PETRO-TECH
PERUANA S.A.

EDM-304-97

INTEROFFICE MEMO

TO: Manager of Engineering Services

FROM: Exploration & Development Manager

RE: GEOLOGICAL PROGNOSIS WELL LO16-23

DATE: November 10, 1997

Attached please find the Geological Prognosis of reference well, which is recommended to be drilled towards SW of platform LO16. The objective Basal Salina is expected to be at 8550 ft. MD (-6900 ft. ss).

This block of more than 2000 acres spacing, have already proved the presence of the Upper and Lower sections of the Basal Salina with excellent productivity of the Upper Basal Salina in well LO16-14. The Lower Basal Salina will be reached in a higher structural position than the well LO16-14 and where the net sand thickness is increasing according to the attached structural and vertical net sand maps.

The successful of this well will open new projects in the Southwest area of the Lobitos Field.

Regards,

Marco A. Raez

HC:kvh

Enclosure

cc: John Norrod
Carlos Valdizán
Jim Hunt
John Meyers
Rafael Samaniego
Fred Majocha
Alberto Erazo
Víctor Arizola
Well File
300.2.1

(4) Se consulto con Talara acerca de la factibilidad de perforación usando la conductora 25. Rolando Rosas confirmo el dia Viernes 7 de Noviembre la perforación del pozo pero usando la conductora 23, KOP: 1500' y max. ang: 41°

1879

PETRO-TECH PERUANA S.A.

GEOLOGIC PROGNOSIS

AREA	OFFICIAL WELL NUMBER	PETRO-TECH N°	TYPE OF WEL	RIG N°
LOBITOS OFFSHORE	Z-2B-21-57-D-LO16	LO16-23	DEVELOPMENT	PETREX 3

OBJECTIVE — PRIMARY: BASAL SALINA — SECONDARY: MOGOLLON

SURFACE COORDINATES (UTM): 9'506,374.52 mN; 459,710.88 mE

TARGET COORDINATES (UTM): 9'505,711.29 mN; 458,579.52 mE

ELEVATION

KB:	50 FT.
WATER DEPTH	309 FT.
GROUND LEVEL	

TARGET

DIRECTION OF DEVIATED WELL	S 60° W
(INITIAL) CONDUCTOR ANGLE FROM VERTICAL	Vertical
RECOMMENDED DEPTH OF K.O.P. FROM 9 5/8 CASING.	1,500 ft.
BUILD UP ANGLE AT	4°/100'
DRILLED DEPTH:	8,550 FT.
VERTICAL DEPTH:	6,950 FT.
HORIZONTAL DRIFT:	4,350 FT.
ESTIMATED FINAL DRILLED DEPTH:	10,200 FT.
HORIZONTAL DRIFT TO TOTAL DEPTH:	5,450 FT.
MAX. ANGLE:	41°
TARGET LIMITS (DIAMETER): TOP:	400 FT. BASE: 600 FT.
ESTIMATED DRILLING TIME TO T. D.	

STRATIGRAPHIC SEQUENCE

FM/MEMBER	DRILLED TOP	SUBSEA TOP	OBSERVATIONS
TALARA	AT SURFACE		
CHACRA	2,700	2,550	
PARIÑAS	4,100	3,100	
PALEGREDA	4,200	3,700	
MOGOLLON	6,600	5,500	SECONDARY
SAN CRISTOBAL	7,500	6,150	
BASAL SALINA	8,550	6,900	OBJECTIVE
BALCONES	10,100	8,100	
TD	10,200	8,150	

CONTROL LOGGING EVALUATION

BIT SAMPLES TO BE TAKEN	EVERY 30 FT. FROM SURF. TO 6000 AND EVERY 10 FT. FROM 6000 TO TOTAL DEPTH
RECOMMENDED FOR PALEO-PALYNOLOGY	SEE REMARKS *1
RECOMMENDED OPEN HOLE	DLL-MSFL-GR, FDC-CNL-GR
RECOMMENDED AFTER CASING	GR-CCL
NEARBY WELLS FOR CORRELATION	LO16-14, LO16-8, LO16-7
SIDEWALL CORES	SWC ☐ HRCT ☐ NOT CONSIDERED
CONVENTIONAL CORES	NOT CONSIDERED
GAS LOGGER	NOT CONSIDERED
FORMATION TESTING	NOT CONSIDERED

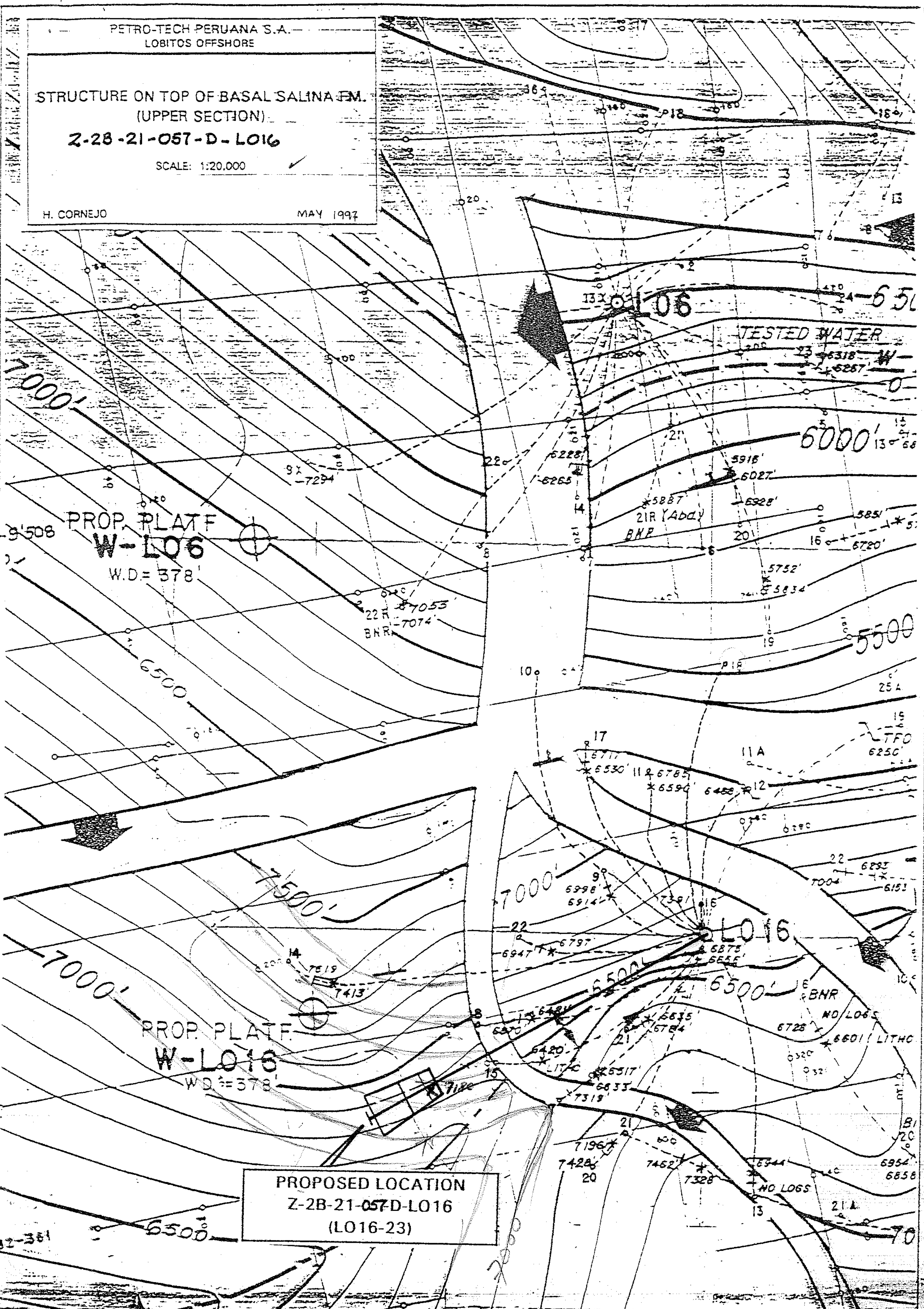
REMARKS

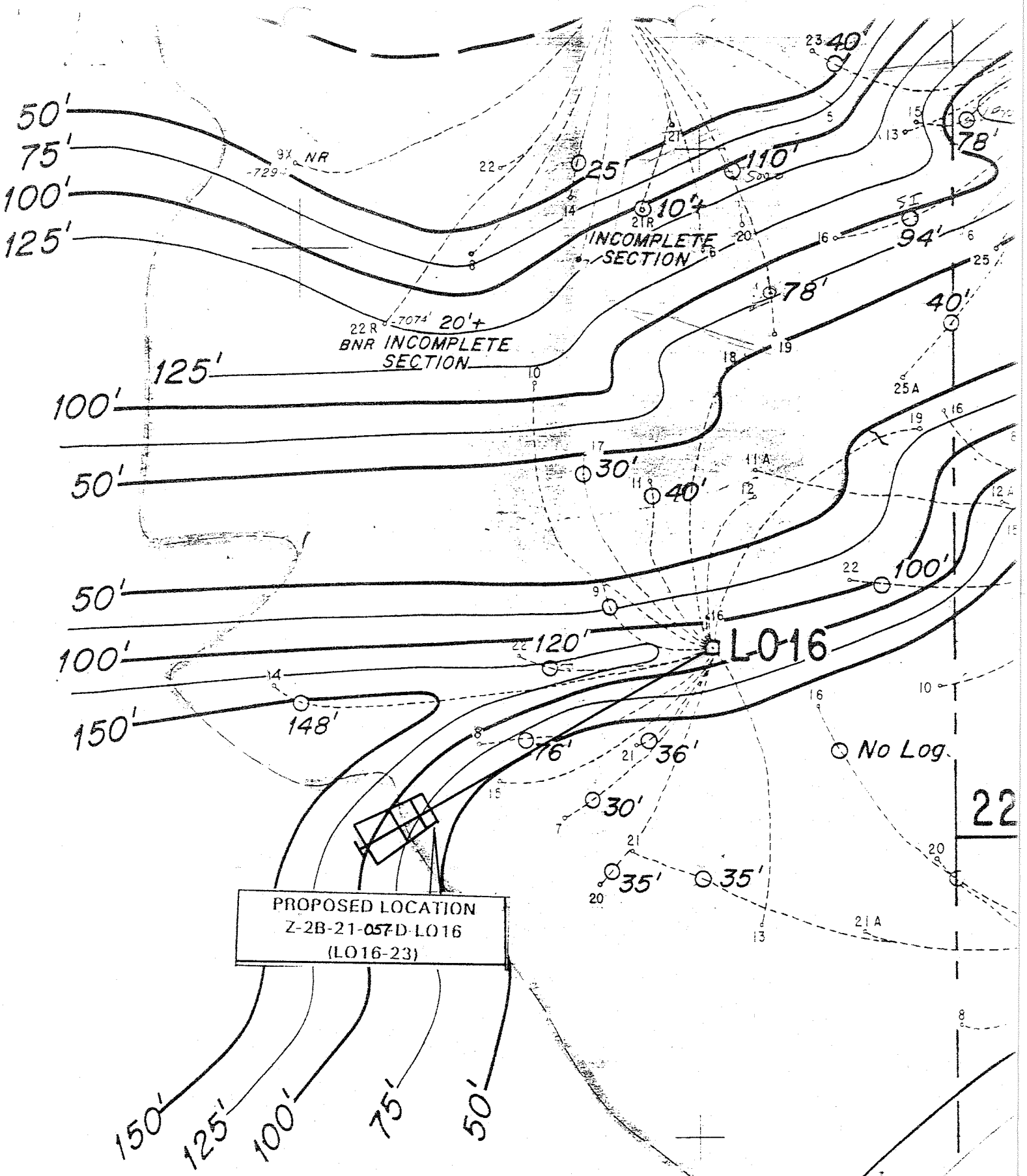
*1 PALEONTOLOGICAL PROCESSING AS FOLLOWS:
EVERY 400 FT. FROM SURF. TO 7000 FT.
EVERY 100 FT. FROM 7000 FT TO TD.

PALYNOLOGICAL PROCESSING
ONLY AT REQUEST OF E&E MANAGEMENT.

RECOMMENDED BY: HUGO CORNEJO — DATE: NOV/07/1997 Rev, Nov, 6/97

APPROVED BY: MARCO A. RAEZ — DATE: NOV/07/1997 Rev. Nov 6/97


PETRO-TECH PERUANA S.A.
LOBITOS OFFSHORE
STRUCTURE ON TOP OF BASAL SALINA FM.
(UPPER SECTION)
Z-28-21-057-D-LO16
SCALE: 1:20,000
H. CORNEJO
MAY 1997
L06
TESTED WATER
6000'
5500
PROP. PLATF
W-L06
W.D.= 378'
7000'
6500
7500'
L016
6500'
PROP. PLATF.
W-L016
NO LOGS
BNR
PROPOSED LOCATION
Z-2B-21-057D-LO16
(LO16-23)

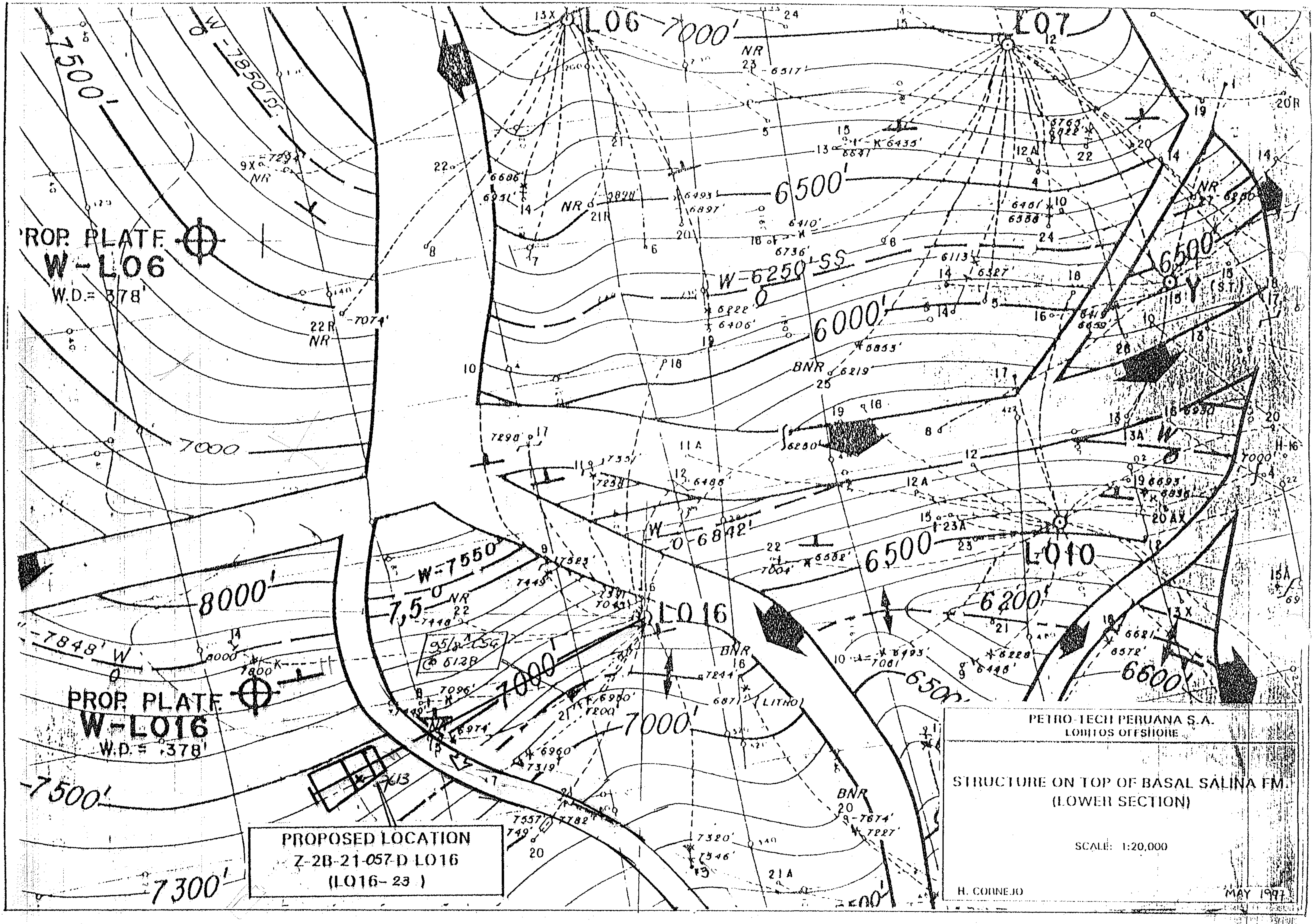


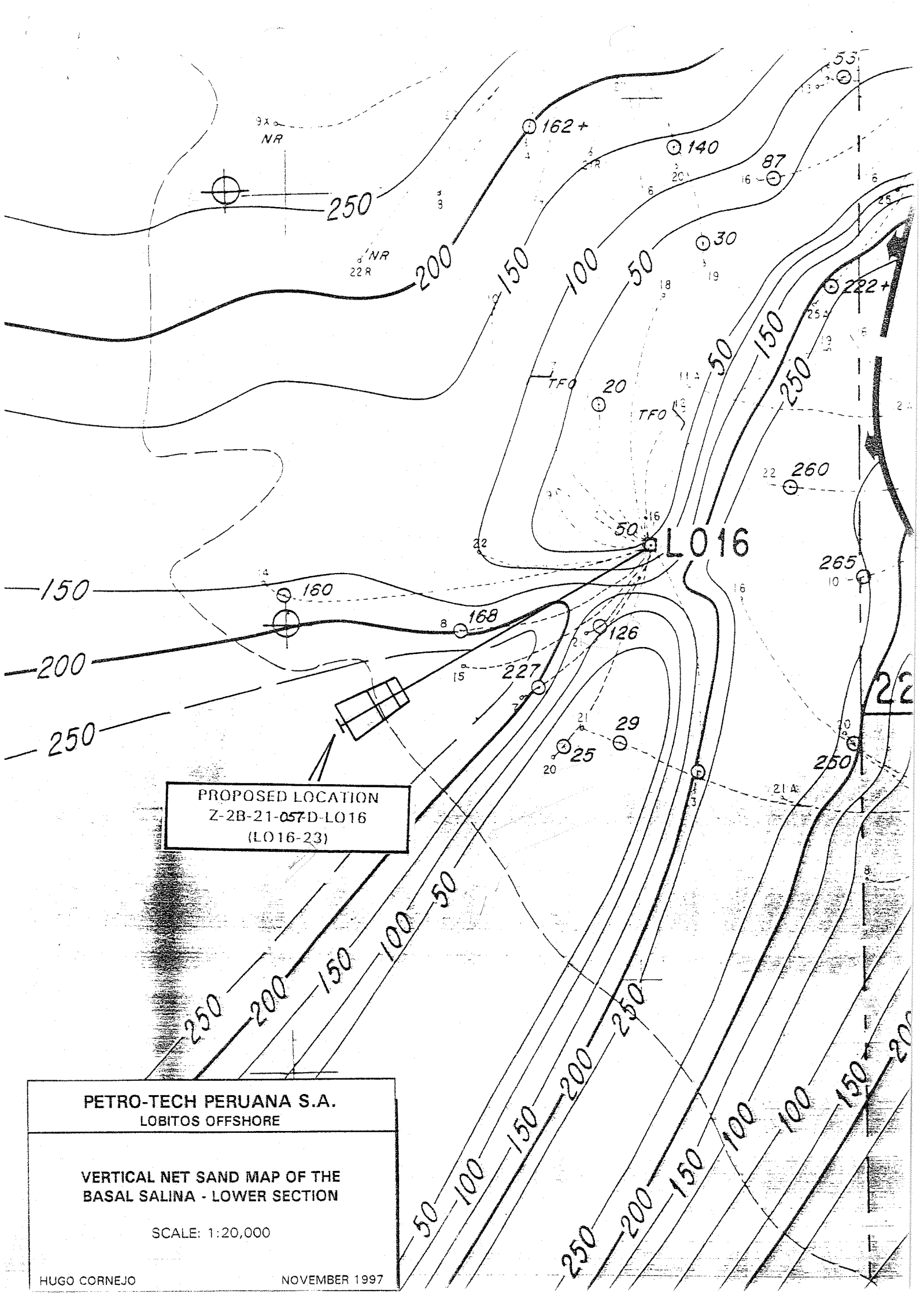
PETRO-TECH PERUANA S.A.
LOBITOS OFFSHORE

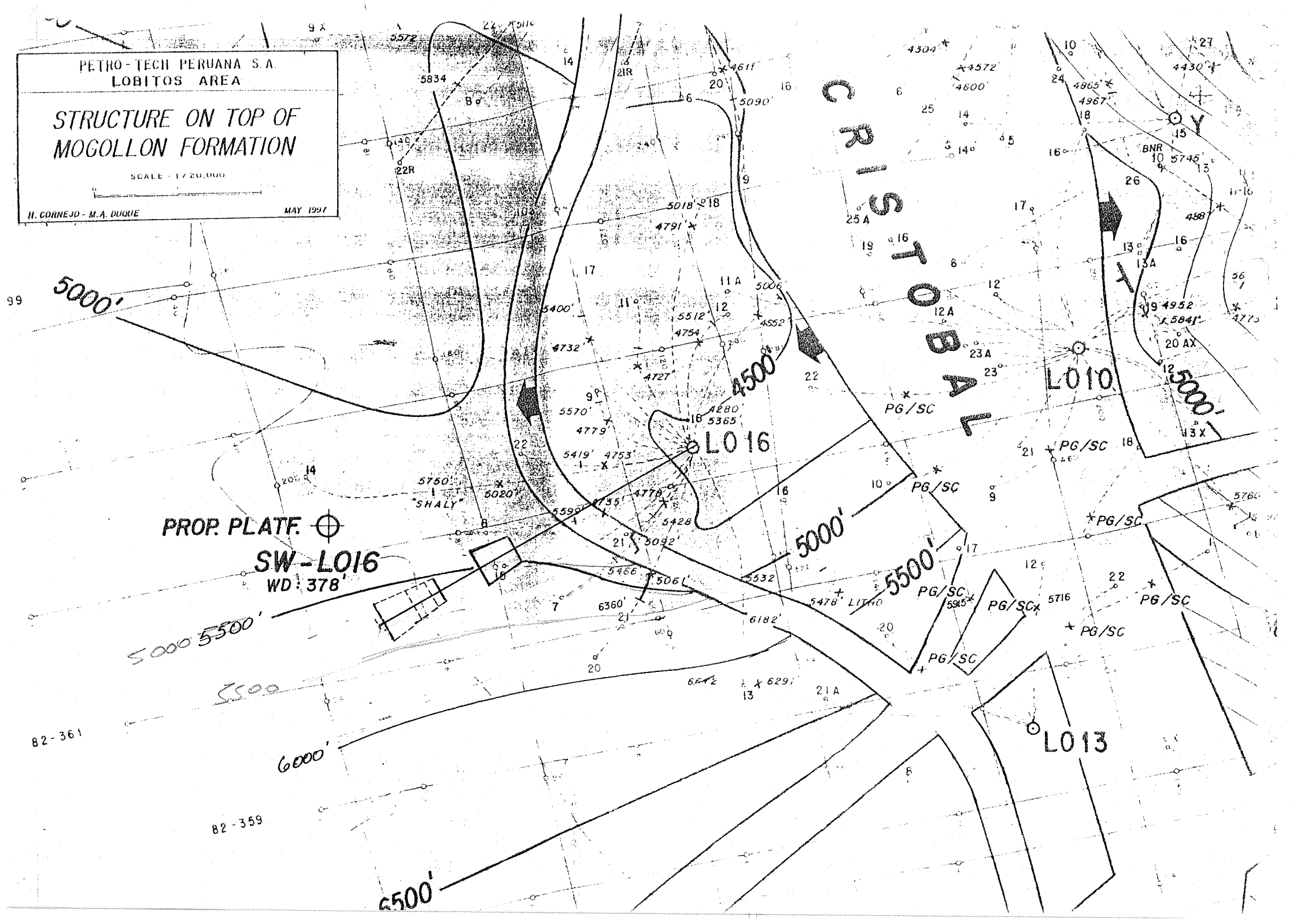
VERTICAL NET SAND MAP OF THE BASAL SALINA - UPPER SECTION

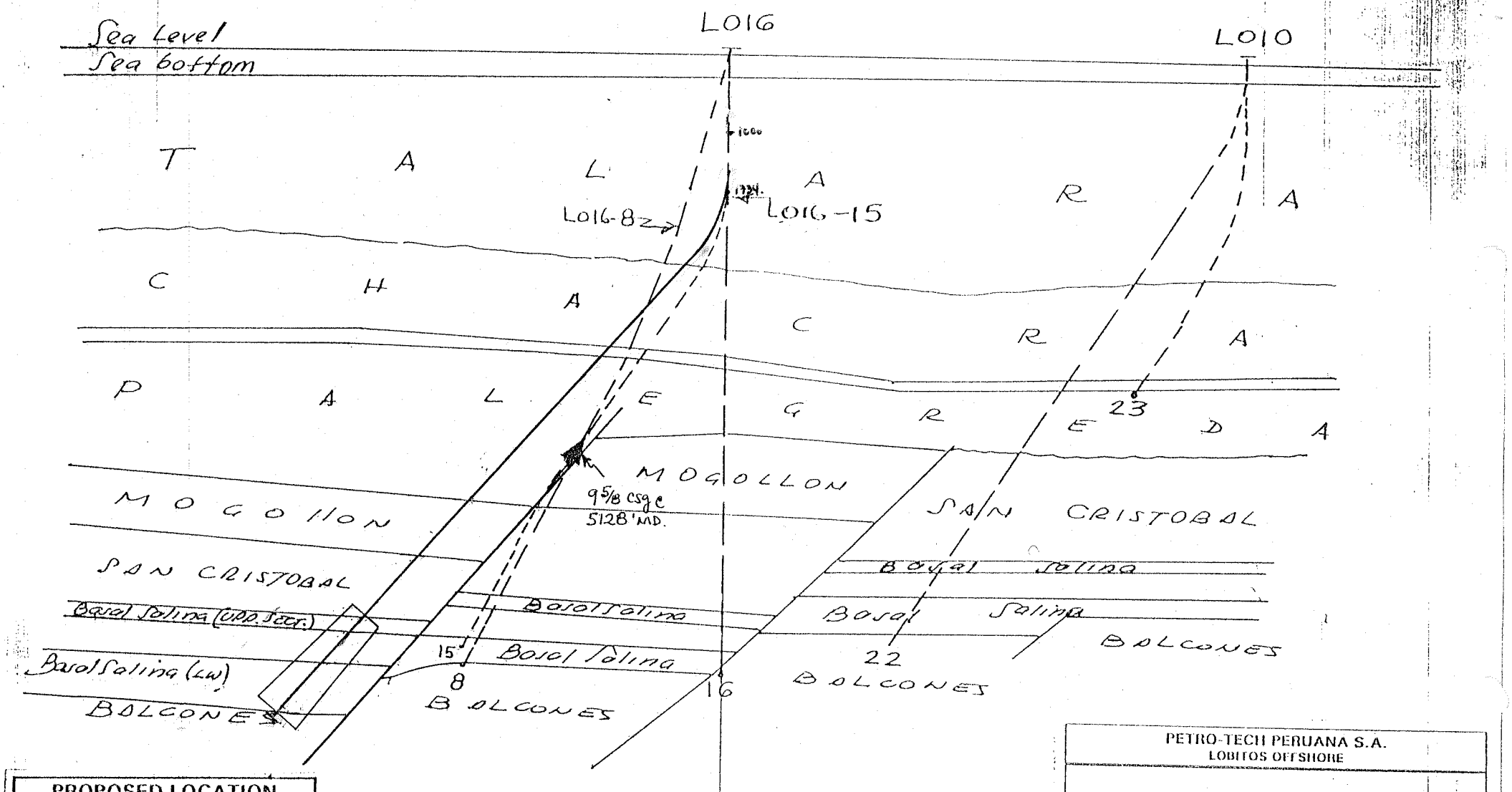
SCALE: 1:20,000

HUGO CORNEJO NOVEMBER 1997


PETRO-TECH PERUANA S.A.
LOBITOS OFFSHORE
STRUCTURE ON TOP OF BASAL SALINA FM.
(LOWER SECTION)
SCALE: 1:20,000
H. CORNEJO
MAY 1997
PROPOSED LOCATION
Z-2B-21-057-D LO16
(LO16- 23)
PROP. PLATF.
W-LO6
W.D.= 378'
PROP. PLATF.
W-LO16
W.D.= 378'
LO6
LO7
LO10
LO16
7500'
7000'
6500'
6000'
8000'
7300'
6200'
6600'
W-6250' SS
W-7550
W-7850' SS
W-6842'
95/8" CSG
6128
BNR
NR
(LITHO)


PROPOSED LOCATION
Z-2B-21-057-D-LO16
(LO16-23)
LO16
PETRO-TECH PERUANA S.A.
LOBITOS OFFSHORE
VERTICAL NET SAND MAP OF THE
BASAL SALINA - LOWER SECTION
SCALE: 1:20,000
HUGO CORNEJO
NOVEMBER 1997


PETRO-TECH PERUANA S.A.
LOBITOS AREA
STRUCTURE ON TOP OF MOGOLLON FORMATION
SCALE 1/20,000
H. CORNEJO - M.A. DUQUE
MAY 1997
CRISTOBAL
L016
L010
L013
PROP. PLATF.
SW-L016
WD: 378'
5000'
5500'
6000'
4500'
PG/SC
"SHALY"
82-361
82-359



PROPOSED LOCATION
Z-2B-21-057-D LO16
(LO16-23)

PETRO-TECH PERUANA S.A.
LOBITOS OFFSHORE

SW-NE STRUCTURAL CROSS SECTION FOR
PROPOSED WELL Z-2B-21-057-D-LO16
(LO16-23)

SCALE: 1:20,000

H. CORNEJO

MAY 1997

PETRO-TECH
PERUANA S.A.

RES-303-97

INTEROFFICE MEMO

TO: Manager of Engineering Services

FROM: Julio Mego

RE: RESERVOIR EVALUATION - PROPOSED WELL LO16-23

DATE: November 7, 1997

Attached please find the Reservoir Analysis and Economic Evaluation of the proposed well LO16-23, which should be started to drill promptly. This evaluation has been done with the Geological Prognosis of the mentioned well done by Geology.

It is expected an initial oil production of 800 B/D for first month and a final recovery of 600 MSTB.

Summary of the result is as follows:

Drilling & Completion Cost, MUS$:	1,765
Present Worth at 12%,MUS	2,704
AROR, %	82
Pay Out, years	0.9
Minimum Oil Reserves, MSTB at Break Even Point.	213

The economical evaluation shows that the prospect is attractive. The success of this well would confirmed additional locations in this block.

Julio Mego C.

Enclosure

cc: John Norrod
Carlos Valdizán
Jim Hunt
John Meyers
Rafael Samaniego
Fred Majocha
Alberto Erazo
Víctor Arizola
Well File
300.2.1

PROPOSED WELL LO16-23

RESERVOIR ANALYSIS AND ECONOMIC EVALUATION

It is proposed to drill the well LO16-23 which will be the first one to be drilled from LO16 platform (Return to Platform LO16 Program). The objective of this well is located in the Basal Salina reservoir, S 60 W of platform LO16, where well LO16-14 and LO16-20 are producing.

The Basal Salina is expected at 5,450 feet HD S 60 W from Platform LO16 at -6,900 feet subsea.

A. Structure and Reservoir Continuity

Basal Salina

The structural map shows that the reservoir block presents a continuous and good structural control toward East; however the limit toward North is extrapolated and there is no control toward South and West. The presence of sands is supported by Basal Salina found in wells LO16-8, LO16-7, LO16-14 and LO16-20. A complete Basal Salina is expected (Lower and Upper sections).

B. Reservoir Fluids

In the reservoir has been determined a water contact at - 7.848 ft. SS in Lower Basal Salina of well LO16-14. This well has produced 470 MBO of Upper Basal Salina without water production. The Lower Basal Salina of this recommended well is in a structural position higher than the water contact. It is expected to find a complete section with oil. There is not a gas contact.

C. Reserves

The Basal Salina reservoir block does not have define its limit toward West and South for which it is not possible to calculate its volumetric reserves. Using the well LO16-14 curve decline it is estimated 600 MSTB as EUR, with an initial oil production of 800 B/P for the first month.

From this reservoir block it has been produced 470 MSTB through well LO16-14 and 38 MSTB through LO16-20.

The last recorded pressure in well LO16-14 was of 3,647 psig. (0.483 psi/ft.) in July 1996. This pressure shows that the reservoir block does not have strong depletion.

D. **Economic Evaluation**

The economic evaluation has been done considering the slightly depletion of production performance in well LO16-14.

Parameters Considered for the Economic Evaluation

Oil Price, $/Bbl.	16
Rate of Discount, %	12
Tax Rate, %	30
Production Cost, MUS$/year	100
Production Share, (Petro-Tech), %	84

Summary of the Economic Evaluation

Evaluation of the well LO16-14 is as follows:

	Prod. w/o Risk	Break Even Point
Oil Reserves, MSTB.	600	213
Total Investment, MUS$	1,765	1,765
Present Worth at 12%, MUS$	2,704	0
Rate of Return, %	82	12
Pay Out, years	0.9	3.11
PW/TI Ratio, $/$	1.53	0

Conclusion

- Considering the geological interpretation, the proposed well does not exhibit risks in relation to its fluids contain. The only risk would be a variation of continuity of sands.
- Economic evaluation shows that the drilling of this well is economically attractive.

V. Peralta/J. Mego

Nov.07.97.