MAR 19950001: OBED

Received date: Jan 17, 1995

Public release date: Jan 18, 1996

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APPENDIX I

To the letter dated: January 13, 1995

Copies of Luscar Ltd. invoices and technical reports including drillhole location map.

Metallic and Industrial Minerals
Permit Numbers: 9393030068 to 9393030070 inclusive.

TELEPHONE : (403) 420-5810
TELEX : 037-2484

LEXCO TESTING LTD.

1600 OXFORD TOWER
10235-101 STREET
EDMONTON, ALBERTA
T5J 3G1

PINTO CREEK TILL AND BEDROCK CUTTING SAMPLES

HOLE #	LITHOLOGY SAMPLED	INTERVAL SAMPLED
94-13A	TILL	O' - 14.0'
94-13A	BEDROCK	19.0' - 29.0'
94-12	TILL	0' - 7.0'
94-~~08~~-09	TILL	0' - 4.5'
94-06	TILL	0' - 14.0'
~~94-05C ?~~	~~TILL~~	~~0' - 7.0'~~ ?
94-01	TILL	0' - 7.0'

Rge. 25 | Rge. 24 | Rge. 23, W.5M.

Twp. 55

Twp. 54

Twp. 53

Twp. 52

9393030068

9393030069

Plante Creek

Apetowun Creek

Gorge Creek

Rooster Creek

Baseline Creek

Canyon Creek

ATHABASCA RIVER

C. N. R.

16

Rge. 25 | Rge. 24 | Rge. 23, W.5M.

LEGEND:

METALLIC/MINERAL

Miles 1 0 1 2 Miles

kms 1 0 1 2 3 4 kms

LUSCAR LTD.

OBED MOUNTAIN COAL

METALLIC AND INDUSTRIAL MINERALS PERMIT

SCALE	DATE	DRAWING No
As shown	94-04-12	LLG.400/PH.9D

Rge. 2 | Rge. 1, W.6M. | Rge. 28 | Rge. 27, W.5M. | Rge. 26 | Rge. 25

Twp. 55

Twp. 54

Twp. 53

Twp. 52

9393030070

WILLMORE WILDERNESS PROVINCIAL PARK

WILLIAM A SWITZER PROVINCIAL PARK

SIXTH MERIDIAN

Ukhland River

Wildcat Creek

Hightower Creek

Pinto Creek

Petite Lake

Gregg Lake

Fourteenth Base Line

Mulcahy Creek

Collie Creek

Doctor Creek

Twelve Mile Creek

Jonas Creek

Hortons Creek

Tetige Creek

ALBERTA RESOURCES (C. N. R.) WILDHAY RIVER

WILDHAY RIVER

40

PINTO CREEK

LEXCO TESTING

PLORATION PROGRAM

CE-10-92

SCALE 1:50,000

94-04
94-03
94-02
94-01
93-02
93-04A
93-01/94-05C
93-04
93-03
94-06
93-08
93-07/94-16C
93-05
93-06
94-08
94-07
94-10
94-09
94-12B
93-09
94-15
94-14
94-13A

Twp 54 R 2 W 6
Twp 54 R 1 W 6
Twp 53 R 2 W 6
Twp 53 R 1 W 6

Hanlan
ALBERTA RESOURCES
(CANADIAN NATIONAL)
Pinto Creek
Teltee Creek
Whitemud Creek
Beaverdam Creek
NATIONAL
PARK

● 1993 COMPLETED DRILLHOLES

■ 1994 COMPLETED DRILLHOLES

Obed
MOUNTAIN COAL LTD.

April 21, 1994

Jack D. McCleary
President
Troymin Resources Ltd.

Dear Jack,

The following is a itemized list of expenditures incurred on the mineral leases presently held by Luscar Ltd.

1994	Pinto Creek drill program Till samples taken	$51,500
	Obed South drill and core program Till and clay samples taken	$47,000
1993	Inland Cement Bulk Sand Sample Contract screening	$ 9,900
	Lafarge Cement Kamloops bulk clay Trucking and loading	$ 1,631
	Pinto Creek drill program Till and bedrock samples	$27,071
	Obed Southdrill program Bedrock samples	$57,960
	Alberta Geological Survey Mineral analysis	$11,200
	Total expences	**$206,262.50**
	Conaco Indicator Mineral Processing	569.00
	C.F. Minerals Processing & analysis	374.50
		207,205.50

Sincerely,

Ron Ronaghan
Senior Mine Geologist

P. O. Bag Service 4000, Hinton, Alberta, Canada T7V 1V8 Phone: (403) 865-8600 • Fax: (403) 865-8630

1600 OXFORD TOWER
10235 - 101 STREET.
EDMONTON. ALBERTA.
CANADA T5J 3G1
PHONE: (403) 420-5810
TELEX: 037-2484
FAX: (403) 420-5878

April 5, 1994

Exploration Program - Pinto Creek 1994

DURATION of PROGRAM: March 21 to April 21

COST BREAKDOWN:

The program is based upon the assumptions that the average hole depth for the 28 remaining holes is 60 metres, and that the drill rate is 85 metres/day, for a total of 20 drill days.

The estimated 1994 costs for this program are:

20 drill days @ $1800/day	$36,000
Mobilization	4,000
Survey	2,000
Weldwood Road Use Agreement	1,500
Geological Supervision 20 days @ $400/day	8,000
TOTAL	$51,500

Development Drill Program - Obed Mountain Coal 1994

DURATION of PROGRAM: April 25 to May 12
July 5 to July 18

COST BREAKDOWN:

The estimated 1994 costs for this program are:

20 drill days @ $1600/day (no geophysical logging of holes)	$32,000
Mobilization	3,000
Geological Supervision 20 days @ $600/day	12,000
TOTAL	$47,000

Gary C. Johnston, P.Geol.
[redacted]
Chief Geologist, Luscar Ltd.

Typewriter tab stops

PRINTED IN CANADA

PRODUCT 105-2 Available from NEBS Ltd., Midland, ON L4R 4V9
Toll Free 1+800-461-7572/In Ontario 1+800-461-7531

Fold at (>) to fit # 771 DU-O-VUE Envelope.

CONTRACTING

WEST CENTRAL [redacted] LTD.
Box 1375
HINTON, ALBERTA T0E 1B0

Phone 865-3000

M361994

№ 1684

INVOICE DATE: Oct 25/93
SALESPERSON:
SHIP TO:

APPROVED FOR PAY
DATE Oct 26/93
6920-0519

TO OBED Mountain Coal

ENTERED W.B.
OCT 27 1993

APPROVED BY

YOUR ORDER NO.	DATE SHIPPED	SHIPPED VIA	F.O.B. POINT	TERMS

QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
	MCB + DMCB	2800 00	
	Screening ½" - Sandy Clay		$ 9,900 cost of producing sand sample
	35½ Hrs AT $200.00 per Hr	200 00	7178
		1.50	
	Screening 2" - 10 Hrs AT $300.00 per Hr (for mine road use)	300 00	3000 00
			13,700 00
		6.5%	903 00
	G.S.T. # R105 [illegible] 566		$ 13,803 00
	P.O. M361994		
	P.R. R03425		

OBED ACCOUNTING
RECEIVED
OCT 25 1993

EXTENDED
APPROVED

NOV 17 1993

ENTERED D
OCT 28 1993

[redacted]

ORIGINAL

Thank You

Acco

771 - Invoice Envelope
Build Sample (post-use Thin)
(Not enough for test-run must produce more in span)

Clay Bulk Sample Lafarge John Wang.

Mine Costs:

Cat Trucks	10 hr.	540 BCM.
Loader 988	10 hr.	

Total cost $1631.6

Bulk sample of 540 BCM was taken late last fall for Lafarge - Kamloops. Weather did not permit sample to be shipped last year (frozen). Will be shipped in late Spring 1994

[PRR171] VOLUME AND HOURS RPT FOR 93/Jan/01 TO 93/Dec/31
ACTIVITY HAUL - HAULING

MATERIAL GROUP	MATERIAL	FROM LOCATION	TO LOCATION	HOURS	CYCLES	CYCLE CONTAINER	VOLUME	CYCLE VOLUME
SUPM	GR	UPPER	ROADS	58.00	139	LOAD	1,390.00	BCM
	MUD	MAINPOND		6.00	42	LOAD	.00	BCM
	MUD	MAINPOND	MAINPOND	35.50	183	LOAD	.00	BCM
	MUD	N1	N1	16.00	74	LOAD	.00	BCM
	MUD	R3	PONDB	51.00	226	LOAD	2,565.00	BCM
	MUD	R3	R1	4.00	31	LOAD	855.00	BCM
	MUD	R3	R3	4.00	23	LOAD	.00	BCM
	MUD	R4	PONDA	7.00	36	LOAD	1,620.00	BCM
	MUD	R5		3.00	18	LOAD	.00	BCM
	MUD	ROADS	MAINPOND	9.50	48	LOAD	2,160.00	BCM
	MUD	ROADS	PONDA	1.50	14	LOAD	630.00	BCM
	MUD	ROADS	PONDB	29.00	157	LOAD	7,065.00	BCM
	SNOW	YARD		4.00	0	LOAD	.00	BCM
TOTAL FOR SUPM				636.00	2,240		37,340.00	
WAST	CLAY	R4	PLANT	10.00	54	LOAD	540.00	BCM
	IB	G12		37.00	303	LOAD	13,635.00	BCM
	IB	G12	ACC6	126.00	523	LOAD	23,535.00	BCM
	IB	G12	ACCESS	77.00	553	LOAD	24,885.00	BCM
	IB	G12	B10	38.50	126	LOAD	5,670.00	BCM
	IB	G12	G12	223.00	1,738	LOAD	78,210.00	BCM
	IB	G12	G13	67.50	182	LOAD	8,190.00	BCM
	IB	G12	G5	10.50	40	LOAD	1,800.00	BCM
	IB	G12	G6	57.00	543	LOAD	24,435.00	BCM
	IB	G12	G7	280.00	2,464	LOAD	110,880.00	BCM
	IB	G12	PONDA	31.50	149	LOAD	6,705.00	BCM

[PRR171]

VOLUME AND HOURS RPT FOR 93/Jan/01 TO 93/Dec/31
ACTIVITY LOAD - LOADING

MATERIAL GROUP	MATERIAL	FROM LOCATION	TO LOCATION	HOURS	CYCLES	CYCLE CONTAINER	VOLUME	CYCLE VOLUME
SUPM	MUD	R3		18.50	0	BUCKET	3,420.00	BCM
	MUD	R4		.00	0	LOAD	1,620.00	BCM
	MUD	R5		2.00	18	LOAD	.00	BCM
	MUD	ROADS		18.50	132	BUCKET	9,855.00	BCM
	MUD	SHOP		6.00	40	BUCKET	.00	BCM
	SNOW	ACCESS		4.50	47	BUCKET	.00	BCM
	SNOW	ROADS		2.00	0	BUCKET	.00	BCM
	SNOW	YARD		.00	0	LOAD	.00	BCM
TOTAL FOR SUPM				389.00	938		37,340.00	
WAST	CLAY	R4		10.00	0	LOAD	540.00	BCM
	IB	G12		748.00	4,506	LOAD	525,330.00	BCM
	IB	G13		5.50	0	BUCKET	.00	BCM
	IB	G6		3.00	0	BUCKET	1,575.00	BCM
	IB	G7		667.50	2,908	LOAD	446,940.00	BCM
	IB	N1		13.50	0	LOAD	22,230.00	BCM
	IB	R2		11.00	54	LOAD	9,945.00	BCM
	IB	R3		1,573.50	8,305	LOAD	1,121,976.00	BCM
	IB	R4		402.50	1,220	LOAD	219,729.00	BCM
	IB	R5		2.00	0	LOAD	.00	BCM
	IB	RG3		.00	0	LOAD	405.00	BCM
	IB	ROADS		3.00	0	BUCKET	.00	BCM
	IBR	G12		27.00	74	LOAD	28,710.00	BCM
	IBR	G7		30.00	372	LOAD	16,470.00	BCM
	IBR	R1		7.00	0	LOAD	3,240.00	BCM
	IBR	R3		16.00	216	LOAD	23,985.00	BCM

2

106 LEXCO TESTING
MONTHLY DRILL INVOICE

CONTRACTOR Lexco RIG TYPE LEX #106 DATE February 1993

AREA Pinto Creek DRILLER Roger Benfeld HELPER Kevin Lahner

TIME PERIOD: FROM Feb 9 '93 TO Feb 25 '93

TOTAL TIME (Hrs)	CHARGEABLE TIME (Hrs)	TOTAL FOOTAGE	TOTAL CONSUMABLES		TOTAL FUEL Gas	TOTAL FUEL Diesel
Mobilization	15		CASING	220	1445 litres	1830 litres
Drilling	112	3060	BITS	8		
			Mud			
			Bran			
			Cement			
			Foam			

PURCHASES

ITEM	VENDOR	COST	DESCRIPTION
Drill Bits		$1,687	Bits Used :
			1 X 4.75 Rock
			6 X 4.75 Insert
			1 X 4.75 Chris Bit
Diesel @ $0.32/l		$585	2 X 4.75 Rock
Gasoline @ $0.50/l		$725	
Line	Baker: $ 50/hr	($941.60	2 X 4.75 Insert
	Palling:$160/hr	($449.40	
Clearing	Contract Cat	$1,391	
Casing		$662	5 9/16 Plastic
Weldwood Road Useage		$1444.50	
Geophysical Logging	[redacted] Contractor	$3,237	
Geological Supervision		$5,400	$450/day for 12 days
Subsistence ($55/day)		$2,420	
Unit Charge Out		$9,520	112 hrs @ $85/hr (excludes $30/hr for logging)
TOTAL :		$27,071.50	($8.85 / foot)

OBED MOUNTAIN COAL LTD
MINERAL ANALYSIS
YEAR ENDED 1993

VENDOR	DATE	AMOUNT	EXPLANATION
LEXCO TESTING	MARCH 93	$6,750.00	TEST HOLES
LEXCO TESTING	APRIL 93	$29,340.00	TEST HOLES
LEXCO TESTING	JUNE 93	$6,480.00	TEST HOLES
LEXCO TESTING	JULY 93	15,390.00	TEST HOLES
	SUBTOTOAL	$57,960.00	
ALBERTA RESEARCH	JULY 93	$11,200.00	MINERAL ANALYSIS
	SUBTOTOAL	$11,200.00	
	TOTAL	$69,160.00	

103 LEXCO TESTING

MONTHLY DRILL SUMMARY

CONTRACTOR Lexco RIG TYPE LEX #103 DATE March '93
AREA OBED DRILLER Carl Moore HELPER Don Ofner

TIME PERIOD: FROM March 26 TO March 31

TOTAL TIME (Hrs)	CHARGEABLE TIME (Hrs)	TOTAL FOOTAGE	TOTAL CONSUMABLES	TOTAL FUEL Gas	TOTAL FUEL Diesel
40	37.5	1240	CASING 40 ft.	100 litres	810 litres
(test holes)	(22.5 hrs)	(500')			
(expl. holes)	(15 hrs)	(740')	BITS 1		
			Mud		
			Bran		
			Cement		
			Foam		

PURCHASES

ITEM	VENDOR	COST	DESCRIPTION
OBED Costs:			
			Bits: 1 x 4.75 Insert
Consumables:			Casing: 40'x 6" steel
Mobilization Costs from Coal Valley to OBED Minesite invoiced directly to minesite.			
Drilling:		$6,750	37.5 hours @ ~~$180/hour~~
TOTAL:		$6,750	

ENTERED E.P. MAY 11 1993

APPROVED FOR PAYMENT
DATE Thurs 6/93
ACCT. # [redacted]
APPROVED BY [redacted]

OBED ACCOUNTING RECEIVED MAY 10 1993

APPROVED:

CK. NO. 7030

103 LEXCO TESTING

MONTHLY DRILL SUMMARY

CONTRACTOR Lexco RIG TYPE LEX #103 DATE April '93

AREA OBED DRILLER Carl Moore HELPER Don Ofner

TIME PERIOD: FROM April 1 TO April 29

TOTAL TIME (Hrs)	CHARGEABLE TIME (Hrs)	TOTAL FOOTAGE	TOTAL CONSUMABLES	TOTAL FUEL	
				Gas	Diesel
166	163	9480	CASING 460 ft.	1150 litres	5020 litres
			BITS 10		
			Mud		
			Bran		
			Cement		
			Foam	5 gal	

PURCHASES

ITEM	VENDOR	COST	DESCRIPTION
OBED Costs:			
Consumables:			
			Bits: 9 x 4.75 Insert, 1 x 6.75 Button
			Casing: 460'x 5 9/16" plastic
Drilling:		$29,340	163 hours @ $180/hour
TOTAL:		$29,340	

APPROVED FOR PAYMENT
DATE [redacted]
ACCT. # [redacted]
APPROVED BY: [redacted]

CK. NO 2020
MAY 17 1993

ENTERED E.P.
MAY 11 1993

M 361076
$ value
records to
rec'd.
03/07/95

103 LEXCO TESTING

MONTHLY DRILL SUMMARY

CONTRACTOR Lexco RIG TYPE LEX #103 DATE June ,93

AREA OBED DRILLER Carl Moore HELPER Don Ofner

TIME PERIOD: FROM June 1 TO June 10

TOTAL TIME (Hrs)	CHARGEABLE TIME (Hrs)	TOTAL FOOTAGE	TOTAL CONSUMABLES	TOTAL FUEL	
				Gas	Diesel
80	36	155 drill 30 core 660 Pit Holes		237 litres	500 litres
		845 feet	Bran		
			Cement		
			Foam		

PURCHASES

ITEM	VENDOR	COST	DESCRIPTION
OBED Costs:	ENTERED JUL 15 93 CK. NO. 7701		OBED ACCOUNTING RECEIVED JUL 12 1993 [redacted]
LEXCO Costs:		JUL 19 1993	EXTENDED APPROVED 7/12/93
1 neoprene & 4 motor mounts	Track Industries	$552.50	Maintenance on drive for unit #6910
Coverall Rental	1 Hour Cleaners	$34.34	Monthly Rental for Coveralls
1 pail degreaser	Acklands	$55.00	Steam cleaning #6910 in preparation for compressor mounting
Track Splice	Track Industries	$130.06	#6911 Track Repair
Drilling:		$6,480	36 hours @ $180/hour
TOTAL:		$6,480	[redacted]

M36/076

103 LEXCO TESTING

MONTHLY DRILL SUMMARY

CONTRACTOR Lexco RIG TYPE LEX #103 DATE July . 93

AREA OBED DRILLER Carl Moore HELPER Don Ofner

TIME PERIOD: FROM July 2 TO July 23

TOTAL TIME (Hrs)	CHARGEABLE TIME (Hrs)	TOTAL FOOTAGE	TOTAL CONSUMABLES	TOTAL FUEL	
				Gas	Diesel
165	85.5	Expl. 837	Casing 6 5/8 steel 80 ft	738 litres	4051 litres
		Prod. 1700	Bits 7 7/8 Rock x 1		
			Mud		
			Bran		
			Cement		
			Foam		

PURCHASES

ITEM	VENDOR	COST	DESCRIPTION
OBED Costs:	Steve's Trucking	Will invoice in August	Standby time while rig drills hole for Pit Operations on July 23rd
Lexco Costs:			Hydraulic Pump & Flange
			Breakout Wrench Air Rams
OBED ACCOUNTING RECEIVED			Pull Down Cables
AUG - 9 1993	OK AR		Installation of Engine and Compressor
EXTENDED 2			
APPROVED			
		$15,390	85.5+ hours @ $180/hour
APPROVED FOR PAYMENT		$15,390	

DATE Aug 11/93

ACCT. # [redacted]

APPROVED BY [redacted]

[redacted]

7474

OK NO

AUG 16 1993

ENTERED D

AUG 11 1993

ALBERTA RESEARCH COUNCIL

PO Box 8330
Edmonton, Alberta
Canada T6H 5X2

U22293

Invoice

Customer #: 10150

08360

INVOICE TO

OBED MOUNTAIN COAL LTD.
P.O. BAG SERVICES 4000
HINTON, ALBERTA
T7V 1V8

CK. NO. 88111
AUG 23 1993

ACCOUNTS PAYABLE

OBED MOUNTAIN COAL LTD.
P.O. BAG SERVICES 4000
HINTON, ALBERTA
T7V 1V8

MR. RON RONAGHAN

DATE	PERIOD COVERED	CONTACT AND TELEPHONE NUMBER	TERMS
07/30/93		STELLA SHIU, (403) 450-5167	NET 30 DAYS

CONTRACT/PURCHASE ORDER NUMBER: M531077

DEPARTMENT: GEOLOGICAL SURVEY

DESCRIPTION	CODE	AMOUNT
RE: FOR THE INDUSTRIAL MINERAL ANALYSIS ON CLAY AND SANDSTONE SAMPLES	- 0044 - 0044 - 0044	
TOTAL CHARGES	4035-1600 0044	11200.00
G.S.T. Registration #: R 124072513 Amount of G.S.T. at 7% is:		11200.00 ~~784.00~~

ENTERED E.P.
AUG 19 1993

APPROVED FOR PAYMENT
DATE Aug 11/93
[redacted]

OBED ACCOUNTING RECEIVED
AUG 09 1993

EXTENDED
APPROVED

AFE 93001
Unit 1900
22919301
P.O. 330799

8/17 per Harvard at OB reminds Resent to change the GST rate & he will do an internal cr. [illegible]

TERMS: NET 30 DAYS (INTEREST WILL BE CHARGED ON ALL OVERDUE ACCOUNTS).

INVOICE TOTAL PLEASE PAY THIS AMOUNT ~~11984.00~~

Canadian Dollars

Please make all cheques payable in CANADIAN FUNDS to Alberta Research Council
Box 8330, Edmonton, Alberta T6H 5X2

[redacted] APPROVED BY

DATE

ENTERED W.B.
AUG 18 1993

08360

CONTROL NUMBER
209009

Invoice

C.F. MINERAL RESEARCH LTD
1677 POWICK ROAD
KELOWNA, BRITISH COLUMBIA
CANADA V1X 4L1

TEL. (604) 763-1815
(604) 860-8525
FAX NO. (604) 862-9435

October 28, 1993

OBED MOUNTAIN COAL LTD.
OBED MINESITE
P.O. BAG SERVICE 4000
HINTON, ALBERTA T7V 1V8

Attention: Ron Ronaghan

Dear Sir:

Enclosed please find original copy of invoice for processing your sample.

Sincerely,

[redacted]

Eva Horak/C.F.M.

Enclosure

TERTIARY GRAVEL DEPOSIT. (FIRE TOWER)
Gravel sample analysis - no indicator minerals within gravel.

1530799

C.F. MINERAL RESEARCH LTD
1677 POWICK ROAD
KELOWNA, BRITISH COLUMBIA
CANADA V1X 4L1

TEL. (604)763-1815
(604)860-8525
FAX NO. (604)862-9435

October 28, 1993

INVOICE NO: 93-136
Please quote invoice number when making payment

OBED MOUNTAIN COAL LTD.
OBED MINESITE
P.O. BAG SERVICE 4000
HINTON, ALBERTA T7V 1V8

ENTERED D
NOV 03 1993

Attention: Ron Ronaghan

INVOICE RE: PROCESSING HEAVY MINERAL SAMPLE

Number of samples: 1

C.F.M.93-256

	$
Processing and analysing 1 heavy mineral sample	
Total	$350.00
7% G.S.T. (R 100 905 777)	24.50
TOTAL COST	$374.50

OBED ACCOUNTING
RECEIVED
NOV - 1 1993
EX.
APPROVED

Annie

G.S.T.

CK. NO. 8998
NOV 22 1993

CHUCK FIPKE

CF

C.F. MINERAL RESEARCH LIMITED
1677 POWICK ROAD
KELOWNA, BRITISH COLUMBIA
CANADA V1X 4L1

TEL. (604) 860-8525
(604) 763-1815
FAX (604) 861-3901

August 20. 1993

OBED MOUNTAIN COAL LTD.
OBED MINESITE
P.O. BAG SERVICE 4000
HINTON. ALBERTA
T7V 1V8

Attention: Ron Ronaghan

Dear Sir:

Enclosed please find copies of documentation pertaining to your sample that we recently processed. Also included is a brief explanation of fractions that we produced.

Sincerely,

[redacted]

Eva Horak/C.F.M.

C.F.MINERAL RESEARCH LTD.
263 LAKE AVENUE
KELOWNA. BRITISH COLUMBIA
CANADA V1Y 5W6

TEL(604)763-1815
(604)860-8525

OBED MOUNTAIN COAL LTD.
PROJECT: GRAVEL ANALYSIS

C.F.M. 93-256

21-MAY-1993

SAMPLE NUMBER	ORIGINAL WEIGHT (KG)	FRACTION	WEIGHT (GMS)
OBED	27.3		
OBED		-60IM	0.12
OBED		-60IP	10.53
OBED		-60IN	169.08
OBED		-60HM	0.25
OBED		-60HP	54.29
OBED		-60HPN	25.27
OBED		-60HNN	18.01

ACTLABS

ACTIVATION LABORATORIES LTD

WORK ORDER # _____ DATE REC'D _____ P.O. # _____
PROJECT # _____ DATE SHIPPED May 25, 1993 SHIPPED VIA PUROLATOR
NO. OF CARTONS 1

GEOCHEMICAL LABORATORY INSTRUCTION SHEET

COPY OF RESULTS/INVOICE TO:	COPY TO:
OBED MOUNTAIN COAL LTD.	C.F. MINERAL RESEARCH
OBED MINESITE	1677 Powick Rd.
P.O. BAG SERVICE 4000	KELOWNA, BC V1X 4L1
HINTON, ALBERTA T7V 1V8	
FAX: (403) 865-8630	FAX: (604) 861-3901
WILL YOU REQUIRE YOUR RESULTS BY? MODEM, COURIER, MAIL, DISKETTE, FAX	

PACKAGE 1D - Au+34 Rock or Soil 30 g
PACKAGE 2A - Humus "Au+33"
PACKAGE 2B - Vegetation "Au+34"
PACKAGE 3A - Heavy Minerals "Au+33"
PACKAGE 4B - Whole Rock Analysis Option 1 & Option 2
PACKAGE 4E - Total Identification (52 Elements)
OTHER PACKAGES AVAILABLE IN PRICE LIST

NO. OF SAMPLES	SAMPLE TYPE	LIST SAMPLE NUMBERS OR ATTACH SAMPLE LIST	PACKAGE CODE OR ELEMENTS REQUESTED
1	-60 HNN	OBED (10A)	Au + 33
1	-60 HPN	OBED (11A)	

SAMPLE DISPOSITION	P	R	I
STORE 90 DAYS & RETURN			
STORE 120 DAYS & DISCARD			
RETURN AFTER ANALYSIS			✓
DISCARD AFTER ANALYSIS			

ADDITIONAL INSTRUCTIONS:
Please return both fractions to C.F. Minerals as soon as possible.

P -PULPS, R -REJECTS, I -IRRADIATED SAMPLES

To receive irradiated samples you must supply a valid AECB license.
COARSE REJECTS WILL BE DISCARDED UNLESS OTHERWISE REQUESTED
IF NO INSTRUCTIONS ARE GIVEN ALL SAMPLES WILL BE DISCARDED AFTER 90 DAYS

1336 SANDHILL DRIVE, ANCASTER, ONTARIO, CANADA L9G 4V5 • TEL: 416-648-9611 • FAX: 416-648-9613

C.F. MINERAL RESEARCH LIMITED
263 LAKE AVENUE
KELOWNA, BRITISH COLUMBIA
CANADA V1Y 5W6

TEL. (604) 763-1815
(604) 860-8525

CFM BATCH # : 93-256

CODE	SAMPLE #	VIAL WEIGHT (gms)	CODE	SAMPLE #	VIAL WEIGHT (gms)
10 A	OBED -60 HNN	17.931			
11 A	OBED -60 HPN	25.213			

C.F.MINERAL RESEARCH LTD.
263 LAKE AVENUE
KELOWNA, BRITISH COLUMBIA
CANADA V1Y 5W6

TEL:(604)763-1615
(604)860-8525

OBED MOUNTAIN COAL LTD.
PROJECT: GRAVEL ANALYSIS

C.F.M. 93-256

27-MAY-1993

SAMPLE NUMBER	ORIGINAL WEIGHT (KG)	FRACTION	WEIGHT (GMS)
OBED	27.3		
OBED		-20+60HM	0.15
OBED		-20+60H - IL.	11.50
OBED		-20+60H - PY.CRD	40.47
OBED		-20+60H - D.	34.83
OBED		-60HM	0.25
OBED		-60H - IL.	35.14
OBED		-60+200H - PY.CRD	16.37
OBED		-60H - D.	0.09

Brief explanation of produced fractions:

For heavy mineral processing we sieve sample into -60 fraction which is electromagnetically separated into:

-60HM = heavy, magnetic fraction
-60HP = heavy, paramagnetic fraction
-60HN = heavy, nonmagnetic fraction

Your nonmagnetic fraction was further separated using Barrier separator (stronger current) into:

-60HPN = slightly more magnetic
-60HNN = slightly more nonmagnetic

For diamond indicator processing we electromagnetically separate sample into (for example):

-20+60HM = again heavy, magnetic fraction
-20+60H - IL. = heavy, paramagnetic fraction
-20+60H - PY.CRD = heavy, slightly less paramagnetic fraction
-20+60H - D. = heavy, nonmagnetic fraction

ACTLABS

ACTIVATION LABORATORIES LTD

Invoice No.: 5114
Work Order: 5151
Invoice Date: 07-JUN-93
Date Submitted: 27-MAY-93
Your Reference: LETTER
Account Number: 0012

BED MOUNTAIN COAL LTD.
BED MINESITE
.O. BAG SERVICE 4000
INTON, ALBERTA
7V 1V8

CERTIFICATE OF ANALYSIS

NAA package, elements and detection limits:

AU	5.	PPB	AG	5.	PPM	AS	2.	PPM	BA	200.	PPM
BR	5.	PPM	CA	1.	%	CO	5.	PPM	CR	10.	PPM
CS	2.	PPM	FE	0.02	%	HF	1.	PPM	HG	5.	PPM
IR	50.	PPB	MO	20.	PPM	NA	500.	PPM	NI	200.	PPM
RB	50.	PPM	SB	0.2	PPM	SC	0.1	PPM	SE	20.	PPM
SR	0.2	%	TA	1.	PPM	TH	0.5	PPM	U	0.5	PPM
W	4.	PPM	ZN	200.	PPM	LA	1.	PPM	CE	3.	PPM
ND	10.	PPM	SM	0.1	PPM	EU	0.2	PPM	TB	2.	PPM
YB	0.2	PPM	LU	0.1	PPM						

CERTIFIED BY :

[redacted]

per DR. ERIC L. HOFFMAN

1336 SANDHILL DRIVE, ANCASTER, ONTARIO, CANADA L9G 4V5 • TEL: 416-648-9611 • FAX: 416-648-9613

OBED MOUNTAIN COAL LTD.

INLAND CEMENT BULK SAMPLE TEST RESULTS AND CONCLUSIONS

930 TONNES OF SAND SENT - TO FOLLOW BILL FROM WEST CENTRAL CONTRACTING

INLAND
Cement

Inland Cement Limited
12640 - 156 Street
P.O. Box 3961
Edmonton, Alberta T5L 4P8
Telephone: (403) 420-2573
Fax: (403) 420-2556

April 18, 1995 Ref: 0091

OBED MOUNTAIN COAL LTD.
P.O. Bag Service 4000
Hinton, Alberta
T7V 1V8

Attention: Mr. R.J. Ronaghan

Dear Ron:

I must apologize for my tardy response in submitting a report on your Obed Mountain sand. A wise man one told me that "a promise made is a debt unpaid", well here it is. You will also find some data enclosed on the trial run.

Introduction

Inland Cement Limited is a 725,000 tonne per year clinker cement manufacturing company, located in the North West end of Edmonton, Alberta. We presently run a five component mix design, one of the five raw materials being silica sand. When market demands are favorable Inland operates year around consuming a nominal 40,000 to 50,000 tonne of sand per year, preferably rich in silica but low in total alkali, expressed as a sodium oxide equivalent (Na20).

Early in 1994 Inland was approached concerning a gravel deposit on Obed Mountain property, part of the over burden covering their quarry expansion. As I recall, approximately 13 % of the gravel bed consisted of sand from a very old deposit. Upon analysis of sand samples we found the chemistry quite acceptable and agreed on running a trial burn of a nominal 900 tonne. A comparison analysis of Obed sand with two of our typical sand suppliers is attached, labeled as Appendix 1.

Discussion

At 12:00 hours, October 14, 1994 Inland began using the Obed Mountain sand in the additive silos for chemical correction of mix design and finished with the 930 tonne delivered at 18:00 hours, on October 25th. Based on a nominal 8000 tonne of Roller Mill feed stored in the homogenizing system at the starting point, evaluation of performance could not be considered until 12:00 hours, October 16/94. In fact it was on October 18th before the plant control was shifted off of bottom ash and on to more sand, this change was required to pull down the total alkalis in the clinker. A printout of our typical Roller Mill tonnage and additive rate is attached, identified as

April 18, 1995

Appendix 2 and dated October 13th. Compare this to the following printout, dated Oct. 18th, using Obed Mountain sand, employing the same mix design (Appendix 3). This mix is specific for Sulfate Resistant clinker. Because of the usual sand addition rates, 5 - 7 tonne per hour is typical, we often perceive this mix to be difficult to grind and equally difficult to combine in the kiln where the synthetic hydraulic minerals are formed. This is often a function of a high quartz content in the silica sand, also making it very abrasive. Since we did not have the means to measure the quartz content one cannot be certain how much quartz is associated with the Obed sand, however based on the Roller Mill through put I would not consider the quartz content to be excessive. The Obed sand performed equally well on the Roller Mill as our conventioanal sand. A very small drop in tonnage was recorded with the Obed but this is attributed to the extra 20 tph of limestone on the mill at the time. Long term abrasion properties cannot be determined with this short a run, lasting for eleven days.

As aforementioned, elevated levels of quartz in some silica sands are difficult to combine in the kiln since target fineness cannot be achieved at the Roller Mill. This **was not** the case with the Obed sand. The typical chemical targets were maintained in terms of Lime Saturation Factor, Silica to Alumina ratio and various component chemistry.

Based on the time of year the plant inventory levels in October 1994 were minimal. As a result, the clinker tonnage produced on the kiln on any given day was consumed almost immediately. Although we had some reserves in the bottom of the storage silos the design of the silos is such that the last clinker in is the first out. This being the case we can evaluate the Type 50 cement ground from the clinker made from Obed sand and be fairly confident that any cement ground after October 16th through October 25th was produced with the Obed sand. Appendix 4 is a copy of data reported on silos released for market during the month of October. A review of the data does not indicate any significant changes in quality while on the Obed sand.

Conclusions

Based on the nominal 900 tonne trial run, I would consider the Obed Mountain sand quality to be more than acceptable for the manufacture of Portland cements and therefore a salable commodity. If we compare the relative chemistry as per Appendix 1 you can see that it is a high purity silica sand with total alkalis of 0.99 %, as a Na20 equivalent, less even than the S10 sand we presently use to produce our low alkali products.

We cannot directly evaluate the abrasiveness of the sand but based on the grinding capacity of raw meal through the Roller Mill and no significant process change required to the burning line of the kiln, it does not appear to have a high percentage of quartz. This could be investigated further with analysis by xray diffraction through the U of A, should you be interested in more detail as to the form of silica. All cement manufacturers are cautious of new raw materials and especially of the wear associated with quartz rich silicates and would most likely ask you for more specifics.

April 18, 1995
The quality of the final product was not hindered by the use of Obed sand, all chemical and physical parameters were well within the Canadian Standards Association specifications for Portland cements and well within Inland Cement Internal Standards which are more rigid still.

I trust this will suite your needs Ron. Should further information or detail be required please feel free to contact me at your earliest convenience.

Yours truly,

[redacted]

Robert Rimes
Process Superintendent

cc: R. Cotterill

Silica Sand Comparison Analysis

	Obed Sand	S_{13}	S_{10}
SiO_2	90.98	86.94	88.14
Al_2O_3	5.25	5.93	3.93
Fe_2O_3	1.99	1.70	1.11
CaO	0.25	<0.10	0.35
MgO	0.17	0.45	0.14
SO_3	<0.10	<0.10	0.11
Na_2O	0.15	1.16	0.71
K_2O	1.28	1.33	0.98
L.O.I.	1.75	1.64	0.68
H_2O	0.10	3.88	3.25
Total Alkali	0.99	2.04	1.35

R. Rimes
1995-04-18

Appendix 1.

01	12.11		NML	YNN	4601 CLAY FEED SPEED CONTR	RUI 22
02 4628W	617.	TPH	NML	YNN	PREBLEND LC TO STACKER	RUI 22
03 LTRATIO	21.73	PER	NML	YNN	LONG TERM CLAY RATIO	RUI 22
04 CLAYRAMP	21.89	PC	NML	YNY	clay ratio of whole pile	RUI 22
05 CLAY1CYC	15.73	PER	NML	YYN	FISHER CALC. CLAY SPD RATIO	RUI 22
06 PRB.HICLP	32.0	PC	NML	YYN	FISHER OUTPUT HIGH CLAMP	RUI 22
07 PRB.HICLP	32.0	PC	NML	YYN	FISHER OUTPUT HIGH CLAMP	RUI 22
08 RMFEED	203.16	TPH	NML	YNN	TOTAL RAW MILL FEED	RUI 22
09 6121W	172.61	TPH	NML	YNN	LIMECLAY FEED TO R MILL	RUI 22
10 6122W	19.853	TPH	NML	YNN	LIMESTONE FEED TO R MILL	RUI 22
11 6123W	4.0762	TPH	NML	YNN	SAND FEED TO ROLLER MILL	RUI 22
12 6124W	4.4615	TPH	NML	YNN	IRON FEED TO ROLLER MILL	RUI 22
13 6125W	2.0879	TPH	NML	YNN	RMILL BOTTOM ASH FEED RATIO	RUI 22
14 6133W	0.0103	TPH	URA	YNN	FLYASH FLOW METER	RUI 22
15 6949F	187.91	TPH	NML	YNN	KF1 CORRECTED FEED	RUI 23
16 6955I	206.63	A	NML	YNN	KFEED AIRLIFT BLOWER	RUI 23
17 6954P	25.54	KPA	NML	YNN	KFEED 1 AIRLIFT	RUI 23
18 6950F	3.82	TPH	NML	YNN	KF2 CORRECTED KILN FEED	RUI 23
19 6956I	128.35	A	NML	YNN	KFEED AIRLIFT STANDBY COMP	RUI 23
20 6994P	6.30	KPA	NML	YNN	KFEED 2 AIRLIFT	RUI 23

PF0

7 8 9 - 4 5 6 ,

DONE RIMES 15:13:00 13-OCT-94

Typical Tonnage of conventional raw materials

01	7.40		NML	YNN	4601 CLAY FEED SPEED CONTR	RUI 22
02	4628W	0.	TPH	NML	YNN PREBLEND LC TO STACKER	RUI 22
03	LTRATIO	22.38	PER	NML	YNN LONG TERM CLAY RATIO	RUI 22
04	CLAYRAMP	22.01	PC	NML	YNY clay ratio of whole pile	RUI 22
05	CLAY1CYC	31.29	PER	NML	YYN FISHER CALC. CLAY SPD RATIO	RUI 22
06	PRB.HICLP	32.0	PC	NML	YYN FISHER OUTPUT HIGH CLAMP	RUI 22
07	PRB.HICLP	32.0	PC	NML	YYN FISHER OUTPUT HIGH CLAMP	RUI 22
08	RMFEED	199.47	TPH	NML	YNN TOTAL RAW MILL FEED	RUI 22
09	6121W	149.65	TPH	NML	YNN LIMECLAY FEED TO R MILL	RUI 22
10	6122W	40.830	TPH	NML	YNN LIMESTONE FEED TO R MILL	RUI 22
11	6123W	4.6945	TPH	NML	YNN SAND FEED TO ROLLER MILL	RUI 22
12	6124W	4.5538	TPH	NML	YNN IRON FEED TO ROLLER MILL	RUI 22
13	6125W	0.1319	TPH	NML	YNN RMILL BOTTOM ASH FEED RATIO	RUI 22
14	6133W	0.0103	TPH	URA	YNN FLYASH FLOW METER	RUI 22
15	6949F	185.52	TPH	NML	YNN KF1 CORRECTED FEED	RUI 23
16	6955I	206.52	A	NML	YNN KFEED AIRLIFT BLOWER	RUI 23
17	6954P	25.78	KPA	NML	YNN KFEED 1 AIRLIFT	RUI 23
18	6950F	1.82	TPH	NML	YNN KF2 CORRECTED KILN FEED	RUI 23
19	6956I	2.34	A	NML	YNN KFEED AIRLIFT STANDBY COMP	RUI 23
20	6994P	24.03	KPA	NML	YNN KFEED 2 AIRLIFT	RUI 23

PF0
7 8 9 - 4 5 6 ,

DONE RIMES 16:30:00 18-OCT-94

Typical Tonnage of sand consumed while on Obed Mountain Sand.

CEMDATA 1994																		
						EDMONTON PLANT CEMENT RESULTS												
MONTH																		
LAB TEST NO.		START DATE	FINISH DATE	MILL	SILO	T.ALK	SO3	C3S	1 DA	3 DA	7 DA	28 DAY	BLAINE	+325	F.S.	SET TIME	XPANS	L.O.I.
OCT. 1994, TYPE 50																		
562		1-Oct	2-Oct	H	E2	0.72	2.15	54.67	13.9	24.1	31.1	39.6	4058	5.34	77	129	-0.003	0.64
565		2-Oct	3-Oct	H	J1	0.77	2.18	53.28	14.3	22.1	28.2	39.4	4294	5.63	64	121	0.008	0.73
567		3-Oct	4-Oct	F	F2	0.75	2.36	54.53	14.7	23.4	28.0	38.2	4294	3.03	64	121	0.008	1.42
568		4-Oct	4-Oct	F	F2	0.74	2.36	52.13	14.0	24.1	30.0	41.1	4260	3.59	64	121	0.008	1.27
569		3-Oct	4-Oct	H	J1	0.75	2.20	51.97	16.8	25.3	32.2	42.9	4342	4.43	64	121	0.008	0.68
570		4-Oct	5-Oct	H	H0	0.75	2.25	50.10	14.9	26.1	30.4	40.5	4260	4.54	64	121	0.008	0.70
571		4-Oct	4-Oct	F	E2	0.75	2.31	50.50	15.0	23.0	28.6	41.9	4372	3.17	73	123	0.004	1.20
572		4-Oct	5-Oct	F	E2	0.75	2.37	50.39	15.0	24.4	27.4	37.9	4391	3.48	73	123	0.004	1.21
573		5-Oct	6-Oct	FH	H0	0.74	2.21	50.37	14.9	24.7	28.6	41.6	4294	3.11	73	123	0.004	0.86
574		5-Oct	6-Oct	F	A1	0.77	2.32	52.30	16.4	26.0	31.3	39.8	4309	3.04	73	123	0.004	1.12
575		6-Oct	6-Oct	F	A1	0.79	2.34	54.01	16.8	28.3	32.9	38.6	4260	2.68	73	123	0.004	1.36
576		6-Oct	7-Oct	H	J1	0.73	2.18	51.87	15.7	25.8	34.0	44.6	4309	3.34	77	120	0.008	0.71
577		7-Oct	8-Oct	H	J1	0.75	2.21	52.49	17.6	28.1	33.7	43.8	4342	2.77	77	120	0.008	0.70
580		9-Oct	9-Oct	F	F2	0.71	2.29	51.75	14.4	24.9	29.3	37.8	4193	3.27	77	120	0.008	1.29
581		9-Oct	9-Oct	F	F2	0.75	2.29	51.44	15.6	23.5	28.9	38.7	4227	2.64	77	120	0.008	1.29
582		8-Oct	10-Oct	H	H0	0.74	2.24	51.42	16.7	25.9	31.9	44.5	4178	4.28	77	120	0.008	0.71
583		10-Oct	11-Oct	F	H0	0.74	2.26	51.73	14.5	24.8	28.3	36.3	4211	2.61	83	127	0.001	1.30
584		10-Oct	11-Oct	H	H0	0.75	2.31	50.29	16.6	24.3	30.4	43.8	4279	3.16	83	127	0.001	0.67
585		11-Oct	12-Oct	H	J1	0.73	2.27	51.54	16.2	24.4	31.0	42.6	4245	3.64	83	127	0.001	0.69
586		11-Oct	12-Oct	F	J1	0.76	2.26	51.15	15.2	25.1	28.2	38.6	4260	2.84	83	127	0.001	1.29
587		12-Oct	12-Oct	F	C1	0.76	2.26	51.36	15.0	24.7	28.9	37.8	4279	2.79	86	135	0.001	1.19
588		12-Oct	12-Oct	F	C1	0.74	2.28	53.56	16.9	27.7	31.1	40.1	4328	3.79	86	135	0.001	1.26
589		12-Oct	13-Oct	F	E2	0.75	2.29	53.88	15.7	24.2	28.6	38.9	4372	3.01	86	135	0.001	1.36
590		13-Oct	13-Oct	F	E2	0.76	2.29	53.56	16.1	24.7	29.5	39.5	4342	3.39	86	135	0.001	1.36
593		13-Oct	14-Oct	F	H0	0.73	2.25	51.26	14.2	23.2	29.9	38.7	4227	3.05	87	158	0.001	1.37
596		14-Oct	16-Oct	F	H0	0.73	2.27	51.06	13.5	24.1	30.4	39.2	4211	3.02	87	158	0.001	1.29
599		16-Oct	16-Oct	F	A1	0.74	2.24	49.71	13.4	22.7	27.0	37.4	4211	3.43	87	158	0.001	1.29
600		16-Oct	17-Oct	F	A1	0.75	2.28	50.34	14.5	24.1	30.4	37.9	4211	2.69	83	139	0.006	1.04
602		17-Oct	18-Oct	F	F2	0.69	1.95	52.68	13.2	23.0	30.8	43.2	4178	4.33	71	128	0.010	0.94
603		18-Oct	19-Oct	F	F2	0.72	2.26	51.48	16.1	26.7	29.5	40.0	4453	3.53	71	128	0.010	1.26
605		19-Oct	19-Oct	FH	J1	0.75	2.29	52.19	15.5	25.9	31.3	42.5	4279	3.30	78	133	0.007	1.11
606		19-Oct	20-Oct	F	J1	0.75	2.28	52.72	16.4	24.8	36.8	40.2	4279	3.48	78	133	0.007	1.00
607		20-Oct	20-Oct	H	E2	0.71	2.24	53.66	15.5	25.9	34.1	42.6	4279	4.43	71	128	0.010	0.67
608		20-Oct	21-Oct	H	E2	0.73	2.24	52.40	15.9	25.6	34.6	43.3	4309	3.13	71	128	0.010	0.67
609		21-Oct	22-Oct	H	J1	0.76	2.22	49.71	14.7	24.1	31.4	41.2	4279	3.63	78	133	0.007	0.66
610		21-Oct	22-Oct	F	A1	0.74	2.27	52.29	15.9	25.8	30.2	38.2	4211	4.46	83	139	0.006	1.25
611		22-Oct	22-Oct	F	A1	0.74	2.27	51.79	14.7	25.1	28.9	37.5	4260	3.96	83	139	0.006	1.36
612		21-Oct	22-Oct	FH	H0	0.73	2.22	51.32	14.5	25.1	30.1	40.0	4260	3.34	81	148	0.000	0.77
613		22-Oct	23-Oct	FH	H0	0.75	2.23	50.77	14.9	25.2	28.6	38.3	4211	4.81	81	148	0.000	1.03
614		23-Oct	24-Oct	FH	H0	0.75	2.25	52.51	16.2	27.2	31.5	40.8	4328	3.76	81	148	0.000	0.87
616		25-Oct	26-Oct	F	J1	0.75	2.33	52.08	15.3	24.4	30.4	36.8	4294	3.42	84	145	-0.002	1.37
MEAN						0.74	2.26	51.91	15.3	24.9	30.4	40.2	4273	3.54	78	131	0.005	1.05
ST. DEV.						0.02	0.07	1.28	1.05	1.40	2.10	2.25	69.26	0.73	7.13	11.22	0.004	0.28
C. V. (%)						2.40	3.09	2.46	6.87	5.61	6.90	5.61	1.62	20.50	9.20	8.54	83.24	26.52

Appendix 4

OBED MOUNTAIN COAL LTD.

BULK SAMPLE: LA FARGE ACTUAL ANALYSIS FOR THE CLAY IN

BULK SAMPLE IS THE #3 SEAM ANALYSIS ON OCTOBER 19, 1993.

THE OTHER ANALYSIS' ARE FROM DIFFERENT ZONES WITHIN OUR OVERBURDEN.

MEMORANDUM

DIVISION: OBED MOUNTAIN COAL LTD

TO: B.WATTS FROM: R.RONAGHAN DATE: JAN 6/92

SUBJECT: ANALYSIS FROM THE UPPER CLAY BANDS IN YELLOW PIT

The upper 10 feet of the mudstone bands between the 1 and 2 seams was sampled in early Dec. The sample consisted of portions taken from as many of the individual bands as possible. This sample was then sent into Chemical & Geological Laboratories INC.in Edmonton. There it was analysised for the minerals on the typical clay analysis sheet, given to us by Inland Cement Ltd.

The analysis of the upper portion of the mudstone band does not meet the required analysis. Further sampling of the middle and lower portion of the zone will take place as mining permits. A copy of both the mudstone analysis and the typical analysis are attached.

CHEMICAL & GEOLOGICAL LABORATORIES INC.

DATE REPORTED: DECEMBER 11, 1991 LABORATORY REPORT NUMBER: E91-6870

OBED MOUNTAIN COAL LTD.

DATE RECEIVED: NOVEMBER 12, 1991 SAMPLE ID: CLAY

ANALYST: G. ELYAS

A subsample was dried at 110°C for 12 hours, then analyzed to determine the concentrations of the requested components.

COMPONENT	% BY WT. (DRY SAMPLE)
SILICA (SiO_2)	59.9
ALUMINUM OXIDE (Al_2O_3)	13.3
IRON OXIDE (Fe_2O_3)	4.26
CALCIUM OXIDE (CaO)	2.17
MAGNESIUM OXIDE (MgO)	1.74
SULFUR TRIOXIDE (SO_3)	<0.2
SODIUM OXIDE (Na_2O)	0.04
POTASSIUM OXIDE (K_2O)	1.23
TOTAL ALKALINITY (pH OF WATER EXTRACT)	7.9

	BY WT. (SAMPLE AS RECEIVED)
MOISTURE	2.27%

SIGNATURE OF SUPERVISOR [redacted]

Lafarge Canada Inc.

Western Region

DATE: 25-Apr-85

WESTERN REGION
KAMLOOPS PLANT

TEL 604-573-3211
FAX 604-573-4010

TO : RON RONEGAN
OBED COAL

FROM: JOHN WONG
Kamloops Plant

NUMBER OF PAGES 4 (INCLUDING COVER PAGE)

SPECIAL INSTRUCTIONS AND COMMENTS:

FAX YOU THE CHEMICALS RESULT FOR YOUR CLAY
SORRY I DIDN'T RESPOND EARLY TO YOU.
BEST REGARD

RECEIVER'S FAX #: 1-403-865-8630

Kamloops Plant
R.R. #2, Site 12, Comp. 1
Kamloops, B.C.
V2C 2J3

Telephone: 604-573-3211
Fax: 604-573-4010

Eco-Tech
LABORATORIES LTD.

ASSAYING
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ENVIRONMENTAL TESTING

10041 E. Trans Canada Hwy., R.R. #2, Kamloops, B.C. V2C 2J3 Phone (604) 573-5700
Fax (604) 573-4557

CERTIFICATE OF ANALYSIS ETK 94-283

CANADA CEMENT LAFARGE
R.R.#2 E.T.C. HWY
KAMLOOPS, B.C.
V2C 2J3

June 14, 1994

ATTENTION: JOHNNY WONG

13 PULP samples received June 7, 1994

ET #.	Tag #	BaO	P2O5	SiO2	MnO	Fe2O3	MgO	Al2O3	CaO	TiO2	Na2O	K2O	L.O.I.
1	[redacted]												
2													
3													
4													
5													
6													
7	Obed Mountain Sample #1 Clay in 4 seam	0.19	0.11	58.29	0.03	13.34	2.21	18.86	2.11	0.55	0.90	2.60	0.5
8	Obed Mountain Sample #2 Clay below 4 seam	0.02	0.06	55.41	0.01	3.75	3.08	18.40	2.11	0.19	0.17	0.05	16.2
10	Obed Mountain Raw Sample #1 Seam Upper Zone	0.25	0.13	70.86	0.02	2.73	2.71	17.47	2.12	0.36	0.58	1.05	0.86
11	Obed Mountain RMined Sample Seam Upper Band	0.07	0.28	36.07	0.03	2.02	0.83	19.82	6.12	16.44	0.83	0.92	16.96
12	[redacted]												
13													

QC/DATA:

REPEAT:

1	Western Clay Products,Apr.29/94 Top of Pit	0.01	0.09	52.93	0.01	4.84	0.90	13.21	1.41	0.66	0.39	0.37	25.02

STANDARDS

MRG1	0.01	0.05	38.78	0.16	17.75	13.49	8.16	14.78	3.73	0.66	0.03	2.40
SY2	0.03	0.41	59.47	0.31	6.27	2.97	11.78	8.01	0.13	4.16	4.83	1.84

Note: Values expressed in percent

[redacted]

ECO-TECH LABORATORIES LTD.
Frank J. Pezzotti, A.Sc.T.
B.C. Certified Assayer

.mlsc

Eco-Tech LABORATORIES LTD.

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10041 E. Trans Canada Hwy., R.R. #2, Kamloops, B.C. V2C 2J3 Phone (604) 573-5700
Fax (604) 573-4557

OCTOBER 19, 1993

CERTIFICATE OF ANALYSIS ETK 93-410

CANADA CEMENT LAFARGE
R.R. #2
KAMLOOPS, B.C.
V2C 2J3

SAMPLE IDENTIFICATION:
2 CLAY samples received OCTOBER 6, 1993

ATTENTION: JOHNNY WONG

ET#	Description	BaO	P2O5	SiO2	MnO	Fe2O3	MgO	Al2O3	CaO	TiO2	Na2O	K2O	L.O.I.
1	- OBED CLAY, LOWER PIT	.06	.21	60.00	.02	3.19	2.34	14.11	2.93	.40	1.51	1.14	14.36
2	- OBED CLAY, UPPER PIT	.10	.19	68.61	.12	3.38	1.49	13.92	1.55	.50	2.51	2.44	5.61

1 clay taken from above the = 3 seam in the Red Pit
2 clay taken from above the = 2 seam in the Red Pit.

QC DATA

[redacted]	.02	.09	39.60	.16	17.16	13.12	8.34	14.33	3.61	.98	.25	2.40
Y2	.05	.44	58.65	.32	6.35	3.20	12.15	8.09	.16	4.31	4.58	1.84

NOTE: VALUES EXPRESSED IN PERCENT

[redacted]

ECO-TECH LABORATORIES LTD.
FRANK J. PEZZOTTI
B.C. CERTIFIED ASSAYER

C93/lafarge

ECO-TECH LABORATORIES LTD.

ASSAYING · ENVIRONMENTAL TESTING

10041 East Trans Canada Hwy., Kamloops, B.C. V2C 2J3 (604) 573-5700 Fax 573-4557

APRIL 20, 1993

CERTIFICATE OF ANALYSIS ETK 93-85WR

CANADA CEMENT LAFARGE
R.R. #2
KAMLOOPS, B.C.
V2C 2J3

SAMPLE IDENTIFICATION:
2 PULP samples received MARCH 7, 1993

ATTENTION: JOHNNY WONG

ET#	Description	BaO	P2O5	SiO2	MnO	Fe2O3	MgO	Al2O3	CaO	TiO2	Na2O	K2O	L.O.I.
1	- OKED SAND, APRIL 5/93	.04	.01	88.08	.02	2.05	.26	5.29	.31	.28	.26	1.39	1.97
2	- OKED CLAY, APRIL 5/93	.06	.11	58.10	.03	2.77	3.19	17.27	3.27	.53	.89	.75	12.96

* 1 - Sand taken from upper gravel pit
* 2 - clay taken from # 3 coal zone

QC DATA

[redacted]at #:

1-OKED SAND, APRIL 5/93	.01	.01	88.98	.01	1.90	.33	5.12	.22	.24	.21	1.07	1.95
STANDARDS:												
SY2	.05	.40	58.82	.32	6.34	2.85	12.16	8.13	.14	1.41	4.59	1.84
MRG-1	.01	.01	38.88	.16	17.52	13.61	8.34	14.58	3.63	.69	.18	2.40

NOTE: VALUES EXPRESSED IN PERCENT

[redacted]

per ECO-TECH LABORATORIES LTD.
FRANK J. PEZZOTTI
B.C. CERTIFIED ASSAYER

SC93/lafarge

MAY 11/94

PINTO CREEK SAMPLES APRIL 1994
SINGLE ANALYSIS ONLY ON SAMPLES

AS RECEIVED BASIS NOT SHOWN FOR INSITU ANALYSIS DUE TO DISTORTION OF HEAD MOISTURE DUE TO METHOD OF DRILLING
13% MOISTURE USED FOR F/S @ 1.5 =TARGET COMBINED C/C TOTAL MOISTURE
5% MOISTURE USED FOR F/S @ 1.5 =TARGET COMBINED C/C TOTAL MOISTURE CUSTOMER SPE
KJoules = Kcal * 4.187
INSITU ANALYSIS (ASH,SULFUR) WITH NO Kcal ARE CALCULATED FROM F/S DATA

					INSITU ANALYSIS DRY WEIGHT BASIS			F/S @ 1.5 S.G. 13% MOISTURE BASIS						F/S @ 1.5 S.G. @ 5% MOISTURE			
HOLE#	DEPTH FT.	DEPTH FT.	SEAM #	YIELD @13%	YIELD (DWB)	DAF Kcal/Kg	% ASH	% S	% ASH	% SUL	Kcal/Kg	KJoules	DAF Kcal/Kg	% SINK ASH	% ASH	%SUL	Kcal	KJoules
PC-94-15C			4 SEAM 3A & B	53.2	61.2	7,391	23.6	0.28	12.3	0.26	5,503	23,042	7,368	33.52 *	13.4	0.28	6,009	25,161
PC-94-15C			4 SEAM 2B & D	54.1	62.2	7,318	24.1	0.55	10.5	0.49	5,723	23,961	7,477	38.16 *	11.4	0.54	6,249	26,165
PC-94-15C			4 SEAM 1A	33.1	38.1	7,461	36.1	0.41	8.0	0.44	5,961	24,959	7,543	45.84 *	8.7	0.48	6,509	27,254
PC-94-15C				22.9	26.3	7,134	50.5	N/A	14.1	0.67	5,500	23,027	7,548	54.56 *	15.4	0.73	6,005	25,144
PC-94-15C			UPPER DIRTY ZONE	19.1	21.9	7,012	42.8	0.39	12.7	0.45	5,430	22,734	7,306	44.12 *	13.8	0.49	5,929	24,824
PC-94-15C			IN 3 SEAM.	1.7	1.9		*66.0	0.00	10.1	0.41	5,751	24,079	7,481	58.29	11.1	0.44	6,280	26,293
PC-94-15C			3 SEAM 5A	68.3	78.5	7,492	16.2	0.39	10.1	0.35	5,755	24,095	7,483	28.74 *	11.0	0.38	6,284	26,310
PC-94-15C			3 SEAM 2A to 4B	30.9	35.5	7,109	40.5	0.41	11.2	0.44	5,630	23,571	7,431	48.38 *	12.3	0.48	6,147	25,738
PC-94-15C			3 SEAM 1A	60.1	69.1		*30.0	0.00	14.4	0.51	5,458	22,851	7,514	52.22	15.7	0.56	5,959	24,952
PC-94-5C	187.15	194.10	3B SEAM	36.5	42.0	6,864	36.4	0.32	11.6	0.46	6,375	26,694	7,328	46.26 *	12.7	0.50	6,962	29,148
PC-94-5C	194.10	196.60	LOWER DIRTY 3B	19.1	21.9	6,641	51.5	0.00	10.3	0.40	6,438	26,957	7,400	54.44 *	11.3	0.44	7,030	29,436
PC-94-5C	72.00	80.00	4 SEAM	48.9	56.2	7,185	26.3	0.33	9.4	0.34	6,440	26,966	7,403	40.19 *	10.3	0.37	7,033	29,446
PC-94-16C	148.85	150.40	UPPER 6 SEAM	27.4	31.5	6,994	46.4	0.00	13.4	0.66	6,357	26,616	7,307	52.81 *	14.7	0.72	6,941	29,063
PC-94-16C	191.40	192.90	LOWER 6 SEAM	17.4	20.0	7,066	53.2	0.00	11.3	0.55	6,457	27,034	7,421	55.01 *	12.3	0.60	7,050	29,519

--NOTE-- THE (*) MEANS THAT THE INSITU DRY ASH, AND THE SINK ASH HAS BEEN CALCULATED

- Mining Engineer

JUNE 7/93 to J[illegible] 23/93

AS RECEIVED BASIS NOT SHOWN FOR INSITU ANALYSIS DUE TO DISTORTION O[illegible]AD MOISTURE DUE TO METHOD OF DRILLING

13% MOISTURE USED FOR F/S @ 1.5 =TARGET COMBINED C/C TOTAL MOISTURE

5% MOISTURE USED FOR F/S @ 1.5 =TARGET COMBINED C/C TOTAL MOISTURE CUSTOMER SPEC

KJoules = Kcal * 4.187

INSITU ANALYSIS (ASH,SULFUR) WITH NO Kcal ARE CALCULATED FROM F/S DATA

							INSITU ANALYSIS DRY WEIGHT BASIS			F/S @ 1.5 S.G. 13% MOISTURE BASIS						F/S @ 1.5 S.G. @ 5% MOISTURE			
AMPLE #	SEAM #	HOLE#	DEPTH FT.	DEPTH FT.	YIELD @13%	YIELD (DWB)	DAF Kcal/Kg	% ASH	% S	% ASH	% SUL	Kcal/Kg	KJoules	DAF Kcal/Kg	% SINK ASH	% ASH	%SUL	Kcal	KJoules
4		93-NP-16C	166.20	167.35	40.5	46.5	7,182	45.8		14.4	0.93	5,408	22,645	7,448	61.94	15.7	1.02	5,906	24,727
5		93-NP-16C	266.95	267.95	48.3	55.5	7,268	36.1	1.13	9.9	1.31	5,730	23,991	7,431	58.29	10.8	1.43	6,257	26,197
6		93-NP-16C	269.45	270.45	19.6	22.5	7,076	54.5		15.5	3.06	5,314	22,250	7,435	56.67	17.0	3.34	5,803	24,296

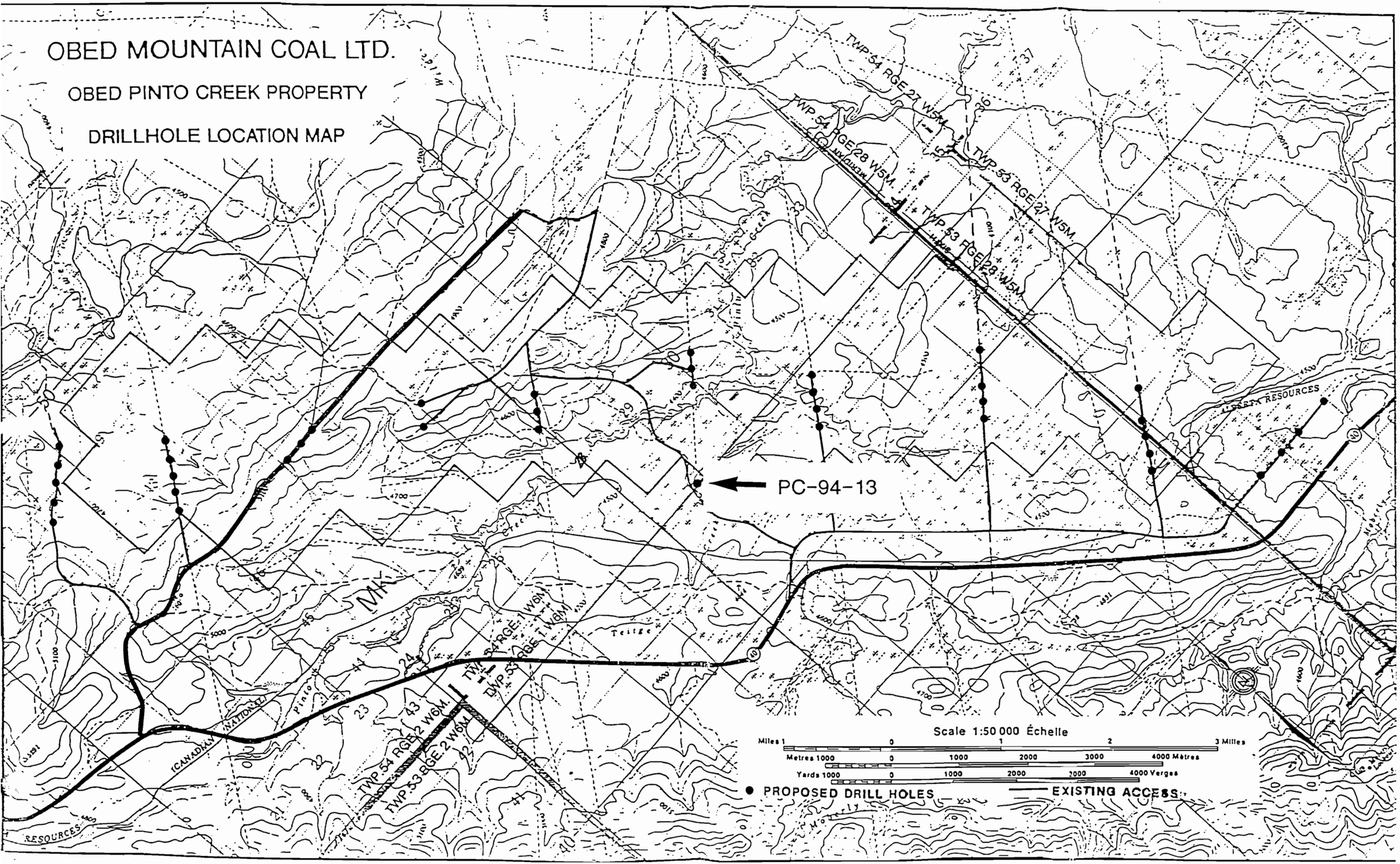
AS RECEIVED BASIS NOT SHOWN FOR INSITU ANALYSIS DUE TO DISTORTION [illegible]AD MOISTURE DUE TO METHOD OF DRILLING
13% MOISTURE USED FOR F/S @ 1.5 =TARGET COMBINED C/C T[illegible]MOISTURE
5% MOISTURE USED FOR F/S @ 1.5 =TARGET COMBINED C/C TOTAL MOISTURE CUSTOMER SPEC
KJoules = Kcal * 4.187
INSITU ANALYSIS (ASH,SULFUR) WITH NO Kcal ARE CALCULATED FROM F/S DATA

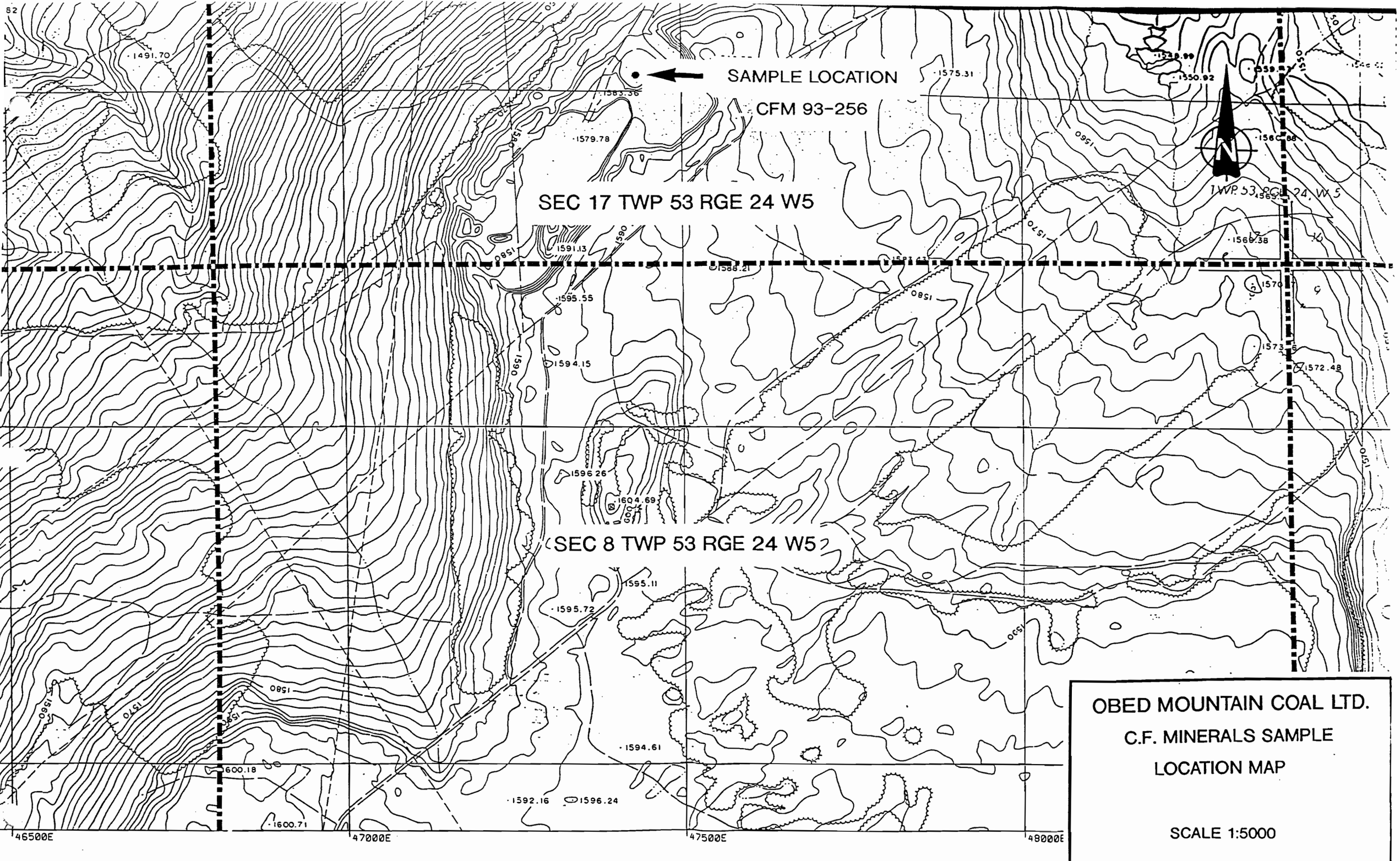
							INSITU ANALYSIS DRY WEIGHT BASIS			F/S @ 1.5 S.G. 13% MOISTURE BASIS						F/S @ 1.5 S.G. @ 5% MOISTURE			
SAMPLE #	SEAM #	HOLE#	DEPTH FT.	DEPTH FT.	YIELD @13%	YIELD (DWB)	DAF Kcal/Kg	% ASH	% S	% ASH	% SUL	Kcal/Kg	KJoules	DAF Kcal/Kg	% SINK ASH	% ASH	%SUL	Kcal	KJoules
1	C	93-NP#2 ZONE #5			53.1	61.0	7,195	26.3	0.78	10.2	0.63	5,596	23,429	7,284	42.68	11.1	0.69	6,110	25,583
1	1	93-ON-2	14.00	25.00	62.5	71.8	7,467	22.9	0.37	8.1	0.38	5,899	24,698	7,475	49.96	8.8	0.42	6,441	26,969
2	1	93-ON-#3	17.50	30.00	65.3	75.0	6,957	20.3	0.46	8.7	0.45	5,553	23,249	7,095	44.28	9.5	0.49	6,063	25,386
3	1	93-ON-4	2.00	14.00	68.9	79.2	7,339	20.1	0.38	8.1	0.44	5,949	24,907	7,541	53.13	8.9	0.48	6,496	27,197
4	1	93-ON-5	0.00	11.00	60.1	69.1	6,982	25.4	0.41	9.0	0.39	5,832	24,418	7,476	51.50	9.8	0.43	6,368	26,663
5	1	93-ON-6	9.50	19.50	57.1	65.6	7,364	27.3	0.46	8.6	0.48	5,482	22,953	6,988	52.62	9.3	0.52	5,986	25,064
6	1	93-ON-7	29.00	40.00	62.1	71.4	7,435	19.0	0.49	7.7	0.52	5,862	24,545	7,390	38.65	8.4	0.57	6,401	26,802
7	1	93-ON-11	29.00	40.00	49.2	56.6	7,462	23.7	0.40	6.9	0.48	5,986	25,064	7,471	38.57	7.5	0.53	6,536	27,368
8		93-ON-12	25.00	34.00	59.2	68.1	7,345	19.6	0.37	8.6	0.38	5,711	23,910	7,285	35.17	9.4	0.41	6,236	26,109
9		93-ON-13	40.00	51.00	55.0	63.2	7,393	25.7	0.44	9.4	0.41	5,753	24,088	7,417	44.53	10.3	0.45	6,282	26,303
10	1	93-ON-23	0.00	11.00	48.4	55.6	6,058	25.3	0.38	13.6	0.42	4,545	19,031	6,196	32.58	14.9	0.46	4,963	20,781
11	1	93-ON-24C	2.00	9.00	59.4	68.3	6,472	28.8	0.33	18.6	0.40	4,439	18,584	6,485	39.00	20.3	0.44	4,847	20,293
12	1	93-ON-25C	0.00	6.00	83.3	95.7	5,958	28.4	0.37	22.2	0.26	3,897	16,316	6,012	80.34	24.2	0.28	4,255	17,817
13	1	93-ON-27C	12.00	29.00	45.2	52.0	6,106	30.9	0.44	16.6	0.53	4,412	18,473	6,271	37.99	18.2	0.58	4,818	20,172
14		93-ON-27C	SPOIL		17.5	20.1				22.4	0.27	3,876	16,230	5,998	66.49	24.4	0.30	4,233	17,722
15	1	93-ON-28	3.00	12.00	65.3	75.1	7,129	19.5	0.46	10.9	0.53	5,353	22,413	7,031	35.34	11.9	0.58	5,845	24,474
16		93-ON-29	5.00	12.00	48.0	55.2	6,620	20.7	0.39	13.0	0.48	5,046	21,127	6,823	24.22	14.2	0.52	5,510	23,070
1		93-NP-8C	53.00	53.80	17.3	19.9				12.2	5.45	5,452	22,827	7,290	28.14	13.3	5.95	5,953	24,925
2		93-NP-8C	138.05	138.25	56.6	65.1				13.5	3.52	5,438	22,767	7,402	37.97	14.8	3.85	5,938	24,860
3		93-NP-8C	142.80	143.20	70.5	81.0				10.4	4.02	5,658	23,690	7,389	29.28	11.4	4.38	6,178	25,868
4		93-NP-8C	144.70	146.30	30.1	34.6	7,160	50.9		14.1	1.67	5,449	22,817	7,479	60.19	15.4	1.82	5,951	24,915
5		93-NP-8C	248.10	248.90	50.4	57.9	7,338	14.8	1.18	9.7	1.02	5,719	23,946	7,401	17.16	10.6	1.11	6,245	26,148
6		93-NP-8C	250.50	252.35	18.6	21.4	6,894	55.8		13.6	2.74	5,415	22,673	7,382	58.04	14.9	2.99	5,913	24,758
7		93-NP-8C	337.00	340.00	29.5	33.9	7,564	13.9	0.93	9.6	0.93	5,862	24,545	7,570	13.44	10.4	1.02	6,401	26,802
8		93-NP-8C	341.05	345.25	62.2	71.5	7,428	23.0	0.30	10.9	0.30	5,722	23,957	7,523	42.68	11.9	0.33	6,248	26,160
9		93-NP-8C	386.50	397.40	52.5	60.3	7,419	29.6	0.39	11.1	0.39	5,699	23,860	7,513	47.97	12.2	0.43	6,223	26,054
1		93-NP-5C	51.00	51.90	64.2	73.8	7,355	22.5	0.91	12.0	0.80	5,568	23,315	7,429	40.87	13.1	0.87	6,080	25,459
2		93-NP-5C	147.40	148.05	26.9	30.9	7,263	38.3		12.3	1.44	5,463	22,876	7,311	42.74	13.4	1.57	5,966	24,979
3		93-NP-5C	151.95	152.95	37.0	42.5	7,300	33.0	1.81	13.7	1.07	5,412	22,661	7,379	39.80	14.9	1.17	5,910	24,744
4		93-NP-5C	255.35	256.25	54.5	62.7	7,214	29.5	1.37	9.3	1.46	5,657	23,684	7,280	53.14	10.2	1.60	6,177	25,862
5		93-NP-5C	257.75	258.70	17.2	19.8	7,358	36.7		12.2	2.32	5,500	23,027	7,353	36.84	13.3	2.53	6,005	25,144
1		93-NP-16C	50.60	51.60	63.9	73.5	7,099	24.8	0.85	8.8	0.85	5,613	23,501	7,176	57.10	9.6	0.92	6,129	25,662
2		93-NP-16C	64.00	64.95	69.8	80.2	7,117	29.3	1.26	15.7	0.99	5,134	21,496	7,201	65.03	17.2	1.08	5,606	23,472
3		93-NP-16C	163.65	164.00	46.0	52.9				12.1	3.10	5,568	23,312	7,435	38.10	13.2	3.39	6,080	25,455

OBED MOUNTAIN COAL LTD.

OBED PINTO CREEK PROPERTY

DRILLHOLE LOCATION MAP





OBED MOUNTAIN COAL LTD.

C.F. MINERALS SAMPLE LOCATION MAP

SCALE 1:5000

Cameco
CORPORATION

2121 - 11th Street West
Saskatoon, Saskatchewan
Canada S7M 1J3

Telephone: (306) 956-6200
Facsimile: (306) 956-6201
Telex: 074-2864

March 1, 1994

Mr. R. J. Ronaghan
Senior Mine Geologist
Obed Mountain Coal Ltd.
P. O. Bag Service 4000
Hinton, Alberta
T7V 1V8

Dear Ron:

RE: DRILL CUTTINGS SENT FOR DIAMOND INDICATOR PROCESSING

Enclosed are our results from 10 pails of samples received from Obed Mountain Coal Ltd. I chose one bedrock sample (PC-93-01 and PC-93-07) from each of two drill fences and combined 3 till samples from PC-93-09 for processing. Attached is the flow-sheet that we have developed.

The samples were processed at the Saskatchewan Research Council, picked by Cameco personnel, probed by the University of Saskatchewan, Geology Department, and classified by Cameco. Attached are tables of sample descriptions, indicator grains, picked per sample, and the electron micro-probe analysis.

In general, nothing significant was identified during the picking process of the mid-fraction (pyropes, eclogitic garnets and chrome diopsides), therefore only a few grains were probed. Two olivine grains were identified in PC-93-01. Olivine commonly occurs in mafic and ultramafic rocks and because of the absence of the more common diamond indicator mineralogy such as pyropes, eclogitic garnets, chrome diopsides, chromite, picroilmenites, etc. the occurrence of olivine grains is probably not significant.

We routinely pick 50 grains from the Lower Franz fraction (chromites and picroilmenites), however, sample PC-93-07 was the only sample with grains worthy of picking. These grains were scanned for MgO and Cr_2O_3 content prior to complete analysis. None were found to contain significant proportions of MgO and Cr_2O_3 to warrant complete analysis.

In summary, we found no evidence of kimberlitic or lampriotic indicator minerals within the samples processed. Enclosed are the various sub-fractions from the processing.

.../2

The following table is a break-down of analytical costs for your information:

Procedure	PC-93-01 ($)	PC-93-07 ($)	PC-93-09 ($)	TOTAL ($)
Laboratory Preparation	130.00	130.00	130.00	390.00
Indicator Mineral Picking (1 hr.)	30.00	30.00	30.00	90.00
Electron Microprobes of Mid-Fraction ($10/grain)	30.00	--	--	30.00
Electron Microprobe of Lower Franz ($125/hr.)	--	50.00	--	50.00
Classification ($3/grain)	9.00	--	--	9.00
TOTAL	199.00	210.00	160.00	569.00

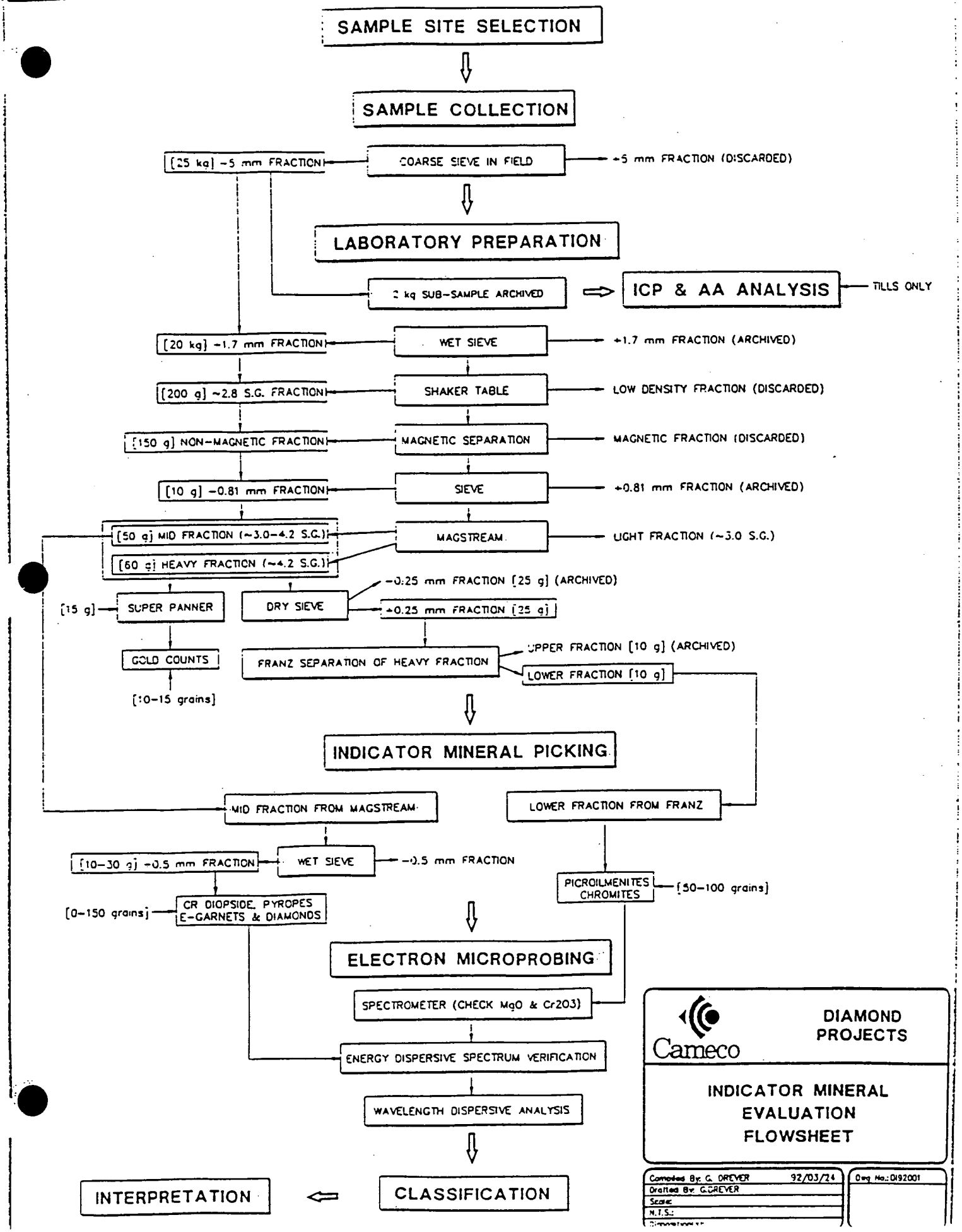
Yours truly,

[redacted]

Garth Drever
Project Geologist

GD/DAR

Attachments


SAMPLE SITE SELECTION
SAMPLE COLLECTION
[25 kg] -5 mm FRACTION
COARSE SIEVE IN FIELD
+5 mm FRACTION (DISCARDED)
LABORATORY PREPARATION
2 kg SUB-SAMPLE ARCHIVED
ICP & AA ANALYSIS
TILLS ONLY
[20 kg] -1.7 mm FRACTION
WET SIEVE
+1.7 mm FRACTION (ARCHIVED)
[200 g] ~2.8 S.G. FRACTION
SHAKER TABLE
LOW DENSITY FRACTION (DISCARDED)
[150 g] NON-MAGNETIC FRACTION
MAGNETIC SEPARATION
MAGNETIC FRACTION (DISCARDED)
[10 g] -0.81 mm FRACTION
SIEVE
+0.81 mm FRACTION (ARCHIVED)
[50 g] MID FRACTION (~3.0-4.2 S.G.)
[60 g] HEAVY FRACTION (~4.2 S.G.)
MAGSTREAM
LIGHT FRACTION (~3.0 S.G.)
-0.25 mm FRACTION [25 g] (ARCHIVED)
[15 g]
SUPER PANNER
DRY SIEVE
+0.25 mm FRACTION [25 g]
GOLD COUNTS
[10-15 grains]
FRANZ SEPARATION OF HEAVY FRACTION
UPPER FRACTION [10 g] (ARCHIVED)
LOWER FRACTION [10 g]
INDICATOR MINERAL PICKING
MID FRACTION FROM MAGSTREAM
LOWER FRACTION FROM FRANZ
[10-30 g] -0.5 mm FRACTION
WET SIEVE
-0.5 mm FRACTION
PICROILMENITES CHROMITES
[50-100 grains]
[0-150 grains]
CR DIOPSIDE, PYROPES E-GARNETS & DIAMONDS
ELECTRON MICROPROBING
SPECTROMETER (CHECK MgO & Cr2O3)
ENERGY DISPERSIVE SPECTRUM VERIFICATION
WAVELENGTH DISPERSIVE ANALYSIS
INTERPRETATION
CLASSIFICATION
Cameco
DIAMOND PROJECTS
INDICATOR MINERAL EVALUATION FLOWSHEET
Compiled By: G. DREVER 92/03/24
Drafted By: G.DREVER
Scale: N.T.S.:
Dwg No.: 0192001

)1/94

OBED SAMPLES
SAMPLE DESCRIPTIONS

)le	NTS Map	UTM Zone	UTM East	UTM North	Elev (ft)	Description	Deposit Type	Depth From(m)	Depth To (m)	Environ-ment	Stratigraphy	Date Sampled	Comments
)3-01	83E/9	11	423455	5949180	4689	drill cuttin	bedrock	6.4	14.0	fluvial	Paskapoo Fm	2/10/93	sample sent to Cameco by Ron Ronaghan
)3-07	83E/9	11	425030	5946750	5100	drill cuttin	bedrock	6.4	11.0	fluvial	Paskapoo Fm	2/20/93	sample sent to Cameco by Ron Ronaghan
)3-09	83E/9	11	430550	5943600	4375	drill cuttin	till	0.0	4.3	glacial	till	2/23/93	3 samples combined; sent Ron Ronaghan

ELECTRON MICROPROBE ANALYSIS

ple	Group	Point	Date	Color	Wt% Sio2	Wt% Tio2	Wt% Al2o3	Wt% Cr2o3	Wt% Feo	Wt% Mno	Wt% Mgo	Wt% Cao	Wt% Na2o	Wt% Nio	Wt% Zno	Wt% Total	Mineral
03-1	1	65	2/03/94	yellowish green	38.32	.19	22.71	.04	12.09	.21	.04	23.38	0.00			96.99	grossular
03-1	2	66	2/03/94	yellowish pink	41.26	.06	.02	0.00	11.03	.18	44.79	.02	.02			97.38	olivine
03-1	3	67	2/03/94	clear	40.80	.03	.01	.04	8.42	.14	47.57	.03	.01			97.04	olivine
03-9	1	68	2/03/94	yellow	0.00	0.00	.02	.00	.46	.04	20.11	30.19	0.00			50.71	?

OBED SAMPLES

GRAINS PICKED PRIOR TO ELECTRON MICROPROBING

Sample	Picker	Mid-dark orange	Yellow orange	Colorless	Yellow	Brown	Green	Black	Metallic black	Picking comments
PC-93-01	GD		3	5			1	4		Nothing picked in Lowe Franz (sdst frags)
PC-93-07	GDkw	1	1	5			2	18	8	→8 picked from Lower Franz
PC-93-09	GD			4	1	1	1	3		Nothing picked in Lowe Franz (sdst frags)

APPENDIX II

To the letter dated: January 13, 1995

Copies of Troymin Resources Ltd. invoices and sample reports.

Metallic and Industrial Minerals
Permit Numbers: 9393030068 to 9393030070 inclusive.

LORING LABORATORIES LTD.

629 BEAVERDAM ROAD N.E., CALGARY, ALBERTA T2K 4W7
TEL: (403) 274-2777 FAX: (403) 275 -0541
G.S.T. # R103388666

Info
Invoice cost to Montello

TROYMIN RESOURCES LTD.,
1204, 333 - 7th Avenue S.W.,
Calgary, Alberta T2P 2Z1
ATTN: Jack McCleary

JUN 17 1994

INVOICE 36579-D

DATE June 13, 1994

SAMPLES

4	Sample Processing Including Desliming, Screening,	@	
	Table Concentrating, Heavy Media Separation,	@	
	Magnetic Separation (>15 kg)	@ 200.00	800.00
2	Same as Above (<15 kg)	@ 150.00	300.00
6	Picking of Concentrates	@ 60.00	360.00
20	Mounting and Picking of Grains	@ 1.00	20.00
14	Electronic Microprobe (Semi-Quantative)	@ 8.50	119.00
1	Computing of Report	@	25.00
		@	
	SUBTOTAL	@	1624.00
		G.S.T.	113.68
		TOTAL	$ 1737.68

THIS IS YOUR INVOICE, PLEASE PAY THE AMOUNT SHOWN

TERMS – 30 DAYS

Ok Pr

JUN 2 [illegible]94

LORING LABORATORIES LTD.

629 BEAVERDAM ROAD N.E., CALGARY, ALBERTA T2K 4W7
TEL: (403) 274-2777 FAX: (403) 275 -0541
G.S.T. # R103388666

TO ....IROYMIN..RESOURCES..LTD..,.....
....200.,.....622..-..5th..Avenue..S.W..,.....
....Calgary.,...Alberta.....T2P..0M6.....
ATTN: Jack McCleary

INVOICE 36579-1D

DATE ...June..28,....1994.....

..... SAMPLES

1	Electronic Microprobe (Semi-Quantative)	@	8.50
5	Electronic Microprobe (Quantative)	@ 15.00	75.00
1	Classification & Reporting of Chromite	@	75.00
1	Indicator Mineral Set	@	75.00
		@	
		@	
		@	
		@	
		@	
	SUBTOTAL	@	233.50
		G.S.T.	16.35
		TOTAL	$ 249.85

THIS IS YOUR INVOICE, PLEASE PAY THE AMOUNT SHOWN

TERMS – 30 DAYS

– 75.00 - Mineral Set
-5.25 GST
= 169.60

629 Beaverdam Rd. N.E.
Calgary, Alberta T2K 4W7

LORING LABORATORIES LTD.

Tel: (403) 274-2777
Fax: (403) 275-0541

TO : TROYMIN RESOURCES LTD.
1204, 333 - 7th Avenue S.W.
Calgary, Alberta T2P 2Z1

FILE # 3 5 6 7 9-D
DATE : June 13, 1994
PAGE : 1

ATTN : Jack McCleary

CERTIFICATE OF ANALYSIS

		MIDDLINGS		HEAVIES >3.3 SG				
	ORIGINAL	2.9 - 3.3 SG		MAGN.	NON-MAG.	2.0 P.M.	W.P.M.	2.0 N-MAG
	WEIGHT	MAGN.	NON-MAG		+28 Mesh	-28 Mesh	-28 Mesh	-28 Mesh
SAMPLE ID	(Kg)	(Gm)	(Gm)	(Gm)	(Gm)	(Gm)	(Gm)	(Gm)
PC-94-01	15.4	<0.01	1.68	0.08	0.00	0.39	N/A	0.07
PC-94-06	17.5	<0.01	1.44	0.05	0.00	0.33	N/A	0.04
PC-94-09	7.7	<0.01	0.29	<0.01	0.00	0.07	N/A	<0.01
PC-94-12	21.5	0.01	0.78	0.05	0.04	0.28	N/A	0.06
TILL (0'-14') PC-94-13A	22.3	<0.01	1.82	0.02	0.16	0.30	N/A	0.29
BRCK (19-29) PC-94-13A	24.9	<0.01	0.97	0.34	0.30	0.29	N/A	0.32

NOTE : P.M. = PARAMAGNETIC W.P.M. = WEAK PARAMAGNETIC

I HEREBY CERTIFY that the above results are those analyses made by me upon the herein described samples....

[redacted]

ASSAYER

629 Beaverdam Rd. N.E.
Calgary, Alberta T2K 4W7

LORING LABORATORIES LTD.

Tel: (403) 274-2777
Fax: (403) 275-0541

To: TROYMIN RESOURCES

From: LORING LABORATORIES LTD.

Date: JUNE 10, 1994

Subject: Sample Results

File: 36579

1. Introduction

Enclosed are the results of the processing of samples PC-94-01, PC-94-06, PC-94-09, PC-94-12, PC-94-13A (Till)and PC-94-13A (Bedrock).

The data sheets enclosed represent the adjusted microprobe data as received from the technician. On the tables and charts attached to this report, the oxides are presented in weight percent of the composition of the mineral and -- indicates that the oxide was not analyzed in the mineral (see Microprobe Data table)

Each grain was designated a number which can be found in the leftmost column of the microprobe data sheet. All numbers plotted on any charts refer to these numbers.

Care must be taken in interpreting this data. Although some of these minerals may be found in kimberlite or lamproite, they may also be present in other rocks.

Following are a few notes on the mineral grains picked from the samples.

2. Garnet

The garnets have been categorized according to Dawson and Stephens' (1975) classification. Of the 5 grains selected for probing, 1 ranks as G3, 3 rank as G5 and 1 ranks as a G9. (see Garnet Classification tables).

No garnets plot in the Eclogitic Field from Fipke.(1989) (see Eclogite Garnet Indicators chart).

On Gurney's (1985) classification of calcic garnets, the garnet designated as grain number 5 PC-94-06 falls on the G10 side of the line. (see Pyrope Garnet chart).

3. Ilmenite

Ilmenite was identified in 3 grains from these samples. None of these grains plot in the indicator field (Fipke, 1989).(see ilmenite indicators chart)

4. Chromite

Eleven grains from these samples were identified as chromite, although none of the grains fall in the diamond inclusion field (Fipke 1989) six were selected for further analysis and classification under another system. These grains have the designated grain numbers; 6, 12, 13, 14 and 16. A separate report on these grains will follow. (see chromite indicator chart)

5. Other Minerals

One grain was unidentified due to low total of the oxides. It is suspected that a silica inclusion was probed.

6. References

Dawson J.B. and W.E. Stephens
1975: Statistical Classification of Garnets from Kimberlite and Associated Xenoliths. Journal of Geology, vol. 83, p. 589-607.

Fipke, C. E. (ed.)
1989: The development of advanced technology to distinguish between diamondiferous and barren diatremes. Geol. Surv. of Canada, Open File Report 2124.

Gurney, J. J.
1985: A correlation between garnets and diamonds in Kimberlites; in J.E. Glover and P.G. Harris (eds.), Kimberlite Occurrence and Origin: A basis for conceptual models in exploration, Geol. Dept. and Univ. Exten., Univ. W. Aust., Publ. No. 8, 143-166.

Stephens W.E. and J.B. Dawson
1977: Statistical Comparison Between Pyroxenes from Kimberlites and their Associated Xenoliths. Journal of Geology, vol. 85, p. 433-449.

Loring Laboratories Ltd.

629 Beaverdam Road N.E.,
Calgary Alberta T2K 4W7
Tel: 274-2777 Fax: 275-0541

File No. : 36579
Client: Troymin Resources
Microprobe Data

Grain #	Sample#	Location P#	C#	R#	Data in wt % SiO2	TiO2	Al2O3	Cr2O3	FeO	MnO	MgO	CaO	Na2O	NiO	ZnO	Total	Mineral
1	PC-94-01	79	B	1	37.23	0.08	20.49	0.01	24.09	0.75	3.08	12.32	0.02	--	--	98.08	Garnet
2	PC-94-01	79	G	1	0.16	1.14	19.41	44.37	19.85	0.29	15.09	0.04	--	--	--	100.34	Chromite
3	PC-94-06	79	A	2	0.00	48.26	0.30	0.03	46.94	0.56	4.14	0.02	--	--	--	100.23	Ilmenite
4	PC-94-06	79	B	2	0.00	45.53	0.45	0.09	48.78	0.38	4.46	0.03	--	--	--	99.72	Ilmenite
5	PC-94-06	79	C	1	40.06	0.17	18.99	5.28	7.81	0.50	21.27	4.08	0.06	--	--	98.22	Garnet
6	PC-94-06	79	C	2	0.12	0.00	17.54	48.50	21.04	0.35	12.04	0.01	--	--	--	99.61	Chromite
7	PC-94-06	79	H	1	0.14	0.05	29.08	34.65	22.03	0.31	12.93	0.02	--	--	--	99.21	Chromite
8	PC-94-06	79	I	1	0.01	49.32	0.16	0.00	48.01	0.68	1.92	0.00	--	--	--	100.11	Ilmenite
9	PC-94-06	79	J	1	0.03	0.02	19.71	49.73	18.97	0.34	12.13	0.01	--	--	--	100.94	Chromite
10	PC-94-09	79	D	1	36.60	0.02	20.17	0.02	31.65	2.26	2.05	5.72	0.01	--	--	98.48	Garnet
11	PC-94-12	79	D	2	0.06	1.10	18.90	45.07	21.23	0.31	14.34	0.00	--	--	--	101.01	Chromite
12	PC-94-12	79	E	2	0.08	0.28	9.08	58.21	18.21	0.30	14.08	0.00	--	--	--	100.23	Chromite
13	PC-94-12	79	F	2	0.13	1.07	15.93	46.52	24.92	0.29	11.01	0.01	--	--	--	99.87	Chromite
14	PC-94-12	79	G	2	0.14	0.47	11.58	55.49	18.91	0.31	13.92	0.00	--	--	--	100.82	Chromite
15	PC-94-12	79	H	2	0.06	1.99	18.40	43.06	22.35	0.31	14.62	0.00	--	--	--	100.79	Chromite
16	PC-94-12	79	I	2	0.10	3.33	13.06	42.20	30.36	0.30	11.51	0.00	--	--	--	100.86	Chromite
17	PC-94-12	79	J	2	0.12	0.20	24.79	43.09	16.15	0.29	16.82	0.00	--	--	--	101.45	Chromite
18	PC-94-13 A (BR)	79	F	1	37.27	0.34	20.75	0.05	28.11	1.58	5.14	5.90	0.02	--	--	99.14	Garnet
19	PC-94-13 A (T)	79	A	3	29.34	1.57	11.52	0.00	14.92	1.73	1.61	10.16	--	--	--	70.84	?
20	PC-94-13 A (T)	79	E	1	36.70	0.30	20.43	0.00	29.93	1.78	3.62	5.66	0.06	--	--	98.49	Garnet

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File # 36579

Client: Troymin Resources

Garnet Classification (after Dawson and Stephens, 1975)

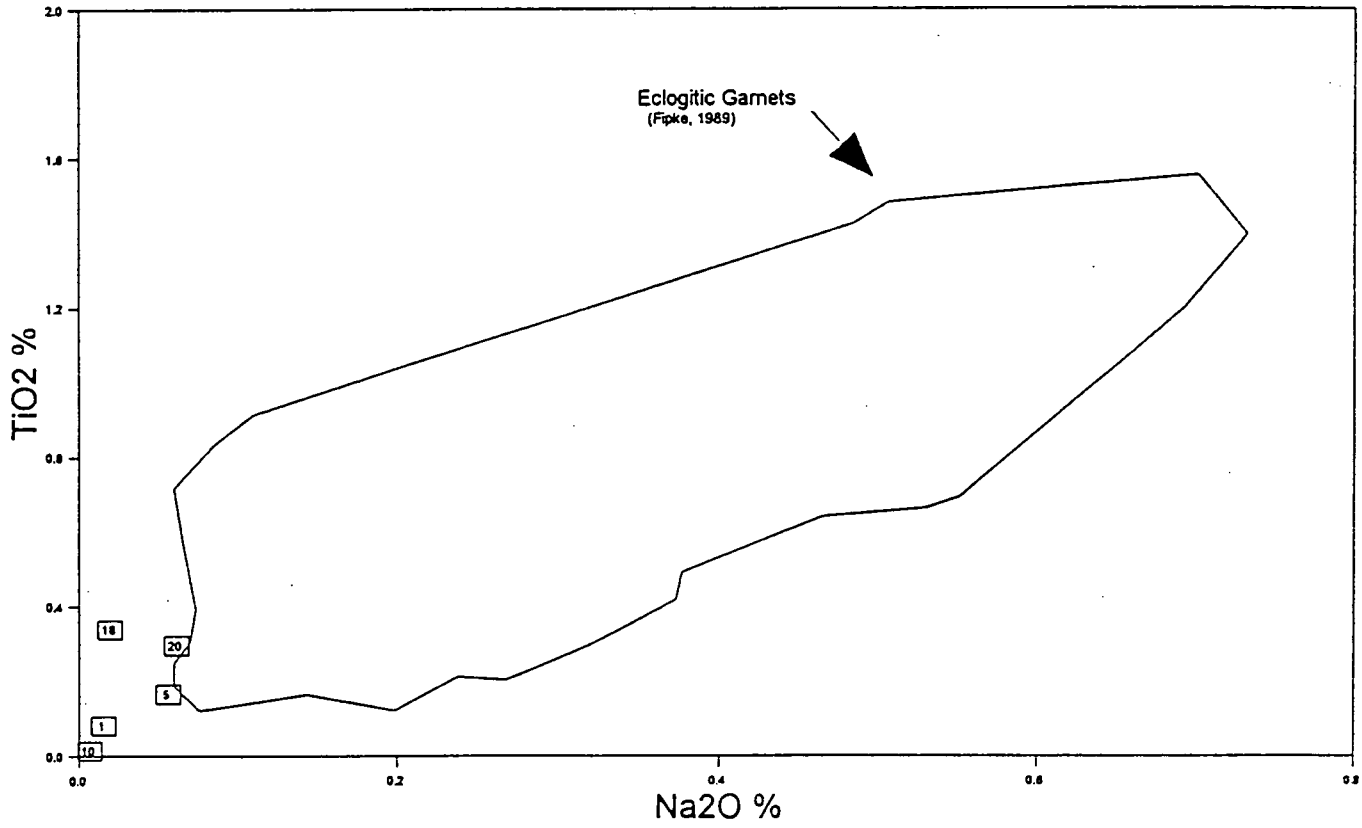
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Grain #	Sample #	P#	C#	R#	TiO2	Cr2O3	FeO	MgO	CaO	Na2O	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12
1	PC-94-01	79	B	1	0.08	0.01	24.09	3.08	12.32	0.02	..	..	..	..	5	..	..	..	..	..	..	..
5	PC-94-06	79	C	1	0.17	5.28	7.81	21.27	4.08	0.06	..	..	..	..	..	..	..	..	9	..	..	..
10	PC-94-09	79	D	1	0.02	0.02	31.65	2.05	5.72	0.01	..	..	..	..	5	..	..	..	..	..	..	..
18	PC-94-13 A (BR)	79	F	1	0.34	0.05	28.11	5.14	5.90	0.02	..	..	3	..	..	..	..	..	..	..	..	..
20	PC-94-13 A (T)	79	E	1	0.30	0.00	29.93	3.62	5.66	0.06	..	..	..	..	5	..	..	..	..	..	..	..
											—	—	—	—	—	—	—	—	—	—	—	—
					Total Garnets					5	0	0	1	0	3	0	0	0	1	0	0	0
											G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12

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Eclogite Garnet Indicators

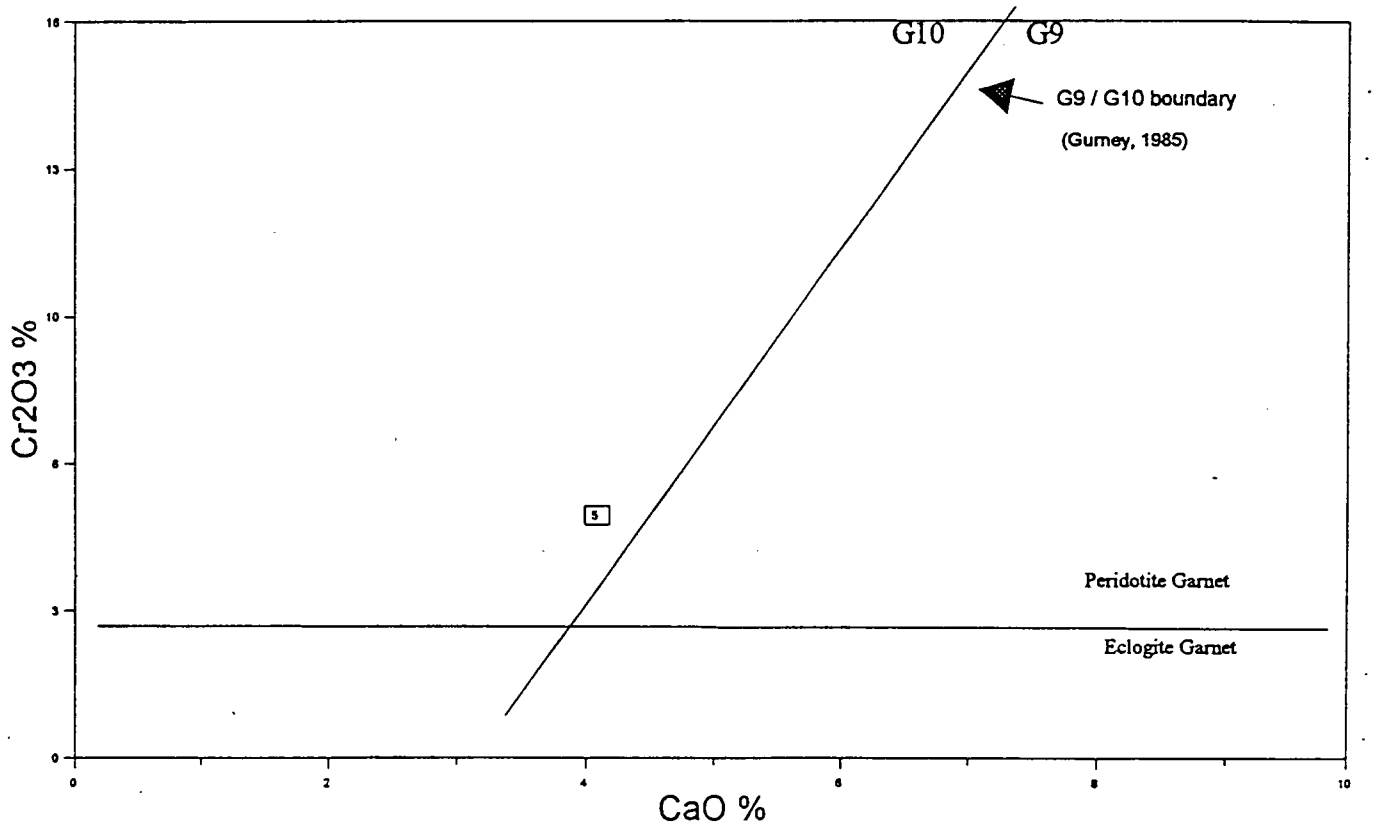


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File No. : 36579
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Pyrope Garnet Indicators



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File No. : 36579

Client: Troymin Resources

Chromite Data

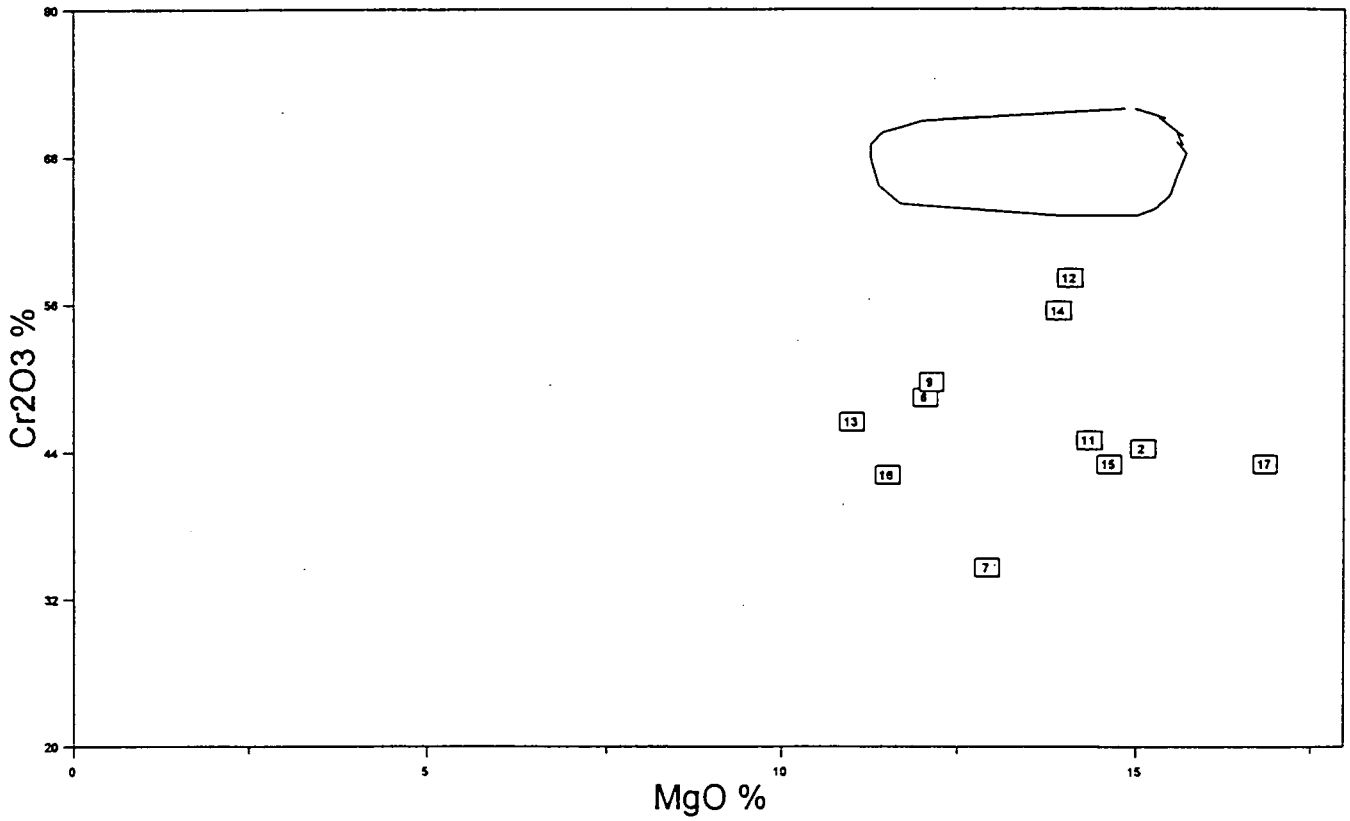
		Location			Data in wt %											
Grain #	Sample#	P#	C#	R#	SiO2	TiO2	Al2O3	Cr2O3	FeO	MnO	MgO	CaO	Na2O	NiO	ZnO	Total
2	PC-94-01	79	G	1	0.16	1.14	19.41	44.37	19.85	0.29	15.09	0.04	—	—	—	100.34
6	PC-94-06	79	C	2	0.12	0.00	17.54	48.50	21.04	0.35	12.04	0.01	—	—	—	99.61
7	PC-94-06	79	H	1	0.14	0.05	29.08	34.65	22.03	0.31	12.93	0.02	—	—	—	99.21
9	PC-94-06	79	J	1	0.03	0.02	19.71	49.73	18.97	0.34	12.13	0.01	—	—	—	100.94
11	PC-94-12	79	D	2	0.06	1.10	18.90	45.07	21.23	0.31	14.34	0.00	—	—	—	101.01
12	PC-94-12	79	E	2	0.08	0.28	9.08	58.21	18.21	0.30	14.08	0.00	—	—	—	100.23
13	PC-94-12	79	F	2	0.13	1.07	15.93	46.52	24.92	0.29	11.01	0.01	—	—	—	99.87
14	PC-94-12	79	G	2	0.14	0.47	11.58	55.49	18.91	0.31	13.92	0.00	—	—	—	100.82
15	PC-94-12	79	H	2	0.06	1.99	18.40	43.06	22.35	0.31	14.62	0.00	—	—	—	100.79
16	PC-94-12	79	I	2	0.10	3.33	13.06	42.20	30.36	0.30	11.51	0.00	—	—	—	100.86
17	PC-94-12	79	J	2	0.12	0.20	24.79	43.09	16.15	0.29	16.82	0.00	—	—	—	101.45

Loring Laboratories Ltd.

629 Beaverdam Road N.E.,
Calgary Alberta T2K 4W7
Tel: 274-2777 Fax: 275-0541

File No. : 36579
Client : Troymin Resources

Chromite Indicator



Loring Laboratories Ltd.

629 Beaverdam Road N.E.,
Calgary Alberta T2K 4W7
Tel: 274-2777 Fax: 275-0541

File No. : 36579

Client: Troymin Resources

Ilmenite Data

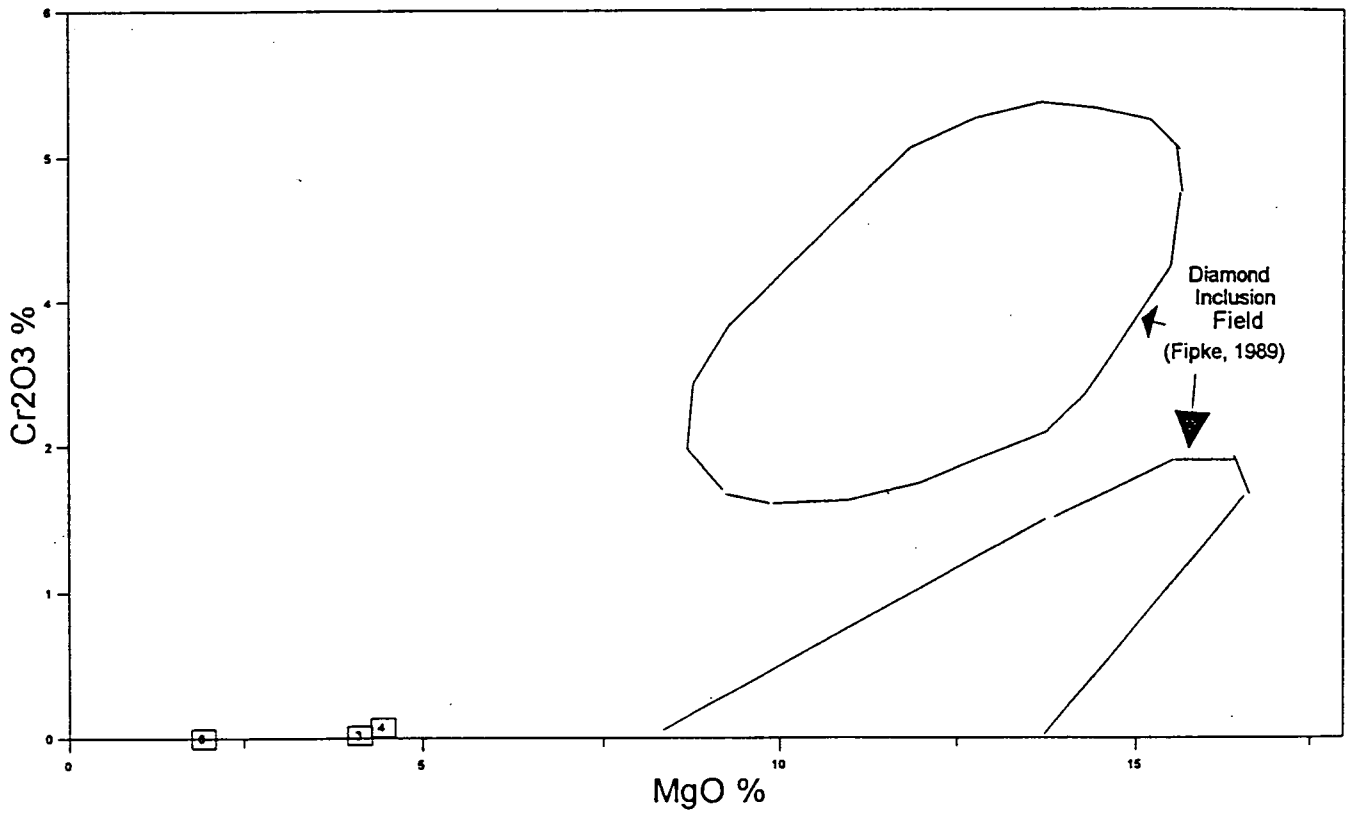
Grain #	Sample#	Location P#	C#	R#	Data in wt % SiO2	TiO2	Al2O3	Cr2O3	FeO	MnO	MgO	CaO	Na2O	NiO	ZnO	Total
3	PC-94-06	79	A	2	0.00	48.26	0.30	0.03	46.94	0.56	4.14	0.02	—	—	—	100.23
4	PC-94-06	79	B	2	0.00	45.53	0.45	0.09	48.78	0.38	4.46	0.03	—	—	—	99.72
8	PC-94-06	79	I	1	0.01	49.32	0.16	0.00	48.01	0.68	1.92	0.00	—	—	—	100.11

Loring Laboratories Ltd.

629 Beaverdam Road N.E.,
Calgary Alberta T2K 4W7
Tel: 274-2777 Fax 275-0541

File No. : 36579
Client : Troymin Resources

Ilmenite Indicators



GEOCHEMICAL CHROMITE REPORT

Prepared for

Loring Labs Ltd.
Calgary, Alberta

BY

D.I.SRAEGA, Geologist
Edmonton, Alberta
(403) 437-1321

JUNE, 1994

COPY NUMBER:

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Introduction

Chromite electron microprobe analyses were analyzed using the criteria of Griffen et al. (in press and 1993), Michell and Bergman (1991), Mitchell (1986) and Sobolev et al. (1992). This was done to define the potential source rock, characterize the geochemistry of the source, define the potential for diamonds.

Chromite electron microprobe data was run through a proprietary program which determines the P-type classification and calculates the statistical parameters used in the preparation of this report. The output from this program is subsequently used as input to a statistical software package, mathematical software package and to a graphics package.

The P-type Classification System

Griffen's chromite population classification system (Griffen et al., in press) is a paragenesis based scheme devised to differentiate lamproitic chromites and kimberlitic chromites from chromites from other sources. Chromites from olivine lamproites, Group I and II kimberlites and diamond inclusions were used to determine the classification parameters. P1 chromites are xenocrysts derived from the desegregation and subsequent incorporation into the ascending magma. P1 chromites are the dominant population in Group 1 kimberlites, a significant population in group II kimberlites and typically insignificant in lamproites. P4 chromites are low pressure and temperature xenocryst chromites derived from incorporation of lherzolitic chromites in the magma. P2 chromites are macrocrysts, products of magmatic crystallization, in Group II kimberlites. P3 chromites are macrocrysts found in olivine lamproites and are indicators of lamproite magmatism. In lamproites P3 chromites are typically the dominant population with lesser amounts of P4 and a small population of P1 chromites. Diamond inclusion (D.I.) chemistry chromites geochemically overlap with part of the P1 population since D.I. chemistry xenocryst chromites are a subpopulation of the harzburgitic chromites

Early magmatic products in both kimberlites and lamproites may resemble geochemically xenocrysts. Griffen's classification scheme is currently the only method for the determination of xenocryst and macrocryst chromites. Equilibration temperatures of xenocryst chromites (Griffen et al., 1993) and their relative abundance is used to determine which potential source rocks are diamondiferous and target prioritization.

3.0 Geochemistry of Chromites

The computer output of a proprietary program was used to generate data used in the graphs and determine the p-type classification of the chromites. Eleven chromites were analyzed of which ten were subsequently found to have compositions suitable for use in this report. Grain 16 of sample PC-94-12 (11.51 wt. % MgO) was found to contain an inappropriate amount of +3 charged cations in the B spinel site and was subsequently rejected by the computer program. Of the ten chromites used by the computer, two chromites were determined to have p-type classifications. Grain 12 was determined to be a P1 chromite (14.08 wt. % MgO) and grain 13 was determined to be a P3 chromite (11.01 wt. % MgO).The P1 chromite was found to have an equilibration temperature of 1001 ^{o}C and given a typical cratonic geothermal gradient of 40 mW/m^2 is potentially derived from the diamond stability field in the upper mantle (Griffen et al., in press).

Figure 3.1 shows the compositions of the spinels projected on the bottom of the spinel prism. Lamproite spinels typically have lower Cr# than kimberlite spinels. The spinels in this study contained are those which most closely match the typical lamproite population. Figure 3.2 shows a clear diagonal trend indicative of magmatic spinels (Sobolev et al., 1992). The early part of the trend with the higher chromium values is indistinct as to macrocryst or xenocryst origin since both are geochemically similar. Figure 3.3 shows a graph of weight percent Cr_2O_3 vs. MgO which shows the chromites do not fall into the diamond inclusion field (R. Moore, BHP, personal communication) indicating the P1 chromite does not have composition which overlaps with diamond inclusion compositions. Figure 3.4 is a graph of weight percent TiO_2 vs. Al_2O_3 which indicates the spinels contain elevated aluminum more characteristic of lamproites than of kimberlites.

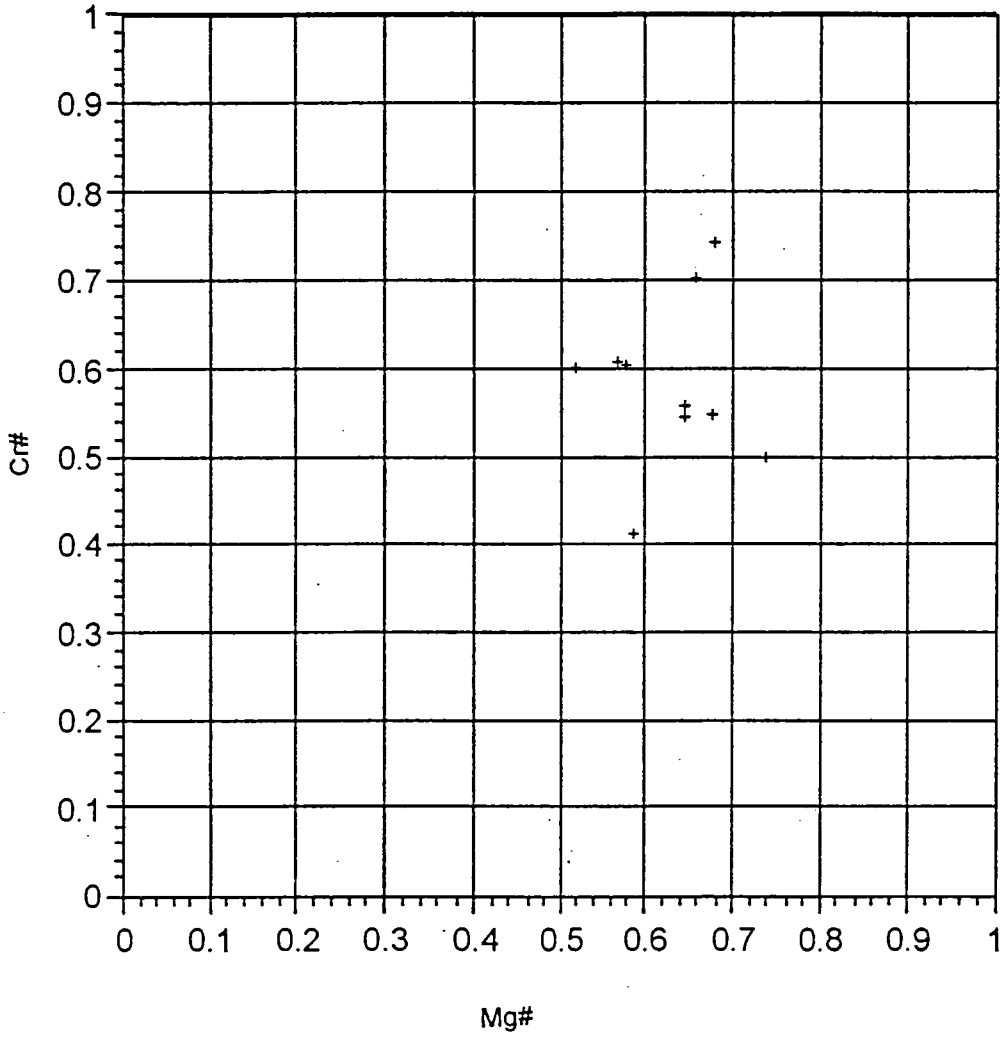


Figure 3.1 Cr# vs Mg#

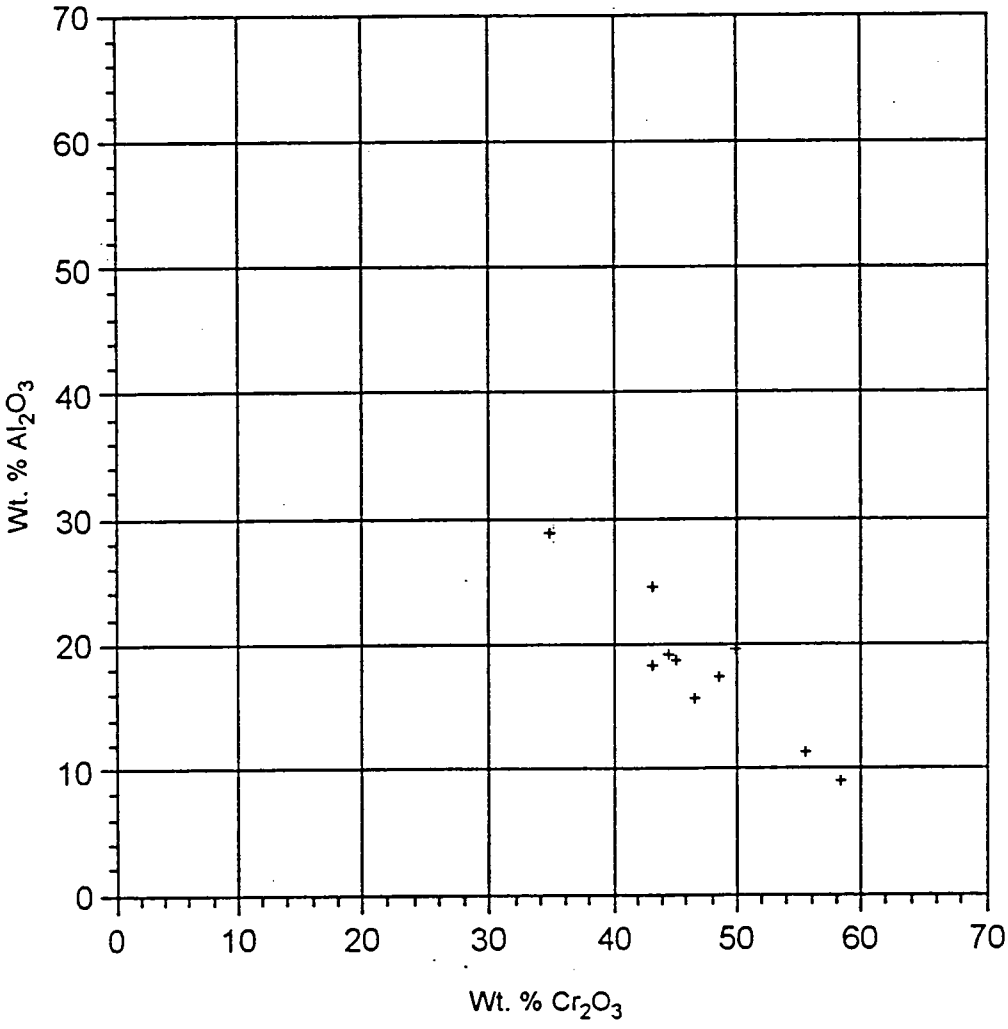


Figure 3.2 Weight percent Al_2O_3 vs Cr_2O_3

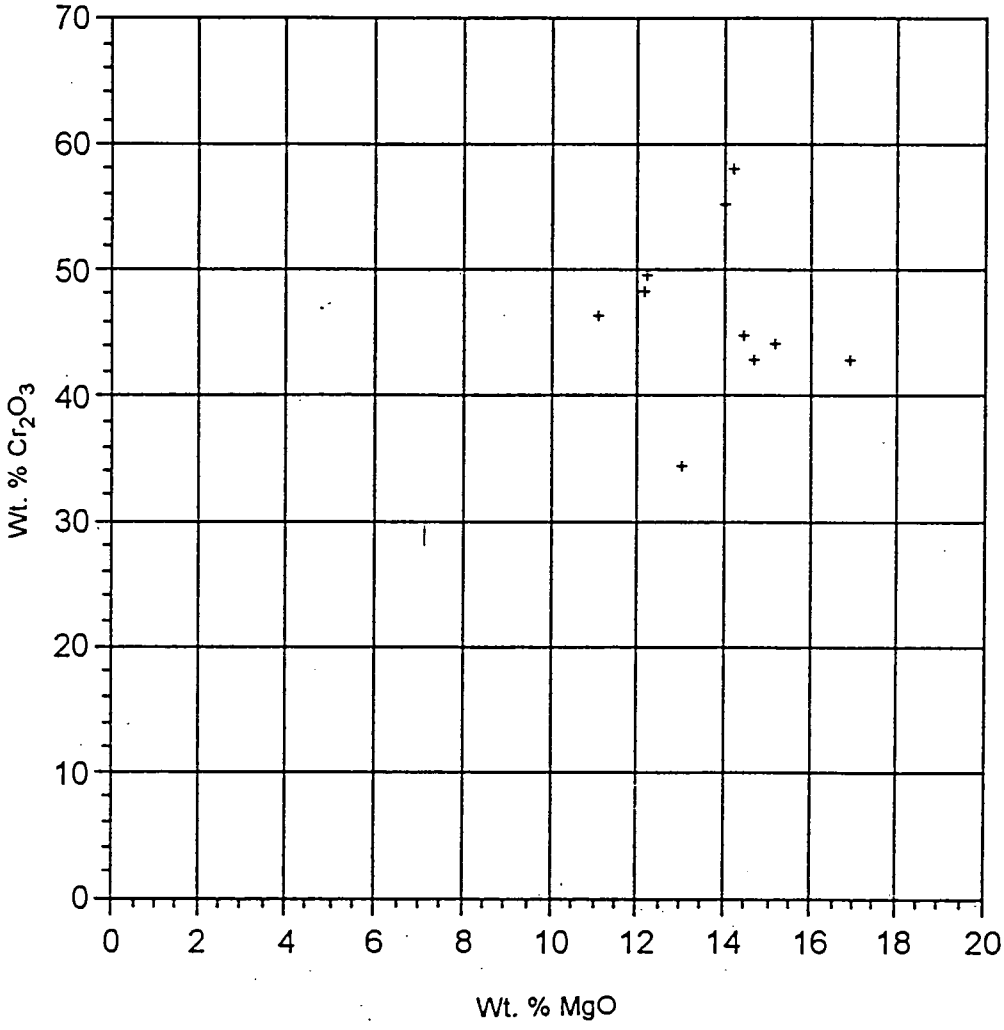


Figure 3.3 Weight percent Cr_2O_3 vs MgO

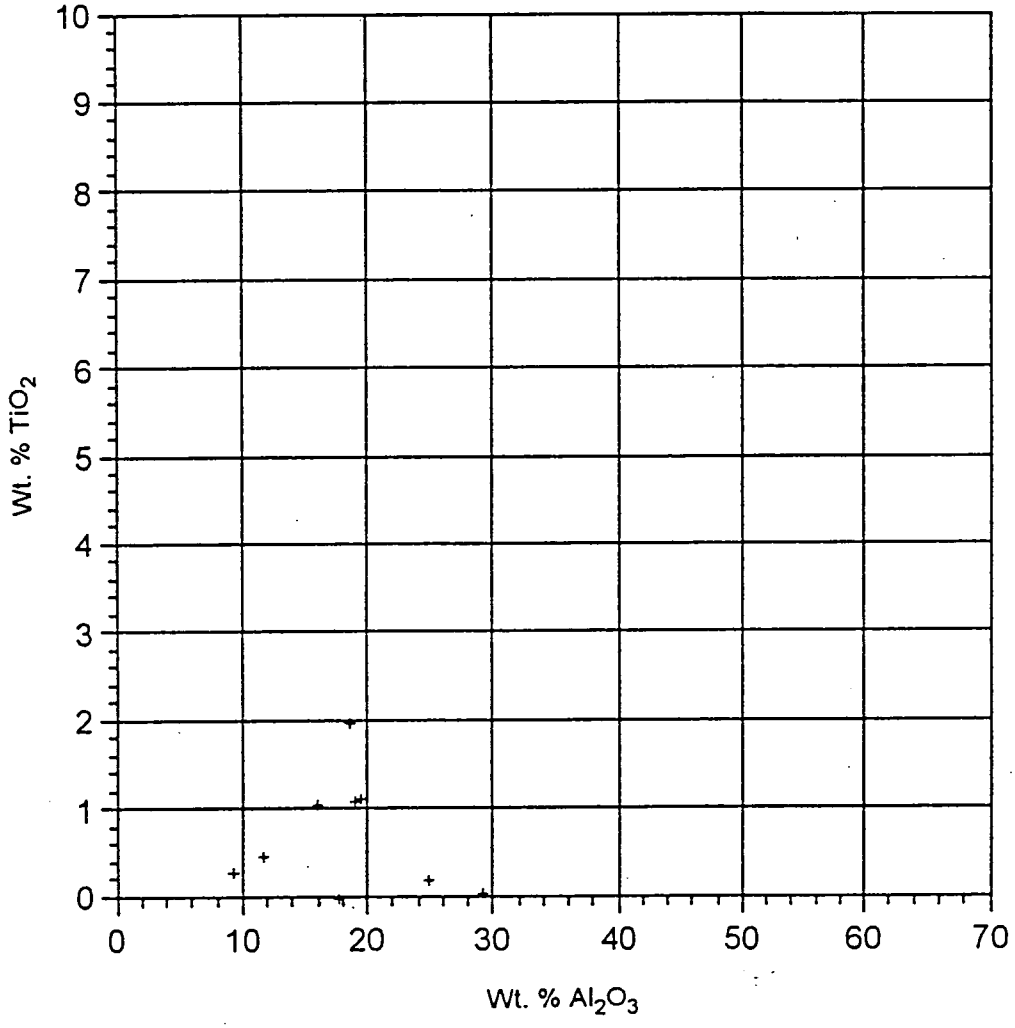
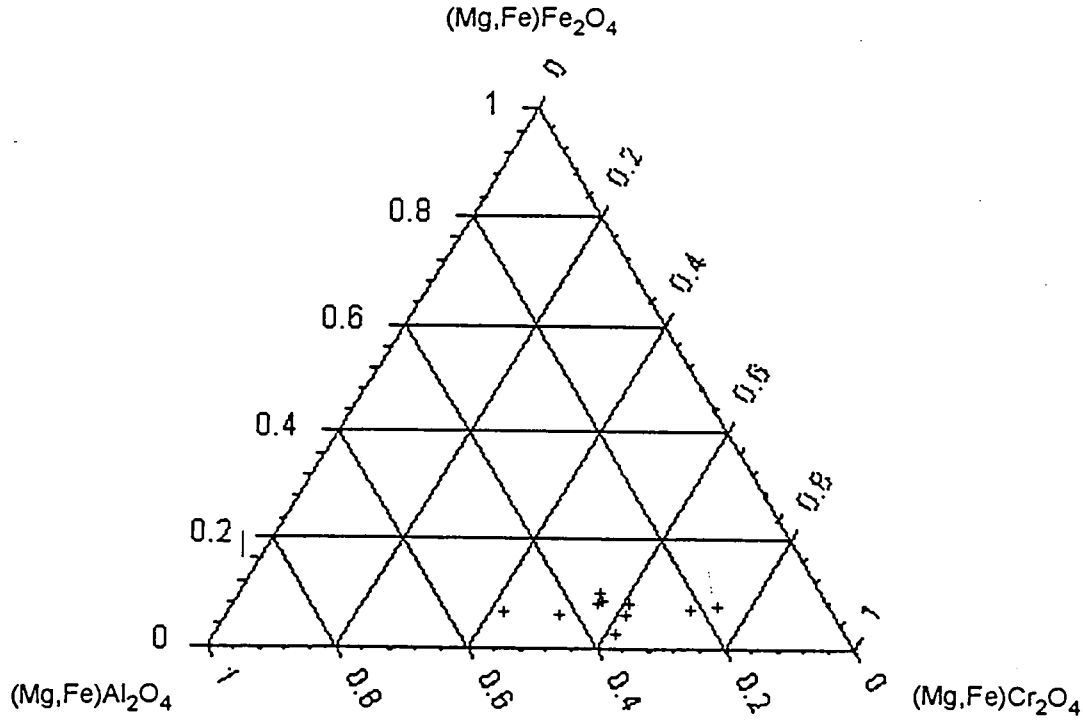


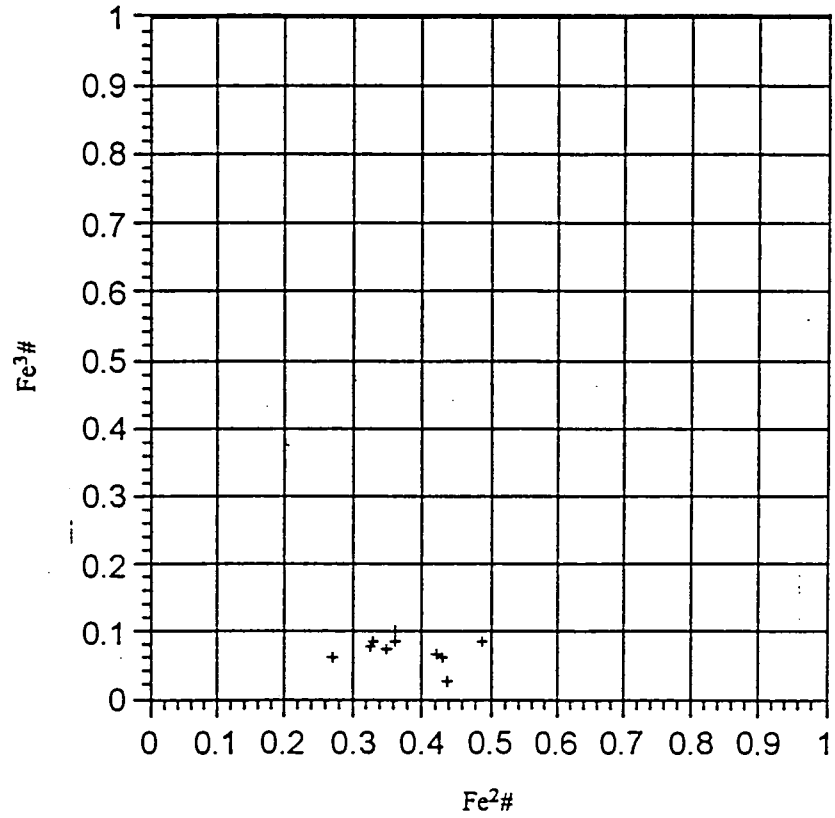
Figure 3.4 Weight percent TiO_2 vs Al_2O_3

4.0 Spinel Evolutionary Trends

Figure 4.1 shows projections onto the side and front of the Oxidized Spinel Prism. Figure 3.1 and Figure 4.1 indicate the spinel compositions are not evolved as defined by Mitchell and Bergman (1992) and Mitchell (1986) and they are more closely associated with lamproite compositions than kimberlite compositions.



Projection onto the side face of the Oxidized Spinel Prism



Pojection onto the front face of the Oxidized Spinel Prism

Figure 4.1 Projections onto the side (top) and front face (bottom) of the Oxidized Spinel Prism

5.0 Conclusions

Grain 12 was determined to be a P1 chromite and grain 13 was determined to be a P3 chromite. The P1 chromite was determined to have an equilibration temperature of 1001 °C (Griffen et al., 1993) and given a typical geothermal gradient of 40 mW/m2 is potentially derived from the diamond stability field in the upper mantle. The P1 chromite is analogous to the G10 chromite in that chromite harzburgite is the source of P1 chromites and the G10 garnet is correspondingly found in garnet harzburgite.

Figures 3.1 to 3.4 indicates that the chromites more closely resemble lamproite derived chromite as compared to kimberlite derived chromites indicating the potential source is potentially a lamproite. A larger number of chromites is needed to conclusively determine the nature of the source for the chromites. Figures 3.1 and 4.1 indicate the chromites are relatively unevolved and except for the P1 chromite potentially represent magmatic products.

5.0 Disclaimer

The above report was written by the author without knowing the source of the chromite data or the client. For report purposes it was assumed the chromites were derived from one sample and are genetically related. The microprobe data was used as received from Loring Labs Ltd. and the integrity of the data is unknown. The small database of chromites presents sampling problems indicative of small sample populations which may not represent the entire chromite population. Because of the small sample population the conclusions derived in this report are preliminary and subject to change pending a larger chromite database. This report does not imply any similarity to any other property, source, person or company, other than the client, and no claims are to be made thereof.

6.0 References

Griffin W.L., Ryan C.G., Gurney J.J., Sobolev N.V. and Win T.T., In Press, Chromite Macrocrysts in Kimberlites and Lamproites Geochemistry and Origin.

Griffin W.L., Sobolev N.V., Ryan C.G., Pokhilenko, Win T.T. and Yefimova E.S., 1993, Trace Elements in Garnets and Chromites: Diamond Formation in the Siberian Lithosphere. Lithos, 29, pp235-256.

Mitchell R.H., 1986, 1986, Kimberlites: Mineralogy, Geochemistry, and Petrology, Plenum Pressm, New York, 442 pages.

Mitchell R.H. and Bergman S.C., 1992 Petrology of Lamproites, Plenum Press, New York. 447 pages.

Sobolev N.V., Pokhilenko N.P., Grib V.P, Skripnichenko V.A. and Titova V.E., 1992 Specific Compositions and Conditions of Formation of Deep-Seated Minerals in Explosion Pipes of the Onega Peninsula and Kimberlites of the Zimni Coast in the Arkhangelsk Province, Soviet Geology and Geophysics Vol 33, No 10, pp 71-78.

Loring Laboratories Ltd.

629 Beaverdam Road N.E.,
Calgary Alberta T2K 4W7
Tel: 274-2777 Fax 275-0541

File No. : 36579

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Chromite Data

		Location			Data in wt %											
Grain #	Sample#	P#	C#	R#	SiO2	TiO2	Al2O3	Cr2O3	FeO	MnO	MgO	CaO	V2O3	NiO	ZnO	Total
2	PC-94-01	79	G	1	0.16	1.14	19.41	44.37	19.85	0.29	15.09	0.04	—	—	—	100.34
6	PC-94-06	79	C	2	0.12	0.00	17.54	48.50	21.04	0.35	12.04	0.01	0.16	0.16	0.09	100.02
7	PC-94-06	79	H	1	0.14	0.05	29.08	34.65	22.03	0.31	12.93	0.02	–	–	–	99.21
9	PC-94-06	79	J	1	0.03	0.02	19.71	49.73	18.97	0.34	12.13	0.01	–	–	–	100.94
11	PC-94-12	79	D	2	0.06	1.10	18.90	45.07	21.23	0.31	14.34	0.00	–	–	–	101.01
12	PC-94-12	79	E	2	0.08	0.28	9.08	58.21	18.21	0.30	14.08	0.00	0.09	0.17	0.08	100.57
13	PC-94-12	79	F	2	0.13	1.07	15.93	46.52	24.92	0.29	11.01	0.01	0.11	0.20	0.06	100.24
14	PC-94-12	79	G	2	0.14	0.47	11.58	55.49	18.91	0.31	13.92	0.00	0.07	0.14	0.08	101.11
15	PC-94-12	79	H	2	0.06	1.99	18.40	43.06	22.35	0.31	14.62	0.00	–	–	–	100.79
16	PC-94-12	79	I	2	0.10	3.33	13.06	42.20	30.36	0.30	11.51	0.00	0.21	0.22	0.10	101.39
17	PC-94-12	79	J	2	0.12	0.20	24.79	43.09	16.15	0.29	16.82	0.00	—	—	—	101.45

SAMPLE 401.0'-404.0' (<2u)

Illite	10%
Montmorillonite	85%
Chlorite	5%
Quartz	

93-NP-16C:
SAMPLE 51.6'-52.65' (<2u)

Illite	10%
Montmorillonite	85%
Kaolinite	5%
Quartz	

SAMPLE 66.7'-68.85' (<2u)

Illite	35%
Montmorillonite	60%
Kaolinte	
Quartz	

SAMPLE 272.55'-274.35' (<2u)

Illite	30%
Montmorillonite	50%
Chlorite	5%
Kaolinite	15%

Quartz
Suspect Calcite
Plagioclase Feldspar

SAMPLE 305.0'-308.0' (<2u)

Illite	20%
Kaolinite	75%
Montmorillonite/Chlorite	5%

Quartz
Suspect Calcite
Plagioclase Feldspar

SAMPLE 321.0'-324.0' (<2u)

Illite	40%
Montmorillonite	30%
Chlorite	5%
Kaolinite	25%

Quartz
Suspect Plagioclase Feldspar

SAMPLE 334.1'-337.0' (<2u)

Illite	35%
Montmorillonite	60%
Kaolinite	5%

Quartz

SAMPLE 348.25'-352.3' (<2u)

Illite	40%
Montmorillonite	45%
Chlorite	5%
Kaolinite	10%

Quartz
Suspect Plagioclase Felspar

SAMPLE 143.2'-144.7' (<2u)

Illite	50%
Montmorillonite	15%
Chlorite	10%
Kaolinite	25%

Quartz
Suspect Plagioclase Feldspar

SAMPLE 149.2'-151.3' (<2u)

Illite	50%
Montmorillonite	15%
Chlorite	10%
Kaolinite	25%

Quartz
Suspect Plagioclase Feldspar

SAMPLE 192.0'-197.0' (<2u)

Illite	15%
Montmorillonite	60%
Chlorite	5%
Kaolinite	20%

Quartz
Suspect Calcite
Plagioclase Feldspar

SAMPLE 244.1'-248.1' (<2u)

Illite	35%
Montmorillonite	40%
Chlorite	5%
Kaolinite	20%

Quartz
Suspect Calcite
Plagioclase Feldspar

SAMPLE 249.2'-250.5' (<2u)

Montmorillonite	95%
Chlorite	5%

Quartz

OBED: XRD SEMI-QUANTITATIVE CLAY MINERAL RESULTS

93-NP-8C:

SAMPLE 64.0'-68.5' (<2u)

Illite	55%
Montmorillonite	20%
Chlorite	10%
Kaolinite	15%

Quartz
Suspect Calcite
Plagioclase Feldspar

SAMPLE 108.0'-112.3' (<2u)

Illite/Chlorite	5%
Montmorillonite	95%

Quartz
Suspect Calcite
Plagioclase Feldspar
Cristobalite

SAMPLE 112.3'-116.0' (<2u)

Illite	5%
Montmorillonite	95%
Kaolinite	Trace

Quartz
Suspect Cristobalite

SAMPLE 130'-134' (<2u)

Illite	10%
Montmorillonite	45%
Chlorite	5%
Kaolinite	40%

Quartz
Suspect Calcite
Plagioclase Feldspar

CHARACTERISTICS OF FIRED SAMPLES

STEEL HARD COLOR	STEEL HARD TEMP. (C)	STEEL HARD ABSORPTION (%)	MAXIMUM FIRE COLOR	MAXIMUM FIRE TEMP. (C)	MAXIMUM FIRE ABSORPTION (%)	MAXIMUM FIRE SHRINKAGE (%)	REMARKS
Grayish red (10R 4/2)	1097	2.64	Moderate brown (5YR 3/4)	1123	0.23	8.05	Extremely short firing range (25 C). Possibly structural clay products if firing is very accurate.
-	-	-	-	-	-	-	Bar too fragile to fire. Little value.
Pale brown (5YR 5/2)	1060	5.03	Moderate brown (5YR 3/4)	1117	0.24	8.32	Moderate firing range (57 C). Structural clay products and earth colored pottery.
Moderate brown (5YR 3/4)	1126	0.80	Moderate brown (5YR3/4)	1126	0.80	8.53	No firing range. Maximum fire and steel hard coincide. Possibly structural clay products if firing is very accurate.
Moderate brown (5YR4/4)	1112	0.74	Moderate brown (5YR 4/4)	1112	0.74	7.18	No firing range. Maximum fire and steel hard coincide. Possibly structural clay products if firing is very accurate.

CHARACTERISTICS OF UNFIRED SAMPLES

SAMPLE	DESCRIPTION	TEMPERING WATER (%)	PLASTICITY	WORK-ABILITY	DRYING PROPERTIES ROOM TEMP.	DRYING PROPERTIES 105 C	DRYING SHRINKAGE (%) 150 C
64.00'-68.50'	Light olive gray (5Y 6/1) mudstone	15.49	fairly good	fairly good	minor warp	minor cracks	4.00
112.30'-116.00'	Very light gray (N8) mudstone	22.08	poor	poor	minor cracks	cracks badly	9.00
143.20'-144.70'	Light gray (N7) mudstone	16.00	fairly good	fairly good	minor cracks	minor cracks	3.00
244.10'-248.10'	Light olive gray (5Y 6/1) mudstone	17.00	good	good	minor cracks	minor cracks	5.50
348.25'-353.30'	Light gray (N7) mudstone	20.30	good	good	minor warp and minor cracks	cracks badly	7.25

CERAMIC TEST

CHEMISTRY ANALYTICAL

CONC UG/G

Sample_ID1	P	S	MG	SI	NA	AL	CA	TI	K
46.5-48.5	414	3103	6825	158947	1783	48487	8866	2157	11779
64-68.5	868	914	12872	277904	8146	78023	17639	4003	21268
108-112.3	306	591	13558	296554	4945	71153	19622	1361	5763
112.3-116.	254	422	12139	306687	5421	69789	17378	943	4005
130-134	579	534	9412	336893	12270	62449	24627	2588	13067
143.2-144.7	820	1047	12058	301890	10530	83834	6197	4506	23445
149.2-151.3	767	279	15175	280581	8342	87054	8769	4394	21108
192.0-197.0	495	380	8562	303681	10154	49467	52343	2049	11498
244.1-248.1	826	278	14084	264840	7243	76803	16476	3960	20289
249.2-250.5	487	216	16360	268853	6357	78101	13596	3060	3924
272.5-274.3	718	779	16234	257823	8013	77546	32436	3927	17018
305-308	561	623	10163	245370	4346	43390	99673	2154	10938
321-324	915	316	15622	249801	6866	82211	16147	4164	18495
334.1-337	449	310	10925	280434	4157	91016	6222	3742	20322
348-352	822	322	13201	285492	11201	83181	9832	4359	21597
401-404	589	342	7858	283875	14103	66214	5664	3226	10901
51.6-52.6	180	511	9266	234952	1026	62899	13276	1825	3909
66.7-68.8	564	1645	10154	264069	673	85159	8555	3399	15421

Sample_ID1	MN	FE
46.5-48.5	102	29932
64-68.5	572	52451
108-112.3	166	21760
112.3-116.	136	20793
130-134	575	23631
143.2-144.7	278	31142
149.2-151.3	323	37019
192.0-197.0	806	17937
244.1-248.1	959	46709
249.2-250.5	190	16901
272.5-274.3	588	38282
305-308	425	18635
321-324	1117	52829
334.1-337	367	27785
348-352	620	34128
401-404	134	17400
51.6-52.6	57	16985
66.7-68.8	122	29951

DG930618.DOC

ANALYTICAL SERVICES
Manufacturing Technolgies Department

Client : D. Goulet
Geology

Charge code : 40351600

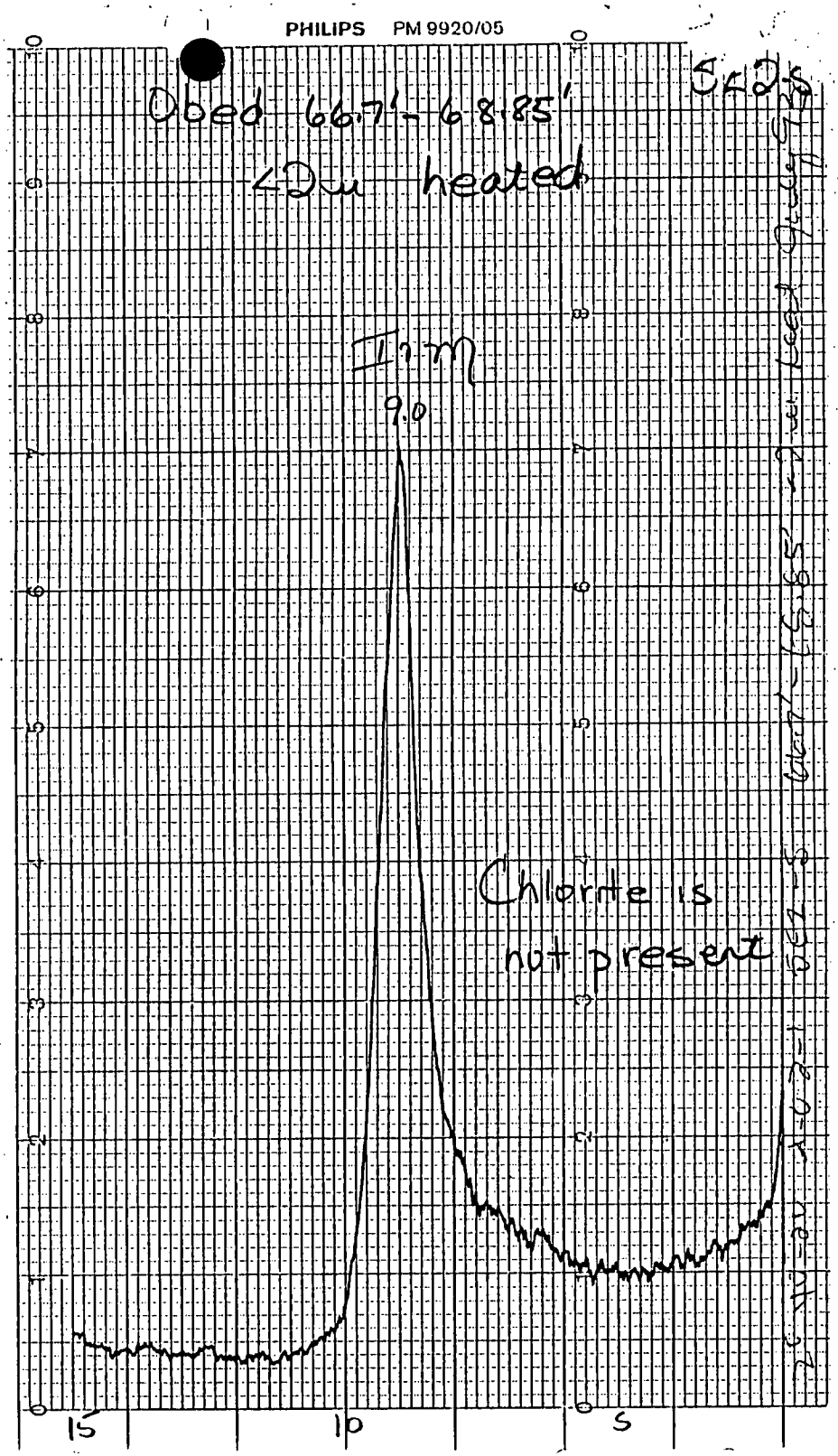
Requested Analysis : L. O. I. & Moisture

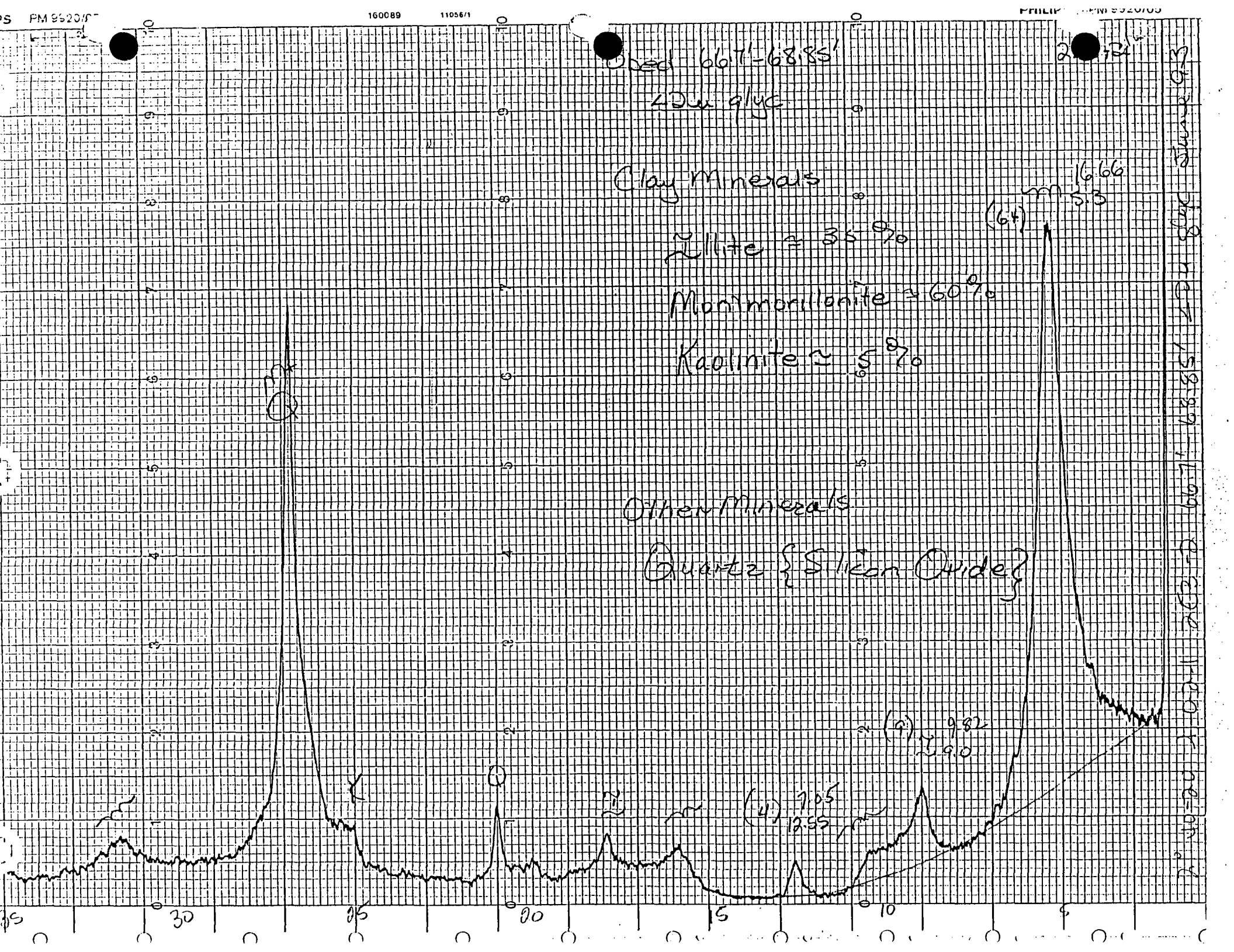
Results : **Results in %**

Sample ID	L O. I. %	Moisture %
46.5' - 48.5'	45.2	3.6
64.0' - 68.5'	7.9	0.8
108.0' - 112.3'	7.5	4
112.3' - 116.0'	7.4	5.1
130.0' - 134.0'	4	0.5
143.2' - 144.7'	7.2	0.5
149.2' -151.3'	6.2	1.1
192.0' -197.0'	8.7	0.4
244.1' - 248.1'	8.9	0.4
249.2' - 250.5'	16.2	7
272.55'-274.35'	9.4	0.3
305.0' - 308.0'	15.7	< 0.1
321.0' - 324.0'	9.7	0.5
334.1' - 337.0'	6.3	2.9
348.25' - 352.3'	5.6	1.1
401.0' - 404.0'	12.5	2.3
51.6' - 52.65'	22.9	7.2
66.7' - 68.85'	10.1	4.9

Analyst : Wendy Wade
Phone : 450-5433

Date : 18-Jun-93


PHILIPS PM 9920/05
Obed 66.7'-68.85'
4Dw heated
11 m
9.0
Chloride is
not present
15
10
5

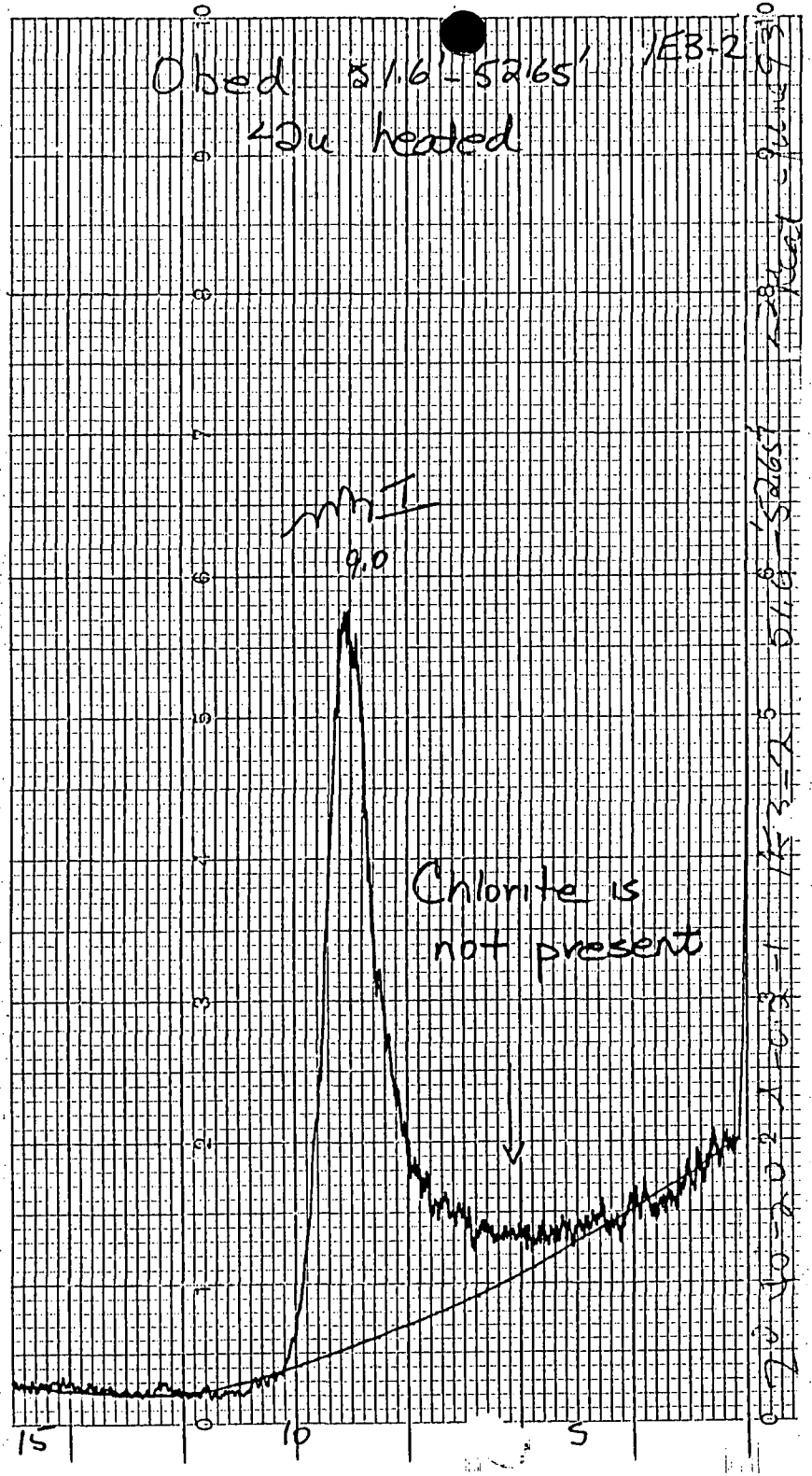

Bed 66.71-68.85'
4Dec 91yc
Clay Minerals
Illite ≈ 35 %
Montmorillonite ≈ 60 %
Kaolinite ≈ 5 %
Other Minerals
Quartz (Silicon Oxide)
M
X
Q
K
(4) 7.05 12.55
(5) 3.34 26.68
(6) 4.25 20.88
(4) 3.33 26.74
(5) 2.45 36.65
(6) 1.66 55.3
(5) 1.98 45.9
2.72
35
30
25
20
15
10
5

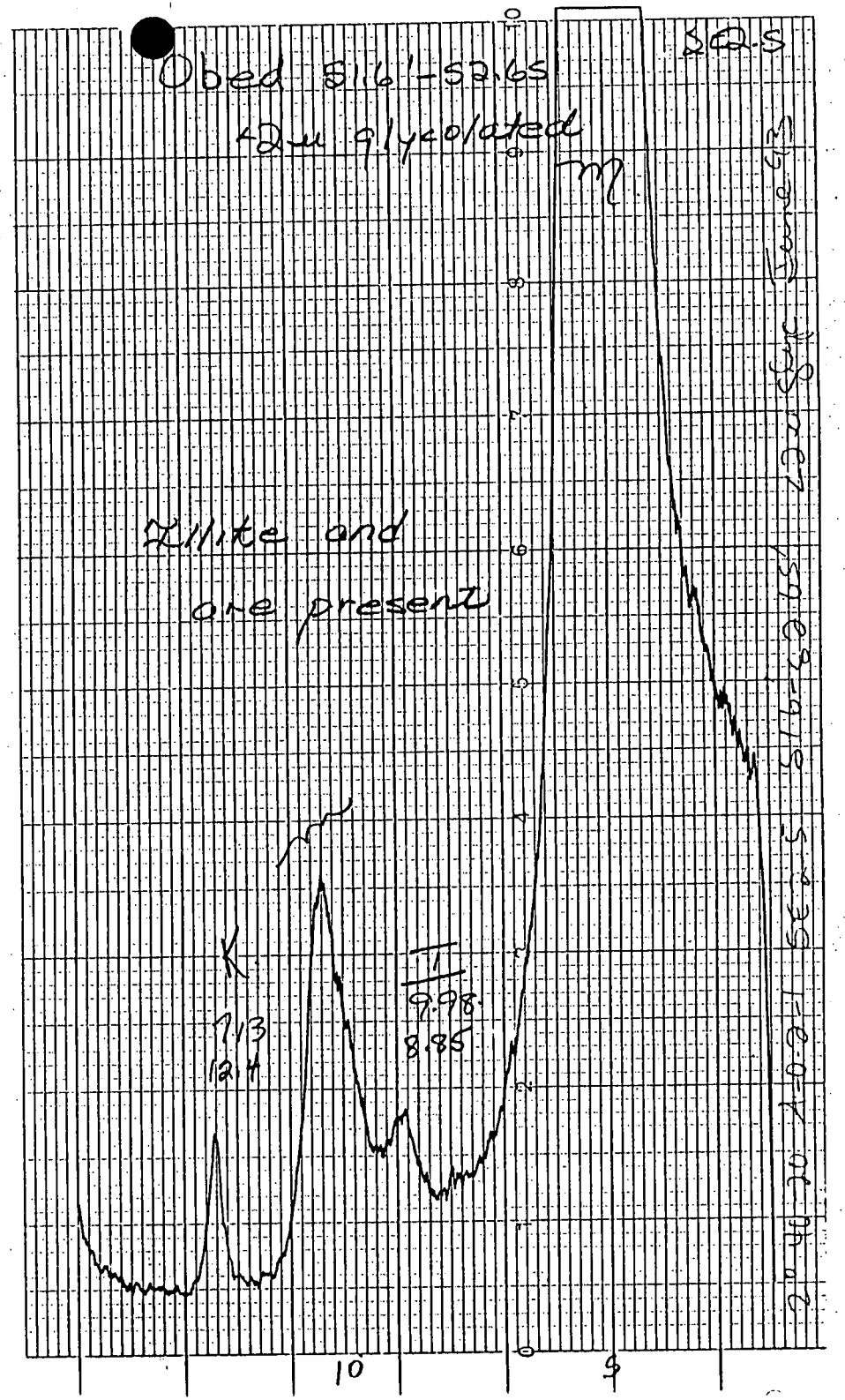
CHEMICAL ANALYSIS

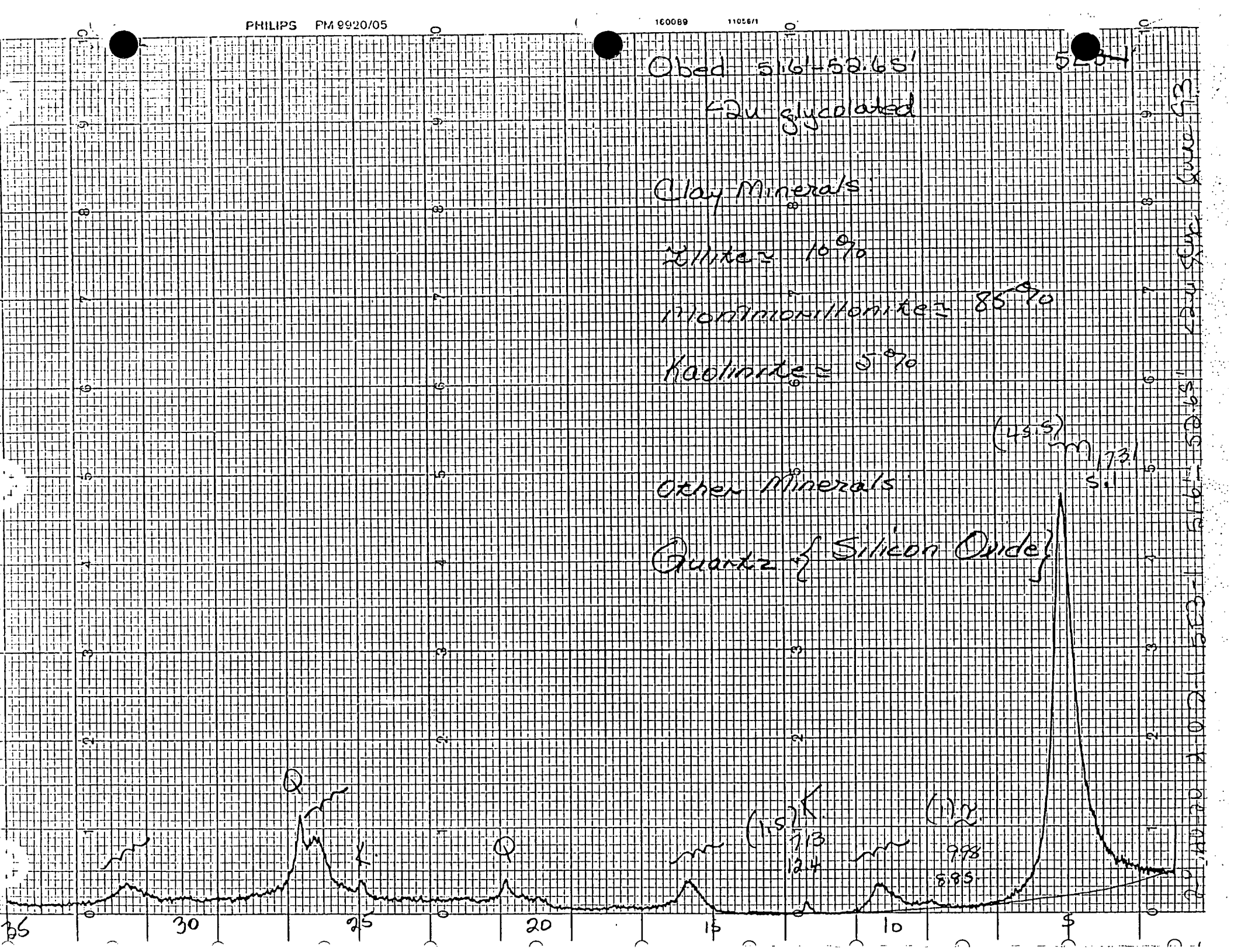
SAMPLE OBED 66.7'-68.85'

Moisture 4.9%
LOI 10.1%

Element	Value (ug/g))	Weight %	Oxide	Weight %
Na	673	0.07	Na2O	0.09
Ca	8555	0.86	CaO	1.20
K	15421	1.54	K2O	1.86
Mn	122	0.01	MnO	0.02
Al	85159	8.52	Al2O3	16.09
Fe	29951	3.00	Fe2O3	4.28
Mg	10154	1.02	MgO	1.68
Ti	3399	0.34	TiO2	0.57
P	564	0.06	P2O5	0.13
S	1645	0.17	SO3	0.41
Si	264069	26.41	SiO2	56.49


Oped 3116'-5216'
20u heated
IEB-2
mm
0,0
Chlorite is
not present
15
10
5
0


Obed 51.6'-52.6S
42" 9% elevated
M
Kinta and
are present
K
7.13
12.4
9.98
8.85
10
9


PHILIPS PM 9920/05
160089 11056/1
Obed 51.6'+52.65'
EDU Glycolated
Clay Minerals:
Illite ~ 10%
Montmorillonite ~ 85%
Kaolinite ~ 5%
Other Minerals
Quartz & Silicon Oxide
(49.5)
(1-5)K
(1)Q
1.73
1.13
1.24
7.98
8.95
35
30
25
20
15
10
5

CHEMICAL ANALYSIS

SAMPLE OBED 51.6'-52.65'

Moisture 7.2%
LOI 22.9%

Element	Value (ug/g))	Weight %	Oxide	Weight %
Na	1026	0.10	Na2O	0.14
Ca	13276	1.33	CaO	1.86
K	3909	0.39	K2O	0.47
Mn	57	0.0057	MnO	0.007
Al	62899	6.29	Al2O3	11.88
Fe	16985	1.70	Fe2O3	2.43
Mg	9266	0.93	MgO	1.54
Ti	1826	0.18	TiO2	0.30
P	180	0.02	P2O5	0.04
S	511	0.05	SO3	0.13
Si	234952	23.50	SiO2	50.26

A N A L Y S I S R E P O R T

Sample # 940733

Customer Information

NAME DIANE GOULET
DEPARTMENT GEOL
PROJECT 40351600
DUE DATE 13-Jul-1993

DATE SUBMITTED 29-Jun-1993

CUSTOMER # #2 93-NP-8C #8 & #7

SAMPLE TYPE Coal

T R A C E A N A L Y S I S

Remarks: N O N E

Method used : ICP

Result #: 1

Moisture: 0.00
550° - Ash : 21.73 WT% (as rcvd)
Loss ign: 0.00

Symbol	Element	Value	Units
V	Vanadium	91	UG/G (IN ASH)
Mo	Molybdenum	215	UG/G
			UG/G
Zn	Zinc	63	UG/G
Cu	Copper	31	UG/G
Pb	Lead	20	UG/G
Li	Lithium	41	UG/G
Cd	Cadmium	2	UG/G
Co	Cobalt	13	UG/G
Ni	Nickel	30	UG/G
B	Boron	1414	UG/G
Cr	Chromium	22	UG/G
Zr	Zirconium	355	UG/G
W	Tungsten	7	UG/G

Analyst: ICP

Compl'n Date: 5-Jul-1993

AUTHORIZED BY: [redacted]

SIGNED BY:

A N A L Y S I S R E P O R T

Sample # 940733

Customer Information

NAME DIANE GOULET
DEPARTMENT GEOL
PROJECT 40351600
DUE DATE 13-Jul-1993

DATE SUBMITTED 29-Jun-1993

CUSTOMER # #2 93-NP-8C #8 & #7

SAMPLE TYPE Coal

A S H C H E M I C A L C O M P O S I T I O N

Remarks: N O N E

Method used : ICP

Result #: 1

Moisture: 0.00 wt % AR
750C Ash: 20.40 wt % AR
Loss ign: 0.00 wt % ash

Element	Wt % in ash	Oxide	Wt % in ash
Na	2.06	Na2O	2.77
Ca	5.16	CaO	7.22
K	0.43	K2O	0.52
Mn	0.03	MnO	0.04
Al	10.47	Al2O3	19.79
Fe	2.34	Fe2O3	3.34
Mg	1.12	MgO	1.85
Ti	0.34	TiO2	0.56
Ba	0.41	BaO	0.46
Sr	0.12	SrO	0.14
P	0.10	P2O5	0.23
S	1.43	SO3	3.58
Si	26.28	SiO2	56.21

Analyst: ICP

Compl'n Date: 5-Jul-1993

AUTHORIZED BY: [redacted]

SIGNED BY:

A N A L Y S I S R E P O R T

Sample # 940734

Customer Information

NAME DIANE GOULET
DEPARTMENT GEOL
PROJECT 40351600
DUE DATE 13-Jul-1993

DATE SUBMITTED 29-Jun-1993

CUSTOMER # #9 93-NP-8C

SAMPLE TYPE Coal

T R A C E A N A L Y S I S

Remarks: N O N E

Method used : ICP

Result #: 1

Moisture: 0.00
550°C- Ash : 24.25 WT% (as received)
Loss ign: 0.00

Symbol	Element	Value	Units
V	Vanadium	33	UG/G (IN ASH)
Mo	Molybdenum	2	UG/G
		--	UG/G
Zn	Zinc	58	UG/G
Cu	Copper	18	UG/G
Pb	Lead	28	UG/G
Li	Lithium	34	UG/G
Cd	Cadmium	1	UG/G
Co	Cobalt	7	UG/G
Ni	Nickel	15	UG/G
B	Boron	1002	UG/G
Cr	Chromium	10	UG/G
Zr	Zirconium	246	UG/G
W	Tungsten	1	UG/G

Analyst: ICP

Compl'n Date: 5-Jul-1993

AUTHORIZED BY: [redacted]

SIGNED BY:

A N A L Y S I S R E P O R T

Sample # 940734

Customer Information

NAME DIANE GOULET
DEPARTMENT GEOL
PROJECT 40351600

DATE SUBMITTED 29-Jun-1993

DUE DATE 13-Jul-1993

CUSTOMER # #9 93-NP-8C

SAMPLE TYPE Coal

A S H C H E M I C A L C O M P O S I T I O N

Remarks: N O N E

Method used : ICP

Result #: 1

Moisture: 0.00 wt % AR
750C Ash: 22.84 wt % AR (as received)
Loss ign: 0.00 wt % ash

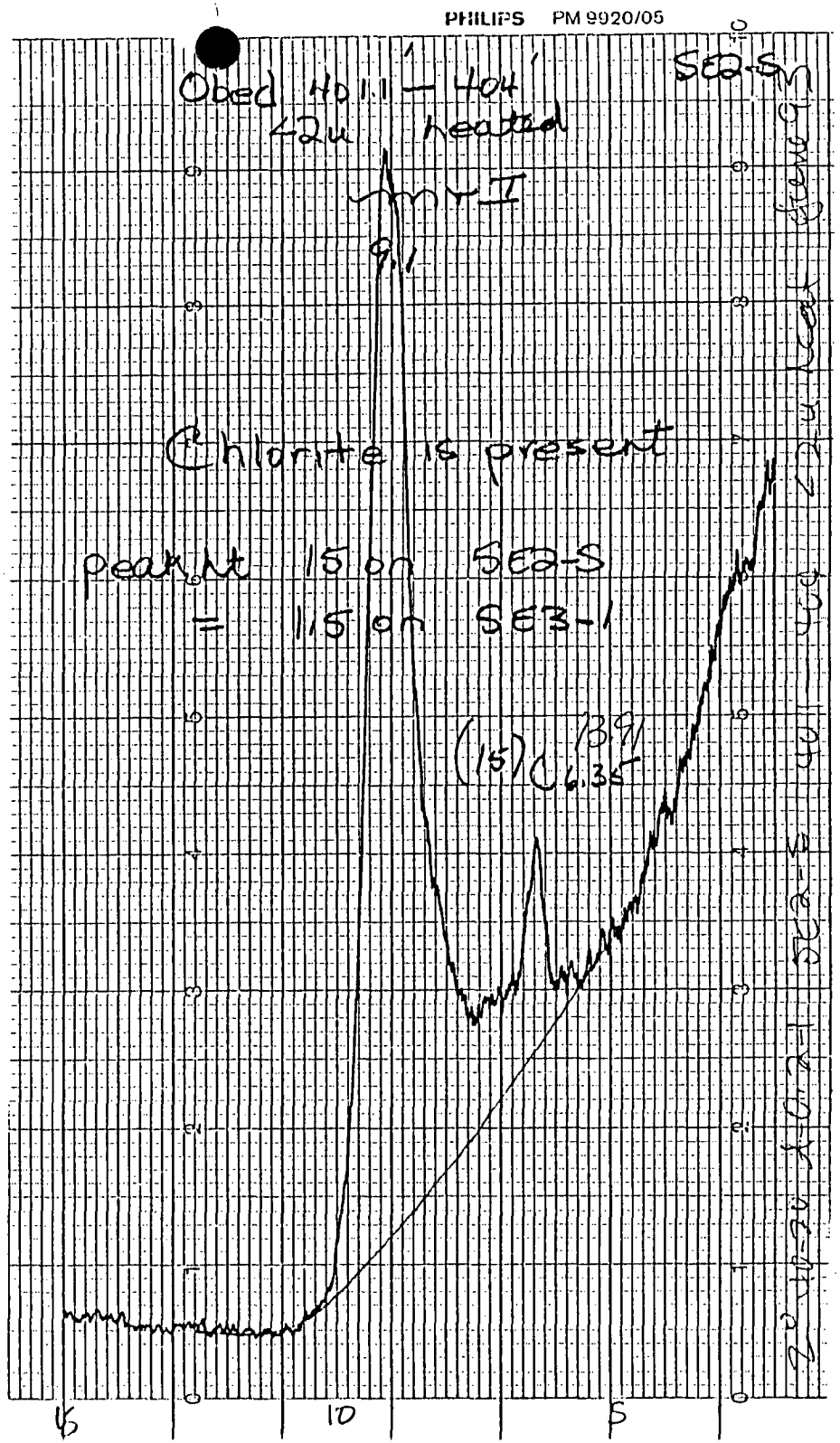
Element	Wt % in ash	Oxide	Wt % in ash
Na	1.91	Na2O	2.57
Ca	5.39	CaO	7.55
K	0.41	K2O	0.49
Mn	0.04	MnO	0.05
Al	8.72	Al2O3	16.48
Fe	1.56	Fe2O3	2.23
Mg	0.77	MgO	1.28
Ti	0.24	TiO2	0.40
Ba	0.32	BaO	0.36
Sr	0.09	SrO	0.11
P	0.07	P2O5	0.16
S	0.96	SO3	2.41
Si	29.10	SiO2	62.25

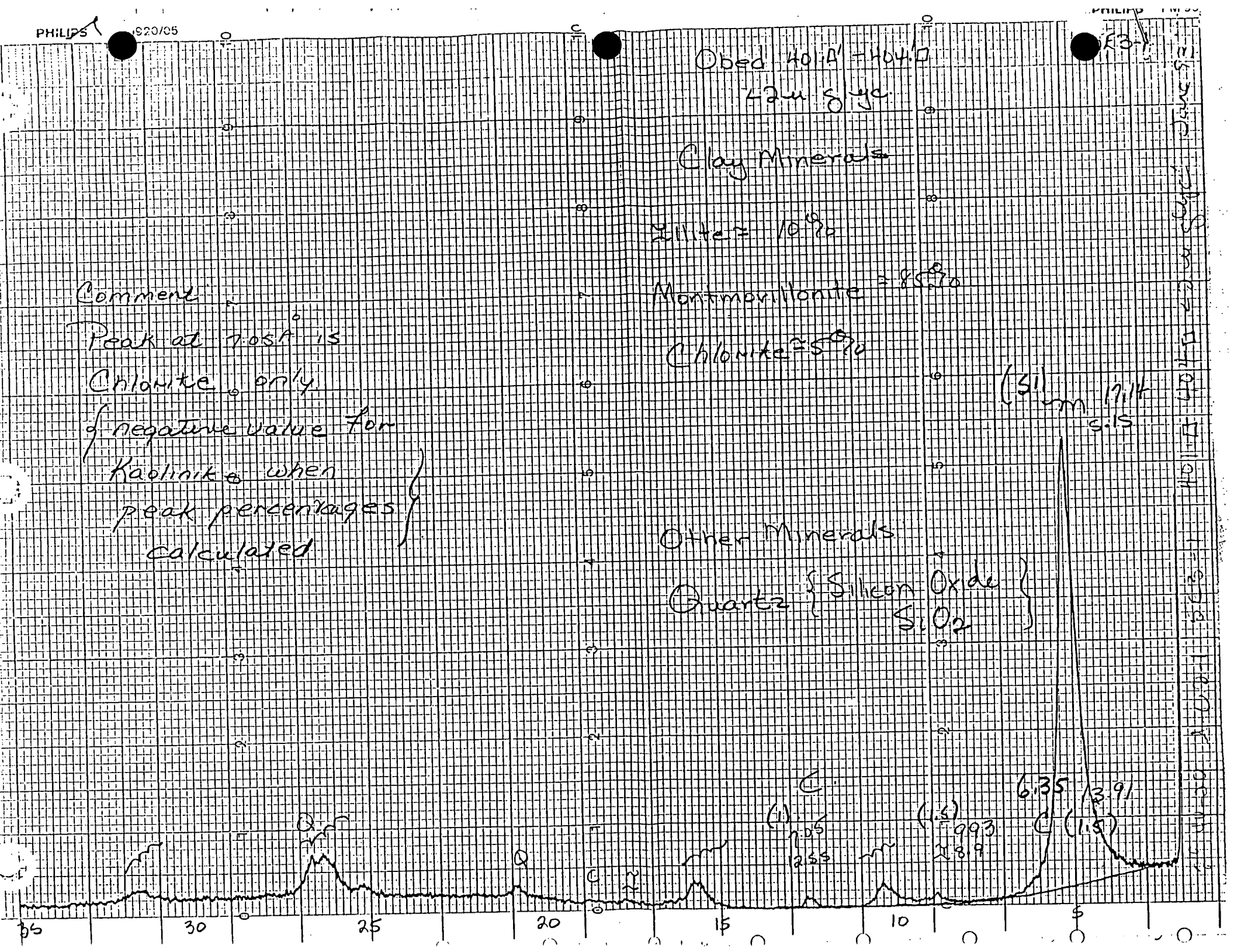
Analyst: ICP

Compl'n Date: 5-Jul-1993

AUTHORIZED BY: [redacted]

SIGNED BY:


PHILIPS PM 9920/05
Obed 401.1 – 404'
42u heated
SE2-S
Chlorite is present
peak ht 115 on SE2-S
= 115 on SE3-1
(15) 6.35
10
5


PHILIPS
Obed 401A' -1404.0
-2w 50yc
Clay Minerals
Illite ≈ 10%
Montmorillonite ≈ 85%
Chlorite ≈ 5%
Other Minerals
Quartz } Silicon Oxide
SiO2
Comment
Peak at 7.05A is
Chlorite only
of negative value for
Kaolinite when
peak percentages
calculated
(51) 17.14
5.15
6.35
3.91
(1.5)
(1.6)
9.93
8.9
(1) 4.25
12.53
35
30
25
20
15
10
5

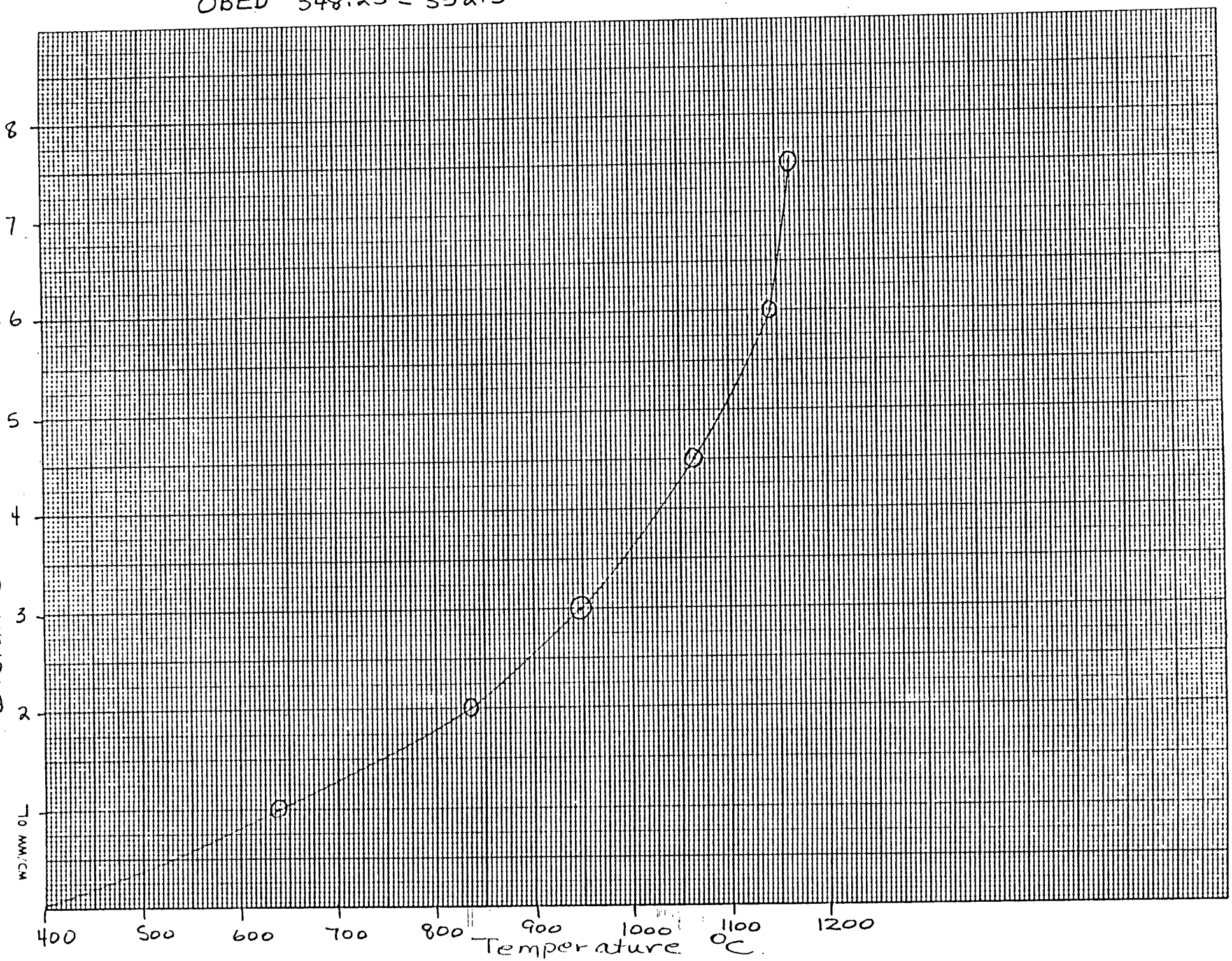
CHEMICAL ANALYSIS

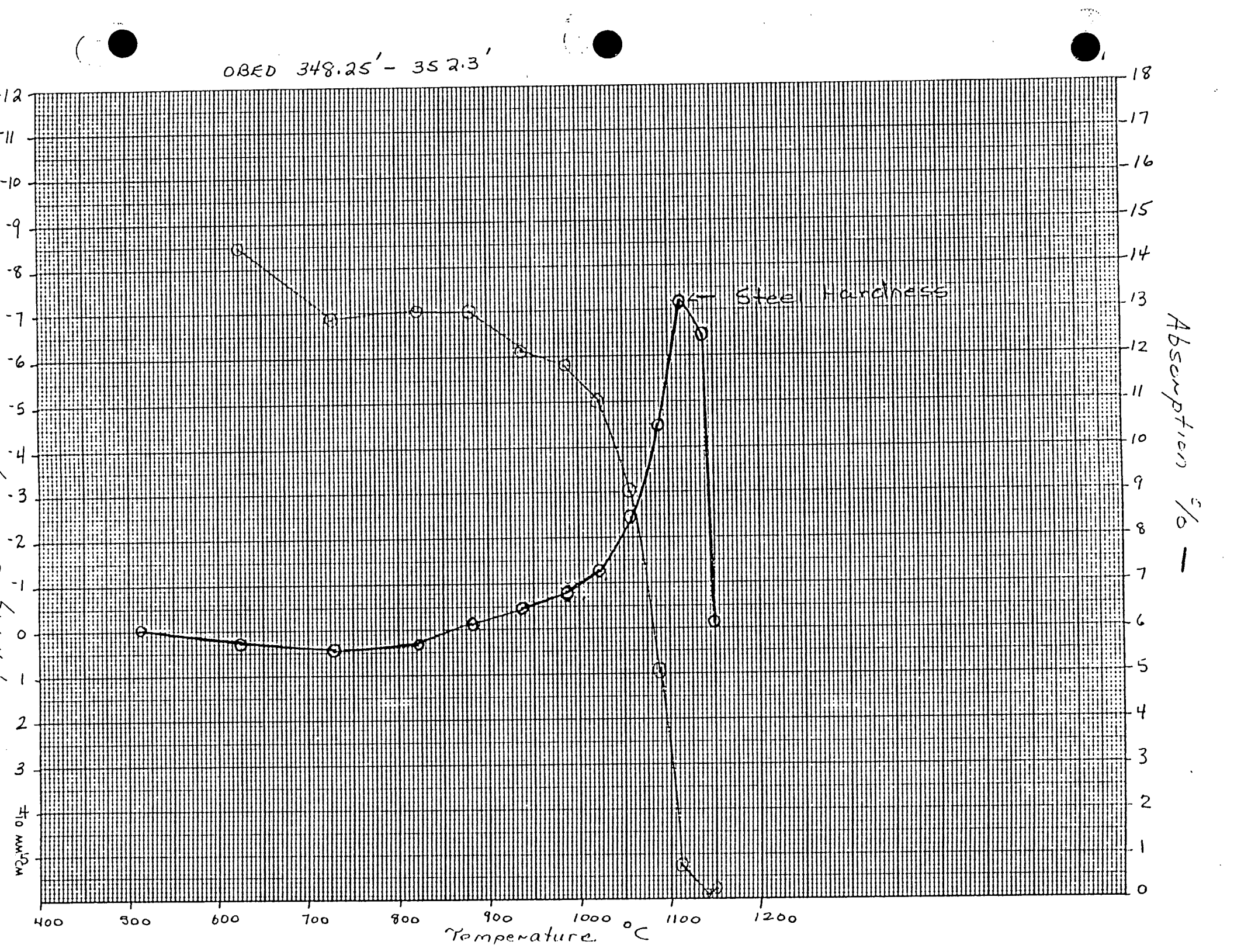
SAMPLE OBED 401.0'-404.0'

Moisture 2.3%
LOI 12.5%

Element	Value (ug/g))	Weight %	Oxide	Weight %
Na	14103	1.41	Na2O	1.90
Ca	5664	0.57	CaO	0.79
K	10901	1.09	K2O	1.31
Mn	134	0.01	MnO	0.02
Al	66214	6.62	Al2O3	12.51
Fe	17400	1.74	Fe2O3	2.49
Mg	7858	0.79	MgO	1.30
Ti	3226	0.32	TiO2	0.54
P	589	0.06	SO3	0.09
Si	283875	28.39	SiO2	60.73

OBED 348.25' - 352.3'




OBED 348.25' - 352.3'
HT Steel Hardness
Absorption %
Temperature °C
400
500
600
700
800
900
1000
1100
1200

SAMPLE NO

	LENGTH		WIDTH			TEMP	SHRINKAGE	FRONT BAR ABSORPTION			
FRONT	DRY	FIRED	DRY	FIRED	DIFF.	°C	%	WET WT.	DRY WT.	DIFF	% AB.
1	1.44	1.44	.873	.873	0	513	0%				
2	1.93	1.93	.882	.884	+.002	625	+.23%	6.9319	5.9528	1.0039	14.48%
3	1.42	1.42	.890	.894	+.004	728	+.45%	8.1620	7.1133	1.0487	12.85%
4	1.92	1.92	.893	.896	+.003	821	+.34%	6.9210	6.0174	.9036	13.06%
5	2.42	2.42	.895	.894	-.001	882	-.11%	6.5791	5.7191	.8600	13.07%
6	2.93	2.93	.896	.892	-.004	937	-.45%	6.8208	5.9936	.8272	12.13%
7	3.43	3.43	.896	.889	-.007	985	-.78%	6.4640	5.7002	.7638	11.82%
8	3.94	3.92	.896	.885	-.011	1022	-1.23%	4.8786	4.3418	.5368	11%
9	4.43	4.40	.895	.873	-.022	1057	-2.46%	7.5214	6.8442	.6772	9%
10	4.93	4.87	.894	.854	-.040	1087	-4.47%	6.0697	5.7662	.3035	5%
11	5.43	5.34	.892	.828	-.064	1112	-7.18%	5.6234	5.5818	.0416	.74%
12	5.93	5.78	.888	.831	-.057	1138	-6.42%	5.9065	5.9011	.0054	.09%
13	6.42	6.25	.884	.883	-.001	1148	-.11%	5.7084	5.6988	.0096	.17%
14											
REAR							0%				
1	.43	.43	.902	.902	0		+.33%				
2	.93	.93	.902	.905	+.003		+.33%				
3	1.43	1.43	.905	.908	+.003		+.33%				
4	1.93	1.93	.906	.909	+.003		0%				
5	2.44	2.43	.908	.908	0		-.33%				
6	2.95	2.94	.909	.906	-.003		-.77%				
7	3.45	3.43	.910	.903	-.007		-1.32%				
8	3.94	3.92	.910	.898	-.012		-2.27%				
9	4.45	4.41	.909	.884	-.025		-5.07%				
10	4.96	4.89	.908	.862	-.046		-7.30%				
11	5.45	5.35	.904	.835	-.066		-6.56%				
12	5.96	5.80	.900	.841	-.059		+2.90%				
13	6.46	6.26	.896	.922	+.026						
14											

COMMENTS.

Absorption Wet #1 broke down in H_2O (no weight taken)

SAMPLE # OBED 348.25'-352.3' DATE June 10/93

Sample	2100
Ml. Water	535
Total	2635
% H_2O	20.3%

Wet Length	10.0
Losson Drying	.725
*(5 Bars	9.25, 9.3, 9.25, 9.3, 9.25
% Drying Shrinkage @ 150°C	7.25%

Color - Light Gray Mudstone

PLASTICITY / WORKABILITY / COMMENTS: Good - Sample was 'dry' in feel while mixing. Entire sample moist. Large chunks formed when squeezed but starting to get sticky. material in extruder exhibited good plasticity - molded onto cap & casing & very easy to remove (peeled off - plasticene in feel) (6 Bars extruded - fairly straight but not firm)

DRYING @ 105°C: 1 Bar - Cracks Badly. - Broke. 3% Drying Shrinkage

@ Room Temp (RT): *3 Bars RT & 2 Bars 50°C - Minor Cracks & Warps

TEMPERATURE GRADIENT FURNACE

TEST UNIT TG-CA DATE June 21/93

CONTROLLER TEMP 2500°C - 1200°C with a 2½ hr soak at 850°C (7¼ hr)

REAR	READINGS	FRONT	READINGS
0 (7.5")	1167.4	0 (7.5")	1165.1
1 (6.0")	1139.2	1 (6.0")	1142.8
2 (4.5")	1068.5	2 (4.5")	1069.1
3 (3.0")	948.5	3 (3.0")	949.2
4 (2.0")	827.9	4 (2.0")	834.6
5 (1.0")	633.7	5 (1.0")	639.5

CHARACTERISTICS OF FIRED SAMPLES

STEEL HARD COLOR	STEEL HARD TEMP. (C)	STEEL HARD ABSORPTION (%)	MAXIMUM FIRE COLOR	MAXIMUM FIRE TEMP. (C)	MAXIMUM FIRE ABSORPTION (%)	MAXIMUM FIRE SHRINKAGE (%)	REMARKS
Moderate brown (5YR4/4)	1112	0.74	Moderate brown (5YR 4/4)	1112	0.74	7.18	No firing range. Maximum fire and steel hard coincide. Possibly structural clay products if firing is very accurate.

CHARACTERISTICS OF UNFIRED SAMPLES

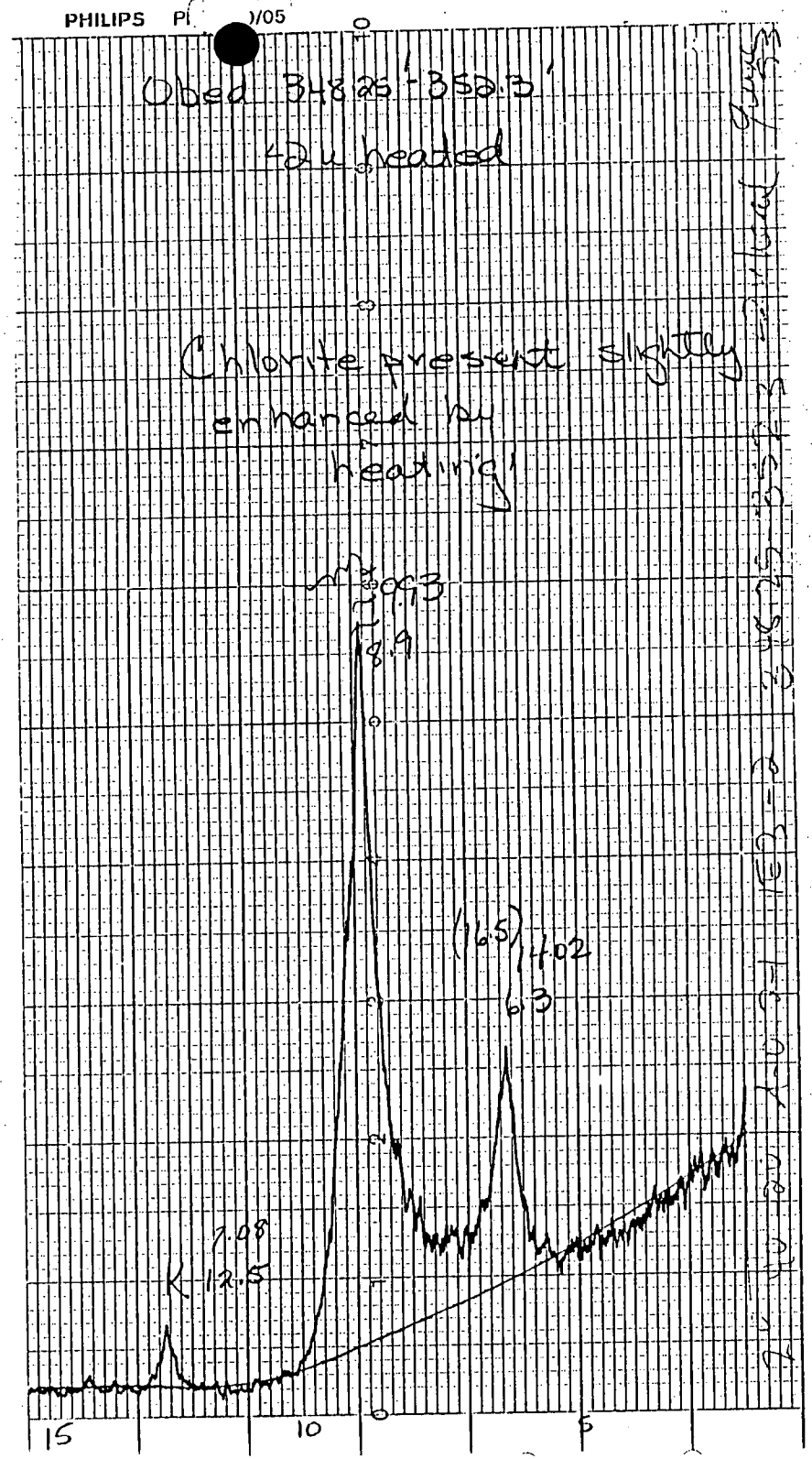
SAMPLE	DESCRIPTION	TEMPERING WATER (%)	PLASTICITY	WORK-ABILITY	DRYING PROPERTIES ROOM TEMP.	DRYING PROPERTIES 105 C	DRYING SHRINKAGE (%) 150 C
348.25'-353.30'	Light gray (N7) mudstone	20.30	good	good	minor warp and minor cracks	cracks badly	7.25

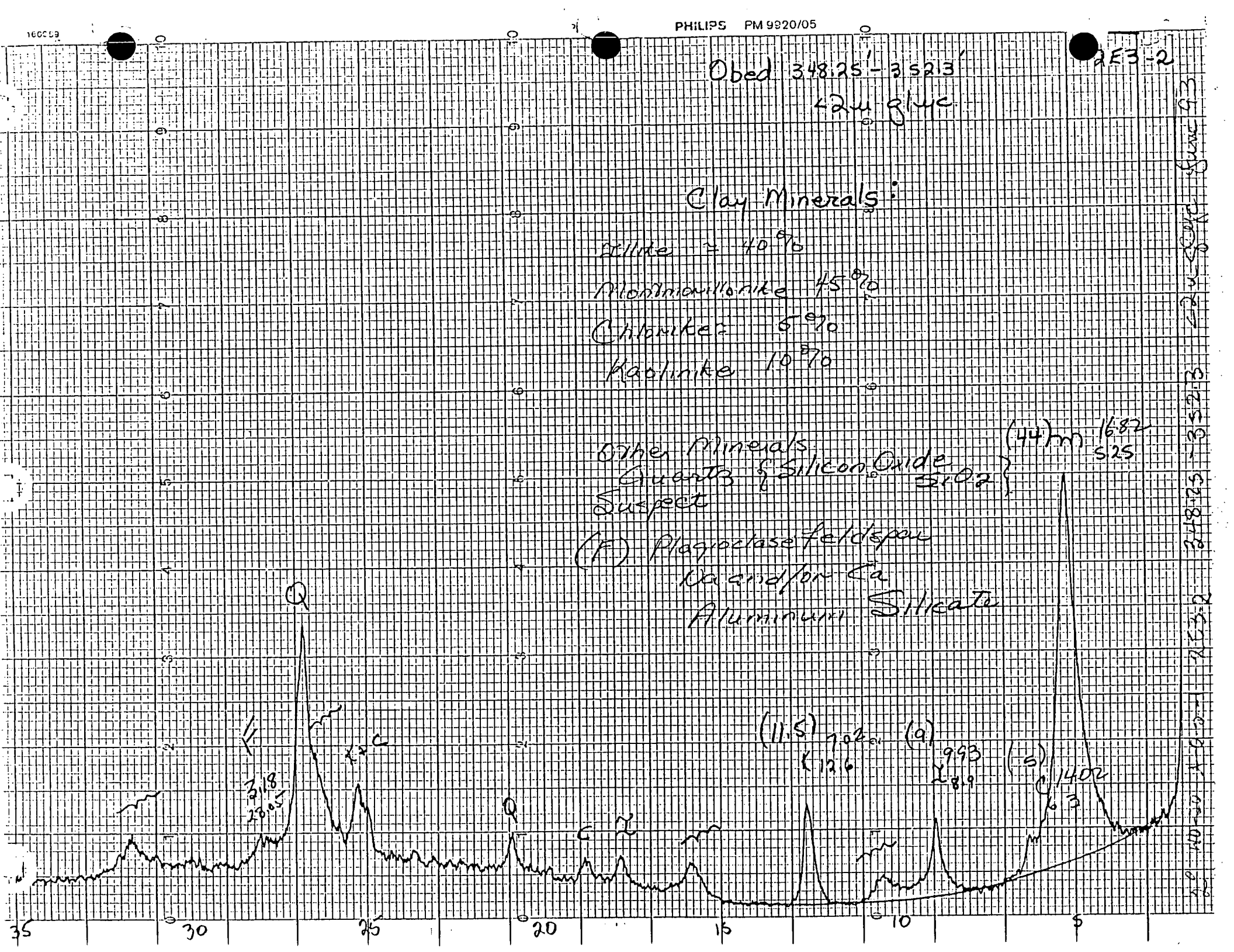
CERAMIC TEST

CHARACTERISTICS OF UNFIRED SAMPLES

SAMPLE	DESCRIPTION	TEMPERING WATER (%)	PLASTICITY	WORK-ABILITY	DRYING PROPERTIES ROOM TEMP.	DRYING PROPERTIES 105 C	DRYING SHRINKAGE (%) 150 C
348.25'-353.30'	Light gray (N7) mudstone	20.30	good	good	minor warp and minor cracks	cracks badly	7.25

CERAMIC TEST


PHILIPS
Oberd 348.25 - 350.3'
4Δu heated
Chlorite present slightly
enhanced by
heating
7.08
K 12.5
14.02
15
10
5

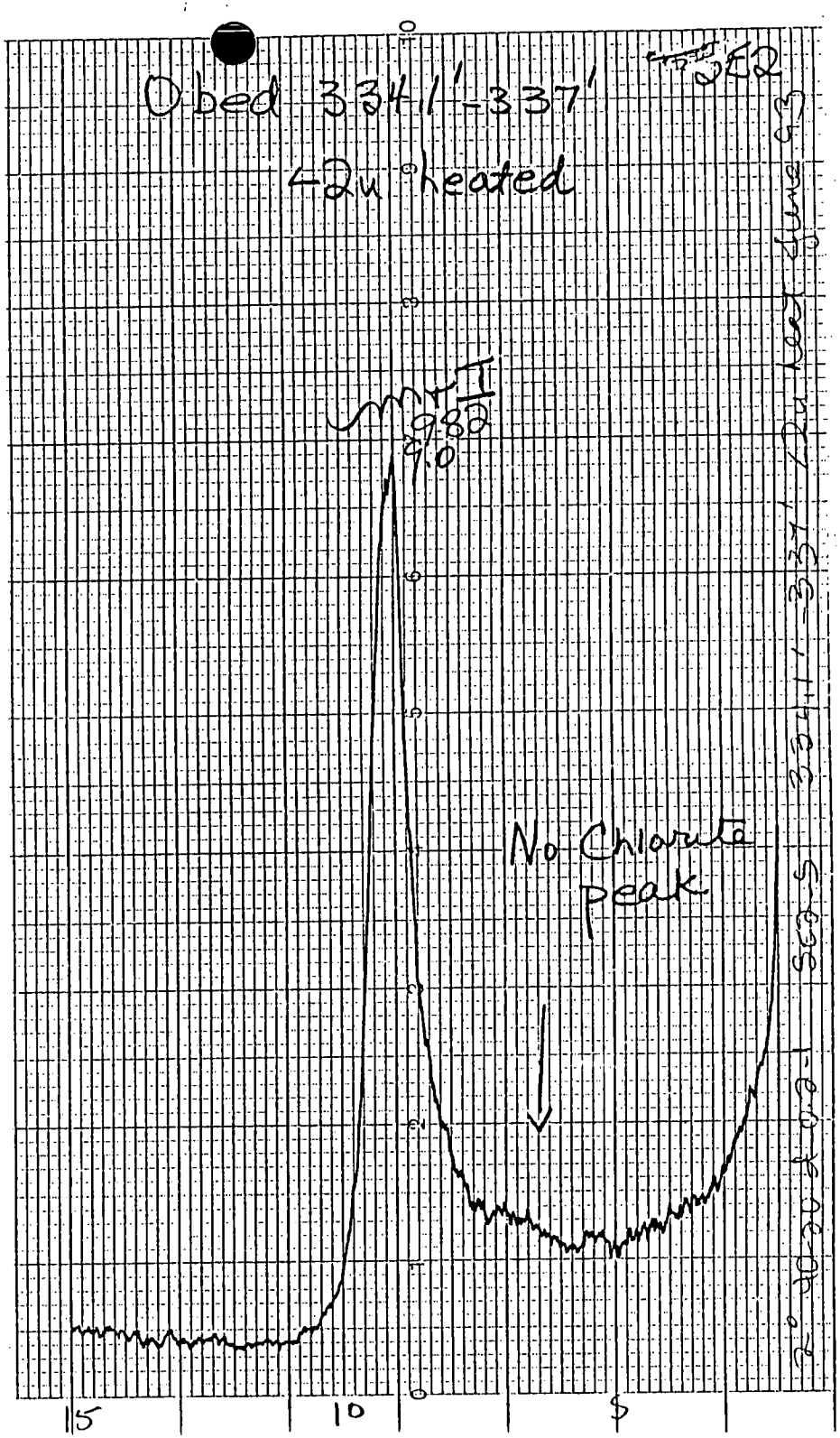

PHILIPS PM 9820/05
Obed 348.25' - 3s213'
<2μ 8.4c
2E3-2
Clay Minerals:
Illite ~ 40%
Montmorillonite 45%
Chlorite 5%
Kaolinite 10%
Other Minerals
Quartz & Silicon Oxide
Suspect
(F) Plagioclase feldspar
Aluminum Silicate
(44)mm 16.82
5.25
Q
F
3.18
28.0°
K+C
Q
C
K
(11.5) 7.02
12.6
(9) 9.93
8.9
(5) 14.02
6.3
35
30
25
20
15
10
5

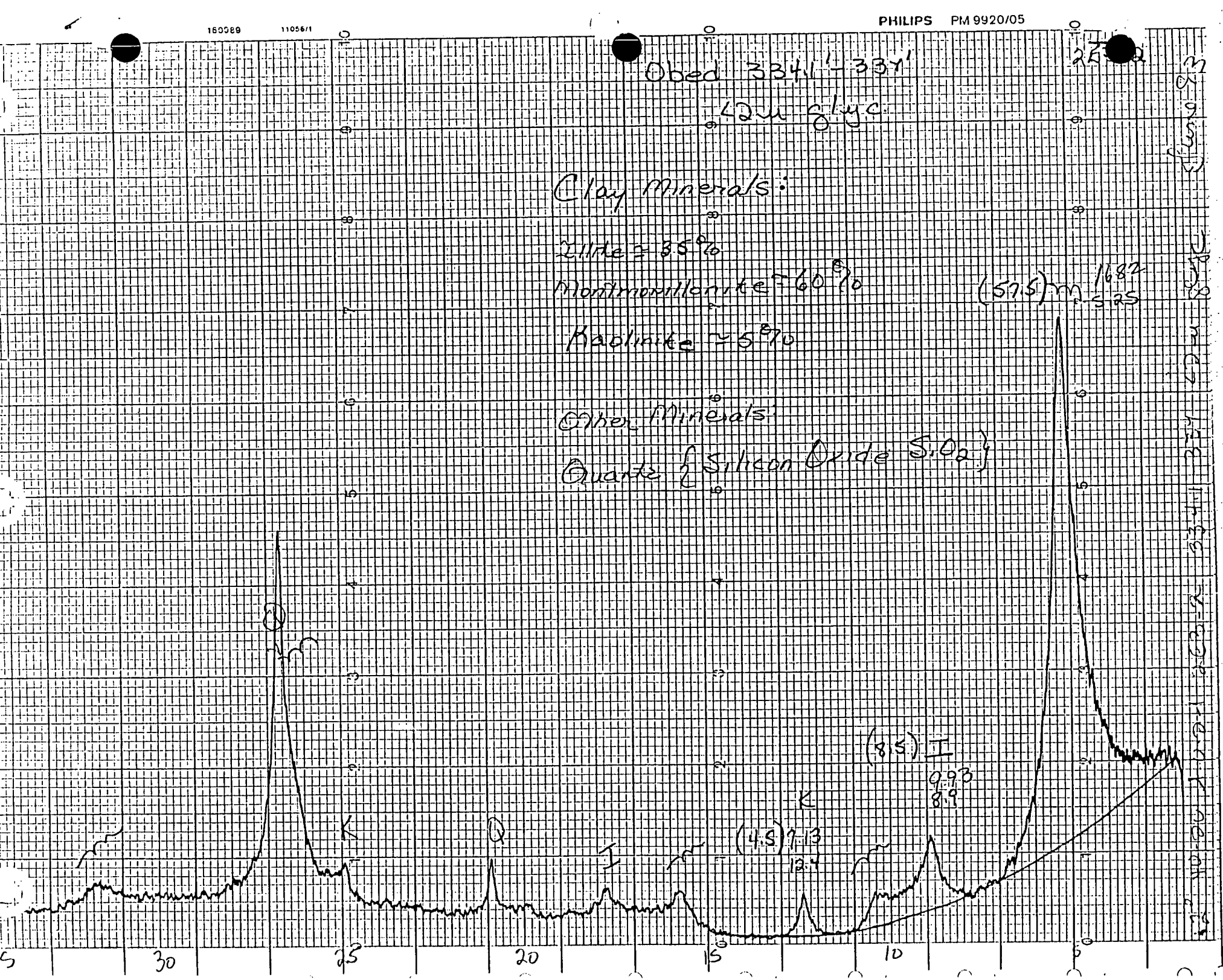
CHEMICAL ANALYSIS

SAMPLE OBED 348.25'-352.3'

Moisture 1.1%
LOI 5.6%

Element	Value (ug/g))	Weight %	Oxide	Weight %
Na	11201	1.12	Na2O	1.51
Ca	9832	0.98	CaO	1.38
K	21597	2.16	K2O	2.60
Mn	620	0.06	MnO	0.08
Al	83181	8.32	Al2O3	15.72
Fe	34128	3.41	Fe2O3	4.88
Mg	13201	1.32	MgO	2.19
Ti	4359	0.44	TiO2	0.73
P	822	0.08	P2O5	0.19
S	322	0.03	SO3	0.08
Si	285492	28.55	SiO2	61.07


O-bed 3341'-3371'
-2w heated
MRT
9.80
9.0
No Chloride
Peak
15
10
5

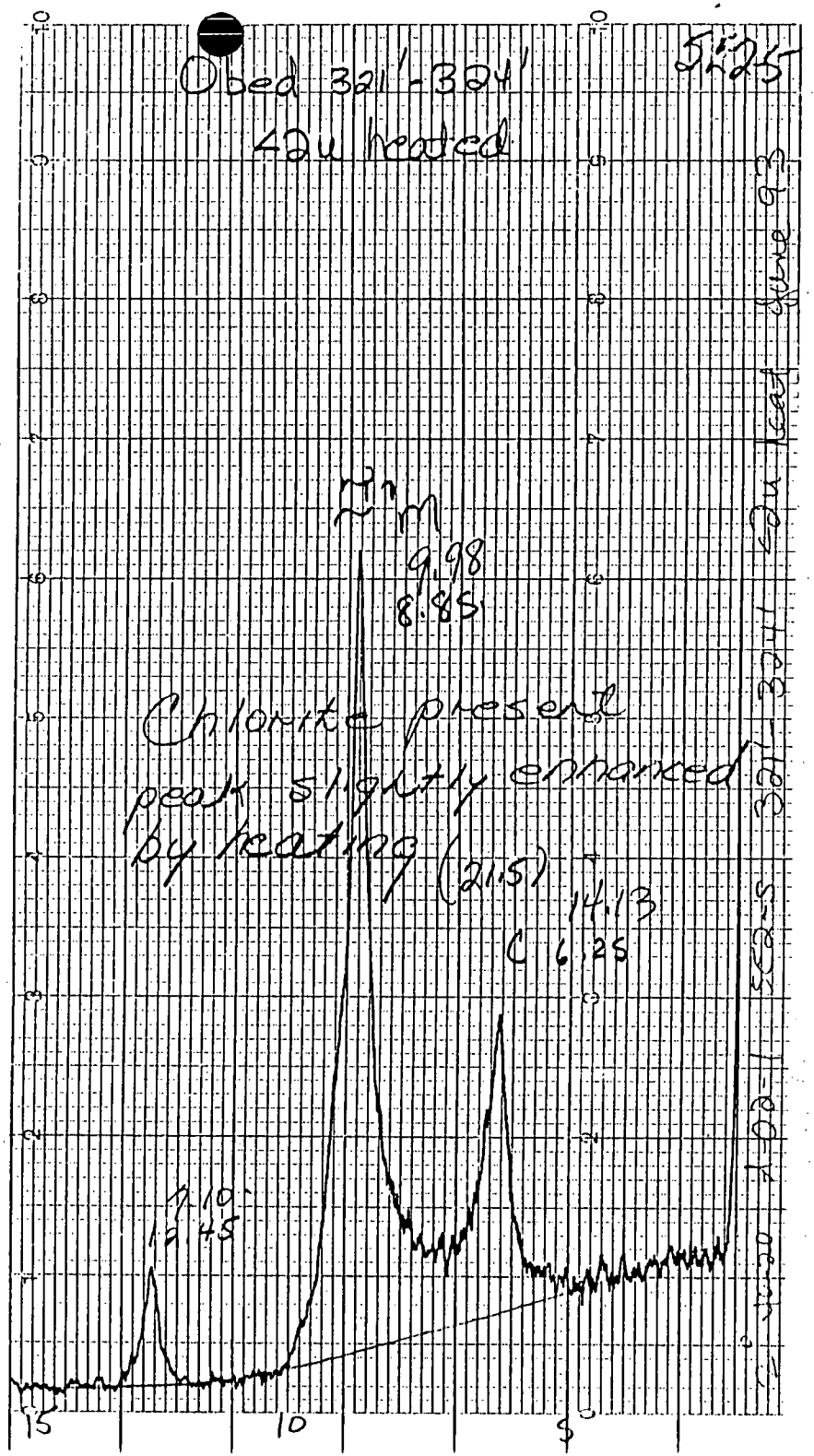

PHILIPS PM 9920/05
Obed 3341-331'
42N 80W
Clay Minerals:
Illite ≈ 35%
Montmorillonite ≈ 60%
Kaolinite ≈ 5%
Other Minerals:
Quartz (Silicon Oxide SiO2)
(57.5) 1682
(8.5) H 9.93 8.9
(4.5) 7.13 12.4
K
Q
I
30
25
20
15
10
5

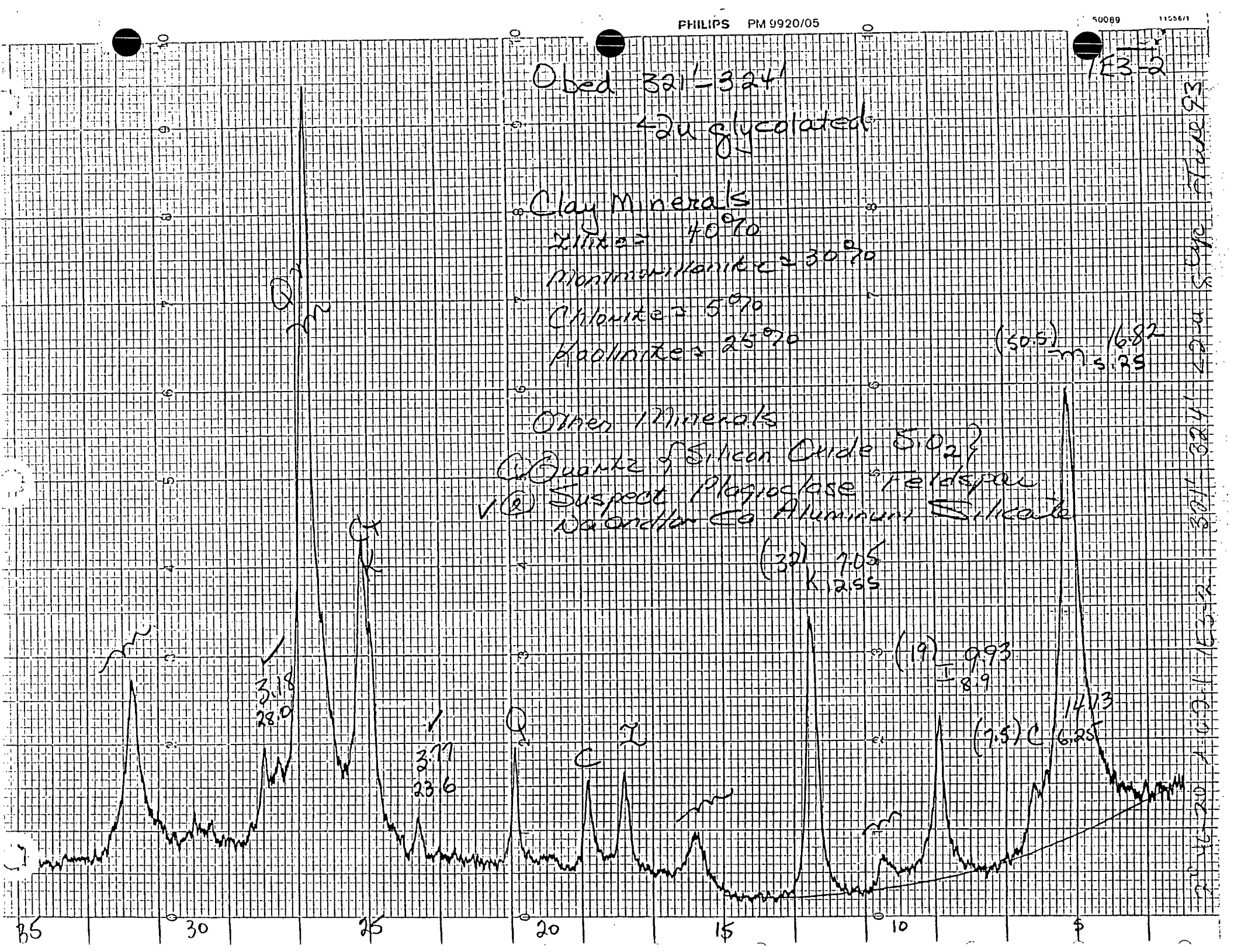
CHEMICAL ANALYSIS

SAMPLE OBED 334.1'-337'

Moisture 2.9%
LOI 6.3%

Element	Value (ug/g))	Weight %	Oxide	Weight %
Na	4157	0.42	Na2O	0.56
Ca	6222	0.62	CaO	0.87
K	20322	2.03	K2O	2.45
Mn	367	0.04	MnO	0.05
Al	91016	9.10	Al2O3	17.20
Fe	27785	2.78	Fe2O3	3.97
Mg	10925	1.09	MgO	1.81
Ti	3742	0.37	TiO2	0.62
P	449	0.05	P2O5	0.10
S	310	0.03	SO3	0.08
Si	280434	28.04	SiO2	59.99


Obed 321'-324'
42u heated
9.98
8.85
Chlorite present
peak slightly enhanced
by heating (2.51)
14.13
6.28
7.10
4.48
15
10
5


Obed 321'-324'
TE3-2
Clay Minerals
Illite ~ 40%
Montmorillonite ~ 30%
Chlorite ~ 5%
Kaolinite ~ 25%
Other Minerals
Quartz & Silicon Oxide 5.0%
Suspect Plagioclase Feldspar
Dolomite & Aluminum Silicate
Q
K
C
Q
K
C
3.18
28.0
3.11
23.6
(30) 7.05
12.5S
(19) 9.93
8.9
(7.5) 14.13
6.25
(50.5) 6.82
5.35
35
30
25
20
15
10
5

CHEMICAL ANALYSIS

SAMPLE OBED 321.0'-324.0'

Moisture 0.5%
LOI 9.7%

Element	Value (ug/g))	Weight %	Oxide	Weight %
Na	6866	0.69	Na2o	0.93
Ca	16147	1.62	Cao	2.26
K	18495	1.85	K2O	2.23
Mn	1117	0.11	MnO	0.14
Al	82211	8.22	Al2O3	15.53
Fe	52829	5.28	Fe2O3	7.55
Mg	15622	1.56	MgO	2.59
Ti	4164	0.42	TiO2	0.69
P	915	0.09	P2O5	0.21
S	316	0.03	SO2	0.08
Si	249801	24.98	SiO2	53.44

SAMPLE NO 305'-308' UNWASHED WT. _____ WT. -325 110.63gm

HICROMETRE	READING ON CHART	PERCENTAGE OF -325	WEIGHT. Retained	Percent Retained	Weight Passing	% Passing
31.0	98.5	1.5	1.66	.32%	108.97	20.64%
22.0	95.0	3.5	3.87	.73%	105.1	19.91%
15.6	86.8	8.2	9.07	1.72%	96.03	18.19%
11.0	73.5	13.3	14.71	2.79%	81.32	15.14%
7.8	59.5	14.0	15.49	2.94%	65.83	12.46%
5.5	45.8	13.7	15.16	2.87%	50.67	9.59%
3.9	35.0	10.8	11.95	2.26%	38.72	7.33%
2.8	27.0	8.0	8.85	1.68%	29.87	5.65%
2.0	22.0	5.0	5.53	1.05%	24.34	4.6%
1.4	18.0	4.0	4.43	.83%	19.91	3.77%
0.98	14.8	3.2	3.54	.67%	16.37	3.1%
0.69	12.0	2.8	3.10	.58%	13.37	2.52%
0.49	10.0	2.0	2.21	.42%	11.06	2.10%
< 0.49		10.0	11.06	2.10%	—	0 %
		100%	110.63	20.96%		

PARTICLE SI_ _ISTRIBUTION

SAMPLE IDENTIFICATION 305'- 308'

DATE July 12 93

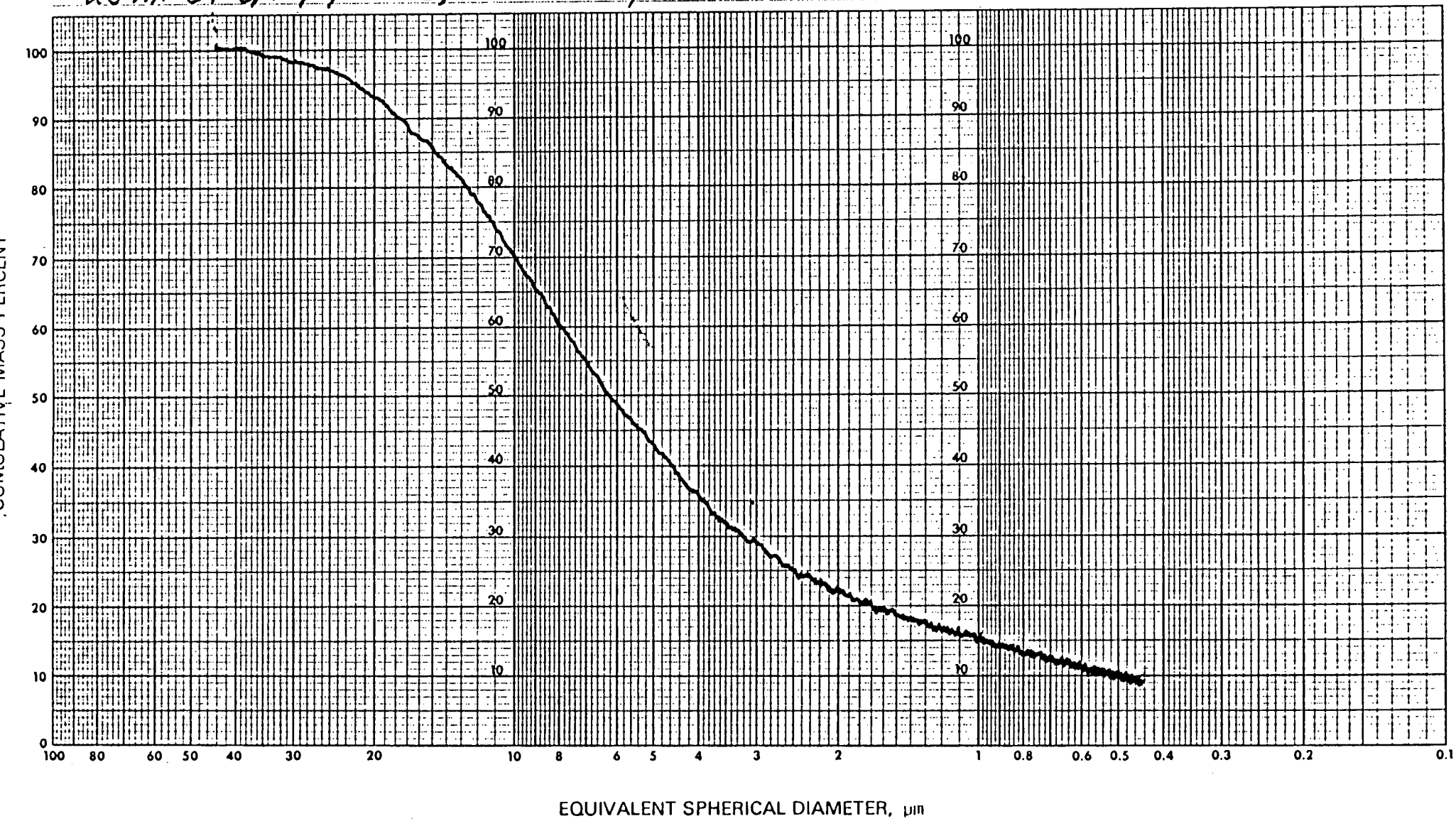
Density 2.65 g/cc LIQUID .05% Sodium Hexametaphosphate Density .9951 g/cc Viscosity .7679 cp

BY D. Goulet

Preparation Mixed with liquid, blended in a Waring blender, 25 ml of spl pipetted, ultrasonk probed for 2 minutes

TEMPERATURE 32 °C

RATE 354 START DIA. 44 µm



micromeritics®
instrument corporation

Form 500/42701

SAMPLE OBED 305' – 308'

DRY SIEVE (INITIAL WT : 486.08)

SIEVE #	WT SIEVE	WT SIEVE + SPL	WT SPL	COMMENTS
#5	426.83	426.83	—	
#10	367.95	381.38	13.43	composites
#18	340.48	361.64	21.16	composites
#35	313.34	342.39	29.05	composites ? single quartz grains
#60	303.36	475.92	172.54	few composites
#120	298.42	413.68	115.26	
#170	276.84	307.87	31.03	
#230	246.86	268.87	22.01	
#325	242.87	255.50	12.63	
PAN	248.29	317.23	68.94	68.94 DRY + 41.69 WET = 110.63
		TOTAL	486.05 (DRY)	+ 41.69 = 527.74 gm.

NAME OBED 305'-308' JOB NO

WET SIEVE

SAMPLE NO.	PAN NO.	WEIGHT PAN	WEIGHT PAN -325 (AIRDRY)	WEIGHT -325 AIRDRY
< 325 MESH	#24	193.48	235.17	41.69
> 325 MESH	#1 (Evaporating Dish)	240.46	726.54	486.08
			TOTAL	527.77

ALBERTA RESEARCH COUNCIL ——— AGGREGATE INVENTORY

GRAIN SIZE ANALYSIS

PROJECT OBED MOUNTAIN COAL LTD DATE JUNE 93 SAMPLE NO. 305'-308'

TESTED BY Goulet CHECKED BY ____

REMARKS ____

DRY WEIGHT OF COARSE SAMPLE =

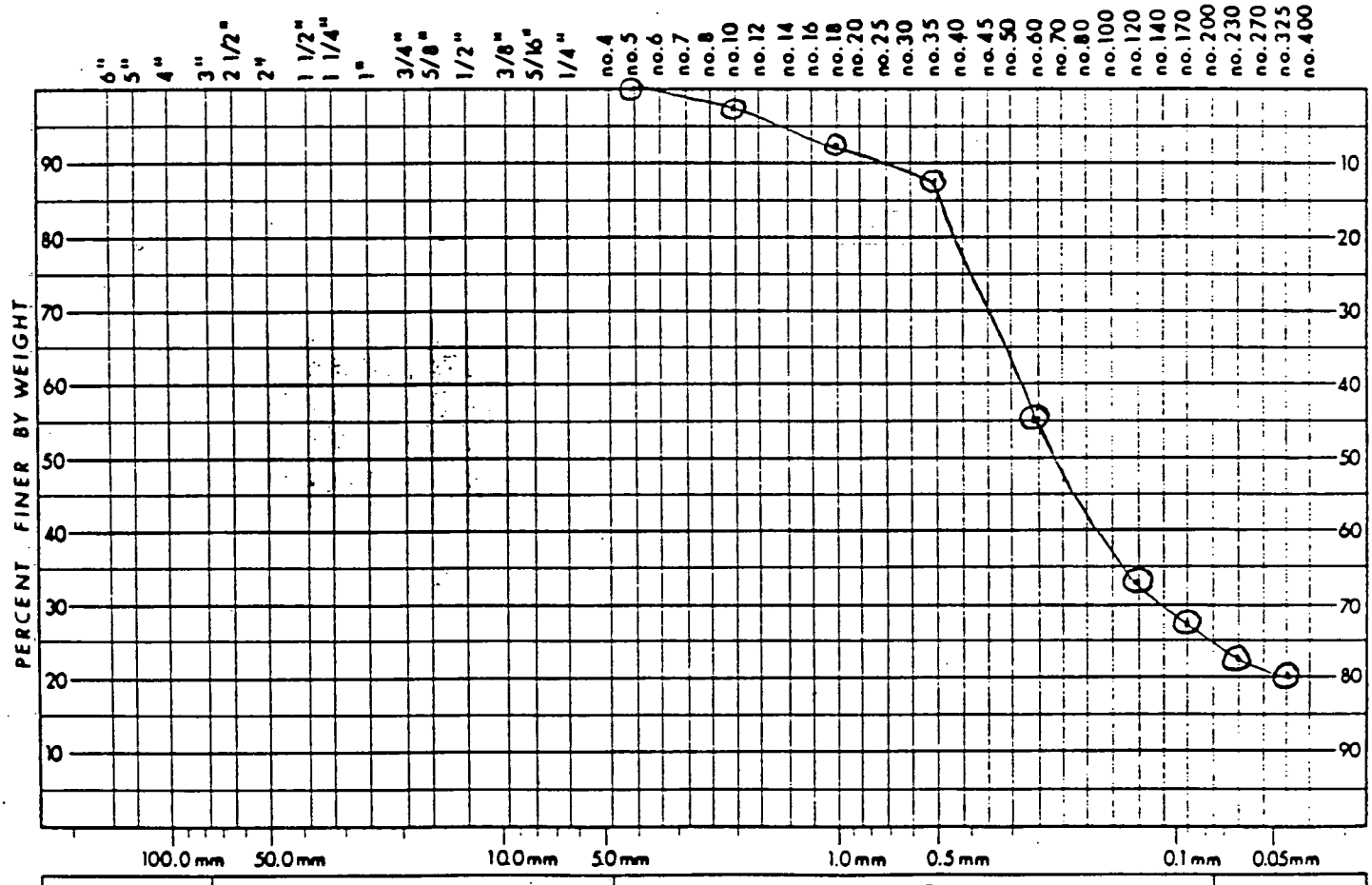
SIEVE OPENING	WEIGHT RETAINED	PERCENT RETAINED	WEIGHT PASSING	PERCENT PASSING
#5	0	0	527.74	100
#10	13.43	2.54	514.31	97.46
#18	21.16	4.01	493.15	93.45
#35	29.05	5.50	464.1	87.94
#60	172.54	32.70	291.56	55.25
#120	115.26	21.85	176.3	33.41
#170	31.03	5.88	145.27	27.53
#230	22.01	4.17	123.26	23.36
#325	12.63	2.39	110.63	20.96
PAN	110.63	20.96		
TOTALS	527.74	100		

DRY WT. OF 1/4'D SAMPLE (IF NECESSARY)
PASSING NO..... SIEVE =

SIEVE OPENING	WEIGHT RETAINED	PERCENT RETAINED	WEIGHT PASSING	PERCENT PASSING
TOTALS				

GRADATION CURVE

CANADIAN STANDARD SIEVE SERIES



COBBLES	GRAVEL		SAND			FINES
	COARSE	FINE	COARSE	MEDIUM	FINE	

GRAIN SIZE ANALYSIS

SAMPLE OBED 305.0'-308.0'

SIEVE OPENING	WEIGHT RETAINED	PERCENT RETAINED	WEIGHT PASSING	PERCENT PASSING
#5	0.00	0.00	527.74	100.00
#10	13.43	2.54	514.31	97.46
#18	21.16	4.01	493.15	93.45
#35	29.05	5.50	464.10	87.94
#60	172.54	32.70	291.56	55.25
#120	115.26	21.85	176.30	33.41
#170	31.03	5.88	145.27	27.53
#230	22.01	4.17	123.26	23.36
#325	12.63	2.39	110.63	20.96
PAN	110.63	20.96		
PAN				
31.00 u	1.66	0.32	108.97	20.64
22.00 u	3.87	0.73	105.10	19.91
15.60 u	9.07	1.72	96.03	18.19
11.00 u	14.71	2.79	81.32	15.40
7.80 u	15.49	2.94	65.83	12.46
5.50 u	15.16	2.87	50.67	9.59
3.90 u	11.95	2.26	38.72	7.33
2.80 u	8.85	1.68	29.87	5.65
2.00 u	5.53	1.05	24.34	4.60
1.40 u	4.43	0.83	19.91	3.77
0.98 u	3.54	0.67	16.37	3.10
0.69 u	3.10	0.58	13.37	2.52
0.49 u	2.21	0.42	13.37	2.10
<0.49 u	11.06	2.10	0.00	0.00
TOTALS	527.74	100.00%		

GRAIN SIZE ANALYSIS

SAMPLE	OBED 305.0'-308.0'
TOTAL WEIGHT	9950 grams (13 pieces of core)
REPRESENTATIVE SPLIT	531.59 grams

(sample taken from each core)

COMMENT: Sandstone sample very hard (grains cemented). Disaggregation method may have affected the accuracy of the grain size analysis.

DISAGGREGATION METHOD:

1. Sample soaked in water for 5 days
2. Ultrasonic probe - 5 minutes
3. Boiled lightly

Sample did not dissaggregate.

4. Sample sieved (#10 mesh). > #10 mesh dried, coarsely crushed with hammer, ultrasonic probe for 1 hour (15 minute intervals) in sedigraph dispersant.
5. Resieved (#10 mesh). > #10 mesh dried, coarsely crushed with steel plate/rolling pin, ultrasonic probe for 2 hours.
6. Above procedure (Steps #4-#5) repeated 2 times.
7. Wet/Dry Sieve Technique

SAMPLE # 305'-308' DATE June 24/93

FRACTION Heavy Mineral Separation #120

FUNNEL #	BEFORE	LIGHTS	HEAVIES
#1			
#2			
#3			
#4			
#5	60	59.20	.48
#6	55.83	55.08	.47
TOTALS	115.83 GM	114.28 GM	.95 GM.

115.23 GM

Loss .60 GM.

{ Fines remaining on filter paper - suspect fines adhering onto single grains and washed onto filter paper with acetone rinse

SAMPLE # 305'-308' DATE June 24/93

FRACTION Heavy Mineral Separation #60
(Modal Fraction)

FUNNEL #	BEFORE	LIGHTS	HEAVIES
#1			
#2	60	59.65	.11
#3	60	59.47	.12
#4	52.26	51.89	.10
#5			
#6			
TOTALS	172.26 GM	171.01 GM	.33 GM

171.34 GM

Loss .92 GM.

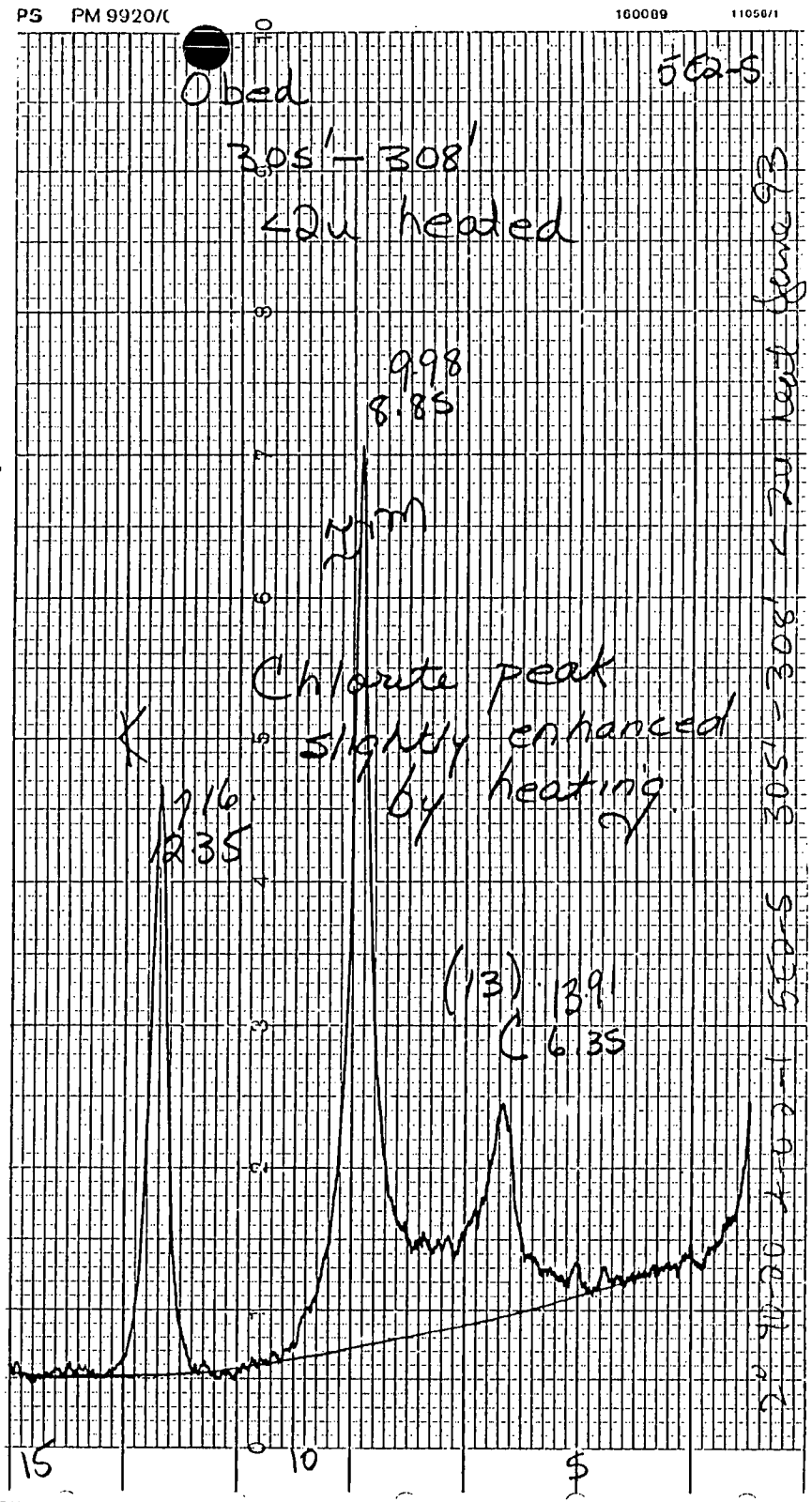
{ Fines remaining on filter paper. - suspect fines adhering onto single grains and washed onto filter paper with acetone rinse

HEAVY MINERAL SEPARATION

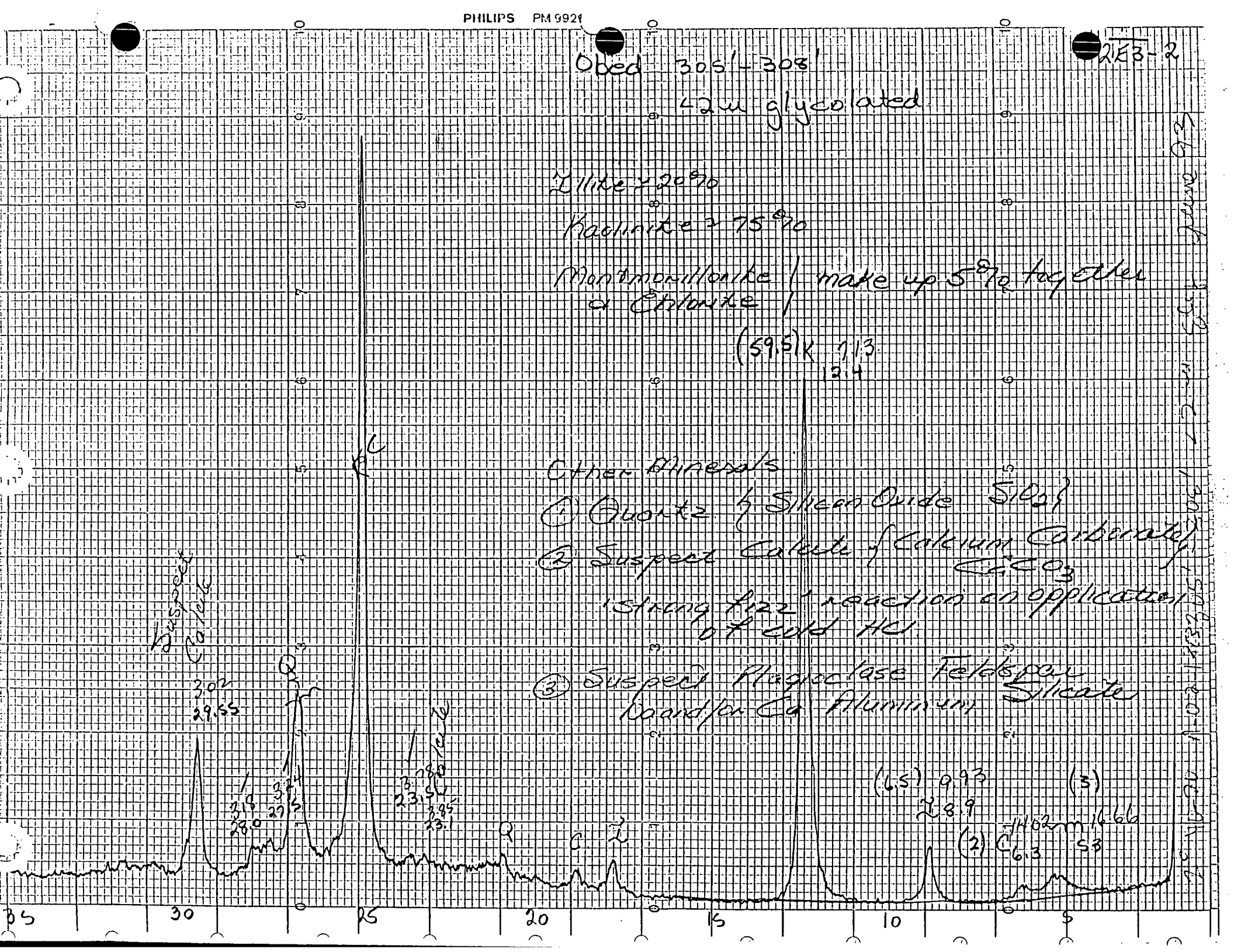
Heavy Mineral Separation (tetrabromoethane - SG 2.95) run on the size analysis sample (modal fraction and the finer or coarser fraction next to the modal fraction).

SAMPLE OBED 305.0'-308.0'

Sieve Opening	Wt of Sample (grams)	Wt of Lights (grams)	Wt of Heavies (grams)	% Heavies
# 60	171.34	171.01	0.33	0.19
#120	115.23	114.28	0.95	0.82


PS PM 9920/(
160089
11056/1
Obed
305' - 308'
<2u headed
9.98
8.85
Chlorite peak
slightly enhanced
by heating
12.16
12.35
13.91
6.35
15
10
5

PHILIPS PM 9921

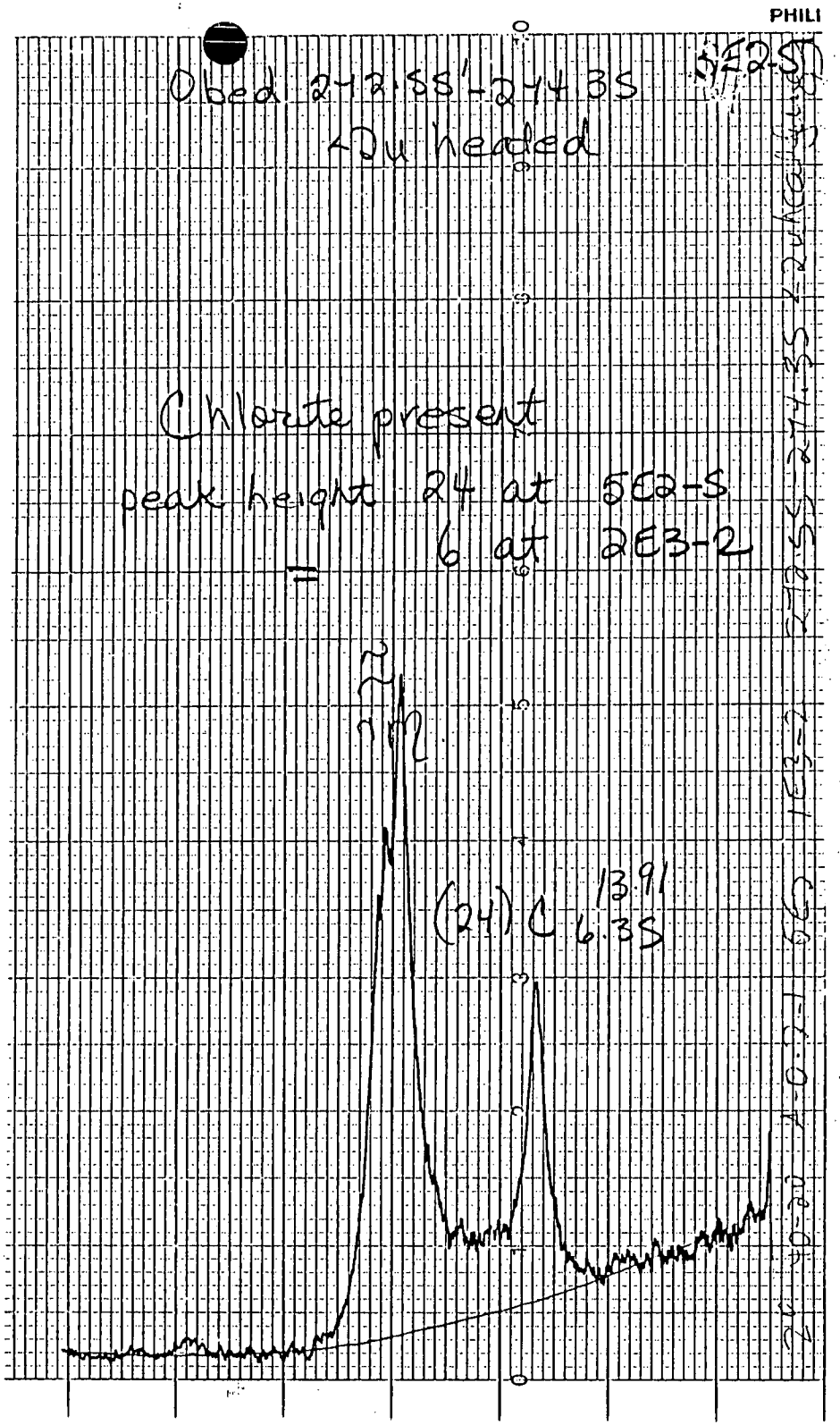


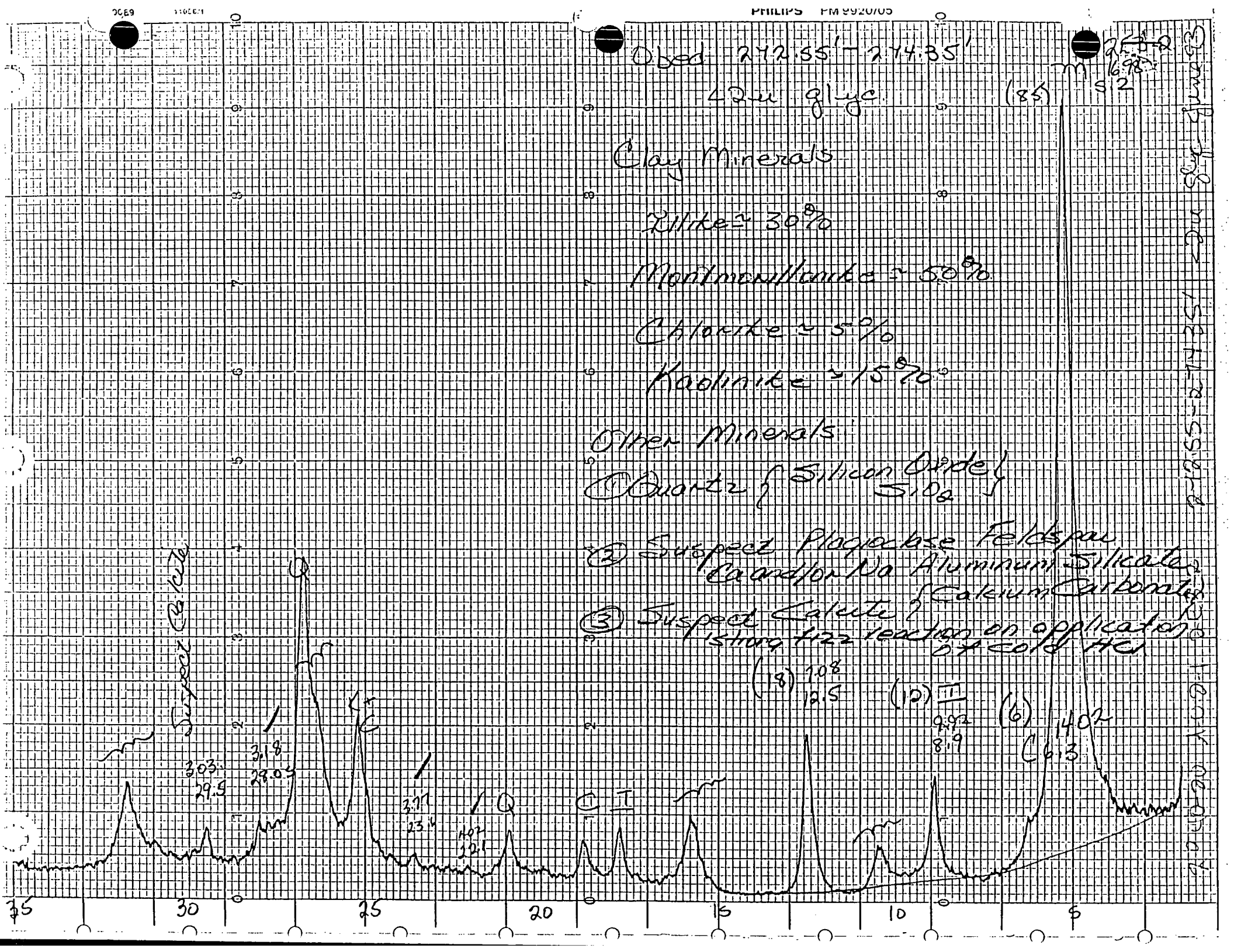
CHEMICAL ANALYSIS

SAMPLE OBED 305.0'-308.0'

Moisture <0.1%
LOI 15.7%

Element	Value (ug/g))	Weight %	Oxide	Weight %
Na	4346	0.44	Na2o	0.59
Ca	99673	9.97	CaO	13.95
K	10938	1.09	K2O	1.32
Mn	425	0.04	MnO	0.05
Al	43390	4.34	Al2O3	8.20
Fe	18635	1.86	Fe2O3	2.66
Mg	10163	1.02	MgO	1.68
Ti	2154	0.22	TiO2	0.36
P	561	0.06	P2O5	0.13
S	623	0.06	SO3	0.16
Si	245370	24.54	SiO2	52.49


PHILI
Obed 2-12.55'-24.35 3E2-S
+Du headed
Chlorite present
peak height 24 at 5C2-S
6 at 2E3-2
(24) C 6.35
13.91

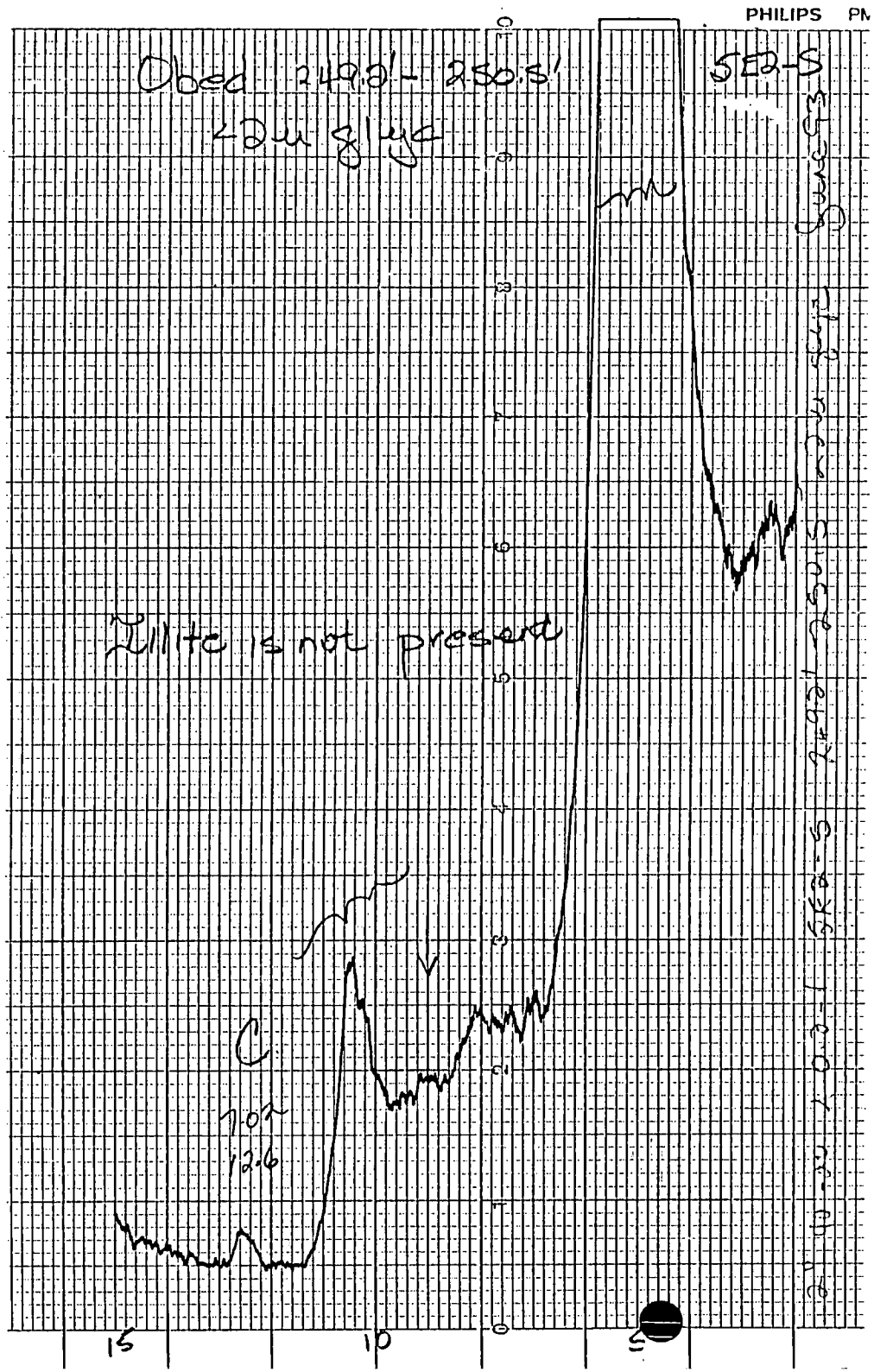

PHILIPS PM 9920/05
Obed 242.55' - 214.35'
42-μ 91-μc
Clay Minerals
Kaolinite ≥ 15%
Chlorite ≥ 5%
Montmorillonite ≥ 50%
Illite ≥ 30%
Other Minerals
(1) Quartz (Silicon Dioxide)
(2) Suspect Plagioclase Feldspar (Calcium Aluminum Silicate)
(3) Suspect Calcite (Calcium Carbonate) Fizzing reaction on application of HCl
Sample Preparation: Ethylene Glycol
Surface Calcite
(185)
(8) 7.08 12.5
(10) 9.92 8.9
(6) 14.02 10.3
35
30
25
20
15
10
5
0

CHEMICAL ANALYSIS

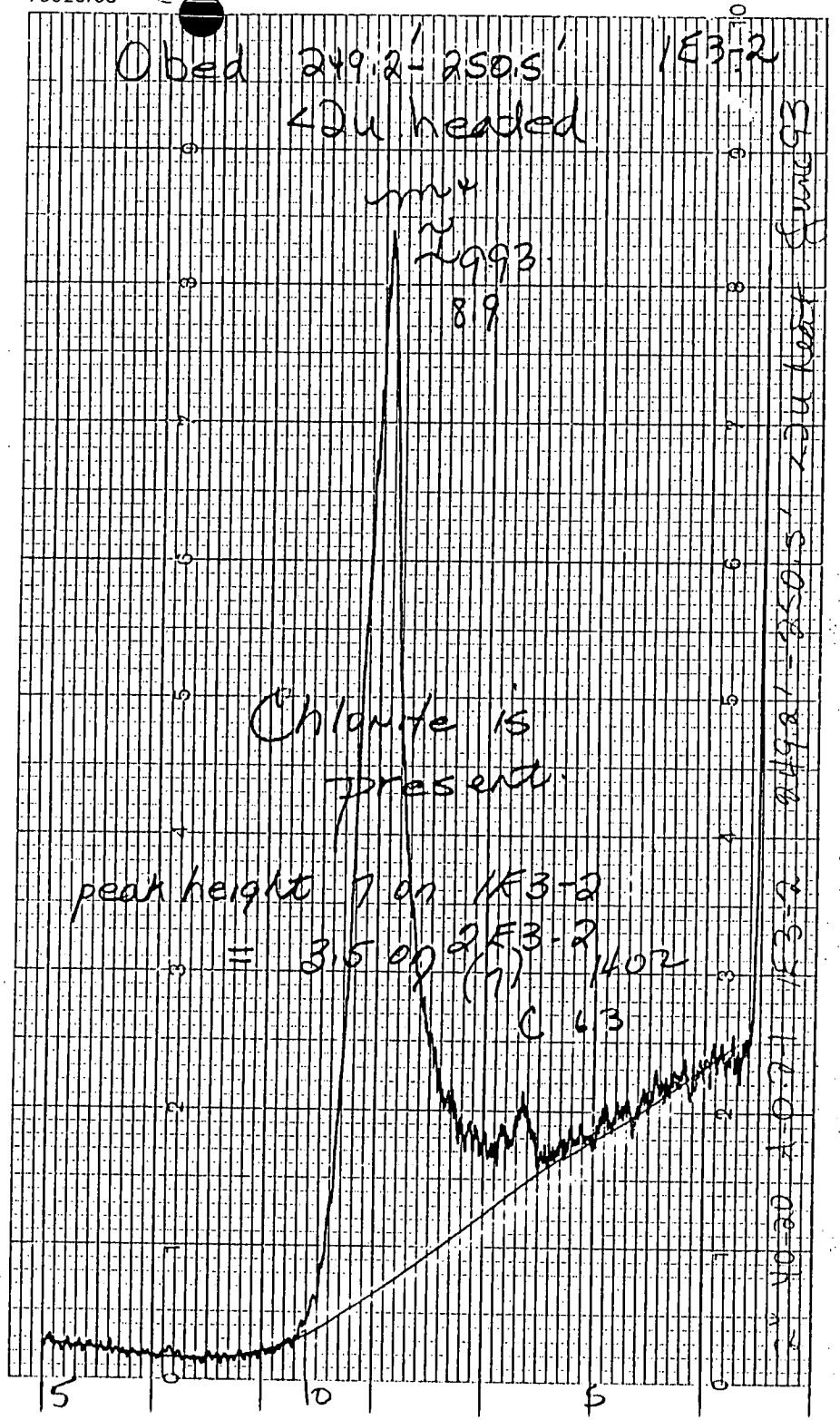
SAMPLE OBED 272.55'-274.35'

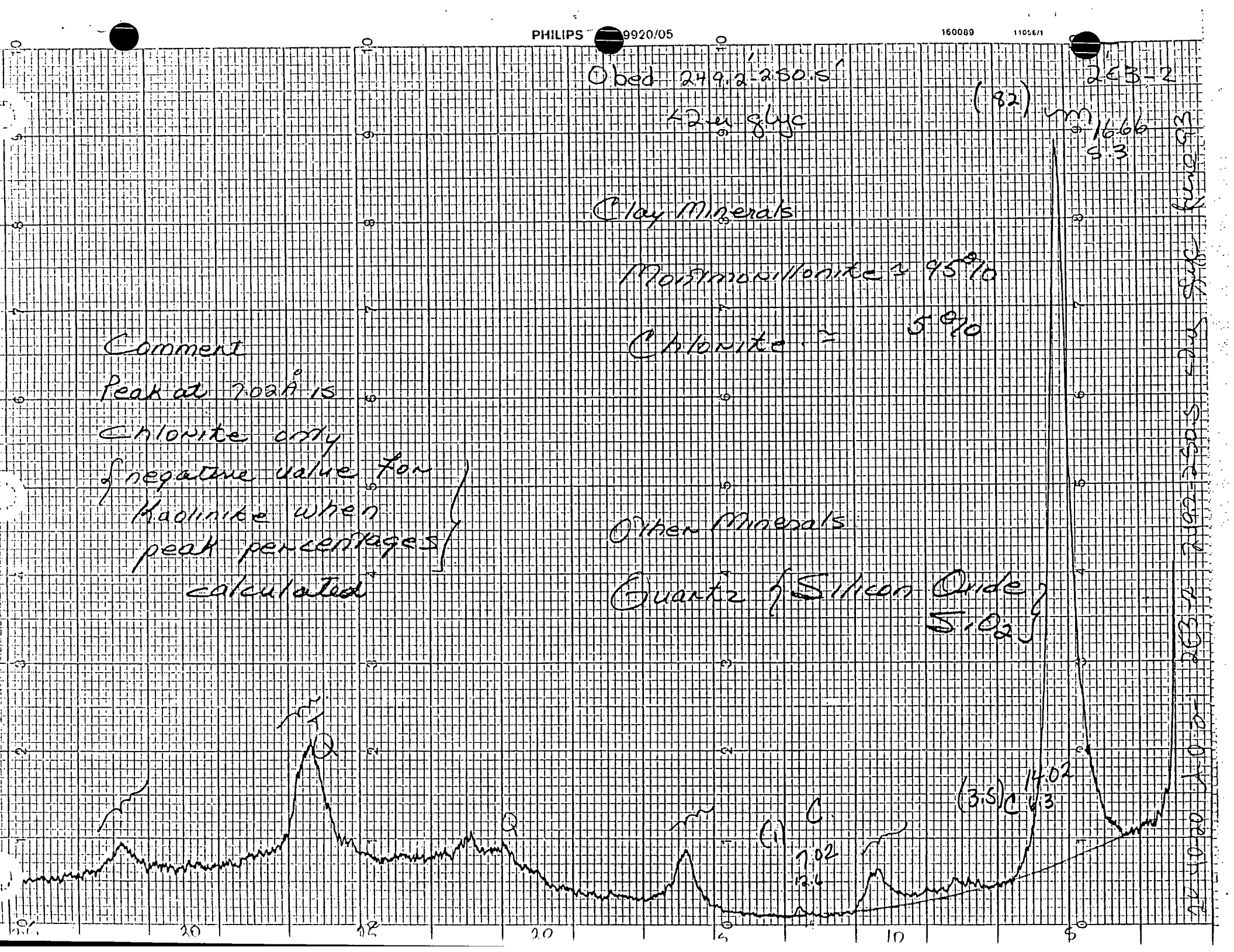
Moisture 0.3%
LOI 9.4%

Element	Value (ug/g))	Weight %	Oxide	Weight %
Na	8013	0.80	Na2O	1.08
Ca	32436	3.24	CaO	4.54
K	17018	1.70	K2O	2.05
Mn	588	0.06	MnO	0.08
Al	77546	7.76	Al2O3	14.65
Fe	38282	3.83	Fe2O3	5.47
Mg	16234	1.62	MgO	2.69
Ti	3927	0.39	TiO2	0.66
P	718	0.07	P2O5	0.16
S	779	0.08	SO3	0.19
Si	257823	25.78	SiO2	55.15


PHILIPS PM
Obed 2490' - 2505'
LDW & HYC
SED-S
Zillite is not present
C
1.0%
12.6
15
10
5

19920/05


Obed 249.2-250.5 1E3-2
EDU headed
M+
249
89
Chloride is present.
peak height 7 on 1E3-2
= 3.5 on 1E3-2
(7)
1402
C 6.3
5
10
5

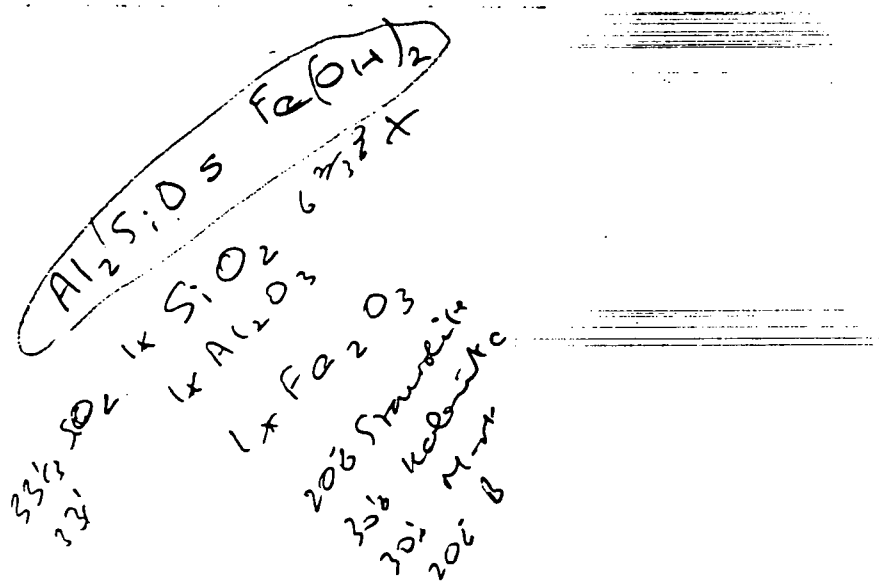

PHILIPS 9920/05
160089
11056/1
Obed 249.2-250.5'
42 in 8yc
(82) cm
1666
5.33
Clay Minerals
Montmorillonite ± 95%
Chlorite ± 5%
Other Minerals
Quartz & Silicon Oxide
Comment
Peak at 7.02Å is
Chlorite only
(negative value for
Kaolinite when
peak percentages
calculated)
14.02
7.02
12.4
(3.5)C
Cl
C
Q

CHEMICAL ANALYSIS

SAMPLE OBED 249.2'-250.5'

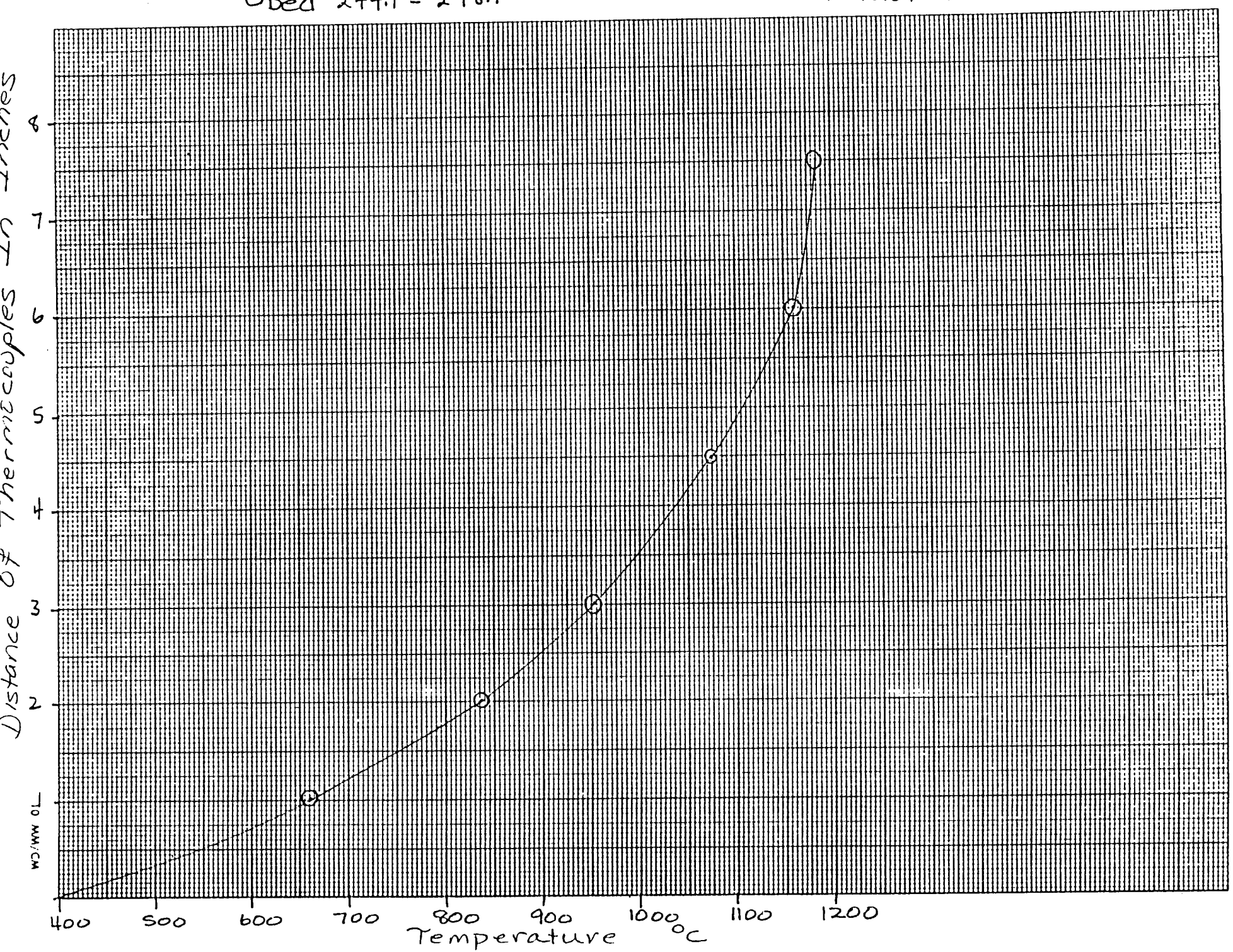
Moisture 7.0%
LOI 16.2%

Element	Value (ug/g))	Weight %	Oxide	Weight %
Na	6357	0.64	Na2O	0.86
Ca	13596	1.36	CaO	1.90
K	3924	0.39	K2O	0.47
Mn	190	0.02	MnO	0.02
Al	78101	7.81	Al2O3	14.76
Fe	16901	1.69	Fe2O3	2.42
Mg	16360	1.64	MgO	2.71
Ti	3060	0.31	TiO2	0.51
P	487	0.05	P2O5	0.11
S	216	0.02	SO3	0.05
Si	268853	26.89	SiO2	57.51

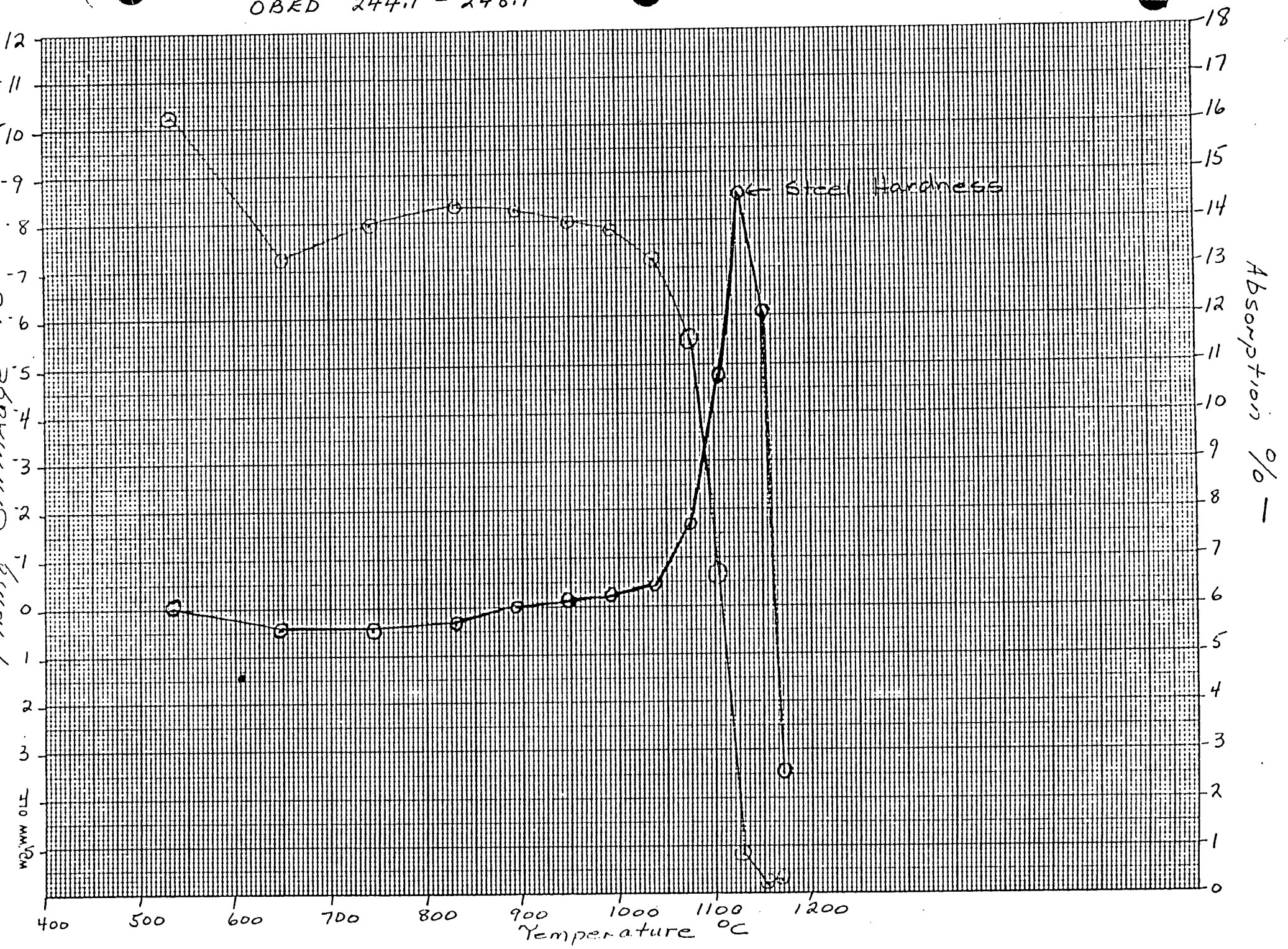


Obed 244.1' - 248.1'

FRONT BAR



OBED 244.1' - 248.1'



SAMPLE NO. OBED 24.1'-24.8'

	LENGTH		WIDTH			TEMP	SHRINKAGE	Front Bar ABSORPTION			
FRONT	DRY	FIRED	DRY	FIRED	DIFF.	°C	%	WET WT.	DRY WT.	DIFF	% AE
1	1.46	1.46	.933	.933	0	532	0	9.1579	7.6684	1.4895	16.26%
2	1.95	1.95	.937	.941	+.004	650	+.43%	7.0531	6.1186	0.9345	13.25%
3	1.45	1.45	.941	.945	+.004	743	+.43%	6.1976	5.3305	0.8671	13.99%
4	1.95	1.95	.945	.948	+.003	830	+.32%	7.4656	6.3855	1.0705	14.34%
5	2.46	2.46	.947	.947	0	892	0%	7.2015	6.1763	1.0252	14.24%
6	2.96	2.96	.949	.948	-.001	948	-.11%	6.9406	5.9694	0.9712	13.99%
7	3.46	3.46	.950	.948	-.002	992	-.21%	5.8313	5.0259	0.8054	13.81%
8	3.96	3.96	.950	.946	-.004	1036	-.42%	7.5445	6.5488	0.9957	13.20%
9	4.46	4.45	.950	.934	-.016	1075	-1.68%	7.2060	6.3776	0.8284	11.50%
10	4.96	4.93	.950	.905	-.045	1103	-4.74%	7.5467	7.0434	.5033	6.67%
11	5.47	5.39	.950	.869	-.081	1126	-8.53%	6.0231	5.9754	.0483	0.80%
12	5.96	5.85	.947	.890	-.057	1153	-6.02%	5.7963	5.7863	.01	0.17%
13	6.46	6.34	.945	.978	+.033	1168	+3.49%	8.4176	8.3974	.0202	.24%
14											
REAR											
1	.41	.47	.937	.937	0		0%				
2	.96	.96	.941	.944	+.003		+.32%				
3	1.46	1.46	.944	.948	+.004		+.42%				
4	1.96	1.97	.947	.949	+.002		+.21%				
5	2.46	2.47	.950	.950	0		0%				
6	2.96	2.96	.952	.950	-.002		-.21%				
7	3.46	3.46	.954	.950	-.004		-.42%				
8	3.96	3.96	.954	.948	-.006		-.63%				
9	4.46	4.45	.954	.940	-.014		-1.47%				
10	4.96	4.93	.952	.908	-.044		-4.62%				
11	5.46	5.39	.948	.875	-.073		-7.70%				
12	5.96	5.85	.945	.902	-.043		-4.55%				
13	6.47	6.35	.941	.990	+.049		+5.21%				
14											

COMMENTS:

Absorption Wet #1 Very Fragil

SAMPLE # OBED 244.1'-248.1' DATE June 10/93

Sample	2100
Ml. Water	430
Total	2530
% H_2O	17%

Wet Length 10.0
Losson Drying .55
* (5 Bars - 9.45, 9.45, 9.45, 9.45, 9.45
% Drying Shrinkage @ 150°C 5.5%

Color - Light Olive Gray Mudstone

PLASTICITY } Good. - Entire sample moist
WORKABILITY } Large chunks formed when
COMMENTS squeezed. Material in extruder exhibited good plasticity - molded on to cap & casing & very easy to remove (peeled off - plastic-ene in feel)
6 Bars extruded - fairly straight but not firm.

DRYING @ 105°C
1 Bar - Minor Cracks
4.5% Drying Shrinkage

@ Room Temp (RT)
*3 Bars RT + 2 Bars 50°C - Minor Cracks

TEMPERATURE GRADIENT FURNACE

TEST UNIT TG-CA DATE June 18/93
CONTROLLER TEMP 250°C — 1200°C with a 2½ hr soak at 850°C (7¼ hr)

REAR	READINGS	FRONT	READINGS
0 (7.5")	1188.4	0 (7.5")	1184.9
1 (6.0")	1152.4	1 (6.0")	1158.4
2 (4.5")	1076.9	2 (4.5")	1075.3
3 (3.0")	952.0	3 (3.0")	952.6
4 (2.0")	830.1	4 (2.0")	836.3
5 (1.0")	648.4	5 (1.0")	659.0

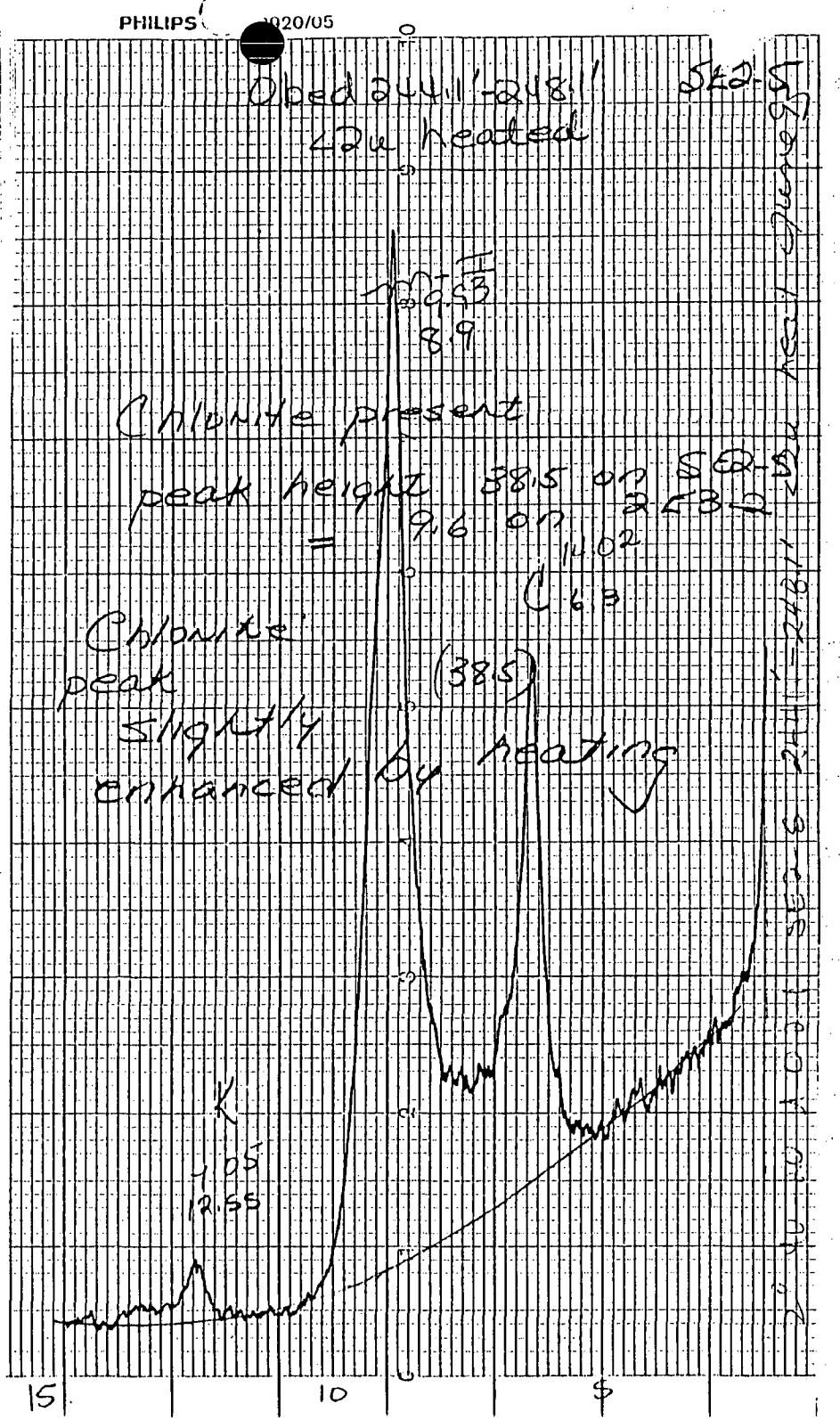
CHARACTERISTICS OF FIRED SAMPLES

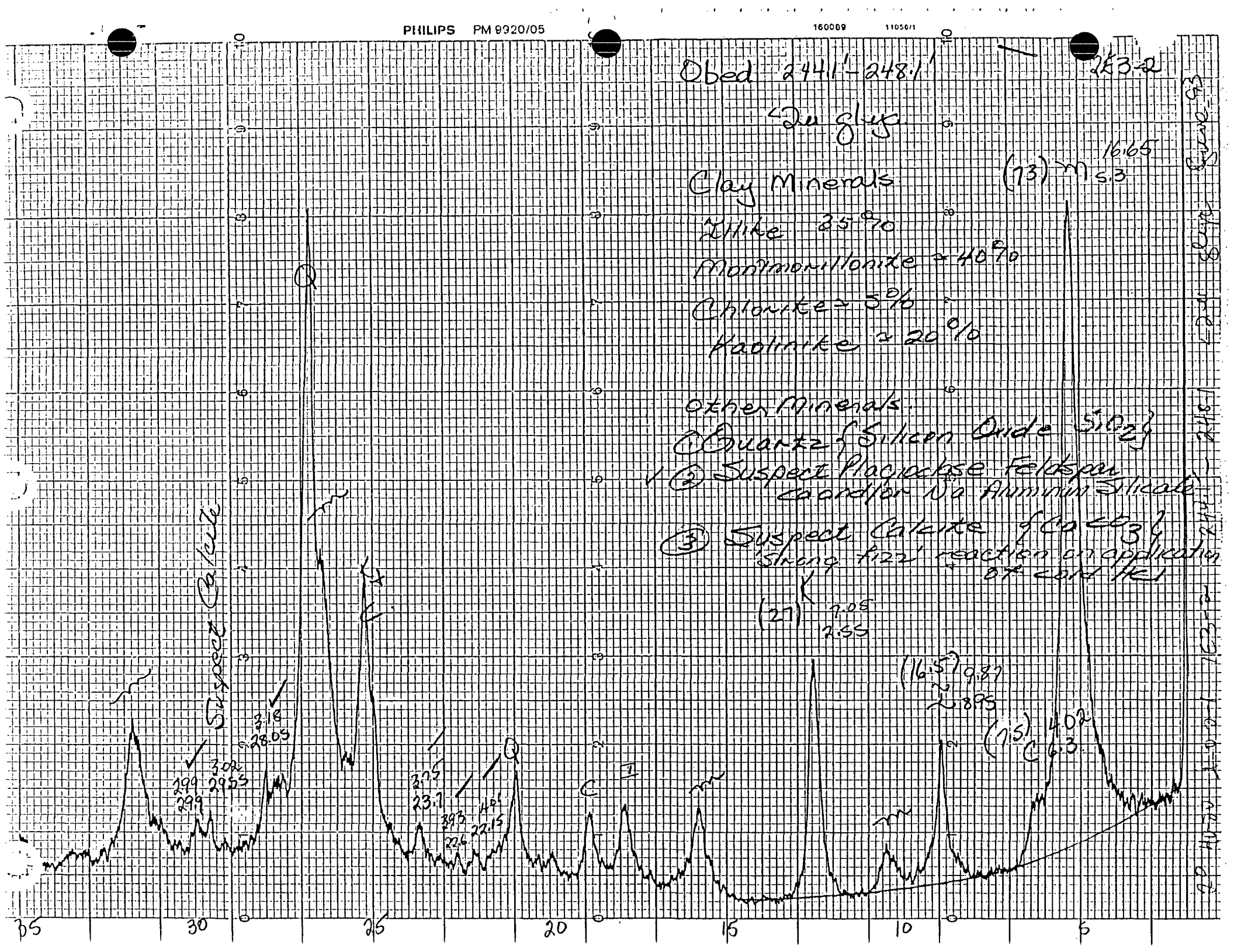
STEEL HARD COLOR	STEEL HARD TEMP. (C)	STEEL HARD ABSORPTION (%)	MAXIMUM FIRE COLOR	MAXIMUM FIRE TEMP. (C)	MAXIMUM FIRE ABSORPTION (%)	MAXIMUM FIRE SHRINKAGE (%)	REMARKS
Moderate brown (5YR 3/4)	1126	0.80	Moderate brown (5YR3/4)	1126	0.80	8.53	No firing range. Maximum fire and steel hard coincide. Possibly structural clay products if firing is very accurate.

CHARACTERISTICS OF UNFIRED SAMPLES

SAMPLE	DESCRIPTION	TEMPERING WATER (%)	PLASTICITY	WORK-ABILITY	DRYING PROPERTIES ROOM TEMP.	DRYING PROPERTIES 105 C	DRYING SHRINKAGE (%) 150 C
244.10'-248.10'	Light olive gray (5Y 6/1) mudstone	17.00	good	good	minor cracks	minor cracks	5.50

CERAMIC TEST


PHILIPS
2020/05
Obed 2441'-2481'
42u heated
8.9
Chloride present
peak height 38.5 on 3.2 SENS
= 9.6 on 1.02 SENS
Chloride
peak
slightly
enhanced by heating
(38.5)
K
12.55
15
10
5


PHILIPS PM 9920/05
160089
Obed 244.1'-248.1'
Clay Minerals
Illite ≥ 35%
Montmorillonite ≥ 40%
Chlorite ≥ 5%
Kaolinite ≥ 20%
other minerals:
(1) Quartz (Silicon Oxide SiO2)
(2) Suspect Plagioclase feldspar
(3) Suspect Calcite (CaCO3)
strong fizz reaction on application of cold HCl
Suspect Calcite
(73)
(27)
(16.5)
(7.5)
16.65
7.05
2.55
9.87
8.95
4.02
6.3
3.18
28.05
3.02
29.55
2.99
29.9
3.25
23.1
3.93
22.6
4.0
22.15
35
30
25
20
15
10
5

CHEMICAL ANALYSIS

SAMPLE OBED 244.1'-248.1'

Moisture 0.4%
LOI 8.9%

Element	Value (ug/g))	Weight %	Oxide	Weight %
Na	7243	0.72	Na2O	0.98
Ca	16476	1.65	CaO	2.31
K	20289	2.03	K2O	2.44
Mn	959	0.10	MnO	0.12
Al	76803	7.68	Al2O3	14.51
Fe	46709	4.67	Fe2O3	6.68
Mg	14084	1.41	MgO	2.34
Ti	3960	0.40	TiO2	0.66
P	826	0.08	P2O5	0.19
S	278	0.03	SO3	0.07
Si	264840	26.49	SiO2	56.65

SAMPLE NO 192'-197' UNWASHED WT. _____ WT. -325 69.5-36

HICROMETRE	READING ON CHART	PERCENTAGE OF -325	WEIGHT. Retained	Percent Retained	Weight Passing	% Passing
31.0	99	1.0	.70	.13%	68.83	13.08
22.0	94.5	4.5	3.13	.60%	65.7	12.48
15.6	86.2	8.3	5.77	1.10%	59.93	11.38
11.0	77.5	8.7	6.05	1.15%	53.88	10.23
7.8	68.0	9.5	6.61	1.26%	47.27	8.97%
5.5	60.0	8.0	5.56	1.06%	41.71	7.91%
3.9	52.5	7.5	5.22	.99%	36.49	6.92%
2.8	46.8	5.7	3.96	.75%	32.53	6.17%
2.0	40.8	6.0	4.17	.79%	28.36	5.38%
1.4	35.8	5.0	3.48	.66%	24.88	4.72%
0.98	32.0	3.8	2.64	.50%	22.24	4.22%
0.69	29.8	2.2	1.53	.29%	20.71	3.93%
0.49	27.8	2.0	1.39	.26%	19.32	3.67%
< 0.49		27.8	19.32	3.67%	—	0%
		100%	69.53	13.21%		

PARTICLE SI... ISTRIBUTION

SAMPLE IDENTIFICATION 192' – 197'

DATE July 12/92

Density 2.65 g/cc LIQUID .05% Sodium Hexametaphosphate Density .9947 g/cc Viscosity .7523 cp

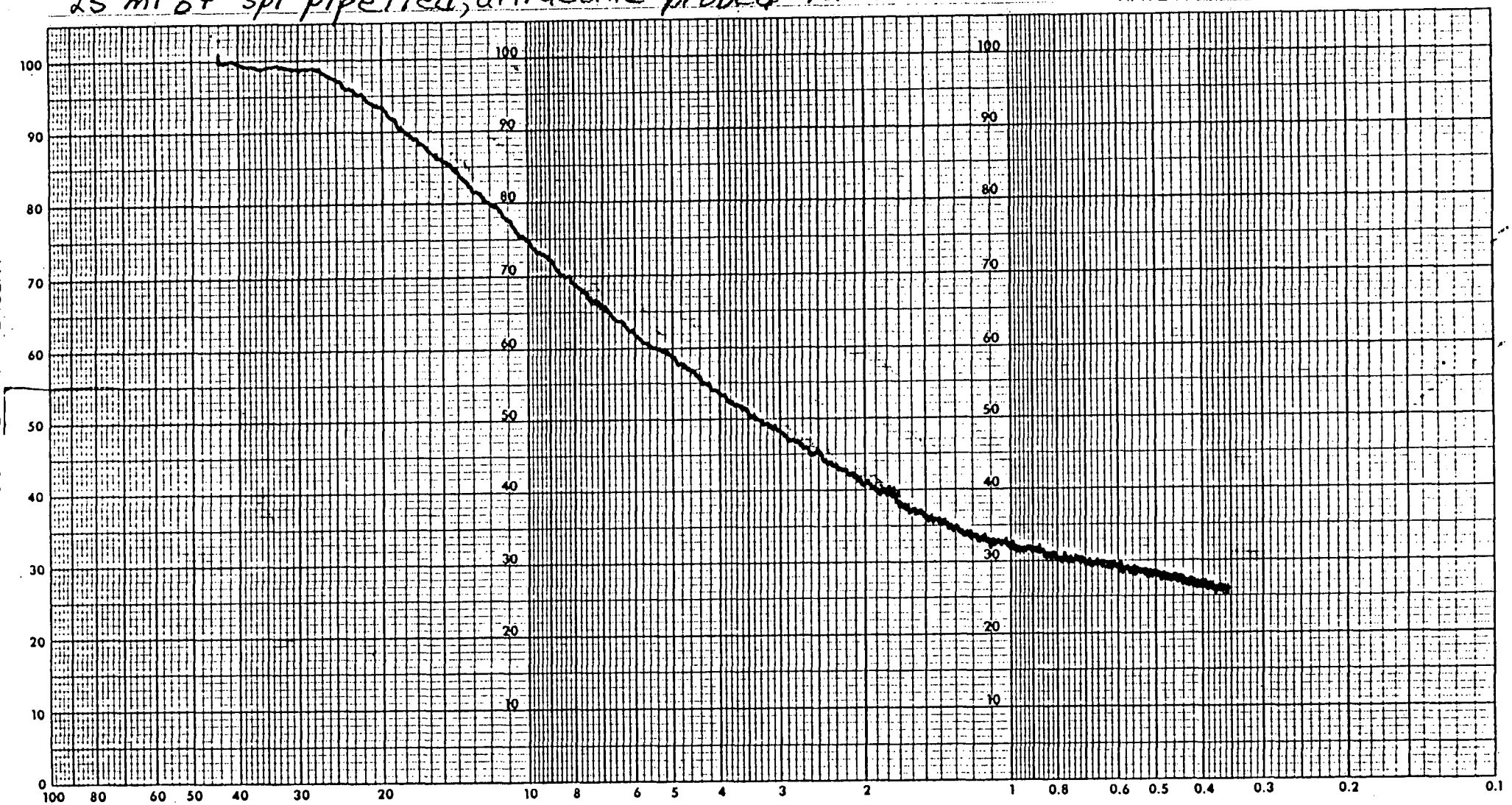
BY D. Goulet

Preparation Mixed with liquid, Blended in a Waring Blender,

TEMPERATURE 33 °C

25 ml of spl pipetted, ultrasonic probed for 2 minutes

RATE 361 START DIA. 44 µm



EQUIVALENT SPHERICAL DIAMETER, µm

micromeritics®
instrument corporation

Form 500/42701

SAMPLE OBED 192'-197'

DRY SIEVE (INITIAL WT 478.21)

SIEVE #	WT SIEVE	WT SIEVE + SPL	WT SPL	COMMENTS
#5	426.83	427.47	.64	composites
#10	367.95	368.90	.95	composites
#18	340.47	347.49	7.02	composites + single grains
#35	313.35	341.59	28.24	composites still present
#60	303.34	545.45	242.11	few composites
#120	298.43	420.07	121.64	
#170	276.83	303.13	26.3	
#230	246.87	266.16	19.29	
#325	242.87	253.47	10.6	
PAN	248.30	269.59	21.29	21.29 DRY + 48.24 WET = 69.53
		TOTAL	478.08 (DRY)	+ 48.24 = 526.32 GM

NAME OBED 192'-197' JOB NO

WEIGHT SIEVE

SAMPLE NO.	PAN NO.	WEIGHT PAN	WEIGHT PAN -325 (AIRDRY)	WEIGHT -325 AIRDRY
< 325 MESH	#8	127.25	175.49	48.24
> 325 MESH	#3 (Evaporating Dish)	279.79	758.00	478.21
			TOTAL	526.45

ALBERTA RESEARCH COUNCIL ——— AGGREGATE INVENTORY

GRAIN SIZE ANALYSIS

PROJECT OBED MOUNTAIN COAL LTD DATE JUNE 93 SAMPLE NO. 192'-197'

TESTED BY Goulet CHECKED BY _____

REMARKS _____

DRY WEIGHT OF COARSE SAMPLE =

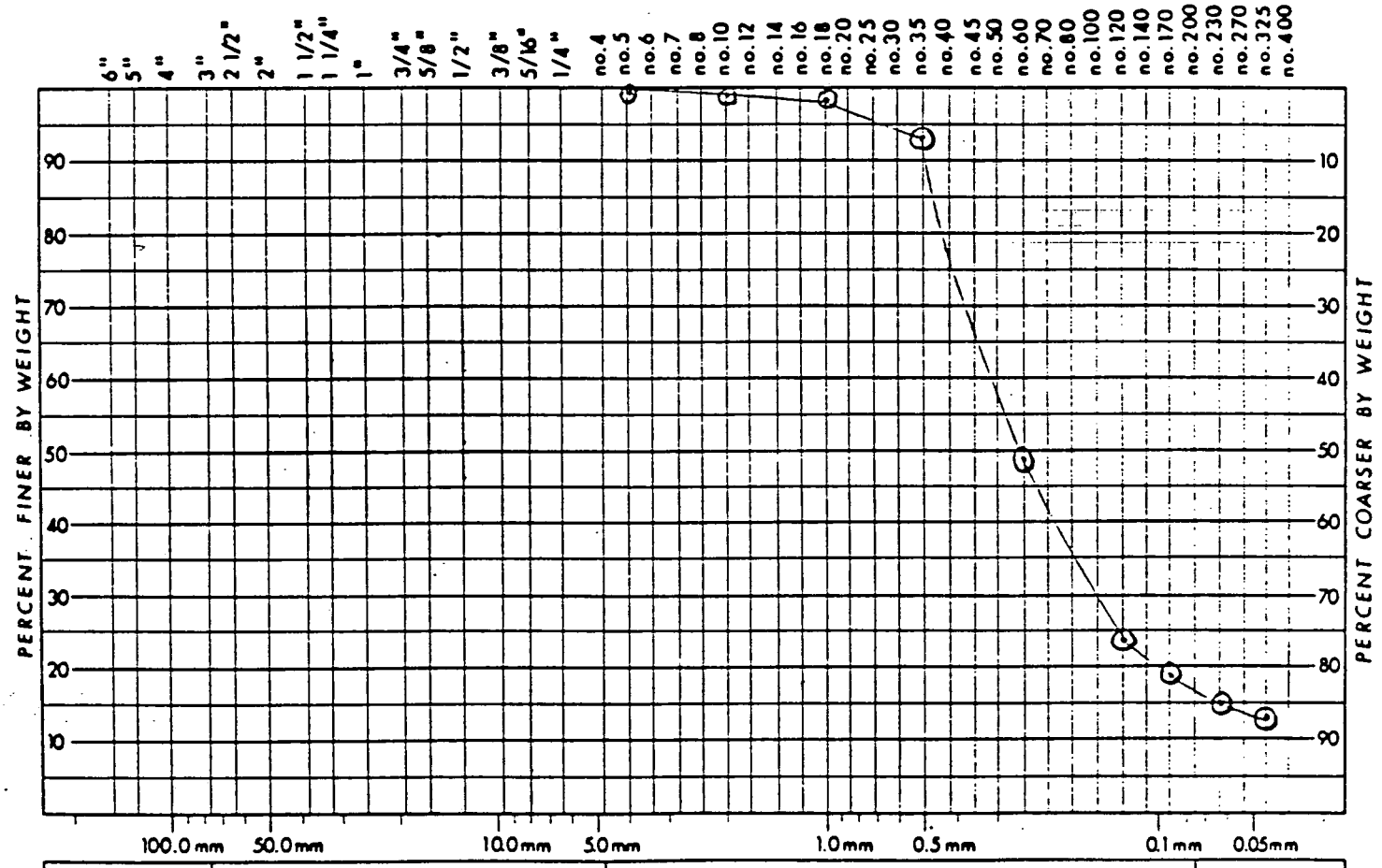
SIEVE OPENING	WEIGHT RETAINED	PERCENT RETAINED	WEIGHT PASSING	PERCENT PASSING
#5	.64	.12	525.68	99.88
#10	.95	.18	524.73	99.70
#18	7.02	1.33	517.71	98.36
#35	28.24	5.37	489.47	93.00
#60	242.11	46.0	247.36	47.00
#120	121.64	23.11	125.72	23.89
#170	26.30	5.0	99.42	18.89
#230	19.29	3.67	80.13	15.22
#325	10.60	2.01	69.53	13.21
PAN	69.53	13.21		
TOTALS	526.32	100		

DRY WT. OF 1/4'D SAMPLE (IF NECESSARY) PASSING NO..... SIEVE =

SIEVE OPENING	WEIGHT RETAINED	PERCENT RETAINED	WEIGHT PASSING	PERCENT PASSING
TOTALS				

GRADATION CURVE

CANADIAN STANDARD SIEVE SERIES



COBBLES	GRAVEL		SAND			FINES
	COARSE	FINE	COARSE	MEDIUM	FINE	

GRAIN SIZE ANALYSIS

SAMPLE OBED 192.0'-197.0'

SIEVE OPENING	WEIGHT RETAINED	PERCENT RETAINED	WEIGHT PASSING	PERCENT PASSING
#5	0.64	0.12	525.58	98.88
#10	0.95	0.18	524.73	99.70
#18	7.02	1.33	517.71	98.36
#35	28.24	5.37	489.47	93.00
#60	242.11	46.00	247.36	47.00
#120	121.64	23.11	125.72	23.89
#170	26.30	5.00	99.42	18.89
#230	19.29	3.67	80.13	15.22
#325	10.60	2.01	69.53	13.21
PAN	69.53	13.21		
PAN				
31.00 u	0.70	0.13	68.83	13.08
22.00 u	3.13	0.60	65.70	12.48
15.60 u	5.77	1.10	59.93	11.38
11.00 u	6.05	1.15	53.88	10.23
7.80 u	6.61	1.26	54.69	8.97
5.50 u	5.56	1.06	47.27	7.91
3.90 u	5.22	0.99	41.71	6.92
2.80 u	3.96	0.75	36.49	6.17
2.00 u	4.17	0.79	32.53	5.38
1.40 u	3.48	0.66	28.36	4.72
0.98 u	2.64	0.50	22.24	4.22
0.69 u	1.53	0.29	20.71	3.93
0.49 u	1.39	0.26	19.32	3.67
<0.49 u	19.32	3.67	0.00	0.00
TOTALS	526.32	100.00%		

GRAIN SIZE ANALYSIS

SAMPLE	OBED 192.0'-197.0'
TOTAL WEIGHT	13100 grams (12 pieces of core)
REPRESENTATIVE SPLIT	528.44 grams

(sample taken from each core)

COMMENT: Sandstone sample very hard (grains cemented). Disaggregation method may have affected the accuracy of the grain size analysis.

DISAGGREGATION METHOD:

1. Sample soaked in water for 5 days
2. Ultrasonic probe - 5 minutes
3. Boiled lightly

Sample did not disaggregate.

4. Sample sieved (#10 mesh). > #10 mesh dried, coarsely crushed with hammer, ultrasonic probe for 1 hour (15 minute intervals) in sedigraph dispersant.
5. Resieved (#10 mesh). > #10 mesh dried, coarsely crushed with steel plate/rolling pin, ultrasonic probe for 30 minutes.
6. Wet/Dry Sieve Technique

SAMPLE # 192'-197' DATE June 20/93

FRACTION Heavy Mineral Separation #120

FUNNEL #	BEFORE	LIGHTS	HEAVIES
#1			
#2			
#3			
#4			
#5	60	59.64	.26
#6	61.56	61.30	.24
TOTALS	121.569m.	120.94 6m	.50 6m.

121.446m.

Loss .12 6m. { Weighing Error }

SAMPLE # 192'-197' DATE June 22/93

FRACTION Heavy Mineral Separation #60
(Modal Fraction)

FUNNEL #	BEFORE	LIGHTS	HEAVIES
#1	60	59.99	.03
#2	60	59.91	.05
#3	60	59.92	.05
#4	61.90.	61.84	.04.
#5			
#6			
TOTALS	241.90gm	241.66gm	0.17gm

241.83gm

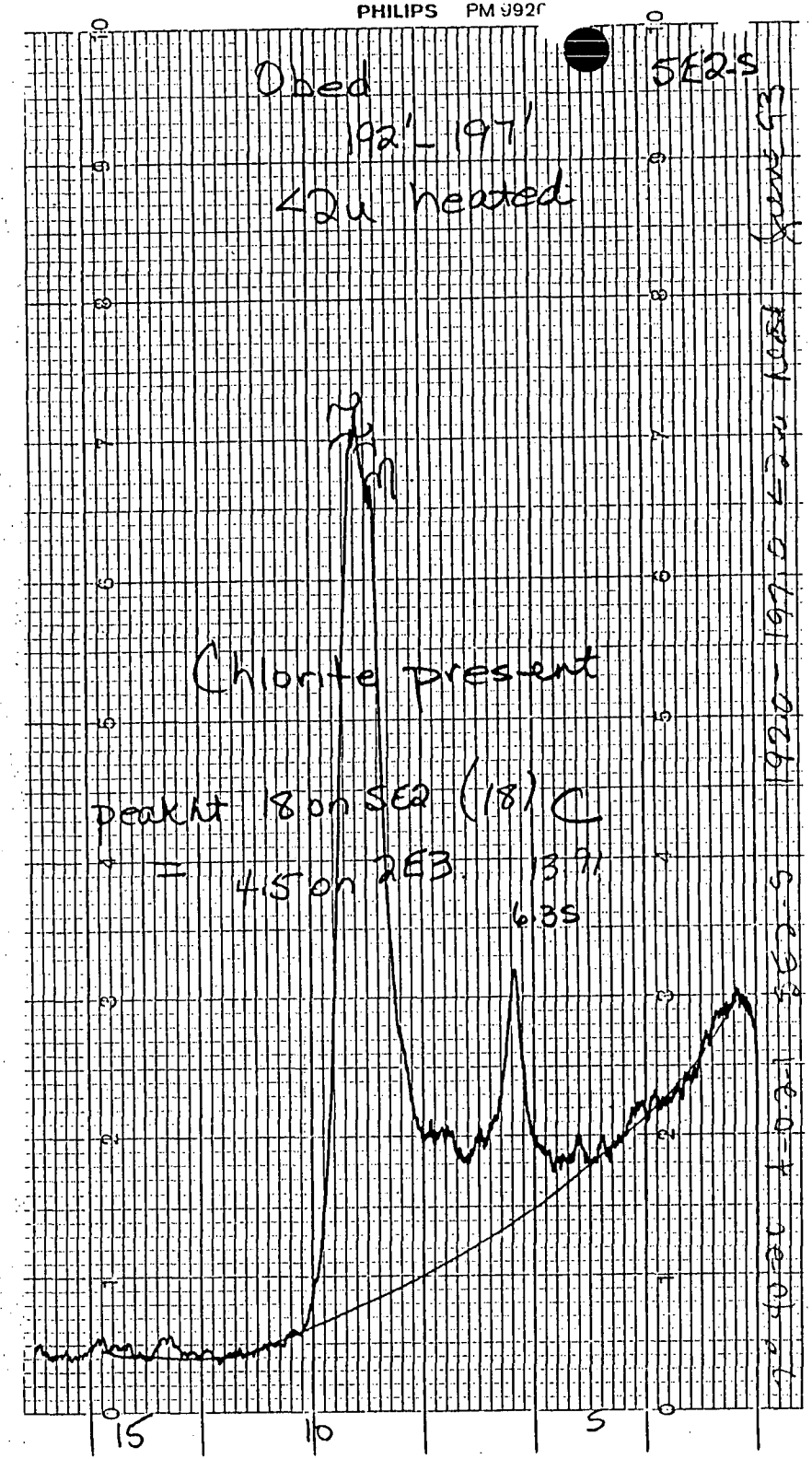
Loss -.07gm. { WEIGHING ERROR }

HEAVY MINERAL SEPARATION

Heavy Mineral Separation (tetrabromoethane - SG 2.95) run on the size analysis sample (modal fraction and the finer or coarser fraction next to the modal fraction).

SAMPLE OBED 192.0'-197.0'

Sieve Opening	Wt of Sample (grams)	Wt of Lights (grams)	Wt of Heavies (grams)	% Heavies
# 60	241.83	241.66	0.17	0.07
#120	121.44	120.94	0.50	0.41


PHILIPS PM 9920
Obed
192' - 197'
42u heated
5E2-S
Chlorite Present
Peak ht 18 on SE2 (18) C
= 45 on 2E3
6.3S
15
10
5

PHILIPS PM 9920/05

63-2

Obed 192'-197'

9 4 <2u

(83) M 16.64 5.3

Clay Minerals:

Illite ≥ 15%

Montmorillonite ≈ 60%

Chlorite ≈ 5%

Kaolinite ≈ 20%

Other Minerals:

- Quartz (Silicon Oxide SiO_2)

V - Suspect Plagioclase Feldspar (Combination of Aluminum Silicate)

Suspect Calcite (Calcium Carbonate) (strong H2 reaction on application of cold HCl)

Surface Quartz

3.02 29.6

3.17 28.05

(19) 10.8 K 12.5

(5.5) 9.82 7.90

(4.5) 13.91 6.35

Kaolinite 7.17 12.35

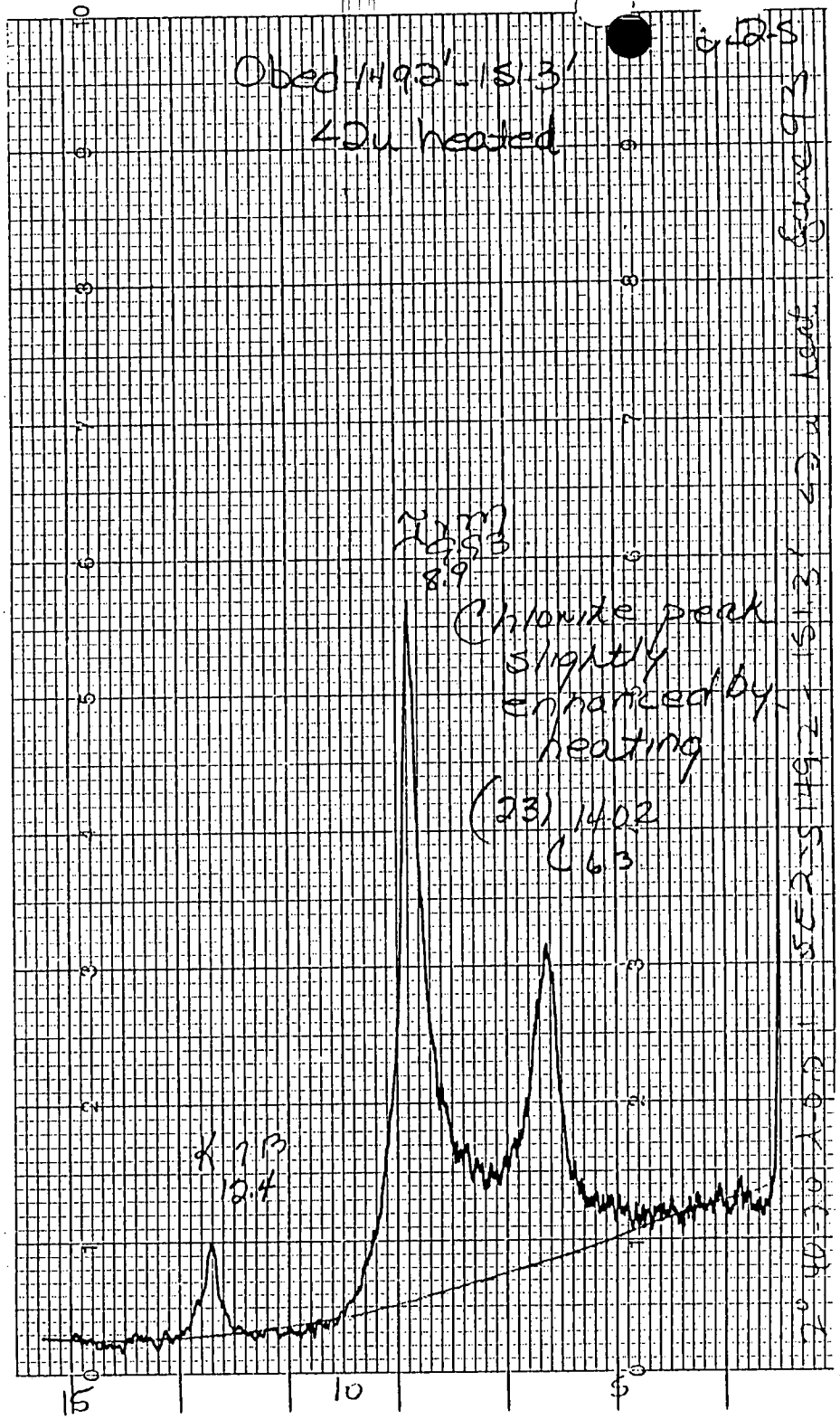
25 30 25 20 15 10 5

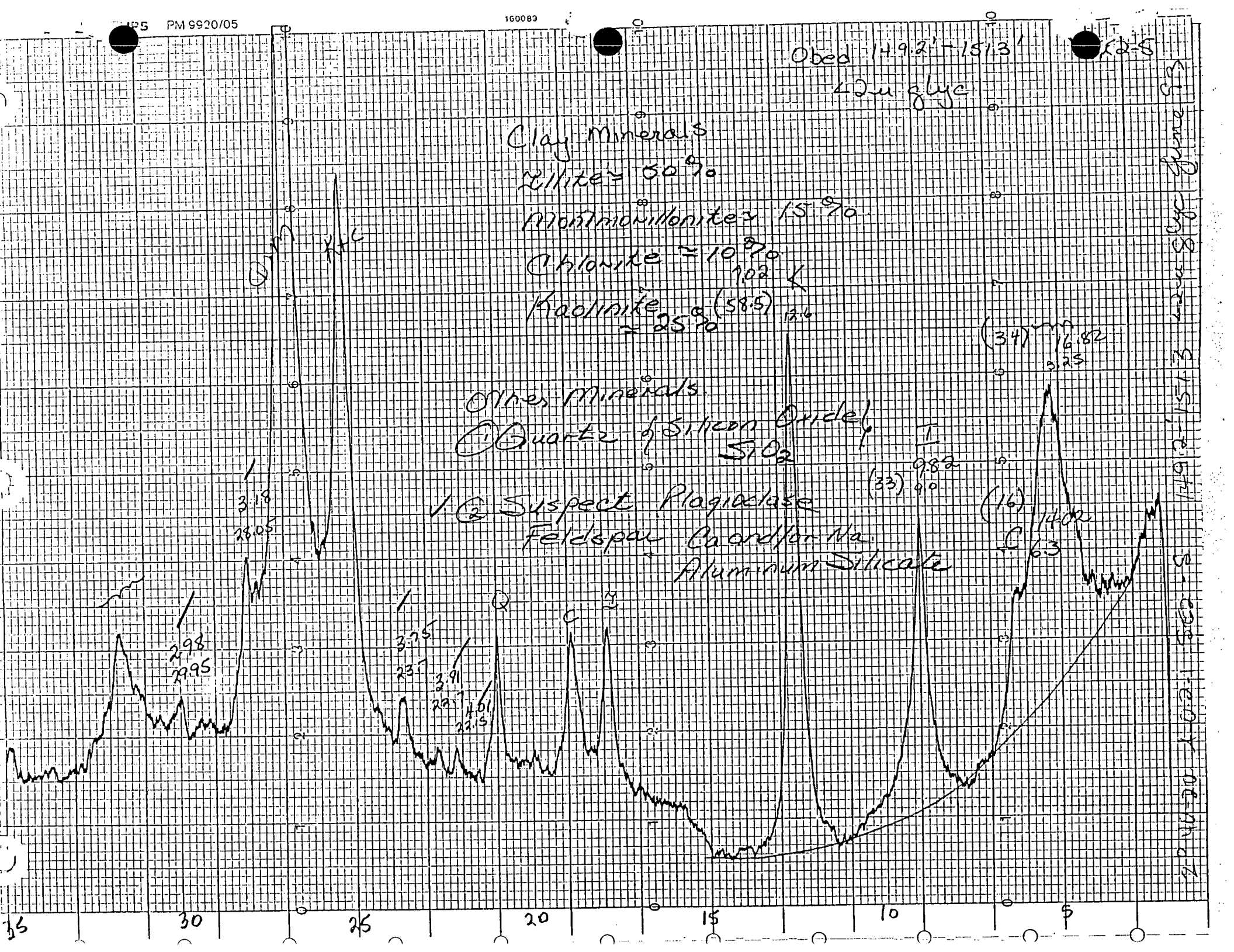
CHEMICAL ANALYSIS

SAMPLE OBED 192.0'-197.0'

Moisture 0.4%
LOI 8.7%

Element	Value (ug/g))	Weight %	Oxide	Weight %
Na	10154	1.02	Na2O	1.37
Ca	52343	5.23	CaO	7.32
K	11498	1.15	K2O	1.39
Mn	806	0.08	MnO	0.10
Al	49467	4.95	Al2O3	9.35
Fe	17937	1.79	Fe2O3	2.56
Mg	8562	0.86	MgO	1.42
Ti	2049	0.21	TiO2	0.34
P	495	0.05	P2O5	0.11
S	380	0.04	SO3	0.09
Si	303681	30.37	SiO2	64.96


Obed 149.2', 151.3'
4Du heated
a-D-S
Solvent front
35E2-5H5-2-1 151.3' 4Du heat
Chloride peak
slightly
enhanced by
heating
(23) 14.02
0.63
8.9
K 1.3
12.4
15
10
5


PM 9920/05
160089
Obed 1492' - 1513'
Low Slyc
Clay minerals
Illite ~ 60%
montmorillonite ~ 15%
Chlorite ~ 10%
Kaolinite ~ 25%
Other minerals
Quartz & Silicon Oxide
SiO2
Suspect Plagioclase
Feldspar Ca and/or Na
Aluminum Silicate
(58.5)
(34)
(33)
(16)
3.18
28.05
2.98
2.95
3.25
3.91
4.01
22.5
9.82
9.0
16.82
3.25
14.02
6.3
1.02
12.4
35
30
25
20
15
10
5

CHEMICAL ANALYSIS

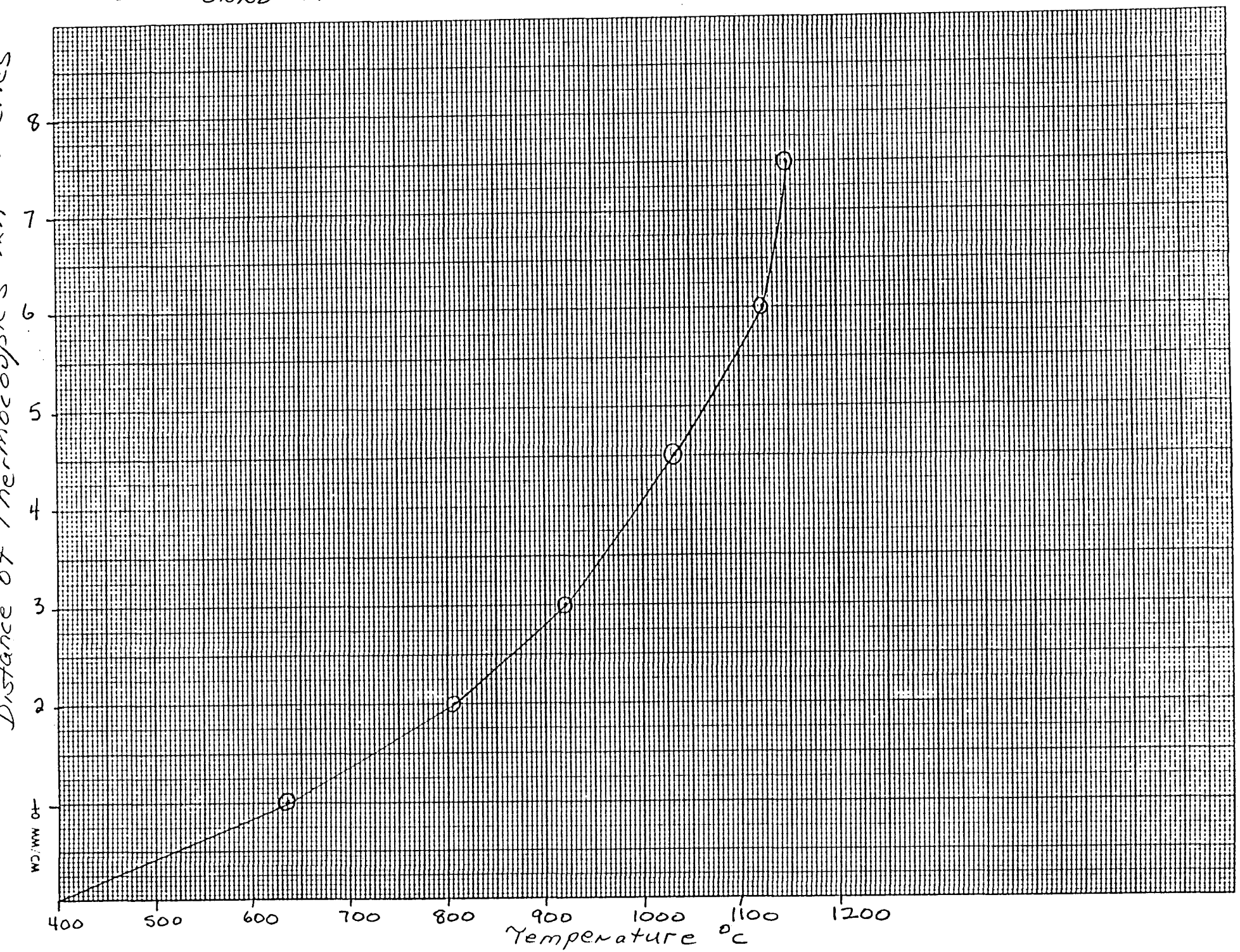
SAMPLE OBED 149.2'-151.3'

Moisture 1.1%
LOI 6.2%

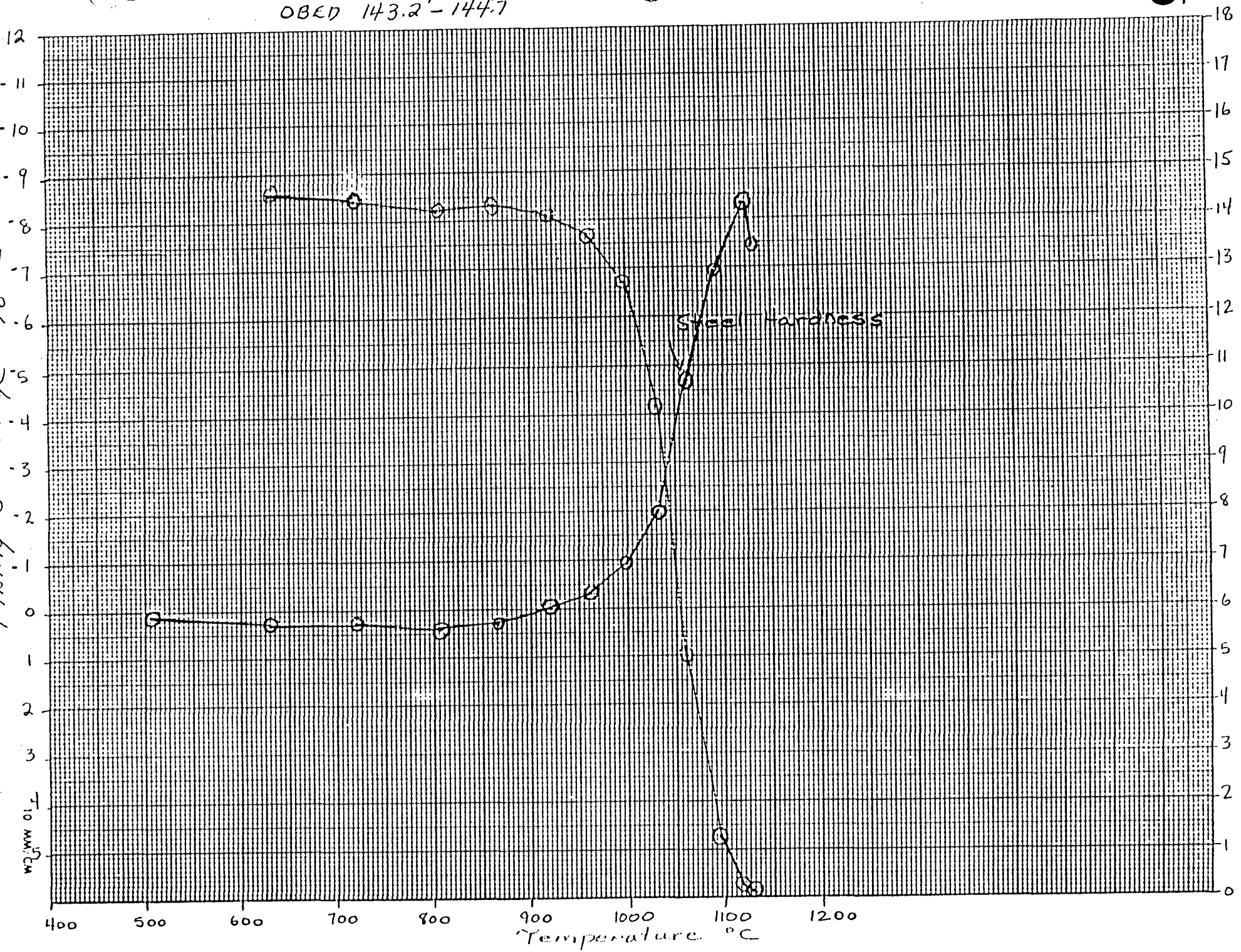
Element	Value (ug/g))	Weight %	Oxide	Weight %
Na	8342	0.83	Na2O	1.12
Ca	8768	0.88	CaO	1.23
K	21108	2.11	K2O	2.54
Mn	323	0.03	MnO	0.04
Al	87054	8.71	Al2O3	16.45
Fe	37019	3.70	Fe2O3	5.29
Mg	15175	1.52	MgO	2.52
Ti	4394	0.44	TiO2	0.73
P	767	0.08	P2O5	0.18
S	279	0.03	SO3	0.07
Si	280581	28.06	SiO2	60.02

OBED 143.2' - 144.7'

FRONT BAR



OBED 143.2' – 144.7'



SAMPLE NO ORED 143.2' - 144.7'

	LENGTH		WIDTH			TEMP	SHRINKAGE	FRONT BAR ABSORPTION			
FRONT	DRY	FIRED	DRY	FIRED	DIFF.	°C	%	WET WT.	DRY WT.	DIFF	% ABS
1	.47	.47	.965	.966	+.001	507	+.10%	—	—	—	—
2	.98	.97	.969	.972	+.003	630	+.31%	7.9478	6.7915	1.1563	14.55%
3	1.48	1.47	.972	.975	+.003	720	+.31%	8.3916	7.1871	1.2125	14.44%
4	1.97	1.97	.974	.978	+.004	805	+.41%	6.4130	5.5023	0.9107	14.20%
5	2.48	2.48	.977	.980	+.003	865	+.31%	8.2388	7.0598	1.1790	14.31%
6	2.98	2.97	.980	.980	+0	920	0	7.6519	6.5742	1.0777	14.08%
7	3.48	3.49	.982	.979	-.003	960	-.31%	6.5175	5.6282	.8893	13.64%
8	3.98	3.98	.983	.974	-.009	998	-.92%	7.1556	6.2486	.9070	12.68%
9	4.47	4.45	.984	.965	-.019	1030	-1.93%	4.3844	3.9376	.4468	10.19%
10	4.98	4.93	.985	.939	-.046	1060	-4.67%	5.3153	5.0467	.2674	5.03%
11	5.48	5.39	.985	.917	-.068	1089	-6.90%	5.2966	5.2308	.0658	1.24%
12	5.98	5.85	.986	.904	-.082	1117	-8.32%	6.2085	6.1937	.0148	0.24%
13	6.48	6.30	.985	.912	-.073	1130	-7.41%	10.7358	10.7178	.0180	0.17%
14											
REAR											
1	.47	.47	.956	.957	+.001		+.10%				
2	.96	.96	.961	.965	+.004		+.42%				
3	1.46	1.47	.966	.970	+.003		+.31%				
4	1.97	1.97	.970	.974	+.004		+.41%				
5	2.46	2.47	.973	.975	+.002		+.21%				
6	2.96	2.97	.974	.975	+.001		+.10%				
7	3.47	3.47	.977	.975	-.002		-.20%				
8	3.97	3.97	.978	.972	-.006		-.61%				
9	4.45	4.45	.978	.957	-.021		-2.15%				
10	4.97	4.93	.976	.930	-.046		-4.71%				
11	5.47	5.24	.975	.901	-.074		-7.59%				
12	5.97	5.83	.972	.889	-.083		-8.54%				
13	6.47	6.29	.969	.902	-.067		-6.91%				
14											

COMMENTS.

Absorption Wet #1 broke down in H_2O. { no weight taken }

SAMPLE # OBED 143.2' - 144.7' DATE June 9/93

Sample	2100
Ml. Water	400
Total	2500
% H_2O	16%

Wet Length 10.0
Losson Drying .35
*(4 Bars 9.65, 9.65, 9.65, 9.65)
% Drying Shrinkage @ 150°C 3.5%

Color - Light Gray Mudstone.

PLASTICITY } F. Good - Entire sample moist. large
WORKABILITY } chunks formed when squeezed.
COMMENTS. Material remaining in extruder molded onto cap but rather dry in feel.

5 Bars extruded - finish fairly straight. (extruder did not shut off but only 5 bars extruded).

DRYING @ 105°C
1 Bar - Minor Cracks
3% Drying Shrinkage

@ Room Temp. (RT)
* 2 Bars @ RT → 2 Bars @ 50°C - Minor Cracks

TEMPERATURE GRADIENT FURNACE

TEST UNIT TG-CA DATE June 17/93
CONTROLLER TEMP 250°C - 1200°C with @ 2½ hr soak at 850°C (7¼ hr)

REAR	READINGS	FRONT	READINGS
0 (7.5")	1152.9	0 (7.5")	1150.2
1 (6.0")	1120.1	1 (6.0")	1125.1
2 (4.5")	1042.8	2 (4.5")	1038.9
3 (3.0")	917.4	3 (3.0")	920.3
4 (2.0")	798.9	4 (2.0")	807.9
5 (1.0")	628.0	5 (1.0")	636.9

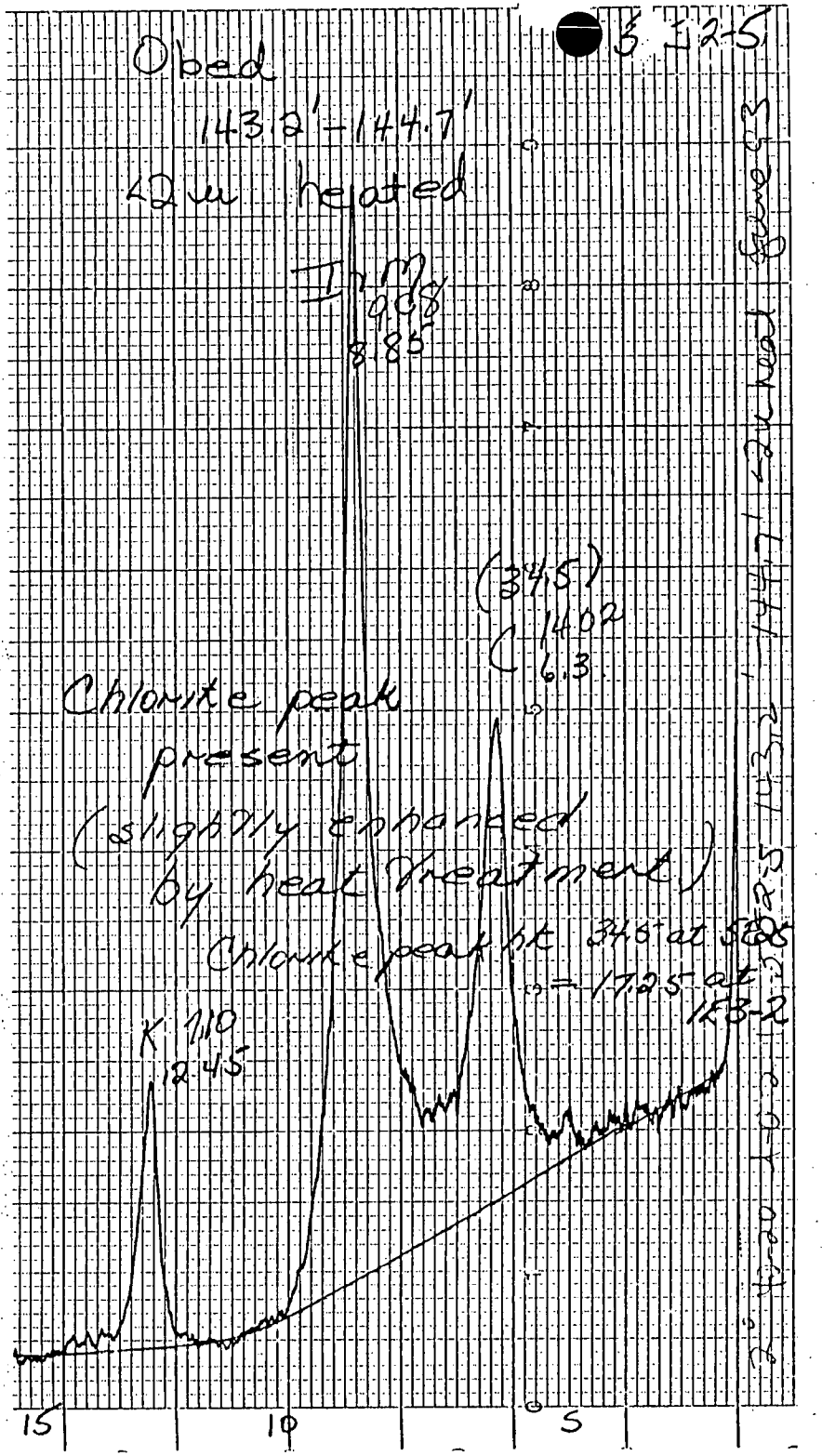
CHARACTERISTICS OF FIRED SAMPLES

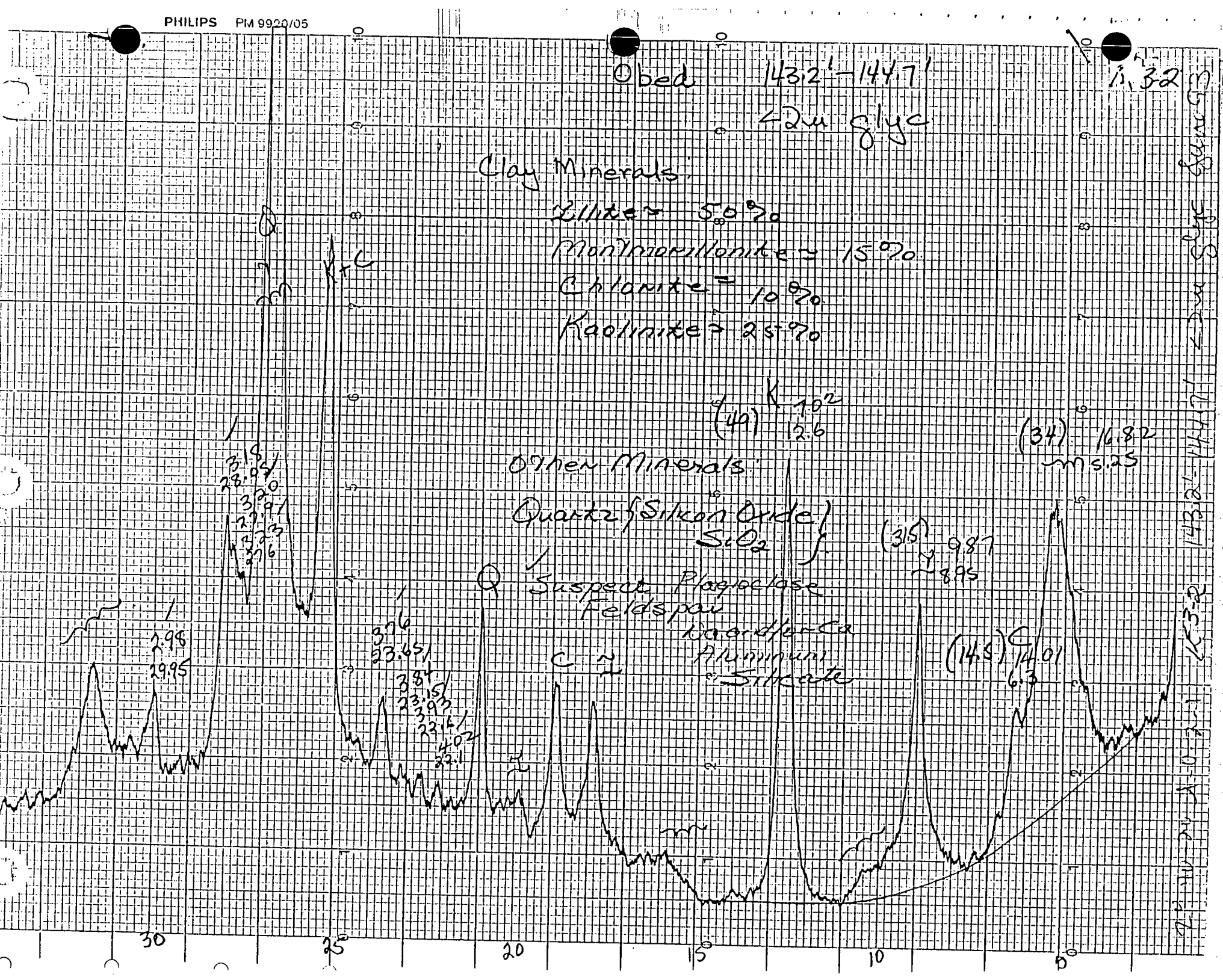
STEEL HARD COLOR	STEEL HARD TEMP. (C)	STEEL HARD ABSORPTION (%)	MAXIMUM FIRE COLOR	MAXIMUM FIRE TEMP. (C)	MAXIMUM FIRE ABSORPTIOM (%)	MAXIMUM FIRE SHRINKAGE (%)	REMARKS
Pale brown (5YR 5/2)	1060	5.03	Moderate brown (5YR 3/4)	1117	0.24	8.32	Moderate firing range (57 C). Structural clay products and earth colored pottery.

CHARACTERISTICS OF UNFIRED SAMPLES

SAMPLE	DESCRIPTION	TEMPERING WATER (%)	PLASTICITY	WORK-ABILITY	DRYING PROPERTIES ROOM TEMP.	DRYING PROPERTIES 105 C	DRYING SHRINKAGE (%) 150 C
143.20'-144.70'	Light gray (N7) mudstone	16.00	fairly good	fairly good	minor cracks	minor cracks	3.00

CERAMIC TEST


160089 11056/1
Obed
143.2'-144.7'
40 w heated
Chlorite peak present (also high in unheated but enhanced by heat treatment)
K 7.10 12.45
(34.5) 14.02 6.3
15
10
5


PHILIPS PM 9920/05
Obed 143.2'-144.7'
<2μ Clay
Clay Minerals
Illite ~ 50%
Montmorillonite ~ 15%
Chlorite ~ 10%
Kaolinite ~ 25%
Other Minerals
Quartz (Silicon Oxide) SiO2
Suspect Plagioclase Feldspar
Aluminum Silicate
(49) K 1.02 12.6
(34) 16.82 8.25
(31S) 9.87 8.95
(14.5) 14.01 6.3
3.18 28.04
3.20 27.91
3.23 27.66
2.98 29.95
3.16 28.10
3.34 26.65
3.15 28.33
3.21 27.83
4.02 22.1
30
25
20
15
10
5

CHEMICAL ANALYSIS

SAMPLE OBED 143.2'-144.7'

Moisture 0.5%
LOI 7.2%

Element	Value (ug/g))	Weight %	Oxide	Weight %
Na	10530	1.05	Na2O	1.42
Ca	6197	0.62	CaO	0.87
K	23445	2.35	K2O	2.82
Mn	278	0.03	MnO	0.04
Al	83834	8.38	Al2O3	15.84
Fe	31142	3.11	Fe2O3	4.45
Mg	12058	1.21	MgO	2.00
Ti	4506	0.45	TiO2	0.75
P	820	0.08	P2O5	0.19
S	1047	0.11	SO3	0.26
Si	301890	30.19	SiO2	64.58

SAMPLE NO 130'-134' UNWASHED WT. _____ WT. -325 87.08 gm

HICROMETRE	READING ON CHART	PERCENTAGE OF -325	WEIGHT. Retained	% Retained	Wt Passing	% Passing
31.0	95.8	4.2	3.66	.64%	83.42	14.67%
22.0	88.0	7.8	6.79	1.19%	76.63	13.48%
15.6	79.2	8.8	7.66	1.35%	68.97	12.13%
11.0	70.0	9.2	8.01	1.41%	60.96	10.72%
7.8	62.8	7.2	6.27	1.10%	54.69	9.62%
5.5	54.8	8.0	6.97	1.22%	47.72	8.4%
3.9	48.0	6.8	5.92	1.04%	41.80	7.36%
2.8	41.5	6.5	5.66	1.00%	36.14	6.36%
2.0	34.8	6.7	5.84	1.03%	30.3	5.33%
1.4	27.8	7.0	6.10	1.07%	24.2	4.26%
0.98	23.5	4.3	3.74	.66%	20.46	3.6%
0.69	19.8	3.7	3.22	.57%	17.24	3.03%
0.49	16.5	3.3	2.87	.51%	14.37	2.52%
< 0.49		16.5	14.37	2.52%	—	0%
		100	87.08	15.31%		

PARTICLE SIZE DISTRIBUTION

SAMPLE IDENTIFICATION 130-134

Density 2.65 g/cc LIQUID .05% Sodium Hexametaphosphate Density .9947 g/cc Viscosity .7523 cp

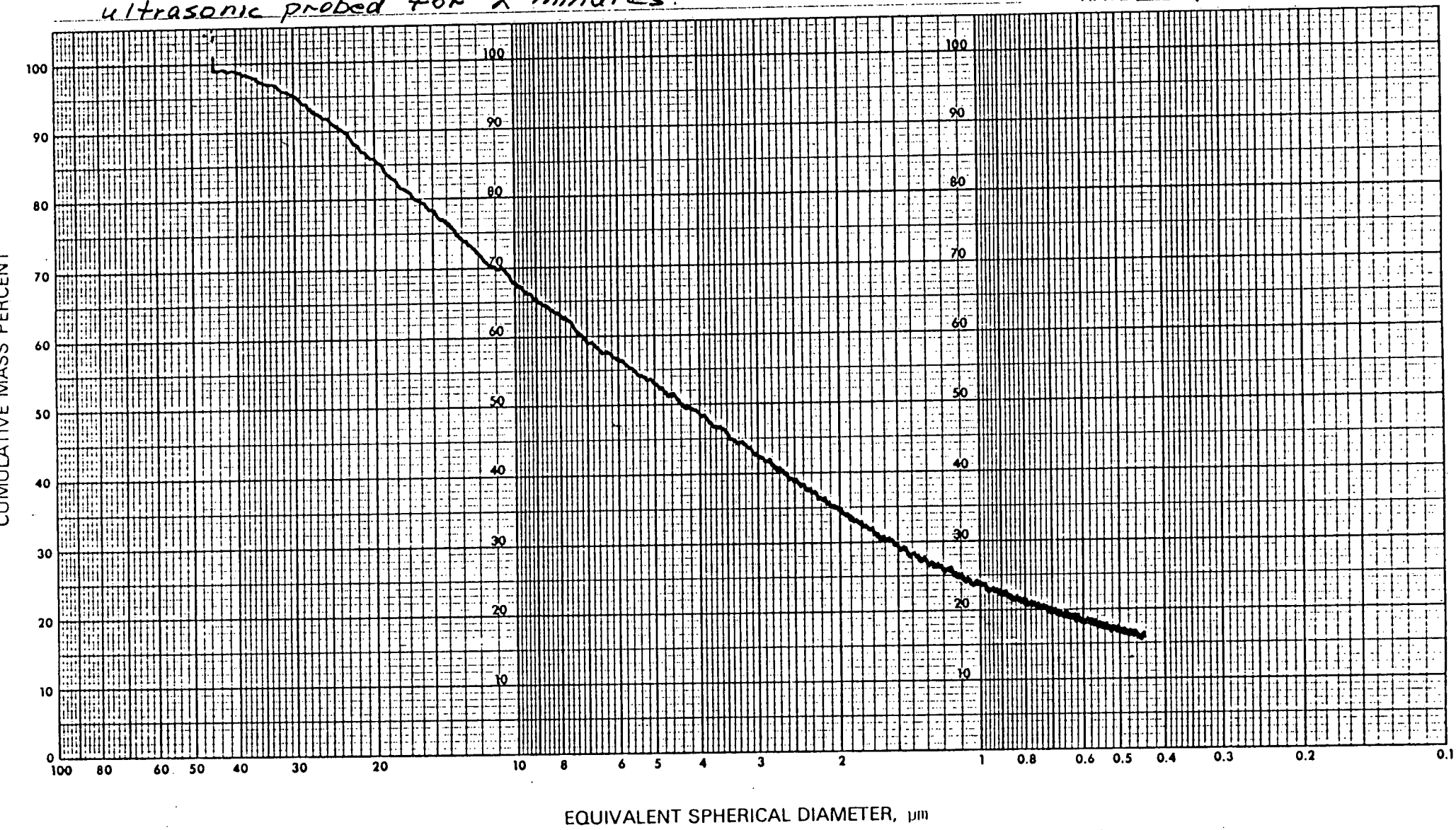
Preparation Mixed with liquid Blended in a Waring Blender, 25 ml of spl pipetted, ultrasonic probed for 2 minutes.

DATE July 28 '83

BY D. Goulet

TEMPERATURE 33 °C

RATE 361 START DIA. 44 µm



micromeritics®
instrument corporation

Form 600/42701

SAMPLE OBED 130' – 134'

DRY SIEVE (INITIAL WT 494.78)

SIEVE #	WT SIEVE	WT SIEVE + SPL	WT SPL	COMMENTS
#5	426.83	426.83	—	
#10	367.95	367.95	—	
#18	340.47	340.77	0.3	composites + single quartz grains
#35	313.35	325.96	12.61	composites still present
#60	303.33	475.93	172.6	composites still present
#120	298.42	525.4	226.98	
#170	276.83	317.09	40.26	
#230	246.83	266.55	19.69	
#325	242.87	252.26	9.39	
PAN	248.30	261.08	12.78	12.78 DRY + 74.30 WET = 87.08
		TOTAL	494.61 (DRY)	+ 74.30 = 568.91 GM.

NAME OBED 130'-134" JOB NO

SAMPLE NO.	PAN NO.	WEIGHT PAN	WEIGHT PAN -325 (AIRDRY)	WEIGHT -325 AIRDRY
< 325 MESH	#27	193.73	268.03	74.30
> 325 MESH	#2 (Evaporating Dish)	302.25		494.78
			TOTAL	569.08

ALBERTA RESEARCH COUNCIL ——— AGGREGATE INVENTORY

GRAIN SIZE ANALYSIS

PROJECT OBED MOUNTAIN COAL LTD DATE JUNE 93 SAMPLE NO. 130.0'-134.0'

TESTED BY Goulet CHECKED BY _____

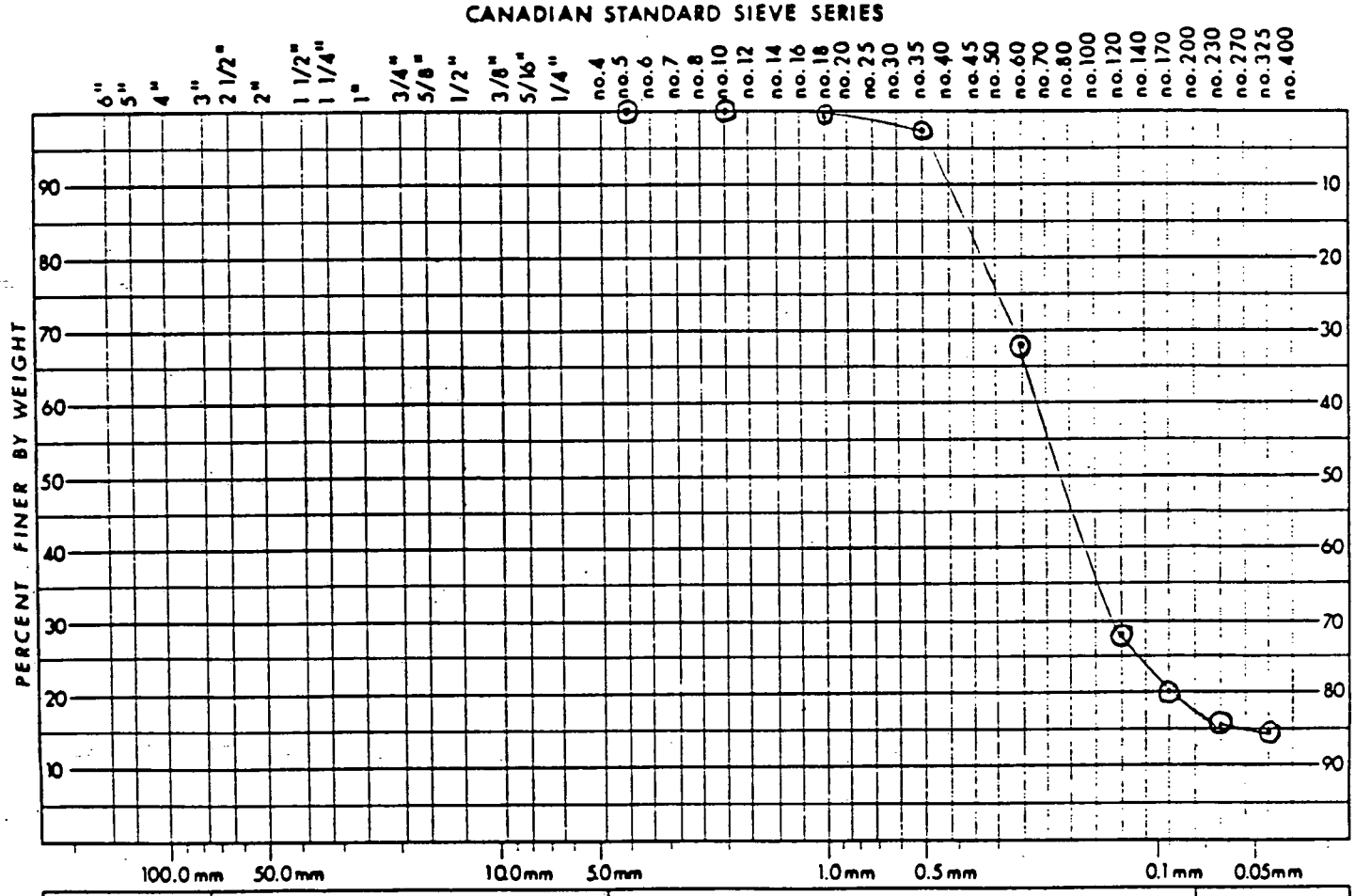
REMARKS _____

DRY WEIGHT OF COARSE SAMPLE =				
SIEVE OPENING	WEIGHT RETAINED	PERCENT RETAINED	WEIGHT PASSING	PERCENT PASSING
#5	0	0	568.91	100
#10	0	0	568.91	100
#18	0.3	.05	568.61	99.95
#35	12.61	2.22	556.0	97.73
#60	172.60	30.34	383.4	67.39
#120	226.98	39.89	156.42	27.49
#170	40.26	7.08	116.16	20.42
#230	19.69	3.46	96.47	16.96
#325	9.39	1.65	87.08	15.31
PAN	87.08	15.31		
TOTALS	568.91	100%		

DRY WT. OF 1/4'D SAMPLE (IF NECESSARY) PASSING NO.....SIEVE =				
SIEVE OPENING	WEIGHT RETAINED	PERCENT RETAINED	WEIGHT PASSING	PERCENT PASSING
TOTALS				

GRADATION CURVE

CANADIAN STANDARD SIEVE SERIES



COBBLES	GRAVEL		SAND			FINES
	COARSE	FINE	COARSE	MEDIUM	FINE	

GRAIN SIZE ANALYSIS

SAMPLE OBED 130.0'-134.0'

SIEVE OPENING	WEIGHT RETAINED	PERCENT RETAINED	WEIGHT PASSING	PERCENT PASSING
#5	0.00	0.00	568.91	100.00
#10	0.00	0.00	568.91	100.00
#18	0.30	0.05	568.61	99.95
#35	12.61	2.22	556.61	97.73
#60	172.60	30.34	383.40	67.39
#120	226.98	39.89	156.42	27.49
#170	40.26	7.08	116.16	20.42
#230	19.69	3.46	96.47	16.96
#325	9.39	1.65	87.08	15.31
PAN	87.08	15.31		
PAN				
31.00 u	3.66	0.64	83.42	14.67
22.00 u	6.79	1.19	76.63	13.48
15.60 u	7.66	1.35	68.97	12.13
11.00 u	8.01	1.41	60.96	10.72
7.80 u	6.27	1.10	54.69	9.62
5.50 u	6.97	1.22	47.72	8.40
3.90 u	5.92	1.04	41.80	7.36
2.80 u	5.66	1.00	36.14	6.36
2.00 u	5.84	1.03	30.30	5.33
1.40 u	6.10	1.07	24.20	4.26
0.98 u	3.74	0.66	20.46	3.60
0.69 u	3.22	0.57	17.24	3.03
0.49 u	2.87	0.51	14.37	2.52
<0.49 u	14.37	2.52	0.00	0.00
TOTALS	568.91	100.00%		

GRAIN SIZE ANALYSIS

SAMPLE	OBED 130.0'-134.0'
TOTAL WEIGHT	9840 grams (14 pieces of core)
REPRESENTATIVE SPLIT	569.74 grams

(sample taken from each core)

DISAGGREGATION METHOD:

1. Sample was soaked in water for 5 days
2. Ultrasonic probe - 5 minutes
3. Boiled lightly
4. Wet/Dry Sieve Technique

SAMPLE # OBED 130'-134' DATE JUNE 23-24/93

FRACTION Heavy Mineral Separation #120
(MODAL FRACTION)

	FUNNEL #	BEFORE	LIGHTS	HEAVIES
June 24/93	#1	46.88	46.75	.11
	#2			
	#3			
June 23/93	#4	60	59.83	.17
	#5	60	59.82	.17
	#6	60	59.83	.17
	TOTALS	226.880m	226.236m	.162 gm

226.856m.

Loss .03 gm.

{ WEIGHING ERROR }

SAMPLE # OBED 130'-134' DATE JUNE 23/93

FRACTION Heavy Mineral Separation #60.

FUNNEL #	BEFORE	LIGHTS	HEAVIES
#1	60	59.90	.09
#2	60	59.92	.08
#3	52.3	52.22	.08
#4			
#5			
#6			
TOTALS	172.36gm	172.04gm	0.26gm

172.36gm.

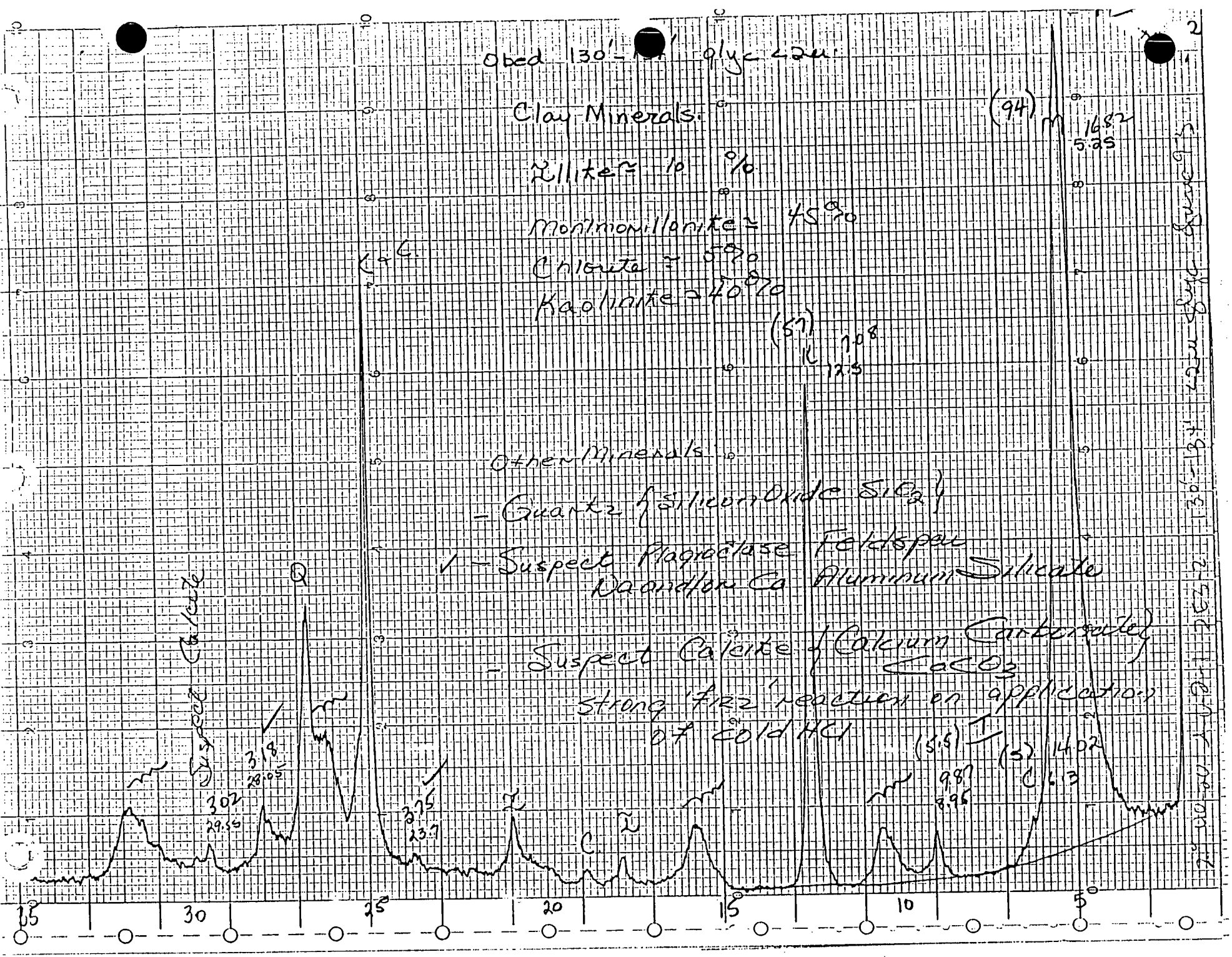
NO LOSS

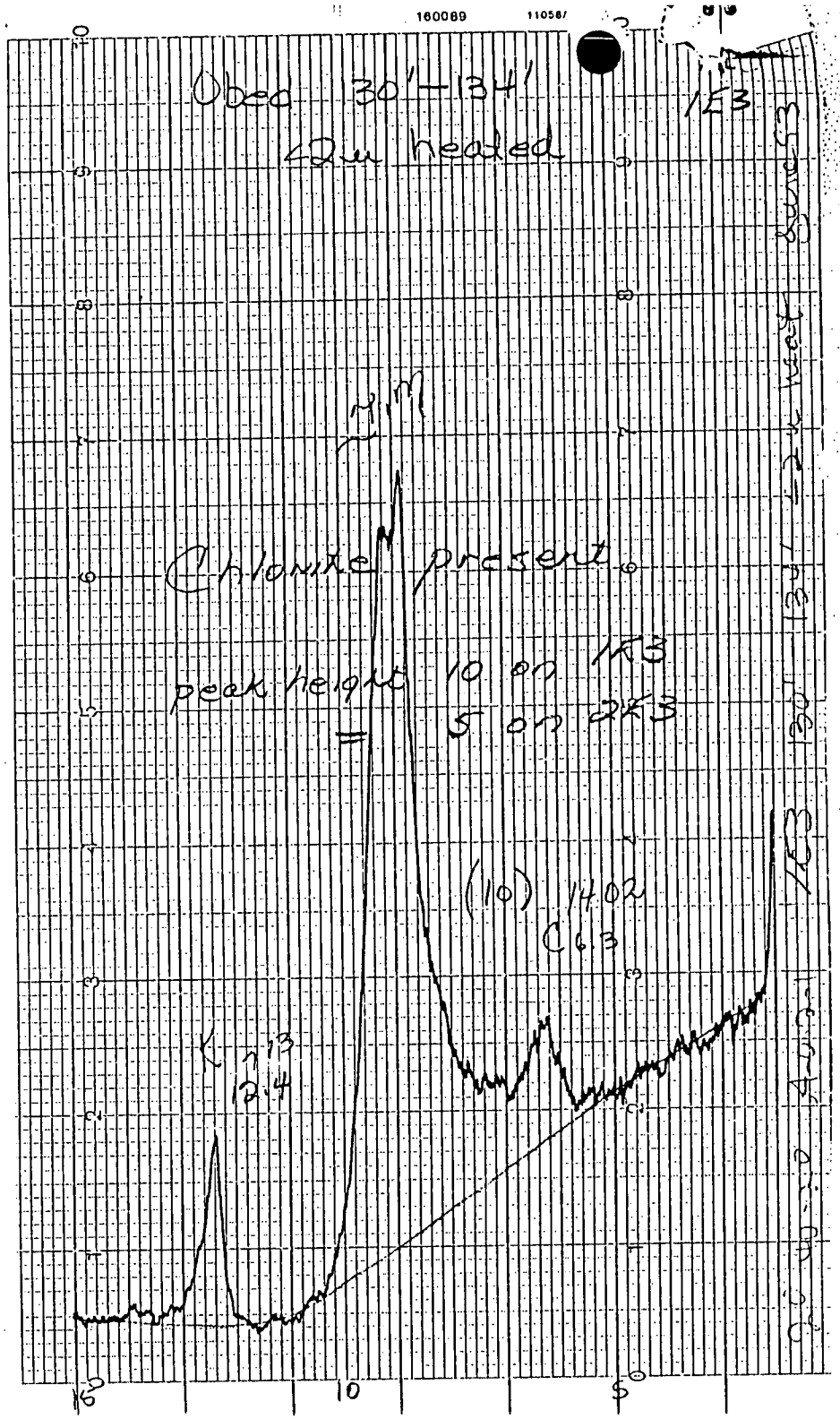
HEAVY MINERAL SEPARATION

Heavy Mineral Separation (tetrabromoethane - SG 2.95) run on the size analysis sample (modal fraction and the finer or coarser fraction next to the modal fraction).

SAMPLE OBED 130.0'-134.0'

Sieve Opening	Wt of Sample (grams)	Wt of Lights (grams)	Wt of Heavies (grams)	% Heavies
# 60	172.3	172.04	0.26	0.15
#120	226.85	226.23	0.62	0.27


Obed 130' - [illegible] glyc 42hr.
Clay Minerals:
Illite ≈ 10 %
Montmorillonite ≈ 45 %
Chlorite ≈ 0 %
Kaolinite ≈ 40 %
Other Minerals:
- Quartz (Silicon Oxide SiO2)
- Suspect Plagioclase Feldspar (Calcium Aluminum Silicate)
- Suspect Calcite (Calcium Carbonate) CaCO3
strong fizz reaction on application of cold HCl
(94)
16.82
5.25
(57)
10.8
12.5
(5.6)
9.87
8.96
(5)
14.02
C.I. 3
Q
C
K
3.18
28.05
3.02
29.56
3.76
23.7
35
30
25
20
15
10
5


160089 11058/
Obsd 130'-134'
42w headed
1E3
Chlorine present
peak height = 10 on 1E3
5 on 2E3
(10) 14.02
C 6.3
K 12.4
10

CHEMICAL ANALYSIS

SAMPLE OBED 130.0'-134.0'

Moisture 0.5%
LOI 4.0%

Element	Value (ug/g))	Weight %	Oxide	Weight %
Na	12270	1.23	Na2O	1.65
Ca	24627	2.47	CaO	3.45
K	13067	1.31	K2O	1.57
Mn	575	0.06	MnO	0.07
Al	62449	6.25	Al2O3	11.80
Fe	23631	2.36	Fe2o3	3.38
Mg	9412	0.94	MgO	1.56
Ti	2588	0.26	TiO2	0.43
P	579	0.06	P2O5	0.13
S	534	0.05	SO3	0.13
Si	336893	33.69	SiO2	72.07

	LENGTH		WIDTH			TEMP	SHRINKAGE	ABSORPTION			
FRONT	DRY	FIRED	DRY	FIRED	DIFF.	°C	%	WET WT.	DRY WT.	DIFF	% AB
1	.45		.873								
2	.95		.880								
3	1.46		.887								
4	1.96		.892								
5	2.46		.897								
6	2.97		.899								
7	3.46		.901								
8	3.97		.903								
9	4.47		.903								
10	4.97		.903								
11	5.47		.901								
12	5.97		.898								
13	6.40		—								
14											
REAR											
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											

COMMENTS.

FRONT BAR - BADLY CHIPPED & BROKEN AT #13 (NO WIDTH READING TAKEN)

REAR BAR BROKE ON SANDING FOR MEASUREMENTS

SAMPLE # OBED 112.3' - 116.0' DATE June 8/93

Wt. Sample	2100
Wt. Water	595
Total	2695
% H_2O	22.08%

Wet Length 10.0
Losson Drying 0.9
(* 2 Bars 9.1, 9.1)
% Drying Shrinkage @ 150°C 9%

Color - Very Light Gray Mudstone.

PLASTICITY } Poor - Entire sample was moist
WORKABILITY } but very dry in feel. Extruder
COMMENTS plugged (stopped - had to remove cover on pulley system & turn by hand)

3 BARS ONLY {1st bars extruded cracking badly - returned to extruder}

DRYING @ 105°C
1 BAR - CRACKS BADLY.
40% Drying Shrinkage

@ Room Temp
* 2 Bars at 50°C
- Minor Cracks

TEMPERATURE GRADIENT FURNACE
DID NOT FIRE ONE BAR — TOO FRAGIL.
TEST UNIT _____ DATE _____
CONTROLLER TEMP _____

REAR READINGS		FRONT READINGS	
0 (7.5")		0 (7.5")	
1 (6.0")		1 (6.0")	
2 (4.5")		2 (4.5")	
(3.0")		3 (3.0")	
(2.0")		4 (2.0")	
(1.0")		5 (1.0")	

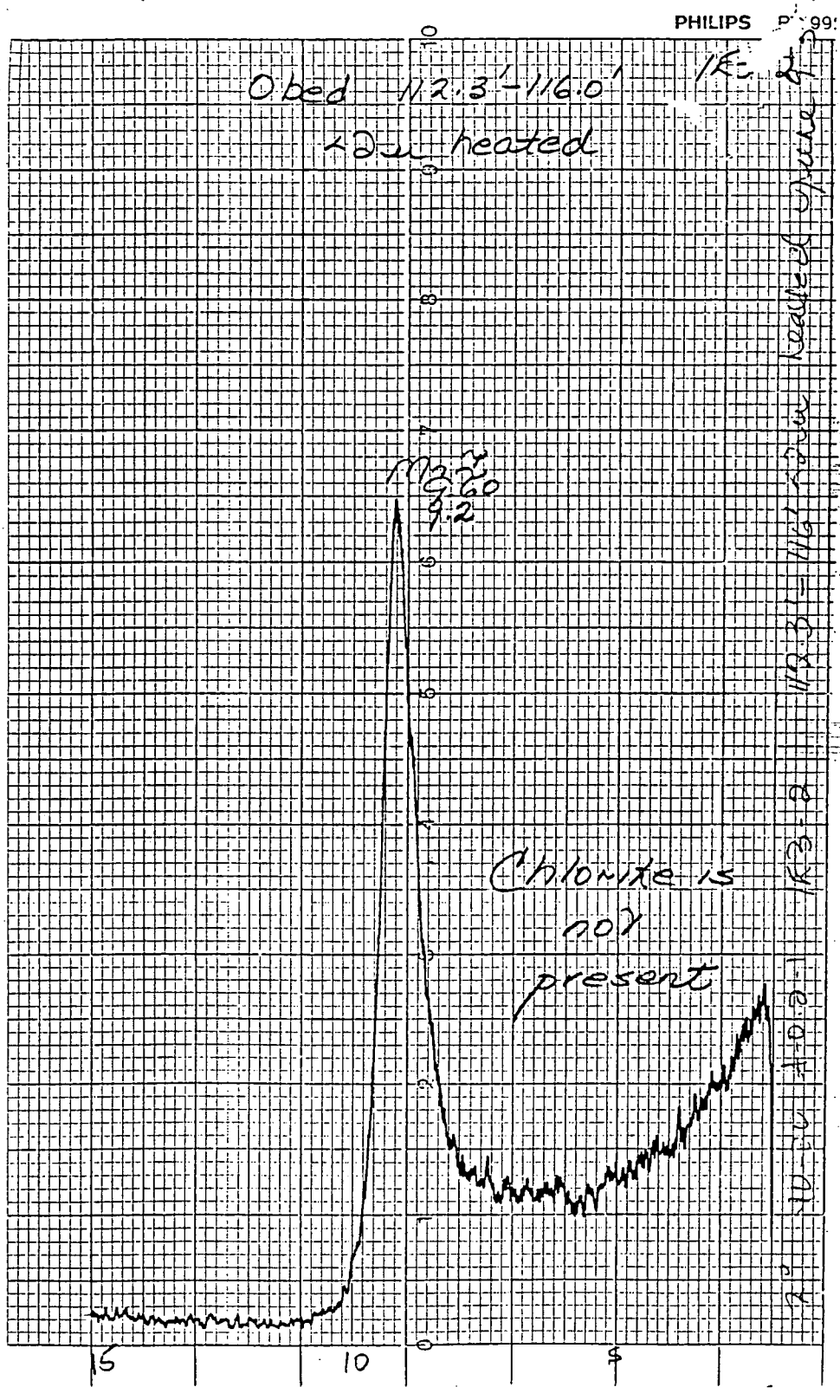
CHARACTERISTICS OF FIRED SAMPLES

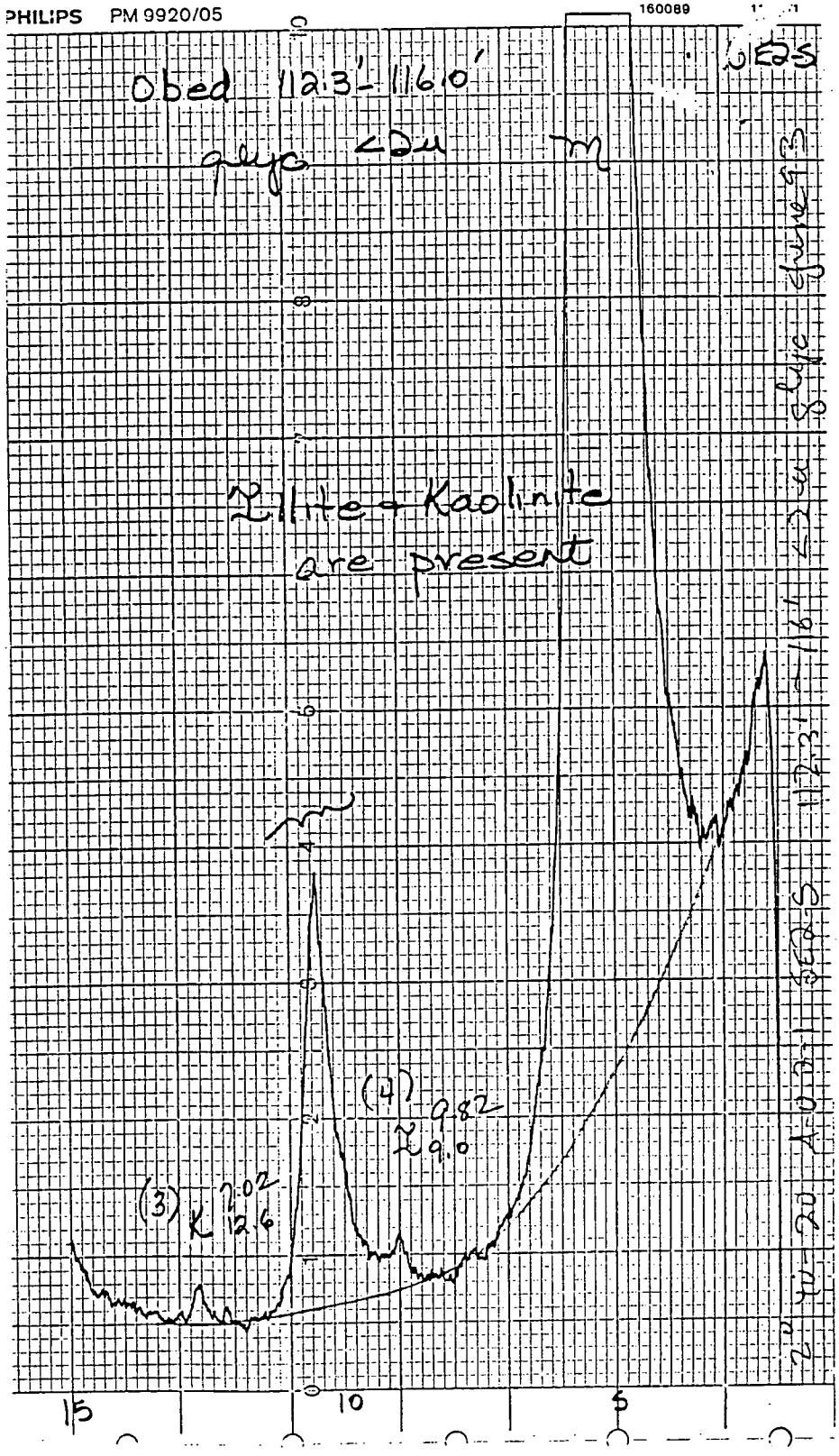
STEEL HARD COLOR	STEEL HARD TEMP. (C)	STEEL HARD ABSORPTION (%)	MAXIMUM FIRE COLOR	MAXIMUM FIRE TEMP. (C)	MAXIMUM FIRE ABSORPTIOM (%)	MAXIMUM FIRE SHRINKAGE (%)	REMARKS
-	-	-	-	-	-	-	Bar too fragile to fire. Little value.

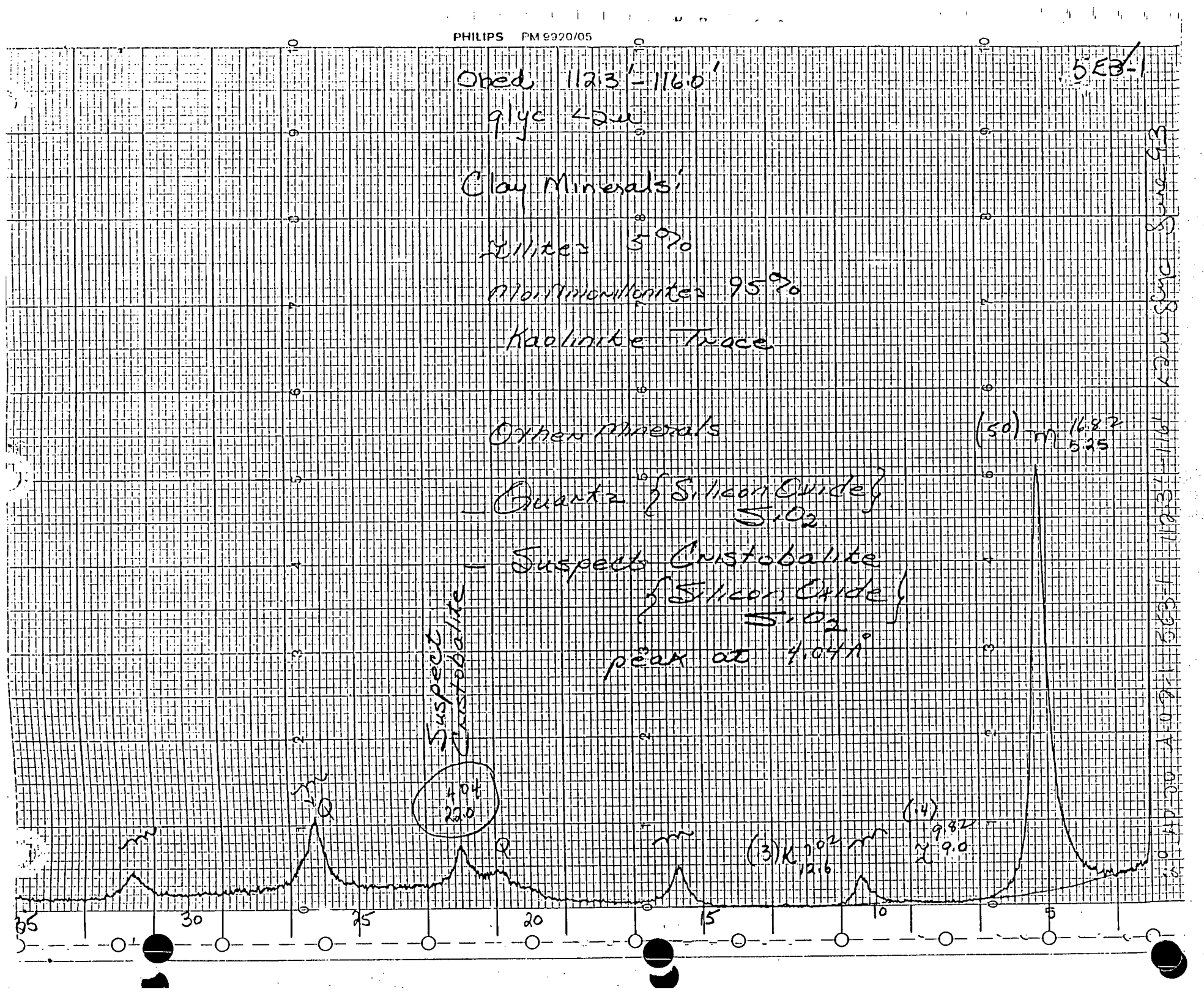
CERAMIC TEST

CHARACTERISTICS OF UNFIRED SAMPLES

SAMPLE	DESCRIPTION	TEMPERING WATER (%)	PLASTICITY	WORK-ABILITY	DRYING PROPERTIES ROOM TEMP.	DRYING PROPERTIES 105 C	DRYING SHRINKAGE (%) 150 C
112.30'-116.00'	Very light gray (N8) mudstone	22.08	poor	poor	minor cracks	cracks badly	9.00


PHILIPS
0 bed 112.3'-116.0'
20μ heated
Chloride is
not
present
15
10
5


PHILIPS PM 9920/05
160089
Obed 112.3'-116.0'
grab <2µ m
Illite + Kaolinite
are present
(3) K 7.02 12.6
(4) 9.82 9.0
15
10
5

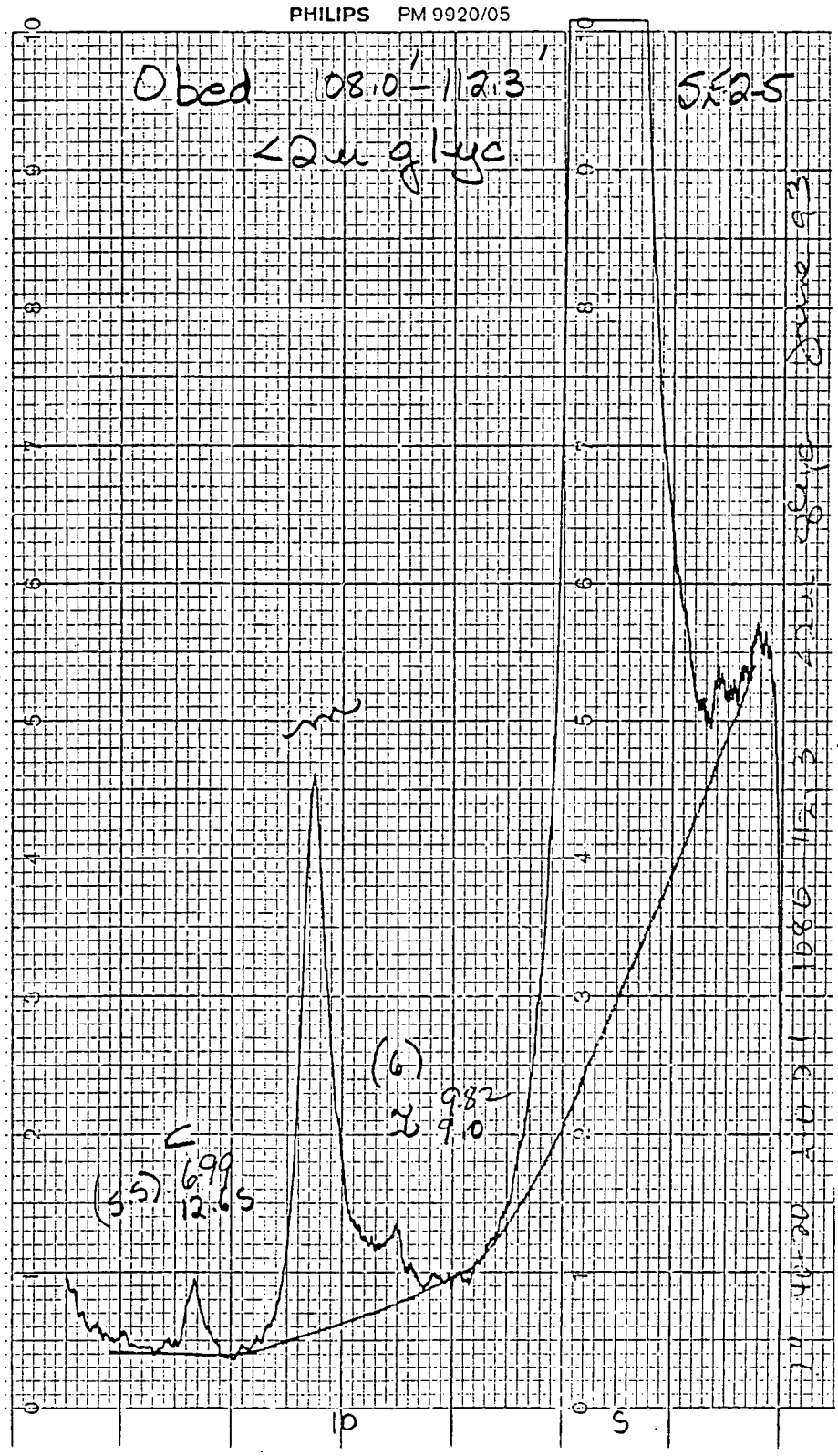

PHILIPS PM 9920/05
Oxed 112.3'-116.0'
5EB-1
Clay Minerals:
Illite ~90%
Mont. Montmorillonite 95%
Kaolinite Trace
Other minerals
Quartz
Silicon Oxide SiO2
Suspect Cristobalite
Silicon Oxide SiO2
peak at 4.04 A°
Suspect Cristobalite
4.04
22.0
(1)
(2)
(3) K 3.02
12.6
(4) 9.82
9.0
(5) 16.82
5.25
35
30
25
20
15
10
5

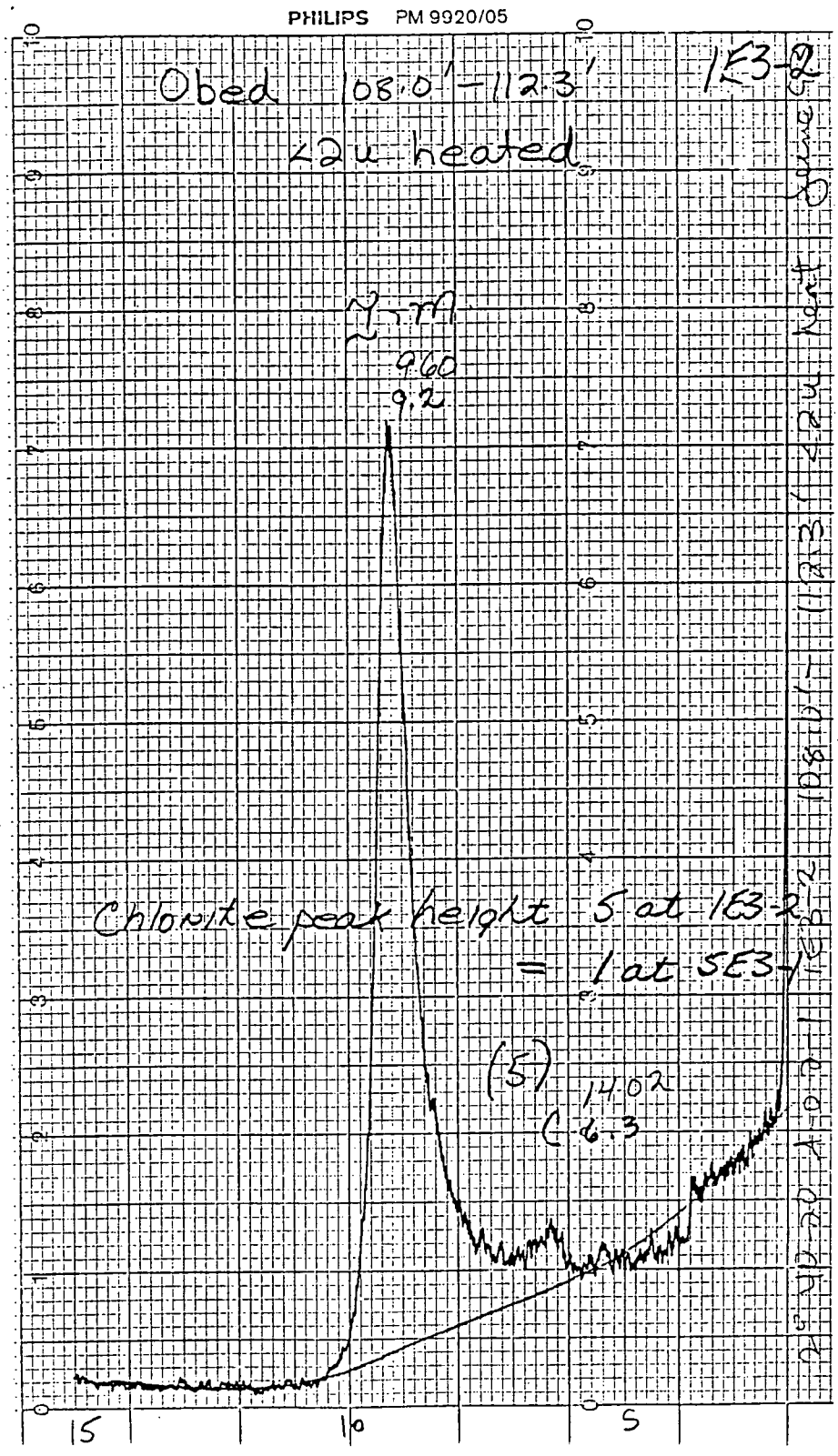
CHEMICAL ANALYSIS

SAMPLE OBED 112.3'-116.0'

Moisture 5.1%
LOI 7.4%

Element	Value (ug/g))	Weight %	Oxide	Weight %
Na	5421	0.54	Na2O	0.73
Ca	17378	1.74	CaO	2.43
K	4005	0.40	K2O	0.48
Mn	136	0.01	MnO	0.02
Al	69789	6.98	Al2O3	13.19
Fe	20793	2.08	Fe2O3	2.97
Mg	12139	1.21	MgO	2.01
Ti	943	0.09	TiO2	0.16
P	254	0.03	P2O5	0.06
S	422	0.04	SO3	0.11
Si	306687	30.67	SiO2	65.61


PHILIPS PM 9920/05
O bed 108.0 - 112.3'
<2w gl yc
5x2-5
(5.5) 6.99 12.6 s
(6) 9.82 9.0
lp
s


PHILIPS PM 9920/05
Obed 1080'-1123'
42u heated
1E3-2
9.60
9.2
Chlorite peak height 5 at 1E3-2
= 1 at 5E3-1
(5)
14.02
6.3
15
10
5

Obed 108.0' - 112.3'

<Dw glyc.

563-1

CLAY MINERALS

Illite } make up 50% roughly
Chlorite }
Montmorillonite 95-80

Comment:

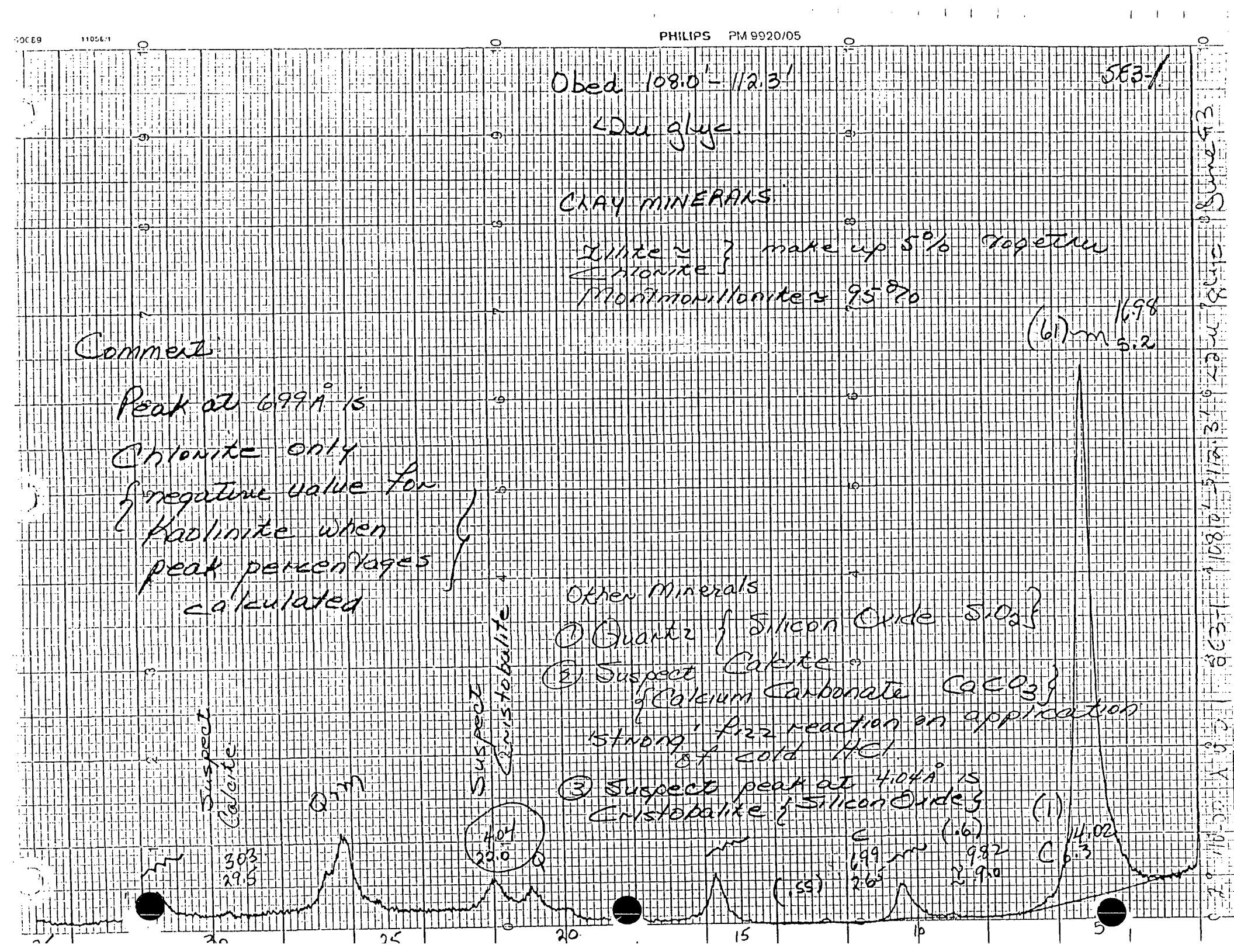
Peak at 699Å is Chlorite only
negative value for Kaolinite when peak percentages calculated

Other Minerals

① Quartz { Silicon Oxide SiO_2 }

② Suspect Calcite { Calcium Carbonate $CaCO_3$ }
Strong effervescence on application of cold HCl

③ Suspect peak at 4.04Å is Cristobalite { Silicon Oxide SiO_2 }



CHEMICAL ANALYSIS

SAMPLE OBED 108.0'-112.3'

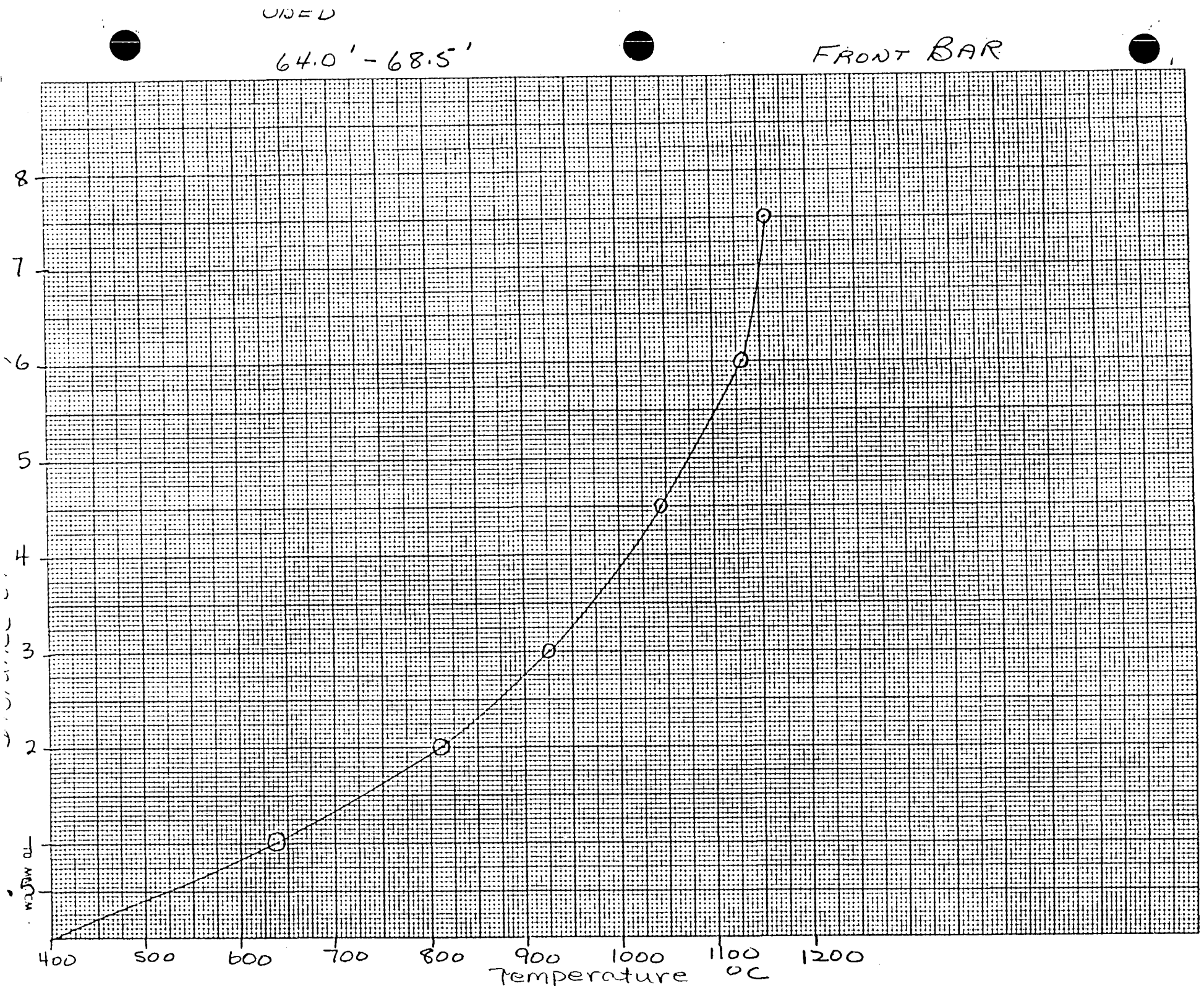
Moisture 4.0%
LOI 7.5%

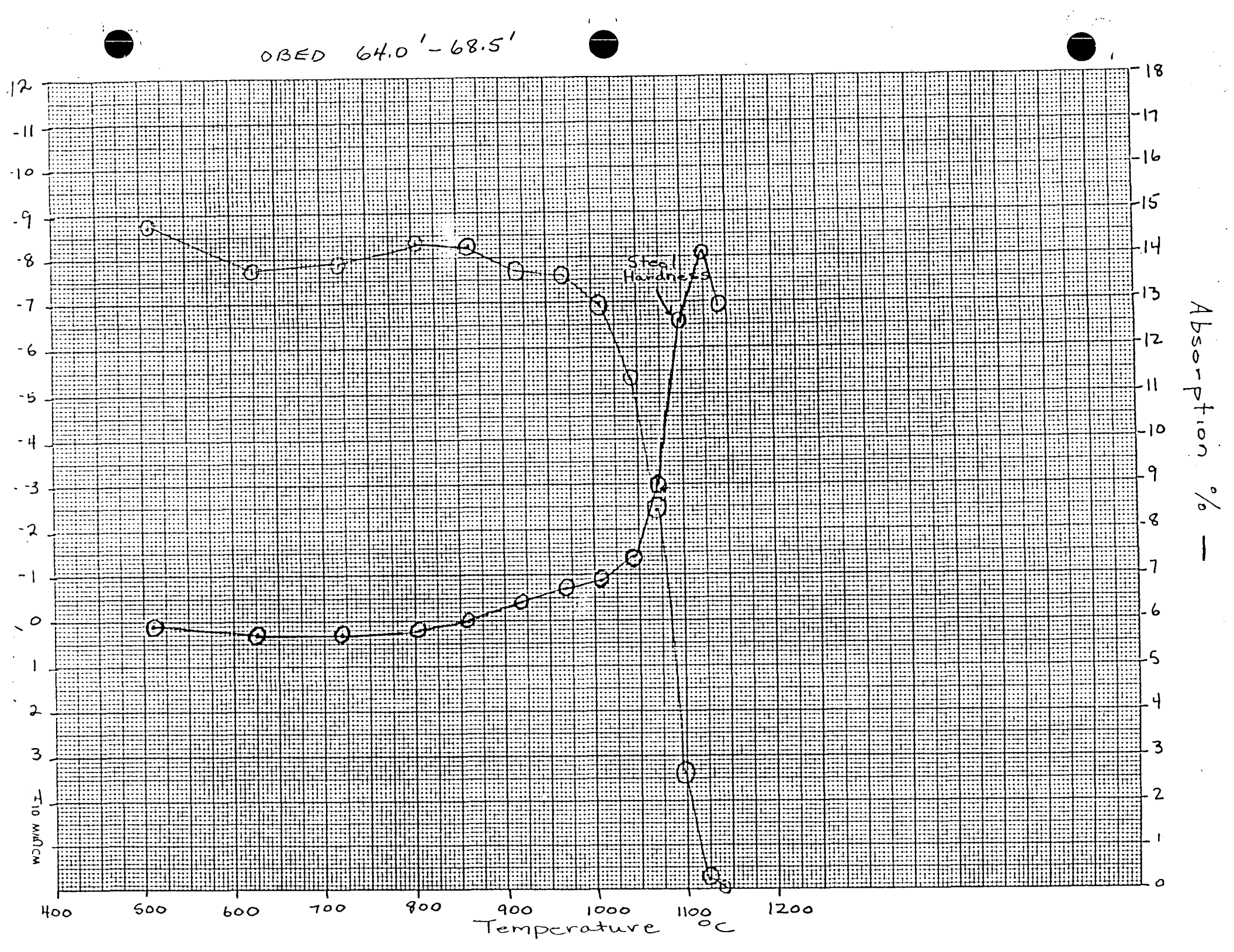
Element	Value (ug/g))	Weight %	Oxide	Weight %
Na	4945	0.50	Na2O	0.67
Ca	19622	1.96	CaO	2.75
K	5763	0.58	K2O	0.69
Mn	166	0.02	MnO	0.02
Al	71153	7.12	Al2O3	13.44
Fe	21760	2.18	Fe2O3	3.11
Mg	13558	1.36	MgO	2.25
Ti	1361	0.14	TiO2	0.23
P	306	0.03	P2O5	0.07
S	591	0.05	SO3	0.15
Si	296554	29.66	SiO2	63.44

USED

64.0' - 68.5'

FRONT BAR




OBED 64.0'-68.5'
Steel Hardness
Absorption %
Temperature °C
400
500
600
700
800
900
1000
1100
1200
T10 MMDCM

SAMPLE No. SAFD 6-4' - 6-8.5'

	LENGTH		WIDTH			TEMP	SHRINKAGE	FRONT BAR ABSORPTION			
FRONT	DRY	FIRED	DRY	FIRED	DIFF.	°C	%	WET WT.	DRY WT.	DIFF	% ABS.
1	.45	.45	.963	.964	+.001	510	+.10%	3.5058	2.9906	0.5152	14.70%
2	.95	.95	.966	.969	+.003	625	+.31%	3.6191	3.1232	0.4959	13.70%
3	1.45	1.45	.969	.972	+.003	720	+.31%	3.1341	2.6999	0.4342	13.85%
4	1.95	1.95	.971	.973	+.002	805	+.21%	3.8755	3.3213	0.5542	14.30%
5	2.45	2.45	.972	.972	0	865	0%	2.7303	2.3404	0.3899	14.28%
6	2.94	2.93	.972	.968	-.004	918	-.41%	3.9412	3.4013	0.5399	13.70%
7	3.46	3.45	.971	.964	-.007	968	-.72%	2.9254	2.5254	0.4000	13.67%
8	3.96	3.95	.969	.961	-.008	1007	-.83%	3.6057	3.1392	0.4665	12.94%
9	4.46	4.44	.966	.952	-.014	1042	-1.45%	4.1434	3.6734	0.470	11.34%
10	4.95	4.93	.963	.934	-.029	1070	-3.01%	6.5073	5.9608	0.5465	8.40%
11	5.45	5.40	.961	.897	-.064	1097	-6.66%	3.7753	3.6758	0.0995	2.64%
12	5.95	5.86	.957	.880	-.077	1123	-8.05%	7.7027	7.6853	0.0174	0.23%
13	6.44	6.30	.952	.886	-.066	1140	-6.93%	5.3749	5.3734	0.0015	0.03%
14											
REAR											
1	.47	.47	.961	.961	.000		+0%				
2	.97	.97	.966	.968	+.002		+.21%				
3	1.46	1.47	.969	.972	+.003		+.31%				
4	1.97	1.98	.971	.974	+.004		+.41%				
5	2.46	2.47	.972	.972	0		0%				
6	2.97	2.97	.974	.969	-.005		-.51%				
7	3.47	3.47	.973	.966	-.007		-.72%				
8	3.97	3.96	.972	.963	-.009		-.93%				
9	4.46	4.45	.970	.956	-.014		-1.44%				
10	4.96	4.93	.967	.938	-.029		-3.00%				
11	5.45	5.40	.963	.907	-.056		-5.83%				
12	5.95	5.85	.959	.883	-.076		-7.92%				
13	6.46	6.31	.954	.886	-.068		-7.13%				
14											

COMMENTS.

Use Front Bar

Rear bar more difficult to measure at higher #s

Absorption Wet #1 broke in 2 pieces.

SAMPLE # OBED 64'-68.5' DATE June 8/93

Sample	2100
Ml. Water	385
Total	2485
% H_2O	15.49 %

Wet Length 10.0
Losson Drying 0.4
*(4 Bars - 9.6, 9.6, 9.6, 9.6)
% Drying Shrinkage @ 150°C 4 %

Colon - Light Olive Gray Mudstone

PLASTICITY
WORKABILITY
COMMENTS } F. Good - Entire sample moist. Large chunks formed when squeezed material in extruder exhibited fairly good plasticity - molded into cap & came out slightly difficult to remove (didn't peel)

5 Bars extruded - Firm & Fairly straight (extruder did not shut off & but only 5 bars extruded)
DRYING @ 105°C
1 BAR - Minor Cracks
3% Drying Shrinkage

@ Room Temp (RT
*2 BARS RT & 2 BARS 50°
- Minor Warp

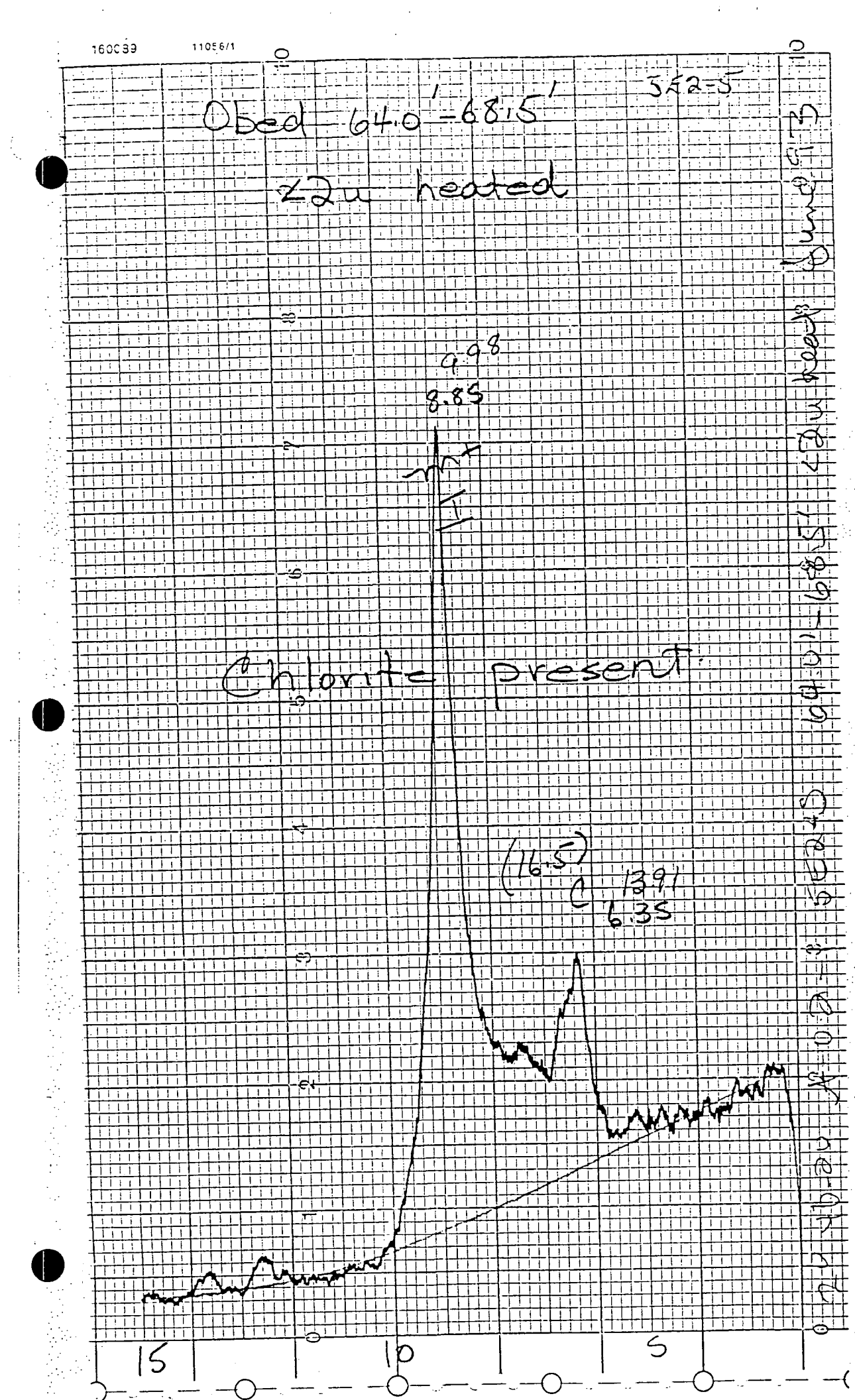
TEMPERATURE GRADIENT FURNACE

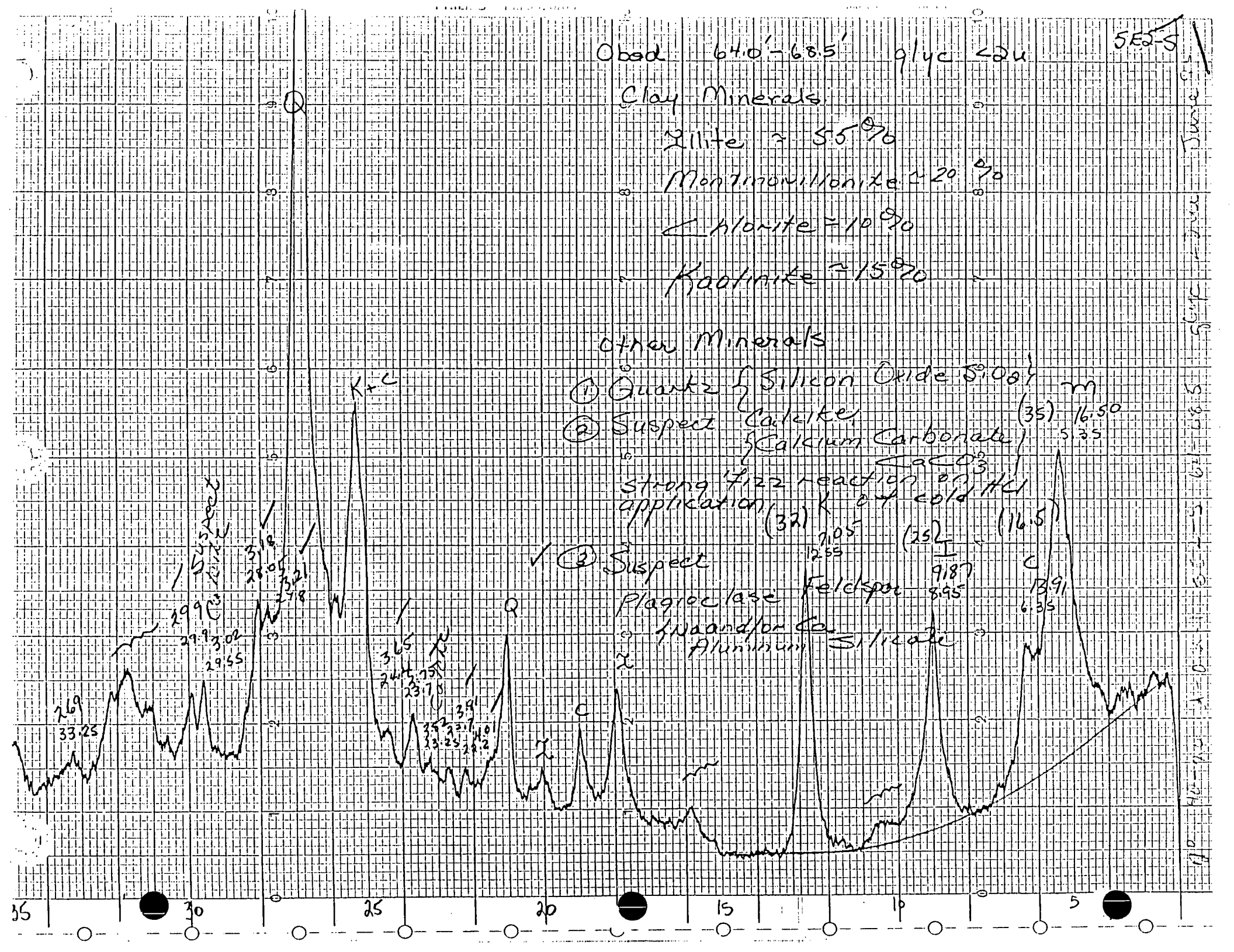
TEST UNIT TG-CA DATE June 16/92
CONTROLLER TEMP 250°C - 1200°C with a 2½ hr soak at 850°C (7¼ hr)

	REAR READINGS		FRONT READINGS
0	(7.5") 1159.9	0	(7.5") 1156.8
1	(6.0") 1124.7	1	(6.0") 1131.3
	(4.5") 1049.0	2	(4.5") 1045.8
3	(3.0") 926.1	3	(3.0") 926.1
4	(2.0") 807.0	4	(2.0") 812.6
5	(1.0") 631.9	5	(1.0") 639.7

CHARACTERISTICS OF FIRED SAMPLES

STEEL HARD COLOR	STEEL HARD TEMP. (C)	STEEL HARD ABSORPTION (%)	MAXIMUM FIRE COLOR	MAXIMUM FIRE TEMP. (C)	MAXIMUM FIRE ABSORPTIOM (%)	MAXIMUM FIRE SHRINKAGE (%)	REMARKS
Grayish red (10R 4/2)	1097	2.64	Moderate brown (5YR 3/4)	1123	0.23	8.05	Extremely short firing range (25 C). Possibly structural clay products if firing is very accurate.


160039
11056/1
542-5
Obed 64.0 - 68.5'
22u heated
9.98
8.85
Chlorite present
(16.5)
13.91
6.35
15
10
5


Obad 64.0'-68.5' 91C <2u
5E2-S
Clay Minerals
Illite ≈ 55%
Montmorillonite, Xa ≈ 20%
Chlorite ≈ 10%
Kaolinite ≈ 15%
other Minerals
① Quartz & Silicon Oxide SiO2
② Suspect Calcite, Calcium Carbonate, CaCO3
strong fizz reaction on application of cold HCl
③ Suspect Plagioclase Feldspar
Aluminum Silicate
K+C
Q
C
Q
C
K
M
(35) 16.50
5.35
(32) 7.05
12.55
(25) 9.87
8.95
(16.5)
13.91
6.35
299
29.9
30.2
29.55
269
33.25
154
5.75
3.18
28.05
3.21
3.78
3.65
24.45
23.75
3.52
33.25
3.41
23.7
29.2
4.01
35
30
25
20
15
10
5

CHARACTERISTICS OF UNFIRED SAMPLES

SAMPLE	DESCRIPTION	TEMPERING WATER (%)	PLASTICITY	WORK-ABILITY	DRYING PROPERTIES ROOM TEMP.	DRYING PROPERTIES 105 C	DRYING SHRINKAGE (%) 150 C
64.00'-68.50'	Light olive gray (5Y 6/1) mudstone	15.49	fairly good	fairly good	minor warp	minor cracks	4.00

CERAMIC TEST

CHEMICAL ANALYSIS

SAMPLE OBED 64.0'-68.5'

Moisture 0.8%
LOI 7.9%

Element	Value (ug/g))	Weight %	Oxide	Weight %
Na	8146	0.82	Na2O	1.10
Ca	17639	1.76	CaO	2.47
K	21268	2.13	K2O	2.56
Mn	102	0.01	MnO	0.01
Al	78023	7.80	Al2O3	14.74
Fe	52451	5.25	Fe2O3	7.50
Mg	12872	1.29	MgO	2.13
Ti	4003	0.40	TiO2	0.67
P	868	0.09	P2O5	0.20
S	914	0.09	SO3	0.23
Si	277904	27.79	SiO2	59.45

CHEMICAL ANALYSIS

SAMPLE OBED 46.5'-48.5'

Moisture 3.6 %
LOI 45.2%

Element	Value (ug/g)	Weight %	Oxide	Weight %
Na	1783	0.18	Na2O	0.24
Ca	8866	0.89	CaO	1.24
K	11779	1.18	K2O	1.42
Mn	102	0.01	MnO	0.01
Al	48487	4.85	Al2O3	9.16
Fe	29932	2.99	Fe2O3	4.28
Mg	6825	0.68	MgO	0.98
Ti	2157	0.22	TiO2	0.36
P	414	0.04	P2O5	0.09
S	3103	0.31	SO3	0.78
Si	158947	15.89	SiO2	34.00

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-8c

LOCATION _____ SEC. TP RGE W.

AREA _____

PROVINCE _____

SURVEYED DATA

ELEV. 1537

LOC. 54702 N

49511 E

RUN No.	1	2	3
DATE	MAY 12, 1993		
DEPTH-DRILLER	409		
DEPTH-LOGGER	409		
FLUID LEVEL	310		
LOGGING TIME			
DRILLED BY	C. MOORE		
RECORDED BY	C. MOORE		
WITNESSED BY	K.J.B.		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
7½	0	20

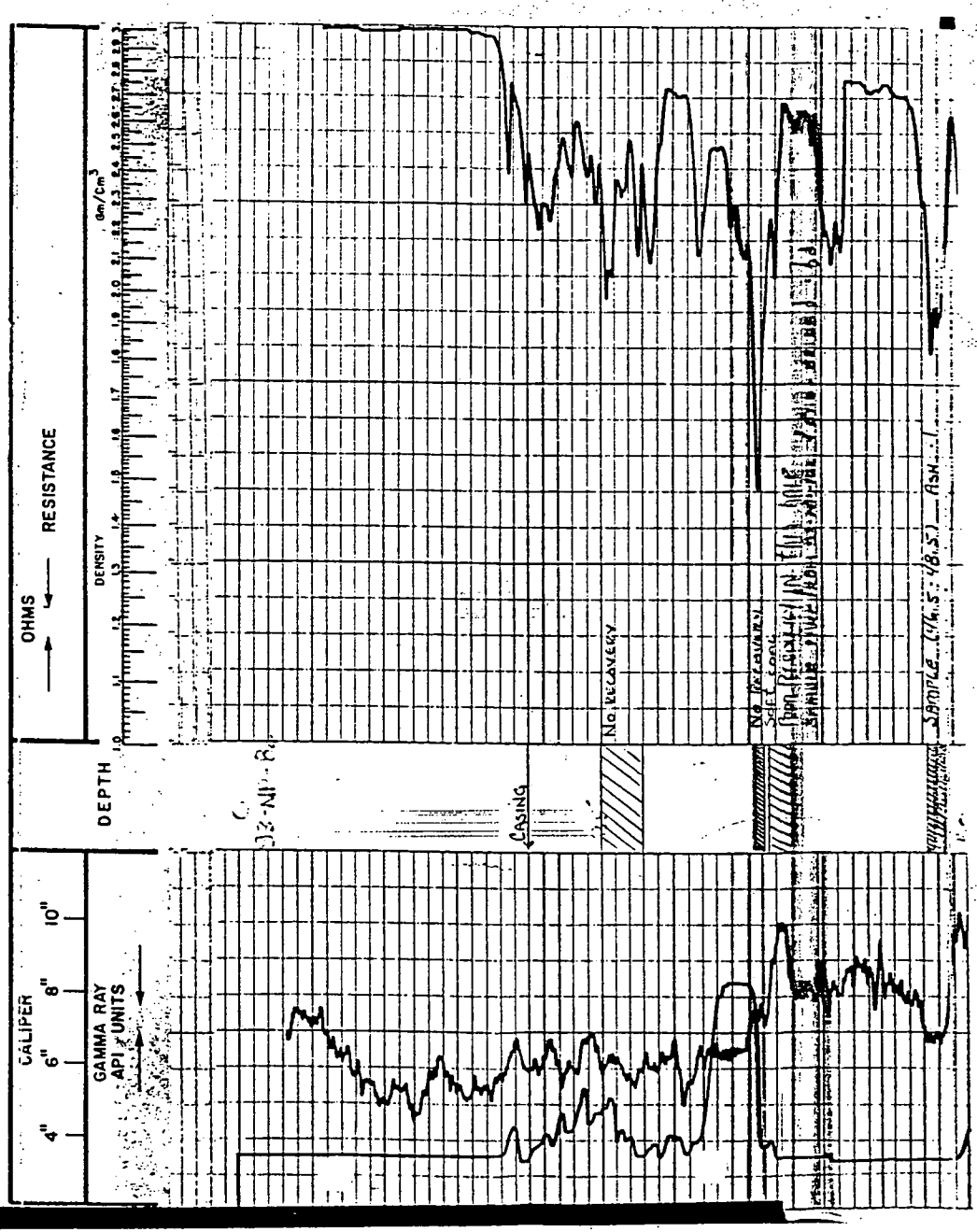
EQUIPMENT DATA

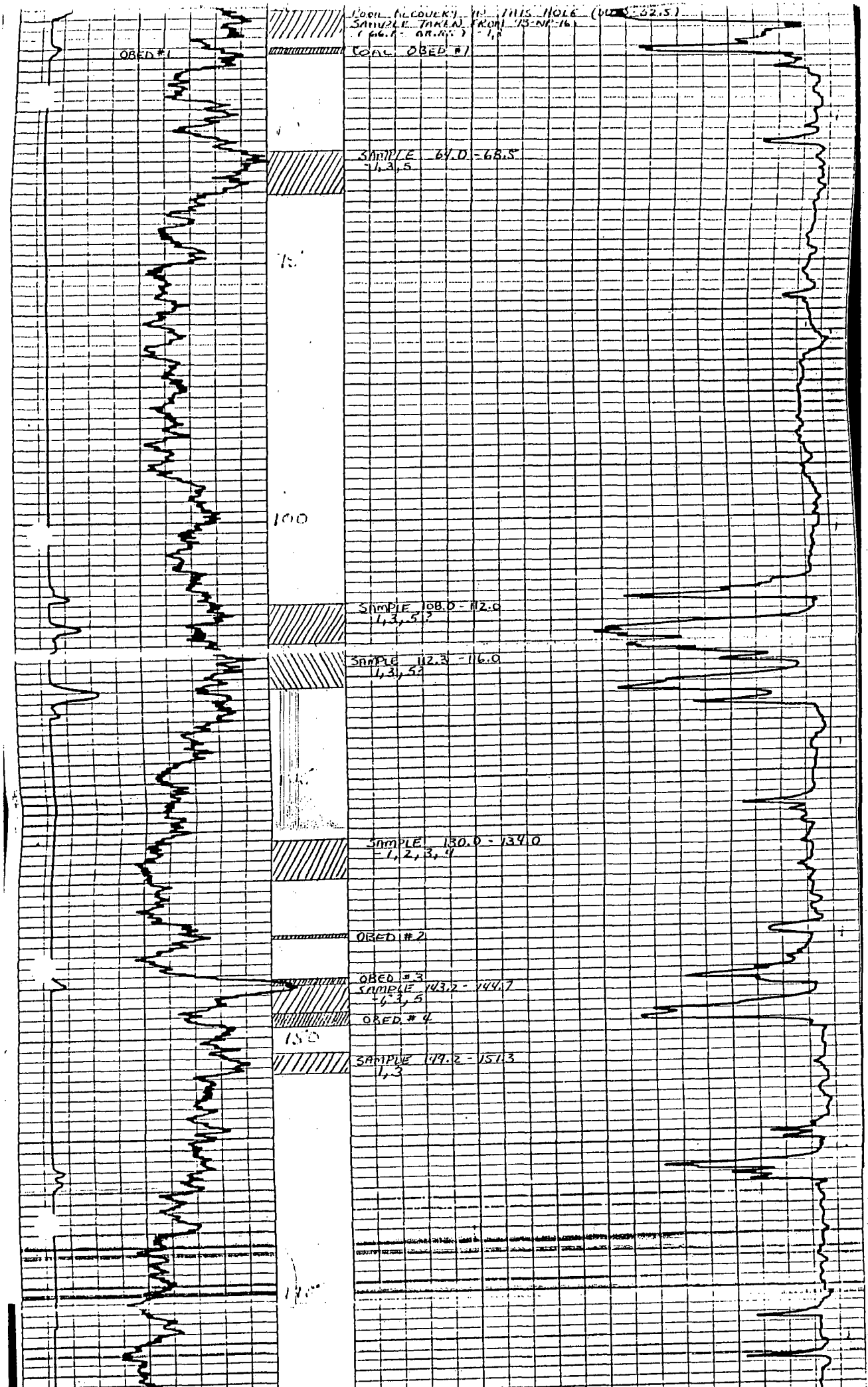
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH	1"		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

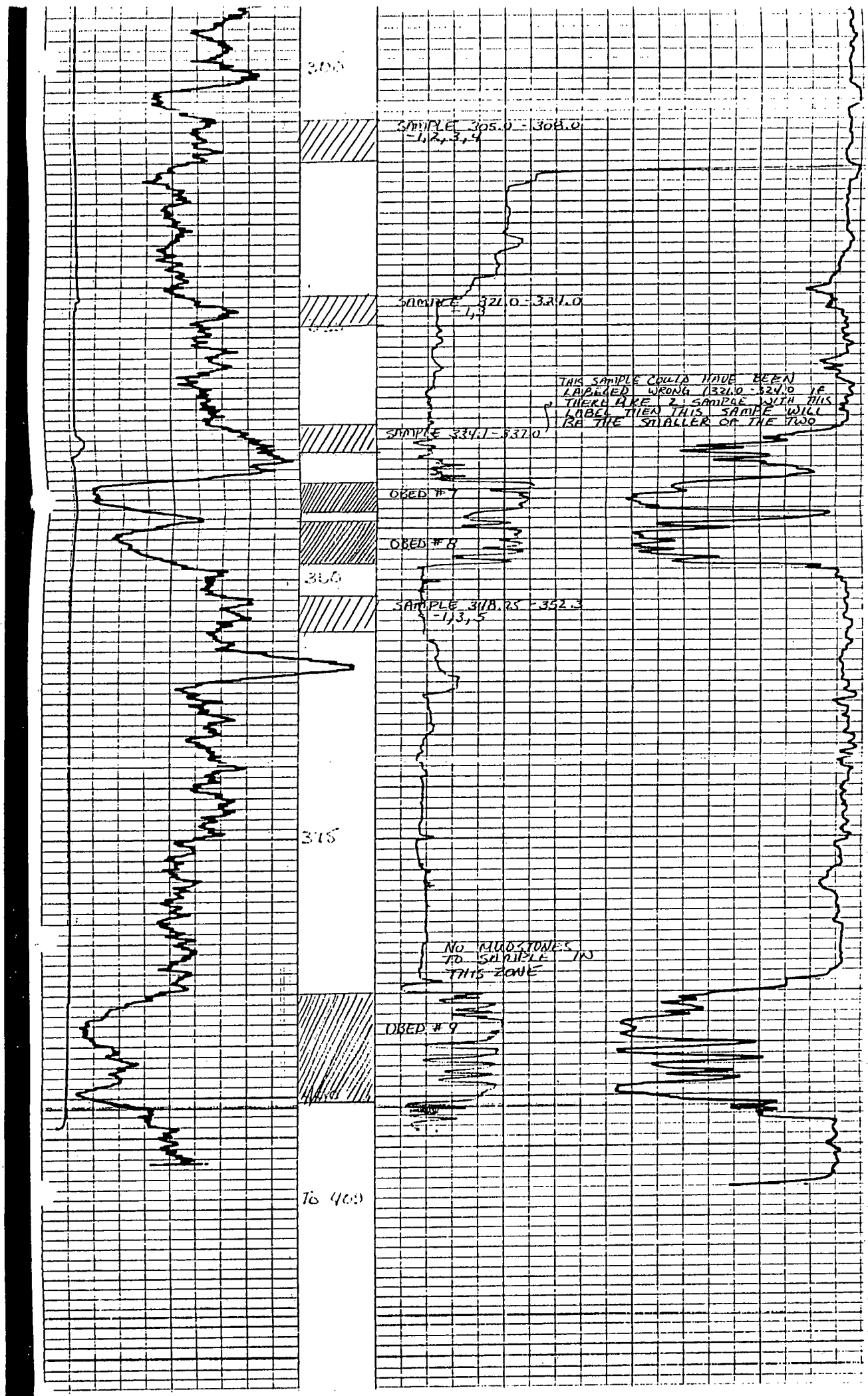
LOGGING DATA

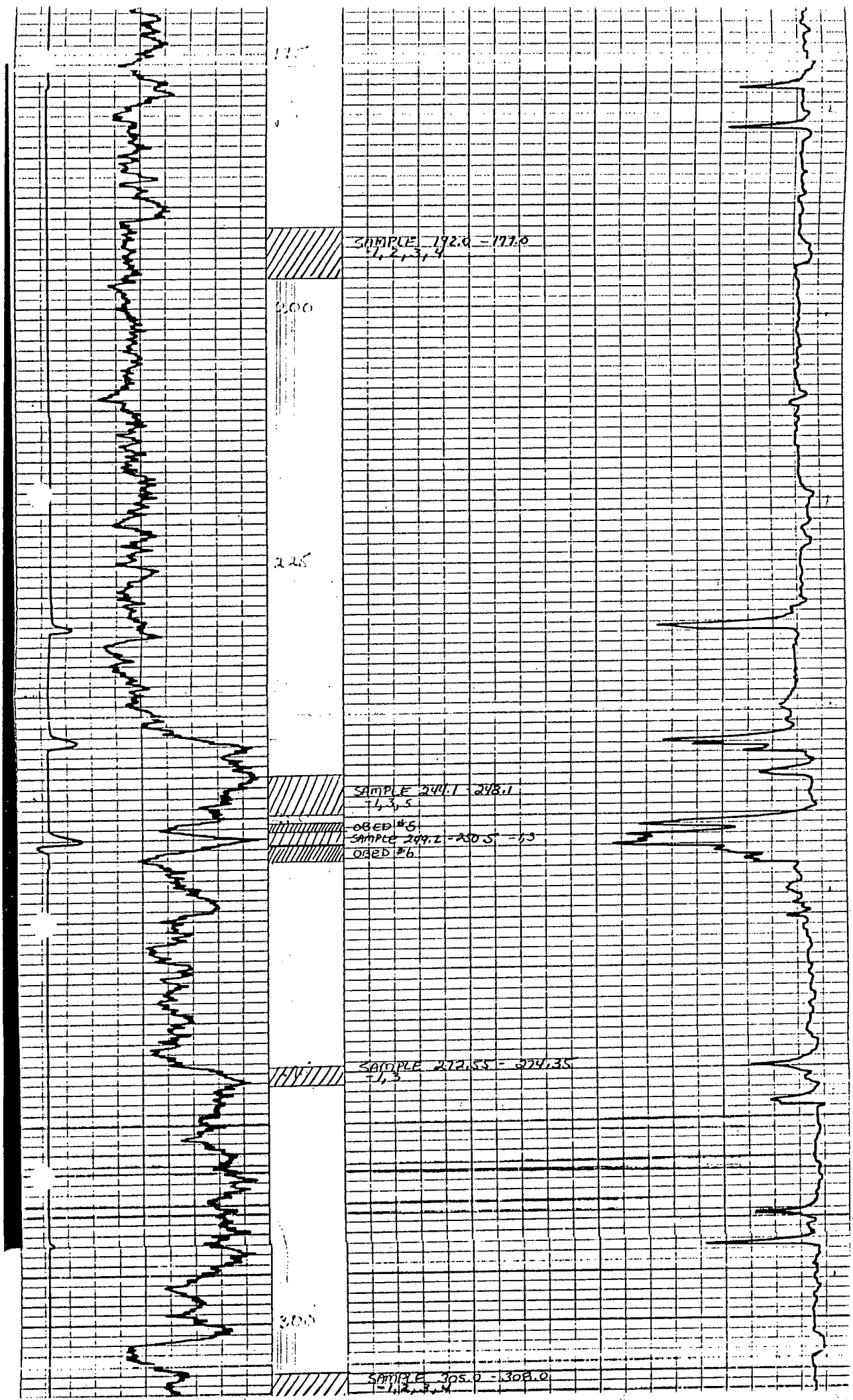
RUN No.	GENERAL DEPTHS FROM	GENERAL DEPTHS TO	SPEED Ft/min.	GAMMA RAY T C SEC.	GAMMA RAY SENS SETTING	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV.	DENSITY T C SEC	DENSITY SENS SETTINGS	DENSITY ZERO
		12.								

REMARKS:




TOOL ACCURACY IN THIS HOLE (QC = 32.5)
SAMPLE TAKEN FROM 13-NM-16
(66.1 - OR.M.) - 1,2
OBED #1
COAL OBED #1
SAMPLE 64.0 - 68.5
1,3,5
100
SAMPLE 108.0 - 112.0
1,3,5?
SAMPLE 112.3 - 116.0
1,3,5?
SAMPLE 130.0 - 134.0
1,2,3,4
OBED #2
OBED #3
SAMPLE 143.2 - 144.7
1,3,5
OBED #4
150
SAMPLE 149.2 - 151.3
1,3


300
SAMPLE 305.0 - 308.0
-1,2,3,4
SAMPLE 321.0 - 321.0
-1,3
THIS SAMPLE COULD HAVE BEEN
LABELED WRONG (321.0 - 324.0 IF
THERE ARE 2 SAMPLE WITH THIS
LABEL THEN THIS SAMPLE WILL
BE THE SMALLER OF THE TWO
SAMPLE 334.1 - 337.0
OBED #7
OBED #8
350
SAMPLE 348.25 - 352.3
-1,3,5
375
NO MUDSTONES
TO SAMPLE IN
THIS ZONE
OBED #9
TO 400


SAMPLE 192.0 - 177.0
1, 2, 3, 4
200
225
SAMPLE 244.1 - 248.1
1, 3, 5
OBED #5
SAMPLE 249.2 - 250.5' - 1, 3
OBED #6
SAMPLE 272.55 - 274.35
1, 3
300
SAMPLE 305.0 - 308.0
1, 2, 3, 4

Russelsteel
service centre
7016 - 99th Street, P.O. Box 4128, Edmonton, Alberta T6E 4T2 (403) 439-2051 Fax (403) 439-0147

June 1/94

Don Scafe.

In conversation with Don he stated

1. Brick industry isn't a great money maker. (?) 2 plants in Alberta owned by IXL industries out of Medicine Hat. Which owns a plant in Edmonton (Northwest Brick & Tile) Don thinks that the plant only works on a ½ basis.

2. He felt that a tile plant may do better at this time (what about both?)

3. Definately needs a market study,

4. Northwest maybe looking for a clay source. This may give us a good chance to look at their plant. a contact would be plant manager

Bob Hurley -447-1978
Plant manager Northwest Brick & tile

5. 57°C firing range not so bad in a gas fired furnace but maybe critical in a coal fired unit.

6. Brick trays are run through the furnace on a train which takes them from the dryer to the furnace then to the cooler.

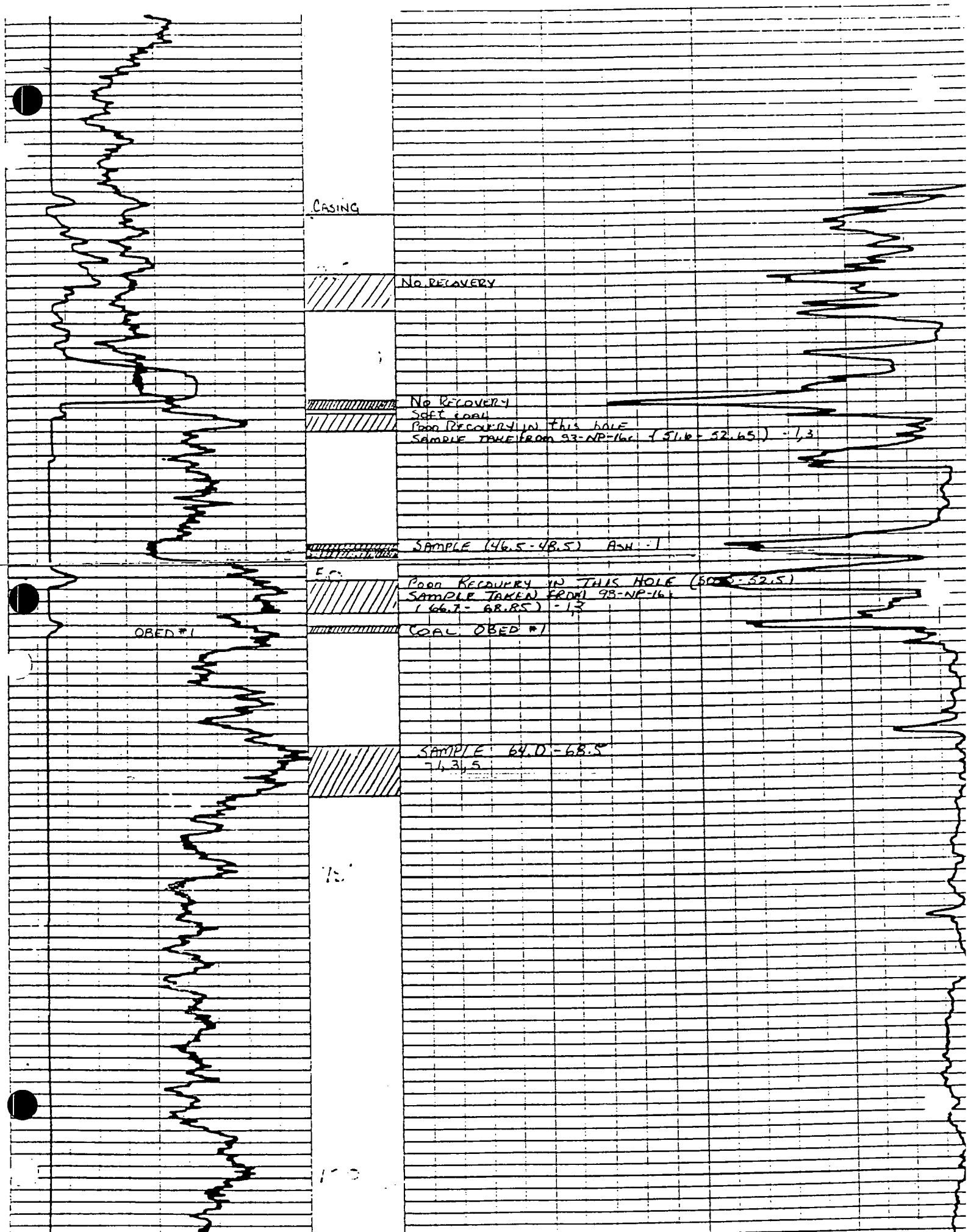

CASING
NO RECOVERY
NO RECOVERY
SOFT COAL
POOR RECOVERY IN THIS HOLE
SAMPLE TAKE FROM 93-NP-16c (51.6 - 52.65) - 1,3
SAMPLE (46.5 - 48.5) ASH - 1
POOR RECOVERY IN THIS HOLE (50.5 - 52.5)
SAMPLE TAKEN FROM 93-NP-16
(66.7 - 68.85) - 1,3
COAL OBED #1
OBED #1
SAMPLE 64.0 - 68.5
1, 3, 5

Table 1. Criteria used in evaluating selected clay products.

	Face brick	Sewer pipe	Stoneware	Artware
Unfired Properties				
Workability	good	good	good	good
% water of plasticity	15-40	0-35	not critical	not critical
Drying characteristics	no warping or cracking	no warping or cracking	no warping or cracking	no warping or cracking
% drying shrinkage	0-12	0-8	3-8	0-15
Fired Properties				
Maturing temperature (°C)	980-1200	980-1150	1210-1330	980-1150
Hardness	steel hard	steel hard	steel hard	steel hard
% Absorption (unglazed)	0-15	0-8	0-2	not critical
Color	reds, buffs, creams, etc.	reds, buffs	buffs, grays	variety

results. On the other hand, the grog will melt at temperatures similar to the raw material and a strong body will be formed. Unfortunately, the energy costs to produce grog are high and this raises the cost of the product. Workability and fired color are the most important properties for pottery clays, with color particularly important for wares that must fire white or some other specific color. Clays for pottery formed by throwing, jiggering, or slipcasting must have good plasticity, and the drying and firing shrinkage must be small enough to prevent warping and cracking. Firing ranges quoted in this report should overlap the maturing temperature values of clay products listed in Table 1 if the clays are to be used as raw materials for those products.

The undesirable trait of bloating exhibited by some clays tested for structural clay products is the desirable trait for lightweight (expanded clay) aggregate production. Absorption should be low but more importantly it should be consistent to facilitate proportioning of cement and water in lightweight concrete mixes.

The most important property to be considered in appraising refractory clays is refractoriness. Clays with P.C.E. values from cone 15 to 29 (1430 to 1660°C) are considered low heat duty refractory clays (A.S.T.M. Designation C27-70). Higher refractoriness designations exist but their quotation would be superfluous for the clays tested.

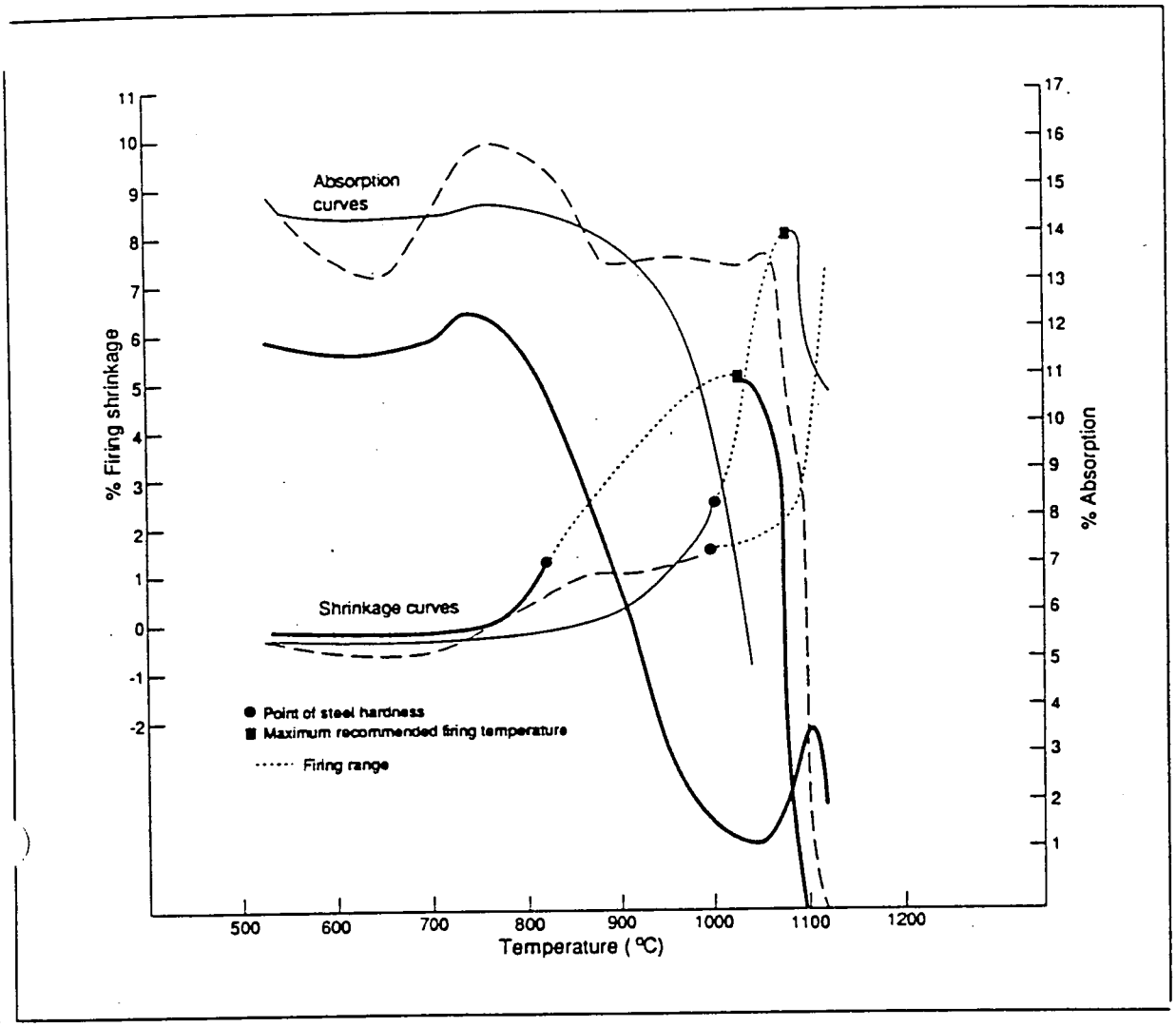


Figure 3. Typical graphs of fired shrinkage and absorption versus temperature curves.

Clay Product Requirements

Generally, the ceramic industry is divided into three divisions: structural clay products, refractories, and whiteware. "Heavy clay products" such as brickware and some stoneware bodies also commonly are called structural clay products. "Refractories" are highly heat-resistant bodies. "Whitewares," in North America, cover earthenware, artware, fireclay, vitreous china, porcelain, and specialized bodies. Of the 37 specific types of ceramic bodies defined in Singer and Singer (1963) only a few types could be produced from Alberta clays and shales. However, these few could come from each of the three general divisions. Because the boundaries of the specific ceramic types are hazy and arbitrary the three general divisions will be used in this report.

Typical requirements for structural clays used in artware (pottery) are given in Table 1. The most common method used in forming structural clay products is the "stiff mud extrusion process," for which good plasticity and workability are essential properties of the raw material, as is uniform drying without warping and cracking. The very high plasticity of many Alberta clays, which causes stickiness and causes difficulty in extruding a body, is deleterious to their working and drying properties. Quartz sand or granular prefired clay called "grog," commonly is added to the raw material to improve the working and drying properties. However, if the amount of sand required is very high, a weak, porous, fired body results. The quartz dilutes the clay mineral concentration and improves the plasticity and drying characteristics but does not melt on firing. Insufficient melt is produced and a weak body

and the possibility of mining the clay in association with some other commodity such as coal.

Testing

In a survey of basic ceramic properties of the clays and shales from a region as large as Alberta, the property tests of primary interest are those that will suggest whether further testing is warranted. The desirable attributes to be tested are discussed in the Properties section of this report. Fundamental ceramic test procedures have remained relatively unchanged over the years, so it is possible to integrate earlier results obtained for Alberta clays and shales into this report.

Plasticity and workability are judged by an experienced worker according to the "feel" of the damp material. Workers probably are very consistent in their assessment of these properties, but some account should be taken of the possibility that two workers may not describe these properties in exactly the same way. In this report the drying and firing characteristics are determined from bars extruded for firing in a temperature gradient furnace. Extruded samples that did not survive drying were tested from hand-pressed bars. Results published by most previous workers are from hand-pressed bars or tablets. Faults such as warping, cracking, or checking are noted when reporting drying behavior at room and elevated temperature. Linear drying shrinkage is obtained by measuring the distance, before and after drying, between two marks scribed on the body, and the difference is expressed as a percentage.

For testing firing properties, the common procedure formerly was to fire test specimens to temperatures determined by standard cones. The amount of detailed information gathered for a firing curve is dependent on the number of specimens fired at increasing temperatures. Commonly, specimens were fired at four to six different temperatures determined by the standard cones. Now it is convenient to fire a pair of specimen bars in a temperature gradient furnace to determine the firing reactions of material at many temperatures below some predetermined maximum temperature. The electric furnace is programmable to raise the temperature at any desired rate or to hold temperature at a desired level. The tubular muffle furnace holds two bars arranged end to end; the temperature is hottest at the centre of the tube, and temperature sensors imbedded in the floor measure the temperature gradient between the hot and cool ends of each bar. By relating the measured temperatures to lines previously scribed on the bar it is possible to determine the temperature reached at any point along the bar. In addition, at any point on the bar the fired shrinkage can be measured, color can be evaluated, and if one of the two bars of the test specimen is sawed into thin wafers at the scribe marks the 24-hour cold water absorption also can be determined. Graphs of fired shrinkage and absorption versus temperature can be plotted to give a visual representation of changes happening during firing (Figure 3). Such graphs were plotted for each sample tested by the author. Data for shrinkage and absorption in the appendices are taken from those graphs. Representative graphs for selected formations are included with the description of the formation in a succeeding section.

Designations of fired colors by previous workers as red, buff, etc. are less meaningful than the number/letter designation, based on the Munsell System, used by the author (Appendix 2). Using any color chart based on the Munsell System a reader can discern the exact fired color seen by the author.

Pyrometric Cone Equivalent (P.C.E.) of a sample is determined in a P.C.E. furnace following the procedures published in A.S.T.M. Designation C27-70.

In general, bulk chemical analyses of clays and shales do not provide data as useful as other forms, such as mineralogical data. Chemical analysis does not reveal the state in which the various ions are combined. Hence, a clay that contains a very small percentage of calcium, magnesium, potassium, and sodium may actually contain a large proportaion of minerals other than clay minerals and some of these minerals may be very active fluxes. On the other hand, bulk chemical analyses of clays and shales are very useful if the total amount of a component present is a limiting factor for its use. For example, the total sodium, potassium, silica, and aluminum present in a clay is important for its use in burning with limestone to make low alkali cement. Chemical analyses were obtained for 75 samples from 20 formations plus Pleistocene (glacial) materials (Appendix 3).

rned clays may be divided conveniently into soft wares (scratched by steel) and hard wares (harder than steel). Soft wares include building bricks for interior use, unglazed earthenware such as flower pots, and most refractory materials. Hard wares include stoneware, china, floor tile, and building bricks for exterior use. For this report the temperature required to produce steel hardness is taken as the lowest desirable firing temperature, because that temperature is considered to be the lower firing limit for clays likely to be used in Alberta. **Maximum recommended firing temperature** in this report is that temperature beyond which a body overfires. Overfiring occurs as the liquid phase becomes prevalent enough to cause the body to collapse or to close pores in the body so that gases generated cannot escape and the body begins to bloat (a condition unacceptable in formed bodies). The temperature range between the temperature to produce steel hardness and the maximum recommended firing temperature is the **firing range** in this report. Other workers may extend the lower limit of the firing range downward if the properties of shrinkage, absorption, and color are acptable for their product. Lightweight synthetic ggregate is the only product that requires firing beyond the normal recommended firing temperature. However, even with synthetic aggregate severe overfiring is undesirable because if enough liquid phase is produced the pieces of material begin to stick to one another and to the inside of the kiln. In this report a firing range of 5 to 25°C is considered extremely short, 30 to 50°C is short, 55 to 100°C is moderate, and greater than 105°C is long.

During firing of a body, open porosity, as measured by **absorption**, gradually decreases and **shrinkage** increases as firing temperature increases. These changes are caused by decomposition of the clay minerals, chemical reactions that produce new materials of greater specific gravity, formation of a liquid phase that flows into and fills some of the original pore space, and sintering reactions that result in a decrease in pore space and an overall volume reduction. As mentioned above, firing may be stopped whenever acceptable absorption and shrinkage is attained for a product.

Many ceramic materials have no definite melting oint. They show progressive sintering, then softening, leading to fusion. The heating rate, particle size, and presence of fluxes all affect the melting point. Therefore to determine the refractoriness of material (the degree to which material will withstand heat without deformation), it is necessary to prepare and heat the test material following standardized procedures and to compare the reaction of the sample to the reaction of mixtures of known properties. The known mixtures (pyrometric cones) are "heat-work" recorders that do not register temperature directly but a combination of temperature and rate of heating. Each test sample, when fired under the standard conditions, has properties that coincide with those of a known pyrometric cone and the melting point of the test sample can be stated as the **pyrometric cone equivalent** (P.C.E.).

The **fired color** of a body is important and at times may take precedence over a characteristic such as absorption or hardness. Iron is the most common coloring agent of fired ceramic bodies and, because of its variable valency states, can be yellow, red, blue, brown, gray, or black. Valency state depends on the fired temperature and the amount of oxygen present in the surrounding atmosphere. Color also is influenced by the particle size of the coloring agent. Colloidal sizes give uniform, evenly distributed color whereas nodules produce blotches. Six to nine percent hematite (Fe_2O_3) generally is necessary to give a pleasing deep red color, but even this depends on impurities such as lime (CaO) or magnesia (MgO) and on the firing temperature. Five percent lime can nullify the red color of a body containing nine percent hematite. This suppression of the red color is due to the growth, during heating, of white calcium silicate crystals, that have no affinity for hematite and expel it to the grain boundaries. This isolation of hematite into small pockets gives a buff color to the body.

Sampling

Two hundred and eighty-six samples from more than 100 locations were analyzed by the author. With the exception of 16 core samples from basal clays of the McMurray Formation, all material was collected from surface exposures. Roadcuts, river cutbanks, open pit coal mines, or other excavations were common sampling locations. At these locations it was possible to assess overburden thickness, clay thickness, access to transport,

Ceramic Clays and Shales

Definitions

The term "clay" may be defined differently by people in diverse disciplines. One definition calls clay "a fine-grained rock which, when suitably crushed and pulverised, becomes plastic when wet, leather-hard when dried, and on firing is converted to a permanent rock-like mass." A similar definition adds that the bulk of the mineral components are platy, hydrous aluminosilicates called the clay minerals. Another definition is "soil consisting of inorganic material the grains of which have diameters smaller than 5μm." Other similar definitions would place the size criterion at 4μm or 2μm. Each definition is useful for its required purpose but everyone should be careful when encountering the term "clay" to determine the limits of the definition.

Similar problems are encountered when defining "shale." A common definition is "an indurated, fine-grained, earthy, sedimentary rock with a distinct laminated or layered character." If the indurated material is not laminated it may be called mudstone. Early investigators, whose data are quoted in the appendices of this report, seem to have been fairly flexible in describing whether the material being tested is a clay or a shale. Their main concern is whether the material can be used to manufacture clay products. Such concern places limits on the type of material likely to be considered because certain properties are desired.

Properties

Any definition of clay based only on a size criterion is unacceptable to workers in ceramics because minerals such as quartz and feldspar can be clay-sized but they lack a very important ceramic property: plasticity. **Plasticity** is the property of a moistened material that allows it to be deformed under pressure then retain the deformed shape after the pressure is removed. In ground clays, shales, or mudstones the plastic properties of the material are the result of the interaction of water with the clay minerals present in the material. The clay minerals, such as kaolinite, illite, and smectite, are very fine-grained, platy hydrous aluminosilicates with substitutions of magnesia, iron, etc. in the structure. These structural substitutions cause electrical imbalance in the clay minerals that make them highly reactive in water. Unlike quartz and feldspar, they readily form even finer (colloidal) size particles when mixed with water. It is these colloidal size, electrically charged, platy particles with their large reactive surface area relative to unit mass that give plastic properties to clay materials. Maximum plasticity occurs when the water film around each particle is about 200 nm thick and for most clay material this would be in the water content range of 15 to 25 percent by weight. Water requirements greater than 20 percent commonly indicates a relatively high content of smectite, which gives good plasticity but less desirable workability (stickiness) and drying properties.

Workability is related to plasticity and is the ease with which a moist clay material can be molded without cracking or sticking. Clay workers commonly judge workability by pressing the moist material in the hand. Material with good workability has satisfactory forming properties over a relatively wide range of water contents.

A critical factor in determining the usefulness of a clay material is its **drying behavior,** because high losses of ware can occur due to warping or cracking as the moist material shrinks during the drying process. High **drying shrinkage** is common for clay material that has drying problems. As unbound water (water not rigidly bound to a particle surface) evaporates first, at a fairly rapid rate, particles in the material come closer together, shrinking the body until a rigid structure is formed. Minerals like quartz have no bound water, so the amount, particle size, and gradation of this and similar minerals affect the drying behavior by reducing the amount of water needed for proper workability. The unbound water around clay minerals also evaporates quickly but the thin layer of water bound electrically to the surface of the clay minerals is much more difficult to remove. This is because the heat applied during drying must overcome the strong electrical forces and the vapor generated must follow a tortuous path between quartz grains and other clay mineral particles to the surface of the body. If the clay minerals are not evenly dispersed in the body, variations in moisture content cause differential shrinkage that sets up stresses that cause warping or cracking.

Economic Geology Report 7

The Ceramic Potential of Alberta Clays and Shales

D.W. Scafe



ALBERTA RESEARCH COUNCIL

Alberta Geological Survey

You also enquired about references to clay studies. I have included some pages copied from Don's report on ceramic potential - he thought it may be of interest to you. The complete report is about $26.00 and is available from Alberta Research Council publications (450-5390).

I hope this information helps with your industrial mineral study. Wylie will call you in early September.

Sincerely,

[redacted]

Dixon Edwards
Alberta Geological Survey

Encl.
DE/sg

cc: Don Scafe
Wylie Hamilton

ALBERTA
RESEARCH
COUNCIL Alberta Geological Survey

ugust 13, 1993

Mr. Ron Ronaghan
Senior Mines Geologist
Obed Mountain Coal Ltd.
P.O. Bag Service 4000
Hinton, Alberta
T7V 1V8

Dear Ron:

I discussed the analyses of your mudstone core samples with our clay expert, Dr. Don Scafe, and we have reached some preliminary conclusions as to the potential shown by the samples for specific uses.

The mudstones can be examined for potential in three general areas: ceramic potential, bentonite potential and kaolinite potential. The ceramic potential includes low alkali cement, structural clay products and light weight aggregate. The bentonite includes both low yield (pelletizing of animal feed, kitty litter, clarifying beer or wine, etc) and high yield (drilling mud, liners in tailings ponds, etc.) uses. The kaolinite potential includes paper coating.

Some of your samples show promise for low alkali uses. In fact you indicated that several companies are already showing considerable interest. Some samples exhibit good Na and K values (below 1.6%), favourable Fe and suitably low Al and Si.

Of the five samples analyzed for ceramic use, one is a "common clay" which could be used in brick making. The other four show no potential.

Some of the samples show a favourable mineralogy for bentonite. It is necessary to do a viscosity test for yield to determine the potential of the sample, that is an estimate of the number of barrels of mud having a viscosity of fifteen centipoise from a ton of mudstone. The eight foot interval from which a sample of interest was collected also makes the sample very promising for harvesting.

In summary some samples show promise as low alkali clay, one sample for ceramic purposes and some for bentonite if further testing confirms the yield. We can conduct a yield test of samples. The cost is $500 per batch for interpretation and report plus $125 per sample.

.../2

...ling address
Bo...60, Station F
Edmonton, Alberta
Canada T6H 5X2

250 Karl Clark Road
Edmonton, Alberta

1021 Hayter Road
Hwy 16E and 17 Street
Edmonton, Alberta

• Terrace Plaza
4445 Calgary Trail South
Edmonton, Alberta
☎ 403/438-7676
fax 403/438-3364

1 Oil Patch Drive
Devon, Alberta

3rd Floor, Digital Building
6815 - 8 Street NE
Calgary, Alberta

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-ON-~~28~~ 23

LOCATION _____ SEC. TP. RGE. W.

AREA OBED North West Pit

PROVINCE O.M.C

SURVEYED DATA

ELEV. 1404.5

LOC. 57141 N

49361 E

RUN No.	1	2	3
DATE	June 1/93		
DEPTH-DRILLER	20		
DEPTH-LOGGER	20		
FLUID LEVEL	20		
LOGGING TIME			
DRILLED BY	D. ORNER		
RECORDED BY	C. MOORE		
WITNESSED BY	R.J.R		

BORE-HOLE RECORD

BIT	FROM	TO
4 3/4	0	20

CASING RECORD

SIZE	FROM	TO

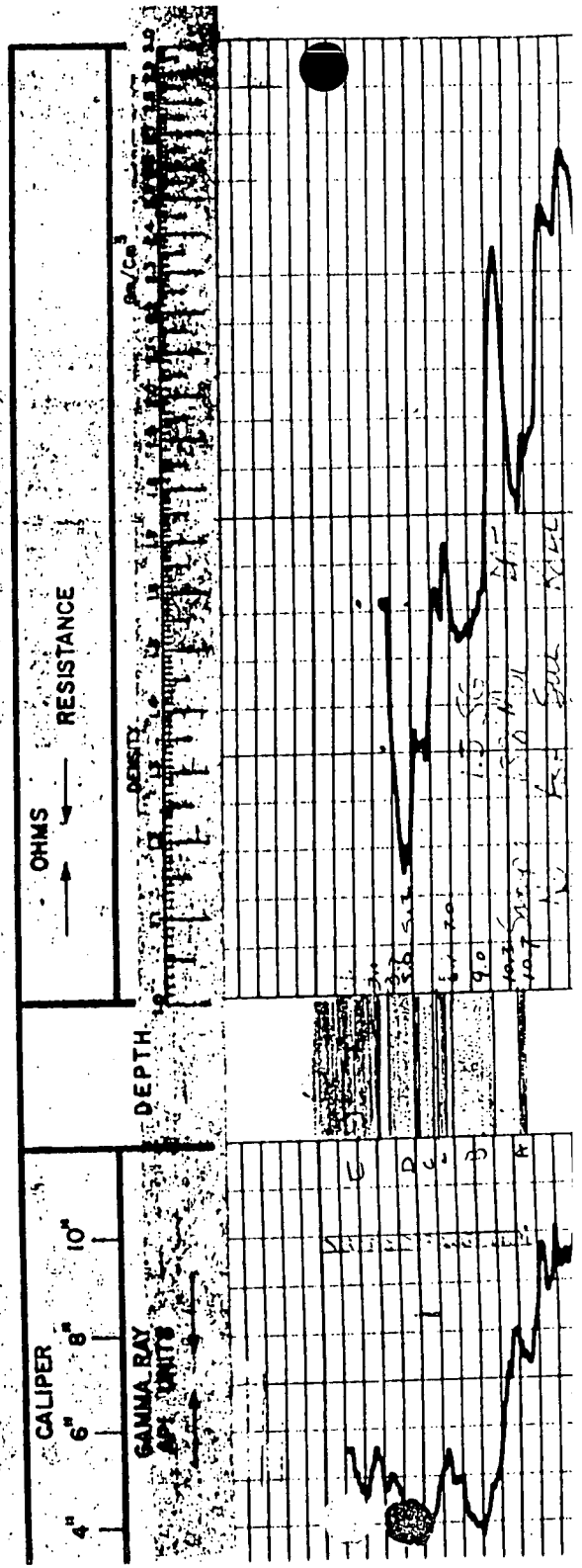
EQUIPMENT DATA

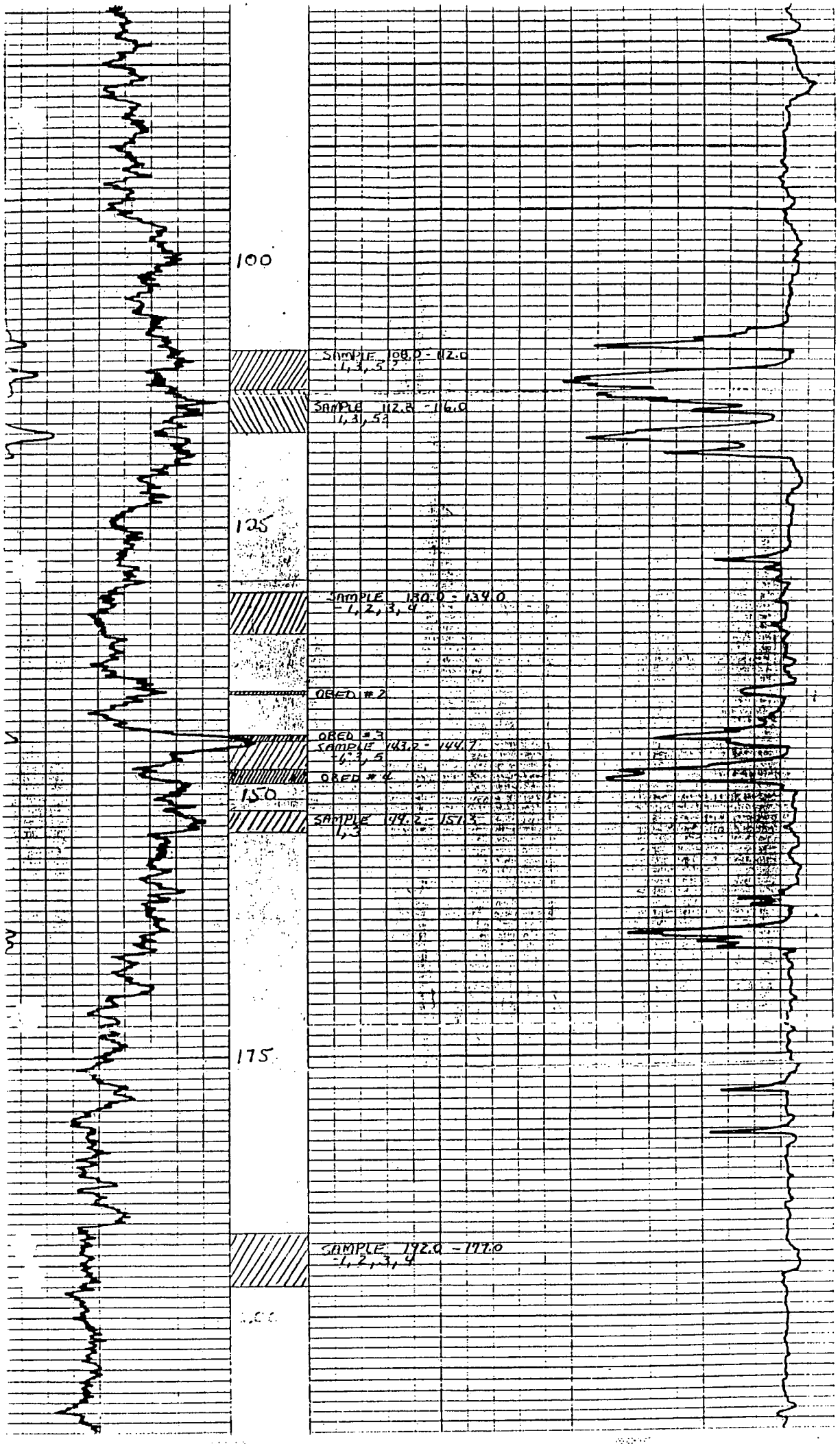
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH	1"		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

LOGGING DATA

GENERAL				GAMMA RAY				DENSITY		
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	TC SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	TC SEC	SENS SETTINGS	ZERO
			12							

REMARKS:




100
SAMPLE 108.0 - 112.0
1, 3, 5
SAMPLE 112.8 - 116.0
1, 3, 5?
125
SAMPLE 130.0 - 139.0
-1, 2, 3, 4
OBED #2
OBED #3
SAMPLE 143.2 - 144.7
-4, 5
OBED #4
150
SAMPLE 149.2 - 151.3
1, 3
175
SAMPLE 192.0 - 197.0
-1, 2, 3, 4

OBED MOUNTAIN COAL LTD. SAMPLE LIST

SAMPLES		DESCRIPTION	ANALYSIS
93-NP-8C			----
	35.00′- 37.00′	Mudstone	1
	46.50′- 48.50′	Ash	----
	50.00′- 52.50′	Mudstone	1,3,5
	64.00′- 68.50′	Mudstone	1,3
	108.00′- 112.30′	Mudstone	1,3,5
	112.30′- 116.00′	Mudstone	1,2,3,4
	130.00′- 134.00′	Sandstone	1,3,5
	143.20′- 144.70′	Mudstone	1,3
	149.20′- 151.30′	Mudstone	1,2,3,4
	192.00′- 197.00′	Sandstone	1,3,5
	244.10′- 248.10′	Mudstone	1,3
	249.20′- 250.50′	? Shale	----
	254.94′- 256.96′	?	1,3
	272.55′- 274.35′	Mudstone	1,2,3,4
	305.00′- 308.00′	Sandstone	1,3
	321.00′- 324.00′	Mudstone	1,3
	334.10′- 337.00′	Mudstone	1,3,5
	348.25′- 352.30′	Mudstone	1,3
	401.00′- 404.00′	Mudstone	
	#9 386.5′-397.4′	Coal	1A
93-NP-8C (#7 + #8) #2		Coal	1A
93-NP-16C			
	51.6′-52.65′	Mudstone	1,3
	66.7′-68.85′	Minus 0.4 Coal seam in middle entry	1,3

ANALYSIS:
1 - Chemical Analysis
1A - Chemical Analysis/Coal Ashed
2 - Size Analysis
3 - XRD (clays)
4 - Heavy Mineral Separation
5 - Ceramic Test

OBED SOUTH 1993
NORTH PLATEAU DRILL AND CORE PROGRAM

HOLE NUMBER	NORTHING	EASTING	ELEVATION
93-NP-1	54,810	49,195	1,520
93-NP-2	54,705	49,280	1,534
93-NP-3	54,590	49,388	1,545
93-NP-4	54,455	49,504	1,549
93-NP-5	54,315	49,630	1,545
93-NP-6	54,175	49,750	1,542
93-NP-7	54,805	49,415	1,531
93-NP-8	54,700	49,512	1,537
93-NP-9	54,570	49,645	1,545
93-NP-10	54,425	49,790	1,543
93-NP-11	54,310	49,900	1,538
93-NP-12	54,140	50,068	1,494
93-NP-13	55,005	49,442	1,506
93-NP-14	54,930	49,525	1,513
93-NP-15	54,850	49,630	1,518
93-NP-16	54,690	49,783	1,538
93-NP-17	54,550	49,935	1,536
93-NP-18	55,105	49,555	1,495
93-NP-19	55,040	49,633	1,496
93-NP-20	54,685	50,056	1,523
93-NP-21	54,530	50,195	1,515
93-NP-22	54,410	50,332	1,492
93-NP-23	54,925	50,045	1,485
93-NP-24	54,810	50,197	1,492
93-NP-25	54,685	50,342	1,489
93-NP-26	54,595	50,473	1,480
93-NP-27	54,730	50,570	1,454

OBED NORTH 1993
OBED NORTH WEST PIT DRILL PROGRAM

HOLE NUMBER	NORTHING	EASTING	ELEVATION
93-ON-1	57,032	49,520	1,407
93-ON-2	57,076	49,480	1,407
93-ON-3	57,078	49,403	1,410
93-ON-4	57,109	49,422	1,405
93-ON-5	57,108	49,404	1,404
93-ON-6	57,174	49,404	1,407
93-ON-7	57,228	49,418	1,412
93-ON-8	57,224	49,434	1,413
93-ON-9	57,250	49,448	1,414
93-ON-10	57,291	49,446	1,416
93-ON-11	57,314	49,424	1,413
93-ON-12	57,357	49,397	1,412
93-ON-13	57,350	49,418	1,416
93-ON-14	57,368	49,419	1,419
93-ON-15	57,340	49,463	1,420
93-ON-16	57,302	49,466	1,420
93-ON-17	57,311	49,482	1,420
93-ON-18	57,317	49,496	1,421
93-ON-19	57,352	49,489	1,421
93-ON-20	57,387	49,527	1,419
93-ON-21	57,389	49,575	1,420
93-ON-22	57,415	49,603	1,421
93-ON-23	57,058	49,336	1,406
93-ON-24	57,141	49,361	1,405
93-ON-25	57,192	49,323	1,405
93-ON-26	57,248	49,365	1,414
93-ON-27	57,319	49,351	1,409
93-ON-28	57,292	49,395	1,406
93-ON-29	57,348	49,371	1,405
93-ON-30	57,152	49,447	1,412

DRILLING AND [illegible] PROGRAM 1993

JUNE 7/93 to JULY 23/93

AS RECEIVED BASIS NOT SHOWN FOR INSITU ANALYSIS DUE TO DISTORTION OF HEAD MOISTURE DUE TO METHOD OF DRILLING

13% MOISTURE USED FOR F/S @ 1.5 =TARGET COMBINED C/C TOTAL MOISTURE

5% MOISTURE USED FOR F/S @ 1.5 =TARGET COMBINED C/C TOTAL MOISTURE CUSTOMER SPEC

KJoules = Kcal * 4.187

INSITU ANALYSIS (ASH,SULFUR) WITH NO Kcal ARE CALCULATED FROM F/S DATA

							INSITU ANALYSIS DRY WEIGHT BASIS			F/S @ 1.5 S.G. 13% MOISTURE BASIS						F/S @ 1.5 S.G. @ 5% MOISTURE			
SAMPLE #	SEAM #	HOLE#	DEPTH FT.	DEPTH FT.	YIELD @13%	YIELD (DWB)	DAF Kcal/Kg	% ASH	% S	% ASH	% SUL	Kcal/Kg	KJoules	DAF Kcal/Kg	% SINK ASH	% ASH	%SUL	Kcal	KJoules
1	C	93-NP#2 ZONE #5			53.1	61.0	7,195	26.3	0.78	10.2	0.63	5,596	23,429	7,284	42.68	11.1	0.69	6,110	25,583
1	1	93-ON-2	14.00	25.00	62.5	71.8	7,467	22.9	0.37	8.1	0.38	5,899	24,698	7,475	49.96	8.8	0.42	6,441	26,969
2	1	93-ON-#3	17.50	30.00	65.3	75.0	6,957	20.3	0.46	8.7	0.45	5,553	23,249	7,095	44.28	9.5	0.49	6,063	25,386
3	1	93-ON-4	2.00	14.00	68.9	79.2	7,339	20.1	0.38	8.1	0.44	5,949	24,907	7,541	53.13	8.9	0.48	6,496	27,197
4	1	93-ON-5	0.00	11.00	60.1	69.1	6,982	25.4	0.41	9.0	0.39	5,832	24,418	7,476	51.50	9.8	0.43	6,368	26,663
5	1	93-ON-6	9.50	19.50	57.1	65.6	7,364	27.3	0.46	8.6	0.48	5,482	22,953	6,988	52.62	9.3	0.52	5,986	25,064
6	1	93-ON-7	29.00	40.00	62.1	71.4	7,435	19.0	0.49	7.7	0.52	5,862	24,545	7,390	38.65	8.4	0.57	6,401	26,802
7	1	93-ON-11	29.00	40.00	49.2	56.6	7,462	23.7	0.40	6.9	0.48	5,986	25,064	7,471	38.57	7.5	0.53	6,536	27,368
8		93-ON-12	25.00	34.00	59.2	68.1	7,345	19.6	0.37	8.6	0.38	5,711	23,910	7,285	35.17	9.4	0.41	6,236	26,109
9		93-ON-13	40.00	51.00	55.0	63.2	7,393	25.7	0.44	9.4	0.41	5,753	24,088	7,417	44.53	10.3	0.45	6,282	26,303
10	1	93-ON-23	0.00	11.00	48.4	55.6	6,058	25.3	0.38	13.6	0.42	4,545	19,031	6,196	32.59	14.9	0.46	4,963	20,781
11	1	93-ON-24C	2.00	9.00	59.4	68.3	6,472	28.8	0.33	18.6	0.40	4,439	18,584	6,485	39.00	20.3	0.44	4,847	20,293
12	1	93-ON-25C	0.00	6.00	83.3	95.7	5,958	28.4	0.37	22.2	0.26	3,897	16,316	6,012	80.34	24.2	0.28	4,255	17,817
13	1	93-ON-27C	12.00	29.00	45.2	52.0	6,106	30.9	0.44	16.6	0.53	4,412	18,473	6,271	37.99	18.2	0.58	4,818	20,172
14		93-ON-27C	SPOIL		17.5	20.1				22.4	0.27	3,876	16,230	5,998	66.49	24.4	0.30	4,233	17,722
15	1	93-ON-28	3.00	12.00	65.3	75.1	7,129	19.5	0.46	10.9	0.53	5,353	22,413	7,031	35.34	11.9	0.58	5,845	24,474
16		93-ON-29	5.00	12.00	48.0	55.2	6,620	20.7	0.39	13.0	0.48	5,046	21,127	6,823	24.22	14.2	0.52	5,510	23,070
1		93-NP-8C	53.00	53.80	17.3	19.9				12.2	5.45	5,452	22,827	7,290	28.14	13.3	5.95	5,953	24,925
2		93-NP-8C	138.05	138.25	56.6	65.1				13.5	3.52	5,438	22,767	7,402	37.97	14.8	3.85	5,938	24,860
3		93-NP-8C	142.80	143.20	70.5	81.0				10.4	4.02	5,658	23,690	7,389	29.28	11.4	4.38	6,178	25,868
4		93-NP-8C	144.70	146.30	30.1	34.6	7,160	50.9		14.1	1.67	5,449	22,817	7,479	60.19	15.4	1.82	5,951	24,915
5		93-NP-8C	248.10	248.90	50.4	57.9	7,338	14.8	1.18	9.7	1.02	5,719	23,946	7,401	17.16	10.6	1.11	6,245	26,148
6		93-NP-8C	250.50	252.35	18.6	21.4	6,894	55.8		13.6	2.74	5,415	22,673	7,382	58.04	14.9	2.99	5,913	24,758
7		93-NP-8C	337.00	340.00	29.5	33.9	7,564	13.9	0.93	9.6	0.93	5,862	24,545	7,570	13.44	10.4	1.02	6,401	26,802
8		93-NP-8C	341.05	345.25	62.2	71.5	7,428	23.0	0.30	10.9	0.30	5,722	23,957	7,523	42.68	11.9	0.33	6,248	26,160
9		93-NP-8C	386.50	397.40	52.5	60.3	7,419	29.6	0.39	11.1	0.39	5,699	23,860	7,513	47.97	12.2	0.43	6,223	26,054
1		93-NP-5C	51.00	51.90	64.2	73.8	7,355	22.5	0.91	12.0	0.80	5,568	23,315	7,429	40.87	13.1	0.87	6,080	25,459
2		93-NP-5C	147.40	148.05	26.9	30.9	7,263	38.3		12.3	1.44	5,463	22,876	7,311	42.74	13.4	1.57	5,966	24,979
3		93-NP-5C	151.95	152.95	37.0	42.5	7,300	33.0	1.81	13.7	1.07	5,412	22,661	7,379	39.80	14.9	1.17	5,910	24,744
4		93-NP-5C	255.35	256.25	54.5	62.7	7,214	29.5	1.37	9.3	1.46	5,657	23,684	7,280	53.14	10.2	1.60	6,177	25,862
5		93-NP-5C	257.75	258.70	17.2	19.8	7,358	36.7		12.2	2.32	5,500	23,027	7,353	36.84	13.3	2.53	6,005	25,144
1		93-NP-16C	50.60	51.60	63.9	73.5	7,099	24.8	0.85	8.8	0.85	5,613	23,501	7,176	57.10	9.6	0.92	6,129	25,662
2		93-NP-16C	64.00	64.95	69.8	80.2	7,117	29.3	1.26	15.7	0.99	5,134	21,496	7,201	65.03	17.2	1.08	5,606	23,472
3	[redacted]	93-NP-16C	163.65	164.00	46.0	52.9			[redacted]	12.1	3.10	5,568	23,312	7,435	38.10	13.2	3.39	6,080	25[redacted]

DRILLING AND CORE PROGRAM 1993
JUNE 7/93 to JULY 23/93

AS RECEIVED BASIS NOT SHOWN FOR INSITU ANALYSIS DUE TO DISTORTION OF HEAD MOISTURE DUE TO METHOD OF DRILLING
13% MOISTURE USED FOR F/S @ 1.5 =TARGET COMBINED C/C TOTAL MOISTURE
5% MOISTURE USED FOR F/S @ 1.5 =TARGET COMBINED C/C TOTAL MOISTURE CUSTOMER SPEC
KJoules = Kcal * 4.187
INSITU ANALYSIS (ASH,SULFUR) WITH NO Kcal ARE CALCULATED FROM F/S DATA

							INSITU ANALYSIS DRY WEIGHT BASIS			F/S @ 1.5 S.G. 13% MOISTURE BASIS						F/S @ 1.5 S.G. @ 5% MOISTURE			
SAMPLE #	SEAM #	HOLE#	DEPTH FT.	DEPTH FT.	YIELD @13%	YIELD (DWB)	DAF Kcal/Kg	% ASH	% S	% ASH	% SUL	Kcal/Kg	KJoules	DAF Kcal/Kg	% SINK ASH	% ASH	%SUL	Kcal	KJoules
4		93-NP-16C	166.20	167.35	40.5	46.5	7,182	45.8		14.4	0.93	5,408	22,645	7,448	61.94	15.7	1.02	5,906	24,727
5		93-NP-16C	266.95	267.95	48.3	55.5	7,268	36.1	1.13	9.9	1.31	5,730	23,991	7,431	58.29	10.8	1.43	6,257	26,197
6		93-NP-16C	269.45	270.45	19.6	22.5	7,076	54.5		15.5	3.06	5,314	22,250	7,435	56.67	17.0	3.34	5,803	24,296

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 14 1993

COMPANY _____

HOLE NO. 93 - NP - 1

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 54810 N - 49195 E

ELEVATION 1520.1

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	18	Till	
18	162	Sandstone	Blind at 35 FT.
162	168	Hard Sandstone	
168	266	Sandstone	
266	271	Coal	
271	273	Sandstone	
273	277	Coal	
277	318	Sandstone	
318	329	Coal	
329	380	Sandstone	

COMMENTS _____

WATER HORIZON _____ FT. _____

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-1

LOCATION _____ SEC. TP. RGE. W

AREA North Plateau

PROVINCE O.M.C.

SURVEYED DATA

ELEV. 1520.1

LOC. 54810 N

49195 E

RUN No.	1	2	3
DATE	April 14/83		
DEPTH-DRILLER	380		
DEPTH-LOGGER	380		
FLUID LEVEL	340		
LOGGING TIME			
DRILLED BY	C. Moore		
RECORDED BY	C. Moore		
WITNESSED BY	R.J.P.		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
6 5/8	0	20

EQUIPMENT DATA

GAMMA RAY		RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	L-103	L-103	
DIAMETER	2 1/8"	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH			
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

LOGGING DATA

RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	GAMMA RAY T C SEC	GAMMA RAY SENS SETTING	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV.	DENSITY T C SEC	DENSITY SENS. SETTINGS	DENSITY ZERO
			12							

REMARKS:

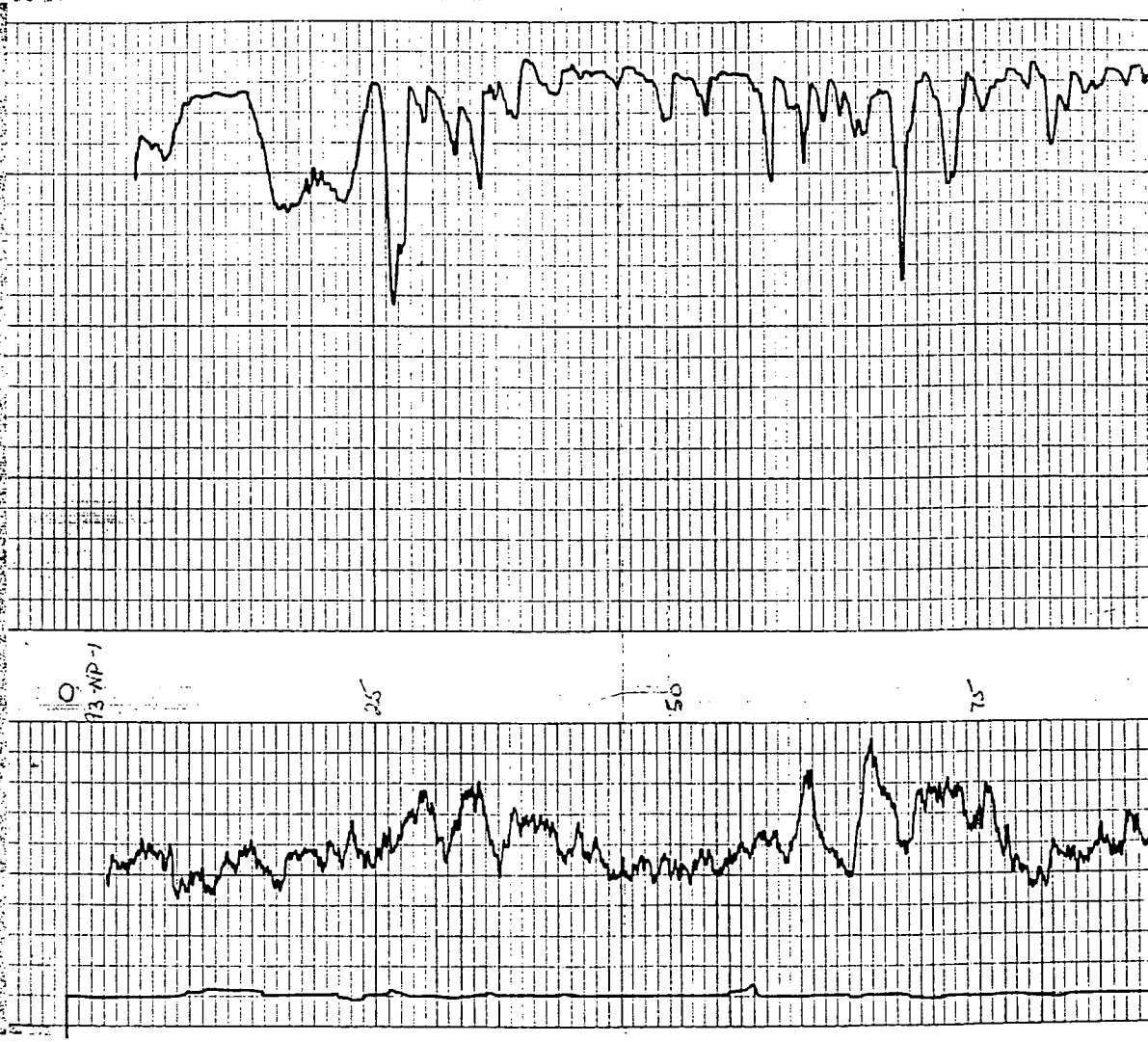
OHMS — RESISTANCE

DENSITY gm/cm³

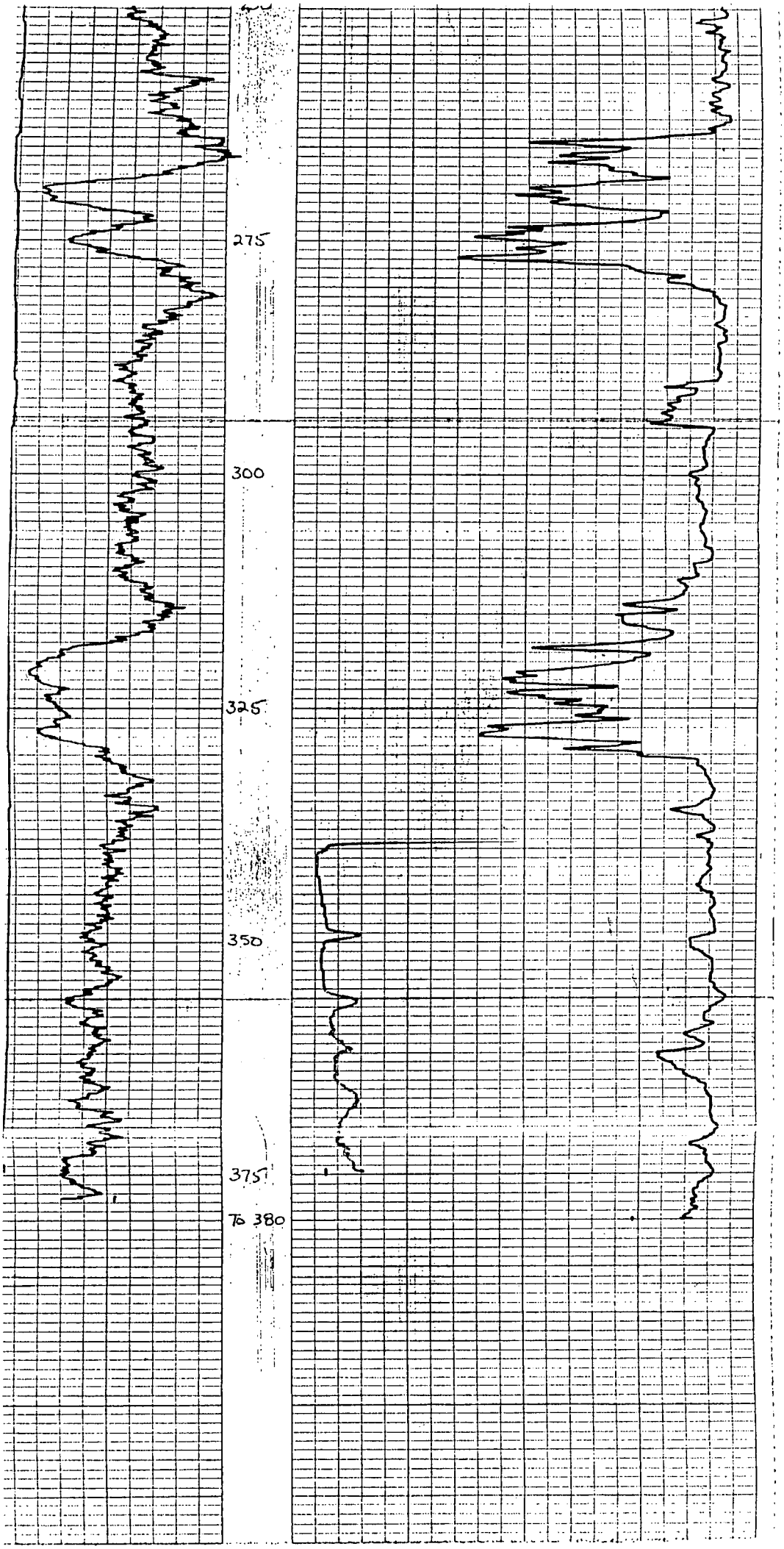
DEPTH

CALIPER 4" 6" 8" 10"

GAMMA RAY API UNITS




100
125
150
175
200
225
250


275
300
325
350
375
To 380

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 13 1993

COMPANY _____

HOLE NO. 93 - NP - #3

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION 54705 N 49280 E

ELEVATION 1534.3

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	9	Till	
9	10	Mudstone	
10	15	Sandstone	
15	16	Coal	
16	22	Sandstone	
22	26	Mudstone with coal	stringers
26	114	Sandstone	
114	118	Mudstone & coal	
118	314	Sandstone	
314	322	Coal	
322	361	Sandstone	
361	374	Coal (Blind)	
374	420	Sandstone	

COMMENTS _____

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-2

LOCATION SEC TP RGE W

AREA NORTH PLATEAU

PROVINCE O.M.C.

SURVEYED DATA

ELEV. 1534.3

LOC. 54705 N

49280 E

RUN No.	1	2	3
DATE			
DEPTH-DRILLER	420		
DEPTH-LOGGER	420		
FLUID LEVEL	379		
LOGGING TIME			
DRILLED BY	C. MOORE		
RECORDED BY	C. MOORE		
WITNESSED BY	RJR		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
6 5/8	0	20

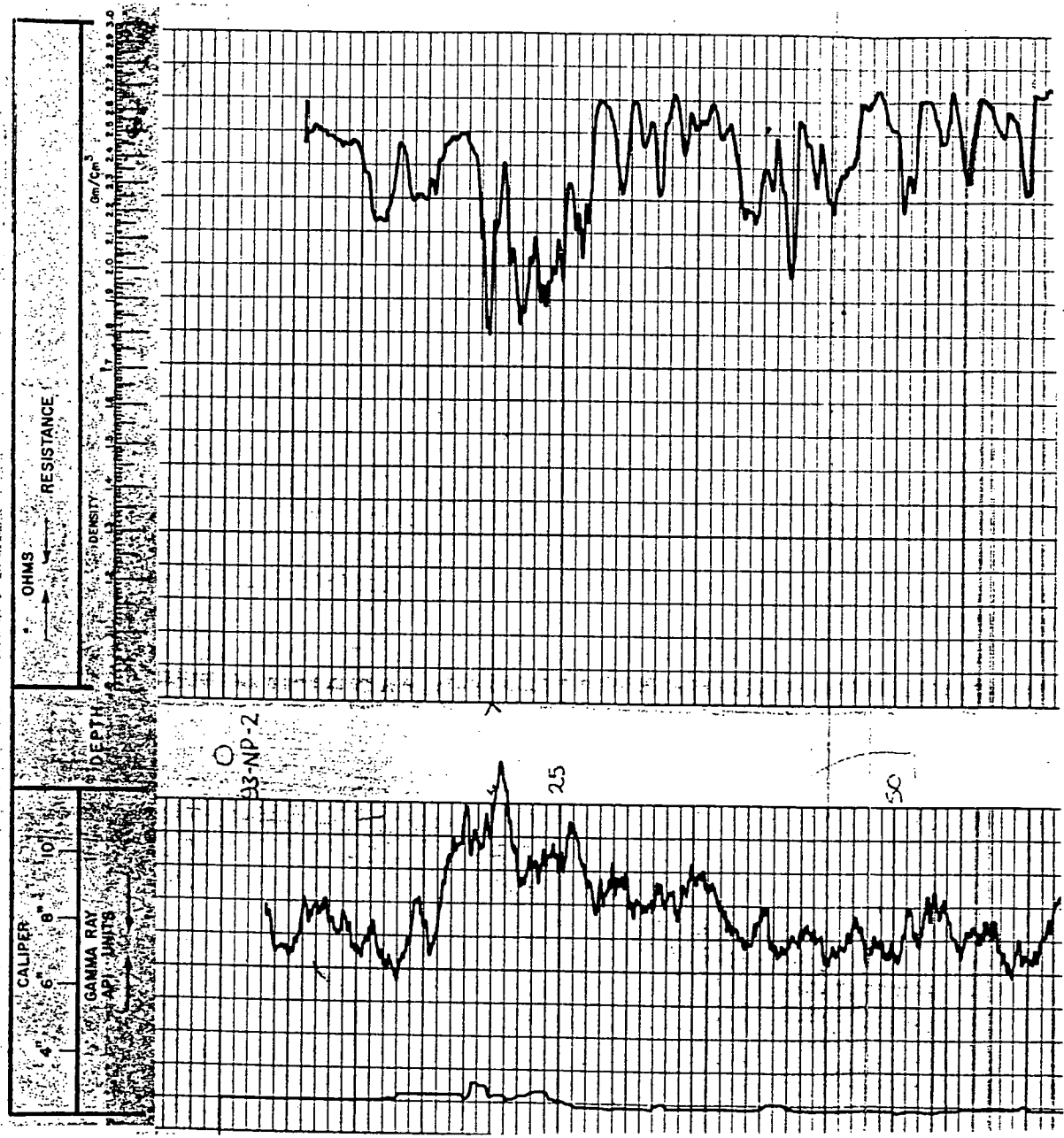
EQUIPMENT DATA

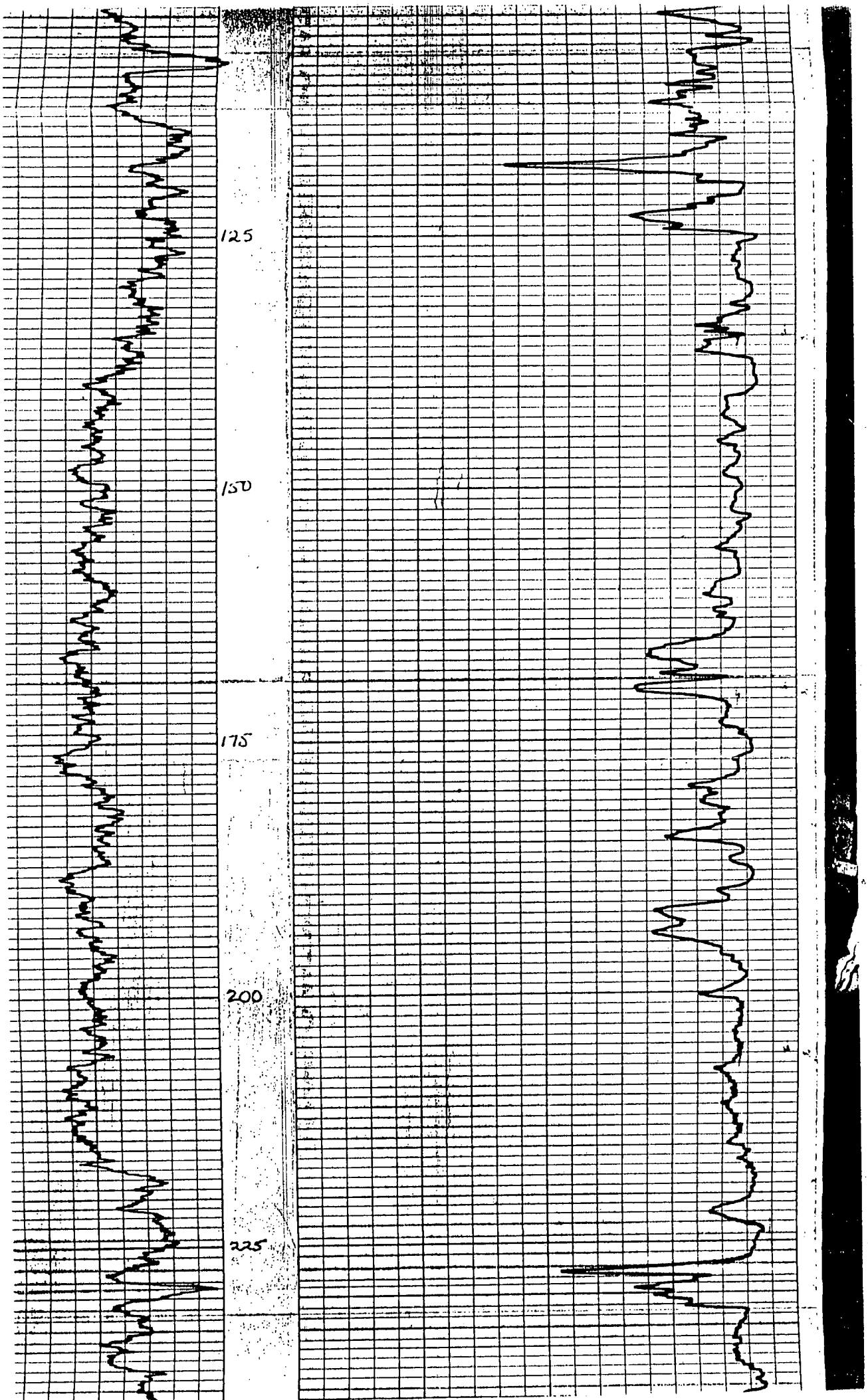
GAMMA RAY		RESISTANCE		DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		15	
LENGTH	3'	LENGTH	1'		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC.	

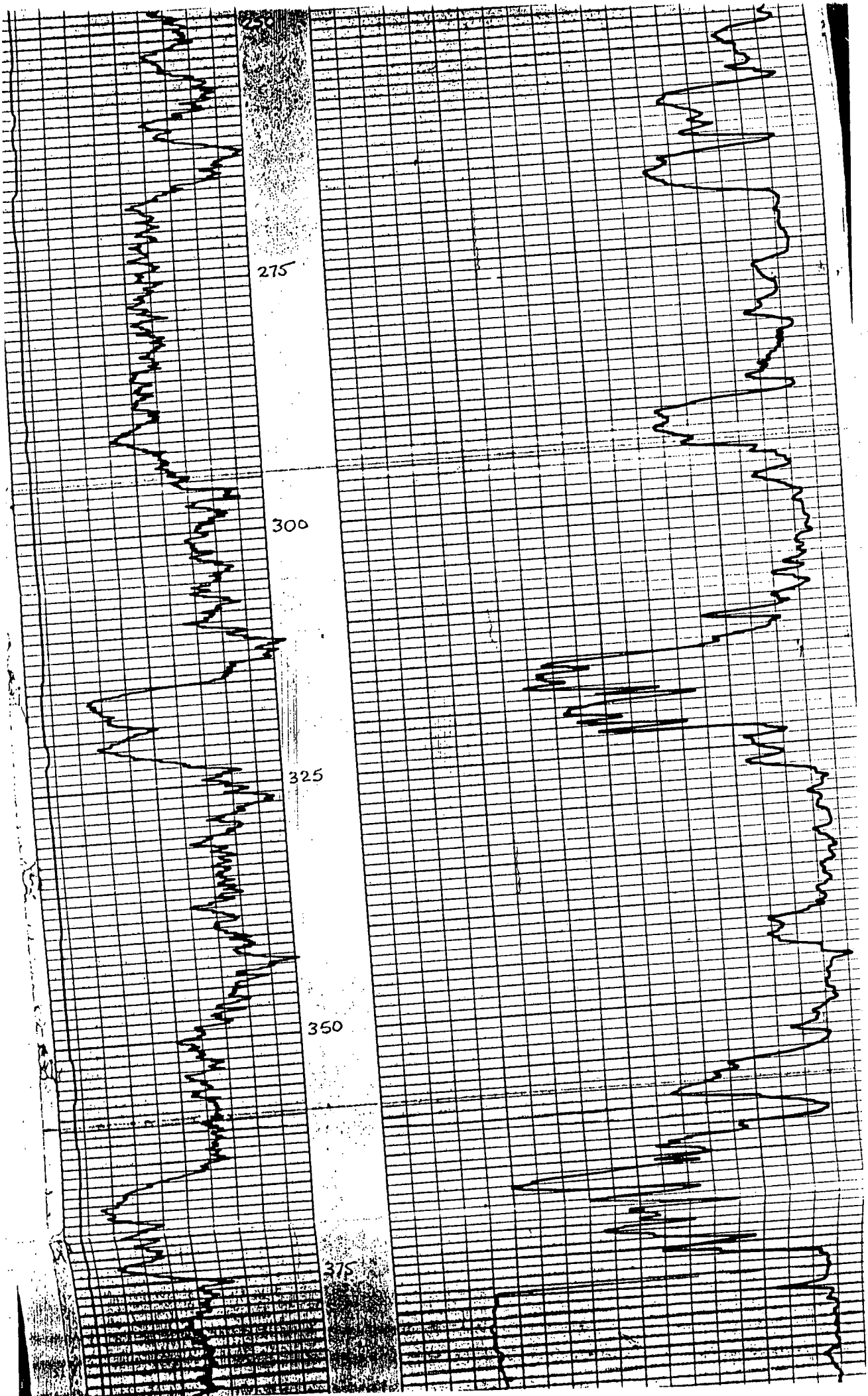
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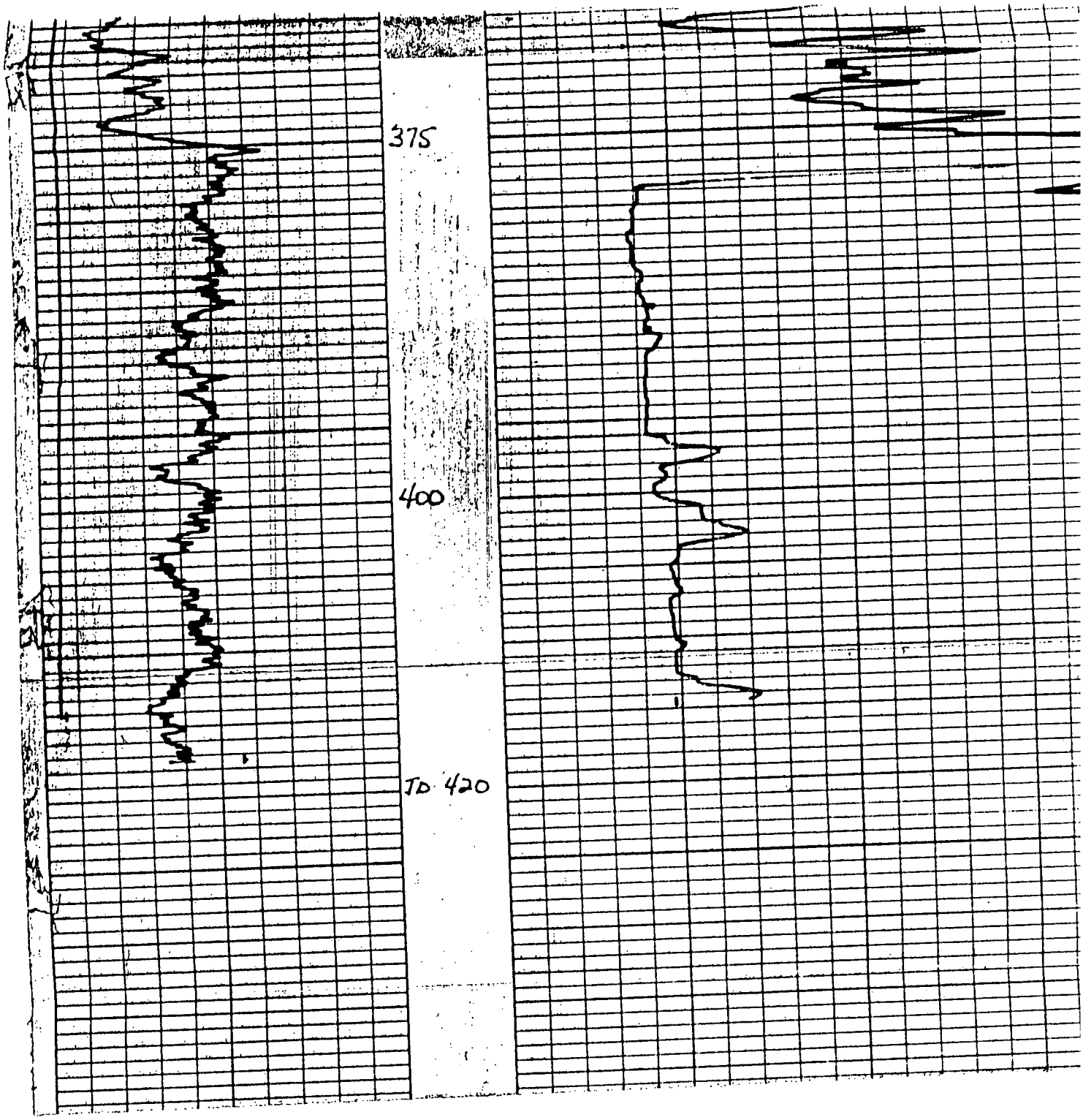
GENERAL				GAMMA RAY			DENSITY		
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	T C SEC	SENS SETTINGS	ZERO
			12							

REMARKS:




125
150
175
200
225


250
275
300
325
350
375


375
400
TD 420

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 13/1993

COMPANY _____

HOLE NO. 93-NP-#3

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION 54590 N - 49388 E

ELEVATION 1544.8

DRILLER Don Ofsen

FROM	TO	LOG	REMARKS
0	5	Till	
5	6	Carb. Coal	
6	7	Mudstone	
7	48	Sandstone	
48	50	Mudstone & coal	
50	158	Sandstone	
158	160	Coal	
160	265	Sandstone	
265	268	Mudstone & coal	Blind @ 260-320
268	349	Sandstone	
349	359	Coal	
359	401	Sandstone	
401	414	Coal	
414	460	Sandstone	

COMMENTS _____

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE 93-NP-3

LOCATION ____ SEC ____ TP ____ RGE ____ W.

AREA NORTH PLATEAU

PROVINCE O.M.C.

SURVEYED DATA

ELEV 1544.8

LOC 54590 N

49388 E

RUN No.	1	2	3
DATE	April 13/83		
DEPTH-DRILLER	460		
DEPTH-LOGGER	456		
FLUID LEVEL	225		
LOGGING TIME			
DRILLED BY	C. Moore		
RECORDED BY	C. Moore		
WITNESSED BY	RJR		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
6 3/8"	0'	20'

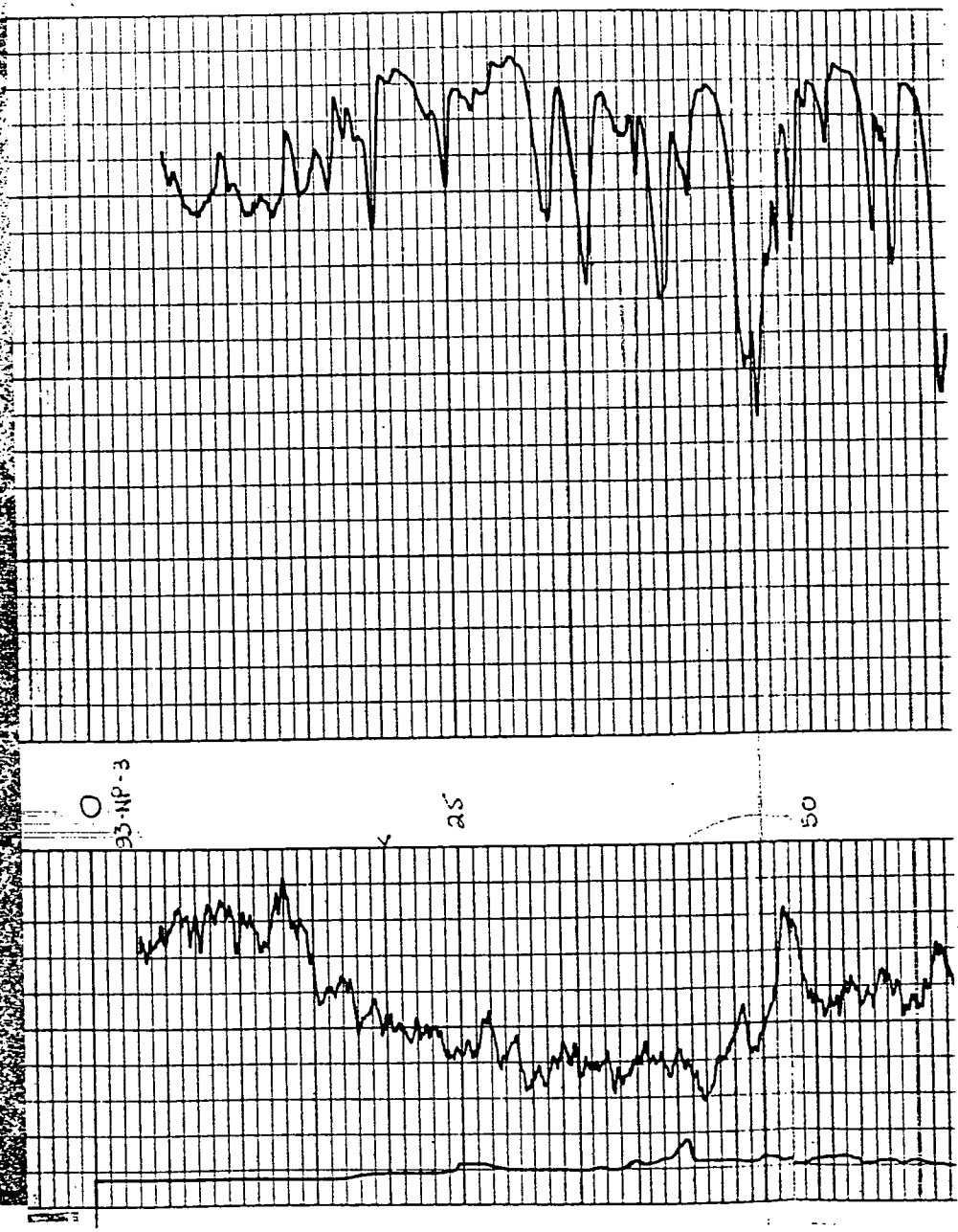
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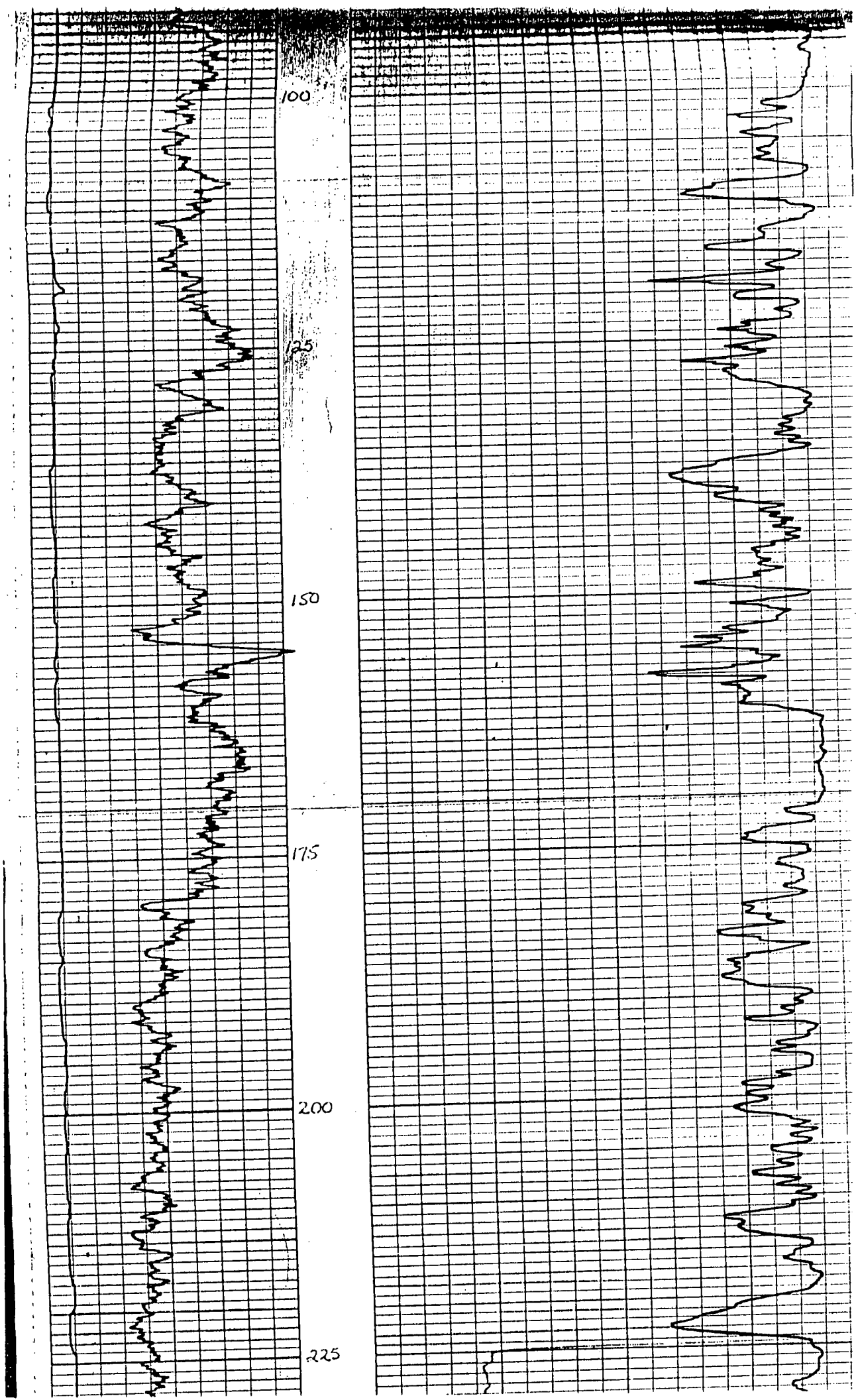
GAMMA RAY		RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	L-103	L-103	
DIAMETER	2-1/8"	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	
TYPE	SCINT	SPACING	18"	
LENGTH		LENGTH		
GENERAL		HOR. SCALE		
TRUCK No.	9	SOURCE MODEL	HOVP	
LOCATION		ISOTOPE	CS 137	
		STRENGTH	125 mC	

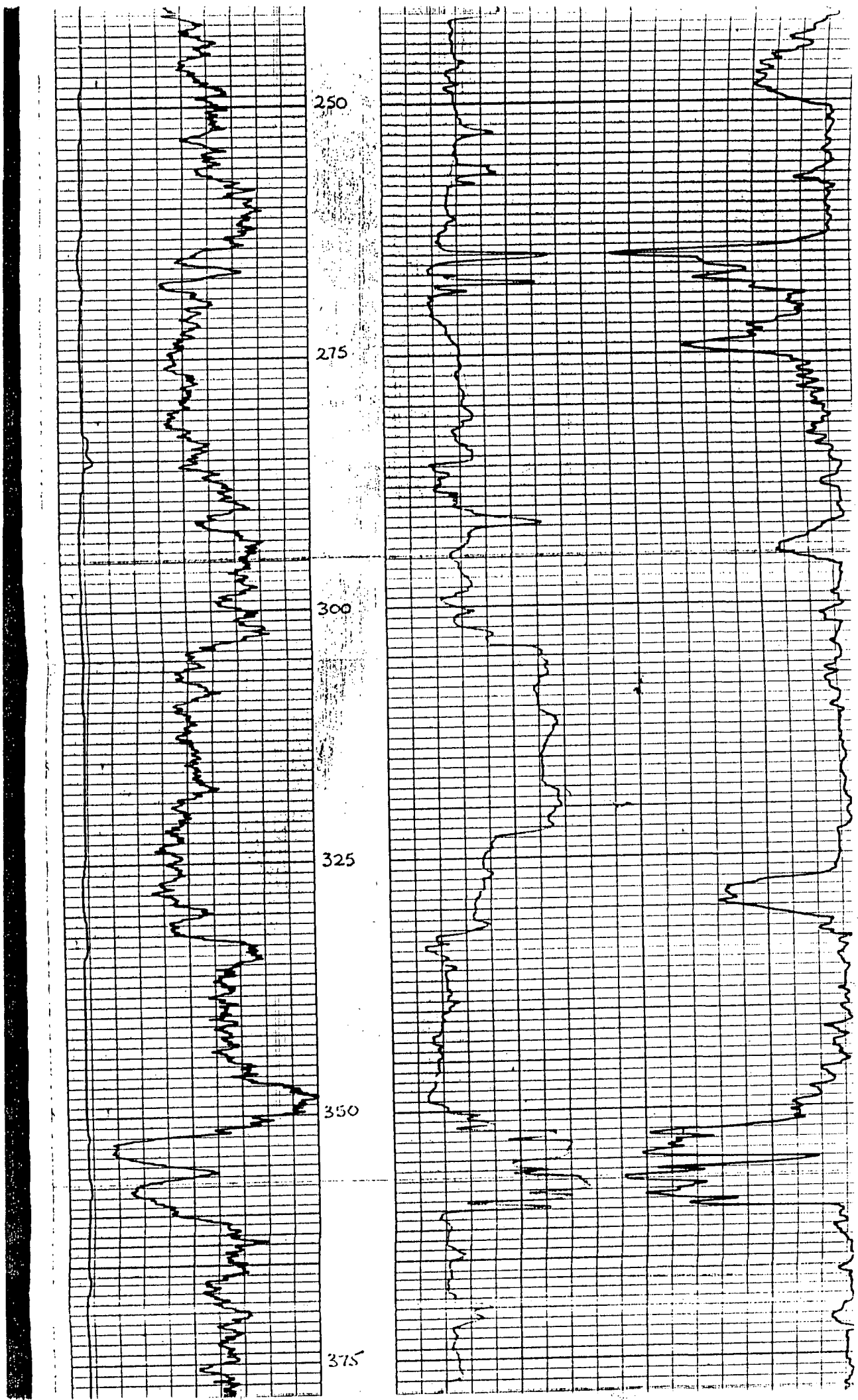
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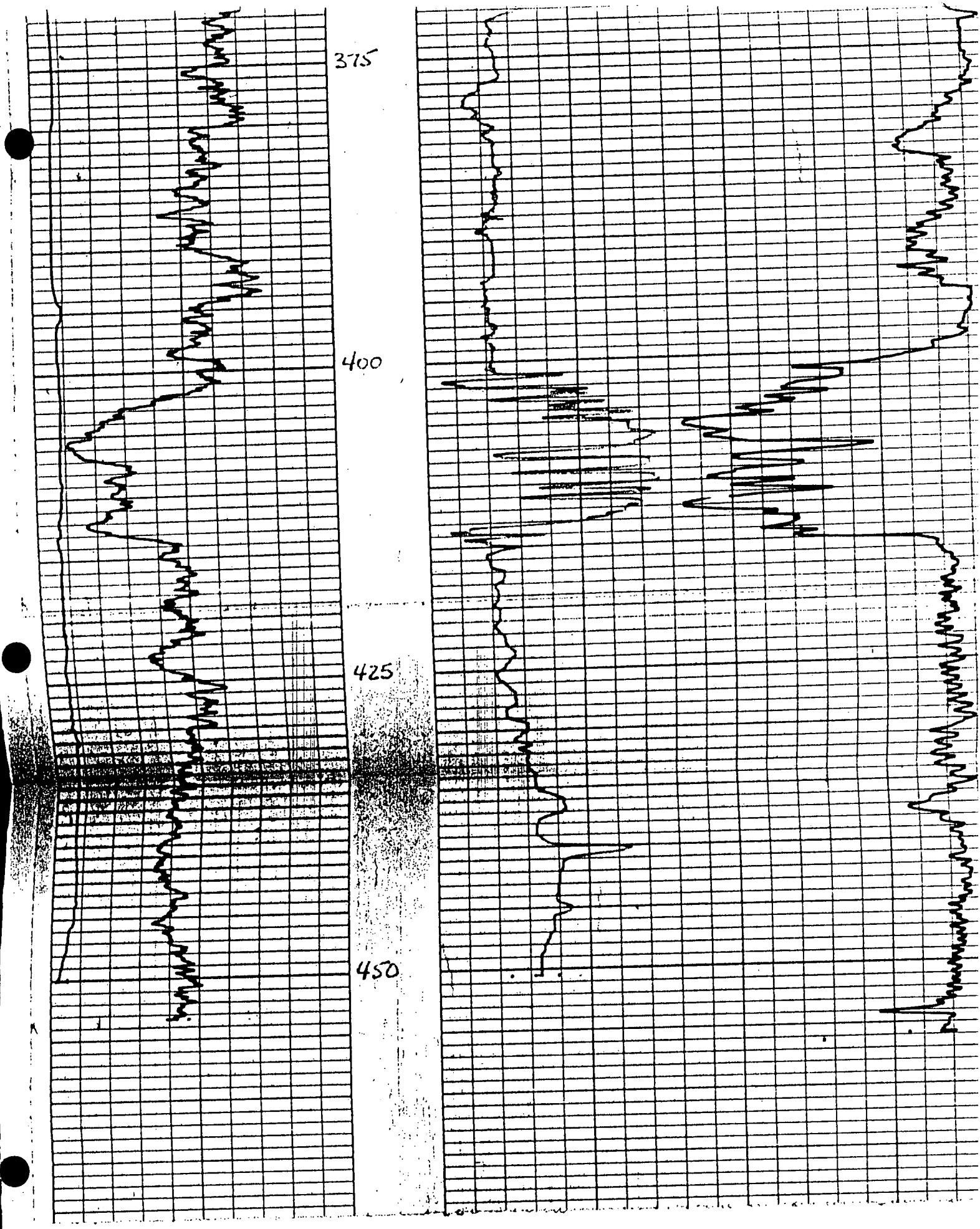
GENERAL RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min	T.C. SEC.	GAMMA RAY SENS. SETTING	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV.	DENSITY T.C. SEC.	DENSITY SENS. SETTINGS	DENSITY ZERO
			12							

REMARKS:




100
125
150
175
200
225


250
275
300
325
350
375


375
400
425
450

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE March 7 1993

COMPANY _____

HOLE NO. 93- NP #4 Skidded

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 54455N - 49504E

ELEVATION 1548.5

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	3	Till	
3	5	Carb. Shail	
5	11	Sandstone wet hard-Soft	
11	68	Sandstone	
68	73	Mudstone	
73	164	Sandstone	
164	168	Mudstone & coal	
168	361	Sandstone	Blind at 324
361	365	Coal	
365	400	Sandstone	
400	410	Coal	
410	460	Sandstone	

COMMENTS _____

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-4

LOCATION SEC. TP. RGE. W.

AREA NORTH PLATEAU

PROVINCE O.M.C.

SURVEYED DATA

ELEV. 1548.5

LOC. 54455 N

49504 E

RUN No.	1	2	3
DATE			
DEPTH-DRILLER	420'		
DEPTH-LOGGER	412		
FLUID LEVEL	225		
LOGGING TIME			
DRILLED BY	C. Moore		
RECORDED BY	C. Moore		
WITNESSED BY	R.T.R.		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
5½	0	20

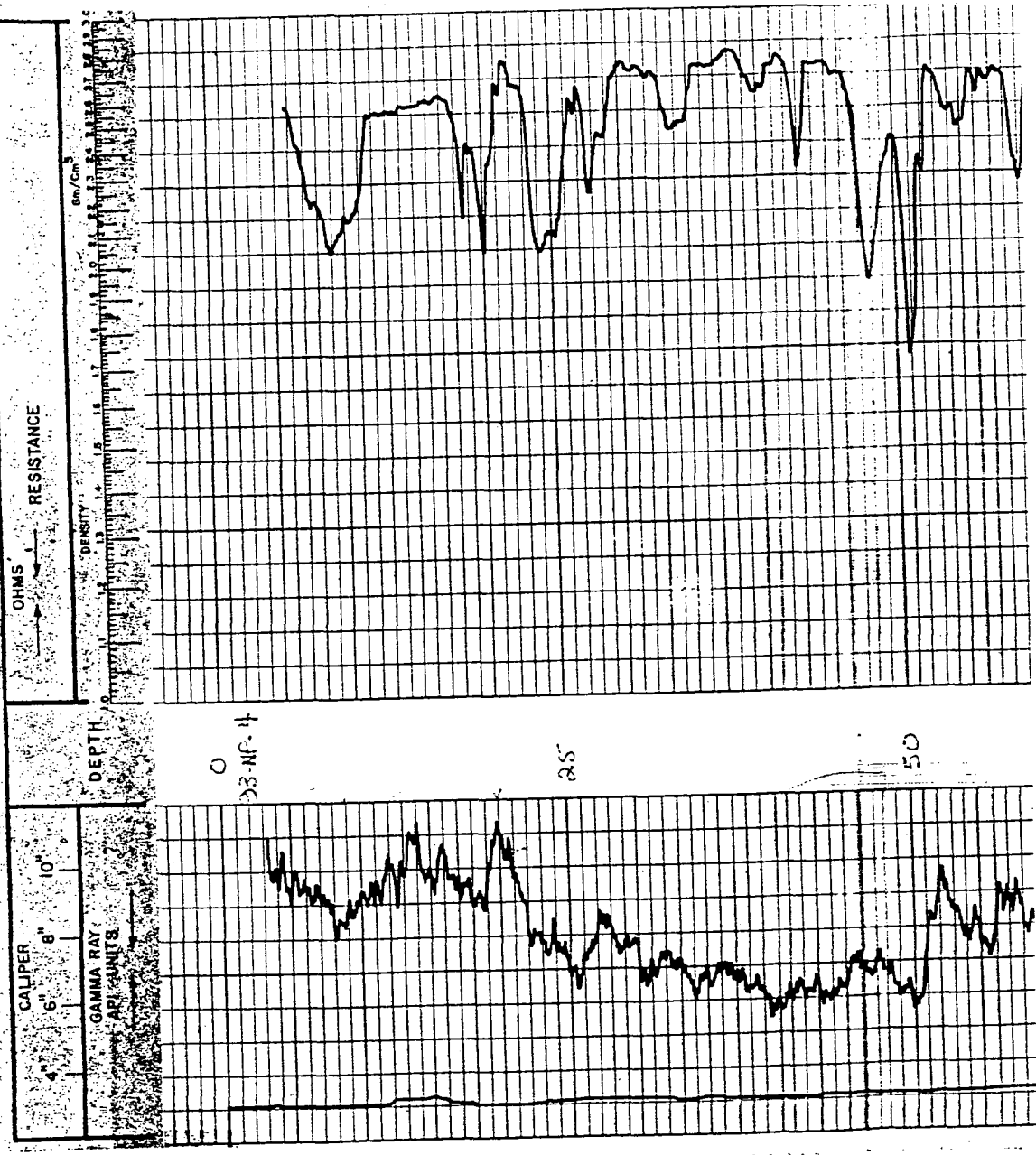
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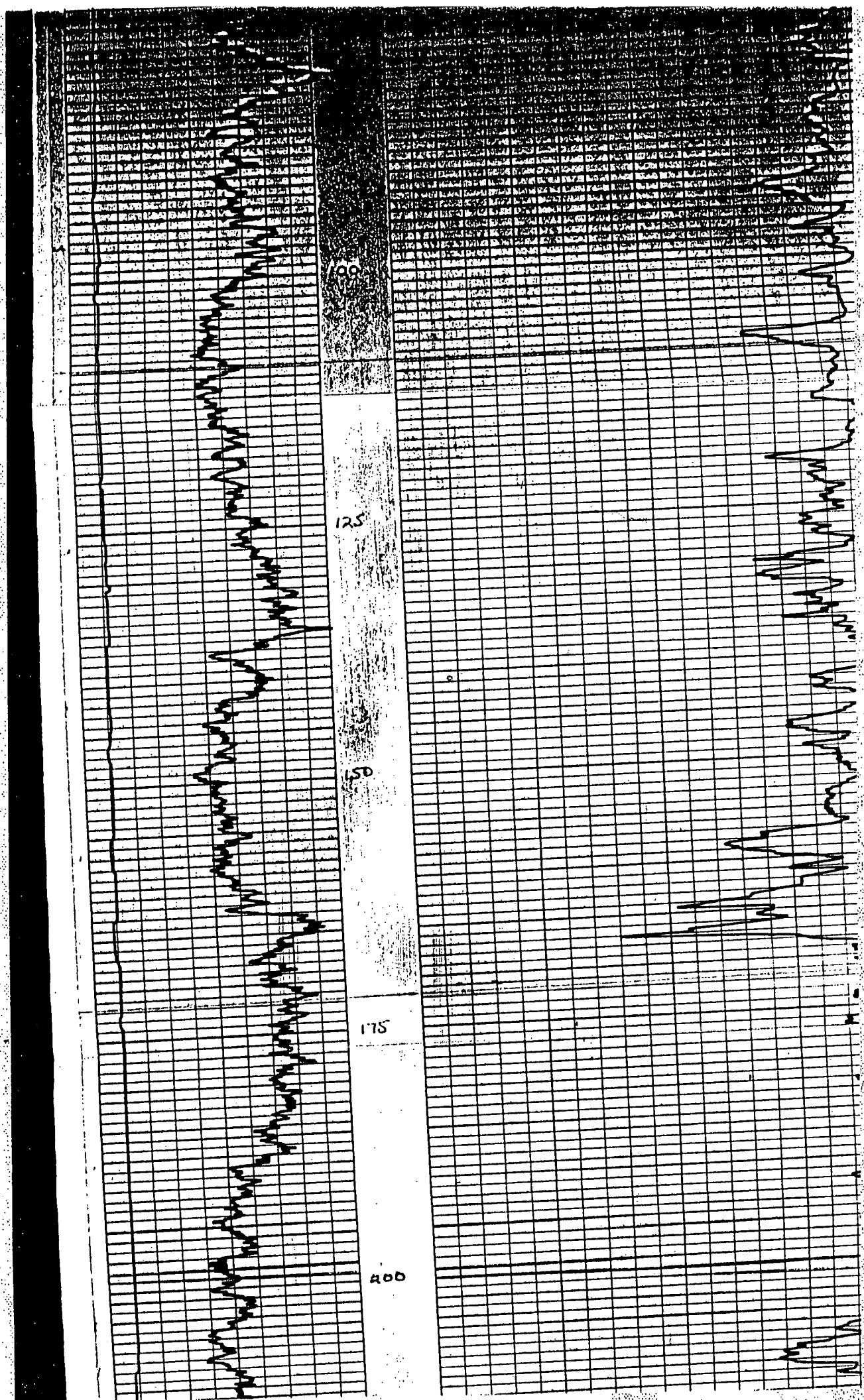
GAMMA RAY		RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	L-103	L-103	
DIAMETER	2 1/8"	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F.
TYPE	SCINT.	SPACING	13"	
LENGTH	8'	LENGTH		
GENERAL		HOR. SCALE		HOVP.
TRUCK No.		SOURCE MODEL		CS-137
LOCATION		ISOTOPE		
		STRENGTH		125 mC/S

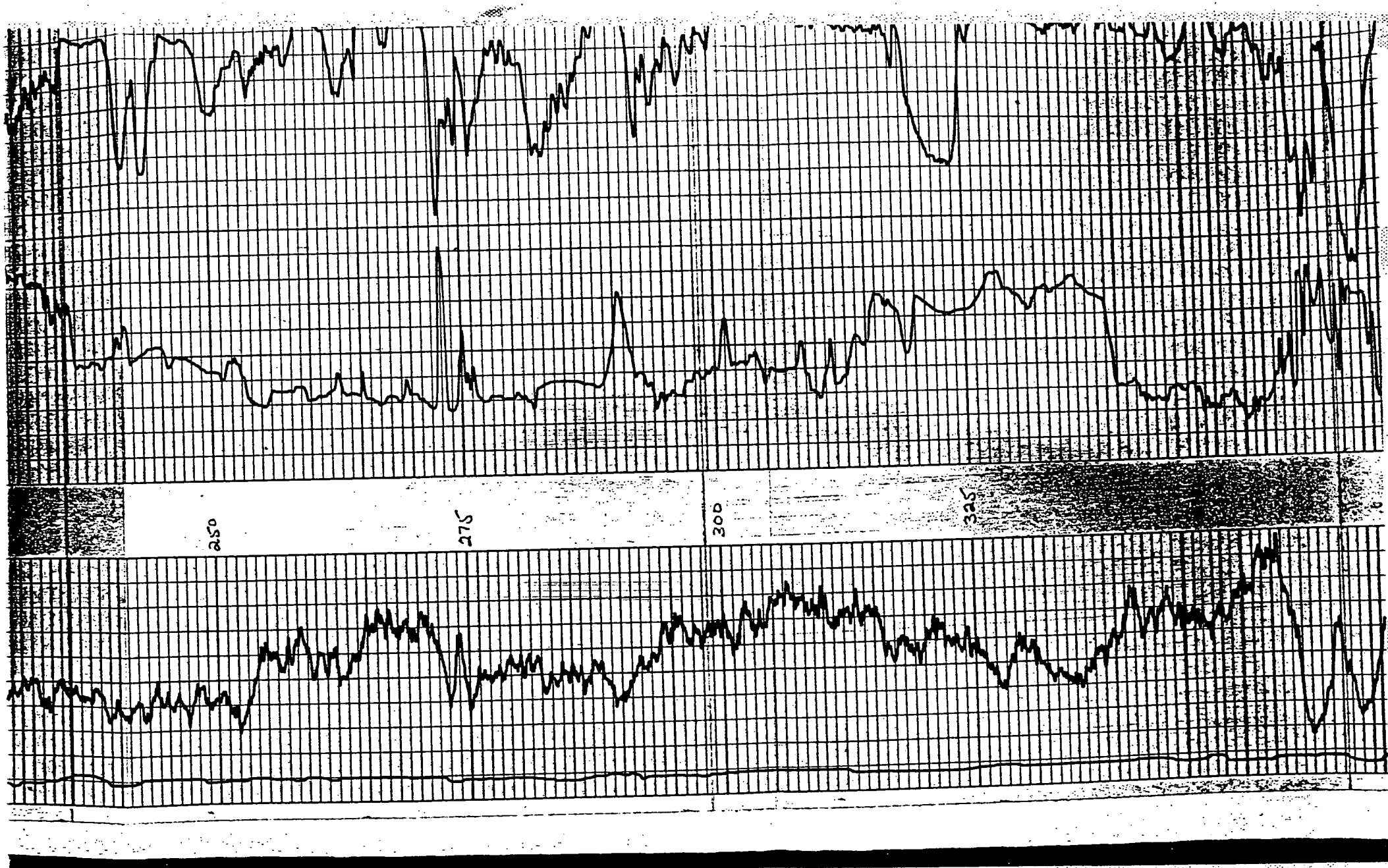
LOGGING DATA

RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	T.C. SEC.	GAMMA RAY SENS. SETTING	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV.	DENSITY T.C. SEC.	DENSITY SENS. SETTINGS	DENSITY ZERO
			12							

REMARKS




100
125
150
175
200


250
275
300
325


350
375
400
HOLE CASED NO DRILLING
FAST 912 #1 SOUTH

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 19 1993

COMPANY _____

HOLE NO. 93 - MP - # 5

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 54315 N 49630 E

ELEVATION 1545.0

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	8	Till	
8	105	Sandstone	
105	106	Trace Of Coal	
106	165	Sandstone	
165	166	Trace of Coal	
166	280	Sandstone	
280	285	Coal	
285	340	Sandstone	
340	351	Coal (Blind)	
351	390	Sandstone	
390	402	Coal	
402	460	Sandstone	

COMMENTS _____

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-5c
PAGE 4 OF

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	SAMPLE INTERVAL
	DRILLED			RECOVERED		LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	
	FROM	TO	TOT.	SEC	TOT.		
				1.15		Mudstone Bentonitic, creamy brown to dark green, massive soft wet, carb. lower contact some water stained	
				0.45		Coal, bright and dull banded some calcite veining.	257.75
							258.7
				0.1		Mudstone dark brown, very silty and wet.	#5
				0.4		Dirty Coal dull black, numerous small clay bands	
				3.1		Silty Mudstone light grey, thinning, more silty down hole, massive med bed. upper contact carby	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-5c
PAGE 3 OF

CORE #	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC	TOT.	GEOLOGICAL DESCRIPTION LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	SAMPLE INTERVAL
				3.9		Mudstone, med. grey, massive, hairline clay between 3 zone, (small coal (0.2') band in center of core clean, hard) soft wet	
				0.3		Coal, bright banded, brittle, upper contact, broken up crushed	151.9 152.9 #3
				0.1		Mudstone, grey, massive, wet, fairly clean contact	
				0.6		Coal, bright black, hard, some visible pyrite	
				0.1		Mudstone bentonite, washed out in the tube at core thickness lost.	
	254.	262	8.0	1.35	7.8	Silty Mudstone, grey, weakly banded fairly sharp upper ct, med soft, wet.	
				0.9		Coal, bright black brit. streak of pyrite, pyrite on some clean	255.35 256.25 #4
				0.35		Carby Mudstone, dark brown, soft, flaggy dirty	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93 - NP - 5c
PAGE 2 OF

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	SAMPLE INTERVAL
	DRILLED			RECOVERED		LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	
	FROM	TO	TOT.	SEC	TOT.		
	51	60	9.0			Upper 2.7' cut lower 6.3 milled and did not recover	
				0.9		Coal bright, broken small clay band at 0.1', dull bands throughout, lower contact dirty	51.0 51.9 #1
				0.75		Mudstone, dark brown massive, med soft, moist, center zone lighter brown very	
				0.2		Coal bright broken shiney	
				0.15		Carb Mudstone massive soft moist. massive	
				0.7		Mudstone, brown, massive, moist, lower zone med hard very fine soft pieces & packed in the tube	
	147.0	155	8.0	0.4	5.95	Mudstone, light to dark grey massive, some water stains on fractures.	
				0.65		Coal, bright to dull, minor clay parting, fissile, lower contact dirty, visible pyrite	147.4 148.05 #2
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-5c
PAGE 1 OF

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	SAMPLE INTERVAL
	DRILLED			RECOVERED		LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	
	FROM	TO	TOT.	SEC	TOT.		
	39	45	7.0		5.4	Rock in hole (lost core in coal seam)	
				0.1		Coal, bright broken hard	
				0.1		Carby Mudstone very silty and wet mush	
				0.2		Mudstone banded tr grey to cream silt wet, minor carby bands, water staining	
				0.3		Dirty Coal dull black, broken to crushed bones, some oxidation & a small clay vein	
				0.05		Silty Mudstone grey silt wet	
				0.15		Mudstone carby, dull brown black basil,	
				4.5		Siltstone, light grey massive low angle fractures, water stained on fractures, med soft.	
	45	51	6.0	0.3		Siltstone as above	
				3.1		Sandstone, light grey, fine grained, soft massive	
				0.4		Siltstone grey to dark grey, bare slightly carby, med soft.	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-5

LOCATION _____ SEC. TP. RGE. W.

AREA NORTH PLATEAU

PROVINCE O.M.C.

SURVEYED DATA

ELEV. 1545.0

LOC. 54315 N

49630 E

RUN No.	1	2	3
DATE	APRIL 19/93		
DEPTH-DRILLER	460		
DEPTH-LOGGER	460		
FLUID LEVEL	315		
LOGGING TIME			
DRILLED BY	C. MOORE		
RECORDED BY	C. MOORE		
WITNESSED BY	R.J.K.		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
6 5/8	0	20

EQUIPMENT DATA

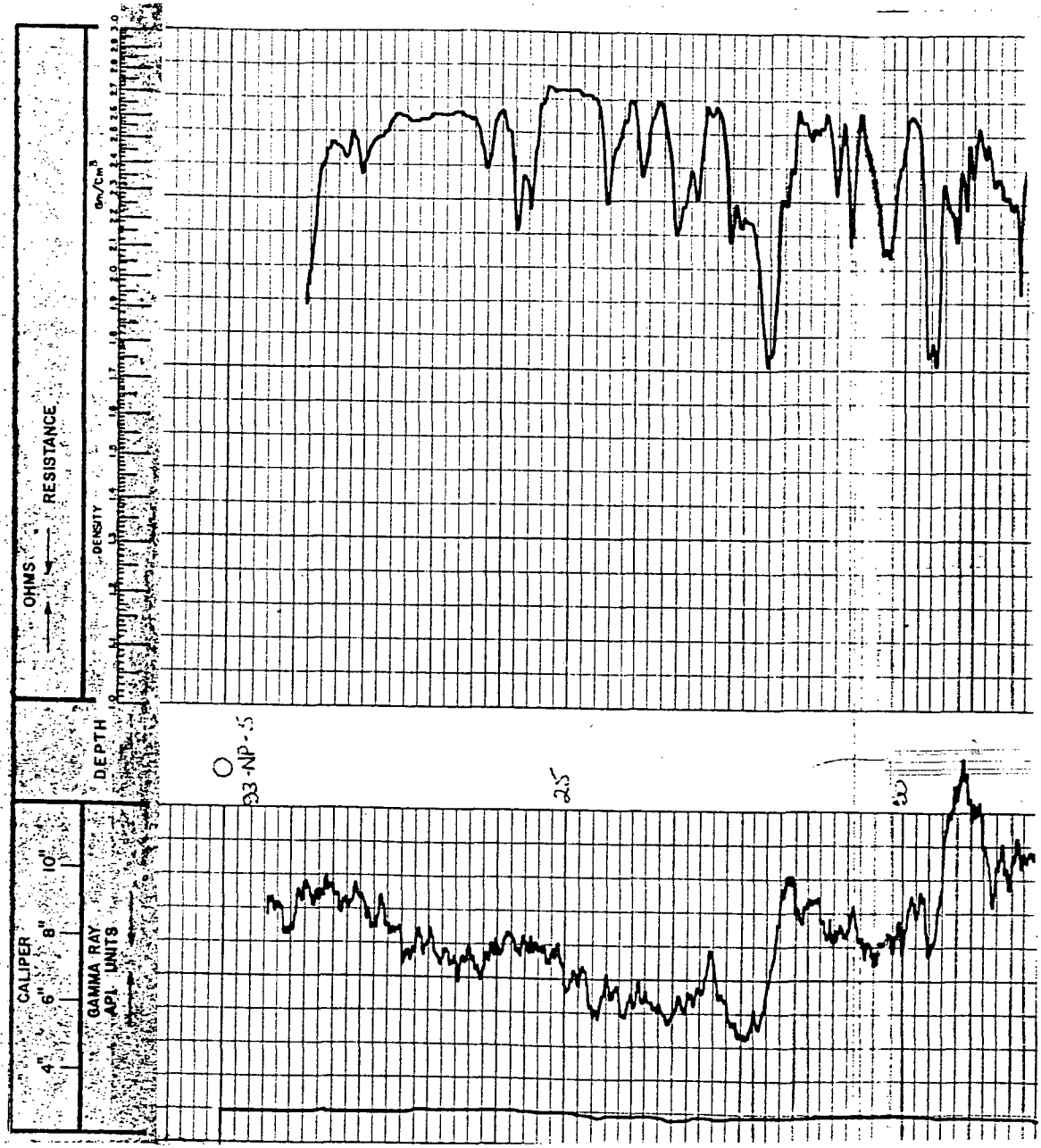
GAMMA RAY		GENERAL		RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TRUCK No.		L-103	L-103	
DIAMETER	2 1/8"	LOCATION		2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516			ME	F	
TYPE	SCINT.				13"	
LENGTH	3"			1'		

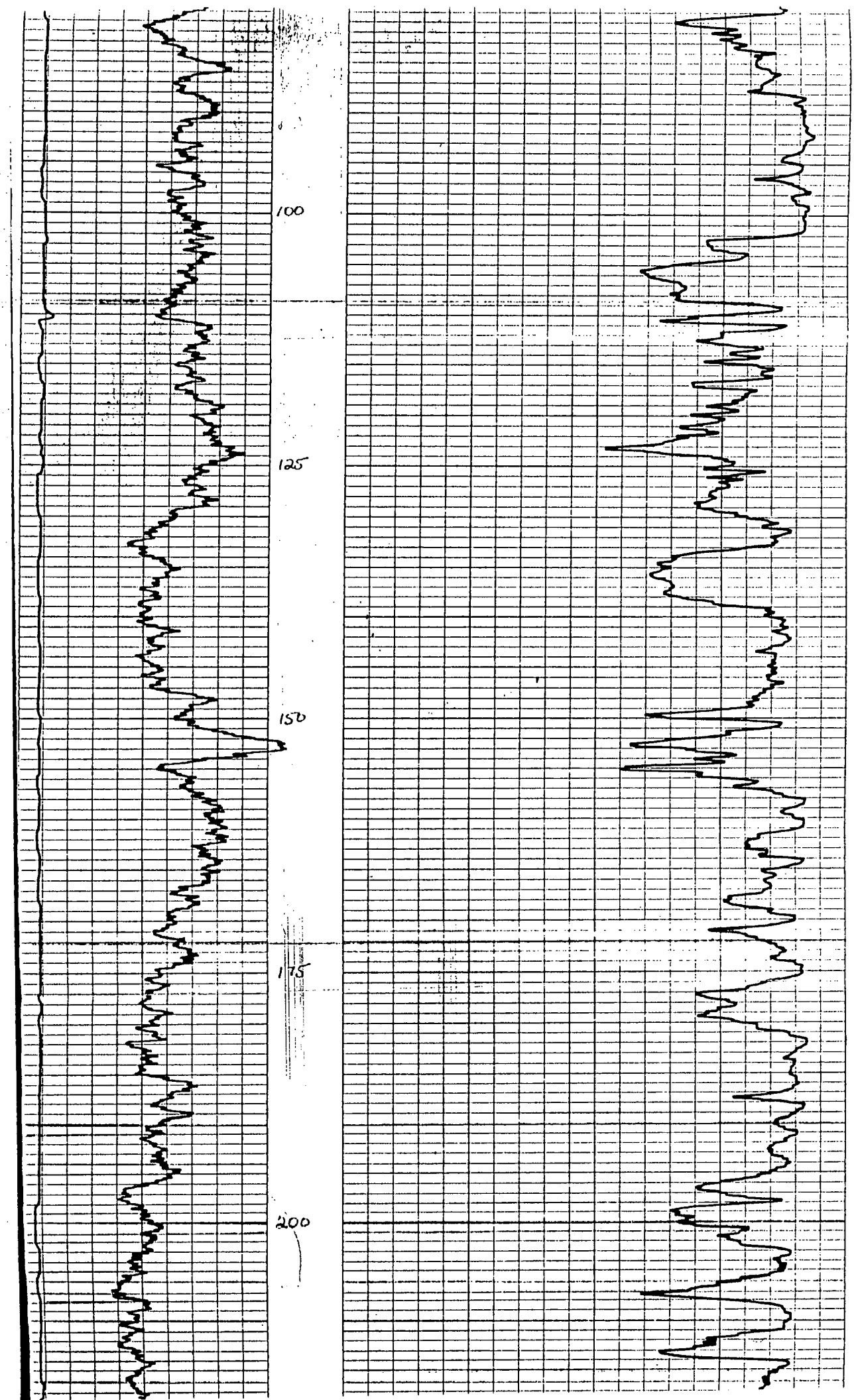
TOOL MODEL No.	
DIAMETER	
TYPE	
SPACING	
LENGTH	
HOR. SCALE	
SOURCE MODEL	HOVP
ISOTOPE	CS-137
STRENGTH	125 mC

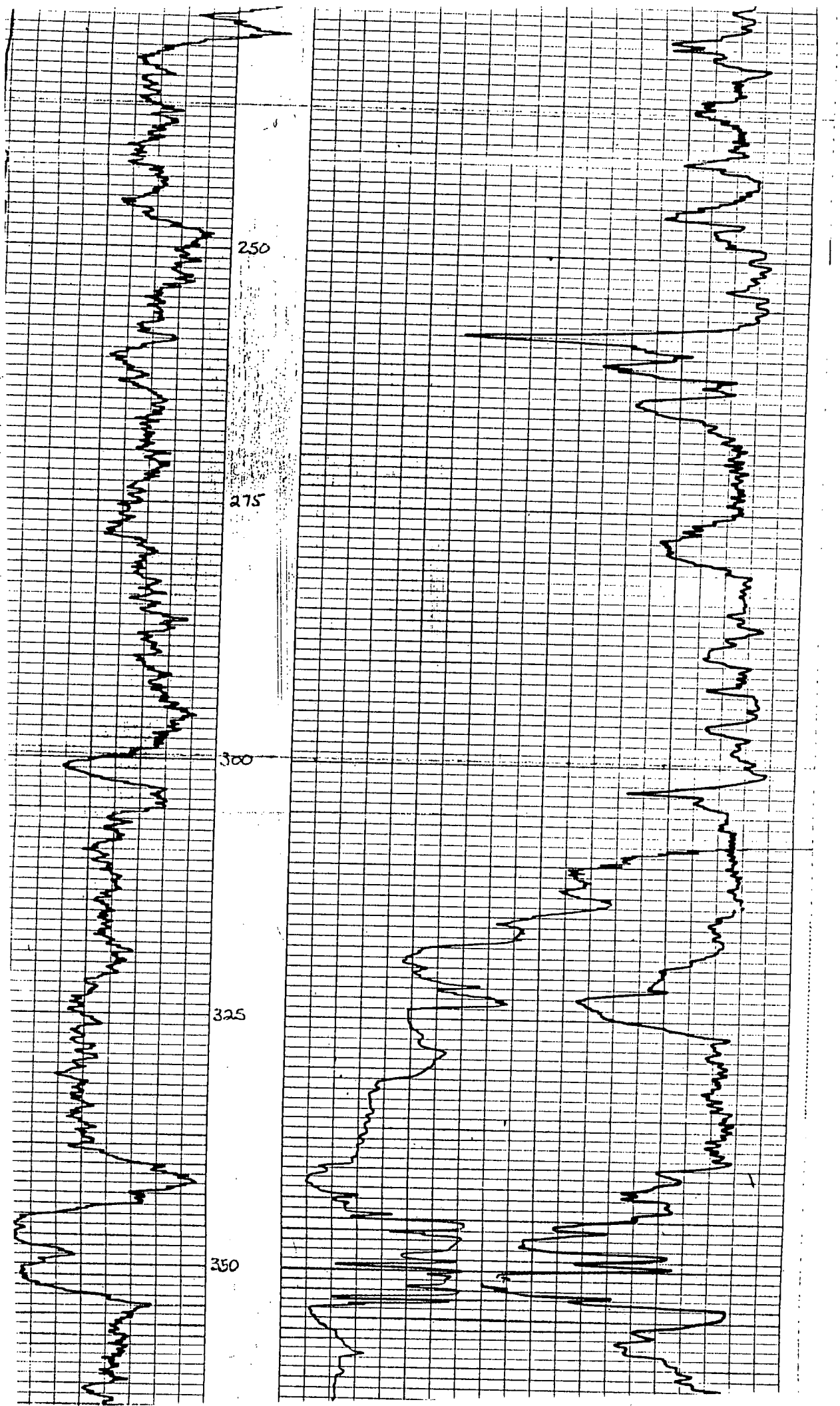
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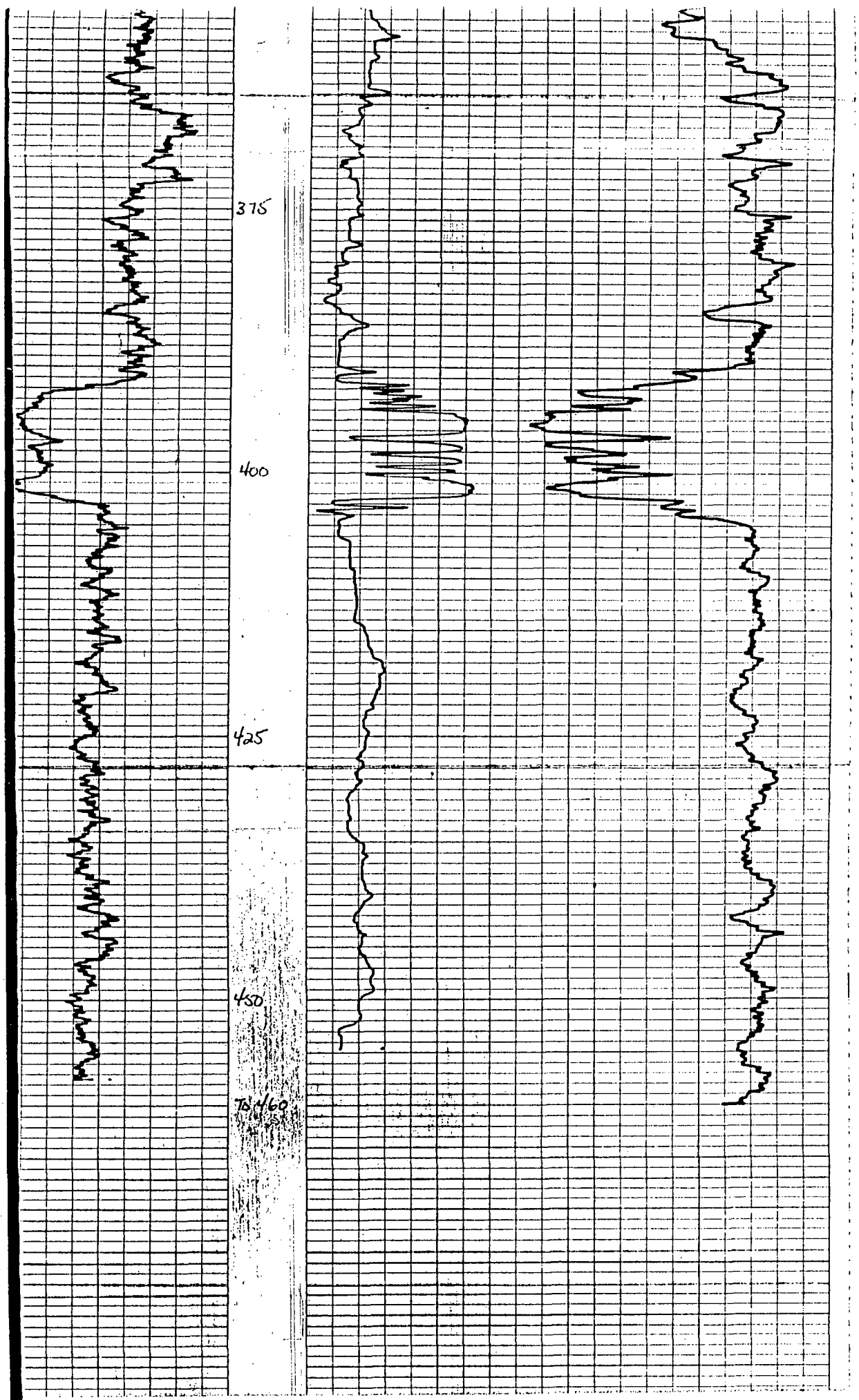
GENERAL RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	GAMMA RAY T C SEC.	GAMMA RAY SENS SETTING	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV.	DENSITY T C SEC	DENSITY SENS SETTINGS	DENSITY ZERO
			12							

REMARKS




100
125
150
175
200


250
275
300
325
350


375
400
425
450
To 460

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 19, 1993

COMPANY _____

HOLE NO. 93 NP - 6

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 54175 N - 49750 E

ELEVATION 1542.3

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	14	Till	
14	23	Sandstone	
23	24	Coal	
24	133	Sandstone	
133	134	Coal	
134	295	Sandstone	Blind at 200'
295	297	Coal	
297	336	Sandstone ?	
336	340	Coal ?	
340	378	Sandstone	
378	389	Coal	
389	440	Sandstone	

COMMENTS _____

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE 93-NP-6

LOCATION SEC TP RGE W

AREA NORTH PLATEAU

PROVINCE O.M.C.

SURVEYED DATA

ELEV. 1542.3

LOC. 54175 N

49750 E

RUN No.	1	2	3
DATE	APRIL 19/93		
DEPTH-DRILLER	440		
DEPTH-LOGGER	440		
FLUID LEVEL	335		
LOGGING TIME			
DRILLED BY	C. MOORE		
RECORDED BY	C. MOORE		
WITNESSED BY	R.T.P.		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
6 5/8	0	20

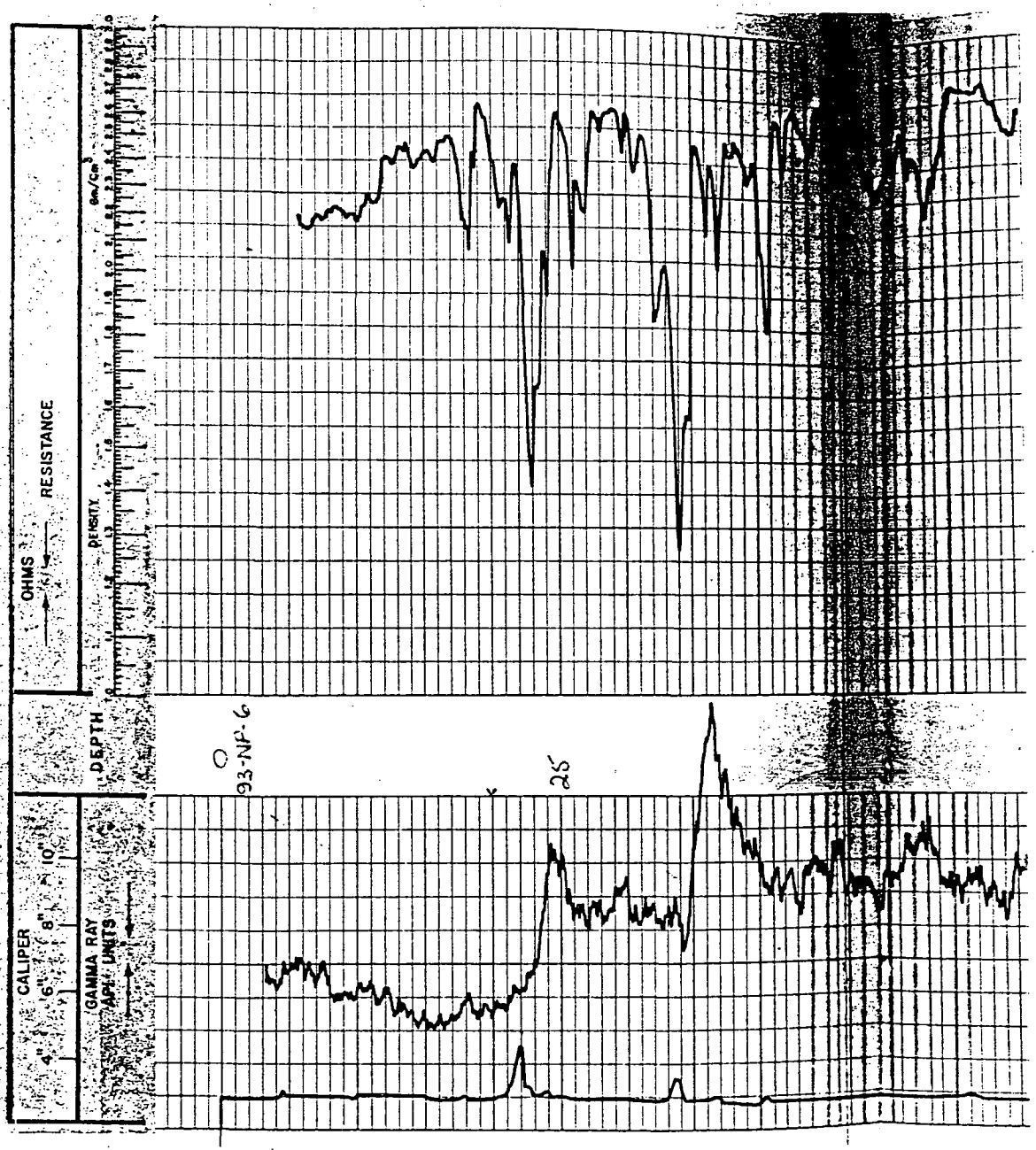
EQUIPMENT DATA

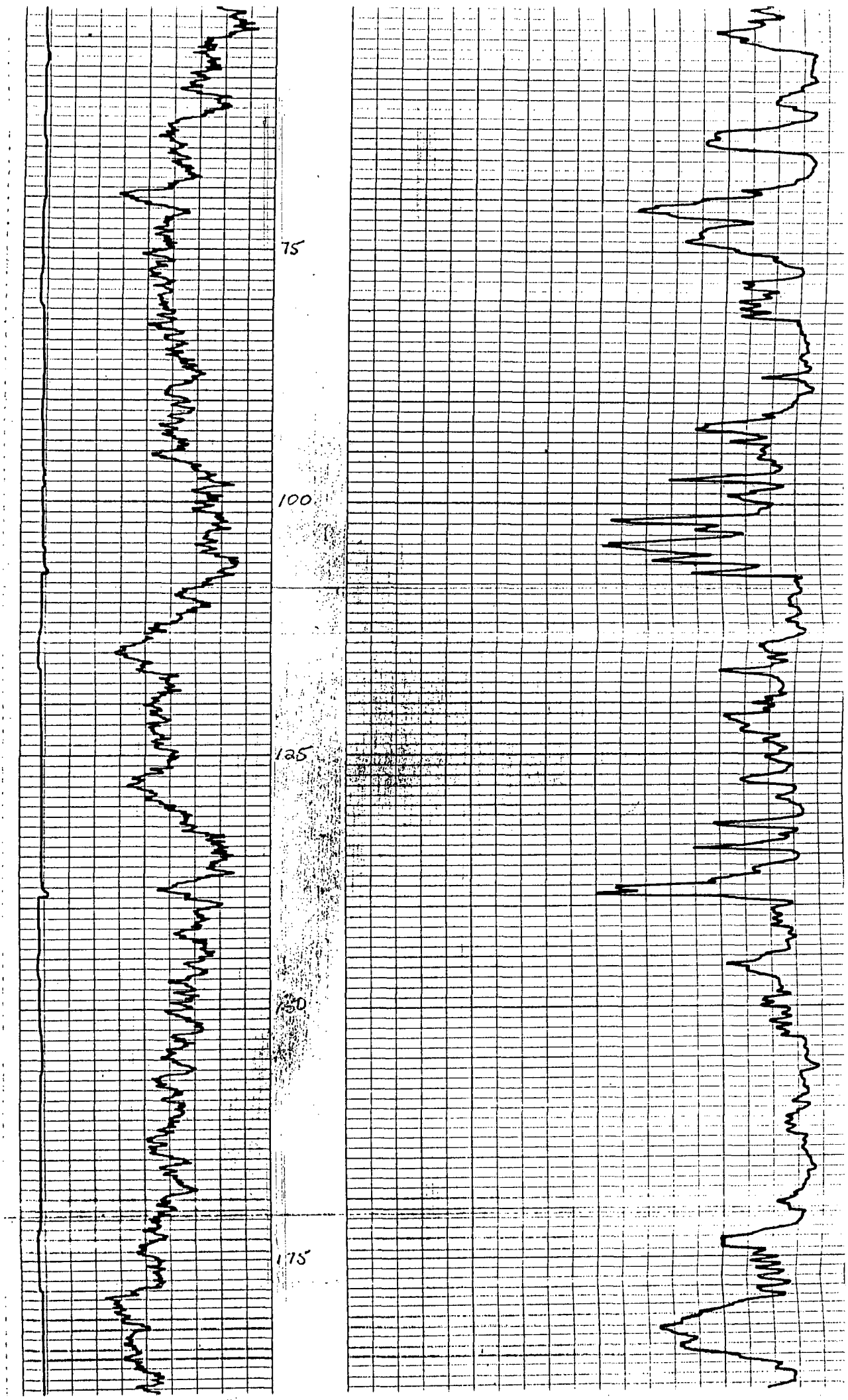
GAMMA RAY		RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	L-103	L-103	
DIAMETER	2 1/8"	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F
TYPE	SCINT	SPACING		13"
LENGTH	3'	LENGTH	1'	
GENERAL		HOR. SCALE		
TRUCK No.		SOURCE MODEL		HOVP
LOCATION		ISOTOPE		CS-137
		STRENGTH		125 mC

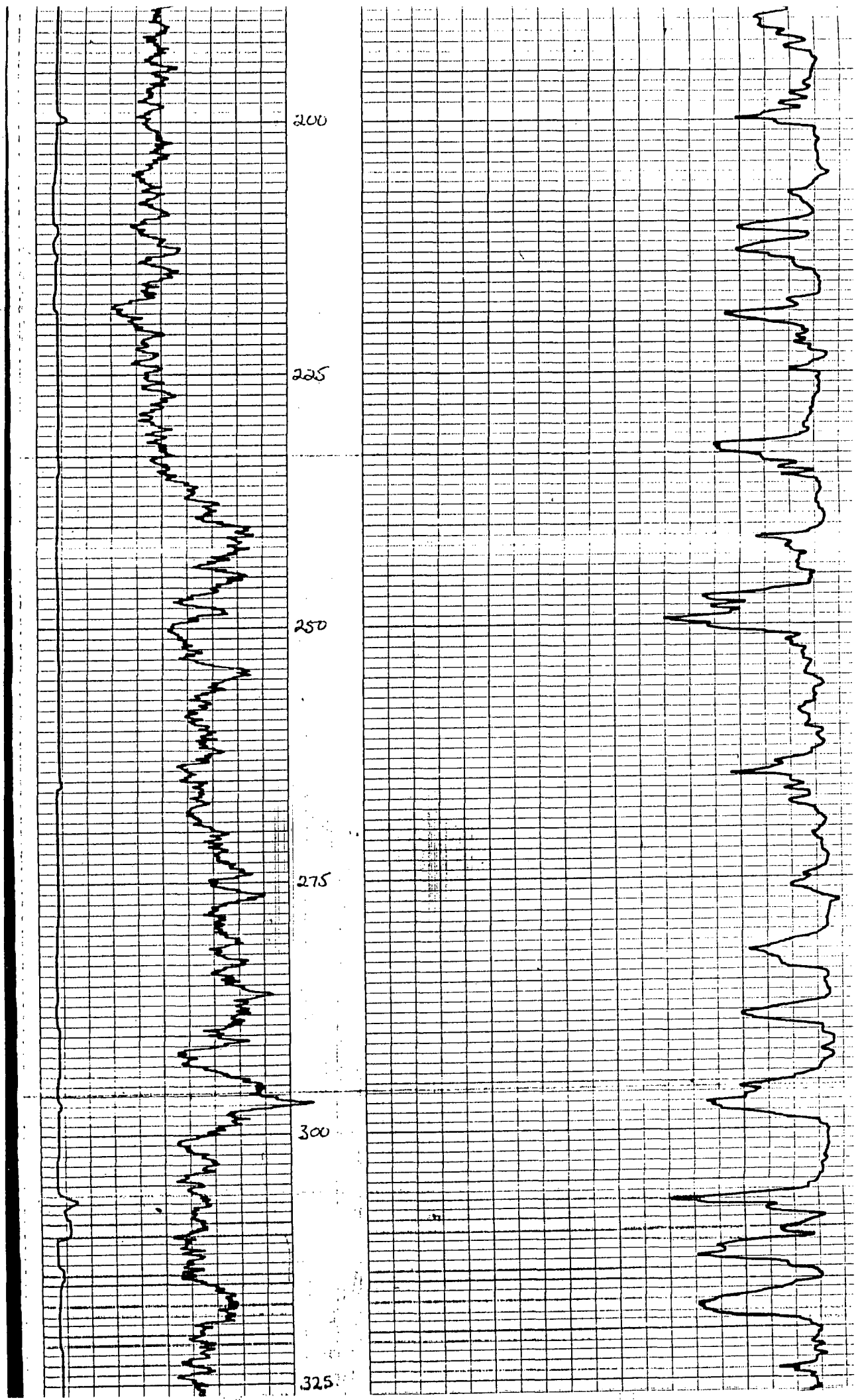
LOGGING DATA

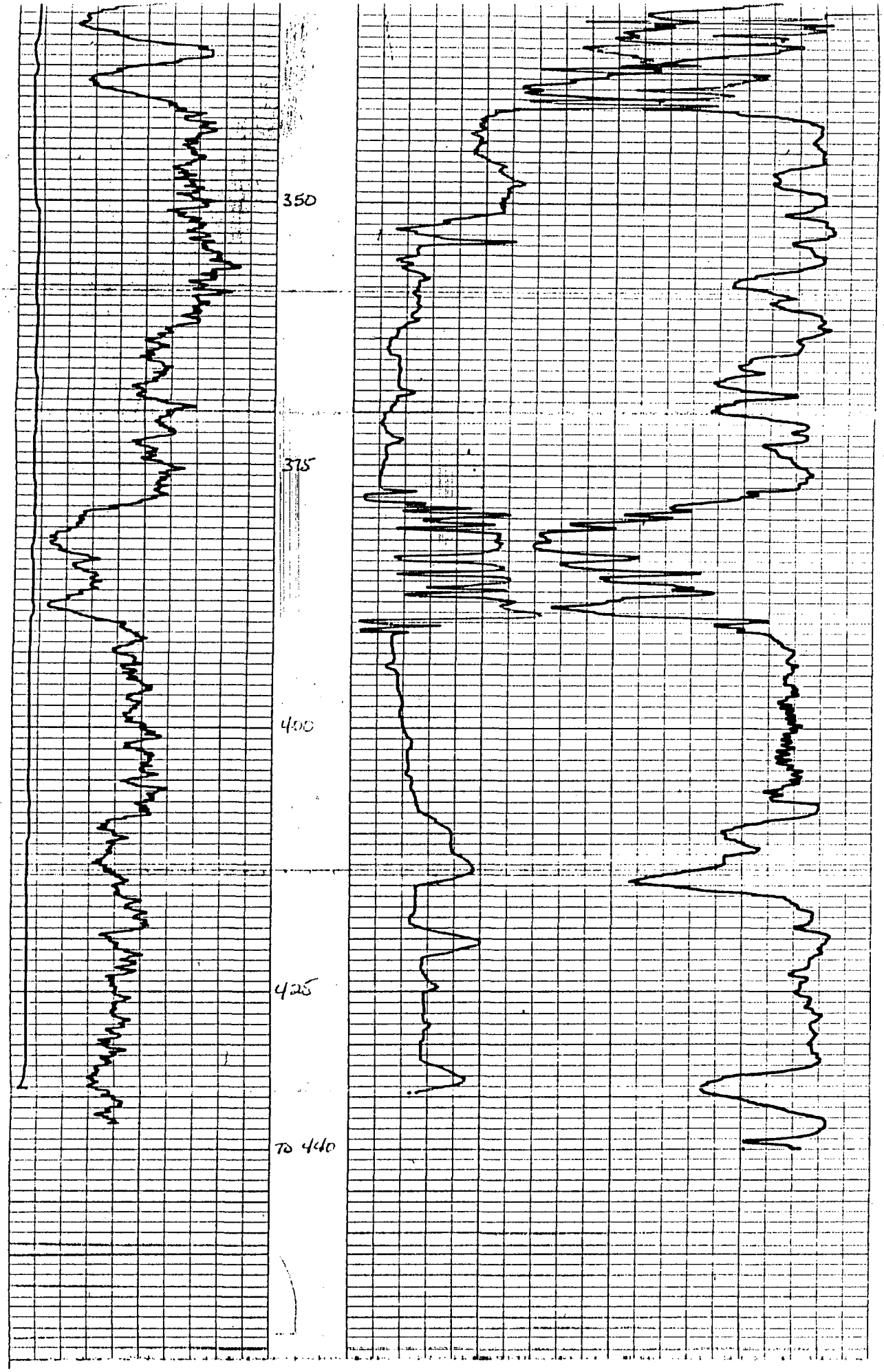
GENERAL RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	GAMMA RAY T.C. SEC.	GAMMA RAY SENS SETTING	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV.	DENSITY T.C. SEC.	DENSITY SENS SETTINGS	DENSITY ZERO
			12							

REMARKS:




75
100
125
150
175


200
225
250
275
300
325


350
375
400
425
To 440

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 15 1993

COMPANY _____

HOLE NO. 93 - NP - #7

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION 54805 N - 49415 E

ELEVATION 1530.9

DRILLER Don Ofuen

FROM	TO	LOG	REMARKS
0	11	Till	
11	12	Coal	
12	20	Sandstone	
20	28	Mudstone & coal	
28	119	Sandstone	
119	121	Coal	
121	227	Sandstone	
227	228	Coal	
228	310	Sandstone	
310	322	Coal	
322	363	Sandstone	
363	376	Coal	
376	420	Sandstone	

COMMENTS _____

WATER HORIZON _____ FT.

LEXCO

TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE 93-NP-7

LOCATION SEC. TP. RGE. W.

AREA NORTH PLATEAU

PROVINCE O.M.C.

SURVEYED DATA

ELEV. 1530.9

LOC. 54805 N

49415 E

RUN No.	1	2	3
DATE	APRIL 15/93		
DEPTH-DRILLER	420		
DEPTH-LOGGER	415		
FLUID LEVEL	402		
LOGGING TIME			
DRILLED BY	C. MOORE		
RECORDED BY	C. MOORE		
WITNESSED BY	R.J.R.		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
6⅝	0	20

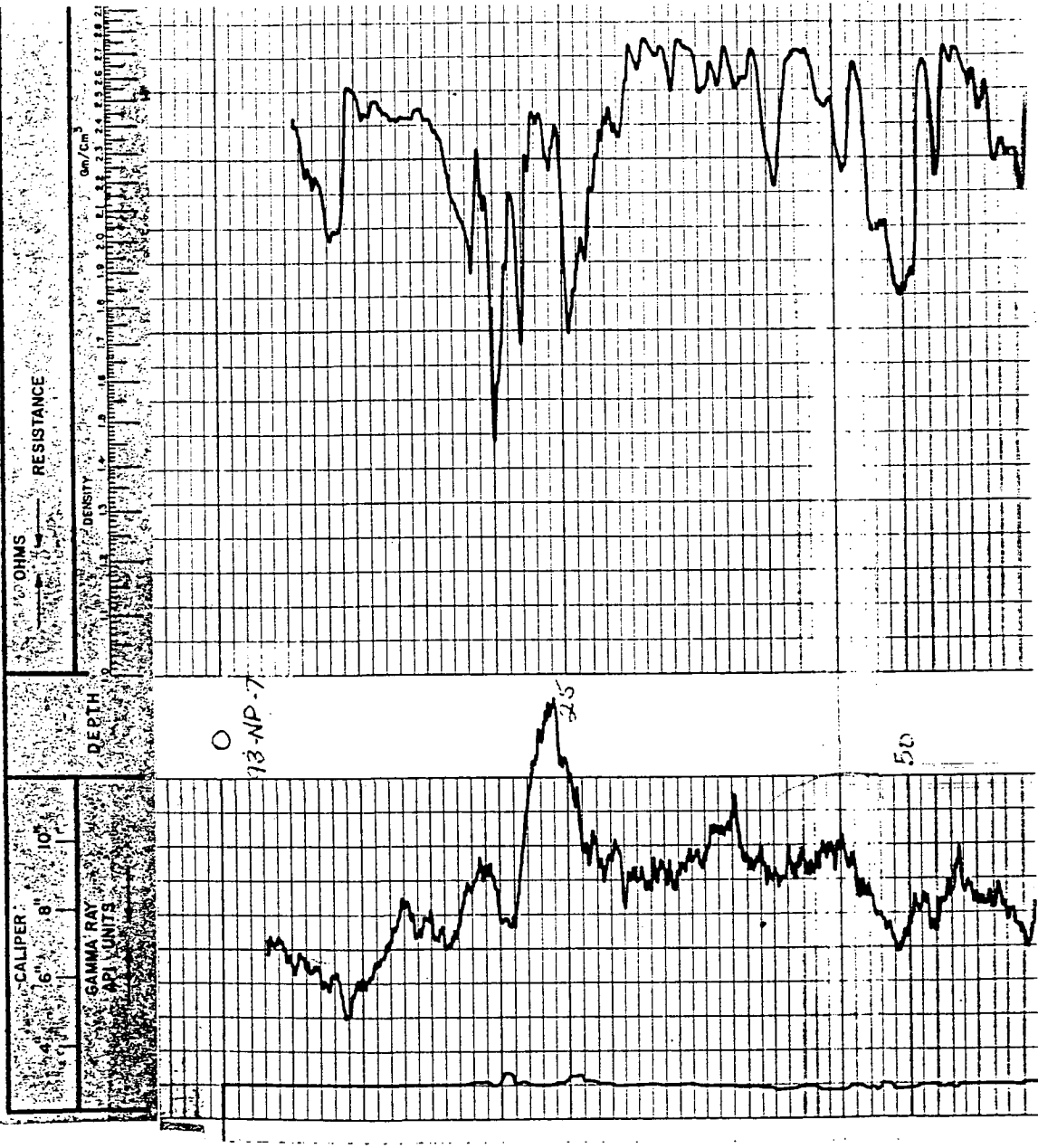
EQUIPMENT DATA

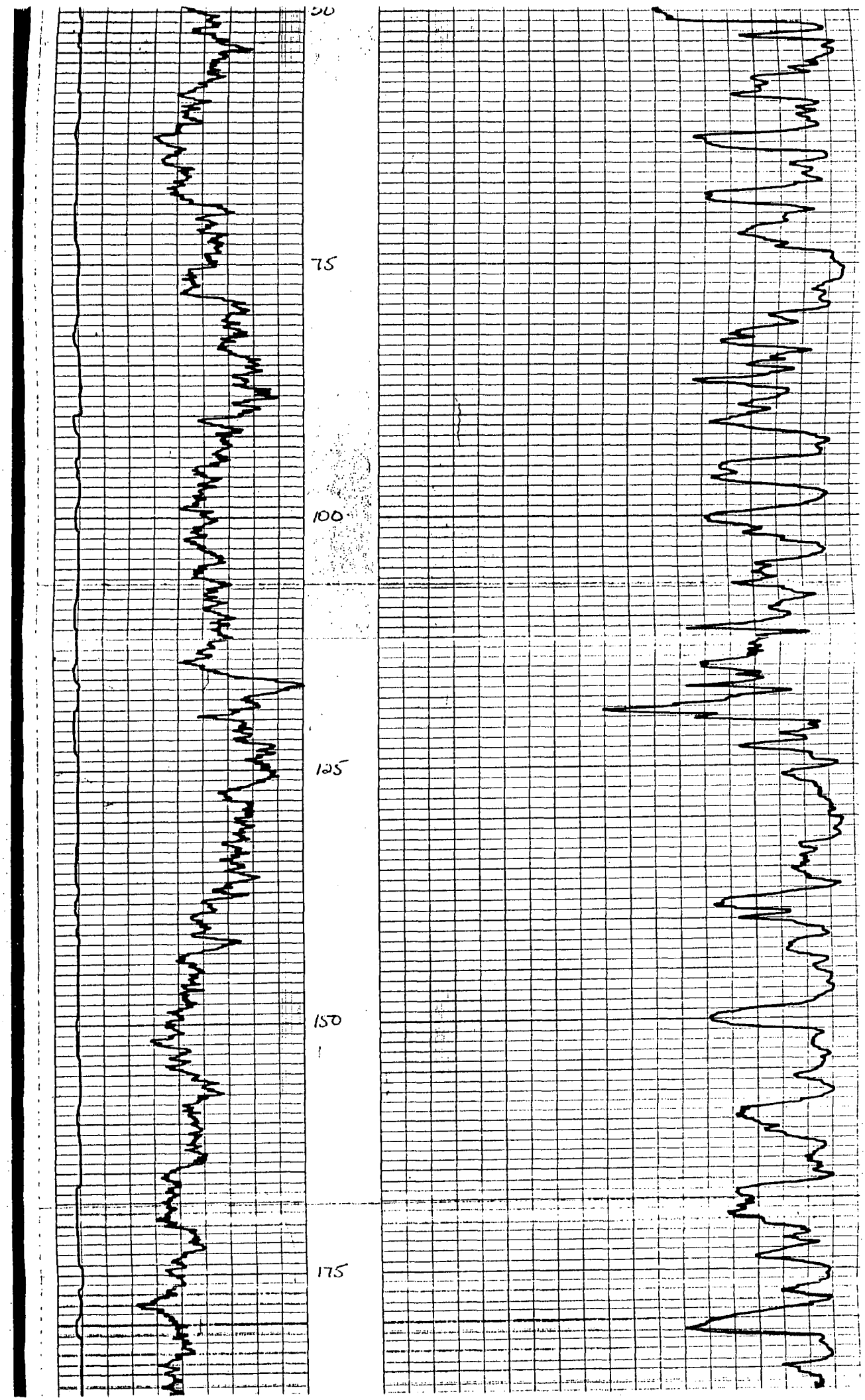
GAMMA RAY		RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	L-103	L-103	
DIAMETER	2 1/8"	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING	1'	13"	
LENGTH	3'	LENGTH			
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

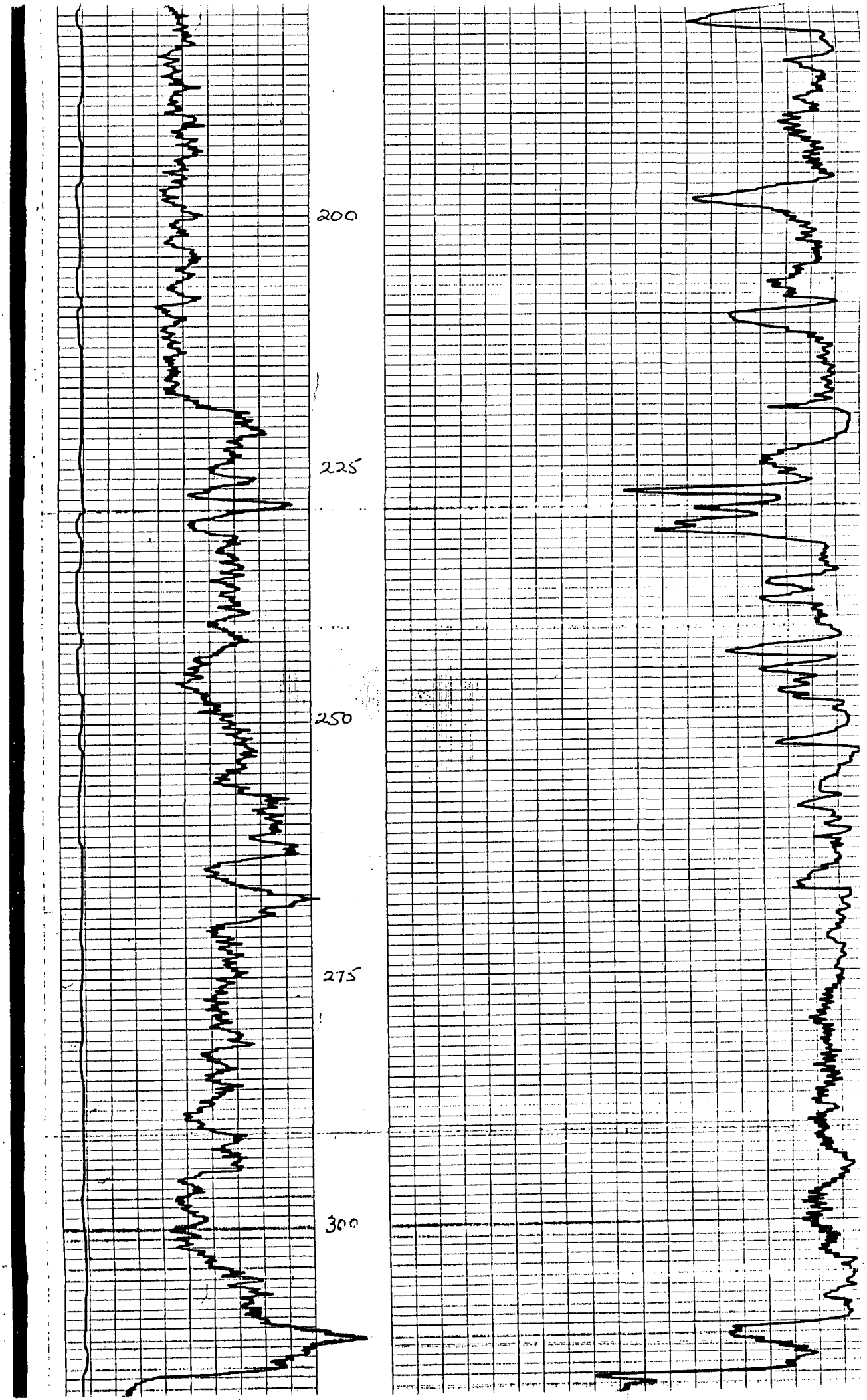
LOGGING DATA

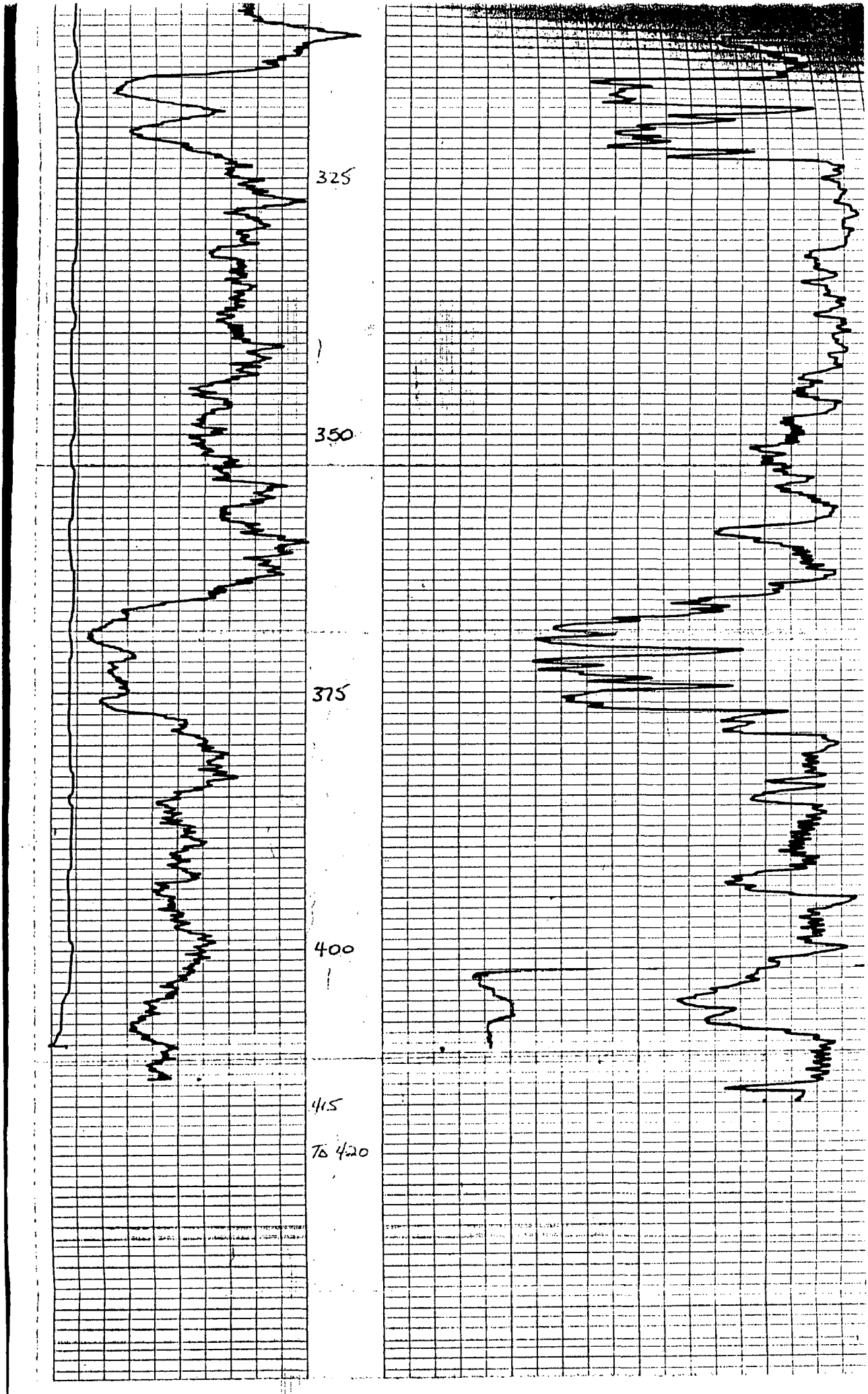
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min	GAMMA RAY TC SEC.	GAMMA RAY SENS. SETTING	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV.	DENSITY TC SEC	DENSITY SENS. SETTINGS	DENSITY ZERO
			12"							

REMARKS




50
75
100
125
150
175


200
225
250
275
300


325
350
375
400
415
To 420

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 6 1993

COMPANY _____

HOLE NO. 93 - NP - 08

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofuen

FROM	TO	LOG	REMARKS
0	3	Till	
3	12	Sandstone - Brown & soft	
12	45	Gray Sandstone	
45	57	Mudstone with small coal partings	
57	181	Sandstone	
181	183	Coal	- Blind Hole
183	249	Sandstone	
249	254	Coal	
254	312	Sandstone	
312	318	Coal ?	
318	319	Sandstone	
319	325	Coal ?	
325	339	Sandstone	
339	347	Coal	
347	389	Sandstone	
389	400	Coal	
400	440	Sandstone	

COMMENTS Clay analysis for this hole by the Alberta Research Council. See Report

TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-8

LOCATION SEC TP RGE W

AREA NORTH PLATEAU

PROVINCE O.M.C

SURVEYED DATA

ELEV. 1536.9

LOC. 54700 N

49512 E

RUN No.	1	2	3
DATE	APRIL 6/93		
DEPTH-DRILLER	440'		
DEPTH-LOGGER	440'		
FLUID LEVEL	243		
LOGGING TIME			
DRILLED BY	C. MOORE		
RECORDED BY	C. MOORE		
WITNESSED BY	RJR		

BORE-HOLE RECORD			CASING RECORD		
BIT	FROM	TO	SIZE	FROM	TO
			5½	0	20

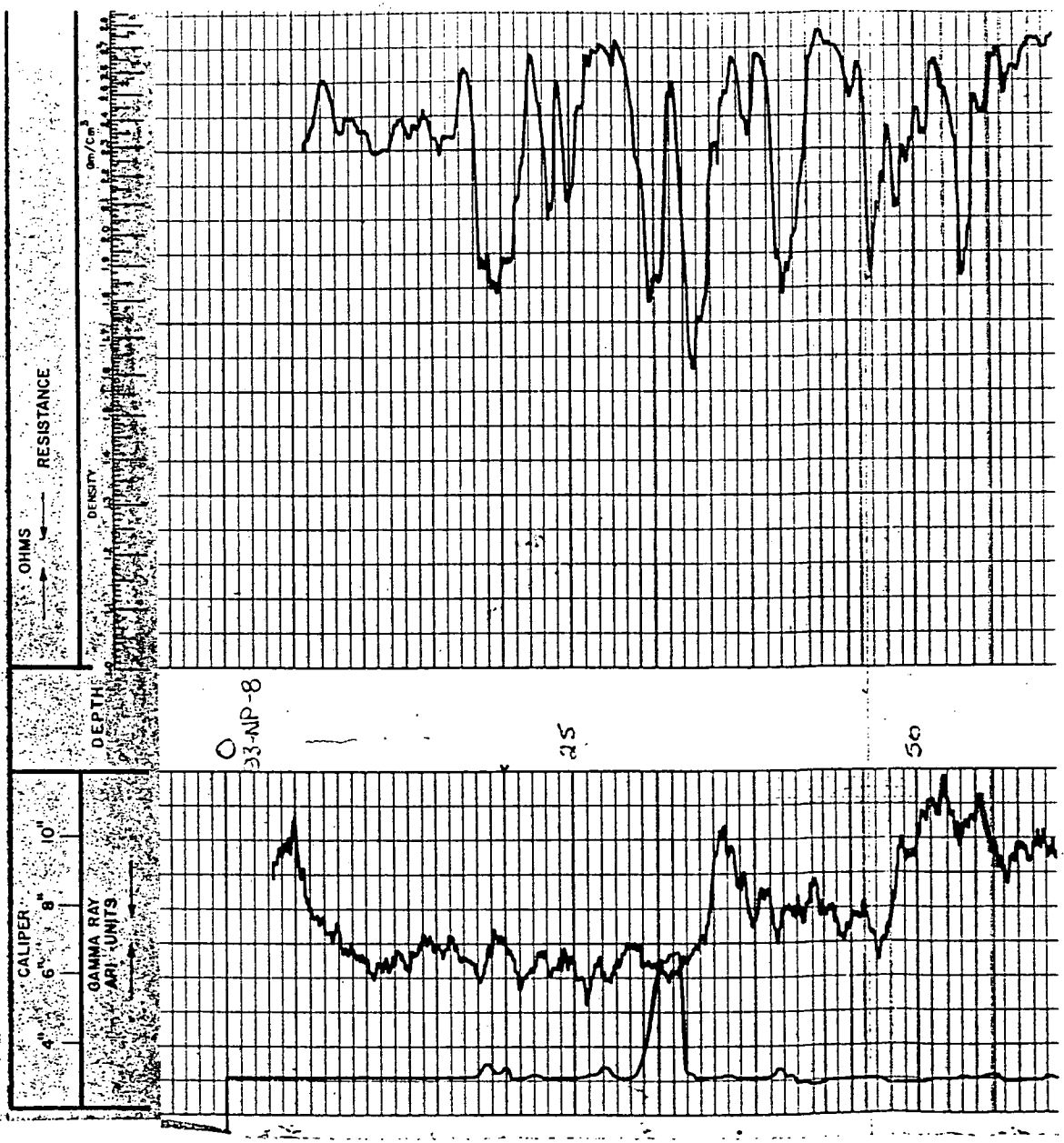
EQUIPMENT DATA

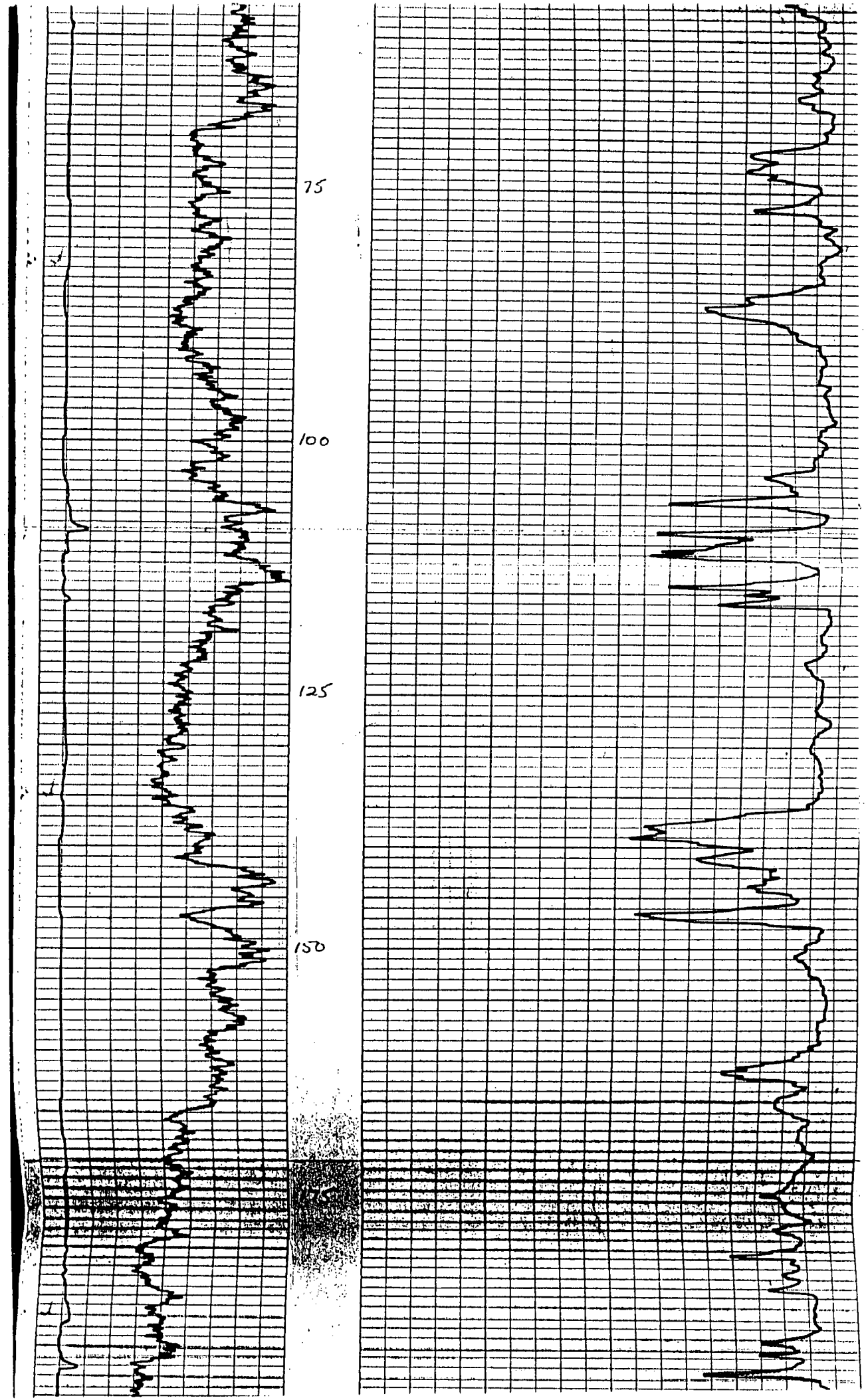
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING	1'	13"	
LENGTH	3'	LENGTH	1"		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

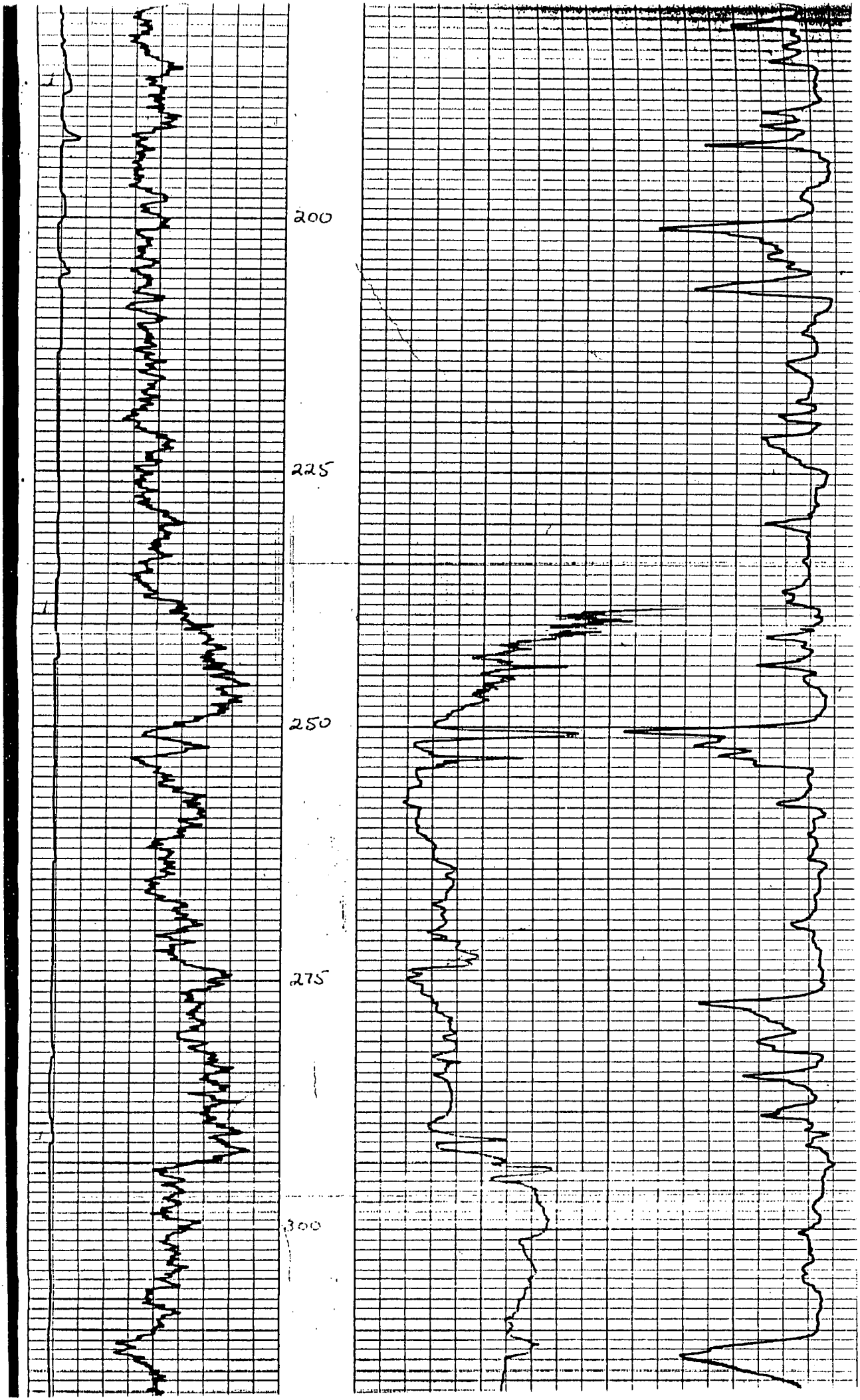
LOGGING DATA

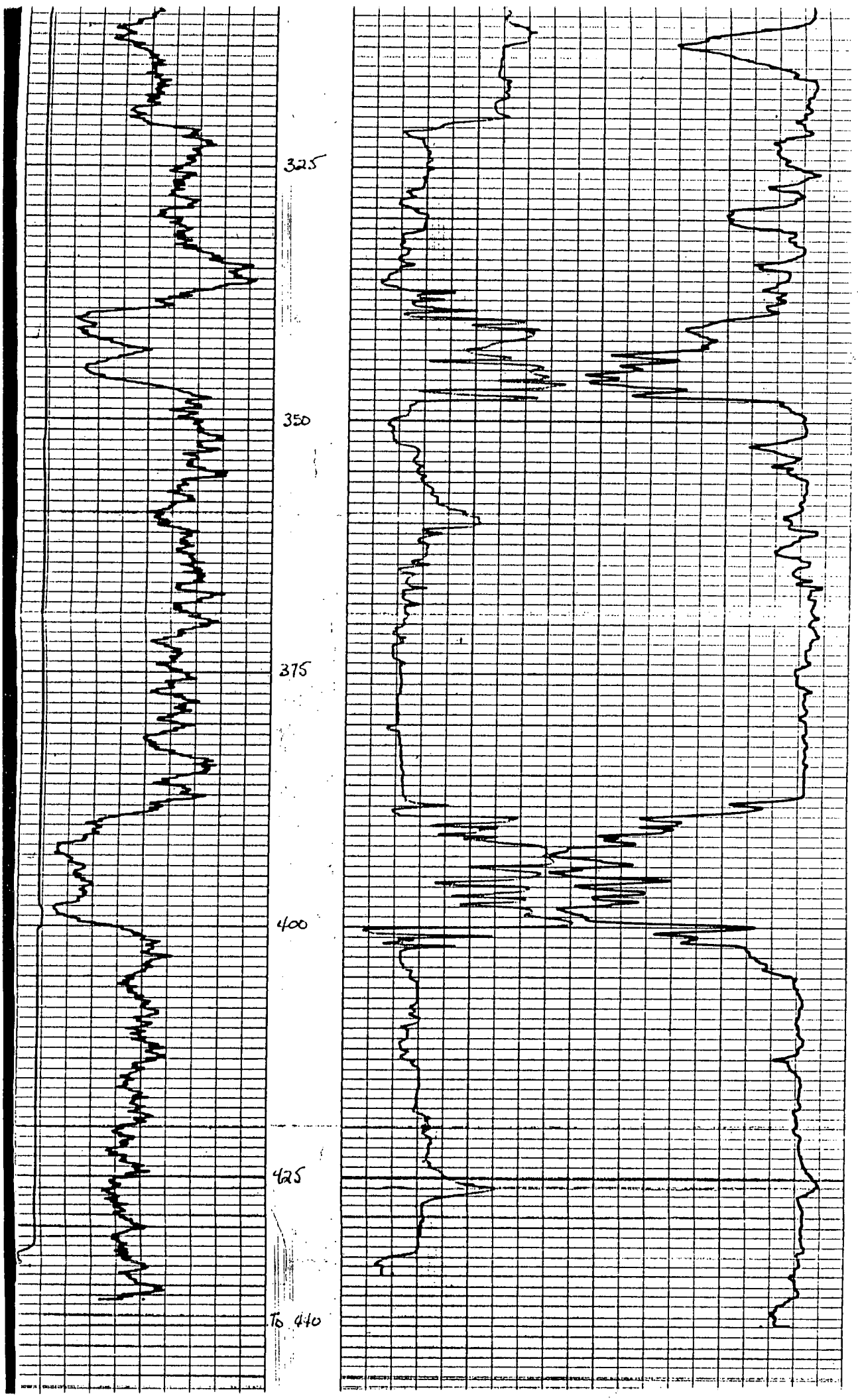
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	GAMMA RAY TC SEC.	GAMMA RAY SENS SETTING	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV.	DENSITY TC SEC	DENSITY SENS SETTINGS	DENSITY ZERO
			12							

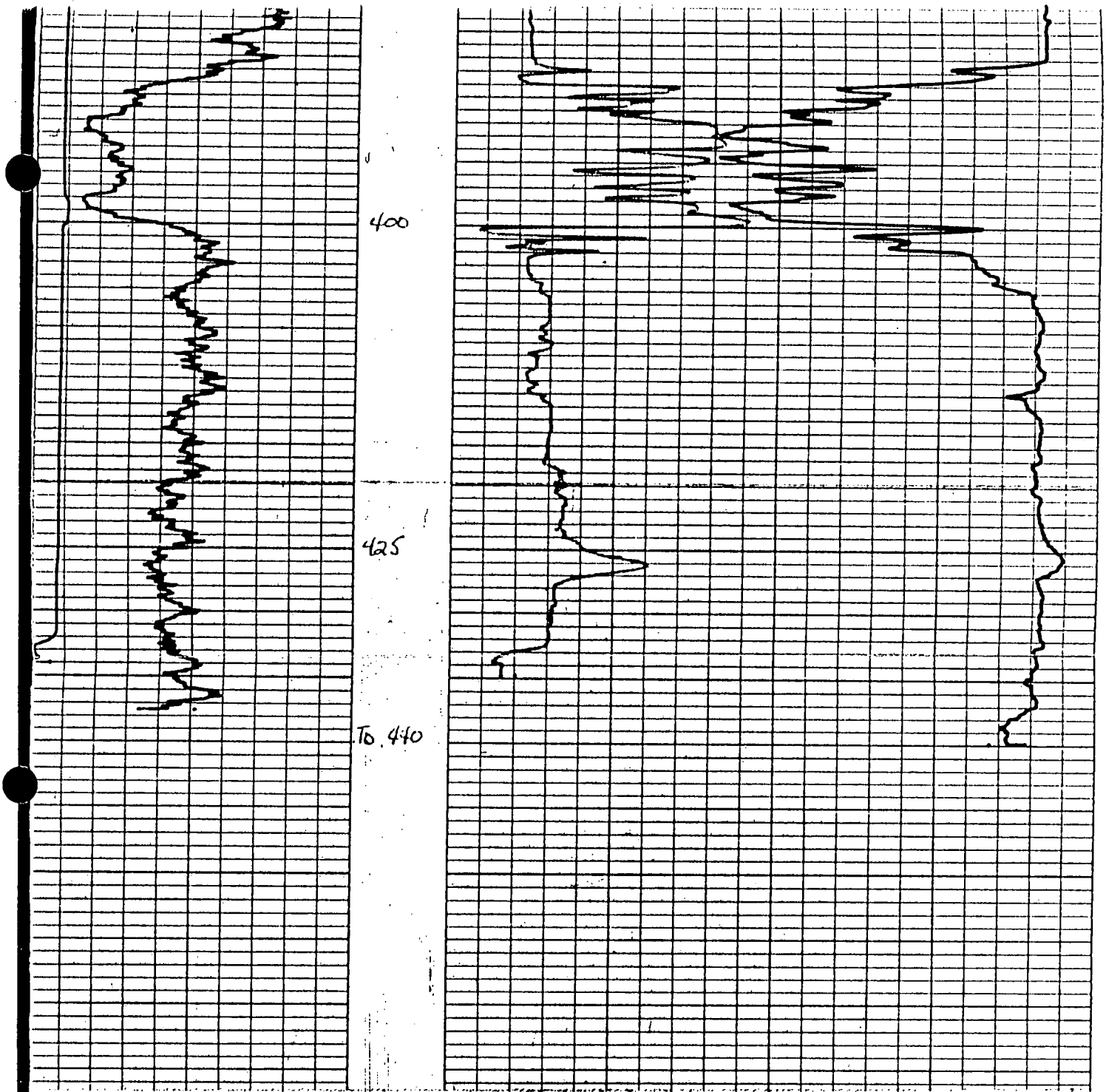
REMARKS




75
100
125
150


200
225
250
275
300


325
350
375
400
425
To 440


400
425
To 440

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE APRIL 15, 1993

COMPANY _____

HOLE NO. 93 - OP - 9

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION 5457ON - 4364SE

ELEVATION 1545.2

DRILLER DON OLNER

FROM	TO	LOG	REMARKS
0	8	TILL	
8	15	SANDSTONE	
15.	15.5	DIRTY COAL	
15.5	60	SANDSTONE	
60	62	Coal	
62	73	Sandstone	
73	74	Coal	
74	278	Sandstone	
278	282	Mudstone & coal	
282	361	Sandstone	
361	372	Coal	
372	411	Sandstone	
411	421	Coal	
421	460	Sandstone	

COMMENTS _____

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE 93-NP-9

LOCATION ____ SEC ____ TP ____ RGE ____ W

AREA North Plateau

PROVINCE O.M.C.

SURVEYED DATA

ELEV. 1545.2

LOC 54570 N
49645 E

RUN No.	1	2	3
DATE	April 15/93		
DEPTH-DRILLER	460		
DEPTH-LOGGER	458		
FLUID LEVEL	290'		
LOGGING TIME			
DRILLED BY	C. Moore		
RECORDED BY	C. Moore		
WITNESSED BY	R.J.K.		

BORE-HOLE RECORD

BIT	FROM	TO	SIZE
			6 3/4

CASING RECORD

FROM	TO
0	20

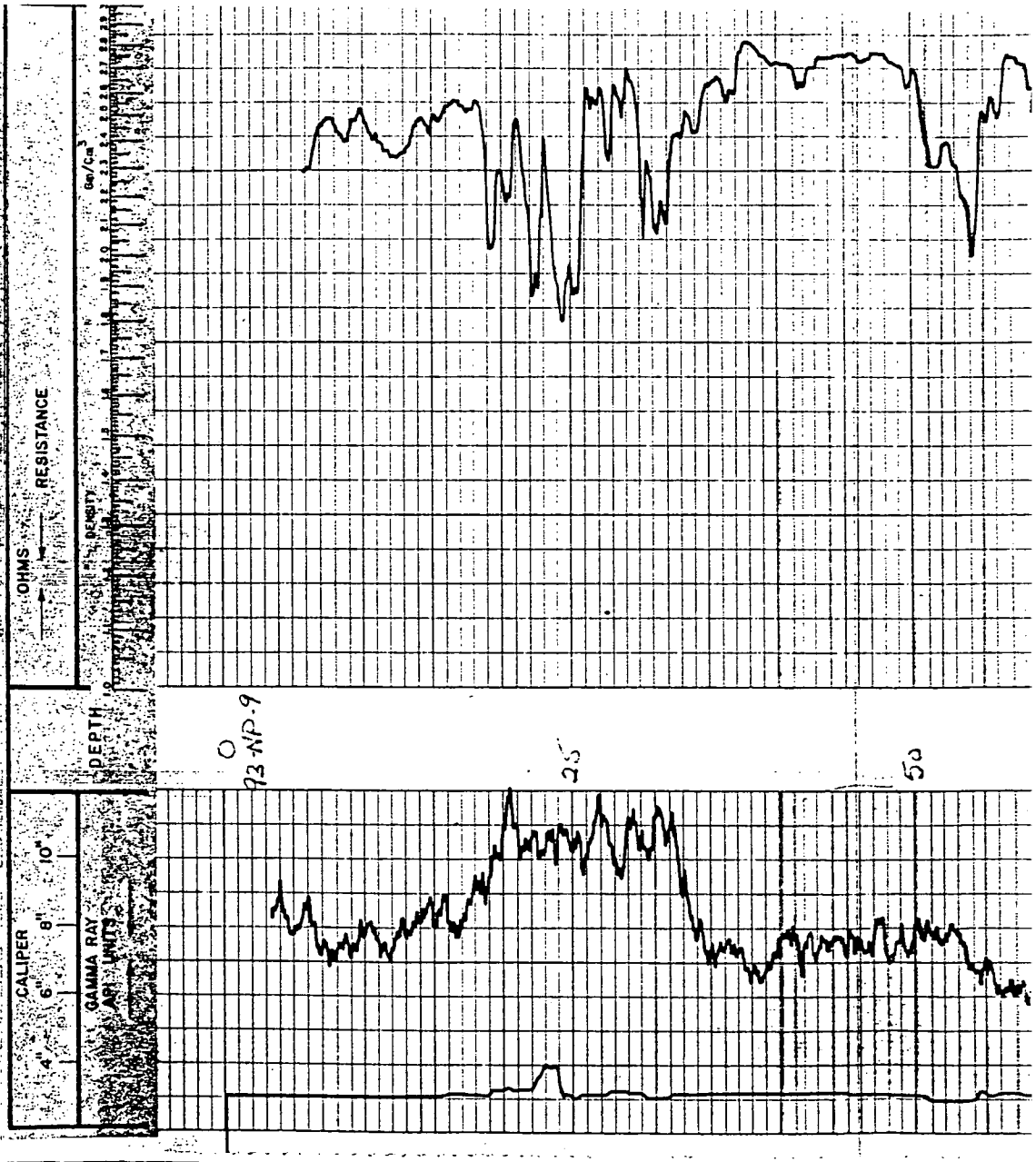
EQUIPMENT DATA

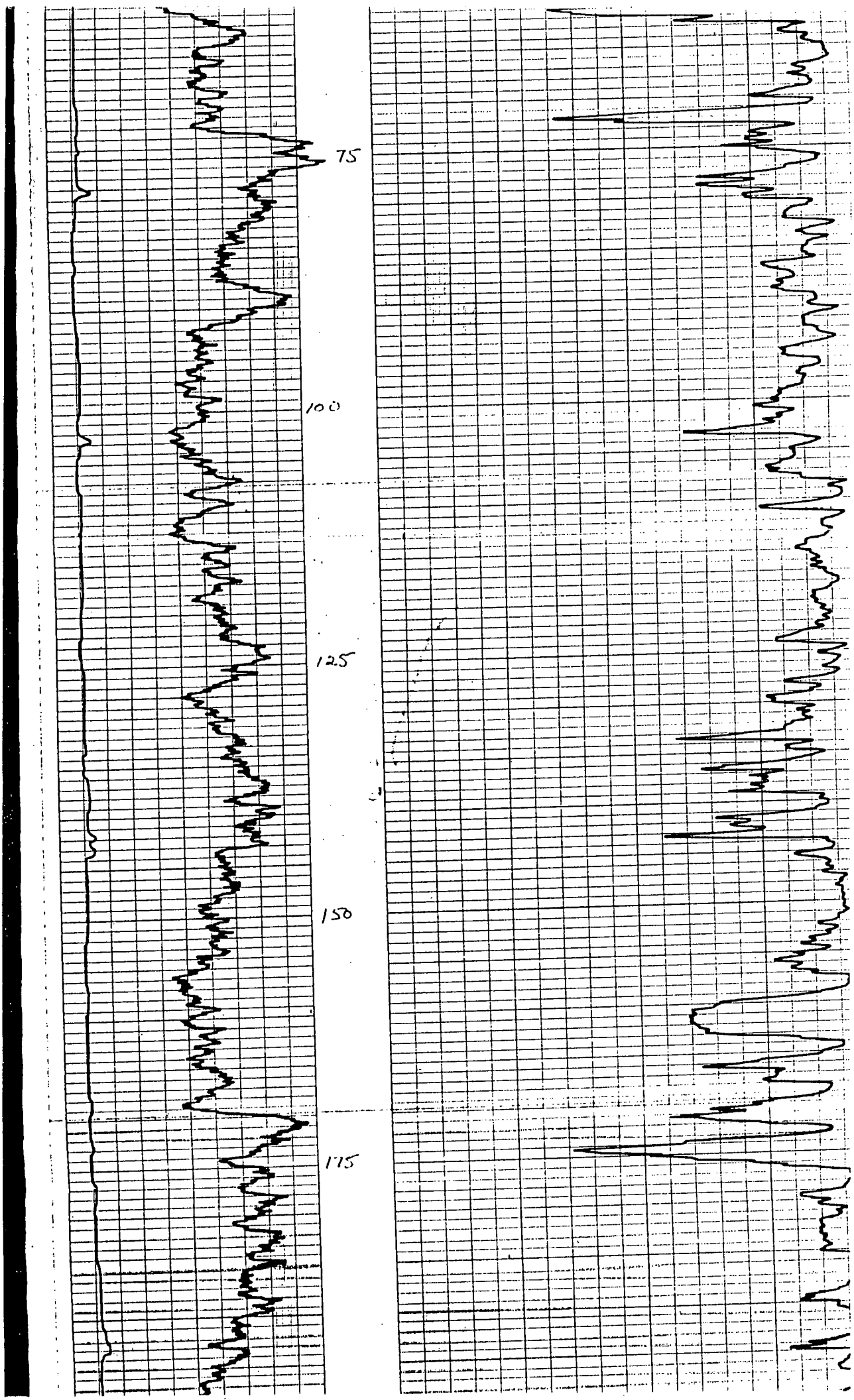
GAMMA RAY		RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	L-103	L-103	
DIAMETER	2 1/8"	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE ME		
TYPE	SCINT	SPACING	13"	
LENGTH	3'	LENGTH 1'		
GENERAL		HOR. SCALE		
TRUCK No.		SOURCE MODEL	HOVP	
LOCATION		ISOTOPE	Cs-137	
		STRENGTH	125 mC	

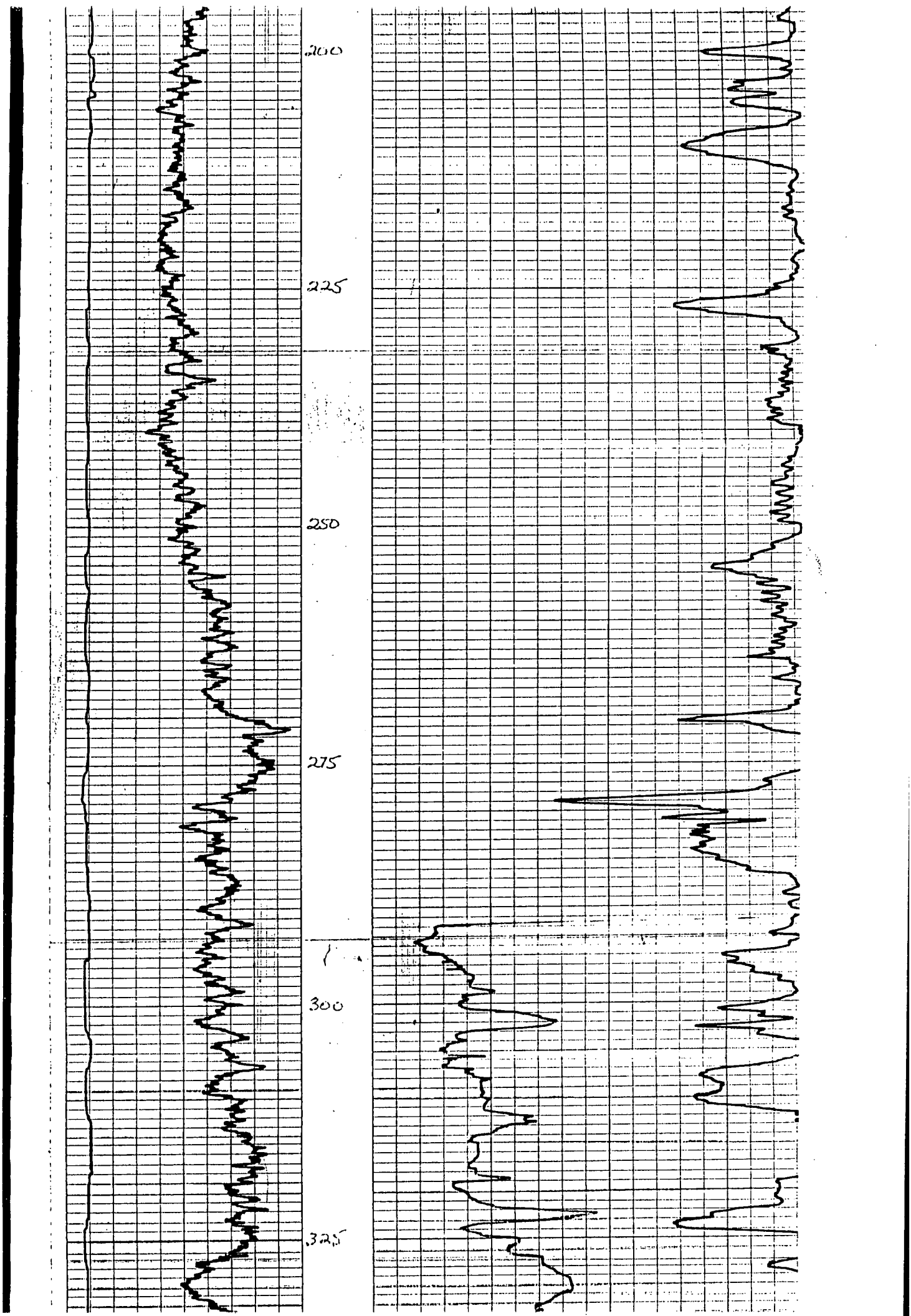
LOGGING DATA

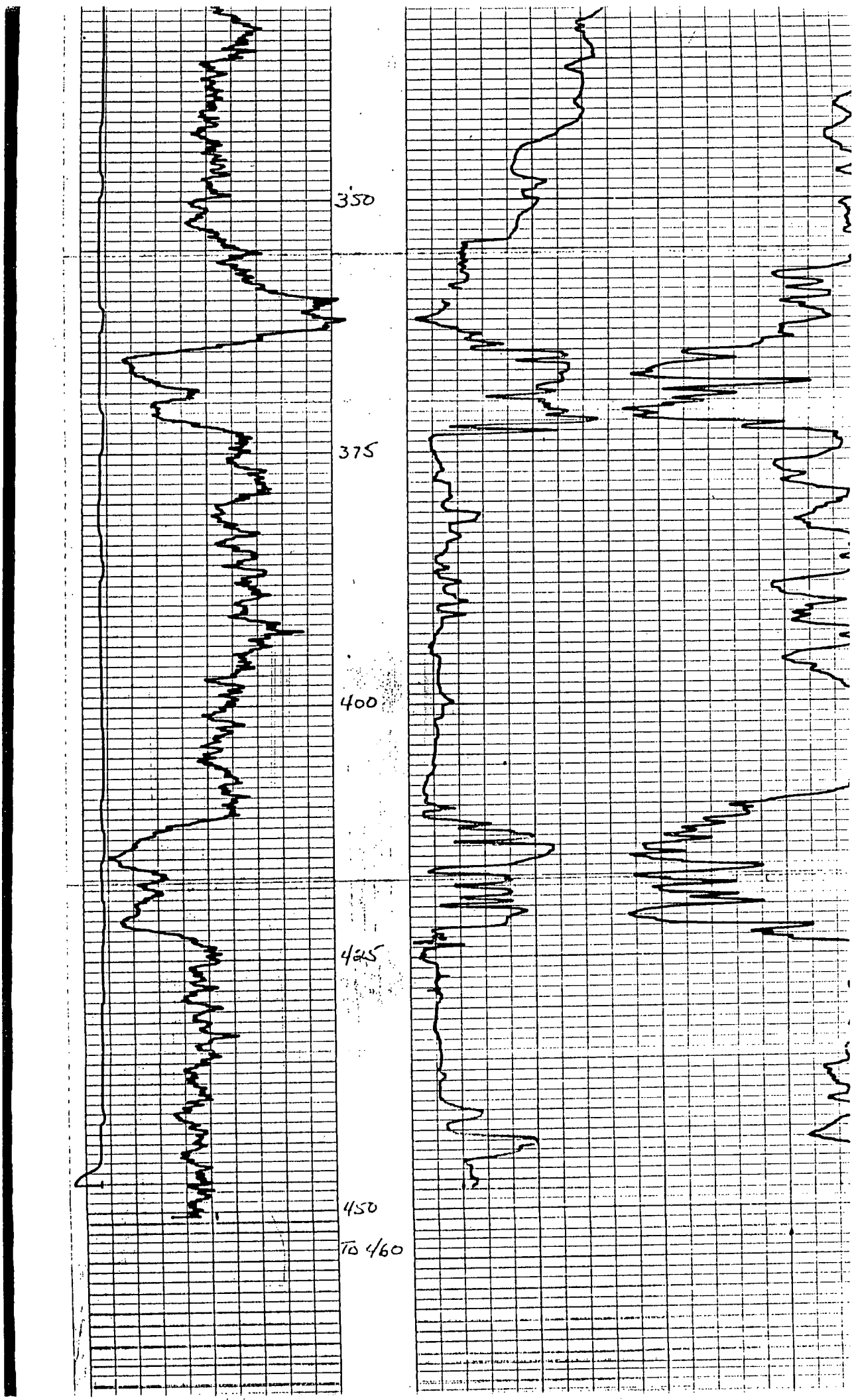
GENERAL				GAMMA RAY				DENSITY		
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	T.C. SEC.	SENS. SETTING	ZERO	API UNITS PER DIV.	T.C. SEC	SENS. SETTINGS	ZERO
			12							

REMARKS:




75
100
125
150
175


200
225
250
275
300
325


350
375
400
425
450
TO 460

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 21 1993

COMPANY _____

HOLE NO. 93-NP-H 10

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	7	TILL	
7	11	SANDSTONE	
11	13	MUDSTONE & COAL STRINGERS	
13	48	SANDSTONE	
48	76	Mudstone with Traces of coal	
76	272	Sandstone	
272	274	Trace of coal	
274	358	Sandstone	
358	362	Coal	
362	401	Sandstone	
401	411	COAL	
411	460	Sandstone	

COMMENTS Blind hole no Liner



Disclaimer

This page was inserted by the Coal and Minerals Development Branch, to provide a reference that log 93 - NP - 10 associated with this report is not contained in the assessment report on file.

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 20 1993

COMPANY _____

HOLE NO. 93-NP-#11

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION 54310 N - 49900E

ELEVATION 1538.0

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	10	Till	
10	55	Sandstone	
55	60	Mudstone & coal	
60	153	Sandstone	
153	158	Mudstone with Traces of coal	
158	302	Sandstone	
302	307	Mudstone & coal	
307	335	Sandstone	
335	345	Coal	
345	387	Sandstone	
387	397	Coal	
397	440	Sandstone	

COMMENTS _____

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE 93-NP-11

LOCATION ____ SEC. ____ TP. ____ RGE. ____ W.

AREA North Plateau

PROVINCE O.M.C

SURVEYED DATA

ELEV. 1538.0

LOC. 54310 N

499006

RUN No.	1	2	3
DATE	April 20/93		
DEPTH-DRILLER	440		
DEPTH-LOGGER	427		
FLUID LEVEL	336		
LOGGING TIME			
DRILLED BY	C. Moore		
RECORDED BY	C Moore		
WITNESSED BY	RJK		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
6 5/8	0'	80

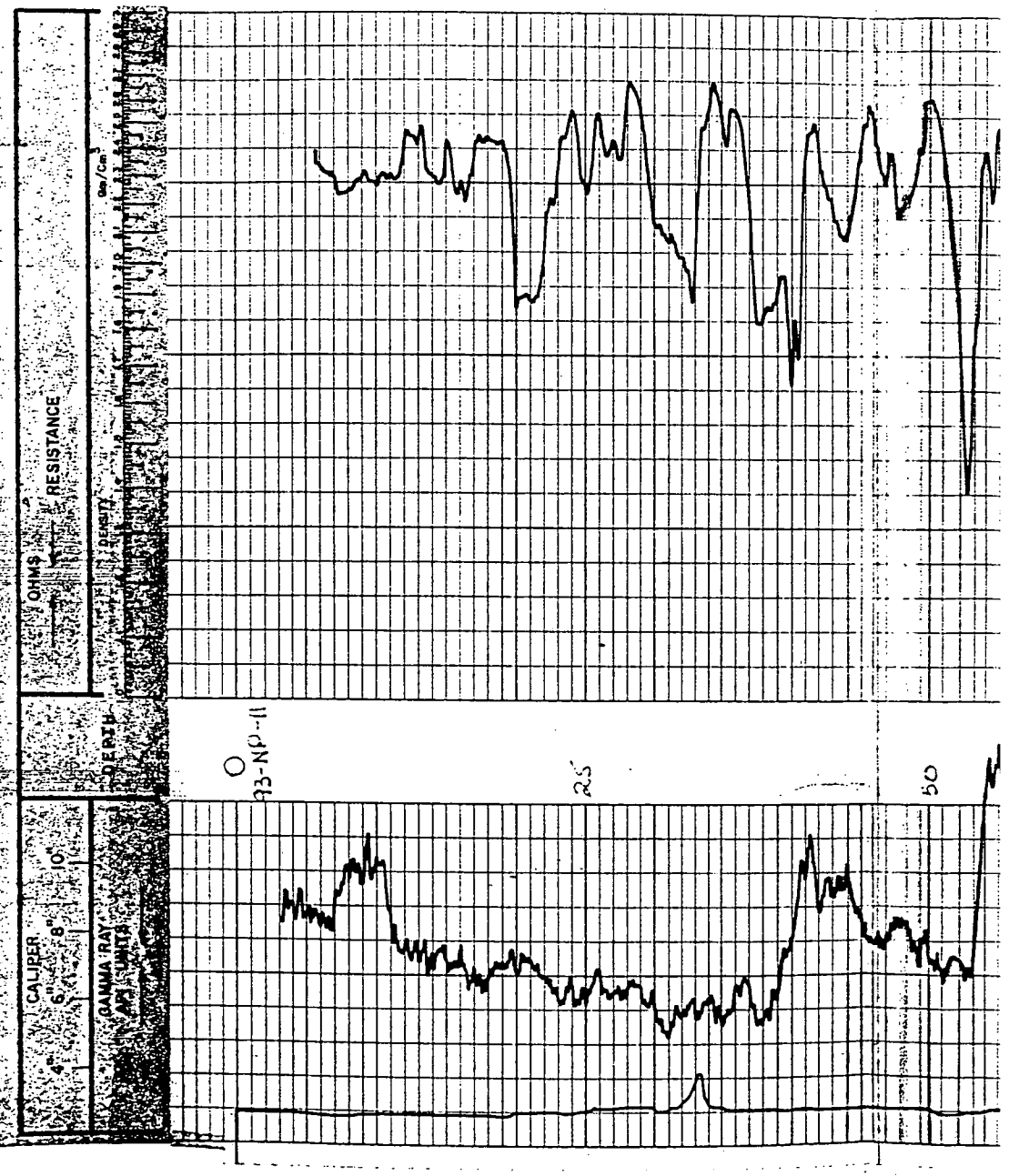
EQUIPMENT DATA

GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	D	
TYPE	SCINT.	SPACING		13"	
LENGTH	3'	LENGTH			
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

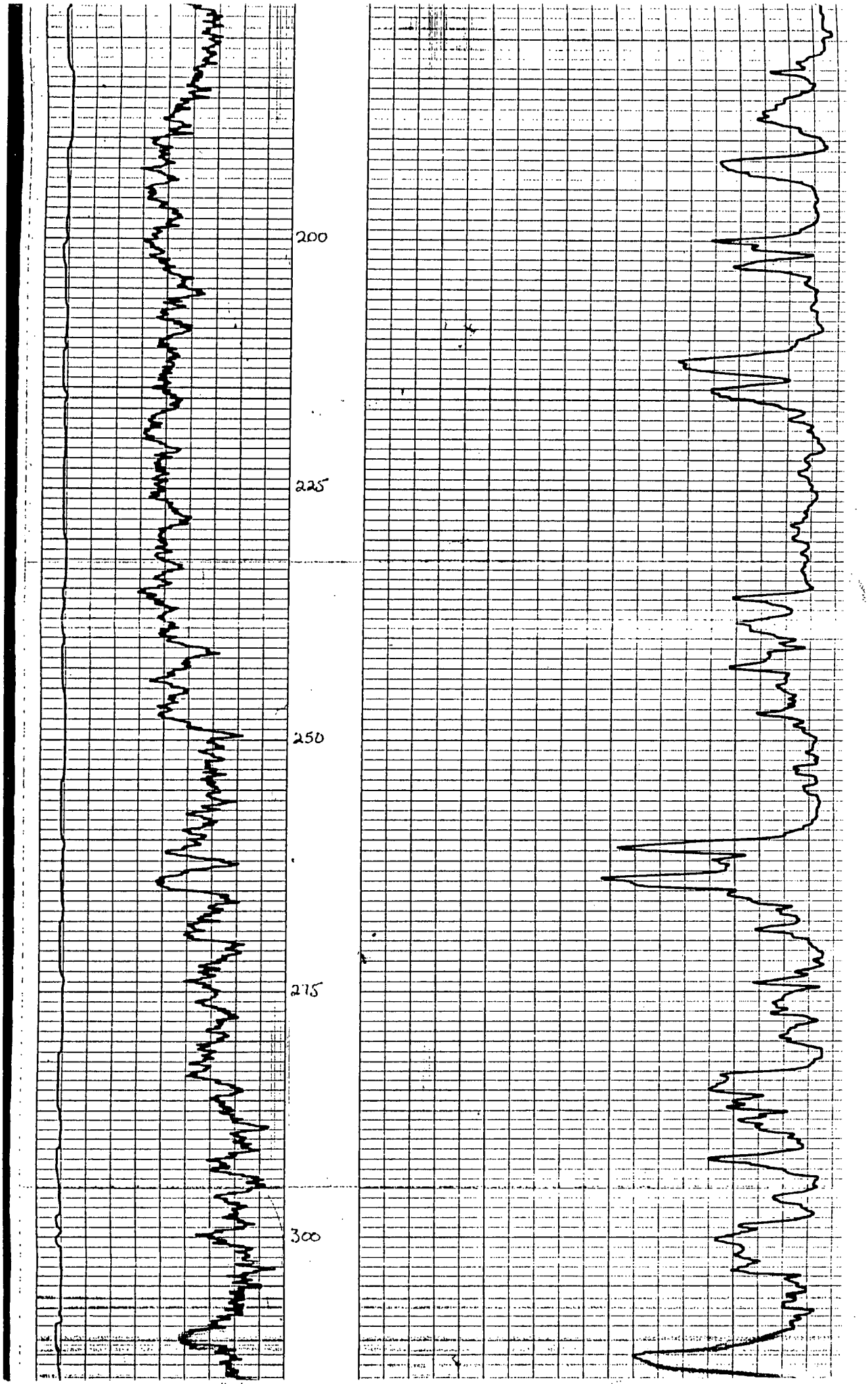
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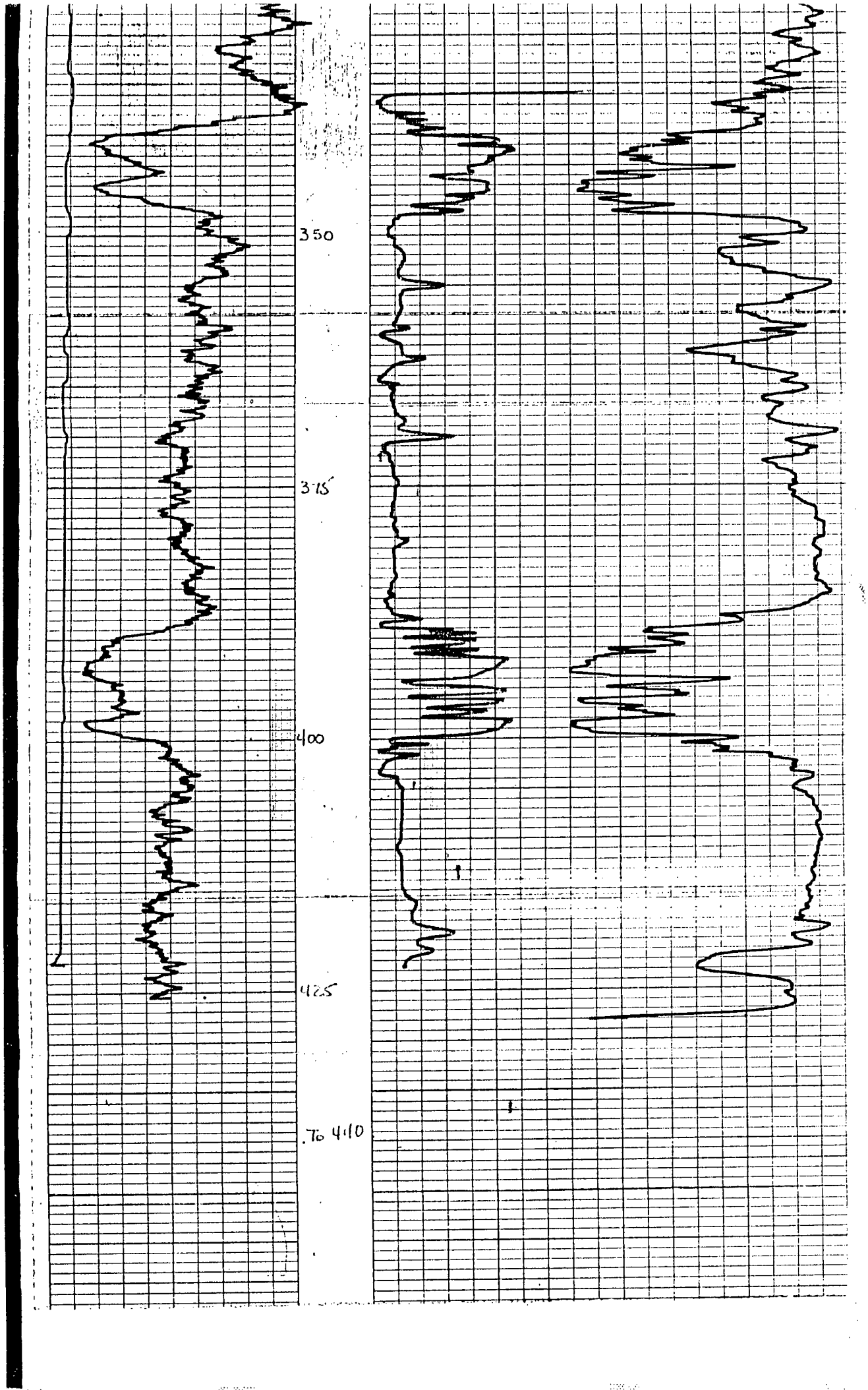
GENERAL				GAMMA RAY				DENSITY		
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	T.C. SEC.	SENS. SETTING	ZERO	API UNITS PER DIV.	T.C. SEC.	SENS. SETTINGS	ZERO
			12							
			7							

REMARKS:



75
100
125
150
175


200
225
250
275
300


350
375
400
425
To 440

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 22 1993

COMPANY _____

HOLE NO. 93-NP-12

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	7	Till	
7	157	SANDSTONE	
157	165	Soft and Broken Sandstone (Blind)	
165	186	Sandstone	
186	196	Coal	
196	237	Sandstone	
237	249	Coal	
249	300	Sandstone	

COMMENTS _____

TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE 93-NP-12

LOCATION SEC TP RGE W

AREA NORTH PLATEAU

PROVINCE O.M.C

SURVEYED DATA

ELEV. 1494.1

LOC. 54140 N

50068 E

RUN No.	1	2	3
DATE	22-APRIL-93		
DEPTH-DRILLER	300		
DEPTH-LOGGER	300		
FLUID LEVEL	232		
LOGGING TIME			
DRILLED BY	C. MOORE		
RECORDED BY	C. MOORE		
WITNESSED BY	R.J.R		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
6 5/8	0	20

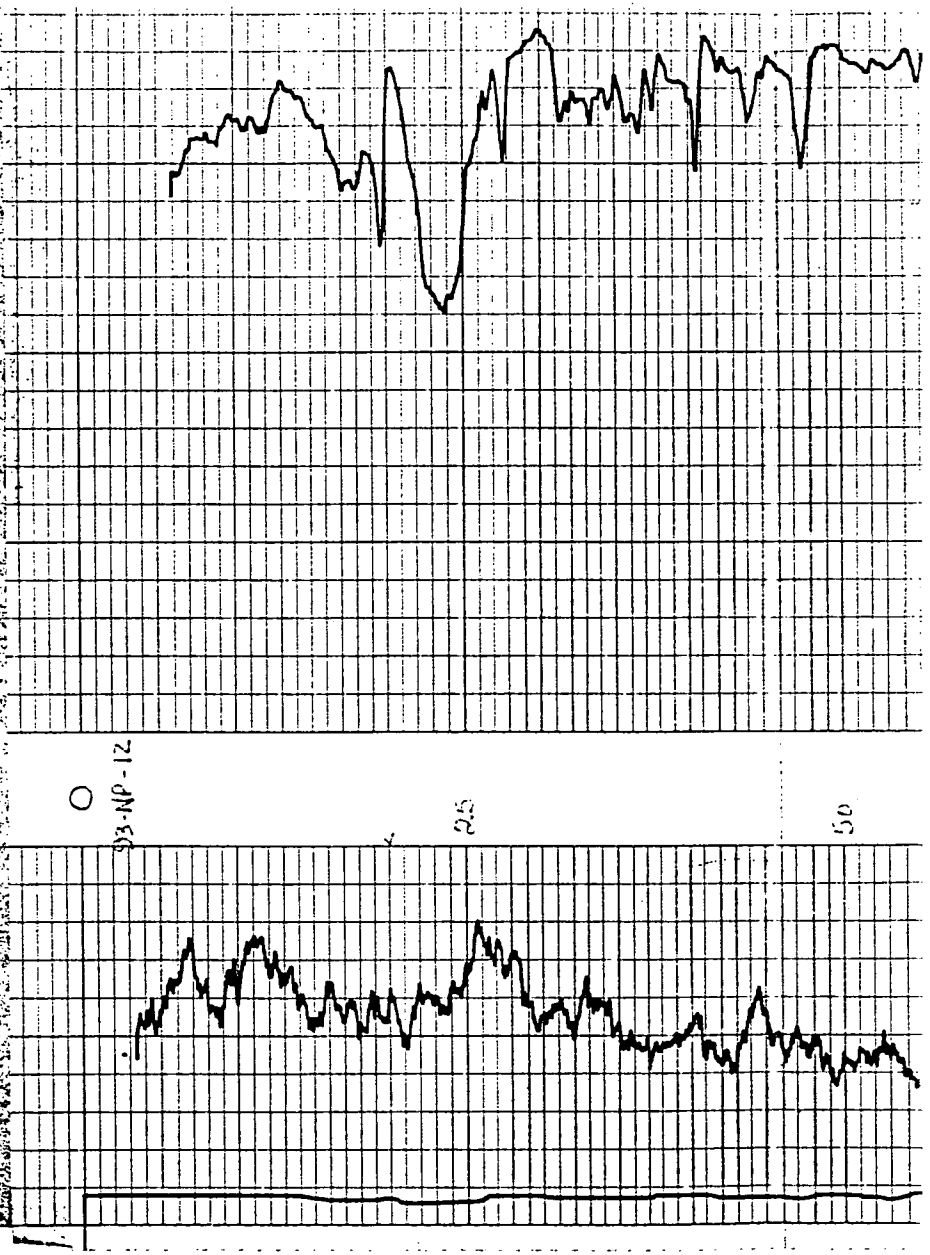
EQUIPMENT DATA

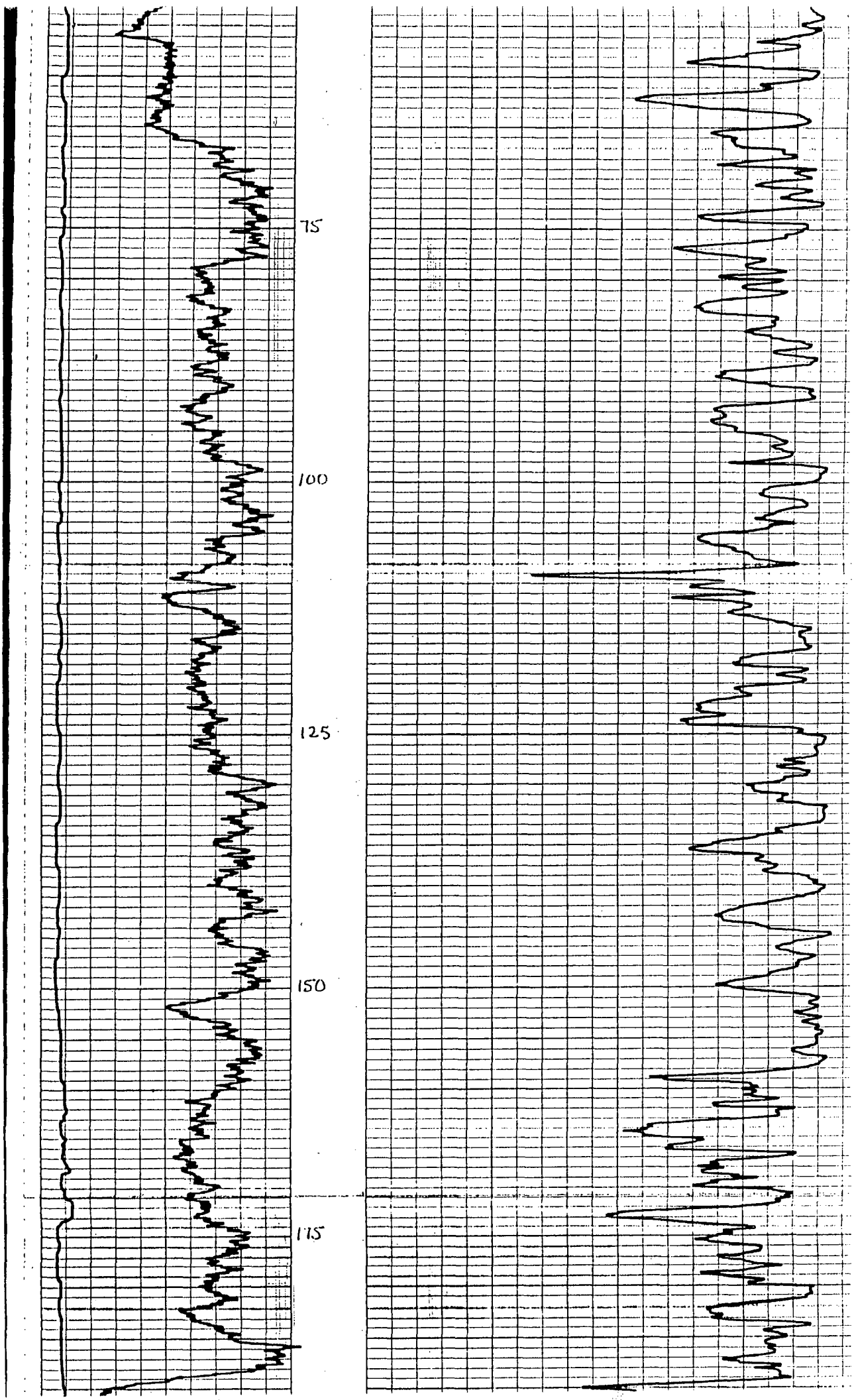
GAMMA RAY		RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	L-103	L-103	L-103	
DIAMETER	2 1/8"	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3'	LENGTH	1'		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

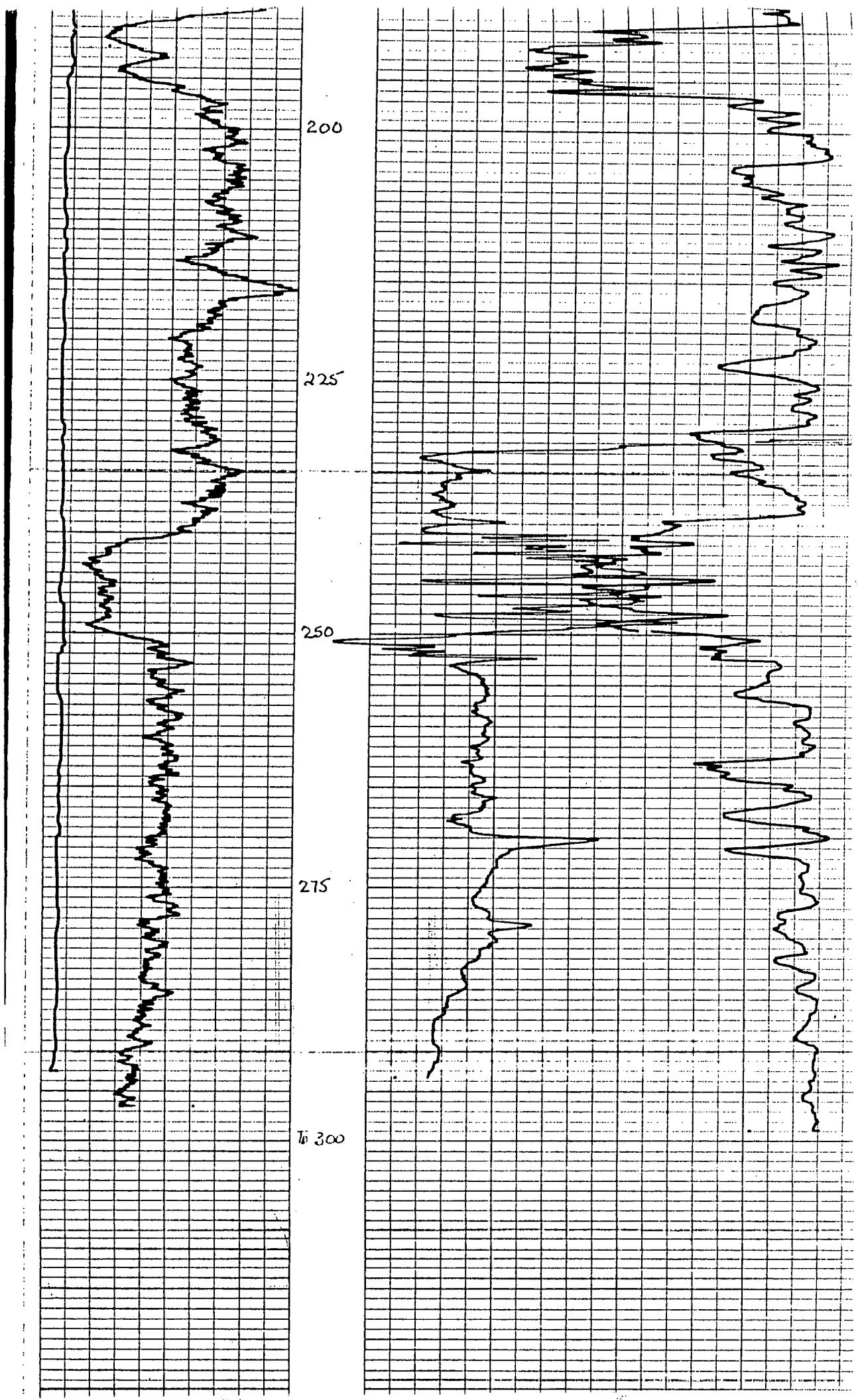
LOGGING DATA

GENERAL				GAMMA RAY				DENSITY		
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min	T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	T C SEC	SENS SETTINGS	ZERO
			12							

REMARKS:




75
100
125
150
175


200
225
250
275
To 300

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: _____ DATE: March 31 1993

COMPANY: _____

HOLE No.: 93 - NP - # 13

APPROX. LOCATION: _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION: 55005 N - 49 442 E

ELEVATION: 1506.3

DRILLER: Don Ofner

FROM	TO	LOG	REMARKS
0	8	Till	
8	210	Sandstone	Cavety at 113 about 6"
210	224	Mudstone with small partings of coal ? (Blind)	
224	241	Sandstone	
241	254	Coal	
254	296	Sandstone	
296	309	Coal	
309	420	Sandstone	

COMMENTS: _____

TESTING LTD. — GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE 93-NP-13

LOCATION ____ SEC ____ TP ____ RGE ____ W

AREA NORTH PLATEAU

PROVINCE O.M.C.

SURVEYED DATA

ELEV. 1506.3

LOC. 55005 N

49442 E

RUN No.	1	2	3
DATE	MARCH 31/93		
DEPTH-DRILLER	420'		
DEPTH-LOGGER	420'		
FLUID LEVEL	388'		
LOGGING TIME			
DRILLED BY	C. MOORE		
RECORDED BY	C. MOORE		
WITNESSED BY	R.J.R.		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
6 5/8	0	20

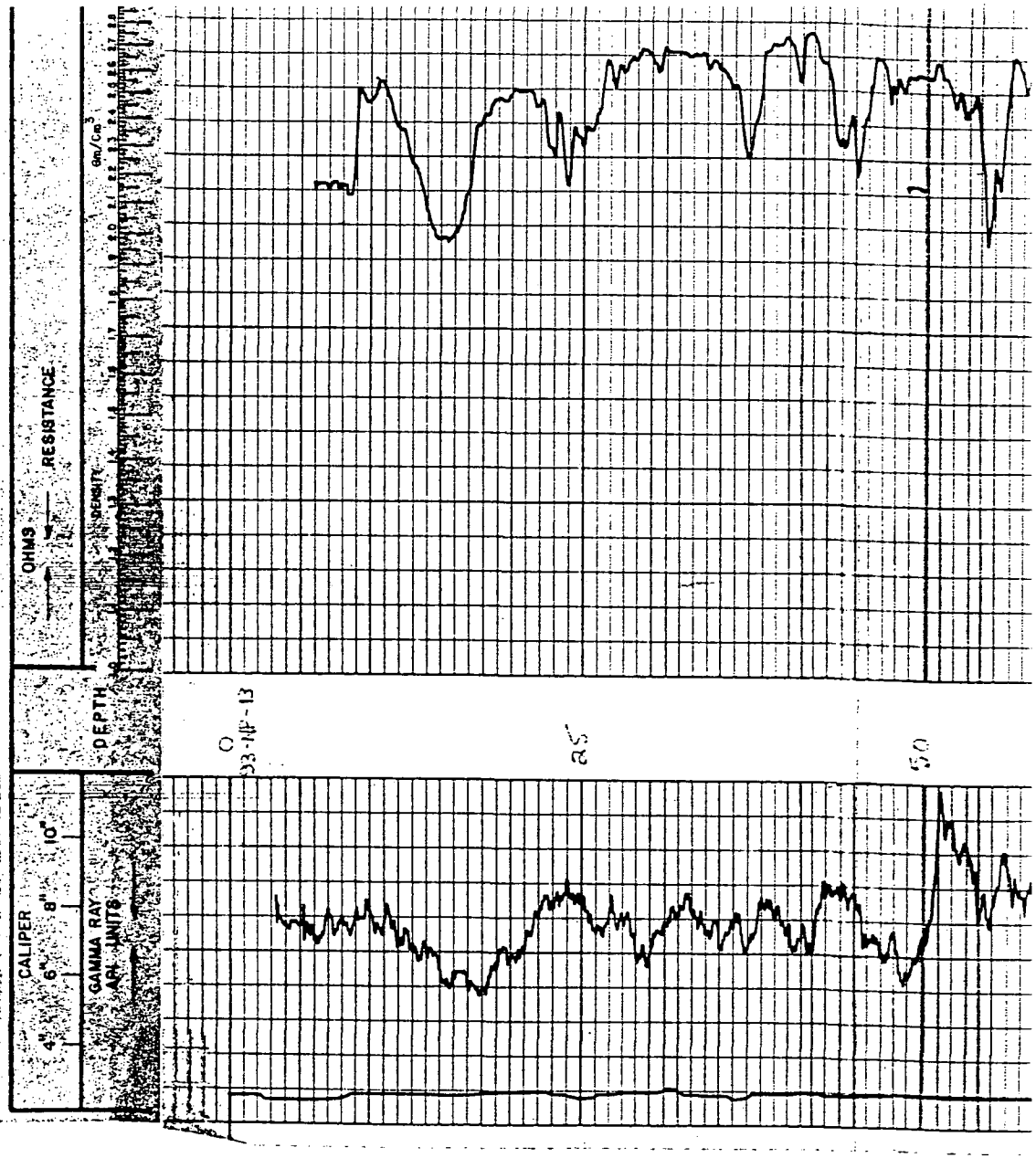
EQUIPMENT DATA

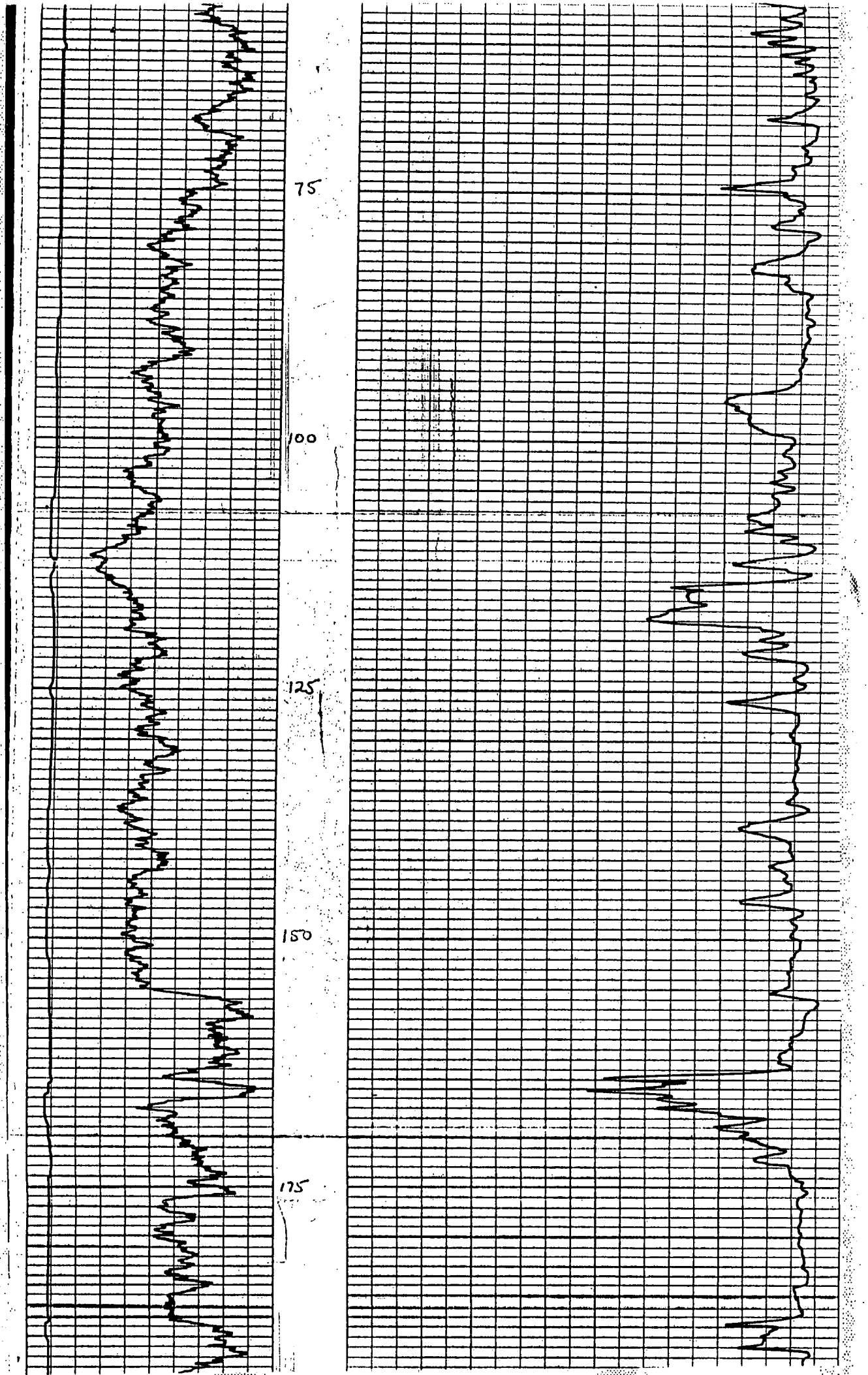
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH	1"		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC.	

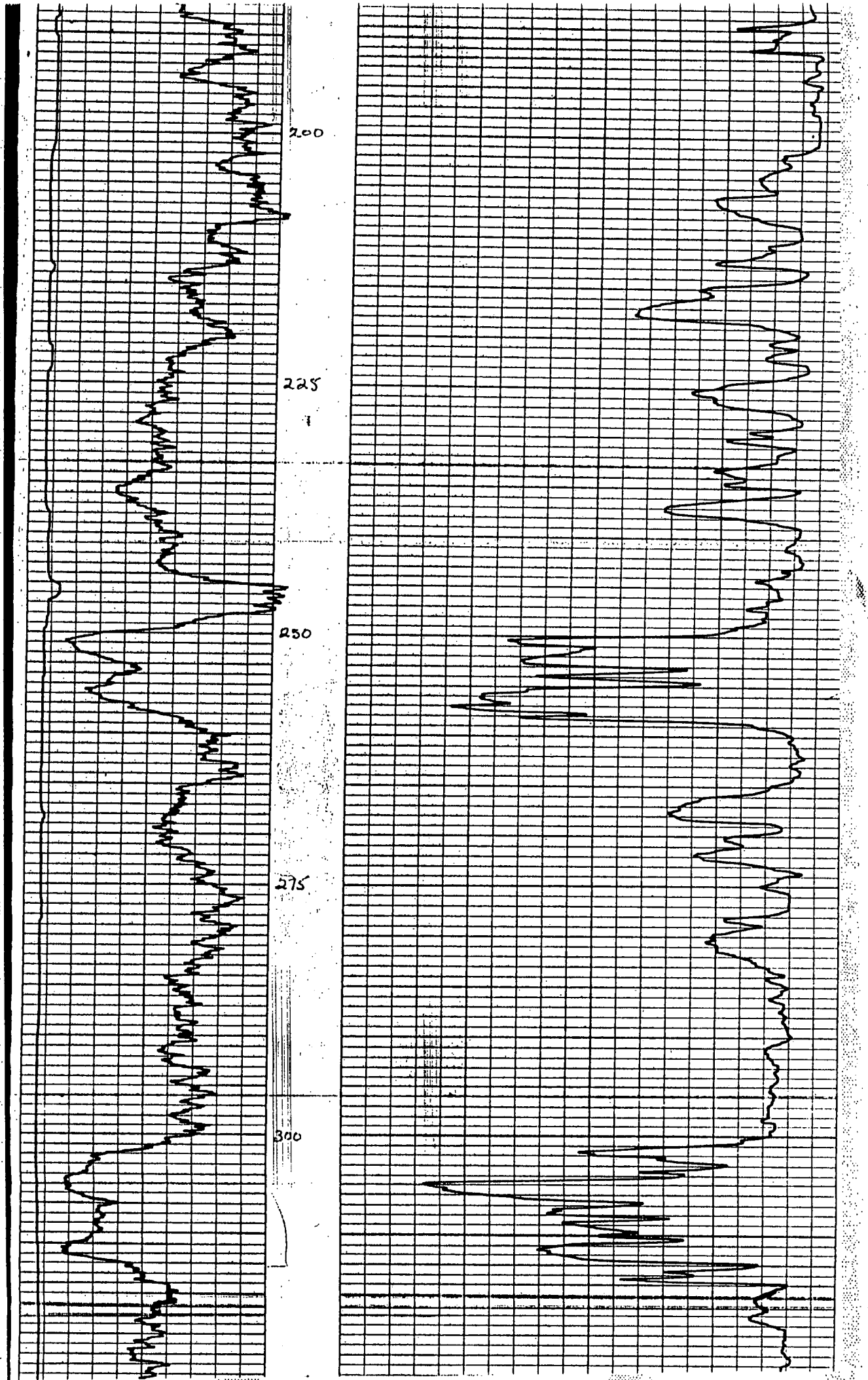
LOGGING DATA

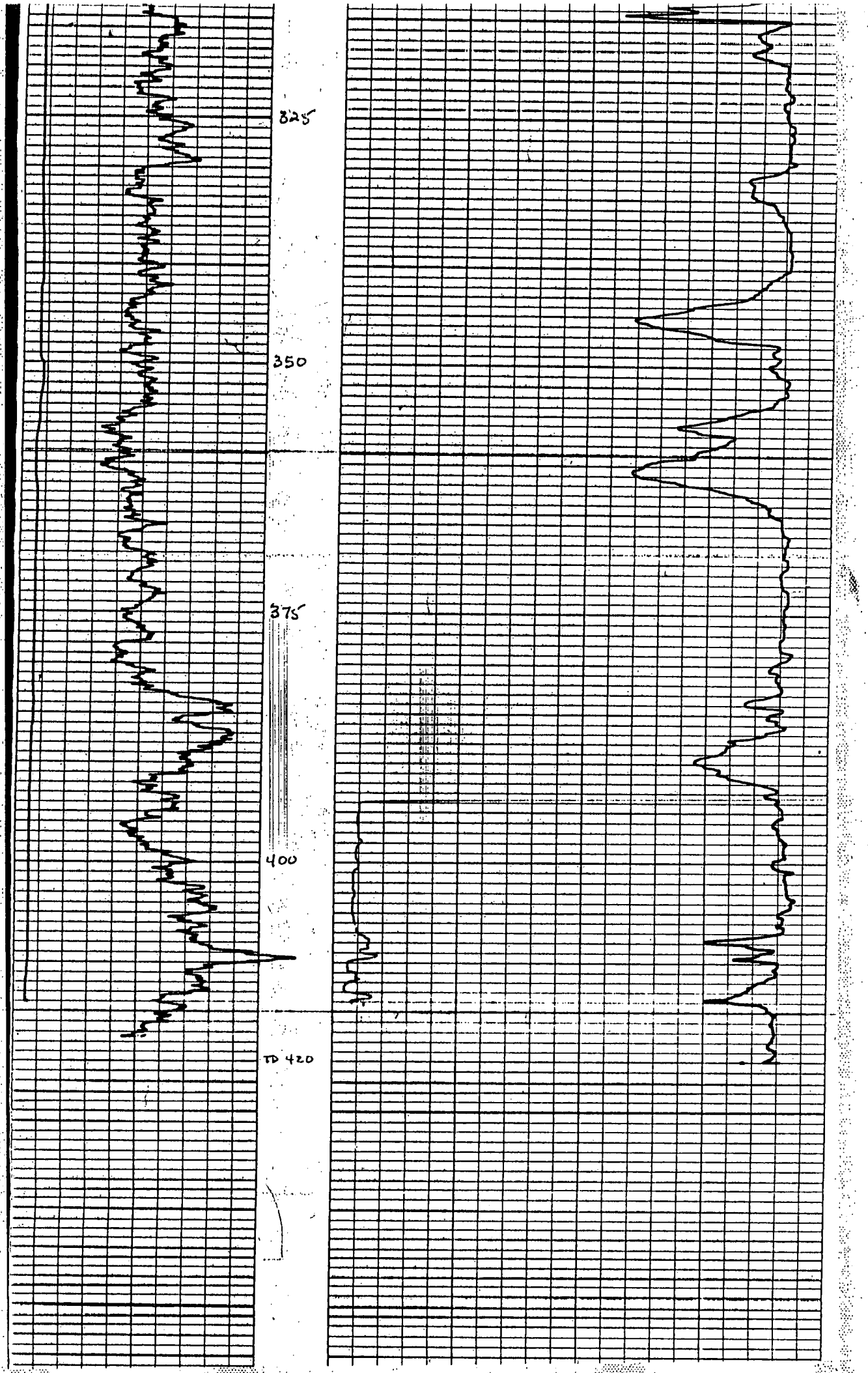
GENERAL				GAMMA RAY				DENSITY		
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	T C SEC	SENS SETTINGS	ZERO

REMARKS:




75
100
125
150
175


200
225
250
275
300


325
350
375
400
TD 420

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: _____ DATE: March 30 1993

COMPANY: _____

HOLE No.: ~~93-NP-#14~~ 93-NP-#14

APPROX. LOCATION: _____ SEC. ____ TWP. ____ RGE. ____ W. ____

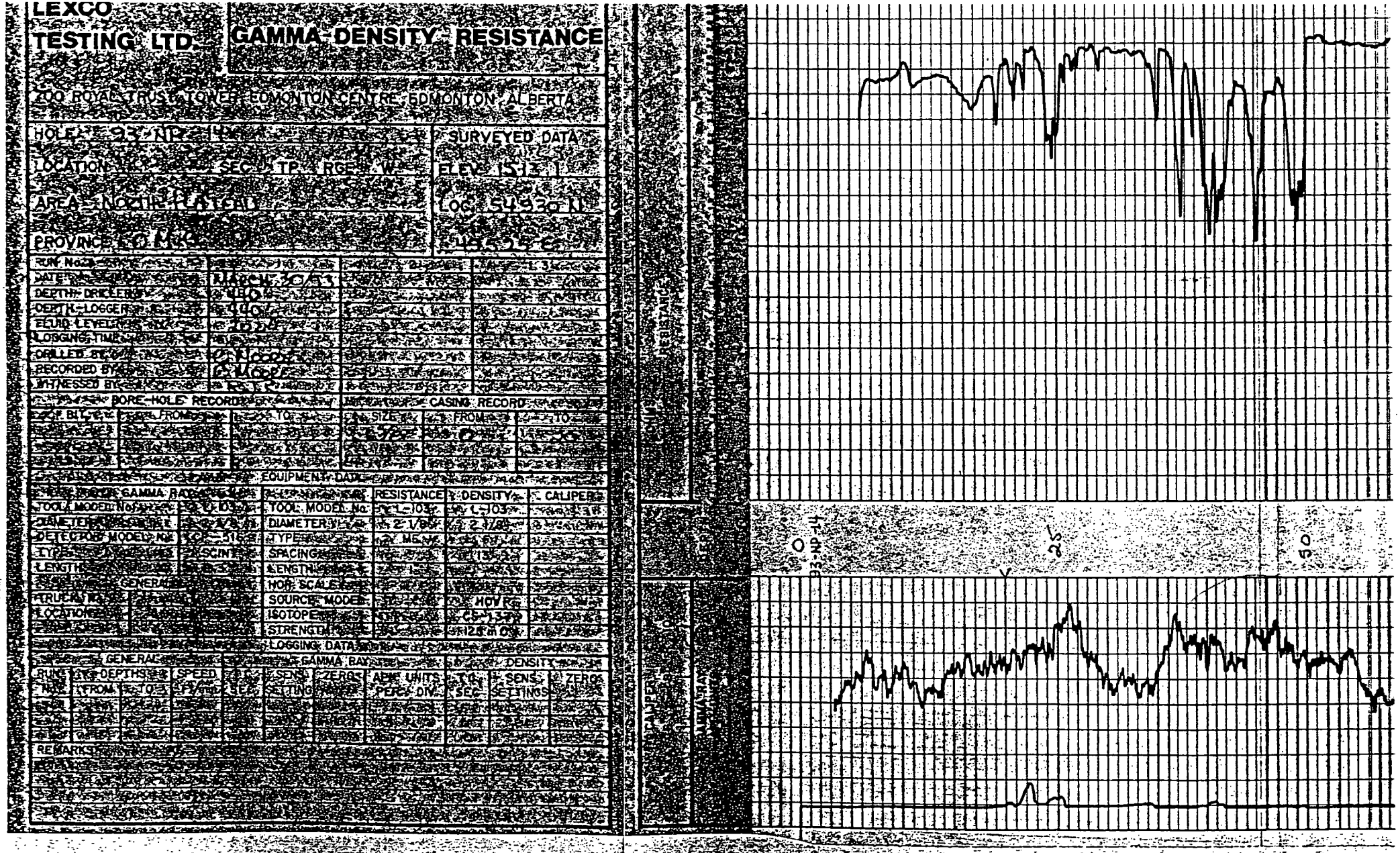
SURVEYED LOCATION: 5419.20N - 49525.E

ELEVATION: 1513.1

DRILLER: Don Ofwin

FROM	TO	LOG	REMARKS
0	6	Till	
6	78	Sandstone	
78	81	Coal	
81	188	Sandstone	
188	191	Coal	
191	272	Sandstone	
272	282	Coal	
282	324	Sandstone	
324	337	Coal	
337	427	Sandstone	
427	429	Coal	
429	440	Sandstone	

COMMENTS: _____



LEXCO

TESTING LTD.

GAMMA-DENSITY-RESISTANCE

400 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE 93-NP-

LOCATION SEC TP RGE W

AREA NORTH PEACE RIVER

PROVINCE ALBERTA

SURVEYED DATA

ELEV. 1513.1

LOC. 5493.0 N

1145.2 E

RUN No.	ONE
DATE	MARCH 30/83
DEPTH-DRILLER	480'
DEPTH-LOGGER	480'
FLUID LEVEL	DRY
LOGGING TIME	
DRILLED BY	C. WOODS
RECORDED BY	C. WOODS
WITNESSED BY	R. ?

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
5 1/2"	0	480'

EQUIPMENT DATA

	GAMMA RAY	RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	GR-103	RL-103	DL-103	
DIAMETER	2 1/8"	2 1/8"	2 1/8"	
DETECTOR MODEL No.	TCP-315	TYPE	MEM	
TYPE	SCINT	SPACING	16"	
LENGTH		LENGTH	13.5'	
GENERAL		HOR. SCALE		
TRUCK No.		SOURCE MODEL	HOVR	
LOCATION		ISOTOPE	CS-137	
		STRENGTH	125 mCi	

LOGGING DATA

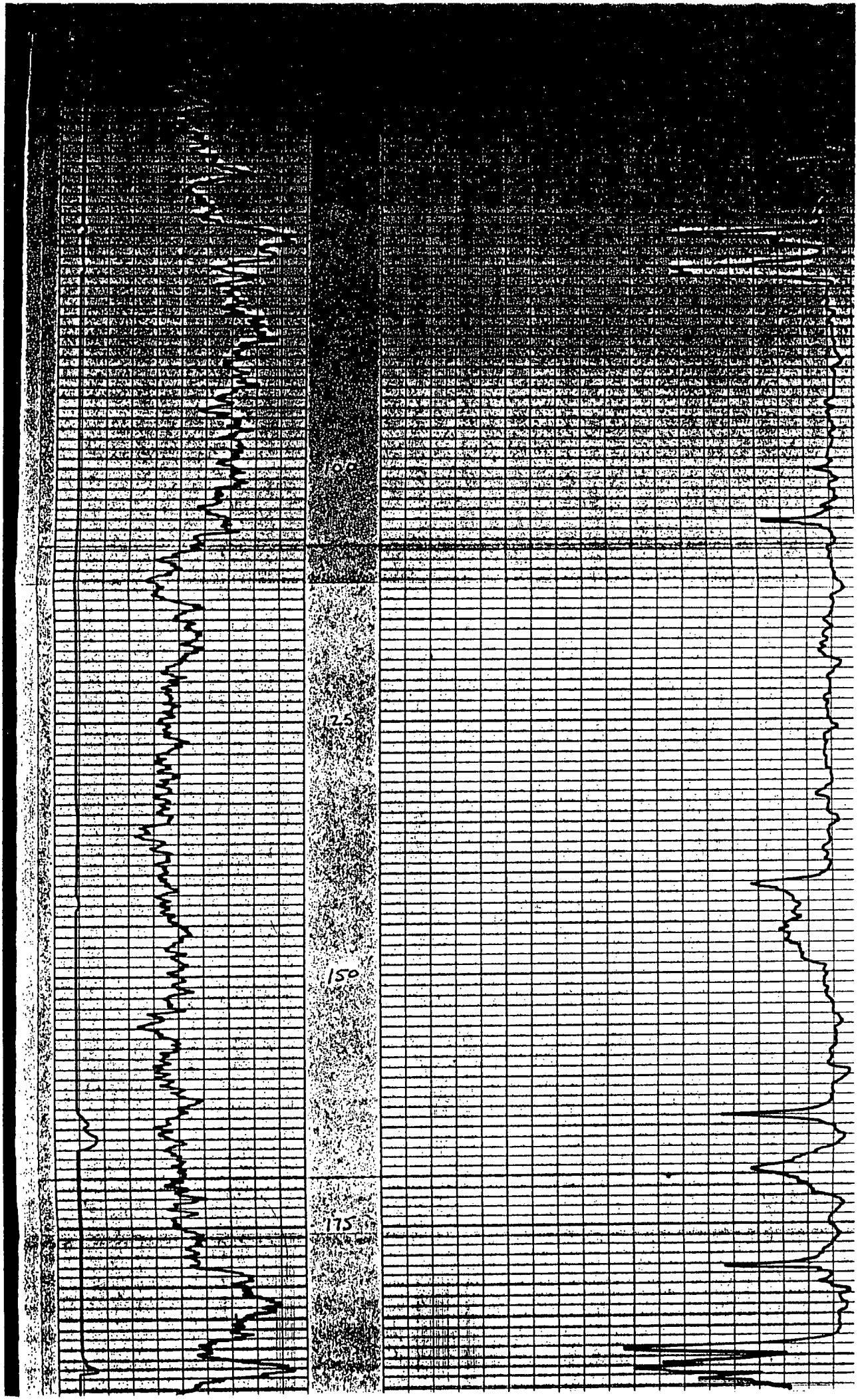
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED FT/MIN	GAMMA RAY SENS. SETTING	GAMMA RAY ZEROS	GAMMA RAY API UNITS PER DIV.	DENSITY T.C. SEC.	DENSITY SENS. SETTINGS	DENSITY ZEROS
ONE	480'	0	30	10	10	10	1	10	10

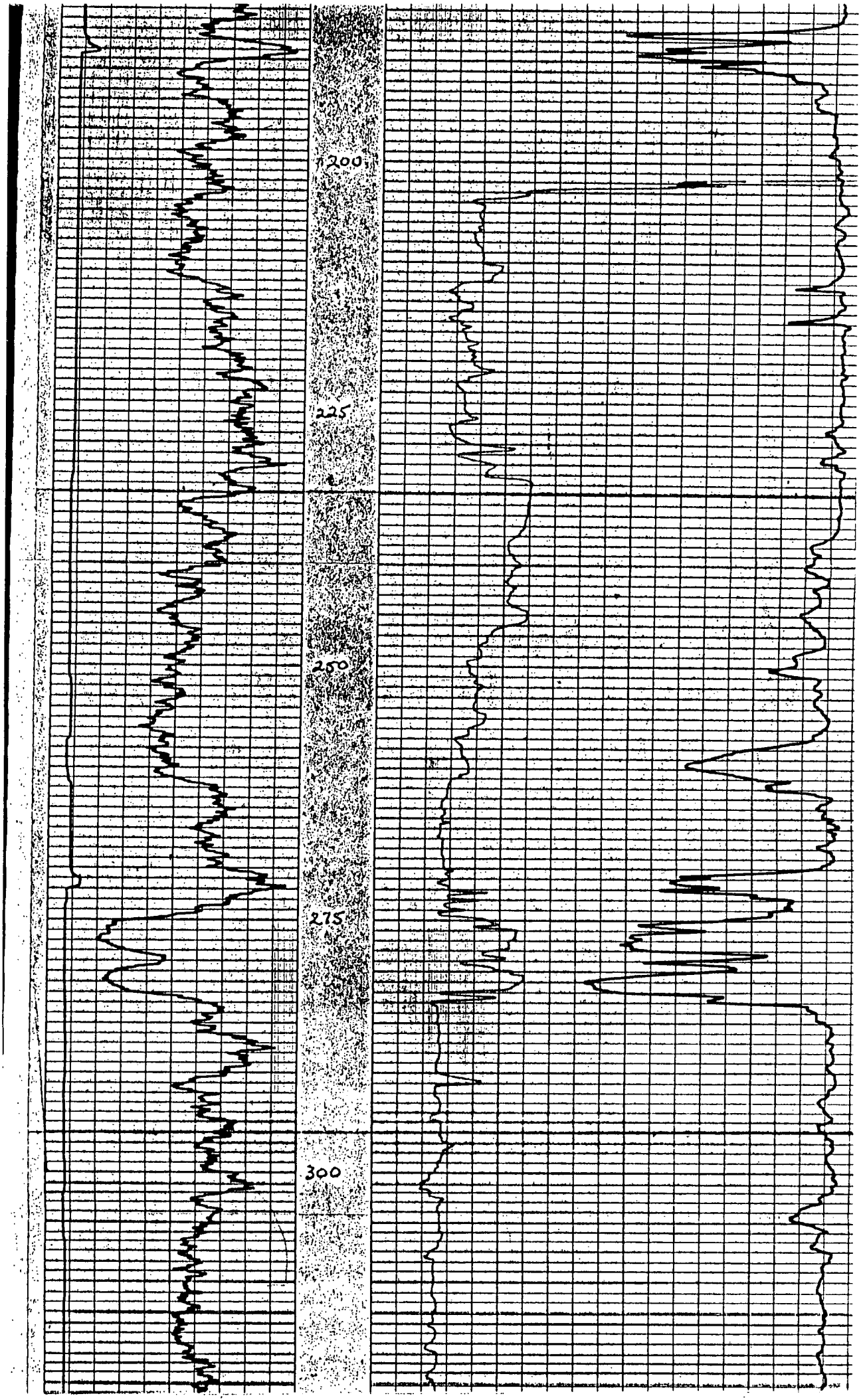
REMARKS

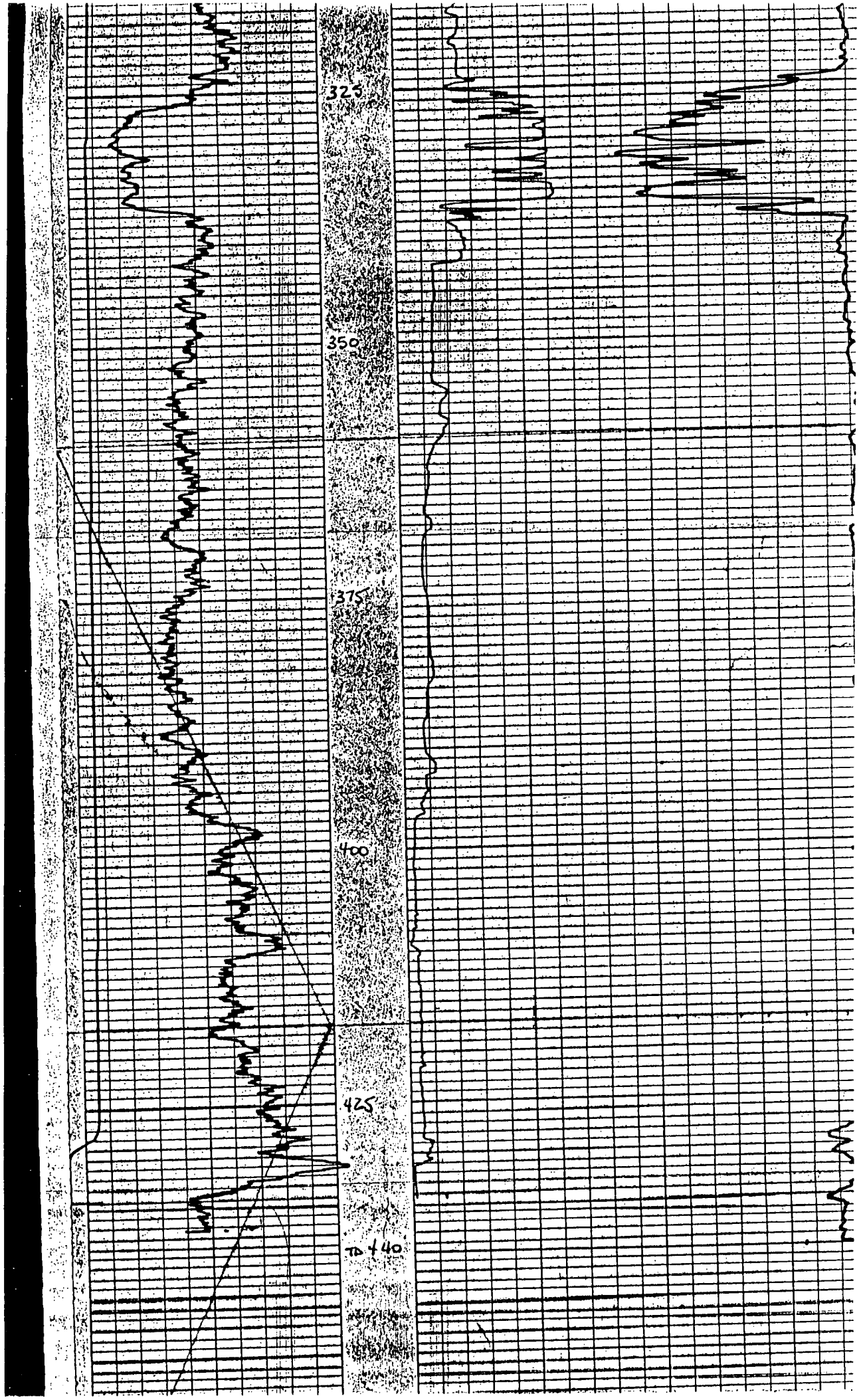
RESISTANCE

CALIPER

0 BKPT 35 50


100
125
150
175


200
225
250
275
300


325
350
375
400
425
TD 440

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE APRIL 5, 1993

COMPANY _____

HOLE NO. 93 - N P - 15

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 54850 N - 40630 E

ELEVATION 1517.6

DRILLER DON OFNER

FROM	TO	LOG	REMARKS
0	3	CARBONATED SHALE	
3	101	SANDSTONE	
101	104	MUDSTONE & TRACE OF COAL	
104	264	SANDSTONE	
264	211	Coal ?	
211	259	Sandstone	
259	273	Coal	
273	339	Sandstone	? - (Blind)
339	351	Coal	
351	420	Sandstone	

COMMENTS _____

TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE 93-NP-15

LOCATION SEC TP RGE W

AREA NORTH PLATEAU

PROVINCE O.M.C

SURVEYED DATA

ELEV. 1517.6

LOC. 54850 N

49630 E

RUN No.	1	2	3
DATE	April 5/93		
DEPTH-DRILLER	420'		
DEPTH-LOGGER	420'		
FLUID LEVEL	270'		
LOGGING TIME			
DRILLED BY	C. Moore		
RECORDED BY	C. Moore		
WITNESSED BY	RJR		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
5½	0	20

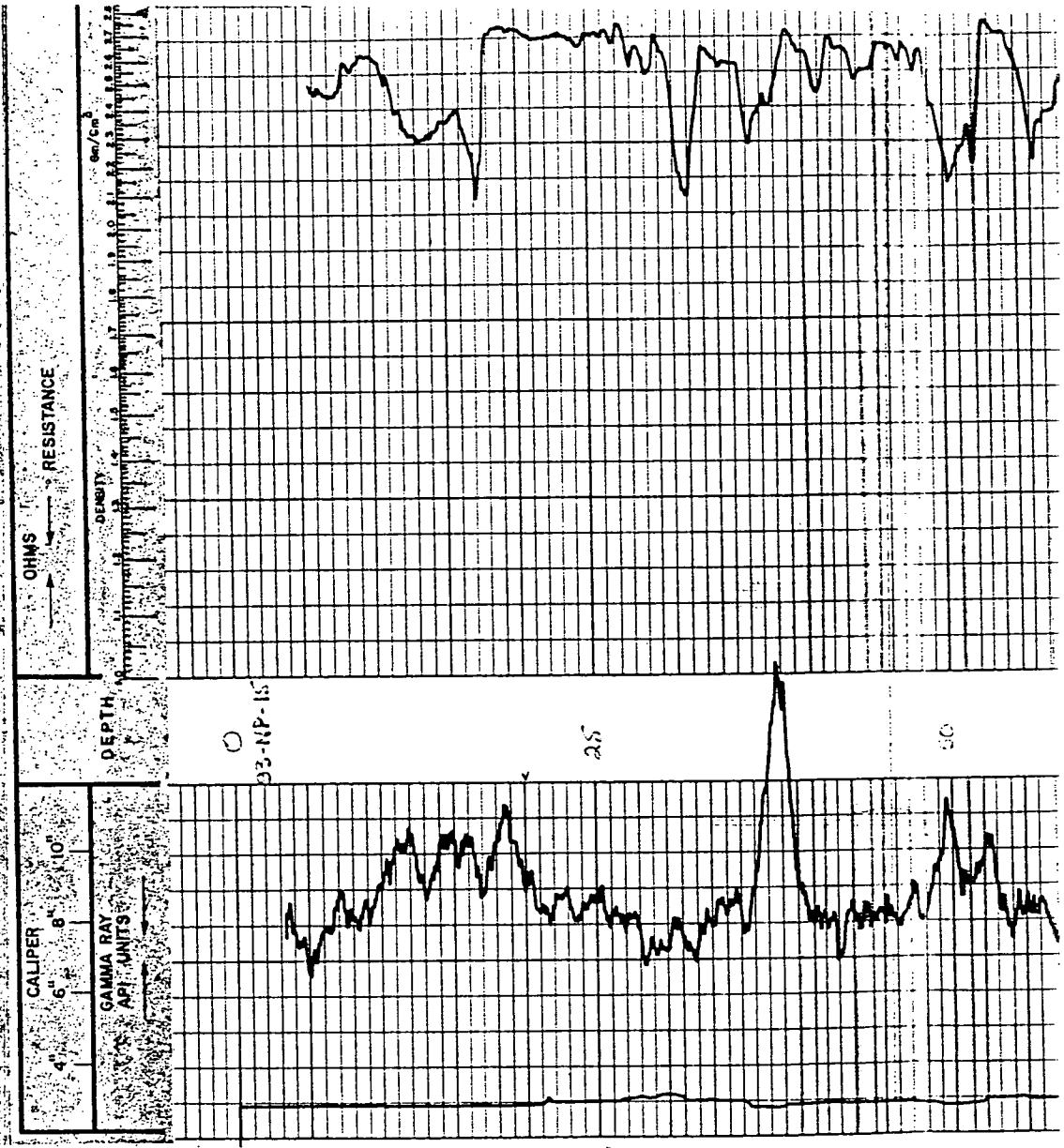
EQUIPMENT DATA

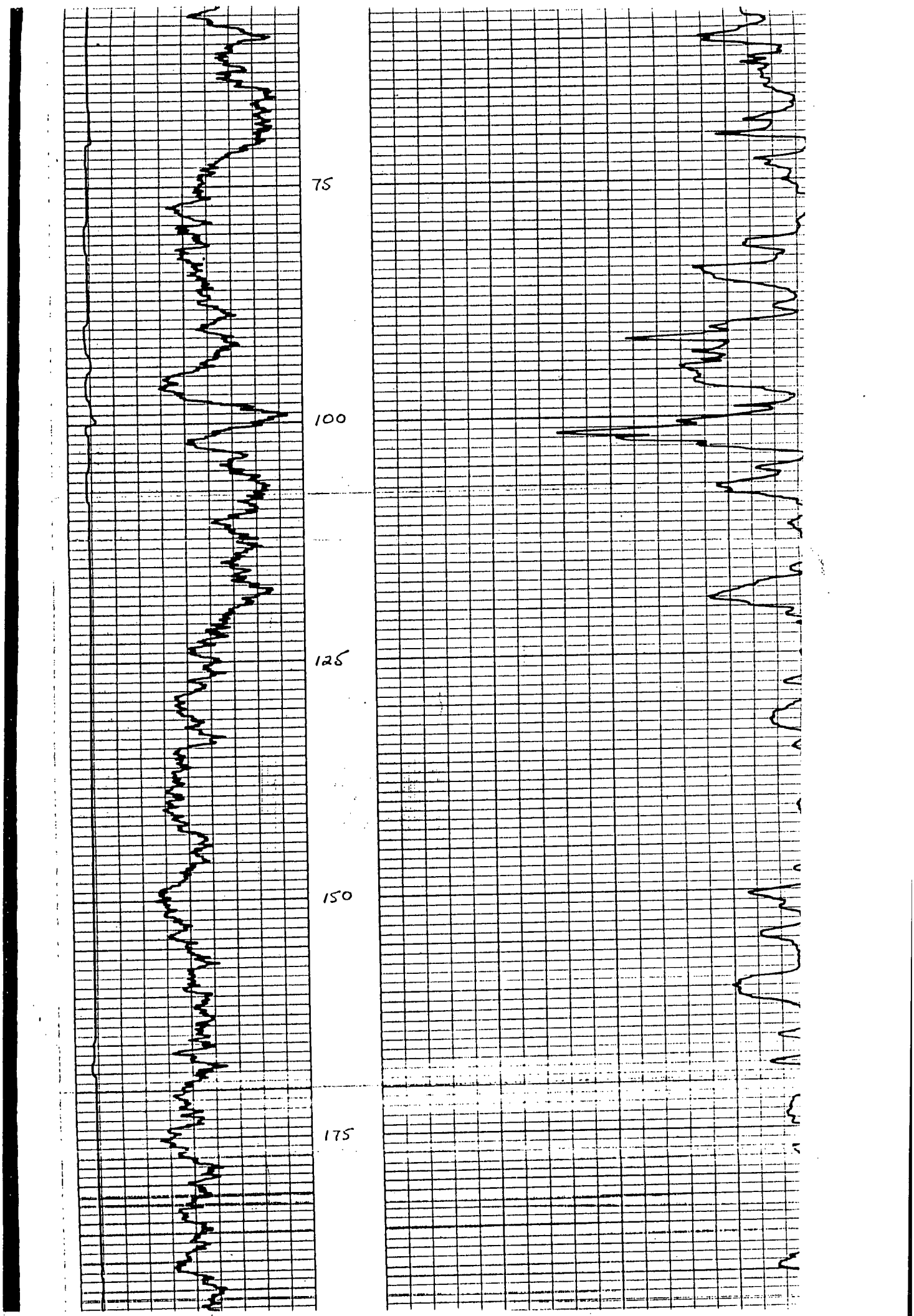
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3'	LENGTH	1"		
GENERAL		HOR. SCALE		HOVP	
TRUCK No.		SOURCE MODEL		CS-137	
LOCATION		ISOTOPE		125 mC	
		STRENGTH			

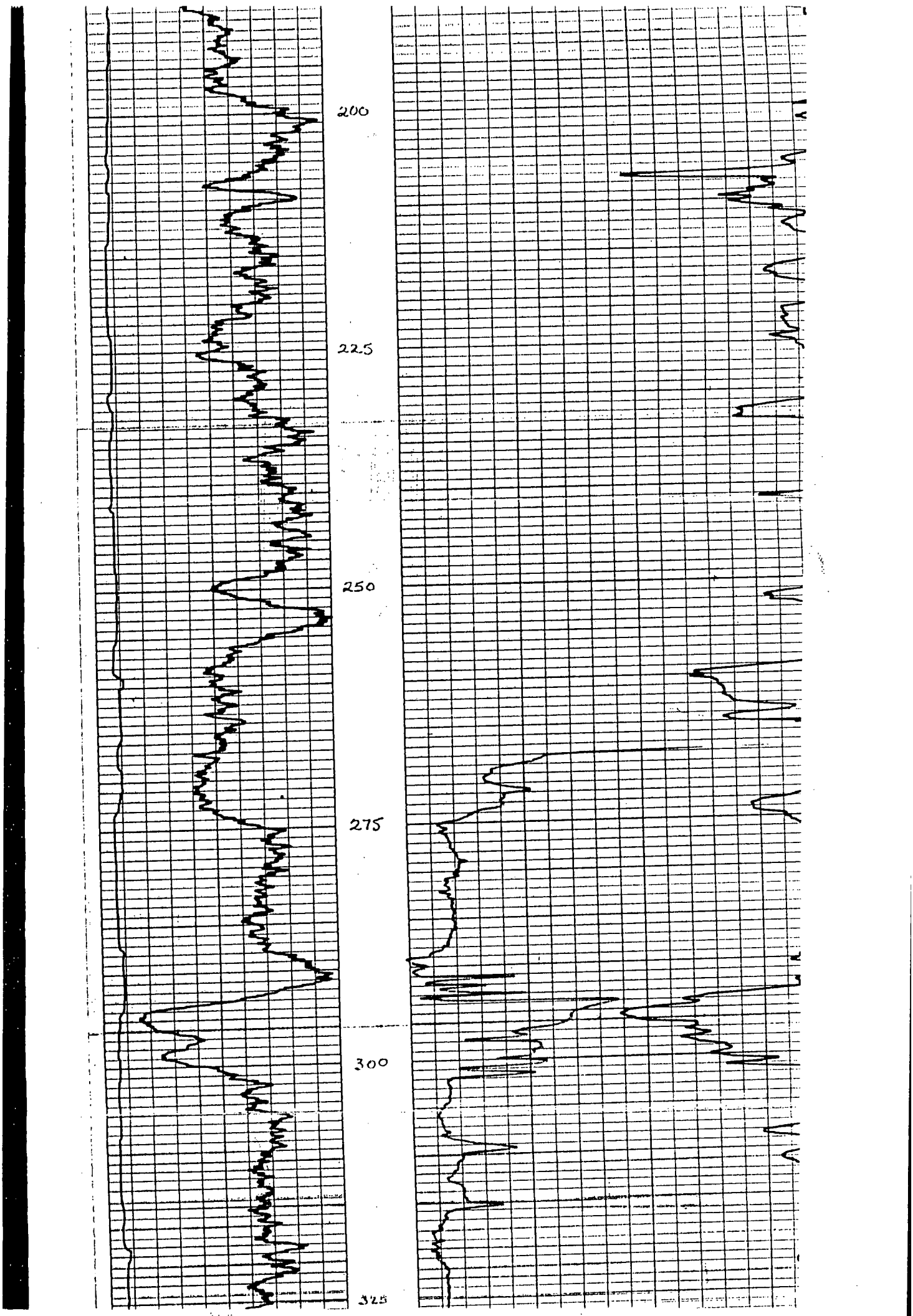
LOGGING DATA

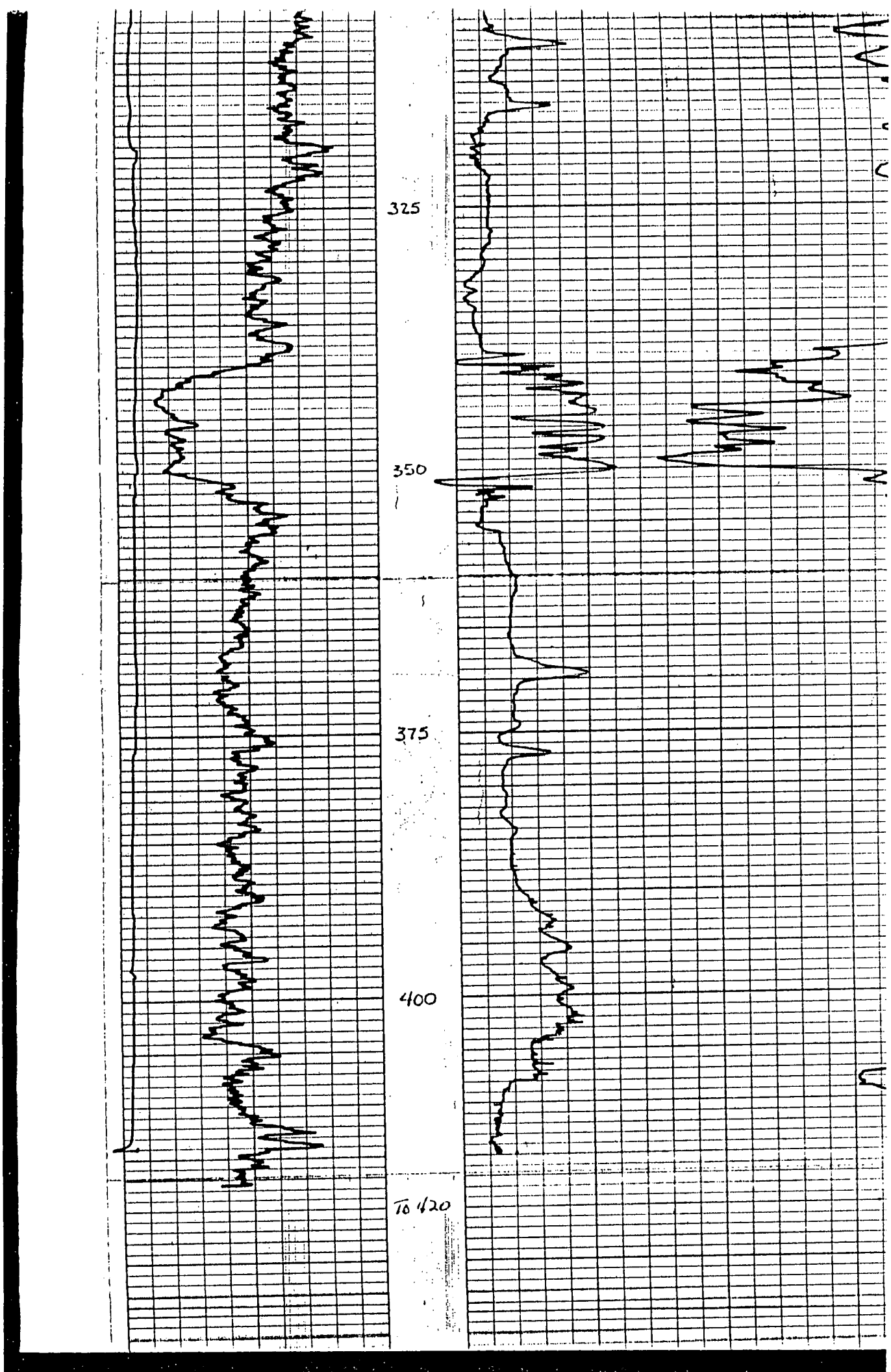
GENERAL				GAMMA RAY				DENSITY		
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min	T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	T C SEC	SENS SETTINGS	ZERO
			12							

REMARKS




75
100
125
150
175


200
225
250
275
300
325


325
350
375
400
To 420

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-16c
PAGE 5 OF 5

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	SAMPLE INTERVAL
	DRILLED			RECOVERED			
	FROM	TO	TOT.	SEC	TOT.		
				0.1		Coal bright lustrous to crushed milled, some coal loss	
				2.6		Siltst. fine massive med hard to hard.	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-16c
PAGE 4 OF 5

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	SAMPLE INTERVAL
	DRILLED			RECOVERED			
	FROM	TO	TOT.	SEC	TOT.		
				0.3		Coal, powder, crushed by drill, hard to identify	
				0.5		Bentonitic Mudstone, light cream to brown, soft wet.	
	266	274	8.0	0.95	7.05	Mudstone, grey, blocky, med soft, irregular lower contact	
				0.7		Coal bright blocky to banded some ankerite lined, clean looking	266.95 267.95
				0.3		Coal dirty dull black, cement and clay bands, friable	#5
				1.2		Mudstone bentonitic, light grey massive, soft	
				0.3		Mudstone, brown, soft wet massive	
				0.3		Coal, bright and dull banded med hard	269.45 270.45
				0.15		Mudstone bentonitic, soft wet massive	#6
				0.2		Dirty coal dull black med hard massive, occ ankerite band	
				0.25		Carb. Mudstone, dark brown, v.fd hard, moist	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OMED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-16c
PAGE 3 OF 5

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	SAMPLE INTERVAL
	DRILLED			RECOVERED			
	FROM	TO	TOT.	SEC	TOT.		
						bit to crushed, lost core in this unit.	
				0.5		Mudstone dark grey, moist soft moist	
	160	169	9.0	1.25		Siltstone grey, fissile, weakly bedded	
						Mudstone dark grey soft moist, coaly bands cream colour, carbonaceous	163.65
				0.35		Coal bright & dull banded some pyrite stain. shaley bottom	164.0 #3
				2.2		Mudstone grey soft moist massive with clay	
				0.25		Coal bright & dull bands, abundant pyrite streaks and bands, small clay bands	166.2 167.35 #4
				0.25		Mudstone light grey, massive med soft	
				0.25		Coal bright, blocky to crushed	
				0.1		Bentonite? Mudstone, brown soft wet	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-16c
PAGE 2 OF 3

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	SAMPLE INTERVAL
	DRILLED			RECOVERED		LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	
	FROM	TO	TOT.	SEC	TOT.		
	57	66	9.0	4.8	3.7	Siltstone, grey, sandy & carb. bands, carb. streaks	
				2.2		Sandstone, grey, fine to medium grained some water staining	
				0.95		Coal, dirty, soft, small clay band at 0.6", water stained	64-64.95 #2
				2.75		Mudstone, grey, massive, soft, broken, wet	
	66	71	5.0	0.1	3.95	Mudstone, as above	
				0.2		Coal, bright, broken, dirty 0.2" Sandstone	
				2.1		Bentonitic Mudstone, light brown, soft, moist.	
				0.9		Mudstone, grey, massive, soft, wet	66.7-68.55
				0.35		Coal, dirty, dull & shiny banded very high in sulphur bands thin coal.	
				0.9		Mudstone, light to dark grey, massive, soft.	
				0.6		Carby Mudstone, dull black soft, massive	
				0.2		Coal, bright & dull banded	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-16c
PAGE 1 OF 5

CORE #	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC	TOT.	GEOLOGICAL DESCRIPTION LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	SAMPLE INTERVAL
	49	57	8.0	1.6	7.0	Sandstone brown med hard banded coarse to fine grained carb streaks sharp base contact	
				0.45		Coal bright blocky med hard	50.6
						low ang fracturing, small	51.6
						clay band at Top. Liquid	#1
				0.1		Bentonitic Mudstone green massive	
						wet, moist sharp contact	
						wavy	
				0.45		Coal bright blocky to dull,	
						upper contact dirty	
				0.45		Siltstone carb dull black to	
						dark brown coaly zones.	51.6
						silt wet	52.65
				0.1		Mudstone, bentonitic, green	
						massive, moist, soft	
				0.1		Carb. Mudstone, dull black	
						silt wet	
				0.15		Mudstone green to brown, massive	
						silt wet	
				0.25		Carb. Mudstone, dull black, coarse	
						carb trash in top	
				3.35		Sandstone grey fine grained, massive	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

L FIELD _____ DATE Aptil 16 1993

COMPANY _____

HOLE NO. 93 - 14P - # 16

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 54690 N - 49783 E

ELEVATION 1538.0

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	13	Till	
13	15	Soft Sandstone	
15	70	Sandstone Grax	
70	74	Mudstone	
74	347	Sandstone	
347	358	Coal	
358	398	Sandstone	
398	410	Coal	
410	460	Sandstone	

COMMENTS _____

TESTING LTD. | **GAMMA-DENSITY-RESISTANCE**

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-16

LOCATION _____ SEC _____ TP _____ RGE _____ W _____

AREA NORTH PLATEAU

PROVINCE _____

SURVEYED DATA

ELEV. 1538.0

LOC. 54690 N

49783 E

RUN No.	1	2	3
DATE	APRIL 16/93		
DEPTH-DRILLER	460		
DEPTH-LOGGER	460		
FLUID LEVEL	315		
LOGGING TIME			
DRILLED BY	C. MOORE		
RECORDED BY	C. MOORE		
WITNESSED BY	R.J.R		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
6 5/8	0	20

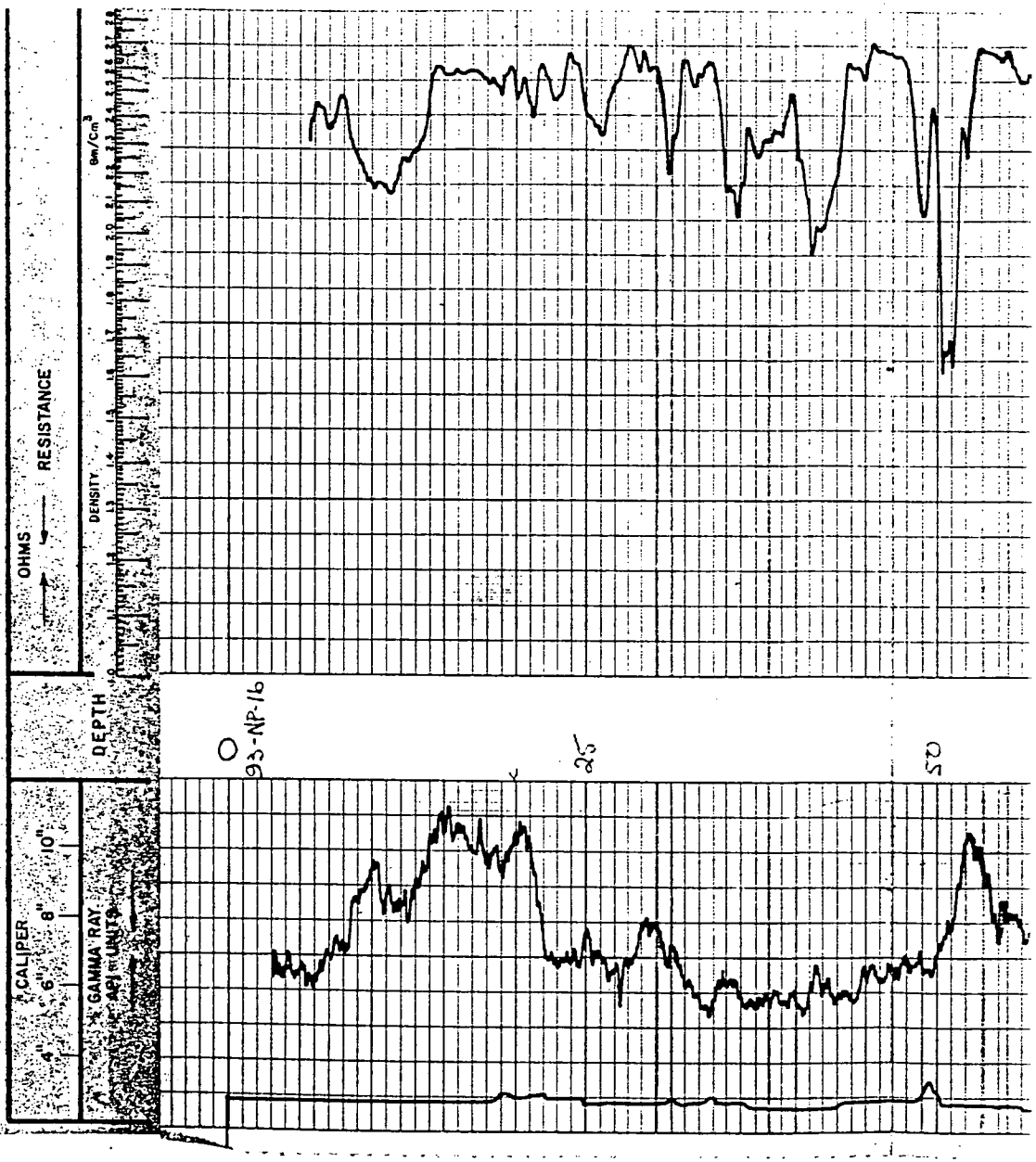
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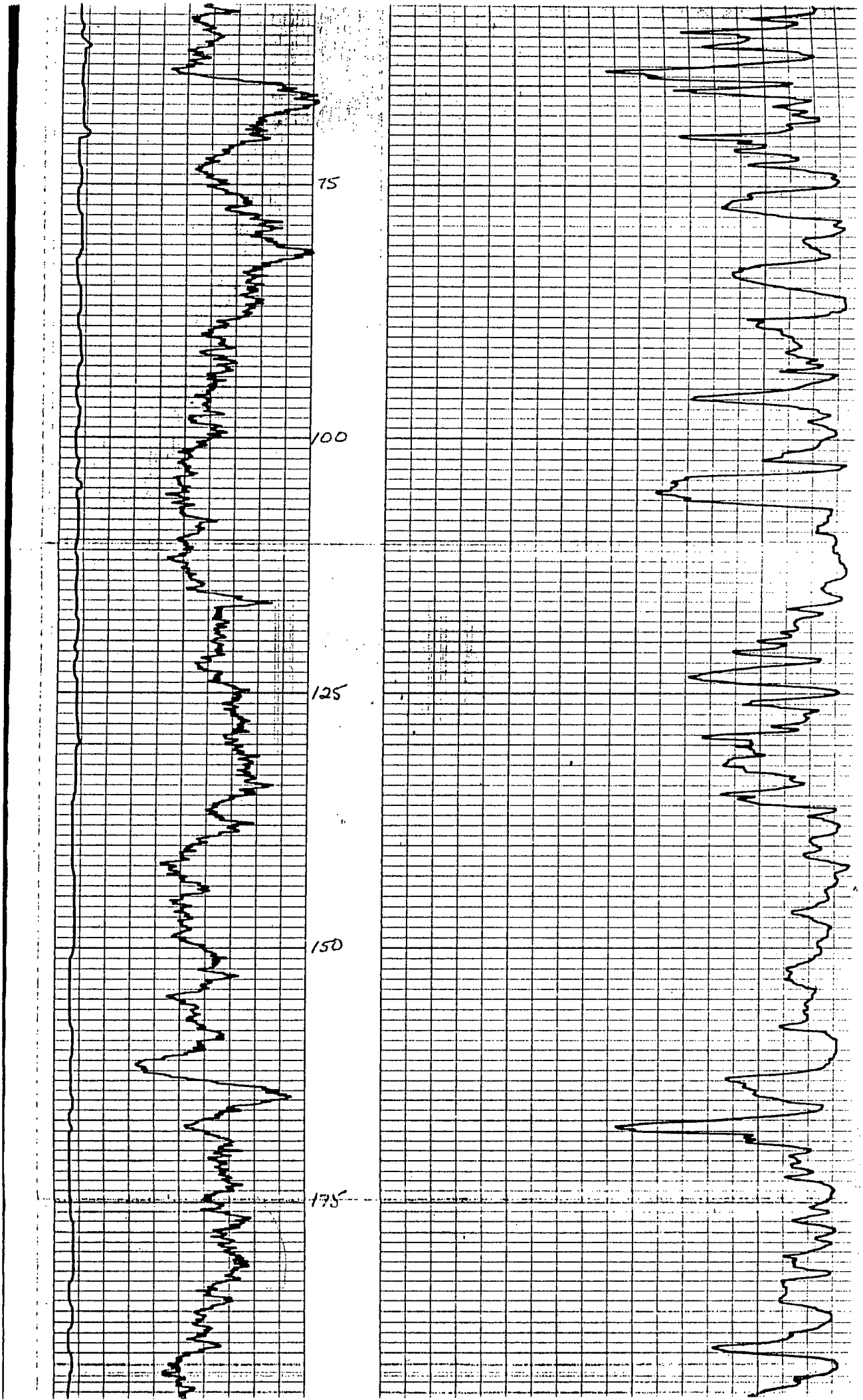
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH	1"		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

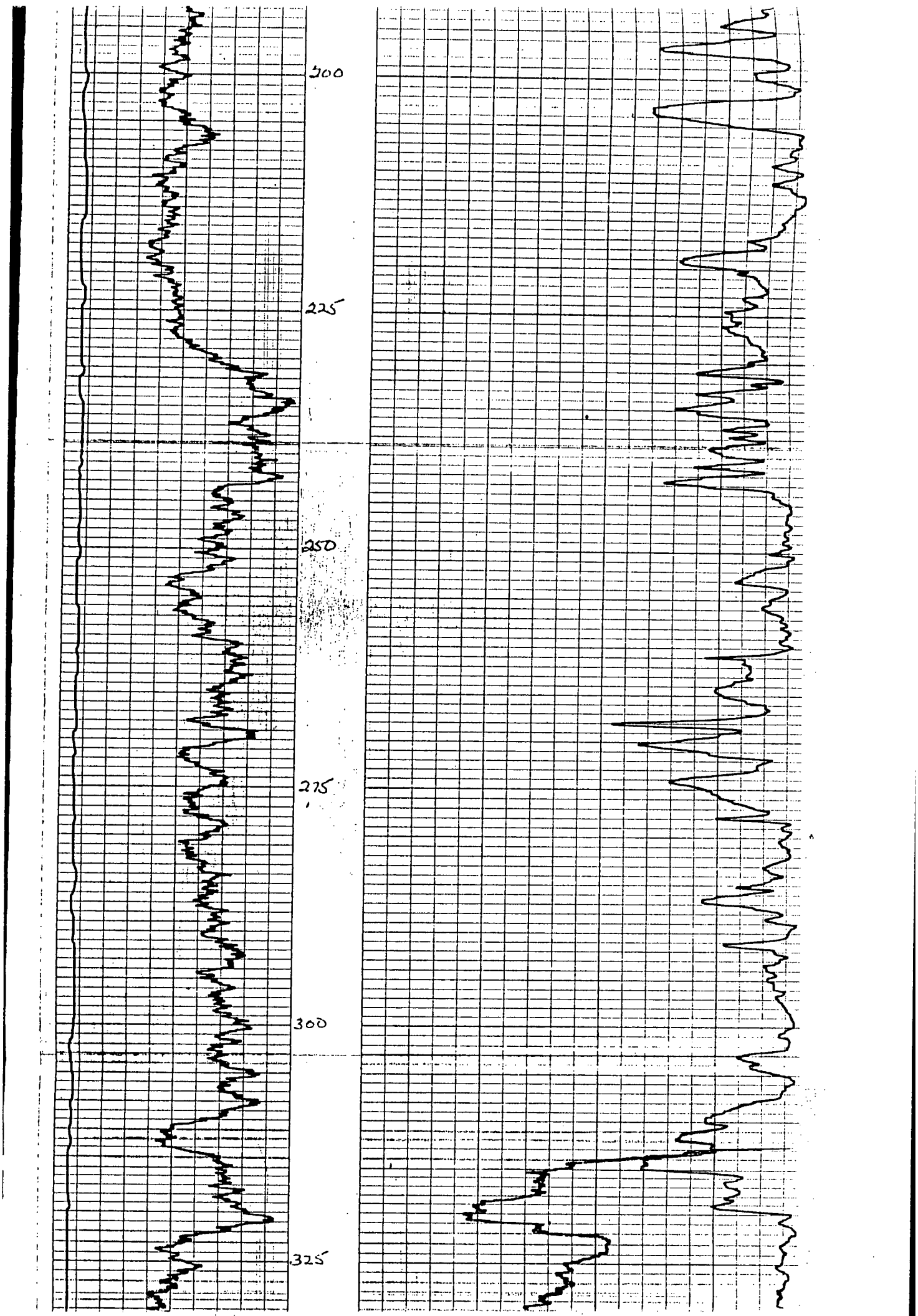
LOGGING DATA

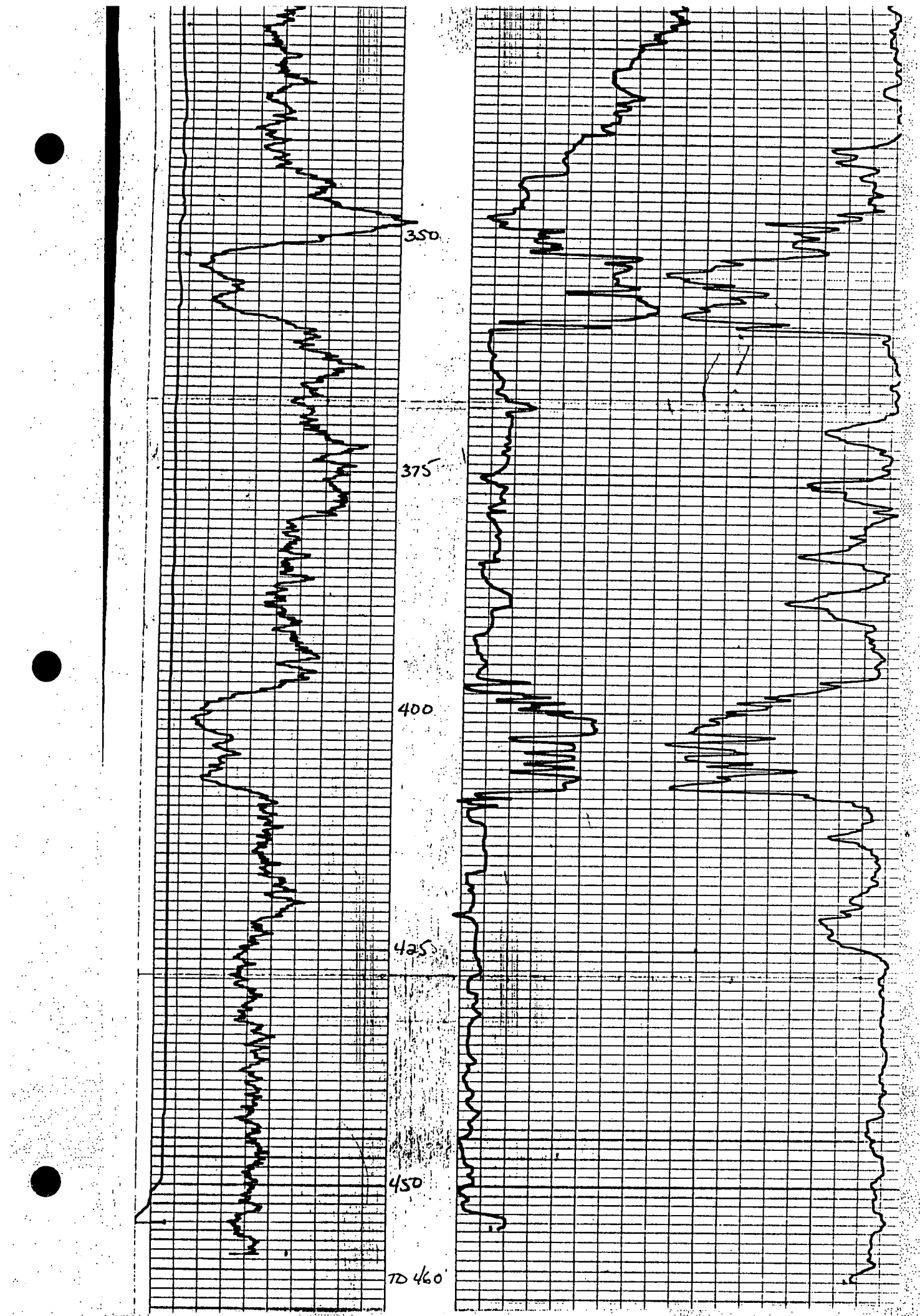
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	GAMMA RAY T C SEC.	GAMMA RAY SENS SETTING	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV.	DENSITY T C SEC	DENSITY SENS SETTINGS	DENSITY ZERO
			12							

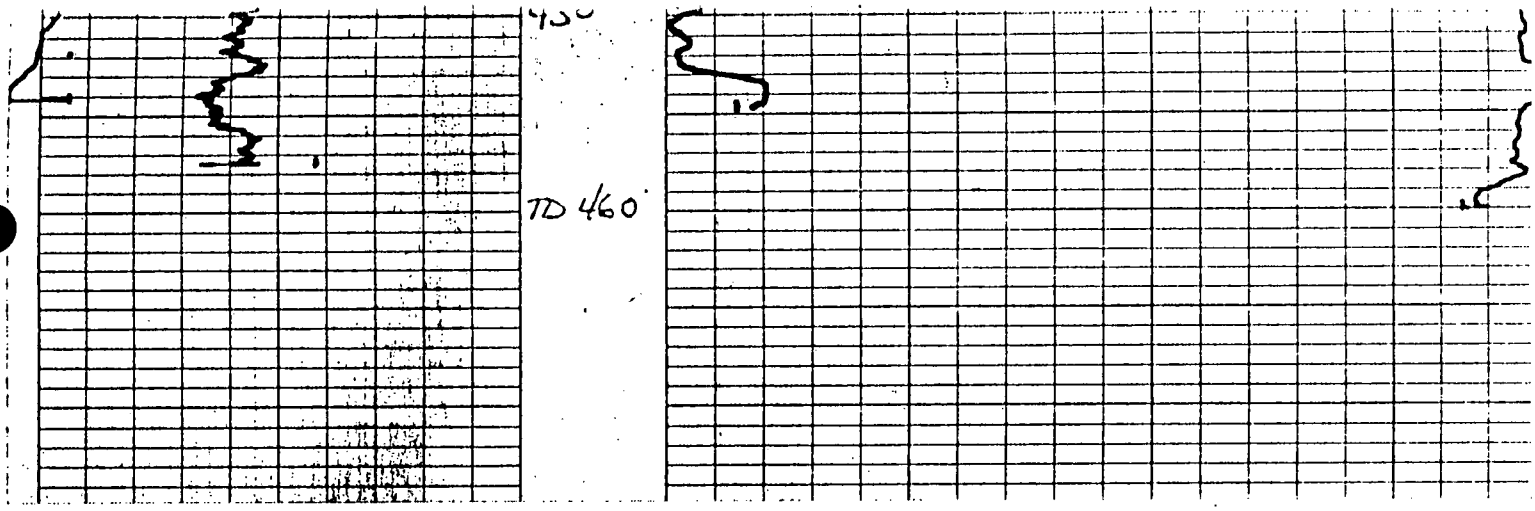
REMARKS:




75
100
125
150
175


200
225
250
275
300
325


350
375
400
425
450
TD 460'


TD 460'

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE APRIL 28, 1993

COMPANY _____

HOLE NO. 93 WP - 17

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION _____

ELEVATION _____

DRILLER DON OFNER.

FROM	TO	LOG	REMARKS
0	6	TILL	
6	10	MUDSTONE & TRACES OF COAL	
10	39	SANDSTONE	
39	40	TRACE OF COAL	
40	51	SANDSTONE	
51	55	MUDSTONE + COAL STRINGERS	
145	146	Trace of coal	
146	263	Sandstone	
263	268	Mudstone & Coal Stringers	
268	348	Sandstone	
348	358	coal	
358	395	Sandstone	
395	406	Coal	
406	440	Sandstone	

COMMENTS _____

LEXCO

TESTING LTD. GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE 93-NP-17

LOCATION SEC TP RGE W

AREA NORTH PLATEAU

PROVINCE O.M.C ALBERTA

SURVEYED DATA

ELEV. 1536.3

LOC. [illegible]N

[illegible]935 E

	1	2	3
RUN No.			
DATE	28/APR/93		
DEPTH-DRILLER	440		
DEPTH-LOGGER	407		
FLUID LEVEL	208		
LOGGING TIME			
DRILLED BY	C. Moore		
RECORDED BY	C. Moore		
WITNESSED BY	K.D.K.		

BORE-HOLE RECORD

BIT	FROM	TO	SIZE
			6 3/8

CASING RECORD

FROM	TO
0	20

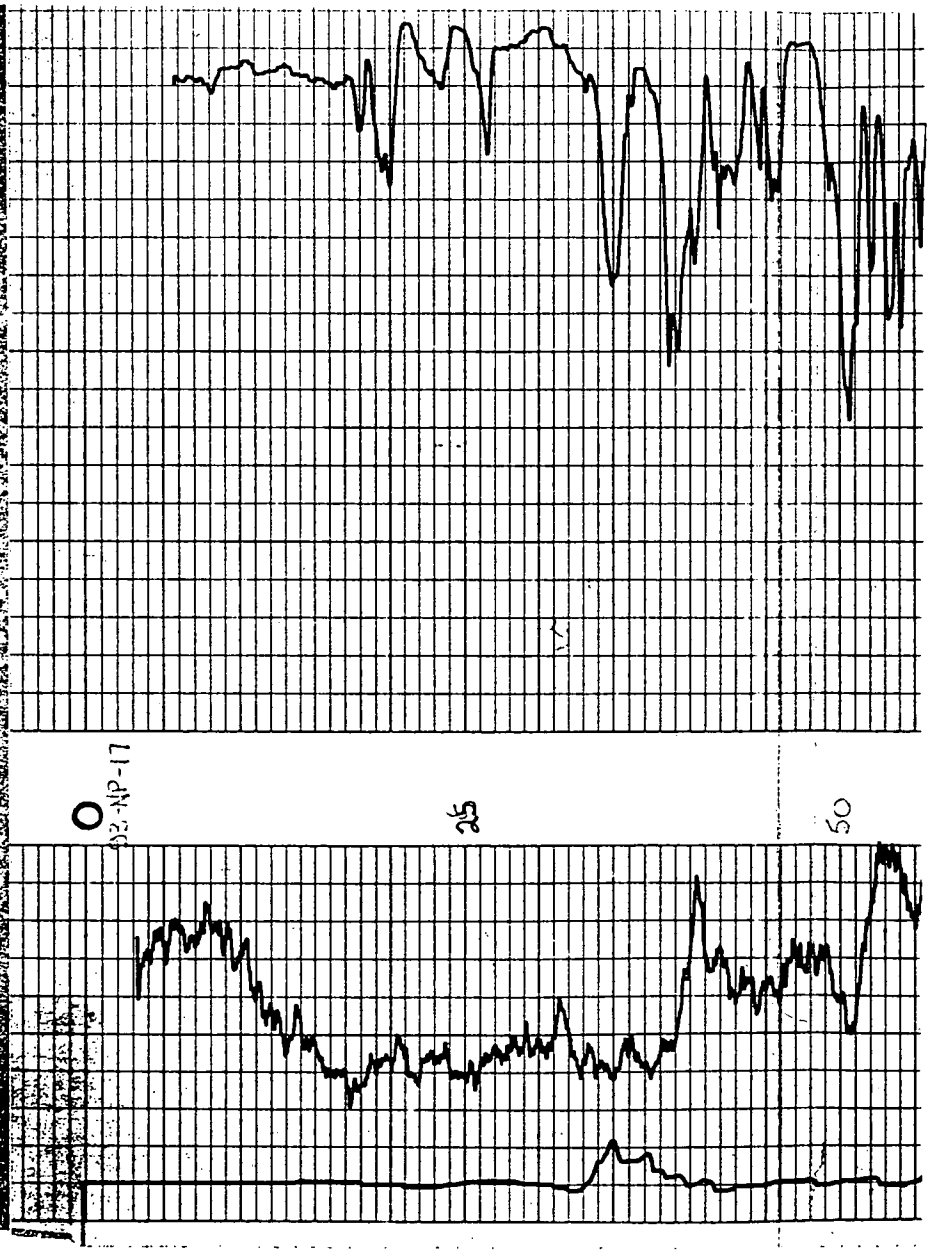
EQUIPMENT DATA

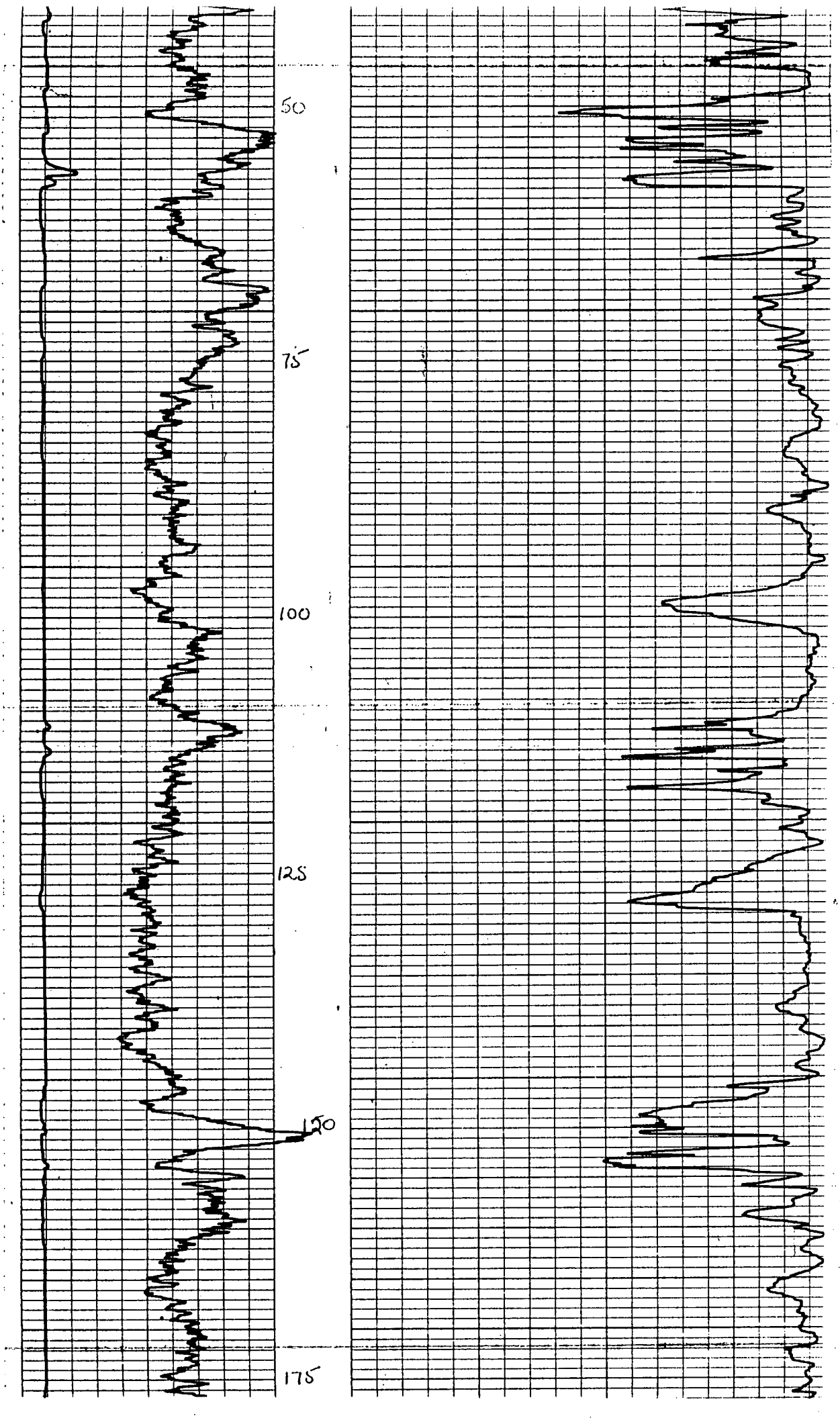
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	E	
TYPE	SCINT.	SPACING		13"	
LENGTH	3"	LENGTH	L		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

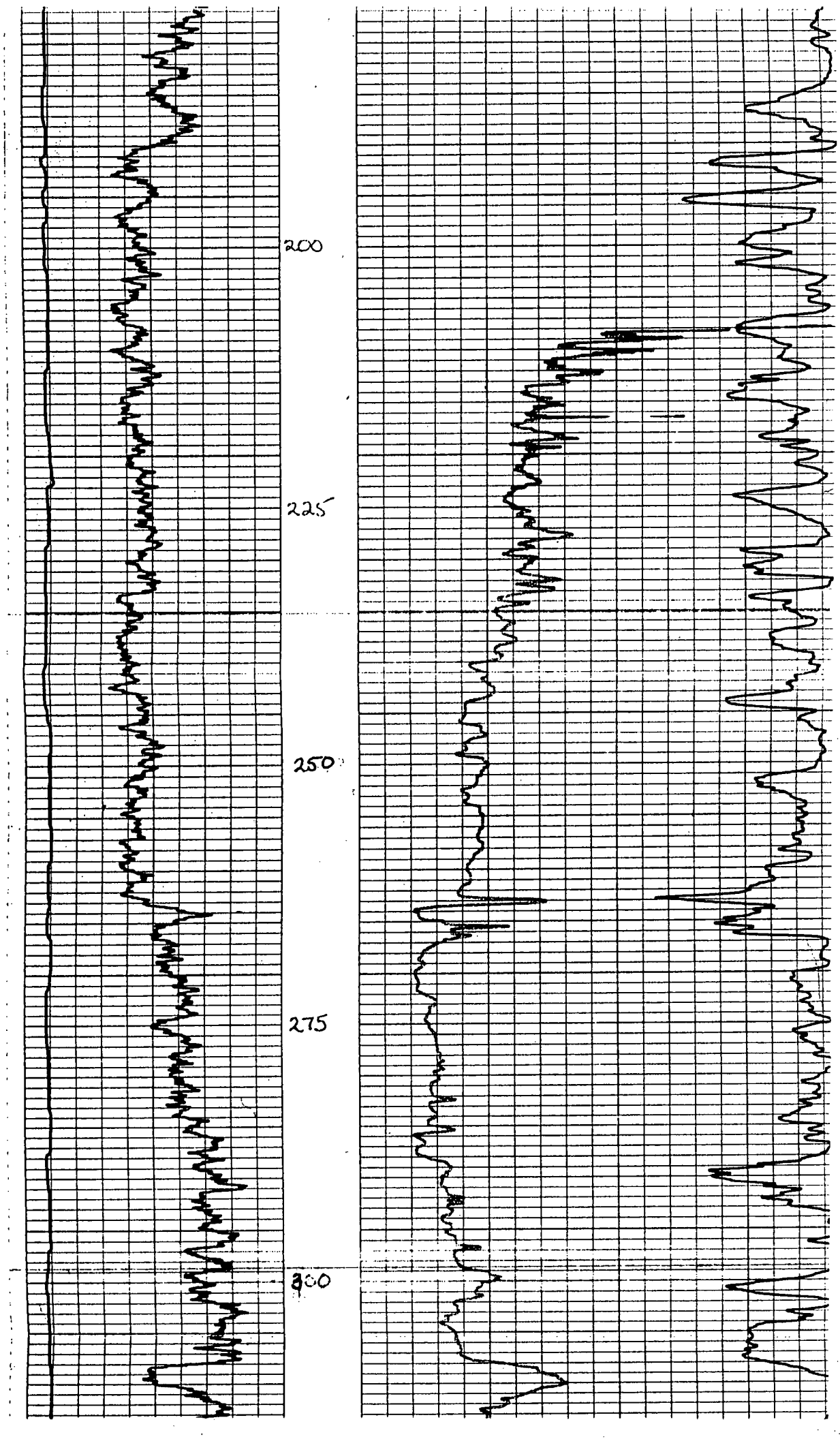
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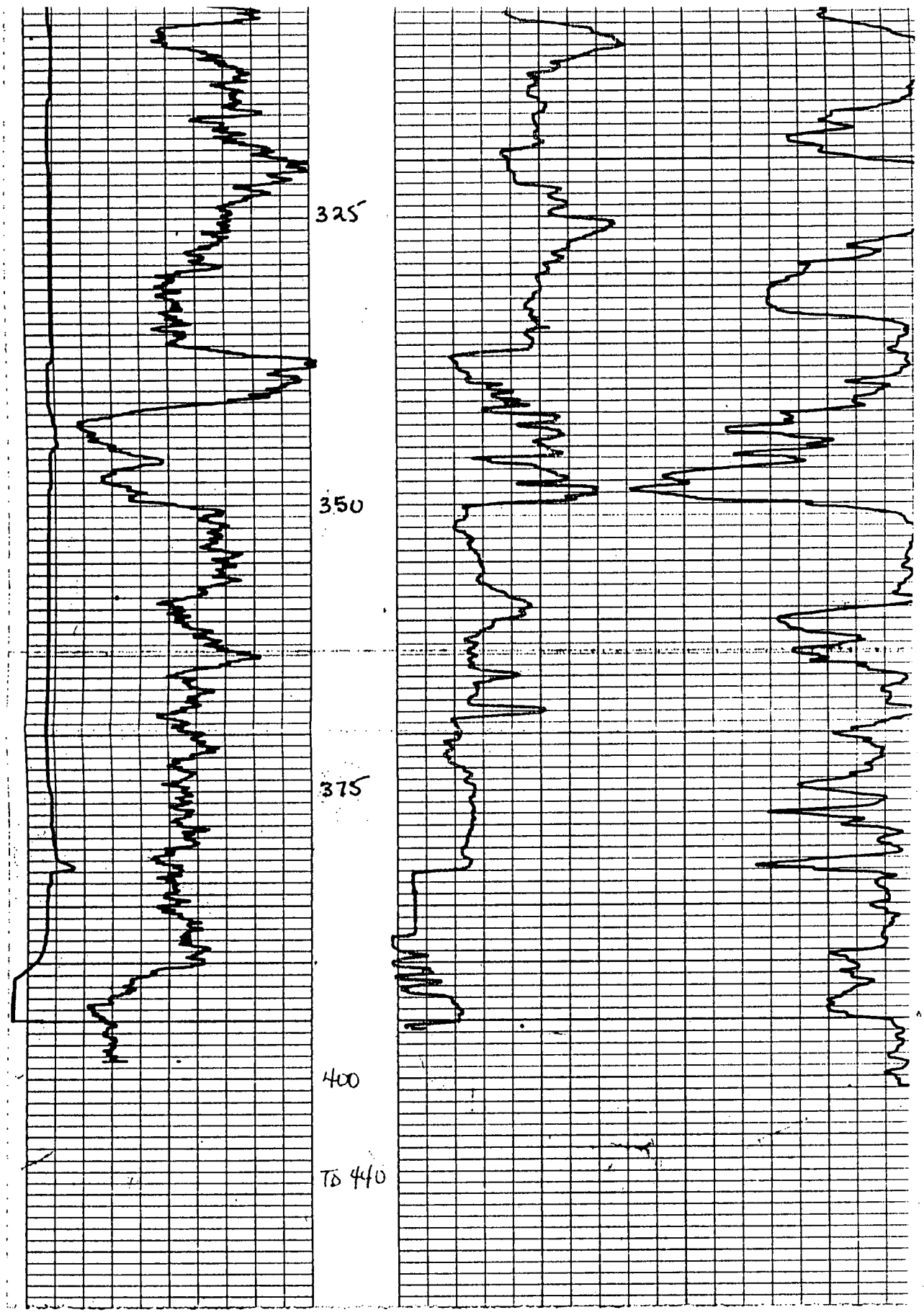
GENERAL				GAMMA RAY				DENSITY		
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min	T.C. SEC	SENS. SETTING	ZERO	API UNITS PER DIV.	T.C. SEC	SENS. SETTINGS	ZERO

REMARKS




50
75
100
125
150
175


200
225
250
275
300


325
350
375
400
TD 440

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD North Plateau DATE April 5 1993

COMPANY _____

HOLE NO. 93 - NP - 18

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION 55105 N - 49555 E

ELEVATION 1495.4

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	46	Till	
46	211	Sandstone	
211	222	Coal	
222	265	Sandstone	
265	278	Coal	
278	380	Sandstone	

COMMENTS _____

LEXCO
TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-18

LOCATION _____ SEC. TP. RGE. W.

AREA NORTH PLATEAU

PROVINCE O.M.C.

SURVEYED DATA

ELEV. 1495.4

LOC. 55105 N

49555 E

RUN No.	1	2	3
DATE	APRIL 5/93		
DEPTH-DRILLER	380		
DEPTH-LOGGER	372		
FLUID LEVEL	271		
LOGGING TIME			
DRILLED BY	C. MOORE		
RECORDED BY	C. MOORE		
WITNESSED BY	R.J.K		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
6 7/8	0	40

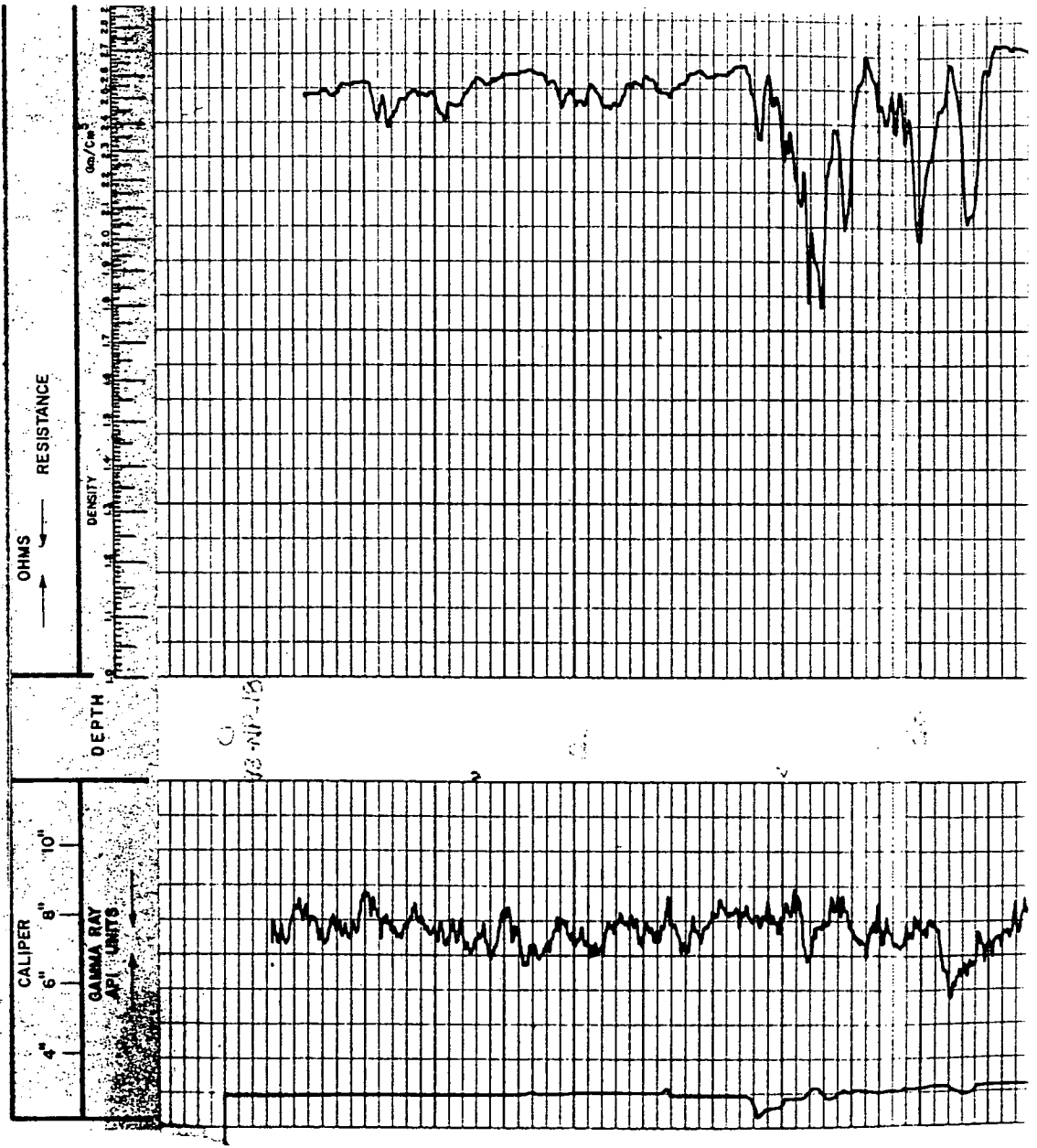
EQUIPMENT DATA

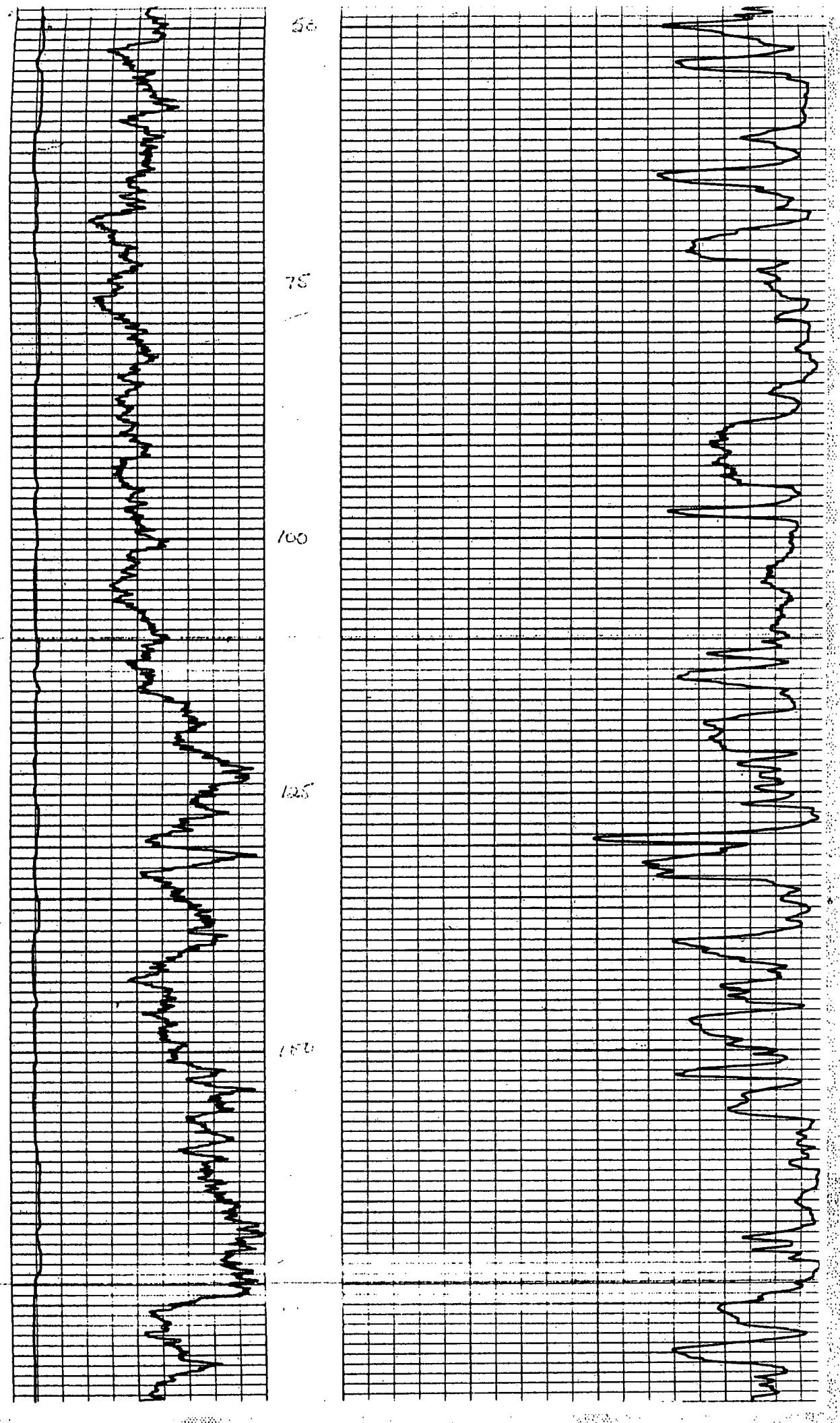
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH	1"		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

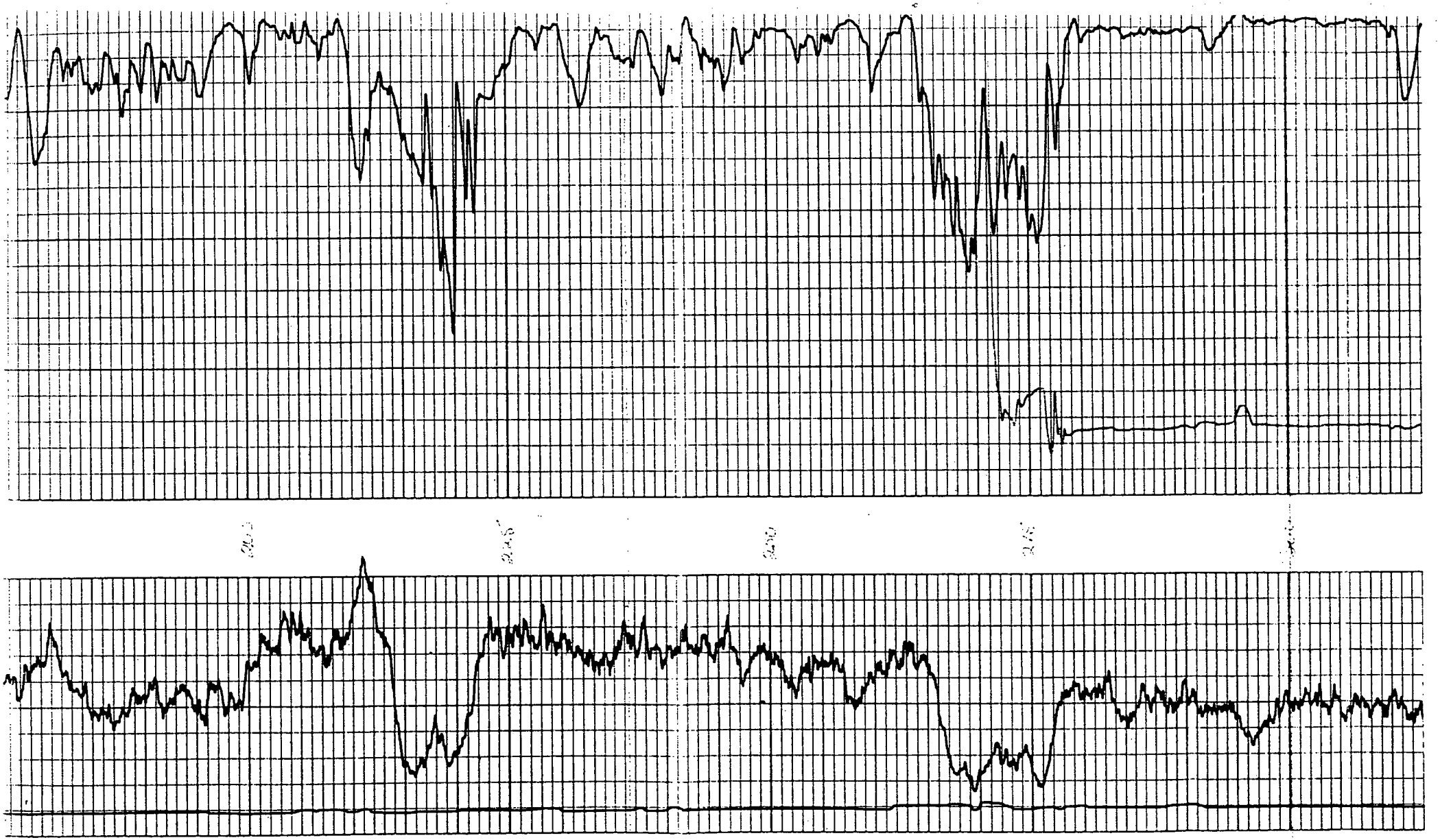
LOGGING DATA

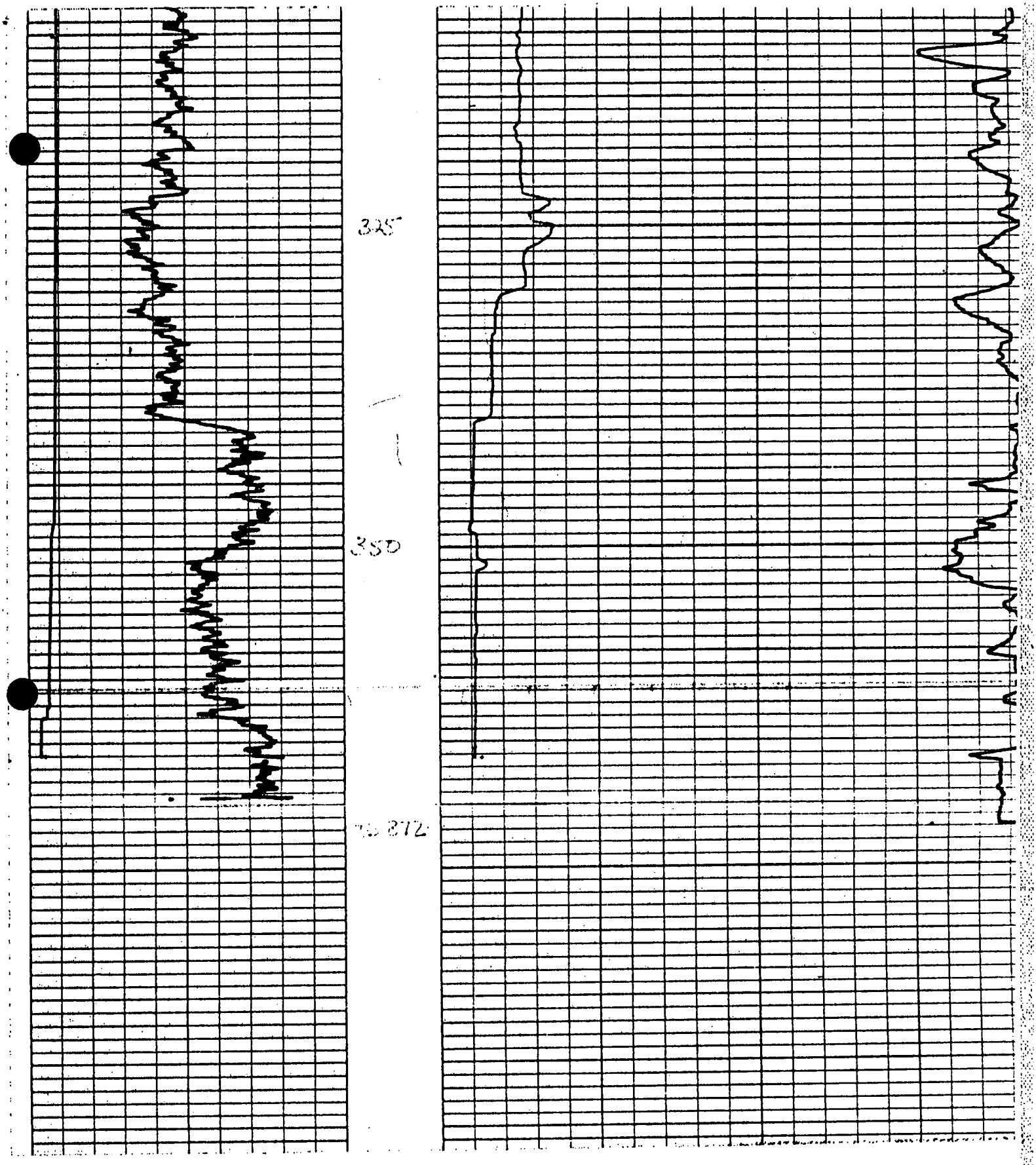
GENERAL				GAMMA RAY				DENSITY		
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	T C SEC	SENS SETTINGS	ZERO
			12							

REMARKS:




50
75
100
125
150




325'
350'
TD 372'

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: _____ DATE: April 1 1993

COMPANY: _____

HOLE No.: 93 - NP - #19

APPROX. LOCATION: _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION: 55040 N - 49633 E

ELEVATION: 1496.0

DRILLER: Don Ofnir

FROM	TO	LOG	REMARKS
0	52	Till	
52	237	Sandstone	
237	240	Coal	
240	277	Sandstone	
277	287	Coal	
287	380	Sandstone	
			/

COMMENTS: _____

LEACO

TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-19

LOCATION _____ SEC. TP. RGE. W.

AREA NORTH PLATEAU

PROVINCE O.M.C

SURVEYED DATA

ELEV. 1496.0

LOC. 55040 N

49633 E

RUN No.	1	2	3
DATE	April 1/93		
DEPTH-DRILLER	380'		
DEPTH-LOGGER	377'		
FLUID LEVEL			
LOGGING TIME			
DRILLED BY	C. MOORE		
RECORDED BY	C. MOORE		
WITNESSED BY	R.T.R		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
6 5/8	0	56

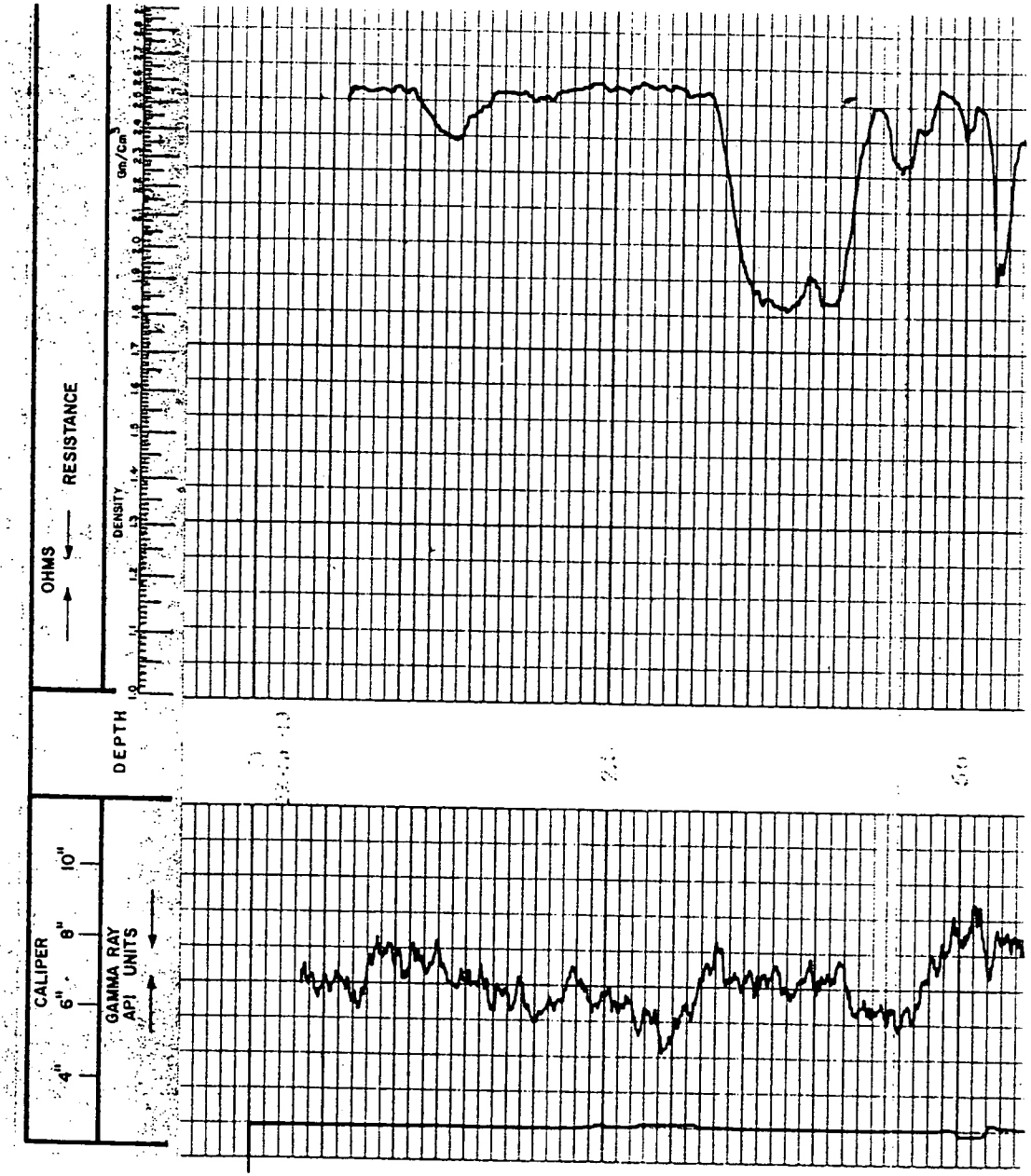
EQUIPMENT DATA

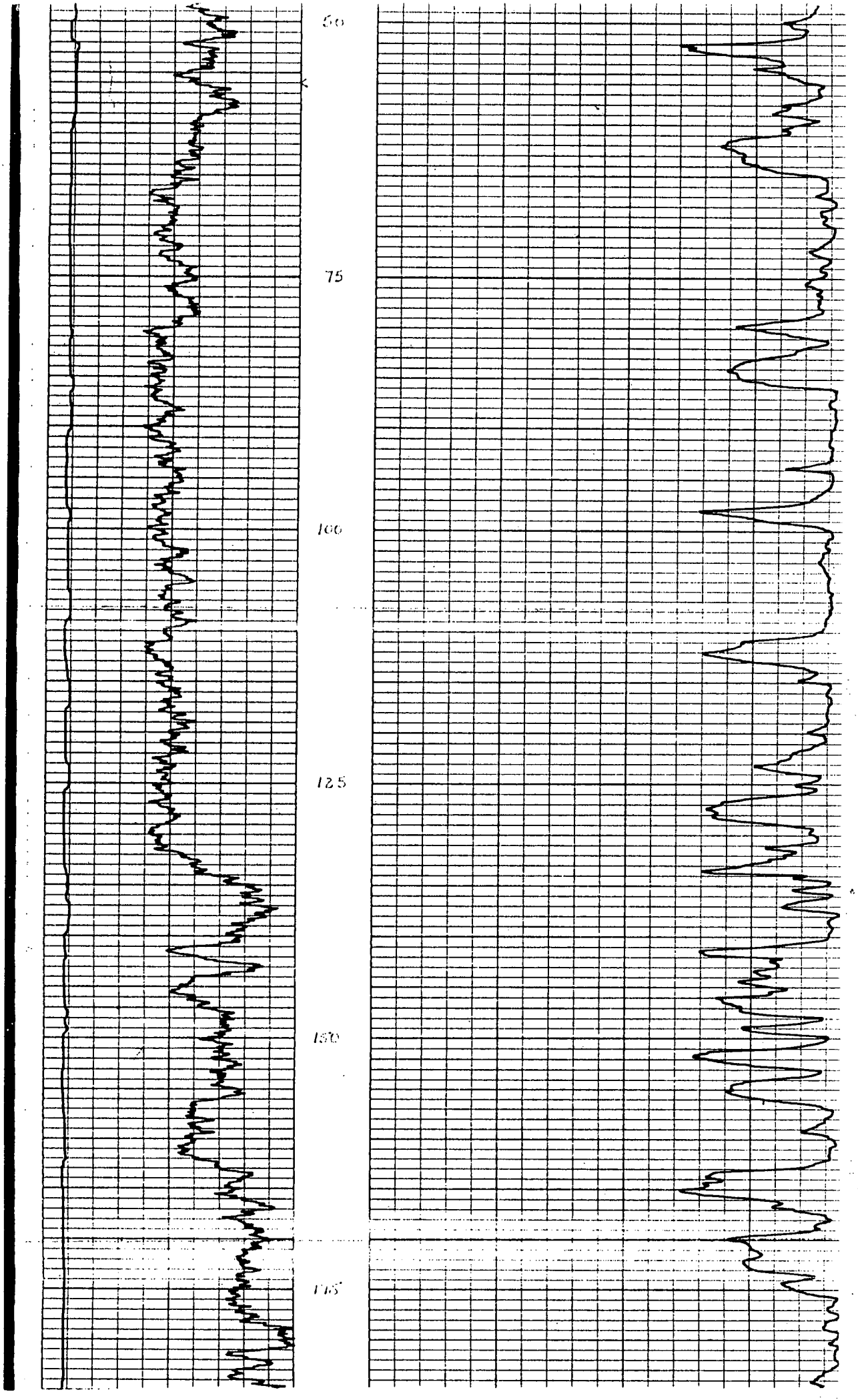
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH	1"		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

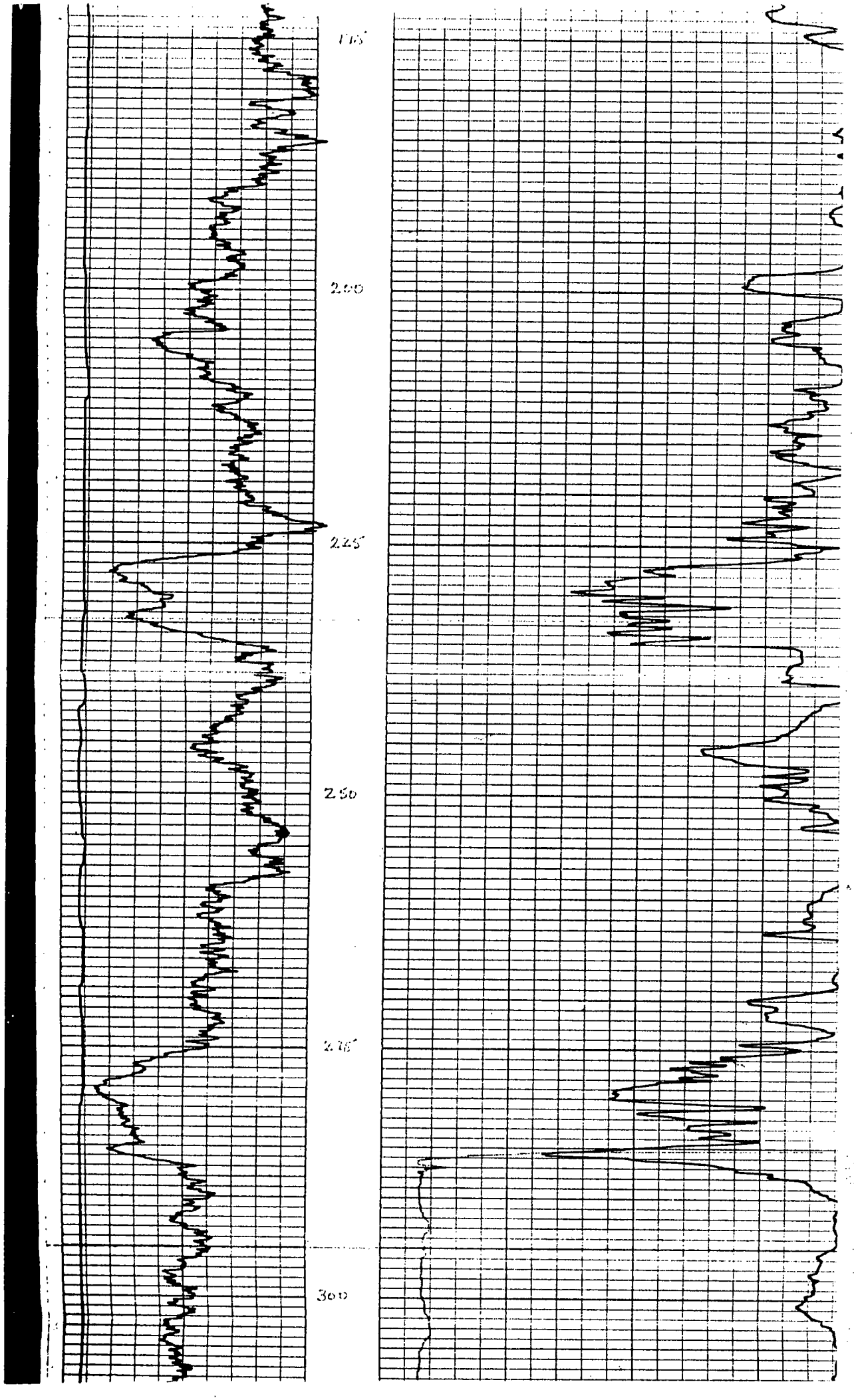
LOGGING DATA

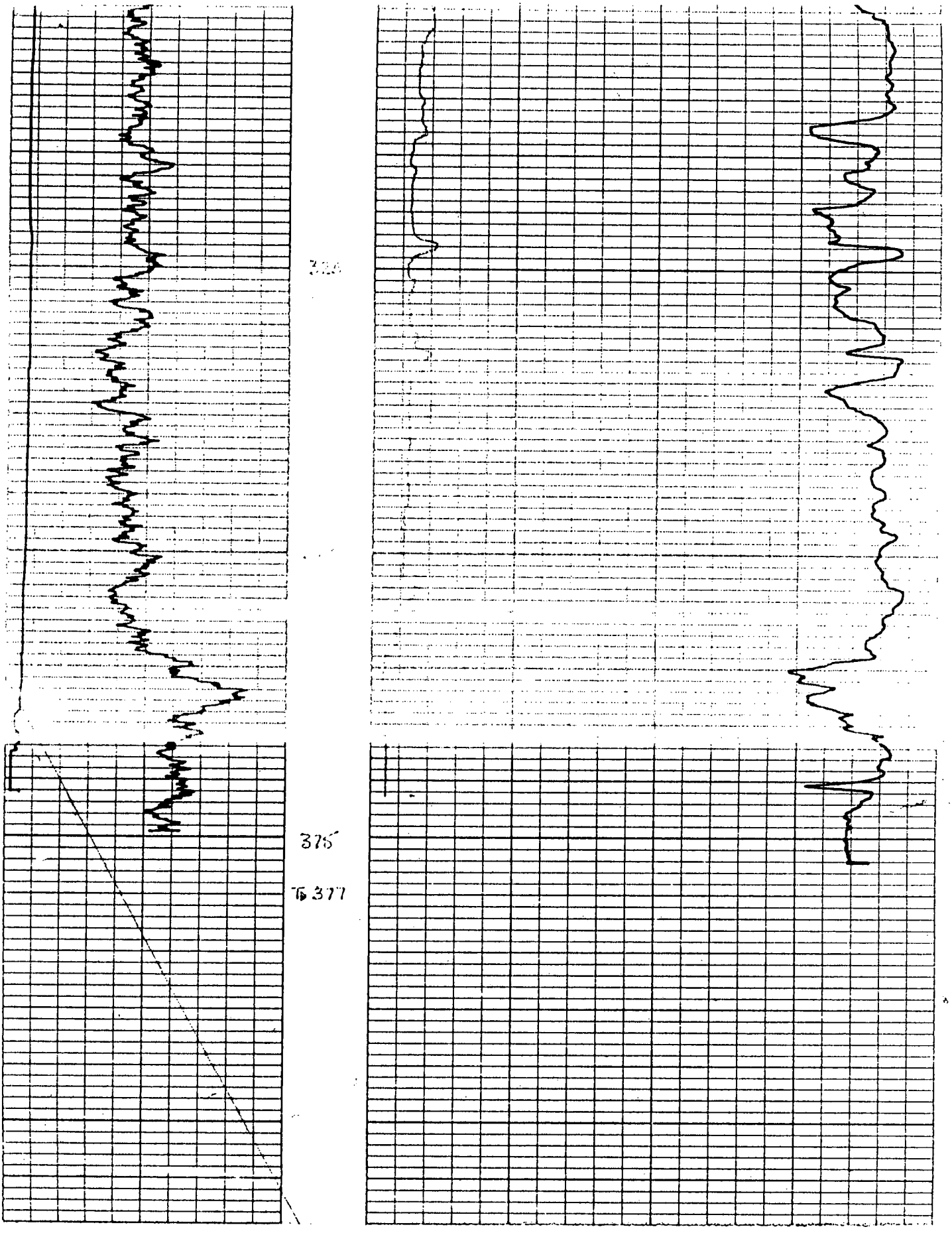
GENERAL				GAMMA RAY				DENSITY		
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	T C SEC	SENS SETTINGS	ZERO
			12'							

REMARKS:




50
75
100
125
150
175


1.75'
2.00
2.25'
2.50
2.75'
3.00


375
TD 377

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

AL FIELD _____ DATE April 28 1993

COMPANY _____

HOLE NO. 93-NP-II 20

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	10	Till 363 - 420 Sandstone	
10	21	Sandstone	
21	23	Mudstone	
23	82	Sandstone	
82	83	TRACE OF COAL	
83	124	SANDSTONE	
124	126	Mudstone	
126	178	Sandstone	
178	181	Mudstone & coal	
181	230	Sandstone	
230	231	Trace of coal	
231	281	Sandstone	
281	285	MUDSTONE	
285	300	SANDSTONE	
300	311	COAL	
311	351	SANDSTONE	
351	363	Coal	

COMMENTS _____

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE

LOCATION SEC TP RGE W

AREA

PROVINCE

SURVEYED DATA

ELEV.

LOC.

RUN No.	1	2	3
DATE			
DEPTH-DRILLER			
DEPTH-LOGGER			
FLUID LEVEL			
LOGGING TIME			
DRILLED BY			
RECORDED BY			
WITNESSED BY			

BORE-HOLE RECORD			CASING RECORD		
BIT	FROM	TO	SIZE	FROM	TO

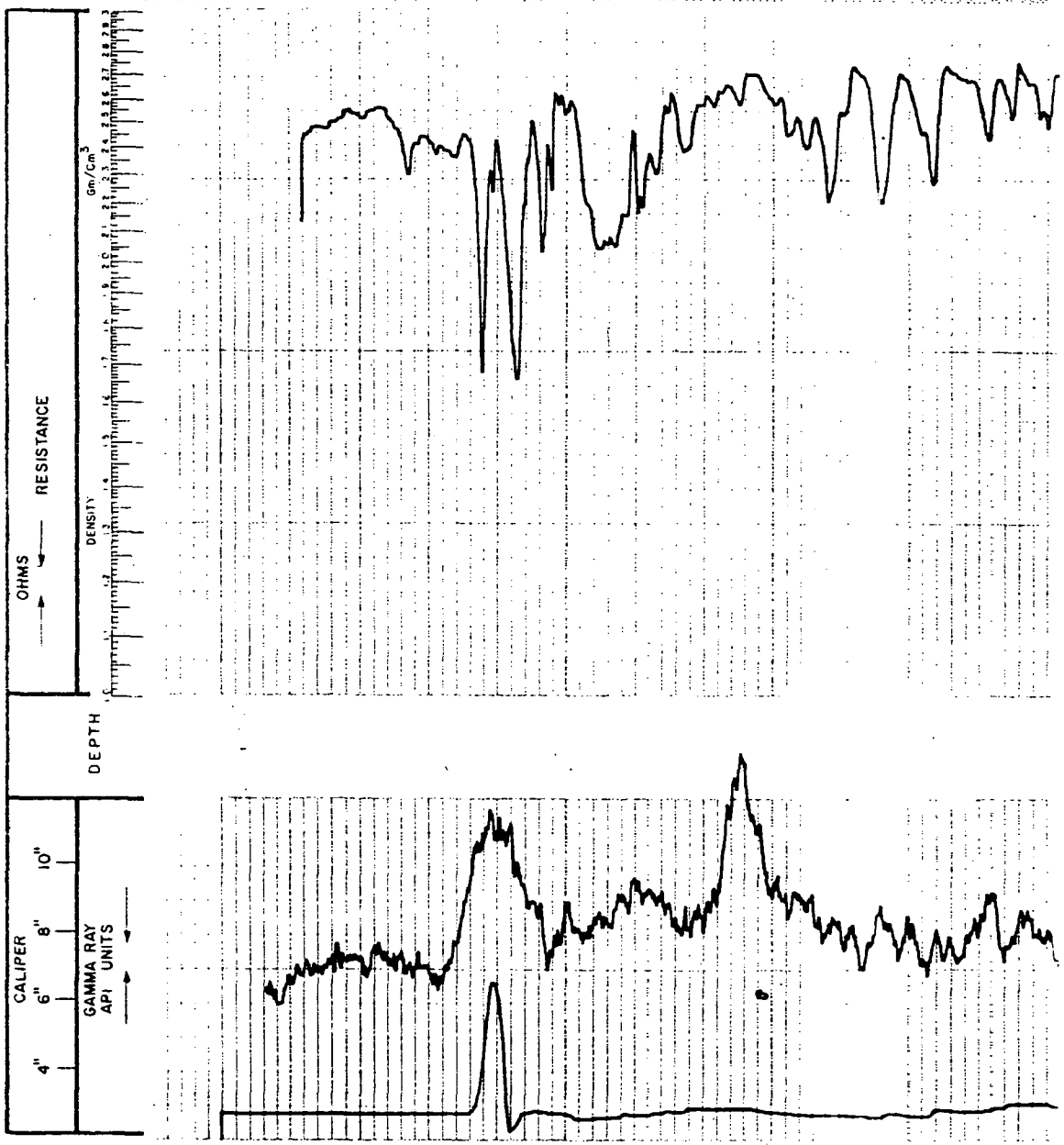
EQUIPMENT DATA

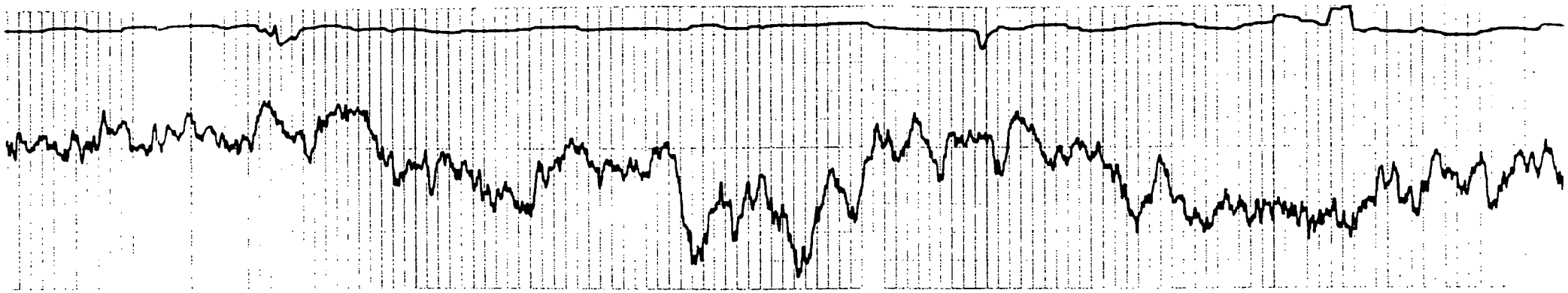
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH	1"		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

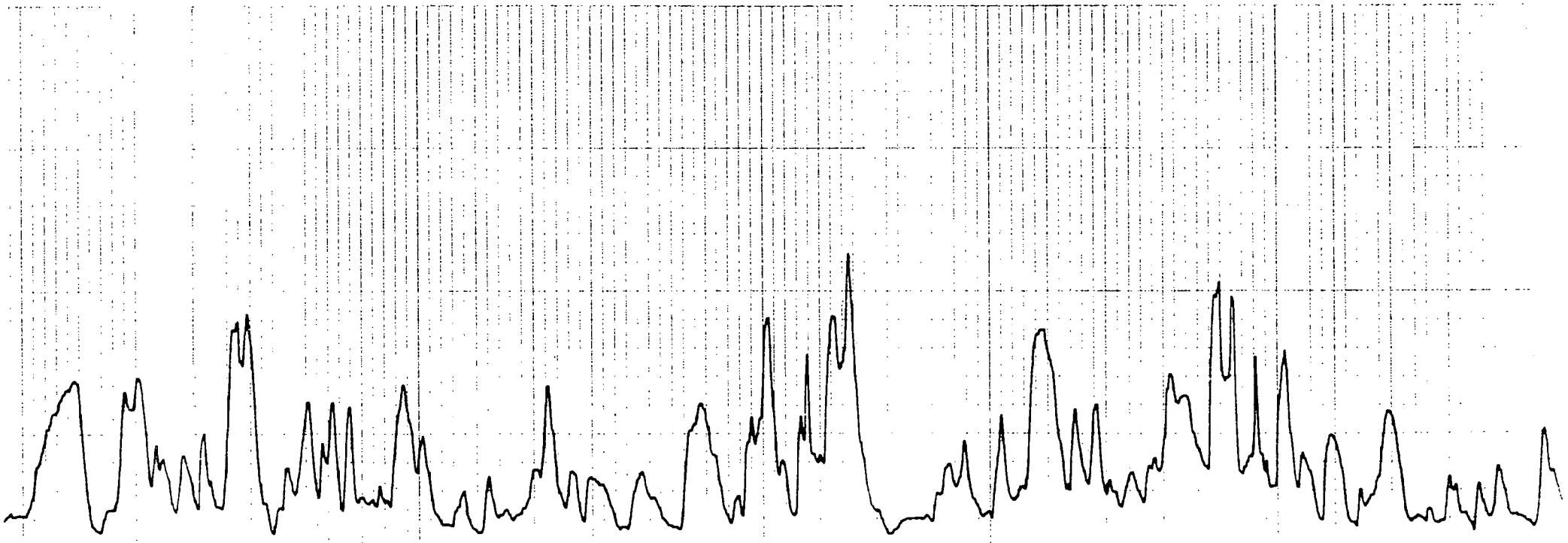
LOGGING DATA

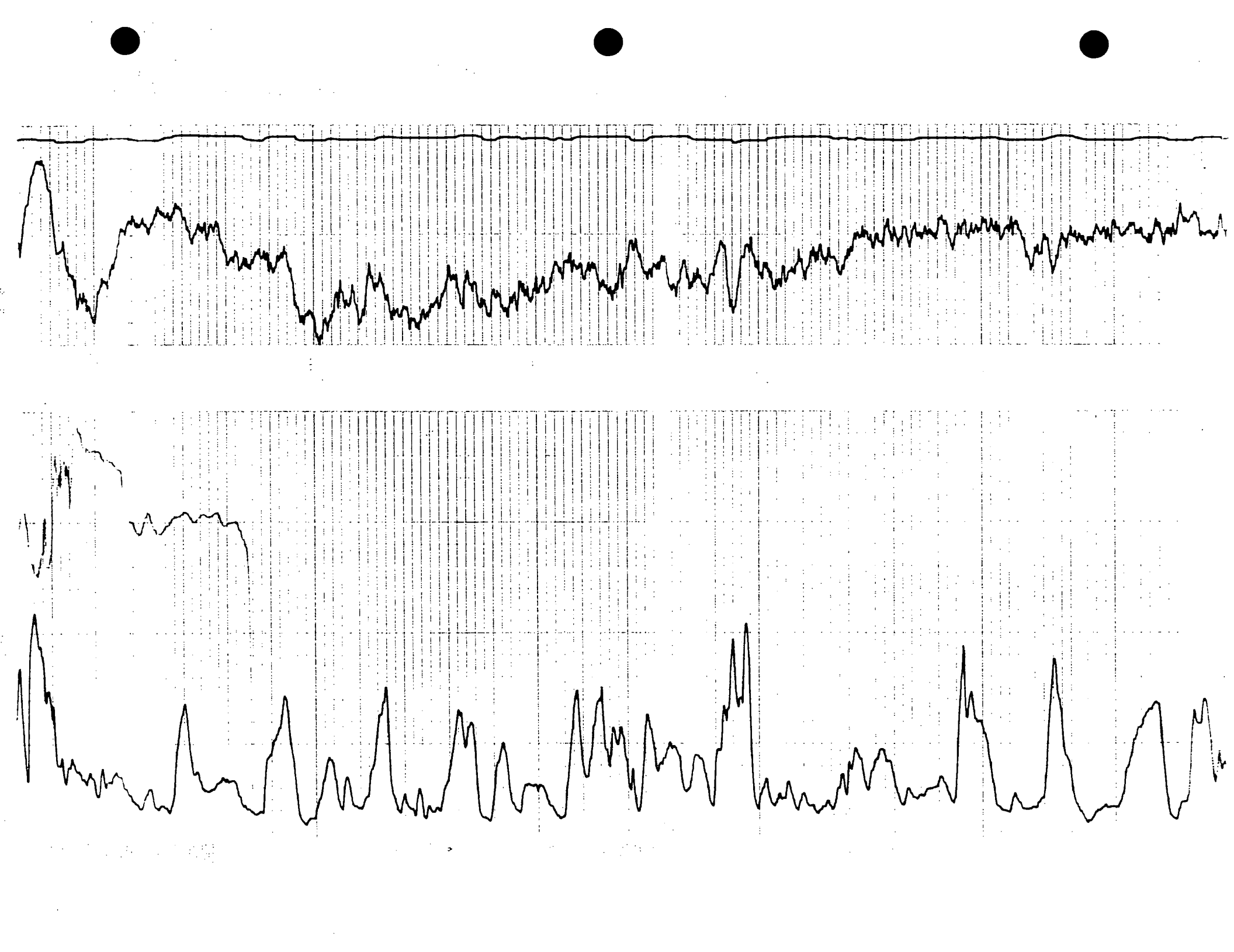
GENERAL				GAMMA RAY				DENSITY		
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min	T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	T C SEC	SENS SETTINGS	ZERO

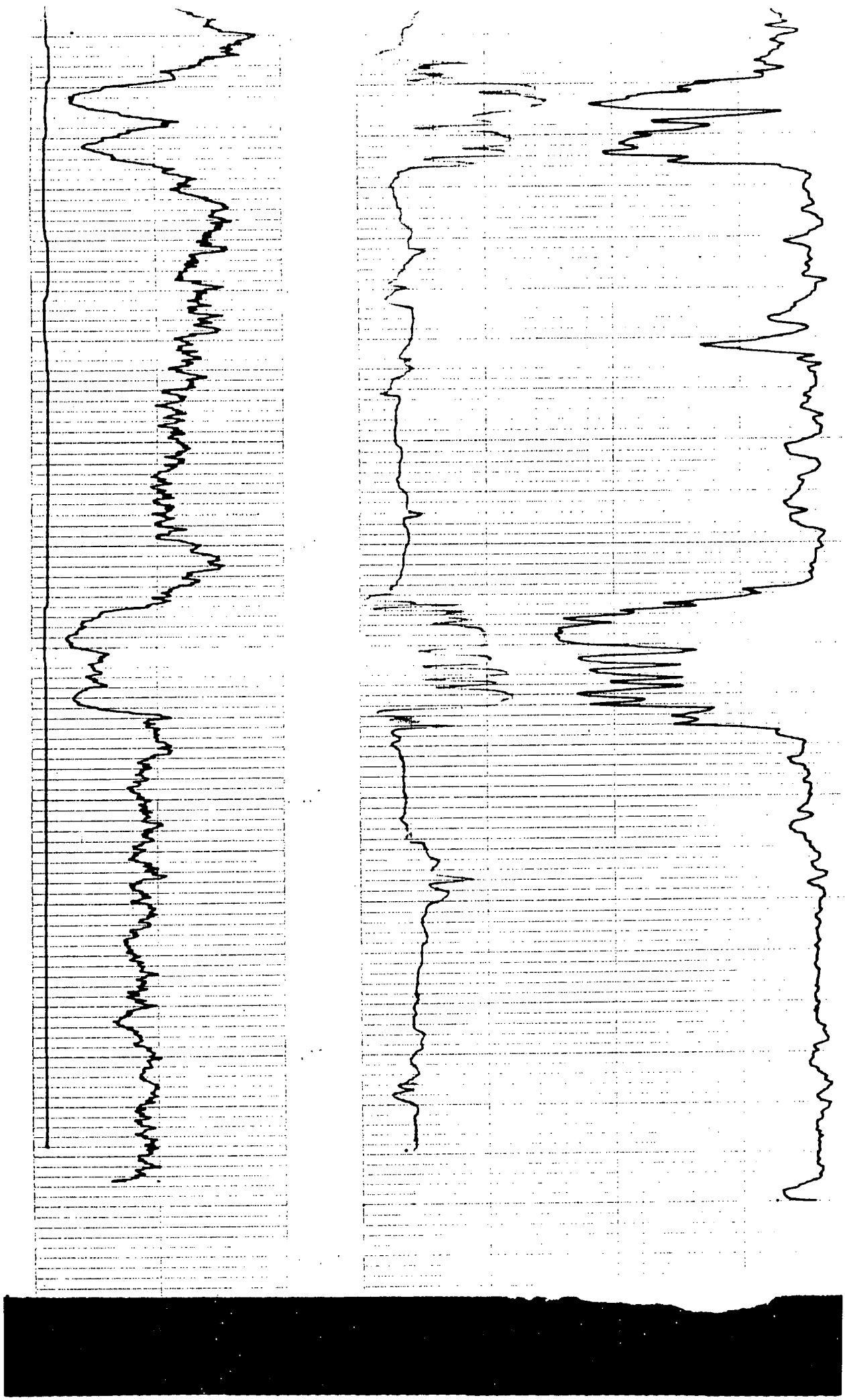
REMARKS:











OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 29 1993

COMPANY _____

HOLE NO. 93 - NP - 21

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER: Don Ufner

FROM	TO	LOG	REMARKS
0	12	Till	
12	185	Sandstone	185 - 186 - Cavety
185	192	Mudstone with coal	partings ?
192	198	Sandstone ?	
198	203	Coal ?	
203	246	Sandstone ?	
246	256	Coal ?	Blind ?
256	326	Sandstone	
326	348	Coal ?	
348	400	Sandstone	

COMMENTS _____

WATER HORIZON _____ FT. _____

EXCO
ESTING LTD.

GAMMA-DENSITY-RESISTANCE

O ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

LE
CATION SEC TP RGE W
REA
OVINCE

SURVEYED DATA
ELEV.
LOC.

N No.	1	2	3
E			
PTH-DRILLER			
PTH-LOGGER			
UID LEVEL			
GGING TIME			
LLED BY			
CORDED BY			
NESSED BY			

BORE-HOLE RECORD			CASING RECORD		
BIT	FROM	TO	SIZE	FROM	TO

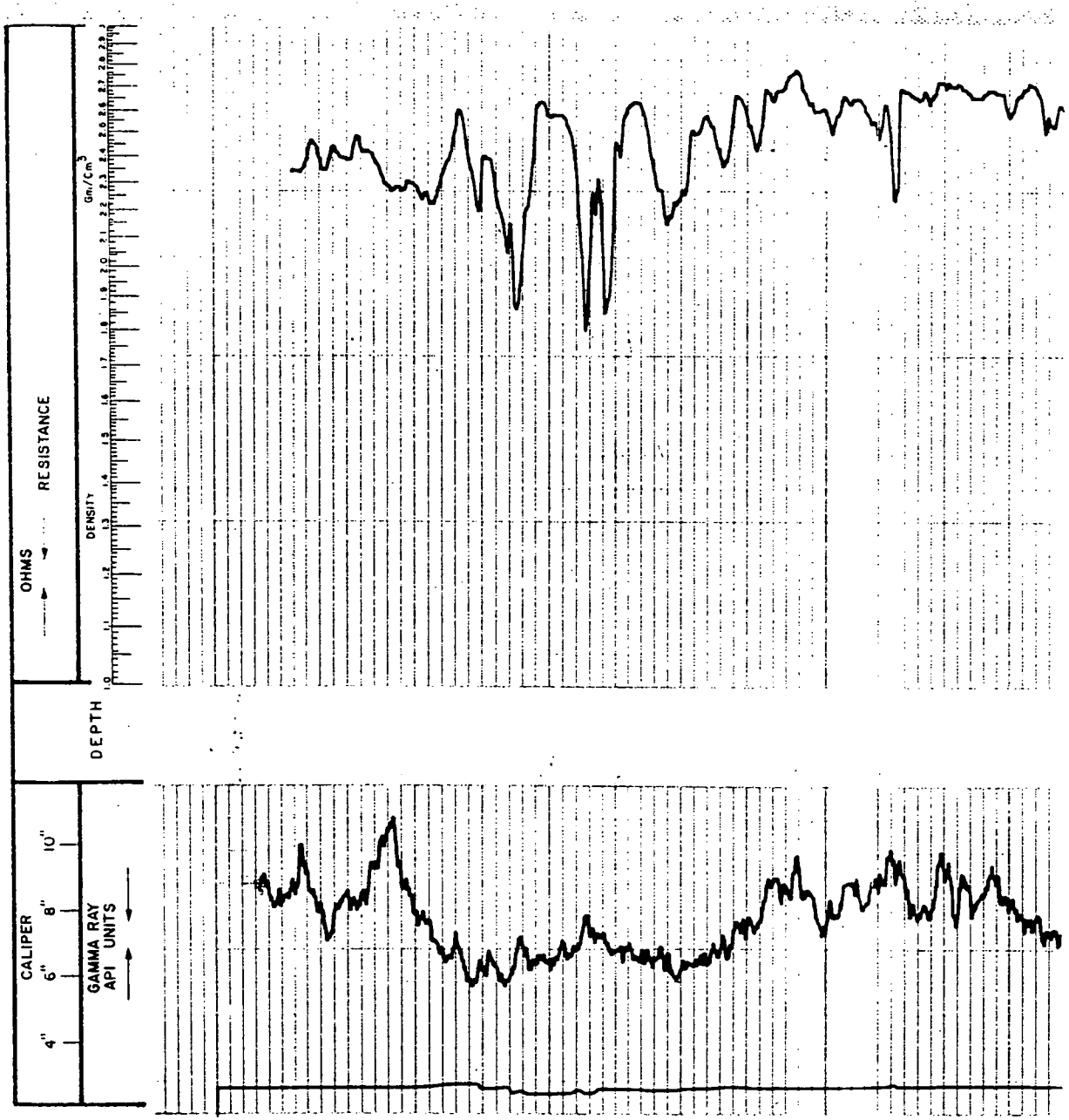
EQUIPMENT DATA

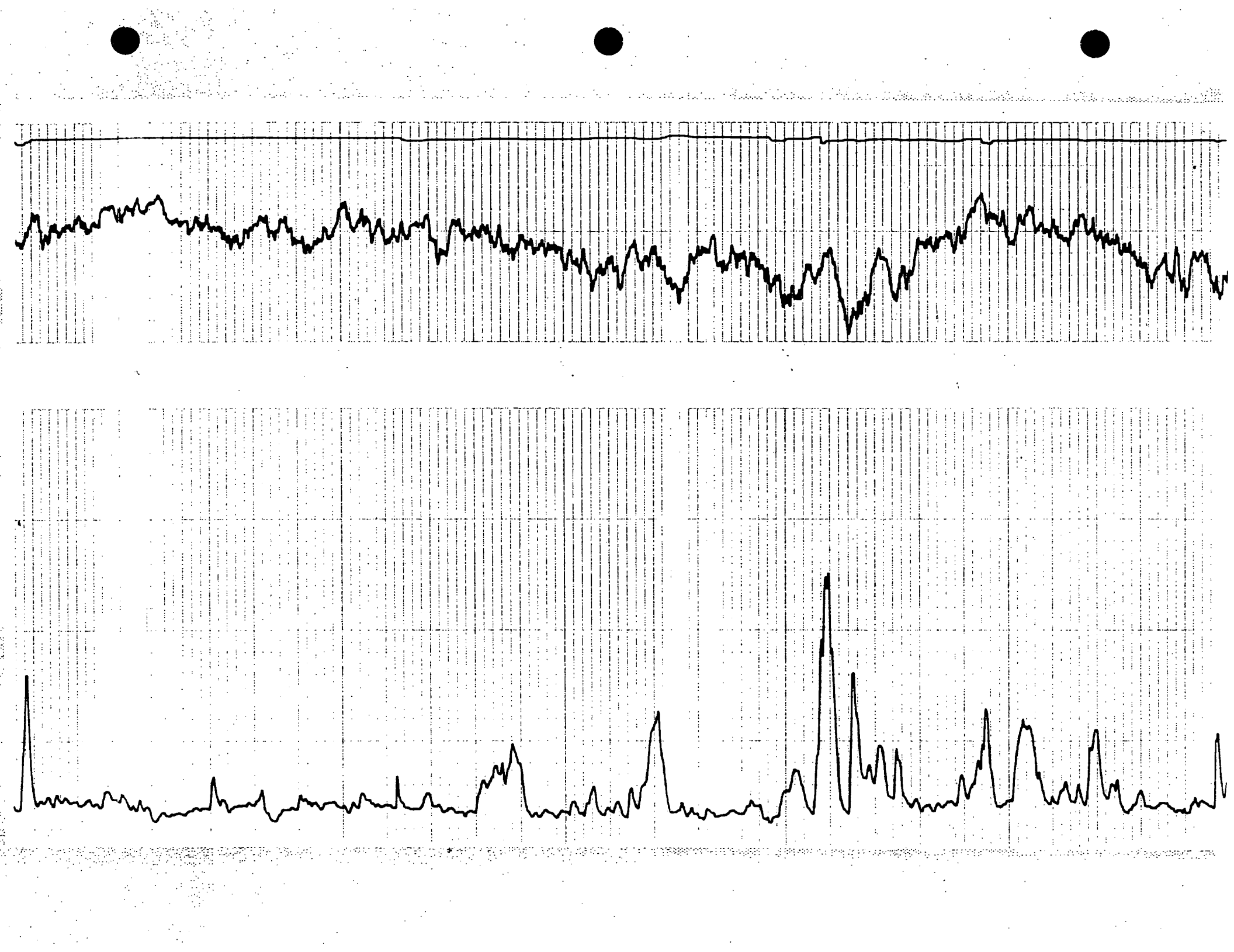
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
OL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
METER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
TECTOR MODEL No.	CP-516	TYPE	ME	F	
PE	SCINT	SPACING		13"	
NGTH	3"	LENGTH	1"		
GENERAL		HOR. SCALE			
UCK No.		SOURCE MODEL		HOVP	
CATION		ISOTOPE		CS-137	
		STRENGTH		125 m C	

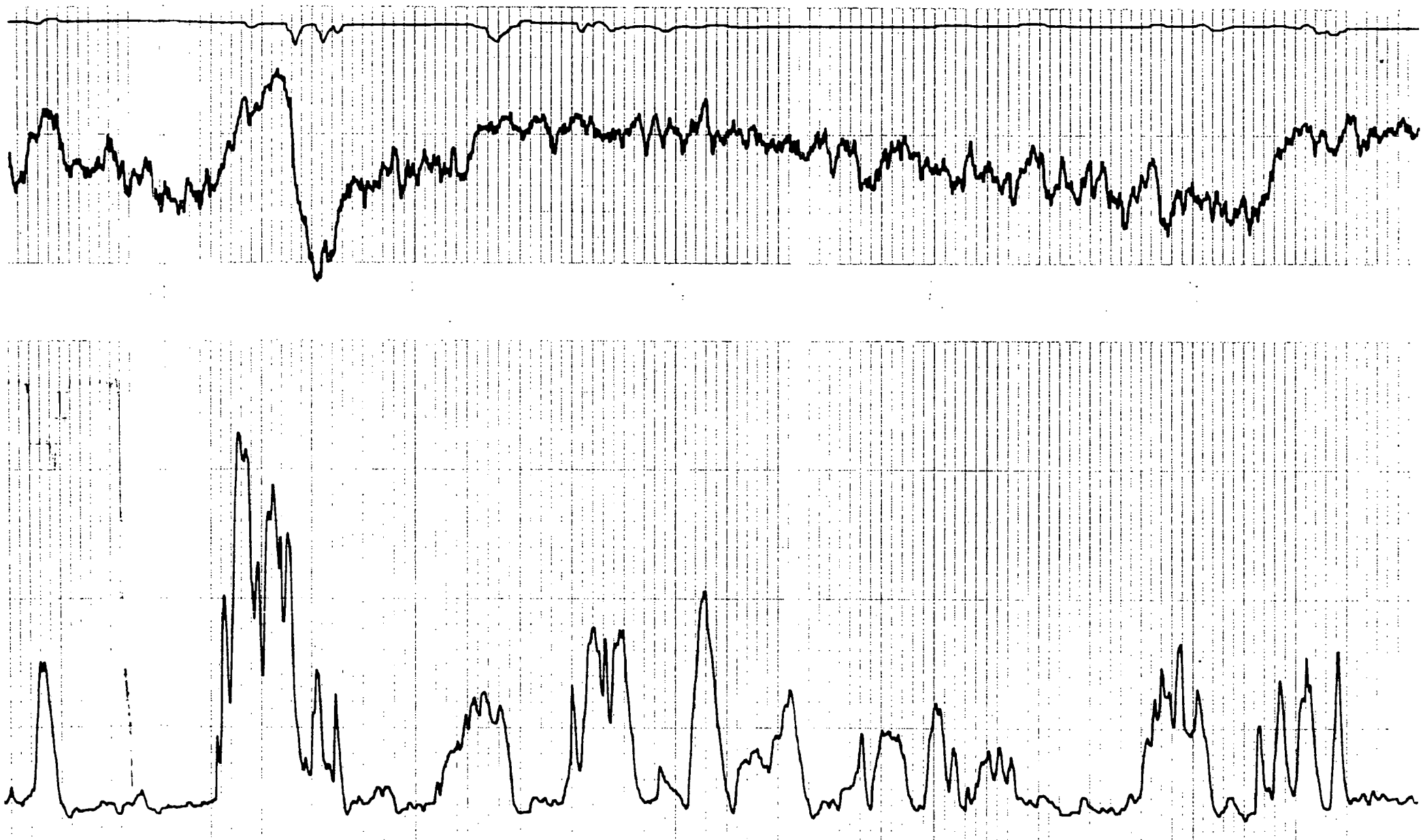
LOGGING DATA

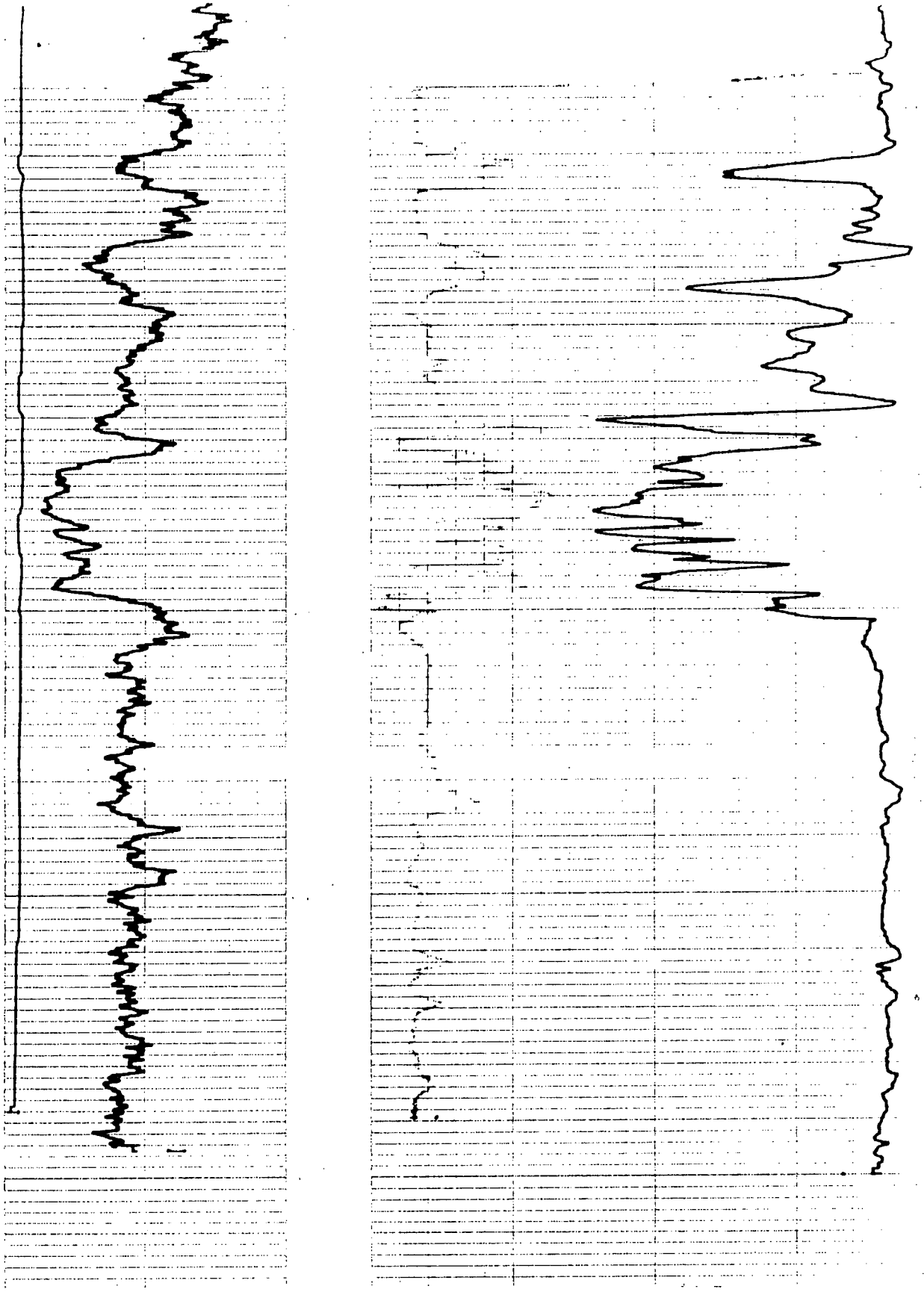
GENERAL				GAMMA RAY				DENSITY		
N	DEPTHS		SPEED	T C	SENS	ZERO	API UNITS	T C	SENS	ZERO
	FROM	TO	Ft/min.	SEC.	SETTING		PER DIV.	SEC	SETTINGS	

MARKS:









OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 26 1993

COMPANY _____

HOLE NO. 93-NP-22

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	6	Till	
6	116	Sandstone	
116	117	Coal	
117	207	Sandstone (Blind at 140)	
207	217	Coal	
217	257	Sandstone	
257	269	Coal	
269	320	Sandstone	

COMMENTS _____

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE [illegible]

LOCATION [illegible] SEC. TP. RGE. W.

AREA [illegible]

PROVINCE [illegible]

SURVEYED DATA

ELEV. [illegible]

LOC. [illegible]

RUN No.	1	2	3
DATE	[illegible]		
DEPTH-DRILLER	[illegible]		
DEPTH-LOGGER	[illegible]		
FLUID LEVEL	[illegible]		
LOGGING TIME			
DRILLED BY	[illegible]		
RECORDED BY	[illegible]		
WITNESSED BY	[illegible]		

BORE-HOLE RECORD			CASING RECORD		
BIT	FROM	TO	SIZE	FROM	TO
			[illegible]	[illegible]	[illegible]

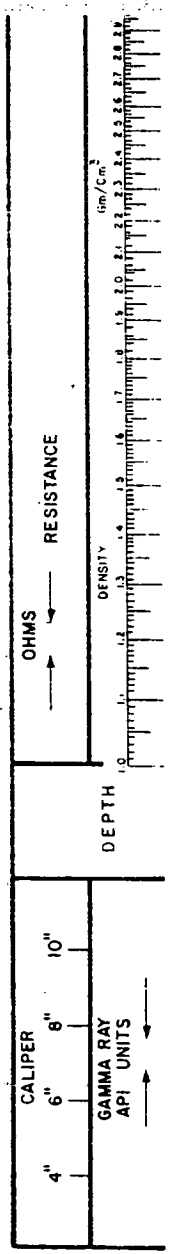
EQUIPMENT DATA

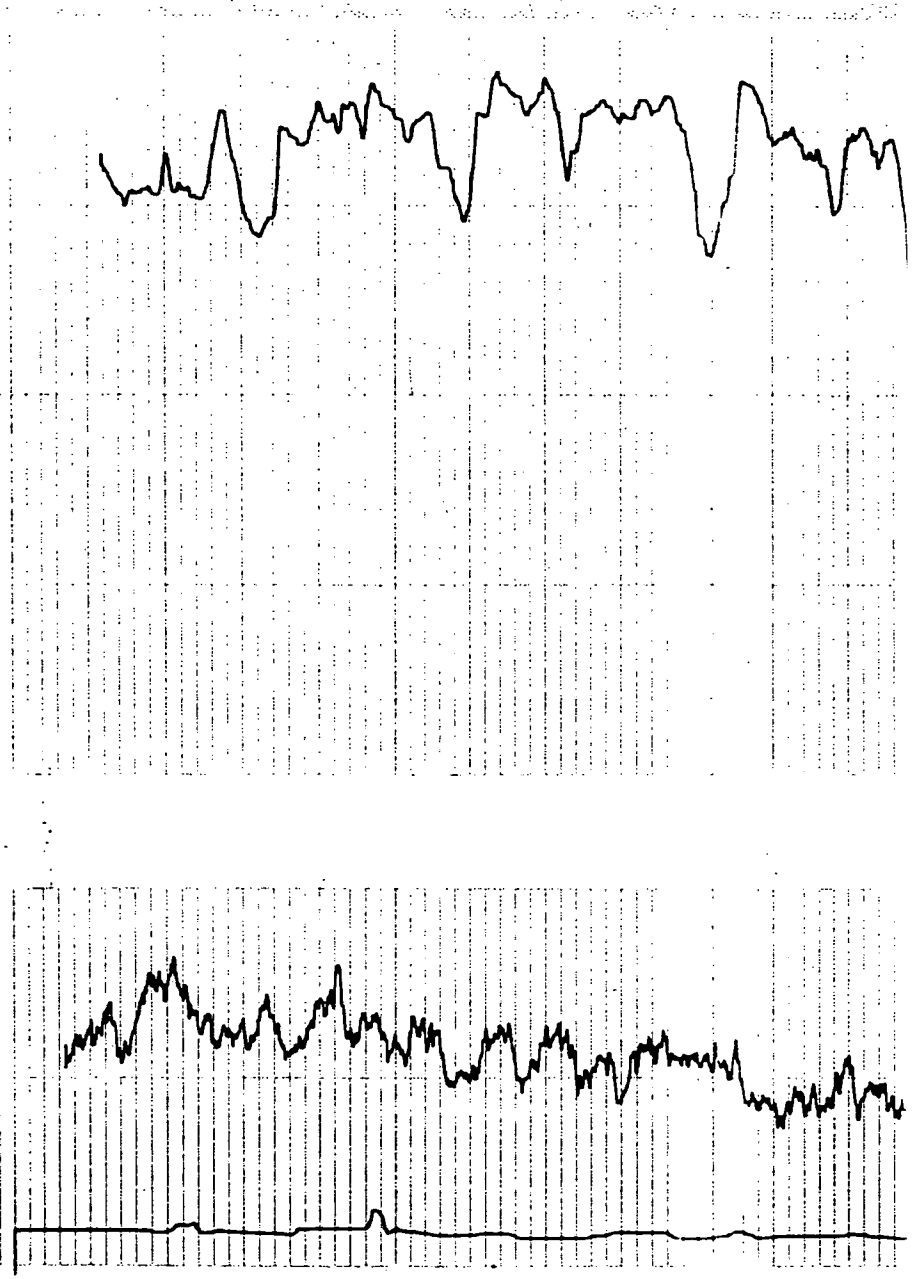
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH	1"		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

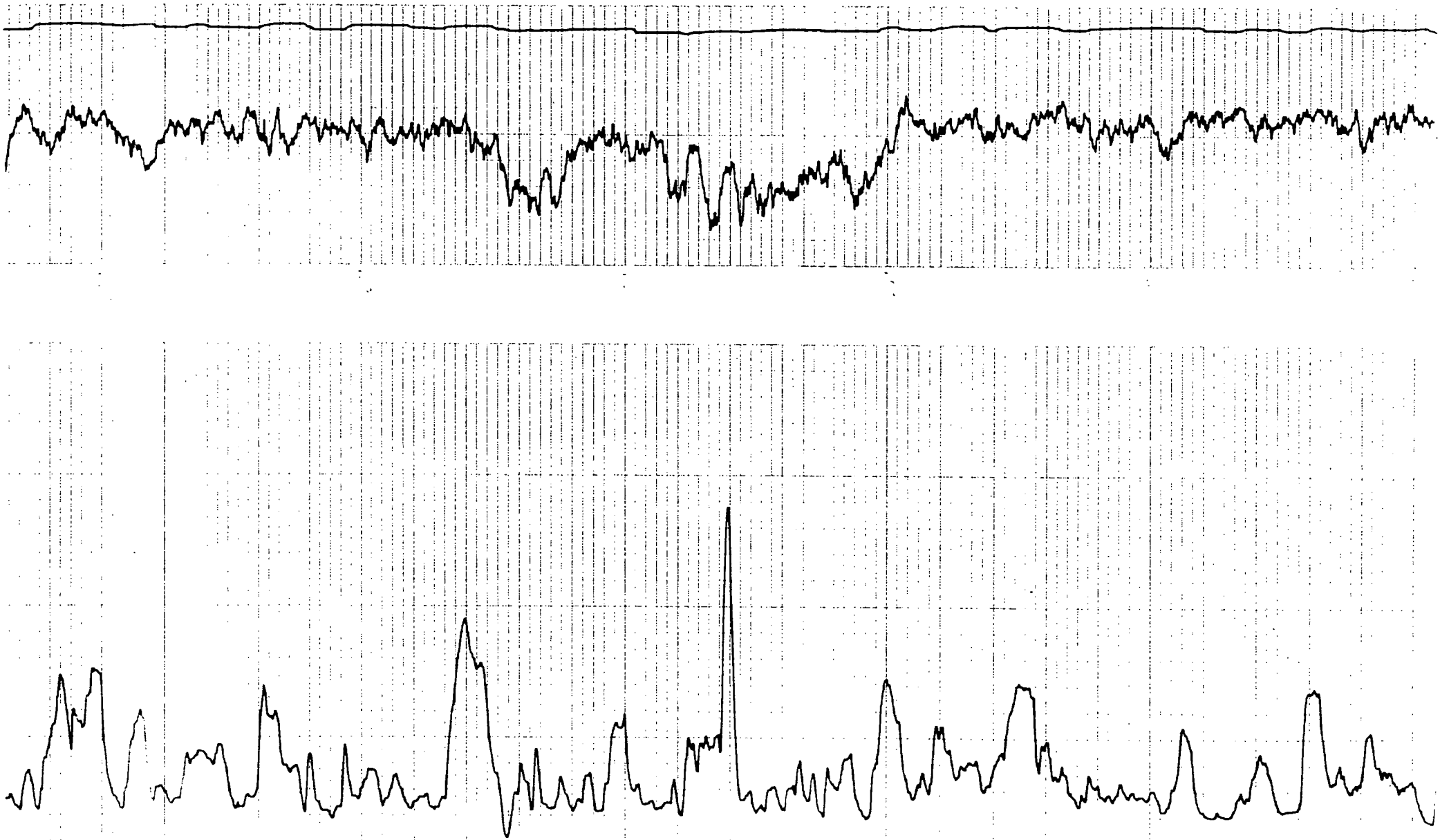
LOGGING DATA

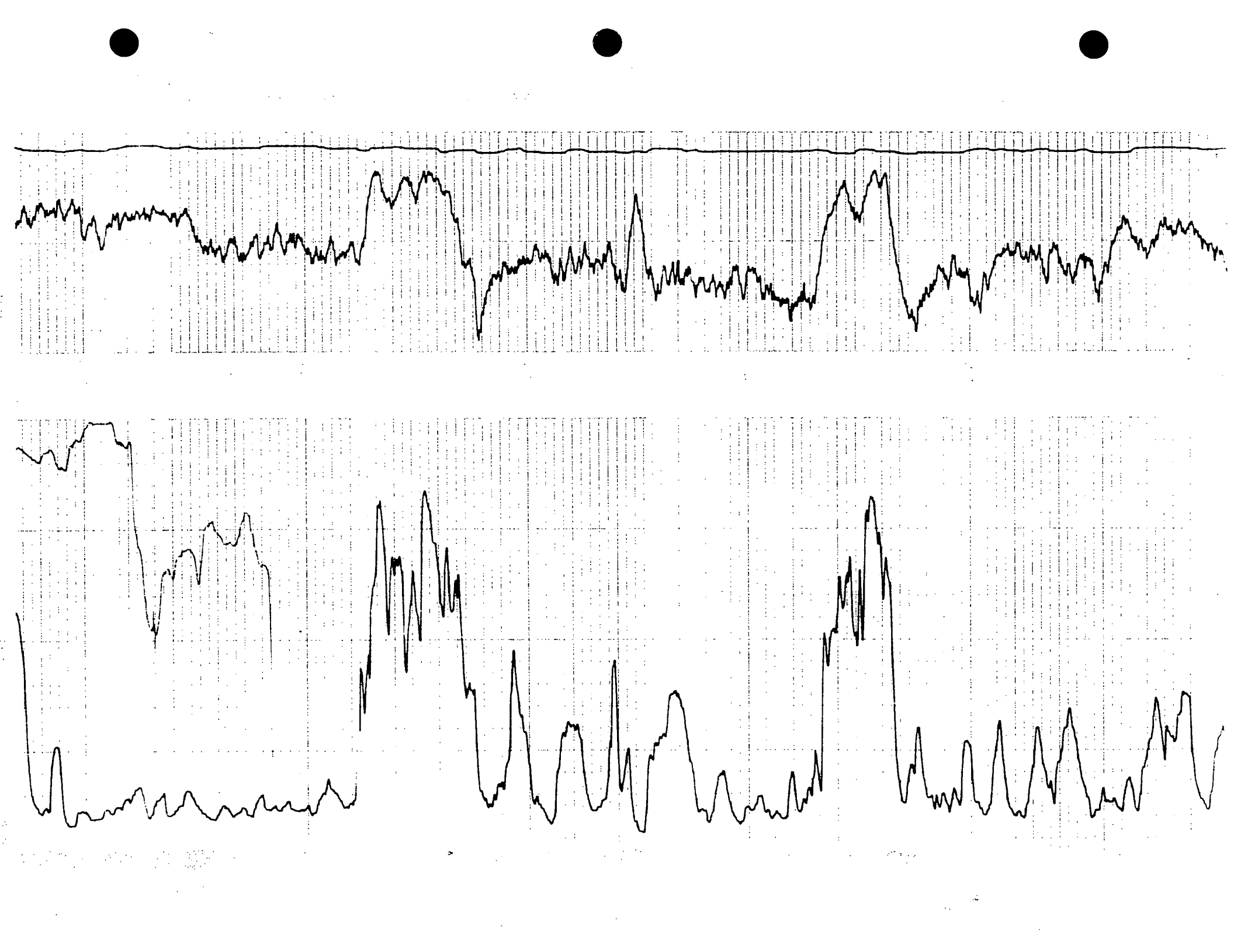
GENERAL				GAMMA RAY				DENSITY		
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	T C SEC	SENS SETTINGS	ZERO
			[illegible]							

REMARKS:









OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE May 3 1993

COMPANY _____

HOLE NO. 93 - NP - 23

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	12	Till	
12	190	Sandstone	
190	199	Coal	
199	241	Sandstone	
241	252	Coal	
252	320	Sandstone	

COMMENTS _____

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-23

LOCATION _____ SEC. TP. RGE. W.

AREA NORTH PLATEAU

PROVINCE _____

SURVEYED DATA

ELEV. 1565.0

LOC. 5425.0 N

5045.0 E

RUN No.	1	2	3
DATE	03/MAR/93		
DEPTH-DRILLER	320		
DEPTH-LOGGER	320		
FLUID LEVEL	DRY		
LOGGING TIME			
DRILLED BY	C. MOORE		
RECORDED BY	C. MOORE		
WITNESSED BY			

BORE-HOLE RECORD			CASING RECORD		
BIT	FROM	TO	SIZE	FROM	TO
			6 3/4"	0	20

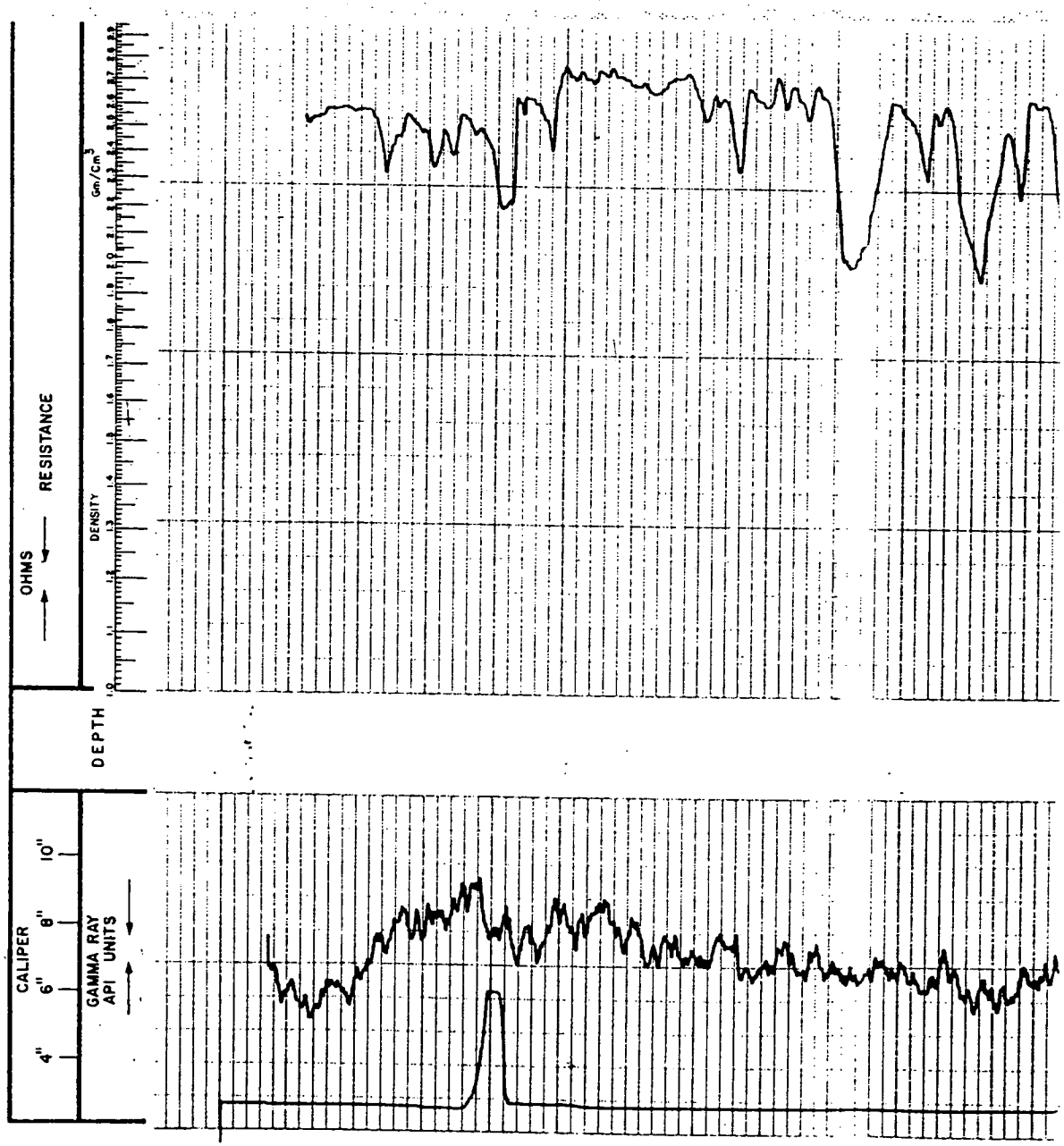
EQUIPMENT DATA

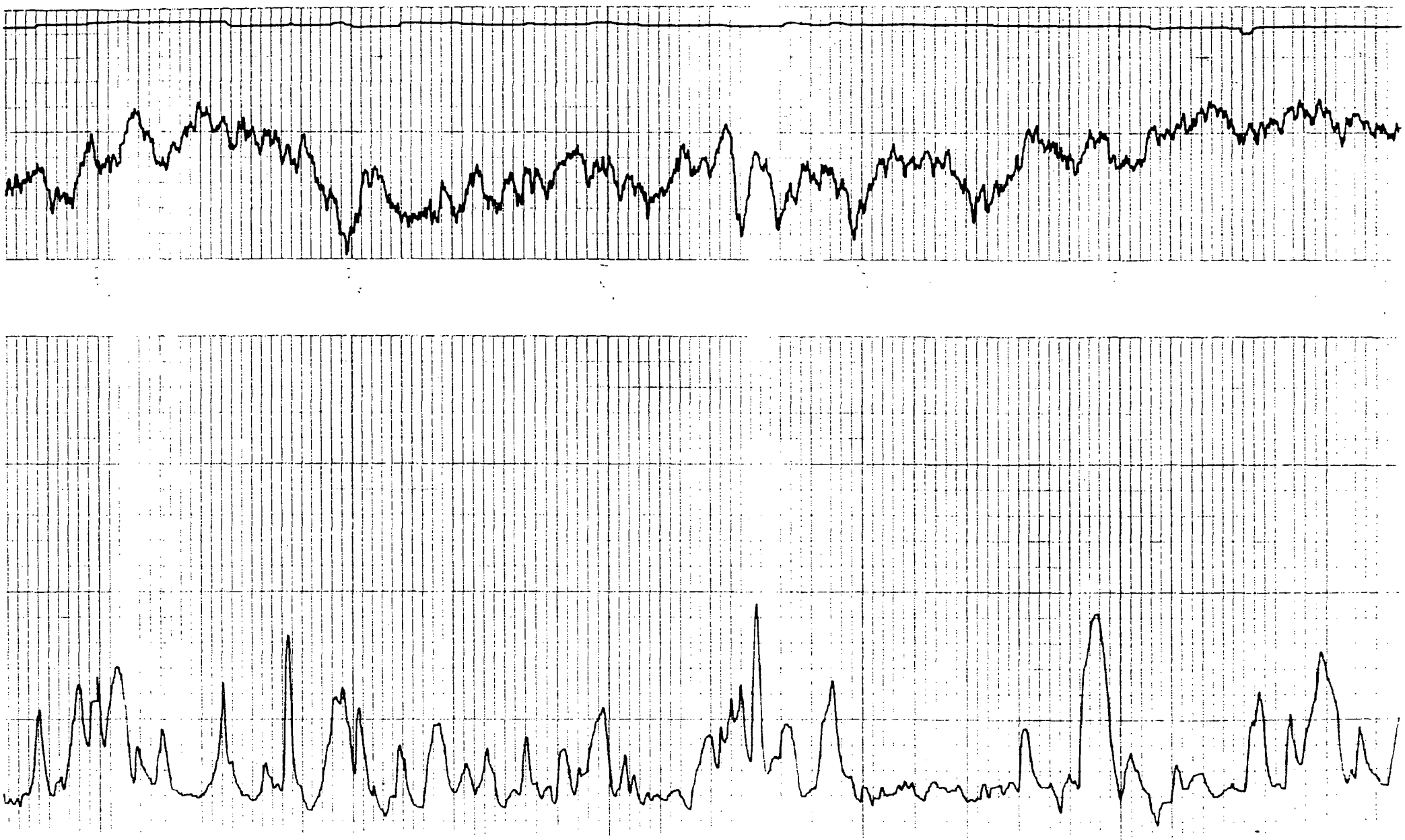
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH	1"		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

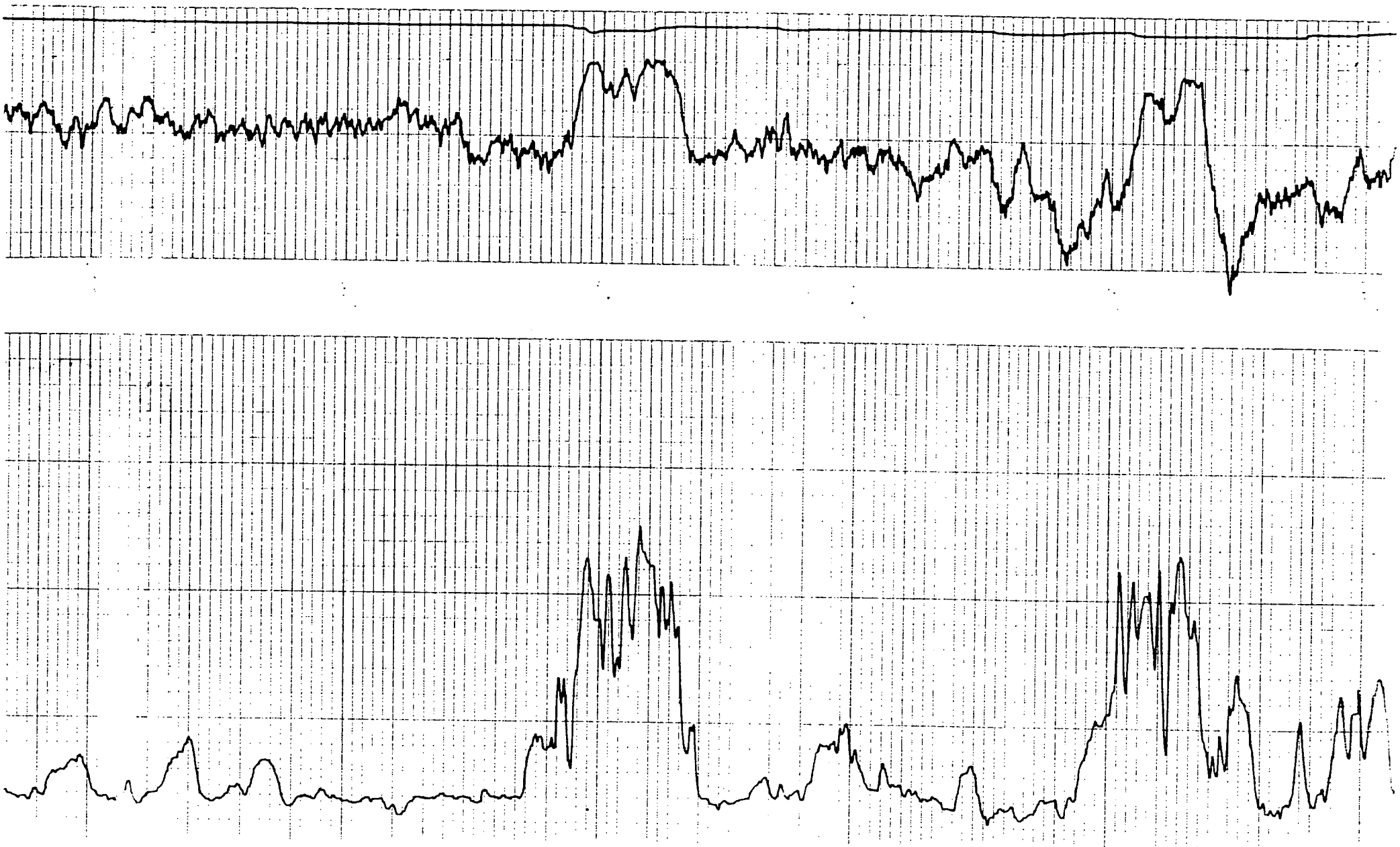
LOGGING DATA

GENERAL				GAMMA RAY				DENSITY		
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	T C SEC	SENS SETTINGS	ZERO
			12							

REMARKS:







OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 27 1993

COMPANY _____

HOLE NO. 93-NP-A24

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	12	Till	
12	26	Mudstone	
26	163	Sandstone	
163	165	Coal	(Blind at 140)
165	194	Sandstone	
194	199	Coal & Mudstone	
199	218	Sandstone	
218	227	Coal	
227	267	Sandstone	
267	279	Coal	
279	340	Sandstone	

COMMENTS _____

EXCO
TESTING LTD.

GAMMA-DENSITY-RESISTANCE

ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE
LOCATION SEC TP RGE W
AREA
PROVINCE

SURVEYED DATA
ELEV.
LOC.

RUN No.	1	2	3
DATE	27-APRIL-82		
DEPTH-DRILLER	340		
DEPTH-LOGGER	340		
FLUID LEVEL	197		
LOGGING TIME			
DRILLED BY	C. Moore		
RECORDED BY	C. Moore		
WITNESSED BY	K.J.R		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
6 5/8	0	30

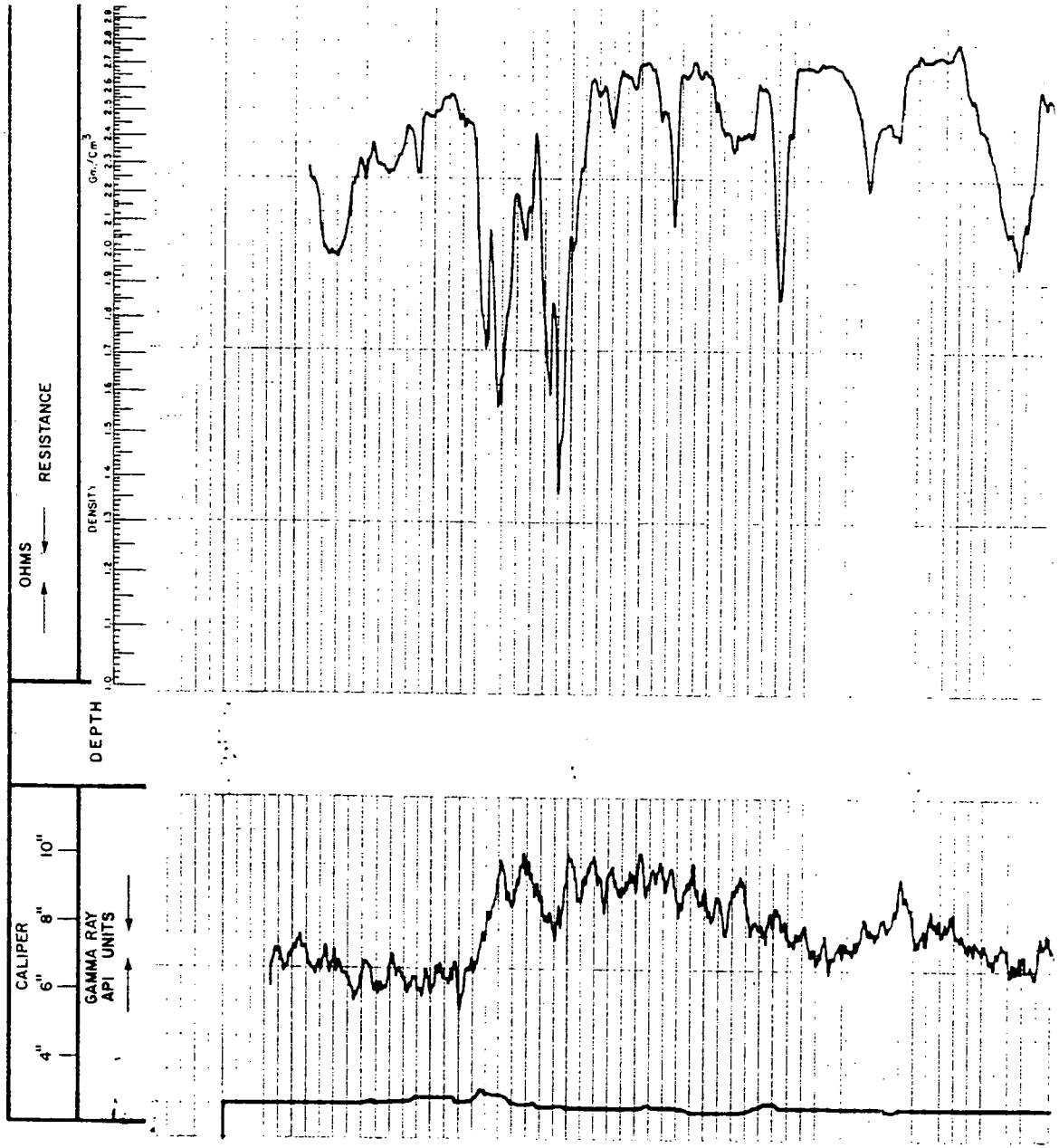
EQUIPMENT DATA

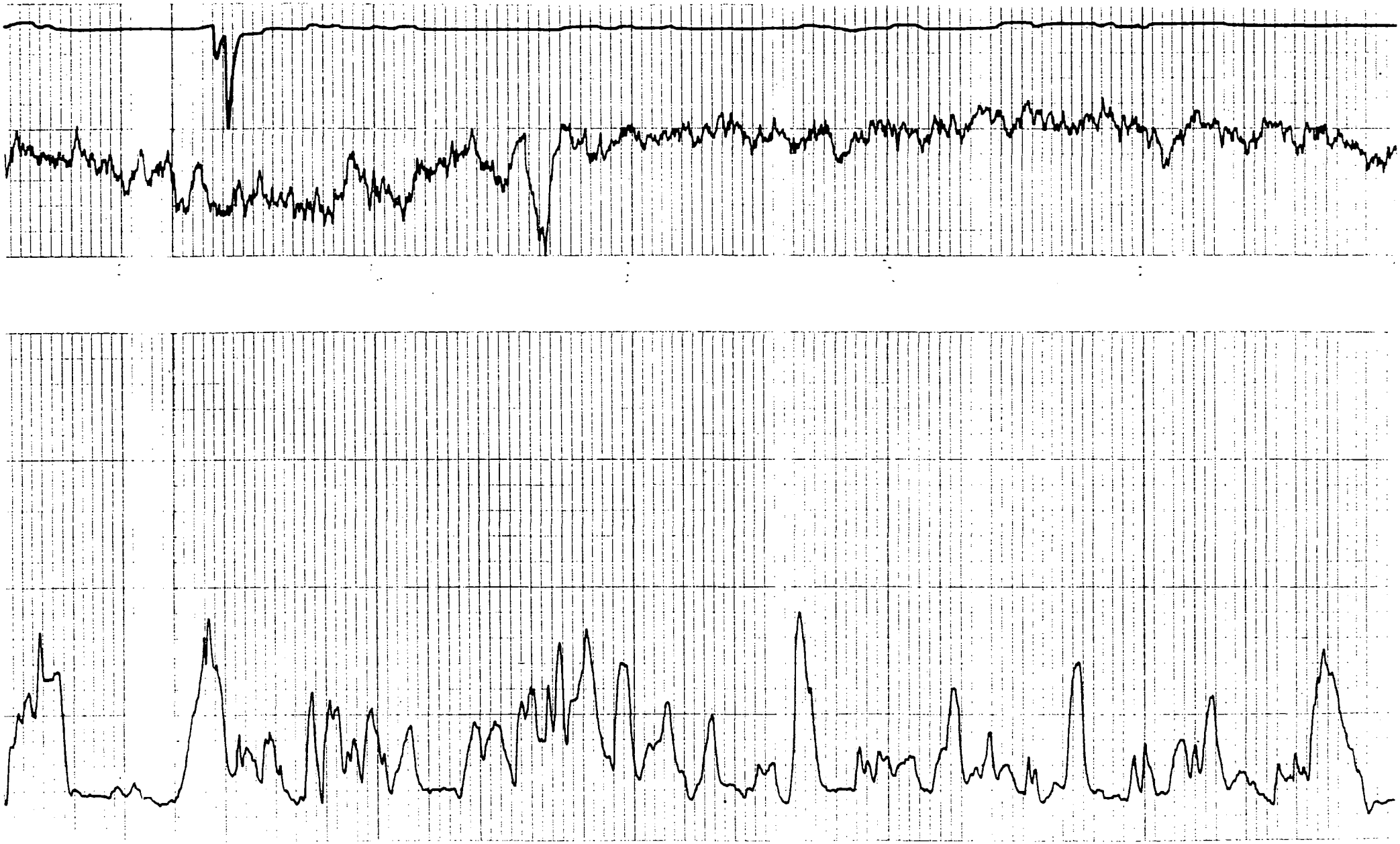
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH	1"		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

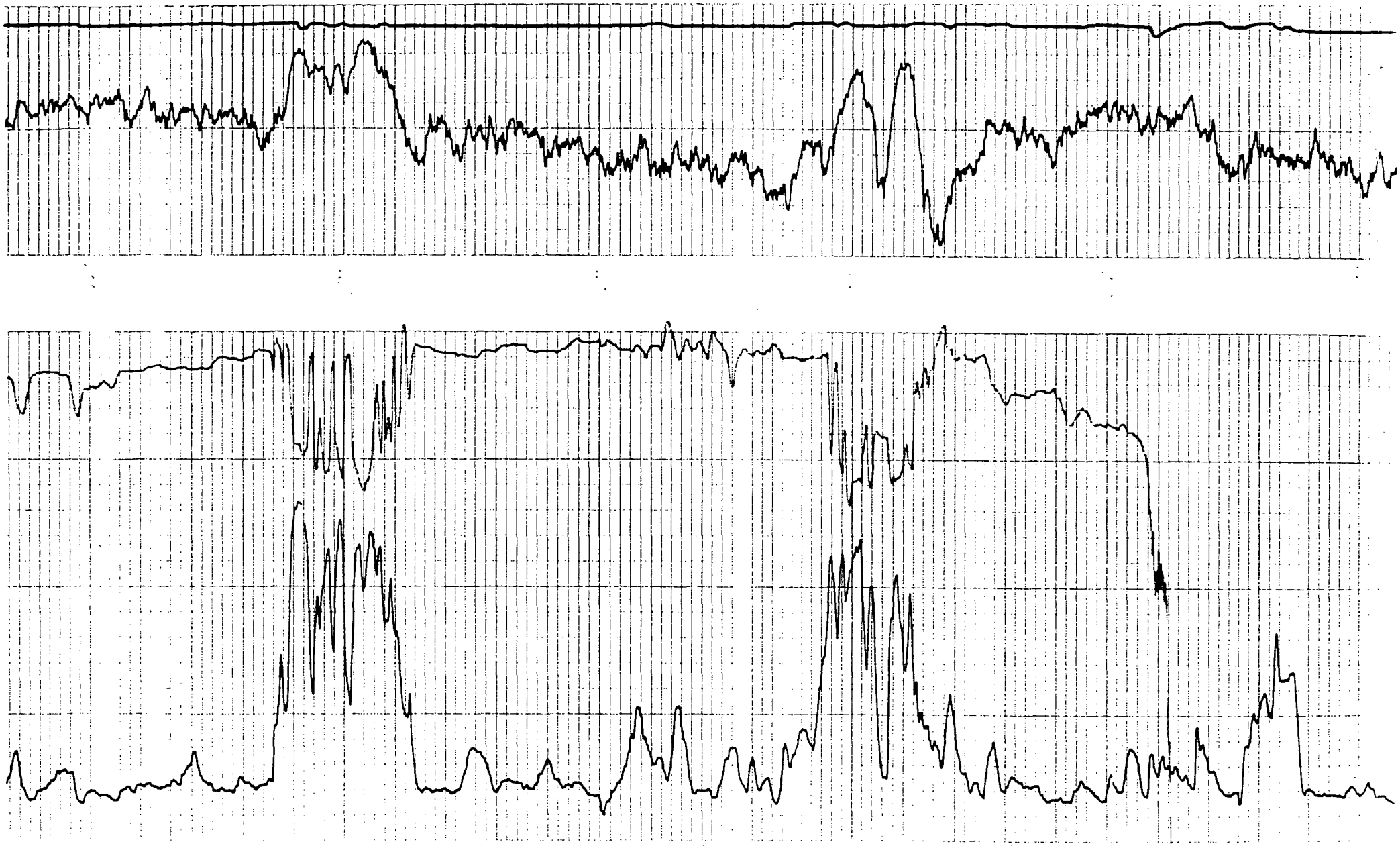
LOGGING DATA

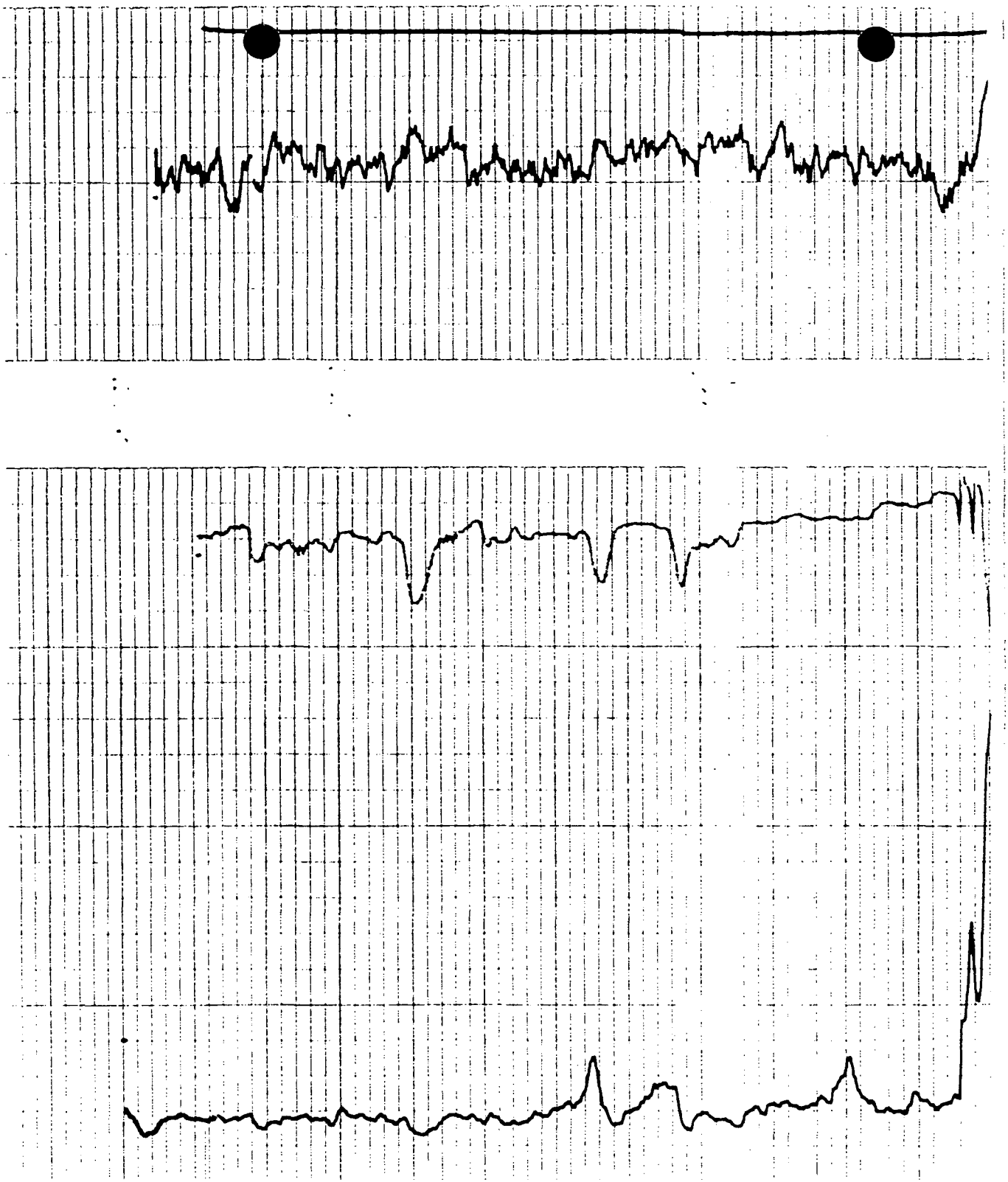
RUN No.	GENERAL DEPTHS FROM	TO	SPEED Ft/min.	GAMMA RAY T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	DENSITY T C SEC	SENS SETTINGS	ZERO

REMARKS:









OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 26 1993

COMPANY _____

HOLE NO. 93 NP - # 25

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	9	Till	
9	109	Sandstone	
109	110	TRACE OF COAL ?	
110	176	SANDSTONE	
176	186	Mudstone	
186	203	Sandstone	
203	208	Coal	
208	253	Sandstone	
253	265	Coal	
265	320	Sandstone	

COMMENTS _____

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-25

LOCATION _____ SEC. TP. RGE. W.

AREA NORTH PLATEAU

PROVINCE O.M.C.

SURVEYED DATA

ELEV. 1488.6

LOC. 54685 N

50342 E

RUN No.	1	2	3
DATE	26-APRIL-93		
DEPTH-DRILLER	320		
DEPTH-LOGGER	320		
FLUID LEVEL	300		
LOGGING TIME			
DRILLED BY	C. Moore		
RECORDED BY	C. Moore		
WITNESSED BY	K.T.R.		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
6 5/8	C	320

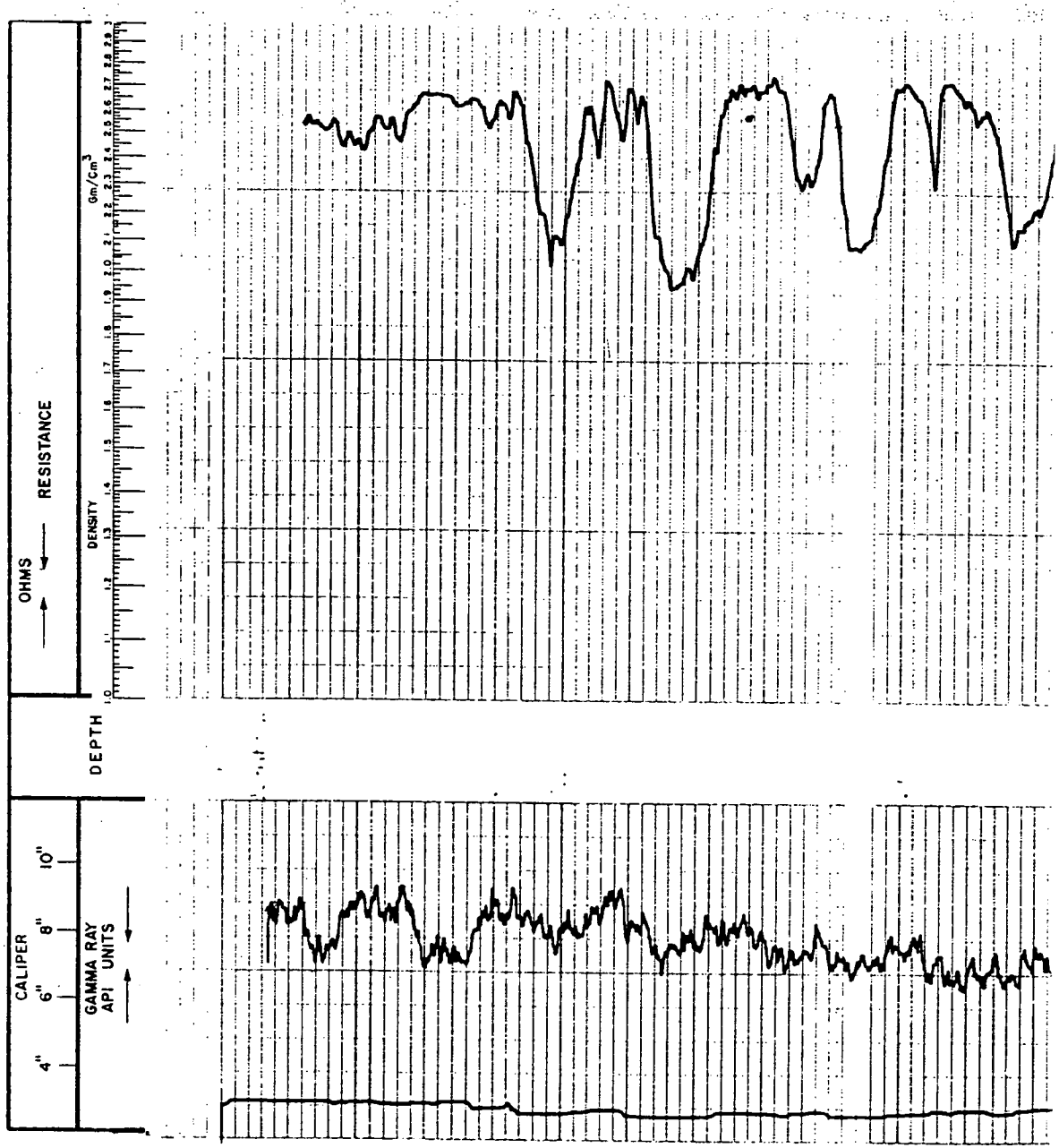
EQUIPMENT DATA

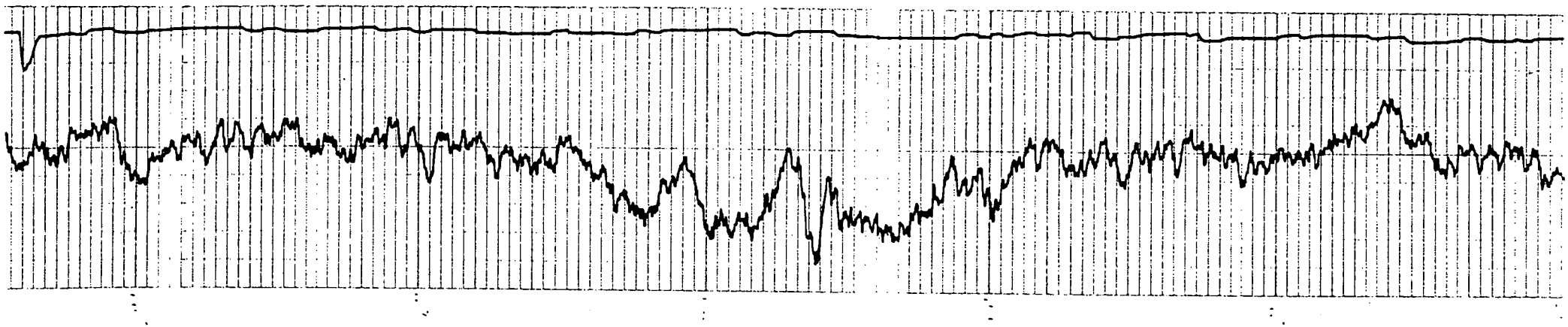
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH	1"		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

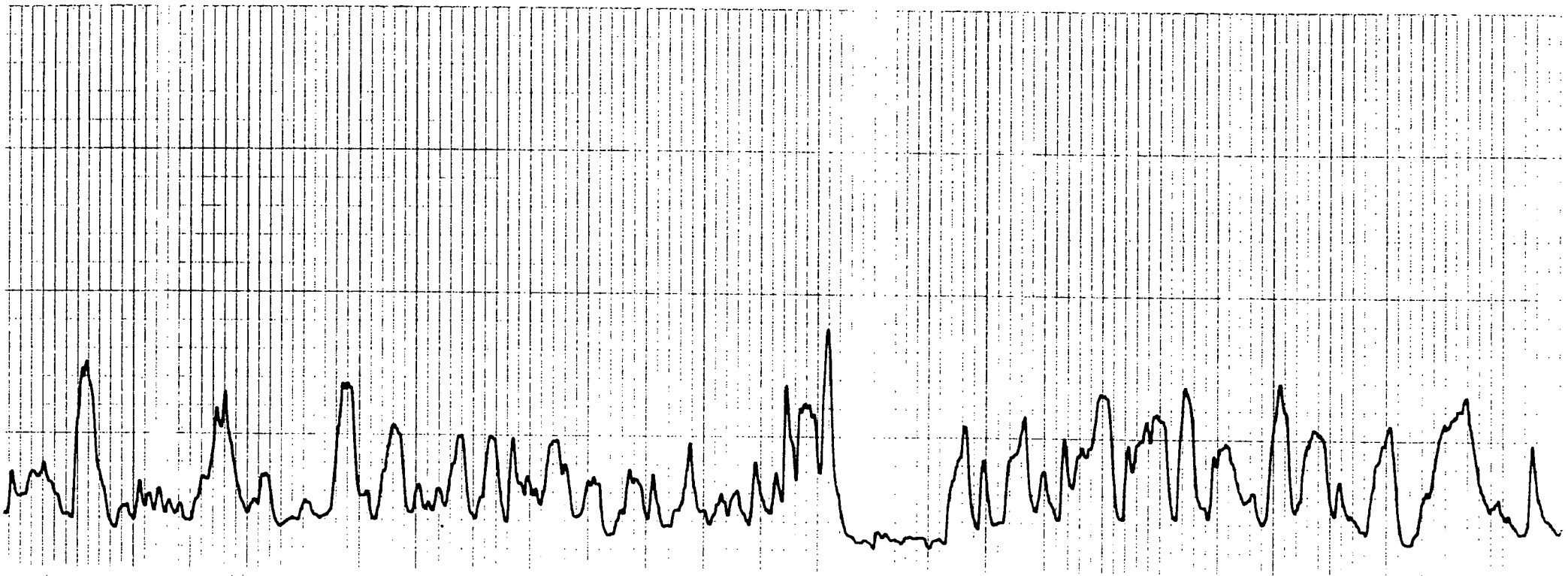
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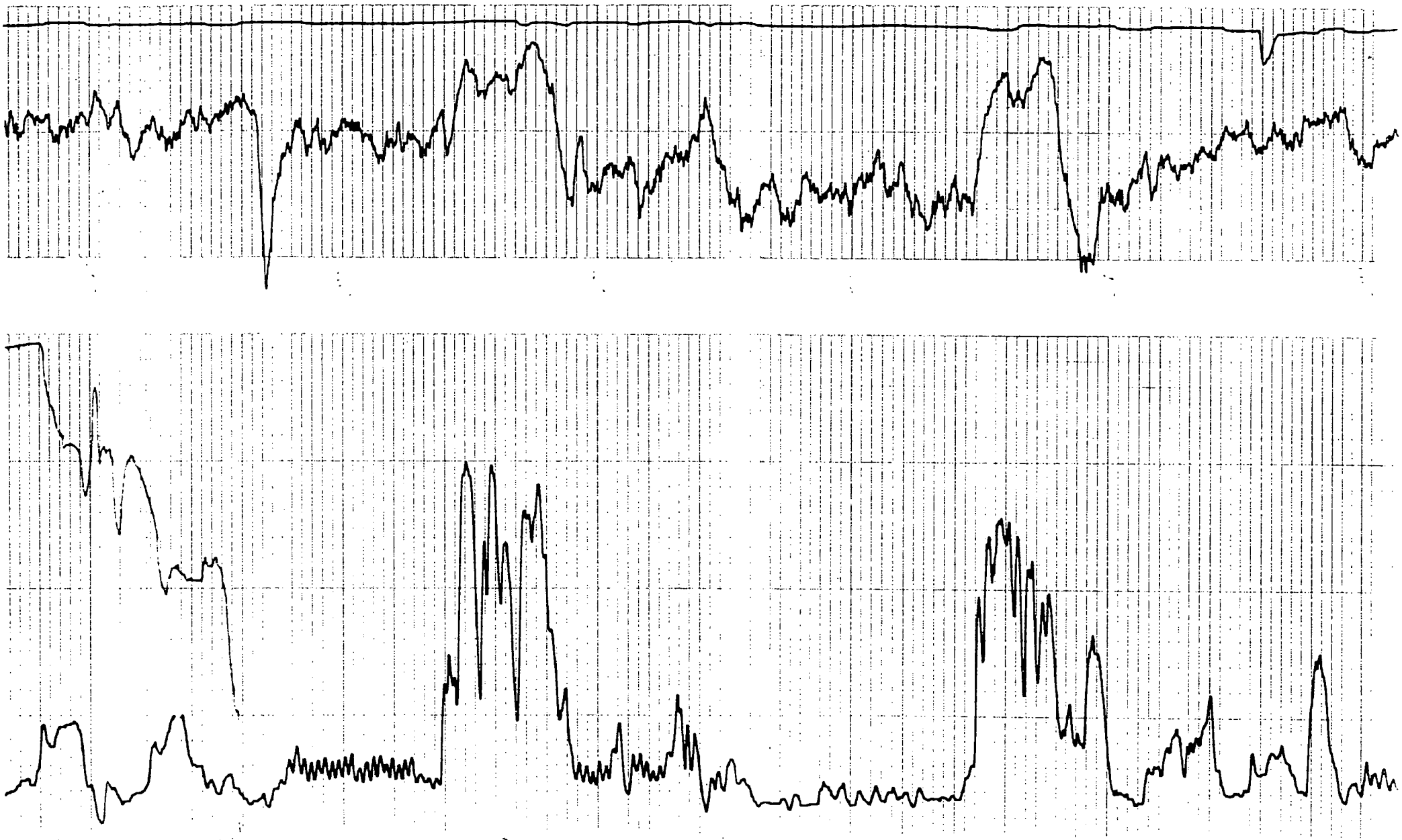
GENERAL				GAMMA RAY				DENSITY		
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	T C SEC	SENS SETTINGS	ZERO
			12							

REMARKS:









OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 27 199-

COMPANY _____

HOLE NO. 93 - NP - # 26

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	4	Till	
4	90	SANDSTONE	
90	91	Coal ?	
91	180	Sandstone	
180	188	Coal	
188	228	Sandstone	
228	240	Coal	
240	300	Sandstone	

COMMENTS _____

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE [illegible]

LOCATION ____ SEC ____ TP ____ RGE ____ W.

AREA [illegible]

PROVINCE [illegible]

SURVEYED DATA

ELEV. [illegible]

LOC. [illegible]

RUN No.	1	2	3
DATE	[illegible]		
DEPTH-DRILLER	[illegible]		
DEPTH-LOGGER	[illegible]		
FLUID LEVEL	[illegible]		
LOGGING TIME			
DRILLED BY	[illegible]		
RECORDED BY	[illegible]		
WITNESSED BY	[illegible]		

BORE-HOLE RECORD			CASING RECORD		
BIT	FROM	TO	SIZE	FROM	TO
			[illegible]		

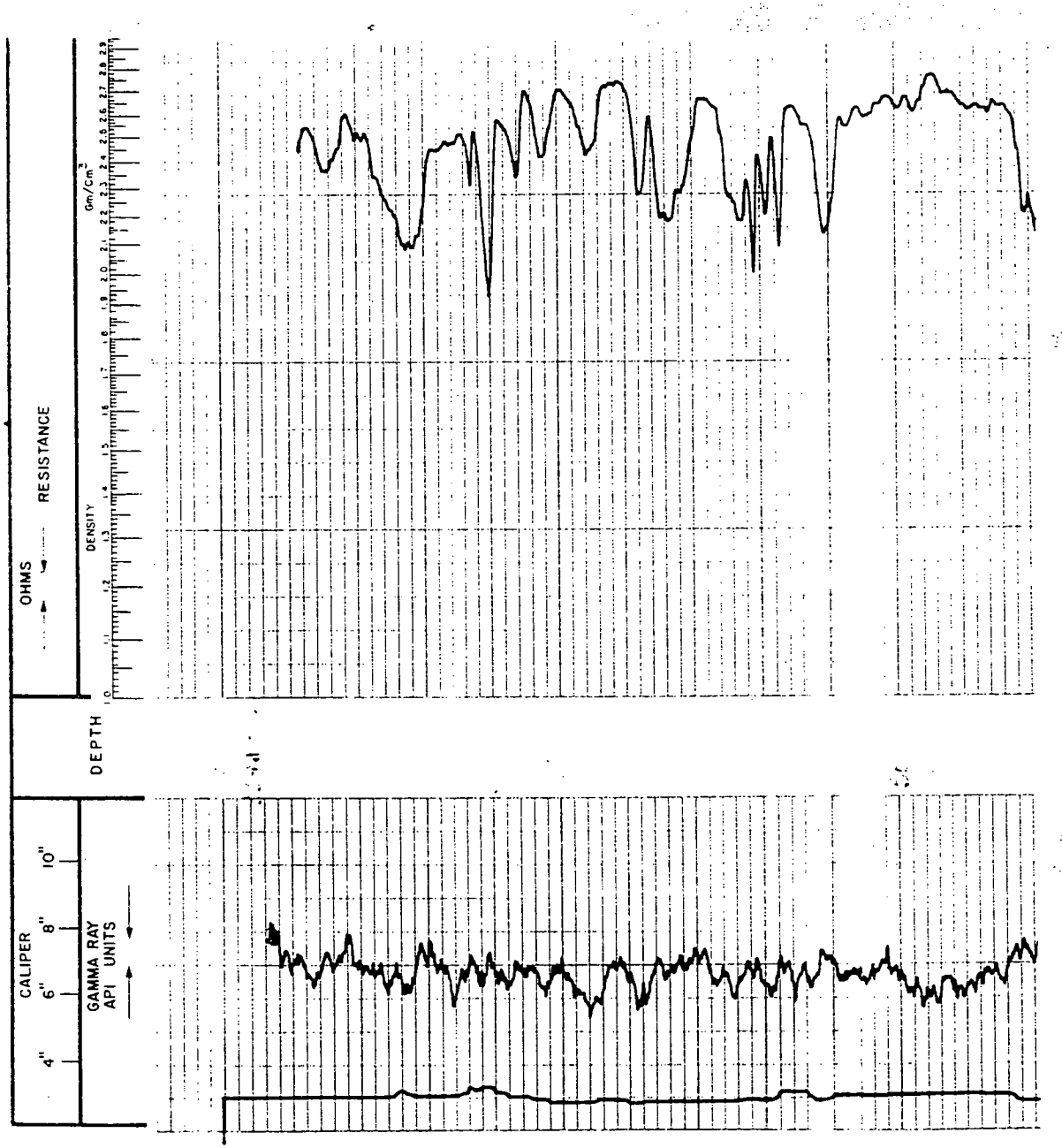
EQUIPMENT DATA

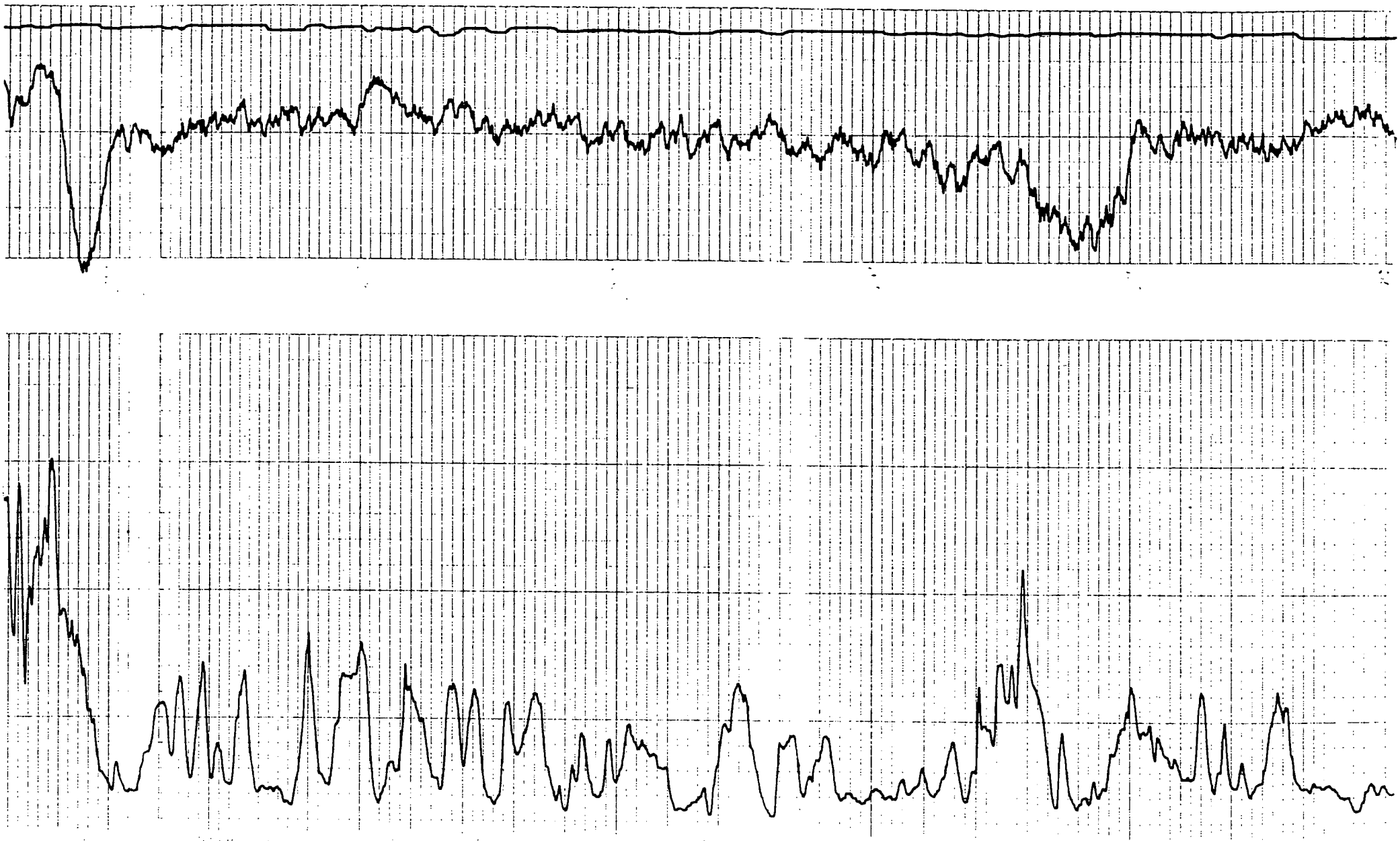
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH	1"		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

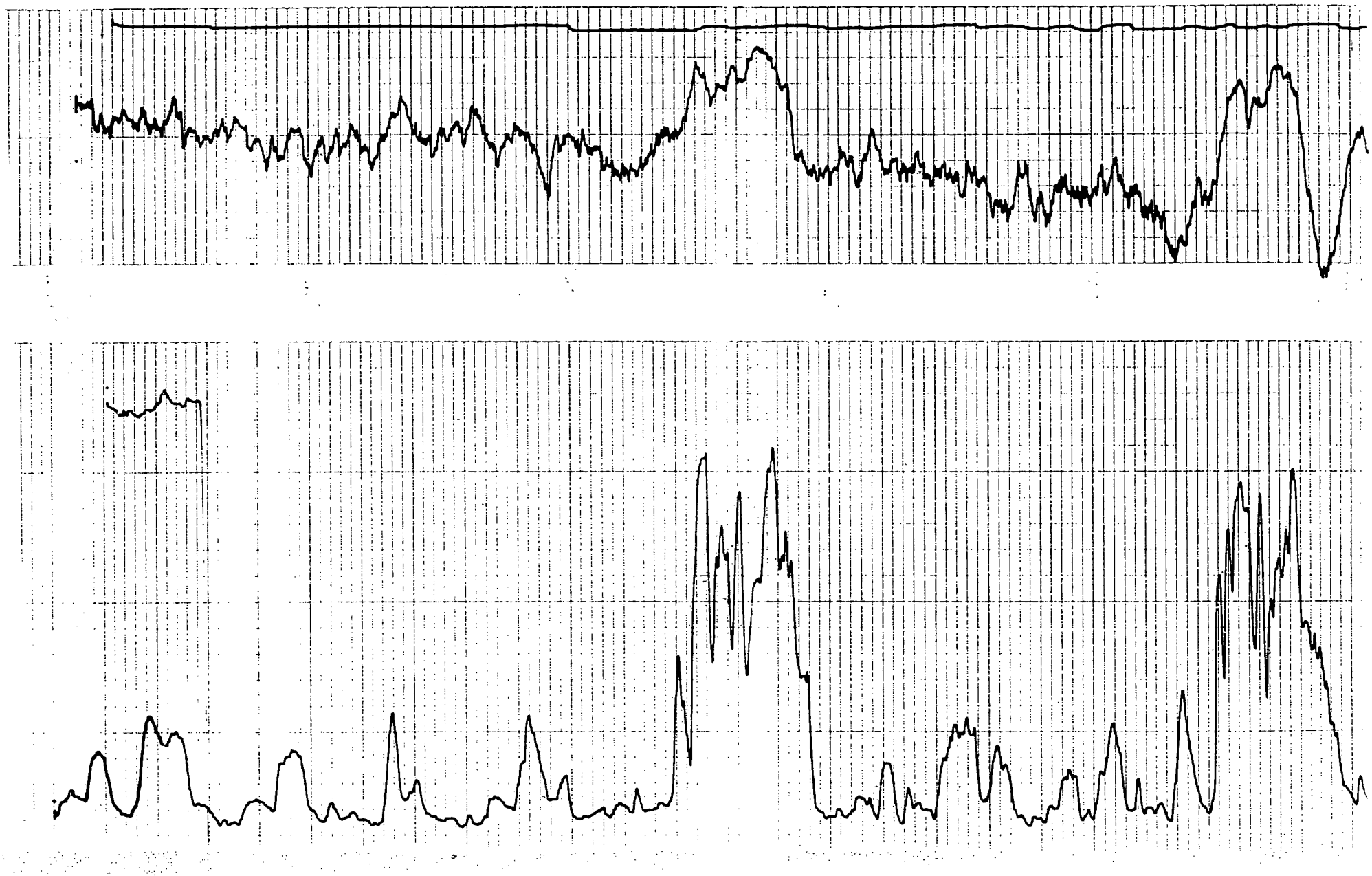
LOGGING DATA

GENERAL				GAMMA RAY			DENSITY		
RUN No.	DEPTHS FROM	TO	SPEED Ft/min.	T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	T C SEC	SENS SETTINGS	ZERO
			[illegible]							

REMARKS:







OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE May 3 1993

COMPANY _____

HOLE NO. 93-NP-27

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	20	Till Clay & Lots Of Rocks	
20	98	Sandstone	
98	110	Coal	
110	150	Sandstone	
150	161	Coal	
161	220	Sandstone	

COMMENTS _____

WATER HORIZON _____ FT.

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-27

LOCATION _____ SEC. TP. RGE. W.

AREA NORTH PEMBINA

PROVINCE ALTA

SURVEYED DATA

ELEV. _____

LOC. _____

RUN No.	1	2	3
DATE	03/MAY/93		
DEPTH-DRILLER	220		
DEPTH-LOGGER	220		
FLUID LEVEL	215		
LOGGING TIME			
DRILLED BY	[illegible]		
RECORDED BY	[illegible]		
WITNESSED BY	[illegible]		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
6 3/4	0	30

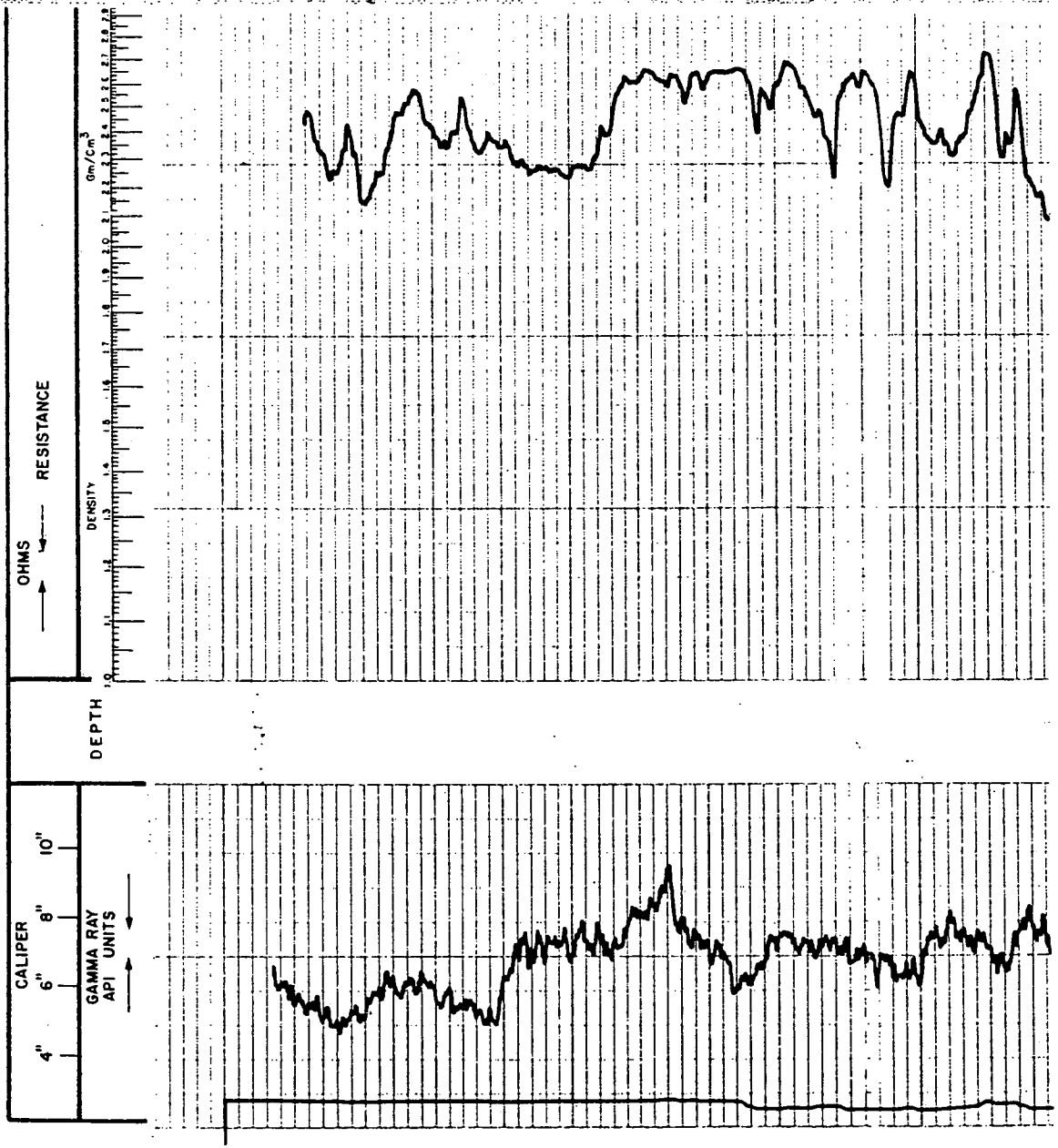
EQUIPMENT DATA

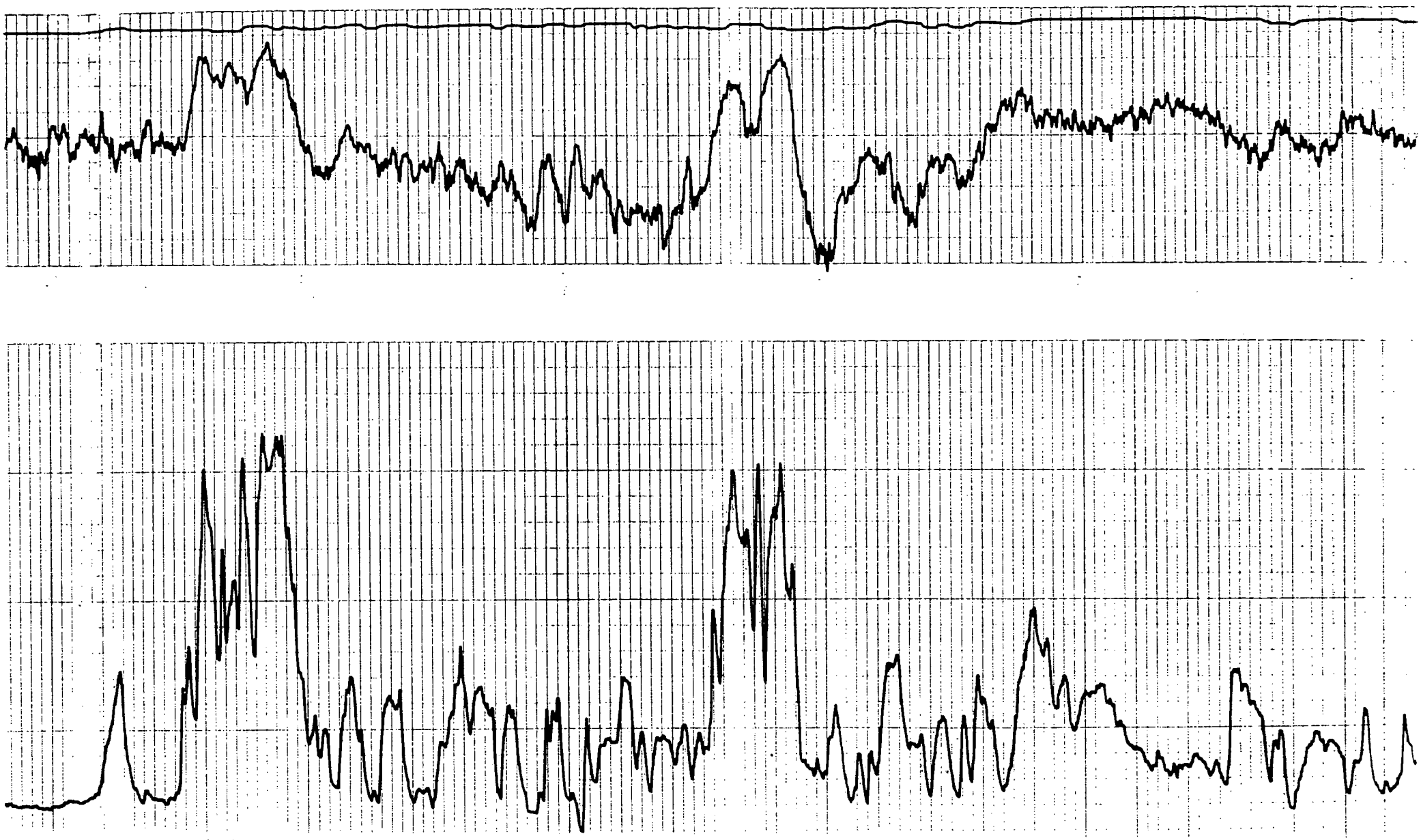
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH	1"		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

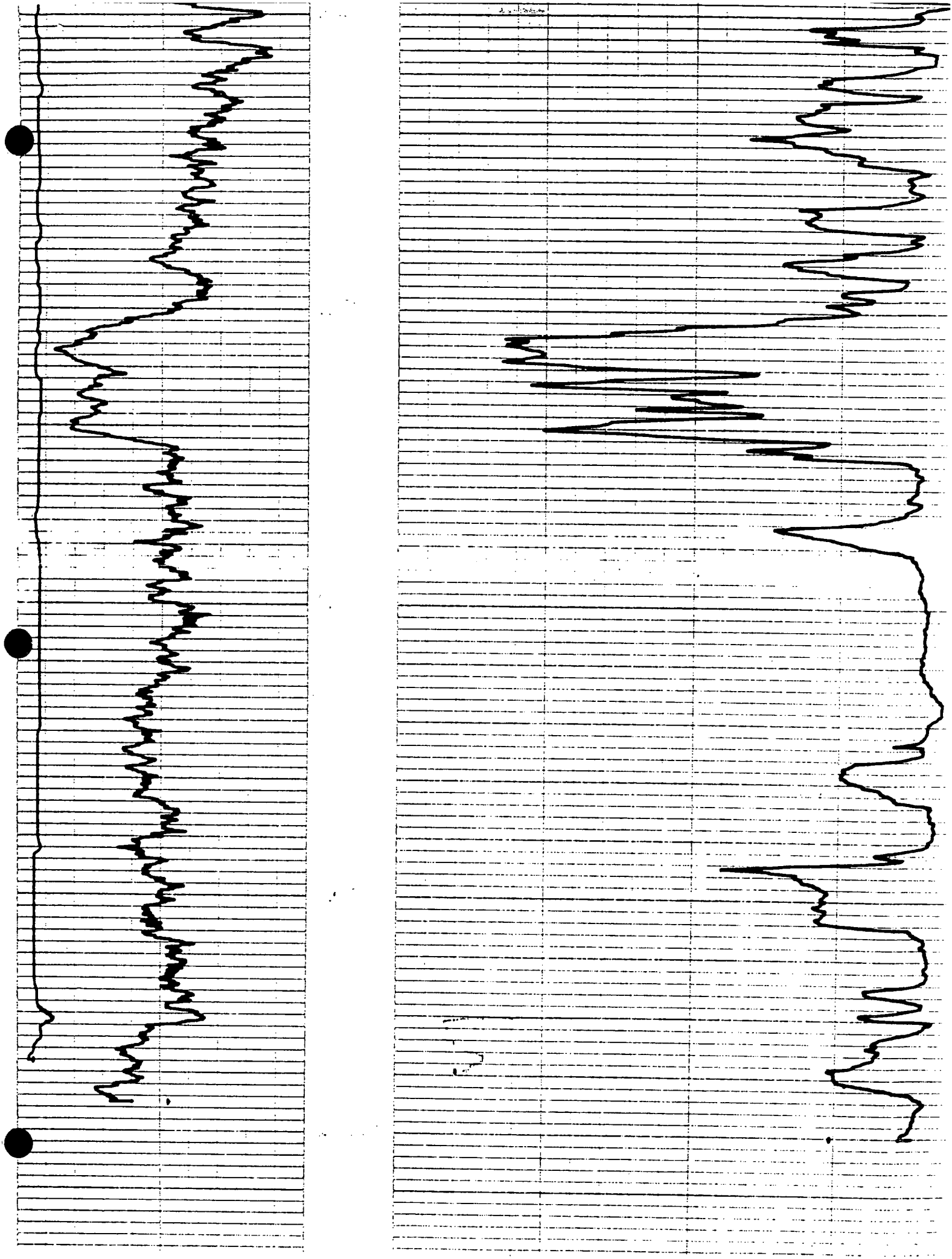
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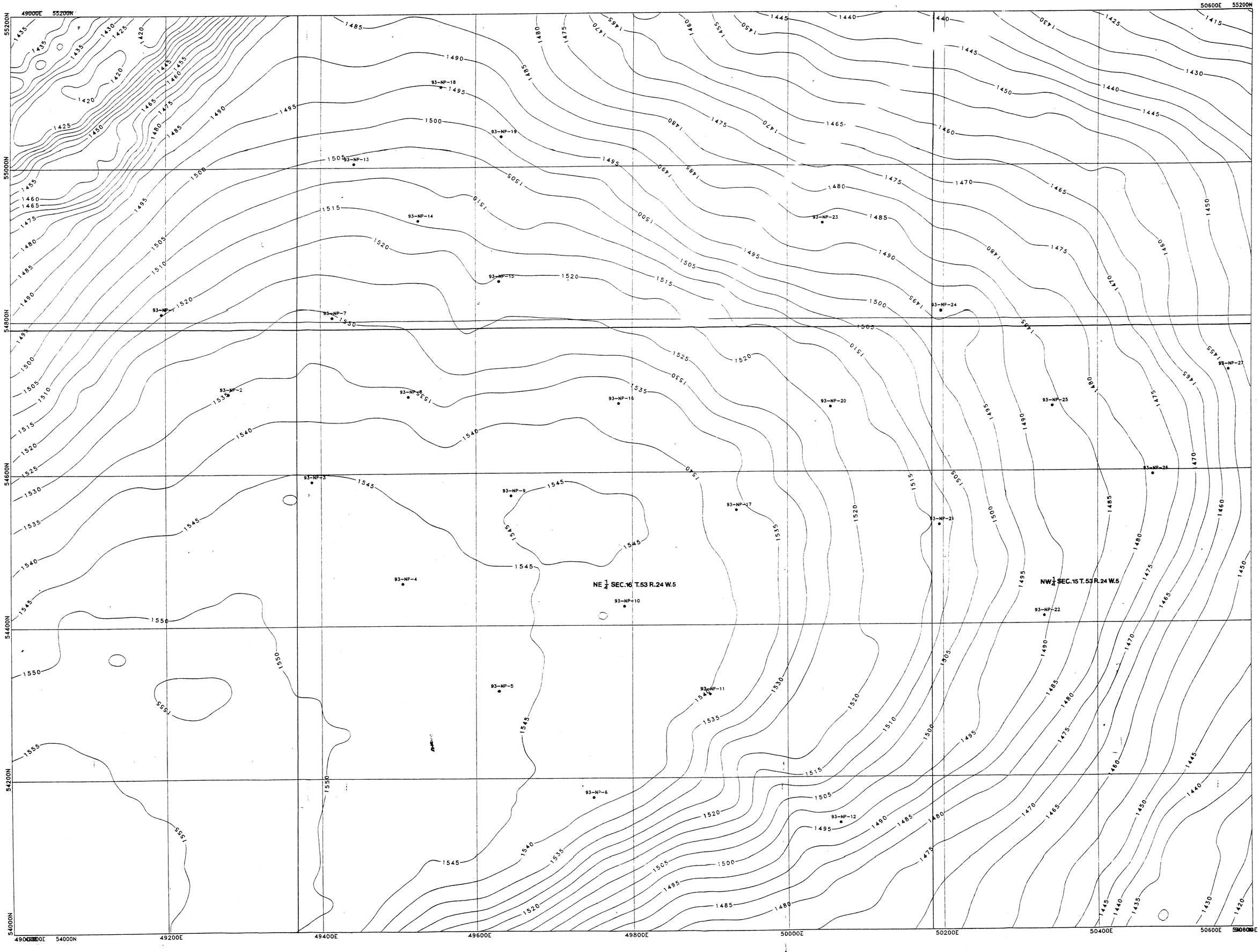
GENERAL				GAMMA RAY				DENSITY		
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	T C SEC	SENS. SETTINGS	ZERO

REMARKS:









BOREHOLE LOCATIONS FOR NORTH PLATEAU DRILL PROGRAM
SCALE: 1:2000
CONTOUR INTERVAL: 5M

57 600 N
57 400 N
57 200 N
57 000 N
56 800 N
56 600 N
56 400 N

48 200 E
48 400 E
48 600 E
48 800 E
49 000 E
49 200 E
49 400 E
49 600 E
49 800 E
50 000 E

SEC.28 SEC.27
SEC.21 SEC.22
TWP.53 RNG.24 W5

Date of Photography: September 25, 1991.
Scale of Photography 1:20 000
Survey control supplied by: Obed Mountain Coal Ltd.
Compiled by The ORTHOSHOP, Calgary, November 1991.
wo 3870

Sheet Key

	19	20
		18
1	2	16
3	4	5

OBED MOUNTAIN COAL LTD

MINESITE AREA

Alberta

Scale 1:2 000

meters 10 0 20 40 60 80 100 meters

feet 100 0 100 200 300 400 feet

contour interval 2m

Approximate Declination 1990
annual change decreasing 11.0'

Paved Road
Gravel Road
Trail
Railway
Fence
Retaining Wall
River
Stream
Ditch
Index Contour
Intermediate Contour
Depression

Intermittent Lake
Trees
Single Tree
Pole
Post
Light Standard
Manhole
Fire Hydrant
Horizontal Control Point
Vertical Control Point
933.7 Spot Height

obed mtn

OBED SOUTH 1993
NORTH PLATEAU DRILL AND CORE PROGRAM

HOLE NUMBER	NORTHING	EASTING	ELEVATION
93-NP-1	54,810	49,195	1,520
93-NP-2	54,705	49,280	1,534
93-NP-3	54,590	49,388	1,545
93-NP-4	54,455	49,504	1,549
93-NP-5	54,315	49,630	1,545
93-NP-6	54,175	49,750	1,542
93-NP-7	54,805	49,415	1,531
93-NP-8	54,700	49,512	1,537
93-NP-9	54,570	49,645	1,545
93-NP-10	54,425	49,790	1,543
93-NP-11	54,310	49,900	1,538
93-NP-12	54,140	50,068	1,494
93-NP-13	55,005	49,442	1,506
93-NP-14	54,930	49,525	1,513
93-NP-15	54,850	49,630	1,518
93-NP-16	54,690	49,783	1,538
93-NP-17	54,550	49,935	1,536
93-NP-18	55,105	49,555	1,495
93-NP-19	55,040	49,633	1,496
93-NP-20	54,685	50,056	1,523
93-NP-21	54,530	50,195	1,515
93-NP-22	54,410	50,332	1,492
93-NP-23	54,925	50,045	1,485
93-NP-24	54,810	50,197	1,492
93-NP-25	54,685	50,342	1,489
93-NP-26	54,595	50,473	1,480
93-NP-27	54,730	50,570	1,454

...YCS
...TING LTD.

GAMMA-DENSITY-RESISTANCE

...D ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

...LE ... SURVEYED DATA

...CATION ... SEC ... TP ... RGE ... W ... ELEV. K.B. ...

...FIELD ... LOG MEASURED FROM ...

PROVINCE ALTA ... 40166 E

No	1	2	3
...E			
...TH-DRILLER			
...TH-LOGGER			
...G LEVEL			
...GGING TIME			
...DED BY			
...CORDED BY			
...NESSED BY			

BORE-HOLE RECORD

BIT	FROM	TO	SIZE	CASING RECORD FROM	TO
			...D		

EQUIPMENT DATA

GAMMA RAY			RESISTANCE	DENSITY	CALIPER
...OBE MODEL No.	6935	TOOL MODEL No.	L-103	L-104	
...VERTER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
...TECTOR MODEL No.	CP-116	TYPE	MS	T	
...TER	SONIT	SPACING		15"	
...NGTH	5'	LENGTH	1'		
GENERAL		HOR. SCALE			
...SITY M.		SOURCE MODEL			
...CATION		SOURCE		HOVF	
		STRENGTH		CS-137	
				125 mC	

LOGGING DATA

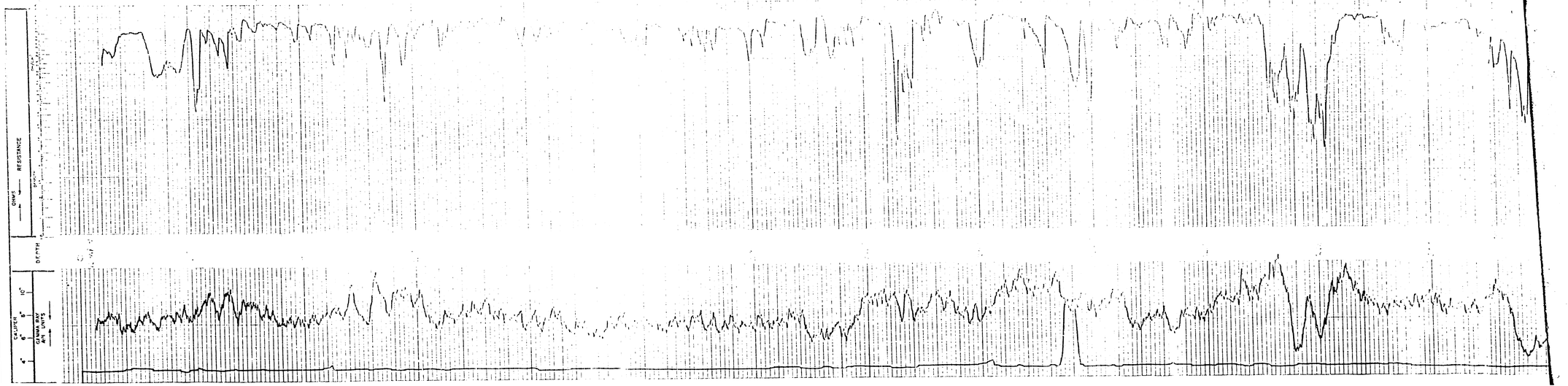
RUN No	DEPTHS FROM	DEPTHS TO	SPEED ft/min	T C SEC.	GAMMA RAY SELECTIVITY	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV.	DENSITY T C SEC.	DENSITY SENS SETTINGS	DENSITY ZERO
			15							

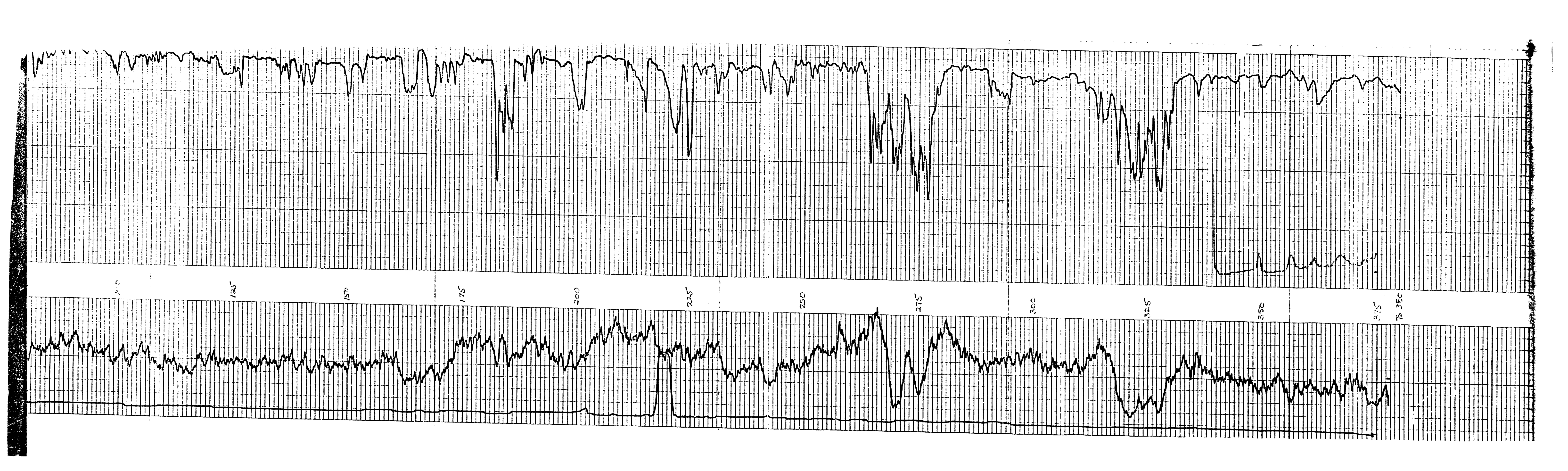
REMARKS:

OHMS — RESISTANCE

DEPTH

CALIPER — GAMMA RAY API UNITS




125
150
175
200
225
250
275
300
325
350
375
To 350

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 13 199

COMPANY _____

HOLE NO. 93 - NP - #2

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 54705 N 45280 E

ELEVATION 1534.3

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	9	Till	
9	10	Mudstone	
10	15	Sandstone	
15	16	Coal	
16	22	Sandstone	
22	26	Mudstone with coal	stringers
26	114	Sandstone	
114	118	Mudstone & coal	
118	314	Sandstone	
314	322	Coal	
322	361	Sandstone	
361	374	Coal (Blind)	
374	420	Sandstone	

COMMENTS _____

GAMMA-DENSITY-RESISTANCE

ELICS TESTING LTD.

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-2

LOCATION SEC. TP. RGE. W

AREA North Plateau.

PROVINCE O.M.C.

SURVEYED DATA

ELEV. 1534.3

LOC. 54705 N

49280 E

RUN No.	1	2	3
DATE			
DEPTH-DRILLER	420		
DEPTH-LOGGER	420		
FLUID LEVEL	379		
LOGGING TIME			
DRILLED BY	C. Moore		
RECORDED BY	C. Moore		
WITNESSED BY	K.T.P.		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
6 5/8	0	20

EQUIPMENT DATA

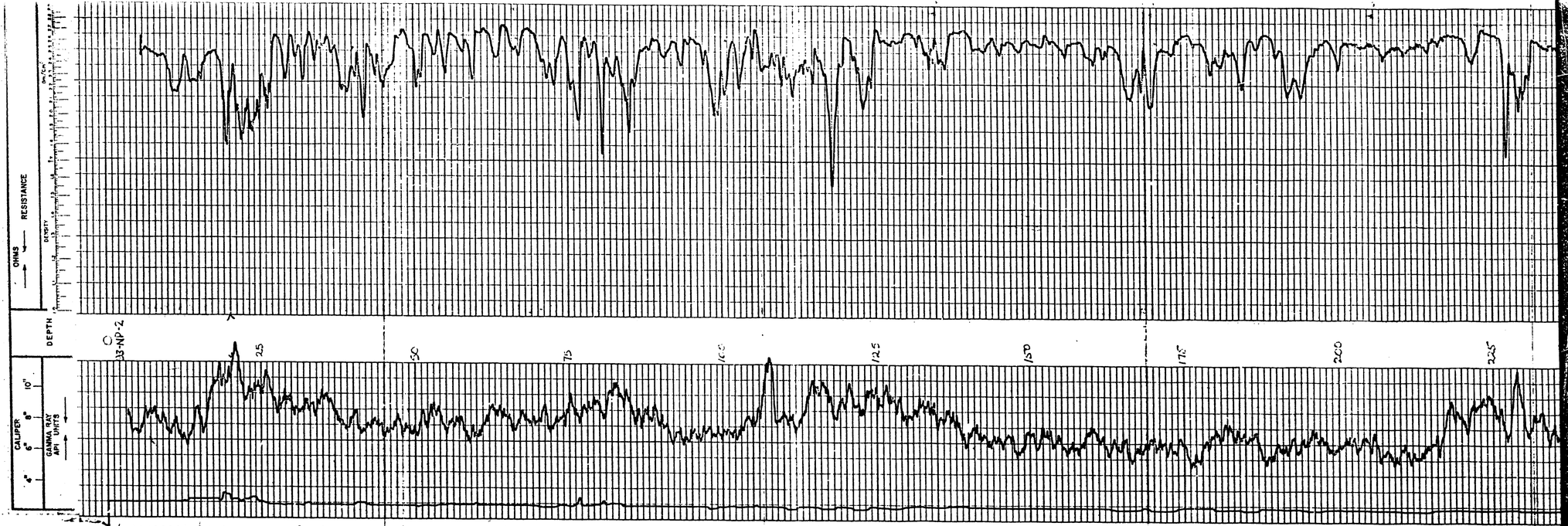
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		15"	
LENGTH	3'	LENGTH	1"		

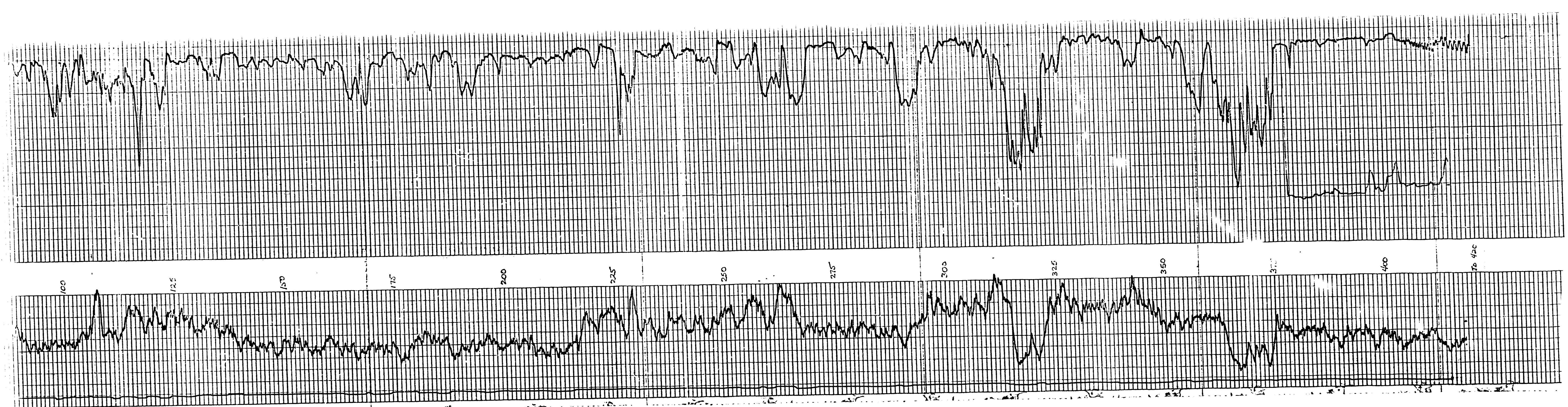
GENERAL			
TRUCK No.		SOURCE MODEL	HOVP
LOCATION		ISOTOPE	CS-137
		STRENGTH	125 m C

LOGGING DATA

GENERAL				GAMMA RAY				DENSITY			
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	T C SEC	SENS SETTINGS	ZERO
			12							

REMARKS:




100
125
150
175
200
225
250
275
300
325
350
400

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 13 1993

COMPANY _____

HOLE NO. 93 - NP - #3

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 54590 N - 49388 E

ELEVATION 1544.8

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	5	Till	
5	6	Carb. Coal	
6	7	Mudstone	
7	48	Sandstone	
48	50	Mudstone & coal	
50	158	Sandstone	
158	160	Coal	
160	265	Sandstone	
265	268	Mudstone & coal	Blind # 260-320
268	349	Sandstone	
349	359	Coal	
359	401	Sandstone	
401	414	Coal	
414	460	Sandstone	

COMMENTS _____

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-3	SURVEYED DATA
LOCATION SEC. TP. RGE. W.	ELEV. 1544.8
AREA NORTH PLATEAU	LOC. 54550 N
PROVINCE O.M.C.	49388 E

RUN No.	1	2	3
DATE	APRIL 16/03		
DEPTH-DRILLER	440		
DEPTH-LOGGER	456		
FLUID LEVEL	225		
LOGGING TIME			
DRILLED BY	C. MOORE		
RECORDED BY	C. MOORE		
WITNESSED BY	KGR		

BORE-HOLE RECORD

BIT	FROM	TO

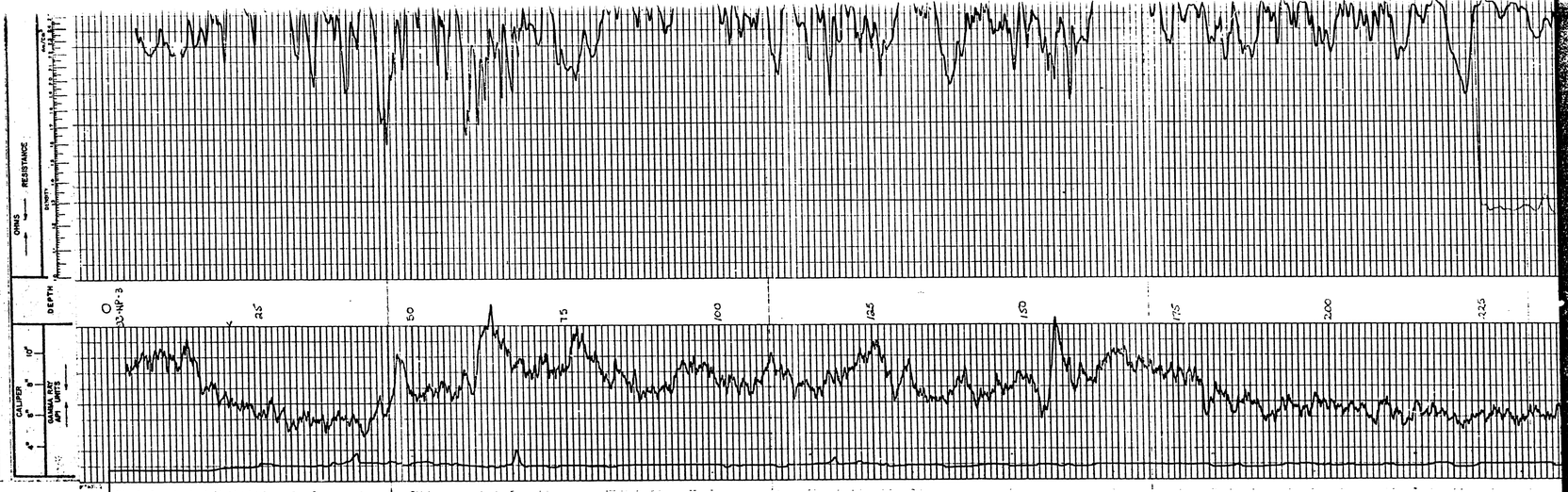
SIZE	CASING RECORD FROM	TO
6.56	0	20

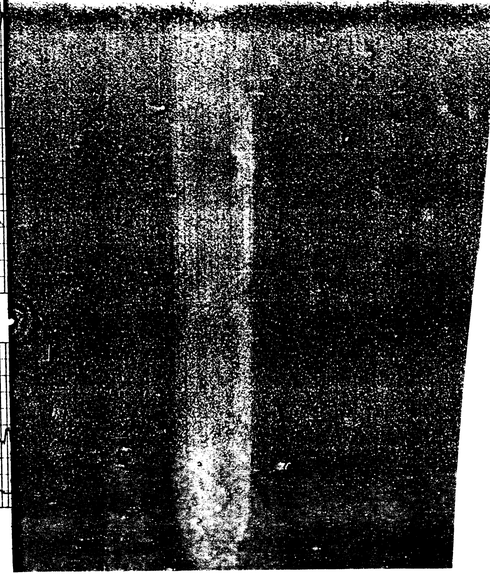
EQUIPMENT DATA

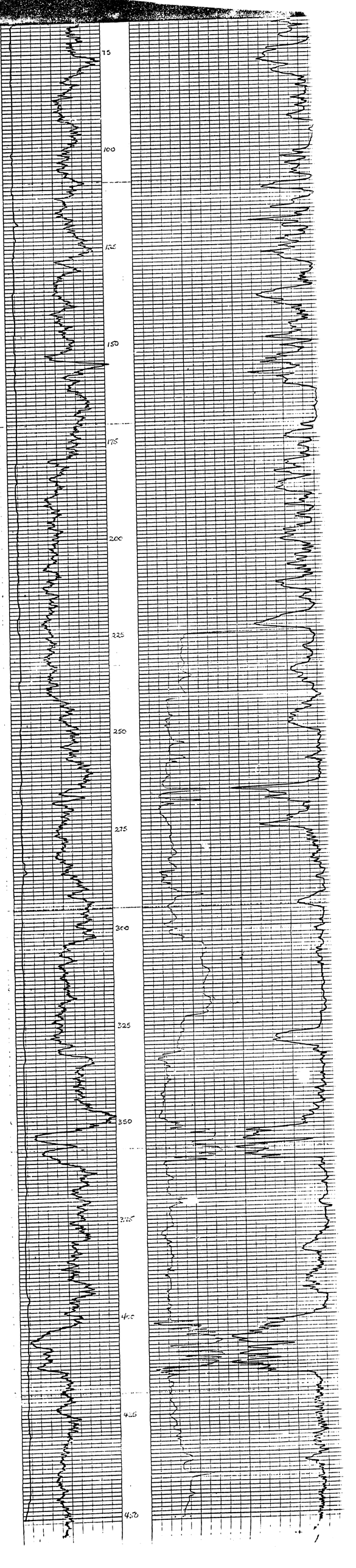
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-105	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	NE	F	
TYPE	SCINT	SPACING		13"	
LENGTH	8"	LENGTH	1"		
GENERAL		NOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 m C	
		LOGGING DATA			

GENERAL				GAMMA RAY					DENSITY		
RUN No.	DEPTHS FROM	TO	SPEED F/min.	T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.		T C SEC.	SENS SETTINGS	ZERO
			12								

REMARKS:






75
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150
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200
225
250
275
300
325
350
375
400
425
450

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE March 7 1993

COMPANY _____

HOLE NO. 93 - NP #4 Skidded

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

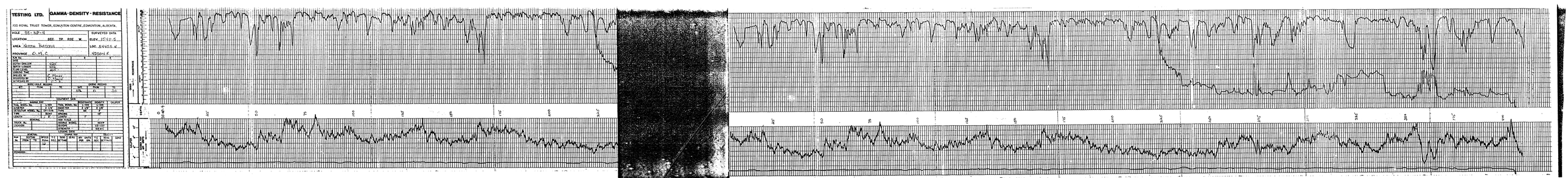
SURVEYED LOCATION 54455N - 49504E

ELEVATION 1548.5

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	3	Till	
3	5	Carb, Shail	
5	11	Sandstone wet hard & Soft	
11	68	Sandstone	
68	73	Mudstone	
73	164	Sandstone	
164	168	Mudstone & coal	
168	361	Sandstone	Blind at 324
361	365	Coal	
365	400	Sandstone	
400	410	Coal	
410	460	Sandstone	

COMMENTS _____


TESTING LTD.
GAMMA-DENSITY-RESISTANCE
200 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.
HOLE 88-NP-11
SURVEYED DATA
LOCATION SEC TP RGE W
ELEV. 1240.5
AREA North Pembina
LOC. 54455 N
PROVINCE Alta.
120504 E
RUN NO.
DATE
DEPTH-DRILLER
DEPTH-LOGGER
BOTTOM LOG INTERVAL
TOP LOG INTERVAL
OPR. RIG NO.
RECORDED BY
WITNESSED BY
BOREHOLE RECORD
BIT
FROM
TO
SIZE
CASING RECORD
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FROM
TO
EQUIPMENT DATA
RESISTIVITY
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MEAS. POINT
LOG MEAS. FROM
DRILL MEAS. FROM
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REMARKS
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OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 19 1993

COMPANY _____

HOLE NO. 93 - MP - #5

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 54315 N 49630 E

ELEVATION 1545.0

DRILLER Don Ofarrell

FROM	TO	LOG	REMARKS
0	8	Till	
8	105	Sandstone	
105	106	TRACE OF COAL	
106	165	SANDSTONE	
165	166	Trace of Coal	
166	280	Sandstone	
280	285	Coal	
285	340	Sandstone	
340	351	Coal (Blind)	
351	390	Sandstone	
390	402	Coal	
402	460	Sandstone	

COMMENTS _____

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-Ec
PAGE 1 OF

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	SAMPLE INTERVAL
	DRILLED			RECOVERED			
	FROM	TO	TOT.	SEC	TOT.		
	33	45	7.0		5.4	Rock in hole (lost core in coal seam)	
				0.1		Coal, bright broken hard	
				0.1		Carby Mudstone very soft and wet mush	
				0.2		Mudstone below it is grey to cream soft wet, mica carby bands, water staining	
				0.3		Dirty Coal dull black, broken to crushed, bones, some rock, is a small clay parting	
				0.05		Silty Mudstone grey soft wet	
				0.15		Mudstone carby dull brown black basal,	
				4.5		Siltstone light grey massive low angle fractures, water stained on fractures, med soft.	
	45	51	6.0	0.3		Siltstone as above	
				3.1		Sandstone, light grey, fine grained, soft massive	
				0.4		Siltstone grey to dark grey, base slightly carby, med soft.	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93 - NP - 5c
PAGE 2 OF

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	SAMPLE INTERVAL
	DRILLED			RECOVERED		LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	
	FROM	TO	TOT.	SEC	TOT.		
	51	60	9.0			Upper 2.7' cut lower 6.3 milled and did not recover	
				0.9		Coal bright, broken, small clay band at 0.4, dull bands throughout, lower contact dirty,	51.0 51.9 #1
				2.75		Mudstone, dark grey, massive, med soft, moist, centre zone lighter brown, massive	
				0.2		Coal bright broken shiny	
				0.15		Carby Mudstone massive, soft moist, massive	
				0.7		Mudstone brown, massive, moist, lower 0.2 med hard, upper 0.5 soft powdery & packed in the tube	
	147.0	155	8.0	0.4	5.95	Mudstone, light to dark grey, massive, some water stains on fractures.	
				0.65		Coal, bright to dull, minor clay parting, fissile, lower contact dirty, visible pyrite	147.4 148.05 #2
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-5c
PAGE 3 OF

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	SAMPLE INTERVAL
	DRILLED			RECOVERED		LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	
	FROM	TO	TOT.	SEC	TOT.		
				3.9		Mudstone, med grey, massive, looks like clay between 3 zone, (small coal (0.2') band in centre of core clean hard) soft wet	
				0.3		Coal, bright & dull banded, brittle, upper contact broken up crushed	151.9 152.9 #3
				0.1		Mudstone, as in wet, fairly clean contact	
				0.6		Coal bright & black hard some visible pyrite	
				0.1		Mudstone bottom of core in the tube all core broken down.	
	254.	262	8.0	1.35	7.8	Silty Mudstone grey, weakly banded fairly sharp upper ct, med soft, wet.	
				0.9		Coal bright black hard, streaks of pyrite, pyrite on some clean	255.35 256.25 #4
				0.35		Carby Mudstone, dark brown, soft, flaggy dirty	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-5c
PAGE 4 OF

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	SAMPLE INTERVAL
	DRILLED				RECOVERED	LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	
	FROM	TO	TOT.	SEC	TOT.		
				1.15		Mudstone Pervasive, creamy brown to dark green massive, silt. wet, sm. l. lower contact some water stain	
				0.45		Coal, bright and dull banded some calcite veining	257.75 – 258.7 #5
				0.1		Mudstone dark brown, very silty and wet.	
				0.4		Dirty Coal, dull black, numerous small clay bands	
				3.1		Silty Mudstone light grey, thinning to silt. down hole, massive, mod hard, upper contact rarely	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

TING LTD. GAMMA-DENSITY-RESISTANCE

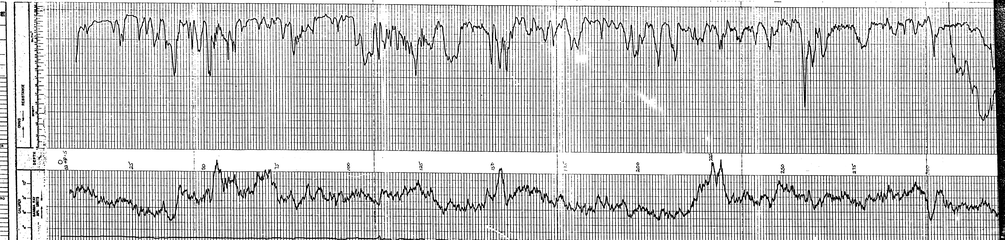
TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

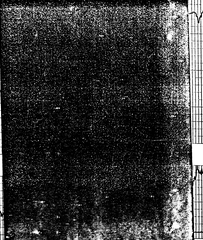
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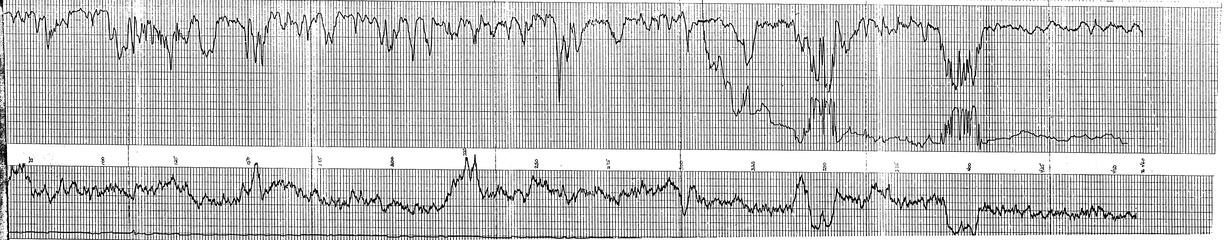
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NORTH RAINBOW LOC. 5935'N

NCE 0.M.C. 1650'E







OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE APRIL 19, 1993

COMPANY _____

HOLE NO. 93 NP - 6

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 54175 N - 49750 E

ELEVATION 1540.3

DRILLER DON OENER

FROM	TO	LOG	REMARKS
0	14	TILL	
14	23	SANDSTONE	
23	24	Coal	
24	133	Sandstone	
133	134	Coal	
134	295	Sandstone	Blind at 200'
295	297	Coal	
297	~~336~~	Sandstone ?	
~~336~~	340	Coal ?	
340	~~378~~	Sandstone	
378	389	Coal	
389	440	Sandstone	

COMMENTS _____

WATER HORIZON _____ FT

COMPANY

HOLE NO. 93 NP - 6

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 54175 N - 49750 E

ELEVATION 1542.3

DRILLER Don Ogner

FROM	TO	LOG	REMARKS
0	14	Till	
14	23	Sandstone	
23	24	Coal	
24	133	Sandstone	
133	134	Coal	
134	295	Sandstone	Flat at 200'
295	297	Coal	
297	326	Sandstone ?	
326	340	Coal ?	
340	378	Sandstone	
378	389	Coal	
389	440	Sandstone	

TESTING LTD. **GAMMA-DENSITY-RESISTANCE**

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-6

LOCATION _____ SEC. TP. RGE. W.

AREA NORTH PLATEAU

PROVINCE O.M.C.

SURVEYED DATA
ELEV. 1542.3
LOC. 54175 N
49750E

RUN No.	1	2	3
DATE	April 19/83		
DEPTH-DRILLER	440		
DEPTH-LOGGER	440		
FLUID LEVEL	335		
LOGGING TIME			
DRILLED BY	C. Hooke		
RECORDED BY	R. Moore		
WITNESSED BY	T.W.D.		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

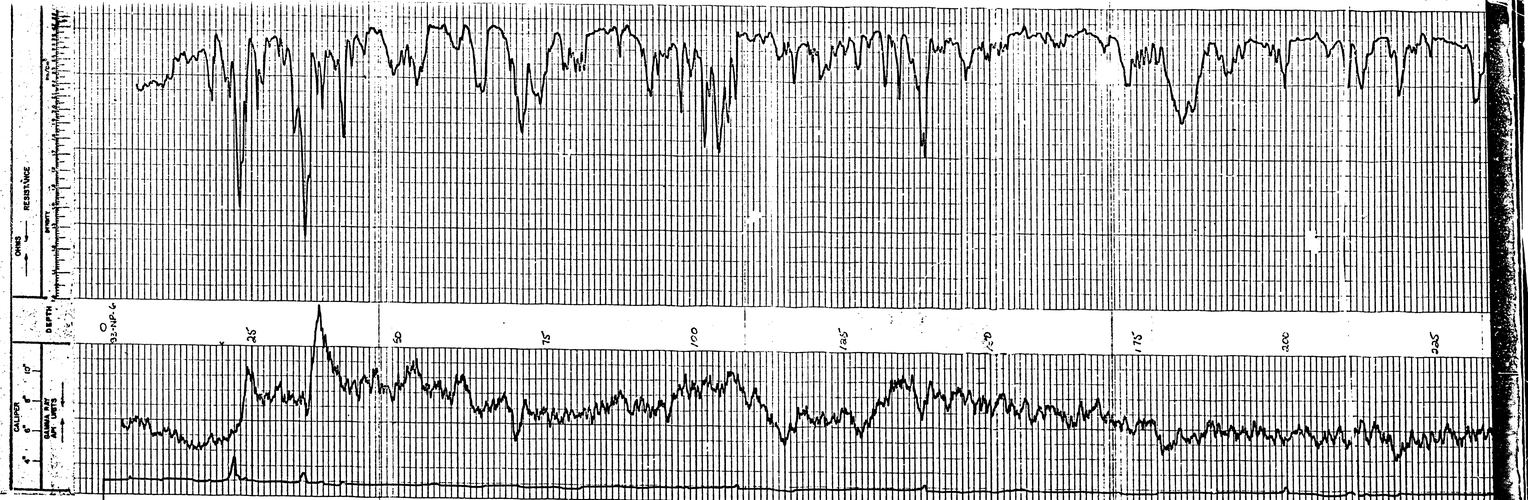
SIZE	FROM	TO
6 5/8	0	20

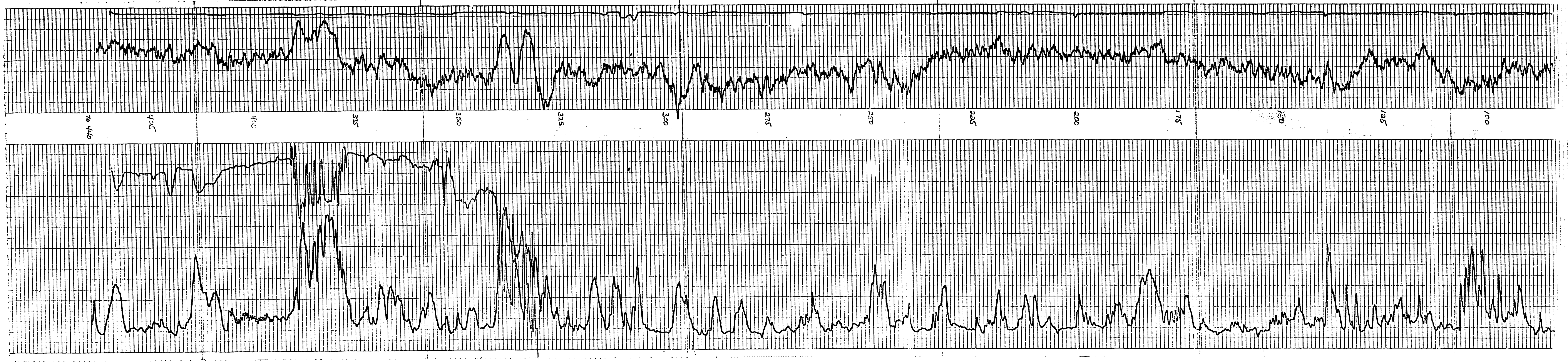
EQUIPMENT DATA

GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-203	TOOL MODEL No.	L-203	L-103	
DIAMETER	2 1/8	DIAMETER	2 1/8"	2 1/8	
DETECTOR MODEL No.	CP-516	TYPE	LONG	F	
TYPE	JOINT	SPACING		15"	
LENGTH	3'	LENGTH			
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	
		LOGGING DATA			

GENERAL					GAMMA RAY			DENSITY	
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED ft/min.	T.C. SEC.	SENS. SETTING	ZERO	API UNITS PER DIV.	T.C. SEC.	SENS. SETTINGS	ZERO
			15							

REMARKS:




to 446
425
400
375
350
325
300
275
250
225
200
175
150
125
100

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 15 1993

COMPANY _____

HOLE NO. 93 - NP - #7

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 5480S N - 4941S E

ELEVATION 1530.9

DRILLER Don Ofucn

FROM	TO	LOG	REMARKS
0	11	Till	
11	12	Coal	
12	20	Sandstone	
20	28	Mudstone & coal	
28	119	Sandstone	
119	121	Coal	
121	227	Sandstone	
227	228	Coal	
228	310	Sandstone	
310	322	Coal	
322	363	Sandstone	
363	376	Coal	
376	420	Sandstone	

COMMENTS _____

WATER HORIZON _____ FT

CROW NIMROTON COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 16 1993

REPORT _____

HOLE NO. 93-NP-7

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 54905 N - 40415 E

ELEVATION 1530.9

DRILLER Don Mann

FROM	TO	LOG	REMARKS
0	11	Till	
11	12	Coal	
12	20	Sandstone	
20	28	Mudstone/coal	
28	119	Sandstone	
119	121	Coal	
121	217	Sandstone	
217	228	Coal	
228	270	Sandstone	
270	322	Coal	
322	363	Sandstone	
363	376	Coal	
376	420	Sandstone	

LEXCO TESTING LTD. — GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-7 — SURVEYED DATA

LOCATION SEC. TP. RGE. W — ELEV. 1530.9

AREA North Plateau — LOC. 54905 N

PROVINCE B.C. — 40415E

RUN No. 1 2 3

DATE - TIME 16 APR 93

DEPTH - DRILLER 420.0

DEPTH - LOGGER 423.0

CASING LOGGER

BTM. LOG INTERVAL

SCALE HOLE RECORD

BIT — FROM — TO — CASING RECORD — SIZE — FROM — TO

0.00 — 21 — 420

EQUIPMENT NO.

GAMMA SUB — DEN. SUB — RESISTANCE SUB — GAMMA SUB — DEN. SUB — RESISTANCE SUB

TOOL MODEL No. — 1.375 — 1.315 — 1.315 — TOOL MODEL No. — 1.375 — 1.315 — 1.315

DETECTOR MODEL No. — 1.375 — 1.315 — 1.315 — DETECTOR MODEL No. — 1.375 — 1.315 — 1.315

SHIELDED MODEL No. — 1.375 — 1.315 — 1.315 — SHIELDED MODEL No. — 1.375 — 1.315 — 1.315

TOOL SERIAL No. — 1237 — 1237 — 1237 — TOOL SERIAL No. — 1237 — 1237 — 1237

CABLE — SERIAL — 1237 — 1237 — 1237 — CABLE — SERIAL — 1237 — 1237 — 1237

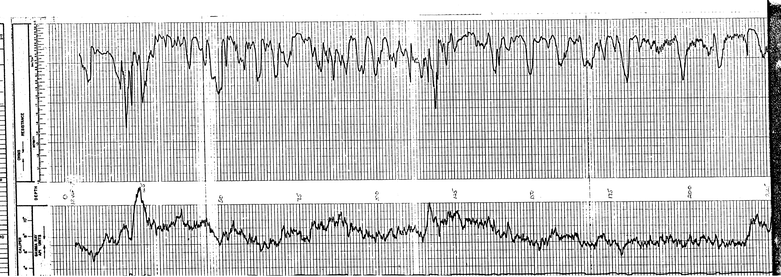
TRUCK No. — SOURCE MODEL — 1.375

LOCATION — SOURCE SERIAL — 1237

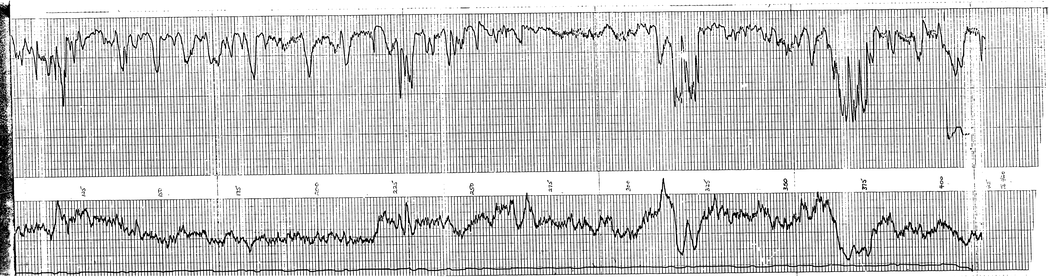
SOURCE SIZE — 10 mCi

RUN No. — BOTTOM FROM — TOP TO — TYPE FLUID — WT. LB/GAL — VISC. SEC — PH — WATER LOSS ML — MUD CAKE 32nds — RMF @ °F — RMC @ °F — RM @ °F — SOURCE

REMARKS







OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 6 1993

COMPANY _____

HOLE NO. 93 - NP - 08

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	3	Till	
3	12	Sandstone - Brown & soft	
12	45	Gray Sandstone	
45	57	Mudstone with small coal partings	
57	181	Sandstone	
181	183	Coal	- Blind Hole
183	249	Sandstone	
249	254	Coal	
254	312	Sandstone	
312	318	Coal ?	
318	319	Sandstone	
319	325	Coal ?	
325	339	Sandstone	
339	347	Coal	
347	389	Sandstone	
389	400	COAL	
400	440	SANDSTONE	

COMMENTS Clay analysis for this hole by the Alberta Research Council. See Report

OBED MOUNTAIN COAL LTD.

HOLE NO. 13-NM-32
PAGE 1 OF 19

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	SAMPLE INTERVAL
	DRILLED			RECOVERED		LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	
	FROM	TO	TOT.	SEC	TOT.		
						20 [illegible]	
	20	30	10	0.3		Sandstone, [illegible]	
						[illegible]	
						[illegible]	
	30	37	7.0	0.	1.9	[illegible]	
						[illegible]	
				0.8		Mudstone, grey, broken fractured	
						[illegible]	
						[illegible]	
						[illegible]	
				1.0		Silty Mudstone, light grey, soft	35.0 - 37.0
						[illegible]	
	37	45	8.0	0.2	7.0	Silty Sandstone, light grey, weakly	
						bedded, occ grey silty, soft	
				1.2		Sandstone, light [illegible]	
						[illegible]	
						[illegible]	
						[illegible]	
				5.0		[illegible] weakly banded,	
						[illegible]	
				2.0		[illegible]	
						to weakly banded, minor	
						[illegible]	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. [illegible]
PAGE 2 OF 19

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	SAMPLE INTERVAL
	DRILLED			RECOVERED			
	FROM	TO	TOT.	SEC	TOT.		
				1.3		Silt to v. fine ss upper zone wet banded lower zone v. fine ss with faint banding, med hard	
				1.5		Sandstone as above	
	45.0	[illegible]		0.4	5.2	As above as silt stringers at base	
				0.5		Coal, bright, broken, both contacts [illegible] (coal loss in core)	465-435
				0.1		Carb Mudstone black, silty	
				0.3		Coal dull hard bands, v. silty streaks, top lower ct	
				0.2		Mudstone v. v. med hard [illegible]	
				0.2		Carb shale and v. v. dk grey med hard [illegible]	
				0.5		Coal bright blocky hard, small carb shale streak, lower contact [illegible]	
				1.0		Mudstone, dark grey, broken to crushed	
	50	57	7.0	0.1	6.3	Coal with thin bands and v. v. thin [illegible]	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 83-
PAGE 3 OF 19

CORE #	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC	TOT.	GEOLOGICAL DESCRIPTION — LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	SAMPLE INTERVAL
				0.3		Tr coal, dull hard steel w chip. Hard coal w/ thin soft layer	
				1.2		Mudstone, grey to dark grey brown fair amt of contact	80 - [illegible]
				0.4		Coal bright w dull bands, lower contact base [illegible]	Sample # 1
				0.1		Carb mudstone, dark brown black soft.	
				0.1		Mudstone bentonitic, light cream grey, soft wet	
				0.9		Mudstone dark grey, upper portion carby, soft, moist.	
				0.3		Siltstone grey, massive, med hard.	
				0.2		Mudstone, light grey med hard, moist	
				0.1		Coaly Mudstone, dull hard soft	
				0.4		Mudstone as above	
				2.3		Siltstone light grey, weakly	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 13-11P-0.

CORE #	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC	TOT.	GEOLOGICAL DESCRIPTION — LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	SAMPLE INTERVAL
						banded [illegible]	
						stained	
	57	64	7.0	2.7	6.35	Silty Mudstone, grey, medium fractured, water stained on fracture	
				4.05		Silty Mudstone, grey brown, fractured, iron staining on fractures	
	64	70	6.0	0.2		Silty Mudstone as above	
				0.2		Mudstone, light grey, silty, very sheared and fractured.	64-68.5
				1.0		Mudstone grey weakly banded, locally light grey	
				3.0		Mudstone grey brown, highly water stained on fractures, some iron staining, small zones sandy	
				2.1		Sandstone, fine grained, massive, iron staining on fractures	
	70	80	10.0	2.8		Sandstone as above	
				0.3		Siltstone grey med bed, banded good coal taste	
				6.0		Sandstone as above, highly broken at 3.6' massive	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 13-OP-9c
PAGE 5 OF 19

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	SAMPLE INTERVAL
	DRILLED			RECOVERED		LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	
	FROM	TO	TOT.	SEC	TOT.		
				0.6		Silty Sandstone, light brown fine grained, med hard massive	
	90	90	10.0	3.4	9.9	Mudstone, silty grey to brown, fractured to broken, hard, iron calcite cemented fractures, locally banded	
				6.5		Sandstone, grey brown, med hard fine to med grained coal streaks at 1.5' from base, lower and softer	
	90	100	10.0	5.3	10.1	Sandstone as above, finer near base	
				4.8		Silty Mudstone, grey, weakly banded, some water staining on fractures, minor coal lens lenses defined by silty	
	100	106.5	6.5	5.2	6.0	Sandstone, light grey, weakly banded, iron stained fractures soft to med hard, finer gr. near base	
				0.1		Coal, bright blocky, hard, clean both contacts sharp	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-8c
PAGE 6 OF 19

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	SAMPLE INTERVAL
	DRILLED			RECOVERED		LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	
	FROM	TO	TOT.	SEC	TOT.		
				0.3		Carb. Mudstone, dull black, massive, hard.	
				0.1		Mudst., grey, massive, med hard	
	106.5	113.0	7.5	1.5	6.5	Mudstone dark grey, massive, med hard, weakly banded	
				4.3		Mudstone, light grey, looks bentonitic, massive, strong, weakly banded	108.0 – 112.3
				0.7		Mudstone as above, fairly well banded harder, slightly silty	112.3 – 116
	113	123	10.0	3.0	9.3	Mudstone as above, lower end much like 4.3 zone locally broken to crushed.	
				3.9		Siltstone grey, massive, weakly bedded med hard	
				2.4		Sandstone, grey, fine to med grained massive, med hard.	
	123	130	7.0	6.9	6.9	Sandstone, grey, fine grained, massive, med hard	
	130	140	10	4.0		Sandstone as above massive hard, med to coarse grained	130 – 134
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-8c
PAGE 7 OF 19

CORE #	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC	TOT.	GEOLOGICAL DESCRIPTION — LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	SAMPLE INTERVAL
				2.9		Sandstone grey as above med grained	
				1.15		Mudstone banded grey med hard occ coal bands	
				0.2		Coal bright blocky hard	138.05 – 138.25 #2
				0.1		Carby shale, shell lined lst	4c
				1.6		Siltstone grey rippled med hard faint bedding	
	140	150	10.0	1.6	8.7	Silty Sandstone, as above	
				1.2		Silty Mudstone grey, lower end carby crinoid zone 0.25 above base (lost core)	
							4B
				0.4		Coal bright & dull banded, massive hard	142.8 – 143.2 #3
				1.5		Silty Mudstone - bioturb grey fine grained well banded	143.2 – 144.7
				0.25		Dirty coal dull & bright banded friable	
				0.05		Silty Mudstone as above	144.7 – 146.3 #4
				0.25		Coal as above bright	4A
				0.15		Silty Mudstone as above	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-OP-3
PAGE 8 OF 19

CORE #	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC	TOT.	GEOLOGICAL DESCRIPTION LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	SAMPLE INTERVAL
				0.25		Coal bright blocky hard, minor lithos pyrite	
				0.05		Mudstone dull black brown, banded soft	
				0.2		Coal, dull black, med hard some carbs, v thin dirty	
				0.1		Bentonite, cream, med hard massive	
				0.1		Coal dirty, dull black massive some carbs	
				0.2		Mudstone carb dark brown med hard	
				0.2		Coal dull & bright banded dirty	149.2
				1.6		Mudstone, light grey, massive med hard	
				0.8		Mudstone as above, finer grained	151.3
	150	160	10.0	1 3	10.0	Mudstone as above	
				8.7		Siltstone, grey, well banded shows cross bedding, channel fills, etc	
	160	170	10.0	3.3	10.0	Siltstone as above, lower end small coal lens	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-3c
PAGE 1 OF 19

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	SAMPLE INTERVAL
	DRILLED				RECOVERED		
	FROM	TO	TOT.	SEC	TOT.		
				6.7		Sandstone grey fine to med grained, some minor coal zones near top, lower 4' med gr. massive	
	170	180	10	10.0	10.0	Sandstone as above, light brown in color, med to coarse gr	
	180	190	10	10.0	10.0	Sandstone, as above, lower end softer, some water staining, zones fine to coarse gr. up hole, Water leached	
	190	200	10.0	10.0	10.0	Sandstone, brown to grey, med grained, with stained, massive, med hard, grain size varies up to coarse gr Samples from 192-197	192-197
	200	210	10.0	10.0	10.0	Sandstone as above, light brown, med hard massive	
	210	220	10.0	10.0	10.0	Sandstone as above, light brown med hard, zone at 6.6' to 9.0' light grey well cemented, hard	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 13-NF-82
PAGE 10 OF 19

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	SAMPLE INTERVAL
	DRILLED				RECOVERED	LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	
	FROM	TO	TOT.	SEC	TOT.		
	220	230	10.0	6.6	10.0	Sandstone, brown, medium grained, med hard, massive	
				0.2		Sandstone, broken zone, quite soft.	
				3.2		Sandstone, brown, med grained, med hard, massive, grades with clay pebbles, some coal seams	
	230	240	10.0	4.5		Sandstone, fine to brown, to grey, locally well banded, streaks of coal, fine to med grained, med hard	
				0.9		Sandstone, grey, fine grained, well banded, clay clasts	
				4.6		Sandstone, grey to brown, locally well banded, coal streaks, some small clay bands, fine grained, downhole	
	240	250	10.0	1.0	9.9	Sandstone, dark grey, clay bands lots of light brown to green clay pebbles, locally banded	
				0.25		Silty Mudstone, dark grey, med soft, some plies	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. [illegible]
PAGE 11 OF 19

CORE #	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC	TOT.	GEOLOGICAL DESCRIPTION — LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	SAMPLE INTERVAL
				0.15		Coal bright black, hard minor dull streak upper shaly	
				0.05		Mudstone as above	
				0.05		Dirty coal duller less bright	
				6.6		Silty Mudstone grey, Massive, med hard some water staining on fractures, lower contact rounded, Sampled last 4'	244.1 248.1
				0.8		Coal bright black hard minor pyrite steak, up to ½"	248.1 248.9 #5
				0.2		Carb. Mudstone dull brown	
				0.8		Mudstone (bentonitic) light grey soft massive	249.2 250.5
	252	260	10.7	0.5		Mudstone as above (possibly some carbonaceous) soft	
				0.5		Carb. Mudstone dull brown black, some sandy grains	250.5 252.35 #
				0.35		Coal, dirty, bright and dull banding fissile	
				0.05		Mudstone Pentonitic, occas. coal med hard	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-OD-32
PAGE 12 OF 17

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	SAMPLE INTERVAL
	DRILLED			RECOVERED		LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	
	FROM	TO	TOT.	SEC	TOT.		
				0.65		Carby Mudstone dull black to brown, fissile, occ bright shiny coal band.	
				0.1		Mudstone dark brown, massive	
				2.8		Sandstone, med to fine grained, silty near bottom, massive med hard	254.95
				1.7		Silty Mudstone, dark grey, massive, med hard	256.6
				1.2		Siltstone grey, med hard, massive	
	260	270	10.0	10.0	10.0	Sandstone (coarse, fine grained) bottom 1' fissile, 0° at top 2' approx 30° to core axis hard, massive	
	270	272	2.0	2.0	2.0	Sandstone as above, med grained hard.	
	272	281	9.0	0.55		Sandstone, grey, coarse grained massive	
				1.8		Mudstone dark grey, massive, fissile coal	272.5 274.35
				1.4		Silty Mudstone dark grey locally well banded	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 92-OM-32
PAGE 13 OF 19

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	SAMPLE INTERVAL
	DRILLED			RECOVERED		LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	
	FROM	TO	TOT.	SEC	TOT.		
				0.55		Mudstone as above.	
				1.6		Siltstone light and dark grey cross bedding, sandy dacto, hard	
	281	290	9.0	6.0	9.0	Siltstone, dark grey light grey sandy clast, massive	
				1.0		Mudstone, dark grey silt wet, shiny, massive.	
				1.2		Siltstone as above.	
				0.4		Sandstone, lt. lt grey, med hard, cross bedding	
				0.4		Mudstone, silty, brown to grey massive, dry.	
	296	300	10.0	2.1	10.0	Siltstone, grey to brown, some water stains, occ. sandy zone, very weakly bedded med hard	
				7.9		Sandstone, brown, water stained, massive med hard to hard, faint bedding	
	300	310	10.0	2.4	10.1	Sandstone, grey to brown, med grained, massive, hard upper entry grey	
				7.7		Sandstone, brown, med to coarse grained, med hard to hard	305.0 308.0
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-Sc
PAGE 14 OF 19

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	SAMPLE INTERVAL
	DRILLED			RECOVERED		LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	
	FROM	TO	TOT.	SEC	TOT.		
						some handling, sample Take from 305 to 310	
	310	320	10.0	9.2	10.0	Sandstone as above	
				0.8		Silty Mudstone, dark grey fine grained massive	321.0
							324.0
	320	330	10.0	3.0		Mudstone silty dark grey, occ lens of limey Mud very hard cream color	
				0.5		Sandstone, grey fine grained massive hard	
				0.7		Mudstone silty as above, 0.1" band of very hard limey Mud	
				3.5		Siltstone grey, bands of well banded, med hard cross bedding	
				2.0		Mudstone as above, dark grey massive, med hard, low angle fractures	
	330	340	10.0	2.0		Mudstone as above, fine grained dark grey, faint banding	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-3c
PAGE 15 OF 19

CORE #	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC	TOT.	GEOLOGICAL DESCRIPTION — LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	SAMPLE INTERVAL
				2.5'		Mudstone, dark green grey, massive, med hard to v. hard, locally weak texture	334.0
				0.65		Carb. Mudstone, dull grey to black, some shiny coal streaks	337.0
				0.15		Sandstone, light grey, bentonitic matrix? weak to bedded	
				0.15		Coal bright blocky hard	
				0.65		Carb. Mudstone, dull black, massive.	
				0.1		Sandstone as above but brown	
				0.4		Dirty Coal & Mudstone, v.f. bedded, dull black, fissile	
				0.4		Mudstone brown to green grey, locally sandy, flaggy	
				1.0		Coal bright blocky hard, hackly as above.	337.0-340 #7
				0.1		Mudstone carby, dull black v.f.t. to med hard	
				2.15		Coal, bright blocky, hard, small bands of clay, dark brown	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-11P-5
PAGE 16 OF 19

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	SAMPLE	INTERVAL
	DRILLED			RECOVERED		LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION		
	FROM	TO	TOT.	SEC	TOT.			
	340	350	10.0	1.05		Sandstone green grey ...		
						... carbonaceous		
				0.15		Coal, bright-black, hard, blocky, clean bottom		C
								341.05
				0.1		Mudstone dark brown, friable silty		345.25
				0.15		Carbonaceous dull black ... Coal		
				0.65		Coal, bright-black, hard, hackly, clean occ very ...	#8	B
				0.35		Mudstone ... coal ≈ 30% dark brown black		
				0.5		Coal bright-black dull, blocky hard		A
				3.0		Siltstone ... green, mottled ... sandy		
				1.7		Mudstone, grey green, ... moist, ... med. hard		348.25 352.3
	350	360	10.0	2.3		Mudstone as above		
	TOTALS					- x 100 = % REC. SEAM		
						- x 100 = % TOTAL REC. SEAM(S)		

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-3
PAGE 17 OF 19

CORE #	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC	TOT.	GEOLOGICAL DESCRIPTION — LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	SAMPLE INTERVAL
				3.5		Siltstone grey, banded, large c.s. bedding, med hard	
				2.2		Sandstone, grey, med grained massive, bit of gyp pole	
				0.35		Mudstone green grey, hard & brittle, mud near base, low end coal	
				1.35		Silty Mudstone, grey, hard massive, no visible bedding	
	360	370	10.0	7.2	9.3	Siltstone, basally muddy, grey blocky, rooting mudband.	
				1.7		Mudstone, grey, carbonaceous, soft [illegible]	
				0.4		Siltstone as above	
	370	380	10.0	2.7	10.7	Siltstone as above	
				8.0		Sandstone, grey, med hard med grained, weak bonding	
	380	390	10.0	5.2		Sandstone as above, strong hard	
				0.1		Mudstone grey, soft wet	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-OMP-5c
PAGE 18 OF 19

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	SAMPLE INTERVAL
	DRILLED FROM	TO	TOT.	RECOVERED SEC	TOT.		
				1.2		Carb. Mudstone, dull black, upper contact small coal seam	
				0.6		Coal, blocky, hard, bright appearance	396.5 397.4
				0.2		Mudstone, brown, lots bentonite soft wet sticky	#9
				0.9		Coal bright and dull banded lower contact lots dirt, some coaly shaly contacts, clay streaks	
				0.05		Mudstone, dark brown, waxy soft and wet	
				1.3		Coal, bright blocky hard, small dull hard near top, some coaly shaly seams	
	390	397	7.0	1.3	7.7	Coal as above finish.	
				0.35		Mudstone dull dark brown to brown blocky.	
				1.1		Coal, bright blocky very clean bright hard	
				0.25		Mudstone brown waxy massive med hard	
				1.0		Coal as above	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 13-[illegible]
PAGE 19 OF 19

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	SAMPLE INTERVAL
	DRILLED			RECOVERED		LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	
	FROM	TO	TOT.	SEC	TOT.		
				0.15		Mudstone dull black and cream streaks,	
				0.6		Coal as above, calcite veining,	
				0.35		Mudstone dark brown, soft wet streaks of coal	
				2.3		Coal, bright black hard calcite veining, small iron streak near top, bottom broken in to	←
				0.3		Bentonite cream soft wet massive	← 401.0
						Core lost in A seam.	404.0 →
						Sample taken B through H very good recovery on all seams.	
	400	410	10.0	0.6	10.0	Mudstone grey medium massive	←
				1.4		Silty Mudstone grey brown sandy near top, iron banding medium hard carby streaks.	
				8.0		Sandstone fine to med grained grey, locally silty zones massive, hard.	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

93 - NP - 08

LOCATION SEC. TWP. RGE. W.

CASING

TO Driller

TO	LOG	REMARKS
6	Till	
12	Sandstone - brown soft	
15	Grey Sandstone	
37	Mudstone with carbonal partings	
92	Sandstone	
93	Coal	+ Bring Home
99	Sandstone	
104	Coal	
108	Sandstone	
115	Coal	
118	Coal ?	
119	Sandstone	
125	Coal ?	
135	Sandstone	
143	Coal	
147	Sandstone	
160	Coal	
161	Sandstone	

TESTING LTD. GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE 93-NP-8	SURVEYED DATA
LOCATION SEC. TP. RGE. W.	ELEV. 1534.9
AREA NORTH PUTNEY	LOC. 5870014
PROVINCE ALTA.	955612.6

TEST No.	1	2
DATE	Aug. 6/93	
DEPTH DRILLER	450	
DEPTH LOGGER	450	
CASING DEPTH	24	
FLUID LEVEL		
BOTTOM HOLE TEMP.		
VISCOSITY		
WEIGHT		
WITNESSED BY		

RUN No.	FROM	TO	CASING RECORD	SIZE	WEIGHT
1	24	450	SURFACE	7	20
			PRODUCTION		

EQUIPMENT USED

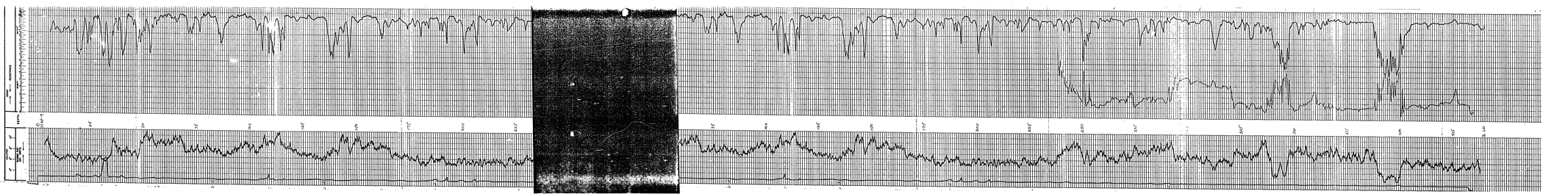
TOOL MODEL No.	1	2	3
DIAMETER MODEL No.	3.625		
LENGTH	7		

TRUCK No.	
OPERATOR	

RECORDED DENSITY	LOCATED
MATRIX	2.71
FLUID	1.00
MATRIX DENSITY	
FLUID DENSITY	
CASING THICKNESS	.362"
CASING I.D.	6.777
CASING WEIGHT	20.01
CASING DENSITY	7.85

RUN	FROM	TO	DENSITY	Y-1	Y-2	R-64	RES.	SPONT.	RES.	Y-1	Y-2	R-64	REMARKS
			1 in					MV.	OHMS				
1	450	24	100	100	100	100				100	100	100	

REMARKS



OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE APRIL 15, 1993

COMPANY _____

HOLE NO. 93 - WP - 9

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION 5457ON - 4364SE

ELEVATION 1545.2

DRILLER DON OENER.

FROM	TO	LOG	REMARKS
0	8	TILL	
8	15	SANDSTONE	
15.	15.5	DIRTY COAL	
15.5	60	SANDSTONE	
60	62	Coal	
62	73	Sandstone	
73	74	Coal	
74	278	Sandstone	
278	282	Mudstone & coal	
282	361	Sandstone	
361	372	Coal	
372	411	Sandstone	
411	421	Coal	
421	460	Sandstone	

COMMENTS _____

COMPANY _____

WELL NO. 97-NP-9

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W.

SURVEYED LOCATION SASTON - 106456

ELEVATION 1015.2

DRILLER Dino Cinder

FROM	TO	LOG	REMARKS
0	9	Till	
9	15	Gravel-ss	
15	15.5	Dirty Coal	
15.5	60	Sandstone	
60	62	Coal	
62	73	Sandstone	
73	74	Coal	
74	278	Sandstone	
278	293	Mudstone & coal	
293	361	Sandstone	
361	372	Coal	
372	441	Sandstone	
441	442	Coal	
442	468	Sandstone	

LEXOO TESTING LTD. — **GAMMA-DENSITY-RESISTANCE**

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 97-NP-9 — SURVEYED DATA

LOCATION SEC. TP. RGE. W. — ELEV. 1015.2

AREA Metis Patricia — LAT. 210.30.41

PROVINCE O.M.C. — 106.45 E

DATA: 1 2 3 4

CASING DRILLER: Dino Cinder

CASING LOG: 1000

CASING FINAL: 1000

FIELD No.: 97-NP-9

RECORDED BY: M. Fraser

WITNESSED BY: M. Fraser

RUN	TIME LOGGER	TD	TIME STARTED	TIME FINISHED
1	2 HR	1000	10	20

DENSITY SHE

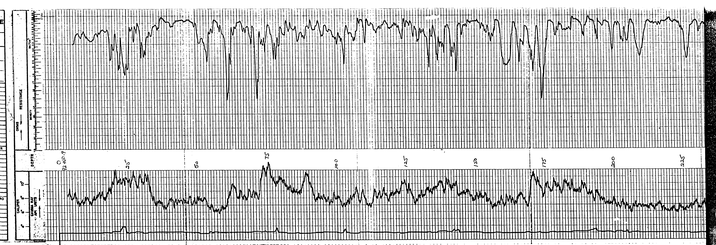
CASING SIZE: 7" — TOOL SERIAL No.: 1 — CASING: 7" — SOURCE: 1 CURIE — TOOL SERIAL No.: 1 — CASING: 7" — SOURCE: 1 CURIE

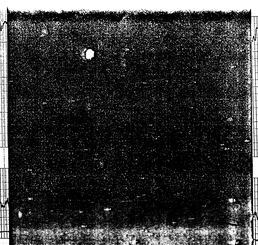
TOOL SERIAL No.: 1 — CASING: 7" — SOURCE: 1 CURIE — TOOL SERIAL No.: 1 — CASING: 7" — SOURCE: 1 CURIE

TOOL SERIAL No.: 1 — CASING: 7" — SOURCE: 1 CURIE — TOOL SERIAL No.: 1 — CASING: 7" — SOURCE: 1 CURIE

RUN	SCALE	TOP	BOTTOM	SPEED	TIME CONST.	TIME STARTED	TIME FINISHED	DATE
1	1" = 100'	0	1000	30	1	10	20	1

REMARKS:







No Logs

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 21 1993

COMPANY _____

HOLE NO. 93-NP-# 10

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	7	TILL	
7	11	SANDSTONE	
11	13	MUDSTONE & COAL STRINGERS	
13	48	SANDSTONE	
48	76	Mudstone with Traces of coal	
76	272	Sandstone	
272	274	Trace of coal	
274	358	Sandstone	
358	362	Coal	
362	401	Sandstone	
401	411	COAL	
411	460	Sandstone	

COMMENTS Blind hole no log



Disclaimer

This page was inserted by the Coal and Minerals Development Branch, to provide a reference that the log 93 - NP - 10 associated with this report is not contained in the assessment report on file.

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 20 1993

COMPANY _____

HOLE NO. 93-NP-#11

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 54310 N - 49900E

ELEVATION 1538.0

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	10	Till	
10	55'	SANDSTONE	
55'	60	Mudstone & coal	
60	153	Sandstone	
153	158	Mudstone with Traces of coal	
158	302	Sandstone	
302	307	Mudstone & coal	
307	335'	Sandstone	
335'	345'	Coal	
345	387	Sandstone	
387	397	Coal	
397	440	SANDSTONE	

COMMENTS _____

HOLE NO. 93-N D- #11

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 64310 N - 4500E

ELEVATION 1539.0

DRILLED Dec. 01 ---

FROM	TO	LOG	REMARKS
0	10	T.U.	
10	55	Sandstone	
55	60	Mudstone + coal	
60	153	Sandstone	
153	158	Mudstone with Trace of coal	
158	201	Sandstone	
201	207	Mudstone + coal	
207	330	Sandstone	
330	335	Coal	
335	347	Sandstone	
347	397	Coal	
397	448	Sandstone	

TESTING LTD. GAMMA-DENSITY-RESISTANCE

705 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-11 — SURVEYED DATA

LOCATION SEC. TP. RGE. W — ELEV. 1539.0

AREA North Rycroft — LOC. 64310 N -4500E

PROVINCE Alta

CASING RECORD

SIZE	FROM	TO	WGT.	GRADE	SHOE
4½	0	448	9.5	J	448

CEMENTING DATA

TYPE	AMOUNT	TOP
Class G	25	0

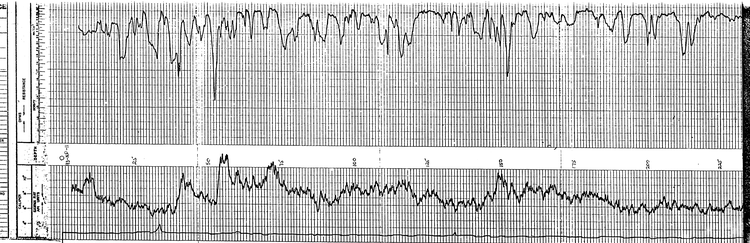
TOOL RUN: 1 RUN 2 RUN 3 — RECORDED: FROM 0 TO 448 — COUNTS

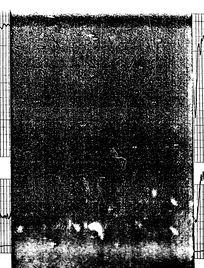
DIRECTION WORK: N S E W — LOGGING UNIT NO. 1 — TIME 1 DAY

TRUCK No. — DRIVER — OPERATOR — ENGINEER — WITNESS

RUN No.	BIT SIZE	WGHT ON BIT	R.P.M.	MUD TYPE	MUD WGT.	VIS.	W.L.	PH	MUD TEMP.	RM @ MEAS. TEMP.	RMF @ MEAS. TEMP.	RMC @ MEAS. TEMP.	SOURCE OF SAMPLE	RM @ BHT	TIME SINCE CIRC.	MAX. REC. TEMP.	EQUIP. LOCATION	RECORDED BY
1	4½	15	70															

REMARKS:







OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 22 1993

COMPANY _____

HOLE NO. 93-NP-12

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	7	Till	
7	157	SANDSTONE	
157	165	Soft and Broken Sandstone (Blind)	
165	186	Sandstone	
186	196	Coal	
196	237	Sandstone	
237	249	Coal	
249	300	Sandstone	

COMMENTS _____

ENSITY - RESISTANCE

ENTRE, EDMONTON, ALBERTA.

SURVEYED DATA

W

ELEV. 1494 I

LOC. 5414 0 N

5006 8 E

2 3

CASING RECORD

SIZE	FROM	TO
4 3/8	0	20

	RESISTANCE	DENSITY	CALIPER
No.	L-103	L-103	
	2 1/8"	2 1/8	
	ME	F	
	1'	13"	
		HOVP	
		CS-137	
		125 mC	

RAY - DENSITY

API UNITS PER DIV.	T C SEC	SENS SETTINGS	ZERO

OHMS — RESISTANCE

DENSITY

DEPTH

CALIPER 4" 6" 10"

GAMMA RAY API UNITS

O

93-NP-12

25 50 75 100 125 150 175 200 225 250 275

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: _____ DATE: March 31 1993

COMPANY: _____

HOLE No.: 93 - NP - #13

APPROX. LOCATION: _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION: 5005 N - 49 442 E

ELEVATION: 1506.3

DRILLER: Don Ofner

FROM	TO	LOG	REMARKS
0	8	Till	
8	210	Sandstone	Cavety at 113 about 6"
210	224	Mudstone with small partings of coal ? (Blind)	
224	241	Sandstone	
241	254	Coal	
254	296	Sandstone	
296	309	Coal	
309	420	Sandstone	

COMMENTS: _____

WATER HORIZON: _____ FT

HOLE No. 13-NEW-13

APPROX. LOCATION: _____ SEC ____ TWP ____ RGE ____ W

SURVEYED LOCATION: 1000' N - 1/2 MILE E

ELEVATION: 1508.3

DRILLER: Don Olsen

FROM	TO	LOG	REMARKS
0	8	Till	
8	110	Sandstone	Core lost 113 to 116'
110	124	Mudstone with small pebble at end 7 (all mud)	
124	141	Sandstone	
141	149	Coal	
149	196	Sandstone	
196	209	Coal	
209	220	Sandstone	

COMMENTS: _____

TSA ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE 13-NEW-13

LOCATION _____ SEC TP RGE W

AREA North Watchil

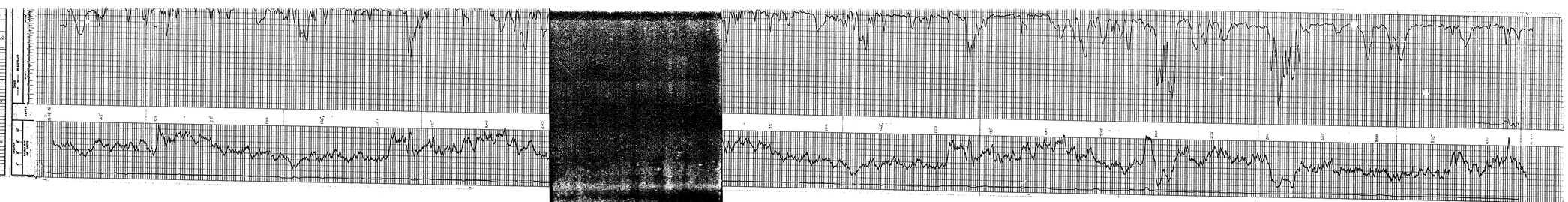
PROVINCE B.C.

SURVEYED DATA

ELEV. 1508.3

LOC. 55000 N

52482 E



LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: _____ DATE: March 30 1993

COMPANY: _____

HOLE No.: ~~93-NP-#14~~ 93-NP-#14

APPROX. LOCATION: _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION: 5419.0N - 4952.5E

ELEVATION: 1513.1

DRILLER: Don Ofun

FROM	TO	LOG	REMARKS
0	6	Till	
6	78	Sandstone	
78	81	Coal	
81	188	Sandstone	
188	191	Coal	
191	272	Sandstone	
272	282	Coal	
282	324	Sandstone	
324	337	Coal	
337	427	Sandstone	
427	429	Coal	
429	440	Sandstone	

COMMENTS: _____

WATER HORIZON: _____ FT

COMPANY: _____

HOLE NO.: Typical 93 - NP - #14

APPROX. LOCATION: _____ SEC. ____ TWP. ____ RGE. ____ W

SURVEYED LOCATION: 610 x 021 - 105°35'E

ELEVATION: 1512.1

DRILLER: Dan O'Brien

FROM	TO	LOG	REMARKS
0	6	Till	
6	28	Sandstone	
28	91	Clay	
91	188	Sandstone	
188	191	Coal	
191	272	Sandstone	
272	282	Coal	
282	324	Sandstone	
324	352	Coal	
352	417	Sandstone	
417	429	Coal	
429	442	Sandstone	

COMMENTS: _____

Petrol Ltd. [illegible]

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-14 SURVEYED DATA

LOCATION SEC. TP. RGE. W. ELEV. 1513.1

AREA North Extent LOC. 5943.0 N

PROVINCE Alta. 105.35 E

RUN NO. 1

DEPTH DRILLER 442.0

DEPTH LOGGER 440.1

CASING LOGGER 442.0

BTM. LOG INTERVAL 440.1

TOP LOG INTERVAL 20.0

DRILLER'S BY Hoback

WITNESSED BY Schaefer

DRILL MEAS. FROM KB

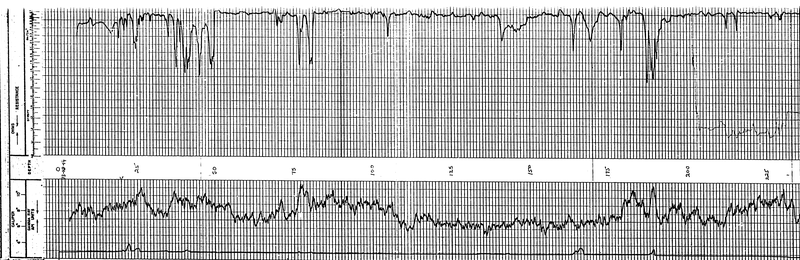
BY	FROM	TO	LOG	CASING RECORD	
				FROM	TO
			6.00	ft.	20.1

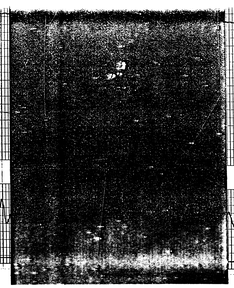
GAMMA RAY — TEMPERATURE

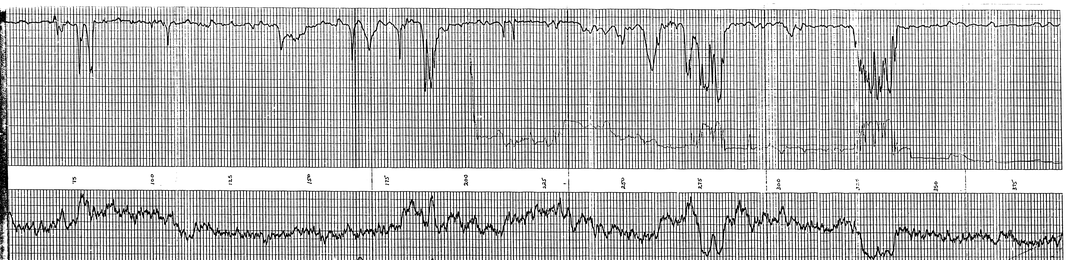
TOOL MODEL NO.	3-GR	TOOL MODEL NO.	3-GR		
DETECTOR	1 1/4 x 16	TYPE	1 1/4 x 16		
CUTTOFF (CPS)	1	TIME	1		
FOR	30 MIN	ENGINE			
LICENSE		SENSOR			
GENERAL		SOURCE STRENGTH			
TRUCK No.		SOURCE MODEL			
LOCATION		SYNCHRO			
		LOGGING DATA			

RUN No.	INTERVAL FROM	INTERVAL TO	SPEED F/min	T.C. SEC.	SENS. SETTING	LOG SCALE	API UNITS PER DIV.	T.C. SEC.	SENSITIVITY SETTING	TIME
1	20.0	440.0	30	1		5	10	1		

REMARKS:







OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE APRIL 5, 1993

COMPANY _____

HOLE NO. 93 - NP - 15

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION 54550 N - 49630 E

ELEVATION 1517.6

DRILLER DON OFNER.

FROM	TO	LOG	REMARKS
0	3	CARBONATED SHALE	
3	101	SANDSTONE	
101	104	MUDSTONE & TRACE OF COAL	
104	264	SANDSTONE	
264	211	Coal ?	
211	259	Sandstone	
259	273	Coal	? - (Blind)
273	339	Sandstone	
339	351	Coal	
351	420	Sandstone	

COMMENTS _____

DRILL HOLE REPORT

COAL FIELD _____ DATE April 5, 1993

COMPANY _____

HOLE NO. 93 - NP - 15

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 54850N - 49630E

ELEVATION 1517.6

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	3	Carbonated Shale	
3	101	Sandstone	
101	104	Mudstone & Trace Of Coal	
104	204	Sandstone	
204	211	Coal ?	
211	259	Sandstone	
259	273	Coal	? - (Blind)
273	339	Sandstone	
339	351	Coal	
351	420	Sandstone	

LEXCO TESTING LTD. — **GAMMA-DENSITY-RESISTANCE**

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-15 — SURVEYED DATA

LOCATION ___ SEC ___ TP ___ RGE ___ W. — ELEV. 1517.6

AREA North Plateau — LOC. 54850 N

PROVINCE O.M.C — 49630 E

RUN No.	1	2	3
DATE	April 5/93		
DEPTH-DRILLER	420'		
DEPTH-LOGGER	420'		
FLUID LEVEL	270'		
LOGGING TIME			
DRILLED BY	C. Noble		
RECORDED BY	C. Noble		
WITNESSED BY	B.M.P.		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
5½	0	20

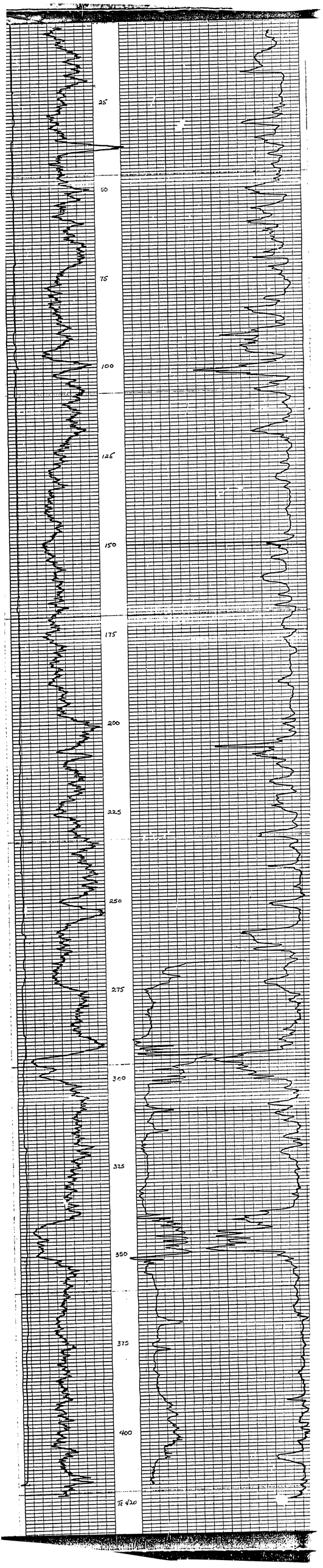
EQUIPMENT DATA

GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3'	LENGTH	1"		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	
		LOGGING DATA			

RUN No.	DEPTHS FROM	DEPTHS TO	GAMMA RAY SPEED Ft/min.	GAMMA RAY T C SEC.	GAMMA RAY SENS SETTING	GAMMA RAY ZERO	API UNITS PER DIV.	DENSITY T C SEC	DENSITY SENS SETTINGS	DENSITY ZERO
			12							

REMARKS:




25
50
75
100
125
150
175
200
225
250
275
300
325
350
375
400
TD 420

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE Aptil 16 1993

COMPANY _____

HOLE NO. 93-MP-#16

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 54690 N - 49783 E

ELEVATION 1538.0

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	13	Till	
13	15	Soft Sandstone	
15	70	Sandstone Grey	
70	74	Mudstone	
74	347	Sandstone	
347	358	Coal	
358	398	Sandstone	
398	410	Coal	
410	460	Sandstone	

COMMENTS _____

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-16c
PAGE 1 OF 5

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	SAMPLE INTERVAL
	DRILLED				RECOVERED	LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	
	FROM	TO	TOT.	SEC	TOT.		
	49	57	8.0	1.6	7.0	Sandstone brown, med hard, bands coarse to fine grained, carby streaks, sharp lower contact	
				0.45'		Coal bright blocky, med hard, low ang's fracturing, small clay band at Top. fissile	50.6 51.6 #1
				0.1		Bentonitic Mudstone green massive soft, moist. sharp contacts wavy	
				0.45'		Coal bright blocky to fissile, upper contact dirty	
				0.45		Mudstone carby dull black to dark brown coaly zones, soft wet	51.6 52.65
				0.1		Mudstone, bentonitic, green, massive, moist, soft	
				0.1		Carby Mudstone, dull black, soft wet,	
				0.15		Mudstone green to brown, massive soft wet	
				0.25'		Carby Mudstone, dull black, more carby towards top	
				3.35		Sandstone grey fine grained, massive	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-16C
PAGE 2 OF 3

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	SAMPLE INTERVAL
	DRILLED			RECOVERED		LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	
	FROM	TO	TOT.	SEC	TOT.		
	57	66	9.0	4.8	8.7	Siltstone, grey, well bedded, very hard, some carb. streaks	
				2.2		Sandstone, grey, fine to medium grained some water staining	
				0.95		Coal, dirty, soft, small clay band at 0.6", water stained	64.64 #2 64.95
				0.75		Mudstone, grey, massive, soft moist, lower contact carbonaceous	
	66	71	5.0	0.1	3.95	Mudstone as above	
				0.2		Coal, bright, broken, dirty 0.2" Siderite	
				0.1		Bentonitic Mudstone, light brown, very soft, moist.	
				0.9		Mudstone, grey, massive, silty, wet	66.7 68.85
				0.35		Coal, dirty, dull & shiny banded very high in sulphur bands throughout.	
				0.9		Mudstone, light to dark grey, massive, soft.	
				0.6		Carby Mudstone, dull black, soft massive	
				0.2		Coal, bright & dull banded	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-16c
PAGE 3 OF 5

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	SAMPLE INTERVAL
	DRILLED			RECOVERED		LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	
	FROM	TO	TOT.	SEC	TOT.		
						broke to crushed, lost core in this unit.	
				0.5		Mudstone, dark grey, med soft moist	
	160	169	9.0	1.25		Siltstone, grey, flaggy, weakly indist	
						Mudstone, dark grey, soft wet, coaly bands cream color, carb in base	
				0.35		Coal, bright & dull banded some vitrain streak, shaley bottom	163.65 164.0 #3
				2.2		Mudstone, grey, soft wet, massive, silty in clay	
				0.25		coal bright to dull banding, abundant pyrite streaks and bands, small clay bands	166.2 167.35 #4
				0.25		Mudstone, light grey, massive med soft.	
				0.25		Coal bright, broke to crushed	
				0.1		Bentonite, Mudstone, brown soft wet	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-16c
PAGE 4 OF 5

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	SAMPLE INTERVAL
	DRILLED			RECOVERED		LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	
	FROM	TO	TOT.	SEC	TOT.		
				0.3		Coal, powder, crushed by drill, hard to identify	
				0.5		Bentonitic Mudstone, silt cream to brown. Soft wet.	
	266	274	8.0	0.95	7.05	Mudstone, grey, blocky, med soft, carbonaceous contact	
				0.7		Coal bright blocky to broken some amber, faint clay looking	266.95 267.95
				0.3		Coal dirty, dull hard, mineral and clay bands, friable	#5
				1.2		Mudstone bentonitic, light grey massive, tidy	
				0.3		Mudstone, brown, soft wet massive	
				0.3		Coal, bright and dull banded med hard	269.45 270.45
				0.15		Mudstone bentonitic, soft wet massive	#6
				0.2		Dirty coal, dull black, med hard massive, occ ironstone band	
				0.25		Carb. Mudstone, dark brown, med hard, moist	
	TOTALS					- x 100 = % REC. SEAM	
						- x 100 = % TOTAL REC. SEAM(S)	

OBED MOUNTAIN COAL LTD.

HOLE NO. 93-NP-16c
PAGE 5 OF 5

CORE #	CORE FOOTAGES					GEOLOGICAL DESCRIPTION LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION	SAMPLE INTERVAL
	DRILLED			RECOVERED			
	FROM	TO	TOT.	SEC	TOT.		
				0.1		Coal bright lustrous to crushed	
						milled, some rock bands	
				2.1		Siltst., grey, massive, med	
						hard to hard.	

Well Name _____ Well No. 92-MP-9 16

Company _____

Well No. 92-MP-9 16

Approx. Location _____ SEC. ___ TWP. ___ RGE. ___ W.

Surveyed Location 54600 N - 44787 E

Elevation 1528.0

Drilled Dan Oliver

FROM	TO	LOG	REMARKS
0	13	Till	
13	15	Soft Sandstone	
15	20	Sandstone Clay	
20	124	Mudstone	
124	140	Sandstone	
140	358	Coal	
358	378	Sandstone	
378	410	Coal	
410	468	Sandstone	

TESTING LTD. — **GAMMA-DENSITY-RESISTANCE**

715 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-16 — SURVEYED DATA

LOCATION SEC. TP. RGE. W — ELEV. 1528.0

AREA North Plateau — LOC. 54600 N

PROVINCE — 37765 E

CO. No. — ELEV. FROM DRILL FLOOR

APPL. DRILLER — LOG

RECORDED BY — C. Moore

WITNESSED BY — J. Hall

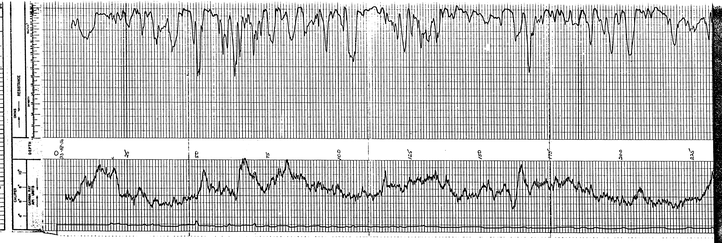
RUN	TYPE	FROM	TO	CASING RECORD SIZE	WT.	GRADE	TO
				SURF.			
				7 5/8"	20		201

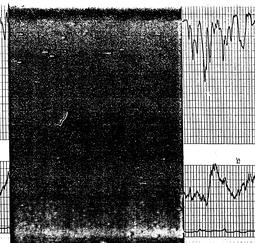
EQUIPMENT NO.

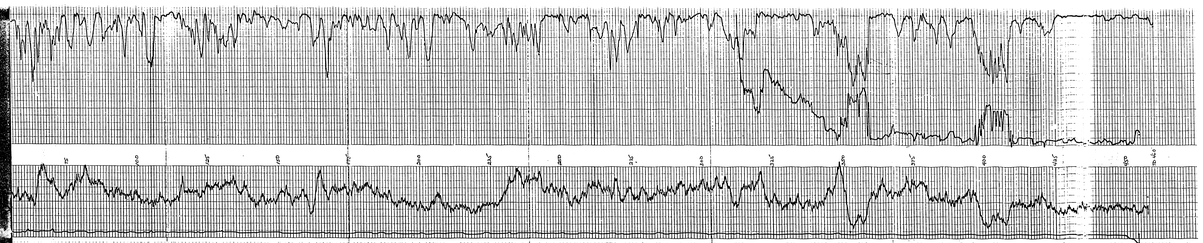
	CASING DIA.	TYPE	TOOL MODEL No.	DENSITY	DENSITY
TOOL SERIAL No.	4 1/2"	CNDD	1	1	
DETECTOR SERIAL No.	4 1/2"	CNDD	1	1	
LOGGING	MR	CNDD	MR	MR	
			SOURCE No.		
TRUCK No.			SOURCE SIZE		
LOGGING			DETECTOR SPACING	20	
			DETECTOR SIZE	20	

RUN No.	MEDIUM FROM	MEDIUM TO	FLUID LEVEL	MUD TYPE	MUD WT.	MUD VISC.	FLUID LOSS	MUD RESIST.	MUD TEMP.
					PPG	SEC	CC	OHM-M	DEG F
1									

REMARKS







OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE APRIL 28, 1993

COMPANY _____

HOLE NO. 93 NP - 17

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER DON OFNER,

FROM	TO	LOG	REMARKS
0	6	TILL	
6	10	MUDSTONE & TRACES OF COAL	
10	39	SANDSTONE	
39	40	TRACE OF COAL	
40	51	SANDSTONE	
51	55	MUDSTONE + COAL STRINGERS	
145	146	Trace of coal	
146	263	Sandstone	
263	268	Mudstone & coal Stringers	
268	348	Sandstone	
348	358	coal	
358	395	Sandstone	
395	406	Coal	
406	440	Sandstone	

COMMENTS _____

COAL FIELD

DATE April 29, 1993

CLIENT

WCE No. 93 NP - 17

APPROX. LOCATION SEC. TWP. RGE. W.

SURVEYED LOCATION

ELEVATION

DRILLER Dan Dewes

FROM	TO	LOG	REMARKS
0	6	Till	
6	10	Mudstone & Traces Of Coal	
10	39	Sandstone	
39	50	Trace Of Coal	
50	51	Sandstone	
51	55	Mudstone & Coal Stringers	
55	106	Interbedded Coal	
106	163	Sandstone	
163	208	Mudstone & Coal Stringers	
208	268	Sandstone	
268	268	Coal	
268	395	Sandstone	
395	406	Coal	
406	409	Sandstone	

LEXCO TESTING LTD. GAMMA-DENSITY-RESISTANCE

900 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE 93-NP-17 SURVEYED DATA

LOCATION SEC TP RGE W ELEV. 1236.3

AREA North Plateau LOC. 5955.0 N

PROVINCE Alta. FILENAME 405.35 E

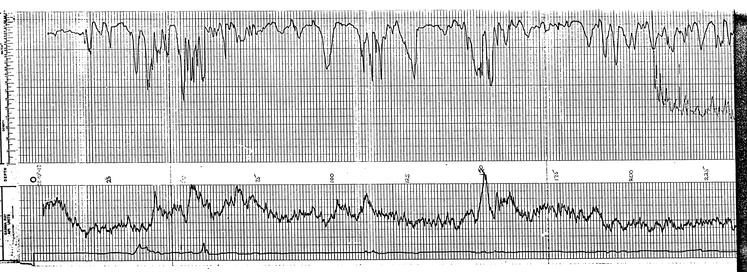
RUN No.	1
DEPTH - DRILLER	28.700 m
DEPTH - LOGGER	428.
DEPTH - SCHLUM.	428.
CASING TYPE	
CASING WT.	
BIT SIZE	5.875"
DRILLER'S No.	1
WITNESSED BY	

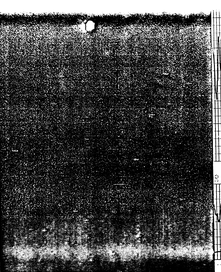
RUN	TIME SINCE CIRC.	TD	LOGGED INTERVAL TOP	BOTTOM
1	3 hrs	428	0	30

TOOL STRING (BOTTOM UP)					
TOOL MODEL No.	TYPE	TOOL MODEL No.	TYPE		
SHORTER	8.125"	DIAMETER	4.375"	4.375"	
TOOL MODEL No.	8.125"	WEIGHT	165	97	
LENGTH	3'	STRING	3'	6'	
		LENGTH			
TRUCK No.		DENSITY SOURCE		SONDE	
LOCATION		MATRIX		MUD	
		DENSITY		10.1	
		MUD RESISTIVITY		0.2	

RUN No.	LOGGED	SPEED m/hr	TC	MAX. TEMP. °C	MAX. RES. OHMS	MIN. DENSITY gm/cc	TC	MAX. DENSITY gm/cc	TC	REMARKS
1	1993 / 5 / 1	1200	1	15	1.0	1.95	1	2.65	1	

REMARKS:







OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD North Plateau DATE April 5 1993

COMPANY

HOLE NO. 93 - NP - H 18

APPROX. LOCATION SEC. TWP. RGE. W.

SURVEYED LOCATION 55105 N - 49555 E

ELEVATION 1495.4

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	46	Till	
46	211	Sandstone	
211	222	Coal	
222	265	Sandstone	
265	278	Coal	
278	380	Sandstone	

COMMENTS

COAL FIELD North Plateau DATE April 5 1993

COMPANY

HOLE NO. 93-NP-18

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 55105 N - 49555 E

ELEVATION 1495.4

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	46	Till	
46	211	Sandstone	
211	222	Coal	
222	265	Sandstone	
265	278	Coal	
278	380	Sandstone	

LEXCO TESTING LTD. — **GAMMA-DENSITY-RESISTANCE**

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-18 — SURVEYED DATA

LOCATION SEC. TP. RGE. W — ELEV. 1495.4

AREA NORTH PLATEAU — LOC. 55105 N

PROVINCE O.M.C. — 49555 E

	1	2	3
RUN No.			
DATE	April 5/93		
DEPTH-DRILLER	380		
DEPTH-LOGGER	372		
FLUID LEVEL	271		
LOGGING TIME			
DRILLED BY	D. Ofner		
RECORDED BY	C. Hogan		
WITNESSED BY	D.M.R.		

BORE-HOLE RECORD

BIT	FROM	TO	SIZE
			6 3/8

CASING RECORD

SIZE	FROM	TO
	0	40

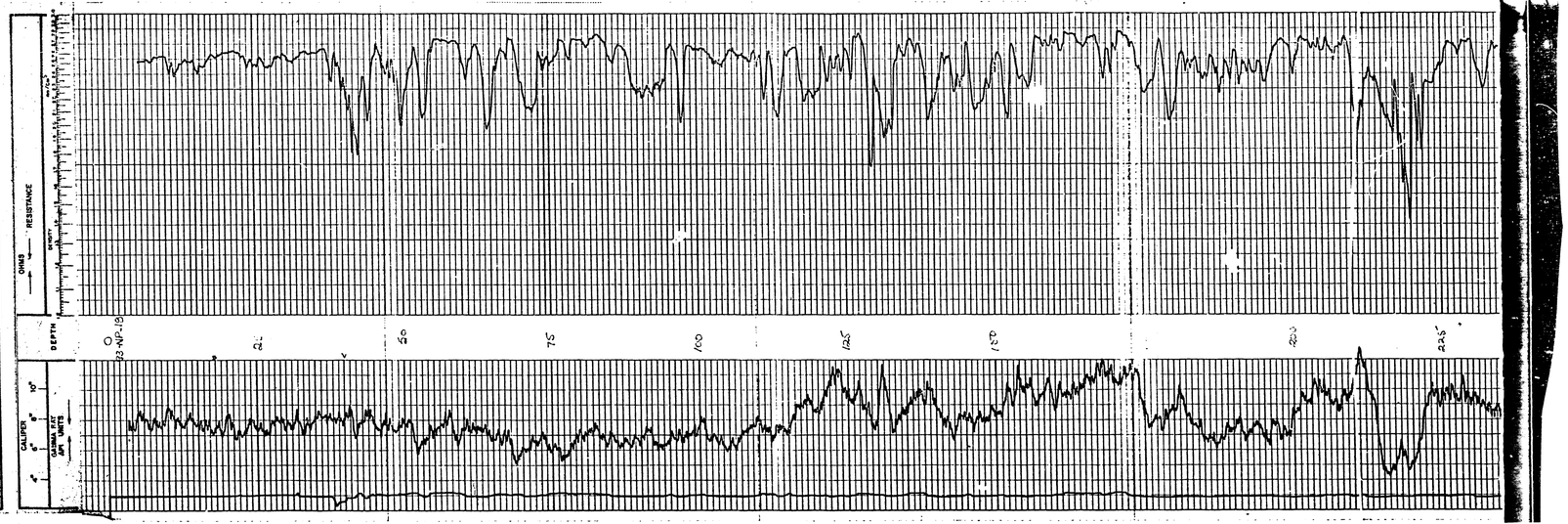
EQUIPMENT DATA

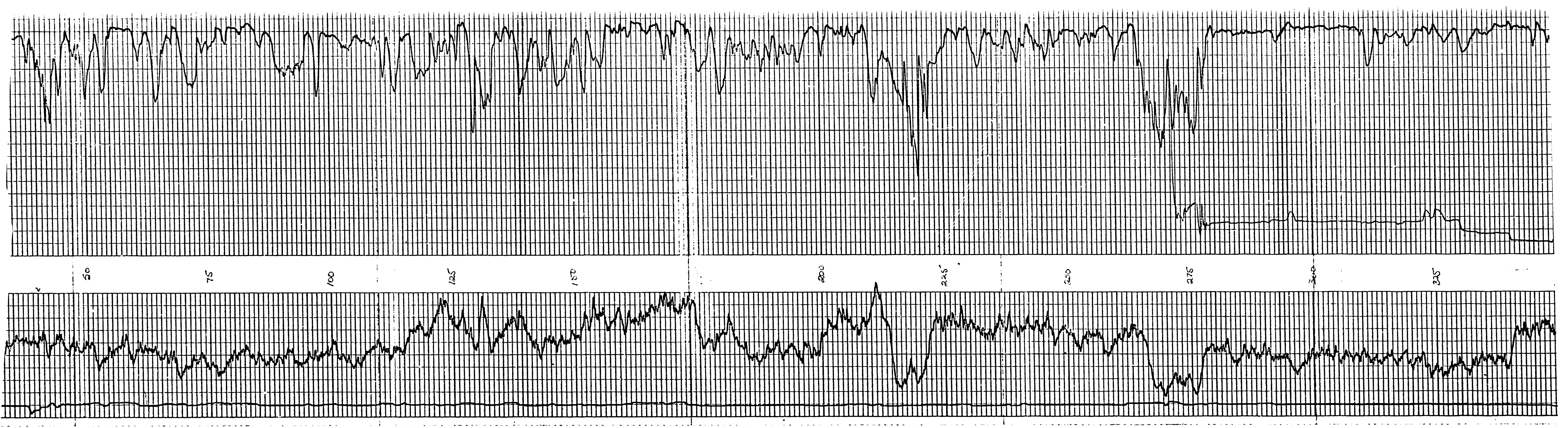
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-316	TYPE	ME	T	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH	1"		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 m C	

LOGGING DATA

RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	T C SEC.	SENS SETTING	ZERO	GAMMA RAY API PER	GAMMA RAY UNITS DIV.	DENSITY T C SEC.	DENSITY SENS SETTINGS	DENSITY ZERO
			12								

REMARKS:




50
75
100
125
150
200
225
250
275
300
325

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: _____ DATE: April 1 1993

COMPANY: _____

HOLE No.: 93 - NP - #19

APPROX. LOCATION: _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION: 55040 N - 49633 E

ELEVATION: 1496.0

DRILLER: Don Ofner

FROM	TO	LOG	REMARKS
0	52	Till	
52	237	Sandstone	
237	240	Coal	
240	277	Sandstone	
277	287	Coal	
287	380	Sandstone	

COMMENTS: _____

WATER HORIZON: _____ FT

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: _____ DATE: April 1 1993

COMPANY: _____

HOLE NO.: 93-NP-019

APPROX. LOCATION: _____ SEC ___ TWP ___ RGE ___ W ___

SURVEYED LOCATION: SCHO N - 10693 E

ELEVATION: 1496.0

DRILLER: Dan Oliver

FROM	TO	LOG	REMARKS
0	82	Till	
82	232	Sandstone	
232	288	Coal	
288	297	Sandstone	
297	380	Coal	
380	460	Sandstone	

LEXCO TESTING LTD. — GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE 93-NP-19 — SURVEYED DATA

LOCATION SEC TP RGE W — ELEV. 1496.0

AREA North Battle — LOC. 550.00 N 10693.63 E

PROVINCE Dt. 84, C

RIG NO.			
DEPTH DRILLED	Above - 1 FEB		
DEPTH LOGGED	460'		
CASING SIZE	219		
CASING TYPE			
DRILLED BY	Dan Oliver		
LOGGED BY	C. Hinds		
WITNESSED BY	C. Hinds		

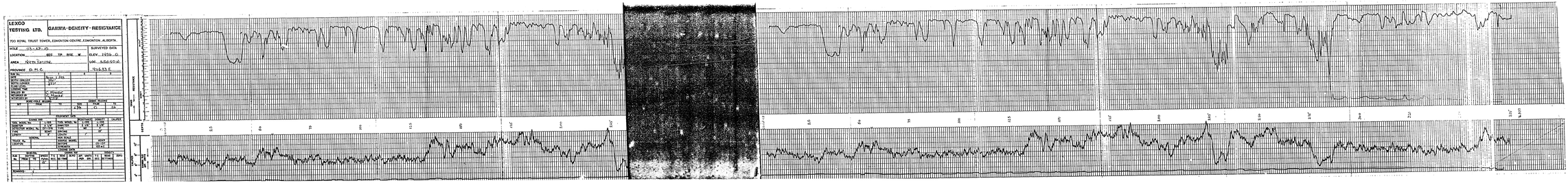
RUN	TIME RECORDED	IN	OUT	GAMMA RANGE	TO
				0 CPS	1500 CPS

GAMMA RAY		DUAL SPACED DEN.	
SOL. MODEL NO.	1-3A	SOL. MODEL NO.	1-3A
DETECTOR MODEL NO.	2-3A	DETECTOR	2-3A
CAL.	1000 API	CAL.	2.0 g/cc
SPEED	30 FPM	SPEED	30 FPM
	GENERAL	HOLE SIZE	
TOOL No.		CASING SIZE	
LOCATION		FORMATION	

RESISTIVITY CON.			
SHORT NORM.		SHORT NORM.	16"
LONG NORM.		LONG NORM.	64"
SPONTANEOUS POTENTIAL		SPONTANEOUS POTENTIAL	
FORMATION		FORMATION	
		LOCK	
		SPEED	30 FPM
		SENSITIVITY	100 MV

RUN No.	DEPTH FROM	DEPTH TO	SHOT INTERVAL	TC 1 SEC	TC 3 SEC	REMARKS	MV SHOT	MV TC	MV REMARKS	SIGNATURE

REMARKS: 1



OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 28 1993

COMPANY _____

HOLE NO. 93-NP-II 20

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	10	Till 363 - 420	Sandstone
10	21	Sandstone	
21	23	Mudstone	
23	82	Sandstone	
82	83	TRACE OF COAL	
83	124	SANDSTONE	
124	126	Mudstone	
126	178	Sandstone	
178	181	Mudstone & coal	
181	230	Sandstone	
230	231	Trace of coal	
231	281	Sandstone	
281	285	MUDSTONE	
285	300	SANDSTONE	
300	311	COAL	
311	351	SANDSTONE	
351	363	Coal	

COMMENTS _____

COAL FIELD _____ DATE April 28 1993

CONTRACT _____

HOLE NO. 93-NP-#20

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Dan Oliver

FROM	TO	LOG	REMARKS
0	10	Till 363 - 420	Sandstone
10	21	Sandstone	
21	23	Mudstone	
23	83	Sandstone	
83	83	Trace Of Coal	
83	124	Sandstone	
124	126	Mudstone	
126	178	Sandstone	
178	181	Mudstone & coal	
181	230	Sandstone	
230	231	Trace of coal	
231	281	Sandstone	

LEXCO TESTING LTD. GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE _____ SURVEYED DATA

LOCATION _____ SEC TP. RGE W. ELEV. _____

AREA _____ LOG _____

PROVINCE _____

	1	2	3
RUN No.	1		
DEPTH-DRILLER	0-420m		
DEPTH-LOGGER	420		
FLUID LEVEL	DRY		
LOGGED BY	D. MILLER		
RECORDED BY	D. MILLER		
WITNESSED BY			

BORE-HOLE RECORD			CASING RECORD		
BIT	FROM	TO	SIZE	FROM	TO
			4.5"		

EQUIPMENT USED					
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-107	TOOL MODEL	107	107	107
SONDE No.	107	SHIELD	1/2"	1/2"	1/2"
DETECTOR MODEL No.	DP-1/8	TYPE	MS	DP	
LENGTH	10'6"	SPACING		6"	
LEAD	DUAL	GAIN		4	
		NOR. SCALE			
TRUCK No.		SCALER MODEL			HOOP
LOCATION		DETECTOR			2.5"
		SENSITIVITY			125 m-r
		LOGGING DATA			

| SONDE | | | | |

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 29 1993

COMPANY _____

HOLE NO. 93 - NP - #21

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ufner

FROM	TO	LOG	REMARKS
0	12	Till	
12	185	Sandstone	185 - 186 - Cavety
185	192	Mudstone with coal	partings ?
192	198	Sandstone ?	
198	203	Coal ?	
203	246	Sandstone ?	
246	256	Coal ?	Blind ?
256	336	Sandstone	
336	348	Coal ?	
348	400	Sandstone	

COMMENTS _____

WATER HORIZON _____ FT. _____

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	12	Till	
12	185	Sandstone	185-186- Cavety
185	192	Mudstone with coal partings?	
192	198	Sandstone?	
198	203	Coal ?	
203	246	Sandstone?	
246	256	Coal ?	Blind ?
256	326	Sandstone	
326	348	Coal ?	
348	400	Sandstone	

TESTING LTD. GAMMA DENSITY RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 32-NE-21 SURVEYED DATA

LOCATION _____ SEC. TP. RGE. W. ELEV. ISTN.

AREA NORTH BATTLE LOC. SHRON

PROVINCE ALBERTA SASK

RUN No.	1	2	3
DATE	27/APR/83		
DEPTH-DRILLER	400		
DEPTH-LOGGER	401		
FLUID LEVEL	300		
LOGGING TIME			
DRILLED BY	D. HOOK		
RECORDED BY			
WITNESSED BY			

BORE-HOLE RECORD			CASING RECORD		
BIT	FROM	TO	SIZE	FROM	TO
					30

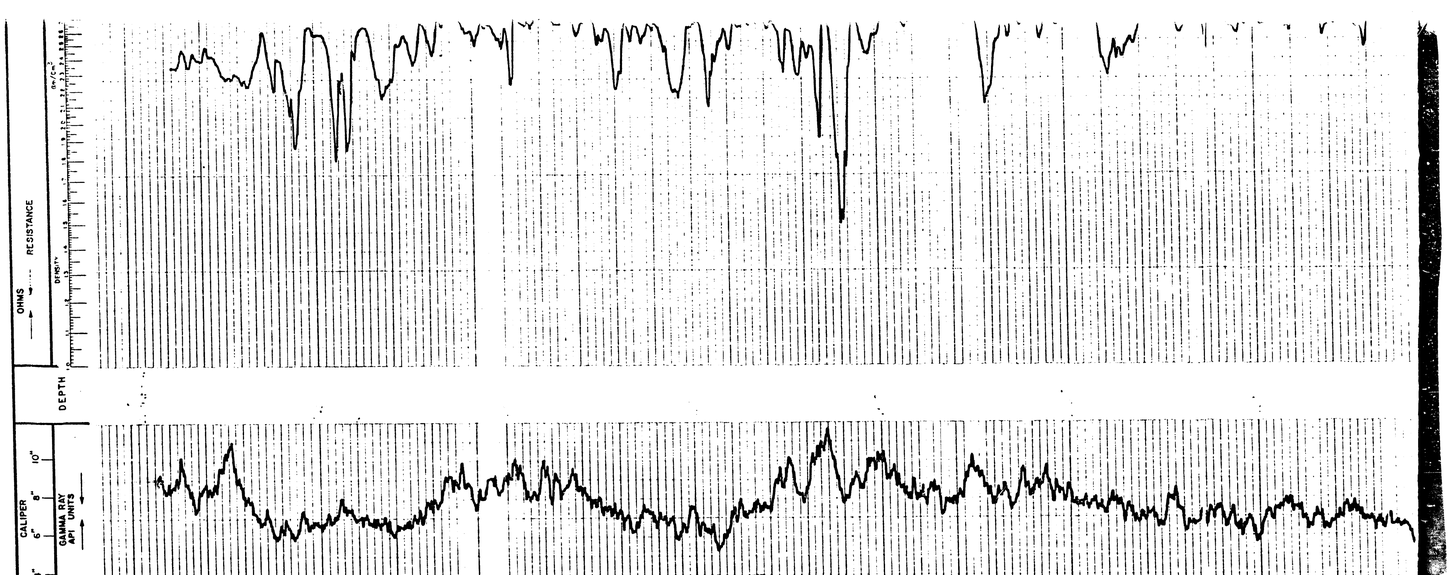
EQUIPMENT DATA

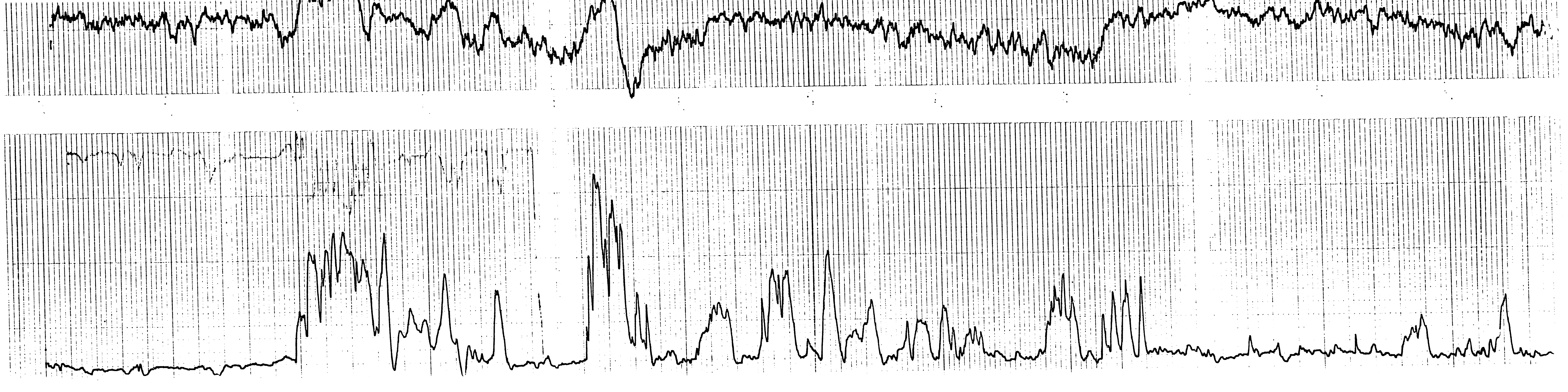
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3'	LENGTH	1"		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

LOGGING DATA

RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	GAMMA RAY T C SEC.	GAMMA RAY SENS SETTING	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV.	DENSITY T C SEC	DENSITY SENS SETTINGS	DENSITY ZERO
			10m							

REMARKS:





OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 26 1993

COMPANY _____

HOLE NO. 93-NP-22

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	6	Till	
6	116	Sandstone	
116	117	Coal	
117	207	Sandstone (Blind at 140)	
207	217	Coal	
217	257	Sandstone	
257	267	Coal	
269	320	Sandstone	

COMMENTS _____

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Olson

FROM	TO	LOG	REMARKS
0	6	Till	
6	116	Sandstone	
116	117	Coal	
117	207	Sandstone (Blindbay 140)	
207	217	Coal	
217	257	Sandstone	
257	267	Coal	
267	310	Sandstone	

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE Dow NH 23 — SURVEYED DATA

LOCATION _____ SEC. TP. RGE. W. — ELEV. 1007

AREA Nisku Pinedale — LOC. 2-11-49-5

PROVINCE Alta. — COUNTY _____

RUN No.	1	2	3
DATE	26-11-80		
DEPTH-DRILLER	2400		
DEPTH-LOGGED	2397		
CASING-LOG	2397		
CASING-DRILL			
DRILLED BY	Mark Drilling		
RECORDED BY	C. Hagen		
WITNESSED BY			

BIT	SIZE	FROM	TO
	7 7/8		

CASING RECORD

SIZE	FROM	TO
9 5/8	0	37

GAMMA RAY

	L 105
TOOL MODEL No.	L 105
DIAMETER	2 1/4
DETECTOR MODEL No.	14-STEL
LENGTH	10'

GENERAL

TRUCK No.	
LOCATION	

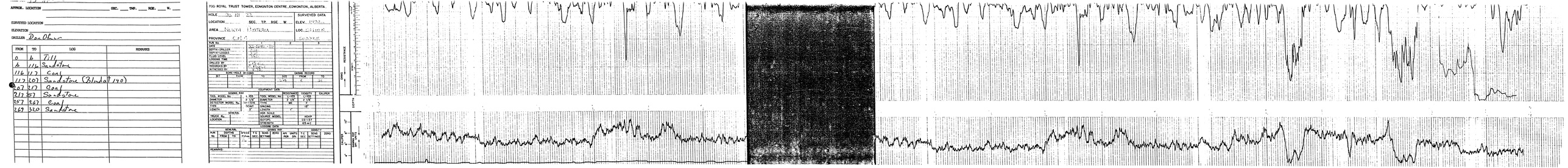
EQUIPMENT SUM

	RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L 105	L 105	
DIAMETER	2 1/4	2 1/4	
TYPE	ME	ME	
SPACING		19"	
LENGTH			
HOW SCALED			
SOURCE MODEL		HOWP	
STRENGTH		CS-137	
STRENGTH		125 mC	

LOGGING DATA

RUN No.	DEPTH FROM	DEPTH TO	SPEED F/min	T.C. SEC.	SCALE SETTING	GAIN R/D	API UNITS PER DIV.	T.C. SEC	SCALE SETTING	ZERO
1	2397	0	30	1	10	10	20	1	10	

REMARKS



OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE May 3 1993

COMPANY _____

HOLE NO. 93 - NP - 23

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	12	Till	
12	190	Sandstone	
190	199	Coal	
199	241	Sandstone	
241	252	Coal	
252	320	Sandstone	

COMMENTS _____

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	12	Till	
12	190	Sandstone	
190	199	Coal	
199	241	Sandstone	
241	252	Coal	
252	320	Sandstone	

HOLE 03-NE-2

SURVEYED DATA

LOCATION _____ SEC TP RGE W

ELEV. _____

AREA Cypress County

LOC. NE-2-13-3

PROVINCE _____

SUR. No. _____

DATE _____

DRILLER _____

DEPTH-DRILLER 320

DEPTH-LOGGER 320

FLUID LEVEL _____

CASING TYP. _____

DRILLED IN _____

CASING LEFT _____

WITNESSED BY _____

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

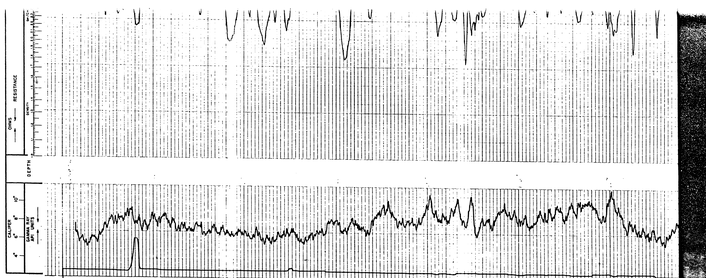
SIZE	FROM	TO

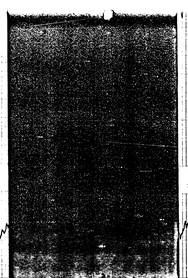
EQUIPMENT DATA

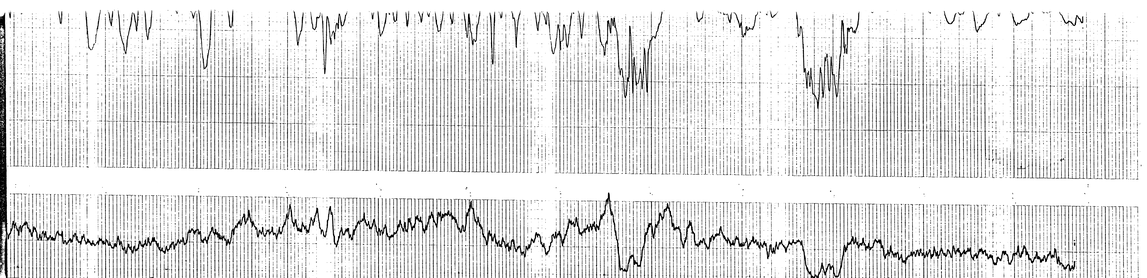
	GAMMA RAY		NEUTRON		RESISTANCE	DENSITY	CALIPER
TRUC. MODEL No.	L-OD	TOOL MODEL No.	L-OD	L-OD			
GAMMA SONDE	2 1/8"	DETECTOR TYPE	2 1/8"	2 1/8"			
DETECTOR MODEL No.	SP-2-S/B	TYPE	HN	15"			
SHIELD	SONY	SPACING					
LENGTH	3'	LENGTH					
GENERAL		HOR. SCALE					
TRUCK No.		DETECTOR MODEL		JOHP			
LOCATION		ISOTOPE		10-132			
		STRENGTH		50 mC			
		CASING DATA					

RUN	GEOPHS IN	GEOPHS FROM	GEOPHS TO	SPEED F/min	T.C. SEC.	SENS. SETTING	SENS.	API UNITS PER DIV.	T.C. SEC.	DENSITY SENS. SETTINGS	ZERO
				10							

REMARKS: _____







OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 27 199?

COMPANY _____

HOLE NO. 93-NP-Z24

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	12	T.11	
12	26	Mudstone	
26	163	Sandstone	
163	165	Coal	(Blind at 140)
165	194	Sandstone	
194	199	Coal & Mudstone	
199	218	Sandstone	
218	227	Coal	
227	267	Sandstone	
267	279	Coal	
279	340	Sandstone	

COMMENTS _____

HOLE NO. 93-NP-24

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	12	Till	
12	26	Mudstone	
26	163	Sandstone	
163	165	Coal	(Blind at 140)
165	194	Sandstone	
194	199	Coal & Mudstone	
199	218	Sandstone	
218	227	Coal	
227	267	Sandstone	
267	279	Coal	
279	340	Sandstone	

ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

CIRCLE [illegible] NO. [illegible]

LOCATION _____ SEC. TP. RGE W

AREA [illegible] PLATEAU

PROVINCE S.A.S.K.

SURVEYED DATA

ELEV. 1892.4

LOC. 54810 N

E 10170 E

RUN No.	1	2	3
DATE	21-APRIL-93		
DEPTH-DRILLER	340		
DEPTH-LOGGER	340		
FLUID LEVEL	197		
LOGGING TIME			
DRILLED BY	C. Moore		
RECORDED BY	C. Moore		
WITNESSED BY	K.T.R.		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
6⅞	0	20

EQUIPMENT DATA

GAMMA RAY		RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	L-103	L-103	
DIAMETER	2 1/8"	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516			
TYPE	SCINT	ME	F	
LENGTH	3"	1"	13"	

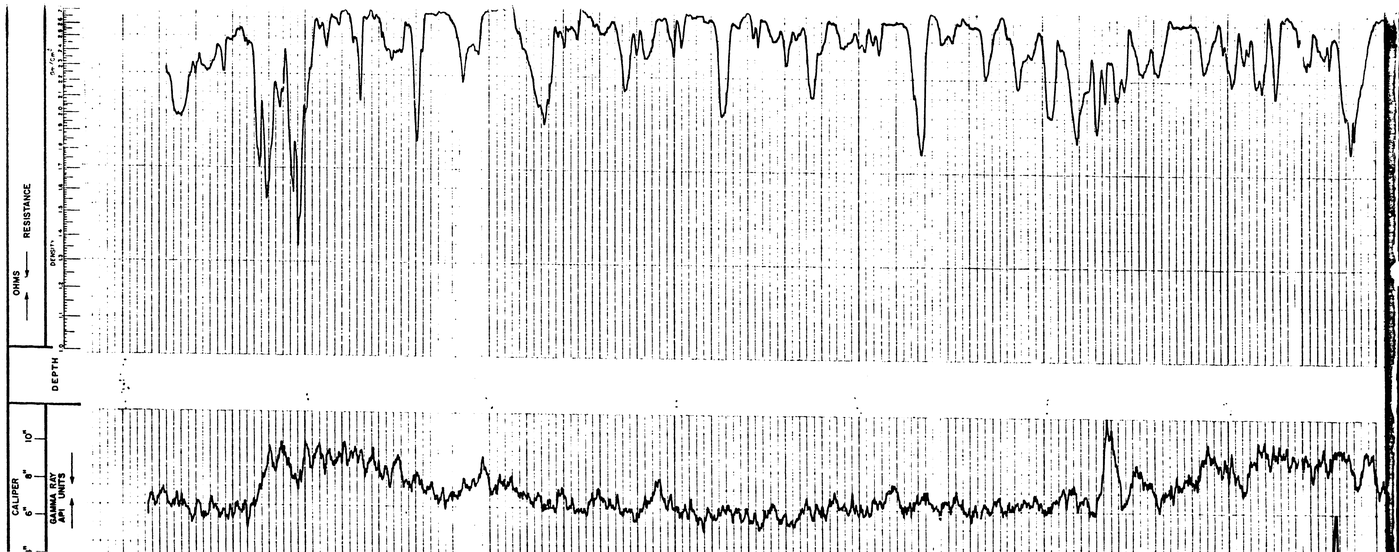
GENERAL	
TRUCK No.	
LOCATION	

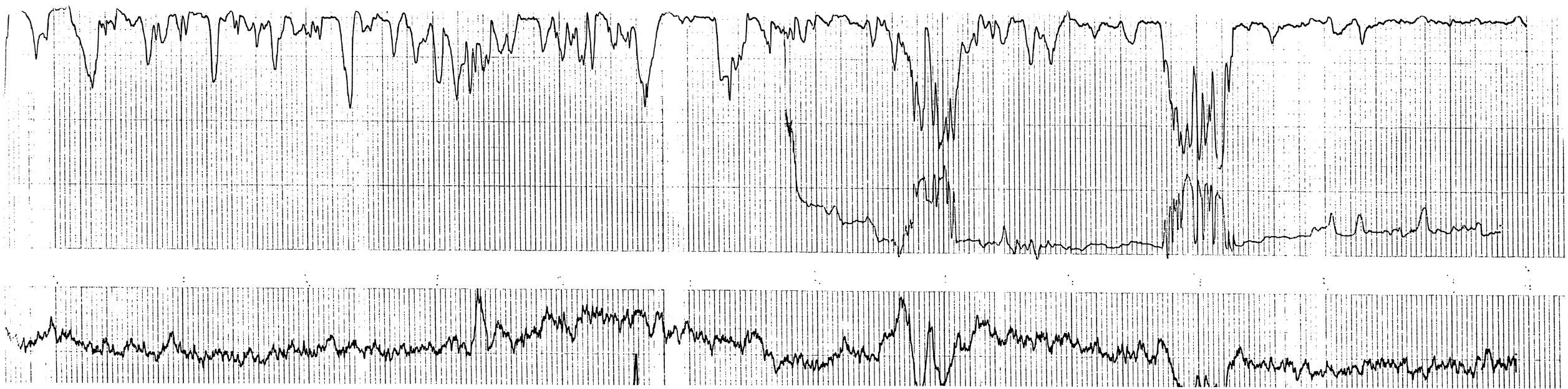
TOOL MODEL No.	L-103
DIAMETER	2 1/8"
TYPE	
SPACING	
LENGTH	
HOR. SCALE	
SOURCE MODEL	HOVP
ISOTOPE	CS-137
STRENGTH	125 mC

LOGGING DATA

RUN No.	GENERAL DEPTHS FROM	TO	SPEED Ft/min.	GAMMA RAY T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	DENSITY T C SEC	SENS SETTINGS	ZERO

REMARKS





OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 26 1993

COMPANY _____

HOLE NO. 93 NP - #25

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	9	Till	
9	109	Sandstone	
109	110	TRACE OF COAL ?	
110	176	SANDSTONE	
176	186	Mudstone	
186	203	Sandstone	
203	208	Coal	
208	253	Sandstone	
253	265	Coal	
265	320	Sandstone	

COMMENTS _____

WATER HORIZON _____ FT.

HOLE NO. 93 NP - #25

APPROX. LOCATION ___ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION

ELEVATION

DRILLER Don Oliver

FROM	TO	LOG	REMARKS
0	9	Till	
9	109	Sandstone	
109	110	Trace Of Coal ?	
110	176	Sandstone	
176	184	Mudstone	
184	203	Sandstone	
203	208	Coal	
208	263	Sandstone	
263	265	Coal	
265	320	Sandstone	

TESTING LTD. NATURAL RADIOACTIVITY - RESISTIVITY

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93 NP - #25

LOCATION SEC TP RGE W

AREA NEAR TABER

PROVINCE ALTA.

SURVEYED DATA

ELEV. 1688.6

LOC. 5460.5 N

20242.2 E

FILE NO.	93-NP-25
DATE	10-JULY-93
DEPTH-DRILLER	320'
DEPTH-LOGGER	320'
FLUID LEVEL	Dry
RECORDED BY	A. Mackie
DRILLED TO	A. Mackie
RECHARGED BY	A. Mackie
WITNESSED BY	Owner

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
5½"	0	320

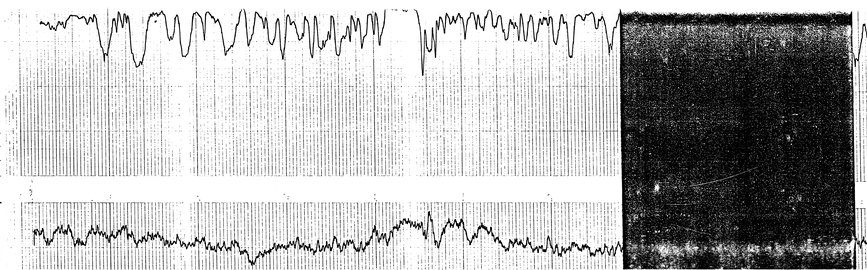
EQUIPMENT USED

TOOL MODEL No.		L-DEN	TOOL MODEL No.	MED. UNDER	DENSITY CALIPER
SONDE No.		2-DEN	CENTRALIZER	9 1/4"	5-DEN
DETECTOR MODEL No.		2-DEN	SPACING		8 1/2"
TYPE		SCINT.	BACKING		
LENGTH		9'	LENGTH		
	GENERAL		SOURCE TYPE		
TRUCK No.			SOURCE MODEL		60MBY
LOCATION			SOURCE		CS-137
			STRENGTH		50 mC

LOGGING DATA

RUN No.	GENERAL SETTING FROM	SETTING TO	SPEED F/min	T/C SEC	T/C SETTING	SAMP. RATE SEC	SAMP. RATE SETTING	MIN. DEV.	UNITS PER DIV.	T/C SEC	DENSITY SENS.	DENSITY ZERO SETTING
			20									

REMARKS



OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE April 27 1993

COMPANY _____

HOLE NO. 93 - NP - # 26

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	4	Till	
4	90	SANDSTONE	
90	91	Coal ?	
91	180	Sandstone	
180	188	Coal	
188	228	Sandstone	
228	240	Coal	
240	300	Sandstone	

COMMENTS _____

WATER HORIZON

SURVEYED LOCATION

ELEVATION

DRILLER Don Other

FROM	TO	LOG	REMARKS
0	4	T.ill	
4	90	Sandstone	
90	91	Coal	
91	120	Sandstone	
120	128	Coal	
128	228	Sandstone	
228	240	Coal	
240	300	Sandstone	

HOLE	132-N1-26	SURVEYED DATA	
LOCATION	SEC TP RGE W	ELEV.	
AREA		LOC.	
PROVINCE			

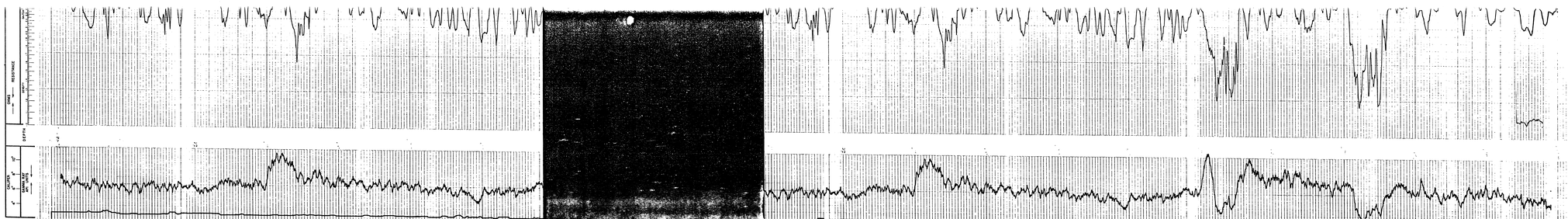
	1	2	3
RUN No.			
DATE			
DEPTH-DRILLER			
DEPTH-LOGGER			
CASING TYP			
CASING TYPE			
DRILLED BY			
RECORDED BY			
WITNESSED BY			

BORE-HOLE RECORD				CASING RECORD		
BIT	FROM	TO		SIZE	FROM	TO

EQUIPMENT DATA					
SONDE No.	L-101	TOOL MODEL No.	L-101	RESISTANCE	DENSITY
DIAMETER	2 1/4"	DIAMETER	2 1/4"	16"	2 3/4"
DETECTOR MODEL No.	CP-378	TYPE		MS	2
LENGTH	SHORT	SPACING			19"
	5'	LENGTH	7'		
TRUCK No.	GENERAL	SOURCE SCALE			
LOCATION		SOURCE MODEL		HOOP	
		ISOTOPE		CS-137	
		STRENGTH		25 mC	
		LOGGING DATE			

GENERAL											DENSITY	
RUN No.	DEPTH FROM	DEPTH TO	SPEED ft/min	T C SEC	SONE SETTING	SONE UNITS	API UNITS PER DIV.	T C SEC	SONE SETTING	ZERO
			12							

REMARKS:



OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE May 3 1993

COMPANY _____

HOLE NO. 93-NP-II27

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	20	Till Clay & Lots Of Rocks	
20	98	Sandstone	
98	110	Coal	
110	150	Sandstone	
150	161	Coal	
161	220	Sandstone	

COMMENTS _____

WATER HORIZON _____

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	20	Till Clay & Lots Of Rocks	
20	98	Sandstone	
98	110	Coal	
110	150	Sandstone	
150	161	Coal	
161	220	Sandstone	

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 92-NP-27

LOCATION _____ SEC TP RGE W

AREA NORTH PEMBINA

PROVINCE C.M.C. ALTA.

SURVEYED DATA

ELEV. _____

LOC. _____

RUN No.	1	2	3
DATE	23/MAY/93		
DEPTH-DRILLER	220.		
DEPTH-LOGGER	220.		
FLUID LEVEL	215.		
LOGGING TIME			
DRILLED BY	D. OFNER		
RECORDED BY	M. MCGRATH		
WITNESSED BY	P.U.C.		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
6 5/8	0	30

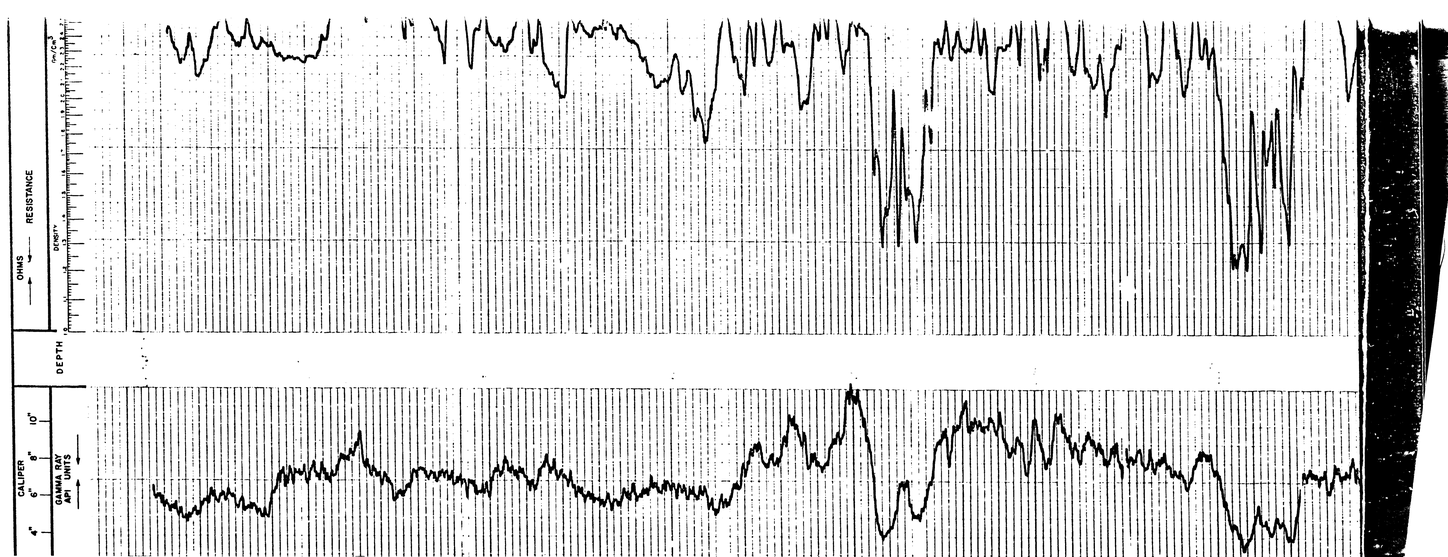
EQUIPMENT DATA

GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH	1"		
GENERAL		HOR SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

LOGGING DATA

GENERAL				GAMMA RAY				DENSITY		
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	T C SEC	SENS SETTINGS	ZERO
			12							

REMARKS



PINTO CREEK EXPLORATION 1994

DRILL HOLE SURVEY LOCATION
UTM COORDINATES

HOLE	NORTHING	EASTING	ELEVATION
PC-94-01	5949169.55	421324.55	1467.58
PC-94-02	5949441.67	421795.34	1440.68
PC-94-03	5949633.36	422008.69	1431.29
PC-94-04	5949944.92	422300.83	1420.43
PC-94-05	5949250.00	422950.00	1431.50
PC-94-06	5947410.74	423604.68	1493.32
PC-94-07	5945994.37	425069.19	1448.35
PC-94-08	5946236.72	425567.89	1519.47
PC-94-09	5945385.51	425909.56	1427.41
PC-94-10	5945630.15	426232.02	1433.79
PC-94-11	HOLE NOT DRILLED		
PC-94-12	5943341.16	427326.80	1380.93
PC-94-13	5942065.00	428850.00	1350.00
PC-94-13A	5942175.79	429173.62	1351.73
PC-94-14	5942354.30	429359.31	1351.06
PC-94-15	5942659.84	429683.07	1346.38
PC-94-16	5946775.76	424900.02	1534.00

~~CARDINAL RIVER COALS LTD.~~

PINTO CREEK

DRILL HOLE LOG

Hole Number P.C. 94-01

Surveyed Location

Baseline

Elevation

Angle

Logs Run

GDRC GN DEV

Logged By

Contractor

Driller CARL MOORE

Rig Type T H 100

Drilling Method

Date(s) Drilled APRIL 1994

From	to	Rock Type	Colour	Hardness	Waterflow	Comments
0	7	TILL				
7	200	SANDSTONE				

COAL FIELD: PINTO CREEK

COMPANY : LICO

HOLE NO. : PC-93-04

APPROX. LOCATION: 1485.2m S 1485.2 W SEC. 25 TWP. 54 RGE. 2 W6M
or 5949175 N 422725 E

SURVEYED LOCATION:

ELEVATION(m) : 1447.4

DRILLER : R. Barnes

FROM	TO	LOG	REMARKS
0	14	till	
14	57	gravel	
57	66	coal (black, pulverized)	
66	97	gravel	
97	107	coal (clay)	water at 32ft.
107	120	gravelly sand	approx. 100 gpm

COMMENTS:

WATER PORTION: FT.

2100 - 1 STREET N.W.
CALGARY, ALBERTA
(403) 276-6452

GAMMA RAY
CALIPER

RESISTANCE
DENSITY

File No.

LSD.
SEC.
TWP.
RGE.
W ____ M

COMPANY LASER MOUNTAIN COAL LTD.
WELL PC-93-04
1485.2mS - 1485.2mW 25-54-2 W6M
LOCATION 5949175N 422725E
FIELD PINTO CREEK
PROVINCE ALBERTA

Other Services

LSD ___ SEC. ___ TWP. ___ RGE. ___ W ___

Permanent Datum GROUND LEVEL Elev. 1447.4 Elev. KB
Log Measured From G.L. Above Perm. Datum DFB
Well Depth Measured From GL

Run No.	1		
Date	19 FEB 93		
First Reading	365		
Last Reading	0		
Footage Logged	365		
Depth Reached	365		
Depth Driller	365		
Casing Electrolog			
Casing Driller			
Fluid Type	WATER		
Liquid Level	FULL		
Min. Diameter	11.5		
Operating Time	1 HR		
Truck No.	1		
Recorded By	SIM	Witnessed By	RON/BRIAN

EQUIPMENT DATA

GAMMA RAY: Run No. 1; Tool Model No. L-101; Diameter 32 mm; Type NOVAT; Spacing 51 mm; Length 51 mm; Serial No. 5 mm; Isotope; Strength

RESISTANCE: Run No. 1; Tool Model No. L-101; Diameter 32 mm; Type FOCUSED; Spacing 76 mm; Length 5 mm; Serial No. 5 mm; Isotope; Strength

DENSITY: Run No. 1; Tool Model No. L-103; Diameter 32 mm; Type FOCUSED; Spacing 76 mm; Length 5 mm; Serial No. HDWP 340; Isotope AM241; Strength 92 Deg

CALIPER: Run No. 1; Tool Model No. L-103; Diameter 32 mm; Type FOCUSED; Spacing 76 mm; Length 5 mm; Serial No. HDWP 340; Isotope AM241; Strength 92 Deg

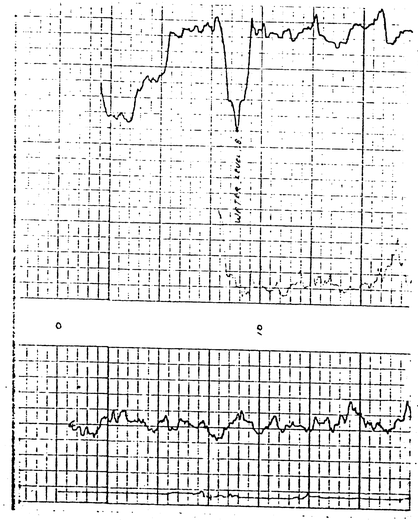
LOGGING DATA

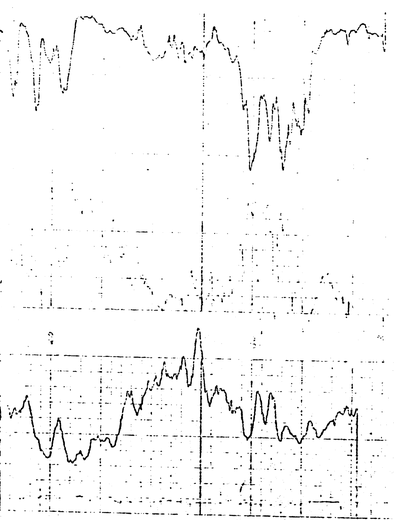
SECTIONAL: RUN NO. 1; DEPTHS FROM 0, TO 365; SPEED MPM 4; TC SECS 1; GAMMA RAY SENS. 20; TC SECS 1; DENSITY SENS. 20; TC SECS 2; CPS 20; DIVL OR R 4; CALIPER DIVL OR R 4

General: Density Type; Matrix; Hole Diameter (Caliper); Remarks

DEPTHS

0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
105
110
115
120
125
130
135
140
145
150
155
160
165
170
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265
270
275
280
285
290
295
300
305
310
315
320
325
330
335
340
345
350
355
360
365





COAL FIELD: PINTO CREEK DATE: FEB/19/93

COMPANY : LUSCO

HOLE NO. : PC-93-4A

APPROX. LOCATION: 1237.7mS 1064.4mW SEC. 25 TWP. 54 RGE. 7 W6M
UTM 5949400 N 422150 E

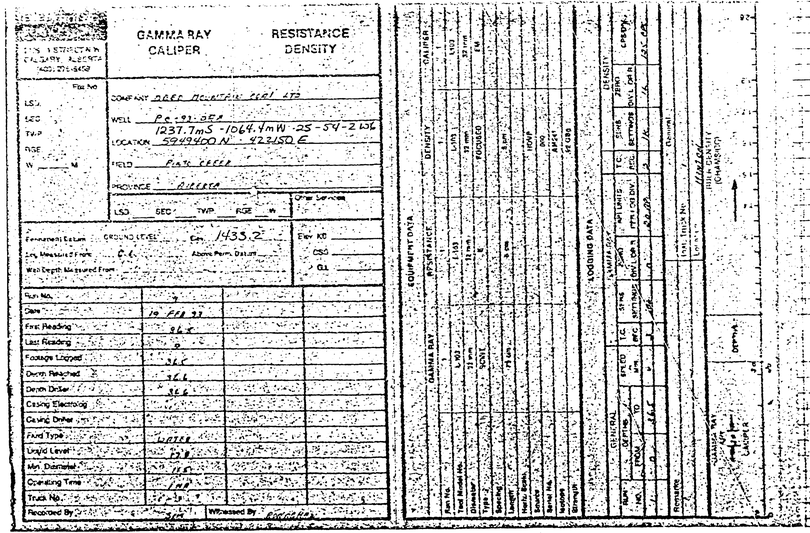
SURVEYED LOCATION:

ELEVATION (M) : 1433.2

DRILLER : R. RUMPEL

FROM	TO	LOG	REMARKS
0	15	tbl	
15	37	gvl	
37	41	coal	
41	81	gvl/sd	
81	86	coal	
86	116	gvl	
116	120	gvl/sd	

COMMENTS:



DRILLSOLE REPORT

COAL FIELD: PINTO CREEK DATE: FEB 20/93

COMPANY : LIDCO

HOLE NO. : PC-93-05

APPROX. LOCATION: 594.1m S 569.3m W SEC. 18 TWP. 8W RGE. 1 W6M
UTM 5946775N 425475E

SURVEYED LOCATION:

ELEVATION(ft) : 1552.0

DRILLER : R. BEDFORD

FROM	TO	LOG	REMARKS
0	12	till	
12	66	gravel (coal stringer)	
66	69	coal	
69	127	gravel (coal stringer)	
127	129	coal	
129	157	gravel	(water 150 gal/min at 75ft)
157	158	coal	
158	297	gravelly ss	
297	298	coal	
298	324	gravel	
324	387	coal	
387	410	gravel	

COMMENTS:

SCHLUMBERGER
2105 - 11 STREET N.W.
CALGARY, ALBERTA
(403) 276-8455

GAMMA RAY CALIPER — RESISTANCE DENSITY

File No.
LSD
SEC
TWP
RGE
W ___ M

COMPANY FORD MOUNTAIN COAL LTD
WELL PC-93-05
LOCATION 594.1mS - 569.3mW - 18 - 8W - 1 W6M
FIELD PINTO CREEK
PROVINCE ALBERTA
LSD ___ SEC ___ TWP ___ RGE ___ W ___
Other Services

Permanent Datum GROUND LEVEL Elev. 1552 Elev. KB ___
Log Measured From G.L. Above Perm. Datum GSG ___
Drill Depth Measured From GL

Run No.	1		
Date	21 FEB 93		
First Reading	117		
Last Reading	0		
Footage Logged	117		
Depth Reached	117.4		
Depth Driller	129		
Casing Footage			
Casing Depth			
Fluid Type	WATER		
Fluid Level	9.7		
Mud Density	1.15		
Operating Time	1½ HR		
Truck No.			
Recorded By	S/-	Witnessed By	BOURGAULT

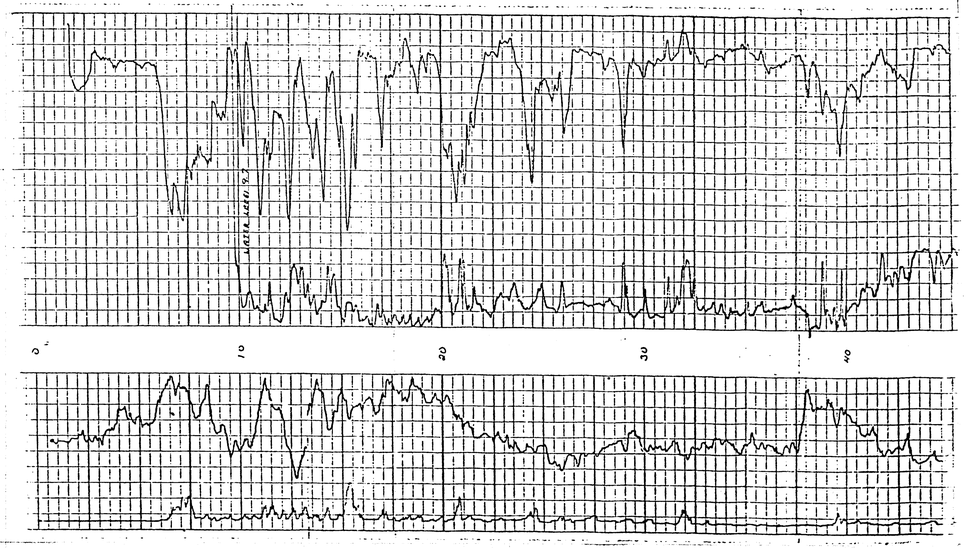
EQUIPMENT DATA
GAMMA RAY 1 — L103 — 32 mm — SCINT — 75 cm
RESISTANCE 1 — L103 — 32 mm — E — 8.5 cm — 8Ω
DENSITY 1 — L103 — 32 mm — FOCUSED — 5 cm — HOUP 250 AM241 .01 Org
CALIPER 1 — L103 — 32 mm — E4

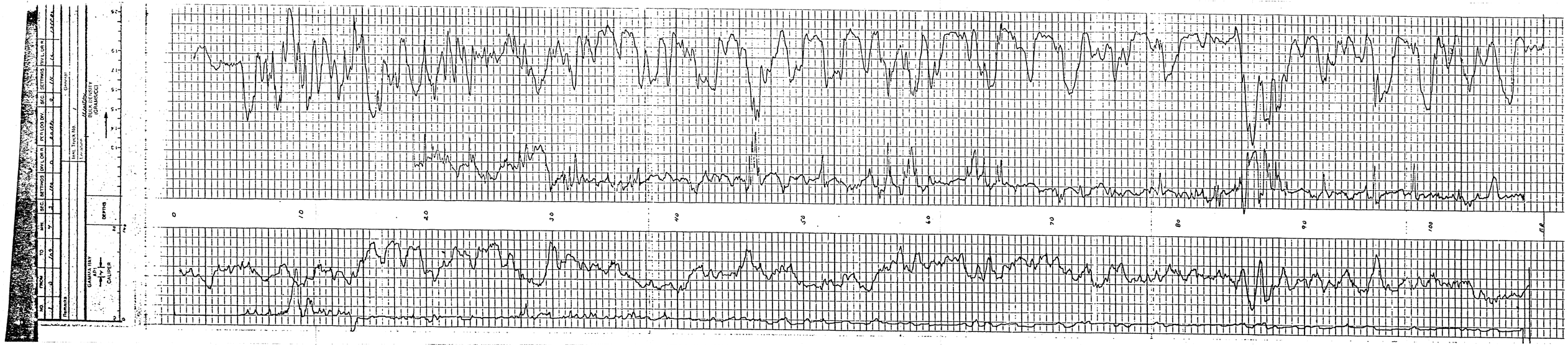
LOGGING DATA
GENERAL — RUN NO. 1 — DEPTHS FROM 0 TO 117 — SPEED MIN. N — T.C. SEC. 3
GAMMA RAY — ZERO 0 — CPS/DIV 100 — T.C. SEC. 3 — SETTINGS 100 — CPS/DIV 100
DENSITY — ZERO 0 — SETTINGS 1.0 — CPS/DIV 1.0 g/cc — T.C. SEC. 3 — API UNITS — MET. LOG DIV. 20/181 — CPS/DIV 1.0 g/cc
Rem. Truck No. — Location — General — Remarks

KALOX — BULK DENSITY (GRAMS/CC)

DEPTHS

GAMMA RAY API — CALIPER




RUN NO.
FROM
TO
Remarks
Inst. Truck No.
Location
GAMMA RAY
API
CALIPER
DEPTHS
BULK DENSITY
(GRAMS/CC)
0
10
20
30
40
50
60
70
80
90
100
END

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: PINTO CREEK DATE: FEB 19/93

COMPANY : LEXCO

HOLE NO. : PC-93-04

APPROX. LOCATION: 1485.2M S 1485.2 W SEC. 25 TWP. 54 RGE. 2 W6M
UTM 5949175N 422725E

SURVEYED LOCATION:

ELEVATION(M) : 1447.4

DRILLER : R. BERNARD

FROM	TO	LOG	REMARKS
0	14	till	
14	57	gr silt	
57	66	coal (shale partings)	
66	97	gr silt	
97	107	coal (shy)	water at 32 ft.
107	120	gr silty ss	approx. 100 gpm

COMMENTS:

WATER HORIZON: FT.

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: PINTO CREEK DATE: FEB 19/93

COMPANY : LEXCO

HOLE NO. : PC-93-4A

APPROX. LOCATION: 1237.7mS 1064.4mW SEC. 25 TWP. 54 RGE. 2 W6M
UTM 5949400 N 422150 E

SURVEYED LOCATION:

ELEVATION (M) : 1433.2

DRILLER : R. BLENDELL

FROM	TO	LOG	REMARKS
0	15	till	
15	37	gm	
37	41	coal	
41	81	gm silt	
81	86	coal	
86	116	gm	
116	120	gm silt	

COMMENTS:

WATER HORIZON: FT.

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: PINTO CREEK DATE: FEB 20/93

COMPANY : LEXCO

HOLE NO. : PC-93-05

APPROX. LOCATION: 594.1m S 569.3m W SEC. 18 TWP. 54 RGE. 1 W6M
UTM 5946775N 425475E

SURVEYED LOCATION:

ELEVATION(M) : 1552.0

DRILLER : R. BLENDFELD

FROM	TO	LOG	REMARKS
0	12	till	
12	66	gr silt (coal stringer)	
66	69	coal	
69	127	gr silt (coal stringer)	
127	129	coal	
129	157	gr silt	(water 150 gal/min at 75 ft)
157	158	coal	
158	297	gr silty ss	
297	298	coal	
298	384	gr silt	
384	387	coal	
387	400	gr silt	

COMMENTS:

WATER HORIZON: FT.

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: PINTO CREEK DATE: FEB 21/93

COMPANY : LEXCO

HOLE NO. : PC-93-06

APPROX. LOCATION: 594.1m S 569.3m W SEC. 18 TWP. 54 RGE. 1 W6M
UTM 5946775 N 425700 E

SURVEYED LOCATION:

ELEVATION(M) : 1551.0

DRILLER : R. BENDFELD

FROM	TO	LOG	REMARKS
0	14	till	
14	207	gy silty sh.	
207	209	coal	
209	243	gy sill (coal stringer)	
243	270	gy ss	WATER
270	287	gy silt	(20 gal min at 110 ft.)
287	310	gy ss	
310	400	gy silt	

COMMENTS:

WATER HORIZON: FT.

COMPANY : LEXCO

HOLE NO. : PC-93-07

APPROX. LOCATION: 618.8m S 915.9m W SEC. 18 TWP. 54 RGE. 1 W6M
UTM 5946754N 424930E

SURVEYED LOCATION:

ELEVATION(M) : 1545.9

DRILLER : R. REMPFORD

FROM	TO	LOG	REMARKS
0	14	till	
14	151	gravel	
151	152	coal	25 gal/min water
152	360	gravel	

COMMENTS:

WATER HORIZON: FT.

2109 1 STREET N.W.
CALGARY, ALBERTA
(403) 270-6455

CALIPER

DENSITY

RESISTANCE

Run No. 1
Date 23 FEB 93
First Reading 109
Last Reading 0
Footage Logged 109
Depth Reached 109
Depth Driller 109.7
Casing Fwd/Log
Casing Driller
Fluid Type WATER
Liquid Level 19
Max Diameter 115
Operating Time 1 HR
Truck No 1
Recorded By SIM
Witnessed By REMPFORD

Well 618.8m S - 915.9m W - 18-54-1-W6M
Location 5946735 N 424930 E
Elev. KB
GSG
GL 1545.9

EQUIPMENT DATA

GAMMA RAY
Run No. 1
Tool Model No. L-103
Diameter 32 mm
Type SONDE
Spacing 75 cm
Length 5 cm
Source HO/B
Serial No. #10
Isotope AM241
Strength 22 GBq

DENSITY
L-103
32 mm
FOCUSED
5 cm
HO/B
#10
AM241
22 GBq

LOGGING DATA

GAMMA RAY
API UNITS
PER LOG DIV. 20
DIVS. OR ft. 10

DENSITY
ZERO OFFSET
GENS SETTINGS
SEC. 100
T.C. SETTINGS
SEC. 0

GENERAL
SPEED MPM 7
DEPTHS FROM 0 TO 109.7

RUN NO. 1

Remarks

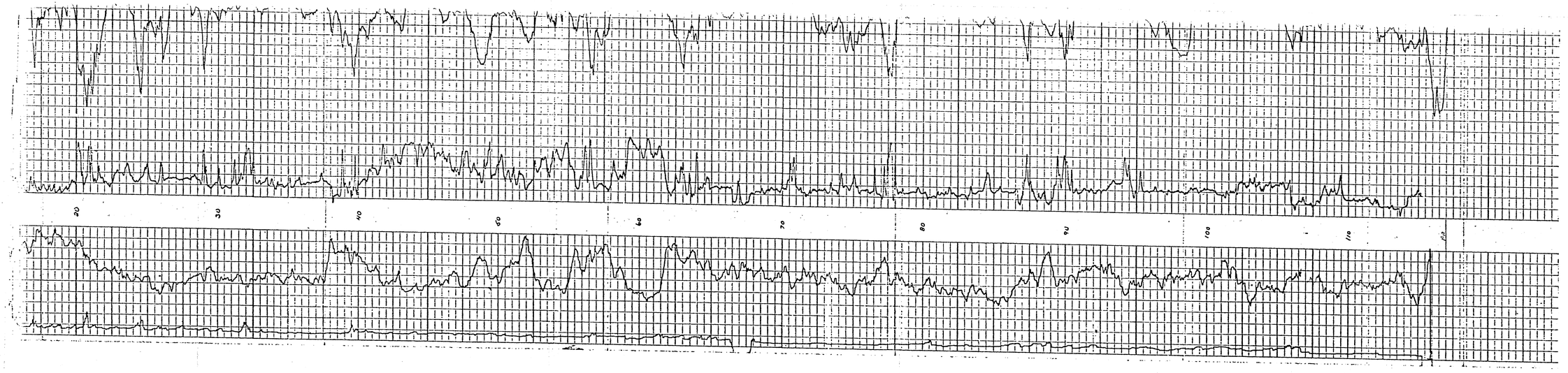
Tool Truck No. 1
Location Medicine Hat

DEPTHS

GAMMA RAY API UNITS CALIPER

BULK DENSITY (G/M3/DIV)

0 10 20 30 40 50


20
30
40
50
60
70
80
90
100
110

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: PINTO CREEK DATE: FEB 22/93

COMPANY : LEXCO

HOLE NO. : PC-93-07

APPROX. LOCATION: 618.8M S 915.9M W SEC. 18 TWP. 54 RGE. 1 W6M
UTM 5946775N 424920E

SURVEYED LOCATION:

ELEVATION(M) : 1545.9

DRILLER : R. BLINDFELD

FROM	TO	LOG	REMARKS
0	14	till	
14	151	gr silt	
151	152	coal	25 gal/min water
152	360	gr silt	

COMMENTS:

WATER HORIZON: FT.





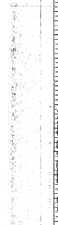






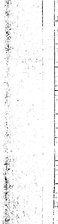














LUSCAR LTD. corehole log

HOLE NO. F[illegible]-22-SC

PAGE 2 OF 4

CORE NO.	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC.	TOT.	GEOLOGICAL DESCRIPTION : LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.	TRUE DEPTH
				0.09		Mdst. dk brn. med hd. blky. v f x y sharp bsr c^c.	
				0.04		C. blk. hd. med brt -> brt. blky. hcky, frac's (horz' vert), sharp bsr c^c	
				0.19		Mdst gry., med slt -> hd, blky. frac's, mnr wvy lams, Carby lams.	
				0.23		SHst. gry, hd. blky. frac's, C. lams. grad bsr c^c.	
				1.17		Sdst. gry., hd -> med hd., blky. salt & pep. fine grds. Silt bnds thru out, softer near bottom (might've lost some from here)	
				0.07		Slts. dk gry. hd. frac. blky.	
						END CORE #1	
	47.4	56.4				CER	
2	56.4	59.4	3.0		2.79		
				0.03		C./Carby lithol. blk/blk. brn. horz fracs. med hd., blky. grad bsr c^c	
	TOTALS					÷ X 100 = % REC. SEAM ÷ X 100 = % TOT. REC. SEAM(S)	

LUSCAR LTD. corehole log

HOLE NO. PC-74-160

PAGE 3 OF 4

CORE NO.	CORE FOOTAGES					GEOLOGICAL DESCRIPTION	TRUE DEPTH
	DRILLED			RECOVERED		: LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.	
	FROM	TO	TOT.	SEC.	TOT.		
				0.18		C., blk, med hd., med brt., blky., crkd., fracs (vert + horz.) mnr harkly, sharp lwr ctc.	
				0.04.		Mdst. lt brn., md., blky., vert + lw ang fracs, C. lams @ upper ctc, sharp lwr ctc.	
				0.04		C., blk., hd., brt., blky., vert + lw ang fracs., hackly., sharp lwr ctc. Carby	
				0.03.		V. Mdst. dk. brn., mod hd., blky, wxy., mass., sharp lwr ctc.	
				0.01		C., as above, sharp lwr ctc	
				0.99.		Mdst. dk brn., hd -> mod hd., blky., vert + lw ang fracs., C. lams., amb. blbs grad lwr ctc	
				0.12		Carby Mdst/C., blk/dk. brn., looks like a dk brn mdst. w/ C. lams thru out., C. -> hd. brt. hackly, fissain Mdst -> mod hd., blky + wxy	
				0.05		Carby Mdst, dk brn, mod hd, wxy	
				0.01		C., blk., fiss -> fissain	
				0.09.		Carby mdst as above w/ numerous C. lams	
	TOTALS					÷ X 100 = % REC. SEAM ÷ X 100 = % TOT. REC. SEAM(S)	

LUSCAR LTD. corehole log

Hole cored at same location as PC-93-07

HOLE NO. [illegible]

PAGE 1 OF

CORE NO.	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC.	TOT.	GEOLOGICAL DESCRIPTION: LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.	TRUE DEPTH
2				0.12		C./Carby Mdst., blk./dk brn. C -> brt., med hd. hckly w/ fissain bnds., amb blbs	
						Carby Mdst -> dk brn., med hd., wxy. amb blbs.	
				0.03		Carby Sltst., dk brn. med hd. blky., mnr. Coalie lams.	
				0.15		C./Carby Mdst., as above	
				0.03		Carby Mdst. dk brn., med hd., mnr Coaly lams grad upr & lwr c/c	
				0.09		C./Carby Mdst, as above w/ more hd C. in lt., sharp lwr c/c	
				0.12		Mdst. brn. med hd., blky., amb blbs. brkn & milled @ lwr c/c.	
				0.04		C., blk, brkn + milled, med brt., hckly, lots of amb.	
						(Sft @ upr c/c)	
				0.57		Mdst. gry., brn @ upr c/c., hd. & blky., frac. (1 w ang) c. lams.,	
						End of Core #2	
	TOTALS					÷ X 100 = % REC. SEAM	
						÷ X 100 = % TOT. REC. SEAM(S)	



LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: PINTO CREEK DATE: FEB 23/93

COMPANY : LEXCO

HOLE NO. : PC-93-08

APPROX. LOCATION: 643.6M S 0M W NE SEC. 18 TWP. 54 RGE. 1 W6M
UTM 5946775 N 424200 E

SURVEYED LOCATION:

ELEVATION (M) : 1548.0

DRILLER : R. BENOFIELD

FROM	TO	LOG	REMARKS
0	12	till	
12	38	gp ss	
38	44	coal (fractured)	
44	147	gp silt	20 gal/min water at 70 ft.
147	158	coal (shy)	
158	233	gp ss	
233	391	gp silt (coal stringer)	
391	400	gp ss	

COMMENTS:

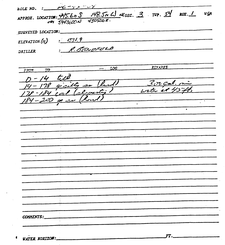
WATER HORIZON: FT.

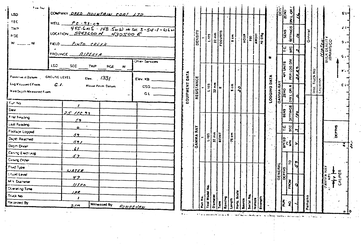
LUSCAR LTD. corehole log

HOLE NO. D-44-15C

PAGE 1 OF 4

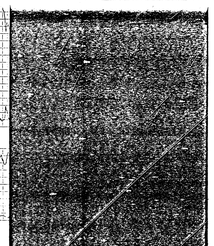
CORE NO.	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC.	TOT.	GEOLOGICAL DESCRIPTION : LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.	TRUE DEPTH
	0	2.13				TILL	
	2.13	45.1				OER	
1	45.1	47.9	2.8		2.53		
				0.16		Mdst. gry-blk, med hd. blky, wxy, mor C/Carb blbs, shrp lwr ctc.	
				0.05		C., blk. hd, brt. blky, lckly. mor fracs, amb blbs, shrp lwr ctc	
				0.13		C./Carb Mdst blk., med hd. brkn/frac wxy, mor C. lams, amb blbs. near bttm shrp lwr ctc., moist	
				0.07		C. blk hd. med brght. blky. frac (vert + horz) amb. blbs, shrp lwr ctc	
				0.015		C/ Carb Mdst blk/dk. brn. med hd. wxy coaly lams shrp lwr ctc	
				0.07		C., blk. hd. brt -> med brt, blky., vert + horz fracs, amb blbs, grad lwr ctc	
				0.05		Carb Mdst. dk brn hd, mor [illegible] grad lwr ctc	
				0.25		C. blk., med hd -> hd. med brt -> dk brn lckly zones. Vert + horz fracs [illegible] grad lwr ctc	
	TOTALS					÷ X 100 = % REC. SEAM ÷ X 100 = % TOT. REC. SEAM(S)	

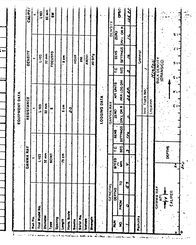

CASE NO.
APPRV. LOCATION
SURVEYED LOCATION
ELEVATION (ft)
DRILLER
TYPE
SIZE
SETTING
0-14 BOB
15-131 Bently on (Bed)
132-154 Lot Lafayette
155-200 gas (Bed)
3 1/2 cal. csg.
Cmtd. w/ 95 sks
COMMENTS
WATER DISTRICT
FT.

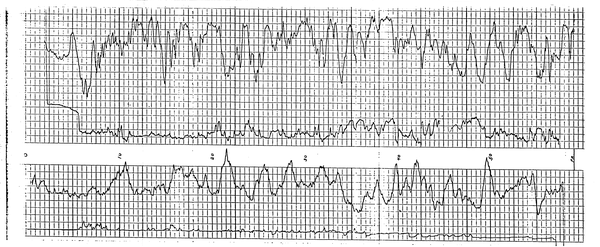

COMPANY
WELL
LOCATION
FIELD
COUNTY
PERMANENT DATUM
LOG MEASURED FROM
DRILLING MEASURED FROM
RUN NO.
DATE
FINAL READING
LAST READING
FOOTAGE LOGGED
DEPTH DRILLER
CASING READING
CASING DRILLER
FLUID TYPE
LIQUID LEVEL
MAX. TEMP.
CREW NO.
RECORDED BY
WITNESSED BY

RESISTIVITY
SPONTANEOUS POTENTIAL
GAMMA RAY
NEUTRON
DENSITY
CALIPER
CORRELATION
GAMMA RAY
NEUTRON
DENSITY
CALIPER






CORR. & ELECTRICAL LOG (GAMMA RAY-NEUTRON-CALIPER)
CALIPER
DENSITY
COMPANY
WELL
LOCATION
FIELD
COUNTY
PERMANENT DATUM
LOG MEASURED FROM
DRILLING MEASURED FROM
RUN NO.
DATE
FINAL READING
LAST READING
FOOTAGE LOGGED
DEPTH DRILLER
CASING READING
CASING DRILLER
FLUID TYPE
LIQUID LEVEL
MAX. TEMP.
CREW NO.
RECORDED BY
WITNESSED BY
RESISTIVITY
SPONTANEOUS POTENTIAL
GAMMA RAY
NEUTRON
DENSITY
CALIPER
CORRELATION
GAMMA RAY
NEUTRON
DENSITY
CALIPER



LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: PINTO CREEK DATE: FEB 24/93

COMPANY : LEXCO

HOLE NO. : PC-93-09

APPROX. LOCATION: 445.6m S 148.5m W NE SEC. 3 TWP. 54 RGE. 1 W6M
UTM 5943600N 430500E.

SURVEYED LOCATION:

ELEVATION (m) : 1331.9

DRILLER : R. BENDFELD

FROM	TO	LOG	REMARKS
0	14	till	
14	178	gy silty ss (hard)	300 gal. min water at 45 ft.
178	184	coal (slabby)	
184	200	gy ss (hard)	

COMMENTS:

WATER HORIZON: FT.

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE P-94-02

LOCATION SEC TP RGE W

AREA PINTO CREEK

PROVINCE ALTA.

SURVEYED DATA

ELEV. 1440.68

LOC. 5949441.6N

421795.3 E

RUN No.	1	2	3
DATE	APRIL 12 1984		
DEPTH-DRILLER	226		
DEPTH-LOGGER			
FLUID LEVEL			
LOGGING TIME			
DRILLED BY	C. MOORE		
RECORDED BY	C. MOORE		
WITNESSED BY	JOHN DAN		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO

EQUIPMENT DATA

GAMMA RAY		RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	L-105	L-103	
DIAMETER	2 1/8"	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F
TYPE	SCINT	SPACING		13"
LENGTH	3"	LENGTH	1'	
GENERAL		HOR. SCALE		
TRUCK No.		SOURCE MODEL		HOVP
LOCATION		ISOTOPE		CS-137
		STRENGTH		125 mC

LOGGING DATA

GENERAL			GAMMA RAY				DENSITY		
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED ft/min	T C SEC	SENS SETTING	ZERO	API UNITS PER DIV.	T C SEC	SENS SETTINGS	ZERO
			15							

REMARKS

OHMS — RESISTANCE — DENSITY

DEPTH

CALIPER 6" 8" 10"

GAMMA RAY API UNITS

P-94-02

0 20' 40' 60' 80' 100' 120' 140' 160' 180' 200' 220' 226' T.D.

Hole Number P.C. 94-02
Surveyed Location
Baseline
Elevation
Angle
Logs Run
GDRC GN DEV

Logged By
Contractor
Driller Carl Mooke
Rig Type
Drilling Method
Date(s) Drilled April 1994

From	to	Rock Type	Colour	Hardness	Waterflow	Comments
0	10	Till				
10	86	Sandstone				
86	87	Shaley Coal				
87	104	Sandstone				
104	110	Coal + Shale				
110	240	Sandstone				

TESTING LTD. — **GAMMA-DENSITY-RESISTANCE**

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE P.C. 94-02
LOCATION SEC. TP. RGE. W.
AREA PINTO CREEK
PROVINCE ALTA.

SURVEYED DATA
ELEV. 1440.68
LOC. 5949441.6N
421795.3 E

RUN No.	1	2	3
DATE	April 12 1994		
DEPTH-DRILLER	226'		
DEPTH-LOGGER			
FLUID LEVEL			
LOGGING TIME			
DRILLED BY	C. MOORE		
RECORDED BY	C. MOORE		
WITNESSED BY	DAN SWAN		

BORE-HOLE RECORD

BIT	FROM	TO	SIZE

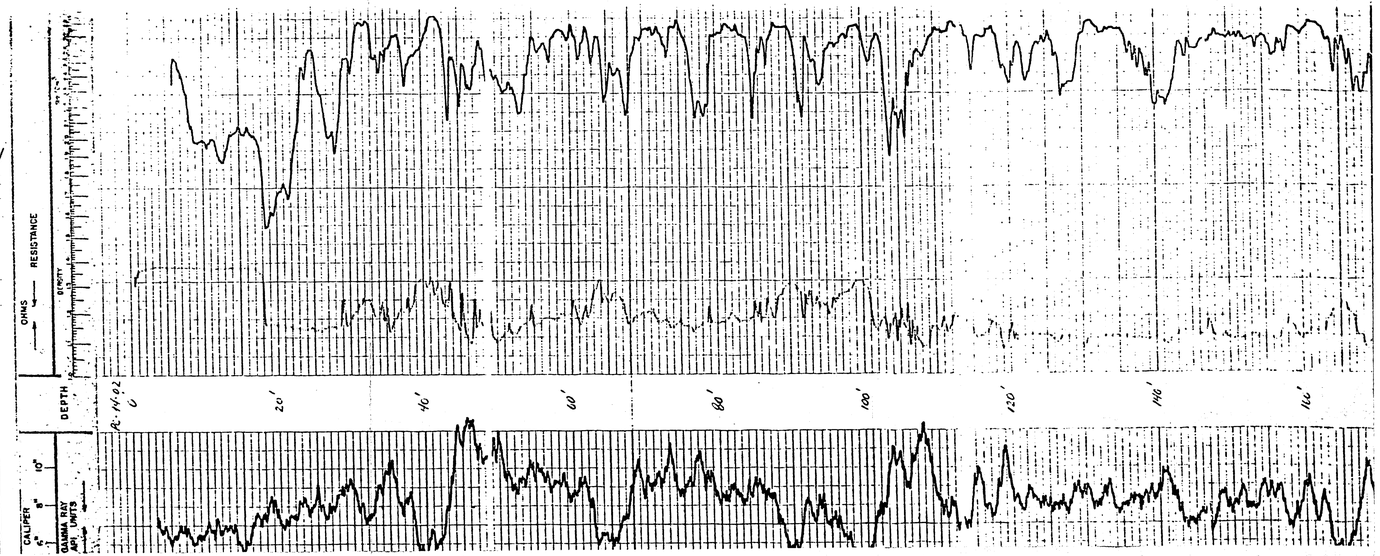
CASING RECORD

FROM	TO

EQUIPMENT USED

GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING	1'	13"	
LENGTH	3"	LENGTH			
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	
		LOGGING DATA			

RUN No.	GENERAL DEPTHS FROM	TO	SPEED Ft/min.	GAMMA RAY T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	DENSITY T C SEC	SENS SETTINGS	ZERO
			15"							



~~CARDINAL RIVER COALS LTD.~~

PINTO CREEK

DRILL HOLE LOG

Hole Number P.C. 94-02

Surveyed Location

Baseline

Elevation

Angle

Logs Run

GDRC GN DEV

Logged By

Contractor

Driller CARL MOORE

Rig Type

Drilling Method

Date(s) Drilled APRIL 1994

From	to	Rock Type	Colour	Hardness	Waterflow	Comments
0	10	TILL				
10	86	SANDSTONE				
86	87	SHALEY COAL				
87	104	SANDSTONE				
104	110	COAL + SHALE				
110	240	SANDSTONE				

Surveyed Location _____ Contractor _____

Baseline _____ Driller CARL MOORE

Elevation _____ Rig Type TH 100

Angle _____ Drilling Method _____

Logs Run _____ Date(s) Drilled APRIL 1994

GDRC GN DEV

From	to	Rock Type	Colour	Hardness	Waterflow	Comments
0	7	TILL				
7	200	SANDSTONE				

HOLE

LOCATION SEC TP R

AREA

PROVINCE

1467.58

5949169.5 N

421324.55 E

GAMMA RAY

CASING

DRILLING

PUMPING

REMARKS

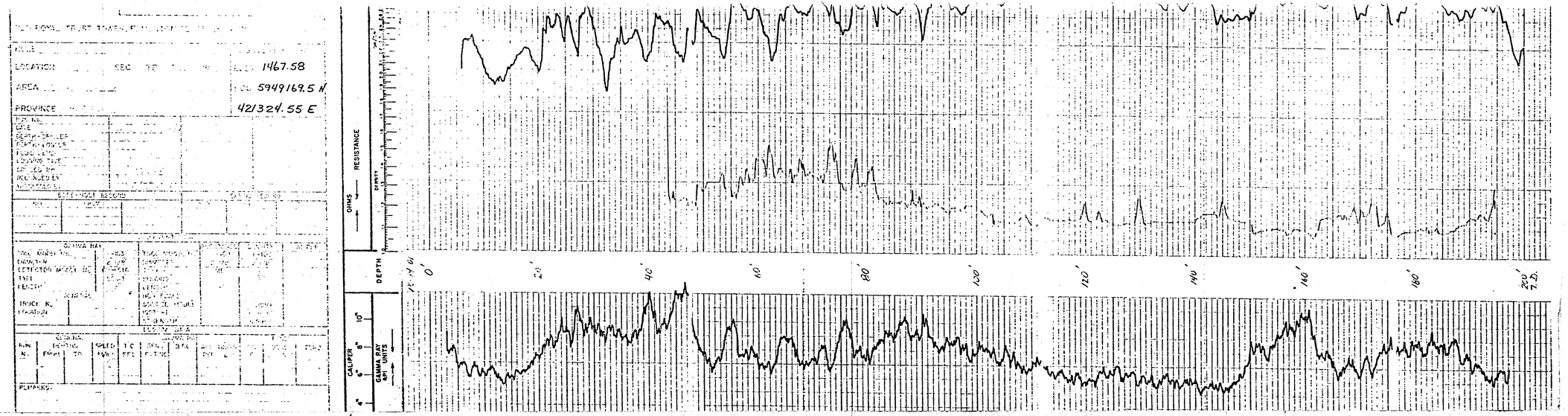
RESISTANCE OHMS

DEPTH

CALIPER 4" 6" 8" 10"

GAMMA RAY 4PI UNITS

0' 20' 40' 60' 80' 100' 120' 140' 160'


1467.58
5949169.5 N
421324.55 E
OHMS
RESISTANCE
DEPTH
CALIPER
GAMMA RAY API UNITS
0'
20'
40'
60'
80'
100'
120'
140'
160'
180'
200'
T.D.

~~CARDINAL RIVER COALS LTD.~~

PINTO

DRILL HOLE LOG

Hole Number P.C 94 - 03
Surveyed Location 5949633.4N
Baseline 422008.7E
Elevation 1431.3
Angle
Logs Run
GDRC GN DEV

Logged By
Contractor LEXCO
Driller CARL MOORE
Rig Type TH 100
Drilling Method
Date(s) Drilled APRIL 94

From	to	Rock Type	Colour	Hardness	Waterflow	Comments
0	9	TILL				
9	61	SANDSTONE				
61	71	COAL & SHALE ?				
71	168	SANDSTONE				
168	169	COAL				
169	170	SANDSTONE				
170	175	COAL & SHALE				
175	181	SANDSTONE				
181	~~220~~ 191	SANDSTONE & STRINGERS OF COAL				
191	220	SANDSTONE				
	DRILLER'S LOG ONLY FOR THIS				HOLE	

Hole Number _____

Surveyed Location _____

Baseline _____

Elevation _____

Angle _____

Logs Run _____

GDRC GN DEV

Contractor _____

Driller CARL MOORE

Rig Type TH 10D

Drilling Method _____

Date(s) Drilled APRIL 1994

From	to	Rock Type	Colour	Hardness	Waterflow	Comments
0	12	TILL				
13	57	SANDSTONE				
57	62	COAL + SHALE				
62	128	SANDSTONE				
128	131	COAL + SHALE				
131	171	SANDSTONE				
171	185	COAL + SHALE				
185	253	SANDSTONE				
253	257	COAL + SHALE				
257	300	SANDSTONE				

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE PC-94-04

LOCATION _____ SEC TP RGE W

AREA PINE CREEK

PROVINCE ALTA.

SURVEYED DATA

ELEV. 1420.4

LOC. 5949944.9 N

422300.8 E

RUN No.	1	2	3
DATE	APRIL 13 PM		
DEPTH-DRILLER	300'		
DEPTH-LOGGER	SCC		
FLUID LEVEL			
LOGGING TIME			
DRILLED BY	C. MOORE		
RECORDED BY	C. MOORE		
WITNESSED BY	JOHNSON		

BORE-HOLE RECORD

BIT	FROM	TO	SIZE

CASING RECORD

SIZE	FROM	TO

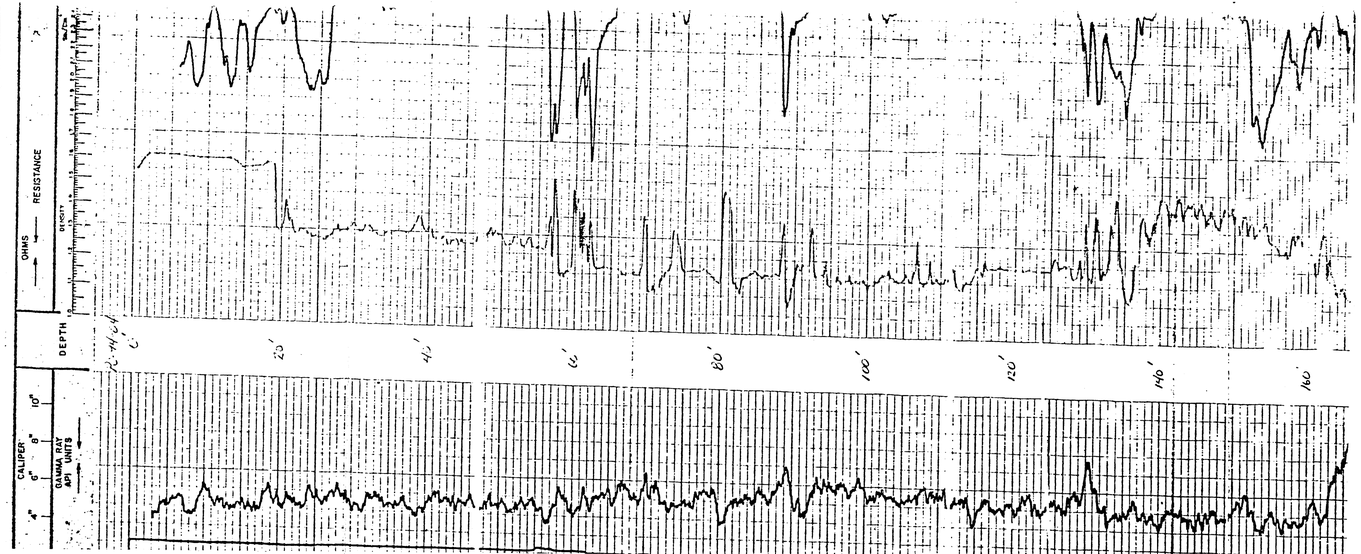
EQUIPMENT DATA

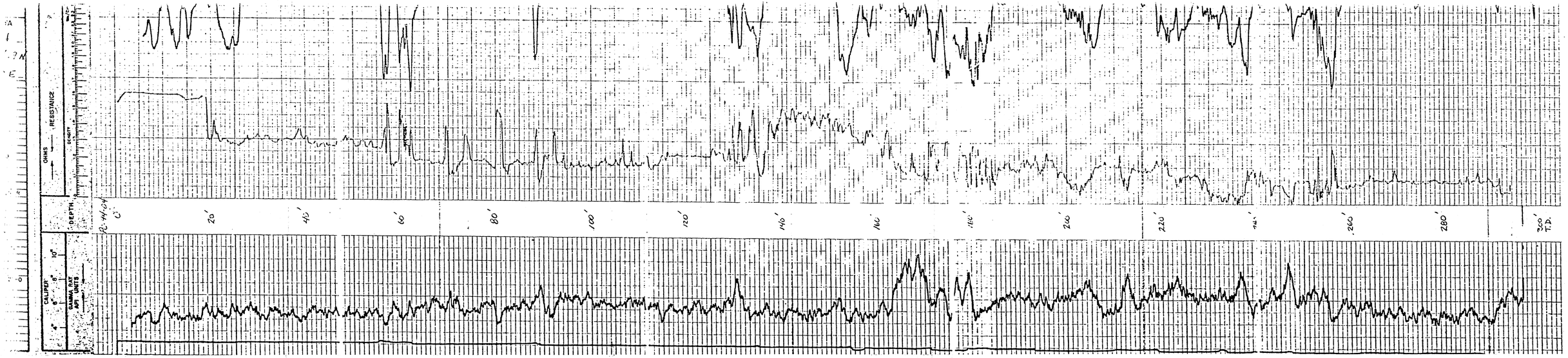
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8	DIAMETER	2 1/8	2 1/8	
DETECTOR MODEL No.	CP-516	TYPE	ME	T	
TYPE	SCINT	SPACING		15	
LENGTH	3'	LENGTH	1'		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HGVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

LOGGING DATA

GENERAL RUN No	DEPTHS FROM	DEPTHS TO	SPEED FT/min	GAMMA RAY T C SEC.	GAMMA RAY SENS SETTING	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV.	DENSITY T C SEC	DENSITY SENS SETTINGS	DENSITY ZERO

REMARKS:




OHMS
RESISTANCE
DEPTH
CALIPER
GAMMA RAY
20'
40'
60'
80'
100'
120'
140'
160'
180'
200'
220'
240'
260'
280'
300'
T.D.

~~CARDINAL RIVER COALS LTD.~~
PINTO CREEK
DRILL HOLE LOG

Hole Number P.C. 94 - 04
Surveyed Location
Baseline
Elevation
Angle
Logs Run
GDRC GN DEV

Logged By
Contractor
Driller CARL MOORE
Rig Type TH 100
Drilling Method
Date(s) Drilled APRIL 1994

From	to	Rock Type	Colour	Hardness	Waterflow	Comments
0	12	TILL				
12	57	SANDSTONE				
57	62	COAL + SHALE				
62	128	SANDSTONE				
128	131	COAL + SHALE				
131	171	SANDSTONE				
171	185	COAL + SHALE				
185	253	SANDSTONE				
253	257	COAL + SHALE				
257	300	SANDSTONE				

WELL NO. P.P. 94-56

SURFACE LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Park Moore

FROM	TO	LOG	REMARKS
0	4	Muskeg	
4	23	Sandy Boulder Sandstone	Water at 4 ft
23	69	Grey Sandstone	
69	160	Coal	
160	166	Grey Sandstone	
166	150	Sandstone	
150	161	Shale & Siderite Bands	
161	179	Sandstone	
179	197	Coal & Shale	
197	210	Sandstone	

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE PC-94-56

LOCATION SEC. TP. RGE. W.

AREA Peace River

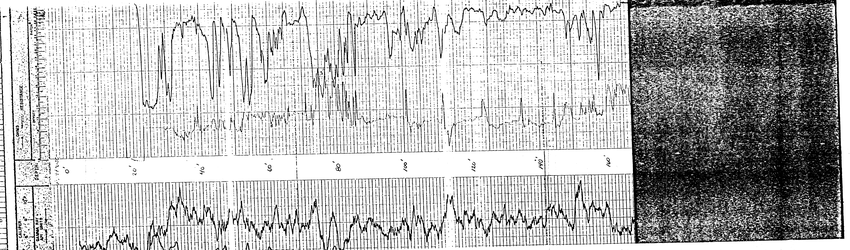
PROVINCE Alberta

SURVEYED DATA

ELEV. 1431.5

LOC. 59°32'50.00 N

122°20'50.00 E



700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE PC-94-56

LOCATION SEC. TP. RGE. W.

AREA Peace River

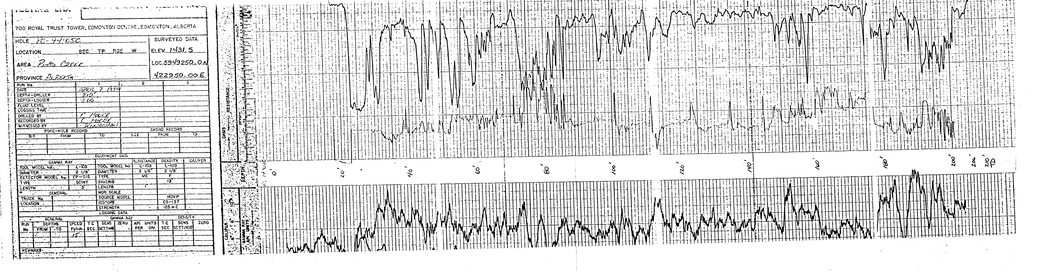
PROVINCE Alberta

SURVEYED DATA

ELEV. 1431.5

LOC. 59°32'50.00 N

122°20'50.00 E



LUSCAR LTD. corehole log

HOLE NO. PC-94-5C

PAGE 7 OF 7

CORE NO.	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC.	TOT.	GEOLOGICAL DESCRIPTION : LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.	TRUE DEPTH
				0.11		Bent Mdst., creame -> gry brn., sft., wxy. mnr C. lams.	
				0.07.		C., brt. blky hd., hrtly., shrp ctcs.	
				0.03		Bent Mdst, as above	
				0.31		Sltst. grn/gry, mass, upr ctc brkn, hd. slkns/des.	
				0.31		Sdst., grn gry., fne grns., mass	
						End of Core #4	

TOTALS					
	÷	X 100 =	% REC.	SEAM	
	÷	X 100 =	% TOT. REC.	SEAM(S)	

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD PINTO CREEK DATE APRIL 7, 1994

COMPANY

HOLE NO. P.C. 94 - 5C

APPROX. LOCATION SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION

ELEVATION

DRILLER CARL MOORE

FROM	TO	LOG	REMARKS
0	4	CLAY & RKS.	
4	23	SOFT BROWN SANDSTONE	WATER @ 40 FT.
23	69	GREY SANDSTONE	15 GPM
69	~~82~~ 82	COAL	
~~150~~	~~156~~	~~SHALE & STRINGERS~~	
82	150	SANDSTONE.	
150	156	SHALE & STRINGERS OF COAL	
156	188	SANDSTONE.	
188	197	COAL & SHALE	
197	210	SANDSTONE	

COMMENTS

LUSCAR LTD. corehole log

HOLE NO. TC-94-05C

CORE NO.	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC.	TOT.	GEOLOGICAL DESCRIPTION : LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.	TRUE DEPTH
	0	1.22				TILL	
	1.22	20.4				OBR	
1	20.4	23.2	2.8		2.27		
				0.1		Mdst., brn., vry hd., blky., lw ang fracs., shrp lwr ctc.	
				0.27		Mdst. dk. grey/brn, med. hd., blky., lw ang & vert fracs, mnr coaly specks., grad lwr ctc.	
				0.23		Sltst. dk grey., med hd/hd., blky., horz & vert fracs, mdst brds thru out., lwr ctc is mdst., shrp lwr ctc.	
				0.12		C. blk., w/ brn brds @ upr ctc., med hd/hd., fiss @ upr ctc., carby mdst brds w/ hd C. lams., amber blebs, mnr lw ang & vert fracs	
				0.11		Carby. Mdst., dull blk/brn. sft., locally amber blbs., grad lwr ctc.	
				0.14		Mdst., cream/brn, sft., moist, bed. shrp lwr ctc	

TOTALS	÷	X 100 =	% REC.	SEAM
	÷	X 100 =	% TOT. REC.	SEAM(S)

LUSCAR LTD. corehole log

HOLE NO. PC-94-5C

PAGE 2 OF 7

CORE NO.	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC.	TOT.	GEOLOGICAL DESCRIPTION : LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.	TRUE DEPTH
				0.22		C, brt/dull bnds., hd., hackly, grad lwr ctc.	
				0.06		C. dull blk., drty., hd., mass., fiss	
	4₃	A,BC		0.67		C, brt blk., mass. hd., some Ca veining local fusain bnds, lw ang fracs., occasional small drty bnd.	
				0.22		C. Drty., dull/blk, occasional Clay band., (0.02m Clay bnd @ upper ctc), grad lwr ctc.	
				0.09		Mdst., dull brn, sft., mass., waxy., mnr C. lams.	
				0.06		C./Carb. Mdst., dull blk., sft., fiss, some slickenslide	
						END CORE 1	
2	23.2	25.9	2.7		1.93		
				0.39		C, blk med brt → brt, hd, blky., hckly., Ca. veins, amb blbs, hckly bnds @ upper ctc., lw ang and vert fracs, shrp lwr ctc., visual pyrite @ lwr ctc.	
		A, D?					
	TOTALS			÷	X 100 =	% REC.	SEAM
				÷	X 100 =	% TOT. REC.	SEAM(S)

0.06 C.

LUSCAR LTD. corehole log

HOLE NO. DC-94-5C

PAGE 3 OF 7

CORE NO.	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC.	TOT.	GEOLOGICAL DESCRIPTION : LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.	TRUE DEPTH
				0.09		Mdst/C. (interbedded) drty C. seam (0.03 thick) Mdst → bent. slightly carby., sft., wet.	
				0.09		C., brt, blky., hd., hckly., mnr pyr. on fracs, shrp lwr ctc	
	4Z	D,B		0.01		Bent. Mdst., cream., sft., wet, shrp ctcs	
				0.03		C., as above., brt/dull bnded	
				0.21		Mdst., dull grey, mnr C. bnds., mnr slks/ds (C. bnd (0.03m thck) in mid)	
		4, B		0.25		C., brt, blky. fracs @ 20° Core axis, fiss, brkn., hckly., slkns/ds. shrp lwr ctc	
				0.05		mdst., dull grey/brn. wxy streak., sharp ctcs., brkn.	
		4, A		0.09		C., dull w/ brt. bnds., med hd., drty looks fiss., lw/ arg fracs	
				0.09		Mdst., grey, mass., med hd., wxy., C. lams.	
				0.11		C., brt., brkn., (0.01m bent mdst bnd @ centre) shrp lwr ctc., b	

TOTALS	÷	X 100 =	% REC.	SEAM
	÷	X 100 =	% TOT. REC.	SEAM(S)

LUSCAR LTD. corehole log

HOLE NO. PC-94-5C

CORE NO.	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC.	TOT.	GEOLOGICAL DESCRIPTION : LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.	TRUE DEPTH
				0.07		Mdst., carby bnds thru out, brkn., med hd. shrp lwr ctc.	
				0.33.		Mdst., dull grey., med hd -> hd., shrp ctcs., mass., mnr fracs.	
				0.10		C., crushed., milled, brt/dull, mnr clay remenards., shrp lwr ctc.	
				0.06		Sdst., gry., med grns., crushed., milled, (poss. bent clay matrix) (core loss this unit)	
						End Core #2	
	25.9	56.4				OBR.	
3	56.4	59.4	3.0		3.0		
				0.06		Mdst., grey, mass -> brkn, some slk.sld.	
				0.05		C, blk., med brt., brkn -> crshd, sme slknsldS., mnr pyr.	
				0.48		Slty/Mdst., gry, mass., mnr C. lams., slknsldS thru out.	
				0.02		C., brt., blk/gy, sme visible pyr.	
	TOTALS			÷	X 100 =	% REC.	SEAM
				÷	X 100 =	% TOT. REC.	SEAM(S)

LUSCAR LTD. corehole log

HOLE NO. PC-94-5c

CORE NO.	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC.	TOT.	GEOLOGICAL DESCRIPTION : LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.	TRUE DEPTH
				0.06		Mdst, dk gry/blk., slightly carby, mnr Coaly zones	
	385		#1	0.54		C, brt, blky, hckly, Ca veining @ 0.45 lwr ctc (0.08m) dirty	
				0.12		Carby Mdst., dk brn/blk, mass., shp upr ctc & grad lwr ctc.	
				0.06		Mdst., brn/cream., med hd., grad ctcs. mass.	
				0.09		Carby Mdst., dull blk, mass., hd., fairly shap lwr ctc.	
				0.27		C., brt., blky., hckly., upr ctc Ca veining	
				0.05		C., dirty / Carby Mdst., dull, hd., blky., dirty looking	
	384	#1					
				0.38		C., upr & lwr ctc brt, blky, hckly hd., Centre portion numerous dirty zones (0.15m thick)	
				0.04		Bent Mdst., lt. gry, stk., mass, shp dc.	
	383			0.28		C., brt., blky., hd., Ca veining near base, hckly., mnr amb blbs	
	TOTALS			÷	X 100 =	% REC.	SEAM
				÷	X 100 =	% TOT. REC.	SEAM(S)

LUSCAR LTD. corehole log

HOLE NO. TC-94-5C

CORE NO.	CORE FOOTAGES DRILLED FROM	TO	TOT.	RECOVERED SEC.	TOT.	GEOLOGICAL DESCRIPTION: LITHOLOGY, COLOR, SIZE, TEXTURE, HARDNESS, SHEARING, CONTACTS, BEDDING ANGLE, ALTERATION, WETNESS, CONTAMINATION.	TRUE DEPTH
				0.08		Bent Mdst., as above.	
	3B 3			0.15		C., as above.	
				0.04		Bent Mdst, Ht. creame/lt. brn, faint banding	
	3B 2	#1		0.09		C., brt → dull, blky., hd., hckly., both ctcs sharp, upr ½ dirty	
				0.06.		Mdst/bent as above.	
	3B2			0.15		C. dirty, numerous clay bands., locally honey., cleaner @ upr ctc	
						END CORE #3	
4	59.4	61.2	1.8		1.8		
				0.04		Bent Mdst., lt brn/cream., sft., wxy., blky., mnr. C. lams., shrp lwr ctc	
				0.06		C./Vry Carby Mdst., blk, dull, hard → mod hrd., blky., fiss., mnr hd. C. bnds	
				0.07		Bent. Mdst., cream., sft., wxy., shrp ctcs.	
	3B1	Sample #2		0.11.		C., blky., upr ½ several clay bands, lwr ½ hrdy.	
	TOTALS					÷ X 100 = % REC. SEAM	
						÷ X 100 = % TOT. REC. SEAM(S)	

HOLE NO. PC-94-06

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER CARL MOORE

FROM	TO	LOG	REMARKS
0	14	CLAY + GRAVEL	
14	35	SANDSTONE	
35	41	COAL + SHALE	
41	219	SANDSTONE	
219	220	COAL	
220	340	SHALE	

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE PC-94-06 — SURVEYED DATA

LOCATION _____ SEC. TP. RGE. W. — ELEV. 1093.8 ft

AREA Pine Creek — LOC. 5947410.7N 428604.7E

PROVINCE B.C.

HOLE NO.	1	2	3
DATE	NOV. 7-77		
DEPTH-DRILLER	340'		
DEPTH-LOGGER	340'		
FLUID LEVEL			
LOGGED TIME			
RECORDED BY	SHULTZ		
WITNESSED BY	SHULTZ		

CASING RECORD

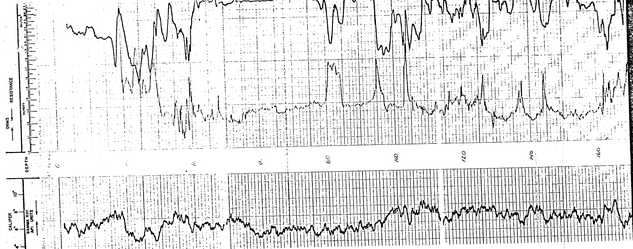
BIT	FROM	TO	SIZE	FROM	TO

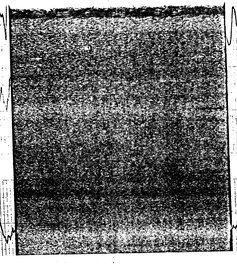
EQUIPMENT USED

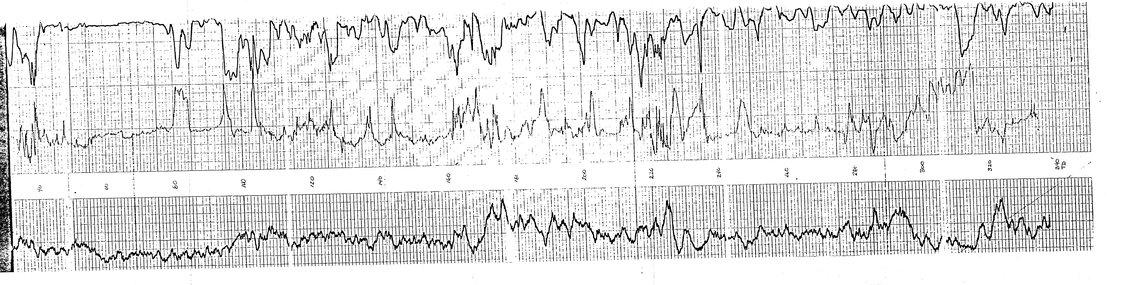
LOGGING EQUIPMENT			INSTRUMENTS	SERIAL	CALIBR.
TOOL MODEL NO.	L-105	L-105	TOOL MODEL NO.	L-105	L-105
SERIAL NO.	1-1-74	1-1-74	SERIAL NO.	1-74	1-74
CAPACITOR MODEL NO.	1-1-74	1-1-74	STATE	UP	UP
CABLE	SCHL	SCHLUM			
LENGTH	2	2			
CONTROL	GENERAL	GENERAL			
TRUCK NO.			SOURCE MODEL	HWY	
LOCATION			STRENGTH	10 STA.	
			ETHERGTH	10 STA.	

RUN No.	GENERAL LOGGING FROM	TO	DATE	TIME LOGGED	ZERO	AM. UNITS PER DIV.	TIME SEC.	SPEED SETTING	ZERO
1	0	340	11-7-77	1		1	1	1	

REMARKS:







OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD PINTO CREEK DATE APRIL 5, 1994

COMPANY LEXCO

HOLE NO. P.C -94-06

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER CARL MOORE

FROM	TO	LOG	REMARKS
0	14	CLAY & ROCKS.	
14	35	SANDSTONE	
35	41	COAL & SHALE	
41	219	SANDSTONE	
219	225	COAL	
225	340	Sandstone	

COMMENTS _____

TESTING LTD. GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE A [illegible]

LOCATION SEC. TP. RGE. W

AREA [illegible] SEC.

PROVINCE [illegible]

SURVEYED DATA

ELEV. 1448.25

LOC. 5945994.4N

425069.2E

RUN No.	1	2	3
DATE	16-12-77		
DEPTH-DRILLER	2100'		
DEPTH-LOGGER	2101'		
FLUID LEVEL			
CASING TYPE			
DRILLED BY	[illegible]		
RECORDED BY	[illegible]		
WITN. FIELD REP.	[illegible]		

BIT	BORE-HOLE RECORD FROM	TO	SIZE	CASING RECORD FROM	TO

EQUIPMENT DATA

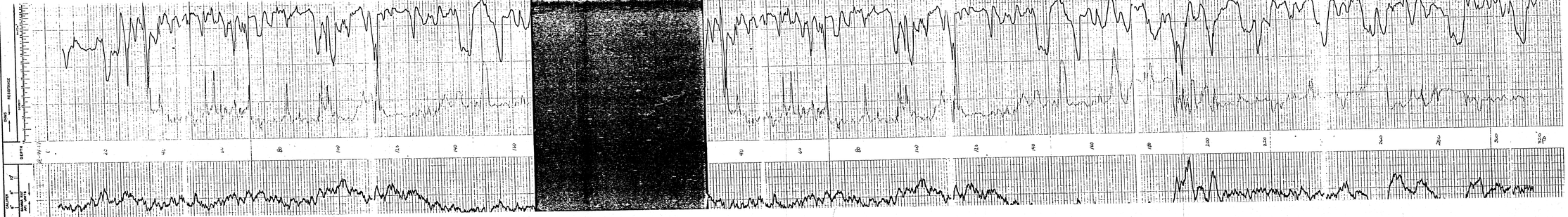
GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	C-105	TOOL MODEL No.	C-105	C-105	
DIAMETER	C-105	SPACING	16"	6 1/8"	
DETECTOR MODEL No.	CS-7/32	TYPE	N.R.	SIDE	
LENGTH	5'	SPACING		13"	
		LENGTH	1'		

GENERAL			GAMMA RAY		DENSITY	
TRUCK No.		HOR. SCALE				
LOCATION		SOURCE, MODEL			HOVF	
		ISOTOPE			CS-137	
		STRENGTH			125 mC.	

LOGGING DATA

RUN No.	DEPTH FROM	DEPTH TO	SPEED F/min	T.C. SEC.	GAMMA RAY SETTING	ZERO	API UNITS PER DIV	T.C. SEC.	DENSITY SETTINGS	ZERO

REMARKS:



No Drillers Log
for PE-94-07

Hole Number P.C.94-08
Surveyed Location
Baseline
Elevation
Angle
Logs Run
GDRC GN DEV

Logged By
Contractor
Driller CARL MOORE
Rig Type TH 100
Drilling Method
Date(s) Drilled

From	to	Rock Type	Colour	Hardness	Waterflow	Comments
0	7	CLAY & RES.				
7	10	SANDSTONE				
10	14	COAL & SHALE				
14	191	SANDSTONE				
191	203	SHALE & COAL				
203	283	SANDSTONE				
283	293	COAL WITH STRINGERS OF SHALE				
293	392	SANDSTONE				
392	400	COAL & SHALE				
400	440	SANDSTONE				

[illegible] ENERGY RESOURCES

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE [illegible]
LOCATION SEC TP RGE W
AREA [illegible]
PROVINCE [illegible]

SURVEYED DATA
ELEV. 1519.47
LOC. 5946236.7N
425567.9 E

RUN No.	1	2	3
DATE	[illegible]		
DEPTH-DRILLER	[illegible]		
DEPTH-LOGGER	[illegible]		
FLUID LEVEL			
LOGGING TIME			
DRILLED BY	[illegible]		
RECORDED BY	[illegible]		
WITNESSED BY	[illegible]		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO

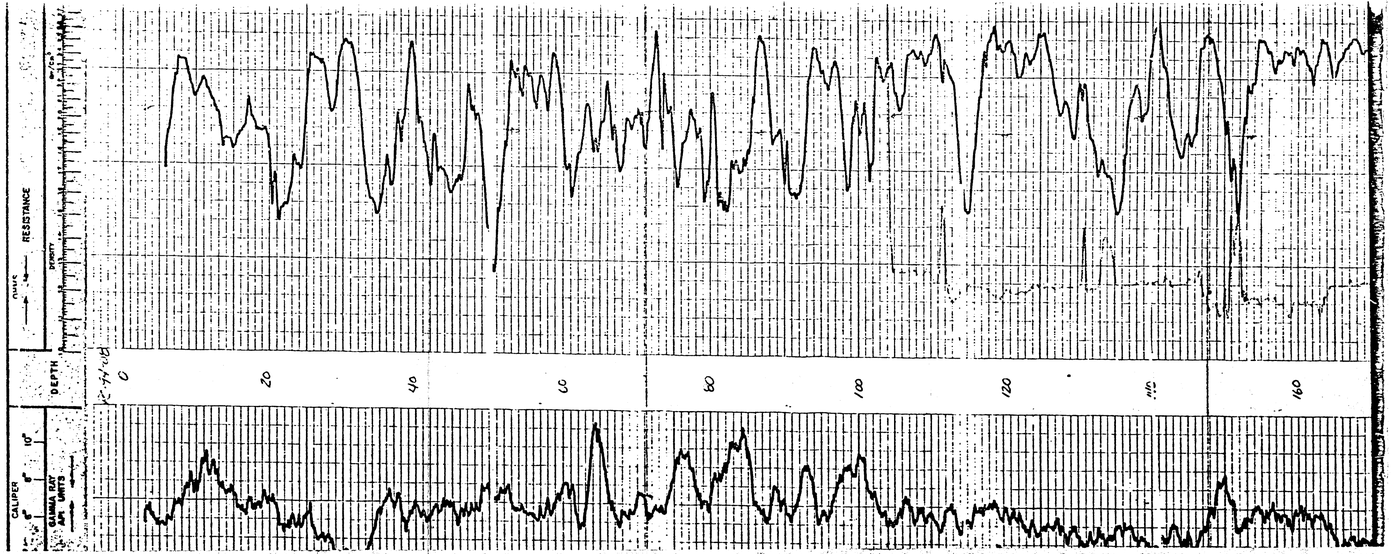
EQUIPMENT DATA

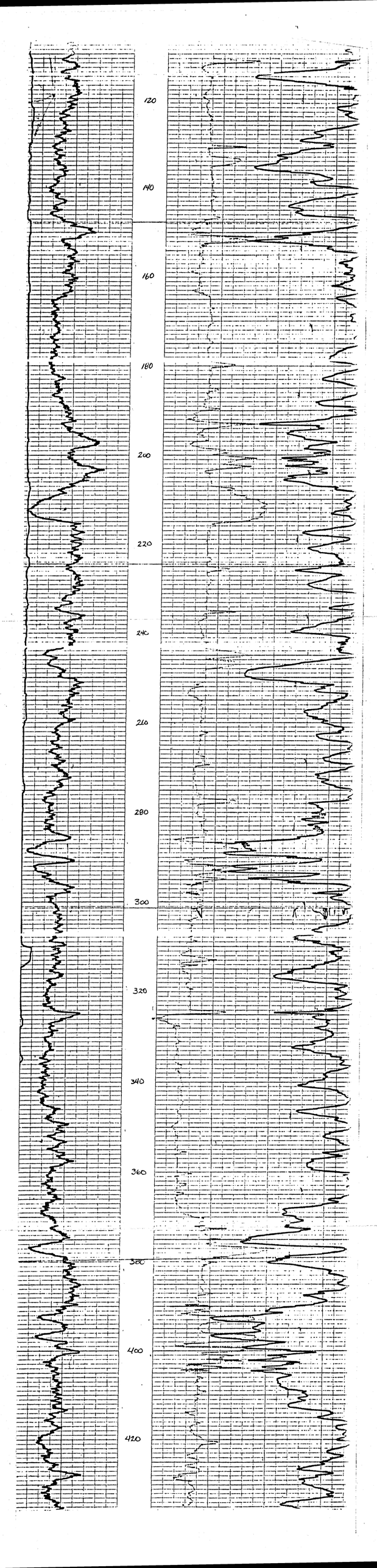
GAMMA RAY		GAMMA RAY	RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3'	LENGTH	1'		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

LOGGING DATA

RUN No.	DEPTHS FROM	DEPTHS TO	SPEED ft/min	GAMMA RAY T C SEC.	GAMMA RAY SENS SETTING	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV.	DENSITY T C SEC	DENSITY SENS SETTINGS	DENSITY ZERO

REMARKS:




120
140
160
180
200
220
240
260
280
300
320
340
360
380
400
420

~~CARDINAL RIVER COALS LTD.~~

PINTO CREEK

DRILL HOLE LOG

Hole Number P.C.94-08

Surveyed Location

Baseline

Elevation

Angle

Logs Run

GDRC GN DEV

Logged By

Contractor

Driller CARL MOORE

Rig Type TH 100

Drilling Method

Date(s) Drilled

From	to	Rock Type	Colour	Hardness	Waterflow	Comments
0	7	CLAY & RKS				
7	10	SANDSTONE				
10	14	COAL & SHALE				
14	191	SANDSTONE				
191	203	SHALE & COAL				
203	283	SANDSTONE				
283	293	COAL WITH STRINGERS OF SHALE				
293	392	SANDSTONE				
392	400	COAL & SHALE				
400	440	SANDSTONE				

HOLE NO. PC-94-09

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DATUM _____

FROM	TO	LOG	REMARKS
0	6.5	T.H.	
6.5	89	Sandstone	
89	93	Tongue Of Coal	
93	98	Sandstone	
98	100	Coal	
100	142	Sandstone	
142	146	Coal + Silt/clay	
146	241	Sandstone	
241	246	Coal + Silt/clay	
246	900	Sandstone	

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE PC-94-09 — SURVEYED DATA

LOCATION _____ SEC ___ TP ___ RGE ___ W. — ELEV. 927.4

AREA Foothills — LOC. 5745385.5N

PROVINCE Alta. — 725903.6E

ELEV. TH 927.4 | 3 | 4

DEPTH—DRILLER 900' | 900' | 900'

DEPTH—LOGGER 900' | 900' | 900'

FLUID LEVEL — | — | —

CASING NO. — | — | —

LOGGED BY J. Pirie | J. Pirie | J. Pirie

RECORDED BY J. Pirie | J. Pirie | J. Pirie

INITIALS OF

BIT	RUN	TO	SIZE	FROM	TO

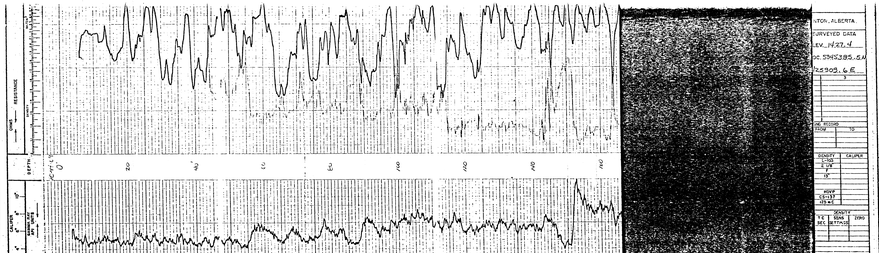
CASING RECORD

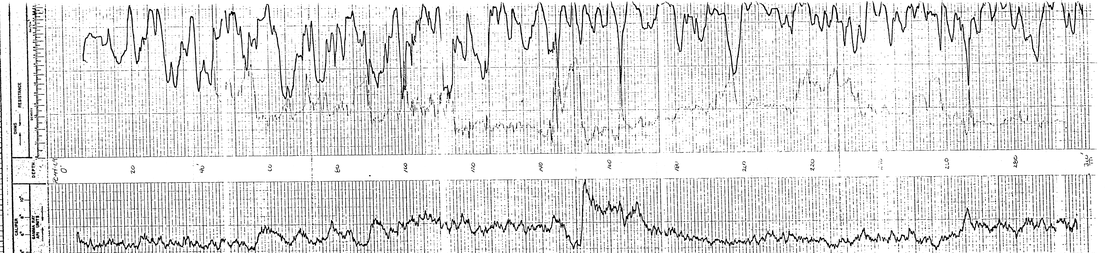
EQUIPMENT DATA

GAMMA RAY			FIELD CHECKS	COUNTS	CALIPER
TOOL MODEL NO.	CCL-A	TOOL MODEL NO.	CASE	2.5M	
SHORT SPACING	1.0m-1m	CABLE TYPE	SOURCE	4.2M	
DETECTOR MODEL NO.	SPC-1A	LENGTH	SEC.	8"	
TYPE	50mC	WEIGHT	—	16"	
LENGTH	5'	MIN. DIAM.	—	32"	
TRACER NO.	SINGEL	SOURCE MODEL	—	SHIFT	
LOCATION		SOURCE STRENGTH	—	16-32"	
		DENSITY LOG	—	32-64"	

GENERAL											SONIC	
RUN NO.	DEPTH FROM	DEPTH TO	SPEED FPM	V.E. SEC.	TIME SETTING	LEAD	AMP. SETTING	GATE	V.E. SEC.	SONIC SETTING	
								PER SEC.			

REMARKS: _____





OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE March 31 1994

COMPANY Levco Testing

HOLE NO. PC-94 09

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION _____

ELEVATION _____

DRILLER _____

FROM	TO	LOG	REMARKS
0	4.5	Till	
4.5	88	Sandstone	
88	89	Trace Of Coal	
89	98	Sandstone	
98	100	Coal	
100	142	Sandstone	
142	146	Coal + Shale	
146	261	Sandstone	
261	266	Coal + Shale	
266	302	Sandstone	

COMMENTS _____

WATER HORIZON

HOLE NO. PC 94-10

ANNUAL LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Coal Valley

FROM	TO	LOG	REMARKS
0	3	Till	
3	59	Sandstone	
59	66	Coal & Shale	
66	102	Sandstone	
102	103	Coal	
103	109	Sandstone	
109	171	Coal, silt + coal partings	
171	209	Sandstone	
209	265	Shale, silt + coal stringers	
265	320	Sandstone	

TD3 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

ROLE _____ SURVEYED DATA

LOCATION _____ SEC TP RGE W ELEV. 1438.8

AREA Cadotte Lake LOC. 5956.30 E.O.

PROVINCE _____ 1062.32 S.O.

RIG #	1	2	
CASING DRILLER	Surface		
CASING DEPTH	60'		
CLASS OF RIG			
DRILLER'S NAME	Cadotte		
DRILLER'S ADDRESS			
LICENCE NO.			
CONTRACTOR			

CASING RECORD

SIZE	FROM	TO

CASING FISH

TOOL MODEL NO.	
DIAMETER	
LENGTH	
WEIGHT	
LOCATION	
NOW SLUG	
SWAGE MODEL	
WEIGHT	
LOCATION	

DIRECTIONAL DATA

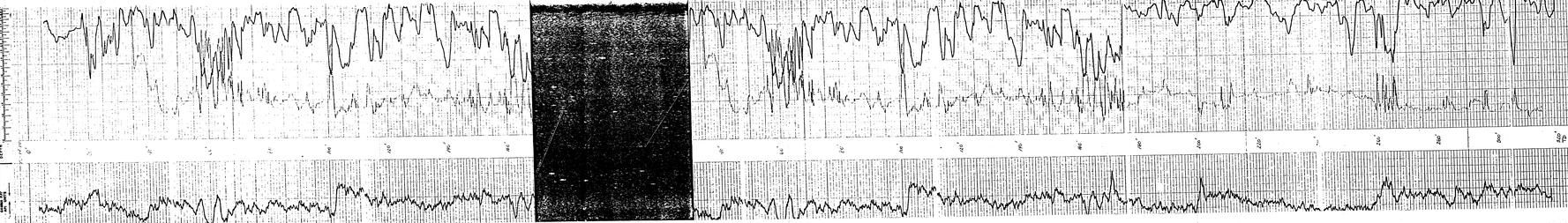
TOOL MODEL NO.	
DIAMETER	5 7/8"
LENGTH	30'
WEIGHT	
LOCATION	
NOW SLUG	
SWAGE MODEL	
WEIGHT	
LOCATION	

RECORDING DATA

RECORDED BY	
CHECKED BY	
DATE	
TIME	

COUNTS

REMARKS:



OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD PINTO CREEK DATE MARCH 31, 1994

COMPANY LEXCO

HOLE NO. P.C. 94 - 10

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION _____

ELEVATION _____

DRILLER CARL MOORE

FROM	TO	LOG	REMARKS
0	3	TILL	
3	59	SANDSTONE	
59	66	Coal & Shale	
66	102	Sandstone	
102	103	Coal	
103	159	Sandstone	
159	171	Coal w. ti coal partings	
171	259	Sandstone	
259	265	Shale w. ti coal partings	
265	320	Sandstone	

COMMENTS _____

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 5941341.16 N - 457326.86

ELEVATION 1390.9

DRILLER Ron Price

FROM	TO	LOG	REMARKS
0	7	T.H.	
7	116	Sandstone	
116	138	Shale with stringers of Lignite at 77' & 90'	
138	300	Sandstone	water at 139.0 gpm

FOUNDATION DRILLING CO. OF CANADA LTD. 700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE No. 74-17

LOCATION SEC. TP. RGE. W.

AREA Bow River

PROVINCE Alta

SURVEYED DATA

ELEV. 1390.9

LOC. 5941341.16N

457326.86E

JOB No.	
DATE	10/21/74
DEPTH-DRILLER	300'
DEPTH-LOGGER	300'
CASING TYPE	
CASING TYPE	6" STEEL
CASING TYPE	4" PLASTIC
DRILLED BY	FOUNDATION
RECORDED BY	

BOREHOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO

EQUIPMENT DATA

TOOL MODEL No.	TYPE	TOOL MODEL No.	TYPE	COUNTERWT.	QUANTITY	GAUGES
LOGGING CABLE	7/16	LOGGING CABLE	3/16	3/16	1/4	
DETECTOR MODEL No.	5701-B	TRUCK		#5	3/8	
SONDE	10-1	SONDE			1/2	
LENGTH		LENGTH			3/4	

SPECIAL

TRUCK No.	
LOCATION	

HOW TO RUN

SONDE MODEL	HOW
SONDE No.	10-1
EXTENSION	125 ft

LOGGING DATA

RUN No.	DIRECTION	SPEED	T.C. SEN. SETTING	R.O.D.	R.O.D.	API UNITS PER INCH	API UNITS SEC.	T.C. SEN. SETTING	SONDE ZERO
1	OUT	20'							

REMARKS:

SURVEYED DATA

ELEV. 1390.9

5941341.16N

457326.86E

FOOTAGE

FROM	TO

DEPTH GAUGES

CABLE	
3/16"	
1/4"	
3/8"	
1/2"	
3/4"	

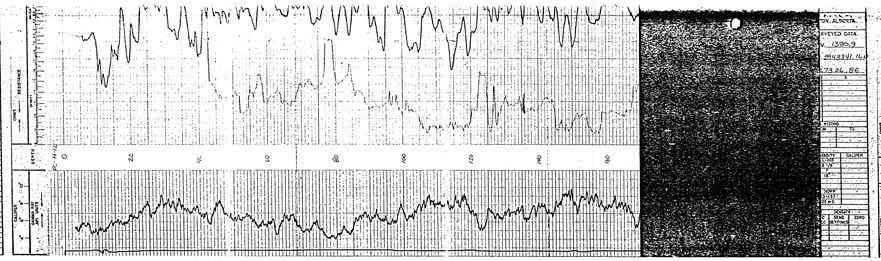
HOW TO RUN

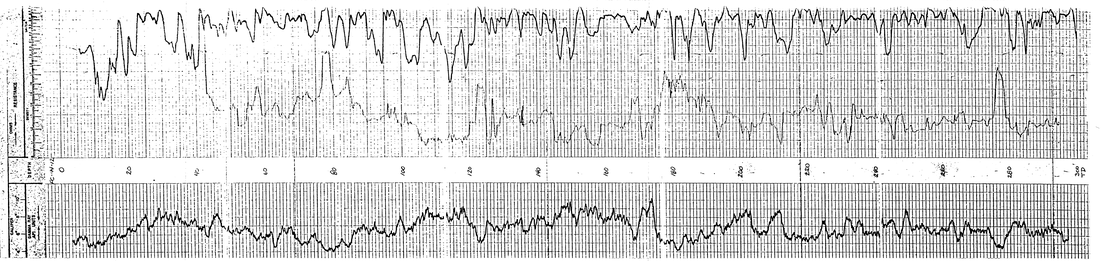
SONDE	HOW
SONDE No.	10-1
EXTENSION	125 ft

LOGGING DATA

RUN No.	DIRECTION	SPEED	T.C. SEN. SETTING	R.O.D.	R.O.D.	API UNITS PER INCH	API UNITS SEC.	T.C. SEN. SETTING	SONDE ZERO
1	OUT	20'							

REMARKS:





PC-94-11

Not Drilled

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE March 24 1994

COMPANY Cayco Testing

HOLE NO. PC-94-12

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 5943341.16 N - 427326.8 E

ELEVATION 1380.9

DRILLER Don Olson

FROM	TO	LOG	REMARKS
0	7	Till	
7	126	Sandstone	
126	138	Shale with stringers of	Water at 77' 5 gPm
138	300	Sandstone	Water at 179' 20 gPm

COMMENTS _____

PROPOSED LOCATION

DIVISION

FIELD Dunvegan

FROM	TO	LOG	REMARKS
0	14	T.11	
14	98	Salt Sandstone	
98	101	Coal	Water at 30' 20 gpm
101	118	Sandstone	Water at 101' 30 gpm
118	204	Coal	
204	220	Sandstone	

HOLE No. 11-14-154

LOCATION SEC TP RSE W

AREA Peace River

PROVINCE Alta

SURVEYED DATA

ELEV. 1351.7

LOC. 5942(35.8 s)

42(73.6 E

RIG No.			
DATE	11-12-54		
SUPT.—DRILLER	Fiddle		
TOOLPUSHER	Fiddle		
FLUID USED	Fw.		
LOGGED TIME			
SPUDDED IN	7 AM/54		
REACHED T.D.	7 PM/54		

SIDE-HOLE RECORDS

BIT	FROM	TO	CORE RECORD NO.	FROM	TO

CASING RECORD

SIZE	FROM	TO

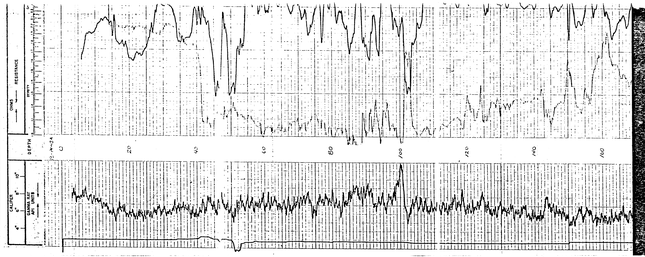
DRILLING DATA

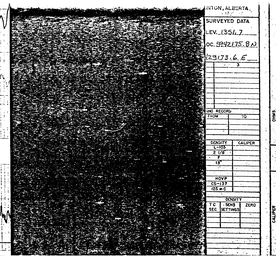
DRAWN BY		L-DEV.	TOOL MODEL No.	RESISTIVITY C-128	DENSITY C-128
DIAMETER		C-128 DIAMETER		3 1/8"	3 1/8"
DATE CALIBRATED		SONDE No.		ft	ft
LENGTH		ft	LENGTH		ft
SOURCE			SOURCE MODEL		SOURCE
TRUCK No.			SOURCE No.		75-119
LOCATION			STRENGTH		100 MV

LOGGING DATA

RUN No.	INTERVAL FROM	TO	SPEED ft/hr	T.C. SCALE SEC. SETTING	SCALE	SPL. SHORTS PER SPL.	T.C. SCALE SEC. SETTING	DENSITY SCALE

REMARKS:





HOLE No. 11-14-154

LOCATION SEC TP RSE W

AREA Peace River

PROVINCE Alta

SURVEYED DATA

ELEV. 1351.7

LOC. 5942(35.8 s)

42(73.6 E

RIG No.			
DATE	11-12-54		
SUPT.—DRILLER	Fiddle		
TOOLPUSHER	Fiddle		
FLUID USED	Fw.		
LOGGED TIME			
SPUDDED IN	7 AM/54		
REACHED T.D.	7 PM/54		

SIDE-HOLE RECORDS

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO

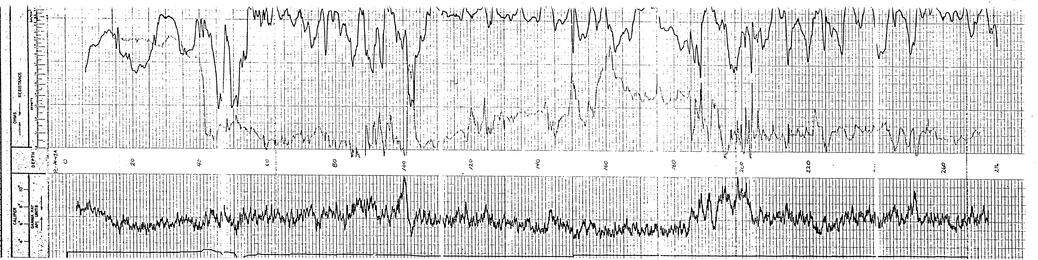
DRILLING DATA

DRAWN BY		L-DEV.	TOOL MODEL No.	RESISTIVITY C-128	DENSITY C-128
DIAMETER		C-128 DIAMETER		3 1/8"	3 1/8"
DATE CALIBRATED		SONDE No.		ft	ft
LENGTH		ft	LENGTH		ft
SOURCE			SOURCE MODEL		SOURCE
TRUCK No.			SOURCE No.		75-119
LOCATION			STRENGTH		100 MV

LOGGING DATA

RUN No.	INTERVAL FROM	TO	SPEED ft/hr	T.C. SCALE SEC. SETTING	SCALE	SPL. SHORTS PER SPL.	T.C. SCALE SEC. SETTING	DENSITY SCALE

REMARKS:



OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE March 22, 1994

COMPANY Layco Testing

HOLE NO. PC-94-13A

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don D. Favero

FROM	TO	LOG	REMARKS
0	14	Till	
14	98	Soft Sandstone	
98	101	Coal	Water at 30' 20 gpm
101	198	Sandstone	Water at 148' 20 gpm
198	204	Coal	
204	280	Sandstone	

COMMENTS _____

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE March 21 1994

COMPANY Lexco Testing

HOLE NO. PC-94-13

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Carl Moore

FROM	TO	LOG	REMARKS
0	10	Till	
10	87	Sandstone	
87	98	Shale	water at 36' - 50gpm.
98	300	Sandstone	
		Blind Hole - No Elog	
		Not Surveyed	

COMMENTS _____

COMPANY Lerco Testing

HOLE NO. PC-94-14

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Carl Moore

FROM	TO	LOG	REMARKS
0	22	Muskeg	
22	25	clay	
25	89	Sandstone	Water at 47'-15gpm
89	94	Coal	
94	126	Sandstone	
126	129	Coal	
129	200	Sandstone	
200	219	Coal	
219		Sandstone	

TESTING LTD. **GAMMA-DENSITY-RESISTANCE**

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE PC-94-14 — SURVEYED DATA

LOCATION _____ SEC. TP. RGE. W. — ELEV. 1357.1

AREA Pouce Creek — LOC. 5942354.3N

PROVINCE Alta. — 429359.36

RUN No.	1	2	3
DATE	Mar 21 '74		
DEPTH-DRILLER			
DEPTH-LOGGER			
FLUID LEVEL			
LOGGING TIME			
DRILLED BY	C. MACKIE		
RECORDED BY	C. MACKIE		
WITNESSED BY	[illegible]		

BORE-HOLE RECORD			CASING RECORD		
BIT	FROM	TO	SIZE	FROM	TO

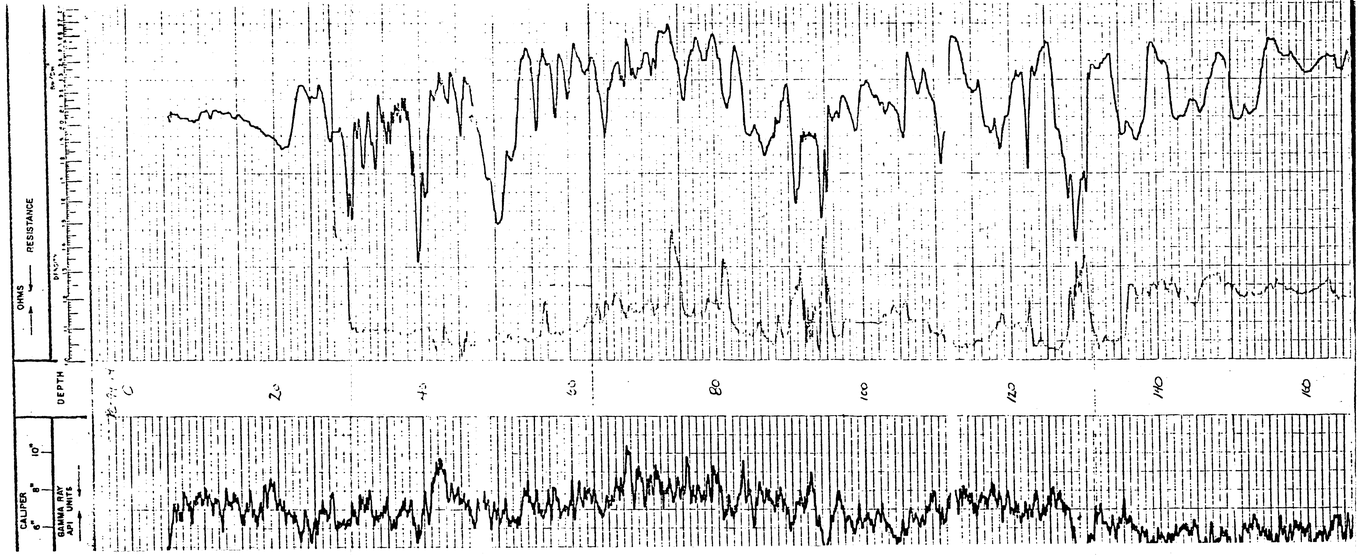
EQUIPMENT DATA

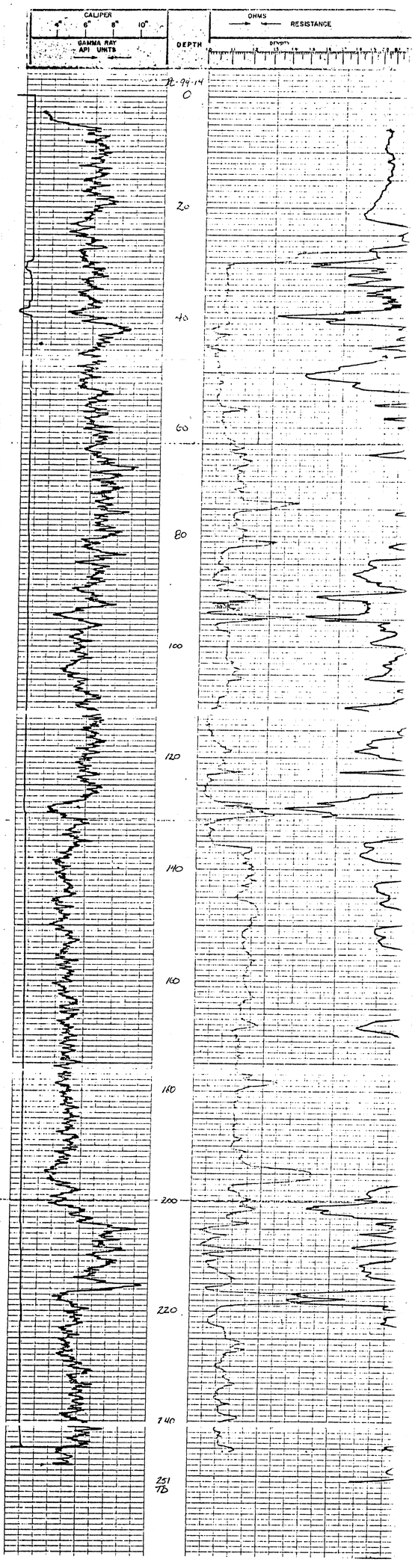
GAMMA RAY		GAMMA RAY	RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3'	LENGTH	1'		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HDVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

LOGGING DATA

GENERAL				GAMMA RAY					DENSITY			
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED FV/mn	T C SEC	SENS SETTING	ZERO	API UNITS PER DIV.		T C SEC	SENS SETTINGS	ZERO
			5								

REMARKS:




CALIPER
6"
8"
10"
GAMMA RAY
API UNITS
DEPTH
OHMS
RESISTANCE
R-94-14
0
20
40
60
80
100
120
140
160
180
200
220
240
251
TD

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE March 23

COMPANY Loxco Testing

HOLE NO. PC - 94 - 15

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Dfour

FROM	TO	LOG	REMARKS
0	12	Till	
12	50	Sandstone	
50	54	Coal	
54	55	Sandstone	
55	59	Coal	
59	156	Sandstone	
156	168	Coal	
168	174	SANDSTONE	
174	183	Coal	
183	199	SANDSTONE	

COMMENTS _____

OBED MOUNTAIN COAL LTD.
DRILL HOLE REPORT

COAL FIELD _____ DATE March 21 1994

COMPANY Lexco Testing

HOLE NO. PC-94-14

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Carl Moore

FROM	TO	LOG	REMARKS
0	22	Muskeg	
22	25	clay	
25	89	Sandstone	Water at 47'-15 gpm
89	94	Coal	
94	126	Sandstone	
126	129	Coal	
129	200	Sandstone	
200	219	Coal	
219		Sandstone	

COMMENTS _____

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION

ELEVATION

DRILLER Dominion

FROM	TO	LOG	REMARKS
0	12	Till	
12	50	Sandstone	
50	54	Coal	
54	56	Sandstone	
56	59	Coal	
59	156	Sandstone	
156	164	Coal	
164	174	Sandstone	
174	175	Coal	
175	195	Sandstone	

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE EC-74-116
LOCATION SEC. TP. RGE. W.
AREA Peace River
PROVINCE Alta.

SURVEYED DATA
ELEV. 1296.8
LOC 5958678.8 N
427583.07 E

RUN No.		2	3
DATE	March 28 1974		
DEPTH-DRILLER	2160'		
DEPTH-LOGGER	2158'		
CASING TYPE			
CASING @			
LOGGING TIME			
DRILLED BY	C. Thiessen		
RECORDED BY	L. Lovell		
WITNESSED BY	Dominion		

BOREHOLE RECORD

BIT	FROM	TO	SIZE
-			

CASING RECORD

SIZE	FROM	TO

SONDE RAY

TOOL MODEL No.	L-105
SONDE No.	3-1/8"
DETECTOR MODEL No.	SPECTOR
TYPE	SCINT
LENGTH	6'-0"

GENERAL

TRUCK No.	
LOCATION	

GAMMA RAY

TOOL MODEL No.	L-105
SONDE No.	3-1/8"
TYPE	SCINT
LENGTH	6'-0"
HOR. SCALE	
SOURCE MODEL	
STRENGTH	

DENSITY

TOOL MODEL No.	L-105
SONDE No.	3-1/8"
TYPE	DENSITY
LENGTH	8'-0"
HOR. SCALE	HOVE
SOURCE MODEL	CS-137
STRENGTH	10 m.c.

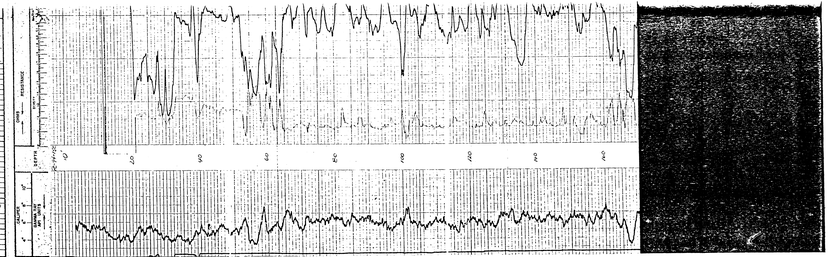
CALIPER

TOOL MODEL No.	L-105
SONDE No.	3-1/8"
TYPE	CALIPER
LENGTH	8'-0"
HOR. SCALE	HOVE
SOURCE MODEL	CS-137
STRENGTH	10 m.c.

LOGGING DATA

RUN No.	GENERAL DEPTHS FROM	TO	SPEED FT/MIN	T.C. SEC.	SENS. SETTING	ZERO	GAMMA RAY API UNITS PER DIV.	T.C. SEC.	SCALE SETTING	ZERO
1			10							

REMARKS:



PINTO CREEK EXPLORATION 1993
DRILL HOLE SURVEY LOCATION
UTM COORDINATES

HOLE	NORTHING	EASTING	ELEVATION
PC-93-01	5949250.00	422950.00	1439.80
PC-93-02	5949500.00	423150.00	1435.30
PC-93-03	5948950.00	422550.00	1452.30
PC-93-04	5949175.00	422725.00	1447.40
PC-93-04a	5949400.00	422150.00	1433.20
PC-93-05	5946775.00	425475.00	1552.00
PC-93-06	5946775.00	425700.00	1551.00
PC-93-07	5946775.00	424920.00	1545.90
PC-93-08	5946775.00	424200.00	1548.00
PC-93-09	5943600.00	430500.00	1331.00

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: PINTO CREEK DATE: FEB 11/93

COMPANY : LEXCO

HOLE NO. : PC-93-01

APPROX. LOCATION: 1411.0M S 1237.7M W SEC. 25 TWP. 54 RGE. 2 W6M
UTM 5949250N 422950E

SURVEYED LOCATION:

ELEVATION (M) : 1439.8

DRILLER : R. BENFELD

FROM	TO	LOG	REMARKS
0	12	till	
12	24	gr sn	
24	64	gr silt	
64	71	gr sn	WATER
71	83	coal (blk shly)	20 gpm at 36 ft.
83	131	gr silt	
131	151	gr sn	steadily increased
151	152	coal	to approx. 150 gpm
152	188	gr silt	at 400 ft.
188	199	coal (sh stks)	
199	204	gr silt	
204	256	gr sn	
256	258	coal	
258	275	gr silt	
275	278	coal	
278	322	gr hrd gr silt	
322	327	gr silty sh	
327	400	hard sn	

COMMENTS:

WATER HORIZON: 36 ft. FT.

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: PINTO CREEK DATE: FEB 17/93

COMPANY : LEXCO

HOLE NO. : PC-93-02

APPROX. LOCATION: 1163.4m S 1039.7m W SEC. 25 TWP. 54 RGE. 2 W6M
UTM 5949500 N 423150 E

SURVEYED LOCATION:

ELEVATION(M) : 1435.3

DRILLER : R. BENFIELD

FROM	TO	LOG	REMARKS
0	17	till	
17	72	gr silty ss	
72	78	coal	
78	116	gr silt	
116	119	coal	Blind hole shattered sandstone
119	152	gr silt	
152	244	gr ss	
244	262	gr silt	
262	267	gr ss	
267	278	coal (shale partings)	
278	300	gr silty ss	

COMMENTS:

WATER HORIZON: FT.

LEXCO TESTING LTD.

DRILLHOLE REPORT

COAL FIELD: PINTO CREEK DATE: FEB 18/93

COMPANY : LEXCO

HOLE NO. : PC-93-03

APPROX. LOCATION: 99.0m W 0m S SEC. 23 TWP. 54 RGE. 2 W6M
UTM 5948950N 422550E

SURVEYED LOCATION:

ELEVATION (m) : 1452.3

DRILLER : R. BENDFELD

FROM	TO	LOG	REMARKS
0	7	till	
7	71	gravel	
71	75	coal (shly)	
75	131	gravel silty sand	
131	135	coal	water est 168 gph.
135	159	gravel silt	approx. 300 gal/min.
159	202	gravel	
202	206	coal (shly)	
206	244	gravel silt	
244	248.5	coal	
248.5	360	gravel siltstone (sandy)	

COMMENTS:

WATER HORIZON: FT.

APPROX. LOCATION: NW NW 1/4 SEC. 25 TWP. 29 RGE. 2 W4M
1/4 SECTION NORTH

SURVEYED LOCATION:

ELEVATION (F) 1419.8

DRILLER: E. Rowland

FROM	TO	COLOR	REMARKS
0	12	GR	
12	21	grvl	
21	64	grvl	
64	71	grvl	Water
71	111	grvl (clyst nod.)	Sagon at 74 ft
111	121	grvl	
121	131	grvl	slightly cemented
131	132	coal	& layers of sagon
132	171	grvl	at bottom
171	191	bottle clyst	
191	202	grvl	
202	205	grvl	
205	210	coal	
210	221	Gravel	
221	231	coal	
231	238	grvl w/ lot of silt	
238	253	grvl w/ silt & sd	
253	410	Bedrock	

COMMENTS:

WATER BOSITION: 74 ft FT

USL
IBC
TWP
RGE
W meridian W

LOCATION: UTM ZONE 11 4523 340E 5970 350N
LEGAL: SEC 25 TWP 29 RGE 2 W4M
FIELD: ATHABASCA TAR SANDS
PROVINCE: ALBERTA

USL	SEC	TWP	RGE	W

Other Services

Permanent Datum: GROUND LEVEL Elev. 1419.8 Elev. KB
Log Measured From: K.B. 0.0 Above Perm. Datum 0.00
Well Bore Measured From: KB 0.0

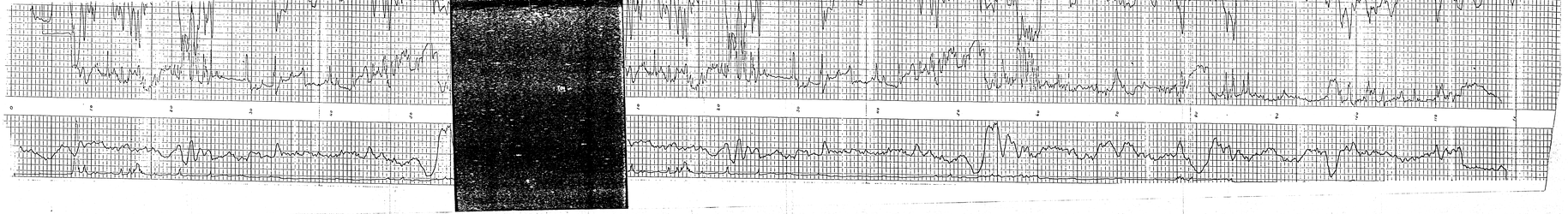
Run No.			
Date	11 FEB 76		
Depth-Reading	410		
Depth-Logged	410		
Casing-Logged	410		
Depth-Type Fluid	UNKNOWN		
Depth-Driller	410		
Casing-Driller	410		
Casing-Diameter	7.5		
Casing-Driller			
Fluid Type	WATER		
Density-Viscosity	8.9		
Fluid Loss	11.5		
Source of Sample			
Operating Time	1.00		
Max. Rec. Temp.			
Equipment No.			
Recorded By	ECG	Witnessed By	E. ROWLAND

DENSITY LOG

DENSITY LOG	RUN	BIT	CASING	TYPE FLUID	DENSITY	VISCOSITY	PH	FLUID LOSS	SOURCE OF SAMPLE	RM @ MEAS. TEMP.	RMF @ MEAS. TEMP.	RMC @ MEAS. TEMP.	SOURCE RMF RMC	RM @ BHT	TIME CIRC.	TIME LOGGER ON BTM.	MAX. REC. TEMP.	EQUIP. LOCATION	RECORDED BY	WITNESSED BY

DENSITY LOG

DENSITY LOG	RUN	BIT	CASING	TYPE FLUID	DENSITY	VISCOSITY	PH	FLUID LOSS	SOURCE OF SAMPLE	RM @ MEAS. TEMP.	RMF @ MEAS. TEMP.	RMC @ MEAS. TEMP.	SOURCE RMF RMC	RM @ BHT	TIME CIRC.	TIME LOGGER ON BTM.	MAX. REC. TEMP.	EQUIP. LOCATION	RECORDED BY	WITNESSED BY



WELL NO. Pc-93-03

APPROX. LOCATION 9N/4W Co 8 SEC. 23 DIV 24 SEC 2 MD

SURVEYED LOCATION

ELEVATION (G) 1493.2

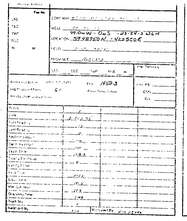
DRILLER Schumacher

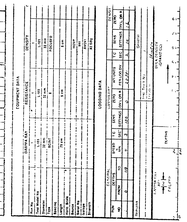
FROM	TO	LOG	REMARKS
0	2	Soil	
2	71	Shale	
71	111	Coal (clay)	
111	117	Shale	
117	117.5	Coal	Lots of light square banding
117.5	123	Shale	
123	126	Coal (clay)	
126	204	Shale	
204	204.5	Coal	
204.5	TD	Sandstone (wet)	

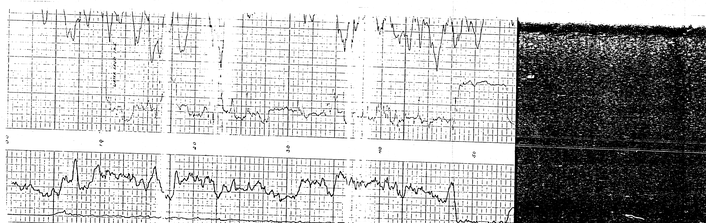
COMMENTS

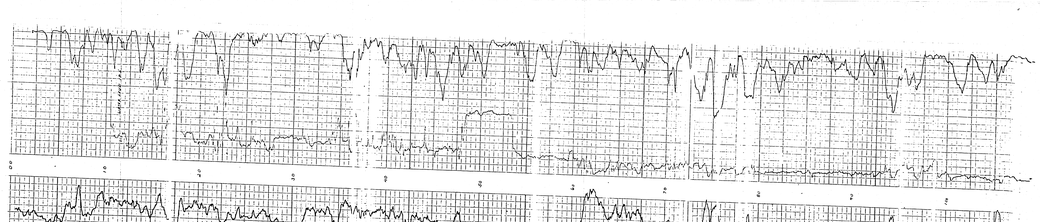
WATER WELL

TD









5,955,000 N

5,950,000 N

5,945,000 N

5,940,000 N

420,000 E

425,000 E

430,000 E

435,000 E

94PPC-04

PC-94-03

PC-94-02

PC-93-02

PC-93-04

PC-94-05

PC-94-01

PC-93-04

PC-93-01

PC-93-03

HIGHTOWER CREEK

WILDCAT CREEK

PC-94-06

PC-93-08

PC-93-05

PC-94-16

PC-93-07

PC-93-06

PC-94-08

PC-94-07

PC-94-10

PC-94-09

MICROWAVE TOWER

PC-93-09

PINTO CREEK

PC-94-12

PC-94-15

PC-94-14

PC-94-13A

TWP 54 RNG 2 W6

TWP 54 RNG 1 W6

TWP 53 RNG 2 W6

TWP 53 RNG 1 W6

CNR

HIGHWAY 40

PINTO CREEK

SCALE: 1=25000

N

Pinto Creek

WELL NO. 93-N-D-11

AGENCY, LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

ESTIMATED LOCATION 69210 N - 450004E

ELEVATION 1038.0

DRILLER Don Olson

FROM	TO	LOG	REMARKS
0	10	Till	
10	65	Sandstone	
65	70	Mudstone & coal	
70	123	Sandstone	
123	158	Mudstone with Trace Coal	
158	202	Sandstone	
202	207	Mudstone & coal	
207	336	Sandstone	
336	346	Coal	
346	382	Sandstone	
382	397	Coal	
397	442	Sandstone	

TESTING LTD. GAMMA-DENSITY-RESISTANCE

PO BOX 6048, TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

WELL 93-N-D-11 SURVEYED DATA

LOCATION SEC TP RGE W ELEV. 1038.0

AREA Hinton, Alberta LOG 442'-0"

PROVINCE Alta 350GE

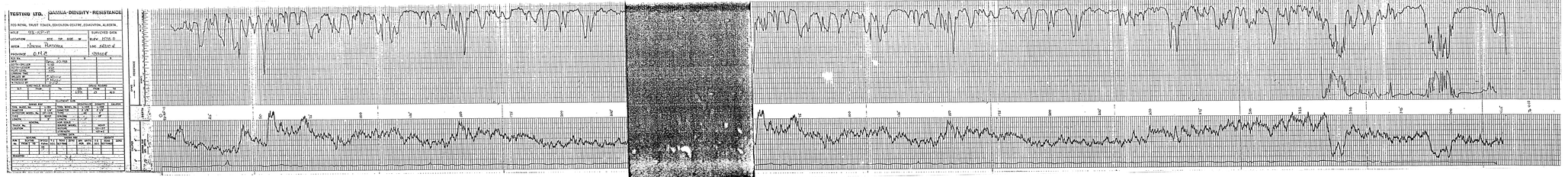
CASING	9 5/8"		
BIT	Rmg. 10 7/8		
MUD WEIGHT	9.0		
MUD VISCOSITY	40		
FLUID LOSS			
RM @ MEAS. TEMP.	@ 60°F		
RMF @ MEAS. TEMP.	@ 60°F		
RMC @ MEAS. TEMP.	@ 60°F		
SOURCE OF SAMPLE	FLOW		
RM @ BHT		1.05	
TIME SINCE CIRC.		1 HRS.	
MAX. REC. TEMP.		70	
EQUIPMENT NO.		1373	
LOGGING UNIT		20	
LOGGED BY		K.H.	

RECEIVED	AMOUNT	VALUES
TOTAL FOOTAGE		
TOTAL FOOTAGE THIS LOG		
FEET		
METRES		
TRUCK No.		
MILEAGE		
TOTAL		

RUN	DIAMETER	WEIGHT	TYPE	FROM	TO	TOP CENTRALIZER	BOTTOM CENTRALIZER	SCRATCHER
1	9 5/8"	36		0	442			

LOCATION

REMARKS



COMPANY _____

HOLE NO. 93 NP - 6

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 54175 N - 49750 E

ELEVATION 1542.3

DRILLER Don Deneer

FROM	TO	LOG	REMARKS
0	14	Till	
14	23	Sandstone	
23	24	Coal	
24	133	Sandstone	
133	134	Coal	
134	295	Sandstone	Flat at 200'
295	297	Coal	
297	328	Sandstone ?	
328	340	Coal ?	
340	378	Sandstone	
378	389	Coal	
389	440	Sandstone	

TESTING LTD. GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-6

LOCATION _____ SEC. TP. RGE. W.

AREA North Plateau

PROVINCE O.M.C.

SURVEYED DATA
ELEV. 1542.3
LOC. 54175 N
49750 E

	1	2	3
RUN No.			
DATE	April 19/83		
DEPTH-DRILLER	440		
DEPTH-LOGGER	440		
CASG. LEVEL	335		
LOGGING TIME			
DRILLED BY	C. Hooke		
RECORDED BY	D. Lycoe		
WITNESSED BY	-		

BORE-HOLE RECORD

BIT	FROM	TO	SIZE
			6 5/8

CASING RECORD

FROM	TO
0	420

EQUIPMENT DATA

GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-105	TOOL MODEL No.	L-105	L-105	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	MN	8"	
TYPE	POINT	SPACING		15"	
LENGTH	3'	LENGTH			
GENERAL		MDA SCALE		MOVP	
TRUCK No.		SOURCE MODEL		CS-137	
LOCATION		ISOTOPE		125 MC	
		SYSTEMATH			
		LOGGING DATA			

GENERAL				GAMMA RAY				DENSITY	
RUN No.	DEPTH FROM	DEPTH TO	SPEED ft/min	T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	T C SEC	SENS SETTINGS	ZERO
			10							

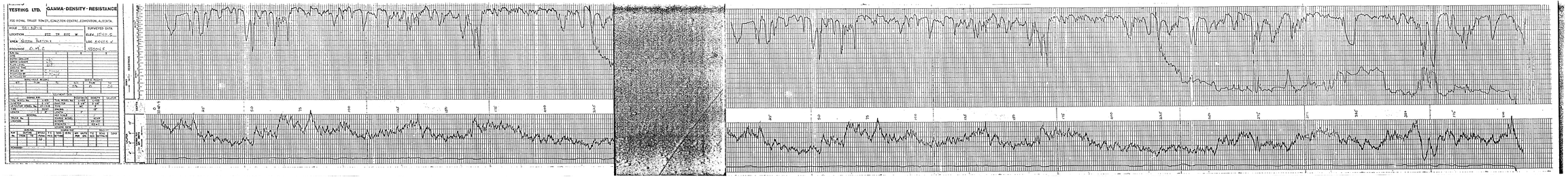
REMARKS:



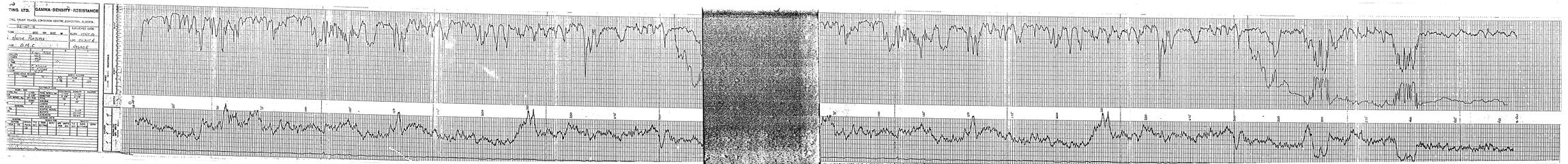
JD 1995001

ID 1d6B000.1




TESTING LTD.
GAMMA-DENSITY-RESISTANCE
FIELD
LOCATION
SURVEYED DATA
ELEV.
LOG
PROVINCE
RUN No.
DRILLER
LOGGER
CASING
BIT
BOREHOLE RECORD
CASING RECORD
RM @ MEAS. TEMP.
RMF @ MEAS. TEMP.
RMC @ MEAS. TEMP.
SOURCE OF RMF & RMC
RM @ BHT
TIME SINCE CIRC.
MAX. REC. TEMP.
EQUIP. LOCATION
RECORDED BY
WITNESSED BY
RESISTANCE
GAMMA RAY
NEUTRON
DENSITY
CALIPER
SPONTANEOUS POTENTIAL
RESISTIVITY
GAMMA RAY
NEUTRON
DENSITY
CALIPER
SPONTANEOUS POTENTIAL
RESISTIVITY

30 PR6000


TING LTD.
GAMMA-DENSITY-RESISTANCE
DISTRICT
SEC TP RGE W
ELEV.
LOG
GAMMA
DENSITY
RESISTANCE

3D 1986001

ELEVATION (ft) 5280
DRILLER Adirondack

FROM	TO	USE	REMARKS
0	12	Csg	
12	36	open	
36	124	coal (fract.)	
124	142	gr sand	Slight water at 70 ft.
142	158	coal (dry)	
158	221	gr sand	
221	291	gr sd & coal (coal at bot.)	
291	308	gr sd.	

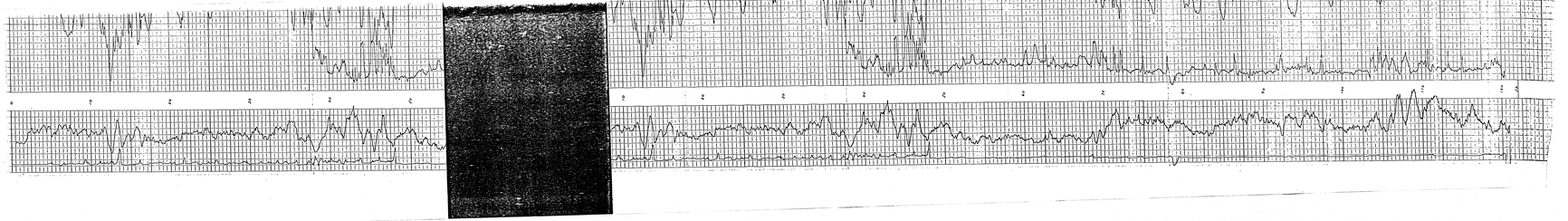
COMMENTS:

WATER BEARING: ft

Well No. 1 — Water Supply — Test Hole
Owner: Route 22222
Location: Address
Elev. 1548 G. — Elev. Meas. Point: — Elev. 5280
Permanent Datum: Ground Level — Elev. 1548 G. — Elev. Meas. Point: — Elev. 5280
Log Measured From: G.L. — Above Perm. Datum: — G.L.
Rig Bushing Measured From: — G.L.

Run No.			
Date	22 12 54		
Time Reading	12 h		
Last Reading	m		
Footage Logged	308		
Depth Reached	308		
Depth Scale			
Depth Recording			
Casing Thickness			
Fluid Type	Water		
Fluid Level	80		
Rm Observed	68		
Operating Time	1 hr		
Truck No.			
Recorded By	Eck	Witnessed By	Anderson

EQUIPMENT DATA — CASING LOG — CASING RECORD — CEMENTING DATA — REMARKS



COMPANY Kansas

WELL NO. B-21-06

ATTRS. LOCATION SW(of) SW¼(of) SEC. 18 TWP. 9S RGE. 1 W(or)E

SURVEYED DIRECTION

ELEVATION(S) 1176

DRILLER Kansonwood

ITEM	TO	FROM	REMARKS
0	14		Fill
14	24		grey shale
24	248		lime
248	249		grey shale (last stringer)
249	270		lime
270	282		grey shale (Appears oil trap)
282	314		lime
314	410		grey shale

COMMENTS

WATER ENCOUNTERED

GAMMA RAY CALIPER — RESISTANCE DENSITY

Company Name: Kansas Wesleyan Oil Co.

Well: B-21-06

Location: SW/4 of SW/4 of SW/4 of Sec. 18 T9S R1W

Field: Kansonwood

County: Ellsworth State: Kansas

	USD	SEC	TWP	RGE	W
Permanent Datum	GROUND LEVEL	Elev.	1177.9		Elev. KB
Log Measured from	K.B.		6.1 ft. above Perm. Datum		Elev. DF
Drld Measured from	K.B.				Elev. GL

Run No. 1

Date 11-19-48

First Reading

Last Reading

Footage Logged

Depth Reached

Depth Driller

Casing Thickness

Casing Driller

Fluid Type WATER

Liquid Level SCA

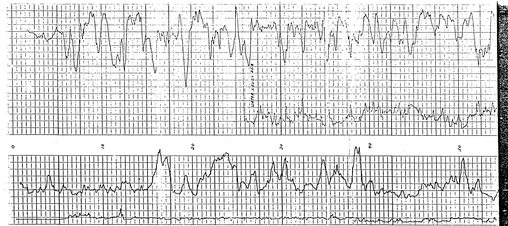
Max. Temperature NR

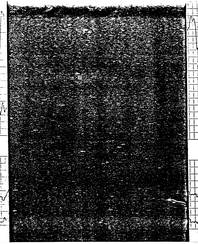
Equipment No. 126

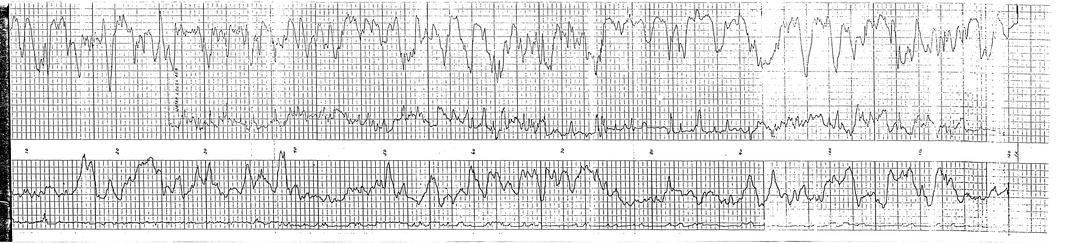
Truck No. 1

Recorded By SCA Witnessed By Kansonwood

DEPARTMENT OF MINERAL RESOURCES — STATE OF KANSAS







ID KRS0001

COMPANY : LEXCO

HOLE NO. : PC-93-07

APPROX. LOCATION: 618.8m S 915.9m W SEC. 18 TWP. 54 RGE. 1 W6M
UTM 5946754 424930E

SURVEYED LOCATION:

ELEVATION(ft) : 1545.9

DRILLER : R. RICHARDSON

FROM	TO	LOG	REMARKS
0	14	till	
14	151	gravel	
151	152	coal	25 gal/min water
152	360	gravel	

COMMENTS:

WATER HORIZON: FT.

2109 1 STREET N.W.
CALGARY ALBERTA
(403) 276-6455

CALIPER DENSITY RESISTANCE

LOCATION: LSD SEC TWP RGE W M

WELL: 618.8m S - 915.9m W - 18-54-1-6W
LOCATION: 5946775 N 424930 E

FIELD: WILDCAT

PROVINCE: SASKATCHEWAN

Other Services

Permanent Datum: GROUND LEVEL Elev. 1545.9
Log Measured from: G.L. Above Perm. Datum
All Depth Measurements are from

Elev. KB
DFG
GL

Run No.	1		
Date	22 FEB 93		
First Reading	109		
Last Reading	0		
Footage Logged	109		
Depth Reached	109		
Depth Driller	109.7		
Casing Electrolog			
Casing Driller			
Mud Type	WATER		
Liquid Level	19		
Min. Diameter	11.5		
Operating Time	1 HR		
Truck No	1		
Recorded By	SIM	Witnessed By	RICHARDSON

EQUIPMENT DATA — LOGGING DATA

DENSITY — CALIPER — GAMMA RAY — RESISTANCE

Run No. 1
Tool Model No. L100 L100 L100
Diameter 32 mm 32 mm 32 mm
Type SCINT FOCUSED
Spacing 75 cm 5 cm
Length
Hole, Scale
Source HOYP
Detector #80
Detector No. AM241
Shielding 32 GM9
Strength

GENERAL: RUN NO. 1; DEPTH FROM 0, TO 109.7; SPEED FPM 30; T.C. SEC. 1; SENS METHODS 1/16

GAMMA RAY: API UNITS; T.C. SEC. 0; SENS SETTINGS DIV/L OR R. 10; CPS/D DIV/L OR R. 1000; PER LOG DIV. 100

DENSITY: CPS/D 1000; DIV/L OR R. 10; SENS SETTINGS 10; T.C. SEC. 0; GAMMA RAY API UNITS 0; PER LOG DIV. 100

Remarks: (Comm)

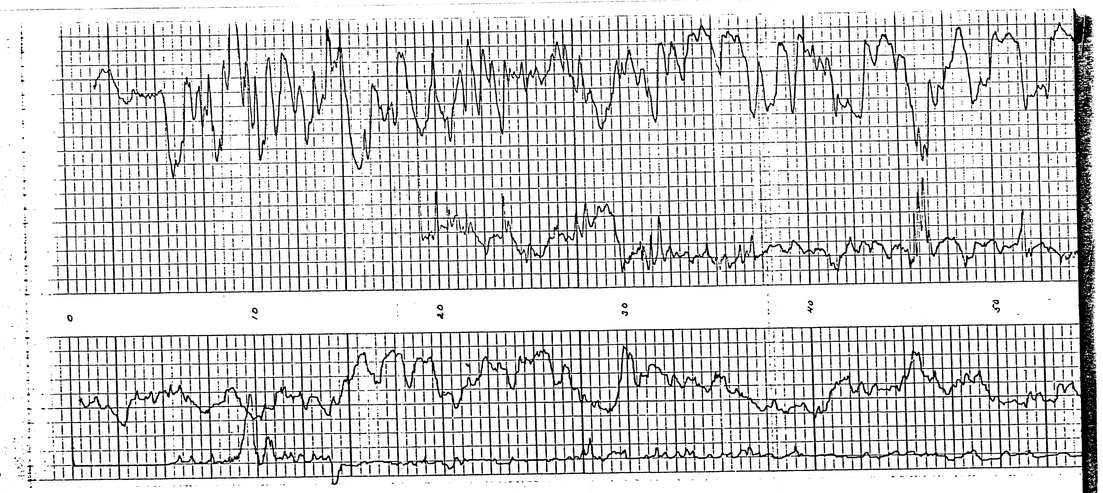
Unit Truck No.
Logged by

DENSITY (GRAM/CC) 1.5 2.0 2.5 3.0

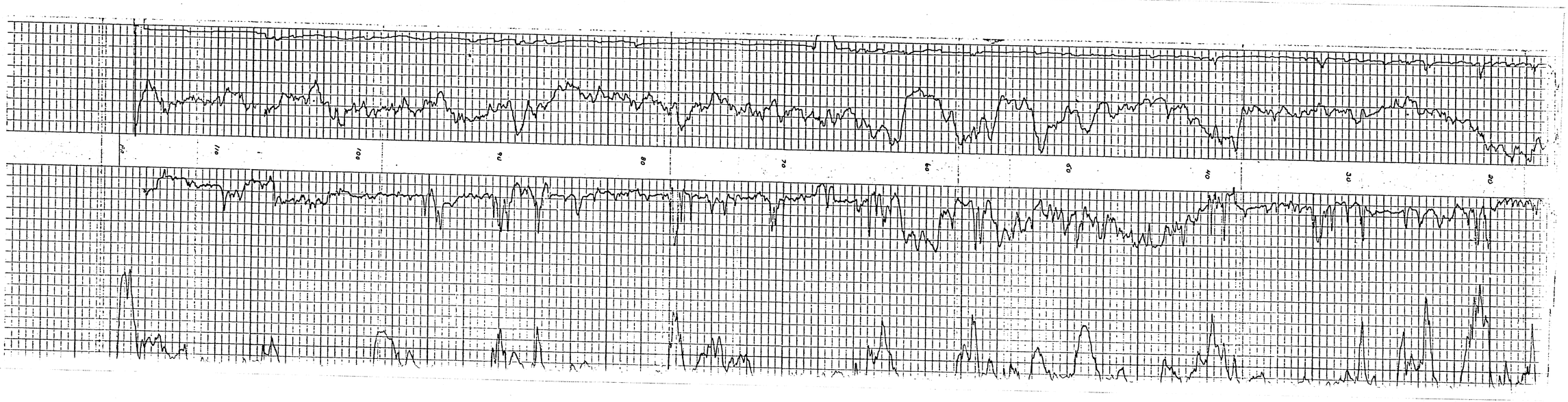
DEPTHS

GAMMA RAY API — CALIPER

0 10 20 30 40 50



IO 19950001



ID 19950001

DRILLHOLE REPORT

COAL FIELD: PINTO CREEK DATE: FEB 20/93

COMPANY : LEDCO

HOLE NO. : PC-93-05

APPROX. LOCATION: 594.1m S 569.3m W SEC. 18 TWP. 54 RGE. 1 W6M
UTM 5946775N 425475E

SURVEYED LOCATION:

ELEVATION(ft) : 1552.0

DRILLER : R. BEDNARSKI

FROM	TO	-- LOG	REMARKS
0	12	till	
12	66	gravelly till (coal stringers)	
66	69	coal	
69	127	gravelly till (coal stringers)	
127	129	coal	
129	157	gravel	(water 150 gal/min at 75ft)
157	158	coal	
158	297	gravelly sand	
297	298	coal	
298	384	gravel	
384	387	coal	
387	400	gravelly till	

COMMENTS:

SCHLUMBERGER

2105 - 1 STREET N.W.
CALGARY, ALBERTA
(403) 276-8459

GAMMA RAY CALIPER — RESISTANCE DENSITY

File No.

LSD
SEC
TWP
RGE
W. ____ M

COMPANY GRAD MOUNTAIN COAL LTD
WELL PC-93-05
LOCATION 594.1mS - 569.3mW - 18 - 54 - 1 W6M
5946775N 425475E
FIELD PINTO CREEK
PROVINCE ALBERTA

LSD SEC TWP RGE W

Other Services

Permanent Datum GROUND LEVEL Elev. 1552 Elev. KB
Log Measured From G.L. Above Perm. Datum CSG
Well Depth Measured From GL

Run No	1			
Date	21 FEB 93			
First Reading	117			
Last Reading	0			
Footage Logged	117			
Depth Reached	117.4			
Depth Driller	122			
Casing Electrocap				
Casing Error				
Fluid Type	WATER			
Liquid Level	5.7			
Min. Diameter	115			
Operating Time	1 1/4 HRS			
Truck No				
Recorded By	S/-	Witnessed By	ORIGINAL	

EQUIPMENT DATA

GAMMA RAY: Run No. 1; Tool Model No. L103; Diameter 32 mm; Type SCINT; Spacing 75 cm; Length 30"; Hard. Scale; Source; Serial No.; Indicator; Strength

DENSITY: Run No. 1; Tool Model No. L103; Diameter 32 mm; Type FOCUSED; Spacing 5 cm; Length 30"; Hard. Scale; Source MWP; Serial No. 1; Indicator AM241; Strength 20 GBq

CALIPER: Run No. 1; Tool Model No. L132; Diameter 32 mm; Type EM; Spacing; Length; Hard. Scale; Source; Serial No.; Indicator; Strength

LOGGING DATA

GENERAL: Run No. 1; Depths From 0, To 117; Speed 4M; Truck No.; Location

GAMMA RAY: To Sec. 3; Scale Settings 0 / 150; Depth Log Dwn. 20/FEB; Dwn. Log Rec. 0; Up Log Rec. 117; API Units

DENSITY: To Sec. 3; Scale Settings 1.4 / 1.6; Depth Log Dwn. 20/FEB; Dwn. Log Rec. 0; Up Log Rec. 117; API Units

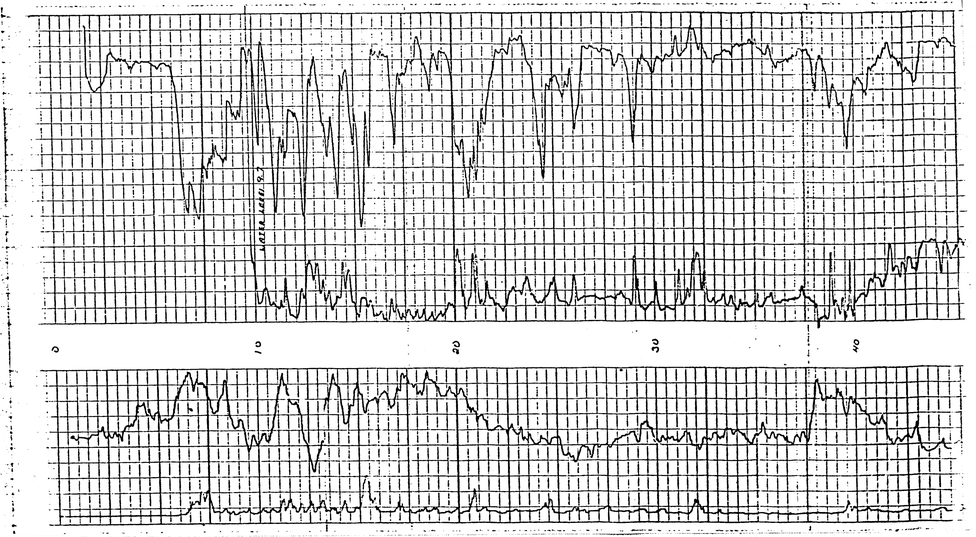
CALIPER: To Sec. 3; Scale Settings 16 / 26; Depth Log Dwn. 20/FEB; Dwn. Log Rec. 0; Up Log Rec. 117; API Units

Remarks: GENERAL

MALCOLM
BULK DENSITY (GRAMS/CC)

GAMMA RAY — CALIPER

DEPTHS



ID 19950001

ID 1995001

BULK DENSITY (GRAM/CC)
DEPTHS
GAMMA RAY API
CALIPER
Remarks
Int. Track No.
Location
Operator
Halliburton
0
10
20
30
40
50
60
70
80
90
100

COAL FIELD: PINTO CREEK DATE: FEB 19/93

COMPANY : LICO

HOLE NO. : PC-93-4A

APPROX. LOCATION: 1237.7mS 1064.4mW SEC. 25 TWP. 54 RGE. 2 W6M
UTM 5949400 N 422150 E

SURVEYED LOCATION:

ELEVATION(M) : 1433.2

DRILLER : R. BLUMFIELD

FROM	TO	LOG	REMARKS
0	15	till	
15	37	grvl	
37	41	coal	
41	81	gravel	
81	86	coal	
86	116	grvl	
116	120	gravel	

COMMENTS:

GAMMA RAY CALIPER — RESISTANCE DENSITY

COMPANY: ROCKY MOUNTAIN COAL LTD

WELL: PC-93-4A

LOCATION: 1237.7mS -1064.4mW -25-54-2 W6

5949400 N 422150 E

FIELD: PINE CREEK

PROVINCE: ALBERTA

LSD: SEC: TWP: RGE: W

Other Services

Permanent Datum: GROUND LEVEL Elev: 1433.2 Elev. KB

Log Measured From: K.B. Above Perm. Datum DFD

Well Depth Measured From: GL

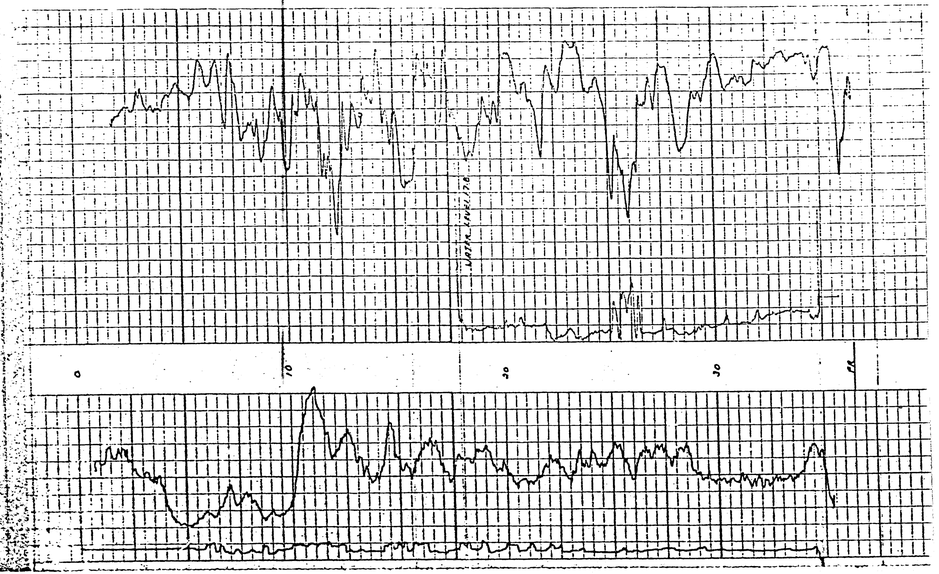
Run No.	1		
Date	19 FEB 93		
First Reading	96.2		
Last Reading	0		
Footage Logged	96.2		
Depth Reached	96.6		
Depth Driller	96.6		
Casing Electrolog			
Casing Driller			
Fluid Type	WATER		
Liquid Level	23.8		
Mat. Dissolved			
Operating Time			
Truck No.	57-2		

Recorded By: Witnessed By: BOUCHARD

EQUIPMENT DATA — DENSITY — CALIPER — GAMMA RAY — RESISTANCE

LOGGING DATA — DENSITY — GAMMA RAY — RESISTANCE

Hi-Res BULK DENSITY (DENSITY)



JD 19950001

COAL FIELD: [illegible]

COMPANY : LODGE

HOLE NO. : PC-93-04

APPROX. LOCATION: 1485.2m S 1485.2 W SEC. 25 TWP. 54 RGE. 2 W6M
UTM 5949175 N 422725 E

SURVEYED LOCATION:

ELEVATION(m) : 1447.4

DRILLER : R. BRAMFORD

FROM	TO	LOG	REMARKS
0	14	till	
14	57	gravel	
57	66	coal (slightly interbed)	
66	97	gravel	
97	107	coal (clay)	water at 32 ft.
107	120	gravelly ss	approx. 100 gpm

COMMENTS:

WATER HORIZON: FT.

2109 - 1 STREET N.W.
CALGARY, ALBERTA
(403) 276-6459

GAMMA RAY CALIPER — RESISTANCE DENSITY

File No.

LSD.
SEC.
TWP
RGE
W ___ M

COMPANY GRAND MOUNTAIN COAL LTD.
WELL PC-93-04
1485.2mS - 1485.2W - 25-54-2 W6M
LOCATION 5949175N 422725E
FIELD PINTO CREEK
PROVINCE ALBERTA
LSD. SEC. TWP. RGE. W.

Other Services

Permanent Datum GROUND LEVEL Elev. 1447.4 Elev KB
Log Measured From G.L. Above Perm. Datum CSG
Well Depth Measured From G.L.

Run No	1		
Date	19 FEB 93		
First Reading	365		
Last Reading	0		
Footage Logged	365		
Depth Reached	365		
Depth Driller	364		
Casing Electrolog			
Casing Driller			
Fluid Type	WATER		
Liquid Level	78		
Min. Diameter	115		
Operating Time	1HR		
Truck No.	1		
Recorded By	SIM	Witnessed By	RONAGHAN

EQUIPMENT DATA

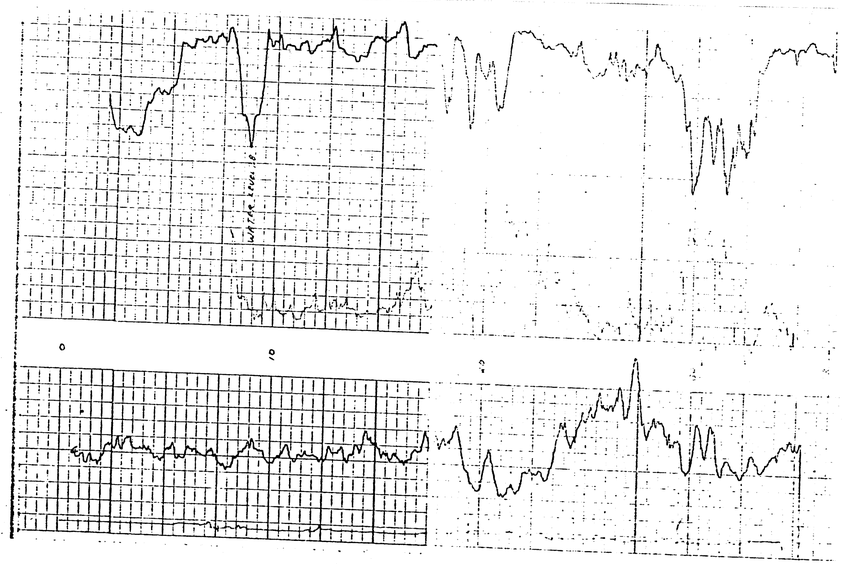
	CALIPER	DENSITY	GAMMA RAY	RESISTANCE
Run No.	1	1	1	1
Tool Model No	L103	L103	L103	L103
Diameter	127 mm	127 mm	127 mm	127 mm
Type		FOCUSED	MONT	EM
Spacing				
Length		5 cm	75 cm	5 cm
Horiz. Scale				
Source		HOVP		
Serial No.		590		
Isotope		445241		
Strength		92 GBq		

LOGGING DATA

RUN NO	SEQUENTIAL DEPTHS FROM	TO	SPEED U/M	T.C. SECS	GAMMA RAY SENS SETTINGS	GAMMA RAY ZERO DIVL ON R	RESISTANCE API UNITS	RESISTANCE PHASE LOG DIV.	DENSITY T.C. SECS	DENSITY SENS SETTINGS	DENSITY ZERO DIVL ON R	DENSITY CPS/D
1	0	365	4	1	100	0	20 Ohm		2	16	14	12.5

Remarks: General

DEPTHS



10005bb1 CI

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	20	Till Clay & Lots Of Rocks	
20	98	Sandstone	
98	110	Coal	
110	150	Sandstone	
150	161	Coal	
161	220	Sandstone	

ID 19950001

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 92-NP-27 — SURVEYED DATA

LOCATION _____ SEC TP RGE W — ELEV. _____

AREA North Plateau — LOC. _____

PROVINCE C.M.P. Alta.

RUN No.	1	2	3
DATE	03/MAY/93		
DEPTH-DRILLER	720		
DEPTH-LOGGER	720		
FLUID LEVEL	215		
LOGGING TIME			
DRILLED BY	C. Pierce		
RECORDED BY	M. Moore		
WITNESSED BY	D.H.		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
6 5/8	0	30

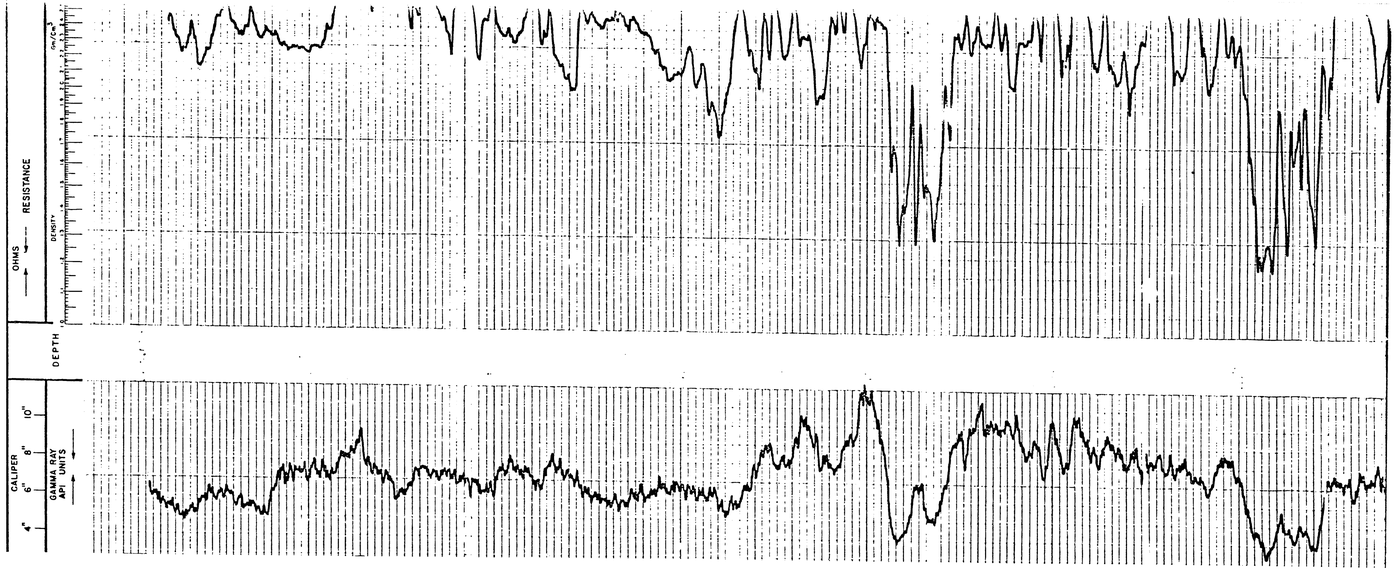
EQUIPMENT DATA

GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3'	LENGTH	1"		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

LOGGING DATA

GENERAL RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min	GAMMA RAY T C SEC.	GAMMA RAY SENS SETTING	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV.	DENSITY T C SEC	DENSITY SENS SETTINGS	DENSITY ZERO
			12							

REMARKS.



HOLE NO. 93 NP- #25

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Oliver

FROM	TO	LOG	REMARKS
0	9	Till	
9	109	Sandstone	
109	110	Trace Of Coal ?	
110	176	Sandstone	
176	186	Mudstone	
186	203	Sandstone	
203	208	Coal	
208	263	Sandstone	
263	266	Coal	
266	270	Sandstone	

ID 1985001

TESTING LTD. GAMMA-DENSITY-RESISTIVITY

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-25 — SURVEYED DATA

LOCATION SEC. TP. RGE. W. — ELEV. 1108' G.L.

AREA Killam Thorhild — LOC. 50°58'S. N.

PROVINCE Alta. — 112°43'E.

	2	3
RUN No.		
DATE	26-JULY-93	
DEPTH-DRILLER	270'	
DEPTH-LOGGER	270'	
FLUID LEVEL	FULL	
LOGGING TIME	4 HR	
DRILLED BY	Don Oliver	
SURVEYED BY	Don Oliver	
WITNESSED BY	Don Oliver	

BIT	BORE-HOLE RECORD FROM	TO	SIZE	CASING RECORD FROM	TO
			6 1/4"	0'	SURF

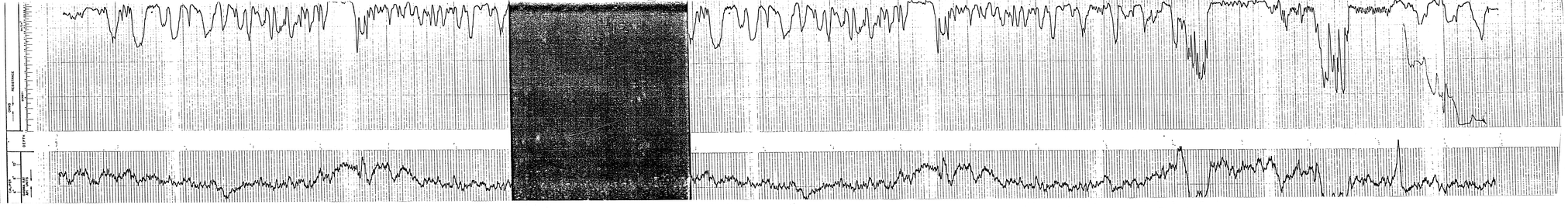
EQUIPMENT DATA

GAMMA RAY			MUD MAKE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	GEL	9.0 LB/G	
SAMPLES	2-1/4"	SAMPLES	3 1/4"	1.206	
DETECTOR MODEL No.	DP-316	TYPE	WC	9	
TYPE	SCINT.	LENGTH		28"	
LENGTH	9'	DIAMETER	4"		
GENERAL		HOR SCALE	2"		
TRUCK No.		SOURCE MODEL		HOVEY	
LOCATION		SOURCE		CS-137	
		RECEIVER		15 m.c.	

LOGGING DATA

RUN No.	SECTION FROM	TO	SPEED F/Min.	T/C SEC.	GAIN RATIO SCALE	ZERO	API UNITS PER	SPK SPK	T/C SEC.	DENSITY SCALE SETTING	ZERO
1	0	270	30	1	1				1		

REMARKS:



SURVEYED LOCATION _____

ELEVATION _____

DRILLER Dan Oliver

FROM	TO	LOG	REMARKS
0	4	T.11	
4	90	Sandstone	
90	91	Coal ?	
91	180	Sandstone	
180	188	Coal	
188	228	Sandstone	
228	240	Coal	
240	320	Sandstone	

ROLE 154-N-21

LOCATION _____ SEC _____ TP _____ RGE _____ W

AREA Nicholas Lake

PROVINCE Alta.

SURVEYED DATA

ELEV. 1479 ft

LOC. 2467 ft N

1479 ft G.L.

RUN No.			
DATE			
DEPTH - DRILLER			
DEPTH - LOGGER			
BTM. LOG INT.			
CASING - DRLR.			
CASING - LOGR.			
BTM. DRLR. RUN			
WITNESSED BY			

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO

EQUIPMENT DATA

	SONIC RAY		
TOOL MODEL No.	1.1 SV		
DIRECTION	1.1 SR		
DETECTOR MODEL No.	1.1 SD		
T-R'S	8 FT		
LENGTH	11 FT		
TRUCK No.	GENERAL		
LOCATION			

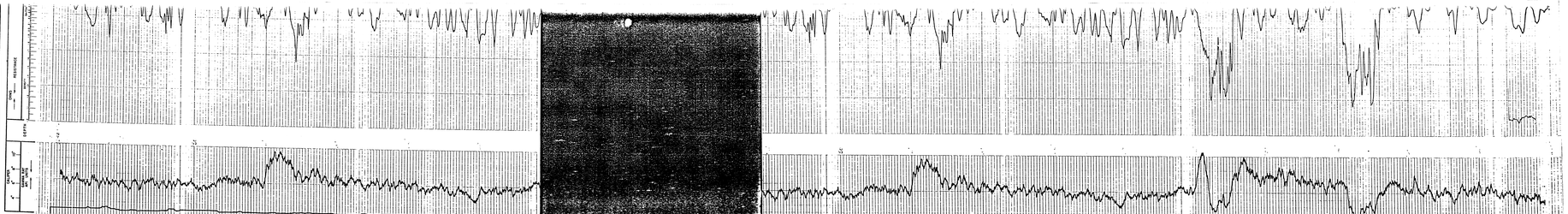
TOOL MODEL No.	
SONDE No.	
TYPE	
LENGTH	
SIDE WALL	
SOURCE MODEL	
SOURCE	
STRENGTH	

RESISTANCE	DENSITY	CALIPER
1.1 ES	1.1 SF	
N	N	
16"	8"	
		20 FT
		5.5 FT

LOGGING DATA

RUN No.	GENERAL DEPTH FROM	TO	SPEED ft/min	T.C. TIME	SONIC RUN No.	SONIC RECD.	ARC DEPTH PER cm	T.C. TIME SEC. SETTING	GAMMA RAY SENS.

REMARKS: _____



ID RA5C001

HOLE NO. 93-NP-H 24

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	12	T, 11	
12	26	Mudstone	
26	163	Sandstone	
163	165	Coal	(Blind at 140)
165	194	Sandstone	
194	199	Coal & Mudstone	
199	218	Sandstone	
218	227	Coal	
227	267	Sandstone	
267	279	Coal	
279	340	Sandstone	

[illegible] ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE [illegible] N-24

LOCATION _____ SEC. TP. RGE W

AREA [illegible] PLATEAU

PROVINCE B.C.

SURVEYED DATA

ELEV. 1402.1

LOC. 5481.0 N

6407.6 E

	1	2	3
RUN No.			
DATE	21-APRIL-93		
DEPTH-DRILLER	340		
DEPTH-LOGGER	340		
FLUID LEVEL	197		
LOGGING TIME			
DRILLED BY	C. Noop		
RECORDED BY	C. Noop		
WITNESSED BY	[illegible]		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
6 5/8	0	20

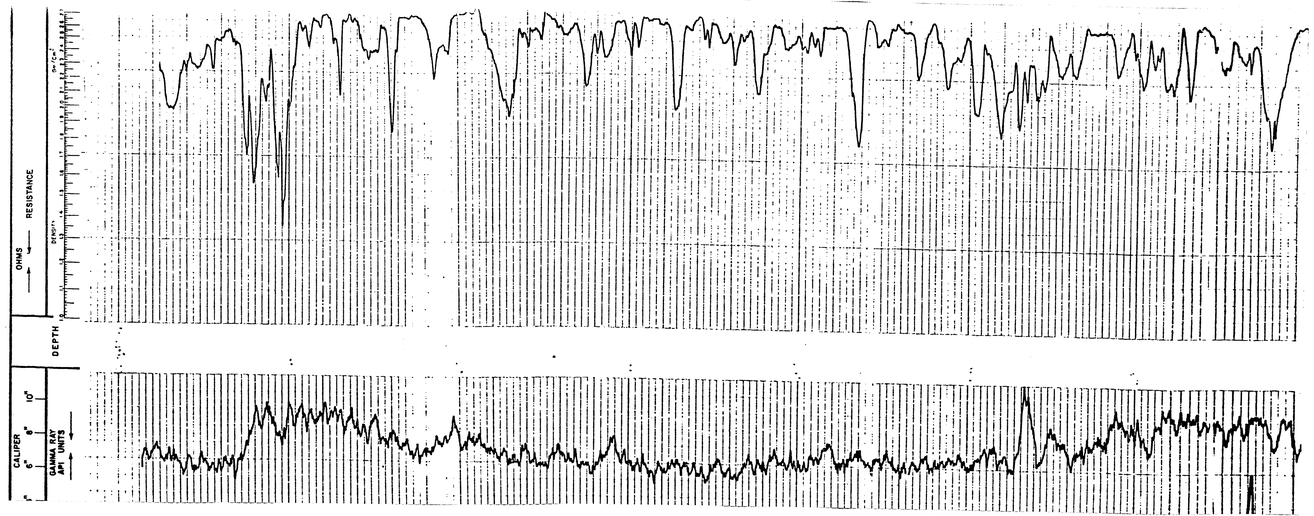
EQUIPMENT DATA

GAMMA RAY		GAMMA RAY		RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.		L-103	L-103	
DIAMETER	2 1/8"	DIAMETER		2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE		ME	F	
TYPE	SCINT	SPACING			13"	
LENGTH	3"	LENGTH		1"		
GENERAL		HOR. SCALE				
TRUCK No.		SOURCE MODEL			HOVP	
LOCATION		ISOTOPE			CS-137	
		STRENGTH			125 mC	

LOGGING DATA

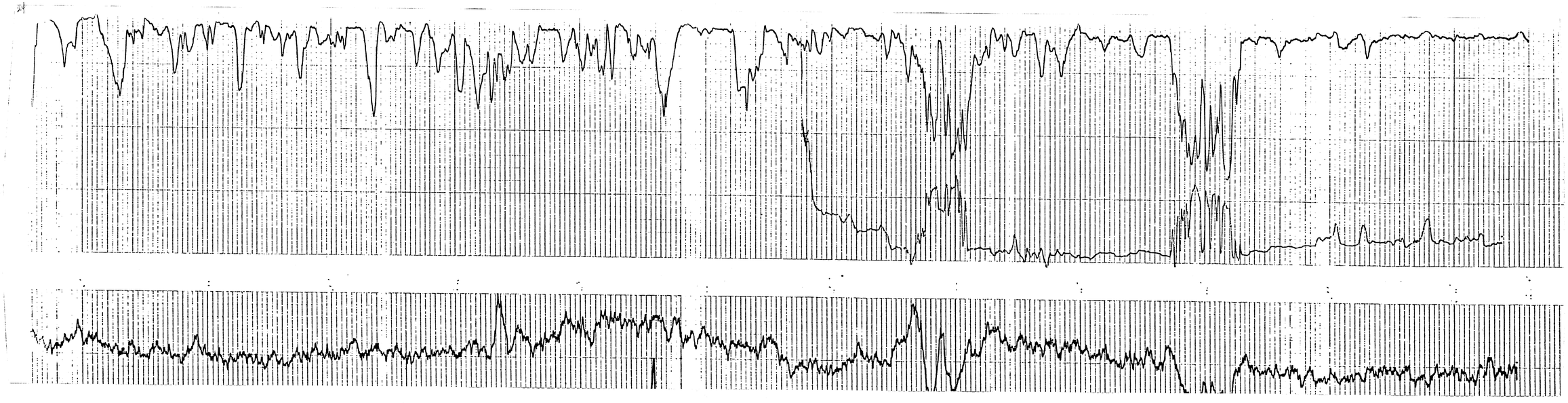
RUN No.	GENERAL DEPTHS FROM	TO	SPEED Ft/min.	GAMMA RAY TC SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	DENSITY TC SEC.	SENS SETTINGS	ZERO
			12							

REMARKS:



ID 19950001

ID Idd2000 1



APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Dan Olsen

FROM	TO	LOG	REMARKS
0	6	Till	
6	116	Sandstone	
116	117	Coal	
117	207	Sandstone (Blindbay)	
207	217	Coal	
217	257	Sandstone	
257	267	Coal	
267	320	Sandstone	

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE ___ SEC. ___ TP. ___ RGE. ___ W.

SURVEYED DATA

LOCATION _____

ELEV. _____

AREA _____

LOG _____

PROVINCE _____

	1	2	3
RUN No.			
DATE			
DEPTH—DRILLER			
DEPTH—LOGGER			
FLOW LEVEL			
CASING TYPE			
DRILLED BY			
WITNESSED BY			

BIT	FROM	TO	CASING RECORD SIZE	FROM	TO

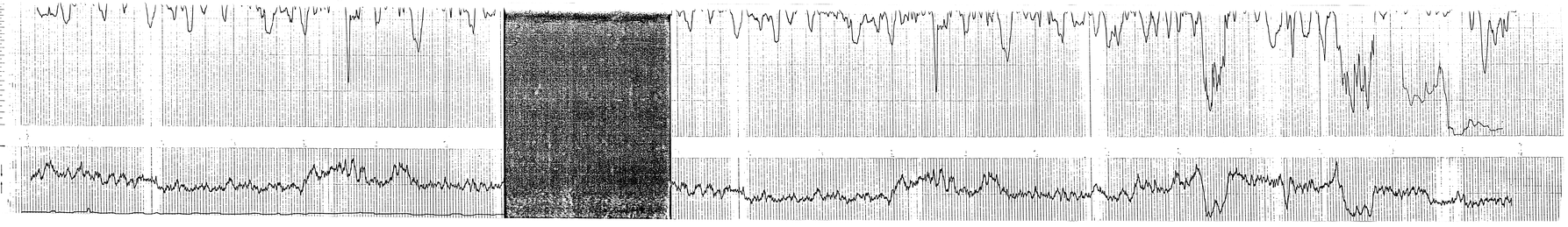
EQUIPMENT USED

CASING #1			RESISTANCE	SONDEX	CALIPER
TOOL MODEL No.		TOOL MODEL No.	1-1/2"	1-1/2"	
SONDE No.		SONDE TYPE	2-1/2"	2-1/2"	
DETECTOR MODEL No.		TYPE	3/8"	3/8"	
CABLE		SPACING		12"	
LENGTH		NEUTRON SOURCE			
	NEUTRON	HOW SOURCE			
TRUCK No.		SQUARE MODEL		HOWE	
LOCATION		SQUARE No.		CS-17	
		SOURCE		20 m	

LOGGING DATA

RUN No.	SONDE TYPE	TOP LOGGED	BOTTOM LOGGED	TC SEC. SETTING	SONDE SERIAL No.	MAX. UNITS MEAS.	MIN. UNITS MEAS.	TC SEC. SETTING	SONDE SERIAL No.

REMARKS



ID RRS0001

SURVEYED LOCATION

ELEVATION

DRILLER Ben Otaw

FROM	TO	LOG	REMARKS
0	12	Till	
12	170	Sandstone	
170	199	Coal	
199	241	Sandstone	
241	252	Coal	
252	270	Sandstone	

HOLE No. NP-2-7

LOCATION SEC TP RGE W

AREA CENTRAL FLORIDA

PROVINCE

SURVEYED DATA

ELEV. [illegible]

LOC [illegible]

	1	2	3
RUN No.			
DATE	10-1-79		
DEPTH-DRILLER	270'		
DEPTH-LOGGER	270'		
PLUG BACK			
CASING TYPE			
DRILLED BY	Ben Otaw		
WITNESSED BY	Tim Dye		

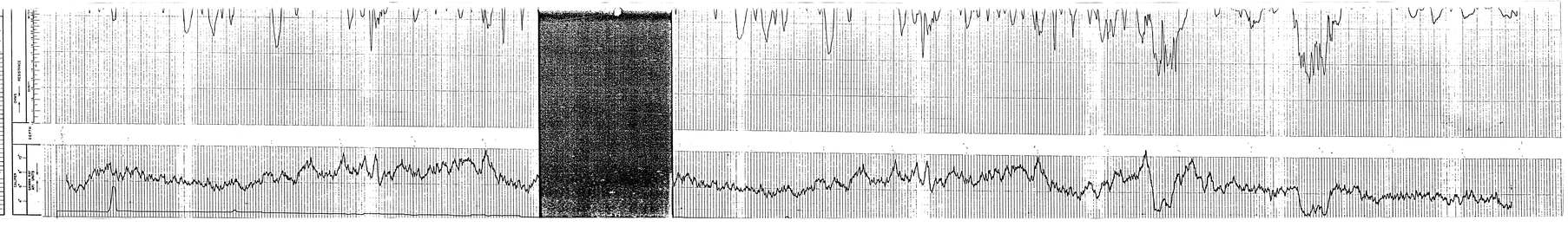
BORE-HOLE RECORD			CASING RECORD		
BIT	FROM	TO	SIZE	FROM	TO
			6"	0'	270'

EQUIPMENT USED

GAMMA RAY			RESISTIVITY	DENSITY	CALIPER
TOOL MODEL No.	1.9DT	TOOL MODEL No.	1-26	3-103	
SERIAL No.	2-1-79	SERIAL No.	1-26	4-DF	
DETECTOR MODEL No.	2-2-18	TYPE		4-DF	
TYPE	SHORT	SPACING		11"	
LENGTH	8"	LENGTH		"	
GENERAL		NEUTRON SOURCE			
TRUCK No.		SOURCE MODEL		200P	
LOCATION		SOURCE		241-Be	
		STRENGTH		100 mC	

GENERAL			GAMMA RAY			DENSITY	
Run No.	DEPTH FROM	DEPTH TO	SPEED F/Min	T/C SEC. SETTING	SENS. ZERO	API. UNITS PER DIV.	T/C SEC. SETTING	SENS. ZERO
1	0	270	30	1	30	10	1	30

REMARKS



ID RRSC001

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Ofner

FROM	TO	LOG	REMARKS
0	12	Till	
12	185	Sandstone	185-186- Cavety
185	192	Mudstone with coal partings?	
192	198	Sandstone?	
198	203	Coal ?	Blind ?
203	246	Sandstone?	
246	256	Coal ?	
256	326	Sandstone	
326	348	Coal ?	
348	400	Sandstone	

TESTING LTD. GAMMA-DENSITY-RESISTIVITY

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-21 — SURVEYED DATA

LOCATION _____ SEC TP RGE W — ELEV. 1511'

AREA North Battleford — LOC. 5610 N

PROVINCE Alberta — 5015 E

RUN No.	1	2	3
DATE	24/Feb/93		
DEPTH-DRILLER	400		
DEPTH-LOGGER	400		
FLUID LEVEL			
LOGGING TIME			
DRILLED BY	D. Ofner		
RECORDED BY	D. Ofner		
WITNESSED BY			

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
7 5/8	0	30

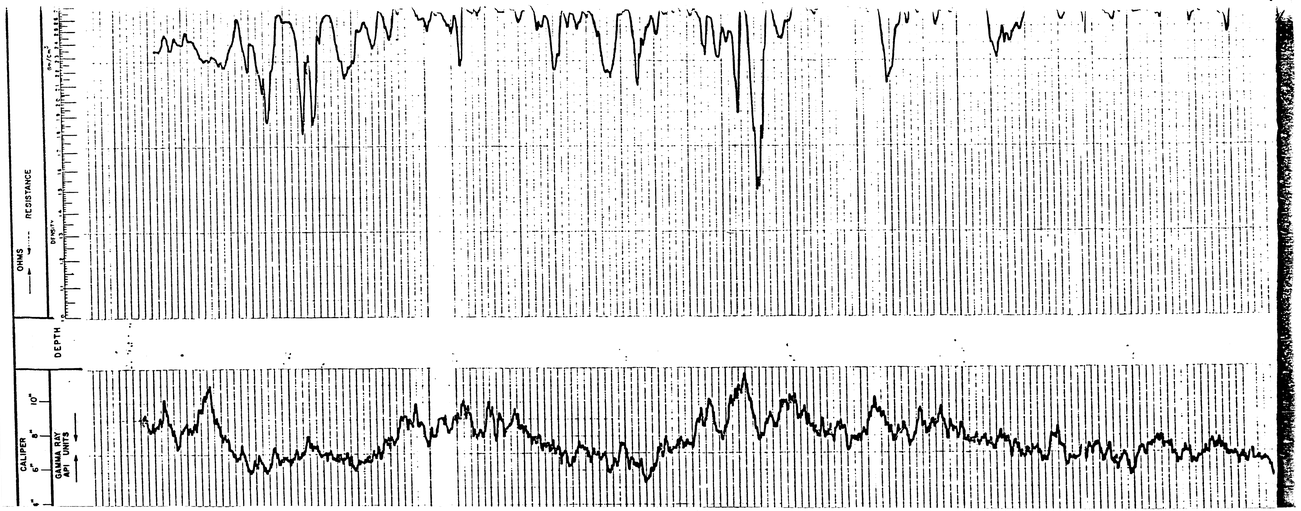
EQUIPMENT DATA

GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH	1"		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

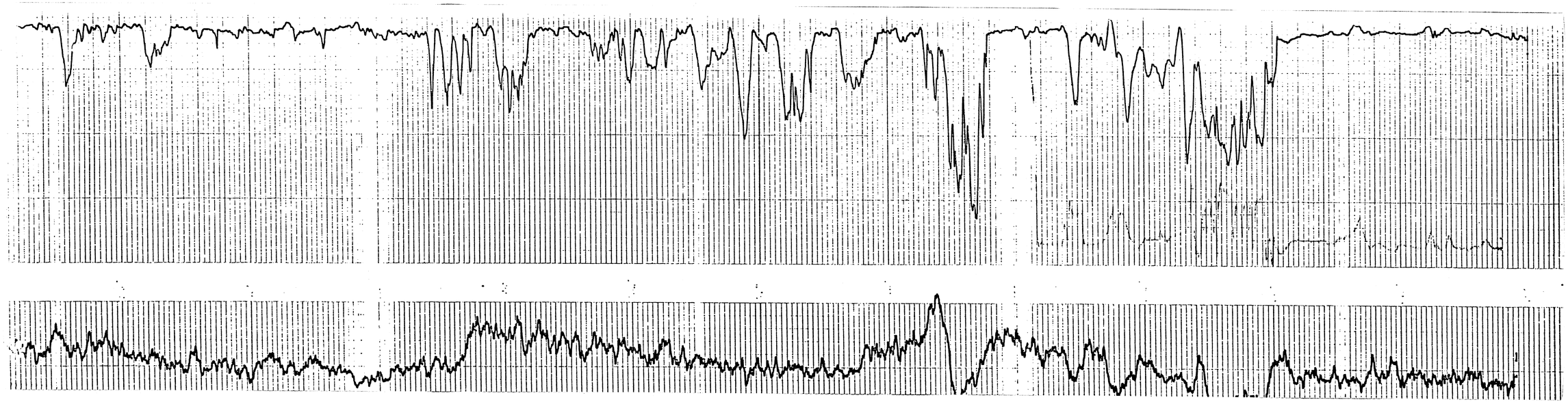
LOGGING DATA

RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/mn.	GENERAL T C SEC.	GAMMA RAY SENS SETTING	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV.	DENSITY T C SEC	DENSITY SENS SETTINGS	DENSITY ZERO
			12							

REMARKS:



ID 1995001



ID 19950001

LEXCO TESTING LTD.

DRILLHOLE REPORT

DATE: April 1 1993

WELL FIELD:

COMPANY:

HOLE NO: 93-NP-A19

APPROX. LOCATION: SEC TWP RGE W

SURVEYED LOCATION: 60°40' N - 114°43' E

ELEVATION: 1145 ft

DRILLER: Drillex

FROM	TO	LOG	REMARKS
0	83	Till	
83	232	Sandstone	
232	242	Coal	
242	277	Sandstone	
277	287	Coal	
287	360	Sandstone	

LEXCO TESTING LTD. GAMMA - DENSITY - RESISTIVITY

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-A19 SURVEYED DATE

LOCATION SEC TP RGE W ELEV. 1139.0

AREA North Zama LOC 60°40'N 114°43'E

PROVINCE ID PH C TD 6.55 C

RUN	Aug 1/93	
WITN UNITS	ATP	
LOGGED ON		
LOGGED BY		
RECORDED BY	K. Hodgins	
WITNESSED BY	A. Taylor	

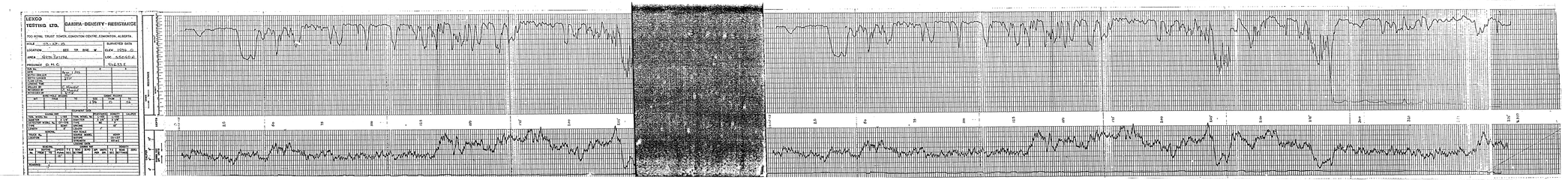
BIT SIZE	CASING SIZE	WGT	DEPTH DRLR	DEPTH LOGR
			6.55	6.55

EQUIPMENT DATA

SOURCE NO.	1.75	MUD TYPE	4.29
SOURCE STRENGTH	10	MUD WT.	9.0
FILTER CAKE	N	VISC	47
LOGGED		PH	
TRUCK NO.		FLUID LOSS	
		RM @ MEAS TEMP	
		RMF @ MEAS TEMP	
		RMC @ MEAS TEMP	
		SOURCE RMF RMC	MEAS
		RM @ BHT	0.42

RUN NO.	PASS NO.	MATRIX	LOG TOP	LOG BOTTOM	HOLE SIZE	CASING SIZE	DENSITY TOOL	NEUTRON TOOL	GAMMA RAY TOOL	RESISTIVITY TOOL
1	1	SS	6.55	0.0			1.75		1.75	

REMARKS: 1


GAMMA RAY
CALIPER
DENSITY
RESISTIVITY
0.0
2.5
4.5
7.5
10.5
11.5
13.5
16.5
19.5
22.5
25.5
28.5
31.5
34.5
37.5
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COAL FIELD _____ DATE April 28 1993

COMPANY _____

HOLE NO. 93-MD-#20

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Don Oliver

FROM	TO	LOG	REMARKS
0	10	Till 363 – 420	Sandstone
10	21	Sandstone	
21	23	Mudstone	
23	83	Sandstone	
83	93	Trace Of Coal	
93	126	Sandstone	
114	126	Mudstone	
126	178	Sandstone	
178	181	Mudstone & coal	
181	230	Sandstone	
230	231	Trace of coal	
231	281	Sandstone	

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-MD-#20

LOCATION SEC. TP. RGE. W.

AREA NORTH WESTERN

PROVINCE ALBERTA

SURVEYED DATA

ELEV. 1503.2

LOG 1455 ft.

RUN No.	1		
DEPTH-DRILLER	28 Apr 93		
DEPTH-LOGGER	420		
CASG. DEPTH	363		
BIT SIZE	7 7/8"		
TYPE FLUID	FRESH		
DENSITY	8.9		
VISCOSITY	45		
PH	9.5		
FLUID LOSS	8.4		
SOURCE OF SAMPLE	CIRC.		
RM @ MEAS. TEMP.	1.0 @ 20		
RMF @ MEAS. TEMP.	1.0 @ 20		
RMC @ MEAS. TEMP.	1.0 @ 20		
SOURCE RMF & RMC	MEAS.		
RM @ BHT	0.5 @ 10		
TIME CIRC.	1 HR		
MAX. REC. TEMP.	10		
EQUIP. LOC.	EDM		
RECORDED BY	D. OLIVER		
WITNESSED BY			

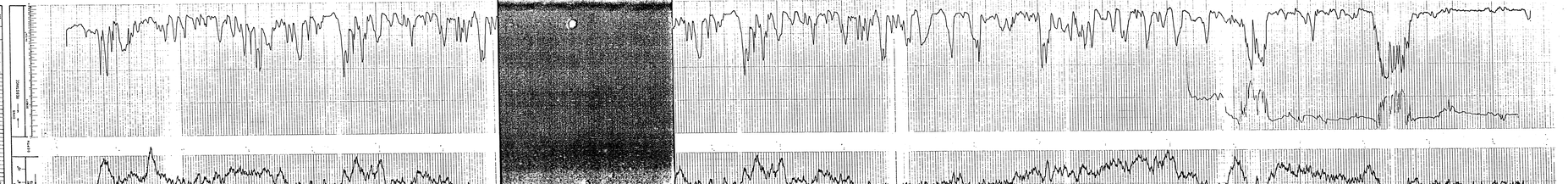
BOREHOLE RECORD			CASING RECORD		
BIT	FROM	TO	SIZE	FROM	TO
7 7/8"	0	420	5 1/2"	0	363

EQUIPMENT DATA

	RUN No. 1	RUN No.	RUN No.
TOOL MODEL No.	3-1/8		
TOOL S/N	3-1/8		
DETECTOR MODEL No.	3-1/8		
SOURCE	300		
LENGTH	8'		
TRUCK or SKID	SKID		
LOCATION	EDM		

	RUN No. 1	RUN No.	RUN No.
RESISTANCE	OHMS		
DENSITY	G/CC		
CALIPER	3-1/8"		
MAX. TEMP.	10		
RECORDED MODEL	SCOUT		
RECORDER S/N	SC-21		
CALIBRATION			

RUN No.	SCALES FROM	SCALES TO	SPEED FPM	T.C. SEC.	GAIN	MAG. DEC. PER	T.C. SEC.	RECORDED BY
1	420	363	30	1	10		1	D. OLIVER



TD PASSCO1

COAL FIELD North Plateau DATE April 5 1993

COMPANY

HOLE NO. 93-NP-P 18

APPROX. LOCATION SEC. TWP. RGE. W.

SURVEYED LOCATION 55105 N 49555 E

ELEVATION 1495.4

DRILLER Don Olsen

FROM	TO	LOG	REMARKS
0	46	Till	
46	211	Sandstone	
211	222	Coal	
222	265	Sandstone	
265	278	Coal	
278	380	Sandstone	

ID 19950001

LEXCO TESTING LTD. — GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-18 — SURVEYED DATA

LOCATION SEC TP RGE W — ELEV. 1495.4

AREA North Plateau — LOC. 55105 N

PROVINCE O.M.C. — 49555 E

RUN No.	1	2	3
DATE	April 5/93		
DEPTH-DRILLER	380		
DEPTH-LOGGER	372		
FLUID LEVEL	271		
LOGGING TIME			
DRILLED BY	C. Nash		
RECORDED BY	C. Nash		
WITNESSED BY	[illegible]		

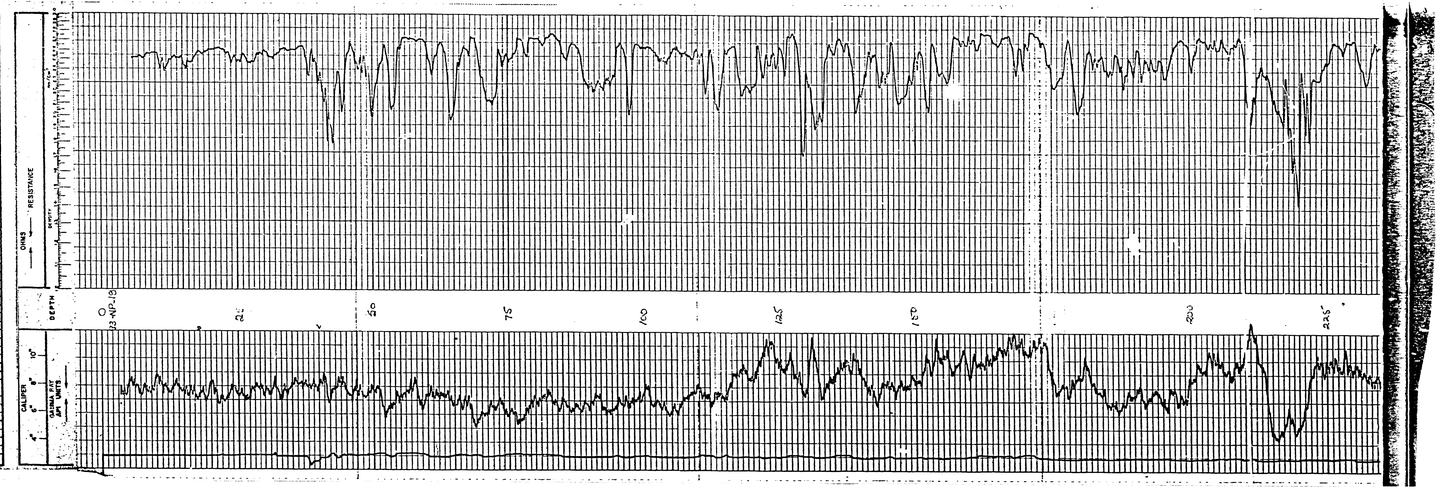
BIT	BORE-HOLE RECORD FROM	TO	CASING RECORD SIZE	FROM	TO
			6.75	0	40

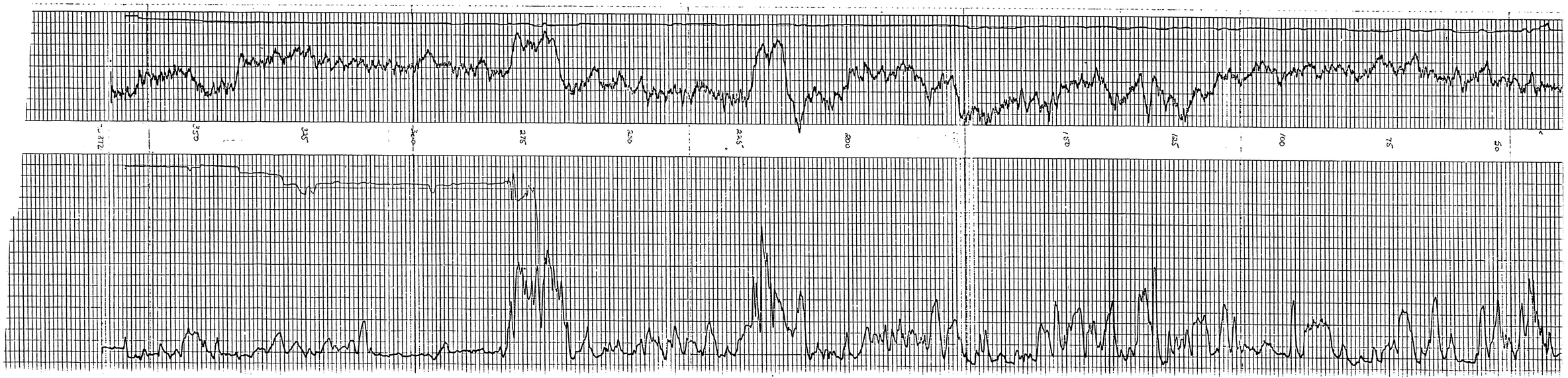
EQUIPMENT DATA

GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8	DIAMETER	2 1/8"	2 1/8	
DETECTOR MODEL No.	C-316	TYPE	ME	7	
TYPE	SCINT	SPACING		15"	
LENGTH	5"	LENGTH	1"		
GENERAL		NOR. SCALE			
TRUCK No.		SOURCE MODEL		MOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 m c	
		LOGGING DATA			

RUN No.	GENERAL DEPTH FROM	TO	SPEED M/min	GAMMA RAY T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	DENSITY T C SEC.	SENS SETTINGS	ZERO
			12							

REMARKS:





ID 19950001

COMPANY [redacted] WELL [redacted] 14

WELL NO. 93-NP-#16

FIELD, LOCATION [redacted] SEC. [redacted] TWP. [redacted] RGE. [redacted] W.

SURVEYED LOCATION 54400 N - 107287 E

ELEVATION 1528.0

DRILLER Dan Oliver

FROM	TO	LOG	REMARKS
0	13	Till	
13	15	Soft Sandst.	
15	70	Sandstone Grey	
70	124	Mudst.	
124	147	Sandstone	
147	148	Coal	
148	198	Sandstone	
198	210	Coal	
210	221	Sandstone	

TESTING LTD. GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

WELL 93-NP-16 SURVEYED DATE

LOCATION SEC. TP. RGE. W ELEV. 1528 G.

AREA North Pembina UNC. 54400 N.

PROVINCE ALBERTA E.

CASING RECORD

SIZE	WT.	GRADE	TOP	SHOE
8 5/8	24	H-40	0	221

EQUIPMENT DATA

TOOL NO.	TYPE	SERIAL NO.	CALIBRATION	SOURCE	VALUE
GAMMA	3"	1			
DENSITY	3"	1			
RESISTIVITY	3"	1			
TOOL NO.					
CABLE					

| RUN | DATE | TIME | TIME | TIME | BOTTOM | TOP | TOP | BOTTOM | TOP | TOP | BOTTOM | TOP | TOP

COAL FIELD _____ DATE APRIL 29, 1993

OWNER _____

HOLE NO. 93 NP - 17

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

ELEVATED LOCATION _____

ELEVATION _____ m

DRILLED BY Box Drake

FROM	TO	LOG	REMARKS
0	6	Till	
6	10	Mudstone & Traces Of Coal	
10	39	Sandstone	
39	50	Trace Of Coal	
50	51	Sandstone	
51	55	Mudstone & Coal Stringers	
55	106	Sandstone	
106	163	Sandstone	
163	263	Sandstone	
263	269	Mudstone & Coal Stringers	
269	288	Sandstone	
288	305	Coal	
305	337	Sandstone	
337	905	Coal	
905	926	Sandstone	

LEXCO TESTING LTD. — GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE 93-NP-17 — SURVEYED DATA

LOCATION SEC. TP. RGE. W. — ELEV. 1530.3

AREA NORTH PLATEAU — LOG 955500.8

PROVINCE B.C. — FILENUM 42936.E

RUN No. 1

DATE RECD. 29-APR-93

DEPTH DRILLER 926.

DEPTH LOGGER 926.

CASING TOP 0.

CASING BOTTOM 0.

TUBING TOP 0.

TUBING BOTTOM 0.

MEASURED FROM KELLY BUSHING

	RUN 1	RUN 2	RUN 3
TOOL MODEL No.	1.25		
DENSITY MODEL No.	1.25		
RESISTIVITY MODEL No.	1.25		
LOGGED INTERVAL	926.		
CASING	0.		
SOURCE			
SOURCE MODEL			
SOURCE STRENGTH	10 MC		
DETECTOR	SD-44		
DENSITY WINDOW			
RESISTIVITY SPACING	16"		
MAX. RECORDED TEMP.	30 DEG C		
EST. FORMATION TEMP.			
TIME SINCE CIRC.			
TIME ON BOTTOM	09:45		
UNIT NUMBER	1		
RECORDED BY	BOB		
WITNESSED BY			

REMARKS

DEPTH — METRES

RESISTANCE — OHMS

DENSITY — G/CC

GAMMA RAY — API UNITS

JD PR5000

DRILL HOLE REPORT

COAL FIELD _____ DATE April 5, 1993

COMPANY _____

HOLE NO. 93 - NP - 15

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 54850 N - 49630 E

ELEVATION 1517.6

DRILLER Don Offer

FROM	TO	LOG	REMARKS
0	3	Carbonated Shale	
3	101	Sandstone	
101	104	Mudstone & Trace of Coal	
104	264	Sandstone	
264	211	Coal ?	
211	259	Sandstone	
259	273	Coal	? - (Blind)
273	339	Sandstone	
339	351	Coal	
351	420	Sandstone	

ID 19950001

LEXCO TESTING LTD.

GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-15

LOCATION SEC TP RGE W

AREA NORTH PLATEAU

PROVINCE O.M.C

SURVEYED DATA

ELEV. 1517.6

LOC. 54850 N

49630 E

RUN No.	1	2	3
DATE	April 5/93		
DEPTH-DRILLER	420'		
DEPTH-LOGGER	420'		
FLUID LEVEL	270'		
LOGGING TIME			
DRILLED BY	D. Mabe		
RECORDED BY	C. Lexo		
WITNESSED BY	Don		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
5¾	0	20

EQUIPMENT DATA

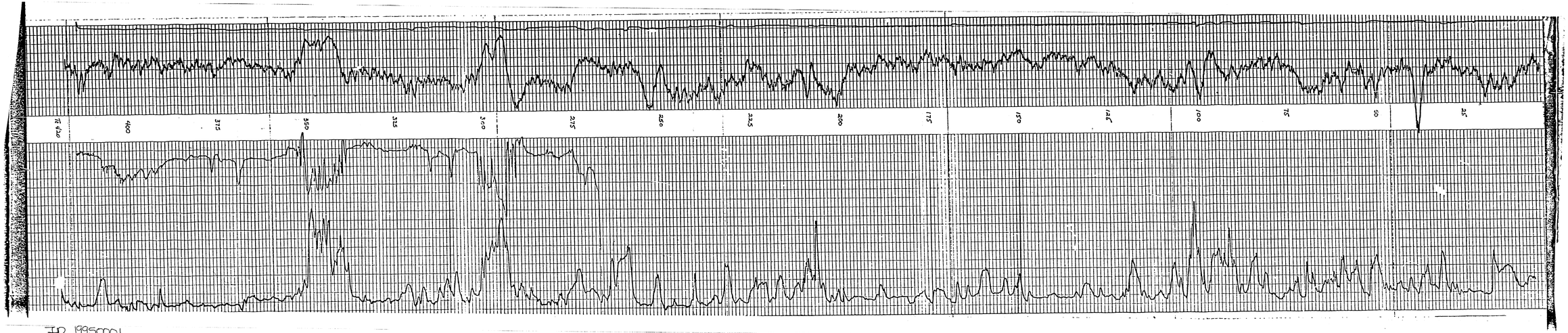
GAMMA RAY			GAMMA RAY	RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE		ME	F	
TYPE	SCINT	SPACING		1"	15"	
LENGTH	3'	LENGTH				
GENERAL		MDR SCALE			HOVP	
TRUCK No.		SOURCE MODEL			CS-137	
LOCATION		ISOTOPE			125 mC	
		STRENGTH				

LOGGING DATA

RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	T C SEC.	GAMMA RAY SENS	GAMMA RAY SETTING	GAMMA RAY ZERO	API UNITS PER DIV.	T C SEC.	DENSITY SCALE SETTINGS	DENSITY ZERO
			12								

REMARKS:





ID 19950001

HOLE No. 13-NH-12

APPROX. LOCATION: ___ SEC ___ TWP ___ RGE ___ W___

SURVEYED LOCATION: manual 43-11-12 E

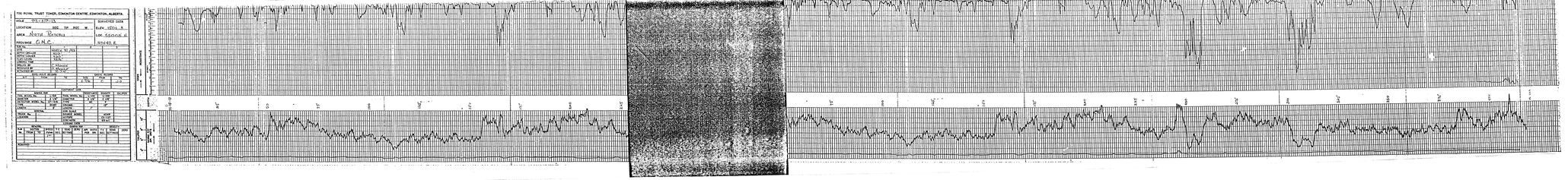
ELEVATION: 1024.7

DRILLER: Dan Oliver

FROM	TO	LOG	REMARKS
0	9	Till	
8	210	Sandstone	Coveloat 1130 phyllite
210	224	Mudstone with small pebbly interval 214.0'-214.5'	
224	261	Sandstone	
261	269	Coal	
269	276	Sandstone	
276	305	Coal	
305	320	Sandstone	

COMMENTS: ___

ID: RRS0001



COMPANY: _____

HOLE No.: TWP. 93 - NP-#16

APPROX. LOCATION: _____ SEC _____ TWP. _____ RGE. _____ W

SURVEYED LOCATION: 1470 S of 1 - 1470 W of 4

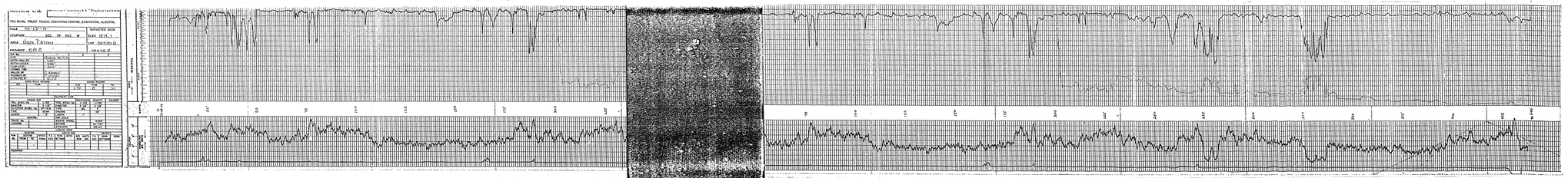
ELEVATION: 1170.1

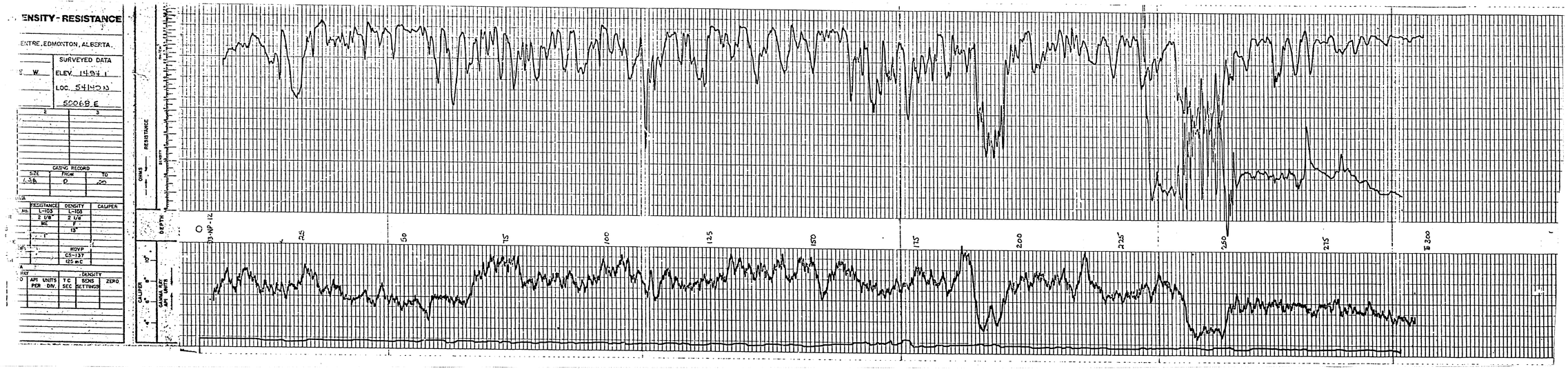
DRILLER: Ron Olson

FROM	TO	LOG	REMARKS
0	8	Till	
8	78	Saskatoon	
78	91	Coal	
91	98	Sk Till	
98	171	Coal	
171	223	Saskatoon	
223	229	Coal	
229	246	Saskatoon	
246	252	Coal	
252	263	Saskatoon	
263	269	Coal	
269	277	Saskatoon	

COMMENTS: _____

ID RR5001


Electronic Well Logging Limited
701 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.
HOLE 93-1-NP-16
SURVEYED DATA
LOCATION SEC TP RGE W
ELEV. (D.F.) 1170.1
AREA North Athens
LOC. DESCRIPTION
PROVINCE ONT.
COUNTRY CANADA
RUN No.
CASING RECORD
SIZE DEPTH
CONV. DRILLER
CONV. LOGGER
TYPE FLUID
DENSITY
VISCOSITY
FLUID LOSS
SOURCE OF SAMPLE
RM @ MEAS. TEMP.
RMF @ MEAS. TEMP.
RMC @ MEAS. TEMP.
SOURCE RMF RMC
RM @ BHT
TIME SINCE CIRC.
MAX. REC. TEMP.
EQUIP. LOCATION
RECORDED BY
WITNESSED BY
EQUIPMENT DATA
TOOL NO. TYPE TRANSMITTER RECEIVER SPACING
BOREHOLE RECORD
RUN BIT FROM TO SIZE
CASING RECORD
SIZE WGT. FROM TO
REMARKS
SPONTANEOUS POTENTIAL
RESISTIVITY
SHORT NORMAL
LONG NORMAL
LATERAL
GAMMA RAY
NEUTRON
DENSITY
CALIPER
CORRELATION
SCALE
SCALE
SCALE


ENSITY - RESISTANCE
ENTRE, EDMONTON, ALBERTA
SURVEYED DATA
W.
ELEV. 1494 I
LOC. 5414 N
5006B E
CASING RECORD
SIZE
FROM
TO
RESISTANCE
DENSITY
CALIPER
DEPTH
GAMMA RAY
API UNITS
03-NOV-12
0
25
50
75
100
125
150
175
200
225
250
275
300

ID 19950001

CROW MOUNTAIN COAL LTD.
DRILL HOLE RECORD

COAL FIELD _____ DATE April 15 1993

MOUNT _____

HOLE NO. 93-NP-7

ADVICE LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 5400 N - 4400 E

ELEVATION 1600.0

DRILLER Ron Olson

FROM	TO	SIZE	REMARKS
0	11	T.ill	
11	13	Coal	
13	20	Sandstone	
20	28	Mudstone & Coal	
28	119	Sandstone	
119	121	Coal	
121	127	Sandstone	
127	218	Coal	
218	220	Sandstone	
220	222	Coal	
222	363	Sandstone	
363	374	Coal	
374	420	Sandstone	

LEXCO TESTING LTD. — GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-7 — SURVEYED DATA

LOCATION SEC. TP. RGE. W. — ELEV. 1580.0

AREA North Plateau — LOG 5400 N

PROVINCE B.C. — 400 M E

RESISTANCE

DENSITY

GAMMA

	100	HOLMES
4	T.U.	
12	Sandstone - Bituminous	
19	Conglomerate	
27	Mudstone with numerous partings	
37	Sandstone	
43	Coal	Rising Hole
43	Sandstone	
53	Coal	
53	Sandstone	
58	Coal	
63	Sandstone	
104	Coal ?	
113	Sandstone	
121	Coal	
127	Sandstone	
1901	Coal	
1901	Sandstone	

TESTING LTD. — GAMMA-DENSITY-RESISTANCE

FOO BOWL TRUST TOWER, EDMONTON, CENTRE, EDMONTON, ALBERTA.

WELL 93-NP-11

LOCATION SEC. TP. RGE. W.

AREA North Pembina

SURVEYED DATA

RUN 1 2 3

LOG 2120.12

2112.8

PERMANENT DATUM

LOG MEAS. FROM

DRILLING MEASURED FROM

ELEVATION K.B.

D.F.

G.L.

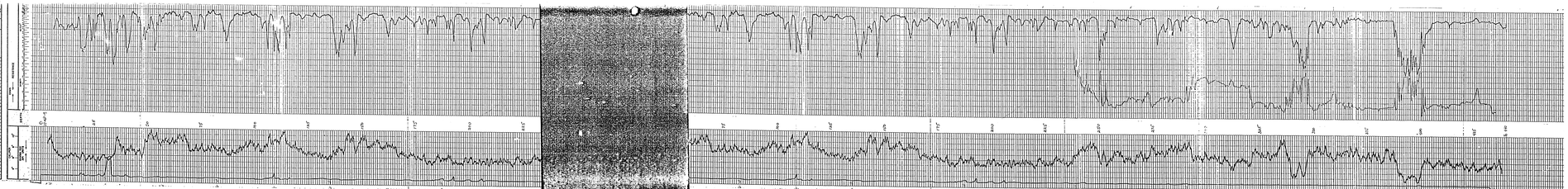
	DRILL. MEAS.	LOG. MEAS.
TOP LOGGED INT.	4300	
BOTTOM LOG INT.	2120	
CASING-DRILLER		
CASING-LOGGER		
BTM. CASING TEMP.	60°F @ 4300	
TYPE FLUID IN HOLE	Gel Chem	
DENSITY	10.0	
VISCOSITY	50	
PH	10	
FLUID LOSS	4.8	
SOURCE OF SAMPLE	Flowline	
RM @ MEAS. TEMP.	.75 @ 60°F	
RMF @ MEAS. TEMP.	.65 @ 60°F	
RMC @ MEAS. TEMP.	.90 @ 60°F	
SOURCE RMF & RMC	Measured	
RM @ BHT	.30 @ 120°F	
TIME SINCE CIRC.	12 hrs.	
MAX. REC. TEMP.	120°F	
EQUIP. LOCATION	3-512 E	
RECORDED BY	Mr. Hall	
WITNESSED BY	Mr. Hall	

RUN NO.	BIT SIZE	FROM	TO	CASING SIZE	WEIGHT	GRADE	DEPTH
1	7 7/8"	0	4300	5 1/2"	15.5	J-55	2120

RUN NO.	TOOL TYPE	SERIAL NO.	TOP	BOTTOM	RUN NO.	TOOL TYPE	SERIAL NO.	TOP	BOTTOM
1	GDT	1	0	2120					

RUN NO.	TOOL TYPE	SERIAL NO.	TOP	BOTTOM	RUN NO.	TOOL TYPE	SERIAL NO.	TOP	BOTTOM
1	GDT	1	0	2120					

REMARKS:



ID 1985001

COMPANY

WELL NO. 97 - WF - 9

OFFICE LOCATION ___ SEC. ___ TWP. ___ RGE. ___ M

SURFACE LOCATION 1650N - 1645E

ELEVATION 1015.4

FIELD Dove Creek

FROM	TO	LOG	REMARKS
0	9	Till	
9	15	Sandstone	
15	108	Dove Creek	
108	160	Sandstone	
160	162	Coal	
162	173	Sandstone	
173	174	Coal	
174	178	Sandstone	
178	194	Muddy coal	
194	361	Sandstone	
361	371	Coal	
371	411	Sandstone	
411	421	Coal	
421	444	Sandstone	

LEXCO TESTING LTD. — GAMMA-DENSITY-RESISTANCE

730 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

WELL 97-WF-9 — SURVEYED DATE

LOCATION SEC TP RGE W — ELEV. 1015.4

AREA Wapiti Property — LOG 2015.10 M

PERSONNEL D.M.C. — CSN 107.6

RUN NO. 1 — PASS NO. 1

DEPTH DRILLER 444 — LOG TOP 444

CASING DRILLER 444 — LOG BOTTOM 2015

CASING LOGGER 444 — SCALE 1/240

BIT SIZE 7 7/8" — MAX. TEMP. 24°C

TYPE FLUID Gel Chem — DENSITY 1.20 — VISCOSITY 45

PH 9.0 — FLUID LOSS 6.0 — SOURCE OF SAMPLE Circ

RM @ MEAS. TEMP. 0.70 @ 24°C — RMF @ MEAS. TEMP. 0.55 @ 24°C — RMC @ MEAS. TEMP. 0.90 @ 24°C

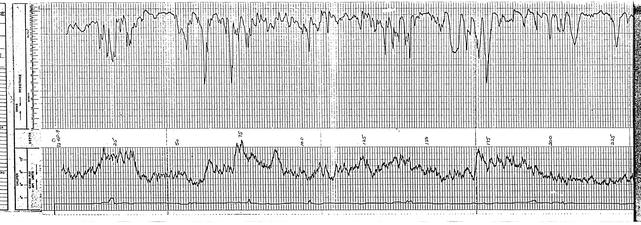
SOURCE OF RMF & RMC Measured — RM @ BHT 0.35 @ 60°C

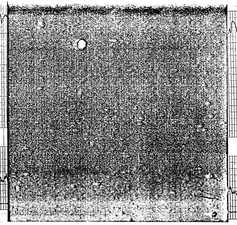
TIME SINCE CIRC. 24 hrs — MAX. REC. TEMP. 60°C — EQUIP. LOCATION 1015

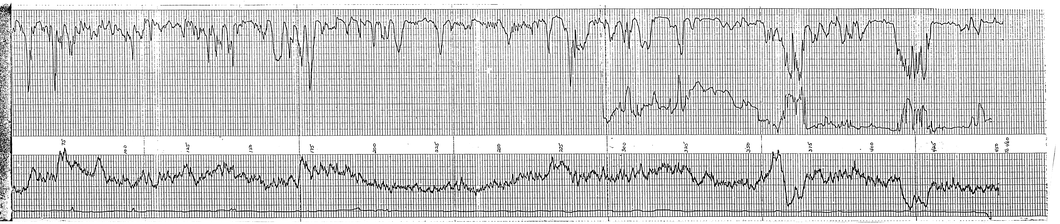
RECORDED BY D. Mc Cormick — WITNESSED BY Mr. Hall

NO.	RUN	CASING	BIT	FROM	TO	HOLE RECORD	CASING RECORD
1	1	7"	7 7/8"	0	444		444
2	1		7 7/8"	444	2015		

REMARKS







ID 1995001

Hole Number _____

Surveyed Location _____

Baseline _____

Elevation _____

Angle _____

Logs Run _____

GDRC GN DEV

Contractor _____

Driller CARL MOORE

Rig Type TH 100

Drilling Method _____

Date(s) Drilled APRIL 1994

From	to	Rock Type	Colour	Hardness	Waterflow	Comments
0	12	TILL				
12	57	SANDSTONE				
57	62	COAL + SHALE				
62	128	SANDSTONE				
128	131	COAL + SHALE				
131	171	SANDSTONE				
171	185	COAL + SHALE				
185	253	SANDSTONE				
253	257	COAL + SHALE				
257	300	SANDSTONE				

ID 19950001

...00 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE PC-94-04

LOCATION _____ SEC TP RGE W

AREA FIRE CREEK

PROVINCE ALTA.

SURVEYED DATA

ELEV. 1420.4

LOC. 5949944.9 N

422300.8 E

RUN No.	1	2	3
DATE	APRIL 13 94		
DEPTH-DRILLER	300'		
DEPTH-LOGGER	300'		
FL(S) LEVEL			
LOGGING TIME			
DRILLED BY			
RECORDED BY	C. MILLER		
WITNESSED BY	C. MILLER / KOLISNYK		

BORE-HOLE RECORD

BIT	FROM	TO	SIZE

CASING RECORD

FROM	TO

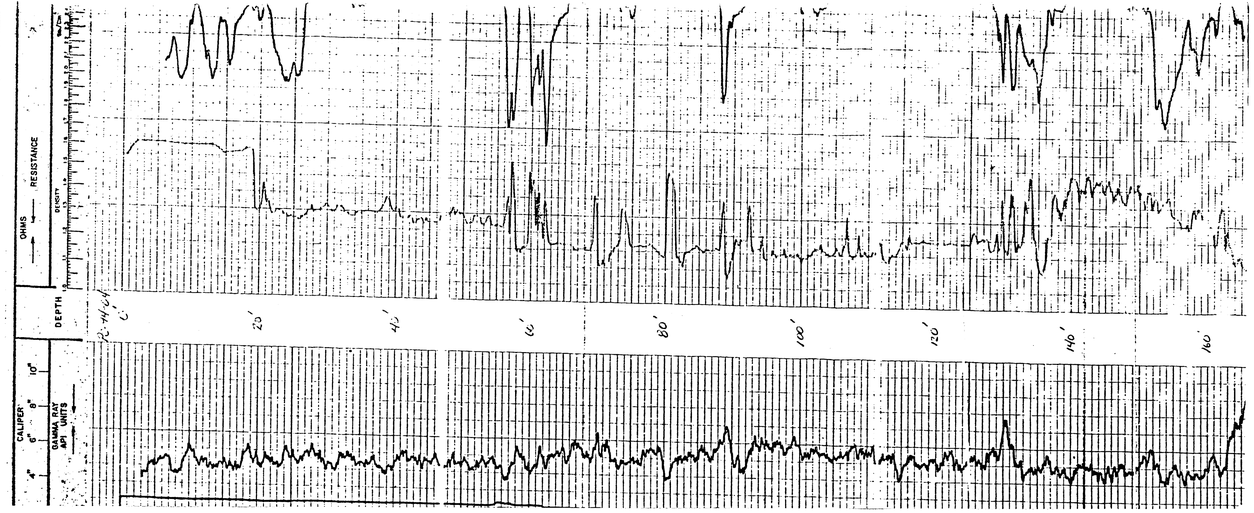
EQUIPMENT DATA

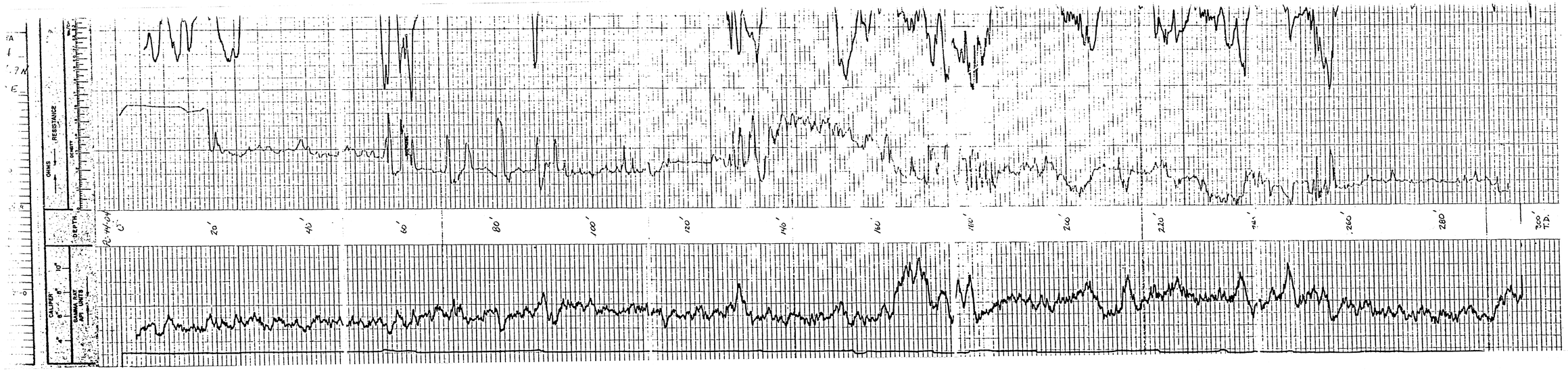
GAMMA RAY		RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-105	L-103	L-103	
DIAMETER	2 1/8	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	
TYPE	SCINT	SPACING	13"	
LENGTH	3'	LENGTH	1"	
GENERAL		HOR. SCALE		
TRUCK No.		SOURCE MODEL	HGVP	
LOCATION		ISOTOPE	CS-137	
		STRENGTH	125 mC	

LOGGING DATA

GENERAL RUN No.	DEPTHS FROM	DEPTHS TO	SPEED ft/min.	GAMMA RAY T C SEC.	GAMMA RAY SENS SETTING	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV.	DENSITY T C SEC	DENSITY SENS SETTINGS	DENSITY ZERO
			15							

REMARKS:




OHMS
RESISTANCE
DEPTH
CALIPER
GAMMA RAY
API UNITS
0'
20'
40'
60'
80'
100'
120'
140'
160'
180'
200'
220'
240'
260'
280'
300'
T.D.

ID 19950001

Surveyed Location

Baseline

Elevation

Angle

Logs Run

GDRC GN DEV

Contractor

Driller CARL MOORE

Rig Type TH 180

Drilling Method

Date(s) Drilled APRIL 1994

From	to	Rock Type	Colour	Hardness	Waterflow	Comments
0	7	FILL				
7	200	SANDSTONE				

NAME

LOCATION SEC TP RGE M

AMLA

PROVINCE

1467.58

5949169.5 N

421324.55 E

PERFORMANCE

PERFORMING

RESISTANCE OHMS

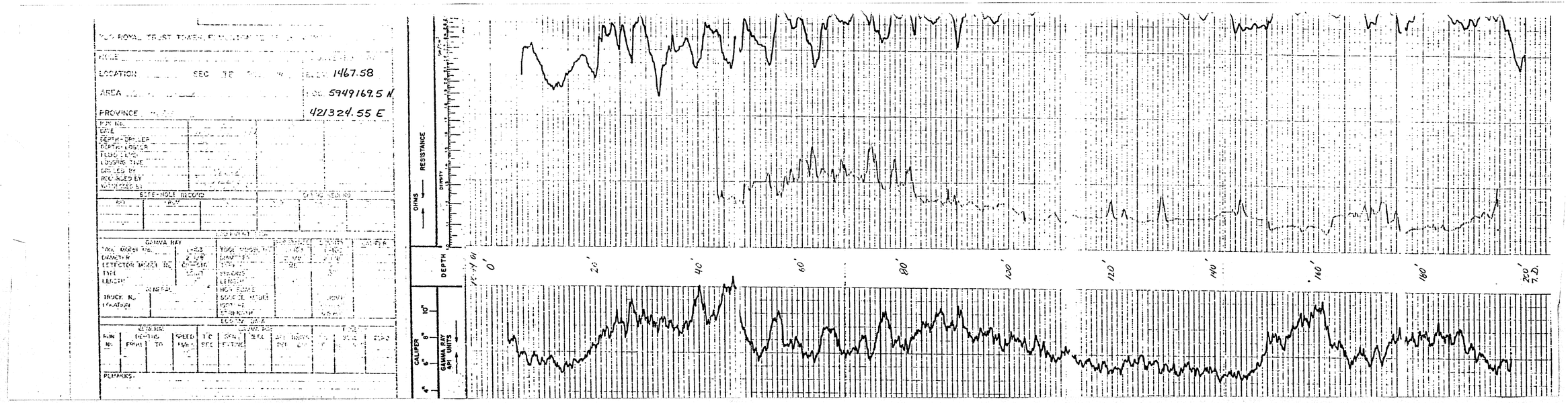
DEPTH

CALIPER 4" 6" 8" 10"

GAMMA RAY API UNITS

0' 20' 40' 60' 80' 100' 120' 140' 160'

JD 19950001


LOCATION SEC
AREA
PROVINCE
ELEV. 1467.58
5949169.5 N
421324.55 E
SITE-HOLE RECORD
GAMMA RAY
RESISTANCE
OHMS
DEPTH
CALIPER
GAMMA RAY API UNITS
0'
20'
40'
60'
80'
100'
120'
140'
160'
180'
200'
T.D.
REMARKS:

ID 19950001

Hole Number P.C. 94-02
Surveyed Location
Baseline
Elevation
Angle
Logs Run
GDRC GN DEV

Logged By
Contractor
Driller CARL MOORE
Rig Type
Drilling Method
Date(s) Drilled APRIL 1994

From	to	Rock Type	Colour	Hardness	Waterflow	Comments
0	10	TILL				
10	86	SANDSTONE				
86	87	SHALEY COAL				
87	104	SANDSTONE				
104	110	COAL + SHALE				
110	240	SANDSTONE				

TESTING LTD. **GAMMA-DENSITY-RESISTANCE**

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE P-94-02
LOCATION SEC. TP. RGE. W.
AREA PINTO CREEK
PROVINCE ALTA.

SURVEYED DATA
ELEV. 1440.68
LOC. 5949441.6N
421795.3 E

RUN No.	1	2	3
DATE	APRIL 12 1994		
DEPTH-DRILLER	276'		
DEPTH-LOGGER			
FLUID LEVEL			
LOGGING TIME			
DRILLED BY	C. MOORE		
RECORDED BY	C. MOORE		
WITNESSED BY	DAN EAN		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

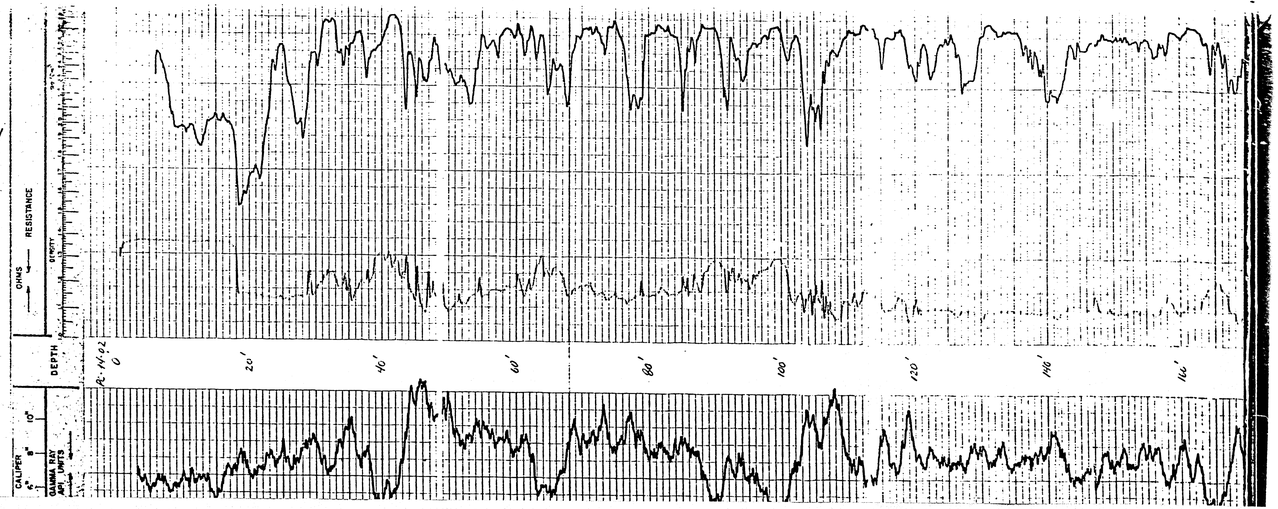
SIZE	FROM	TO

EQUIPMENT DATA

GAMMA RAY			GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103		TOOL MODEL No.	L-103		L-103	L-104	
DIAMETER	2 1/8"		DIAMETER	2 1/8"		2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516		TYPE			ME	F	
TYPE	SCINT		SPACING				15"	
LENGTH	3'		LENGTH		1"			
GENERAL			HOR. SCALE					
TRUCK No.			SOURCE MODEL				HDVP	
LOCATION			ISOTOPE				CS-137	
			STRENGTH				125 m C	

LOGGING DATA

RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	GAMMA RAY T C SEC.	GAMMA RAY SENS SETTING	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV.	DENSITY T C SEC	DENSITY SENS SETTINGS	DENSITY ZERO
			45'							



ID 19950001

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE P-94-02

LOCATION SEC TP RGE W

AREA PINTO CREEK

PROVINCE ALTA.

SURVEYED DATA

ELEV. 1440.68

LOC. 5949441.6N

4z1795.3 E

	1	2	3
RUN No.			
DATE	APRIL 12, 1994		
DEPTH-DRILLER			
DEPTH-LOGGER	226'		
FLUID LEVEL			
LOGGING TIME			
DRILLED BY	C. MOORE		
RECORDED BY	C. MOORE		
WITNESSED BY	P. VAN HAN		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO

EQUIPMENT DATA

GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-105	L-105	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING		13"	
LENGTH	3'	LENGTH	1'		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

LOGGING DATA

GENERAL			GAMMA RAY					DENSITY			
RUN No.	DEPTHS FROM	TO	SPEED ft/min	T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	T C SEC	SENS SETTINGS		ZERO
1			15								

REMARKS

OHMS — RESISTANCE — 0 — 10 — 20 — 30 — 40 — 50 — 60 — 70 — 80 — 90 — 100

DEPTH

CALIPER — 8" — 10" — 12"

GAMMA RAY — API UNITS — 0 — 50 — 100 — 150 — 200

P-94-02

0 — 20' — 40' — 60' — 80' — 100' — 120' — 140' — 160' — 180' — 200' — 220' — 226' T.D.

ID 1995000)

AGE No. 4C-714-W

AFFEC. LOCATION: UNIT A (NE SE) SEC. 3 TWP. 29 RGE. 4 W4M
1980 FSL 1980 FEL

RESTRICTED LOCATION:

ELEVATION (K): 1019

DRILLER: K. Stevenson

FROM	TO	— SIZE	REMARKS
0	16	6.8	
16	178	5 7/8 (Surface Casing)	3 Joints
178	1270	4 1/2 (Production Casing)	Weight 10.5 lb/ft
1270	1275	5 7/8 (Junk Basket)	Grade H-40

COMMENTS:

RATES RECOM: _____ FT. _____

Tie No.

LSD SEC TWP RGE W

COMPANY: ESSO RESOURCES CANADA LIMITED

WELL: 4C-3-29-4

FIELD: CRUDE OIL

PROVINCE: ALBERTA

LSD SEC TWP RGE W — Other Services

Permanent Datum: GROUND LEVEL — Elev.: (K) 1019 — Elev.: KB 1029

Log Measured From: K.B. — Above Perm. Datum — DFO —

Drilled Measured From: K.B. — GL 1019

	1	2	3
Run No.	1		
Date	82 JAN 24		
First Reading	1278		
Last Reading	178		
Feet(m) Logged	1100		
Depth Driller	1276		
Depth Logger	1274		
Casing Bottom	1270		
Casing Driller	5 7/8 @ 178		
Fluid Type	WATER		
Fluid Level	FULL		
Max. Recorded Temp.	93 DEG C		
Estimated Temp.	DEG C		
Time Since Circ.	6 HRS		
Max. Rec. Temp.	93 DEG C		
Equip. Location	3-29-4 W4M		
Recorded By	K. STEVENSON		
Witnessed By	MR. MCCLUSKY		

SOURCE OF SAMPLE: CUTTINGS

RM @ MEAS. TEMP.: 0.6 @ 20 DEG C

RMF @ MEAS. TEMP.: 0.5 @ 20 DEG C

RMC @ MEAS. TEMP.: 0.4 @ 20 DEG C

SOURCE OF RMF: MEASURED

SOURCE OF RMC: CALCULATED

RM @ BHT: 0.3 @ 93 DEG C

TIME CIRC. STOPPED: 0600 HRS

TIME LOGGER ON BOTTOM: 1200 HRS

MAX. REC. TEMP. (DEPTH): 93 DEG C @ 1274 M

EQUIP. LOCATION: 3-29-4 W4M

RECORDED BY: K. STEVENSON

WITNESSED BY: MR. MCCLUSKY

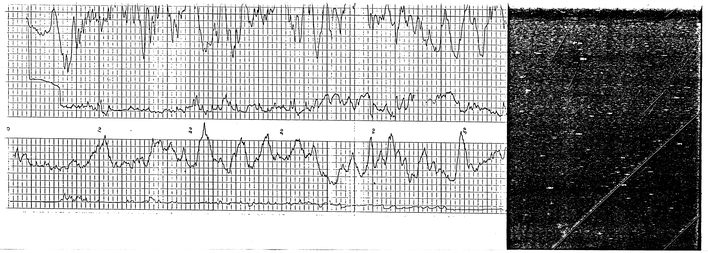
RUN NO. 1 — DATE 82 JAN 24

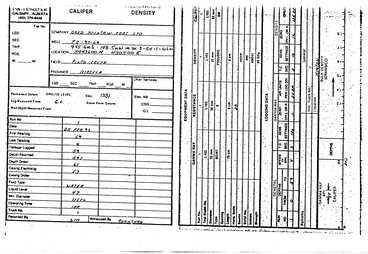
	BOREHOLE RECORD			CASING RECORD			
	BIT	FROM	TO	SIZE	WGT	FROM	TO
1	7 7/8	178	1278	5 7/8	10.5	0	178
2				4 1/2	10.5	178	1270
3							

	RUN	TOOL	SERIAL NO.	DIA.	MAX. REC. TEMP.	EQUIP. LOC.	RECORDED BY	WITNESSED BY
1	1	GAMMA RAY	1008	3 5/8	93 DEG C	3-29-4 W4M	K. STEVENSON	MR. MCCLUSKY
2		NEUTRON	1008	3 5/8				
3								

	RUN	TOOL	SERIAL NO.	DIA.	MAX. REC. TEMP.	EQUIP. LOC.	RECORDED BY	WITNESSED BY
1	1	GAMMA RAY	1008	3 5/8	93 DEG C	3-29-4 W4M	K. STEVENSON	MR. MCCLUSKY
2		DENSITY	1008	3 5/8				
3								

	RUN	TOOL	SERIAL NO.	DIA.	MAX. REC. TEMP.	EQUIP. LOC.	RECORDED BY	WITNESSED BY
1	1	GAMMA RAY	1008	3 5/8	93 DEG C	3-29-4 W4M	K. STEVENSON	MR. MCCLUSKY
2		CALIPER	1008	3 5/8				
3								







ID 1A85C001

GAMMA-DENSITY-RESISTANCE

ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

WELL [illegible]

LOCATION SEC TP RGE W

AREA [illegible]

PROVINCE [illegible]

SURVEYED DATA

ELEV. [illegible]

LOG. MEASURED [illegible]

RUN NO.	1	2	3
DATE	[illegible]		
TIME-LOGGER	[illegible]		
TIME-LOGGED	[illegible]		
FLUID LEVEL	[illegible]		
CASING TYPE			
RECORDED BY	[illegible]		
WITNESSED BY	[illegible]		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO
[illegible]	[illegible]	[illegible]

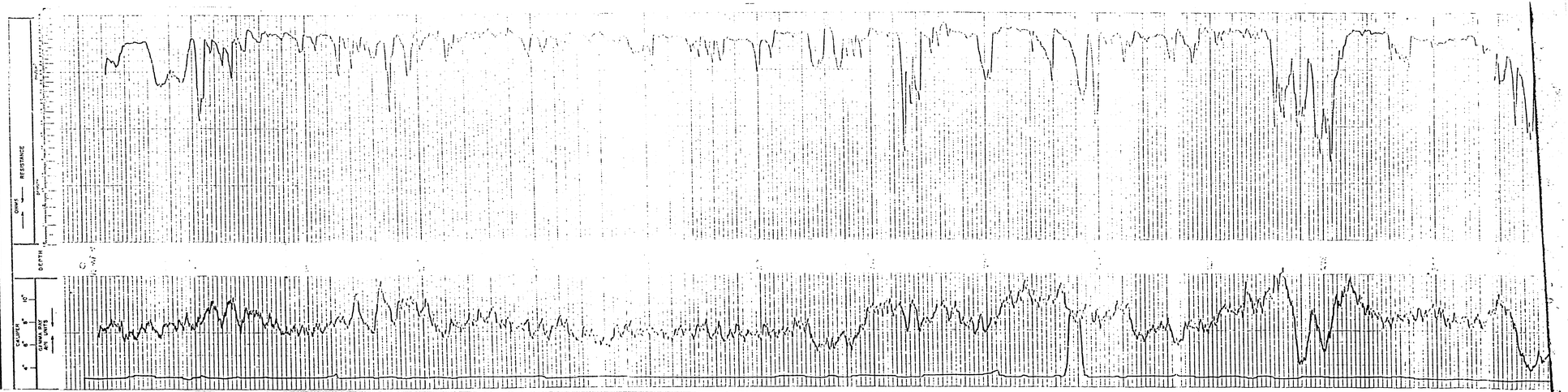
EQUIPMENT DATA

GAMMA RAY		RESISTANCE	DENSITY	CALIPER
SONDE MODEL No.	[illegible]			
DIAMETER	2 1/8		2 1/8"	2 1/8
TELEMETER MODEL No.	[illegible]	TYPE	MC	
TYPE	SCINT.	SPACING		10"
LENGTH	5'	LENGTH	1'	
GENERAL		NORM. SCALE		
TRACER NO.		SOURCE MODEL		HOWP
LOCATION		FIGURE		CS-137
		STRENGTH		125 mC

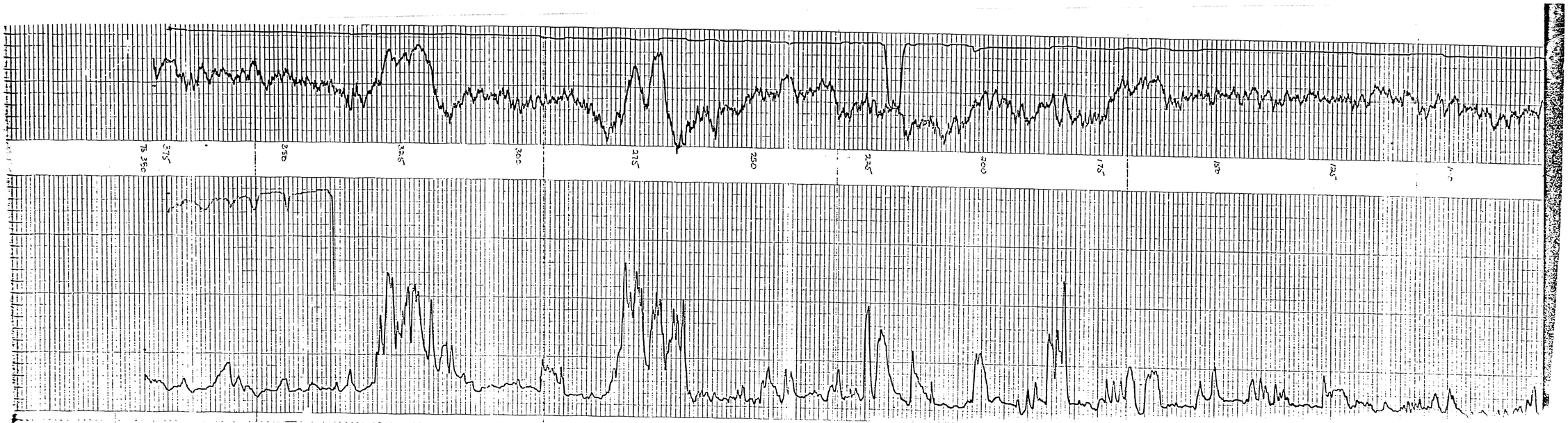
LOGGING DATA

RUN No.	GAMMA: DEPTHS FROM	TO	SPEED ft/min	T.C. SEC.	GAMMA RAY TRACE SETTING	ZERO	API UNITS PER DIV.	T.C. SEC	DENSITY SENS SETTINGS	ZERO
			15							

REMARKS:



ID 19950001



ID 19950001

TESTING LTD. **GAMMA-DENSITY-RESISTANCE**

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-2 — SURVEYED DATA

LOCATION ____ SEC ____ TP ____ RGE ____ W — ELEV. 1534.3

AREA North Plateau. — LOC. 54705 N

PROVINCE O.M.C. — 49260 E

RUN No.	1	2	3
DATE			
DEPTH-DRILLER	420		
DEPTH-LOGGER	420		
FLUID LEVEL	379		
LOGGING TIME			
DRILLED BY	C. Moore		
RECORDED BY	C. Moore		
WITNESSED BY	E.T.P.		

BORE-HOLE RECORD			CASING RECORD		
BIT	FROM	TO	SIZE	FROM	TO
			6 3/4	0	20

EQUIPMENT DATA

GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-105	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	F	
TYPE	SCINT	SPACING	1"	13"	
LENGTH	3"	LENGTH			
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 m C	

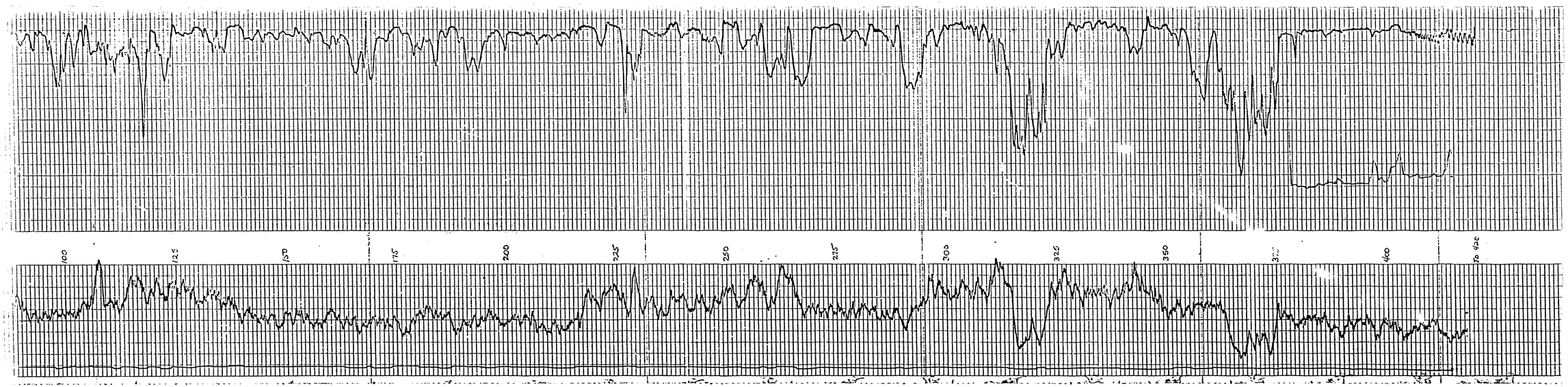
LOGGING DATA

GENERAL				GAMMA RAY				DENSITY			
RUN No.	DEPTHS FROM	DEPTHS TO	SPEED Ft/min.	T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.	T C SEC	SENS SETTINGS	ZERO
			12							

REMARKS:



ID 19950001



JD 19950001

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 93-NP-3

LOCATION ____ SEC ____ TP ____ RGE ____ W

AREA NORTH PLATEAU

PROVINCE N.W.T.

SURVEYED DATA

ELEV. 1544.8

LOC. 54590 N

493886 E

RUN No.	1	2	3
DATE	APRIL 16/73		
DEPTH-DRILLER	460		
DEPTH-LOGGER	458		
FLUID LEVEL	225		
LOGGING TIME			
DRILLED BY	R. HOWE		
RECORDED BY	R. HOWE		
WITNESSED BY	NOB		

BORE-HOLE RECORD

BIT	FROM	TO	SIZE
			6 3/8

CASING RECORD

SIZE	FROM	TO
	0	20

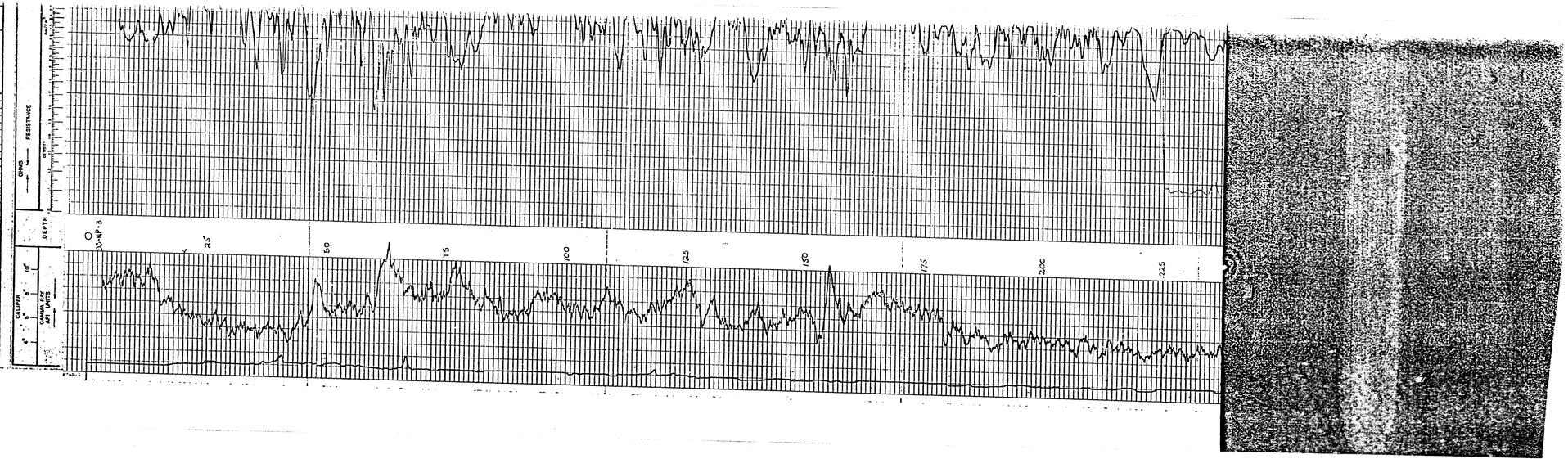
EQUIPMENT DATA

GAMMA RAY		RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103
DIAMETER	2 1/8	DIAMETER	2 1/8 ME	2 1/8
DITECTOR MODEL No.	CP-516	TYPE		
TYPE	SCINT	SPACING		13"
LENGTH	8"	LENGTH	1'	
GENERAL		NOR. SCALE		
TRUCK No.		SOURCE MODEL		HOVP
LOCATION		ISOTOPE		CS-137
		STRENGTH		125 mC

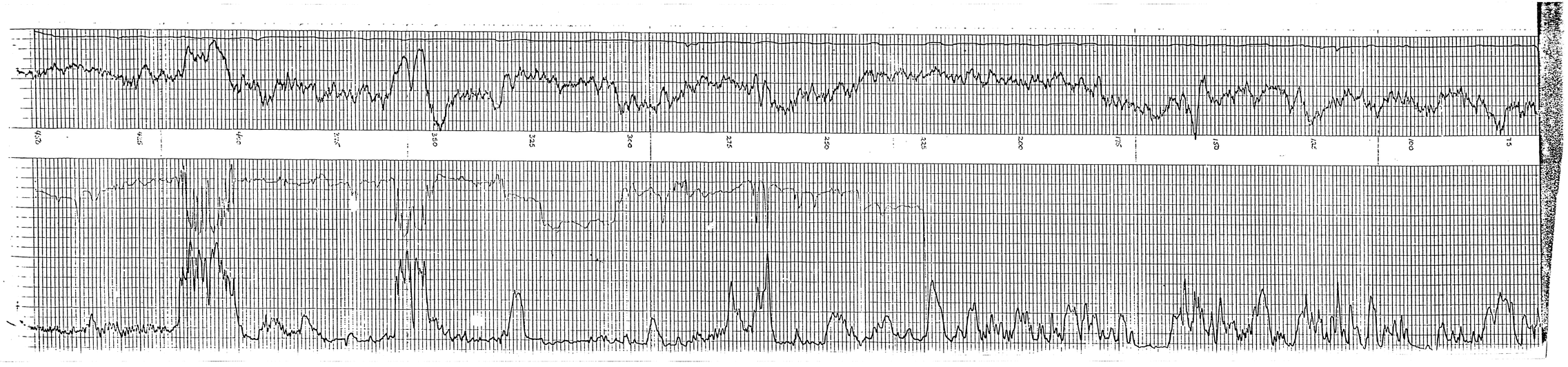
LOGGING DATA

RUN No.	DEPTHS FROM	DEPTHS TO	SPEED FT/MIN.	GAMMA RAY T.C. SEC.	GAMMA RAY SENS SETTINGS	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV.	DENSITY T.C. SEC.	DENSITY SENS SETTINGS	DENSITY ZERO
			12							

REMARKS:



ID19950001



ID 19950001

HOLE NO. RC-94-07

APPROX. LOCATION _____ SEC. ____ TWP. ____ RGE. ____ W. ____

SURVEYED LOCATION _____

ELEVATION _____

DRILLER _____

FROM	TO	LOG	REMARKS
0	6.6	Till	
6.6	19	Sandstone	
19	19	Trace Of Coal	
19	98	Sandstone	
98	100	Coal	
100	145	Sandstone	
145	146	Coal & Shale	
146	241	Sandstone	
241	246	Coal & Shale	
246	300	Sandstone	

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE RC-94-07 | SURVEYED DATA

LOCATION ___ SEC ___ TP ___ RGE ___ W | ELEV. 1437.4

AREA Fort Mac | LOC. 5965385.5N 482900.6E

PROVINCE Alta

DATE			
DEPTH-DRILLER	1968.10.24		
DEPTH-LOGGER	1968		
PLUG BACK TD	None		
CASING TYP			
CASING WT	6 Meter		
MEASURED BY	Logging		
WITNESSED BY	Mr. Fuller		

CASING RECORD

BIT	FROM	TO	SIZE	FROM	TO

OPEN HOLE RECORD

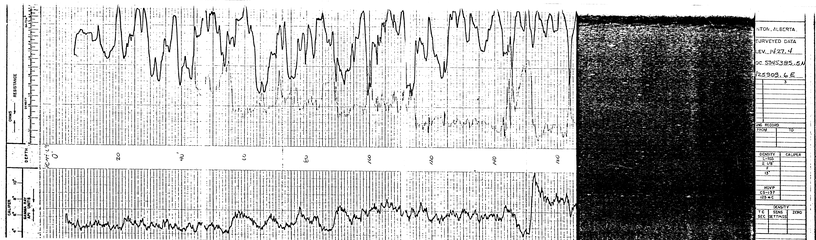
EQUIPMENT USED

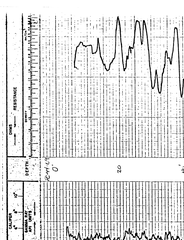
SOND. MODEL No.	3-1/4"	TOOL MODEL No.	C-108	S-1100	
SOND. SERIAL No.	3-1/4	CABLE	4-38	4-39	
RECEIVER MODEL No.	SC-114	LINE	4-38	4-39	
LENGTH	30cm	SENSORS		18	
LENGTH	GENERAL	SENSOR MODEL			
		HOW SCALE			
TRUCK No.		SOUND MODES		SOND	
LOCATION		SPEED		10,000	
		STACKING		32,767	
		LOGGING SCALE			

GENERAL

RUN No.	DEPTH FROM	DEPTH TO	SPEED FEET/MIN	FT. / TURN METRES	TURNS / MIN	SAT. LEVEL PER DIV	FT. / SEC. METRES	SOND SEC. BETWEEN	ZERO

REMARKS:





HD (RECOD)

HOLE NO. PC 94-10

REMARK LOCATION

SURVEYED LOCATION

ELEVATION

DRILLER Coal Mover

FROM	TO	LOG	REMARKS
0	3	Till	
3	59	Sandstone	
59	66	Coal & Shale	
66	102	Sandstone	
102	103	Coal	
103	109	Sandstone	
109	171	Fractured & coal partings	
171	179	Sandstone	
179	185	Shale with coal partings	
185	220	Sandstone	

TOO ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE

LOCATION SEC. TP. RGE W

AREA

PROVINCE

SURVEYED DATA

ELEV. 1433.8

LOC. 5965320.20

1262232.08

	1	2	3
TOP TO			
CASING DIA			
CASING WT			
CASING GRADE			
CASING SET AT			
CASING CEMENTED BY			
DRILLED BY			

BARE HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO

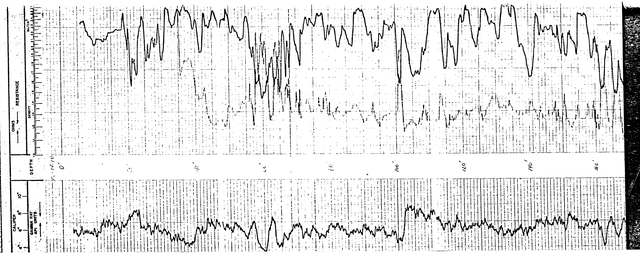
EQUIPMENT USED

SAMPLE KIT			DRILLING KIT			RESISTIVITY LOGGING		CALIPER
TOOL MODEL NO.			TOOL MODEL NO.			DIRECTION	S	N
DIRECTION			DIRECTION			TYPE	SPL	SP
CUTTING HEAD, No.			SIZE			SPACING		LN
No.			TYPE			LOGGING		
HEAD			MANUFACTURER			FOR SCALE		
SERIAL			SOURCE MODEL					HOLE
RETURN No.			RETURN					FILLED
LOCATION			LOCATION					TO FT

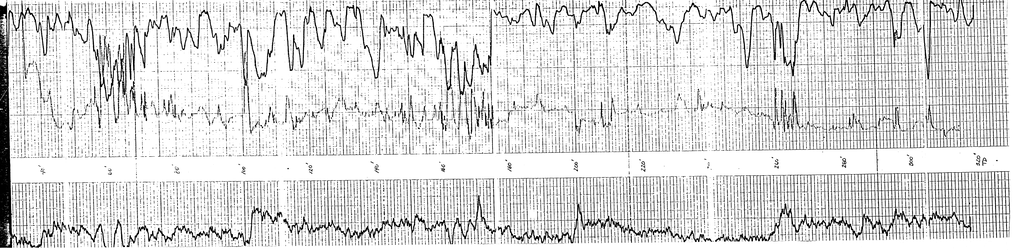
LOGGING DATA

RUN No.	INTERVAL FROM	INTERVAL TO	SPEED FT/MIN	T.C. SETTING	SENS.	MFL SCALE FOR	MFL SCALE FOR	T.C. SETTING	SENS.
1	1400	1433	30	1	1	1	1	1	1

REMARKS:







ID 1985001

AFFIDAVIT LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION 5741334.16 N - 457326.96 E

ELEVATION 1350.9

DRILLED Jan. 04 1972

FROM	TO	LOG	REMARKS
0	7	Till	
7	116	Sandstone	
116	138	Shale with Limestone stringers	Water at 77' 5 gpm
138	300	Sandstone	Water at 179 1/2 gpm

FOO ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

WELL No. 10-27-12

LOCATION SEC. TP. RGE. W.

AREA Fort Assiniboine

PROVINCE Alberta

SURVEYED DATA

ELEV. 1350.9

LOC. 5741334.16 N

457326.96 E

CASING RECORD

NO.	KIND	FROM	TO

CEMENTING RECORD

NO.	KIND	FROM	TO

EQUIPMENT USED

RIG No.		DRILL COLLARS No.		DRILL PIPE	
DRILLING MACHINE No.		KELLY		SWIVEL	
CABLE TOOL ENGINE No.		SAND REEL No.		BAILER	
CABLE TOOL BOILER No.		CALIPER			

DRILLING DATA

DRILLING STARTED		DRILLING FINISHED	
DRILLING TIME		DRILLING RATE	
DRILLED BY			
WITNESSED BY			

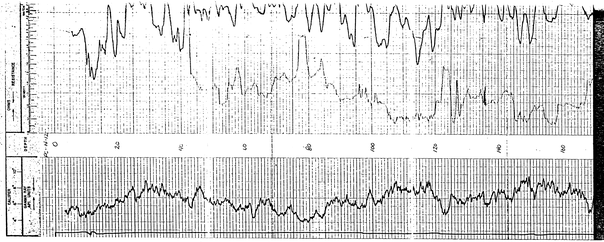
CORE RECORD

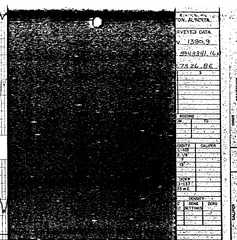
NO.	FROM	TO	RECOVERY	FROM	TO

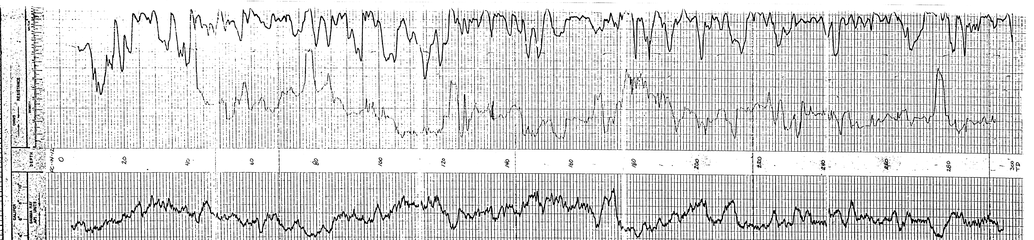
SPECIAL EQUIPMENT USED

NO.	TYPE	SIZE	FROM	TO	DATE SET	DATE REMOVED

REMARKS:







ID 1995001

RECORDED LOCATION

LOCATION

RECORDED BY Don Plume

FROM	TO	LOG	REMARKS
0	14	T.ill	
14	98	Salt Sandstone	
98	101	Coal	4/Water at 30' 30 gpm
101	118	Sandstone	Water at 140' 20 gpm
118	209	Coal	
209	280	Sandstone	

HOLE No. 84-44-104

LOCATION SEC. TP. RGE. W.

AREA Pine Creek

PROVINCE Alta

SURVEYED DATA

ELEV. 1351.7

LOC. SW2/15.8m

82573.6 E

RUN No.

DATE 16th Jan 84

DEPTH-DRILLER 280'

DEPTH-LOGGER 280'

FLUID LEVEL

SALINITY, PPM

MAX. REC. TEMP. 11 Hours

RECORDED BY Plume

WITNESSED BY Elevation

CASING RECORD

SIZE	FROM	TO	WGT.	TYPE	TO
8"		14'			

DEPTH-DRILLER

GAMMA RAY

SOND MODEL No.	3 1/8"
DETECTOR MODEL No.	3 1/8"
LENGTH	10'

NEUTRON

TRUCK No.	
LOCATION	

TOOL MODEL No.	3 1/8"
DIAMETER	3 1/8"
TYPE	SS
SPACING	18"
SOURCE	
HOW HOLE	
SOURCE MODEL	
STRENGTH	50 MV
LOGGING SPEED	

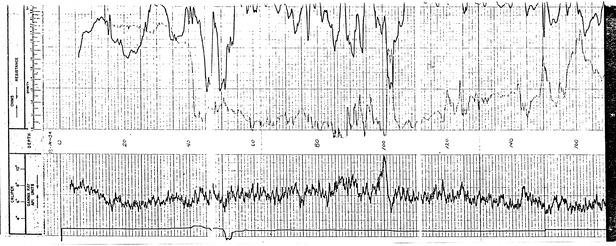
RESISTANCE	GAMMA RAY	CALIPER
3 1/8"	3 1/8"	
SS	SS	
18"		

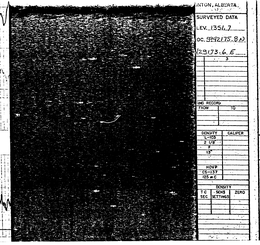
DENSITY	
TYPE	
SOURCE	
DETECTOR	
SPACING	

GENERAL

RUN No.	SECTION FROM	SECTION TO	SPEED Ft/min	Y.C. SEC.	SCALE SETTING	CPS	AMPS	VOLTS	Y.C. SEC.	SCALE SETTING
			20'							

REMARKS:





LOCATION, ALBERTA

SURVEYED DATA

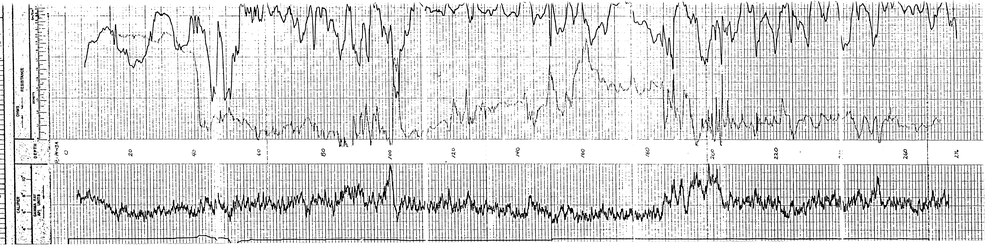
ELEV. 1351.7

LOC. SW2/15.8m

82573.6 E

RESISTANCE	GAMMA RAY	CALIPER
3 1/8"	3 1/8"	
SS	SS	
18"		

DENSITY	
Y.C.	SCALE SETTING
SEC.	



ID 1985000|

10005861 CI

COMPANY Lasco Testing

HOLE NO. PC-94-14

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Carl Moore

FROM	TO	LOG	REMARKS
0	22	Muskeg	
22	25	clay	
25	89	Sandstone	Water at 47'-15 gpm
89	94	Coal	
94	126	Sandstone	
126	129	Coal	
129	200	Sandstone	
200	219	Coal	
219		Sandstone	

TESTING LTD. **GAMMA-DENSITY-RESISTANCE**

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE PC-94-14 — SURVEYED DATA

LOCATION _____ SEC TP RGE W — ELEV. 1357.1

AREA Pinto Creek — LOC. 5942354.3N

PROVINCE Alta. — 429359.3E

RUN No.		1	2	3
DATE		Mar 21 '74		
DEPTH-DRILLER				
DEPTH-LOGGER				
FLUID LEVEL				
LOGGING TIME				
DRILLED BY		C. MOORE		
RECORDED BY		C. MOORE		
WITNESSED BY		DR. ACHARI		

BORE-HOLE RECORD

BIT	FROM	TO	SIZE

CASING RECORD

FROM	TO

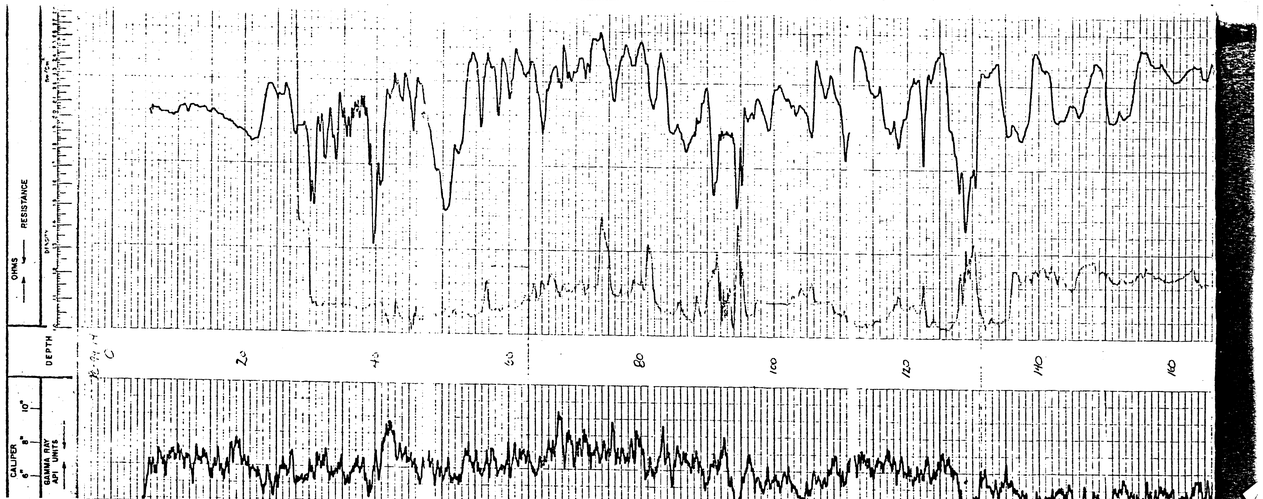
EQUIPMENT DATA

GAMMA RAY			RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.	L-103	L-103	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	CP-516	TYPE	ME	2	
TYPE	SCINT	SPACING		13"	
LENGTH	3"	LENGTH	1"		
GENERAL		HOR. SCALE			
TRUCK No.		SOURCE MODEL		HOVP	
LOCATION		ISOTOPE		CS-137	
		STRENGTH		125 mC	

LOGGING DATA

GENERAL RUN No.	DEPTHS FROM	DEPTHS TO	SPEED F/min	GAMMA RAY T C SEC	GAMMA RAY SENS SETTING	GAMMA RAY ZERO	GAMMA RAY API UNITS PER DIV.	DENSITY T C SEC	DENSITY SENS SETTINGS	DENSITY ZERO
			17							

REMARKS:



10005661 CH

OHMS
RESISTANCE
DEPTH
FEET
DEPTH
CALIPER
6"
8"
10"
GAMMA RAY
API UNITS
12-94-14
0
20
40
60
80
100
120
140
160
180
200
220
240
251
TD

HOLE NO. AC-93-03

APPROX. LOCATION 9Mile Rd & Mo. Rte. 25 700 ft. N. & 2 mi. W. OF JUNCTION W/ Rte. 34

SURVEYED LOCATION: _____

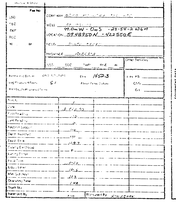
ELEVATION GS + 473.9

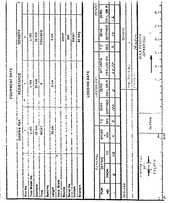
DRILLER Alderson

FROM	TO	USE	REMARKS
0	7	Soil	
7	11	Weath	
11	31	Sand (dry)	
31	111	Sh with ss	
111	117	Sand	Water not found
117	123	Shale	Approx. Target Zone
123	262	Sh	
262	264	Coal (Lwr)	
264	274	Sand	
274	282	Coal	
282	426	Shale (Lwr)	

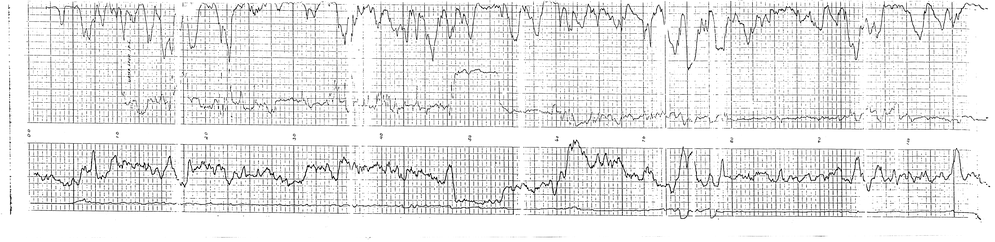
COMMENTS: _____

WATER RECEIVED _____ FT









WITNESS LOCATION: Alaska 3 11327'+Wire 25 DEG. 59 MIN. 2 WEST
OPR. CONTINUED AT TOPSIDE

SURVEYED LOCATION

ELEVATION (F) 1019.8

DRILLER R. Edmonstone

FROM	TO	TIME	REMARKS
0	12	TOH	
12	24	go in	
24	44	go out	
44	71	go in	ELECTRIC
71	72	Core (1.5 ft)	24 gun at 71.5
72	91	go out	
91	111	go in	shooting incorrect
111	112	out	4 guns fired gun
112	117	go in	at 94.5
117	121	Core (4')	
121	150	go out	
150	174	go in	
174	175	out	
175	176	go in	
176	211	out	
211	212	go in	
212	213	out	
213	218	go in set gun #1	
218	223	go out	
223	424	Rest of	

COMMENTS

WATER WATCH: 76.4 FT

API 50-029-20001-00-00

WELL PBU M-21

LOCATION 1927.5 FNL 1933.3 FWL SEC 20 T11N R13E UM

FIELD PRUDHOE BAY

RECORDED PRUDHOE

LOG	SEC	TWP	RGE	M

Other Services

Permanent Datum: GROUND LEVEL Elev. 1019.8 Elev. KB 1019.8

Log Measured From K.B. 48.66 Ft. Above Perm. Datum DF N/A

Drilling Measured From KELLY BUSHING GL N/A

Run No.			
Date	12-Jul-74		
First Reading	12656		
Last Reading	11900		
Hanger Logged	12656		
Logm Type Fluid	Salt Water		
Depth Control			
Driller's Depth	12656		
Casing Driller			
Logm Type Fluid	Salt Water		
Density	9.9		
Viscosity	39		
Max. Temperature	215		
Equipment Number	1204		
Location	PRUDHOE		
Recorded By	R.ZIMMERMAN		
Witnessed By	R.EDMONSTONE		

CASING RECORD

	Size	Wgt.	Grade	From	To
Surface String	13 3/8	72	N-80	0	2700
Intermediate String	9 5/8	47	N-80	0	11327
Liner	7	29	N-80	11327	12656
Liner					
Liner					

BOREHOLE RECORD

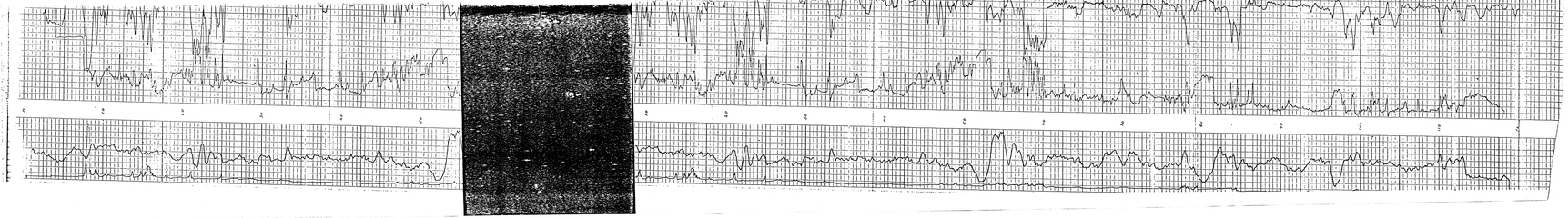
Bit No.	Size	From	To
1	12 1/4	2700	11327
2	8 1/2	11327	12656

TUBING RECORD

Size	Wgt.	Grade	From	To
5 1/2	17	N-80	0	11327
4 1/2	12.6	N-80	11327	12656

PERFORATION RECORD

Interval	Size	Shots/Ft.	Date
12656-12650	4"	4	7-12-74
12650-12640	4"	4	7-12-74
12640-12630	4"	4	7-12-74
12630-12620	4"	4	7-12-74
12620-12610	4"	4	7-12-74
12610-12600	4"	4	7-12-74
12600-12590	4"	4	7-12-74
12590-12580	4"	4	7-12-74
12580-12570	4"	4	7-12-74
12570-12560	4"	4	7-12-74
12560-12550	4"	4	7-12-74
12550-12540	4"	4	7-12-74
12540-12530	4"	4	7-12-74
12530-12520	4"	4	7-12-74
12520-12510	4"	4	7-12-74
12510-12500	4"	4	7-12-74
12500-12490	4"	4	7-12-74
12490-12480	4"	4	7-12-74
12480-12470	4"	4	7-12-74
12470-12460	4"	4	7-12-74
12460-12450	4"	4	7-12-74
12450-12440	4"	4	7-12-74
12440-12430	4"	4	7-12-74
12430-12420	4"	4	7-12-74
12420-12410	4"	4	7-12-74
12410-12400	4"	4	7-12-74
12400-12390	4"	4	7-12-74
12390-12380	4"	4	7-12-74
12380-12370	4"	4	7-12-74
12370-12360	4"	4	7-12-74
12360-12350	4"	4	7-12-74
12350-12340	4"	4	7-12-74
12340-12330	4"	4	7-12-74
12330-12320	4"	4	7-12-74
12320-12310	4"	4	7-12-74
12310-12300	4"	4	7-12-74
12300-12290	4"	4	7-12-74
12290-12280	4"	4	7-12-74
12280-12270	4"	4	7-12-74
12270-12260	4"	4	7-12-74
12260-12250	4"	4	7-12-74
12250-12240	4"	4	7-12-74
12240-12230	4"	4	7-12-74
12230-12220	4"	4	7-12-74
12220-12210	4"	4	7-12-74
12210-12200	4"	4	7-12-74
12200-12190	4"	4	7-12-74
12190-12180	4"	4	7-12-74
12180-12170	4"	4	7-12-74
12170-12160	4"	4	7-12-74
12160-12150	4"	4	7-12-74
12150-12140	4"	4	7-12-74
12140-12130	4"	4	7-12-74
12130-12120	4"	4	7-12-74
12120-12110	4"	4	7-12-74
12110-12100	4"	4	7-12-74
12100-12090	4"	4	7-12-74
12090-12080	4"	4	7-12-74
12080-12070	4"	4	7-12-74
12070-12060	4"	4	7-12-74
12060-12050	4"	4	7-12-74
12050-12040	4"	4	7-12-74
12040-12030	4"	4	7-12-74
12030-12020	4"	4	7-12-74
12020-12010	4"	4	7-12-74
12010-12000	4"	4	7-12-74
12000-11990	4"	4	7-12-74
11990-11980	4"	4	7-12-74
11980-11970	4"	4	7-12-74
11970-11960	4"	4	7-12-74
11960-11950	4"	4	7-12-74
11950-11940	4"	4	7-12-74
11940-11930	4"	4	7-12-74
11930-11920	4"	4	7-12-74
11920-11910	4"	4	7-12-74
11910-11900	4"	4	7-12-74



ID 1980001

APPROX. LOCATION _____ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION _____

ELEVATION _____

DRILLER Dr. Hare

FROM	TO	LOG	REMARKS
0	12	Till	
12	50	Sand & Gravel	
50	64	Coal	
64	67	Sand & Gravel	
67	69	Coal	
69	156	Sand & Gravel	
156	180	Coal	
180	198	Sandstone	
198	224	Coal	
224	295	Sandstone	

145

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 15-14-TP

LOCATION _____ SEC. TP. RGE. W.

AREA Peace River

PROVINCE Alta.

SURVEYED DATA

ELEV. 1256.8

LOC 5956879.88 N

457683.07 E

RUN No.	1	2	3
DATE	March 28 1975		
DEPTH-DRILLER	1256		
DEPTH-LOGGER	1256		
CASING TYPE			
LOGGED TIME			
SPILLED BY	C. Hecker		
WITNESSED BY	A. Gardiner		

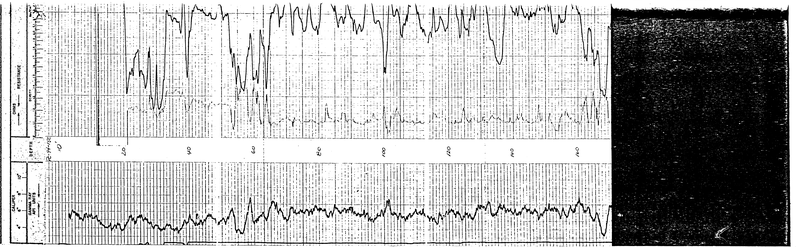
BORE-HOLE RECORD			CASING RECORD		
BIT	FROM	TO	SIZE	FROM	TO

EQUIPMENT USED

GAMMA RAY			NEUTRON-NEUTRON	DENSITY	CALIPER
TOOL MODEL No.	1-GR	TOOL MODEL No.	1-GR	2-DN	2-CN
DETECTOR MODEL No.	2-GR	DIAMETER	2 1/2"	2 1/2"	2 1/2"
TYPE	SCINT.	SPACING	18"	18"	18"
LENGTH	5'	LENGTH	5'	5'	5'
TRUCK No.	GENERAL	SOURCE MODEL		HIGH	
LOCATION		SOURCE STRENGTH		66-137	
		DETECTOR		66-41	

RUN No.	GENERAL FROM	TO	SPEED FT/MIN	T.C. SEC.	SENS SETTING	DEPTH ADJ. UNITS PER INCH	T.C. SEC.	SENS SETTING
1	1256	TD	20			10		

REMARKS:



700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE 15-14-TP

LOCATION _____ SEC. TP. RGE. W.

AREA Peace River

PROVINCE Alta.

SURVEYED DATA

ELEV. 1256.8

LOC 5956879.88 N

457683.07 E

RUN No. 1 2 3

DATE March 28 1975

DEPTH-DRILLER 1256

DEPTH-LOGGER 1256

CASING TYPE

LOGGED TIME

SPILLED BY C. Hecker

WITNESSED BY A. Gardiner

BORE-HOLE RECORD: BIT / FROM / TO

CASING RECORD: SIZE / FROM / TO

EQUIPMENT USED

GAMMA RAY: TOOL MODEL No. 1-GR; DETECTOR MODEL No. 2-GR; TYPE SCINT.; LENGTH 5'

NEUTRON-NEUTRON: TOOL MODEL No. 1-GR; DIAMETER 2 1/2"; SPACING 18"; LENGTH 5'

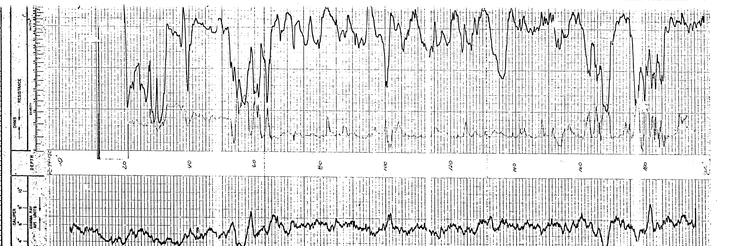
DENSITY: TOOL MODEL No. 2-DN; DIAMETER 2 1/2"; SPACING 18"; LENGTH 5'

CALIPER: 2-CN; 2 1/2"; 18"; 5'

GENERAL: TRUCK No. ; LOCATION ; SOURCE MODEL ; SOURCE STRENGTH HIGH 66-137; DETECTOR 66-41

RUN No.	GENERAL FROM	TO	SPEED FT/MIN	T.C. SEC.	SENS SETTING	DEPTH ADJ. UNITS PER INCH	T.C. SEC.	SENS SETTING
1	1256	TD	20			10		

REMARKS:



ID 1985C001

Hole Number P.C.94-08
Surveyed Location
Baseline
Elevation
Angle
Logs Run
GDRC GN DEV

Logged By
Contractor
Driller CARL MOORE
Rig Type TH 100
Drilling Method
Date(s) Drilled

From	to	Rock Type	Colour	Hardness	Waterflow	Comments
0	7	CLAY & RES				
7	10	SANDSTONE				
10	14	COAL & SHALE				
14	191	SANDSTONE				
191	203	SHALE & COAL				
203	283	SANDSTONE				
283	293	COAL WITH STRINGERS OF SHALE				
293	392	SANDSTONE				
392	400	COAL & SHALE				
400	440	SANDSTONE				

[illegible] ELECTRIC RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE [illegible]
LOCATION SEC TP RGE W
AREA [illegible]
PROVINCE [illegible]

SURVEYED DATA
ELEV. 1519.47
LOC. 5946236.7N
425567.3 E

RUN No.	1	2	3
DATE	[illegible] 30 94		
DEPTH-DRILLER	444'		
DEPTH-LOGGER	444'		
FLUID LEVEL			
LOGGING TIME			
DRILLED BY	T. MAGE		
RECORDED BY	T. MAGE		
WITNESSED BY	[illegible]		

BORE-HOLE RECORD

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO

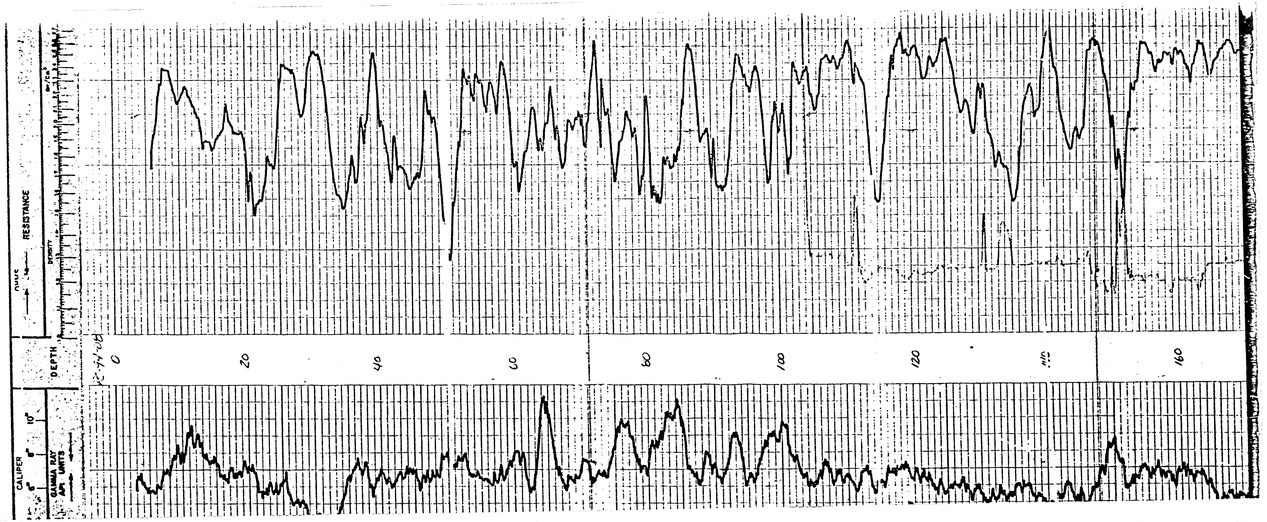
EQUIPMENT DATA

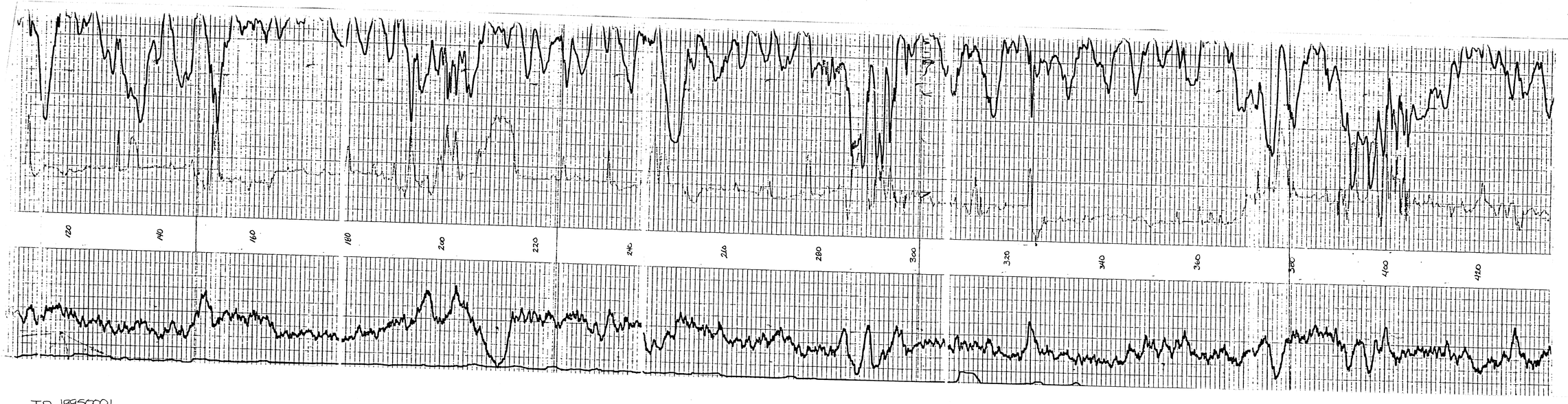
GAMMA RAY				RESISTANCE	DENSITY	CALIPER
TOOL MODEL No.	L-103	TOOL MODEL No.		L-103	L-103	
DIAMETER	2 1/8	DIAMETER		2 1/8"	2 1/8	
DETECTOR MODEL No.	CP-516	TYPE		ME	F	
TYPE	SCINT	SPACING			13"	
LENGTH	3'	LENGTH		1"		
GENERAL		HOR. SCALE				
TRUCK No.		SOURCE MODEL			HOVP	
LOCATION		ISOTOPE			CS-137	
		STRENGTH			125 mC	

LOGGING DATA

GENERAL				GAMMA RAY					DENSITY		
RUN No.	DEPTHS FROM	TO	SPEED Ft/min	T C SEC.	SENS SETTING	ZERO	API UNITS PER DIV.		T C SEC	SENS SETTINGS	ZERO
			10								

REMARKS:





ID 19950001

TESTING LTD. GAMMA-DENSITY-RESISTANCE

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE [illegible]

LOCATION SEC TP RGE W

AREA [illegible]

PROVINCE [illegible]

SURVEYED DATA

ELEV. 1448.35

LOC. 5945994.9N

425069.2 E

RUN No.	1	2	3
DATE	[illegible]		
DEPTH-DRILLER	[illegible]		
DEPTH-LOGGER	[illegible]		
BTM. LOG INTVL.			
LOGGING TIME			
SPILLED BY	[illegible]		
RECORDED BY	[illegible]		
WITNESSED BY	[illegible]		

BIT	FROM	TO

CASING RECORD

SIZE	FROM	TO

EQUIPMENT DATA

GAMMA RAY		RESISTIVITY		DENSITY	CALIPER
TOOL MODEL No.	L-93	TOOL MODEL No.	IL-1108	L-1108	
DIAMETER	2 1/8"	DIAMETER	2 1/8"	2 1/8"	
DETECTOR MODEL No.	SH-344	TYPE		ME	
TYPE	SCINT.	SPACING		15"	
LENGTH	3"	LENGTH			

GENERAL	
TRUCK No.	
LOCATION	

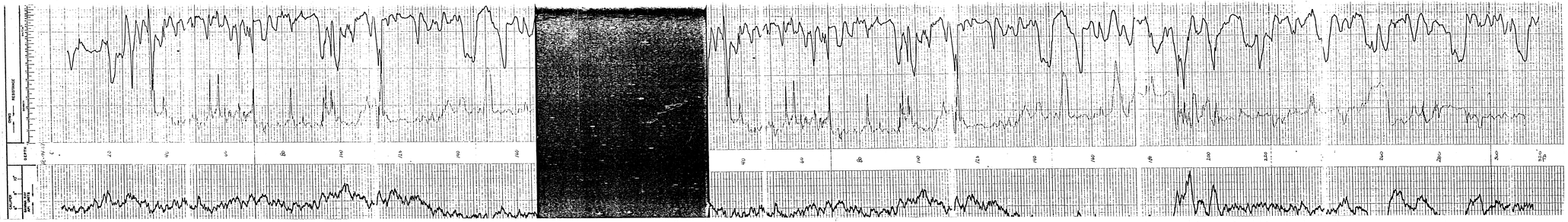
SOURCE TABLE	
SOURCE MODEL	
INTERFACE	
STRENGTH	

HOWCO
CS-137
10 m c

LOGGING DATA

GENERAL					GAMMA RAY					DENSITY			
RUN No.	DEPTH FROM	DEPTH TO	SPEED F/min	T.C. SEC.	SENS. SCT/MIN	ZERO	APL UNITS PER DIV	T.C. SEC.	SENS. SCT/MIN	ZERO

REMARKS:



ED 1990001

HOLE NO. PC-94-06

APPROX. LOCATION ___ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION

ELEVATION

DRILLER CARL MOORE

FROM	TO	LOG	REMARKS
0	14	CLAY + GRAVELS	
14	35	SANDSTONE	
35	41	COAL + SHALE	
41	219	SANDSTONE	
219	236	COAL	
236	259	SHALE	

700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA.

HOLE PC-94-06

LOCATION SEC. TP. RGE. W

AREA Fort Saskatchewan

PROVINCE Alta.

SURVEYED DATA

ELEV. 1498.3

LOG 224760.7N

723604.7E

GUN No. 2 3

DRILLED BY CARL MOORE

LOGGED BY R. CLARK

RECORDED BY R. CLARK

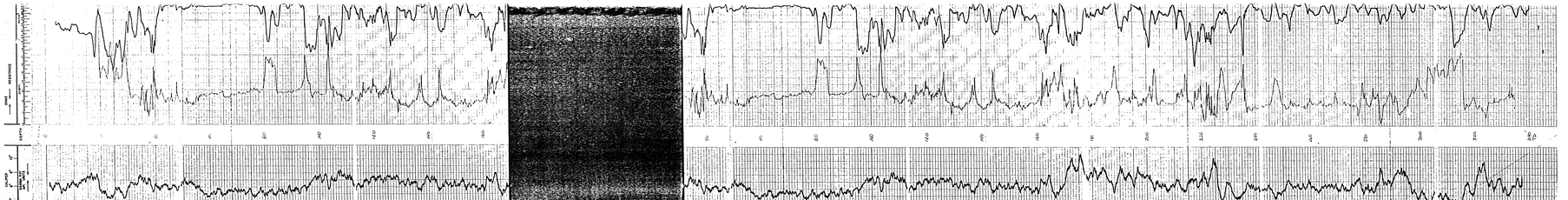
HOLE-HOLE RECORD				CASING RECORD			
SIZE	FROM	TO		SIZE	FROM	TO	

EQUIPMENT USED

SAMPLE BAR			RESISTIVITY	SONDE	CALIPER
TOOL MODEL No.	3-1/8	TOOL MODEL No.	3-1/8	3-1/8	
GUN No.	2	SONDE No.	2	2	
DETECTOR MODEL No.	DT-1/8	TYPE	MN	N	
LENGTH	20.0'	SPACING	16"	16"	
CABLE No.	3	TYPE	7	7	
	GENERAL		SONDE MODEL		
TRUCK No.			SONDE MODEL		WINCH
DRIVER			CALIBRATION		CU-17
			LOGGING DATE		08-14-74

GENERAL							SONDE		
RUN No.	DEPTH DRILLER	DEPTH LOGGER	MUD TYPE	T.C. SET.	BOND SET.	BHT. WHEN LOG.	T.C. SETTING	TIME
1	259'	259'	FW					

REMARKS:



ID A85CC01

HOLE NO. PC 94-5C

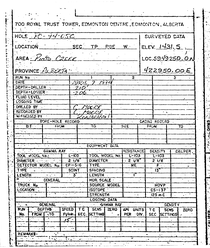
AUTHOR, LOCATION ___ SEC. ___ TWP. ___ RGE. ___ W. ___

SURVEYED LOCATION

ELEVATION

DRILLER Pmel Mercer

FROM	TO	LOG	REMARKS
0	4	Clay & Rock	
4	23	Soft Brown Sandstone	Water @ 4 Gal/min
23	69	Hard Sandstone	15 GPM
69	149	Coal	
149	150	Hard Stone	
150	151	Sandstone	
151	156	Shale & Stringers of Coal	
156	172	Sandstone	
172	197	Coal & Shale	
197	210	Sandstone	



700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE PC-94-5C — SURVEYED DATA

LOCATION ___ SEC. ___ TP. ___ RGE. ___ W. — ELEV. 1431.5

AREA Peace Creek — LOC. 5949250.0N

PROVINCE Alberta — 422950.00E

FOR NO.	1	2	3
DATE	March 7 1978		
DEPTH-DRILLER	210'		
DEPTH-LOGGER	206'		
FLUID LEVEL			
CASING TYPE			
DRILLED BY	C. Hinds		
WITNESSED BY	Pmel Mercer		
PURPOSE OF HOLE	Coal Exploration		

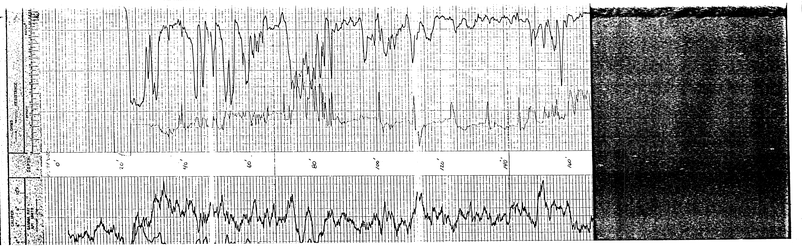
FORMATION	TOP	BASE	CASING RECORD SIZE	TOP	BOTTOM

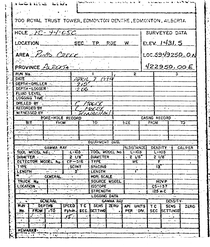
EQUIPMENT DATA

SONDE RAY		CALIPER	DENSITY	RESISTIVITY
TOOL MODEL NO.	1-105	TOOL MODEL NO.	1-205	1-305
DIAMETER	3 1/8"	DIAMETER	3 3/8"	3 1/8"
DETECTOR MODEL NO.	1-105	TYPE	MS	M
TYPE	SCINT	SPACING	36"	16"
LENGTH	9'	LENGTH	9'	9'
TRUCK NO.	LOCAL	SOURCE MODEL		1-305
LOCATION		SOURCE		50-17
		STRENGTH		50 mC

GENERAL				SONDE RAY							DENSITY						
RUN	DATE	LOGGING UNIT	SPEED FPM	T.C. SEC.	SENS. MV/DIV	ARC. UNITS	T.C. SEC.	SENS. MV/DIV	ARC. UNITS	T.C. SEC.	SENS. MV/DIV	ARC. UNITS	T.C. SEC.	SENS. MV/DIV	ARC. UNITS	T.C. SEC.	SENS. MV/DIV
1	7 Mar	1-105	10														

REMARKS





700 ROYAL TRUST TOWER, EDMONTON CENTRE, EDMONTON, ALBERTA

HOLE PC-94-5C — SURVEYED DATA

LOCATION ___ SEC. ___ TP. ___ RGE. ___ W. — ELEV. 1431.5

AREA Peace Creek — LOC. 5949250.0N

PROVINCE Alberta — 422950.00E

FOR NO.	1	2	3
DATE	March 7 1978		
DEPTH-DRILLER	210'		
DEPTH-LOGGER	206'		
FLUID LEVEL			
CASING TYPE			
DRILLED BY	C. Hinds		
WITNESSED BY	Pmel Mercer		
PURPOSE OF HOLE	Coal Exploration		

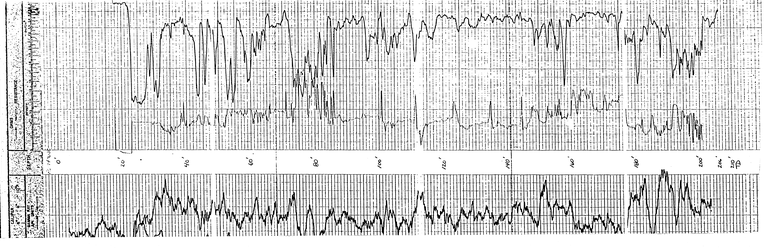
FORMATION	TOP	BASE	CASING RECORD SIZE	TOP	BOTTOM

EQUIPMENT DATA

SONDE RAY		CALIPER	DENSITY	RESISTIVITY
TOOL MODEL NO.	1-105	TOOL MODEL NO.	1-205	1-305
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LOCATION		SOURCE		50-17
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GENERAL				SONDE RAY							DENSITY						
RUN	DATE	LOGGING UNIT	SPEED FPM	T.C. SEC.	SENS. MV/DIV	ARC. UNITS	T.C. SEC.	SENS. MV/DIV	ARC. UNITS	T.C. SEC.	SENS. MV/DIV	ARC. UNITS	T.C. SEC.	SENS. MV/DIV	ARC. UNITS	T.C. SEC.	SENS. MV/DIV
1	7 Mar	1-105	10														

REMARKS



ID: RA85000