					
8940	Sequence Boundary	58.5				
8980	Maximum Flooding Surface	59.0				
9020	*GUMBELINA SP.*					
9100	Top Lowstand Prograding Complex					
9350	Top Slope Fan					
9380	*Chiasmolithus bidens*			NP10-6		
9620	*GUMBELINA GLOBOSA*					
10080	*Cyclagelosphaera margerelii*	64.0		NP2		
10340	T.D.					

(PROJECTS/95-393/PETRO-TECH/PERU/FINAL.RPT)

HIGH RESOLUTION BIOSTRATIGRAPHIC AND PALEOBATHYMETRIC SUMMARY
TABLE 2
PETRO-TECH PERUANA S.A.
LO16-14 WELL, LOBITOS AREA, OFFSHORE PERU

DEPTH (feet)	FIRST DOWNHOLE OCCURRENCE OF FORAMINIFERS AND CALCAREOUS NANNOFOSSILS	AGE (MA)	FM ZONES	CN ZONES	INFERRED RELATIVE AGE	PALEO-BATHYMETRY ECOZONE
6200	*VALVULINERIA PALEGREDENSIS*				Eocene	Upper Bathyal 600-1500 Ecozone 4
6200	*Neochiastozygus concinnus*	55.5		NP8		
6260	*GLOBOROTALIA AEQUA*					
6270						
6320	*Fasciculithus sp.*	54.0		NP9		
6500					Late Paleocene	
6740	*Discoaster mediosus*	56.5		NP10-7		
6800	*GLOBOROTALIA WILCOXENSIS*					
7460	*GLOBIGERINA TRILOCULINOIDES*					
7760	*HAPLOPHRAGMOIDES ATAHAULLPAI*					
8180	*GLOBIGERINA PSEUDOTRILOBA*					
8300	*TROCHAMMINA ONDEGARDOI*					
9020	*GUMBELINA SP.*					
9380	*Chiasmolithus bidens*			NP10-6		
9620	*GUMBELINA GLOBOSA*					
10080	*Cyclagelosphaera margerelii*	64.0		NP2		
10340	T.D.					

SEISMIC SEQUENCE STRATIGRAPHIC SUMMARY TABLE 3 PETRO-TECH PERUANA S.A. LO 16-14 WELL, LOBITOS AREA, OFFSHORE PERU			
Depth (Feet)	**Sequences Boundaries, Maximum Flooding Surfaces, Systems Tracts**	**Age (Ma)**	**Relative Age**
5600	Sequence Boundary	53.0	Eocene
6080	Maximum Flooding Surface	53.5	
6320	Top Lowstand Prograding Complex		
6610	Sequence Boundary	54.2	Late Paleocene
6650	Maximum Flooding Surface	56.5	
6860	Top Lowstand Prograding Complex		
8940	Sequence Boundary	58.5	
8980	Maximum Flooding Surface	59.0	
9100	Top Lowstand Prograding Complex		
9350	Top Slope Fan		
10340	T.D.		

SEISMIC SEQUENCE STRATIGRAPHIC ANALYSIS

WELL HIGHLIGHTS

- The well highlights are based on the integration of the Foraminiferal and Calcareous Nannofossil analysis.
- Unless otherwise stated, all tops (bioevents) in this well can be considered reliable.
- Planktonic and Benthic Foraminiferal names appear in upper case letters (i.e. *GLOBOROTALIA MIOCENICA*) whereas the Calcareous Nannofossils appear in upper and lower case letters (i.e. *Helicopontosphaera truncata*).
- (In) means that the first downhole occurrence of this species is younger and could be found higher in the section.
- The numerical ages used in this report are from the New Global Cycle Chart of Haq. et al., 1987.
- Numerical ages of a species are given in million of years before present (Ma).
- The numerical age of a species is given when the species is being used to date the sediments in the well.
- Numerical ages may not be given if the first downhole occurrence is not its highest occurrence, its last appearance datum (LAD) or if the species is interpreted as reworked.
- cf= Species is similar to the type species.

Sequence Stratigraphic Basinal Development. Discussion of geological development of the basin using Vail Sequences, age, and paleobathymetry.

The base of the late Paleocene is assigned an age of 60.2 Ma after the Global Cycle Chart of Haq. et al. 1987.

LATE PALEOCENE

10,340 T.D. - 6,500 Feet

60.0 Ma Third Order Depositional Sequence

10,340 T.D. - 8,940 Feet

- The **60.0 Ma Third Order Depositional Sequence** is recognized from the 60.0 Ma Sequence Boundary which is below the T.D. of the well to the 58.5 Ma Sequence Boundary at 8,940 feet.
- The first downhole occurrence of *Cyclagelosphaera margerelii* (64.0 Ma) is at 10,080 feet.
- *GUMBELINA GLOBOSA* makes its first downhole occurrence in the sample at 9,620 feet.
- *Chiasmolithus bidens* makes its first downhole occurrence at 9,380 feet. This species is associated with the NP10-6 Calcareous Nannofossil Zone
- The **top slope fan** is placed at 9,350 feet.
- The **top Lowstand Prograding Complex** is placed at 9,100 feet.

- *GUMBELINA SP.* makes its first downhole occurrence at 9,020 feet
- The **59.0 Ma Maximum Flooding Surface** is recognized at 8,980 feet .
- The sediments in this sequence were deposited in an upper Bathyal environment, Ecozone 4, paleowater depths 1500-600 feet.

58.5 Ma Third Order Depositional Sequence

8,940 - 6,610 Feet

- The **58.5 Ma Third Order Depositional Sequence** is recognized from the 58.5 Ma Sequence Boundary at 8,940 to the 54.2 Ma Sequence Boundary at 6,610 feet.
- The first downhole occurrence of *TROCHAMMINA ONDEGARDOI* and *GLOBIGERINA PSEUDOTRILOBA* is at 8,300 and 8,180 feet, respectively.
- *HAPLOPHRAGMOIDES ATAHAULLPAI* makes its first downhole occurrence at 7,760 feet.
- The first downhole occurrence of *GLOBIGERINA TRILOCULINOIDES* is at 7,460 feet.
- The **top Lowstand Prograding Complex** is placed at 6,860 feet.
- The first downhole occurrence of *GLOBOROTALIA WILCOXENSIS* is at 6,800 feet and *Discoaster mediosus* (56.5 Ma) in the NP10-7 Calcareous Nannofossil Zone is at 6,740 feet
- The **56.5 Ma Maximum Flooding Surface** is at 6,650 feet.
- The sediments in this sequence were deposited in an upper Bathyal environment, Ecozone 4, paleowater depths 1500-600 feet.

The base of the early Eocene is assigned an age of 54.0 Ma after the Global Cycle Chart of Haq. et al. 1987.

EARLY EOCENE

6,500 - 5,600 Feet

54.2 Ma Third Order Depositional Sequence

6,610 - 5,600 Feet

- The **54.2 Ma Third Order Depositional Sequence** is recognized from the 54.2 Ma Sequence Boundary at 6,610 feet to the 53.0 Ma Sequence Boundary at 5,600 feet.
- *Fasciculithus sp.* (54.0 Ma) makes its first downhole occurrence at 6,320 feet. This species is assigned to the NP9 Calcareous Nannofossil Zone.
- The **top Lowstand Prograding Complex** is placed at 6,320 feet.
- The first downhole occurrence of *GLOBOROTALIA AEQUA* is at 6,260 feet.
- The first downhole occurrence of *Neochiastozygus concinnus* (55.5 Ma) in the NP8 Calcareous Nannofossil Zone and *VALVULINERIA PALEGREDENSIS* is at 6,200 feet.
- The **53.5 Ma Maximum Flooding Surface** is recognized at 6,080 feet.
- The sediments in this sequence were deposited in an upper Bathyal environment, Ecozone 4, paleowater depths 1500-600 feet.