019-06-06-051

Western Decalta Petroleum Limited

Report on a Seismic Survey

of the

Norman Wells Area

NWT Permit 3785

D.I.A.N.D. Project #19-6-6-73-2

Seismic Sections Lines:

1, 2, 3, & 4.

Western Decalta Petroleum Limited

Report on a Seismic Survey

of the

Norman Wells Area

N.W.T. Permit 3785

OPERATOR: Western Decalta Petroleum Limited

CONTRACTOR: Northern Geophysical Limited

OIL & GAS OPERATIONS UNIT
Oil and Mineral Division
DEC 9 1975
OTTAWA, CANADA
Dept. of Indian Affairs & Northern Development

D.I.A.N.D. Project #19-6-6-73-2

Field work carried out in March and April, 1973.

D.I.A.N.D.
OTTAWA
COPY

019-06-06-051

Submitted by [signature]

Date Nov 24/75

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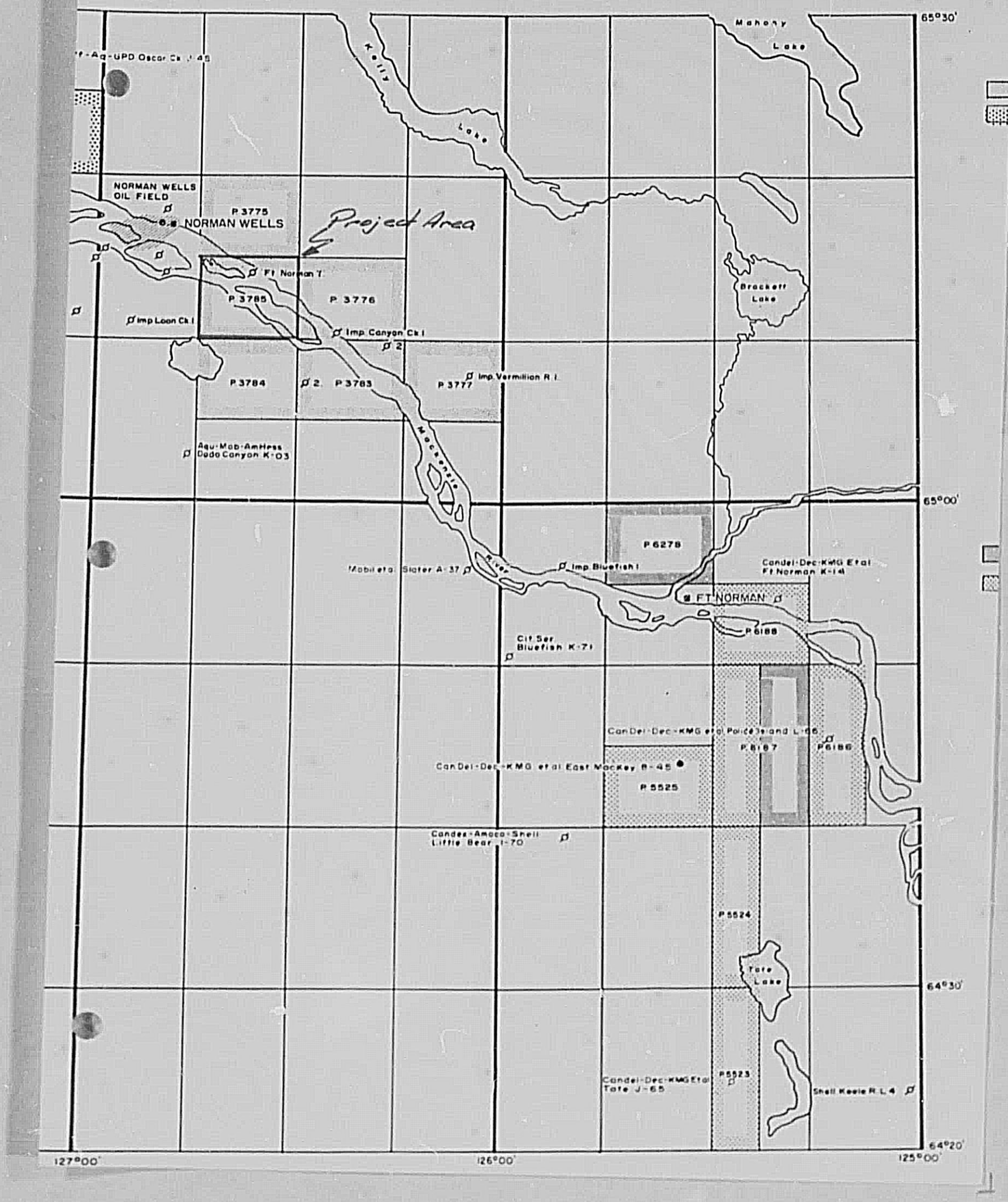
ENCLOSURES: Shot Point Map In pocket.

Seismic Sections Lines 1, 2, 3, & 4 " "


65°30'
Mahony Lake
Kelly Lake
NORMAN WELLS OIL FIELD
P 3775
NORMAN WELLS
Project Area
Ft Norman 7
P 3785
P 3776
Imp Loon Ck I
Imp Canyon Ck I
2
Brackett Lake
P 3784
2
P 3783
P 3777
Imp Vermilion R I
Aqu-Mob-AmHess Dodo Canyon K-03
Mackenzie River
65°00'
P 6278
Mobil et al Slater A-37
Imp Bluefish I
Candel-Dec-KMG Et al Ft Norman K-14
FT NORMAN
P 6188
Cit Ser Bluefish K-71
Can Del-Dec-KMG et al Police Island L-66
P 6187
P 6186
Can Del-Dec-KMG et al East MacKay B-45
P 5525
Candex-Amoco-Shell Little Bear I-70
P 5524
Tate Lake
64°30'
Candel-Dec-KMG Et al Tate J-65
P 5523
Shell Keele R L 4
64°20'
127°00'
126°00'
125°00'

INTRODUCTION

Project Name	-	Norman Wells, Northwest Territories
Project Number	-	73-192T
Location	-	Map Ref. 96-E-SE
- Latitude	-	65° 10' 00" to 65° 14' 30" N
- Longitude	-	126° 41' 55" to 126° 45' 00" W
Duration of Project	-	March 26, 1973 to April 8, 1973
Contractor	-	Northern Geophysical Ltd., Party N-3
Client	-	Western Decalta Petroleum Ltd.
Client Representative	-	Mr. L. Motiuk
Type of Survey	-	Seismic reflection (dynamite)
Purpose of Survey	-	To evaluate the Norman Wells Reef

FIELD OPERATIONS

General

- Description of area - flat terrain covered with small trees and muskeg - program came to the banks of the Mackenzie River which were approximately 30 feet above water level.
- Topographic features - program located between the Mackenzie River and Three Day Lake.
- Maximum elevation 385.7 feet above sea level at S.P. #6 on Line #N-4.
- Minimum elevation 194.1 feet above sea level at S.P. #3 on Line #N-2.
- Camp location - 4 miles southwest of Norman Wells, N.W.T. - access by truck across the Mackenzie River.

Surveying

Contractor	-	Felix Seismic Surveys Ltd.
Surveyor	-	B. MacBride
Instrument	-	TlAE Theodolite
Chain	-	Steel tape
Control	-	From established survey (1972) Line #1-G
Vertical Ties	-	Within + or - 3 feet
Horizontal Ties	-	Within + or - 100 feet
Bearings	-	From established survey (1972) Line #1-G

Drilling

- General - muskeg, clay, silt, sand, gravel and ice stringers
- Drills - (1) Failing 1000, (1) Carey Top Drive and (1) Mayhew 500
- Drill production - fair to good

Recording

Equipment & Instrumentation:

- PT-800 24 Trace Digital Binary Gain Amplifiers
- PDR-89 tape transport, 9 track, SEG (A) format
- Remote firing system - Mandrel SPC-OPC with Motrac radios
- 20 - 6 takeout cables - 220' station intervals
- 125 strings Mark L-2 (14 Hz.) geophones - 9/grp. - 25' spacing

Parameters:

- Type of spread	0 - 24 12/12 24 - 0
- Coverage - CDP	300%
- Station interval	110 feet
- Tail spreads	Ø

- Geophone array	9/110'
- Record quality	Fair to good
- Shot point spacing	440 feet
- Shot point patterns	single holes on flag
- Hole depth	60 feet
- Charge size	10 lbs.
- Number of groups dropped	3
- Record filter	LC 16-124
- Sample rate	2 Ms.

COMMUNICATIONS

Citizen band Motracs employed for inter-crew communications.

KEY PERSONNEL

Supervisor	-	I. P. Bishko
Party Manager	-	J. A. Miller
Observer	-	R. Ireland
Shooter	-	J. Hulowski
Surveyor	-	B. MacBride

EQUIPMENT (Northern Geophysical Ltd. - Camp, Drills & Recording)

Unit #	Use	Description
240	Kitchen	Nodwell Carrier
239	Utility/Sleeper	Nodwell Carrier
127	Sleeper	Nodwell Bros. - Sleigh
11	Fold-out Sleeper	Sleigh
111	Shop	Sleigh
181	Party Manager	Ford 4 x 4 3/4 ton
201	Mechanic	Ford 4 x 4 3/4 ton
213	Drill	Mayhew 1000
128	Carrier	Nodwell FN110
212	Drill	Carey Top Drive
172	Carrier	Nodwell FN110
203	Recorder	S.I.E. Instruments - PT-800 & PDR-8
1	Carrier	Nodwell FN110
189	Shooter	Bombardier
174	Reel	Nodwell FN110
190	Survey	Bombardier
144	Fuel	Sleigh - 3 x 500 gallon tanks
	Fuel	Sleigh - 3 x 500 gallon tanks
191	Reel	Bombardier
5	Water	Nodwell
	Parts	Sleigh
241	Utility/Sleeper	Atco Sleigh - office Norman Wells

Unit #	Use	Description
242	Shop	Sleigh mounted
220	Kitchen	Sleigh - Corab
148	Sleeper	Sleigh - Portabuilt
	Fuel	Sleigh - 2000 gallon capacity

SUB-CONTRACTED EQUIPMENT AND SERVICES

Surveying

- Felix Seismic Surveys Ltd.
  - (1) Surveyor and (1) Rodman
  - (1) PasseParTout

Drilling

- Garrity & Baker
  - (1) Mayhew 500 mounted on Nodwell FN-110

Bulldozing

- Bruce Rome Construction
  - (2) D6C's

Slashing

- Fred Clement - Fort Norman

SEISMIC REPORT DATA

Western Decalta Landuse Permit Number - N73B430

PERMITS AND DAMAGES

No settled lands exist in this area, therefore permitting was not required.

DATA PREPARATION AND PROCESSING

- Northern Geophysical.Ltd., posted relevant data information on the field records and tapes and supplied final operations map.

- Felix Seismic Surveys Ltd., supplied the shotpoint locations, computations and prepared the final location map.

- Seismic data was transmitted to Western Decalta Petroleum Ltd. for data preparation, processing and interpretation.

EXPERIMENTATION

Shooting and recording parameters were specified by the client based on previous experience in this area and no experimentation was undertaken.

CLIMATIC CONDITIONS

The program was conducted late in the winter season with spring thaw conditions prevailing, but conditions did not seriously hamper operations.

CONCLUSIONS AND RECOMMENDATIONS

We consider that near optimum selection of equipment and choice of field parameters was employed on this assignment, and for a similiar program in this area, would recommend little if any change.

Respectfully submitted by:

NORTHERN GEOPHYSICAL LTD.

I. P. Bishko
Supervisor

July 17, 1974

APPENDIX I - PRODUCTION STATISTICS

1.	Total Number Miles Shot	10.33
2.	Total Number Profiles Shot	128
3.	Total Dynamite Used	1550 lbs.
4.	Dynamite Used Per Profile	12.11 lbs.
5.	Total Number Caps Used	166
6.	Caps Used Per Profile	1.3
7.	Total Number Holes Drilled	131
8.	Total Footage Drilled	7870 feet
9.	Extra Water Truck Hours	Ø
10.	Bulldozer Hours	214.0

Cats

Commencement Date	March 26, 1973
Completion Date	April 8, 1973

Drills

Commencement Date	April 2, 1973
Completion Date	April 6, 1973

Recorder

Commencement Date	April 5, 1973
Completion Date	April 8, 1973

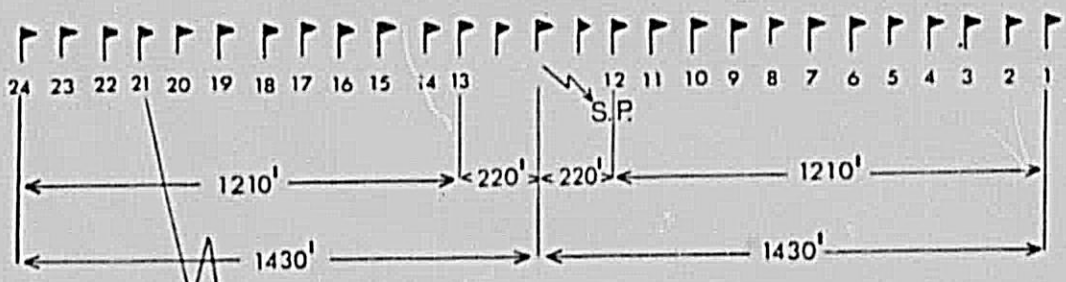
SPREAD DIAGRAM

MINIMUM OFFSET : 220'

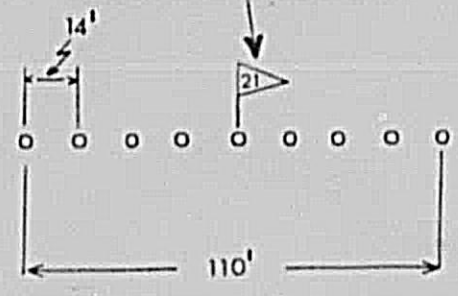
SPREAD DISTANCE : 1430'

S.P. INTERVAL : 440'

GROUP INTERVAL : 110'



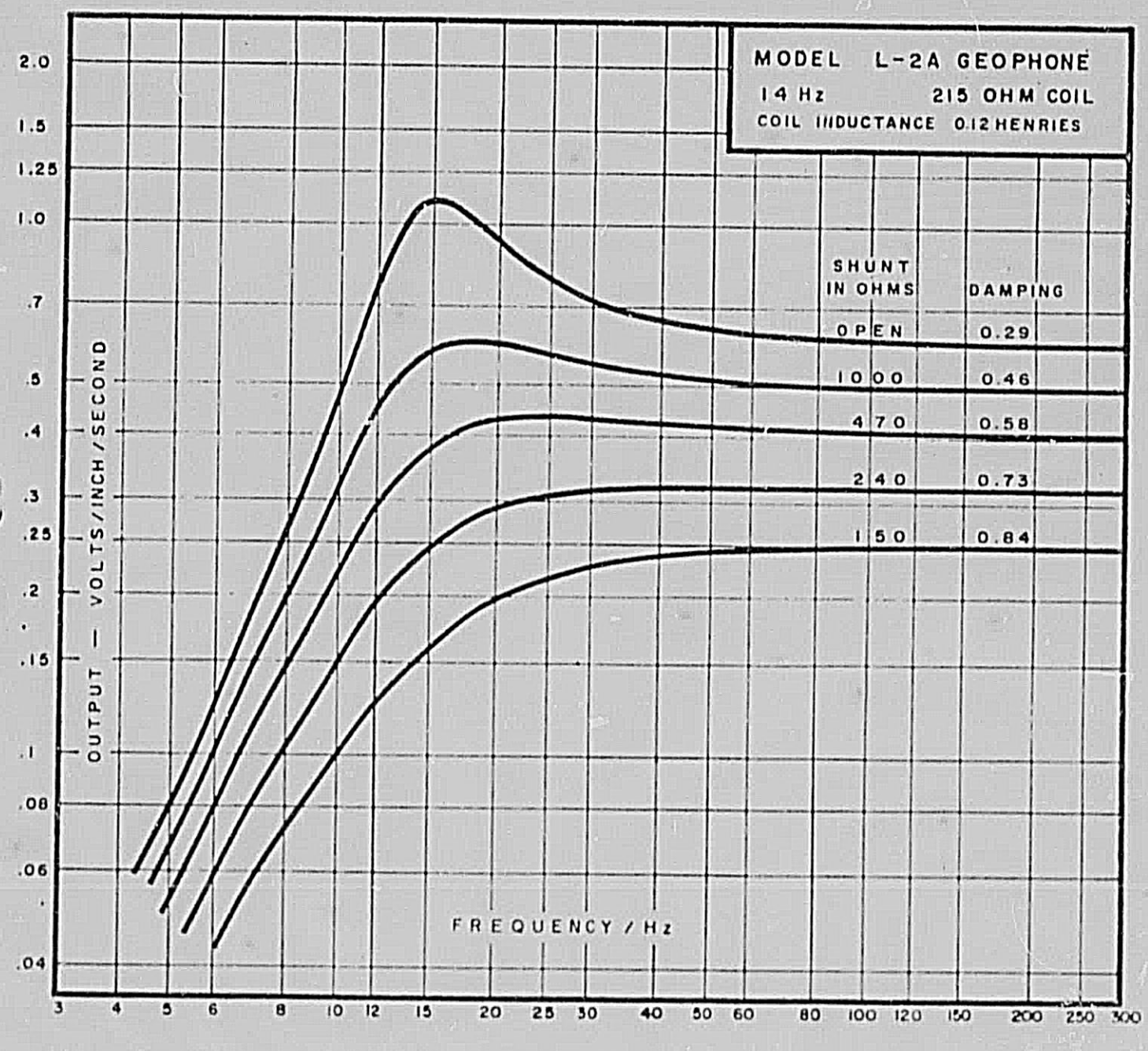
TYPICAL ARRAY



HOLE PATTERN

SINGLE HOLE.

THE ARRAY IS CENTERED AT THE STATION FLAG.


MODEL L-2A GEOPHONE
14 Hz 215 OHM COIL
COIL INDUCTANCE 0.12 HENRIES
SHUNT IN OHMS
DAMPING
OPEN 0.29
1000 0.46
470 0.58
240 0.73
150 0.84
OUTPUT — VOLTS/INCH/SECOND
2.0
1.5
1.25
1.0
.7
.5
.4
.3
.25
.2
.15
.1
.08
.06
.04
FREQUENCY / Hz
3 4 5 6 8 10 12 15 20 25 30 40 50 60 80 100 120 150 200 250 300

DATA PROCESSING:

Percent coverage	300
Filter	12/58
Window	0 - 2000 ms.
Flattened (Hume)	0.65 sec.

RESULTS:

In order to more clearly define possible Kee Scarp reefs all sections were played back with the Hume reflection flattened (at 0.65 seconds). As a result no time structure maps were made. No evidence of Kee Scarp reefs was found.

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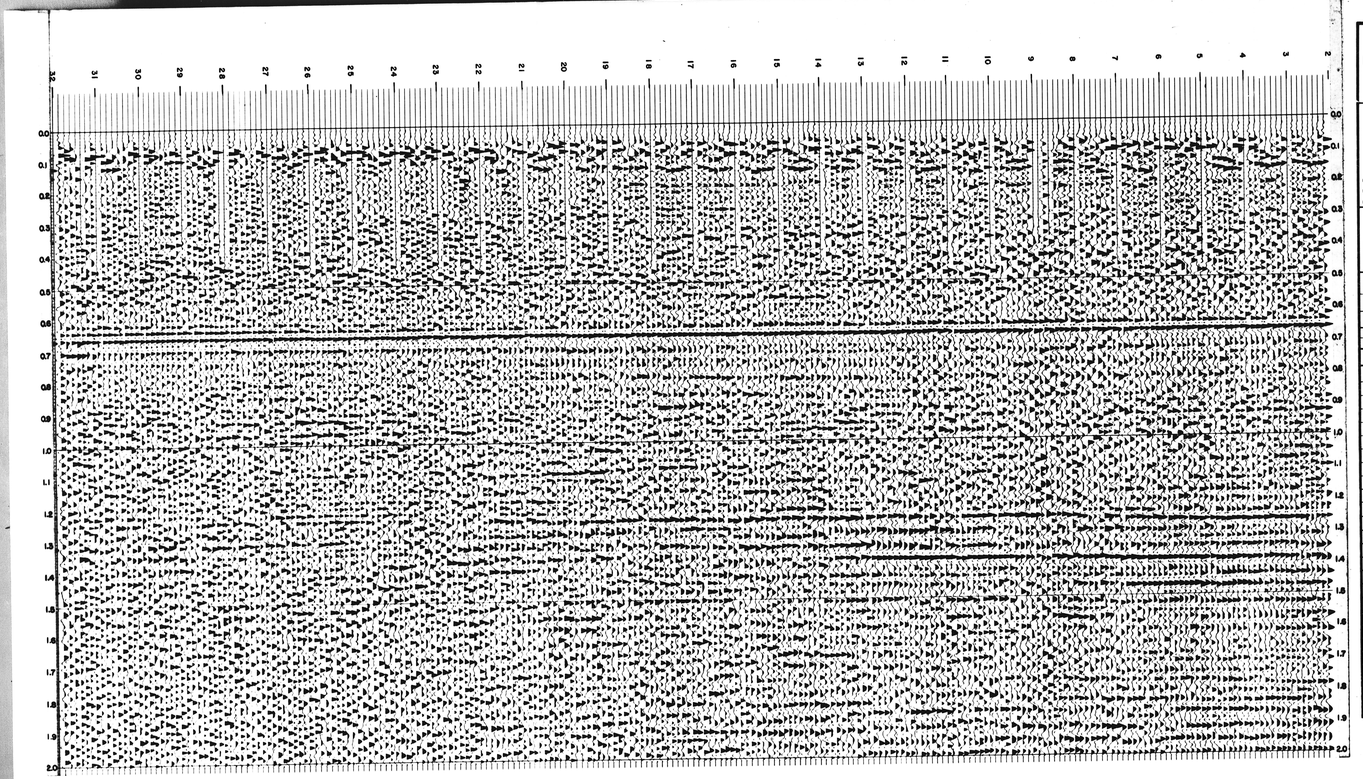


019-06-06-051

19-360-6

SEFEL J. & ASSOCIATES
DATA PROCESSING CONSULTANTS

NORMAN WELLS
PROSPECT

WESTERN DECALTA PETROLEUM LTD
CLIENT

3
LINE No.

DIRECTION

DATA PREPARATION BY: SEFEL J. & ASSOCIATES
PARAMETER SELECTION BY: WESTERN DECALTA
RECORDED BY: NORTHERN GEOPHYSICAL LTD

RAW		SPREAD LENGTH	1320-110-80-1320
MIG			
STACKED ISOCHRON	X	GR. INTERVAL	80'
STACKED STRUCTURAL		S.P. INTERVAL	440'
FINAL ISOCHRON		RECORD LENGTH	2000
FINAL STRUCTURAL		SAMPLE INT.	.2
TRACE GATHER		FOLD	300%

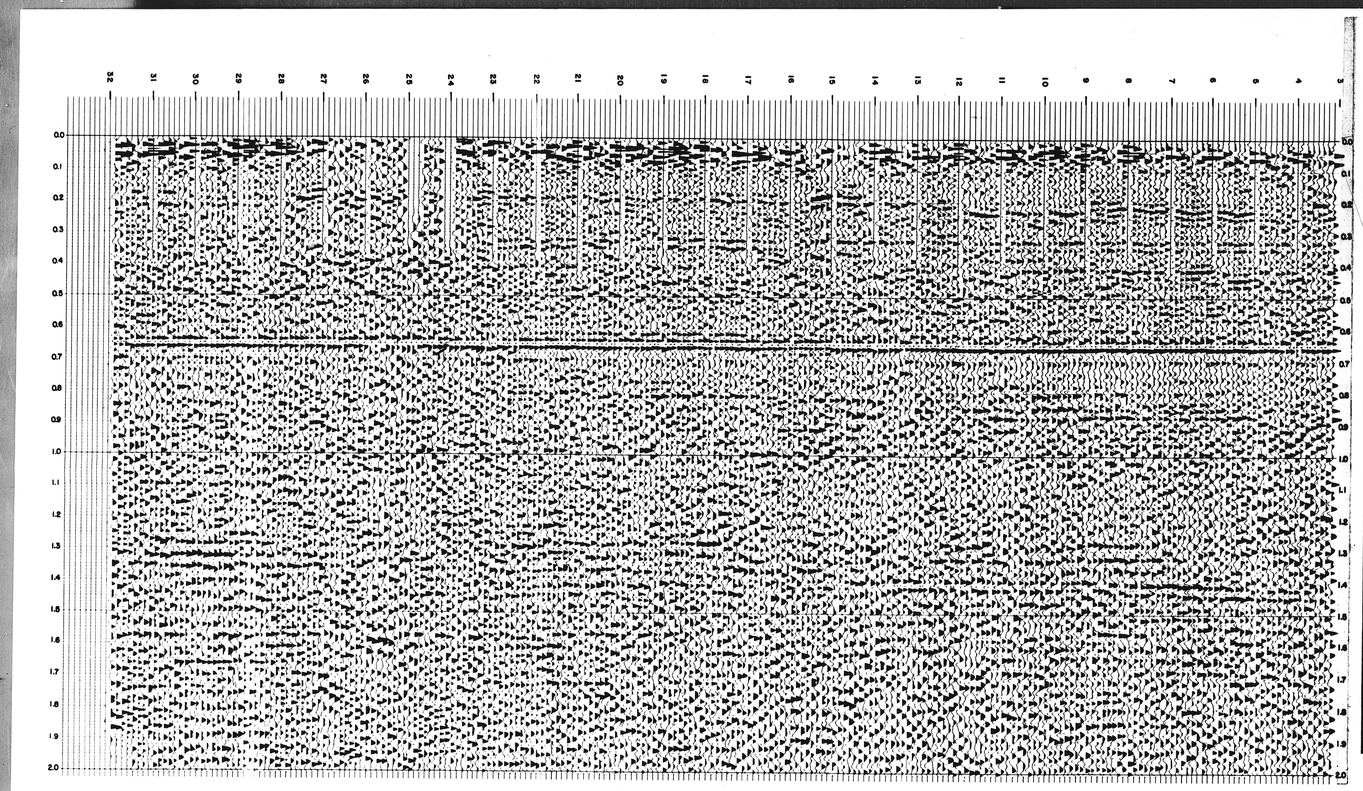
	DIGITAL	ANALOG
RECORDING INSTRUMENTS		
TAPE	X 9 TRACK 21 TRACK FORMAT HD DD BIAS	RECORD SS Hz SS Hz REC REC ST GAIN
GAIN		
FIELD FILTER X	HIGH OUT	HIGH
SWEEP FREQ	LOW 18	LOW

DIGITAL PROCESSING

PROCESS	SEQ	TYPE	OPERATION LENGTH	WINDOW
VIBROSEIS CORRELATION				
RESAMPLE				
NMO	5			
DECONVOLUTION				
FILTER (CONV)				
FILTER (M.G.)	4,10	B.P.	320 /88	0-2000
DMPX	1			
STATIC	8	FLAT		
RESIDUAL NMO				
TRACE GATHER				
RE STATIC				
PHASE ALIGNMENT				
CORRELATION ALIGNMENT				
STACK	9			
TRACE SCALE	12	T.V.		
EQUALIZE	5,11		RM=2200	200-1500
DISPLAY PAPER	6			
DISPLAY FILM	13			
DIGITAL AGC	2			400
MUTE	7			

DATE MAY. 9 /73. DATUM

19-C8-06-6:-17



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19-360.13

SEFEL J. & ASSOCIATES
DATA PROCESSING CONSULTANTS

NORMAN WELLS
PROSPECT

WESTERN DECALTA PETROLEUM LTD
CLIENT

2 — LINE No. — DIRECTION

DATA PREPARATION BY: SEFEL J. & ASSOCIATES
PARAMETER SELECTION BY: WESTERN DECALTA
RECORDED BY: NORTHERN GEOPHYSICAL LTD

RAW		SPREAD LENGTH	1320-80-40-1320
NMO			
STACKED (MIGRATION)	X	CDP INTERVAL	110
STACKED STRUCTURAL		G.P. INTERVAL	4.160
VERT. DEFLECTION		RECORD LENGTH	2.000
VERT. STRUCTURAL		SAMPLE INT.	.4
TRACE GATHER		FOLD	500%

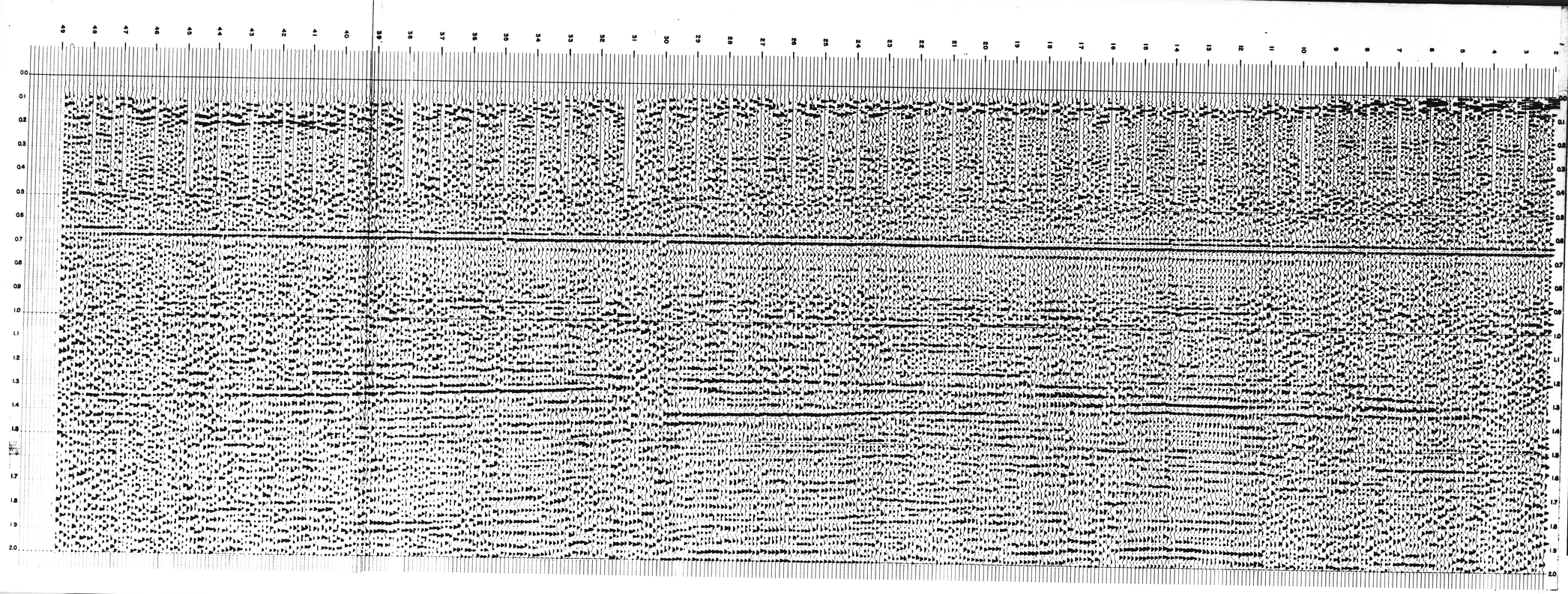
RECORDING INSTRUMENTS	DIGITAL		ANALOG	
TAPE	X	9 TRACK 21 TRACK FORMAT		TELEMET SIE — FM SIE — PM
GAIN		FIXED AGC BINARY		VGC AGC ST. BAIN
FIELD FILTER	X	OUT		
SWEEP FREQ		LOW 16		LOW

DIGITAL PROCESSING

PROCESS	SEQ	TYPE	OPERATION LENGTH	WINDOW
VIBROSEIS CORRELATION				
RESAMPLE				
NMO	3			
DECONVOLUTION				
FILTER (CONV)				
FILTER (M.G.)	4,10	B P	320 $^{16}/_{58}$	0 - 2000
DMPX	1			
STATIC	8	FLAT		
RESIDUAL NMO				
TRACE GATHER				
RE STATIC				
PHASE ALIGNMENT				
CORRELATION ALIGNMENT				
STACK	9			
TRACE SCALE	12	T V		
EQUALIZE	5,11		RM+2200	200-1500
DISPLAY PAPER	6			
DISPLAY FILM	13			
DIGITAL AGC	2			400
MUTE	7			

DATE: MAY 9 / 73 — DATUM — CDP VELOCITY

19-05-06-51-12



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SEFEL J. & ASSOCIATES
DATA PROCESSING CONSULTANTS

NORMAN WELLS
PROSPECT
WESTERN DECALTA PETROLEUM LTD
CLIENT

LINE NO. DIRECTION

DATA PREPARATION BY: SEFEL J. & ASSOCIATES
PARAMETER SELECTION BY: WESTERN DECALTA
RECORDED BY: NORTHERN GEOPHYSICAL LTD

RAW		SPREAD LENGTH	1320-110-110-1320
MIX			
STACKED ISOCHRON	X	SR INTERVAL	110'
STACKED STRUCTURAL		S-P INTERVAL	440'
MIG. ISOCHRON		RECORD LENGTH	2.000
MIG. STRUCTURAL		SAMPLE INT.	4
TRACE GATHER		FOLD	1100%

RECORDING INSTRUMENTS	DIGITAL	ANALOG
TAPE	X 9 TRACK 1 TRACK FORMAT	TELEDYNE SO SP SO TB
GAIN	FIXED PROG. BINARY	FIXED PROG. AUTO. SP. GAIN
FIELD FILTER	X IN OUT	IN
SWEEP FREQ	LOW 16	LOW

DIGITAL PROCESSING

PROCESS	SEQ	TYPE	OPERATION LENGTH	WINDOW
VIBROSEIS CORRELATION				
RESAMPLE				
NMO	3			
DECONVOLUTION				
FILTER (CONV)				
FILTER (M.G.)	4,10	B P	32Ø/68	0-2000
DMPX	1			
STATIC	8	FLAT		
RESIDUAL NMO				
TRACE GATHER				
RE STATIC				
PHASE ALIGNMENT				
CORRELATION ALIGNMENT				
STACK	9			
TRACE SCALE	12	T V		
EQUALIZE	5,6		RM=2200	200-1500
DISPLAY PAPER	6			
DISPLAY FILM	13			
DIGITAL AGC	2			400
MUTE	7			

DATE MAY 8/73 | DATUM | CONST. VELOCITY

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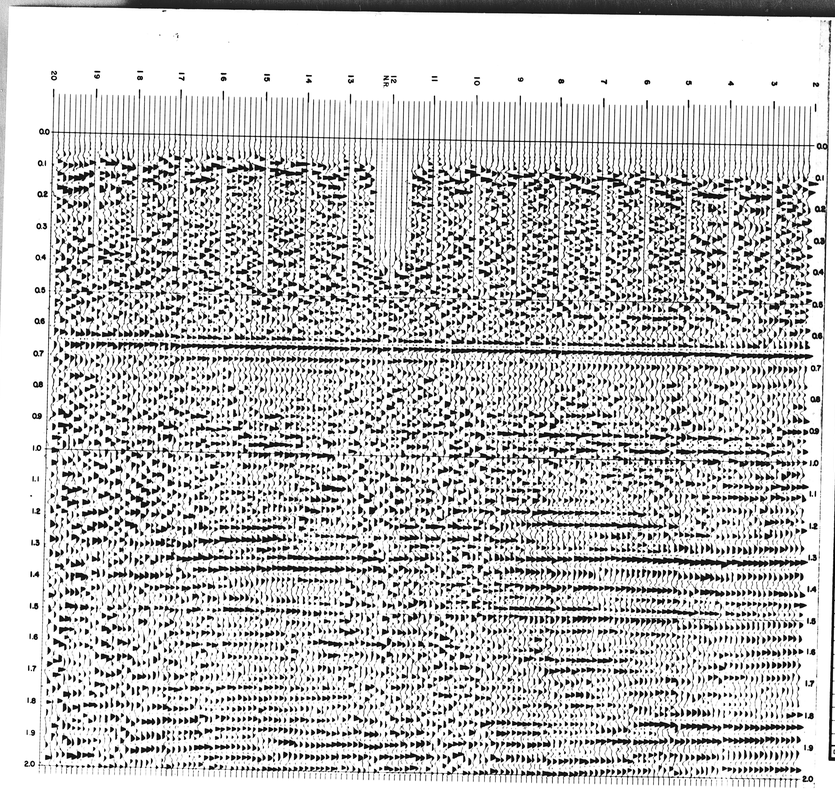
19-06-06-51-15



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19-360-S

SEFEL J. & ASSOCIATES
DATA PROCESSING CONSULTANTS

PROSPECT: NORMAN WELLS

CLIENT: WESTERN DECALTA PETROLEUM LTD.

LINE No. 4 — DIRECTION →

DATA PREPARATION BY: SEFEL J. & ASSOCIATES

PARAMETER SELECTION BY: WESTERN DECALTA

RECORDED BY: NORTHERN GEOPHYSICAL LTD

RAW		SPREAD LENGTH	1320-110-80-1320
MIG			
STACKED ISOCHRON	X	GR. INTERVAL	110
STACKED STRUCTURAL		S.P. INTERVAL	440
FINAL ISOCHRON		RECORD LENGTH	2000
FINAL STRUCTURAL		SAMPLE INT.	2
TRACE GATHER		FOLD	300%

RECORDING INSTRUMENTS	DIGITAL		ANALOG	
TAPE	X	9 TRACK 21 TRACK FORMAT		TRF/MUX SS - MM SS - FM
GAIN		FIXED PROG. BINARY		PROG FIXED S.P. GAIN
FIELD FILTER	X	HI OUT	HI	
SWEEP FREQ		LOW 16	LOW	

DIGITAL PROCESSING

PROCESS	SEQ	TYPE	OPERATION LENGTH	WINDOW
VIBROSEIS CORRELATION				
RESAMPLE				
NMO	3			
DECONVOLUTION				
FILTER (CONV)				
FILTER (M.G.)	4,10	B.P	320/98	0-2000
DMPX	1			
STATIC	8	FLAT		
RESIDUAL NMO				
TRACE GATHER				
RE STATIC				
PHASE ALIGNMENT				
CORRELATION ALIGNMENT				
STACK	9			
TRACE SCALE	12	T V		
EQUALIZE	5,11		RM=2200	200-1500
DISPLAY PAPER	6			
DISPLAY FILM	13			
DIGITAL AGC	2			400
MUTE	7			

DATE MAY 9/73 | DATUM | CONST. VELOCITY