COMPANY BP Coal
BOREHOLE BP # 60 Sukunka '78
STATE S.C. COUNTY Canada

COAL LITHOLOGY LOG

Re-Sukunka 2/3/84

Permanent Datum: Ground Level — Elev. — m.
Log measured from: Ground Level 22.0 m. above P.D.
Drilling measured from: Ground Level 22.0 m. above P.D.

GR/DEN Run No. 1 Depth Scale 1:200
Date Recorded 8th August '78
Log Bottom 125.6m
Logging Unit 123m
Driller's Depth 125.6m
Depth Driller 125.6m
Bottom Driller 130.0m
Hole Condition Quick Gel
BS 1 in. 2 in. 3" to T.D.
Centre 1 2 %
Rm @ Meas. Temp %
Rmf @ Meas. Temp 3½" to 10m %
Rmc @ Meas. Temp %
Source Rmf Rmc %
Rm @ BHT %
Rmf @ BHT %
Rmc @ BHT %
Time Since Circ. hrs
Max. Rec. Temp °C
Equip. Location
Recorded By R. Bishop
Witnessed By T. Rinderer

965

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REMARKS Borehole logged through NQ drill rods.

Changes in Mud Type or Additional Samples

Date	Sample No			
Depth - Driller				
Type Fluid in Hole				
Dens.	Visc.			
ph	Fluid Loss	ml		
Source of Sample				
Rm @ Meas. Temp	@ °F	@ °F		
Rmf @ Meas. Temp	@ °F	@ °F		
Rmc @ Meas. Temp	@ °F	@ °F		
Source Rmf	Rmc			
Rm @ BHT	@ °F	@ °F		
Rmf @ BHT	@ °F	@ °F		
Rmc @ BHT	@ °F	@ °F		

Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down

Equipment Data

Run No.	Tool Type	Tool Position	Other

Logging Data

Log	Depths m From	To	Speed m/min	T.C. sec	Norm.	Sonde No	Source No
Gamma	123	0	9	1	1.3	110	
LSD	123	0	9	1/3	7.1	110	M-5852

GAMMA RAY — 0 AFI 150 — DEPTHS — L.S.DENSITY — 3000 SDU 0

DX 1/3 — 2000 1200 0

Repeat section

OB 1/3

0 AFI 150 DEPTHS 3000 SDU 0
GAMMA RAY L.S.DENSITY

COMPANY BP Coal
BOREHOLE BP # 60 Sukunka '78
STATE British Columbia
COUNTRY Canada

PR - Sukunka TR Coal

NEUTRON-NEUTRON LOG

COMPANY BP Coal
BOREHOLE BP #60 Sukunka 1978
STATE B.C. COUNTRY Canada

Permanent Datum	Ground Level	Elev.	m.
Log measured from	Ground Level	zero m. above P.D.	
Drilling measured from	Ground Level	zero m. above P.D.	

Job Date	1		
Run No.	1	Depth Scale	1:1200
Date	8th August 1978		
First Reading	12m		
Last Reading	0m		
Log Measured	12m		
Casing Size	10m		
Casing Depth	10m		
Depth Reached	125.6m		
Bottom Driller	130.4m		
Mud Volume	Quick Gel		
Size	Viscosity		
Bit Size 1	3" to P.D.		
2	to		
3	to		
Casing Size 1	3½" to 10m		
2	to		
Rm @ Meas Temp	@		
Rmf @ Meas Temp	@		
Rmc @ Meas Temp	@		
Bmf			
Operating Time	2 hrs		
Truck No.	23/21		
Recorded By	R.Bishop		
Witness	L.Rindero		

665

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REMARKS

Changes in Mud Type or Additional Samples			
Date	Sample No.		
Depth - Driller			
Type Fluid in Hole			
Dens.	Visc.		
ph	Fluid Loss	ml	
Source of Sample			
Rm @ Meas Temp	@ °F	@ °F	
Rmf @ Meas Temp	@ °F	@ °F	
Rmc @ Meas Temp	@ °F	@ °F	
Source Rmf	Rmc		
Rm @ BHT	@ °F	@ °F	
Rmf @ BHT	@ °F	@ °F	
Rmc @ BHT	@ °F	@ °F	

Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down
Neutron	20m	0- 1500 SNU	0- 1000

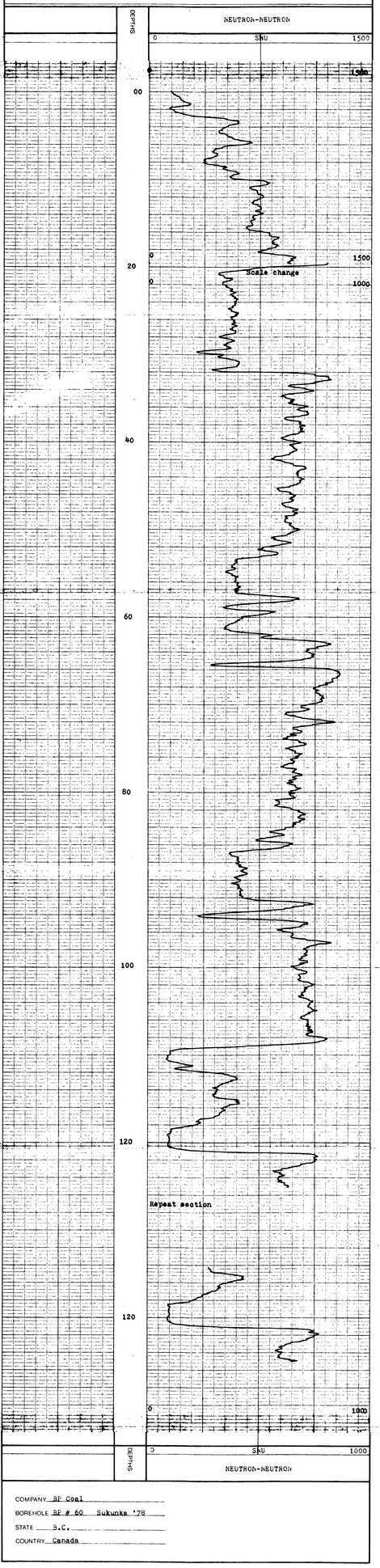
Equipment Data

Run No.	Tool Type	Tool Position	Other

Logging Data

Log	Depths m From	To	Speed m/min	T.C. sec	Norm.	Source No.	Source No.
N-N	125	0	9	1	0.75	81	N2479

Borehole logged through NQ drill rods.



COMPANY BP Coal
BOREHOLE BP # 60 Sukunka '78
STATE B.C.
COUNTRY Canada

MT (8) 3350 R

Re-Sukunka 78(3)

COMPANY BP Coal

BOREHOLE BP # 60 Sukunka '78

STATE ____ B.C. ____ COUNTRY Canada

COAL QUALITY LOG

Permanent Datum ____ Ground Level ____ Elev. ____ m.

Log measured from ____ Ground Level ____ zero m above P.D.

Drilling measured from ____ Ground Level ____ zero m above P.D.

Run No. 1

Depth Driller 120m

Depth Logger 120.4m

Bottom Driller 120m

Casing Shoe 10m

Casing Driller 10m

Casing Logger 10m

Bit Size 6¾" to 65m 5¾" to 120m

Type Fluid in Hole Quick gel

Density

Viscosity

pH

Fluid Loss

Source of Sample

Rm @ Meas Temp

Rmf @ Meas Temp

Rmc @ Meas Temp

Source Rmf Rmc

Rm @ BHT

Rmf @ BHT

Rmc @ BHT

Time Since Circ.

Max. Rec. Temp.

Equip. Location

Recorded By L.Bindero

Witnessed By R.Bishop

Date 6th August '78

Log Measured

Log Bottom 120.4m

Logging Unit No. 1

Logging Date 2/VIII/78

Truck No. 69S

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REMARKS

Changes in Mud Type or Additional Samples

Date	Sample No.					
Depth - Driller						
Type Fluid in Hole						
Dens.	Visc.					
pH	Fluid Loss	ml				
Source of Sample						
Rm @ Meas Temp		@ °F		@ °F		
Rmf @ Meas Temp		@ °F		@ °F		
Rmc @ Meas Temp		@ °F		@ °F		
Source Rmf Rmc						
Rm @ BHT		@ °F		@ °F		
Rmf @ BHT		@ °F		@ °F		
Rmc @ BHT		@ °F		@ °F		

Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down

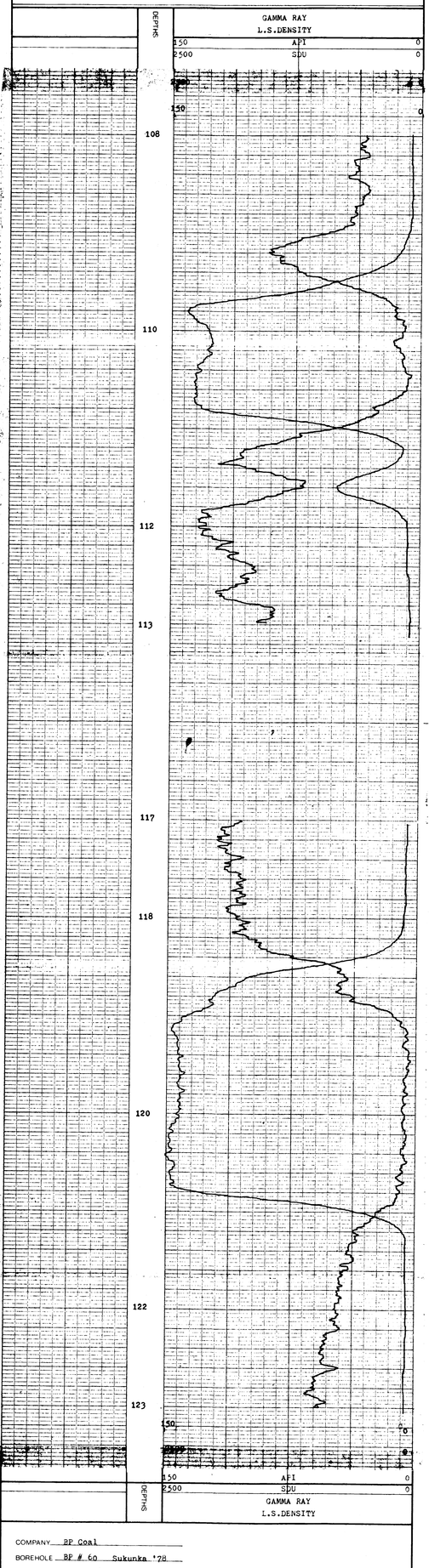
Equipment Data

Run No.	Tool Type	Tool Position	Other

Logging Data

Log	Depths. m From	To	Speed m/min	T.C. sec	Norm.	Sonde No.	Source No.
Gamma	123	108	2½	2	1.3	110	
LSD	123	108	2½	1	7.1	110	M-5852

Borehole logged through NQ drill rods.



COMPANY BP Coal

BOREHOLE BP # 60 Sukunka '78

STATE B.C.

COUNTRY Canada

AW (8) 5246 8

COMPANY BP Coal
BOREHOLE BF # 60 Sukunka '78
STATE B.C. COUNTRY CANADA

SEAM THICKNESS.LOG

Permanent Datum Ground Level Elev. m
Log Measured from Kelly Bushing 5.79 m above P.D.
Drilling Measured from Ground Level 1650. m above P.D.

Rig: Diamond Drill
Driller: E. Nelson
Recorded by: R.Sanford
Witnessed by: R.Sanford

Run No. 1
Depth-Driller 1160
Depth-Logger 1158
Bit Size 3" to 1123
Casing-Driller 10m
Casing-Logger 10m
Bottom Driller 1160m
Bottom Logger 1158m
Top Log Interval 10m
Open Hole Size 3" to T.D.
Density/Viscosity
Type Fluid in Hole QUICK GEL
Salinity, PPM Cl
Source of Sample
Rm @ Meas Temp @ °F
Rmf @ Meas Temp @ °F
Rmc @ Meas Temp @ °F
Source of Rmf / Rmc
Rm @ BHT @ °F
Rmf @ BHT @ °F
Rmc @ BHT @ °F
Time Since Circ. 33 hrs.
Max. Rec. Temp. @ °F
Equip. Location 10m
Recorded By R.Sanford
Witnessed By R.Sanford

Date 2/1/21
Sample No.
Depth-Driller
Type Fluid in Hole
Dens. Visc.
ph Fluid Loss ml
Source of Sample
Rm @ Meas Temp @ °F
Rmf @ Meas Temp @ °F
Rmc @ Meas Temp @ °F
Source Rmf Rmc
Rm @ BHT @ °F
Rmf @ BHT @ °F
Rmc @ BHT @ °F

Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down

Equipment Data

Run No.	Tool Type	Tool Position	Other

Logging Data

Log	Depths m From	To	Speed m/min	T.C. sec	Norm.	Remarks	Source No.
BRD	123	108	2	1	0.76	110	M-5852

Borehole logged through NQ drill rods.

B.R.DENSITY

300 SBRDU 150

DEPTHS

108
110
112
118
120
122
122
123

Repeat section

B.R.DENSITY

300 SBRDU 150

DEPTHS

COMPANY BP Coal
BOREHOLE BF # 60 Sukunka '78
STATE British Columbia
COUNTRY Canada

Re. Sukunka 78/81

BPB

COAL LITHOLOGY LOG

BOREHOLE BP #61 - Sukunka 1978
CLIENT BP Coal
AREA B.C.
COUNTRY Canada
DATE LOGGED 5 Aug. '78
DEPTH SCALE 1:200
1 cm = 3 m

SONDE TYPE:	GAMMA RAY, L.S. DENSITY, CALIPER
COAL COMBINATION SONDE	
LOG SUITE	GAMMA RAY, L.S. DENSITY, CALIPER

OPERATION DATA

DATE RECORDED	15-12m (relog)
INTERVAL LOGGED	133m
INTERVAL RECORDED	132/23
LOG UNITS (C/s No)	K/Counts
WITNESS	E. Rinaldo

FLUID DATA

MEDIUM	Water
RH	8.4
VISCOSITY	15-12m (relog)
BH TEMP	665

BOREHOLE DATA

PERMANENT DATUM	Ground level		
ELEVATION OF PD			
LOG MEASUREMENTS FROM	G.L.	DRILLER	
DEPTH REACHED	134.8m	135m	
CASING SIZE	6 in	6 in	
BIT SIZES	1 5/8" to 2.4m	2	
	4	4	
CASING SIZES	1 5½" to 7m	2	to
	4	4	to

TAPING

LOG TAPED	RECORDING SPEED	DIRECT OR REPLAY
Y	9	D
Y	9	D
Y	9	R

PANEL

SPEED	T.C. S/C S	NORM
9	1	1.3
9	1/37.1	
9	1/3	-

DEPTHS

CAL. DEPTH	FROM	TO	INTERVAL	SEAM LOG RUN
	133	0	133	Y
	133	0	133	Y
	133	0	133	Y

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

LOG	EQUIPMENT: SONDE	EQUIPMENT: SOURCE	EQUIPMENT: CALIBRATOR
GAMMA RAY & DENSITY	110		3
CALIPER		85852	42
	SIDEWALL POSITION		

COAL QUALITY/SEAM THICKNESS LOG INTERVALS (Refer to relevant log)

FROM	131	122	49
TO	126	116	45
INTERVAL	5	6	4

INTERVAL TOTAL 15m

ADDITIONAL SONDES RUN

SONDE	LOG	GENERAL SCALE LOG	DETAIL SCALE LOG
81	N-N	1:200	

REFER TO ADDITIONAL HEADINGS

REMARKS

B P B COAL LITHOLOGY LOG

CALIBRATION DATA

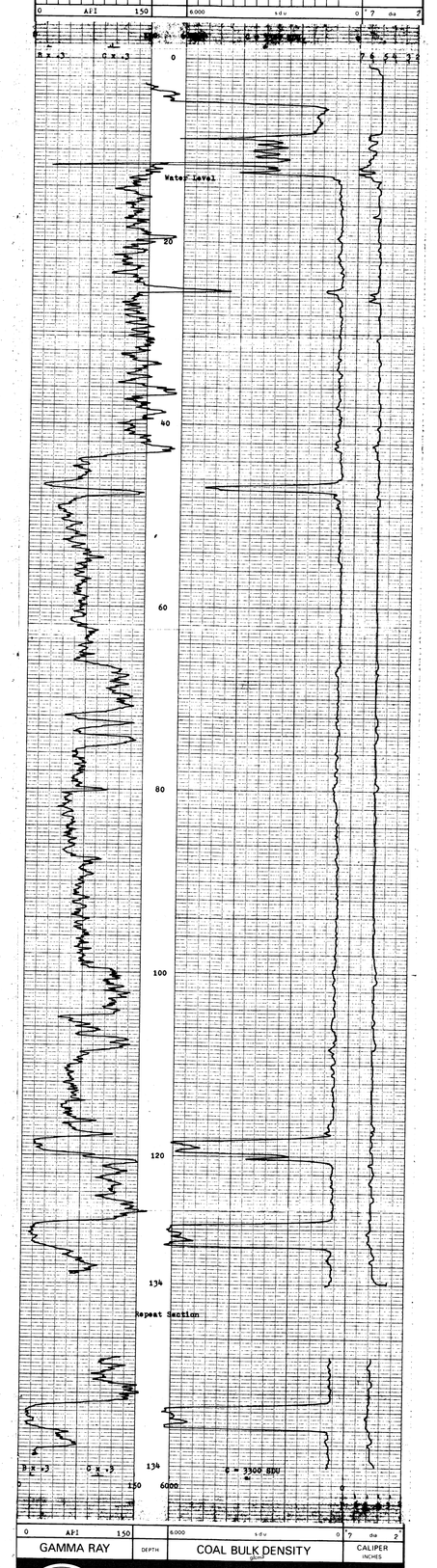
JIG No 3 VALUE 3000 2" DIAM
JIG MARK SHOWN AT ABOVE VALUE -3.33

JIG CAL DATE 1/8/78 JIG VALUE 3300 SDU @ 1.59 gm/cm³ 7 ins 950 ps
JIG No 42 SPAN 6000 NORM 7.10 2 ins 490 ps

GAMMA RAY | DEPTH | COAL BULK DENSITY g/cm³ | CALIPER INCHES

HOLE SIZE CORRECTION DATA

0 API 150 | 6000 s-du 0 | 7 dia 2"



0 API 150 | 6000 s-du 0 | 7 dia 2"

GAMMA RAY | DEPTH | COAL BULK DENSITY g/cm³ | CALIPER INCHES

BPB

BOREHOLE BP #61 - Sukunka 1978 AREA B.C.
CLIENT BP Coal COUNTRY Canada

COAL LITHOLOGY LOG

MY 88003 R

Re. Sukunka 78 B/A.

BPB

BOREHOLE BP #61 - Sukunka 1978
CLIENT BP Coal
AREA B.C.
COUNTRY Canada
DATE LOGGED 5 Aug. '78
DEPTH SCALE 1:20
2 OF 4 PAGES

COAL QUALITY LOG

SONDE TYPE: COAL COMBINATION SONDE
LOG SUITE: GAMMA RAY L.S. DENSITY

BOREHOLE DATA: REFER TO LITHOLOGY LOG
OPERATION DATA: REFER TO LITHOLOGY LOG
EQUIPMENT AND RECORDING DATA

LOG	COAL COMBINATION SONDE	SCAVENGE POSITION
CALIBRATION	SHORT	NORMAL
SCAVENGE	2	1.3
SHORE SENSE	2	2
SHORE SENSE AND CALIBRATION	1	1

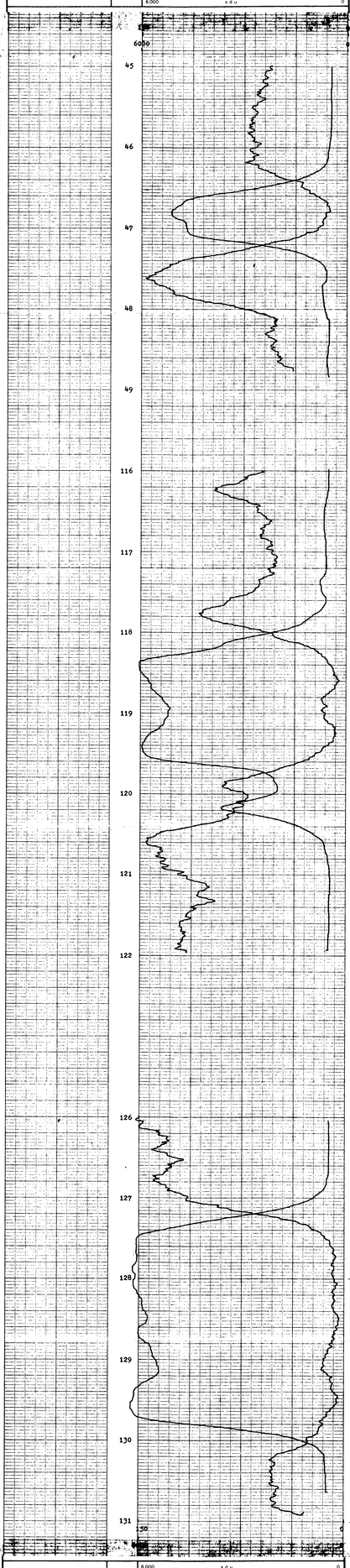
SCAVENGE: Y
PAD: R
PAD POSITION: 2.4 1 2.4
SHORE SENSE: 2 1 2
SHORE SENSE AND CALIBRATION: 1 1 1

COAL QUALITY LOG INTERVALS

FROM	TO	PAD POSITION
131	122	49
126	116	46
2	8	

INTERVAL	TOTAL
9	15

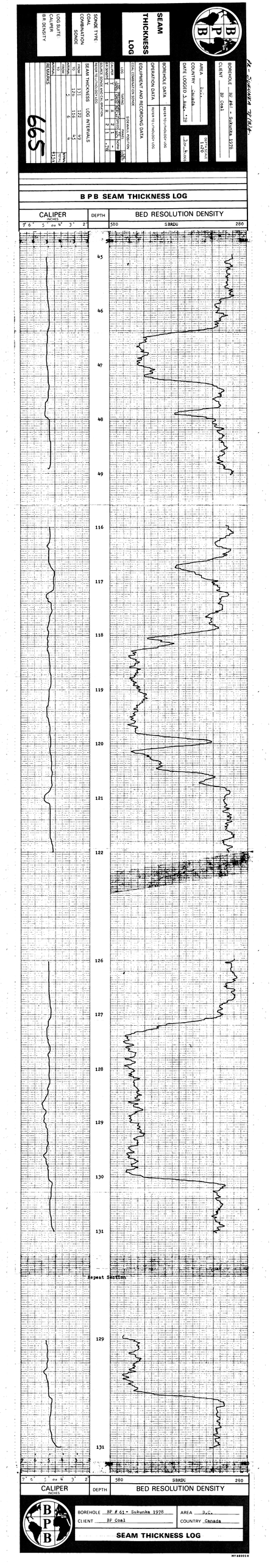
REMARKS



BPB

BOREHOLE BP #61 - Sukunka 1978
CLIENT BP Coal
AREA B.C.
COUNTRY Canada

COAL QUALITY LOG


SEAM THICKNESS LOG
BPB
BOREHOLE BP #61 - Sukunka 1976
CLIENT BP Coal
AREA B.C.
COUNTRY Canada
DATE LOGGED 3 Aug. '76
DEPTH DATUM Ground
DEPTH REFERENCE 1220
LOG SUITE CALIPER BPB DENSITY
SONDE TYPE COAL COMBINATION SONDE
BOREHOLE DATA
BOREHOLE FLUID
OPERATION DATA
EQUIPMENT AND RECORDING DATA
SEAM THICKNESS LOG INTERVALS
REMARKS
Repeat Section
CALIPER
DEPTH
BED RESOLUTION DENSITY
SBRDU
BOREHOLE BP #61 - Sukunka 1976
CLIENT BP Coal
AREA B.C.
COUNTRY Canada
SEAM THICKNESS LOG

COMPANY BP Coal

BOREHOLE BP #61 - Sukunka 1978

STATE B.C. COUNTRY Canada

NEUTRON-NEUTRON LOG

Permanent Datum Ground Level Elev. m.

Log measured from Ground Level m. above P.D.

Drilling measured from Ground Level m. above P.D.

Run No.	1		
Date	5 Aug. 1978		
First Reading	134m		
Last Reading	15m		
Casing-Driller	7m		
Casing-Logger	7m		
Bit Size	5 7/8" to T.D.		
Type Fluid in Hole	Water		
Dens.			
Visc.			
pH			
Fluid Loss			
Source of Sample			
Rm @ Meas. Temp.			
Rmf @ Meas. Temp.			
Rmc @ Meas. Temp.			
Source Rmf	Rmc		
Rm @ BHT			
Rmf @ BHT			
Rmc @ BHT			
Max. Rec. Temp.			
Equip. Location			
Recorded By	R.Wilson		
Witnessed By	R.Wilson		

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REMARKS

Changes in Mud Type or Additional Samples

Date	Sample No.		
Depth - Driller			
Type Fluid in Hole			
Dens.	Visc.		
pH	Fluid Loss	ml	
Source of Sample			
Rm @ Meas. Temp.	@ °F	@ °F	
Rmf @ Meas. Temp.	@ °F	@ °F	
Rmc @ Meas. Temp.	@ °F	@ °F	
Source Rmf	Rmc		
Rm @ BHT	@ °F	@ °F	
Rmf @ BHT	@ °F	@ °F	
Rmc @ BHT	@ °F	@ °F	

Scale Changes

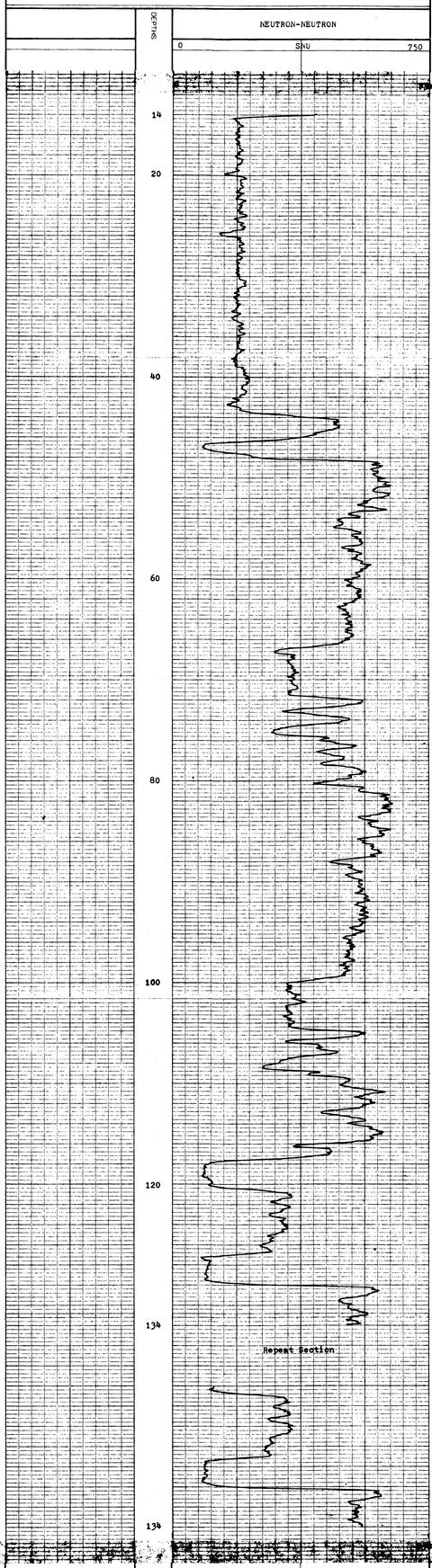
Type Log	Depth	Scale Up Hole	Scale Down

Equipment Data

Run No.	Tool Type	Tool Position	Other

Logging Data

Log	Depths From	Depths To	Speed	T.C.	Norm	Sonde No	Source No
N-N	134	15	9	1	0.75	81	N2429



COMPANY BP Coal

BOREHOLE BP #61 - Sukunka 1978

STATE B.C.

COUNTRY Canada

MY 181 33240 0

COMPANY	BP CANADA ENERGY RESOURCES
WELL	32 Cal
FIELD	Dunvegan
COUNTY	Grande Prairie
PROVINCE	Alberta
LOCATION	10-32-71-10 W6
DATE	7-9-92
RUN	1

COAL LITHOLOGY LOG

BP CANADA ENERGY RESOURCES

WELL	32 CAL
FIELD	DUNVEGAN
COUNTY	GRANDE PRAIRIE
PROVINCE	ALBERTA
LOCATION	10-32-71-10 W6
DATE	7-9-92
RUN	1

COMPANY	BP CANADA ENERGY RESOURCES
WELL	32 CAL
FIELD	DUNVEGAN
COUNTY	GRANDE PRAIRIE
PROVINCE	ALBERTA
LOCATION	10-32-71-10 W6
DATE	7-9-92
RUN	1

BOREHOLE	32 CAL
COMPANY	BP CANADA ENERGY RESOURCES
WELL	32 CAL
FIELD	DUNVEGAN
COUNTY	GRANDE PRAIRIE
PROVINCE	ALBERTA
LOCATION	10-32-71-10 W6
DATE	7-9-92
RUN	1

EQUIPMENT AND RECORDING DATA

COAL CHARACTERISTIC SCALE

		EQUIPMENT		TAPING				PANEL		LOG		DEPTH			SCALE
		SERIES	SOURCE	SUMMARY	CABLE	PRESSURE	TEMP	CABLE	PRESSURE	TEMP	RATE	FROM	TO	INTERVAL	
GAMMA RAY	1				2	1	9	2	9	1	1				
CALIPER	1	1111	B 6422	1	2	9	2	9	1/2	7.5	1	304.00	0	304.00	1
COAL BULK DENSITY					1	9	8	9	1/2		1	304.00	0	304.00	1

COAL BULK DENSITY CALIBRATION DATA (Refer to Calibration log)

FROM	304	275	INTERVAL
TO	300	240	
INTERVAL	15	0	25

ADDITIONAL SONDES RUN

SONDE	SERIAL NO.	DEPTH INTERVAL
01	n/a	1-2000

REFER TO ADDITIONAL HEADINGS

REMARKS

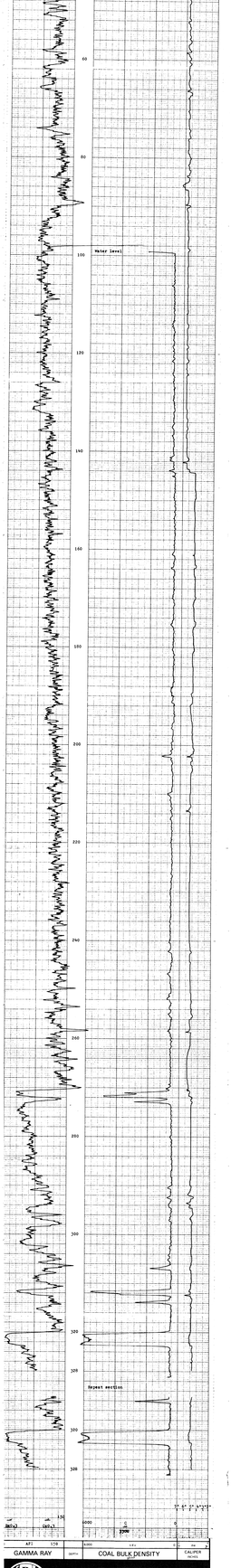
1.Density log not drawn above water level. Source removed for gamma ray log.

B P B COAL LITHOLOGY LOG

CALIBRATION DATA

GR No. 3	VALUE 0000 / 2000	HOLE SIZE 7.75 / 10	1000 / 1.73
GR WARM SETTING AT HEIGHT OF 0.5	5.13	CALIPER 6000 / 3500	7 — 9.92

GAMMA RAY	DEPTH	COAL BULK DENSITY	CALIPER
			HOLE SIZE CORRECTION DATA



GAMMA RAY	DEPTH	COAL BULK DENSITY	CALIPER

BOREHOLE 32 Cal
COMPANY BP Cal
WELL 32 Cal
FIELD Dunvegan
COUNTY Grande Prairie
PROVINCE Alberta
LOCATION 10-32-71-10 W6
DATE 7-9-92
RUN 1

CLIENT 32 Cal
COUNTY Grande Prairie
PROVINCE Alberta
LOCATION 10-32-71-10 W6
DATE 7-9-92
RUN 1

COAL LITHOLOGY LOG

Pre-Drilling Profile

BPB

BOREHOLE 32 # 62 Sukunka '78
CLIENT 32 Coal

AREA B.C.
COUNTRY Canada
DATE COLLARED 13 August

DEPTH SCALE 1:200
2 cm = 1.00m

COAL QUALITY LOG

SOURCE TYPE	COAL
COAL COMBINATION	SINGLE
COAL QUALITY	ISO INTERVALS
From	328.
To	338.
Interval	10.
Sample No.	8
REMARKS	

LOG SUITE	GAMMA RAY
L1 DENSITY	

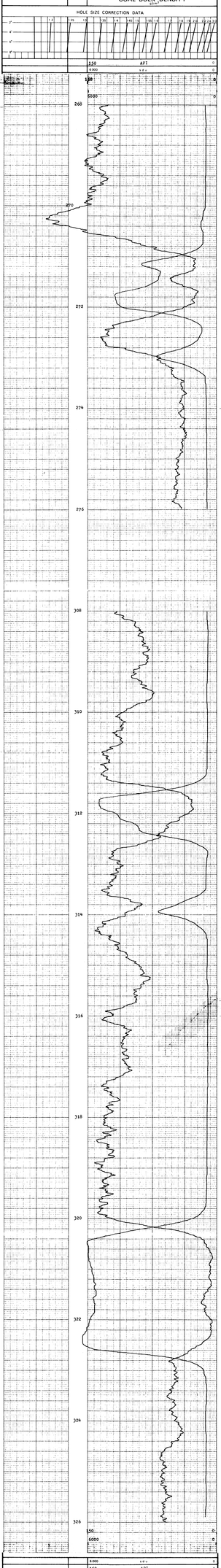
BOREHOLE DATA	REFER TO LISTING-001 LOG
OPERATION DATA	REFER TO LISTING-001 LOG
COLLARING AND RECORDING DATA	

GAMMA RAY	150	API	0
	6000		0
DENSITY	1.700	g/cm³	2.700
	2.700		3.700

BPB COAL QUALITY LOG

DEPTH	GAMMA RAY
	COAL BULK DENSITY g/cm³

HOLE SIZE CORRECTION DATA



6000	kg/m³ 0
150	API 0
	COAL BULK DENSITY g/cm³
DEPTH	GAMMA RAY

BPB

BOREHOLE 32 # 62 Sukunka '78	AREA B.C.
CLIENT 32 Coal	COUNTRY Canada

COAL QUALITY LOG

665

SEAM THICKNESS LOG

BOREHOLE DATA	
OPERATION DATA	BEAM TO CALIPER 0.00
	BEAM TO LINE 0.00
EQUIPMENT AND RECORDING DATA	
CALIBRATION DATA	
SEAM THICKNESS LOG	

BOREHOLE	32 # 62 Sukunka "70
CLIENT	32 Coal
AREA	B.C.
COUNTRY	Canada
DATE LOGGED	12 MARCH
RUN NO.	1
DEPTH	0.0 - 329.0

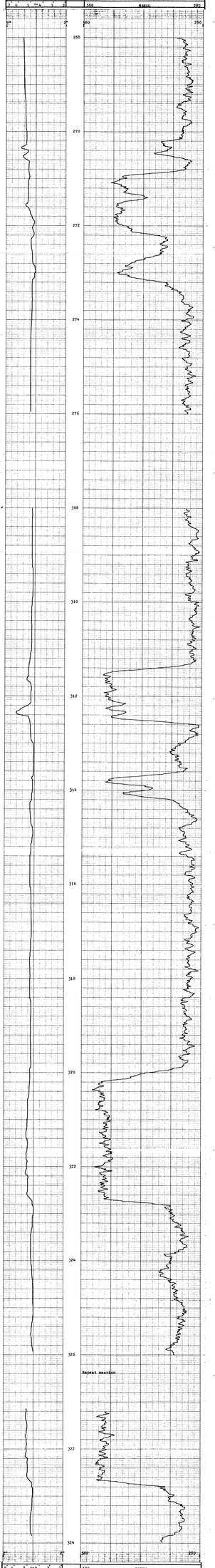
DENSITY	1.3 g/cm³
COAL COMBUSTION	32%
SEAM THICKNESS	1.0 m
LOG INTERVALS	329 - 228
DEPTH	0 - 329
RECORDING	1
LOG SUITE	1
LOG SUITE	1
B.P.B. DENSITY	1

SCALE TYPE: LINEAR
COAL COMBUSTION SOURCE: 32 Coal
SEAM THICKNESS: 1.0 m
LOG INTERVALS: 329 - 228
DEPTH: 0 - 329
RECORDING: 1
LOG SUITE: 1
LOG SUITE: 1
B.P.B. DENSITY: 1

665

Borehole 32 # 62 Sukunka '70
Client 32 Coal

B P B SEAM THICKNESS LOG



CALIPER | DEPTH | BED RESOLUTION DENSITY

BOREHOLE 32 # 62 Sukunka '70
CLIENT 32 Coal
AREA B.C.
COUNTRY Canada

SEAM THICKNESS LOG

BP Sukunka 78 (3) A.

NEUTRON-NEUTRON LOG

COMPANY BP Coal
BOREHOLE BP # 62 Sukunka '78
STATE B.C. COUNTRY Canada

Permanent Datum Ground Level Elev. ___ m.
Log measured from Ground Level zero m. above P.D.
Drilling measured from Ground Level zero m. above P.D.

GRID REF E ___ N ___ R.L. ___

Run No	1		
Depth Scale	1:200		
Date	10 August 1978		
First Reading	330m		
Last Reading	0m		
Interval Measured	330m		
Casing BPB			
Casing Driller			
Depth Reached	330.2m		
Bottom Driller	329.0m		
Mud Nature	Natural		
SG / Viscosity			
Bit Size 1	6¼" to 144m	to	to
2	5" to 294m	to	to
3	4 7/8" to T.D.	to	to
Casing Size 1	to	to	to
2	to	to	to
Rm @ Meas Temp.	@	@	@
Rmf @ Meas Temp.	@	@	@
Rmc @ Meas Temp.	@	@	@
BHT			
Operating Time	6 hrs		
Truck No.	23/21		
Recorded By	D.Fisher		
Witness	B.Nylland		

665

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REMARKS

Changes in Mud Type or Additional Samples				
Date	Sample No.			
Depth-Driller				
Type Fluid in Hole				
Dens.	Visc.			
ph.	Fluid Loss	ml		
Source of Sample				
Rm @ Meas. Temp.	@	°F	@	°F
Rmf @ Meas. Temp.	@	°F	@	°F
Rmc @ Meas. Temp.	@	°F	@	°F
Source: Rmf	Rmc			
Rm @ BHT	@	°F	@	°F
Rmf @ BHT	@	°F	@	°F
Rmc @ BHT	@	°F	@	°F

Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down
Neutron	101.6	750-1500 SNU	0-750

Equipment Data

Run No.	Tool Type	Tool Position	Other

Logging Data

Log	Depths m From	Depths m To	Speed m/min	T.C. sec	Norm.	Sonde No	Source No.
N-N	330	0	9	1	0.25	81	N-2479

COMPANY BP Coal
BOREHOLE BP # 62 Sukunka '78
STATE British Columbia
COUNTRY Canada

MY (8) 58360 R

COMPANY BP Coal

BOREHOLE BP # 63 Sukunka '78

STATE B.C. COUNTRY Canada

Permanent Datum Ground Level Elev. m

Log measured from Ground Level 52.0 m above P.D.

Drilling measured from Ground Level 52.0 m above P.D.

COAL LITHOLOGY LOG

Run No. 1 Depth-Driller 112.2m

Date 14 August 1978

First Reading 110m

Last Reading 0m

Casing Driller 10.8m

Casing Logger 10.8m

Depth Reached 112.2m

Bit Record 11in

Mud Type Water

Mud Viscosity Quick Gel

Bit Size 3" to T.D.

Casing Size 1 3" to 11m

2 to

Rm @ Meas Temp. @ °F @ °F

Rmf @ Meas Temp. @ °F @ °F

Rmc @ Meas Temp. @ °F @ °F

BHT 3 hrs

Operating Time 2 hrs

Recorded By P. Gaither

Witness P. Gaither

665

fold here

REMARKS

Changes in Mud Type or Additional Samples

Date	Sample No.						
Depth-Driller							
Type Fluid in Hole							
Dens.	Visc.						
pH	Fluid Loss	ml					
Source of Sample							
Rm @ Meas Temp.	@ °F	@ °F					
Rmf @ Meas Temp.	@ °F	@ °F					
Rmc @ Meas Temp.	@ °F	@ °F					
Source Rmf Rmc							
Rm @ BHT	@ °F	@ °F					
Rmf @ BHT	@ °F	@ °F					
Rmc @ BHT	@ °F	@ °F					

Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down

Equipment Data

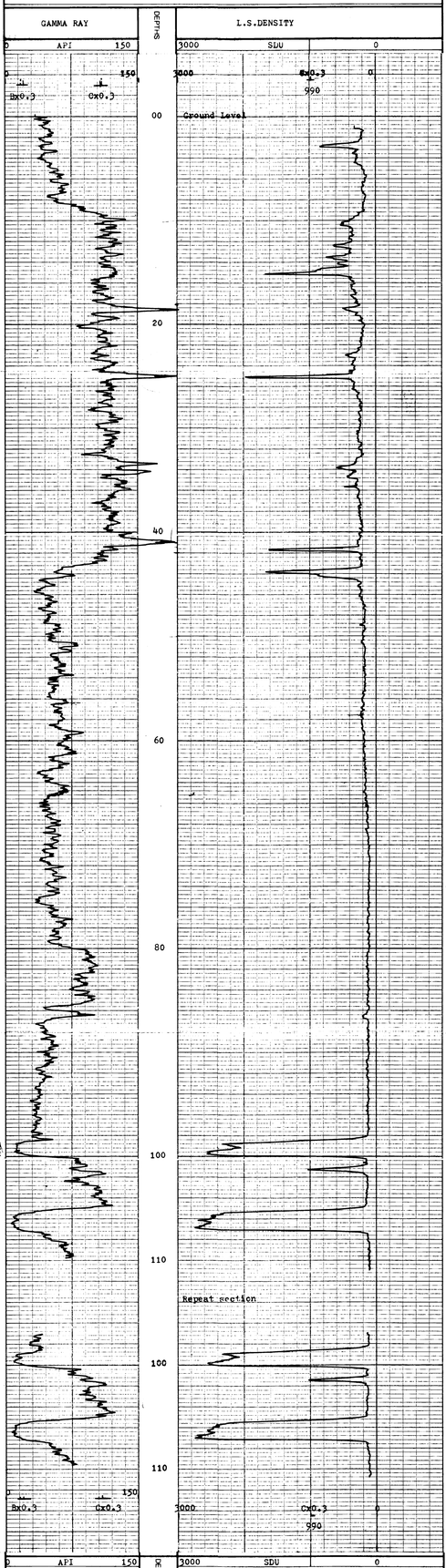
Run No.	Tool Type	Tool Position	Other

Logging Data

Log	Depths m From	To	Speed m/min	T.C. sec	Norm.	Sonde No.	Source No.
Gamma	110	0	9	1	1.3	110	
LSD	111	1	9	1/3	2.2	110	M-5852

Gamma ray calibrator value 300 API

Borehole logged through NQ rods.



GAMMA RAY — DEPTHS — L.S.DENSITY

COMPANY BP Coal

BOREHOLE BP # 63 Sukunka '78

STATE B.C.

COUNTRY Canada

AW ID 5250

COMPANY BP Coal

BOREHOLE BP # 63 Sukunka '78

STATE B.C. COUNTRY Canada

NEUTRON-NEUTRON LOG

Permanent Datum Ground Level Elev. m.

Log measured from Ground Level 22.2 m. above P.D.

Drilling measured from Ground Level 22.2 m. above P.D.

GRID REF E N

Run No. 1 Depth-Scale 1:200

Date 14 August 1978

Log Recorded 112m

Log Interval Measured 112m

Casing Size 9.68m

Casing Driller 11m

Casing Logger 112.3m

Bottom Driller 112.3m

Bottom Logger 112.3m

Mud Type Gel

Mud Density 8.6 lb/gal Viscosity

pH Fluid Loss ml

Source of Sample

Rm @ Meas Temp @ °F @ °F

Rmf @ Meas Temp @ °F @ °F

Rmc @ Meas Temp @ °F @ °F

Source: Rmf Rmc

Rm @ BHT @ °F @ °F

Rmf @ BHT @ °F @ °F

Rmc @ BHT @ °F @ °F

Time Since Circ. 3 hrs

Max. Rec. Temp. 3/221

Equip. Location P. Caine

Recorded By

Witnessed By

RL - SIDEWALL 71 18/P.

fold here

REMARKS

Changes in Mud Type or Additional Samples

Date	Sample No.				
Depth - Driller					
Type Fluid in Hole					
Dens.	Visc.				
ph	Fluid Loss				
Source of Sample					
Rm @ Meas Temp		@ °F		@ °F	
Rmf @ Meas Temp		@ °F		@ °F	
Rmc @ Meas Temp		@ °F		@ °F	
Source: Rmf	Rmc				
Rm @ BHT		@ °F		@ °F	
Rmf @ BHT		@ °F		@ °F	
Rmc @ BHT		@ °F		@ °F	

Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down

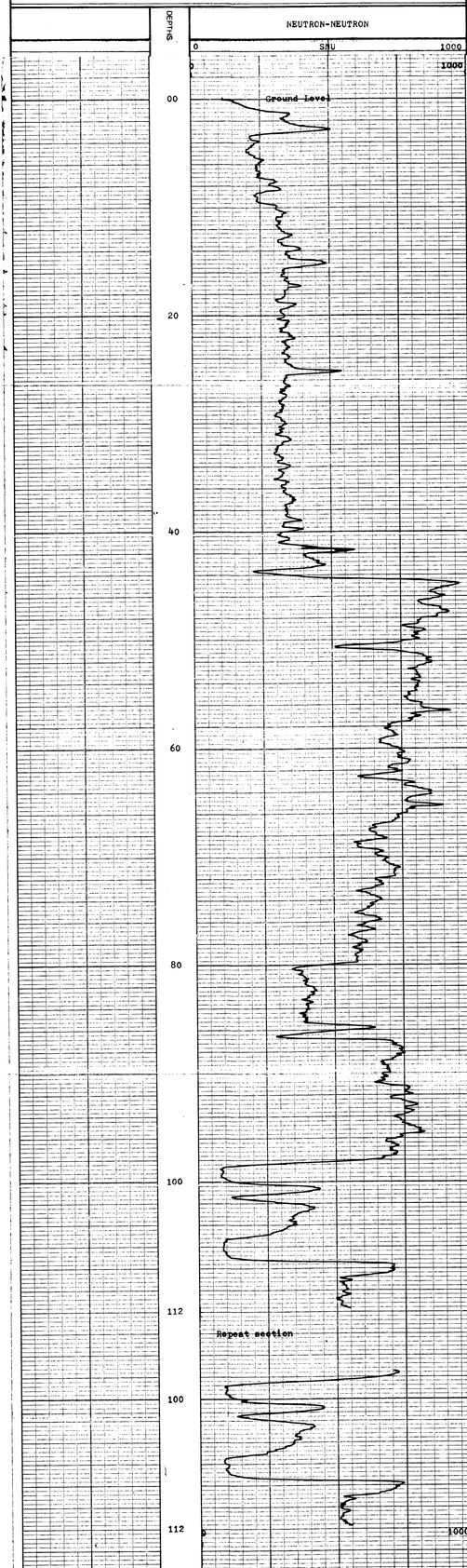
Equipment Data

Run No.	Tool Type	Tool Position	Other

Logging Data

Log	Depths m From	To	Speed m/min	T.C. sec	Norm.	Sonde No.	Source No.
N-N	112	0	9	1	.757	81	N-2479

Borehole logged through NQ rods.



COMPANY BP Coal

BOREHOLE BP # 63 Sukunka '78

STATE B.C.

COUNTRY Canada

965

RE SURVEYS LTD.

BOREHOLE: SF # 63 Sukunka '78
STATE: B.C. COUNTRY: Canada

SEAM THICKNESS LOG

Permanent Datum: Ground Level Elev. 0
Log Measured from: Ground Level 0 ft above Perm. Datum
Drilling Measured from: Ground Level 0 ft above Perm. Datum

Date of Log: 1-Jun-78
Run No. 1
Depth Driller 1125
Depth Logger 1125
Bottom Logged Interval 1120
Top Logged Interval 330
Casing Driller 330 @ 0
Casing Logger 330
Bit Size 15
Type Fluid in Hole Water
Salinity ppm Cl
Density lb/gal
Level Empty
Max. Rec. Temp. °F
Equip. No. & Location 1134 Dawson Creek
Recorded By D.Hall
Witnessed By

Run No. | Bit From | Bit To | Size | Type Fluid | Density | Visc. | pH | Fluid Loss | Source of Sample | Rm @ Meas Temp | Rmf @ Meas Temp | Rmc @ Meas Temp | Source: Rmf / Rmc | Rm @ BHT | Rmf @ BHT | Rmc @ BHT
1 | 0 | 1125 | 15 | Water | 8.3 | 40 | 9.0 | 10.2 | Cuttings | @ °F | @ °F | @ °F | | @ °F | @ °F | @ °F

Tool Description: 1 Gamma Ray Sonde 1134 Dawson Creek

Rig Time: Logging 3 hrs. Standby hrs.

Remarks: Borehole logged through NQ rods.

Witness: Todd here

RE MARKS

Changes in Mud Type or Additional Samples

Date | Sample No. | Depth

Depth - Driller

Type Fluid in Hole

Dens. | Visc.
pH | Fluid Loss
Source of Sample

Rm @ Meas Temp | Rmf @ Meas Temp | Rmc @ Meas Temp | Source: Rmf / Rmc | Rm @ BHT | Rmf @ BHT | Rmc @ BHT

Scale Changes

Type Log | Depth | Scale Up Hole | Scale Down
S.R.Density | 46m | 330-180 SRDU | 300-150

Equipment Data

Run No | Tool Type | Tool Position | Other

Logging Data

Log | Depths From | Depths To | Speed F/M | Time Constant | Normalizing Window | Recorded | Source No.
SRD | 110 | 40 | 2 | 1 | 0.75 | 110 | K-5852

Borehole logged through NQ rods.

DEPTHS

S.R.DENSITY

330 SRDU 180

330 180

40

42

44

46

330 180

Scale change

300 150

96

98

100

102

104

106

108

110

Repeat section

106

108

300 SRDU 150

DEPTHS

S.R.DENSITY

COMPANY SF Coal

BOREHOLE SF # 63 Sukunka '78

STATE B.C.

COUNTRY Canada

COMPANY BP COAL
BOREHOLE BP # 63 SUKUNKA '78
STATE B.C. COUNTRY CANADA

Permanent Datum: Ground Level — Elev. — m
Log measured from: Ground Level — 3.20 m above R.D.
Drilling measured from: Ground Level — 3.20 m above R.D.

GEOLOG 1 — Date: 3-8-78 — Run No: 1 — Depth-Driller: 1425 — Depth-Logger: 1427 — Btm. Log Interval: 1410 — Top Log Interval: 0 — Casing-Driller: 1425 — Casing-Logger: 1427 — Bit Size: 96 mm — Type Fluid in Hole: WATER — Dens.: — Visc.: — pH: — Fluid Loss: — ml — Source of Sample: CORE — Rm @ Meas Temp: @ °F — Rmf @ Meas Temp: @ °F — Rmc @ Meas Temp: @ °F — Source: Rmf — Rmc — Rm @ BHT: @ °F — Rmf @ BHT: @ °F — Rmc @ BHT: @ °F

Recorded By: D. PETERS — Witnessed By: P. NEW

Changes in Mud Type or Additional Samples — Date — Sample No. — Depth - Driller — Type Fluid in Hole — Dens. — Visc. — pH — Fluid Loss — ml — Source of Sample — Rm @ Meas Temp — Rmf @ Meas Temp — Rmc @ Meas Temp — Source: Rmf — Rmc — Rm @ BHT — Rmf @ BHT — Rmc @ BHT

Scale Changes — Type Log — Depth — Scale Up Hole — Scale Down

Equipment Data — Run No. — Tool Type — Tool Position — Other

Logging Data — Log — Depths m From — To — Speed m/min — T.C. sec — Norm. — Invert. — Source No

Log	From	To	Speed m/min	T.C. sec	Norm.	Invert.	Source No
Gamma	110	40	2	3	1.3	110	
LSD	110	40	2	1	7.2	110	M-5852

REMARKS: Borehole logged through HQ rods.

S99

BOREHOLE GEOPHYSICS LTD.

GAMMA RAY
L.S.DENSITY

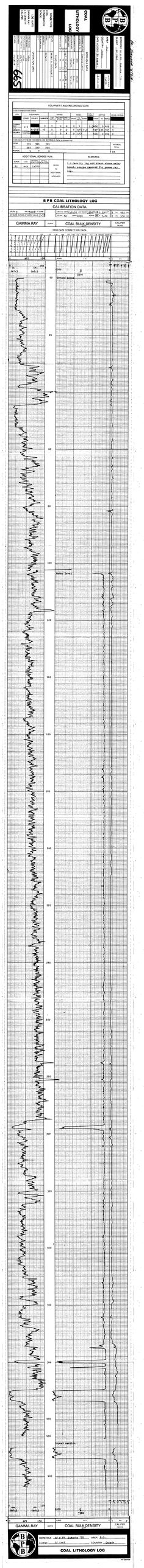
DEPTHS

API 150 0 — 3000 0
SGU 550 0 — 3000 0

40 42 44 96 98 100 102 104 106 108 110

DEPTHS
API 150 0 — 3000 0
SGU 50 0 — 3000 0
GAMMA RAY
L.S.DENSITY

COMPANY BP Coal
BOREHOLE BP # 63 Sukunka '78
STATE B.C.
COUNTRY Canada


COAL LITHOLOGY LOG
S99
EQUIPMENT AND RECORDING DATA
CALIBRATION DATA
GAMMA RAY
COAL BULK DENSITY
CALIBER
HOLE SIZE CORRECTION DATA
Ground Level
Water Level
MINAR 86/2/25
COAL LITHOLOGY LOG

BOREHOLE BP # 64 Sukunka '78
CLIENT BP Coal
AREA B.C.
COUNTRY Canada
DATE LOGGED 14 August
DEPTH SCALE 1:20
3 OF 4 LOGS

PR- SUKUNKA 78(3)A.

COAL QUALITY LOG

SONDE TYPE:
COAL COMBINATION SONDE

LOG SUITE:
GAMMA RAY
L.S. DENSITY

BOREHOLE DATA — REFER TO LITHOLOGY LOG

OPERATION DATA — REFER TO LITHOLOGY LOG

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE — SIDEWALL POSITION

LOG	TAPING: LOG TAPED	RECORD SPEED	DIREC. OF REPLAY	PANEL: SPEED	T.C. SECS	NORM.	CAL COEFF.
GAMMA RAY	Y	1	R	22	2		1.3
L.S. DENSITY	Y	1	R	22	1	7.2	

SOURCE, SONDE AND CALIBRATION — REFER TO LITHOLOGY LOG

COAL QUALITY LOG INTERVALS

FROM	396	384	301	
TO	387	377	295	
INTERVAL	9	7	6	
FROM				
TO				
INTERVAL				INTER-VAL TOTAL = 22

REMARKS

665

BPB COAL QUALITY LOG

	DEPTH	GAMMA RAY
		COAL BULK DENSITY g/cm3

HOLE SIZE CORRECTION DATA

		6.000 s.d.u 0
		150 API 0
		COAL BULK DENSITY g/cm3
	DEPTH	GAMMA RAY

BOREHOLE BP # 64 Sukunka '78
CLIENT BP Coal
AREA B.C.
COUNTRY Canada

COAL QUALITY LOG

Pr. Sherwood 71/3/A

BPB

SEAM THICKNESS LOG

BOREHOLE SP # 64 Sukunka '78
CLIENT SP Coal
AREA B.C.
COUNTRY Canada
DATE LOGGED 26 August 1978
DEPTH CONTROL 1 in = 2.00 m

BOREHOLE DATA	REFER TO CALIBRATION LOG
OPERATION DATA	REFER TO CALIBRATION LOG
EQUIPMENT AND RECORDING DATA	
LOG INTERVALS	
SONDE TYPE	
COAL COMBINATION	
SONDE	
LOG SUITE	
CALIPER	
BR DENSITY	
REMARKS	

LOG	SONDE	SERIAL NO.	LOG INTERVALS
CALIPER			
BR DENSITY			

SEAM	TOP	BASE	THICKNESS
1	293.5	295.5	2.0
2	297.5	299.5	2.0
3	301.5	303.5	2.0
4	376.5	378.5	2.0
5	379.5	381.5	2.0
6	383.5	385.5	2.0
7	387.5	389.5	2.0
8	391.5	393.5	2.0
9	395.5	397.5	2.0
10	399.5	401.5	2.0
11	403.5	405.5	2.0
12	407.5	409.5	2.0
13	411.5	413.5	2.0
14	415.5	417.5	2.0
15	419.5	421.5	2.0
16	423.5	425.5	2.0
17	427.5	429.5	2.0
18	431.5	433.5	2.0
19	435.5	437.5	2.0
20	439.5	441.5	2.0
21	443.5	445.5	2.0
22	447.5	449.5	2.0
23	451.5	453.5	2.0
24	455.5	457.5	2.0
25	459.5	461.5	2.0
26	463.5	465.5	2.0
27	467.5	469.5	2.0
28	471.5	473.5	2.0
29	475.5	477.5	2.0
30	479.5	481.5	2.0
31	483.5	485.5	2.0
32	487.5	489.5	2.0
33	491.5	493.5	2.0
34	495.5	497.5	2.0
35	499.5	501.5	2.0
36	503.5	505.5	2.0
37	507.5	509.5	2.0
38	511.5	513.5	2.0
39	515.5	517.5	2.0
40	519.5	521.5	2.0
41	523.5	525.5	2.0
42	527.5	529.5	2.0
43	531.5	533.5	2.0
44	535.5	537.5	2.0
45	539.5	541.5	2.0
46	543.5	545.5	2.0
47	547.5	549.5	2.0
48	551.5	553.5	2.0
49	555.5	557.5	2.0
50	559.5	561.5	2.0
51	563.5	565.5	2.0
52	567.5	569.5	2.0
53	571.5	573.5	2.0
54	575.5	577.5	2.0
55	579.5	581.5	2.0
56	583.5	585.5	2.0
57	587.5	589.5	2.0
58	591.5	593.5	2.0
59	595.5	597.5	2.0
60	599.5	601.5	2.0
61	603.5	605.5	2.0
62	607.5	609.5	2.0
63	611.5	613.5	2.0
64	615.5	617.5	2.0
65	619.5	621.5	2.0
66	623.5	625.5	2.0
67	627.5	629.5	2.0
68	631.5	633.5	2.0
69	635.5	637.5	2.0
70	639.5	641.5	2.0
71	643.5	645.5	2.0
72	647.5	649.5	2.0
73	651.5	653.5	2.0
74	655.5	657.5	2.0
75	659.5	661.5	2.0
76	663.5	665.5	2.0
77	667.5	669.5	2.0
78	671.5	673.5	2.0
79	675.5	677.5	2.0
80	679.5	681.5	2.0
81	683.5	685.5	2.0
82	687.5	689.5	2.0
83	691.5	693.5	2.0
84	695.5	697.5	2.0
85	699.5	701.5	2.0
86	703.5	705.5	2.0
87	707.5	709.5	2.0
88	711.5	713.5	2.0
89	715.5	717.5	2.0
90	719.5	721.5	2.0
91	723.5	725.5	2.0
92	727.5	729.5	2.0
93	731.5	733.5	2.0
94	735.5	737.5	2.0
95	739.5	741.5	2.0
96	743.5	745.5	2.0
97	747.5	749.5	2.0
98	751.5	753.5	2.0
99	755.5	757.5	2.0
100	759.5	761.5	2.0
101	763.5	765.5	2.0
102	767.5	769.5	2.0
103	771.5	773.5	2.0
104	775.5	777.5	2.0
105	779.5	781.5	2.0
106	783.5	785.5	2.0
107	787.5	789.5	2.0
108	791.5	793.5	2.0
109	795.5	797.5	2.0
110	799.5	801.5	2.0
111	803.5	805.5	2.0
112	807.5	809.5	2.0
113	811.5	813.5	2.0
114	815.5	817.5	2.0
115	819.5	821.5	2.0
116	823.5	825.5	2.0
117	827.5	829.5	2.0
118	831.5	833.5	2.0
119	835.5	837.5	2.0
120	839.5	841.5	2.0
121	843.5	845.5	2.0
122	847.5	849.5	2.0
123	851.5	853.5	2.0
124	855.5	857.5	2.0
125	859.5	861.5	2.0
126	863.5	865.5	2.0
127	867.5	869.5	2.0
128	871.5	873.5	2.0
129	875.5	877.5	2.0
130	879.5	881.5	2.0
131	883.5	885.5	2.0
132	887.5	889.5	2.0
133	891.5	893.5	2.0
134	895.5	897.5	2.0
135	899.5	901.5	2.0
136	903.5	905.5	2.0
137	907.5	909.5	2.0
138	911.5	913.5	2.0
139	915.5	917.5	2.0
140	919.5	921.5	2.0
141	923.5	925.5	2.0
142	927.5	929.5	2.0
143	931.5	933.5	2.0
144	935.5	937.5	2.0
145	939.5	941.5	2.0
146	943.5	945.5	2.0
147	947.5	949.5	2.0
148	951.5	953.5	2.0
149	955.5	957.5	2.0
150	959.5	961.5	2.0
151	963.5	965.5	2.0
152	967.5	969.5	2.0
153	971.5	973.5	2.0
154	975.5	977.5	2.0
155	979.5	981.5	2.0
156	983.5	985.5	2.0
157	987.5	989.5	2.0
158	991.5	993.5	2.0
159	995.5	997.5	2.0
160	999.5	1001.5	2.0
161	1003.5	1005.5	2.0
162	1007.5	1009.5	2.0
163	1011.5	1013.5	2.0
164	1015.5	1017.5	2.0
165	1019.5	1021.5	2.0
166	1023.5	1025.5	2.0
167	1027.5	1029.5	2.0
168	1031.5	1033.5	2.0
169	1035.5	1037.5	2.0
170	1039.5	1041.5	2.0
171	1043.5	1045.5	2.0
172	1047.5	1049.5	2.0
173	1051.5	1053.5	2.0
174	1055.5	1057.5	2.0
175	1059.5	1061.5	2.0
176	1063.5	1065.5	2.0
177	1067.5	1069.5	2.0
178	1071.5	1073.5	2.0
179	1075.5	1077.5	2.0
180	1079.5	1081.5	2.0
181	1083.5	1085.5	2.0
182	1087.5	1089.5	2.0
183	1091.5	1093.5	2.0
184	1095.5	1097.5	2.0
185	1099.5	1101.5	2.0
186	1103.5	1105.5	2.0
187	1107.5	1109.5	2.0
188	1111.5	1113.5	2.0
189	1115.5	1117.5	2.0
190	1119.5	1121.5	2.0
191	1123.5	1125.5	2.0
192	1127.5	1129.5	2.0
193	1131.5	1133.5	2.0
194	1135.5	1137.5	2.0
195	1139.5	1141.5	2.0
196	1143.5	1145.5	2.0
197	1147.5	1149.5	2.0
198	1151.5	1153.5	2.0
199	1155.5	1157.5	2.0
200	1159.5	1161.5	2.0
201	1163.5	1165.5	2.0
202	1167.5	1169.5	2.0
203	1171.5	1173.5	2.0
204	1175.5	1177.5	2.0
205	1179.5	1181.5	2.0
206	1183.5	1185.5	2.0
207	1187.5	1189.5	2.0
208	1191.5	1193.5	2.0
209	1195.5	1197.5	2.0
210	1199.5	1201.5	2.0
211	1203.5	1205.5	2.0
212	1207.5	1209.5	2.0
213	1211.5	1213.5	2.0
214	1215.5	1217.5	2.0
215	1219.5	1221.5	2.0
216	1223.5	1225.5	2.0
217	1227.5	1229.5	2.0
218	1231.5	1233.5	2.0
219	1235.5	1237.5	2.0
220	1239.5	1241.5	2.0
221	1243.5	1245.5	2.0
222	1247.5	1249.5	2.0
223	1251.5	1253.5	2.0
224	1255.5	1257.5	2.0
225	1259.5	1261.5	2.0
226	1263.5	1265.5	2.0
227	1267.5	1269.5	2.0
228	1271.5	1273.5	2.0
229	1275.5	1277.5	2.0
230	1279.5	1281.5	2.0
231	1283.5	1285.5	2.0
232	1287.5	1289.5	2.0
233	1291.5	1293.5	2.0
234	1295.5	1297.5	2.0
235	1299.5	1301.5	2.0
236	1303.5	1305.5	2.0
237	1307.5	1309.5	2.0
238	1311.5	1313.5	2.0
239	1315.5	1317.5	2.0
240	1319.5	1321.5	2.0
241	1323.5	1325.5	2.0
242	1327.5	1329.5	2.0
243	1331.5	1333.5	2.0
244	1335.5	1337.5	2.0
245	1339.5	1341.5	2.0
246	1343.5	1345.5	2.0
247	1347.5	1349.5	2.0
248	1351.5	1353.5	2.0
249	1355.5	1357.5	2.0
250	1359.5	1361.5	2.0
251	1363.5	1365.5	2.0
252	1367.5	1369.5	2.0
253	1371.5	1373.5	2.0
254	1375.5	1377.5	2.0
255	1379.5	1381.5	2.0
256	1383.5	1385.5	2.0
257	1387.5	1389.5	2.0
258	1391.5	1393.5	2.0
259	1395.5	1397.5	2.0
260	1399.5	1401.5	2.0
261	1403.5	1405.5	2.0
262	1407.5	1409.5	2.0
263	1411.5	1413.5	2.0
264	1415.5	1417.5	2.0
265	1419.5	1421.5	2.0
266	1423.5	1425.5	2.0
267	1427.5	1429.5	2.0
268	1431.5	1433.5	2.0
269	1435.5	1437.5	2.0
270	1439.5	1441.5	2.0
271	1443.5	1445.5	2.0
272	1447.5	1449.5	2.0
273	1451.5	1453.5	2.0
274	1455.5	1457.5	2.0
275	1459.5	1461.5	2.0
276	1463.5	1465.5	2.0
277	1467.5	1469.5	2.0
278	1471.5	1473.5	2.0
279	1475.5	1477.5	2.0
280	1479.5	1481.5	2.0
281	1483.5	1485.5	2.0
282	1487.5	1489.5	2.0
283	1491.5	1493.5	2.0
284	1495.5	1497.5	2.0
285	1499.5	1501.5	2.0
286	1503.5	1505.5	2.0
287	1507.5	1509.5	2.0
288	1511.5	1513.5	2.0
289	1515.5	1517.5	2.0
290	1519.5	1521.5	2.0
291	1523.5	1525.5	2.0
292	1527.5	1529.5	2.0
293	1531.5	1533.5	2.0
294	1535.5	1537.5	2.0
295	1539.5	1541.5	2.0
296	1543.5	1545.5	2.0
297	1547.5	1549.5	2.0
298	1551.5	1553.5	2.0
299	1555.5	1557.5	2.0
300	1559.5	1561.5	2.0
301	1563.5	1565.5	2.0
302	1567.5	1569.5	2.0
303	1571.5	1573.5	2.0
304	1575.5	1577.5	2.0
305	1579.5	1581.5	2.0
306	1583.5	1585.5	2.0
307	1587.5	1589.5	2.0
308	1591.5	1593.5	2.0
309	1595.5	1597.5	2.0
310	1599.5	1601.5	2.0
311	1603.5	1605.5	2.0
312	1607.5	1609.5	2.0
313	1611.5	1613.5	2.0
314	1615.5	1617.5	2.0
315	1619.5	1621.5	2.0
316	1623.5	1625.5	2.0
317	1627.5	1629.5	2.0
318	1631.5	1633.5	2.0
319	1635.5	1637.5	2.0
320	1639.5	1641.5	2.0
321	1643.5	1645.5	2.0
322	1647.5	1649.5	2.0
323	1651.5	1653.5	2.0
324	1655.5	1657.5	2.0
325	1659.5	1661.5	2.0
326	1663.5	1665.5	2.0
327	1667.5	1669.5	2.0
328	1671.5	1673.5	2.0
329	1675.5	1677.5	2.0
330	1679.5	1681.5	2.0
331	1683.5	1685.5	2.0
332	1687.5	1689.5	2.0
333	1691.5	1693.5	2.0
334	1695.5	1697.5	2.0
335	1699.5	1701.5	2.0
336	1703.5	1705.5	2.0
337	1707.5	1709.5	2.0
338	1711.5	1713.5	2.0
339	1715.5	1717.5	2.0
340	1719.5	1721.5	2.0
341	1723.5	1725.5	2.0
342	1727.5	1729.5	2.0
343	1731.5	1733.5	2.0
344	1735.5	1737.5	2.0
345	1739.5	1741.5	2.0
346	1743.5	1745.5	2.0
347	1747.5	1749.5	2.0
348	1751.5	1753.5	2.0
349	1755.5	1757.5	2.0
350	1759.5	1761.5	2.0
351	1763.5	1765.5	2.0
352	1767.5	1769.5	2.0
353	1771.5	1773.5	2.0
354	1775.5	1777.5	2.0
355	1779.5	1781.5	2.0
356	1783.5	1785.5	2.0
357	1787.5	1789.5	2.0
358	1791.5	1793.5	2.0
359	1795.5	1797.5	2.0
360	1799.5	1801.5	2.0
361	1803.5	1805.5	2.0
362	1807.5	1809.5	2.0
363	1811.5	1813.5	2.0
364	1815.5	1817.5	2.0
365	1819.5	1821.5	2.0
366	1823.5	1825.5	2.0
367	1827.5	1829.5	2.0
368	1831.5	1833.5	2.0
369	1835.5	1837.5	2.0
370	1839.5	1841.5	2.0
371	1843.5	1845.5	2.0
372	1847.5	1849.5	2.0
373	1851.5	1853.5	2.0
374	1855.5	1857.5	2.0
375	1859.5	1861.5	2.0
376	1863.5	1865.5	2.0
377	1867.5	1869.5	2.0
378	1871.5	1873.5	2.0
379	1875.5	1877.5	2.0
380	1879.5	1881.5	2.0
381	1883.5	1885.5	2.0
382	1887.5	1889.5	2.0
383	1891.5	1893.5	2.0
384	1895.5	1897.5	2.0
385	1899.5	1901.5	2.0
386	1903.5	1905.5	2.0
387	1907.5	1909.5	2.0
388	1911.5	1913.5	2.0
389	1915.5	1917.5	2.0
390	1919.5	1921.5	2.0
391	1923.5	1925.5	2.0
392	1927.5	1929.5	2.0
393	1931.5	1933.5	2.0
394	1935.5	1937.5	2.0
395	1939.5	1941.5	2.0
396	1943.5	1945.5	2.0
397	1947.5	1949.5	2.0
398	1951.5	1953.5	2.0
399	1955.5	1957.5	2.0
400	1959.5	1961.5	2.0
401	1963.5	1965.5	2.0
402	1967.5	1969.5	2.0
403	1971.5	1973.5	2.0
404	1975.5	1977.5	2.0
405	1979.5	1981.5	2.0
406	1983.5	1985.5	2.0
407	1987.5	1989.5	2.0
408	1991.5	1993.5	2.0
409	1995.5	1997.5	2.0
410	1999.5	2001.5	2.0
411	2003.5	2005.5	2.0
412	2007.5	2009.5	2.0
413	2011.5	2013.5	2.0
414	2015.5	2017.5	2.0
415	2019.5	2021.5	2.0
416	2023.5	2025.5	2.0
417	2027.5	2029.5	2.0
418	2031.5	2033.5	2.0
419	2035.5	2037.5	2.0
420	2039.5	2041.5	2.0
421	2043.5	2045.5	2.0
422	2047.5	2049.5	2.0
423	2051.5	2053.5	2.0
424	2055.5	2057.5	2.0
425	2059.5	2061.5	2.0
426	2063.5	2065.5	2.0
427	2067.5	2069.5	2.0
428	2071.5	2073.5	2.0
429	2075.5	2077.5	2.0
430	2079.5	2081.5	2.0
431	2083.5	2085.5	2.0
432	2087.5	2089.5	2.0
433	2091.5	2093.5	2.0
434	2095.5	2097.5	2.0
435	2099.5	2101.5	2.0
436	2103.5	2105.5	2.0
437	2107.5	2109.5	2.0
438	2111.5	2113.5	2.0
439	2115.5	2117.5	2.0
440	2119.5	2121.5	2.0
441	2123.5	2125.5	2.0
442	2127.5	2129.5	2.0
443	2131.5	2133.5	2.0
444	2135.5	2137.5	2.0
445	2139.5	2141.5	2.0
446	2143.5	2145.5	2.0
447	2147.5	2149.5	2.0
448	2151.5	2153.5	2.0
449	2155.5	2157.5	2.0
450	2159.5	2161.5	2.0
451	2163.5	2165.5	2.0
452	2167.5	2169.5	2.0
453	2171.5	2173.5	2.0
454	2175.5	2177.5	2.0
455	2179.5	2181.5	2.0
456	2183.5	2185.5	2.0
457	2187.5	2189.5	2.0
458	2191.5	2193.5	2.0
459	2195.5	2197.5	2.0
460	2199.5	2201.5	2.0
461	2203.5	2205.5	2.0
462	2207.5	2209.5	2.0
463	2211.5	2213.5	2.0
464	2215.5	2217.5	2.0
465	2219.5	2221.5	2.0
466	2223.5	2225.5	2.0
467	2227.5	2229.5	2.0
468	2231.5	2233.5	2.0
469	2235.5	2237.5	2.0
470	2239.5	2241.5	2.0
471	2243.5	2245.5	2.0
472	2247.5	2249.5	2.0
473	2251.5	2253.5	2.0
474	2255.5	2257.5	2.0
475	2259.5	2261.5	2.0
476	2263.5	2265.5	2.0
477	2267.5	2269.5	2.0
478	2271.5	2273.5	2.0
479	2275.5	2277.5	2.0
480	2279.5	2281.5	2.0
481	2283.5	2285.5	2.0
482	2287.5	2289.5	2.0
483	2291.5	2293.5	2.0
484	2295.5	2297.5	2.0
485	2299.5	2301.5	2.0
486	2303.5	2305.5	2.0
487	2307.5	2309.5	2.0
488	2311.5	2313.5	2.0
489	2315.5	2317.5	2.0
490	2319.5	2321.5	2.0
491	2323.5	2325.5	2.0
492	2327.5	2329.5	2.0
493	2331.5	2333.5	2.0
494	2335.5	2337.5	2.0
495	2339.5	2341.5	2.0
496	2343.5	2345.5	2.0
497	2347.5	2349.5	2.0
498	2351.5	2353.5	2.0
499	2355.5	2357.5	2.0
500	2359.5	2361.5	2.0
501	2363.5	2365.5	2.0
502	2367.5	2369.5	2.0
503	2371.5	2373.5	2.0
504	2375.5	2377.5	2.0
505	2379.5	2381.5	2.0
506	2383.5	2385.5	2.0
507	2387.5	2389.5	2.0
508	2391.5	2393.5	2.0
509	2395.5	2397.5	2.0
510	2399.5	2401.5	2.0
511	2403.5	2405.5	2.0
512	2407.5	2409.5	2.0
513	2411.5	2413.5	2.0
514	2415.5	2417.5	2.0
515	2419.5	2421.5	2.0
516	2423.5	2425.5	2.0
517	2427.5	2429.5	2.0
518	2431.5	2433.5	2.0
519	2435.5	2437.5	2.0
520	2439.5	2441.5	2.0
521	2443.5	2445.5	2.0
522	2447.5	2449.5	2.0
523	2451.5	2453.5	2.0
524	2455.5	2457.5	2.0
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526	2463.5	2465.5	2.0
527	2467.5	2469.5	2.0
528	2471.5	2473.5	2.0
529	2475.5	2477.5	2.0
530	2479.5	2481.5	2.0
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532	2487.5	2489.5	2.0
533	2491.5	2493.5	2.0
534	2495.5	2497.5	2.0
535	2499.5	2501.5	2.0
536	2503.5	2505.5	2.0
537	2507.5	2509.5	2.0
538	2511.5	2513.5	2.0
539	2515.5	2517.5	2.0
540	2519.5	2521.5	2.0
541	2523.5	2525.5	2.0
542	2527.5	2529.5	2.0
543	2531.5	2533.5	2.0
544	2535.5	2537.5	2.0
545	2539.5	2541.5	2.0
546	2543.5	2545.5	2.0
547	2547.5	2549.5	2.0
548	2551.5	2553.5	2.0
549	2555.5	2557.5	2.0
550	2559.5	2561.5	2.0
551	2563.5	2565.5	2.0
552	2567.5	2569.5	2.0
553	2571.5	2573.5	2.0
554	2575.5	2577.5	2.0
555	2579.5	2581.5	2.0
556	2583.5	2585.5	2.0
557	2587.5	2589.5	2.0
558	2591.5	2593.5	2.0
559	2595.5	2597.5	2.0
560	2599.5	2601.5	2.0
561	2603.5	2605.5	2.0
562	2607.5	2609.5	2.0
563	2611.5	2613.5	2.0
564	2615.5	2617.5	2.0
565	2619.5	2621.5	2.0
566	2623.5	2625.5	2.0
567	2627.5	2629.5	2.0
568	2631.5	2633.5	2.0
569	2635.5	2637.5	2.0
570	2639.5	2641.5	2.0
571	2643.5	2645.5	2.0
572	2647.5	2649.5	2.0
573	2651.5	2653.5	2.0
574	2655.5	2657.5	2.0
575	2659.5	2661.5	2.0
576	2663.5	2665.5	2.0
577	2667.5	2669.5	2.0
578	2671.5	2673.5	2.0
579	2675.5	2677.5	2.0
580	2679.5	2681.5	2.0
581	2683.5	2685.5	2.0
582	2687.5	2689.5	2.0
583	2691.5	2693.5	2.0
584	2695.5	2697.5	2.0
585	2699.5	2701.5	2.0
586	2703.5	2705.5	2.0
587	2707.5	2709.5	2.0
588	2711.5	2713.5	2.0
589	2715.5	2717.5	2.0
590	2719.5	2721.5	2.0
591	2723.5	2725.5	2.0
592	2727.5	2729.5	2.0
593	2731.5	2733.5	2.0
594	2735.5	2737.5	2.0
595	2739.5	2741.5	2.0
596	2743.5	2745.5	2.0
597	2747.5	2749.5	2.0
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601	2763.5	2765.5	2.0
602	2767.5	2769.5	2.0
603	2771.5	2773.5	2.0
604	2775.5	2777.5	2.0
605	2779.5	2781.5	2.0
606	2783.5	2785.5	2.0
607	2787.5	2789.5	2.0
608	2791.5	2793.5	2.0
609	2795.5	2797.5	2.0
610	2799.5	2801.5	2.0
611	2803.5	2805.5	2.0
612	2807.5	2809.5	2.0
613	2811.5	2813.5	2.0
614	2815.5	2817.5	2.0
615	2819.5	2821.5	2.0
616	2823.5	2825.5	2.0
617	2827.5	2829.5	2.0
618	2831.5	2833.5	2.0
619	2835.5	2837.5	2.0
620	2839.5	2841.5	2.0
621	2843.5	2845.5	2.0
622	2847.5	2849.5	2.0
623	2851.5	2853.5	2.0
624	2855.5	2857.5	2.0
625	2859.5	2861.5	2.0
626	2863.5	2865.5	2.0
627	2867.5	2869.5	2.0
628	2871.5	2873.5	2.0
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630	2879.5	2881.5	2.0
631	2883.5	2885.5	2.0
632	2887.5	2889.5	2.0
633	2891.5	2893.5	2.0
634	2895.5	2897.5	2.0
635	2899.5	2901.5	2.0
636	2903.5	2905.5	2.0
637	2907.5	2909.5	2.0
638	2911.5	2913.5	2.0
639	2915.5	2917.5	2.0
640	2919.5	2921.5	2.0
641	2923.5	2925.5	2.0
642	2927.5	2929.5	2.0
643	2931.5	2933.5	2.0
644	2935.5	2937.5	2.0
645	2939.5	2941.5	2.0
646	2943.5	2945.5	2.0
647	2947.5	2949.5	2.0
648	2951.5	2953.5	2.0
649	2955.5	2957.5	2.0
650	2959.5	2961.5	2.0
651	2963.5	2965.5	2.0
652	2967.5	2969.5	2.0
653	2971.5	2973.5	2.0
654	2975.5	2977.5	2.0
655	2979.5	2981.5	2.0
656	2983.5	2985.5	2.0
657	2987.5	2989.5	2.0
658	2991.5	2993.5	2.0
659	2995.5	2997.5	2.0
660	2999.5	3001.5	2.0
661	3003.5	3005.5	2.0
662	3007.5	3009.5	2.0
663	3011.5	3013.5	2.0
664	3015.5	3017.5	2.0
665	3019.5	3021.5	2.0
666	3023.5	3025.5	2.0
667	3027.5	3029.5	2.0
668	3031.5	3033.5	2.0
669	3035.5	3037.5	2.0
670	3039.5	3041.5	2.0
671	3043.5	3045.5	2.0
672	3047.5	3049.5	2.0
673	3051.5	3053.5	2.0
674	3055.5	3057.5	2.0
675	3059.5	3061.5	2.0
676	3063.5	3065.5	2.0
677	3067.5	3069.5	2.0
678	3071.5	3073.5	2.0
679	3075.5	3077.5	2.0
680	3079.5	3081.5	2.0
681	3083.5	3085.5	2.0
682	3087.5	3089.5	2.0
683	3091.5	3093.5	2.0
684	3095.5	3097.5	2.0
685	3099.5	3101.5	2.0
686	3103.5	3105.5	2.0
687	3107.5	3109.5	2.0
688	3111.5	3113.5	2.0
689	3115.5	3117.5	2.0
690	3119.5	3121.5	2.0
691	3123.5	3125.5	2.0
692	3127.5	3129.5	2.0
693	3131.5	3133.5	2.0
694	3135.5	3137.5	2.0
695	3139.5	3141.5	2.0
696	3143.5	3145.5	2.0
697	3147.5	3149.5	2.0
698	3151.5	3153.5	2.0
699	3155.5	3157.5	2.0
700	3159.5	3161.5	2.0
701	3163.5	3165.5	2.0
702	3167.5	3169.5	2.0
703	3171.5	3173.5	2.0
704	3175.5	3177.5	2.0
705	3179.5	3181.5	2.0
706	3183.5	3185.5	2.0
707	3187.5	3189.5	2.0
708	3191.5	3193.5	2.0
709	3195.5	3197.5	2.0
710	3199.5	3201.5	2.0
711	3203.5	3205.5	2.0
712	3207.5	3209.5	2.0
713	3211.5	3213.5	2.0
714	3215.5	3217.5	2.0
715	3219.5	3221.5	2.0
716	3223.5	3225.5	2.0
717	3227.5	3229.5	2.0
718	3231.5	3233.5	2.0
719	3235.5	3237.5	2.0
720	3239.5	3241.5	2.0
721	3243.5	3245.5	2.0
722	3247.5	3249.5	2.0
723	3251.5	3253.5	2.0
724	3255.5	3257.5	2.0
725	3259.5	3261.5	2.0
726	3263.5	3265.5	2.0
727	3267.5	3269.5	2.0
728	3271.5	3273.5	2.0
729	3275.5	3277.5	2.0
730	3279.5	3281.5	2.0
731	3283.5	3285.5	2.0
732	3287.5	3289.5	2.0
733	3291.5	3293.5	2.0
734	3295.5	3297.5	2.0
735	3299.5	3301.5	2.0
736	3303.5	3305.5	2.0
737	3307.5	3309.5	2.0
738	3311.5	3313.5	2.0
739	3315.5	3317.5	2.0
740	3319.5	3321.5	2.0
741	3323.5	3325.5	2.0
742	3327.5	3329.5	2.0
743	3331.5	3333.5	2.0
744	3335.5	3337.5	2.0
745	3339.5	3341.5	2.0
746	3343.5	3345.5	2.0
747	3347.5	3349.5	2.0
748	3351.5	3353.5	2.0
749	3355.5	3357.5	2.0
750	3359.5	3361.5	2.0
751	3363.5	3365.5	2.0
752	3367.5	3369.5	2.0
753	3371.5	3373.5	2.0
754	3375.5	3377.5	2.0
755	3379.5	3381.5	2.0
756	3383.5	3385.5	2.0
757	3387.5	3389.5	2.0
758	3391.5	3393.5	2.0
759	3395.5	3397.5	2.0
760	3399.5	3401.5	2.0
761	3403.5	3405.5	2.0
762	3407.5	3409.5	2.0
763	3411.5	3413.5	2.0
764	3415.5	3417.5	2.0
765	3419.5	3421.5	2.0
766	3423.5	3425.5	2.0
767	3427.5	3429.5	2.0
768	3431.5	3433.5	2.0
769	3435.5	3437.5	2.0
770	3439.5	3441.5	2.0
771	3443.5	3445.5	2.0
772	3447.5	3449.5	2.0
773	3451.5	3453.5	2.0
774	3455.5	3457.5	2.0
775	3459.5	3461.5	2.0
776	3463.5	3465.5	2.0
777	3467.5	3469.5	2.0
778	3471.5	3473.5	2.0
779	3475.5	3477.5	2.0
780	3479.5	3481.5	2.0
781	3483.5	3485.5	2.0
782	3487.5	3489.5	2.0
783	3491.5	3493.5	2.0
784	3495.5	3497.5	2.0
785	3499.5	3501.5	2.0
786	3503.5	3505.5	2.0
787	3507.5	3509.5	2.0
788	3511.5	3513.5	2.0
789	3515.5	3517.5	2.0
790	3519.5	3521.5	2.0
791	3523.5	3525.5	2.0
792	3527.5	3529.5	2.0
793	3531.5	3533.5	2.0
794	3535.5	3537.5	2.0
795	3539.5	3541.5	2.0
796	3543.5	3545.5	2.0
797	3547.5	3549.5	2.0
798	3551.5	3553.5	2.0
799	3555.5	3557.5	2.0
800	3559.5	3561.5	2.0
801	3563.5	3565.5	2.0
802	3567.5	3569.5	2.0
803	3571.5	3573.5	2.0
804	3575.5	3577.5	2.0
805	3579.5	3581.5	2.0
806	3583.5	3585.5	2.0
807	3587.5	3589.5	2.0
808	3591.5	3593.5	2.0
809	3595.5	3597.5	2.0
810	3599.5	3601.5	2.0
811	3603.5	3605.5	2.0
812	3607.5	3609.5	2.0
813	3611.5	3613.5	2.0
814	3615.5	3617.5	2.0
815	3619.5	3621.5	2.0
816	3623.5	3625.5	2.0
817	3627.5	3629.5	2.0
818	3631.5	3633.5	2.0
819	3635.5	3637.5	2.0
820	3639.5	3641.5	2.0
821	3643.5	3645.5	2.0
822	3647.5	3649.5	2.0
823	3651.5	3653.5	2.0
824	3655.5	3657.5	2.0
825	3659.5	3661.5	2.0
826	3663.5	3665.5	2.0
827	3667.5	3669.5	2.0
828	3671.5	3673.5	2.0
829	3675.5	3677.5	2.0
830	3679.5	3681.5	2.0
831	3683.5	3685.5	2.0
832	3687.5	3689.5	2.0
833	3691.5	3693.5	2.0
834	3695.5	3697.5	2.0
835	3699.5	3701.5	2.0
836	3703.5	3705.5	2.0
837	3707.5	3709.5	2.0
838	3711.5	3713.5	2.0
839	3715.5	3717.5	2.0
840	3719.5	3721.5	2.0
841	3723.5	3725.5	2.0
842	3727.5	3729.5	2.0
843	3731.5	3733.5	2.0
844	3735.5	3737.5	2.0
845	3739.5	3741.5	2.0
846	3743.5	3745.5	2.0
847	3747.5	3749.5	2.0
848	3751.5	3753.5	2.0
849	3755.5	3757.5	2.0
850	3759.5	3761.5	2.0
851	3763.5	3765.5	2.0
852	3767.5	3769.5	2.0
853	3771.5	3773.5	2.0
854	3775.5	3777.5	2.0
855	3779.5	3781.5	2.0
856	3783.5	3785.5	2.0
857	3787.5	3789.5	2.0
858	3791.5	3793.5	2.0
859	3795.5	3797.5	2.0
860	3799.5	3801.5	2.0
861	3803.5	3805.5	2.0
862	3807.5	3809.5	2.0
863	3811.5	3813.5	2.0
864	3815.5	3817.5	2.0
865	3819.5	3821.5	2.0
866	3823.5	3825.5	2.0
867	3827.5	3829.5	2.0
868	3831.5	3833.5	2.0
869	3835.5	3837.5	2.0
870	3839.5	3841.5	2.0
871	3843.5	3845.5	2.0
872	3847.5	3849.5	2.0
873	3851.5	3853.5	2.0
874	3855.5	3857.5	2.0
875	3859.5	3861.5	2.0
876	3863.5	3865.5	2.0
877	3867.5	3869.5	2.0
878	3871.5	3873.5	2.0
879	3875.5	3877.5	2.0
880	3879.5	3881.5	2.0
881	3883.5	3885.5	2.0
882	3887.5	3889.5	2.0
883	3891.5	3893.5	2.0
884	3895.5	3897.5	2.0
885	3899.5	3901.5	2.0
886	3903.5	3905.5	2.0
887	3907.5	3909.5	2.0
888	3911.5	3913.5	2.0
889	3915.5	3917.5	2.0
890	3919.5	3921.5	2.0
891	3923.5	3925.5	2.0
892	3927.5	3929.5	2.0
893	3931.5	3933.5	2.0
894	3935.5	3937.5	2.0
895	3939.5	3941.5	2.0
896	3943.5	3945.5	2.0
897	3947.5	3949.5	2.0
898	3951.5	3953.5	2.0
899	3955.5	3957.5	2.0
900	3959.5	3961.5	2.0
901	3963.5	3965.5	2.0
902	3967.5	3969.5	2.0
903	3971.5	3973.5	2.0
904	3975.5	3977.5	2.0
905	3979.5	3981.5	2.0
906	3983.5	3985.5	2.0
907	3987.5	3989.5	2.0
908	3991.5	3993.5	2.0
909	3995.5	3997.5	2.0
910	3999.5	4001.5	2.0
911	4003.5	4005.5	2.0
912	4007.5	4009.5	2.0
913	4011.5	4013.5	2.0
914	4015.5	4017.5	2.0
915	4019.5	4021.5	2.0
916	4023.5	4025.5	2.0
917	4027.5	4029.5	2.0
918	4031.5	4033.5	2.0
919	4035.5	4037.5	2.0
920	4039.5	4041.5	2.0
921	4043.5	4045.5	2.0
922	4047.5	4049.5	2.0
923	4051.5	4053.5	2.0
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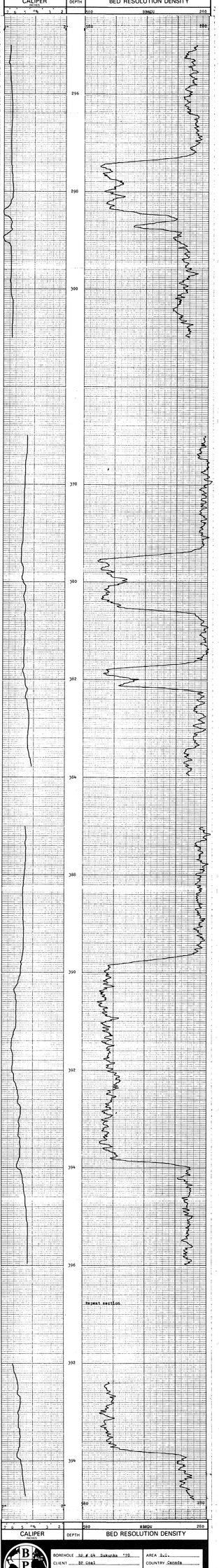
925	4059.5	4061.5	2.0
926	4063.5	4065.5	2.0
927	4067.5	4069.5	2.0
928	4071.5	4073.5	2.0
929	4075.5	4077.5	2.0
930	4079.5	4081.5	2.0
931	4083.5	4085.5	2.0
932	4087.5	4089.5	2.0
933	4091.5	4093.5	2.0
934	4095.5	4097.5	2.0
935	4099.5	4101.5	2.0
936	4103.5	4105.5	2.0
937	4107.5	4109.5	2.0
938	4111.5	4113.5	2.0
939	4115.5	4117.5	2.0
940	4119.5	4121.5	2.0
941	4123.5	4125.5	2.0
942	4127.5	4129.5	2.0
943	4131.5	4133.5	2.0
944	4135.5	4137.5	2.0
945	4139.5	4141.5	2.0
946	4143.5	4145.5	2.0
947	4147.5	4149.5	2.0
948	4151.5	4153.5	2.0
949	4155.5	4157.5	2.0
950	4159.5	4161.5	2.0
951	4163.5	4165.5	2.0
952	4167.5	4169.5	2.0
953	4171.5	4173.5	2.0
954	4175.5	4177.5	2.0
955	4179.5	4181.5	2.0
956	4183.5	4185.5	2.0
957	4187.5	4189.5	2.0
958	4191.5	4193.5	2.0
959	4195.5	4197.5	2.0
960	4199.5	4201.5	2.0
961	4203.5	4205.5	2.0
962	4207.5	4209.5	2.0
963	4211.5	4213.5	2.0
964	4215.5	4217.5	2.0
965	4219.5	4221.5	2.0
966	4223.5	4225.5	2.0
967	4227.5	4229.5	2.0
968	4231.5	4233.5	2.0
969	4235.5	4237.5	2.0
970	4239.5	4241.5	2.0
971	4243.5	4245.5	2.0
972	4247.5	4249.5	2.0
973	4251.5	4253.5	2.0
974	4255.5	4257.5	2.0
975	4259.5	4261.5	2.0
976	4263.5	4265.5	2.0
977	4267.5	4269.5	2.0
978	4271.5	4273.5	2.0
979	4275.5	4277.5	2.0
980	4279.5	4281.5	2.0
981	4283.5	4285.5	2.0
982	4287.5	4289.5	2.0
983	4291.5	4293.5	2.0
984	4295.5	4297.5	2.0
985	4299.5	4301.5	2.0
986	4303.5	4305.5	2.0
987	4307.5	4309.5	2.0
988	4311.5	4313.5	2.0
989	4315.5	4317.5	2.0
990	4319.5	4321.5	2.0
991	4323.5	4325.5	2.0
992	4327.5	4329.5	2.0
993	4331.5	4333.5	2.0
994	4335.5	4337.5	2.0
995	4339.5	4341.5	2.0
996	4343.5	4345.5	2.0
997	4347.5	4349.5	2.0
998	4351.5	4353.5	2.0
999	4355.5	4357.5	2.0
1000	4359.5	4361.5	2.0



BPB

BOREHOLE SP # 64 Sukunka '78
CLIENT SP Coal
AREA B.C.
COUNTRY Canada

SEAM THICKNESS LOG

As delivered to client

SCHLUMBERGER

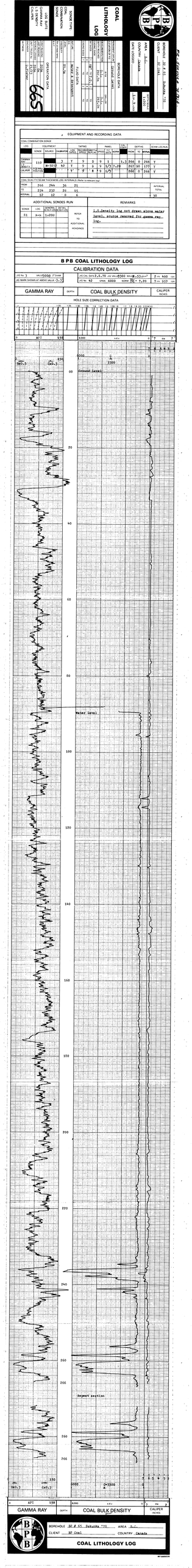
COMPANY: N. Coast

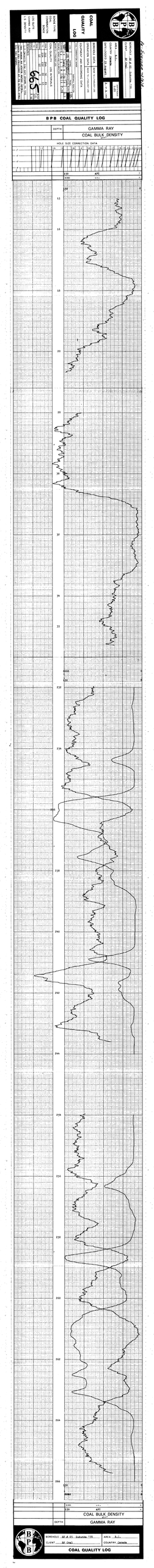
WELL: 32 A 65 Cutbank 79

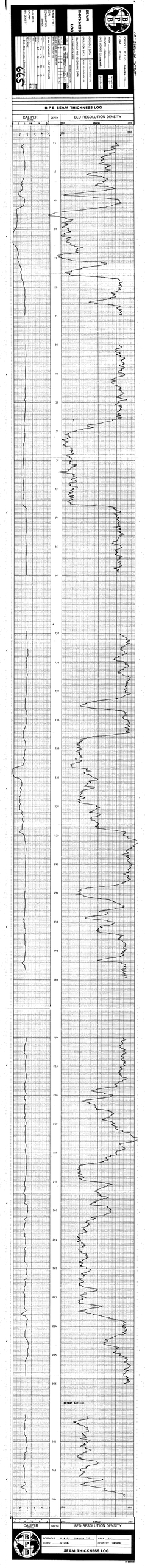
FIELD: British Columbia

COUNTRY: Canada

SCHLUMBERGER


COAL LITHOLOGY LOG
BOREHOLE 92 # 65 Dokuchia '93
CLIENT 92 Coal
AREA Sask.
COUNTRY Canada
LOG SUITE
SONDE COMBINATION
SONDE TYPE
EQUIPMENT AND RECORDING DATA
COAL COMBINATION SONDE
EQUIPMENT
TAPING
PANEL
COAL CONTACTS
DEPTHS
GEAR LOG RUN
SONDE
SOURCE
CALIBRATOR
LOG LEVEL
RECORDING SPEED
PANEL NO.
PANEL LOG
SCALE
SCALE
FROM
TO
NOTE
GAMMA RAY
NEUTRON
DENSITY
CALIPER
REMARKS
1.5 density log not drawn above water level, source removed for gamma ray log.
COAL QUALITY/GEAR THICKNESS LOG INTERVALS (Refer to Wksht top)
FROM
TO
INTERVAL
ADDITIONAL SONDES RUN
SONDE
LOG
CONTROL TOTAL SCALE/CORRELATION
METER TO ADDITIONAL HEADINGS
CALIBRATION DATA
GAMMA RAY
DEPTH
COAL BULK DENSITY
CALIPER
HOLE SIZE CORRECTION DATA
API
Ground level
Water level
Repeat section
AREA Sask.
COUNTRY Canada
COAL LITHOLOGY LOG


COAL QUALITY LOG
BPB
BOREHOLE 87-4-65 Saskatoon '35
CLIENT BC Coal
AREA Bullmoose
COUNTY Cariboo
DATE 87 Dec 3
DRILLED BY B.P.B. Industries Ltd.
DEPTH
GAMMA RAY
COAL BULK DENSITY
HOLE SIZE CORRECTION DATA
API
695



SEAM THICKNESS LOG
B P B
BOREHOLE 50 ø 65 Dubuisson 770
CLIENT 50 Cent
AREA B.C.
COUNTRY Canada
SEAM THICKNESS LOG
FLOWING FLUID
CALIPER
CALIPER
DEPTH
BED RESOLUTION DENSITY
Depth Section

COMPANY SF COAL
BOREHOLE SF # 65 SUKUNKA '70
STATE B.C. COUNTRY CANADA
LOCATION
Other Services
Permanent Datum
Log Measured From
Drilling Measured From
Elev.: K.B.
D.F.
G.L.
Date
Run No.
Depth-Driller
Depth-Logger
Bottom Logged Interval
Top Logged Interval
Type Fluid in Hole
Salinity
Density
Level
Max. Rec. Temp.
Equip. Location
Recorded By
Witnessed By
Run No.
Bit Size
Type Log
Depth-Driller
Depth-Logger
Bottom Logged Interval
Top Logged Interval
Casing-Driller
Casing-Logger
Bit Size
Type Fluid in Hole
Density
Viscosity
pH
Fluid Loss
Source of Sample
Rm @ Meas. Temp.
Rmf @ Meas. Temp.
Rmc @ Meas. Temp.
Source: Rmf / Rmc
Rm @ BHT
Rmf @ BHT
Rmc @ BHT
Time Since Circ.
Max. Rec. Temp.
Equip. Location
Recorded By
Witnessed By
Run No.
Bit Size
Type Log
Depth-Driller
Depth-Logger
Bottom Logged Interval
Top Logged Interval
Casing-Driller
Casing-Logger
Bit Size
Type Fluid in Hole
Density
Viscosity
pH
Fluid Loss
Source of Sample
Rm @ Meas. Temp.
Rmf @ Meas. Temp.
Rmc @ Meas. Temp.
Source: Rmf / Rmc
Rm @ BHT
Rmf @ BHT
Rmc @ BHT
Time Since Circ.
Max. Rec. Temp.
Equip. Location
Recorded By
Witnessed By
S.F. Coal
SF # 65
Sukunka '70
B.C.
Canada
Neutron
89.6m-900-1650 SNL
0-750
Neutron
Ground Level
Repeat section
Water level
Scale change
NEUTRON-NEUTRON
Depth
900
1650
750
0
1000
2025
Run No.
Date
Depth-Driller
Depth-Logger
Bottom Logged Interval
Top Logged Interval
Casing-Driller
Casing-Logger
Bit Size
Type Fluid in Hole
Density
Viscosity
pH
Fluid Loss
Source of Sample
Rm @ Meas. Temp.
Rmf @ Meas. Temp.
Rmc @ Meas. Temp.
Source: Rmf / Rmc
Rm @ BHT
Rmf @ BHT
Rmc @ BHT
Time Since Circ.
Max. Rec. Temp.
Equip. Location
Recorded By
Witnessed By
Run No.
Bit Size
Type Log
Depth-Driller
Depth-Logger
Bottom Logged Interval
Top Logged Interval
Casing-Driller
Casing-Logger
Bit Size
Type Fluid in Hole
Density
Viscosity
pH
Fluid Loss
Source of Sample
Rm @ Meas. Temp.
Rmf @ Meas. Temp.
Rmc @ Meas. Temp.
Source: Rmf / Rmc
Rm @ BHT
Rmf @ BHT
Rmc @ BHT
Time Since Circ.
Max. Rec. Temp.
Equip. Location
Recorded By
Witnessed By
S99
Well name
REMARKS
Changes in Mud Type or Additional Samples
Date
Sample No.
Depth-Driller
Depth-Logger
Type Fluid in Hole
Density
Viscosity
pH
Fluid Loss
Source of Sample
Rm @ Meas. Temp.
Rmf @ Meas. Temp.
Rmc @ Meas. Temp.
Rm @ BHT
Rmf @ BHT
Rmc @ BHT
Scale Changes
Type Log
Depth
Scale Up Hole
Scale Down
Neutron
89.6m-900-1650 SNL
0-750
Run No.
Tool Type
Tool Position
Other
Equipment Data
FUNCTIONS
Log
From
To
Depths
Scale
F.C.
Norm.
Averaging
Source No.
N-N
268
0
9
1
0.75
81
R-2479
Ref. elevation
Elevations
K.B.
D.F.
G.L.
Log Measured From
Drilling Measured From
Permanent Datum

Rn - Sukunka 7/83/A

BP

COMPANY BP Coal
BOREHOLE BP # 66 Sukunka '78
STATE B.C. COUNTRY Canada

NEUTRON-NEUTRON LOG

Permanent Datum Ground Level Elev. ___ m
Log measured from Ground Level m above P.D.
Drilling measured from Ground Level m above P.D.

Run No.	1	Date	20 August 1978
Elev. Perm. Datum	Ground Level	Time	1200
Log Measured from	Ground Level	Depth Driller	172m
Drilling Measured from	Ground Level	Depth Logger	166m
Casing Driller	6 in	Bottom Log Interval	172m
Casing Logger	6 in	Top Log Interval	0m
Bit Size	3 7/8"	Max. Rec. Temp.	6.4
Type Fluid in Hole	Water	Equip. No.	1
Dens.		Max. Rec. Temp.	6.4
Visc.		Equip. No.	1
pH		Rmf @ Meas. Temp.	3.4 @ 6.4
Fluid Loss	ml	Rmc @ Meas. Temp.	3.4 @ 6.4
Source of Sample		Rm @ Meas. Temp.	3.4 @ 6.4
Rm @ Meas. Temp.	@ °F	Rmf @ Meas. Temp.	3.4 @ 6.4
Rmf @ Meas. Temp.	@ °F	Rmc @ Meas. Temp.	3.4 @ 6.4
Rmc @ Meas. Temp.	@ °F	Source: Rmf Rmc	
Source: Rmf Rmc		Rm @ BHT	@ °F
Rm @ BHT	@ °F	Rmf @ BHT	@ °F
Rmf @ BHT	@ °F	Rmc @ BHT	@ °F
Rmc @ BHT	@ °F		
Max. Rec. Temp.	6.4	Equipment No.	1
Location	Sukunka	Truck No.	23/72A
Recorded By	D. Fisher	Witnessed By	

Fold here

REMARKS

Changes in Mud Type or Additional Samples

Date	Sample No	
Depth - Driller		
Type Fluid in Hole		
Dens.	Visc.	
pH	Fluid Loss	ml
Source of Sample		
Rm @ Meas. Temp.	@ °F	@ °F
Rmf @ Meas. Temp.	@ °F	@ °F
Rmc @ Meas. Temp.	@ °F	@ °F
Source: Rmf Rmc		
Rm @ BHT	@ °F	@ °F
Rmf @ BHT	@ °F	@ °F
Rmc @ BHT	@ °F	@ °F

Scale Changes

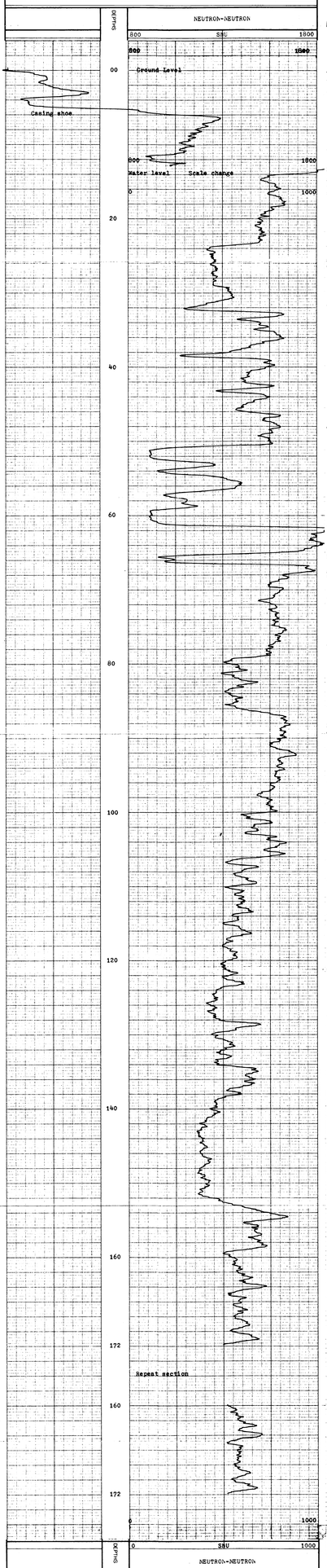
Type Log	Depth	Scale Up Hole	Scale Down
Neutron	13	800-1800 SNU	0-1000

Equipment Data

Run No.	Tool Type	Tool Position	Other

Logging Data

Log	Depths From	Depths To	Speed m/min	T.C. sec	Norm.	Sonde	Source No.
N-N	172	0	9	1	0.75	81	N-2479



COMPANY BP Coal
BOREHOLE BP # 66 Sukunka '78
STATE British Columbia
COUNTRY Canada

665

COAL LITHOLOGY LOG

BPB

LOG SUITE
L.S. DENSITY
GAMMA RAY
CALIPER

SONDE TYPE
COMBINATION SONDE

CASING
SIZE 7" DEPTH 170'
WEIGHT
GRADE
CEMENT

OPERATION DATA
DRILLER'S DEPTH 170'
LOGGER'S DEPTH 171'
BIT SIZE 6 1/4"
CASING SIZE 7" TO 170'
FLUID DATA
FLUID LEVEL
SALINITY
VISCOSITY
PH
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

BOREHOLE RECORD
RUN NO. 1
BIT FROM 0
TO 171'
CASING DRILLER 7" @ 170'
CASING LOGGER 170'
BOTTOM LOGGED INTERVAL 171'
TOP LOGGED INTERVAL 0
TYPE FLUID IN HOLE
DENSITY
VISCOSITY
PH
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

PERMANENT DATUM
ELEVATION
LOG MEASURED FROM
DRILLING MEASURED FROM
GROUND LEVEL
ELEV.: K.B.
D.F.
G.L.

DATE LOGGED 22 August

SECTION 1200
TOWNSHIP 1200

BOREHOLE BP # 66 Sukunka *78
CLIENT BP Coal
AREA B.C.
COUNTRY Canada

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

LOG	EQUIPMENT			TAPING			PANEL		CAL LOG	DEPTHS		SEAM LOG RUN
	SONDE	SOURCE	CALIBRATOR	LOG TAPE/S	RECORDING SPEED	REPEAT	SPEED	T.C. DATA	NORM	FROM	TO	MINPAL
GAMMA RAY	110			Y	9	D	9	1	1.3	170	0	Y
DENSITY		WS849	42	Y	9	D	9	1/3	7.20	171	1	Y
CALIPER	SIDEWALL POSITION			Y	9	R	9	1/3		170	0	Y

COAL QUALITY/SEAM THICKNESS LOG INTERVALS (Refer to relevant log)

FROM	69	?
TO	49	?
INTERVAL	20	?

INTERVAL TOTAL = 25

ADDITIONAL SONDES RUN

SONDE	LOG	GENERAL SCALE	DETAIL LOG
81	n-n	1:200	

REFER TO ADDITIONAL HEADINGS

REMARKS

B PB COAL LITHOLOGY LOG

CALIBRATION DATA

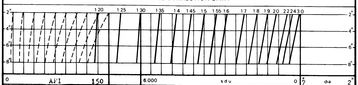
JIG No 3 VALUE 308.0 FDIAM
JIG MARK SHOWN AT ABOVE VALUE - 3.33

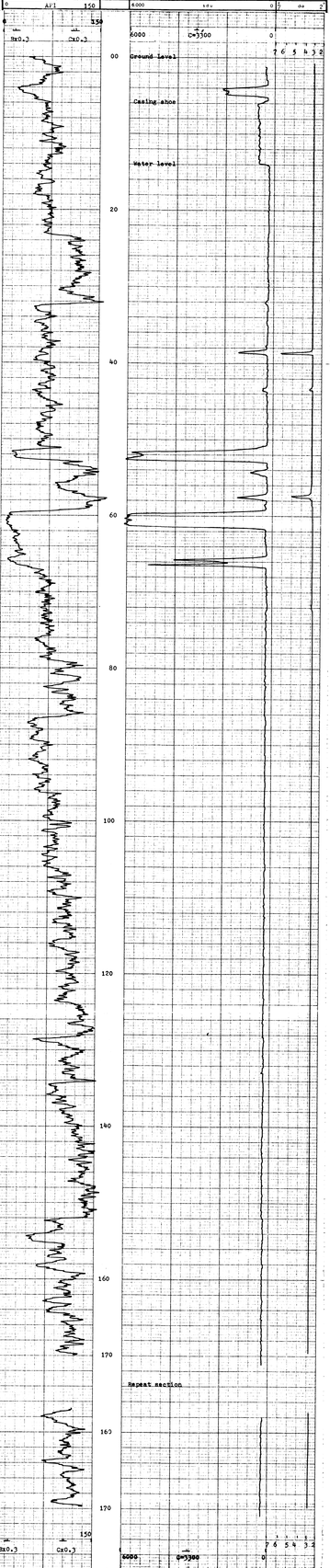
JIG CAL DATE 2.0.75 JIG VALUE 3300 SIU 2.53 gm/cm³
JIG No 42 SPAN 6000 NORM 80 = 7.20

2 ins 490 cps
7 ins 950 cps

GAMMA RAY | DEPTH | COAL BULK DENSITY | CALIPER (INCHES)

HOLE SIZE CORRECTION DATA





0 API 150 | DEPTH | 6000 s.p.u. 0 | 0 ins 2

GAMMA RAY | DEPTH | COAL BULK DENSITY | CALIPER (INCHES)

BPB

BOREHOLE BP # 66 Sukunka *78 AREA B.C.
CLIENT BP Coal COUNTRY Canada

COAL LITHOLOGY LOG

MT 660035

PK- SUKUNKA 78(3)A.

BOREHOLE BP # 66 Sukunka '78
CLIENT BP Coal

AREA B.C.
COUNTRY Canada
DATE LOGGED 20 August

DEPTH SCALE 1:20

2 OF 4 LOGS

COAL QUALITY LOG

BOREHOLE DATA	REFER TO LITHOLOGY LOG
OPERATION DATA	REFER TO LITHOLOGY LOG

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

SIDEWALL POSITION

LOG	TAPING			PANEL			CAL COEFF.
	LOG TAPED	RECORD SPEED	DIRECT or REPLAY	SPEED	T.C. SECS	NORM	
GAMMA RAY	Y	1	R	2½	2		1.3
L.S. DENSITY	Y	1	R	2½	1	7.2	

SOURCE, SONDE AND CALIBRATION
REFER TO LITHOLOGY LOG

COAL QUALITY LOG INTERVALS

FROM	69	7
TO	49	2
INTERVAL	20	5
FROM		
TO		
INTERVAL		

665

INTERVAL TOTAL 25

SONDE TYPE:
COAL COMBINATION SONDE

LOG SUITE:
GAMMA RAY
L.S. DENSITY

REMARKS
Detail of Bird seam at top of hole not a true reading of bulk density as above water level & behind casing

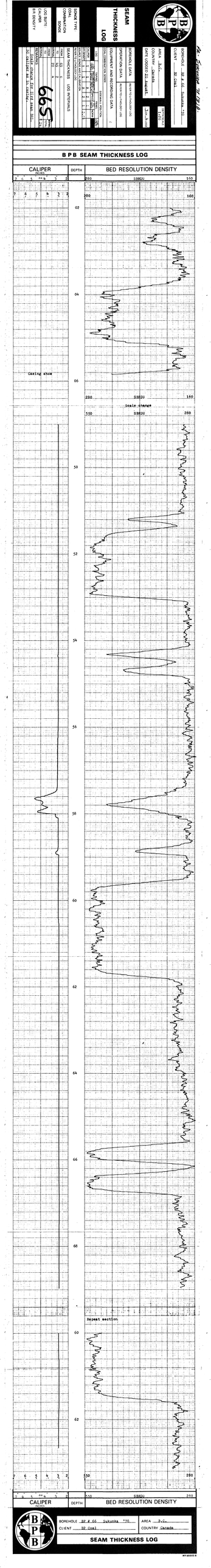
BPB COAL QUALITY LOG

DEPTH | GAMMA RAY | COAL BULK DENSITY

COAL BULK DENSITY
GAMMA RAY
DEPTH

BOREHOLE BP # 66 Sukunka '78
CLIENT BP Coal
AREA B.C.
COUNTRY Canada

COAL QUALITY LOG


SEAM THICKNESS LOG
B P B
LOG SUITE
CALIPER
DENSITY
SONDE TYPE
GOAL COMBINATION SONDE
SEAM THICKNESS
FROM
TO
BOREHOLE DATA
OPERATION DATA
EQUIPMENT AND RECORDING DATA
BOREHOLE BF # 66 Sukunka '78
CLIENT BC Coal
AREA B.C.
COUNTRY Canada
DATE LOGGED 22nd August
RUN NUMBER
DEPTH DRILLER
DEPTH LOGGER
BOTTOM LOGGED INTERVAL
TOP LOGGED INTERVAL
CASING DRILLER
CASING LOGGER
BIT SIZE
TYPE FLUID IN HOLE
DENSITY
LEVEL
MAX. REC. TEMP.
EST. CKT. TEMP.
TIME SINCE CIRC.
TIME ON BOTTOM
UNIT NUMBER
WITNESS
REMARKS
CALIPER BELL ELECTRIC 4 ARM SONDE
CALIPER
DEPTH
BED RESOLUTION DENSITY
SBRDU
280
160
550
Casing shoe
Scale change
Repeat section
02
04
06
50
52
54
56
58
60
62
64
66
68
60
62
BOREHOLE BF # 66 Sukunka '78
CLIENT BC Coal
AREA B.C.
COUNTRY Canada
SEAM THICKNESS LOG

COAL LITHOLOGY LOG

BP PB

BOREHOLE BP # 67 Sukunka '78 AREA B.C.
CLIENT BP Coal COUNTRY Canada
DATE LOGGED 20 August DEPTH SCALE 1:200
1 of 5 sheets

SONDE TYPE: COAL COMBINATION SONDE
LOG SUITE: GAMMA RAY L.S. DENSITY CALIPER

BOREHOLE DATA

	PERMANENT DATUM	ELEVATION OF P.D.	LOG MEASUREMENTS	DEPTH REACHED	DRILLER
	Ground Level	818		129.45m	
				129.10m	
				11 ft	

CASING SIZES: 1 7" TO 5.64 m; 2 4" TO 112.2 m; 3 TO; 4 TO

FLUID DATA: Water & detergent

OPERATION DATA: RECORDING SPEED 12.4m; DEPTH DRILLER 129.45m; DEPTH LOGGER 129.10m; BOTTOM LOGGED INTERVAL 128m; TOP LOGGED INTERVAL 0m; CASING-DRILLER 5.64m; CASING-LOGGER 5.64m; BIT SIZE 11"; TYPE FLUID IN HOLE Water & detergent; DENSITY; LEVEL; MAX. REC. TEMP. (deg. C); EQUIP. NO. & LOCATION; RECORDED BY; WITNESS

ENGINEER P. Calvin

66S

EQUIPMENT AND RECORDING DATA

COAL COMBINATION SONDE

LOG	EQUIPMENT SONDE	EQUIPMENT SOURCE	CALIBRATOR	TAPING LOG TAPED	TAPING RECORD SPEED	TAPING DIRECT or REPLAY	PANEL SPEED	PANEL T.C. SECS	PANEL NORM	CAL COEFF	DEPTHS FROM	DEPTHS TO	DEPTHS INTERVAL	SEAM LOG RUN
GAMMA RAY	110		3	Y	9	D	9	1		1.3	128	0	128	Y
L.S. DENSITY		M-5852	42	Y	9	D	9	1/3	7.2		129	12	117	Y
CALIPER	SIDEWALL POSITION			Y	9	R	9	1/3			128	1	127	Y

COAL QUALITY / SEAM THICKNESS LOG INTERVALS (Refer to relevant log)

FROM	122	74	51	INTERVAL TOTAL
TO	106	60	20	
INTERVAL	16	14	31	63

ADDITIONAL SONDES RUN

SONDE	LOG	GENERAL SCALE LOG	DETAIL SCALE LOG
81	N-N	1:200	
11	HRD	1:20	

REFER TO ADDITIONAL HEADINGS

REMARKS

Source removed for gamma ray log above water level, LSD log not drawn.
Hole initially too shallow at 105m, deepened to 129m.

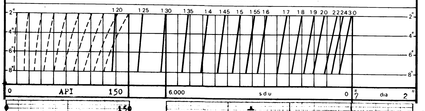
B P B COAL LITHOLOGY LOG

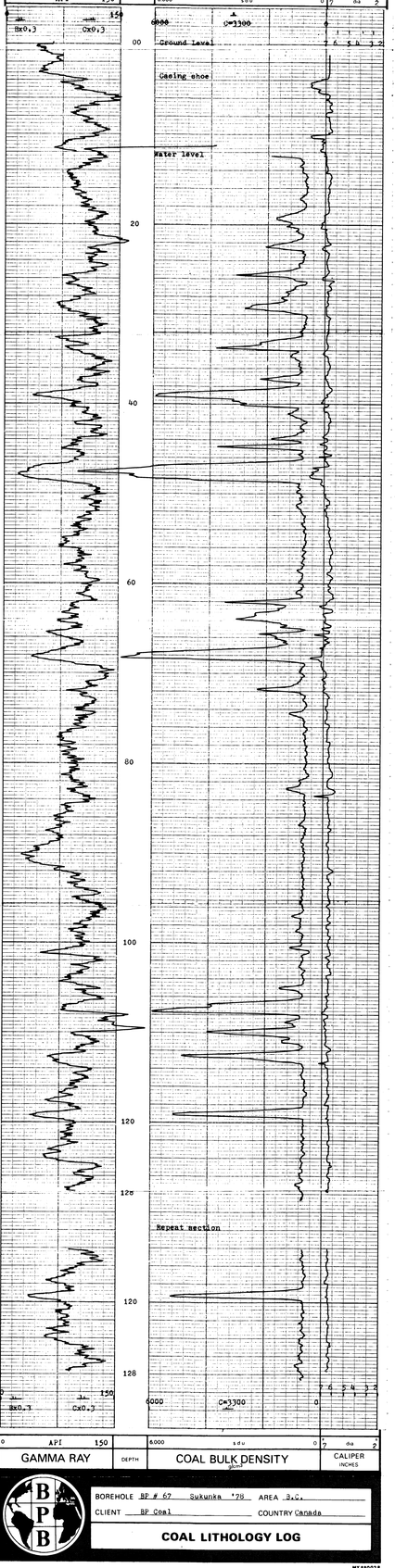
CALIBRATION DATA

JIG No. 3 VALUE 3000@ 2" DIAM
JIG MARK SHOWN AT ABOVE VALUE -3.33
JIG CAL DATE 12.8.78 JIG VALUE 3300SDU@1.53g/cm³ 2 ins 490 cps
JIG No. 42 SPAN 6000 NORM 2ins = 7.20 7 ins 953 cps

GAMMA RAY | DEPTH | COAL BULK DENSITY g/cm³ | CALIPER INCHES

HOLE SIZE CORRECTION DATA





0 API 150 | 6000 sdu 0 | 7 dia 2
GAMMA RAY | DEPTH | COAL BULK DENSITY g/cm³ | CALIPER INCHES

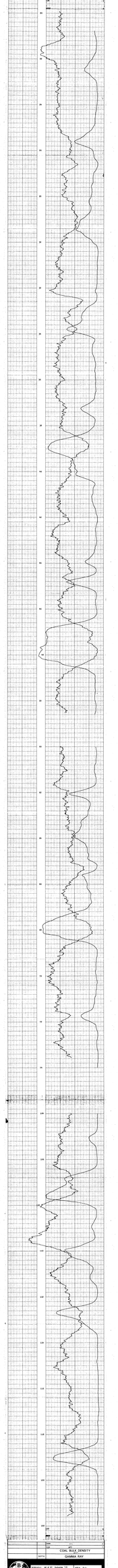
BP PB

BOREHOLE BP # 67 Sukunka '78 AREA B.C.
CLIENT BP Coal COUNTRY Canada

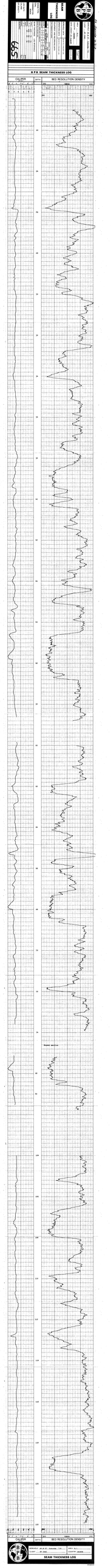
COAL LITHOLOGY LOG

MY 880028

BPB	COAL QUALITY LOG
DATE	GAMMA RAY
	COAL BULK DENSITY
HOLE SIZE CORRECTION DATA	

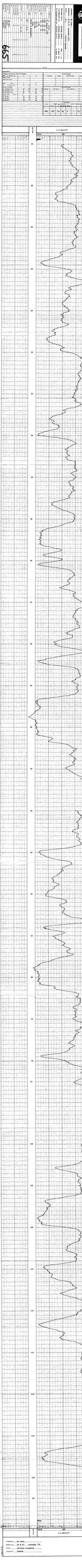


DATE	GAMMA RAY
	COAL BULK DENSITY
	COAL QUALITY LOG


8 P.S SEAM THICKNESS LOG
CALIPER
BED RESOLUTION DENSITY
SEAM THICKNESS LOG

599

Well Name	599
Field	
Date	
Time	
Operator	
Rig	
Depth	



Pr - Sukunka 78 (3) A.

NEUTRON-NEUTRON LOG

COMPANY BP Coal
BOREHOLE BP # 67 Sukunka '78
STATE B.C. COUNTRY Canada

Permanent Datum Ground Level Elev. m.
Log measured from Ground Level m. above P.D.
Drilling measured from Ground Level m. above P.D.

Run No.	1	1	R.L.
Date	20 August 1978		
First Reading	129m		
Last Reading	0		
Interval Measured	129m		
Casing Bottom	3.5m		
Casing Driller	11 ft		
Depth Reached	129.9m		
Bottom Driller	129m		
Mud Nature	Water & detergent		
Sig. Viscosity			
Bit Size	6¾" to P.D.	to	to
Bit Size	to	to	to
Casing Size	7" to 11ft	to	to
Casing Size	to	to	to
Rm @ Meas Temp	@	@	@
Rmf @ Meas Temp	@	@	@
Rmc @ Meas Temp	@	@	@
Source Rmf	Rmc		
Rm @ BHT	@	@	@
Rmf @ BHT	@	@	@
Rmc @ BHT	@	@	@

Logging Data

Log	Depths m From	Depths m To	Speed m/min	T.C. sec	Norm.	Sonde No.	Source No.
N-N	129	0	9	1	0.75	61	N-2479

Fold Here

REMARKS

Changes in Mud Type or Additional Samples

Date	Sample No.		
Depth - Driller			
Type Fluid in Hole			
Dens.	Visc.		
ph	Fluid Loss	ml	
Source of Sample			
Rm @ Meas Temp	@ °F	@ °F	
Rmf @ Meas Temp	@ °F	@ °F	
Rmc @ Meas Temp	@ °F	@ °F	
Source Rmf	Rmc		
Rm @ BHT	@ °F	@ °F	
Rmf @ BHT	@ °F	@ °F	
Rmc @ BHT	@ °F	@ °F	

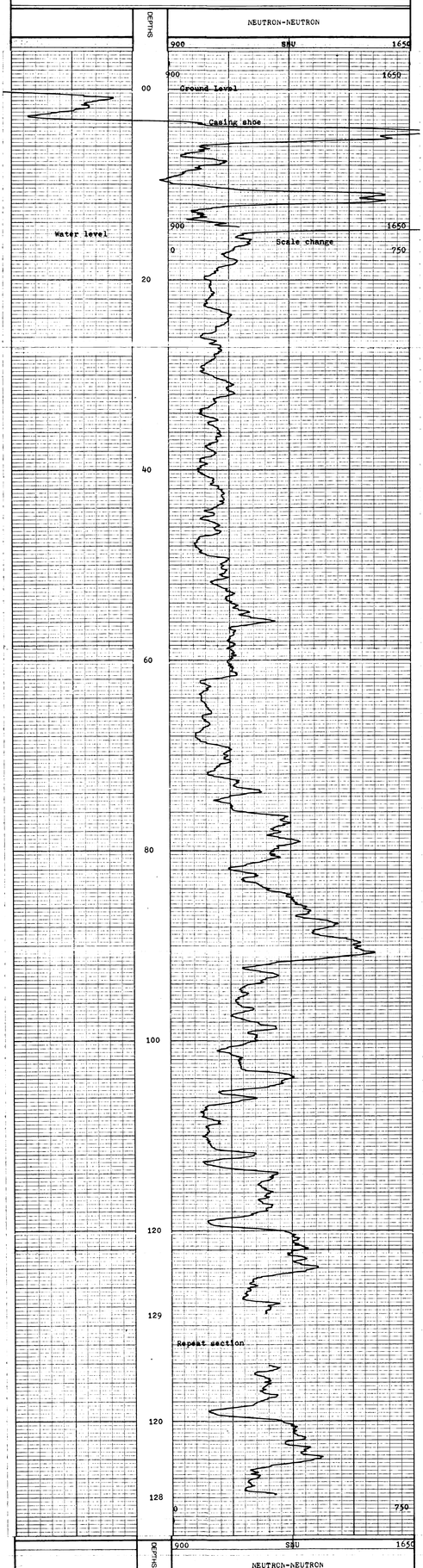
Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down
Neutron	15	900-1650 SNU	0-750

Equipment Data

Run No.	Tool Type	Tool Position	Other

Depth-Driller



COMPANY BP Coal
BOREHOLE BP # 67 Sukunka '78
STATE British Columbia
COUNTRY Canada

MT 1 (8) 3 OCT 78

COMPANY BP Coal

BOREHOLE BP #68 - Sukunka 1978

STATE B.C. COUNTRY Canada

NEUTRON-NEUTRON SGS

Re-Surveyed 7/81.

Permanent Datum _____ Elev. _____ m

Log measured from Ground Level m. above P.D.

Drilling measured from Ground Level m. above P.D.

Rig Fasse

Run No.	1		
Date	23 Aug. 1978		
First Reading	156m		
Last Reading			
Feet or Metres Measured	156m		
Casing Driller			
Casing Depth	6.1m		
Depth Rec. Int.	156.2m		
Depth Log Int.	156.2m		
Max. Hole Temp.	40deg.C		
Time Since Circ.			
Equip. No.			
Location			
Recorded By			
Witnessed By			

S.G.	Viscosity		
pH	Fluid Loss		
Source of Sample			
Rm @ Meas. Temp	3ppm @ 5.0deg.C		
Rmf @ Meas. Temp			
Rmc @ Meas. Temp			
Source of Rmf / Rmc			
Rm @ BHT			
Rmf @ BHT			
Rmc @ BHT			

Rm @ Meas. Temp	@ deg.	@ deg.	@ deg.
Rmf @ Meas. Temp	@ deg.	@ deg.	@ deg.
Rmc @ Meas. Temp	@ deg.	@ deg.	@ deg.
Source: Rmf / Rmc			
Rm @ BHT	@ deg.	@ deg.	@ deg.
Rmf @ BHT	@ deg.	@ deg.	@ deg.
Rmc @ BHT	@ deg.	@ deg.	@ deg.

Time Since Circ.	23 hrs.		
Max. Rec. Temp.	42.2deg.C		
Equip. No.			
Location			
Recorded By	R. Bishop		
Witnessed By	P. Oblate		

SGS

REMARKS

told here

Changes in Mud Type or Additional Samples

Date	Sample No.			
Depth - Driller				
Type Fluid in Hole				
Dens.	Visc.			
pH	Fluid Loss		ml	
Source of Sample				
Rm @ Meas. Temp	@ °F	@ °F	@ °F	
Rmf @ Meas. Temp	@ °F	@ °F	@ °F	
Rmc @ Meas. Temp	@ °F	@ °F	@ °F	
Source: Rmf / Rmc				
Rm @ BHT	@ °F	@ °F		
Rmf @ BHT	@ °F	@ °F		
Rmc @ BHT	@ °F	@ °F		

Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down

Equipment Data

Run No.	Tool Type	Tool Position	Other

Logging Data

Log	Depths From	Depths To	Speed	T.C.	Norm	Sonarite	Source No.
N-N	156	0	9	1	0.75	81	N2479

DEPTHS

NEUTRON-NEUTRON

0 SNU 1100

0

20

40

60

80

100

120

140

156

Repeat Section

156

0 SNU 1100

DEPTHS

NEUTRON-NEUTRON

COMPANY BP Coal

BOREHOLE BP #68 - Sukunka 1978

STATE B.C.

COUNTRY Canada

Re Sukunka Well.

DSL 2007SHIFT-1605

COMPANY BP Coal
BOREHOLE BP #66 - Sukunka 1978
STATE B.C. COUNTRY Canada

Permanent Datum Ground Level Elev. m.
Log measured from Ground Level m. above P.D.
Drilling measured from Rig Floor G.L. m. above P.D.

Run No.	1
Date	29 Aug. 1978
First Reading	1200
Last Reading	154
Hours Recorded	14
Casing Driller	156m
Casing Logger	156.3m
Bit Size	6.1in
Type Fluid in Hole	Gel-Chem
Max. Rec. Temp.	15°C
Equip. Location	Dawson Creek
Recorded By	J. Mabry
Witnessed By	

Density/Gamma Run No.	2		
Depth Driller	156m		
Depth Logger	156.3m		
Bit Size	6.1in		
Type Fluid in Hole	Gel-Chem		
Max. Rec. Temp.	15°C		
Equip. Location	Dawson Creek		
Recorded By	J. Mabry		
Witnessed By			

Run No.	1	2	
Bit Size	3"	3"	
Casing Size	2.375in	2.375in	
Casing Wgt.	4.6	4.6	
Fluid in Hole	Water	Water	
Max. Rec. Temp.	6°C	6°C	
Operating Time	3¼ Hrs.		
Truck No.	932/21		
Logging Eng.	P. Cahill		
Witness			

CALIPER — in — cm

fold here

REMARKS

Changes in Mud Type or Additional Samples

Date	Sample No.				
Depth - Driller					
Type Fluid in Hole					
Dens.	Visc.				
ph	Fluid Loss	ml			
Source of Sample					
Rm @ Meas Temp	@ °F	@ °F			
Rmf @ Meas Temp	@ °F	@ °F			
Rmc @ Meas Temp	@ °F	@ °F			
Source Rmf Rmc					
Rm @ BHT	@ °F	@ °F			
Rmf @ BHT	@ °F	@ °F			
Rmc @ BHT	@ °F	@ °F			

Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down

Equipment Data

Run No.	Tool Type	Tool Position	Other

Logging Data

Log	Depths From	Depths To	Speed	T.C.	Norm.	Savanx	Source No.
Gamma	154	0	9	1	1.1	110	
L.S.D.	155	1	9	1/3	7.25	110	M5852

Logs run through NQ rods.

GAMMA RAY — 0 — API — 150 — DEPTHS — L.S.DENSITY — 2500 — SDU — 0

8 x .3 — C x .3 — C = 3200/3 SDU

0 20 40 60 80 100 120 140 155

Repeat Section

155 150

8 x .3 — C x .3 — C = 3200/3 SDU

GAMMA RAY — 0 API 150 — DEPTHS — L.S.DENSITY — 2500 SDU 0

COMPANY BP Coal
BOREHOLE BP #66 - Sukunka 1978
STATE B.C.
COUNTRY Canada

MW 181 Printed in Canada

COMPANY BP Coal
WELL BP #69 - Sukunka 1978
FIELD B.C.
LOCATION Sukunka River
Permanent Datum Ground Level Elev. m. Above B.D.
Log Measured from 25'(est.) above G.L. m. Above B.D.
Drilling Measured from G.L. (Datum) 0 m. Above B.D.

SEAL TECHNOLOGY
GEARHART-OWEN

Run Number: 1
Date: 5-Dec-78
Depth-Driller: 1376m
Depth-Logger: 1378m
Bottom Log Interval: 1376m
Top Log Interval: 1 1/2"
Casing-Driller: 244.5mm @ 1376m
Casing-Logger: 244.5mm @ 1376m
Bit Size: 6 1/4"
Type Fluid in Hole: Gel Chem
Density: 1.1
Viscosity: 43
Ph: 9.5
Fluid Loss: 5.6ml
Source of Sample: Flow Line
R_m @ Measured Temp: 0.5 @ 24°C
R_mf @ Measured Temp: 0.4 @ 24°C
R_mc @ Measured Temp: 0.6 @ 24°C
Source of R_mf: Flow Line
R_m @ BHT: 0.3 @ 50°C
R_mf @ BHT: 0.2 @ 50°C
R_mc @ BHT: 0.4 @ 50°C
Time Since Circulation: 3 1/2 hrs.
Max. Rec. Temp. Deg. C: 50°C
Equipment No.: 1376-244
Location: Kelowna
Recorded By: J. Kaiser
Witnessed By: Mr. Moore

S99

Field Interval

REMARKS
Changes in Mud Type or Additional Samples
Date | Sample No. | | |
Depth - Driller
Depth - Logger
Type Fluid in Hole
Dens. | Visc.
Ph | Fluid Loss | ml
Source of Sample
Rm @ Meas Temp | @ °F | @ °C
Rmf @ Meas Temp | @ °F | @ °C
Rmc @ Meas Temp | @ °F | @ °C
Source: Rmf | Rmc
Rm @ BHT | @ °F | @ °C
Rmf @ BHT | @ °F | @ °C
Rmc @ BHT | @ °F | @ °C

Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down

Equipment Data

Run No.	Tool Type	Tool Position	Other

Logged Data

Log	Depths From	Depths To	Speed m/min	Tool Position	Remarks	Source No.
D.R.Lo.	1376		2	1	0.76	110 KU452

DEPTH

D.R.DENSITY

330 SPACE 160

330 160

94
95
96
97
98
99
100
101
102
124
125
126
127
128
129
130
131
147
148
149
150
151

Repeat Section

169
150
151

330 SPACE 160

CURVES

D.R.DENSITY

COMPANY BP Coal
BOREHOLE BP #69 - Sukunka 1978
STATE B.C.
COUNTRY Canada

Mr. Sherwin Wylie.

599

COMPANY SP Coal

BOREHOLE SP #68 - Sukunka 1978

STATE B.C. COUNTRY Canada

SCAN QUALITY DETAIL LOG

Permanent Datum: Ground Level — Elev. — m

Log Measured From: Ground Level — 0.3m above P.D.

Drilling Measured From: RKB #2002 — P.D.

Date	1-11-78		
Run No.	One		
Depth-Driller	534.4m		
Depth-Logger	534.4m		
Bottom Log Interval	533.4m		
Top Log Interval	0.0m		
Casing-Driller	9.5" @ 0.0m		
Casing-Logger	9.5" @ 0.0m		
Bit Size	8.5"		
Type Fluid in Hole	Water		
Density / Viscosity	0	0	
pH / Fluid Loss	0	0	
Source of Sample	Pump		
Rm @ Meas. Temp	0.0 @ 0°F		
Rmf @ Meas. Temp	0.0 @ 0°F		
Rmc @ Meas. Temp	0.0 @ 0°F		
Source of Rmf / Rmc	Pump / Pump		
Rm @ BHT	0.0 @ 0°F		
Rmf @ BHT	0.0 @ 0°F		
Rmc @ BHT	0.0 @ 0°F		
Circulation Stopped	23:30		
Logger on Bottom	1:45		
Unit Number	1372		
Recorded By	Ang.		
Witnessed By	Dale		

REMARKS

Changes in Mud Type or Additional Samples

Date	Sample No.		
Depth - Driller			
Depth - Logger			
Type Fluid in Hole			
Dens.	Visc.		
pH	Fluid Loss		cc
Source of Sample			
Rm @ Meas. Temp	@ °F	@ °F	
Rmf @ Meas. Temp	@ °F	@ °F	
Rmc @ Meas. Temp	@ °F	@ °F	
Source Rmf / Rmc			
Rm @ BHT	@ °F	@ °F	
Rmf @ BHT	@ °F	@ °F	
Rmc @ BHT	@ °F	@ °F	

Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down

Equipment Data

Run No.	Tool Type	Tool Position	Other

Logger's Data

Log	Depths From	Depths To	Speed	T.C.	Norm	Invert	Source No
Gamma	1 deta.		2	2	1.3	110	
L.S.D.	1 deta.		2	1	7.75	110	K5052

GAMMA RAY API
L.S.DENSITY
SDU

DEPTHS

150 — 0
2500 — 0

94 95 96 97 98 99 100 101 102 124 125 126 127 128 129 130 131 147 148 149 150 151

150 — 0
2500 — 0

GAMMA RAY API
L.S.DENSITY
SDU

DEPTHS

150 — 0
2500 — 0

COMPANY SP Coal

BOREHOLE SP #68 - Sukunka 1978

STATE B.C.

COUNTRY Canada