

82-G-2
OPEN FILE

SAGE CREEK COAL LIMITED

Report
on
Field Investigations
June to October 1976

November 1976

O. Cullingham

MINING RECORDER RECEIVED and RECORDED
MAY 30 1977
M.R. #..... VICTORIA, B. C.

00371 (4)

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- | | | |
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INTRODUCTION

Following the completion and evaluation of all exploratory works to the end of 1975, it was apparent that two anomalous areas existed which required further investigation. The two areas were:

1. An apparent N-S trend of depressed F.S.I.'s running through the centre of North Hill.
2. The apparent dissimilarity of washability results performed on bulk samples from seam 2 (from Adit 73-2 S) and core recovered from seam 2 in several diamond drill holes on South Hill.

It was agreed that diamond drilling would be the most economical and reliable method to investigate and explain the anomalies. Six holes were proposed and drilled: three holes on the North Hill, all drilled to the basal sandstone, and three on the South Hill, all terminated after intersecting seam 2. A total of 2,976 feet was drilled.

In addition, a bulk sampling programme was carried out to determine the following:

1. The washability of seam 5 on South Hill excluding the parting separating seam 5U from seam 5L. (In all previous samples of Seam 5 from South Hill the parting was included in the sample).

2. The washability and coal qualities of a blend of Seam 2, Seam 4U and Seam 4L only. The necessity of this was brought about by a decision to look at a mining plan to open pit Seams 2 and 4 only, at a production rate of 1.5 million long tons of clean coal per year.

Adit 73-5A-S on South Hill was re-entered for the purpose of obtaining samples of Seam 5U and Seam 5L and Adits 72-2-N and 72-4-N on North Hill were re-entered to obtain samples of Seam 2, Seam 4U and Seam 4L.

The diamond drilling contract was awarded to Connors Drilling Limited of Vancouver. The rig was a skid-mounted Longyear 28, equipped with wireline equipment to recover H.Q. core (2 25/32" diameter).

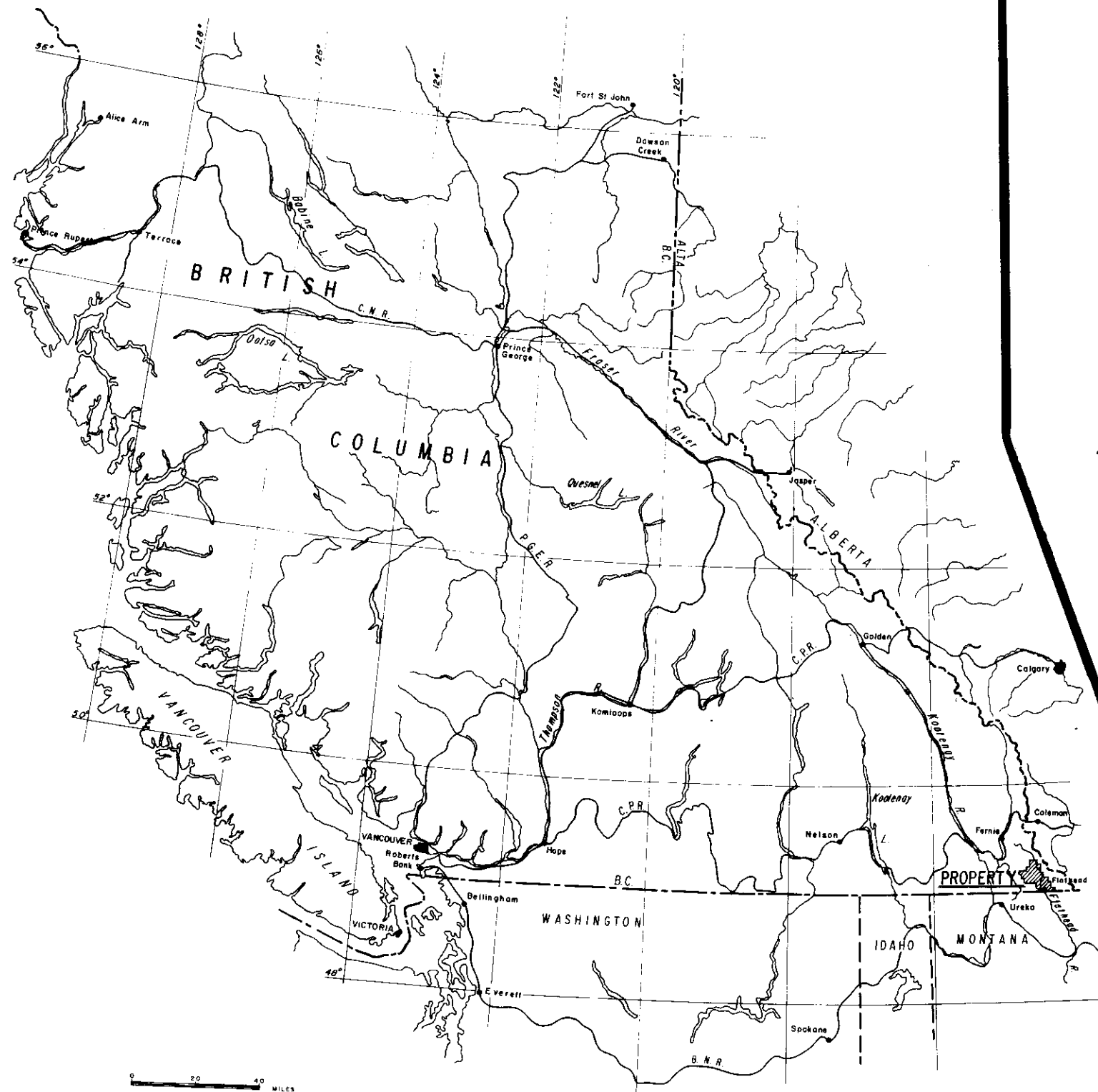
The bulk sampling contract was awarded to Trina Maree Mining Limited of Blairmore, Alberta. All excavation and bulk sampling was carried out using hand equipment (picks and shovels) air pick and wheelbarrow. A total of 213 feet of drifting and cross-cutting was carried out and 67 long tons of sample extracted.

The support facilities contract (camp and catering, bulldozing and rehabilitation) was awarded to McMeekin Construction Limited of Rocky Mountain House, Alberta. McMeekin provided one D-7 Caterpillar tractor to construct drill sites and access roads and to carry out rehabilitation.

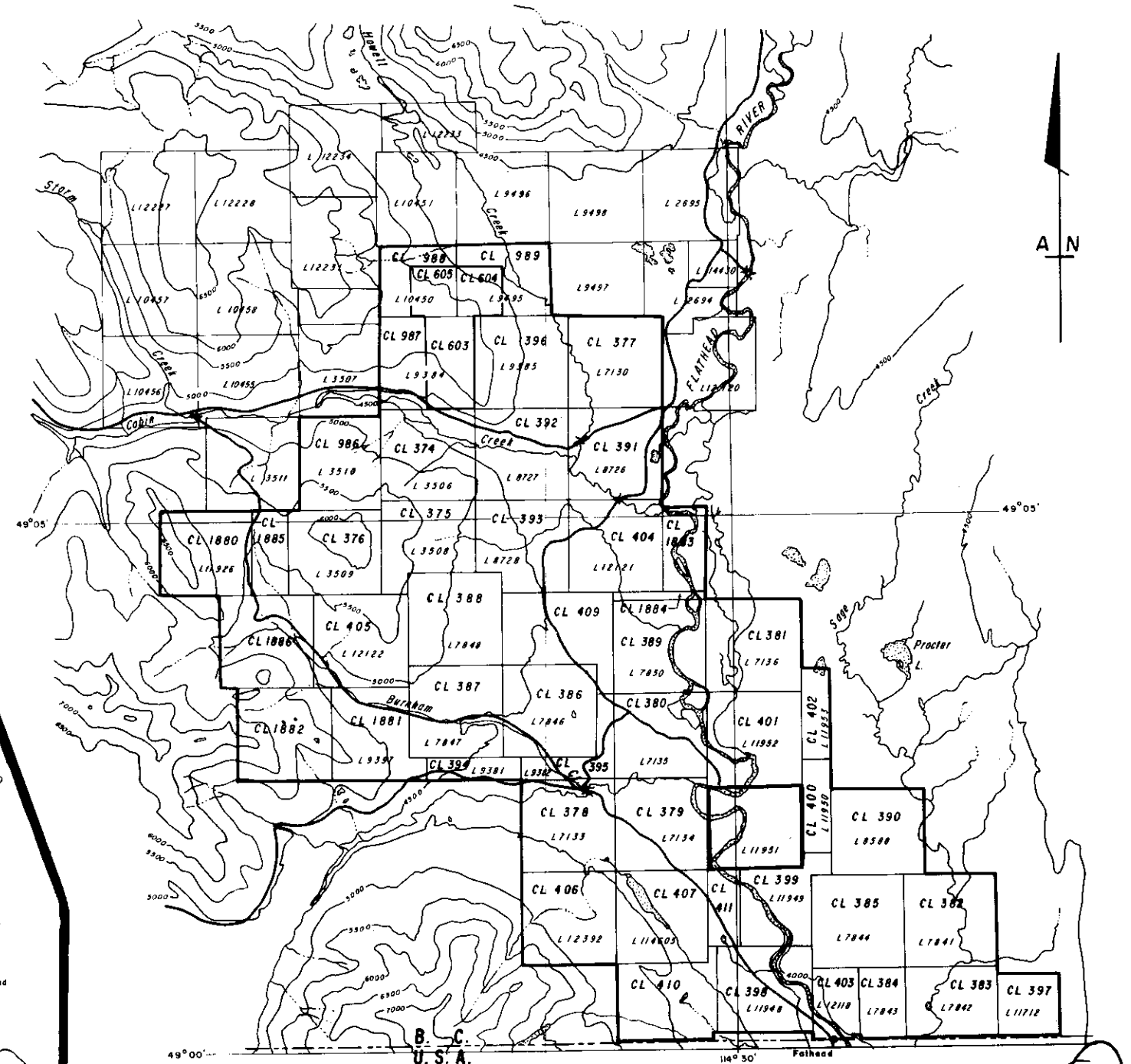
CONCLUSIONS

The following conclusions have been drawn from the 1976 drilling program:

1. Test results from holes 76D01, 76D02, and 76D03 indicate normal F.S.I. values for all seams on North Hill. Therefore, there is no low F.S.I. zone. Its apparent presence was due to poor quality F.S.I. data derived from previous rotary hole samples.
2. Washability test results from holes 75D04, 75D05, and 75D06 corroborate the washability test results from the adit samples. Therefore, the washability results of the adit samples are reliable data.



PROPERTY LOCATION MAP-
SHOWING RAILWAYS TO VANCOUVER



LEGEND

- Outline of property
- L.11712 Lot number
- CL.397 Coal Licence

NOTE: 603, 604 & 605 purchased
from C.N.I. Nov. 1973

K-SAGE CREEK 76(2)A.

RIO TINTO CANADIAN EXPLORATION LTD.	
SAGE CREEK COAL LIMITED - B.C.	
PROPERTY PLAN	
FEB. 1975	O.C. / E.S. DWG. L 2692

LOCATION AND ACCESS

The Sage Creek Coal property lies in lower Flathead Valley in southeastern British Columbia. The centre of activity is some 6 air miles north of the border near the confluence of Howell and Cabin Creeks. Geographically this location lies at $49^{\circ}06'$ north latitude, $114^{\circ}34'$ west longitude (N.T.S.: 82-G-1,2). The centre of the property is 35 air miles southeast of the town of Fernie, B.C.; the nearest settlement where supplies and services are available.

Access to the property from Fernie is via paved Provincial Highway No. 3 to Morrissey and from there via gravel surfaced B. C. Forest Development Roads along Lodgepole and Harvey Creeks and Flathead Valley. An alternate route into the property is south from Highway No. 3, east of Michel, B.C., along the Flathead Road. The Flathead Road continues across the International Boundary to Columbia Falls, Montana.

The nearest railway to the property is CP's line in Crows Nest Pass area and in Elk Valley at Morrissey. Electrical power is available in Elk Valley and the Crows Nest Pass area.

DRILLING

The drilling programme commenced July 22 with the mobilization of the drilling equipment to the property and was concluded September 24 with the completion of hole 76D06.

Holes 76D01, 76D02 and 76D03 were drilled on the North Hill to investigate the apparent depressed F.S.I. zone and holes 76D04, 76D05 and 76D06 were drilled on the South Hill to investigate the dissimilarity in washability results of Seam 2.

Drill Hole 76D01

This hole was drilled approximately 40 feet north from hole 74-41 and close to the centre of the apparent depressed F.S.I. zone. The purpose of the hole was to provide coal core samples of all three economic coal seams to compare with rotary chip samples recovered from hole 74-41.

Hole 76D01 intersected what appears to be a normal sequence of stratigraphy to Seam 5 and generally correlated well with hole 74-41; however, minor variations in intersected thicknesses were observed. The more noticeable of these are the apparent thinning of Seam 2 from 37 ft. (hole 74-41) to 24.5 ft. (hole 76D01) and the apparent thickening of the parting separating Seam 4U and Seam 4L from 22.5 ft. (hole 74-41) to 42.0 ft. (Hole 76D01). In the writers opinion variations of this nature are not unexpected and are readily explained by depositional variations and localized steepening and flattening of dip.

Of more concern is the apparent thinning of Seam 5 from 67.5 ft. (hole 74-41) to 28.5 ft. (hole 76D01). The thinning appears to affect only the lower bench of the seam, Seam 5 lower. Seam 5 lower is abnormally thick in hole 74-41

(41.5 ft.) and abnormally thin in hole 76D01 (4.0 ft.) with respect to surrounding holes SCC5, SCC11, 74-42, 74-45, 75D02 and 75D03. The thickness in these holes varies from 11.0 ft. to 20.0 ft. and averages 15.0 ft. A plausible explanation - and the one adopted by the writer - for this apparent thickening and thinning in such close proximity is "pinch and swell".

Drill Hole 76D02

This hole was drilled to investigate the apparent depressed F.S.I. zone at its north end in the centre of the zone. The hole intersected what appears to be a normal section of stratigraphy to the basal sandstone. An apparent thinning of the interval between Seam 2 and Seam 4U is, in part, compensated by a thickening of the strata between Seam 4L and Seam 5 and between No. 1 Horizon and Seam 2. The thinning appears to be depositional.

Drill Hole 76D03

This hole was drilled to investigate the apparent depressed F.S.I. zone at its south end in the centre of the zone. The hole intersects what appears to be a normal section of stratigraphy to the basal sandstone.

Test results from all three holes indicate normal F.S.I. values for all three seams. It would appear that the depressed F.S.I. zone, indicated by the rotary drill results, was caused by poor recovery of rotary chip samples. (See tabulation of analytical results Table 1).

SAGE CREEK PROJECT
ANALYTICAL RESULTS OF COAL SEAM COMPOSITE SAMPLES
1976 DRILLING PROGRAM

Hole Number	Seam	Start Ft.	End Ft.	Thick Ft.	Core Recovery %	Raw Coal Analysis	
						Ash	FSI
76D-01	2	359.5	388.7	29.2	86	32.2	4.0
76D-01	4U	539.0	551.1	12.1	95	22.8	2.5
76D-01	4L	592.3	610.0	17.7	38	29.4	3.0
76D-01	5U	824.0	840.0	16.0	69.5	23.2	3.0
76D-01	5L	846.0	848.0	2.0	65	23.7	5.5
76D-02	2	269.0	297.8	18.8	76	17.0	5.5
76D-02	4U	342.3	376.5	34.2	91	20.2	3.0
76D-02	4L	388.7	400.0	11.3	73	26.2	1.5
76D-02	5U + L	637.0	686.0	49.0	79	28.0	2.0
76D-03	2	127	135.8	8.8	71	19.5	6.0
76D-03	4U	359.2	394.1	34.9	100	22.0	2.5
76D-03	4L	407.2	428.65	21.15	96	26.1	2.5
76D-03	5U	610.8	635.0	24.2	95	33.1	2.5
76D-03	5L	644.15	658.5	14.35	95	31.2	3.0
76D-04	2	327	346.3	19.3	92	30.6	5.0
76D-05	2	172	185.1	13.1	96	21.6	6.5
76D-06	2	108	120.3	12.3	87	21.3	5.5

TABLE - 1

All holes were logged open hole with Gamma Ray/Neutron, Sidewall Density, Caliper and Focused Beam Logs. (Appendix E). Three Sperry-Sun single-shot deviation surveys were run in each of the holes and the results are tabulated in Table II.

Drill Hole 76D04

This hole was drilled approximately 650 feet southeast from Adit 73-2-S; its proximity to the adit was designed to obtain a reliable correlation between the drill hole and the adit.

The hole intersected a normal section of stratigraphy to the base of Seam 2. Immediately below Seam 2, extensive downhole caving caused the hole to be abandoned a few feet short of its planned depth. No open hole logs were obtained.

Drill Hole 76D05

This hole was drilled approximately 500 feet south from hole SCC19. The hole intersected what appears to be a normal section of stratigraphy to the base of Seam 2.

Drill Hole 76D06

This hole was drilled approximately 400 feet south from hole 74-06. The hole intersected what appears to be a normal section of stratigraphy to the base of Seam 2.

Washability tests results from all three holes corroborate the washability test results from adit 73-2-S.

TABLE II

DEVIATION SURVEYS

RUN NO.1			RUN NO.2		RUN NO.3	
Hole	Depth	Dip & Dir.	Depth	Dip & Dir.	Depth	Dip & Dir.
76 _D 01	250'	0.7°@ 286°	500'	2.0°@ 276°	850'	3.0°@ 295°
76 _D 02	250'	3.5°@ 310°	500'	4.5°@ 298°	700'	4.5°@ 302°
76 _D 03	200'	2.3°@ 282°	450'	4.8°@ 276°	660'	6.8°@ 282°
76 _D 04	N/A					
76 _D 05	200'	1.0°@ 355°				
76 _D 06	145'	1.0°@ 153°				

Holes 76D05 and 76D06 were logged open hole with Gamma Ray/Neutron, Sidewall Density and Caliper probes. (Appendix E). A Sperry-Sun single-shot deviation survey was run in each of the holes and the results are tabulated in Table II. Hole 76D04 was logged through H.Q. drill rods with Gamma Ray/Neutron and Sidewall Density probes only. (Appendix E).

All holes were logged visually and detailed lithology logs are attached as Appendix A at the back of this report.

Columnar sections of all holes were drawn at 1"=40' and coal sequences expanded to 1"=2'. Reductions of these drawings are attached as Appendix F.

The co-ordinates of all drill holes were located by tape and compass only and elevations taken from the property base map at 1" = 200' with a 5' contour interval. The table of co-ordinates precedes Appendix A as Table III.

The coal seams and horizons intersected by the drill holes were sampled on the basis of lithology usually in increments of less than 2.0 feet. Channel samples of approximately 100 gm. were cut from the core for field tests and the rest of the samples were sent to Coal Science and Minerals Testing Limited - a division of Birtley Engineering Limited - in Calgary.

The field tests carried out on the channel samples were:

- (i) Raw Coal F.S.I.
- (ii) Float/Sink at 1.5 s.g.
- (iii) F.S.I. of float sample
- (iv) F.S.I. of sink sample

The results of the tests are tabulated at the back of this report in Appendix B.

The samples sent to Calgary were tested for raw ash, raw coal F.S.I. and specific gravity (dry basis). Composite samples of each coal seam were tested for washability. The laboratory test results are attached to this report as Appendix C.

BULK SAMPLING

The bulk sampling of Seam 5 on the South Hill was carried out from June 22 to June 28, 1976, and the bulk sampling of Seam 4 and Seam 2 on the North Hill were carried out from September 20 to October 7, 1976.

Adit 73-5a-S

This adit was re-entered to extract separate bulk samples of Seam 5U, Seam 5L and the parting separating the seams. The samples were extracted from the south wall of the cross-cut excavated in 1975. A total of 30 long tons was extracted as follows:

Seam 5U	12 long tons
Seam 5L	12 long tons
Separating Parting	6 long tons

The attached tape and compass plan of the adit at 1" - 20' indicates the location of the bulk sample points relative to previous sample points. (Drawing DWG. G.2751-3).

Adit 72-4-N

This adit was re-entered to extract bulk samples of Seam 4U and Seam 4L for further blending tests with Seam 2. The adit was advanced a further 20 feet along strike in each of the seams from the cross-cuts driven in 1975. New crosscuts were driven and bulk samples extracted from the north walls. Twelve long tons were extracted from each of Seam 4U and Seam 4L. The adit extensions and crosscuts are plotted on the attached tape and compass plan of the adit at 1" = 20'. (Drawing DWG.G.2751-2). Seam 4U was measured as 31.9' and Seam 4L was measured as 19.0'. Channel samples in 2 foot increments were taken across the true thickness of each seam. The samples were subjected to raw F.S.I. determinations and F.S.I. determinations on the float and sink fractions at 1.5 s.g. F.S.I. tests were also made on raw and float/sink composite samples. The results of the tests are recorded in Appendix D at the back of this report.

Adit 72-2-N

This adit was re-entered to extract a bulk sample of Seam 2 for further blending tests with Seam 4U and Seam 4L. The adit was advanced a further 20 ft. along strike from the crosscut driven in 1975 and a new crosscut was driven. The crosscut was extended from previous years to expose coal bands above and below the main seam. A bulk sample of 12 long tons was extracted from the north wall of the crosscut from the main seam. Two special samples, each of

approximately 1/2 long ton, were extracted from the coal bands and the separating shale partings above and below the main seam.

The adit extension and the crosscut are plotted on the attached tape and compass plan at 1" = 20'. (Drawing DWG. G.2751-1). The main seam was measured as 11.0' and the total thickness of stratigraphy as exposed in the crosscut was measured as 17.6' (Section and profile of crosscut; (Drawing DWG. G.2751-1). Channel samples at approximate 2 foot increments were taken across the true thickness of the exposure in the crosscut. The samples were subjected to raw F.S.I. determinations and F.S.I. determinations on the float and sink fractions at 1.5 s.g. F.S.I. tests were also made on composites of the samples. The results of the tests are recorded in Appendix D at the back of this report.

The bulk samples from all seams transported to Coal Science and Minerals Testing Limited in Calgary - a division of Birtley Engineering Limited - where washability tests were carried out. Results of the testing are reported in other reports.

ENVIRONMENTAL STUDIES AND REHABILITATION

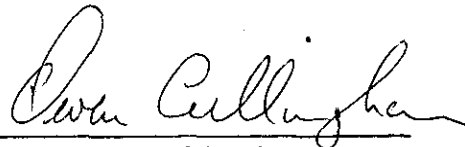
Environmental Studies

Environmental studies and monitoring continued throughout the season and are scheduled to continue through the winter. The studies have mainly revolved around Fish Population Studies, Water Quality, Hydrology and Weather Monitoring. Details of

the Environmental programme and results there-from are beyond the scope of this report and will be discussed in separate reports.

Rehabilitation

Rehabilitation of all surface workings was carried out in compliance with guidelines laid down by the Reclamation Branch of the Department of Mines and Petroleum Resources. The rehabilitation was carried out continuously during the drilling and bulk sampling programmes and was completed by the end of the latter. The rehabilitation of drill sites, access roads, trenches and adit sites was inspected by two representatives of the Department of Mines and Petroleum Resources on September 30th. Both expressed satisfaction for the way in which the clean-up was performed.


Owen Cullingham

CERTIFICATE OF QUALIFICATION

I, Owen Robert Cullingham, hereby certify as follows:

1. That I am a geologist and reside at
#8, 475 Bramalea Road, Brampton, Ontario L6T 2X2.
2. That I graduated in 1968 from The University of
Calgary with a B.A. degree in History and Economics
and in 1971 also from The University of Calgary with a
B.Sc. degree in Geology.
3. That I have been practicing as an exploration
geologist since 1970 with Rio Tinto Canadian Exploration
Limited. I have been mainly concerned with coal exploration
in Western Canada.


Owen Cullingham

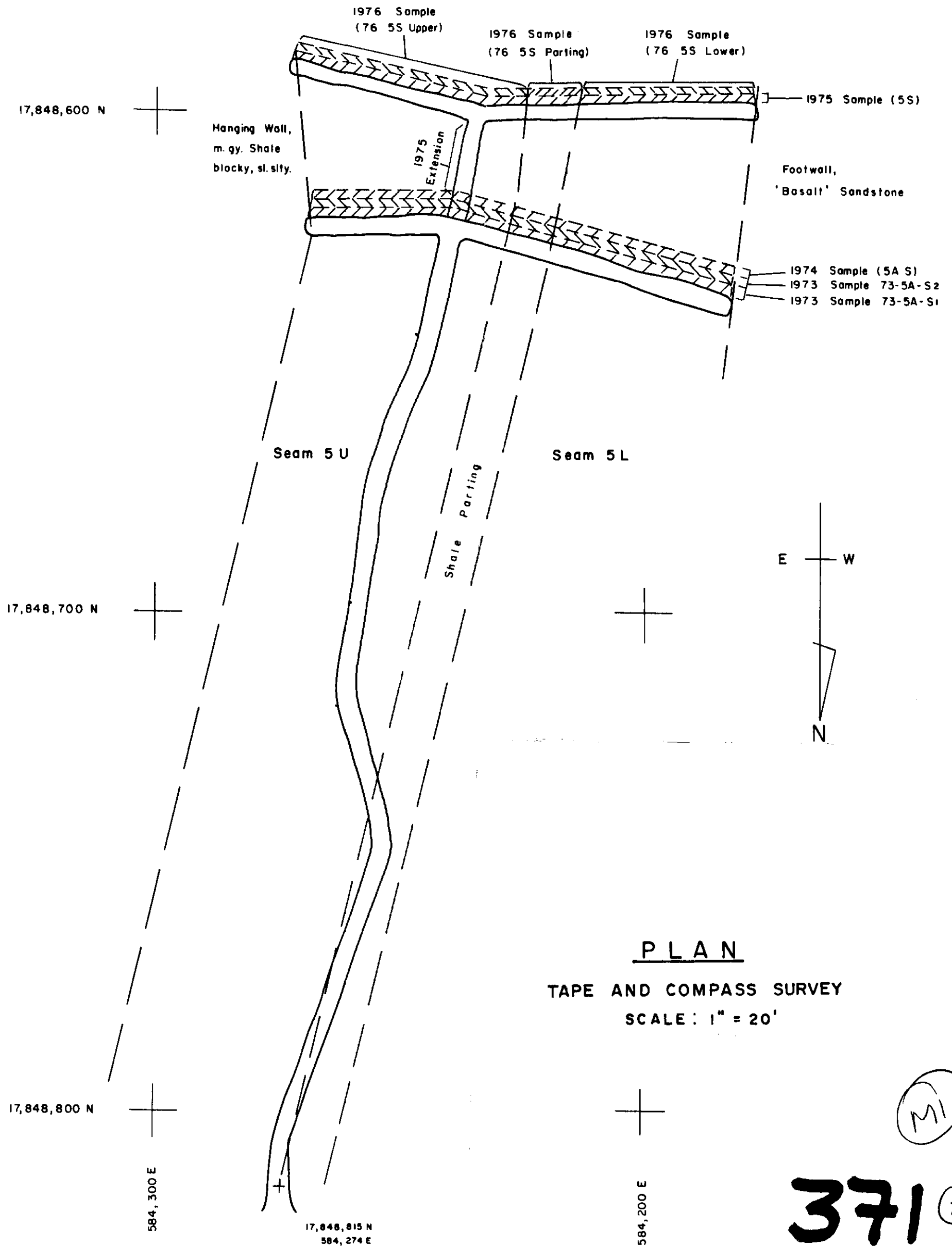
K - SAGE CREEK 76(2)A

SAGE CREEK COAL LTD.
REPORT ON
FIELD INVESTIGATIONS
(MAPS)

D. CULLINGHAM

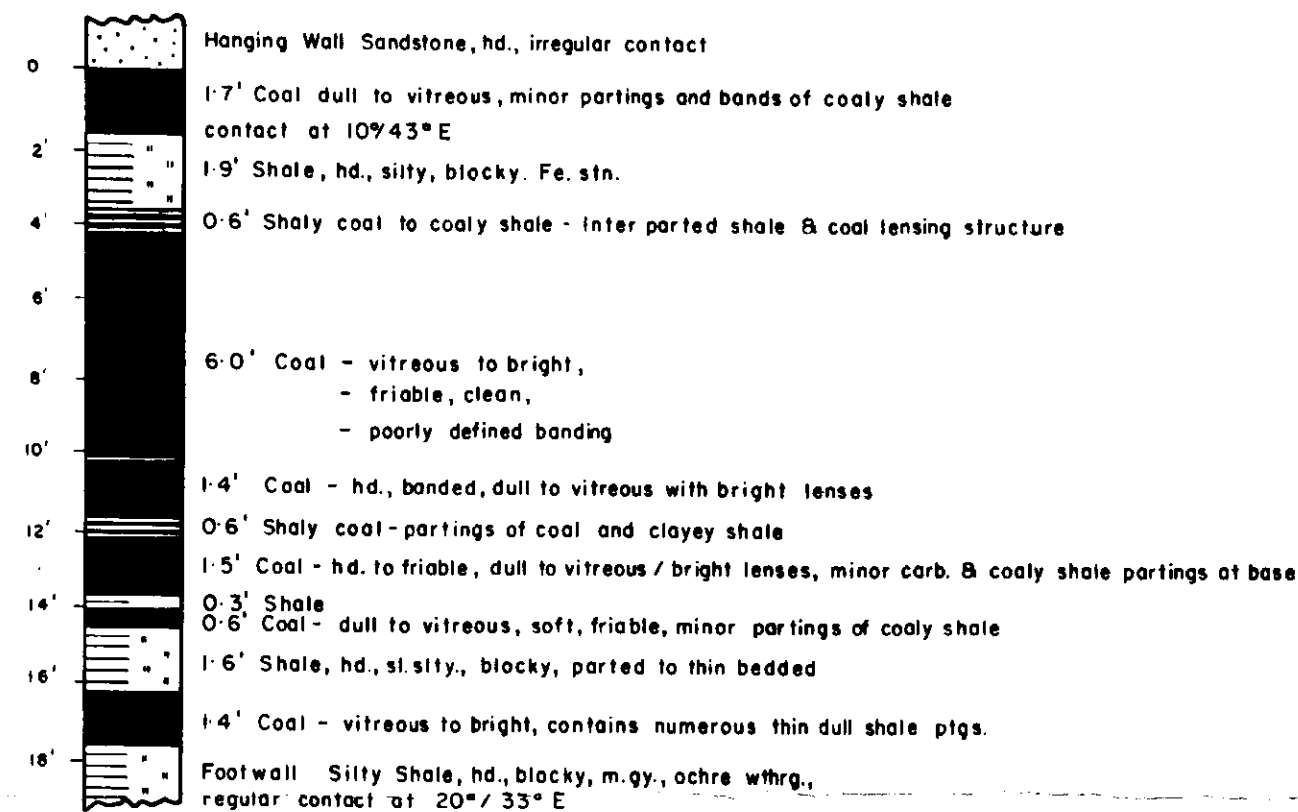
NOVEMBER 1976

00371 (2)

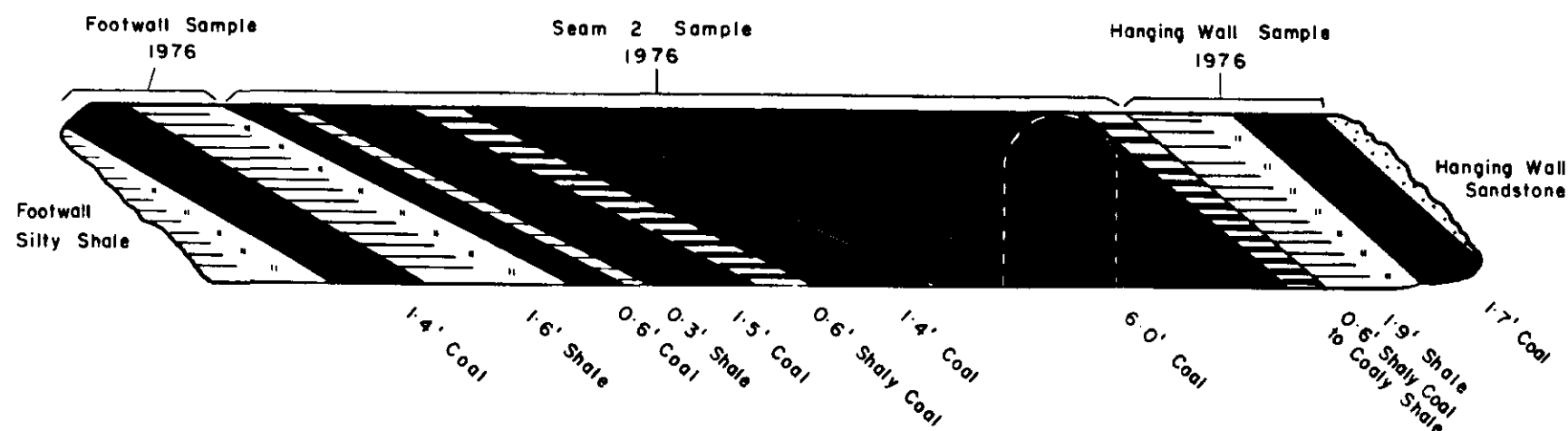


K-SAGE CREEK 76 (2) A

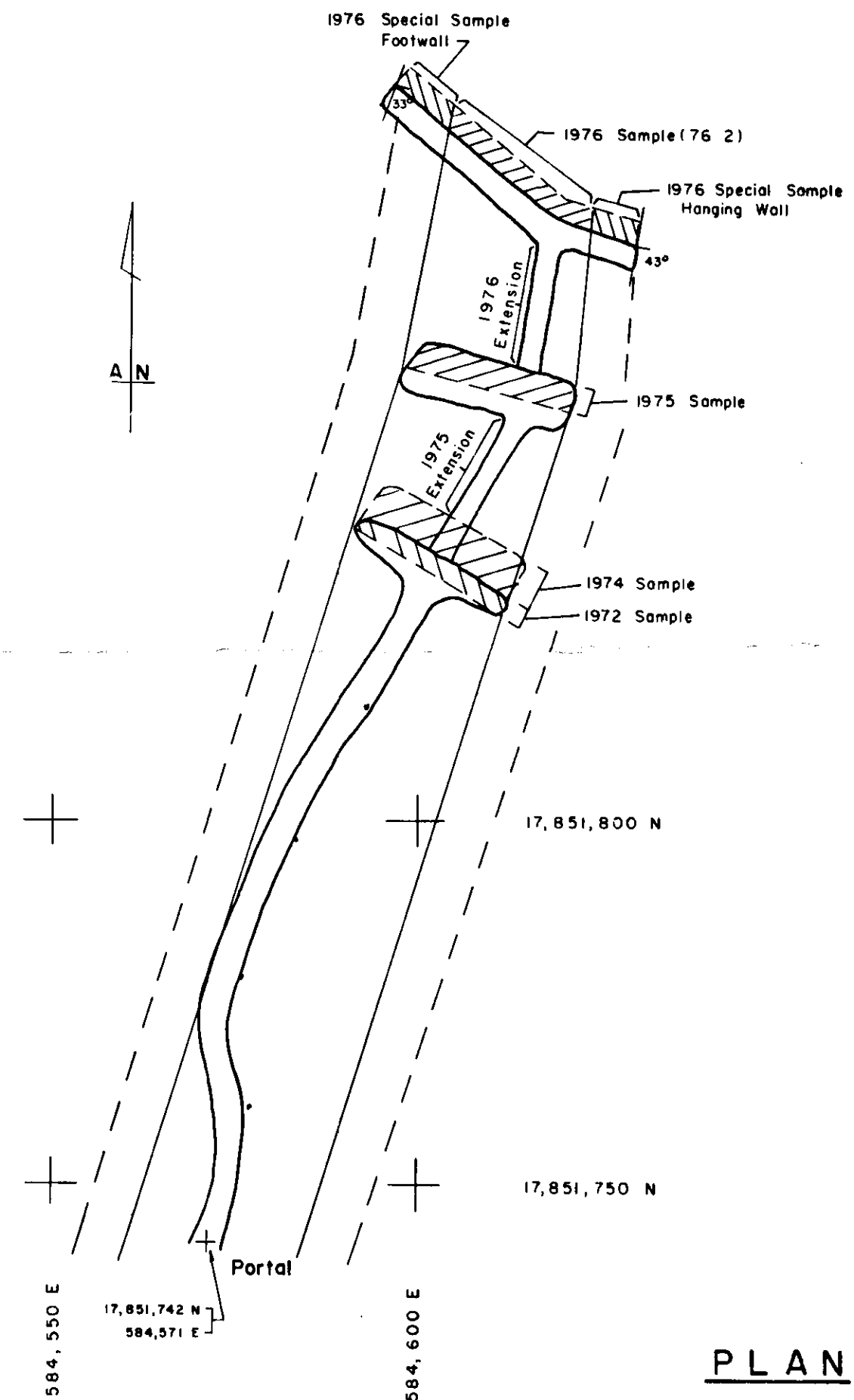
RIO TINTO CANADIAN EXPLORATION LIMITED		
SAGE CREEK COAL LTD. - B.C.		
ADIT No. 73-5a-S SEAM 5 35 AS		
Nov, 1976	O.C. / e.s.	DWG. G 2751-3



SECTION
DERIVED FROM MAPPING
NORTH WALL OF 1976 CROSS-CUT
SCALE: 1" = 5'



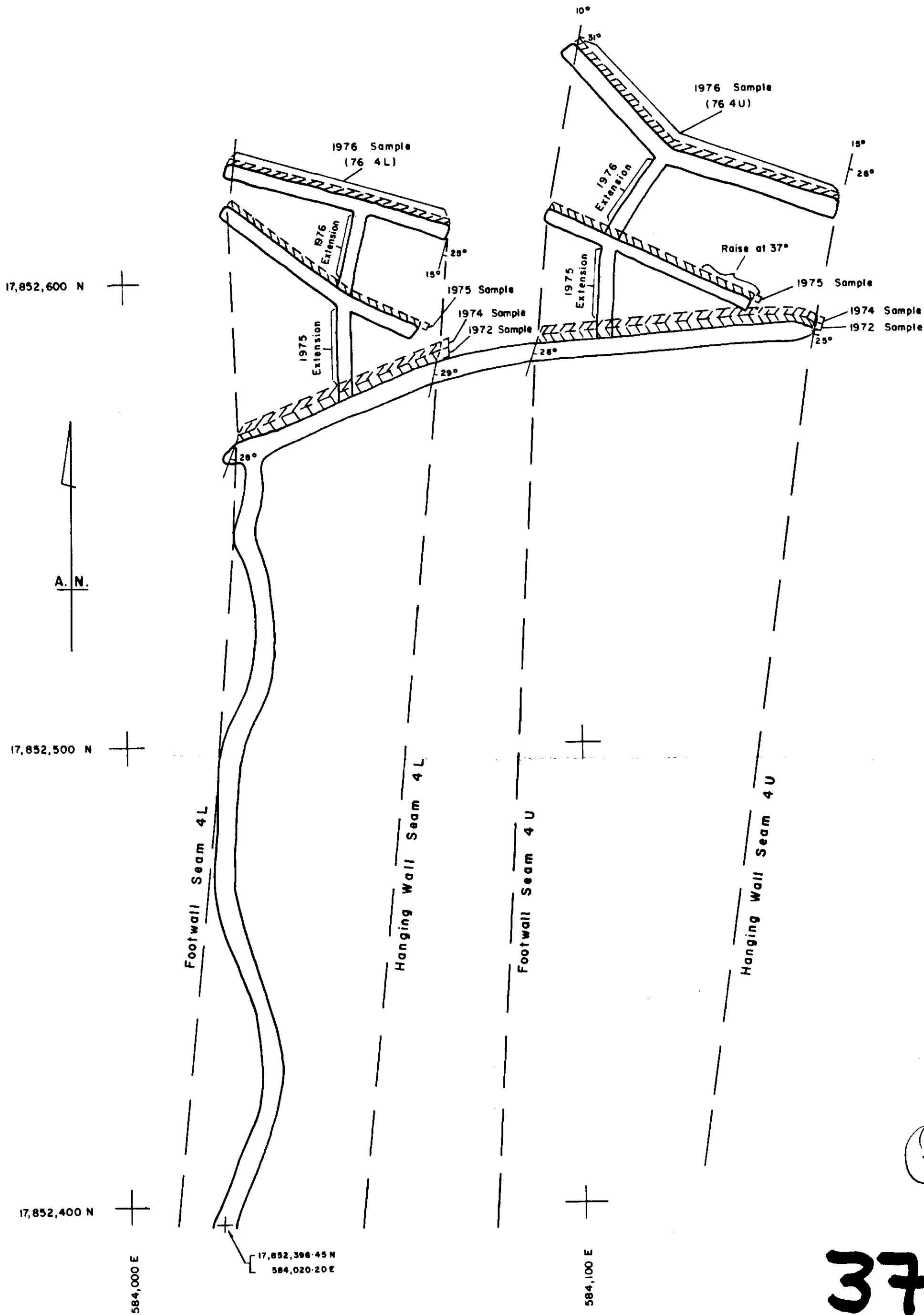
CROSS-CUT
NORTH WALL OF 1976 CROSS-CUT
(Measured at waist height by O.C. October 1976)
SCALE: 1" = 5'



PLAN
SURVEY PLOT OF ADIT
(Extensions by Tape & Compass)
SCALE: 1" = 20'

K-SAGE CREEK 76(2)A

RIO TINTO CANADIAN EXPLORATION LIMITED		
SAGE CREEK COAL LTD. - B.C.		
ADIT No. 72-2N - SEAM 2 <i>72-2-N</i> <i>22-N</i>		
Nov, 1976	O.C. / e.s.	DWG. G 2751-1



M3

371 (2)

K-SAGE CREEK 76(2)A

PLAN
 SURVEY PLOT OF ADIT
 (Extensions by Tape & Compass)
 SCALE: 1" = 20'

RIO TINTO CANADIAN EXPLORATION LIMITED		
SAGE CREEK COAL LTD. - B.C.		
72-4-N ADIT No. 72-4N - SEAMS 4U & 4L 04-N		
Nov, 1976	O.C. / e.s.	DWG. G 2751 - 2

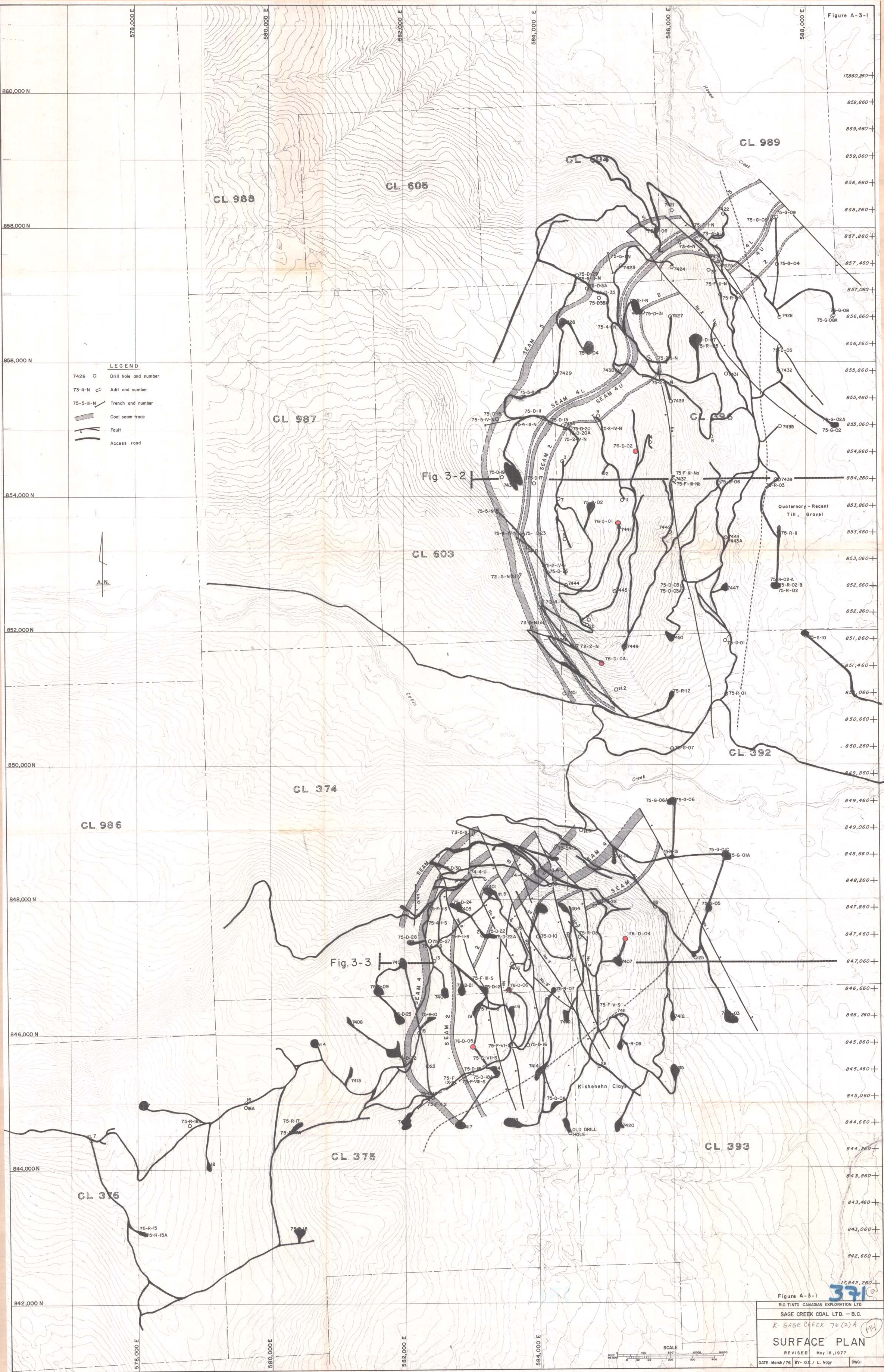


Figure A-3-1

Figure A-3-1

RIO TINTO CANADIAN EXPLORATION LTD.
SAGE CREEK COAL LTD. - B.C.
K-SAGE CREEK 76(2)A
SURFACE PLAN
REVISED May 18, 1977
DATE: March/76 BY: O.C. / L. Nagy DWG:

1K SAGE CREEK 76(3) A

SAGE CREEK COAL LTD.

REPORT ON
FIELD INVESTIGATIONS
(LOGS)

O. COLLINGHAM (Book B-1) NOVEMBER 1976

00371 (1)

ROKE

GAMMA RAY NEUTRON LOG

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. COMPANY SAGE CREEK COAL

WELL 76-D-0-1

LOCATION

FIELD FLATHEAD

PROVINCE BRITISH COLUMBIA

GROUND LEVEL

Log Measured from

With Depth Measured from

Run No. ONE

Date 12 AUGUST 1976

First Reading 0

Footage Logged 862

Depth Reached 863

Depth Driller 864

Casing Roke 53

Fluid Type GEL

Liquid Level 62

Min. Diam. HQ

Run @ 01

Operating Time 2 HOURS

Truck No. 36

Recorded By CARLSON

Witnessed By CULLINHAM

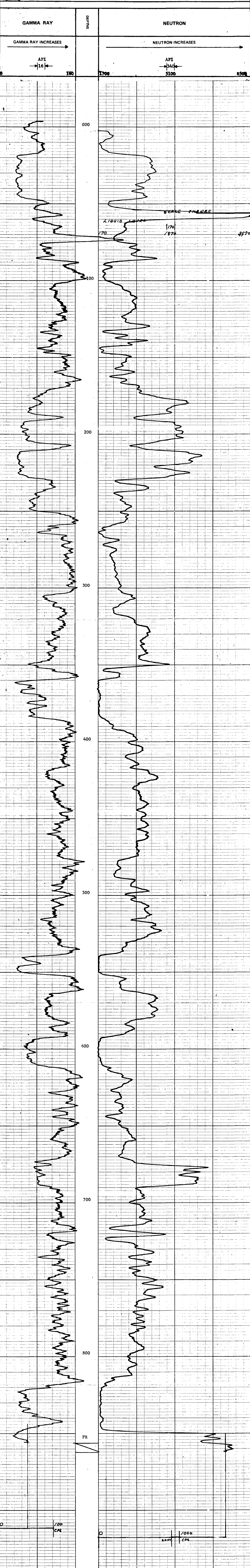
EQUIPMENT DATA

EQUIPMENT DATA			
GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.		LOG TYPE	NEUTRON/NEUTRON
DIAMETER	1 11/16	TOOL MODEL NO.	
DETECTOR MODEL NO.		DIAMETER	1 11/16
TYPE	SCINTILLATION	DETECTOR MODEL NO.	
LENGTH	4 INCH	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	6.8 FT.	LENGTH	6 INCH
		SOURCE MODEL NO.	MRC-N-SS-W
GENERAL		SERIAL NO.	265
HOIST TRUCK NO.		SPACING	17 INCH
INSTRUMENT TRUCK NO.	36	TYPE	AmBe
TOOL SERIAL NO.	125002	STRENGTH	3 CURIES

LOGGING DATA

GENERAL				GAMMA RAY				NEUTRON			
RUN NO.	FROM	TO	SPEED FT/MIN	T.C. SEC.	SENS SETTINGS	ZERO DIV. L OR R	API G. R. UNITS PER LOG DIV.	T. C. SEC.	SENS SETTINGS	ZERO DIV. L OR R	API N. UNITS PER LOG DIV.
1	0	62	12	4	100	0	16	3	1000	5 L	340
2	62	862	12	4	100	0	16	3	500	1 L	170

REMARKS



ROKE

FOCUSED BEAM LOG

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. COMPANY SAGE CREEK COAL

WELL 76-D-0-1

W. M.

LOCATION FIELD PLATEAU

PROVINCE BRITISH COLUMBIA

Permanent Datum GROUND LEVEL

Log Measured from KIG FLOOR

Well Depth Measured from KIG FLOOR

Run No. 001

Date 12 AUGUST 1976

Last Reading 72

Footage Logged 788

Depth Reached 864

Casing Rate 53

Casing Driller GEL

Fluid Type 72

Liquid Level HQ

Min. Diam. 12.50 @ 77

Rm @ 9F

Operating Time 1 HOUR

Truck No. 36

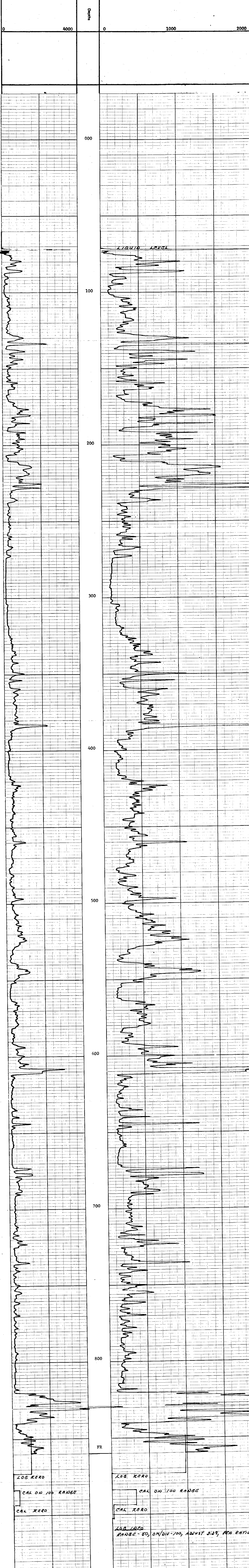
Recorded By CARLSON

Witnessed By CILLINGHAM

371

11

Remarks SONDE GEOMETRIC FACTOR .329 PROTO TYPE 3
GROUND FISH READING - 65 OHMS
WATER SAMPLE TAKEN FROM MUD TANK



LOG ZERO CAL ON 100 RANGE CAL ZERO

LOG ZERO CAL ON 100 RANGE CAL ZERO RANGE - 50, 0M/DIV - 100, ADJUST 3.29, RES RATIO 4761

ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO.

COMPANY

WELL

DATE

LOCATION

FIELD

PROVINCE

Log Measured from

Well Depth Measured from

Other Services

PERMIT NO.

LOG TYPE

TOOL MODEL NO.

DIAMETER

DETECTOR MODEL NO.

TYPE

LENGTH

SOURCE MODEL NO.

SERIAL NO.

SPACING

TYPE

STRENGTH

371

76-DO 2

24 AUGUST 1976

FLAT TOP MOUNTAIN

BRITISH COLUMBIA

RIG FLOOR

RIG FLOOR

DENIS-CAL. FBI, INC.

K.B.

CSG

G.L.

Run No.

Date

First Reading

Footage Logged

Depth Reached

Depth Driller

Casing Driller

Fluid Type

Liquid Level

Min. Diam.

Rm @ OF

Operating Time

Truck No.

Recorded By

Witnessed By

ONE

24 AUGUST 1976

710

0

710

711

712

24

MUD/WATER

90

IR

2 HOURS

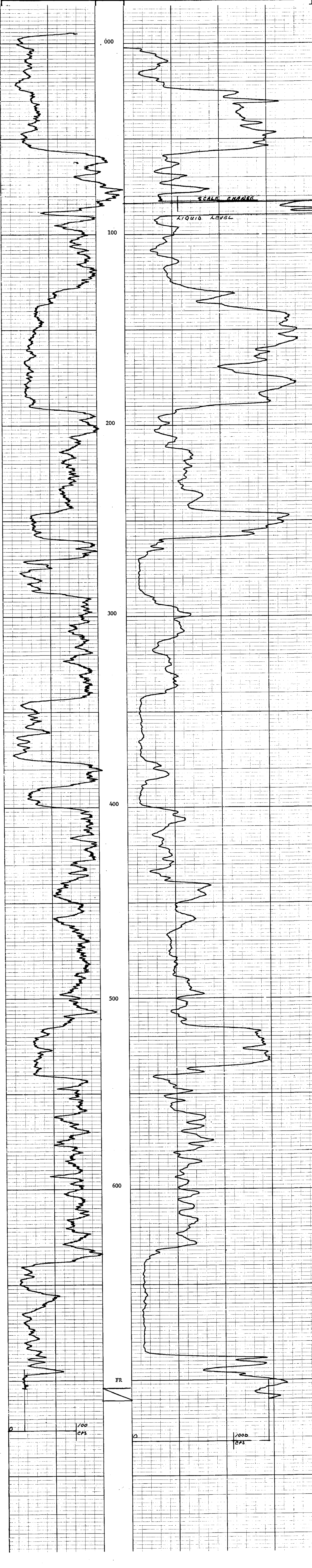
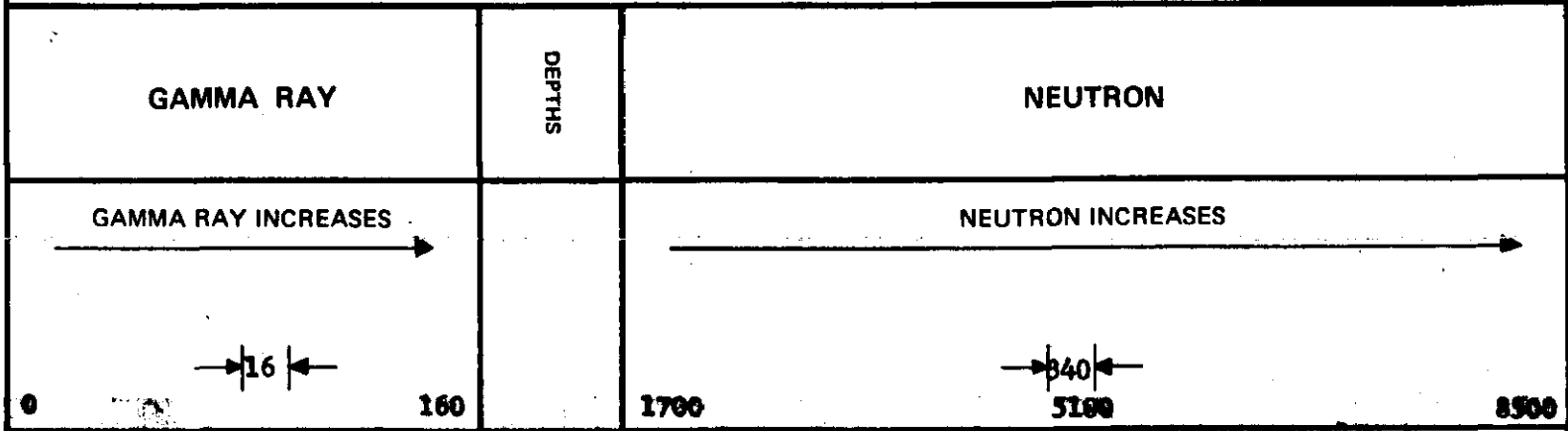
36

CARLSON

CUTTINGHAM

EQUIPMENT DATA			
GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.		LOG TYPE	NEUTRON/NEUTRON
DIAMETER	1 ¹¹ / ₁₆	TOOL MODEL NO.	
DETECTOR MODEL NO.		DIAMETER	1 ¹¹ / ₁₆
TYPE	SCINTILLATION	DETECTOR MODEL NO.	
LENGTH	4 INCH	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	6.8 FT.	LENGTH	6 INCH
		SOURCE MODEL NO.	MRC-N-SS-W
	GENERAL	SERIAL NO.	236
HOIST TRUCK NO.		SPACING	17 INCH
INSTRUMENT TRUCK NO.	36	TYPE	AmBe
TOOL SERIAL NO.	125 002	STRENGTH	3 CURIES
LOGGING DATA			

LOGGING DATA									
GENERAL				GAMMA RAY				NEUTRON	
RUN NO.	DEPTHS	TO	FT/MIN	T.C. SEC.	SENS. SETTINGS	ZERO DIV. L OR R	API G. R. UNITS PER LOG DIV.	T. C. SEC.	SENS. SETTINGS
1	0	84	12	4	100	0	16	3	1000
2	84	710	12	4	100	0	16	3	500



ROKE

FOCUSED BEAM LOG

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO.

COMPANY SAGE CREEK COAL COMPANY

WELL

76-BO 2

LOCATION

FLAT TOP MOUNTAIN

FIELD

FLAT TOP MOUNTAIN

PROVINCE BRITISH COLUMBIA

GROUND LEVEL

Log Measured From

RICE FLOOR

Well Depth Measured From

RICE FLOOR

Run No.

ONE

Date

24 AUGUST 1976

Last Reading

708

Footage Logged

618

Depth Reached

711

Depth Driller

712

Coring Rate

24

Coring Driller

MUD/WATER

Liquid Type

90

Min. Diam.

HQ

Rm @ of

13.33 @ 77

Other Services:

K.B.

C.S.G.

G.L.

Operating Time

1 HOUR

Truck No.

36

Recorded By

CARLSON

Witnessed By

CULLINHAM

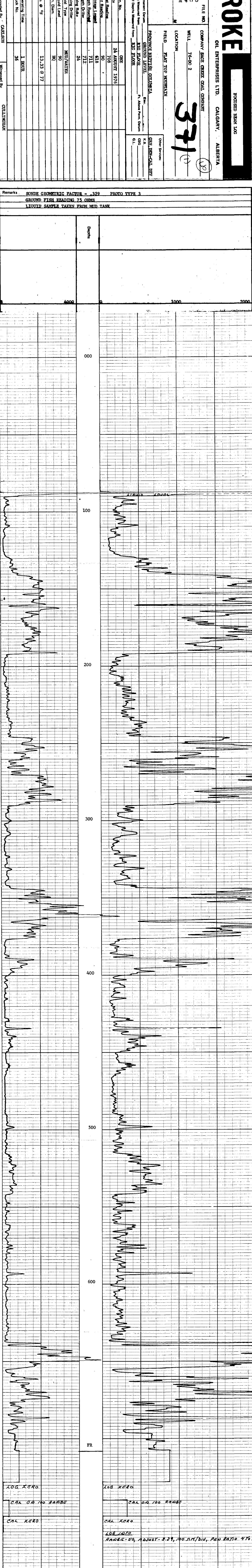
Remarks

SONDE GEOMETRIC FACTOR - .329

PROTO TYPE 3

GROUND FISH READING 75 OHMS

LIQUID SAMPLE TAKEN FROM MID TANK



ROKE

GAMMA RAY NEUTRON LOG

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. COMPANY SAGE CREEK COAL COMPANY

WELL 76 - DO 3

LOCATION

FIELD FLAT TOP

PROVINCE BRITISH COLUMBIA

GROUND LEVEL

Log Measured from RIG FLOOR

Well Depths Measured from RIG FLOOR

DATE 4 SEPTEMBER 1976

First Reading 0

Footage Logged 670

Depth Reached 671

Casing Hole 14

Casing Driller

Fluid Type GEL/WATER

Liquid Level 29

Mtn. Diam. HQ

Rm @ 9F

Operating Time 2 HOURS

Truck No. 36

Recorded By CARLSON

Witnessed By CULLINGHAM

371

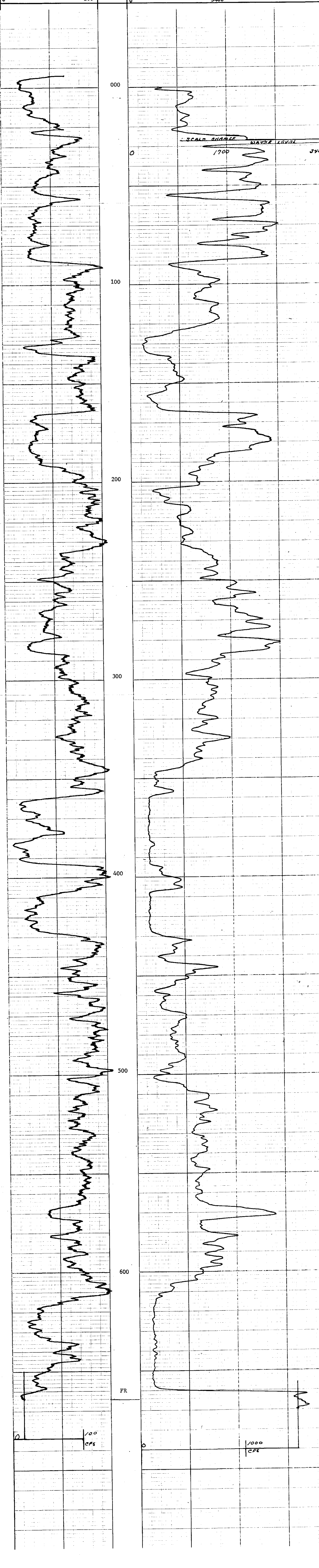
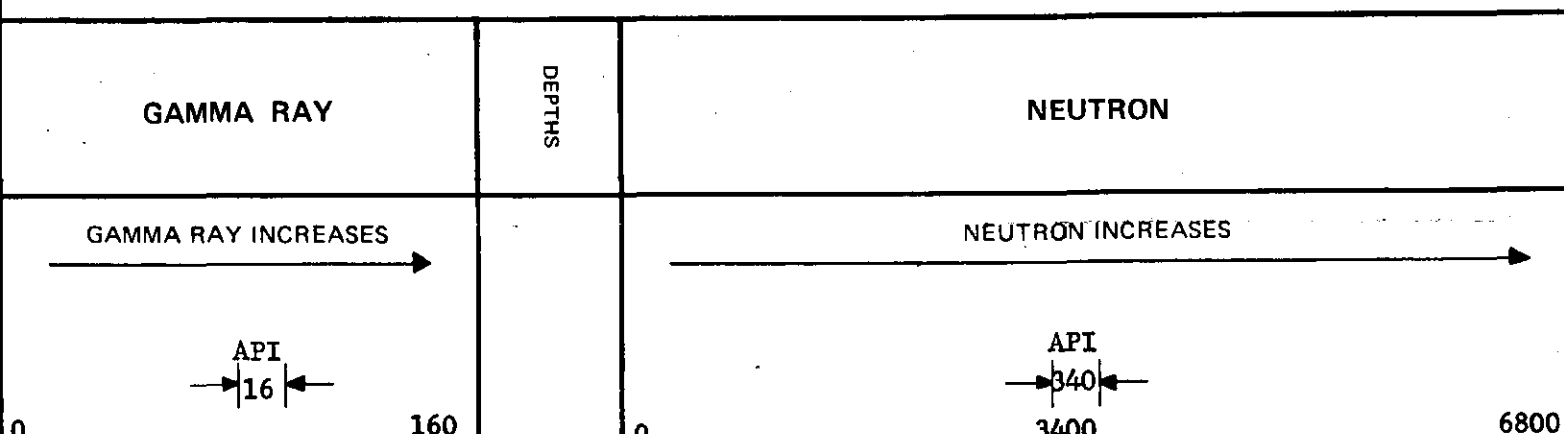
EQUIPMENT DATA

GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.		LOG TYPE	NEUTRON/NEUTRON
DIAMETER	1 $\frac{11}{16}$	TOOL MODEL NO.	
DETECTOR MODEL NO.		DIAMETER	1 $\frac{11}{16}$
TYPE	SCINTILLATION	DETECTOR MODEL NO.	
LENGTH	4 INCH	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	6.8 FT.	LENGTH	6 INCH
		SOURCE MODEL NO.	MRC-N-SS-W
GENERAL		SERIAL NO.	265
HOIST TRUCK NO.		SPACING	17 INCH
INSTRUMENT TRUCK NO.	36	TYPE	AmBe
TOOL SERIAL NO.	125 002	STRENGTH	3 CURIES

LOGGING DATA

GENERAL				GAMMA RAY				NEUTRON			
RUN NO.	DEPTHS		SPEED FT/MIN	T.C. SEC.	SENS SETTINGS	ZERO DIV. L OR R	API G. R. UNITS PER LOG DIV.	T.C. SEC.	SENS SETTINGS	ZERO DIV. L OR R	API N. UNITS PER LOG DIV.
	FROM	TO									
1	0	27	12	4	100	0	16	3	1000	0	340
2	27	670	12	4	100	0	16	3	500	0	170

REMARKS



ROKE

SIDEWALL DENSILOG
CALIPER

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO.

COMPANY

WELL

TRIP

RCE

W

LOCATION

FIELD

PROVINCE

PERMANENT CHAIN

LOG MEASURED FROM

WELL DEPTHS MEASURED FROM

ONE

DATE

LAST READING

FOOTAGE LOGGED

DEPTH REACHED

DEPTH DRILLER

CASING NO.

FLUID TYPE

LIQUID LEVEL

MIN. DIAM.

OPERATING TIME

TRUCK NO.

RECORDED BY

WITNESSED BY

SAGE CREEK COAL COMPANY

76 - DO 3

M

FLAT TOP

BRITISH COLUMBIA

GROUND LEVEL

RIG FLOOR

RIG FLOOR

GRN. FBI. DEV

K.B.

CSG

GL

4 SEPTEMBER 1976

668

0

668

671

671

14

GEL/WATER

29

HQ

2 HOURS

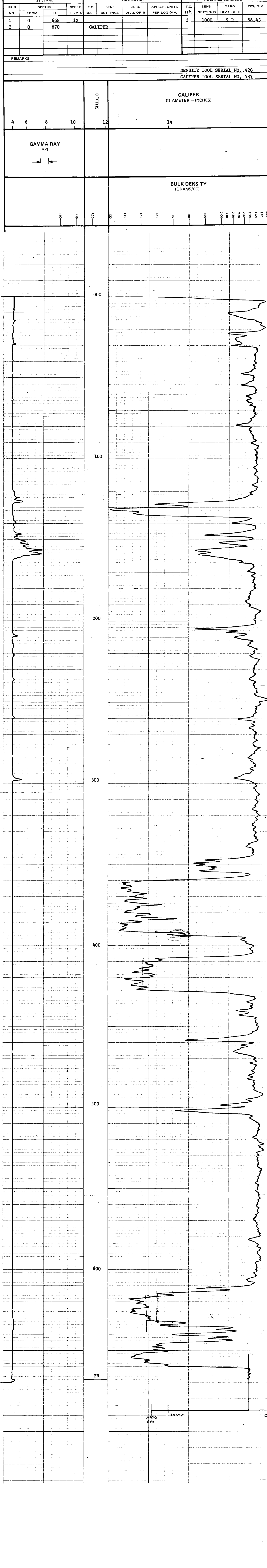
36

CARLSON

CULLINGHAM

158

371



ROKE

FOCUSED BEAM LOG

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. COMPANY SAGE CREEK COAL COMPANY

SEC WELL 76 - DO 3

TWP

RGE

M

FIELD FLAT TOP

Other Services:

PROVINCE BRITISH COLUMBIA

PERMANENT DATUM GROUND LEVEL

Log Measured from RIG FLOOR

Well Depth Measured from RIG FLOOR

Run No. ONE

Date 4 SEPTEMBER 1976

First Reading 668

Last Reading 28

Footage Logged 640

Depth Reached 671

Depth Driller 671

Casing Rate 14

Casing Driller

Fluid Type GEL/WATER

Liquid Level 28

Min. Diam. HQ

Rm. @ 9f 11.76 @ 77°

Operating Time 1 HOUR

Truck No. 36

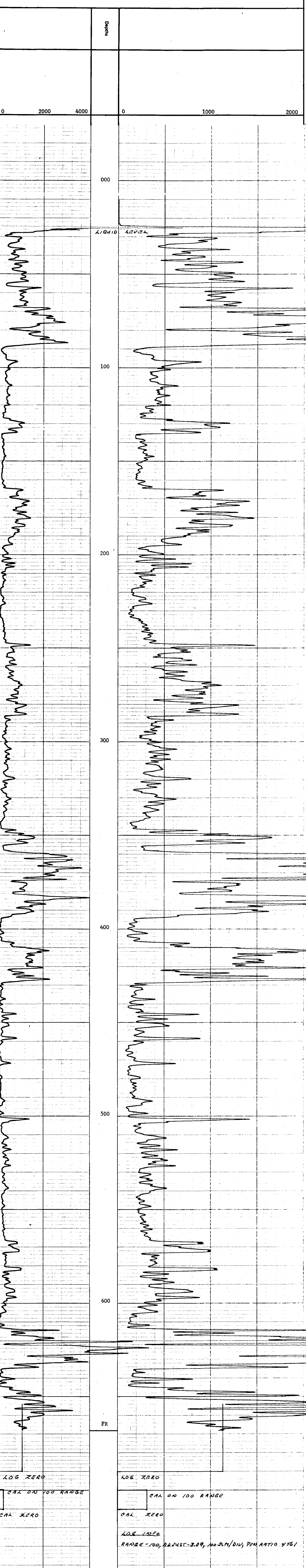
Recorded By CARLSON

Witnessed By CULLINGHAM

Remarks GEOMETRIC FACTOR OF SONDE - .329 PROTO TYPE 3

GROUND FISH READING - 400 OHMS

LIQUID SAMPLE TAKEN FROM MUD TANK

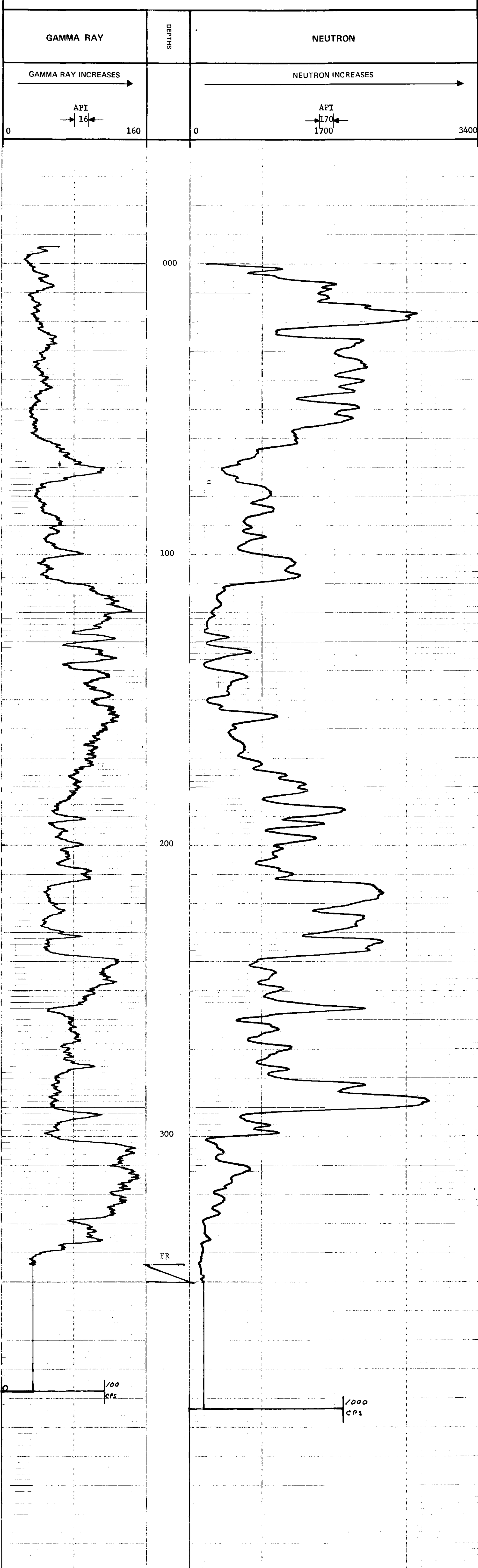


ROKE		GAMMA RAY NEUTRON LOG	
OIL ENTERPRISES LTD. CALGARY, ALBERTA			
FILE NO.	COMPANY	SAGE CREEK COAL COMPANY	
LSD	WELL	76 - DO 4	
SEC	TWP	RGE	
W	M	LOCATION	
FIELD		FLAT TOP	
PROVINCE		BRITISH COLUMBIA	
Permanent Datum		GROUND LEVEL	
Log Measured from		RIG FLOOR	
Well Depths Measured from		RIG FLOOR	
Elev		K.B.	
2 Ft. Above Perm. Datum		CSC	
G.L.		DINS	
Run. No.	ONE		
Date	15 SEPTEMBER 1976		
First Reading	350		
Last Reading	0		
Footage Logged	350		
Depth Reached	350		
Depth Driller	350		
Casing Foke			
Casing Driller			
Fluid Type	GEL/WATER		
Liquid Level	0		
Min. Diam.	HQ		
Rm @ 9F			
Operating Time	1 HOUR		
Truck No.	36		
Recorded By	CARLSON	Witnessed By	CULLINCHAN

EQUIPMENT DATA			
GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.		LOG TYPE	NEUTRON/NEUTRON
DIAMETER	1 11/16	TOOL MODEL NO.	
DETECTOR MODEL NO.		DIAMETER	1 11/16
TYPE	SCINTILLATION	DETECTOR MODEL NO.	
LENGTH	4 INCH	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	6.8 FT.	LENGTH	6 INCH
		SOURCE MODEL NO.	MRC-N-SS-W
GENERAL		SERIAL NO.	265
HOIST TRUCK NO.		SPACING	17 INCH
INSTRUMENT TRUCK NO.	36	TYPE	AmBe
TOOL SERIAL NO.	125 - 002	STRENGTH	3 CURIES

LOGGING DATA										
GENERAL			GAMMA RAY				NEUTRON			
RUN NO.	DEPTHS		SPEED FT/MIN	T.C. SEC.	SENS SETTINGS	ZERO DIV. L OR R	API G. R. UNITS PER LOG DIV.	T. C. SEC.	SENS SETTINGS	ZERO DIV. L OR R
	FROM	TO								API N. UNITS PER LOG DIV.
1	0	350	12	4	100	0	16	3	500	0

REMARKS LOGGED THROUGH HQ DRILL ROD. DRILLER UNABLE TO GO FURTHER DUE TO HOLE CONDITIONS.



SIDEWALL DENSITOG

OIL ENTERPRISES LTD. CALGARY, ALBERTA

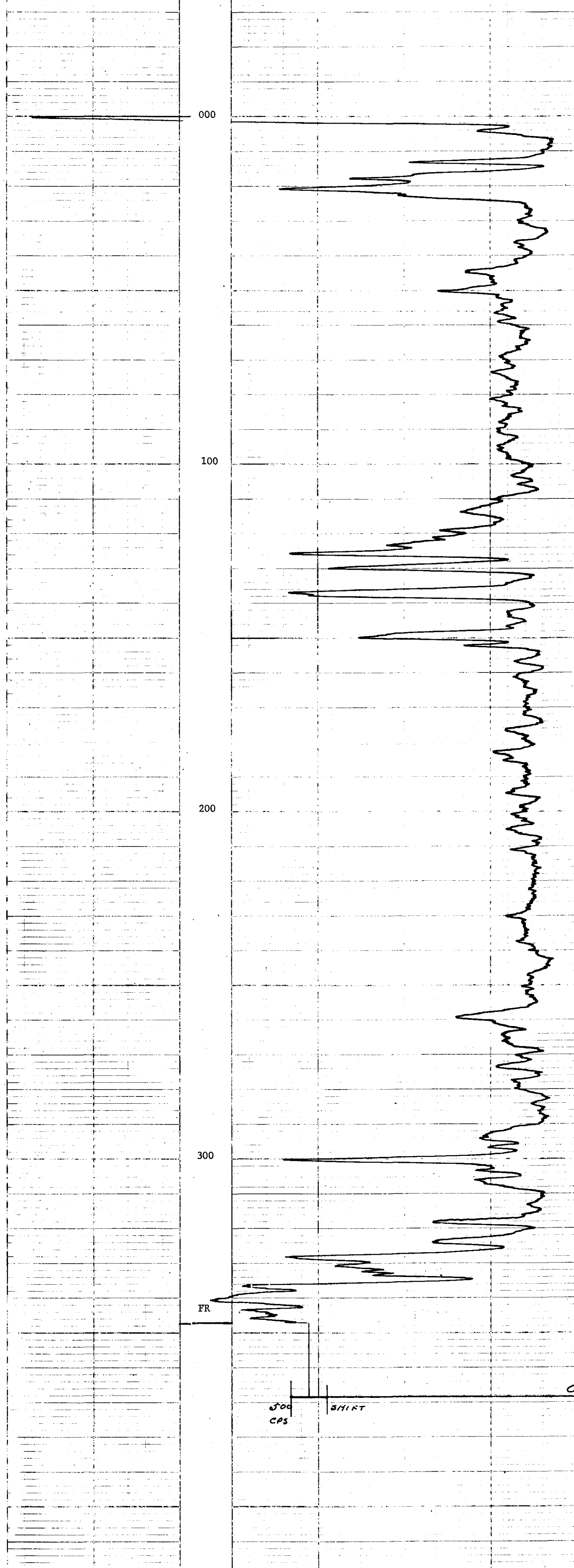
FILE NO.		COMPANY	SAGE CREEK COAL COMPANY	(71)
LSD		WELL	76 - DO 4	
SEC		LOCATION		
TWP		FIELD	FLAT TOP	
RGE				
N				
M				
		PROVINCE	BRITISH COLUMBIA	
Permanent Datum	GROUND LEVEL	Elev.		K.B.
Log Measured from	RIG FLOOR	2 Ft. Above Perm. Datum		CSC
Well Depths Measured from	RIG FLOOR			G.L.
Run. No.	ONE			
Date	15 SEPTEMBER 1976			
First Reading	347			
Last Reading	0			
Footage Logged	347			
Depth Reached	350			
Depth Driller	350			
Casing Roke				
Casing Driller				
Fluid Type	GEL/WATER			
Liquid Level	0			
Min. Diam.	HQ			
Operating Time	1 HOUR			
Truck No.	36			
Recorded By	CARLSON	Witnessed By	CULLINCHAM	

[illegible]

REMARKS LOGGED THROUGH HQ DRILL ROD. DRILLER WAS UNABLE TO GO FURTHER DUE TO BAD HOLE CONDITIONS.

DENSITY TOOL SERIAL NO. 420

DENSITY LOG SERIAL NO. 470		
CALIPER (DIAMETER - INCHES)	DEPTHS	GAMMA RAY API
2.80 2.70 2.60 2.50 2.40 2.30 2.20 2.10 2.00	1.30 1.40 1.50 1.60 1.70 1.80 1.90	100 110



ROKE

GAMMA RAY NEUTRON LOG

OIL ENTERPRISES LTD. CALGARY, ALBERTA

(10)

FILE NO.

COMPANY **SAGE CREEK COAL COMPANY**

WELL **76 - DO 5**

LOCATION

FIELD **FLATHEAD VALLEY**

PROVINCE **BRITISH COLUMBIA**

Other Services:
DENS-CAL, DEV

Permanent Datum **GROUND LEVEL** Elev. _____

Log Measured from **RIG FLOOR** Ft. Above Perm. Datum _____

Well Depth Measured from **RIG FLOOR** G.L. _____

371 (1)

Run No	ONE	
Date	20 SEPTEMBER 1976	
First Reading	220	
Last Reading	0	
Footage Logged	220	
Depth Reached	221	
Depth Driller	222	
Casing Roke	20	
Casing Driller		
Fluid Type	MUD	
Liquid Level	0	
Min. Diam.	HQ	
Operating Time	1 HOUR	
Truck No.	32	
Recorded By	GIBEAU	Witnessed By
		CULLINGHAM

EQUIPMENT DATA

EQUIPMENT DATA

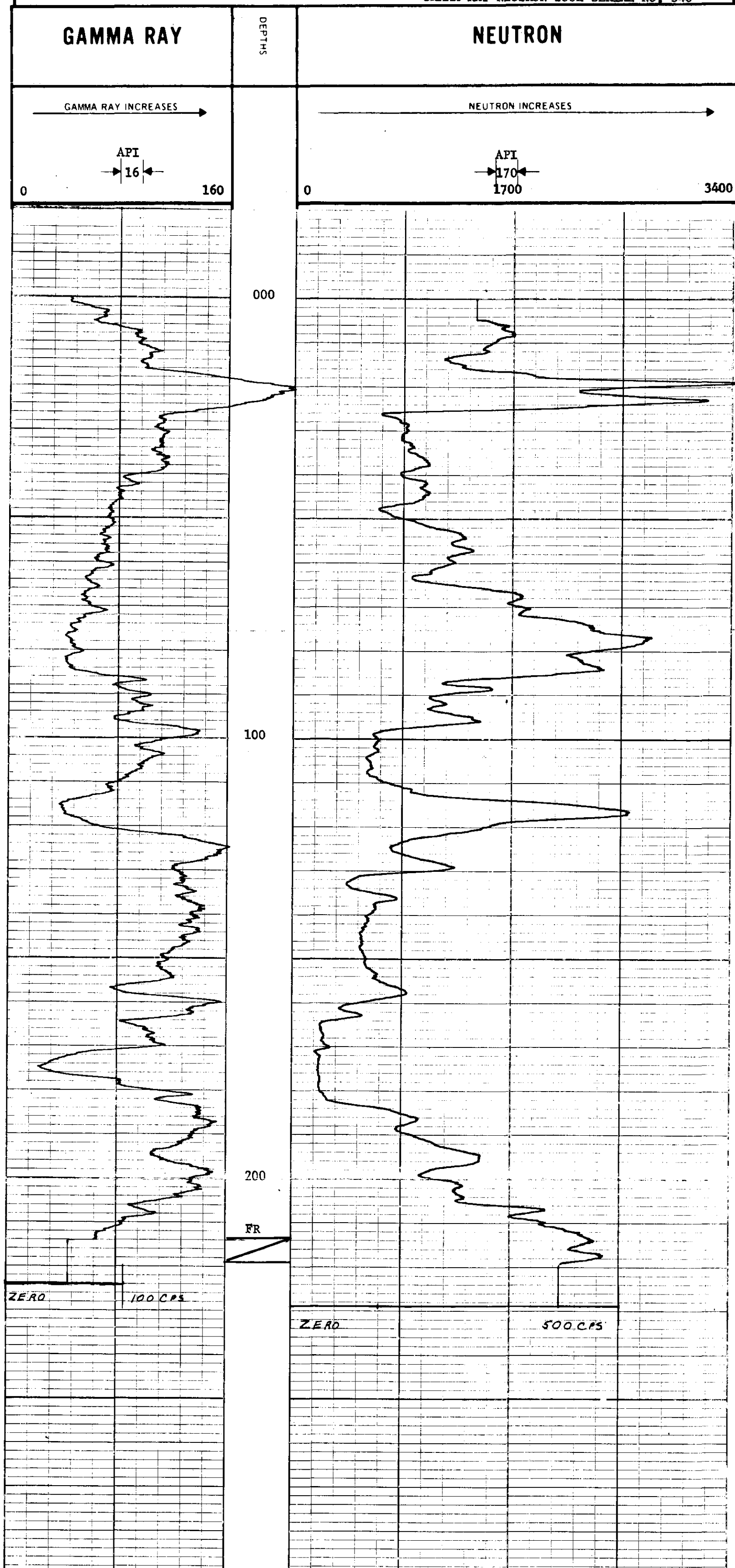
GAMMA RAY		NEUTRON	
RUN NO	ONE	RUN NO	ONE
TOOL MODEL NO		LOG TYPE	NEUTRON/NEUTRON
DIAMETER	1 11/16	TOOL MODEL NO	
DETECTOR MODEL NO		DIAMETER	1 11/16
TYPE	SCINTILLATION	DETECTOR MODEL NO	
LENGTH	4 INCH	TYPE	PROPORTIONAL
DISTANCE TO N SOURCE	5.5 FT	LENGTH	6 INCH
		SOURCE MODEL NO	MRC-N-SS-W
GENERAL		SERIAL NO	171
HOIST TRUCK NO	32	SPACING	17 INCH
INSTRUMENT TRUCK NO		TYPE	AmBe
TOOL SERIAL NO	340	STRENGTH	3 Curies

LOGGING DATA

GENERAL				GAMMA RAY				NEUTRON			
RUN NO	DEPTHS		SPEED FT/MIN	T C SEC	SENS SETTINGS	ZERO DIV L OR R	API GR UNITS PER LOG DIV	T C SEC	SENS SETTINGS	ZERO DIV L OR R	API N UNITS PER LOG DIV
	FROM	TO									
1	0	220	12	5	100	0	16	3	500	0	170

REMARKS

GAMMA RAY NEUTRON TOOL SERIAL NO. 340



ROKE

SIDEWALL DENSILOG
CALIPER

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. COMPANY SAGE CREEK COAL COMPANY

LSD SEC TWP RGE WELL 76 - DO 5

LOCATION

FIELD PLATHHEAD VALLEY

PROVINCE BRITISH COLUMBIA

GROUND LEVEL

Permanent Datum Log Measured from RIG FLOOR

Well Depths Measured from RIG FLOOR

Other Services: GRN, DEV

K.B. _____

CSG _____

G.L. _____

Run. No. ONE

Date 20 SEPTEMBER 1976

First Reading 218

Last Reading 0

Footage Logged 218

Depth Reached 221

Depth Driller 222

Casing Roke 20

Casing Driller

Fluid Type MUD

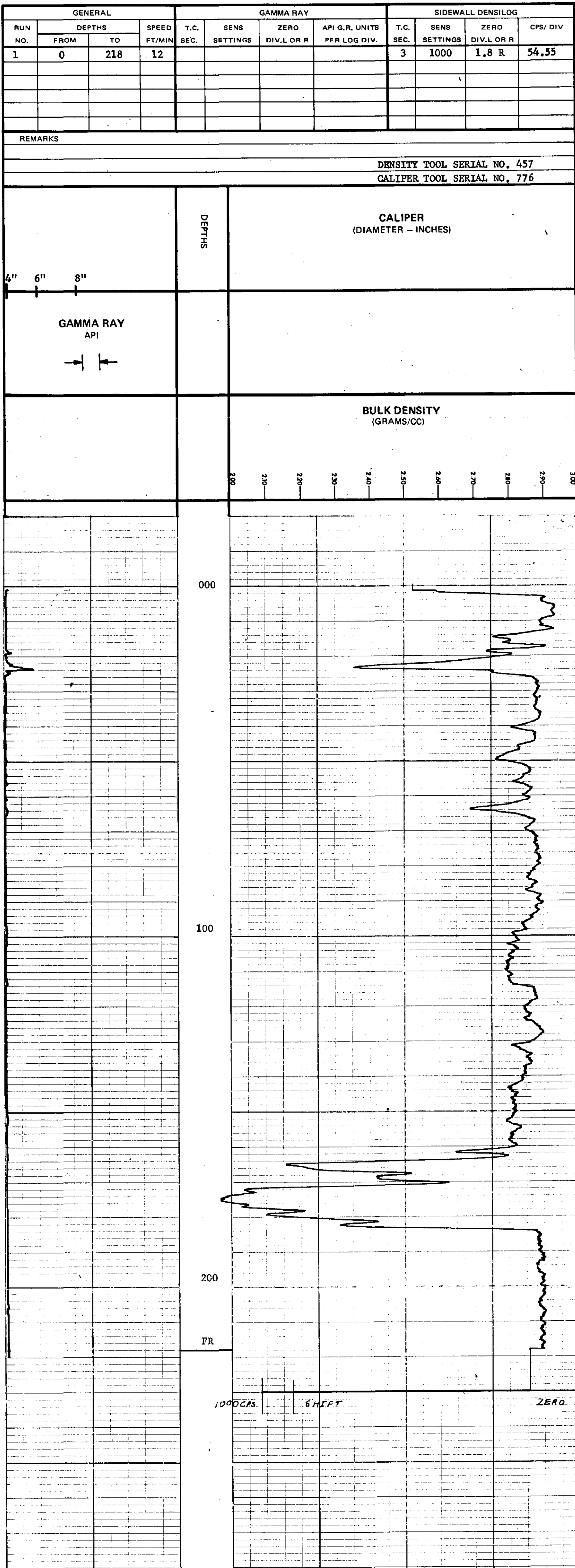
Liquid Level 0

Min. Diam. HQ

Operating Time 1 1/4 HOUR

Truck No. 32

Recorded By GIBEAU Witnessed By CULLINGHAM



ROKE

GAMMA RAY NEUTRON LOG

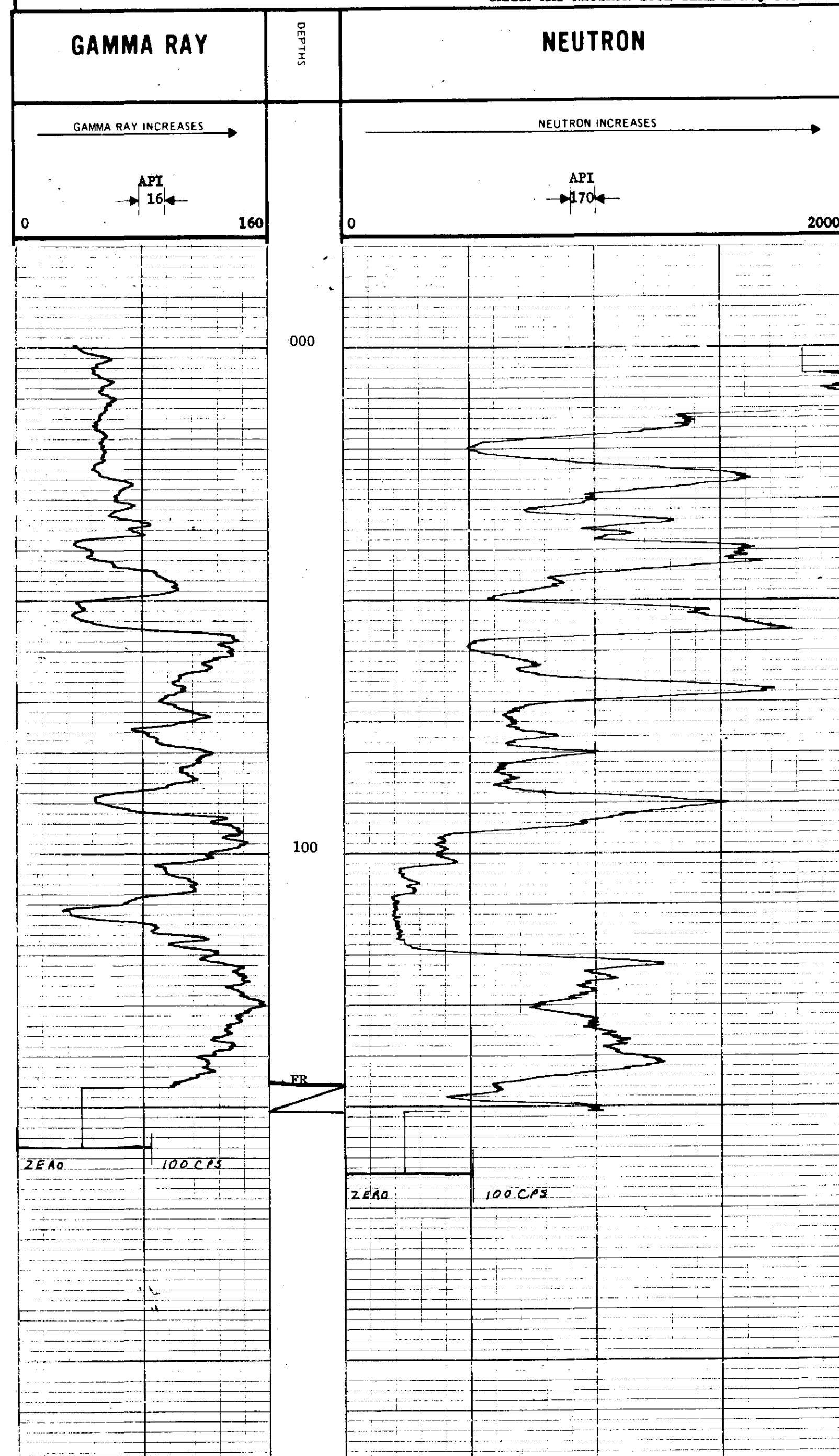
OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. _____
COMPANY SAGE CREEK COAL COMPANY
WELL DO 6
LOCATION _____
FIELD FLATHEAD VALLEY
PROVINCE BRITISH COLUMBIA
Other Services: _____
DENS-CAL, DEV _____
K.B. _____
CSG _____
GL _____
Elev. _____
Ft. Above Perm. Datum _____
Log Measured from RIG FLOOR
Well Depths Measured from RIG FLOOR

371

Run No.	ONE
Date	23 SEPTEMBER 1976
First Reading	151
Last Reading	0
Footage Logged	151
Depth Reached	152
Depth Driller	152
Casing Roke	10
Casing Driller	
Fluid Type	MUD
Liquid Level	0
Min Diam.	100
Operating Time	1 HOUR
Truck No.	32
Recorded By	GIBBEAU
Witnessed By	CULLINGHAM

EQUIPMENT DATA											
GAMMA RAY						NEUTRON					
RUN NO		ONE				RUN NO		ONE			
TOOL MODEL NO						LOG TYPE		NEUTRON/NEUTRON			
DIAMETER		1 11/16				TOOL MODEL NO					
DETECTOR MODEL NO						DIAMETER		1 11/16			
TYPE		SCINTILLATION				DETECTOR MODEL NO					
LENGTH		4 INCH				TYPE		PROPORTIONAL			
DISTANCE TO N SOURCE		5.5 FT				LENGTH		6 INCH			
						SOURCE MODEL NO		MRC-N-SS-W			
		GENERAL				SERIAL NO		171			
HOIST TRUCK NO		32				SPACING		17 INCH			
INSTRUMENT TRUCK NO						TYPE		AmBe			
TOOL SERIAL NO		340				STRENGTH		3 Curies			
LOGGING DATA											
GENERAL				GAMMA RAY				NEUTRON			
RUN NO	DEPTHS		SPEED FT/MIN	T C SEC	SENS SETTINGS	ZERO DIV L OR R	API GR UNITS PER LOG DIV	T C SEC	SENS SETTINGS	ZERO DIV L OR R	API N UNITS PER LOG DIV
	FROM	TO									
1	0	151	12	5	100	0	16	3	500	0	100
REMARKS											
GAMMA RAY NEUTRON TOOL SERIAL NO. 340											



ROKE
SIDEWALL DENSILOG
CALIPER

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. COMPANY SAGE CREEK COAL COMPANY

WELL DO 6

LSD SEC TWP RGE M LOCATION

FIELD FLATHEAD VALLEY

PROVINCE BRITISH COLUMBIA

GROUND LEVEL

Permanent Datum
Log Measured from
Well Depths Measured from

GRN, DEV
K.8.
CSG
G.L.

Run No. ONE

Date 23 SEPTEMBER 1976

First Reading 149

Last Reading 0

Footage Logged 149

Depth Reached 152

Depth Driller 152

Casing Roke 10

Casing Driller

Fluid Type MUD

Liquid Level 0

Min. Diam. HQ

Operating Time 1 HOUR

Truck No. 32

Recorded By GIBEAU

Witnessed By CULLINGHAM

SIDEWALL DENSILOG			
T.C. SEC.	SENS SETTINGS	ZERO DIV. L OR R	CPS/ DIV
3	1000	1.8 R	54.55

GAMMA RAY			
T.C. SEC.	SENS SETTINGS	ZERO DIV. L OR R	API G.R. UNITS PER LOG DIV.

GENERAL		
RUN NO.	DEPTHS	
	FROM	TO
1	0	149

REMARKS
DENSITY TOOL SERIAL NO. 457
CALIPER TOOL SERIAL NO. 776

