TK-SMITHERS 79(1)A

"SMITHERS AREA COAL PROSPECTS"

C.L. NOS. 4252-4256, 4257, 4260-4262, 4264, 4265, 4267, 4269, 4270-4283, 4246-4250, 5178-5183, 4229-4241, 5185, 5190.

DAVID L. HANDY

CONFIDENTIAL

SMITHERS AREA COAL PROSPECTS

Coast Land District, Range 5, British Columbia

NTS 93L N. Lat. 54° 30' W. Long. 127° 30'

Zymoetz River	CL 4252-4255, 4257
Telkwa River	CL 4260-4262, 4264, 4265, 4267, 4269, 4270-4283
Deny's Creek	CL 4246-4250, 5178-5183
Thautil River	CL 4229-4241
Chisholm Lake	CL 5185, 5190

held by: Shell Canada Resources Limited

operated by: Crows Nest Resources Limited

GEOLOGICAL REPORT

on work done from September 1, 1978 to August 31, 1979.

November 26, 1979

by David L. Handy
Geologist
Crows Nest Resources Limited

SMITHERS AREA COAL PROSPECTS

GEOLOGICAL REPORT, 1979

TABLE OF CONTENTS

PROFESSIONAL VERIFICATION OF REPORT

Entitled: *Smithers Area Coal Prospects*
Coast Land District, B.C., 1979
B.C. Coal Licences
No. 4252-4255, 4257, 4260-4262, 4264,
4265, 4267, 4269, 4270-4283, 4246-4250,
5178-5183, 4229-4241, 5185, 5190

Mr. David L. Handy planned and carried out the 1979 geological field program on Smithers B.C. Coal Licences held by Shell Canada Resources Ltd. and operated by Crows Nest Resources Ltd. He also prepared this report. Mr. Frank Martonhegyi supervised the activity of this program under the general direction of the undersigned.

Dave Handy, Honours B.Sc., graduated in Geology from the University of Waterloo in 1977. Prior to his graduation Mr. Handy worked as an assistant for two geotechnical companies and after graduation as a geologist for a major exploration company in Saskatchewan.

Frank Martonhegyi, M.E., graduated in Mining Geological Engineering from the University of the Heavy Industry, Hungary, in 1962; and received post-graduate training at the University of Saskatchewan, Saskatoon, in 1969-1971. His experience in Western Canadian coal exploration since 1971 includes positions with:

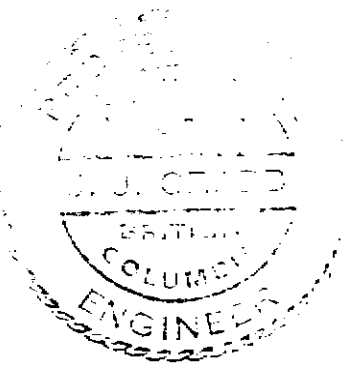
- CanPac Minerals Ltd., Calgary, Alberta
- Shell Canada Resources Ltd., Calgary, Alberta
- Crows Nest Resources Ltd., Calgary, Alberta

His prior experience includes underground coal mining geology, geotechnical engineering and geochemistry in Hungary, Austria and Canada.

He currently holds the position of Senior Staff Geologist for Crows Nest Resources Ltd. supervising coal exploration in British Columbia.

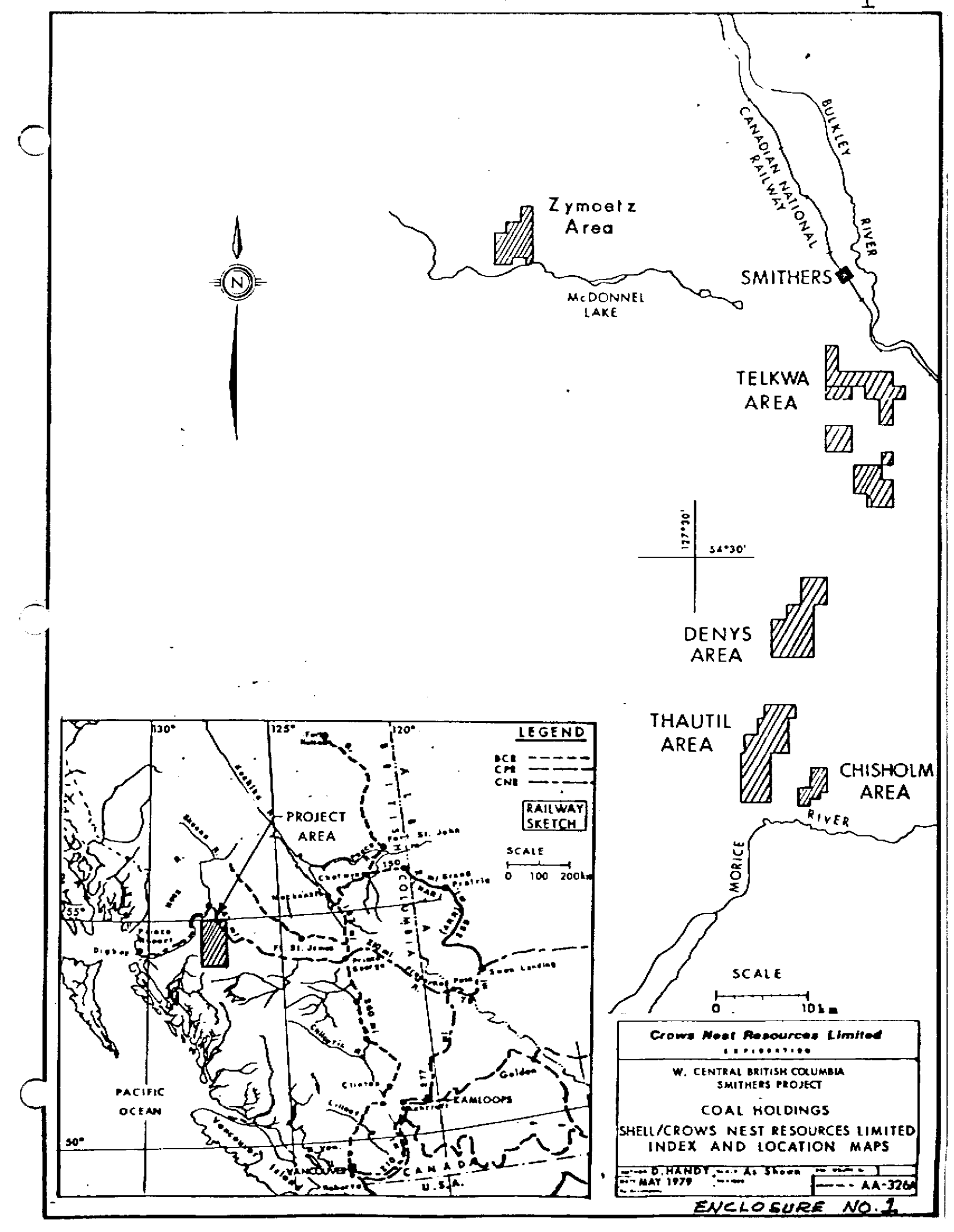
I consider both the aforementioned geologists to be well qualified to undertake responsibilities they were assigned on this project. I am satisfied that the attached report dated Nov. 26, 1979 has been competently prepared and justly represents the information obtained from this project.

J. J. Crabb
Manager - Exploration



November 27, 1979

LIST OF ENCLOSURES



ENCLOSURE NO. 1

SUMMARY

In the Smithers area, 52 B.C. Coal Licences held by Shell Canada Resources Limited, operated by its wholly-owned subsidiary, Crows Nest Resources Limited cover 11,874 hectares of Crown Coal lands. Shell/CNRL also hold 518 hectares of Freehold Land under an option agreement.

The area in general, and the Telkwa licences in particular lie along the Canadian National Railway, 360 km from the port of Prince Rupert. Existing infrastructure, the proximity of a port (coal handling being proposed) and the good quality of the coal make these prospects attractive.

Lower Cretaceous sedimentary rocks include significant thicknesses (aggregate up to 17 metres, single seams up to 10 metres) of low ash, high grade, high volatile "A" bituminous coal amenable for exportation as thermal coal. As well, coal of metallurgical grade exists in places. As the geological structure is the main problem, the primary objective of exploration in this area is to locate, delineate, and prove large enough reserves with workable structure.

The property was acquired in 1978 with minor additions this year. The 1979 exploration program was of a grass roots nature. Reconnaissance geological mapping covered all the prospect areas and 13 rotary, as well as 3 diamond holes were drilled. The total field expenditure was $392,539.

The 1979 field work confirmed both the expectations and concerns. Additional detailed mapping is needed to prove or disprove the potential indicated at all the prospect areas. At Telkwa, a further step can probably be taken, aiming for delineation of open pit reserve areas by further drilling. Coal reserves can be estimated with a reasonable degree of confidence only after this additional work.

GEOLOGY

Enclosure Nos. 8-12:	Geological Maps by Area (in pocket)
Enclosure No. 13:	Stratigraphic Section, Telkwa River (in pocket)
Enclosure Nos. 14,15:	Lithology Logs (Rotary Drilling Chip and Diamond Drilling Core Samples)
Enclosure Nos. 16-30:	Downhole Geophysical Logs (in pocket)

The sedimentary rocks in the Smithers area consist of thin, interbedded mudstones, sandstones, shales and coal seams. This sequence overlies a thick series of volcanic rocks composed chiefly of tuffs, agglomerates, andesites, and other flow rocks. Both of these horizons are cut by a series of younger intrusives consisting of coarsely crystalline porphyritic rocks. All three form part of the Hazelton Group of Jurassic-Cretaceous age.

The surface of the volcanic basement is irregular suggesting an erosional period preceded deposition of the sedimentary sequence. Subsequent erosion removed the soft coal-bearing sediments from higher ridges leaving relatively small isolated sedimentary basins in the mountain valleys. Sedimentary exposures are found only in certain low lying stream valleys which have cut through the glacial drift cover. Few exposures are visible away from the creeks until the higher ridges are reached and invariably these are composed of volcanic rocks. The volcanic - sedimentary contact over most of the prospect area is drift covered and heavily timbered making accurate delineation of the coal bearing sediments very difficult.

1.1 Stratigraphy

The thickness of the coal measures in the Smithers area is quite variable but probably does not exceed 350 metres. Stratigraphic sections, measured on the prospect areas and obtained from drill holes, are dissimilar and make meaningful correlation difficult. A basal conglomerate unit exists on the Thautil River and Zymoetz River properties but has not been encountered on the others. A type stratigraphic section measured on the north bank of the Telkwa River has been included to illustrate typical lithologies of the coal-bearing rocks in the Smithers area. (Enclosure No. 13, in pocket)

1.2 Structure

The geological structure of the sedimentary rocks in the Smithers area is complex, especially on the Telkwa and Deny's properties where folding and closed spaced normal faulting is apparent. The Zymoetz, Thautil, and Chisholm properties seem to have been subjected to less faulting and structural disturbance in general. However, at these latter areas there are fewer good exposures to substantiate this impression.

The Zymoetz River area is relatively undisturbed with the beds maintaining a consistent dip usually 20 to 30 degrees N.W.

In the Telkwa north area, normal faulting appears to have been

the major structural mechanism. Normal faults are visible on Goathorn Creek and the Telkwa River,where a displacement of approximately 5 metres can be seen. Bedding plane faults are also common, with carbonate stringers filling the fractures. Bedding angles and directions vary considerably over short distances.

The Telkwa south area has undergone faulting and folding, both of which are evident in outcrops on Cabinet Creek. The folding is tight and fault displacements are in the order of a few metres. Outcrop data suggests a tight north-south anticlinal structure here.

The Deny's Creek area is an oval shaped synclinal structure with steeper dips (up to 45°), tight folding and shearing, as well as minor faulting.

The Thautil River area appears to be a shallow synclinal structure, relatively undisturbed by faulting, and with dips in the order of 25 degrees or less.

On the Chisholm Lake area one reverse fault was found which forms a fault contact between the volcanic basement and sediments.

1.3 Coal Geology and Mining Potential

Coal seams occur throughout the sedimentary sequence. In the northern part of the general area (Zymoetz, Telkwa) coal seams

seem to be concentrated in the lower part of the section and it is more coaly in general (more and thicker seams) than on the southern properties. Most of the properties are amenable to open pit mining, especially since they are structurally complex. At Zymoetz, because of the great single seam thickness, and at Thautil because of the gentle dips and undisturbed structure, underground mining may be envisioned. These potentials are rather speculative at this stage. A great deal of further exploration is needed to prove these possibilities.

The Zymoetz River area has five major seams, the thickest being 3.0 metres, the aggregate thickness of the seams being 8.0 to 9.0 metres, contained in approximately 60 metres of stratigraphic section. Open pit potential is limited here due to the structural and topographic limitations. It is recommended that further exploration be shifted towards the east in general, and concentrate on the southeast and northeast where the sediments are gently dipping to flat. Further geological mapping is necessary, but will be constrained by the limited bedrock exposures. Further drilling will be needed to test the presence and thickness of coal seams in these structurally more favourable areas.

In the Telkwa area, up to 17 metres aggregate thickness in eight seams was intersected by drill holes. The thickest seam found was 4.5 metres, a seam of 10 metres thickness has been found elsewhere. The stratigraphic position and number of seams varied from hole to hole. This problem is further complicated by

the intensity of faulting and erosion in this area. However, the coaliness of the sedimentary section is similarly high throughout the entire Telkwa area as far as the Cabinet Creek area to the south. Two locations appear conducive to open pit mining but much more drilling is required to estimate potential.

On the Thautil River property approximately two metres of soft, oxidized coal was exposed by hand trenching. The area holds promise as a dip-slope situation and as an underground possibility if the broad, undisturbed synclinal structure is proven and more coal is found. At this time geological data are insufficient to evaluate the mining potential for this area and further drilling is required.

On the Deny's Creek property there appears to be at least five seams, two of which are visible in old bulldozer trenches and measured a total of 1.5 metres. Previous work shows the existence of three stratigraphically deeper seams, the lowermost being 2.2 metres thick. Geological mapping indicates a dip slope situation here. Further drilling is required to evaluate this potential.

On the Chisholm property a 1.5 metre coal seam was found under a relatively gently (25-30°) dipping and structurally undisturbed ridge of sedimentary rocks on licences 5185 and 5190. The possibility of more and maybe thicker seams can only be tested by drilling. The value of the remaining licences is questionable.

COAL QUALITY

Analyses of the diamond drill core and coal outcrop samples are not available at the time of writing this report. These analyses will be submitted in a subsequent report covering exploration work done for the following term of the coal licences.

Based on published information on previous analyses, the Smithers area coal is "high grade high volatile "A" bituminous having a calorific value of 13,160 Btu/lb." (Report of the Royal Commission on Coal, 1946). The coal is of metallurigical grade in places.

LOCATION

Enclosure No. 1: Index and Location Map. Page 1

The Smithers Area Coal Prospects are located in the southwest sector of a 65 km radius circle, centred at the Town of Smithers in West-Central British Columbia; Coast Land District, Range 5, NTS 93L.

It consists of five prospect areas as follows:

Zymoetz River	N.Lat. 54°30', W.Long. 127°45" wrong try 54°50'	straddling Coal Creek from its confluence with the Zymoetz River.
Telkwa North	N.Lat. 54°40', W.Long. 127°10'	largely north of the Telkwa River and east of Pine Creek
Telkwa South		
Cabinet Creek	N.Lat. 54°33', W.Long. 127°07'	along Cabinet Creek from its confluence with Goathorn Creek
Tenas Creek	N.Lat. 54°36', W.Long. 127°13'	along Tenas Creek south of its confluence with Goathorn Creek
Deny's Creek	N.Lat. 54°25', W.Long. 127°15'	along Deny's Creek, north of its confluence with the Thautil River
Thautil River	N.Lat. 54°16', W.Long. 127°20'	along the Thautil River north of its confluence with the Morice River
Chisholm Lake	N.Lat. 54°14', W.Long. 127°13'	immediately north of Chisholm Lake

ACCESS

Enclosure No. 2 Access Map. (in pocket)

Smithers is 360 km from the port of Prince Rupert along the CNR line and Highway 16. The Telkwa prospects are 10 km from this rail line and mostly accessible by good road.

Exploration roads were constructed in the past to the other prospects, except Thautil River and Chisholm Lake. These roads are in very poor condition and were not used in 1979.

The Chisholm Lake and Thautil River prospects are some 10 km from an existing good logging road on the south (opposite) side of the Morice River which runs east 50 km to the Town of Houston.

The Thautil River prospect could be reached from the Deny's Creek prospect with an additional 10 km of road, the Chisholm Lake property would be a further 25 km distance by road.

In the 1979 program all properties, except Telkwa were accessible by helicopter.

TENURE

Enclosure No. 3: B.C. Land Tenure Standing,
Enclosure No's. 4,5: Coal Land Disposition Maps, in pocket following
Enclosure No. 6: Applications to Extend Term of Licences (cost accounts),

The B.C. Coal Licences granted in September 1, 1978 and June 27, 1979, held by Shell Canada Resources Limited, operated by Crows Nest Resources Limited, cover a total of 11,874 hectares of Crown coal land. These are in five licence areas, in seven licence blocks, since licences in the Telkwa area occur in three blocks (North, Cabinet Creek, Tenas Creek).

Subsequently, Shell/CNRL applied for additional licences in the Pine Creek area on the northwest end of the Telkwa North block and between the Cabinet Creek and Tenas Creek blocks making these latter blocks contiguous in the future. These new applications,some of them granted since, are not covered in this report.

WORK DONE

Enclosure No. 6: Applications to Extend Term of Licences (cost account)

Enclosure No. 7: Geodetic Location Survey Report,

1:10,000/10.0 metre form line photogrammetric maps were prepared by R. M. Hardy and Associates, Mapping Division, covering all licences from existing government photographs and ground control. Geodetic location survey of all the drill holes was done by the Surveying Department, Shell Canada Resources Limited.

Reconnaissance geological mapping was carried out over the summer of 1979 on each of the prospect areas. The cost of this work was allocated to the licences on an area basis.

Seventeen hand trenches were dug with a total length of 46.8 metres. Thirteen rotary drill holes were completed totalling 1500 metres. Three diamond drill holes were cored for a total length of 260 metres. Chip samples and drill core were logged, and coal intersections sent for analyses. Results were not available at the time of compilation of this report. One bulldozer trench was dug and totalled 9.0 metres in length. Road upgrading by bulldozer totalled 10.8 km. Reclamation of drill sites and roads is accounted for in the cost statement.

The total cost of the 1978-79 exploration program was $392,539 as of August 31, 1979.

Enclosure No. 3

CROWS NEST RESOURCES LIMITED
EXPLORATION

B. C. COAL LICENCES
TENURE STANDING

BLOCK: SMITHERS AREA / TELKWA SOUTH, NE & NW PROJECT: SMITHERS AREA / TELKWA YEAR: 79-80
GROUP: Not Grouped DATE: Nov 28

PROJECT NAME	PROJECT LICS TOTAL NO.	PROJECT AREA TOTAL HECTARES	BLOCK NAME	BLOCK LIC. TOTAL NO.	BLOCK AREA TOTAL HECTARES	GROUP NO.	GROUP LICS. TOTAL NO.	GROUP AREA TOTAL HECTARES	GROUP YEAR	LICENCE NO.	LICENCE LEGAL DESCRIPTION	LICENCE AREA TOTAL HECTARES	ACQ/ADM FEES YEAR	ACQ/ADM FEES $	RENTALS PAYABLE $	RENTALS TOTAL EXPEND. $10^3	REQUIREMENT WORK EXPIRED $10^3	REQUIREMENT WORK CURRENT YEAR LIC. TOTAL	REQUIREMENT WORK CURRENT YEAR $	REQUIREMENT WORK CURRENT YEAR YEAR	REQUIREMENT WORK CUMULATIVE $	REQUIREMENT WORK CUMULATIVE DATE	BUDGET CURRENT YEAR $	BUDGET CURRENT YEAR $10^3	EXP TOTAL $10^3	POTL SHELL 3,456	COMMITMENTS, J.V. OTHER TYPE B.C. COAL DESCRIPTION	REMARKS
SMITHERS AREA	62	17920											78	820	98,135	130	66	181	19,389		56,882		ACQ'N & ADM	370	559	Y		TWO LEASE NEW SHEETS
TELKWA	26 (2 PARTIAL)	6734 (2 PARTIAL)											78															ONE LEASE
													79	510	25,605	49	41	182	77,700	2	15,524	NOT I & S	"	"	242			MAP SHEET
			Telkwa South	9 (one)	2351 (one)									180	12,950	19	17	2 (APP)	28,157	1 & 3	9,615	SEPT. 1			47			
			[redacted]	(8)	(7760)					4060	L681	259					1.95	2	3,237	1 & 3	389							WORK EXPENDITURES TO AUG 31/79 ARE INCLUDED ONLY
										4061	L608	259	"				1.95	2	3,237	1 & 3	389							$ 18,750 AS REPORTED TO THE BC GOVT
										4062	L607	259	"				1.95	2	3,237	1 & 3	389							
										4266	L625	259	"				1.95	2	3,237	1 & 3	389							
										4265	L624	259	"				1.95	2	3,237	1 & 3	389							
										4262	(ALL Survey L627	259	"				1.95	2	3,237	1 & 3	389							
			[redacted]	(8)	(777)					4067	L695	259	"				1.95	2	3,237	1 & 3	1,227							BLOCK EXPENDITURES TO AUG 31/79 ARE $ 19,250 AS REPORTED TO THE BC GOVT
										4069	L635	259	"				1.95	2	3,237	1 & 3	1,227							
										4270	L634	259	"				1.95	2	3,237	1 & 3	1,227							
										APP	[redacted]	259	79				-	APP	-	-	-	-						
			TELKWA NE	8 (one)	2078 (one)									90	11,610	16	16	2 (APP)	25,900	3 & 0	98,606		"	"	126	Y		WORK EXPENDITURES TO AUG 31/79 ARE INCLUDED ONLY $98,606 AS REPORTED TO THE BC GOVT
			[redacted]							4271	[redacted]	259	78				1.95	2	3,237	3 -	11,826	SEPT 1 & 3						
										4272	L622	259	"				1.95	2	3,237	3 -	11,826							
										4273	L609	259	"				1.95	2	3,237	3 -	11,826							
										4274	L625	259	"				1.95	2	3,237	3 -	11,826							
										4275	L624	259	"				1.95	2	3,237	3 -	11,826							
										4276	L611	259	"				1.95	2	3,237	3 -	11,826							
										4277	L610	259	"				1.95	2	3,237	3 -	11,826							
										4278	L608	259	"				1.95	2	3,237	3 -	11,826							
										APP	SURVEY L 227	150	79				-	APP	-	-	-							
			TELKWA NW	9	2351									90	11,655	14	8	182	22,613	3 & 0	42,303	SEPT 1 & 3	"	"	69	Y		WORK EXPENDITURES TO AUG 31/79 ARE INCLUDED ONLY $42,303 AS REPORTED TO THE B.C. GOVT
										4279	[redacted]	259	78				1.95	"	3,237	3 -	11,826	SEPTEMBER 1						
										4280	L636	259	"				1.95	"	3,237	3 -	11,826	"						
										4281	L644	259	"				1.95	"	3,237	3 -	11,826	"						
										4285	[redacted]	259	"				1.95	"	3,237	3 -	11,826	"						
										5305	L239	259	79				-	1	1,943	-	-	SEPTEMBER 1						
										5306	L243	259	"				-	"	1,943	-	-	"						
										5307	[redacted]	259	"				-	"	1,943	-	-	"						
										5308	[redacted]	259	"				-	"	1,943	-	-	"						
										5309	[redacted]	259	"				-	"	1,943	-	-	"						

GENERAL REMARKS: FILL NECESSARY LINES AND COLUMNS ONLY. COAL DEVELOPMENT POTENTIAL IS "Y" (PRIME) UNLESS OTHERWISE STATED. LICENCES HELD BY SHELL CANADA RESOURCES LTD.* CNRL IS THE OPERATOR. ENTERED IN BRACKETS E.G. (CABINET CR.) ARE TEMPORARY DESIGNATIONS USED ONLY IN REPORTING TO THE B.C. GOVT ON AUGUST 31, 1970.

COGEMA
File # 84-3

CROWS NEST RESOURCES LIMITED
EXPLORATION

B.C. COAL LICENCES
TENURE STANDING

BLOCK: SMITHERS AREA, TAHTSA R., DENY'S CR., ZYMOETZ R. PROJECT: SMITHERS AREA, TAHTSA R., DENY'S CR., ZYMOETZ R. YEAR: 79-80

GROUP: NOT GRANTED DATE: NOV 28, 79

PROJECT NAME	PROJECT LICS TOTAL NO.	PROJECT AREA TOTAL HECTARES	BLOCK NAME	BLOCK LIC. TOTAL NO.	BLOCK AREA TOTAL HECTARES	GROUP NO.	GROUP LICS TOTAL NO.	GROUP AREA TOTAL HECTARES	GROUP YEAR	LICENCE NO.	LICENCE LEGAL DESCRIPTION	LICENCE AREA TOTAL HECTARES	ACQ/ADM FEES YEAR	ACQ/ADM FEES $	RENTALS RATE/HA. $	RENTALS TOTAL TO NEXT ANN. $10³	REQUIREMENT WORK $ PRIMED $10³	REQUIREMENT WORK CURRENT YEAR $	REQUIREMENT WORK PRE YEAR	REQUIREMENT WORK CURRENT $	REQUIREMENT WORK MANDATORY DATE	BUDGET CURRENT YEAR FEE	BUDGET CURRENT YEAR $10³	EXP TOTAL $10³	POTL SHELL CLASS	COMMITMENTS, J.V. OTHER THAN B.C. DEV'T DESCRIPTION	REMARKS
SMITHERS AREA	62 (GRANTED)	17,920 (GRANTED)							78 79				78 79	820	54,155	150	86	18	19,581		516,983		APPROX	370	589	Y		ONE LAND MAP SHEET
TAHTSA RIVER	13	3847	TAHTSA RIVER	13	3847								78	180	16,835	28	28	2	42,087	3/4	31,423	SEPT 1	"	"	85	Y		ONE LAND MAP SHEET WORK EXPENDITURES TO JUNE 21/79 ARE INCLUDED
										4233	SEE LIST OF LICENCES	253	"														
										4230	" " 4823	253	"														
										4231	" " 4824	253	"														THEY $56,678 AS REPORTED TO THE B.C. DEV'T.
										4232	" " 4825	253	"														
										4233	4817	253	"														
										4234	4818	253	"														
										4235	4819	253	"														
										4236	4820	253	"														
										4237	4821	253	"														
										4238	4822	253	"														
										4239	4823	253	"														
										4240	4824	253	"														
										4241	4825	253	"														
DENY'S CREEK	11	2849	DENY'S CREEK	11	2849								78 79	150	16,263	20	10	182	27,845	11 1/2 %	16,273	SEPT 1 JUNE 27	"	"	46	Y		ONE LAND MAP SHEET WORK EXPENDITURES TO AUG 31/79 ARE INCLUDED $ 41,934 AS REPORTED TO THE B.C. DEV'T EXCEPT WORK DONE ON DENY'S LICENCES GRANTED IN 1979 ARE NOT INCLUDED
										4246	MAP REF 77 L133	253	78				1.55	2	3,237	1/2	3,254	SEPT 1						
										4247	4814	253	"				1.55	"	3,237	1/2	3,254	"						
										4248	4815	253	"				1.55	"	3,237	1/2	3,254	"						
										4249	4805	253	"				1.55	"	3,237	1/2	3,254	"						
										4250	4811	253	"				1.55	"	3,237	1/2	3,254	"						
										5178	4807	253	79				—	1	1,943	—	—	JUNE 27						
										5179	4808	253	"				—	"	1,943	—	—	"						
										5180	4812	253	"				—	"	1,943	—	—	"						
										5181	4813	253	"				—	"	1,943	—	—	"						
										5182	4816	253	"				—	"	1,943	—	—	"						
										5183	4810	253	"				—	"	1,943	—	—	"						
ZYMOETZ R.	5 (GRANTED)	1233 (GRANTED)	ZYMOETZ R.	5 (GRANTED)	1233 (GRANTED)								78 (GRANTED)	110	3,965	15	10	2 APP	16,183	4½	106,723	SEPT 1	"	"	131	Y		ONE LAND MAP SHEET WORK EXPENDITURES TO AUG 31/79 ARE INCLUDED
										4252	MAP REF 77 L3554	253	78				1.35	2	3,237	4½	21,348	"						
										4253	L3555	253	"				1.35	2	3,237	4½	21,348	"						
										4254	L3560	253	"				1.35	2	3,237	4½	21,348	"						
										4255	L3561	253	"				1.35	2	3,237	4½	21,348	"						
										4257	L3570	253	"				1.35	2	3,237	4½	21,348	"						
										APP	L3571	253	79			—	—	APP	—	—	—	—						
										APP	L3554	253	"			—	—	APP	—	—	—	—						

GENERAL REMARKS: FILL NECESSARY LINES AND COLUMNS ONLY. COAL DEVELOPMENT POTENTIAL IS "Y" (PRIME) UNLESS OTHERWISE STATED. LICENCES HELD BY SHELL CANADA RESOURCES LTD.* CNRL IS THE OPERATOR.

C0019A

FILE NO. 82-318

CROWS NEST RESOURCES LIMITED
EXPLORATION

B. C. COAL LICENCES
TENURE STANDING

BLOCK: SMITHERS AREA / CHISOLM LAKE
GROUP: NOT GROUPED

PROJECT: SMITHERS AREA / CHISOLM LAKE

YEAR: 79-80
DATE: NOV. 28

PROJECT NAME	LICS TOTAL NO.	AREA TOTAL HECTARES	BLOCK NAME	LIC. TOTAL NO.	AREA TOTAL HECTARES	GROUP NO.	LICS TOTAL NO.	AREA TOTAL HECTARES	YEAR
SMITHERS AREA	60	17,980							
CHISOLM LAKE	7	3675	CHISOLM UNIT	7	3675				

LICENCE NO.	LEGAL DESCRIPTION	AREA TOTAL HECTARES
	VTS 82L/SE BY 3 UNITS	
5/85	42, 48, 72, 78	303
5/90	43, 30, 73, 80	303
5/84	48, 50, 53, 60	303
5/86	61, 84, 93, 94	303
5/87	87, 88, 97, 98	303
	VTS 93L/NW 3 UNITS	
5/88	5, 4, 15, 14	303
5/89	7, 8, 17, 18	303

ACQUISITION FEES YEAR	#	RENTALS RENTAL #	TOTAL TO NEXT ANN. 10^3	REQUIREMENT WORK EXPIRED 10^3	CURRENT YEAR 10^3	#	CREDIT YEAR	#	PREVIOUS DATE	BUDGET CURRENT YEAR $	10^3	EXP TOTAL 10^3	POTL SHELL CLASS	COMMITMENTS, J. V. OTHER THAN B.C. DEV'T DESCRIPTION	REMARKS
78	820	94,135	130	66	102	19,381		54,682		<25K	370	533	Y		THIS LICENCE AND GROUPS
79										L					
															SOLE LAND
79	70	18,375	18	—	1	12462			JUNE 27			29	Y		MAP SHEET
				—	1	2,278	93	3,467		"	"				
				—	1	2,272	152	5,467							
				—	1	2272	—	—							
				—	1	2272	—	—							
				—	1	2272	—	—							
					1	2272	—	—							
					1	2272	—	—							

GENERAL REMARKS: FILL NECESSARY LINES AND COLUMNS ONLY; COAL DEVELOPMENT POTENTIAL IS 'Y' (PRIME) UNLESS OTHERWISE STATED. LICENCES HELD BY SHELL CANADA RESOURCES LTD. CNRL IS THE OPERATOR

Enclosure No. 6

DEPARTMENT OF MINES AND PETROLEUM RESOURCES

Coal Act (Sec. 19)

APPLICATION TO EXTEND TERM OF LICENCE

1. I, GLENN C. PROUDFOOT (Name) agent for SHELL CANADA RESOURCES LIMITED (Name)
400 FOURTH AVENUE S.W. (Address) (Address)
CALGARY, ALBERTA T2P 0J4

Valid FMC No. 171 929

hereby apply to the Minister to extend the term of Coal Licences No(s) 4271 TO 4281 INCL. AND 4283 TWELVE LICENCES IN RANGE 5 COAST LAND DISTRICT, CALLED TELKWA-NORTH COAL PROSPECTS for a further period of one year.

2. I have performed, or caused to be performed, during the period September 1, 1978 to August 31, 1979, work to the value of at least $ 165,225 on the location of coal licences as follows:

CATEGORY OF WORK	Licence No(s).	Apportioned Cost
Geological mapping	4271 TO 4281 INCL. AND 4283	$ 12,475
Surveys: Geophysical	—	—
Geochemical	—	—
Other - Geodetic	4271 TO 4281 INCL. AND 4283	$ 14,700
Road construction (upgrading)	4271, 4272, 4277, 4281, 4283	$ 12,600
Surface work	4281	$ 2,375
Underground work	—	
Drilling	4271, 4272, 4277, 4281, 4283	$ 108,775
Logging, sampling, and testing	4271, 4272, 4277, 4281, 4283	$ 8,000
Reclamation	4271, 4272, 4277, 4281, 4283	$ 3,300
Other work (specify)	—	

3. I wish to apply $ 165,225 of this value of work on Coal Licence(s)* 4271 TO 4281 INCL. AND 4283

N.A. 4. I wish to pay cash in lieu of work in the amount of $ — on Coal Licence(s) No(s).

N.A. 5. I wish to apply $ — of this value of work to claim a refund of cash in lieu of work in the amount of $ which was paid to extend the term of Coal Licence(s) No(s). from to , 19 . Mining Receipt No. for prior payment of cash in lieu of work *is attached* for adjustment.

6. The work performed on the location(s) is detailed in the attached report entitled Technical report will be submitted in ninety days.

August 31, 1979 (Date)

(Signature and position) LANDMAN

* Applications to group licences may be filed to apportion costs on a maximum of 10 licences.

(FORMS TO BE SUBMITTED IN DUPLICATE)

FOR DEPARTMENTAL USE ONLY

Value of work reported $ Value of work applied on licences $

Value of work approved $ Value of credit remaining $

Work performed. Yes [x] No [ ]

The program of operations detailed hereunder was carried out during the period from September 1, 1978 to August 31, 1979. Total costs are $ 165,225, an average of $ 21.51 per acre, $ 53.16 per hectare. (3,108 hectares)

GEOLOGICAL MAPPING Yes [x] No [ ] Cost $ 12,475

	Area (Acres)	Scale	Time
Reconnaissance	7,700	1:10,000	30 man-days
Detail: Surface	–	–	
Underground	–	–	
Other (specify)	–	–	

GEOPHYSICAL OR GEOCHEMICAL SURVEYS Yes [ ] No [x] Cost $ NIL

Method ____ Line miles ____

OTHER SURVEYS Yes [x] No [ ] Cost $ 14,700

Grid ____ Topographic Photogrammetric Other Geodetic Location Survey

ROAD CONSTRUCTION Yes [x] No [ ] Cost $ 12,600 UPGRADING

Length: On Licences 2 miles Access (off licences) 3 miles

SURFACE WORK Yes [x] No [ ] Cost $ 2,375

	Length	Licence Number(s)
Trenching	30 feet	4281
Seam tracing	–	–
Crosscutting	–	–
Other	–	–

UNDERGROUND WORK Yes [ ] No [x] Cost $ NIL

Test adits: Number ____ Average length ____ Total footage ____

Other workings: Area ____ Total footage ____

DRILLING Yes [x] No [ ] Cost $ 108,775

	Hole Size	Number of Holes	Total Footage
Core: Diamond [ ] Wireline [ ]			
Rotary: Conventional [x]	5 3/8"	13	4128 feet
Reverse circulation [ ]			
Other			

Contractor Gregory & Sahse Drilling Co. Where core stored N.A.

LOGGING, SAMPLING, AND TESTING (check) Yes [x] No [ ] Cost $ 8,000

Lithology: Drill samples [x] Core samples [ ] Bulk samples [ ]

Logs: Gamma-Neutron [x] Density [x] Other [x]

Testing: Prox. analysis [ ] FSI [ ] Washability [ ]

Carbonization [ ] Petrographic [ ] Plasticity [ ] Other [ ]

OTHER WORK (specify details) NONE Cost $ NIL

REPORTS:

Reclamation work (Permit No. ____) Detail of work* DITCHING, SEEDING, FERTILIZING

Technical report will be prepared in the subsequent term

Cost $ to date 3,300

OPERATIONS:

Work was supervised by Frank MARTONHEGYI Position Staff Geologist

Is this person a registered or licensed Professional Engineer in British Columbia? Yes [ ] No [x]

NOTE—Where the licensee intends to perform, during the extended term of his licence, work not set out in the plan of operations filed under section 15 (2) (c), a supplemental plan of operations is to be attached.

* If reclamation work reported in separate report give details of report identification.

VALUATION OF WORK: COST STATEMENT
(Sec. 27, B.C. Reg. 436/75)

ON-PROPERTY COSTS: For period from September 1, 1978 to August 31, 1979

1. OPERATOR'S FEES, SALARIES, AND WAGES:

	Average Number of Employees	Average Rate	Average Number of Days	Amount
Professional and technical	2	125	29	7,250
Machine operators and support				
Miners				
Other				

Total operator's costs $ 7,250

2. CONTRACTORS AND CONSULTANTS:

Name	Service	Contract Amount
W. THOMPSON CONSULTANTS	GEOLOGICAL CONSULTING	2,800
E. TOTTINGER CONSTRUCTION	BULLDOZER WORK	14,250
GARRITY & SAUER DRILLING	ROTARY DRILLING	63,215
ROKE OIL ENTERPRISES	DOWNHOLE GEOPHYSICAL LOGGING	8,000
TRONNES SURVEY	FIELD FOREMAN	6,200
SHELL CANADA RESOURCES	GEODETIC LOCATION SURVEY	9,000
R.M. HARDY & ASSOCIATES	PHOTOGRAMMETRIC MAPPING	3,700
GALANT TRUCKING	WATER HAULING	9,600

Total contractor and consultant costs $ 117,365

3. EQUIPMENT AND INSTRUMENTS USED: Owned X Rented

Type	Rented From	Amount
GEOLOGICAL	–	150

Total equipment and instrument rentals $ 150

4. FIELD CAMP COSTS:

		Amount
Food		
Accommodation		12,620
Fuel	and lubricant including those for the helicopter	3,600
Other	Communication	110

Total field camp costs $ 16,330

5. SAMPLING, ANALYSIS, AND TESTING:

Service	Performed by	Amount

Totals, samplings, analysis, and testing $ NIL

6. SUPPLIES AND MATERIALS COSTS:

	Amount
Process supplies	
Operating and maintenance supplies	1,330
Office and technical supplies	
Other supplies and materials — Rights of entry	1,600

Total, supplies and materials $ 2,930

7. TRANSPORTATION COSTS (Ground transportation details):

Vehicles	Owner	Rental Rate	Amount
one 4x4 truck	Rentrite	$1500 / month	$ 2,000
Field Moving Cost	Galant Trucking	$45 / hour	$ 2,750

Air support details:

Aircraft Type	Owner	Charter
Helicopter 206B	Maple Leaf Helicopters	8,750
Fixed Wing	Shell Canada Resources	300

Total transportation costs $ 13,800

8. RECLAMATION WORK:
E. POTINGER CONSTRUCTION: DITCHING, SEEDING, FERTILIZING $ 3,300

9. TRAVEL EXPENDITURES (operator's costs only):

Number of Personnel	Number of Trips	Amount
2	1	600

Total travel expenditures $ 600

Total costs $ 161,725

(Secs. 28 and 29, B.C. Reg. 436/75)

OFF-PROPERTY COSTS: Period from September 1, 1978 to August 31, 1979

	Amount
(a) Logistics and field support	$
(b) Technical and feasibility studies	
(c) Preparation of reports photogeological mapping the rest will be done in the subsequent terms	500
(d) Supplies and services	
(e) Mobilization and demobilization of equipment	3,000
(f) Travelling expenses (Itemize)	

Total $ 3,500

Supporting Cost Statements Attached

Supporting costs, supervision, administration and overhead are included in $125 man-day

Total supporting costs $ —

SUMMARY

On-property costs	$ 161,725
Off-property costs	$ 3,500
Total costs	$ 165,225

Statement of costs verified by

August 31, 1979
(Date)

(Signature and position)
Chief Accountant

DEPARTMENT OF MINES AND PETROLEUM RESOURCES

Coal Act (Sec. 19)

APPLICATION TO EXTEND TERM OF LICENCE

1. I, GLENN C. PROUDFOOT (Name) agent for SHELL CANADA RESOURCES LIMITED (Name)
400 FOURTH AVENUE S.W. (Address) (Address)
CALGARY, ALBERTA T2P 0J4

Valid FMC No. 171 929

hereby apply to the Minister to extend the term of Coal Licences No(s) 4260, 4261, 4262, 4264, 4265, 4282
SIX LICENCES IN RANGE 5 COAST LAND DISTRICT, CALLED CABINET CREEK COAL PROSPECTS
for a further period of one year.

2. I have performed, or caused to be performed, during the period September 1, 1978 to August 31, 1979, work to the value of at least $ 18,730 on the location of coal licences as follows:

CATEGORY OF WORK	Licence No(s).	Apportioned Cost
Geological mapping	4260, 4261, 4262, 4264, 4265, 4282	$ 12,905
Surveys: Geophysical	—	—
Geochemical	—	—
Other Geodetic	4260, 4261, 4262, 4264, 4265, 4282	2,200
Road construction	4262, 4264	2,900
Surface work	—	—
Underground work	—	—
Drilling	—	—
Logging, sampling, and testing	—	—
Reclamation	4262, 4264	700
Other work (specify)	—	—

3. I wish to apply $ 18,730 of this value of work on Coal Licence(s)* 4260, 4261, 4262, 4264, 4265, 4282 — SIX LICENCES

N.A. 4. I wish to pay cash in lieu of work in the amount of $ — on Coal Licence(s) No(s).

N.A. 5. I wish to apply $ — of this value of work to claim a refund of cash in lieu of work in the amount of $ which was paid to extend the term of Coal Licence(s) No(s). from to , 19 . Mining Receipt No. for prior payment of cash in lieu of work *is attached* for adjustment.

6. The work performed on the location(s) is detailed in the attached report entitled Technical report will be submitted in ninety days.

August 31, 1979 (Date)

(Signature and position) LANDMAN

* Applications to group licences may be filed to apportion costs on a maximum of 10 licences.

(FORMS TO BE SUBMITTED IN DUPLICATE)

FOR DEPARTMENTAL USE ONLY

Value of work reported $ Value of work applied on licences $

Value of work approved $ Value of credit remaining $

Work performed. Yes [x] No [ ]

The program of operations detailed hereunder was carried out during the period from September 1, 1978 to August 31, 1979. Total costs are $ 18,730, an average of $ 4.58 per acre, $ 11.32 per hectare. (1,654 hectares)

GEOLOGICAL MAPPING Yes [x] No [ ] Cost $ 12,905

	Area (Acres)	Scale	Time
Reconnaissance	4,500	1:10,000	22 man-days
Detail: Surface			
Underground			
Other (specify)			

GEOPHYSICAL OR GEOCHEMICAL SURVEYS Yes [ ] No [x] Cost $ NIL

Method ____ Line miles ____

OTHER SURVEYS Yes [x] No [ ] Cost $ 2,200

Grid ____ Topographic Photogrammetric Other ____

ROAD CONSTRUCTION Yes [x] No [ ] Cost $ 2,900

Length: On Licences ½ mile (upgrading) Access (off licences) 2½ miles (upgrading)

SURFACE WORK Yes [ ] No [x] Cost $ NIL

	Length	Licence Number(s)
Trenching		
Seam tracing		
Crosscutting		
Other		

UNDERGROUND WORK Yes [ ] No [x] Cost $ NIL

Test adits: Number ____ Average length ____ Total footage ____

Other workings: Area ____ Total footage ____

DRILLING Yes [ ] No [x] Cost $ NIL

	Hole Size	Number of Holes	Total Footage
Core: Diamond [ ] Wireline [ ]			
Rotary: Conventional [ ]			
Reverse circulation [ ]			
Other			

Contractor ____ Where core stored ____

LOGGING, SAMPLING, AND TESTING (check) Yes [ ] No [x] Cost $ NIL

Lithology: Drill samples [ ] Core samples [ ] Bulk samples [ ]

Logs: Gamma-Neutron [ ] Density [ ] Other [ ]

Testing: Prox. analysis [ ] FSI [ ] Washability [ ]

Carbonization [ ] Petrographic [ ] Plasticity [ ] Other [ ]

OTHER WORK (specify details) NONE Cost $ NIL

REPORTS:

Reclamation work (Permit No. ____) Detail of work* DITCHING, SEEDING, FERTILIZING

Technical report will be prepared in the subsequent term Cost $ 700

OPERATIONS:

Work was supervised by Frank MARTONHEGYI Position Staff Geologist

Is this person a registered or licensed Professional Engineer in British Columbia? Yes [ ] No [x]

NOTE—Where the licensee intends to perform, during the extended term of his licence, work not set out in the plan of operations filed under section 15 (2) (c), a supplemental plan of operations is to be attached.

* If reclamation work reported in separate report give details of report identification.

VALUATION OF WORK: COST STATEMENT
(Sec. 27, B.C Reg 436/75)

ON-PROPERTY COSTS: For period from September 1, 1978 to August 31, 1979

1. OPERATOR'S FEES, SALARIES, AND WAGES:

	Average Number of Employees	Average Rate	Average Number of Days	Amount
Professional and technical	2	125	8	2,000
Machine operators and support	–	–	–	–
Miners	–	–	–	–
Other	–	–	–	–

Total operator's costs $ 2,000

2. CONTRACTORS AND CONSULTANTS:

Name	Service	Contract Amount
W. THOMPSON CONSULTANTS	GEOLOGICAL CONSULTING	1,400
E. POTTINGER CONSTRUCTION	BULLDOZER WORK	2,250
TRONNES SURVEY	FIELD FOREMAN	675
R.M. HARDY & ASSOCIATES	PHOTOGRAMMETRIC MAPPING	2,200

Total contractor and consultant costs $ 6,525

3. EQUIPMENT AND INSTRUMENTS USED: Owned X Rented ____

Type	Rented From	Amount
GEOLOGICAL	–	80

Total equipment and instrument rentals $ 80

4. FIELD CAMP COSTS:

		Amount
Food / Accommodation		840
Fuel	and lubricants including those for the helicopter	2,000
Other	Communication	60

Total field camp costs $ 2,900

5. SAMPLING, ANALYSIS, AND TESTING:

Service	Performed by	Amount

Totals, samplings, analysis, and testing $ NIL

6. SUPPLIES AND MATERIALS COSTS:

	Amount
Process supplies	
Operating and maintenance supplies	200
Office and technical supplies	
Other supplies and materials	

Total, supplies and materials $ 200

7. TRANSPORTATION COSTS (Ground transportation details):

Vehicles	Owner	Rental Rate	Amount
one 4x4 truck	Rentrite	$1500/month	$1,000

Air support details:

Aircraft Type	Owner	Charter
Helicopter 206 B	Maple Leaf Helicopters	4,225
Fixed Wing	Shell Canada Resources	200

Total transportation costs $ 5,425

8. RECLAMATION WORK:

Poringer Construction : ditching, seeding, fertilizing $ 700

9. TRAVEL EXPENDITURES (operator's costs only):

Number of Personnel	Number of Trips	Amount
2	1	600

Total travel expenditures $ 600

Total costs $ 18,430

(Secs. 28 and 29, B.C. Reg. 436/75)

OFF-PROPERTY COSTS: Period from September 1, 1978 to August 31, 1979

	Amount
(a) Logistics and field support	$
(b) Technical and feasibility studies	
(c) Preparation of reports photogeological mapping the rest will be done in the subsequent term	300
(d) Supplies and services	
(e) Mobilization and demobilization of equipment	
(f) Travelling expenses (Itemize)	

Total $ 300

Supporting Cost Statements Attached

	Amount
Supporting Cost, supervision, administration and overhead are included in $125 per man-day	

Total supporting costs $ —

SUMMARY

On-property costs	$ 18,430
Off-property costs	$ 300
Total costs	$ 18,730

Statement of costs verified by

August 31, 1979
(Date)

W.S. Kamilar
(Signature and position)
Chief Accountant

2M-675-8196

DEPARTMENT OF MINES AND PETROLEUM RESOURCES

Coal Act (Sec. 19)

APPLICATION TO EXTEND TERM OF LICENCE

1. I, GLENN C. PROUDFOOT (Name) agent for SHELL CANADA RESOURCES LIMITED (Name)
400 FOURTH AVENUE, S.W. (Address)
CALGARY, ALBERTA T2P 0J4 (Address)

Valid FMC No. 171 929

hereby apply to the Minister to extend the term of Coal Licences No(s). 4267, 4269, 4270
THREE LICENCES IN RANGE 5 COAST LAND DISTRICT, CALLED TENAS CREEK COAL PROSPECT
for a further period of one year.

2. I have performed, or caused to be performed, during the period September 1, 1978 to August 31, 1979, work to the value of at least $ 9,480 on the location of coal licences as follows:

CATEGORY OF WORK	Licence No(s).	Apportioned Cost
Geological mapping	4267, 4269, 4270	$ 8,280
Surveys: Geophysical	—	—
Geochemical	—	—
Other Geodetic	4267, 4269, 4270	$ 1,200
Road construction	—	—
Surface work	—	—
Underground work	—	—
Drilling	—	—
Logging, sampling, and testing	—	—
Reclamation	—	—
Other work (specify)	—	—

3. I wish to apply $ 9,480 of this value of work on Coal Licence(s)* 4267, 4269, 4270 — THREE LICENCES

N.A. 4. I wish to pay cash in lieu of work in the amount of $ — on Coal Licence(s) No(s).

N.A. 5. I wish to apply $ — of this value of work to claim a refund of cash in lieu of work in the amount of $ which was paid to extend the term of Coal Licence(s) No(s). from to , 19 . Mining Receipt No. for prior payment of cash in lieu of work *is attached* for adjustment.

6. The work performed on the location(s) is detailed in the attached report entitled Technical report will be submitted in ninety days.

August 31, 1979 (Date)

(Signature and position) LANDMAN

* Applications to group licences may be filed to apportion costs on a maximum of 10 licences.

(FORMS TO BE SUBMITTED IN DUPLICATE)

FOR DEPARTMENTAL USE ONLY

Value of work reported $ Value of work applied on licences $

Value of work approved $ Value of credit remaining $

Work performed. Yes [X] No [ ]

The program of operations detailed hereunder was carried out during the period from September 1, 1978 to August 31, 1979. Total costs are $9,480, an average of $4.94 per acre, $12.20 per hectare. (777 hectares)

GEOLOGICAL MAPPING Yes [X] No [ ] Cost $8,280

	Area (Acres)	Scale	Time
Reconnaissance	2,000	1:10,000	9 man-days
Detail: Surface			all helicopter supported
Underground			
Other (specify)			

GEOPHYSICAL OR GEOCHEMICAL SURVEYS Yes [ ] No [X] Cost $NIL

Method _____ Line miles _____

OTHER SURVEYS Yes [X] No [ ] Cost $1,200

Grid _____ Topographic Photogrammetric Other _____

ROAD CONSTRUCTION Yes [ ] No [X] Cost $NIL

Length: On Licences _____ Access (off licences) _____

SURFACE WORK Yes [ ] No [X] Cost $NIL

	Length	Licence Number(s)
Trenching		
Seam tracing		
Crosscutting		
Other		

UNDERGROUND WORK Yes [ ] No [X] Cost $NIL

Test adits: Number _____ Average length _____ Total footage _____

Other workings: Area _____ Total footage _____

DRILLING Yes [ ] No [X] Cost $NIL

	Hole Size	Number of Holes	Total Footage
Core: Diamond [ ] Wireline [ ]			
Rotary: Conventional [ ]			
Reverse circulation [ ]			
Other			

Contractor _____ Where core stored _____

LOGGING, SAMPLING, AND TESTING (check) Yes [ ] No [X] Cost $NIL

Lithology: Drill samples [ ] Core samples [ ] Bulk samples [ ]

Logs: Gamma-Neutron [ ] Density [ ] Other [ ]

Testing: Prox. analysis [ ] FSI [ ] Washability [ ]

Carbonization [ ] Petrographic [ ] Plasticity [ ] Other [ ]

OTHER WORK (specify details) NONE Cost $NIL

REPORTS:

Reclamation work (Permit No. _____) Detail of work* _____

NONE Cost $NIL

OPERATIONS:

Work was supervised by Frank MARTONHEGYI Position Staff Geologist

Is this person a registered or licensed Professional Engineer in British Columbia? Yes [ ] No [X]

NOTE—Where the licensee intends to perform, during the extended term of his licence, work not set out in the plan of operations filed under section 15 (2) (c), a supplemental plan of operations is to be attached.

* If reclamation work reported in separate report give details of report identification.

VALUATION OF WORK: COST STATEMENT
(Sec. 27, B.C. Reg. 436/75)

ON-PROPERTY COSTS: For period from September 1 1978 to August 31, 1979

1. OPERATOR'S FEES, SALARIES, AND WAGES:

	Average Number of Employees	Average Rate	Average Number of Days	Amount
Professional and technical	2	125	3	750
Machine operators and support				
Miners				
Other				

Total operator's costs $ 750

2. CONTRACTORS AND CONSULTANTS:

Name	Service	Contract Amount
W. Tompson Consultants	Geological consulting	700
R.M. Hardy & Associates	Photogrammetric mapping	1,200

Total contractor and consultant costs $ 1,900

3. EQUIPMENT AND INSTRUMENTS USED: Owned X Rented

Type	Rented From	Amount
Geological	—	40

Total equipment and instrument rentals $ 40

4. FIELD CAMP COSTS:

		Amount
Food / Accommodation		320
Fuel	and lubricants including hours for the helicopter	1,000
Other	Communications	30

Total field camp costs $ 1,350

5. SAMPLING, ANALYSIS, AND TESTING:

Service	Performed by	Amount

Totals, samplings, analysis, and testing $ NIL

6. SUPPLIES AND MATERIALS COSTS:

	Amount
Process supplies	
Operating and maintenance supplies	100
Office and technical supplies	
Other supplies and materials	

Total, supplies and materials $ 100

7. TRANSPORTATION COSTS (Ground transportation details):

Vehicles	Owner	Rental Rate	Amount
one 4x4 truck	Rentrite	$1,500/month	750

Air support details:

Aircraft Type	Owner	Charter
Helicopter 206B	Maple Leaf Helicopters	4,045
Fixed Wing	Shell Canada Resources	100

Total transportation costs $ 4,895

8. RECLAMATION WORK:

$ NIL

9. TRAVEL EXPENDITURES (operator's costs only):

Number of Personnel	Number of Trips	Amount
1	1	300

Total travel expenditures $ 300

Total costs $ 9,335

(Secs. 28 and 29, B.C. Reg. 436/75)

OFF-PROPERTY COSTS: Period from September 1, 1978 to August 31, 1979

	Amount
(a) Logistics and field support	$
(b) Technical and feasibility studies	
(c) Preparation of reports photogeological mapping that need will be done in the subsequent term	145
(d) Supplies and services	
(e) Mobilization and demobilization of equipment	
(f) Travelling expenses (Itemize)	

Total $ 145

Supporting Cost Statements Attached

Supporting cost, supervision, administration and overhead are included in $125 per man-day.

Total supporting costs $ -

SUMMARY

On-property costs	$ 9,335
Off-property costs	$ 145
Total costs	$ 9,480

Statement of costs verified by

August 31, 1979
(Date)

W.S. Kennedy
(Signature and position)
Chief Accountant

2M-675-8196

DEPARTMENT OF MINES AND PETROLEUM RESOURCES

Coal Act (Sec. 19)

APPLICATION TO EXTEND TERM OF LICENCE

1. I, GLENN C. PROUDFOOT (Name) agent for SHELL CANADA RESOURCES LIMITED (Name)
400 FOURTH AVENUE S.W. (Address)
CALGARY, ALBERTA T2P 0J4 (Address)

Valid FMC No. 171 929

hereby apply to the Minister to extend the term of Coal Licences No(s). 4229 TO 4241 INCLUSIVE THIRTEEN LICENCES IN RANGE 5 COAST LAND DISTRICT, CALLED THAUTIL RIVER COAL PROSPECTS for a further period of one year.

2. I have performed, or caused to be performed, during the period September 1, 1978 to August 31, 1979, work to the value of at least $ 56,675 on the location of coal licences as follows:

CATEGORY OF WORK	Licence No(s).	Apportioned Cost
Geological mapping	4229 TO 4241 INCLUSIVE	$ 12,195
Surveys: Geophysical	—	—
Geochemical	—	—
Other Geologic	4229 TO 4241 INCLUSIVE	$ 5,000
Road construction	—	—
Surface work	4234	$ 1,500
Underground work	—	—
Drilling	4234	$ 33,725
Logging, sampling, and testing	4234	3,500
Reclamation	—	—
Other work (specify)	—	—

3. I wish to apply $ 56,675 of this value of work on Coal Licence(s)* 4229 TO 4241 INCLUSIVE – THIRTEEN LICENCES

N.A. 4. I wish to pay cash in lieu of work in the amount of $ — on Coal Licence(s) No(s).

N.A. 5. I wish to apply $ — of this value of work to claim a refund of cash in lieu of work in the amount of $ which was paid to extend the term of Coal Licence(s) No(s). from to , 19. Mining Receipt No. for prior payment of cash in lieu of work *is attached* for adjustment.

6. The work performed on the location(s) is detailed in the attached report entitled Technical report will be submitted in ninety days.

August 31, 1979 (Date)

(Signature and position) LANDMAN

* Applications to group licences may be filed to apportion costs on a maximum of 10 licences.

(FORMS TO BE SUBMITTED IN DUPLICATE)

FOR DEPARTMENTAL USE ONLY

Value of work reported $ Value of work applied on licences $

Value of work approved $ Value of credit remaining $

Work performed. Yes [x] No [ ]

The program of operations detailed hereunder was carried out during the period from September 1, 1978 to August 31, 19 79. Total costs are $ 56,675, an average of $ 6.79 per acre, $ 16.78 per hectare. (3,367 hectares)

GEOLOGICAL MAPPING Yes [x] No [ ] Cost $ 12,195

	Area (Acres)	Scale	Time
Reconnaissance	8,500	1:10,000	29 man-days
Detail: Surface	-	-	-
Underground	-	-	-
Other (specify)	-	-	-

GEOPHYSICAL OR GEOCHEMICAL SURVEYS Yes [ ] No [x] Cost $ NIL

Method _____ Line miles _____

OTHER SURVEYS Yes [x] No [ ] Cost $ 5,000

Grid _____ Topographic Photogrammetric Other Geodetic Location Survey

ROAD CONSTRUCTION Yes [ ] No [x] Cost $ NIL

Length: On Licences _____ Access (off licences) _____

SURFACE WORK Yes [x] No [ ] Cost $ _____

	Length	Licence Number(s)
Trenching	by hand (3) 36 feet	4234
Seam tracing		
Crosscutting		
Other		

UNDERGROUND WORK Yes [ ] No [x] Cost $ NIL

Test adits: Number _____ Average length _____ Total footage _____

Other workings: Area _____ Total footage _____

DRILLING Yes [x] No [ ] Cost $ 33,725

	Hole Size	Number of Holes	Total Footage
Core: Diamond [x] Wireline [ ]	H.Q.	1	161
Rotary: Conventional [ ]			
Reverse circulation [ ]			
Other			

Contractor Canadian Longyear Drilling Co. Where core stored Smithers Storage

LOGGING, SAMPLING, AND TESTING (check) Yes [x] No [ ] Cost $ 3,500

Lithology: Drill samples [ ] Core samples [x] Bulk samples [ ]

Logs: Gamma-Neutron [x] Density [x] Other [x]

Testing: Prox. analysis [ ] FSI [ ] Washability [ ]

Carbonization [ ] Petrographic [ ] Plasticity [ ] Other [ ]

OTHER WORK (specify details) none Cost $ NIL

REPORTS:

Reclamation work (Permit No. _____) Detail of work* none

Technical report will be prepared in the subsequent term Cost $ NIL to date

OPERATIONS:

Work was supervised by Frank MARTONHEGYI Position Staff Geologist

Is this person a registered or licensed Professional Engineer in British Columbia? Yes [ ] No [x]

NOTE—Where the licensee intends to perform, during the extended term of his licence, work not set out in the plan of operations filed under section 15 (2) (c), a supplemental plan of operations is to be attached.

* If reclamation work reported in separate report give details of report identification.

VALUATION OF WORK: COST STATEMENT
(Sec. 27, B.C. Reg. 436/75)

ON-PROPERTY COSTS: For period from September 1, 1978 to August 31, 1979

1. OPERATOR'S FEES, SALARIES, AND WAGES:

	Average Number of Employees	Average Rate	Average Number of Days	Amount
Professional and technical	2	125	13	3,250
Machine operators and support				
Miners				
Other				

Total operator's costs $ 3,250

2. CONTRACTORS AND CONSULTANTS:

Name	Service	Contract Amount
W. Thompson Consultants	Geol. Consulting and Drawing	$ 3,000
E. Fortissier Construction	Bulldozer work, Blasting	$ 2,250
Canadian Longyear	Diamond Drilling	$ 7,055
Rose & Associates	Downhole Geophysical Logging	$ 2,500
Trounce Survey	Field Foreman	$ 1,000
Shellcanada Resources	Geodetic location survey	$ 500
E.W. Hachy & Associates	Photogrammetric Mapping	$ 3,500

Total contractor and consultant costs $ 19,805

3. EQUIPMENT AND INSTRUMENTS USED: Owned X Rented

Type	Rented From	Amount
Geological	-	160

Total equipment and instrument rentals $ 160

4. FIELD CAMP COSTS:

		Amount
Food / Accommodation		4,460
Fuel	and lubricants including those for the helicopters	4,200
Other	Communication	110

Total field camp costs $ 8,770

5. SAMPLING, ANALYSIS, AND TESTING:

Service	Performed by	Amount

Totals, samplings, analysis, and testing $ NIL

6. SUPPLIES AND MATERIALS COSTS:

	Amount
Process supplies	
Operating and maintenance supplies	425
Office and technical supplies	
Other supplies and materials	

Total, supplies and materials $ 425

7. TRANSPORTATION COSTS (Ground transportation details):

Vehicles	Owner	Rental Rate	Amount
one 4x4 truck	Rentrite	$ 1,500 / month	$ 1,000

Air support details:

Aircraft Type	Owner	Charter
Helicopter 206 B	Maple Leaf Helicopters	10,775
Helicopter 205	Maple Leaf Helicopters	8,000
Fixed Wing	Shell Canada Resources	300

Total transportation costs $ 20,075

8. RECLAMATION WORK:

included in slashing and hand trenching $ nil

9. TRAVEL EXPENDITURES (operator's costs only):

Number of Personnel	Number of Trips	Amount
2	1	600

Total travel expenditures $ 600

Total costs $ 53,085

(Secs. 28 and 29, B.C. Reg. 436/75)

OFF-PROPERTY COSTS: Period from September 1, 1978 to August 31, 1979

		Amount
(a)	Logistics and field support	$
(b)	Technical and feasibility studies	
(c)	Preparation of reports photogeological mapping the rest will be done in the subsequent term	590
(d)	Supplies and services	
(e)	Mobilization and demobilization of equipment	3,000
(f)	Travelling expenses (Itemize)	

Total $ 3,590

Supporting Cost Statements Attached

Supporting cost, supervision, administration and overhead are included in $125 per man-day

Total supporting costs $ —

SUMMARY

On-property costs $ 53,085

Off-property costs $ 3,590

Total costs $ 56,675

Statement of costs verified by

August 31, 1979
(Date)

M. Kowalchuk
(Signature and position)
Chief Accountant

DEPARTMENT OF MINES AND PETROLEUM RESOURCES

Coal Act (Sec. 19)

APPLICATION TO EXTEND TERM OF LICENCE

1. I, GLENN C. PROUDFOOT (Name) agent for SHELL CANADA RESOURCES LIMITED (Name)
400 FOURTH AVENUE, S.W. (Address)
CALGARY, ALBERTA, T2P 0J4 (Address)

Valid FMC No. 171 929

hereby apply to the Minister to extend the term of Coal Licences No(s). 4246 TO 4250 INCLUSIVE in RANGE 5 COAST LAND DISTRICT, 5 LICENCES CALLED DENY'S CR. COAL PROSPECT for a further period of one year.

2. I have performed, or caused to be performed, during the period SEPTEMBER 1, 1978 to AUGUST 31, 1979, work to the value of at least $ 25,994 on the location of coal licences as follows:

CATEGORY OF WORK	Licence No(s).	Apportioned Cost
Geological mapping	4246 TO 4250 INCLUSIVE	$ 21,351
Surveys: Geophysical	–	–
Geochemical	–	–
Other GAUGING	4246 TO 4250 INCLUSIVE	$ 1,643
Road construction	–	–
Surface work	4248	$ 2,500
Underground work	–	–
Drilling	–	–
Logging, sampling, and testing	–	–
Reclamation	–	–
Other work (specify)	–	–

3. I wish to apply $ 25,994 of this value of work on Coal Licence(s)* 4246 TO 4250, 5 LICENCES

N.A. 4. I wish to pay cash in lieu of work in the amount of $ – on Coal Licence(s) No(s).

N.A. 5. I wish to apply $ – of this value of work to claim a refund of cash in lieu of work in the amount of $ – which was paid to extend the term of Coal Licence(s) No(s). from to , 19 . Mining Receipt No. for prior payment of cash in lieu of work *is attached* for adjustment.

6. The work performed on the location(s) is detailed in the attached report entitled Report will be submitted in ninety days.

AUGUST 31, 1979 (Date)

(Signature and position) LANDMAN

*Applications to group licences may be filed to apportion costs on a maximum of 10 licences.

(FORMS TO BE SUBMITTED IN DUPLICATE)

FOR DEPARTMENTAL USE ONLY

Value of work reported $ Value of work applied on licences $

Value of work approved $ Value of credit remaining $

Work performed. Yes [X] No [ ]

The program of operations detailed hereunder was carried out during the period from September 1, 1978 to August 31, 19 79. Total costs are $ 25,994, an average of $ 8.12 per acre, $ 20.07 per hectare. (1,295 hectares)

GEOLOGICAL MAPPING Yes [X] No [ ] Cost $ 21,851

	Area (Acres)	Scale	Time
Reconnaissance	3500	1:10,000	28 man-days all helicopter supported
Detail: Surface	-	-	
Underground	-	-	-
Other (specify)	-	-	-

GEOPHYSICAL OR GEOCHEMICAL SURVEYS Yes [ ] No [X] Cost $ NIL

Method _____ Line miles _____

OTHER SURVEYS Yes [X] No [ ] Cost $ 1,643

Grid _____ Topographic Photogrammetric Other _____

ROAD CONSTRUCTION Yes [ ] No [X] Cost $ NIL

Length: On Licences _____ Access (off licences) _____

SURFACE WORK Yes [X] No [ ] Cost $ 2,500

	Length	Licence Number(s)
Trenching	by hand (8) 60 feet	4248
Seam tracing		all helicopter supported
Crosscutting		
Other		

UNDERGROUND WORK Yes [ ] No [X] Cost $ NIL

Test adits: Number _____ Average length _____ Total footage _____

Other workings: Area _____ Total footage _____

DRILLING Yes [ ] No [X] Cost $ NIL

	Hole Size	Number of Holes	Total Footage
Core: Diamond [ ] Wireline [ ]			
Rotary: Conventional [ ]			
Reverse circulation [ ]			
Other			

Contractor _____ Where core stored _____

LOGGING, SAMPLING, AND TESTING (check) Yes [ ] No [X] Cost $ NIL

Lithology: Drill samples [ ] Core samples [ ] Bulk samples [ ]

Logs: Gamma-Neutron [ ] Density [ ] Other [ ]

Testing: Prox. analysis [ ] FSI [ ] Washability [ ]

Carbonization [ ] Petrographic [ ] Plasticity [ ] Other [ ]

OTHER WORK (specify details) _____ Cost $ NIL

REPORTS:

Reclamation work (Permit No. _____) Detail of work* _____

Report will be prepared in the next term of the licences.

Cost $ NIL to date

OPERATIONS:

Work was supervised by Frank Martonhegyi Position Staff Geologist

Is this person a registered or licensed Professional Engineer in British Columbia? Yes [ ] No [X]

NOTE—Where the licensee intends to perform, during the extended term of his licence, work not set out in the plan of operations filed under section 15 (2) (c), a supplemental plan of operations is to be attached.

* If reclamation work reported in separate report give details of report identification.

VALUATION OF WORK: COST STATEMENT
(Sec. 27, B.C. Reg. 436/75)

ON-PROPERTY COSTS: For period from September 1, 1978 to August 31, 1979

1. OPERATOR'S FEES, SALARIES, AND WAGES:

	Average Number of Employees	Average Rate	Average Number of Days	Amount
Professional and technical	2	125	28	7,000
Machine operators and support				
Miners				
Other				

Total operator's costs $ 7,000

2. CONTRACTORS AND CONSULTANTS:

Name	Service	Contract Amount
W. Tomson Consultants	Geol. consulting, hand trenching	1,500
R.M. Hardy & Associates	Photogrammetric mapping	1,643

Total contractor and consultant costs $ 3,143

3. EQUIPMENT AND INSTRUMENTS USED: Owned X Rented

Type	Rented From	Amount
Geological	—	60

Total equipment and instrument rentals $ 60

4. FIELD CAMP COSTS:

		Amount
Food / Accommodation		1,120
Fuel	one lubricants including those for the helicopter	1,575
Other	Communications	60

Total field camp costs $ 2,755

5. SAMPLING, ANALYSIS, AND TESTING:

Service	Performed by	Amount

Totals, samplings, analysis, and testing $ —

6. SUPPLIES AND MATERIALS COSTS:

	Amount
Process supplies	
Operating and maintenance supplies	
Office and technical supplies	155
Other supplies and materials	

Total, supplies and materials $ 155

7. TRANSPORTATION COSTS (Ground transportation details):

Vehicles	Owner	Rental Rate	Amount
one 4x4 truck	Rentrite	$1500/month	1,000

Air support details:

Aircraft Type	Owner	Charter
Helicopter 206 B	Maple Leaf Helicopters	10,500
Fixed wing	Shell Canada Resources	200

Total transportation costs $ 11,700

8. RECLAMATION WORK:

included in hand trenching $ —

9. TRAVEL EXPENDITURES (operator's costs only):

Number of Personnel	Number of Trips	Amount
2	1	600

Total travel expenditures $ 600

Total costs $ 25,413

(Secs. 28 and 29, B.C. Reg. 436/75)

OFF-PROPERTY COSTS: Period from September 1, 1978 to August 31, 1979

	Amount
(a) Logistics and field support	$
(b) Technical and feasibility studies	
(c) Preparation of reports photogeological mapping the rest will be done in the next term of the lics.	581
(d) Supplies and services	
(e) Mobilization and demobilization of equipment	
(f) Travelling expenses (Itemize)	

Total $ 581

Supporting Cost Statements Attached

Supporting cost, supervision, administration and overhead are included in $125 per man-day

Total supporting costs $ —

SUMMARY

On-property costs $ 25,413

Off-property costs $ 581

Total costs $ 25,994

Statement of costs verified by

August 31, 1979
(Date)

W. S. Kamilee
(Signature and position)
Chief Accountant

2M-675-8196

DEPARTMENT OF MINES AND PETROLEUM RESOURCES

Coal Act (Sec. 19)

APPLICATION TO EXTEND TERM OF LICENCE

1. I, GLENN C. PROUDFOOT (Name) agent for SHELL CANADA RESOURCES LTD. (Name)
400 FOURTH AVENUE, S.W. (Address) (Address)
CALGARY, ALBERTA T2P 0J4

Valid FMC No. 171 929

hereby apply to the Minister to extend the term of Coal Licences No(s) 4252, 4253, 4254, 4255, 4257
FIVE LICENCES IN RANGE 5 COAST LAND DISTRICT, CALLED ZYMOETZ RIVER COAL PROSPECT
for a further period of one year.

2. I have performed, or caused to be performed, during the period September 1, 1978 to August 31, 1979, work to the value of at least $ 116,435 on the location of coal licences as follows:

CATEGORY OF WORK	Licence No(s).	Apportioned Cost
Geological mapping	4252, 4253, 4254, 4255, 4257	$ 12,431
Surveys: Geophysical		
Geochemical		
Other Geodetic	4252, 4253, 4254, 425, 4257	$ 3,700
Road construction		
Surface work	4251, 4253	$ 2,375
Underground work		
Drilling	4254	$ 92,264
Logging, sampling, and testing	4254	$ 5,665
Reclamation		
Other work (specify)		

3. I wish to apply $ 116,435 of this value of work on Coal Licence(s)*
4252, 4253, 4254, 4255, 4257 - FIVE LICENCES

N.A. 4. I wish to pay cash in lieu of work in the amount of $ — on Coal Licence(s) No(s).

N.A. 5. I wish to apply $ — of this value of work to claim a refund of cash in lieu of work in the amount of $ which was paid to extend the term of Coal Licence(s) No(s). from to , 19 . Mining Receipt No. for prior payment of cash in lieu of work *is attached* for adjustment.

6. The work performed on the location(s) is detailed in the attached report entitled
Technical report will be submitted in ninety days.

August 31, 1979 (Date)

(Signature and position)
LANDMAN

* Applications to group licences may be filed to apportion costs on a maximum of 10 licences.

(FORMS TO BE SUBMITTED IN DUPLICATE)

FOR DEPARTMENTAL USE ONLY

Value of work reported $ Value of work applied on licences $

Value of work approved $ Value of credit remaining $

Work performed. Yes [x] No [ ]

The program of operations detailed hereunder was carried out during the period from September 1, 1978 to August 31, 19 79. Total costs are $ 116,435, an average of $ 246.54 per acre, $ 99.77 per hectare. (1,167 hectares)

GEOLOGICAL MAPPING Yes [x] No [ ] Cost $ 12,431

	Area (Acres)	Scale	Time
Reconnaissance	3,000	1:10,000	21 man-days
Detail: Surface	–	–	–
Underground	–	–	–
Other (specify)	–	–	–

GEOPHYSICAL OR GEOCHEMICAL SURVEYS Yes [ ] No [x] Cost $ NIL

Method ____ Line miles ____

OTHER SURVEYS Yes [ ] No [ ] Cost $ 3,700

Grid ____ Topographic Photogrammetric Other Geodetic Location Survey

ROAD CONSTRUCTION Yes [ ] No [x] Cost $ NIL

Length: On Licences ____ Access (off licences) ____

SURFACE WORK Yes [x] No [ ] Cost $ 2,375

	Length	Licence Number(s)
Trenching by hand (6)	60 feet	4252, 4253
Seam tracing		
Crosscutting		
Other		

UNDERGROUND WORK Yes [ ] No [x] Cost $ NIL

Test adits: Number ____ Average length ____ Total footage ____

Other workings: Area ____ Total footage ____

DRILLING Yes [x] No [ ] Cost $ 92,264

	Hole Size	Number of Holes	Total Footage
Core: Diamond [x] Wireline [ ]	HQ	2	675 feet
Rotary: Conventional [ ]			
Reverse circulation [ ]			
Other			

Contractor Canadian Longyear Drilling Co. Where core stored Smithers Storage

LOGGING, SAMPLING, AND TESTING (check) Yes [x] No [ ] Cost $ 5,665

Lithology: Drill samples [ ] Core samples [x] Bulk samples [ ]

Logs: Gamma-Neutron [x] Density [x] Other [x]

Testing: Prox. analysis [x] FSI [x] Washability [ ]

Carbonization [ ] Petrographic [ ] Plasticity [ ] Other [x]

OTHER WORK (specify details) NONE Cost $ NIL

REPORTS:

Reclamation work (Permit No. ____) Detail of work* NONE

Technical report will be prepared in the subsequent term Cost $ NIL to date

OPERATIONS:

Work was supervised by Frank MARTONEGH Position Staff Geologist

Is this person a registered or licensed Professional Engineer in British Columbia? Yes [ ] No [x]

NOTE—Where the licensee intends to perform, during the extended term of his licence, work not set out in the plan of operations filed under section 15 (2) (c), a supplemental plan of operations is to be attached.

* If reclamation work reported in separate report give details of report identification.

VALUATION OF WORK: COST STATEMENT
(Sec. 27, B.C. Reg. 436/75)

ON-PROPERTY COSTS: For period from September 1, 1978 to August 31, 1979

1. OPERATOR'S FEES, SALARIES, AND WAGES:

	Average Number of Employees	Average Rate	Average Number of Days	Amount
Professional and technical	2	125	17	4,250
Machine operators and support				
Miners				
Other				

Total operator's costs $ 4,250

2. CONTRACTORS AND CONSULTANTS:

Name	Service	Contract Amount
W. THOMPSON CONSULTANTS	GEOL. CONSULTING, HAND TRENCHING	1,200
E. POTWEER CONSTRUCTION	BULLDOZER WORK AND SLASHING	6,000
CANADIAN LONGYEAR	DIAMOND DRILLING	29,295
TROWNER SURVEY	FIELD FOREMAN	2,000
SHELL CANADA RESOURCES	LOCATION SURVEY	1,000
R.M. HARDY & ASSOCIATES	PHOTOGRAMMETRIC MAPPING	1,700
ROKE OIL ENTERPRISES	DOWNHOLE GEOPHYSICAL LOGGING	4,000

Total contractor and consultant costs $

3. EQUIPMENT AND INSTRUMENTS USED: Owned X Rented

Type	Rented From	Amount
GEOLOGICAL	—	50

Total equipment and instrument rentals $ 50

4. FIELD CAMP COSTS:

		Amount
Food / Accommodation		8,560
Fuel	and lubricants including those for the helicopters	3,200
Other	Communications	50

Total field camp costs $ 11,810

5. SAMPLING, ANALYSIS, AND TESTING:

Service	Performed by	Amount
Analysis, tests	CNRL Lab	165

Totals, samplings, analysis, and testing $ 165

6. SUPPLIES AND MATERIALS COSTS:

	Amount
Process supplies	
Operating and maintenance supplies	429
Office and technical supplies	
Other supplies and materials	

Total, supplies and materials $ 429

7. TRANSPORTATION COSTS (Ground transportation details):

Vehicles	Owner	Rental Rate	Amount
one 4x4 truck	Rentrite	$1,500/month	$ 1,000
Field moving cost	Galant	$45/hour	2,750

Air support details:

Aircraft Type	Owner	Charter
Helicopter 206 B	Maple Leaf Helicopters	28,500
" 205	" " "	15,000
Fixed Wing		200

Total transportation costs $ 47,450

8. RECLAMATION WORK:

included in slashing and hand trenching $ NIL

9. TRAVEL EXPENDITURES (operator's costs only):

Number of Personnel	Number of Trips	Amount
2	1	600

Total travel expenditures $ 600

Total costs $ 109,949

(Secs. 28 and 29, B.C. Reg. 436/75)

OFF-PROPERTY COSTS: Period from September 1, 1978 to August 31, 1979

	Amount
(a) Logistics and field support	$
(b) Technical and feasibility studies	
(c) Preparation of reports photogeological mapping the rest will be done in the subsequent term	946
(d) Supplies and services	
(e) Mobilization and demobilization of equipment	5,540
(f) Travelling expenses (Itemize)	

Total $ 6,486

Supporting Cost Statements Attached

Supporting cost, supervision, administration and overhead are included in $ 125 per man-day.

Total supporting costs $ NIL

SUMMARY

On-property costs	$ 109,949
Off-property costs	$ 6,486
Total costs	$ 116,435

Statement of costs verified by

August 31, 1979 (Date)

(Signature and position) Chief Accountant

2M-675-8196

Enclosure No. 7

Date	AUGUST 31, 1979
To	CROWS NEST RESOURCES LIMITED (CNRL) Frank Martonhegyi
From	SHELL CANADA RESOURCES LIMITED Surveying Section
Subject	LOCATION SURVEY TELKWA PROSPECT - Telkwa, British Columbia (Telkwa Area) TW1 to TW13 (Zymoetz Area) ZZ1 & ZZ2 (Thavtil River Area) TH1

Six 2nd order control stations (Coal, Hankin, Bitzen, 1127, Denys & Glacis)were found and occupied to establish the survey in these areas. A total of 16 drill holes (3 diamond and 13 rotary holes) were surveyed between August 16, 1979 and August 29, 1979, using conventional surveying methods of theodolite and electronic distance measuring equipment. Co-ordinates and all calculations were done in the U.T.M. Grid System and distances and bearings (referenced to 129°) were corrected for sea level and scale factor.

Accuracy of drill location network was above 1/20,000 in all cases.

The results of the surveys will be presented to CNRL in both tabular & plan form upon their completion later this fall.

The total cost of survey as of August 31, 1979 attributed to the TELKWA PROSPECT was approximately $10,500.00

D.P. Poulsom

EK:DPP:bp

TELKWA PROSPECT

Telkwa Area

CONTROL	N.	E.	ELEVATION
1123 (Blitzen)	6041357.619	618115.615	2291.79
1127	6074304.088	609310.424	2330.81
Stoney	6041782.045	626223.776	1754.12
DRILL HOLES			
TW1	6055879.3	621340.0	670.48
TW2	6054415.0	621393.1	744.08
TW3	6054639.9	622372.7	727.64
TW4	6057505.8	621491.8	604.70
TW5	6062359.4	615618.5	888.81
TW6	6062996.0	615952.3	875.09
TW7	6062569.2	614517.1	895.26
TW8	6062877.5	615725.6	879.62
TW9	6062589.1	615817.6	891.40
TW10	6058538.0	618143.6	754.13
TW11	6058688.2	619564.4	658.89
TW12	6059818.7	620761.0	596.91
TW13	6054761.2	621457.7	719.08

Zymoetz Area

CONTROL			
Hankin	6084356.303	582913.556	1478.58
Coal	6077793.292	575819.005	1735.53
DRILL HOLES			
ZZ1	6074967.6	580686.0	843.26
ZZ2	6075659.3	580520.8	860.40

Thautil Area

CONTROL			
Glacis	6039759.817	614018.632	1874.82
Denys	6029300.872	609149.865	1629.46
DRILL HOLE			
TH1	6020198.4	608608.6	997.32

TK. SMITHERS 79(3)A

BOREHOLE DATA

OPEN FILE

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Enclosure No. 14

00 232

ROTARY HOLE NO. R-TW-01

DATE	July 31, 1979
ELEV.	670.48
NORTHING	6055879.3
EASTING	621340.0
TOTAL DEPTH	189.0
ANGLE	-90°
AZIMUTH	-
LOGS RUN	G.R., Den., Cal,. G.R.-Neu., Dir.

Depth (m)	Lithology (Chip Samples)
0-2.25	Overburden
2.25-24.38	Sandstone; samples contaminated by O.B.
24.38-47.24	Shale; gray, minor green
47.24-62.48	Shale/Siltstone interbedded, gray
62.48-68.58	Sandstone with minor shale and siltstone interbedded
68.58-82.30	Shale; with siltstone, minor sandstone interbedded
82.30-112.78	Sandstone; fine grain, green, with black and white specks, minor gray shale, minro siltstone
112.78-123.44	Shale; gray, minor carbonaceous
123.44-128.01	Shale; gray with coal
128.01-131.06	Sandstone; very fine grain, with shale
131.06-134.11	Sandstone; very fine grain, with shale, with trace of coal
134.11-138.63	Shale with siltstone/sandstone interbedded
138.63-146.30	Shale; with coal
146.30-173.74	Shale/Siltstone, minor fine grain Sandstone
173.74-185.93	Shale; gray
189.00	T.D.

00232 2/3

ROTARY HOLE NO. R-TW-02

DATE	August 1, 1979
ELEV.	744.088
NORTHING	6054415.0
EASTING	621393.1
TOTAL DEPTH	237.8
ANGLE	-90°
AZIMUTH	-
LOGS RUN	G.R., Den., Cal., G.R.-Neu., Res., Dir.

Depth (m)	Lithology (Chip Samples)
0-3.05	Overburden
3.05-4.57	Limestone; medium gray, hard, efferveces, minor siltstone
4.57-35.05	Shale; gray, occassionally silty
35.05-36.00	Limestone; medium gray, hard, efferveces, minor siltstone
36.00-45.72	Shale; gray, soft, minor pyrite
45.72-50.29	Coal and Shale
50.29-51.81	Coal; clean
51.81-53.34	Shale; gray, trace coal
53.34-56.38	Shale with siltstone
56.38-60.96	Shale; carbonaceous, with coal and pyrite
60.96-68.58	Coal with shale and pyrite, some clean coal sections
68.58-71.62	Shale; carbonaceous
71.62-73.15	Shale; gray
73.15-77.72	Sandstone; fine grain, with gray shale
77.72-80.77	Siltstone; gray
80.77-83.83	Shale; carbonaceous and gray, with coal

ROTARY HOLE NO. R-TW-02

DEPTH (m)	LITHOLOGY
83.83-85.34	Coal
85.34-86.87	Shale; carbonaceous and gray with pyrite
86.87-91.44	Siltstone; with carbonaceous bands, medium hard
91.44-96.01	Shale; gray, minor siltstone and carbonaceous shale
96.01-97.53	Coal
97.53-99.06	Shale; carbonaceous
99.06-131.06	Shale, gray, and siltstone interbedded
131.06-134.11	Siltstone, gray, and sandstone, fine grain, green
134.11-137.16	Siltstone; gray
137.16-181.35	Shale; gray, occassional silty
181.35-185.93	Sandstone and shale
185.93-187.45	Sandstone; fine grain, green
187.45-188.97	Siltstone, sandstone, and shale
188.97-192.02	Shale; gray
192.02-196.60	Siltstone and shale
196.60-199.64	Sandstone; fine grain, green
199.64-207.26	Sandstone, fine grain, siltstone, shale interbedded
207.26-211.84	Shale, gray, with siltstone, minor to trace coal
211.84-213.36	Shale; gray
213.36-216.48	Siltstone; gray, coaly stringers, with shale, gray
216.48-220.93	Sandstone, fine grain, and siltstone, gray, trace coal
220.93-227.08	Shale; gray, minor siltstone
227.08-230.12	Sandstone; fine to very fine grain, gray to green
230.12-231.64	Siltstone and shale, gray and carbonaceous, trace coal
231.64-237.80	Shale and siltstone, minor carbonaceous wisps
237.80	T.D.

ROTARY HOLE NO. R-TW-03

DATE	August 4, 1979
ELEV.	727.64
NORTHING	6054639.9
EASTING	622372.7
TOTAL DEPTH	237.80
ANGLE	-90°
AZIMUTH	-
LOGS RUN	G.R., Den., Cal., G.R.-Neu., Res., Dir.

Depth (m)	Lithology (Chip Samples)
0-6.09	Overburden
6.09-51.82	Shale; dark gray, minor calcite and siltstone
51.82-54.86	Siltstone; dark gray-green, trace coal
54.86-60.96	Siltstone very fine grain sandstone, dark gray-green minor carbonaceous streaks
60.96-70.10	Sandstone; fine grain, light gray-green, trace siltstone and calcite, carbonaceous streaks.
70.10-82.30	Shale; dark gray
82.30-86.87	Shale; dark gray, coal, pyrite grains
86.87-88.39	Shale; medium gray, silty, micaceous
88.39-106.68	Sandstone; light gray, fine to very fine grain, trace coal; siliceous
106.68-108.20	Sandstone; light gray, fine to very fine grain, with coal; siliceous
108.20-182.89	Sandstone; fine to very fine grained, trace to minor coal, trace to minor pyrite, minor siltstone and medium grain sandstone
182.89-184.40	Siltstone; light gray, and shale, trace coal
184.40-187.45	Shale; silty; minor carbonaceous shale, coal, trace chalcopyrite
187.45-188.97	Siltstone; medium to light gray, with chalcopyrite

ROTARY HOLE NO. R-TW-03

DEPTH (m)	LITHOLOGY
188.97-192.02	Shale with calcite on slicked surfaces, minor chalcopyrite
192.02-216.40	Siltstone and shale, trace coal
216.40-219.46	Shale, carbonaceous, trace coal
219.46-222.50	Siltstone/Shale, trace coal, calcite and sulphides
222.50-225.55	Siltstone and fine grain sandstone (micaceous), trace coal, calcite, chalcopyrite
225.55-237.74	Shale/Siltstone; trace coal, minor very fine grain sandstone
237.74	T.D.

ROTARY HOLE NO. R-TW-04

DATE	August 10, 1979
ELEV.	604.70
NORTHING	6057505.8
EASTING	621491.8
TOTAL DEPTH	71.30
ANGLE	-90°
AZIMUTH	-
LOGS RUN	G.R.- Neut., Res.

Depth (m)	Lithology (Chip Samples)
0-16.76	Overburden
16.76-18.29	Shale; silty, gray
18.29-71.30	Volcanics, weathered near top
71.30	T.D.

ROTARY HOLE NO. R-TW-05

DATE	August 12, 1979
ELEV.	888.81
NORTHING	6062359.4
EASTING	615618.5
TOTAL DEPTH	201.20
ANGLE	-90°
AZIMUTH	-
LOGS RUN	G.R., Den., Dir., G.R.-Neut., Res., Cal.

Depth (m)	Lithology (Chip Samples)
0-1.52	Shale; carbonaceous with coal
1.52-4.57	Siltstone with coal stringers and carbonaceous shale
4.57-10.67	Shale; carbonaceous, minor coal
10.67-18.29	Sandstone; very fine grained with siltstone, minor shale, trace coal
18.29-19.81	Coal; clean
19.81-25.91	Shale; carbonaceous, trace coal and coal stringers, minor siltstone, calcite
25.91-27.43	Sandstone; medium grain, minor siltstone and shale, coaly wisps, trace coal
27.43-33.53	Shale; carbonaceous, minor coal and medium grain sandstone
33.53-35.05	Siltstone Shale, minor coal
35.05-44.19	Sandstone; medium to fine grained, minor coal, carbonaceous shale
44.19-53.34	Shale; carbonaceous, minor medium grain sandstone, minor coal
53.34-56.39	Sandstone; medium grain, minor coal, carbonaceous shale
56.39-59.44	Sandstone; fine grain, minor shale
59.44-60.96	Siltstone/Shale with coal stringers

ROTARY HOLE NO. R-TW-05

DEPTH (m)	LITHOLOGY
60.96-64.00	Shale; carbonaceous, minor coal and sandstone
64.00-68.58	Shale/carbonaceous shale/siltstone interbedded, minor fine grain sandstone
68.58-71.63	Shale; carbonaceous, very fine grain sandstone, siltstone with coal
71.63-74.67	Sandstone/ Siltstone, minor carbonaceous shale
74.67-85.34	Shale/Siltstone; (gray), minor fine grain sandstone, shaly coal
85.34-89.91	Sandstone; very fine grain to medium grain, trace to minor coal
89.91-92.96	Shale; carbonaceous, minor fine to medium grain sandstone, trace coal
92.96-94.50	Shale/Siltstone (dark gray); minor coal, minor fine grain sandstone
94.50-97.54	Sandstone; fine to medium grain, siltstone, trace coal
97.54-100.58	Shale/Siltstone; coal minor
100.58-102.4	Sandstone/Siltstone; medium to fine grain sandstone, coaly wisps,minor carbonaceous shale, trace coal
102.4-105.15	Sandstone/Siltstone/Shale; trace coal
105.15-106.68	Siltstone (medium gray); some sandstone (medium grained); trace coal
106.68-109.73	Shale (dark gray); minor siltstone, calcite in fractures
109.73-118.00	Shale; trace igneous and trace coal
	Shale; carbonaceous, minor clean coal, minor sandstone, siltstone
118.00-201.20	Volcanics; red
201.20	T.D.

ROTARY HOLE NO. R-TW-06

DATE	August 13, 1979
ELEV.	875.09
NORTHING	6062996.0
EASTING	615952.3
TOTAL DEPTH	42.7
ANGLE	-90°
AZIMUTH	-
LOGS RUN	G.R., Den., Cal,, G.R.-Neut., Res.

Depth (m)	Lithology (Chip Samples)
0-13.71	Overburden
13.71-42.70	Volcanics; red
42.70	T.D.

ROTARY HOLE NO. R-TW-07

DATE	August 12, 1979
ELEV.	895.26
NORTHING	6062569.2
EASTING	614517.1
TOTAL DEPTH	24.40
ANGLE	-90°
AZIMUTH	-
LOGS RUN	G.R., Den., Cal., G.R.-Neut., Res.

Depth (m)	Lithology (Chip Samples)
0-6.20	Overburden
6.20-13.72	Siltstone/ Shale, some coaly shale, minor calcite and pyrite
13.72-16.20	Shale; carbonaceous, minor coal, trace pyrite and fine grain sandstone
16.20-24.40	Volcanics
24.40	T.D.

ROTARY HOLE NO. R-TW-08

DATE	August 13, 1979
ELEV.	879.62
NORTHING	6062877.5
EASTING	615725.6
TOTAL DEPTH	24.7
ANGLE	-90°
AZIMUTH	-
LOGS RUN	G.R., Den., Cal., G.R.-Neut., Res.

Depth (m)	Lithology (Chip Samples)
0-5.70	Overburden
5.70-24.00	Siltstone/carbonaceous shale, minor calcite on slickensided surfaces, trace coal to 30% coal
24.00-24.70	Volcanics; red and blue
24.70	T.D.

ROTARY HOLE NO. R-TW-09

DATE	August 13, 1979
ELEV.	891.40
NORTHING	6062589.1
EASTING	615817.6
TOTAL DEPTH	24.7
ANGLE	-90°
AZIMUTH	-
LOGS RUN	G.R., Den., Cal., G.R.-Neut., Res.

Depth (m)	Lithology (Chip Samples)
0-24.70	Volcanics; red and purple, altered
24.70	T.D.

ROTARY HOLE NO R-TW-10

DATE	August 21, 1979
ELEV.	754.13
NORTHING	6058538.0
EASTING	618143.6
TOTAL DEPTH	225.9
ANGLE	-90°
AZIMUTH	-
LOGS RUN	G.R.-Neut.

Depth (m)	Lithology (Chip Samples)
0-45.7 (approx.)	Overburden
45.7-59.44	O.B. contaminated samples
59.44-77.72	Shale; gray, trace to 50% coal
77.72-102.12	Shale; gray, hard, minor to trace coal, samples badly contaminated by O.B.
102.12-106.68	Coal with shale
106-68-201.17	Shale; gray, hard, trace coal to minor coal, samples contaminated by O.B.
201.17-292.69	As above; slickensides evident, coated with calcite
292.69-225.90	Sandstone; fine grain, gray-green with gray shale
225.90	T.D.

ROTARY HOLE NO. R-TW-11

DATE	August 22, 1979
ELEV.	658.89
NORTHING	6058688.2
EASTING	619564.4
TOTAL DEPTH	7.60
ANGLE	-90°
AZIMUTH	-
LOGS RUN	-

Depth (m)	Lithology (Chip Samples)
Hole abandoned in coarse gravel overburden due to lost circulation	

ROTARY HOLE NO.R-TW-12

DATE	August 23, 1979
ELEV.	596.91
NORTHING	6059818.7
EASTING	620761.0
TOTAL DEPTH	48.80
ANGLE	-90°
AZIMUTH	-
LOGS RUN	G.R.-Neutron

Depth (m)	Lithology (Chip Samples)
0-12.50	Overburden
12.50-13.72	Volcanics; mixture of purple and light brown igneous rock
13.72-48.80	Volcanics; purple, altered
48.80	T.D.

ROTARY HOLE NO. R-TW-13

DATE	August 25, 1979
ELEV.	719.08
NORTHING	6054761.2
EASTING	621457.7
TOTAL DEPTH	128.0
ANGLE	-90°
AZIMUTH	-
LOGS RUN	G.R., Den., Cal., G.R.-Neu., Res., Dir.

Depth (m)	Lithology (Chip Samples)
0-2.40	Overburden
2.40-7.62	Coal with gray shale, minor pyrite
7.62-19.80	Shale; gray, trace coal
19.80-30.48	Shale/Siltstone, gray/ green, trace coal, trace pyrite
30.48-54.86	Shale; gray, minor coal, minor pyrite, trace calcite on slickensided surfaces
54.86-56.39	Shale; gray, minor greenish-gray, fine grain sandstone
56.39-60.96	Shale and Siltstone; gray, trace coal, trace pyrite
60.96-67.06	Shale, gray, minor silstone, trace coal
67.06-68.58	Shale; gray
68.58-71.63	Shale; dark gray, minor crystalline concretions (brown)
71.63-73.15	As above; trace clcite and pyrite
73.15-88.39	Shale; gray, trace pyrite, trace coal
88.39-91.44	Shale; silty, gray, trace coal
91.44-128.01	Siltstone; light brown to gray, traces of coal and pyrite
128.01	T.D.

Enclosure No. 15

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASUR FROM CORE AXIS)

HOLE No: D-ZZ-1 SHEET No: 1

DATE BEGUN: AUGUST 14, 1979 DEPTH: 42.67 m BEARING: N 135°E U.T.M. 6074967.6N/580686.0 E

DATE FINISHED: AUGUST 16, 1979 ELEV. COLLAR: 860.40 TOTAL DEPTH: 41.2 m COAL LICENSE: ZYMOETZ

LAT.: HOLE ANGLE: -60° LOGGED BY: P.GILMAR G.SLOAN,R.NIEDERAUER CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
Box 1										
	0.45m						Overburden, boulder			
	0.96					78°	SHALE - medium to dark grey, slightly silty broken to broken stick	0° & 8° calcite	R2	.38
12.19										
	1.52	1.52	1.53	99		78°	- as above, silty in parts, stick		R2	.45/1.52 30
13.72										
Box 2										
	0.11						- as above, broken to broken rubble		R2	0
	0.99					67°	- as above, broken to broken stick		R2	.22
	0.025						- carbonaceous and coaly, with pyrite, broken to powder, sheared		S2	0
	0.29	1.415	1.52	93			COAL - hard, bright, minor pyrite, minor calcite filled fractures, broken		S3	0
15.24									S3	
	0.44						- as above, broken		S3	0
	0.18						- bright with dull, hard, minor calcite filled fractures, broken	2° calcite	S3	0
	0.04					74°	- dull with bright, broken stick		S3	0
	0.09						- with major silty shale turbidite (very hard shaley material), broken stick		S5	0
	0.06				TW-1		- dull with bright, minor calcite filled fractures, broken to broken stick, minor (.005 m) carbonaceous shale parting		S3	0
Box 3										
	0.05						- bright with dull, minor calcite filled fractures, broken to broken stick		S3	0
	0.08						- bright and dull, minor weathered pyrite along fractures, broken to broken stick	12° x 3 calcite	S3	0
	0.06						- dull, grading to coaly shale at base, minor calcite filled fractures, broken to broken stick		S3	0

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASUR FROM CORE AXIS)

HOLE No: ZZ-1 SHEET No: 2

DATE BEGUN: AUGUST 14, 1979 DEPTH: 42.67 m BEARING: N 135°E U.T.M.

DATE FINISHED: AUGUST 16, 1979 ELEV. COLLAR: 860.40 TOTAL DEPTH: 41.2 m COAL LICENSE: ZYMOETZ

LAT.: HOLE ANGLE: -60° LOGGED BY: G.SLOAN,R.NIEDERAUER, P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
	0.03					80°	COAL - bright and dull, minor calcite filled fractures, broken to broken stick		S3	0
	0.06						- dull with bright, minor calcite filled fractures, broken to broken stick		S3	0
	0.025						SHALE - carbonaceous and coaly, broken stick		R3	0
	0.25						- slightly carbonaceous, medium to dark grey, much plant debris and few coaly wisps, broken stick		R3	0
	0.03					16.74	- coaly, broken		R1	0
	0.02	1.415	1.52	93			COAL - shaley, with amber on base, broken, dull		S5	0
16.76										
	0.025						- shaley, dull, amber along fractures, broken		S3	0
	0.025						- dull with bright, broken stick		S3	0
	0.02						- hard, bright with dull, calcite along fracture, broken stick		S3	0
	0.04				TW-2		- dull with bright, broken stick		S3	0
	0.025						- bright with dull, broken		S3	0
	0.02						- bright and dull, amber, broken		S3	0
	0.04						- dull with bright, broken		S3	0
	0.015						- bright, broken		S3	0
	0.01					88°	- bright with dull, broken		S2	0
	0.02						SHALE - coaly, with one polished coaly slick, broken		S2	0
	0.11						COAL - dull and bright, broken		S3	0
	0.015						SHALE - carbonaceous and coaly, plant debris throughout, broken		S3	0
	0.09						COAL - dull and bright		S3	0
	0.12					82°	SHALE - carbonaceous and coaly, plant debris, broken to broken stick		S3	0
	0.06				TW-3		COAL - shaley, dull with bright, broken		S2	0
	0.08						SHALE - carbonaceous and coaly, plant debris throughout, broken		S2	0
	0.025						COAL - bright with dull, broken with large cast on bottom, broken		S2	0

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASU[illegible] FROM CORE AXIS)

HOLE No: ZZ-1 SHEET No: 3

DATE BEGUN: AUGUST 14, 1979 DEPTH: 42.67 m BEARING: N 135°E U.T.M.

DATE FINISHED: AUGUST 16, 1979 ELEV. COLLAR: 860.40 TOTAL DEPTH: 41.2 m COAL LICENSE: ZYMOETZ

LAT.: HOLE ANGLE: -60° LOGGED BY: G.SLOAN, R.NIEDERAUER CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
	0.04						SHALE - carbonaceous, plant debris throughout, broken		S2	0
	0.01						COAL - dull with bright, badly sheared, calcite throughout, broken		S2	0
	0.38						SHALE - carbonaceous, silty with sand grains (coarse to medium) throughout, plant debris throughout, broken to broken stick		S2	0.10
	0.055						COAL - hard, dull with bright, broken, gradational below, broken		S3	0
	0.04					64°	SILTSTONE - coaly wisps near base, current deformation and coal near base, medium to dark grey, plant debris throughout, gradational below, broken		R2	0
	0.14	1.405	1.53	92		80°	SILTSTONE - light grey, very fine grained, plant debris throughout, few coaly wisps		R2	0
18.29										
	0.64					74°	- slightly sandy, finely laminated with carbonaceous streaks and plant debris, light grey, breaks along carbonaceous streaks, few coaly wisps throughout, current deformation, broken stick to stick		R3	
Box 4										
	0.865	1.505	1.52	99		74°	- as above		R3	.89 1.52
19.81										
	1.44					75°	- as above, grading to very fine grained sandstone in places		R3	.66
21.34										
	0.38					74°	- as above, interbedded with very fine grained sandstone		R3	.275
Box 5										
	1.09	1.47	1.52	97		79°	SILTSTONE/SANDSTONE - as above, numerous fossils along fractures		R3	.53
22.86										

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASU FROM CORE AXIS)

HOLE No: ZZ-1 SHEET No: 4

DATE BEGUN: AUGUST 14, 1979 DEPTH: 42.67 m BEARING: N 135°E U.T.M.

DATE FINISHED: AUGUST 16, 1979 ELEV. COLLAR: 860.40 TOTAL DEPTH: 41.2 m COAL LICENSE: ZYMOETZ

LAT.: HOLE ANGLE: -60° LOGGED BY: G. SLOAN R. NIEDERAUER CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
22.86										
	0.60					73°	SILTSTONE- as above, no sandstone, grading to silty shale at base, broken to broken stick		R2	.135
	0.03						COAL - hard, bright, calcite along fractures, broken rubble		S3	0
	0.26					57°	SHALE - slightly carbonaceous, light to medium grey, carbonaceous and coaly streaks with plant debris throughout, few coaly wisps, fractures along carbonaceous streaks exposing fossils, some weathered pyrite, current deformation, broken stick		R2	0
	0.04						- carbonaceous, plant debris throughout, coaly wisps, few slicked surfaces, broken		R2	0
	0.05						- very coaly, very thin coaly beds less than .004 m, appears to be sheared, broken		S1	0
	0.045						COAL - shaley, dull with bright, calcite filled fractures, broken stick		S2	0
	0.02						SHALE - coaly, broken		R1	0
	0.15						COAL - dull with bright, calcite filled fractures, broken stick		S4	0
	0.085						SHALE - carbonaceous, plant debris throughout, broken stick		S2	0
	0.03						COAL - dull		S2	0
	0.025	1.36	1.52	89	TW-4		- bright with dull, calcite along fractures, broken		S3	0
24.38										
	0.02						- dull with bright, calcite along fractures, broken		S3	0
Box 6										
	0.07						- dull with bright, calcite along fractures, some amber, broken		S3	0
	0.08					73°	- dull with bright bands, calcite along fractures, amber, broken stick		S3	0
	0.10						SHALE - carbonaceous, dark grey, few thin coal laminations, current deformation, broken		R2	

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASUR[illegible] FROM CORE AXIS)

HOLE No: ZZ-1 SHEET No: 5

DATE BEGUN: AUGUST 14, 1979 DEPTH: 42.67 m BEARING: N 135°E U.T.M. _____

DATE FINISHED: AUGUST 16, 1979 ELEV. COLLAR: 860.40 TOTAL DEPTH: 41.2 m COAL LICENSE: ZYMOETZ

LAT.: _____ HOLE ANGLE: -60° LOGGED BY: ~~R.NIEDERAUER~~ G.SLOAN CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
	0.02						COAL - very shaley, amber inclusions, broken rubble		S4	0
	0.10						SHALE - light to medium grey, carbonaceous and coaly streaks with plant fragments, stick to broken stick		R2	.815
	0.305						SILTSTONE - with interbedded very fine grained sandstone, light grey, carbonaceous streaks with plant fragments throughout, fractures along carbonaceous streaks, broken stick		R2	
	0.785	1.48	1.53	97			SANDSTONE - very fine grained, light grey, carbonaceous streaks throughout, with plant fragments along fractures, stick		R3	
25.91										
	1.215						- as above			.965
Box 7										
	0.035						- very fine grained, silty, light grey, carbonaceous streaks, broken		R3	
	0.14	1.39	1.52	91			- fine grained, light grey, carbonaceous streaks with plant debris throughout		R4	.14
27.43										
	0.51					81°	- fine grained, light grey, some siltstone interbeds near base, carbonaceous and plant debris streaks throughout (from 27.68 to 27.73 there exists a minor fracture zone which exhibits only very small slickensides, calcite and pyrite filled, angle to core 34°), broken stick		R3	.135
	0.51						SHALE - with some thin siltstone interbeds, light to medium grey, carbonaceous streaks with plant debris along fractures, broken stick		R2-R3	.22
	0.065						- carbonaceous and coaly, broken		S1	
	0.41	1.495	1.53	98			COAL - bright		S4	
28.96										
	0.05						- bright		S4	
	0.03						- bright and dull		S4	
	0.01						- bright		S4	

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASUR ROM CORE AXIS)

HOLE No: ZZ-1 SHEET No: 6

DATE BEGUN: AUGUST 14, 1979 DEPTH: 42.67 m BEARING: N 135°E U.T.M.

DATE FINISHED: AUGUST 16, 1979 ELEV. COLLAR: 860.40 TOTAL DEPTH: 41.2 m COAL LICENSE: ZYMOETZ

LAT.: HOLE ANGLE: -60° LOGGED BY: G.SLOAN R.NIEDERAUER CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
	0.02				TW-5		COAL - bright with dull		S3	
	0.03						- dull and bright		S3	
	0.045						- dull with bright, fracture zone with some slicks		S3	
							much calcite infilling			
	0.11						- dull		S3	
	0.04						- bright and dull		S3	
	0.03						- badly sheared		S1	
	0.08						- dull and bright, shaley on dull		S3	
	0.10						SHALE - carbonaceous, medium to dark grey, fractures		R1	0
							along carbonaceous streaks			
	0.08						COAL - bright, calcite along fractures		S3	0
Box 8										
	0.06				TW-6		- bright, broken		S3	0
	0.21						- dull with bright, broken		S3	0
	0.085						- bright and dull, broken		S3	0
	0.065	1.045	1.52	69			SHALE - carbonaceous, dark grey, broken		S5	0
30.48										
	0.105						- carbonaceous, dark grey with coal stringers,		S4	
							broken rubble			
	0.02						- carbonaceous, dark grey with coal stringers less		S4-R1	
							than .01 m, broken stick			
	0.015						- carbonaceous, very badly sheared, powder(compacted)		S2	
	0.05						- carbonaceous, coal stringers, calcite on slicked		S4	
							surfaces, broken stick (slicked surfaces at 70° to			
							core axis)			
	0.035						- carbonaceous, very badly sheared, powder(compacted)		S2	
	0.135					80°	- silty, medium grey, plant debris throughout,		R2	
							broken stick to stick, grading to siltstone at			
							bottom			
	0.445						SILTSTONE - medium grey, some plant debris, stick		R1	

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASUF FROM CORE AXIS)

HOLE No: ZZ-1 SHEET No: 7

DATE BEGUN: AUGUST 14, 1979 DEPTH: 42.67 m BEARING: N 135°E U.T.M.

DATE FINISHED: AUGUST 16, 1979 ELEV. COLLAR: 860.40 TOTAL DEPTH: 41.2 m COAL LICENSE: ZYMOETZ

LAT.: HOLE ANGLE: -60° LOGGED BY: G.SLOAN ~~R.NIEDERAUER~~ CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
	0.035						SILTSTONE - sandy, light grey, some pebbles (diameter less than .005 m) in rock, broken stick		R3	
	0.67						- very fine grained sandstone, light grey,		R3	
		1.51	1.52	99			interbedded with conglomerate (pebbles less than .01 m diameter), stick			1.27
32.0										
	0.05						- light grey, very badly sheared, with some pebbles (diameter less than .005 m) calcite along fractures, stick		S1	.63
	0.680						- very fine grained sandstone, light grey, some small pebbles, stick		R2	
Box 9										
	0.62	1.35	1.53	88			- with occasional sand granules, light grey, trace plant debris, coal blebs, stick and broken stick		R3	.495
33.53										
	1.53	1.53	1.52	100			- as above, stick, numerous sand granules to 5 mm and small pebble lenses		R3	1.39/
35.05							numerous volcanic minerals at base			
	0.32						- grey, as above, with numerous volcanic rock fragments (green, angular, to 30 mm) increasing to base		R3	1.20/
	0.28						VOLCANICS - highly brecciated and weathered green minerals, red weathering, broken stick			
Box 10										
	0.86	1.46	1.53	95			- as above, broken stick		R4	.54/
36.58										
	0.20						- as above, broken		R4	
	0.92						- as above, broken stick			

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASURED FROM CORE AXIS)

HOLE No: ZZ-1 SHEET No: 8

DATE BEGUN: AUGUST 14, 1979 DEPTH: 42.67 m BEARING: N 135°E U.T.M.

DATE FINISHED: AUGUST 16, 1979 ELEV. COLLAR: 860.40 TOTAL DEPTH: 41.2 m COAL LICENSE: ZYMOETZ

LAT.: HOLE ANGLE: -60° LOGGED BY: P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
	0.40	1.52	1.52	100			VOLCANICS - green, fresh, broken			
38.10										
	0.08						- as above, broken			
Box 11										
	0.40						VOLCANICS - green, breccia, broken stick		R4	.80/
	0.93	1.41	1.52	93			- green, stick		R5	
39.62										
	0.13						- as above			
	1.35						VOLCANICS - purple tinge, numerous calcite filled fractures, stick		R5	1.50/
Box 12										
	0.1	1.58	1.53	103			- as above, broken stick		R5	1.30/
41.15										
	1.45						- as above, stick			
42.67							TD			

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASU FROM CORE AXIS)

HOLE No: DDH-ZZ -2 SHEET No: 1

DATE BEGUN: AUGUST 17, 1979 DEPTH: 169.16 BEARING: N 90°E U.T.M. 6075659.3 N/580520.8 E

DATE FINISHED: AUGUST 21, 1979 ELEV. COLLAR: 843.26 TOTAL DEPTH: 169.2 COAL LICENSE: ZYMOETZ

LAT.: HOLE ANGLE: -90° LOGGED BY: G.SLOAN/P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE	JOINTING	HARDNESS	FRACT FREQ
Box 1										
	0.08						MUD		S1	
	0.11						SHALE - medium to dark grey, badly weathered, possibly broken but reshaped by core barrel, broken stick		S2	
	0.03						SILTSTONE - medium grey, badly weathered, broken stick		S5	
	0.14						SHALE - as above, not broken or reshaped, broken stick		S2	
	0.05						SANDSTONE - fine, light grey, badly weathered, broken stick		S4	
	0.10						SHALE - as above, broken stick		S2	
	0.06						SANDSTONE - as above, broken stick		S4	
	0.05						SHALE - silty, as above, broken stick		S3	
	0.25						- medium grey, badly weathered, broken stick		S3	
	0.14						- as above, broken stick		S1	
	0.20	1.21					- as above, broken to broken stick, trace plant debris		S4	.337
9.45										
	0.28						- medium grey, badly weathered, trace plant debris, broken		S2	
	0.51						- as above, broken stick		S3	
	0.62						- as above, broken to broken stick		S3	
Box 2										
	0.20	1.61	1.52	106			- as above, broken to broken stick		S3	1.52
10.97										
	0.37						- as above, broken		S4	
	0.02						- dark grey, carbonaceous, broken		S3	
	0.19						- medium grey, trace plant debris, stick		S3	
	0.19						- dark grey, broken		S3	
	0.065						- carbonaceous, dark grey, coaly in part, plant debris throughout		S3	
	0.16						- medium grey, trace plant debris, broken stick		S3	
	0.04						SILTSTONE - medium grey, broken		S4	
	0.26						SHALE - medium grey, broken stick		S5	

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASURED FROM CORE AXIS)

HOLE No: DDH-ZZ-2 SHEET No: 2

DATE BEGUN: AUGUST 17, 1979 DEPTH: 169.16 BEARING: N 90°E U.T.M.

DATE FINISHED: AUGUST 21, 1979 ELEV. COLLAR: 843.26 TOTAL DEPTH: 169.2 COAL LICENSE: ZYMOETZ

LAT.: HOLE ANGLE: -90° LOGGED BY: G.SLOAN/P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ
	0.05						SILTSTONE - grading to very fine grained, sandstone at base, light grey, broken stick		R3	
	0.01						SANDSTONE - very fine grained, light grey, broken		R3	0
	0.08	1.435	1.53	94			- medium, light grey, trace plant debris, broken stick		R5	19 / 1.53 12
12.5										
	0.01						- as above, stick		R5	
	0.05						- very fine grained, light grey, stick		R5	.15
	0.07						- coarse, light grey, stick		R5	
	0.02						SILTSTONE - light grey, stick		R2	
	0.09						SHALE - medium grey, broken stick, trace plant debris		R2	
	0.03						SANDSTONE - fine, light grey, plant debris throughout, calcite along fracture		R2	
	0.09						SHALE - medium to dark grey, minor plant debris throughout broken stick		R3	
	0.18						- as above, broken stick		R1	
	0.08						- as above, broken stick		R3	
	0.06						- as above, broken stick		R1	
	0.17						- as above, two coal stringers (less than or equal to .005 m) near top, broken stick		R1	
	0.015						- carbonaceous and coaly, dark grey, sheared and slicked, broken stick		S3	
	0.08						SANDSTONE - coarse, light grey, broken stick		R4	
Box 3										
	0.07						- as above, broken stick		R5	
	0.08	1.095	0.91	120			SHALE - medium grey, appears to have been broken and then reshaped by core barrel, broken to broken stick		S2	.15 / .91 16
13.41										
	0.18						- as above, broken, carbonaceous at top		S3	
	0.12						- medium grey, broken stick		R2	
	0.02						SILTSTONE - light grey, broken stick		R3	

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASUR FROM CORE AXIS)

HOLE No: DDH-ZZ-2 SHEET No: 3

DATE BEGUN: AUGUST 17, 1979 DEPTH: 169.16 BEARING: N 90°E U.T.M.

DATE FINISHED: AUGUST 21, 1979 ELEV. COLLAR: 843.26 TOTAL DEPTH: 169.2 COAL LICENSE: ZYMOETZ

LAT.: HOLE ANGLE: -90° LOGGED BY: G.SLOAN/P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.	
	0.05						SANDSTONE - very fine grained, light grey, carbonaceous and coaly streaks with plant debris, broken stick		R3		
	0.06						- medium, light grey, carbonaceous and coaly streaks and stringers with plant debris, broken stick		R3		
	0.30						- medium, light grey, stick		R5		
	0.20						- as above, with many pebbly conglomerate layers carbonaceous and coal stringers (less than .003 m), stick		R4		
	0.17						- pebbly, light grey, few carbonaceous wisps, stick		R5		
	0.57	1.67	1.52	110			CONGLOMERATE - few carbonaceous sandstone lenses, stick		R4	1.03 / 1.50	68
14.93											
	0.83						- as above, stick, pebbles less than or equal to .015 m		R4		
Box 4											
	0.12						SANDSTONE - coarse, pebbly, light grey, trace coaly plant debris		R4		
	0.02					82	- fine, carbonaceous and coaly streaks, broken stick		R3		
	0.07	1.04	1.68	62			CONGLOMERATE -light grey, broken stick			.87 / 1.68	52
16.61											
	1.08						-light grey, pebbles (less than or equal to .02 m), stick		R4		
	0.18						SANDSTONE - fine, light grey, coaly wisps throughout, broken stick		R2		
	0.015						- medium, light grey, broken stick		R2		
	0.09						SHALE - medium to dark grey, carbonaceous and coaly plant debris throughout, broken		S4		
	0.02						SILTSTONE - medium grey, carbonaceous and coaly streaks, broken		S5		

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASURED FROM CORE AXIS)

HOLE No: DDH-ZZ-2 SHEET No: 4

DATE BEGUN: AUGUST 17, 1979 DEPTH: 169.16 BEARING: N 90°E U.T.M.

DATE FINISHED: AUGUST 21, 1979 ELEV. COLLAR: 843.26 TOTAL DEPTH: 169.2 COAL LICENSE: ZYMOETZ

LAT : HOLE ANGLE: -90° LOGGED BY: G.SLOAN/P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.	
	0.11						SANDSTONE - fine, light grey, carbonaceous streaks throughout, broken		R2		
	0.025						SHALE - black, carbonaceous, thin (.002 m) coal band, slicked with calcite alongside, broken	slick-50° calcite	R3		
	0.08						- dark grey, carbonaceous and coaly plant debris in streaks throughout, some minor interbedded light grey, fine sandstone, slicks, broken	2xslicks-90°	R1		
	0.10	1.70	1.68	101			- dark grey, badly sheared and slicked, carbonaceous, broken	slick-78° numerous @85°	S1	.80 / 1.68	48
18.29											
	0.06						- as above, broken		S1		
	0.44						- medium grey, carbonaceous and coaly plant debris throughout, broken		S3		
Box 5											
	0.25						- as above, broken stick to broken		S3		
	0.50						- as above, grading to siltstone at base, broken stick		R2		
	0.29	1.54	1.52	101			SILTSTONE - medium grey, minor carbonaceous and coaly plant debris, broken stick		R3	.11 / 1.50	7
19.81											
	0.29						- as above, stick		R3		
	0.055						SHALE - medium grey, carbonaceous and coaly plant debris and stringers throughout, broken stick		R2		
	0.30						SILTSTONE - very fine grained, interbedded, light to medium grey, carbonaceous and coaly plant debris throughout, stick		R2		
	0.70	1.345	1.53	88			CONGLOMERATE - light grey, pebbles less than or equal to .025 m, stick		R4	.91 / 1.53	59
21.34											
	0.34						- light grey, pebbles less than or equal to .055 m, stick		R4	.35	
Box 6											

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASURED FROM CORE AXIS)

HOLE No: DDH-ZZ-2 SHEET No: 5

DATE BEGUN: AUGUST 17, 1979 DEPTH: 169.16 BEARING: N 90°E U.T.M.

DATE FINISHED: AUGUST 21, 1979 ELEV. COLLAR: 843.26 TOTAL DEPTH: 169.2 COAL LICENSE: ZYMOETZ

LAT.: HOLE ANGLE: -90° LOGGED BY: G.SLOAN/P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ	
Box 6											
	0.53						CONGLOMERATE - as above, fining at bottom, stick		R5	1.15	
	0.16						SANDSTONE - coarse grading to fine at bottom, coaly wisps, stick		R5		
	0.55	1.58	1.52	104			CONGLOMERATE - as above, stick		R4	1.5 / 1.52	99
2.86											
	0.14						- as above, stick		R4		
	0.06						SANDSTONE - light grey, coarse, broken stick		R5		
	0.43						CONGLOMERATE - light grey matrix, volcanic pebbles (less than or equal to .015 m), stick		R4		
	0.20						SHALE - light to medium grey, with shale interclasts, pebble lenses, carbonaceous wisps at top, stick		R3		
	0.28						CONGLOMERATE - as above, stick		R4		
	0.06						SANDSTONE - SHALE, interbedded, sandstone is fine to coarse, pebbly, light grey: Shale is dark grey, carbonaceous and coaly, broken stick		R3		
	0.03	1.20	1.52	79			SHALE - medium grey, carbonaceous, slightly sheared with .005 m coal at base, broken		S1	1.03 / 1.52	68
24.38											
	0.22						- light to medium grey, minor plant debris, broken to broken stick		S2	.11	
Box 7											
	0.29						- medium grey, broken stick		R3	.82/	
	0.035						SHALE AND SILTSTONE - finely interlaminated, grey, broken stick		R3		
	0.26						SANDSTONE - medium grained, some carbonaceous bands and coaly material, pebbly at base, stick		R4		
	0.25						- medium grained matrix with abundant volcanic granules and pebbles to 10 mm, broken stick		R4		
	0.30					70-75°	CONGLOMERATE - volcanic fragments to 20 mm, medium sandstone matrix, coaly wisps and sandstone laminations				

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASU FROM CORE AXIS)

HOLE No: DDH-22-2 SHEET No: 6

DATE BEGUN: AUGUST 17, 1979 DEPTH: 169.16 BEARING: N90°E U.T.M.

DATE FINISHED: AUGUST 21, 1979 ELEV. COLLAR: 843.26 TOTAL DEPTH: 169.2 COAL LICENSE: ZYMOETZ

LAT : HOLE ANGLE: -90° LOGGED BY: G.SLOAN/P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
	0.16	1.515	1.53	99			SANDSTONE - medium, carbonaceous laminations at base, broken stick			
25.91										
	0.43					80-85°	- medium, small shale interbeds, numerous carbonaceous bands and coaly wisps, broken stick		R4	.85/
	0.18						SHALE - medium grey, broken stick		R3	
	0.23						SANDSTONE - medium, shale interbeds, broken stick		R4	
	0.44						SHALE - medium grey, sandy lenses, broken stick, carbonaceous material along bedding		R3	
	0.20	1.48	1.52	97			SILTSTONE AND SHALE - with some sandstone lenses and carbonaceous partings, broken stick		R3	
Box 8										
27.43										
	0.76						- as above			.34/
	0.45						SANDSTONE - medium and coarse, interbedded shale			
	0.17	1.38	1.52	91			SHALE - grey, silty at top, broken			
28.96										
	1.39					82°	SILTSTONE AND SHALE - with sandstone interbedded, carbonaceous partings and coaly wisps		R3-R4	.70/
Box 9										
	0.13	1.52	1.53	99			SHALE - grey, broken		R3	.12/
30.48										
	0.85						SHALE AND SILTSTONE - interbedded, coaly wisps, broken stick		R3	.92/
	0.12						SANDSTONE - lense, coarse, coaly material			
	0.21					85°	- fine, with interlaminated shale, siltstone and carbonaceous partings		R3	
	0.26	1.44	1.52	95			SILTSTONE AND SHALE - with carbonaceous bands			
32.0										
	0.45					86°	SHALE AND SILTSTONE - interlaminated with sandstone lenses, and carbonaceous partings, broken stick		R3	1.27/

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASURED FROM CORE AXIS)

HOLE No: DDH-ZZ-2 SHEET No: 7
DATE BEGUN: AUGUST 17, 1979 DEPTH: 169.16 BEARING: N90°E U.T.M.
DATE FINISHED: AUGUST 21, 1979 ELEV. COLLAR: 843.26 TOTAL DEPTH: 169.2 COAL LICENSE: ZYMOETZ
LAT.: HOLE ANGLE: -90° LOGGED BY: G.SLOAN/P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
	0.68						SANDSTONE AND SILTSTONE - interlaminated, with shale, carbonaceous partings, stick		R4	
	0.07						SANDSTONE - coarse, light grey, stick			
Box 10										
	0.26	1.46	1.53	95			- as above			
33.53										
	0.13						CONGLOMERATE - granules with angular interclasts of siltstone, broken stick			1.29/
	0.86					85°	SANDSTONE - fine with lenses of medium to coarse siltstone lenses at base and top, carbonaceous partings, broken stick		R4	
	0.08						SHALE - grey, broken			
	0.52	1.59	1.52	105			SILTSTONE AND SANDSTONE - fine interlaminated, grey, broken stick			
35.05										
	0.84					85°	SILTSTONE/SANDSTONE FINE/SHALE - interlaminated grey, broken stick		R4	.42/
Box 11										
	0.59	1.43	1.53	93			- as above, broken stick			
36.58										
	1.18						SILTSTONE/SANDSTONE FINE - with some shale, broken stick		R4	1.19/
	0.47	1.65	1.52	109			- as above, with two pebble lenses and some coaly wisps, broken stick			
38.1										
	0.25						SILTSTONE/SANDSTONE FINE - grey, broken stick		R4	1.47/
	0.33						PEBBLE CONGLOMERATE - pebbles to 2 cm, volcanic and sedimentary, broken stick		R5	
Box 12										
	1.11	1.69	1.52	111			- as above, stick		R5	
39.62										

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASUR' FROM CORE AXIS)

HOLE No: DDH-ZZ-2 SHEET No: 8

DATE BEGUN: AUGUST 17,1979 DEPTH: 169.16 BEARING: N90°E U.T.M.

DATE FINISHED: AUGUST 21,1979 ELEV. COLLAR: 843.26 TOTAL DEPTH: 169.2 COAL LICENSE: ZYMOETZ

LAT.: HOLE ANGLE: -90° LOGGED BY: G.SLOAN/P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ
39.62										
	1.05						PEBBLE CONGLOMERATE - as above, stick		R5	1.21/
	0.35	1.40	1.53	92			SANDSTONE - medium grain, light grey, massive stick		R5	
41.15										
	0.12						- as above, stick			1.26
	0.20					68°	- medium grain, light grey with interbeds of		R4	
							siltstone, broken stick			
Box 13									R4	
	0.12						- as above		R5	
	0.89	1.33	1.52	88			- medium, light grey with small coarse sandstone		R5	
							lenses, stick			
42.67										
	0.61						- as above, stick		R5	1.33/
	0.31						- as above, with silty beds near top			
	0.43						SILTSTONE - medium grey		R3	
	0.30	1.65	1.53	108			SANDSTONE - medium, light grey, massive		R5	
44.20										
	0.17						- as above, stick		R5	1.43/
Box 14										
	0.68						- as above, stick		R5	
	0.61	1.46	1.52	96			- medium to coarse with abundant volcanic pebbles		R5	
							to 10 mm, stick			
45.72										
	1.44	1.44	1.52	95			- medium to coarse with abundant volcanic		R5	1.33/
							pebbles to 10 mm, stick, small section in			
							middle with carbonaceous partings			
Box 15										
47.24										
	1.44	1.44	1.52	95			PEBBLE CONGLOMERATE - with sandstone lenses, pebbles to		R5	1.27/
							8 mm, stick			
48.76										

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASURED FROM CORE AXIS)

HOLE No: DDH-ZZ-2 SHEET No: 9

DATE BEGUN: AUGUST 17, 1979 DEPTH: 169.16 BEARING: N90°E U.T.M.

DATE FINISHED: AUGUST 21, 1979 ELEV. COLLAR: 843.26 TOTAL DEPTH: 169.2 COAL LICENSE: ZYMOETZ

LAT.: HOLE ANGLE: -90° LOGGED BY: G.SLOAN/P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE	JOINTING	HARDNESS	FRACT. FREQ.
48.76										
	0.38						PEBBLE CONGLOMERATE - as above, with some carbonaceous partings, stick		R5	1.18/
	0.95	1.33	1.53	87		65°	SANDSTONE - medium, light grey, with pebble lenses and carbonaceous partings, stick		R4	
Box 16										
							- medium to coarse, massive		R5	
50.29										
	0.89						- as above, with some pebble lenses, stick		R5	1.19
	0.28						- as above, broken			
	0.25						- as above, stick			
	0.06	1.48	1.53	97			- medium to coarse, with interlaminated siltstone and carbonaceous partings, stick and broken stick		R4-R5	
51.82										
	1.18					60°	- as above			.91/
Box 17										
	0.20	1.38	1.52	91			- as above			
53.34										
	0.74					65°	- as above			1.13/
	0.75	1.49	1.52	98			- medium grain, light grey, carbonaceous partings and some siltstone laminae, broken stick		R4	
54.86										
	0.19						- as above		R4	.5/
	0.89						- medium and fine, light grey, carbonaceous partings and some siltstone laminae, broken stick			
Box 18										
	0.17						- as above			
	0.34	1.59	1.53	104			- medium to coarse, massive, broken stick		R5	
56.39										

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASUR FROM CORE AXIS)

HOLE No: DDH-ZZ-2 SHEET No: 10
DATE BEGUN: AUGUST 17, 1979 DEPTH: 169.16 BEARING: N90°E U.T.M.
DATE FINISHED: AUGUST 21, 1979 ELEV. COLLAR: 843.26 TOTAL DEPTH: 169.2 COAL LICENSE: ZYMOETZ
LAT : HOLE ANGLE: -90° LOGGED BY: G.SLOAN/P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ
56.39										
	0.16					75°	SANDSTONE - as above, broken stick			.72/
	1.16	1.32	1.52	87			- fine to medium, carbonaceous partings, some coarse sandstone laminae, broken stick		R3-4	
57.91										
	0.80						- coarse with pebble lenses (1.5 mm pebbles) stick		R5	1.31/
Box 19										
	0.35						- as above, stick			
	0.11	1.26	1.53	82			- coarse to fine, interlaminated		R4	
59.44										
	1.03						- as above, with two pebble beds, stick and broken stick			1.60/
	0.71	1.74	1.52	114			- medium and fine with abundant carbonaceous partings and siltstone laminae, broken stick		R4	
60.96										
	0.37						- as above, broken stick			1.25/
	0.18					70°	SILTSTONE/SANDSTONE - fine interlaminated		R3	
Box 20							- as above, broken stick		R3	
	0.48						SANDSTONE - medium grain, with interlaminated siltstone		R4	
	0.16	1.19	1.52	78		80°	SILTSTONE - fine sandstone laminae		R3	
62.48										
	0.40						SILTSTONE/SHALE - dark grey to black, with some fine sandstone laminae, broken stick		R3	1.13/
	0.98	1.38	1.52	91			SHALE - black, silty in places		R3	
64.0										
	0.53						- black		R3	
Box 21										
	1.06	1.59	1.22	130			- black, broken stick			
65.22										

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASUR' ROM CORE AXIS)

HOLE No: DDH-ZZ-2 SHEET No: 11
DATE BEGUN: AUGUST 17, 1979 DEPTH: 169.16 BEARING: N90°E U.T.M.
DATE FINISHED: AUGUST 21, 1979 ELEV. COLLAR: 843.26 TOTAL DEPTH: 169.2 COAL LICENSE: ZYMOETZ
LAT.: HOLE ANGLE: -90° LOGGED BY: G.SLOAN/P. GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
65.22										
	0.29						SANDSTONE - medium grain, with granule lenses, stick		R5	1.25/
	0.22					75°	SANDSTONE/SILTSTONE/SHALE - interlaminated with carbona-		R4	
							ceous partings			
	1.10	1.61	1.53	105			SANDSTONE - medium with granule lenses, numerous carbona-		R4	
							ceous partings and siltstone laminations, some			
							coal stringers			
66.75										
	0.09						- as above, broken stick			1.11/
Box 22										
	0.09						- as above, broken			
	1.56	1.74	1.52	114		71°	- fine to medium and siltstone interbedded,		R3	
							stick and broken stick			
68.27										
	1.15						SILTSTONE - dark grey with sandstone lenses		R3	.36/
Box 23										
	0.38	1.53	1.68	91		70°	- dark grey with small sandstone laminations,		R4	
							broken stick			
69.95										
	0.57						- as above, broken stick			.60/
	1.04	1.61	1.68	96			SANDSTONE - coarse grained, siltstone laminae, top 6 cm		R5	
							and scattered intermittently, broken stick			
71.63										
	0.21						PEBBLE CONGLOMERATE - coarse sandstone at base		R5	.79/
	0.52						SILTSTONE/SANDSTONE - interbedded with carbonaceous and		R4	
							coal partings			
Box 24										
	0.33					68°	- as above			
	0.25						SILTSTONE - grey, sandstone lenses at top and grading to			
							shale at base, broken stick, carbonaceous			
							partings			

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASUR ROM CORE AXIS)

HOLE No: DDH-ZZ-2 SHEET No: 12

DATE BEGUN: AUGUST 17, 1979 DEPTH: 169.16 BEARING: N90°E U.T.M.

DATE FINISHED: AUGUST 21, 1979 ELEV. COLLAR: 843.26 TOTAL DEPTH: 169.2 COAL LICENSE: ZYMOETZ

LAT.: HOLE ANGLE: -90° LOGGED BY: G.SLOAN/P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
	0.33	1.64	1.52	108			SHALE - dark grey to black, silty at top, broken, highly sheared		R2	
					73.00					
73.15										
	0.86						- as above, highly broken		R2	0
					FAULT					
	0.60	1.46	1.52	96	ZONE	70°	SANDSTONE AND SILTSTONE - interbedded, carbonaceous partings, numerous slicks, highly broken to broken		R3	
74.67										
Box 25										0
	0.40						- as above, broken			
	0.36						SHALE - black, highly sheared, highly broken			0
	0.49				FAULT		SANDSTONE - with siltstone laminations, fine to medium, sheared, broken		R3	
					ZONE					
	0.04	1.29	1.53	84			SHALE - black, highly sheared, broken		R2	
76.20										
	0.79						- as above, silty in places, broken		R2	.40/
	0.38						SANDSTONE/SHALE/SILTSTONE - interlaminated, sheared, coal and carbonaceous laminae, broken			
Box 26										
	0.42	1.59	1.52	105			SANDSTONE - very fine to fine, with siltstone carbonaceous bands, numerous sticks parallel to bedding, broken stick, medium grey with dark grey		R3-R4	
77.72										
	1.36	1.36	1.53	89		52°	- as above, with some coal stringers, broken stick			.59/
79.25										
	0.76						SHALE - dark grey, silty in places, numerous slicks, some sandy lenses, broken to broken stick			0
Box 27										

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASUR 'ROM CORE AXIS)

HOLE No: DDH-ZZ-2 SHEET No: 13

DATE BEGUN: AUGUST 17, 1979 DEPTH: 169.16 BEARING: N90°E U.T.M.

DATE FINISHED: AUGUST 21, 1979 ELEV. COLLAR: 843.26 TOTAL DEPTH: 169.2 COAL LICENSE: ZYMOETZ

LAT.: HOLE ANGLE: -90° LOGGED BY: G.SLOAN/P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
Box 27										
	0.50						SHALE - as above, grading downward to siltstone, broken to broken stick		R3	
	0.21						SANDSTONE - fine to medium, coal and carbonaceous stringers, broken		R3-R4	
	0.20	1.67	1.52	110			SHALE - dark grey, slightly silty, highly slicked, broken			
80.77										
	0.20						- as above, broken			.61/
	0.67						SANDSTONE - coarse with abundant interclasts and some pebbles, abundant slicks of various oreientations and some calcite filled fractures		R4	
	0.20						SILTSTONE - dark grey, grading downward to shale, highly slicked, broken		R3	
	0.28	1.35	1.53	88			SHALE - black, slicked, silty, broken		R3	
82.3										
	0.34					70°	- as above, broken, small pebble lenses at base		R3	0
Box 28										
	0.14						- as above, broken, silty to base		R3	
	0.33						SANDSTONE - fine to medium and siltstone, medium grey, broken			
	0.05						MUDSTONE - stick		S1	
	0.60	1.46	1.52	96			SHALE - black, broken		R2	
83.82										0
	1.45	1.45	1.52	95			- black, broken stick		R2	
85.34										
	0.04						- as above, broken		R2	0
Box 29										
	1.34	1.38	1.53	90			- as above, broken stick			
86.87										
	1.47						- as above, broken stick		R2	0
Box 30										

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASUR FROM CORE AXIS)

HOLE No: DDH-ZZ-2 SHEET No: 14

DATE BEGUN: AUGUST 17,1979 DEPTH: 169.16 BEARING: N90°E U.T.M.

DATE FINISHED: AUGUST 21,1979 ELEV. COLLAR: 843.26 TOTAL DEPTH: 169.2 COAL LICENSE: ZYMOETZ

LAT.: HOLE ANGLE: -90 LOGGED BY: G.SLOAN/P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
Box 30										
	0.15	1.62	1.52	107			SHALE - dark grey, slightly silty, broken stick		R3	
88.39										
	1.60	1.60	1.53	105			SILTSTONE AND SANDSTONE - fine interlaminated, medium grey, stick and broken stick			1.50/
89.92										
	1.02						SILTSTONE - dark grey, sandy lenses at top, stick		R3	
Box 31										
	0.62	1.64	1.52	108			- dark grey, stick		R3	
91.44										
	1.25	1.25	1.52	82			- as above, stick, top .03 slicked and broken calcite filled fracture in middle (45°), very fine sandstone laminaie throughout			1.20/
92.96										
	0.80						- dark grey, stick and broken stick		R3	1.22/
Box 32										
	0.56	1.36	1.53	89			- dark grey with small very fine sandstone laminae, broken stick		R3	
94.49										
	1.52	1.52	1.52	100			- dark grey and shale, broken stick		R3	1.28/
96.01										
	0.62						SHALE - dark grey and black, some siltstone, broken stick, broken at top		R2	.59/
Box 33										
	0.48						- as above, broken stick		R2	
	0.15						SILTSTONE - dark grey		R3	
	0.35	1.60	1.53	105			SHALE - black, broken		R2	
97.54										
	1.50						- as above, broken stick and broken		R2	0
Box 34										0
	0.15	1.65	1.52	109			- black, broken stick		R2	
99.06										

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASUR 'ROM CORE AXIS)

HOLE No: DDH-ZZ-2 SHEET No: 15

DATE BEGUN: AUGUST 17,1979 DEPTH: 169.16 BEARING: N90°E U.T.M.

DATE FINISHED: AUGUST 21,1979 ELEV. COLLAR: 843.26 TOTAL DEPTH: 169.2 COAL LICENSE: ZYMOETZ

LAT.: HOLE ANGLE: -90° LOGGED BY: G.SLOAN/P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
99.06										
	1.60	1.60	1.52	105		80°	SHALE -black, broken to stick		R3	.10 1.52
100.58										
	0.25						-as above			
	0.06						-as above, faulted with calcite and mudstone (S1	45°-	R2	0
							gouge) along fault, broken rubble	calcite		
	0.48						-black, broken stick		R2	
Box 35										
	0.68	1.47	1.52	97		72°	-as above, broken, few slicks with calcite		R2	
102.1										
	0.54						-as above, stick	0°-calcite	R2	
	0.10						- as above, sheared and slicked, broken			
	0.75	1.39	1.52	91			-black, slicked, broken stick	6x40°-	R2	.65
								calcite		
103.63										
	0.48						-as above, broken to broken stick, mudstone on top	2x0°-	R2	
							(Gouge?)	calcite		
Box 36								1x60°-		
								calcite		
	1.06					90°	-black, slightly silty, broken to stick	1x0°	R2	
								calcite		
								1x20°		
								calcite		
	0.16	1.70	1.53	111			SILTSTONE - medium to dark grey,, shaly, stick	1x20°	R5	.40
								calcite		
105.16										
	1.41	1.41	1.52	93		83°	SHALE - black, slightly silty, minor calcite filled	1x30°	R3	
							fracture zone at 106.06 to 106.16, stick to	calcite		
							broken stick	4x60°		.665
								calcite		
106.68										

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASUR FROM CORE AXIS)

HOLE No: DDH-ZZ-2 SHEET No: 16

DATE BEGUN: AUGUST 17,1979 DEPTH: 169.16 BEARING: N90°E U.T.M.

DATE FINISHED: AUGUST 21,1979 ELEV. COLLAR: 843.26 TOTAL DEPTH: 169.2 COAL LICENSE: ZYMOETZ

LAT : HOLE ANGLE: -90° LOGGED BY: G.SLOAN/P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
106.68										
Box 37										
	1.60	1.60	1.52	105		79°	SHALE - black, broken to stick	1x20°	R3	.30
								calcite		
108.2								1x60°		
								calcite		
	0.22						- black, stick	1x40°	R3	.91
								calcite		
	0.02						- black, dominant calcite filled fracture, broken	1x40°	R3	
							stick	calcite		
	0.70					85°	- black, stick			
Box 38										
	0.41	1.35	1.53	88		84°	- black, broken stick to stick	1x90°	R2	
								calcite		
109.73										
	1.47					85°	- black, broken to stick	1x5°	R3	.77
								calcite		
								1x47°		
								calcite		
	0.23	1.70	1.52	112			SANDSTONE - coarse, light green, stick		R5	
111.25										
	0.35						- as above		R5	
	0.16						SILTSTONE - dark grey-green, silty, pebbles (few), stick		R3	.54
	0.06						VOLCANICS		R2	
Box 39										
	0.90	1.47	1.53	96			VOLCANIC BRECCIA - medium to dark green with some white,		R3-R4	
							some red, calcite along numerous fract-			
							ures, looks conglomeritic, fine matrix,			
							irregular pebble and cobble size up to			
							.1 m, stick			
112.78										

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASURED FROM CORE AXIS)

HOLE No: DDH-ZZ-2 SHEET No: 17

DATE BEGUN: AUGUST 17, 1979 DEPTH: 169.16 BEARING: N90°E U.T.M.

DATE FINISHED: AUGUST 21,1979 ELEV. COLLAR: 843.26 TOTAL DEPTH: 169.2 COAL LICENSE: ZYMOETZ

LAT : HOLE ANGLE: -90° LOGGED BY: G.SLOAN/P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
112.78										
	1.65	1.65	1.52	109			VOLCANIC BRECCIA - as above, stick		R3-R4	
114.3										
	0.15						- as above, stick		R3-R4	
Box 40										
	1.35	1.50	1.52	99			- as above, stick			
115.82										
	1.46	1.46	1.53	95			- as above, stick			
Box 41										
117.35										
	1.56	1.56	1.52	103			- as above, stick			
118.87										
	1.13						- as above, stick			
Box 42										
	0.43	1.56	1.53	102			- as above, stick			
120.40										
	0.21						- as above, broken		R3-R4	
	1.11						- as above, stick			
	0.22	1.54	1.52	101			- as above, rubble, red stained			
121.92										
	0.77						- as above, stick			
Box 43										
	0.80	1.57	1.52	103			- as above, broken stick to stick		R3-R4	
123.44										
	1.53	1.53	1.53	100			- as above, stick			
124.97										
	0.32						- as above, stick		R3-R4	
Box 44										
	0.94	1.26	1.52	83			- as above, stick			
126.49										
	1.51	1.51	1.52	99			- as above, stick to broken stick			
128.01										

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASUP FROM CORE AXIS)

HOLE No: DDH-ZZ-2 SHEET No: 18

DATE BEGUN: AUGUST 17, 1979 DEPTH: 169.16 BEARING: N90°E U.T.M.

DATE FINISHED: AUGUST 21, 1979 ELEV. COLLAR: 843.26 TOTAL DEPTH: 169.2 COAL LICENSE: ZYMOETZ

LAT.: HOLE ANGLE: -90° LOGGED BY: G.SLOAN/P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
128.0										
	0.09						VOLCANCI BRECCIA - as above, broken stick			
Box 45										
	1.49	1.58	1.53	103			- as above, stick to broken stick			
129.54										
	1.10						- as above, stick			
Box 46										
	0.39	1.49	1.52	98			- as above, broken stick to stick			
131.06										
	1.52	1.52	1.53	99			- as above, broken to stick			
132.59										
	0.61						- as above, stick			
Box 47										
	0.86	1.47	1.52	97			- as above, stick			
134.11										
	1.60	1.60	1.53	105			- as above, broken to stick		R3-R4	
135.64										
	0.13						- as above, broken stick			
Box 48										
	1.14	1.27	1.52	84			- as above, broken stick to stick			
137.16										
	1.59	1.59	1.52	105			- as above, broken stick to stick			
Box 49										
138.68										
	1.26	1.26	1.53	82			- as above, stick			
140.21										
	1.37						- as above, stick			
Box 50										
	0.13	1.50	1.57	99			- as above, broken stick			
141.73										
	1.53	1.53	1.53	100			- as above, stick			
143.26										

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASUR' 'ROM CORE AXIS)

HOLE No: DDH-ZZ-2 SHEET No: 19

DATE BEGUN: AUGUST 17,1979 DEPTH: 169.16 BEARING: N90°E U.T.M.

DATE FINISHED: AUGUST 21, 1979 ELEV. COLLAR: 843.26 TOTAL DEPTH: 169.2 COAL LICENSE: ZYMOEZ

LAT.: HOLE ANGLE: -90° LOGGED BY: G.SLOAN/P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
143.26										
	0.90						VOLCANIC BRECCIA - as above, broken to broken stick			
Box 51										
	0.67	1.57	1.52	103			- as above, broken stick to stick			
144.78										
	1.46	1.46	1.52	96			- as above, stick			
146.30										
	0.29	0.29	1.53	19			- as above, stick			
147.83										
	0.19						- as above, broken stick			
Box 52										
	0.62	0.81	1.52	53			- as above, broken			
149.35										
	1.19	1.19	1.52	78			- as above, broken to stick			
150.87										
	0.49						- as above, broken to stick		R3-R4	
Box 53										
	1.10	1.59	1.53	104			- as above, broken to stick			
152.4										
	1.43						- as above, broken to stick			
Box 54										
	0.45	1.88	1.52	124			- as above, broken to stick			
153.92										
	1.30	1.30	1.53	84			- as above, stick			
155.45										
	0.59						- as above, broken to stick			
Box 55										
	0.96	1.55	1.52	102			- as above, stick			
156.97										
	1.62	1.62	1.52	107			- as above, stick			
158.49										

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASUR ROM CORE AXIS)

HOLE No: DDH-ZZ-2 SHEET No: 20

DATE BEGUN: AUGUST 17, 1979 DEPTH: 169.16 BEARING: N90°E U.T.M.

DATE FINISHED: AUGUST 21, 1979 ELEV. COLLAR: 843.26 TOTAL DEPTH: 169.2 COAL LICENSE: ZYMOETZ

LAT.: HOLE ANGLE: -90° LOGGED BY: G.SLOAN/P.GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
158.49										
	0.08						VOLCANIC BRECCIA - as above, broken stick			
Box 56										
	1.48	1.56	1.53	102			- as above, very granular in part, broken			
							to stick			
160.02										
	1.15						- as above, stick, not granular			
Box 57										
	0.36	1.51	1.52	99			- as above, stick			
161.54										
	1.57	1.57	1.53	103			- as above, stick			
163.07										
	0.72						- as above, stick			
Box 58										
	0.67	1.39	1.52	91			- as above, broken stick to stick			
164.59									R3-R4	
	1.46	1.46	1.52	96			- as above, stick			
166.11										
	0.60						- as above, stick			
Box 59										
	0.89	1.49	1.53	97			- as above, stick			
167.64										
	1.63	1.63	1.52	107			- as above, broken to stick			
169.16							TD			

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASUP FROM CORE AXIS)

HOLE No: D-TH-1 SHEET No: 1

DATE BEGUN: AUGUST 26, 1979 DEPTH: 49.07 m BEARING: - U.T.M. 6020198.4 N/608608.6 E

DATE FINISHED: AUGUST 27, 1979 ELEV. COLLAR: 997.32 TOTAL DEPTH: 49.07 COAL LICENSE: THAUTIL R.

LAT.: HOLE ANGLE: -90° LOGGED BY: P. GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
Box 1										
	0.35	0.35					VOLCANIC BRECCIA - highly broken		R5	0
10.97										
	0.14						- as above, broken			.32/
	0.72	0.86	1.53	56			- as above, broken stick			
12.50										
	0.83						- as above, broken stick			.33/
Box 2										
	0.27						- as above, broken stick			
	0.55	1.65	1.52	109			- as above, highly broken			
14.02										
							- as above, broken stick, some broken			.67/
	1.20	1.20	1.52	80						
15.54										
	0.38						- as above, broken stick, some broken			
Box 3										
	1.12	1.50	1.53	98			- as above, broken to broken stick		R4	.47
17.07										
	0.40						- as above, broken stick		R4	
	0.24						SANDSTONE - very coarse, pebbly, mainly volcanic granules,		R4	
							stick			
	0.56	1.20	1.52	80		47	- medium to coarse, light grey with coaly blebs		R4	.91
							and stringers throughout, grading to			
							conglomerate at base, stick			
18.59										
Box 4										

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASUR ROM CORE AXIS)

HOLE No: D-TH-1 SHEET No: 2

DATE BEGUN: AUGUST 26, 1979 DEPTH: 49.07 m BEARING: - U.T.M.

DATE FINISHED: AUGUST 27, 1979 ELEV. COLLAR: 997.32 TOTAL DEPTH: 49.07 COAL LICENSE: THAUTIL R.

LAT.: HOLE ANGLE: -90° LOGGED BY: P. GILMAR CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
Box 4										
	1.55	1.55	1.53	101			VOLCANIC BRECCIA - broken stick and broken			.53+
20.12										
	0.77						- as above, broken stick			.66/
Box 5										
	0.72	1.49	1.52	98						
21.64										
	1.58	1.58	1.52	104			- as above, broken stick			1.20/
23.16										
	0.29						- as above, broken stick			.85/
Box 6										
	1.26	1.55	1.53	101			- as above, broken stick			
24.69										
	1.43	1.43	1.52	94			- as above, broken stick			.50/
Box 7										
26.21										1.3/
	1.46	1.46	1.53	95			- as above, broken stick			
27.74										
	1.07						- as above, broken stick			.93/
Box 8										
	0.58	1.65	1.52	109			- as above, broken stick			
29.26										1.17/
	1.48	1.48	1.52	97			- as above, broken stick			
30.78										
	0.56						- as above, broken stick			
Box 9										
	1.01	1.57	1.53	103			- as above, broken to broken stick		R4	.65
32.31										
	1.35	1.35	1.52	89			- as above, broken stick to stick		R4	.72
33.83										

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASUR[illegible] FROM CORE AXIS)

HOLE No: D-TH-1 SHEET No: 3

DATE BEGUN: AUGUST 26, 1979 DEPTH: 49.07 m BEARING: - U.T.M.

DATE FINISHED: AUGUST 27, 1979 ELEV. COLLAR: 997.32 TOTAL DEPTH: 49.07 COAL LICENSE: THAUTIL R.

LAT.: HOLE ANGLE: -90° LOGGED BY: G. SLOAN CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
33.83										
	0.09						VOLCANIC BRECCIA - as above, broken			
Box 10										
	1.49	1.58	1.53	103			- as above, broken stick to stick		R4	.74
35.36										
	0.77						- as above, broken to stick		R4	
Box 11										
	0.60	1.37	1.52	90			- as above, broken to stick		R4-R5	.56
36.88										
	1.53	1.53	1.52	101			- as above, broken to stick		R4-R5	.71
38.40										
	0.10						- as above, broken stick		R4-R5	
	0.11						- volcanics, sandy grained with pebbles throughout, stick		S4	
Box 12										
	0.65						- as above, stick	1x45°	S5	
	0.43	1.29	1.53	84			- as above, stick to broken stick		R4-R5	.94
39.93										
	1.39						- as above, broken to stick		R4-R5	.95
Box 13										
	0.15	1.54	1.52	101			- as above, broken		R4-R5	
41.45										
	1.40	1.40	1.53	92			- as above, broken to stick		R4-R5	.87
42.98										
	0.90						- as above, broken stick to stick		R4-R5	
Box 14										
	0.66	1.56	1.52	103			- as above, stick		R4-R5	1.25
44.50										
	1.46	1.46	1.52	96			- as above, stick		R4-R5	1.38
46.02										
	0.60						- as above, stick		R4-R5	
Box 15										

DIAMOND DRILL CORE LOG

(ALL ANGLES MEASU' FROM CORE AXIS)

HOLE No: D-TH-1 SHEET No: 4

DATE BEGUN: AUGUST 26, 1979 DEPTH: 49.07 m BEARING: - U.T.M.

DATE FINISHED: AUGUST 27, 1979 ELEV. COLLAR: 997.32 TOTAL DEPTH: 49.07 COAL LICENSE: THAUTIL R.

LAT.: HOLE ANGLE: -90° LOGGED BY: G. SLOAN CORE SIZE: HQ

MARKER BLOCKS	UNIT THICK.	RECOVD. THICK.	ACTUAL THICK.	% REC.	FINAL TOPS	BEDDING ANGLE	LITHOLOGY, ROCK TYPE, GRAIN SIZE, COLOUR, WEATHERING, GOUGE & SLICKS, BROKEN CORE.	JOINTING	HARDNESS	FRACT. FREQ.
Box 15										
	1.03	1.63	1.53	107			- as above, stick		R4-R5	1.43
47.55										
	1.39	1.39	1.52	91			- as above, stick		R4-R5	.86
49.07							TD			

TW.01

232 ① TK-SMITHERS 7-10-A

ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO.
LSD
SEC
TWP
RGE
W

COMPANY ROKE OIL ENTERPRISES LTD.
WELL B-70-05
LOCATION TESSAS AREA
FIELD UNDESIGNATED
PROVINCE BRITISH COLUMBIA

Run No.	ONE		
Date	8 JUL 1979		
Last Reading	335		
First Reading	16		
Footage Logged	320		
Depth Reached	1336		
Depth Drlr.	1340		
Casing Rules	6		
Casing Depth	1334		
Fluid Type	GEL-CHEM		
Liquid Level	1333		
Max. Temp.	93 DEG		
Operating Time	3.5 HR.		
Truck No.	FL 16		

Recorded By P. HALE Witnessed By HARDY

GENERAL DATA
RUN NO. | DATE | DEPTH DRLR. | DEPTH LOGGER | CASING SHOE | CASING DRLR. | CASING LOGGER | BIT FROM | BIT TO | TYPE FLUID IN HOLE | DENSITY | VISCOSITY | PH | FLUID LOSS | SOURCE OF SAMPLE | RM @ MEAS. TEMP. | RMF @ MEAS. TEMP. | RMC @ MEAS. TEMP. | SOURCE OF RMF & RMC | RM @ BHT | TIME SINCE CIRC. | MAX. REC. TEMP. | EQUIP. LOCATION | RECORDED BY | WITNESSED BY

RECORDS ON THIS TICKET

CALIPER DIAMETER - IN
BULK DENSITY (GRAMS/CC)
DEPTH
GAMMA RAY API

SPONTANEOUS
SHORT NORMAL 16"
LONG NORMAL 64"
LATERAL 18' 8"
SHORT NORMAL
GAMMA RAY API
LONG NORMAL

232 (2) TW-01

TK-SMITHERS 79(3)A

ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO.

COMPANY CROSS WEST RESOURCES LTD.

WELL R-TW-01

LOCATION TUTUYA AREA

FIELD TUTUYA PROPERTY

PROVINCE BRITISH COLUMBIA

Permanent Datum: GROUND LEVEL Elev.

Log Measured from: KELLY BUSHING Above Perm. Datum

Well Depths Measured from: KELLY BUSHING

K.B. C.S.G. G.L.

Other Services: DIR GR-DEN-CAL

LSD SEC TWP RGE W of 6M

Recorded By: ZIELKIE

Witnessed By: BAILEY

Run No.	ONE
Date	9 AUG 79
First Reading	140 M
Last Reading	0
Footage Logged	140
Depth Reached	140.5
Depth Driller	139
Casing Rule	0
Casing Driller	
Fluid Type	WATER
Liquid Level	123.2
Min. Diam.	13 CM
Rm @	
Truck No.	
Operating Time	1.00

EQUIPMENT DATA

GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.	125	LOG TYPE	NEUTRON/NEUTRON
DIAMETER	3.2 CM	TOOL MODEL NO.	125
DETECTOR MODEL NO.		DIAMETER	3.2 CM
TYPE	SCINTILLATION	DETECTOR MODEL NO.	
LENGTH	10 CM	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	2.07 M	LENGTH	15 CM
		SOURCE MODEL NO.	MRC-N-SS-W
GENERAL		SERIAL NO.	171
HOIST TRUCK NO.		SPACING	43 CM
INSTRUMENT TRUCK NO.	FT 94	TYPE	AmBe
TOOL SERIAL NO.	002	STRENGTH	3 CURIES

LOGGING DATA

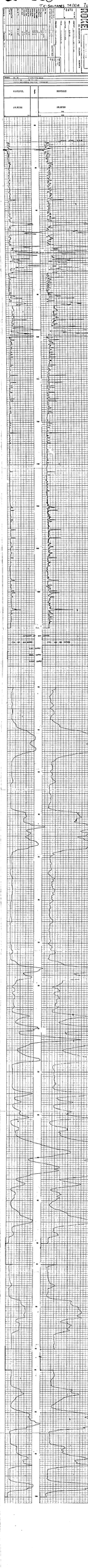
GENERAL				GAMMA RAY				NEUTRON			
RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED M/MIN	T.C. SEC	SENS SETTINGS	ZERO DIV. L OR R	API G. R. UNITS PER LOG DIV.	T. C. SEC	SENS SETTINGS	ZERO DIV. L OR R	API N. UNITS PER LOG DIV.
1	0	122	4	2	100	0	12	3	1000	161	200
	122	140	4	2	100	0	12	3	1000	0	50

REMARKS

GAMMA RAY	DEPTHS	NEUTRON
GAMMA RAY INCREASES →		NEUTRON INCREASES →
API 0 — 12 — 120		API 3400 — 5600 — 7600

232

TC Sentinel 76/10 TSL-02



232 (4)

TK-SMITHERS 79 (3)A TW-02

JKF OIL ENTERPRISES LTD. CALGARY, ALBERTA

COMPANY COMINCO WEST RESOURCES LTD.
WELL R-TH-02
LOCATION TESTA AREA
FIELD TESTA PROPERTY
PROVINCE B.C.S. COLUMBIA
Other Services GEOLOGICAL FDC, DIP
Elev. K.B. D.F. G.L.
Above Perm. Datum
Log Measured from GROUND LEVEL
Drilling Measured from GROUND LEVEL
Permanent Datum
Date 2 AUG 79
Run No. ONE
Depth Driller 237
Depth Logged 237.5
Bottom Logged 237
Top Logged 0
Casing Driller 237
Casing Logger 237.8
Bit Type
Fluid in Hole WATER
Fluid Level 13.72
Max. Temp.
Equipment No. FT 4
Recorded By JEN-ZZ
Witnessed By HANDY

EQUIPMENT DATA

GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.	125	LOG TYPE	NEUTRON/NEUTRON
DIAMETER	3.2 CM	TOOL MODEL NO.	125
DETECTOR MODEL NO.		DIAMETER	3.2 CM
TYPE	SCINTILLATION	DETECTOR MODEL NO.	
LENGTH	10 CM	TYPE	PROPORTIONAL
DISTANCE TO N SOURCE	2.07 M	LENGTH	15 CM
		SOURCE MODEL NO.	MRC-N-SS-W
GENERAL		SERIAL NO.	171
HOIST TRUCK NO.		SPACING	43 CM
INSTRUMENT TRUCK NO.	FT #4	TYPE	AmBe
TOOL SERIAL NO.	002	STRENGTH	3 CURIES

LOGGING DATA

GENERAL				GAMMA RAY				NEUTRON			
RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED M/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	237	4	3	100		12	3	1000		50

REMARKS

GAMMA RAY | DEPTHS | NEUTRON

GAMMA RAY INCREASES → API 12 — 0 — 120

NEUTRON INCREASES → API 50 — 0 — 500 — 1000

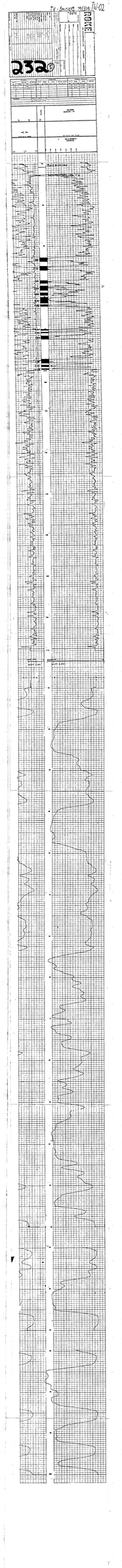
FLUID LEVEL 7.2 M

00 20 40 60 80 100 120 140 160 180 200 220

T.D. 237 M

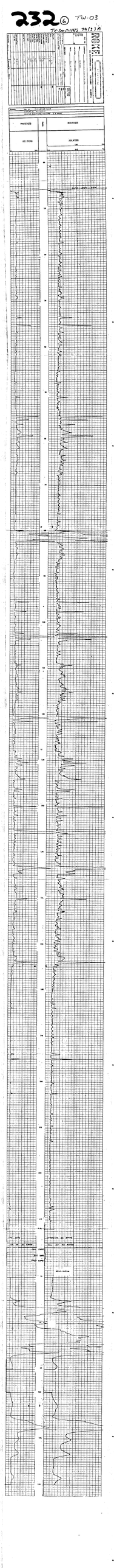
0 100 CPS

0 50



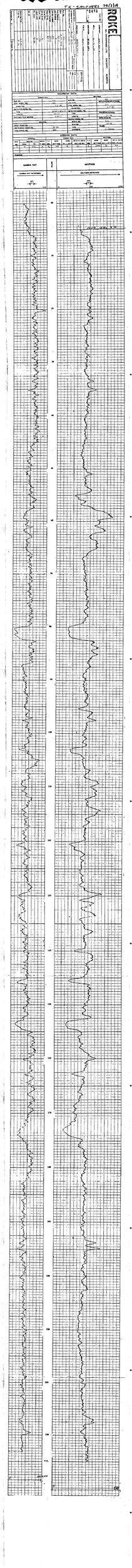
232 (6) TW-03

Tr Smithers 76(3)A



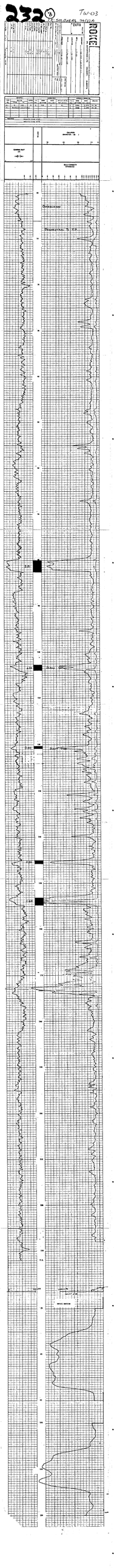
232 (7) TW-03

FK-SMITHERS 7A(1)A



232 (2) Tenneco 74(13)

TW-03



232 (9)

TW-04

TK-SMITHERS 79(3)A

ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

COMPANY CROWS NEST RESOURCES LTD.

WELL R - TK - 04

LOCATION TETANA AREA

FIELD TETANA PROPERTY

PROVINCE BRITISH COLUMBIA

FILE NO.

LSD SEC TWP RGE W M

Permanent Datum: GROUND LEVEL

Log Measured from: GROUND LEVEL

Drill Depths Measured from: GROUND LEVEL

Elev.: K.B. DF GL

Above Perm. Datum

Other Services:

Run No.	ONE			
Date	10 AUG 1979			
First Reading	66 M			
Last Reading	0			
Footage Logged	66			
Depth Reached	66.5	"	"	"
Depth Driller	21.3			
Casing Rate	18.5			
Casing Driller	18.3			
Fluid Type	WATER			
Liquid Level	9			
Min. Diam.	13			
Rm @				
Operating Time	0.7 HR			
Truck No.	FU #4			

Recorded By: [illegible]

Witnessed By: HAYDY

EQUIPMENT DATA

GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.	125	LOG TYPE	NEUTRON/NEUTRON
DIAMETER	3.2 CM	TOOL MODEL NO.	125
DETECTOR MODEL NO.		DIAMETER	3.2 CM
TYPE	SCINTILATION	DETECTOR MODEL NO.	
LENGTH	10 CM	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	2.07 M	LENGTH	15 CM
GENERAL		SOURCE MODEL NO.	MRC-N-SS-W
HOIST TRUCK NO.		SERIAL NO.	171
INSTRUMENT TRUCK NO.	FU #4	SPACING	43 CM
TOOL SERIAL NO.	002	TYPE	AmBe
		STRENGTH	3 CURIES

LOGGING DATA

RUN NO.	GENERAL DEPTHS FROM	GENERAL DEPTHS TO	GENERAL SPEED M /MIN	GAMMA RAY T.C. SEC.	GAMMA RAY SENS SETTINGS	GAMMA RAY ZERO DIV. L OR R	GAMMA RAY API G. R. UNITS PER LOG DIV.	NEUTRON T.C. SEC.	NEUTRON SENS SETTINGS	NEUTRON ZERO DIV. L OR R	NEUTRON API N. UNITS PER LOG DIV.
1	0	66	4	2	100	0	12	2	1000	2L	100

REMARKS

GAMMA RAY | DEPTHS | NEUTRON

GAMMA RAY INCREASES →

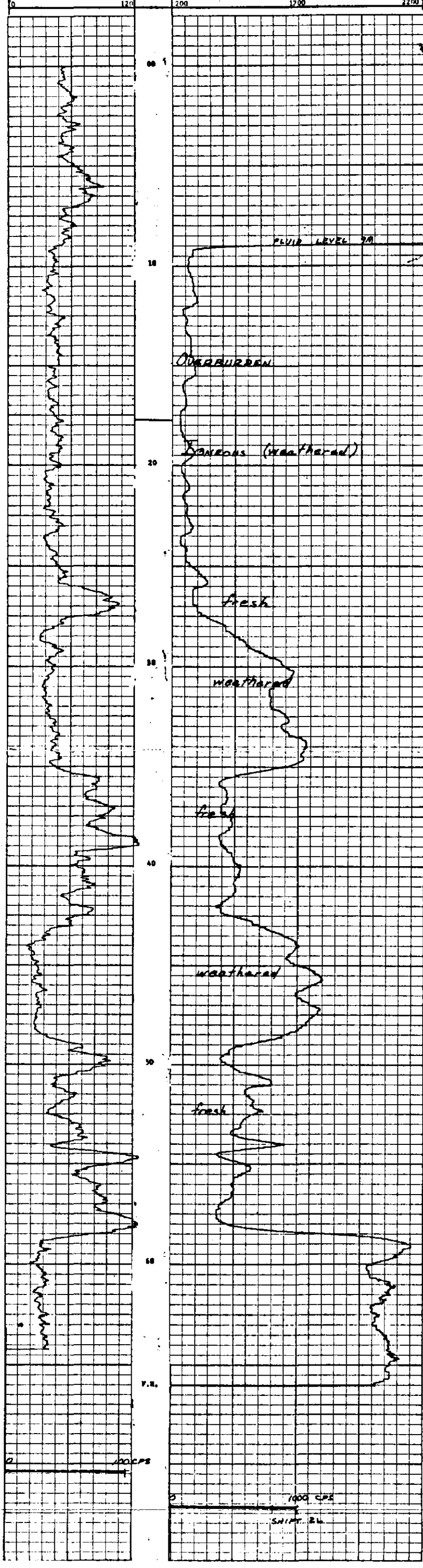
API 12

0 120

NEUTRON INCREASES →

API 100

200 1700 2200



TW-04

TK-SMITHERS 79(3) A

ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FOCUSED BEAM LOG

FILE NO.

LSD SEC TWP RGE W ___ M

COMPANY CROWS NEST RESOURCES LTD.

WELL R - TK - 04

LOCATION TEKWA LAKE

FIELD TEKWA PROPERTY

PROVINCE BRITISH COLUMBIA

Other Services: GEN

Permanent Datum: ___ Elev. ___

Log Measured from: ___ Above Perm. Datum: ___

Drill Collar Measured from: ___ K.B. ___ D.F. ___ G.L. ___

Run No.	ONE	
Date	10 [illegible] 79	
Last Reading	[illegible]	
Last Reading	0	
Footage Logged	66	
Depth Reached	66.5	
Depth Driller	71.5	
Casing Rotes	19.5	
Casing Driller	19.5	
Fluid Type	WATER	
Logged Level	15.5	
Max Diam.	15.5	
Min Diam.	13.5	
Run @ °	[illegible]	
Operating Time	0 [illegible]	
Truck No.	FU 84	
Recorded By	[illegible]	
Witnessed By	BARRY	

2320

Remarks: FRL 85 7 ELECTRODE SONDE
CURRENT HI 20 GA BEAM
MUDFISH RESISTANCE 325 OHMS 1 M ARRAY

RESISTIVITY	Depths	RESISTIVITY 1
OHM METERS 0 500		OHM METERS 0 100 200 630 1150 1650

FLUID LEVEL 15.5 M

10
20
30
40
50
60
T.D.

LOG ZERO

CAL ON 60 RANGE

CAL ZERO

REC ZERO

STOP ZERO

LOGGED ON 20 RANGE

CAL ON 20 RANGE

TW-05

TK-SMITHERS 79(3)A

ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO

LSD
SEC
TWP
RGE
W M

COMPANY CONS. WEST RESOURCES LTD.

WELL R-TW-05

LOCATION TELKWA AREA

FIELD TELKWA PROPERTY

PROVINCE BRITISH COLUMBIA

Permanent Datum GROUND LEVEL Elev.

Log Measured from GROUND LEVEL Above Perm. Datum

Well Depths Measured from GROUND LEVEL

K.B.
CSG
G.L.

Other Services FBL, DIR CB-DEN-CAL

Run. No.	ONE
Date	12 AUG 79
First Reading	199 M
Last Reading	0
Footage Logged	199
Depth Reached	199.5
Depth Driller	201.2
Casing Rake	
Casing Driller	6.1
Fluid Type	WATER
Liquid Level	8.2
Min. Diam.	13 CM
Rm @	
Operating Time	1.4 HR
Truck No.	PU #4

Recorded By P. BAUTZ

Witnessed By HANDY

232 (1)

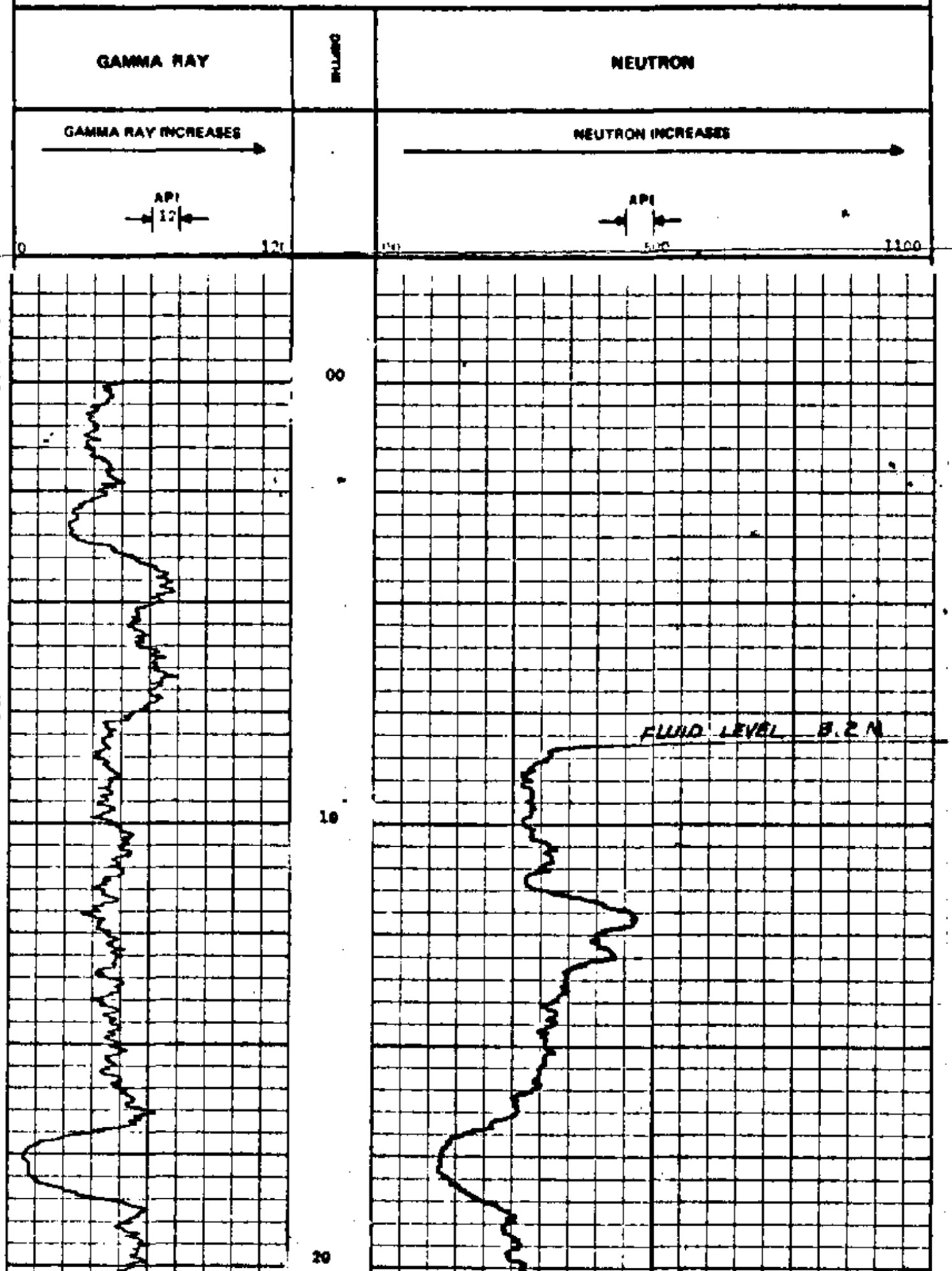
EQUIPMENT DATA

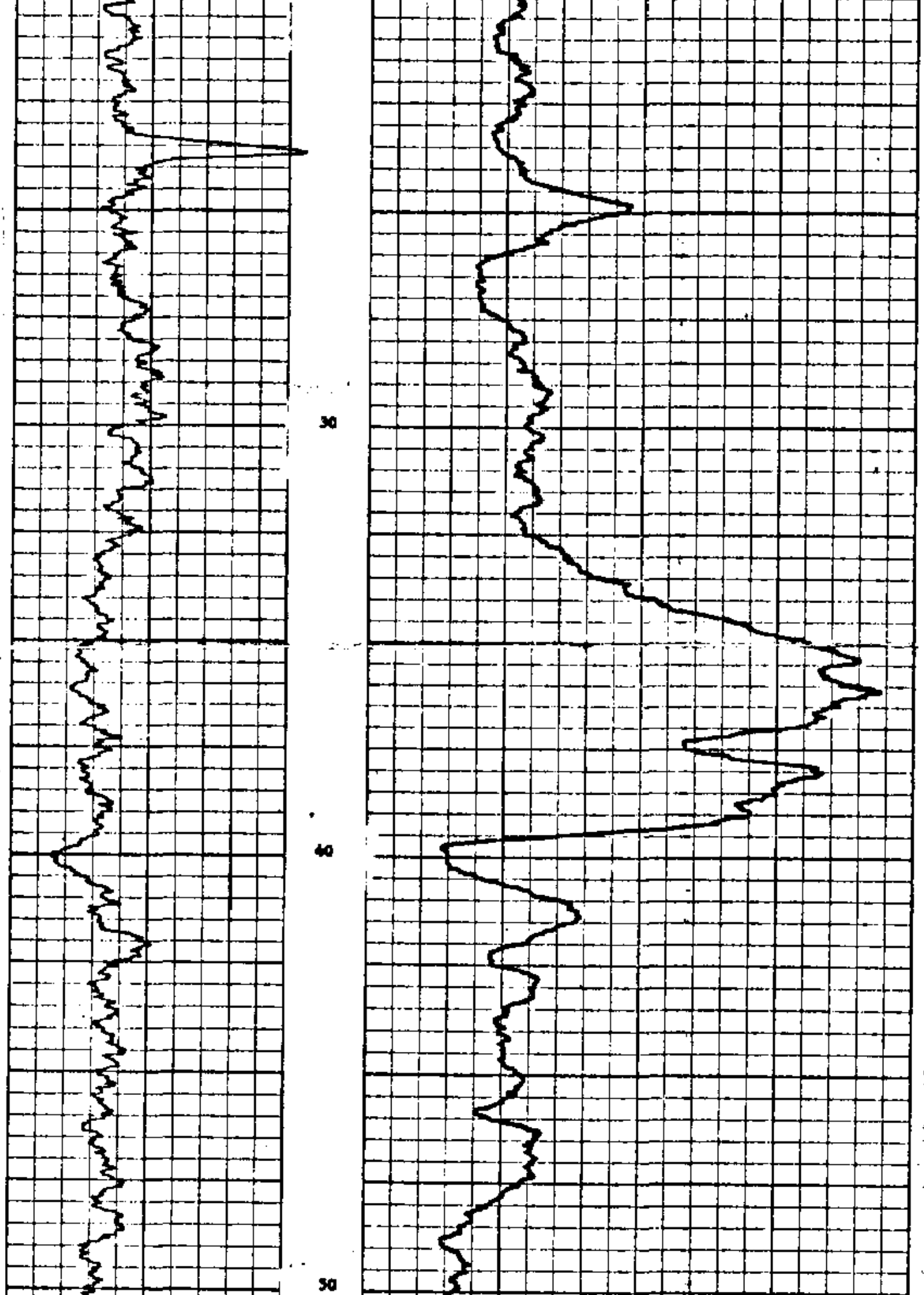
GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.	125	LOG TYPE	NEUTRON/NEUTRON
DIAMETER	3.2 CM	TOOL MODEL NO.	125
DETECTOR MODEL NO.		DIAMETER	3.2 CM
TYPE	SCINTILLATION	DETECTOR MODEL NO.	
LENGTH	10 CM	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	2.07 M	LENGTH	15 CM
		SOURCE MODEL NO.	MRC-N-SS-W
GENERAL		SERIAL NO.	171
HOIST TRUCK NO.		SPACING	43 CM
INSTRUMENT TRUCK NO.	PU #4	TYPE	AmBe
TOOL SERIAL NO.	002	STRENGTH	3 CURIES

LOGGING DATA

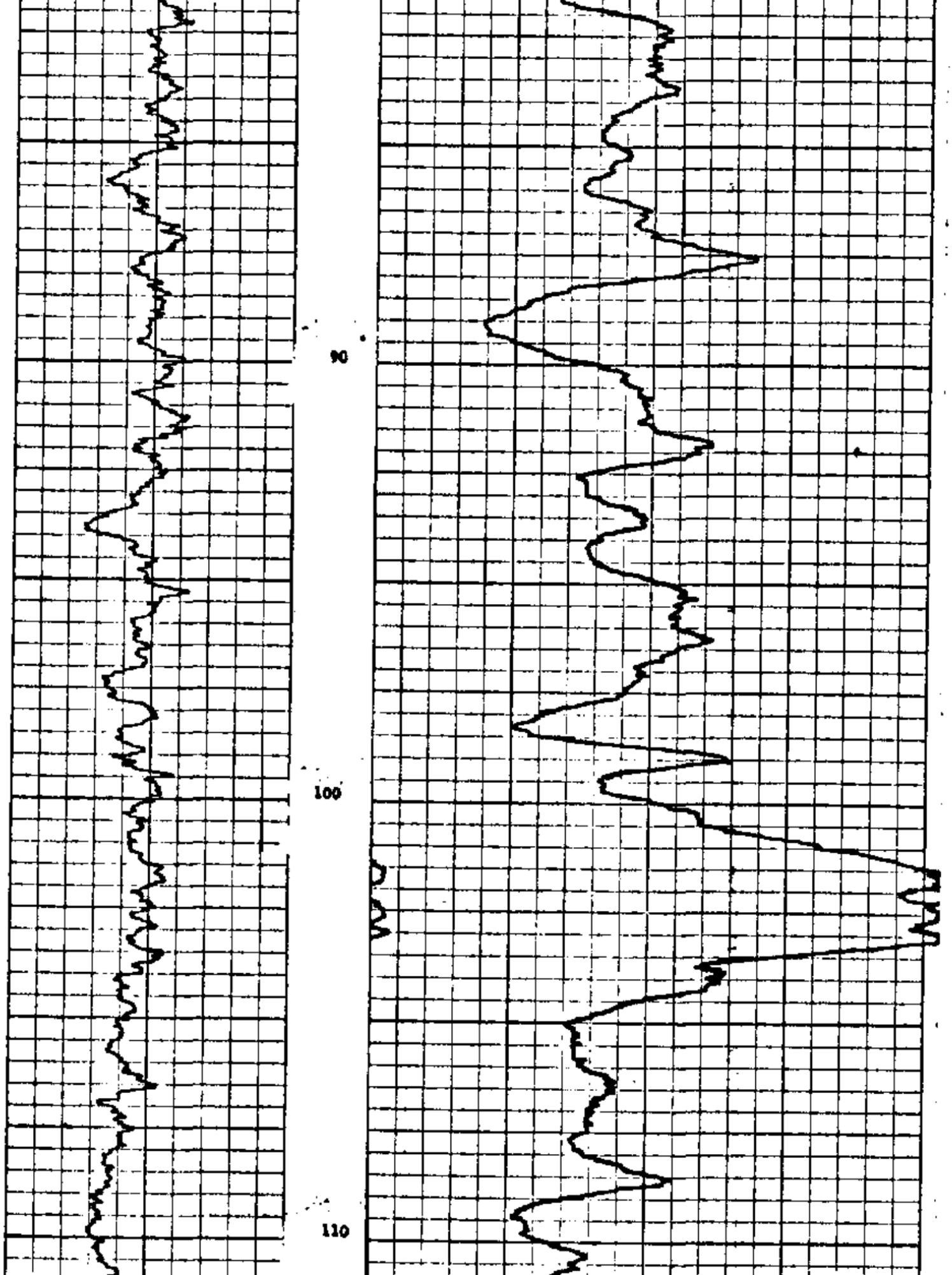
GENERAL				GAMMA RAY				NEUTRON			
RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED M/MIN	T.C. SEC.	SENS SETTINGS	ZERO DIV. L OR R	API G. R. UNITS PER LOG DIV.	T.C. SEC.	SENS SETTINGS	ZERO DIV. L OR R	API N. UNITS PER LOG DIV.
1	199	0	4	2	100	0	12	3	1000	21	50

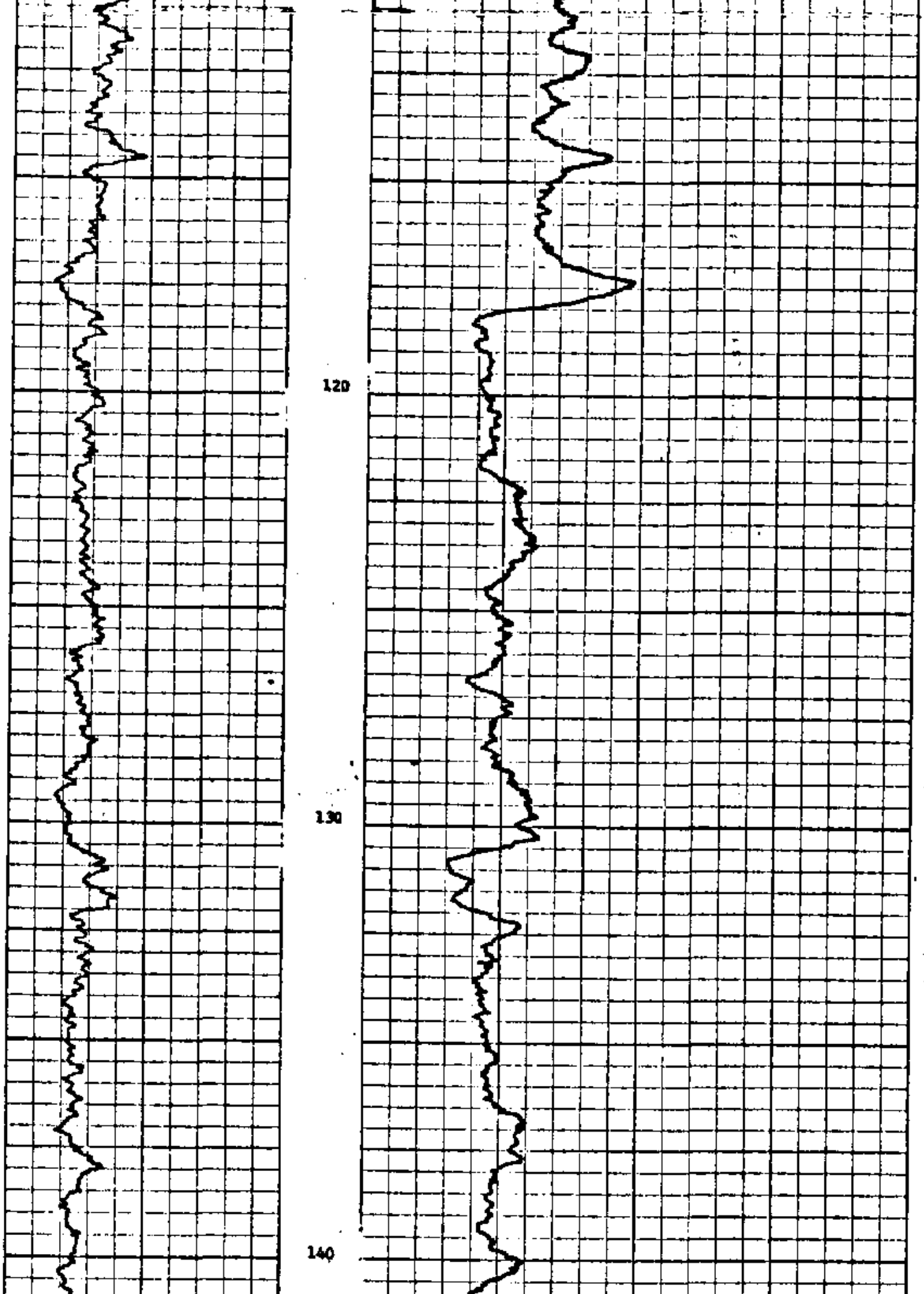
REMARKS

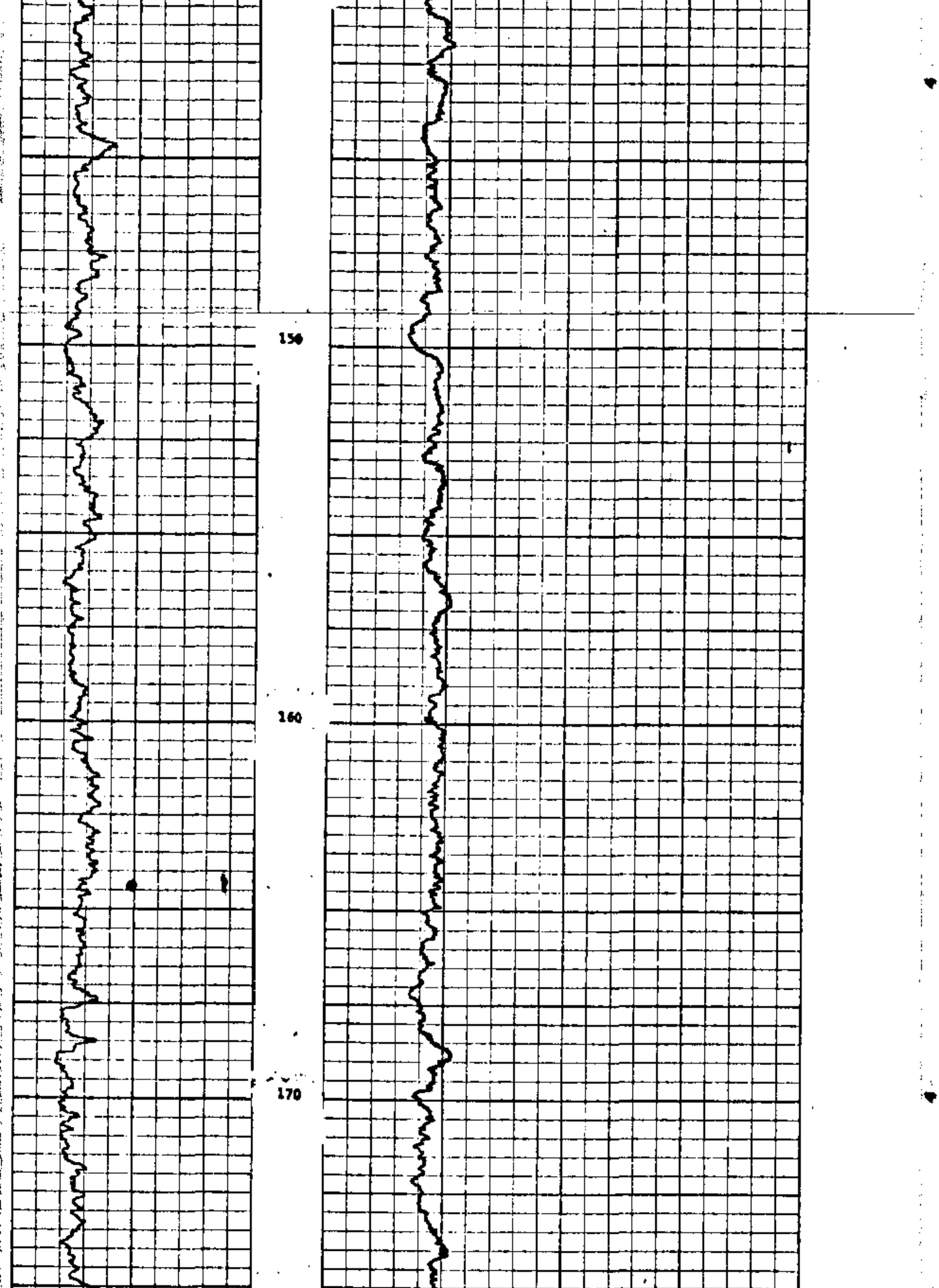

GAMMA RAY
DEPTH
NEUTRON
GAMMA RAY INCREASES
API
12
0
120
NEUTRON INCREASES
API
1100
00
10
20
FLUID LEVEL 8.2 M


30
40
50

60
70
80


90
100
110


120
130
140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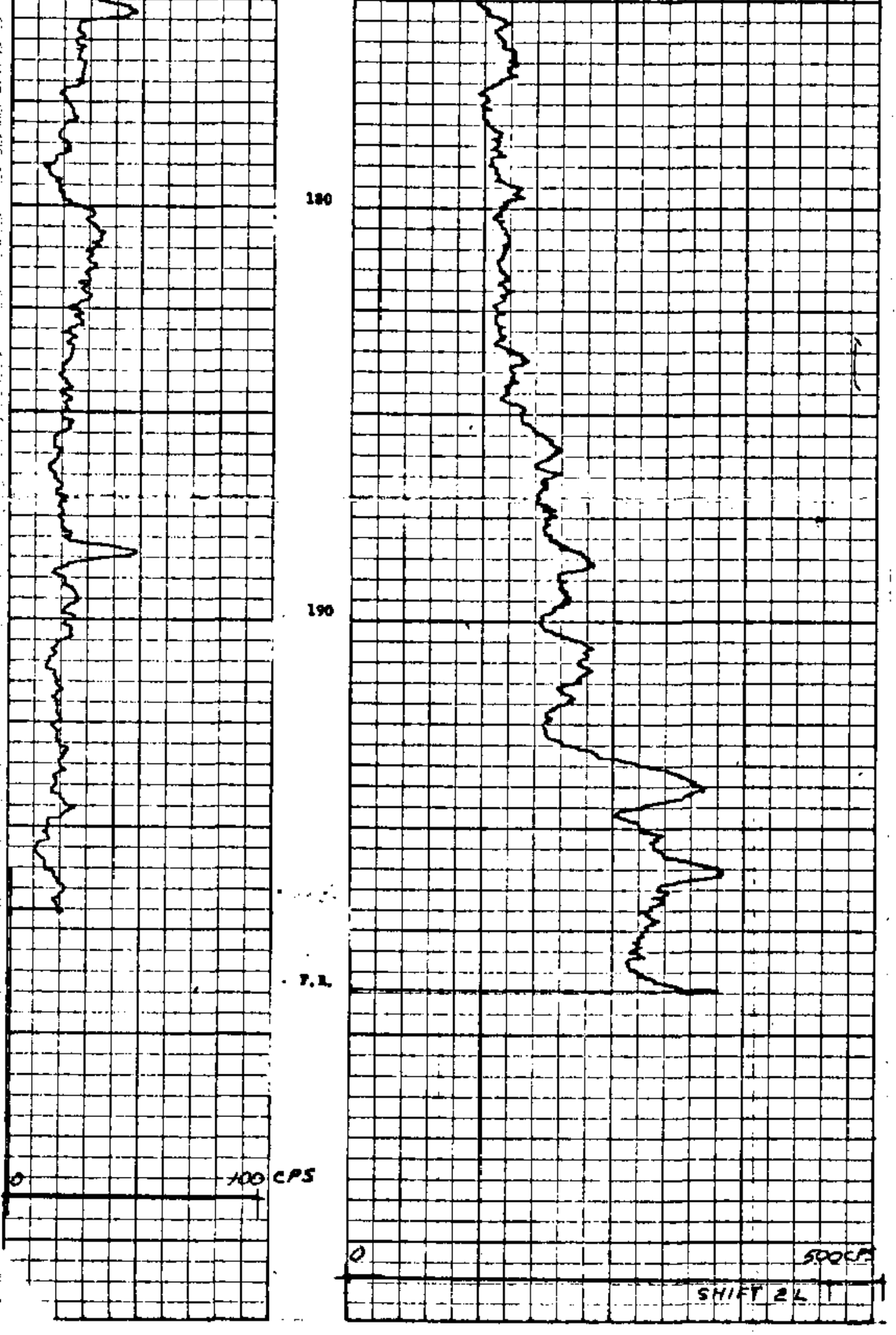
160
170


180
190
T.D.
0
100 CPS
0
500 CPS
SHIFT 2L

TW-05

TK-SMITHERS 79(3)A

ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO.

LSD
SEC
TWP
RGE
W M

COMPANY CROWS NEST RESOURCES LTD.

WELL R-TW-05

LOCATION TELKWA AREA

FIELD TELKWA PROPERTY

PROVINCE BRITISH COLUMBIA

Other Services: GRS, FDL, DIL

Permanent Datum GROUND LEVEL Elev.

Log Measured from GROUND LEVEL Above Perm. Datum

Well Depths Measured from GROUND LEVEL

K.B.
DF
G.L.

Run No.	ONE
Date	12 AUG 79
First Reading	198
Last Reading	0
Footage Logged	198
Depth Reached	199
Depth Driller	201.2
Casing Size	6.3
Casing Driller	6.1
Fluid Type	WATER
Liquid Level	8.2
Min. Diam.	13 CM
Operating Time	1.7 HR
Truck No.	FU #4
Recorded By	WISANZ
Witnessed By	RANDY

232 (12)

GENERAL				GAMMA RAY				SIDEWALL DENSILOG			
RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED M/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	CPS/DIV
1	0	198	4	2	100	0	12	2	1000	2.09R	66.38

REMARKS DEN TOOL #457
CAL TOOL #776

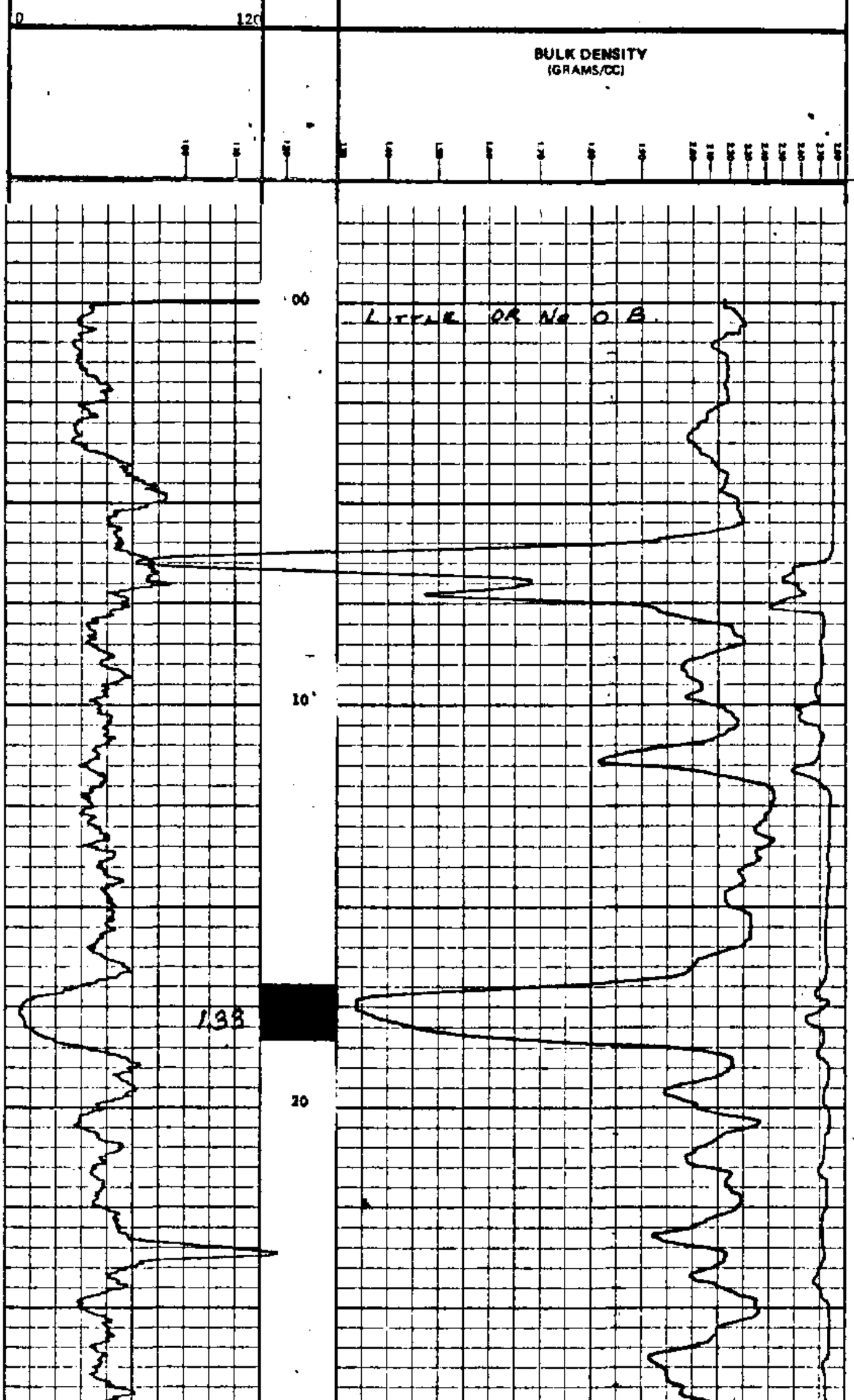
DEPTHS

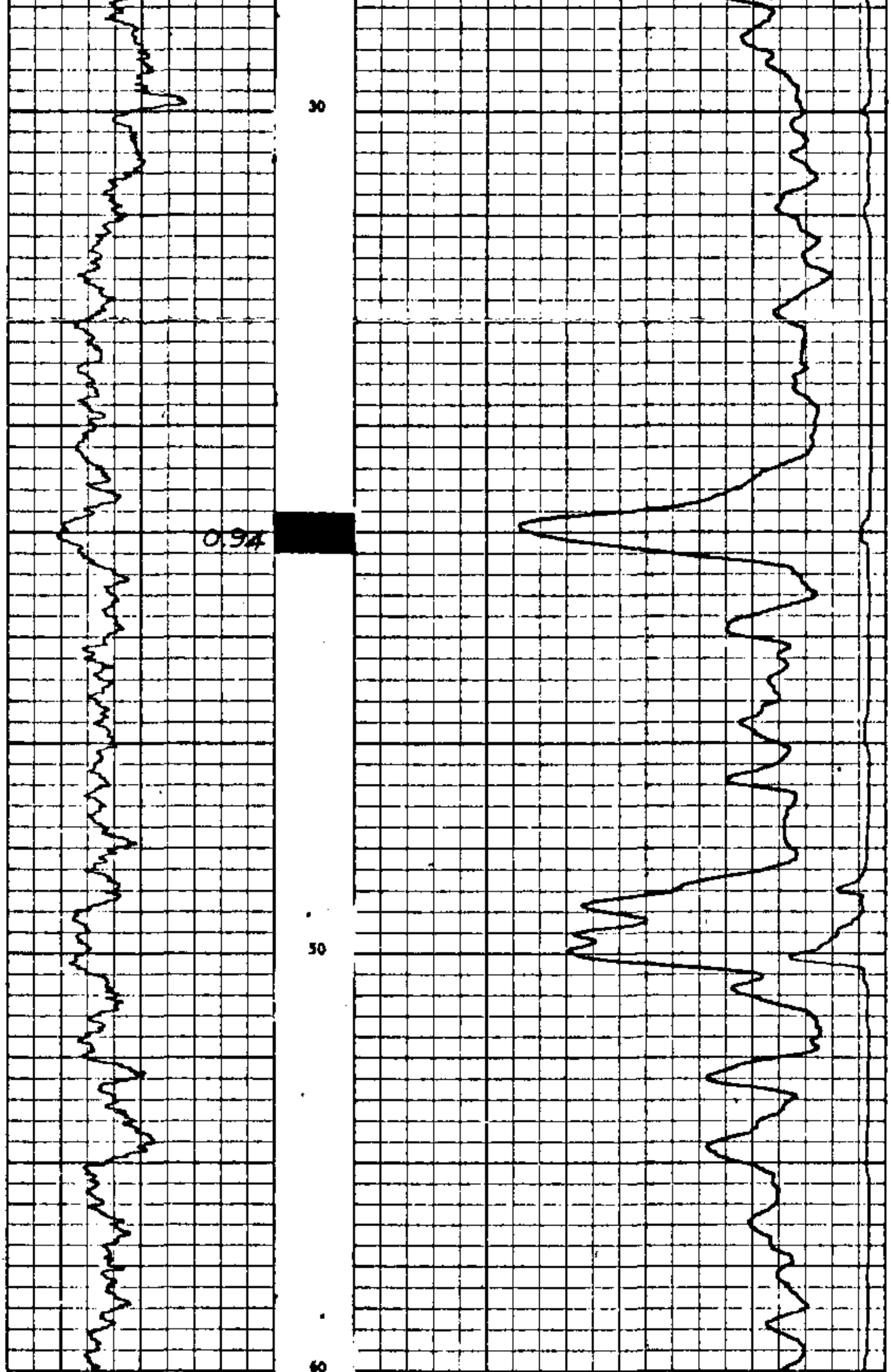
CALIPER
(DIAMETER - CM)

30 25 20 15 10

GAMMA RAY
API

12


0
120
BULK DENSITY
(GRAMS/CC)
00
LITTLE OR NO O.B.
10'
133
20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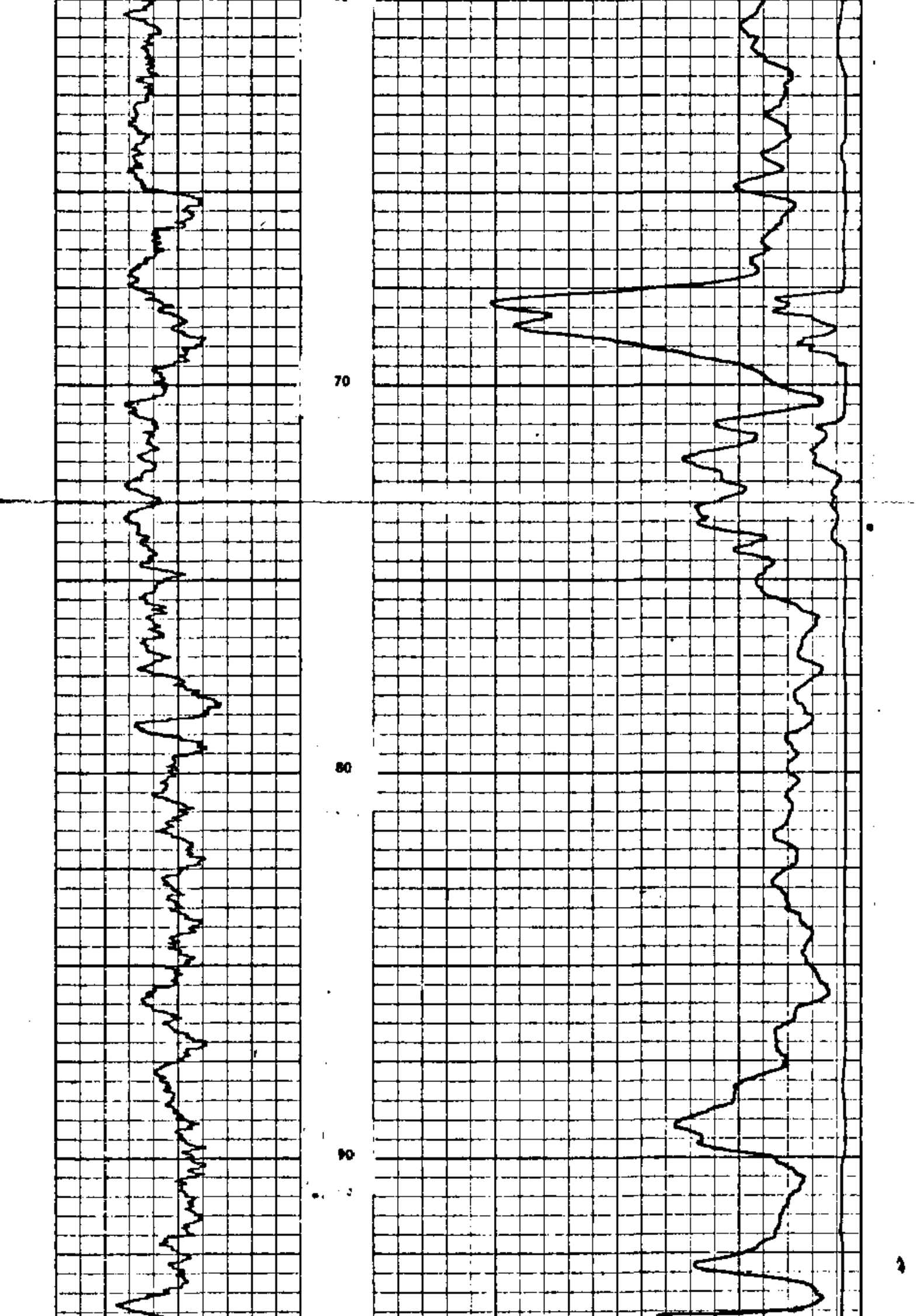
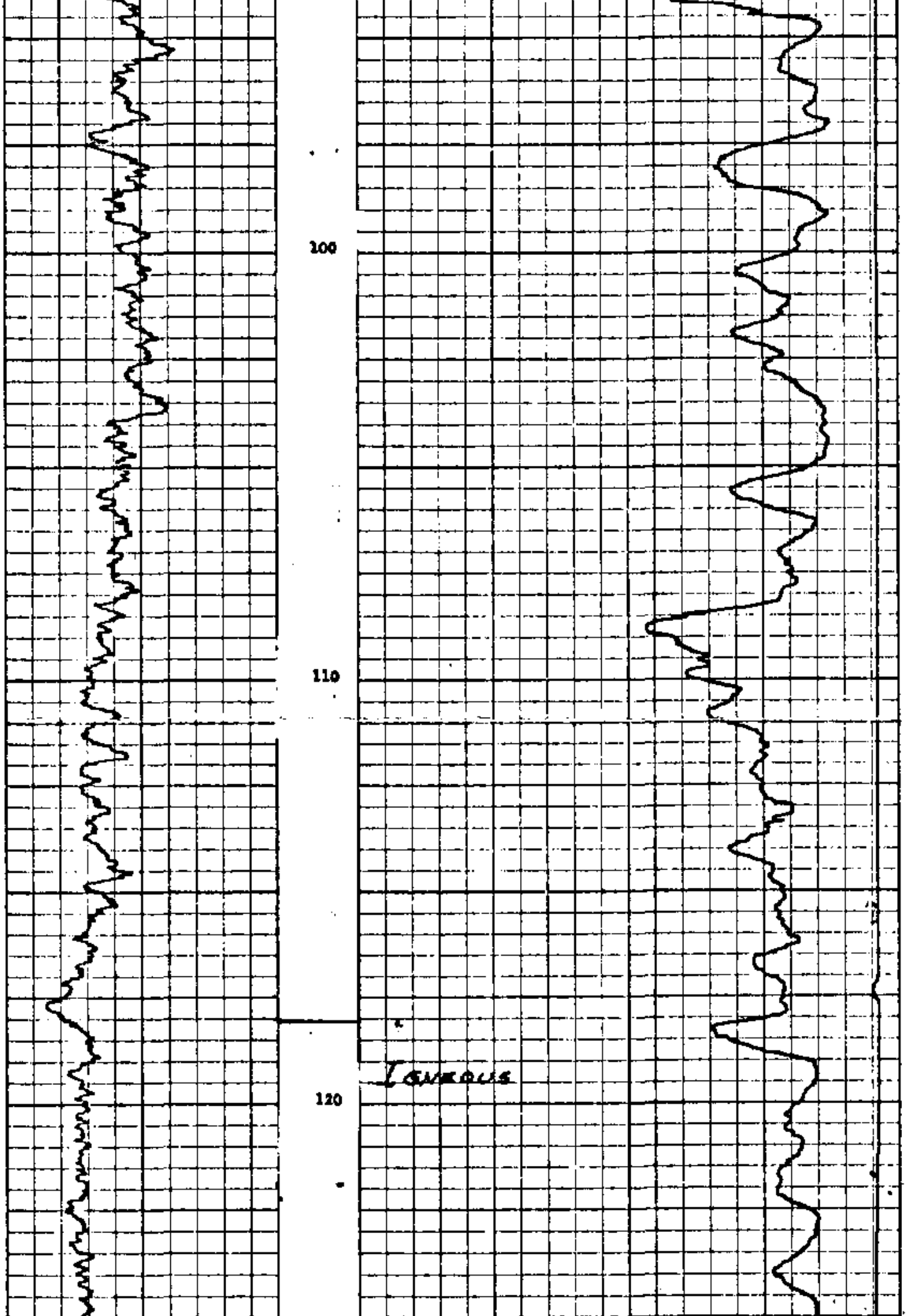
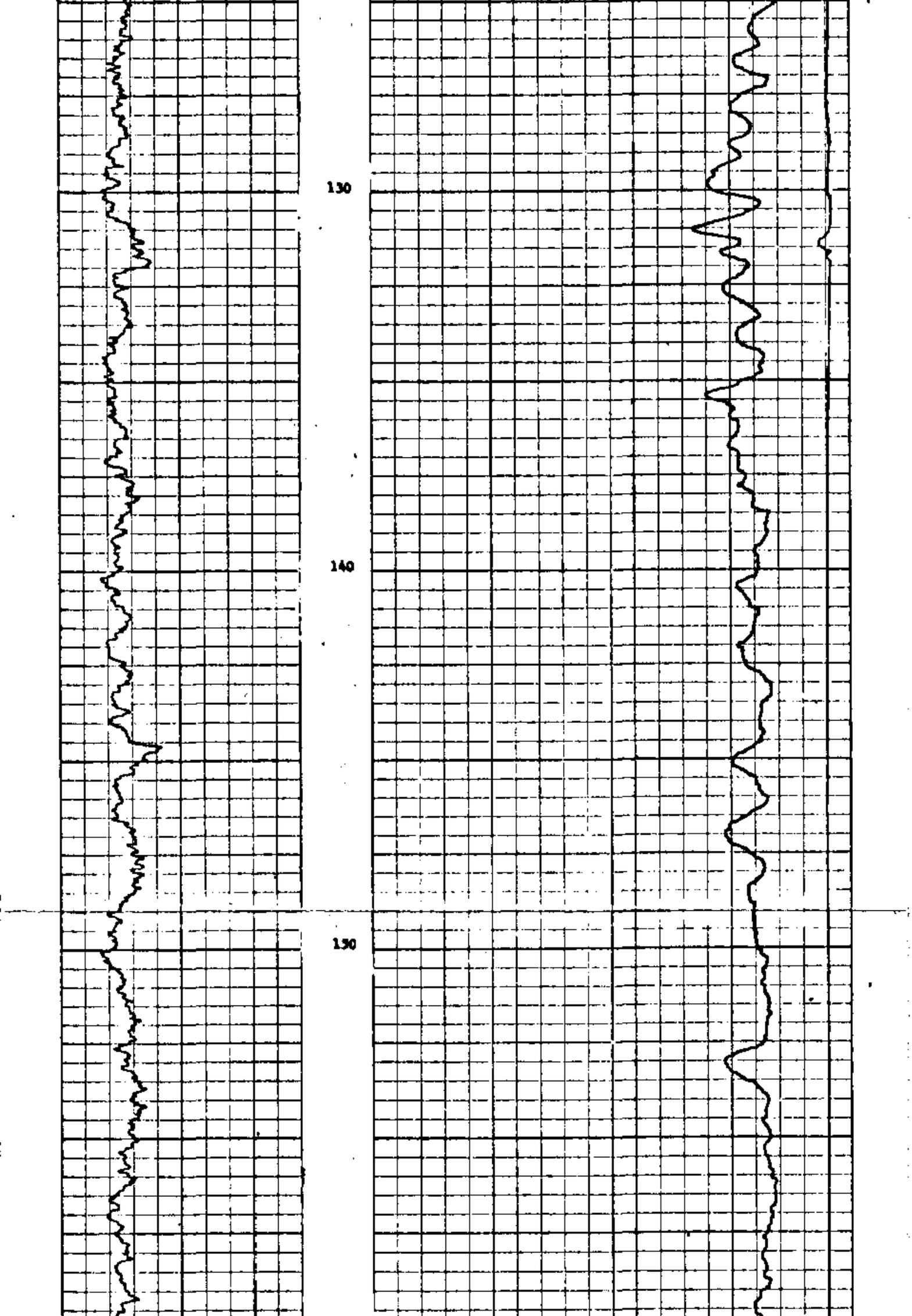
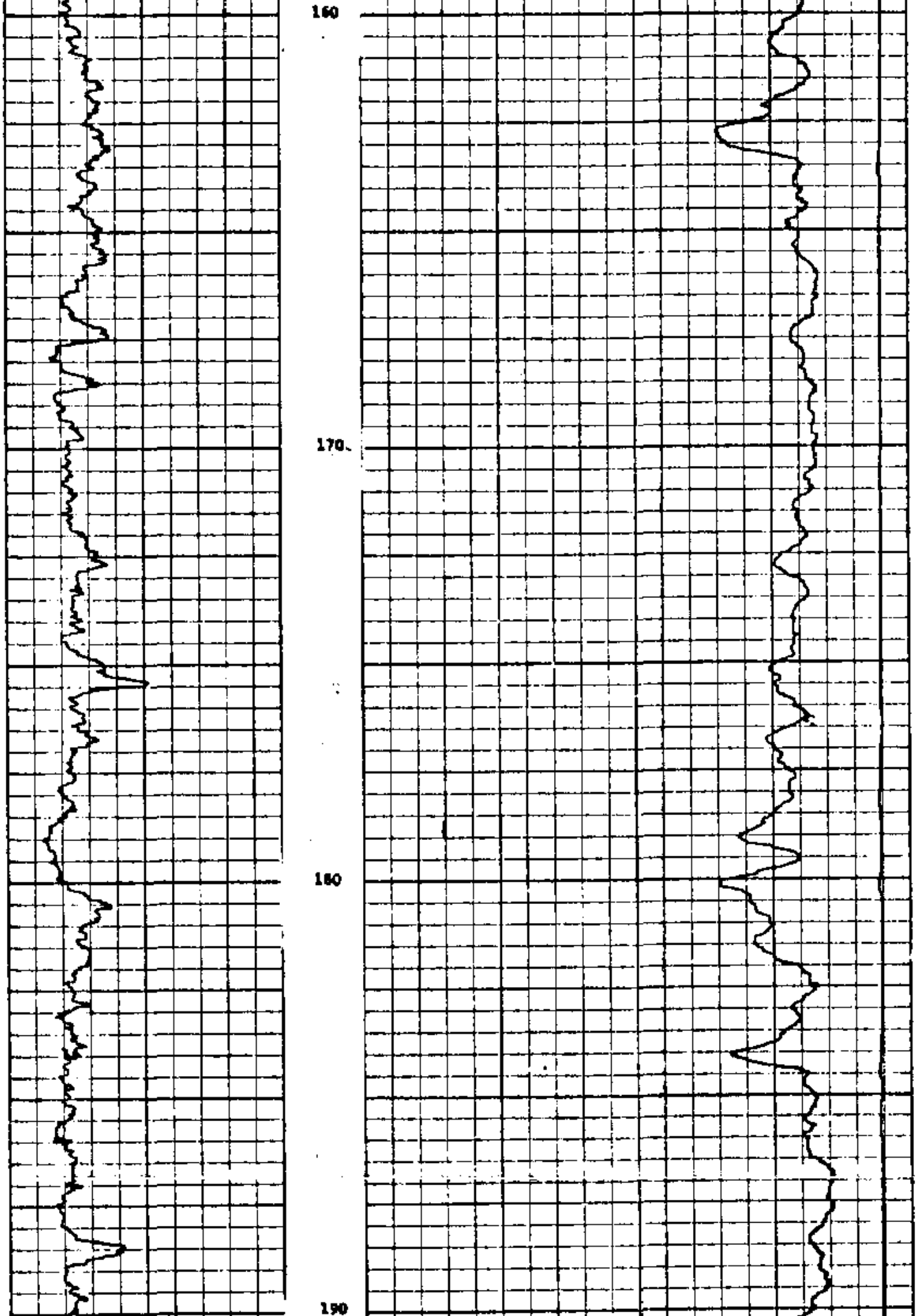
0.94
50
60


70
80
90


100
110
120
Tumous


130
140
150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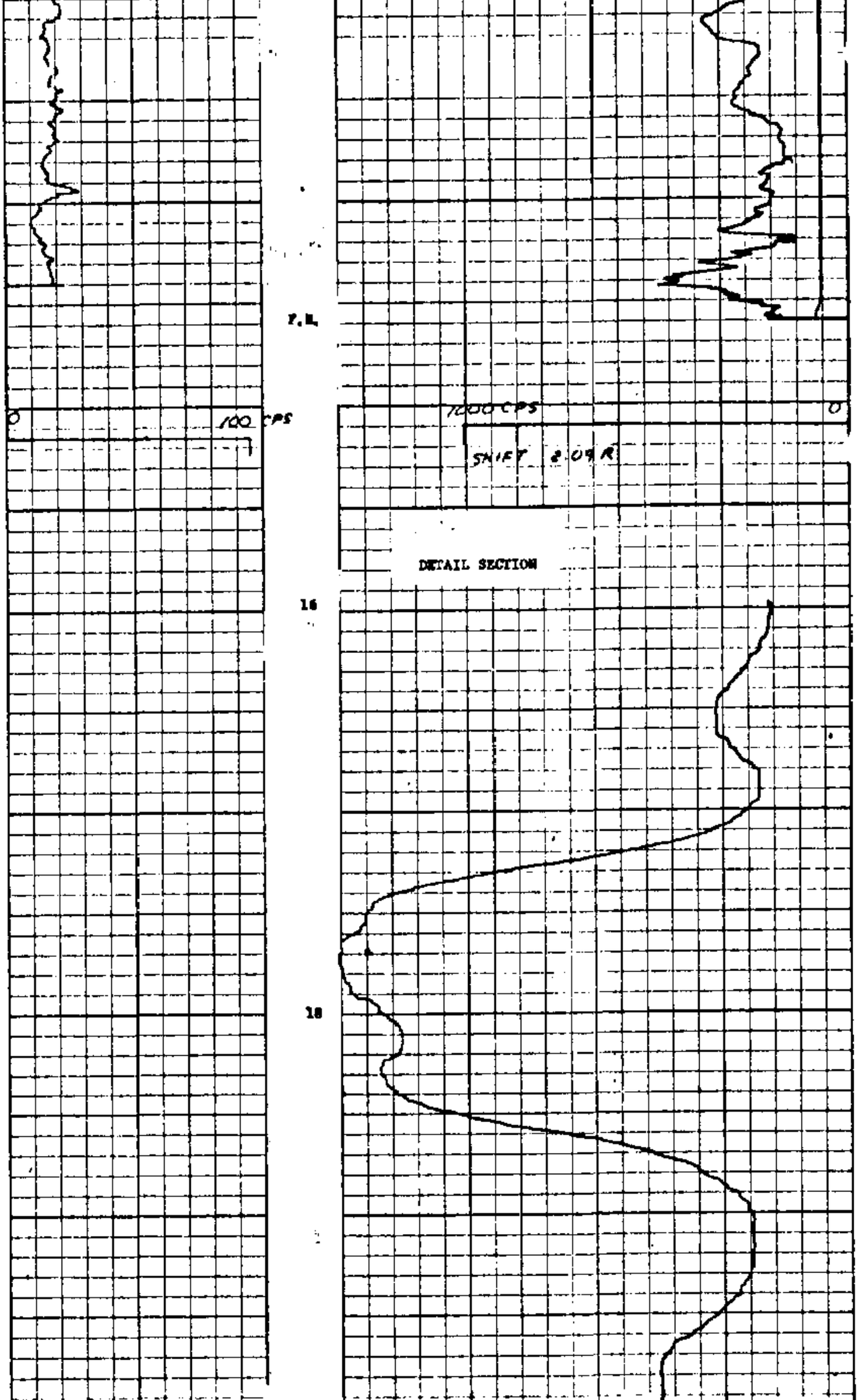
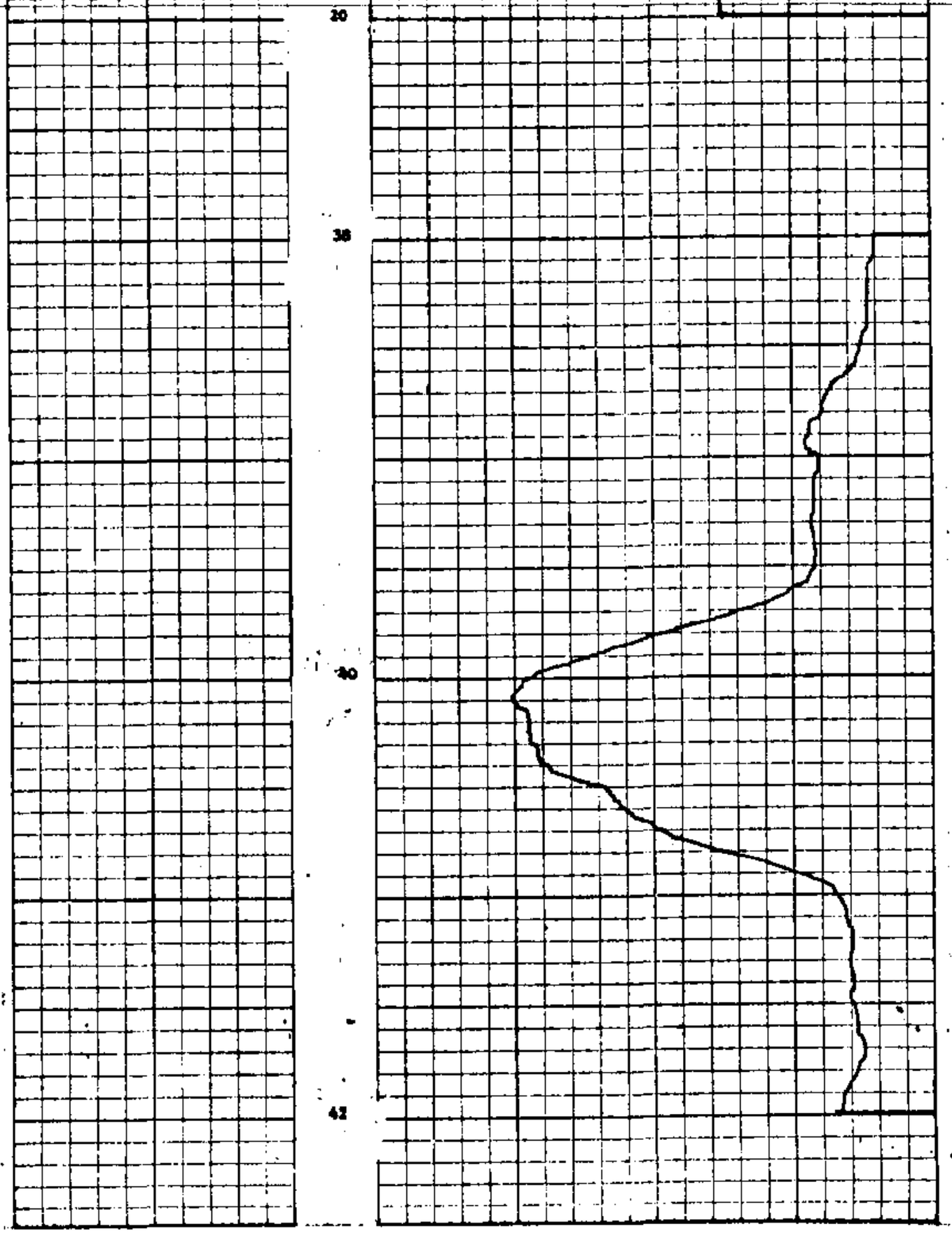
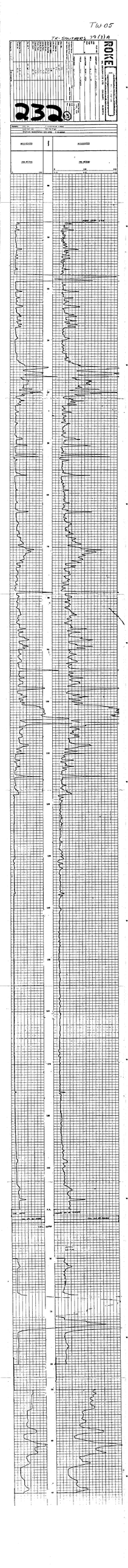
170
180
190


F.L.
0
100 CPS
1000 CPS
0
SHIFT 2.09 R
DETAIL SECTION
16
18


20
30
40
42

TW 05

TR-SMITHERS 79(1)A



TW-06

TK-SMITHERS 79(3)A

ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO

COMPANY CROSS WEST RESOURCES LTD.

WELL F-TW-06

LOCATION TELKWA AREA

FIELD TELKWA PROPERTY

PROVINCE BRITISH COLUMBIA

Other Services: FDL GR-DEN-CAL

Permanent Datum: GROUND LEVEL — Elev.

Log Measured From: GROUND LEVEL — Above Perm. Datum

Dr. Measured From: GROUND LEVEL

K.B. / D.F. / G.L.

LSD SEC TWP RGE M

Recorded By: [illegible]

Witnessed By: [illegible]

Run No.	ONE
Date	13 AUG 79
Depth-Driller	34.4
Depth-Logger	0
Bottom Logged Interval	36
Top Logged Interval	34.5
Casing-Driller	42.7
Casing-Logger	2
Bit Size	1.8
Type Fluid in Hole	WATER
Density / Viscosity	2.5
pH / Fluid Loss	13 CM
Source of Sample	
Rm @ Meas. Temp.	17.5 @ 25°
Rmf @ Meas. Temp.	
Rmc @ Meas. Temp.	
Source: Rmf / Rmc	
Rm @ BHT	
Time Since Circ.	0.5 HR.
Time on Bottom	11:24
Max. Rec. Temp.	
Equip. No. / Location	
Recorded By	
Witnessed By	

232 (14)

Remarks: FDL #6 — 7 ELECTRODE SONDE

CURRENT 1ft — 20 CM BEAM

MUDFISH RESISTANCE 380 OHMS — 1 M ARRAY

RESISTIVITY	Depths	RESISTIVITY
OHM METERS 0 — 200		OHM METERS 0 — 100 — 200 / 260 — 460 — 660

00

10

20

30

T.D.

OP ZERO

CAL ON 20 RANGE

CAL ZERO

REC ZERO

STOP ZERO

LOGGED ON 20 RANGE

CAL ON 20 RANGE

TW-06

TK-SMITHERS 79(3)A

ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO.

COMPANY CROSS [illegible] RESOURCES LTD.

WELL B - 79 - A

LOCATION TELKWA AREA

FIELD TELKWA PROPERTY

PROVINCE BRITISH COLUMBIA

Permanent Datum [illegible] Elev.

Log Measured from [illegible] Above Perm. Datum

All Depths Measured from RECORD LEVEL

Other Services CBL-VDL-GR

K.B. [illegible]
D.F. [illegible]
G.L. [illegible]

Run. No.	ONE
Date	13 AUG 1974
First Reading	38 M
Last Reading	0
Footage Logged	38
Depth Reached	38.5
Depth Driller	42.7
Casing Size	2
Casing Driller	1.8
Fluid Type	WATER
Liquid Level	1.7
Max. Diam.	13 CM
Rm @	
Truck No.	FU #4
Operating Time	0.5 HR
Recorded By	[illegible]
Witnessed By	PATTY

232

EQUIPMENT DATA

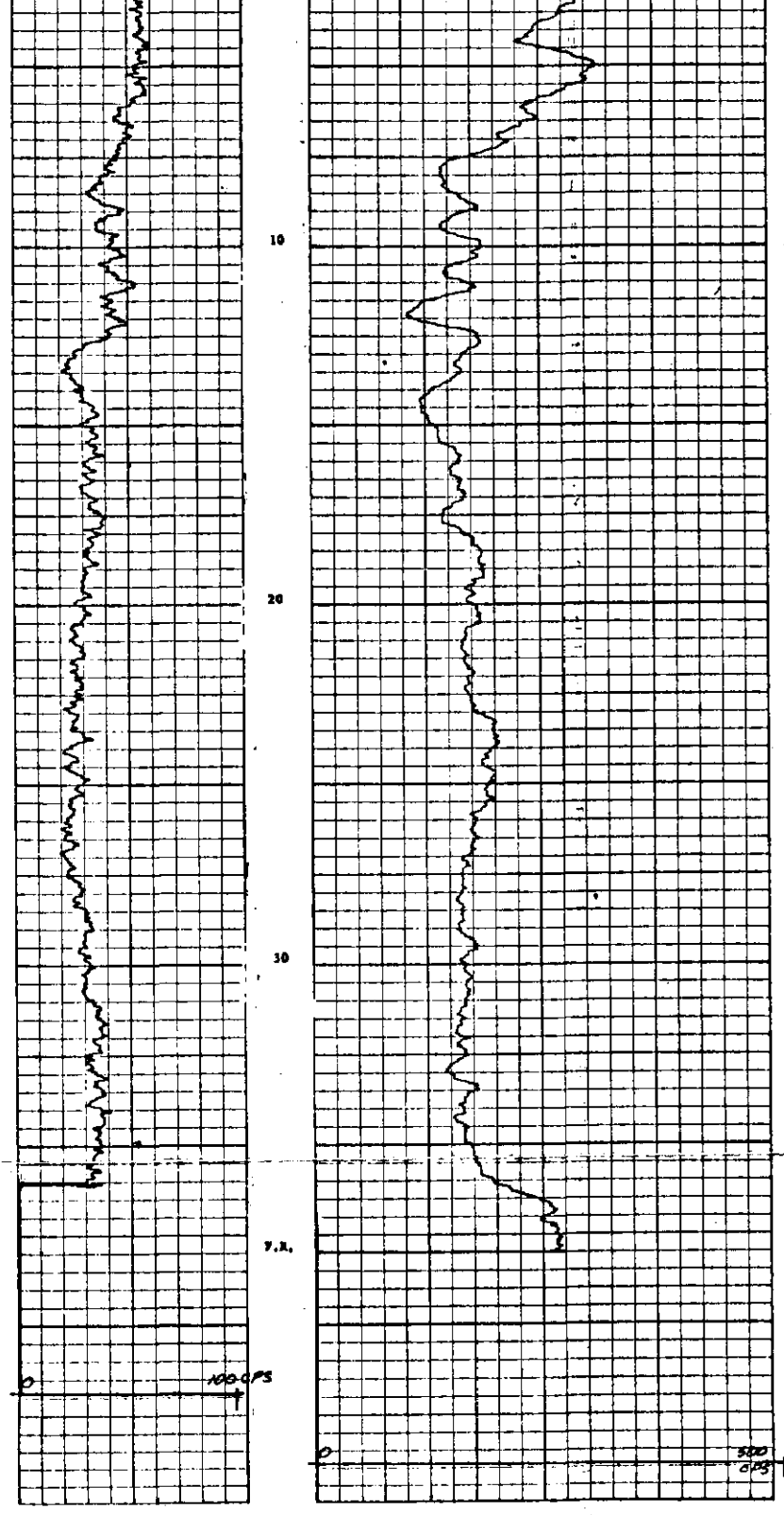
GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.	125	LOG TYPE	NEUTRON/NEUTRON
DIAMETER	3.2 CM	TOOL MODEL NO.	125
DETECTOR MODEL NO.		DIAMETER	3.2 CM
TYPE	SCINTILLATION	DETECTOR MODEL NO.	
LENGTH	10 CM	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	2.07 M	LENGTH	15 CM
		SOURCE MODEL NO.	MRC-N-SS-W
GENERAL		SERIAL NO.	171
HOIST TRUCK NO.		SPACING	43 CM
INSTRUMENT TRUCK NO.	FU #4	TYPE	AmBe
TOOL SERIAL NO.	002	STRENGTH	3 CURIES

LOGGING DATA

RUN NO.	GENERAL DEPTHS FROM	GENERAL DEPTHS TO	SPEED M /MIN	GAMMA RAY T.C. SEC.	GAMMA RAY SENS SETTINGS	GAMMA RAY ZERO DIV. L OR R.	GAMMA RAY API G. R. UNITS PER LOG DIV.	NEUTRON T.C. SEC.	NEUTRON SENS SETTINGS	NEUTRON ZERO DIV. L OR R	NEUTRON API N. UNITS PER LOG DIV.
1	38	0	4	2	100	0	12	1	1000	0	50

REMARKS

GAMMA RAY	DEPTHS	NEUTRON
GAMMA RAY INCREASES →		NEUTRON INCREASES →
API 12		API 50
0 — 120		0 — 1000



TW-08

TK SMITHERS 79(3)A

ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO.
LSD
SEC
TWP
RGE
W. M

COMPANY CROWS NEST RESOURCES LTD.

WELL R - TW - 08

LOCATION TELKWA AREA

FIELD TELKWA PROPERTY

PROVINCE BRITISH COLUMBIA

Other Services: CRN, FEL

Permanent Datum [illegible] Elev.
Log Measured from [illegible] Above Perm. Datum
Well Depths Measured from [illegible]
K.B.
CSG.
G.L.

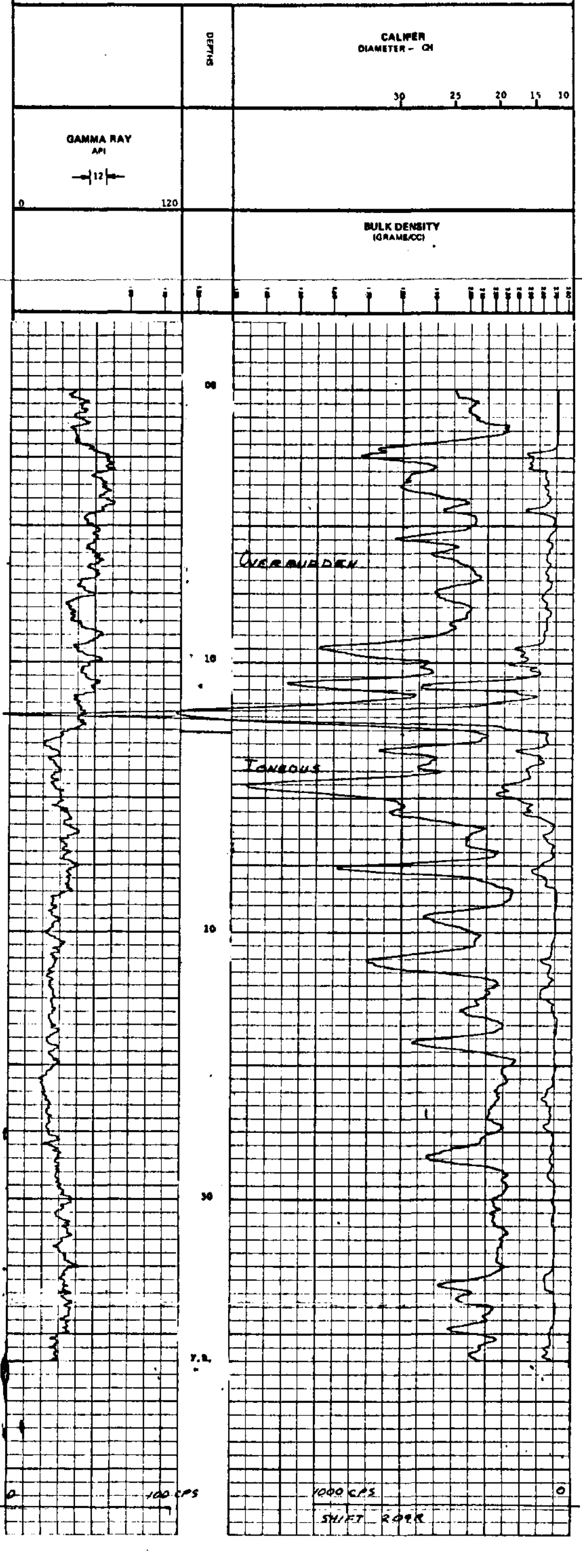
232 ⑯

Run No.	[illegible]
Date	13 [illegible] 1979
First Reading	3[illegible]
Last Reading	0
Footage Logged	3[illegible]
Depth Reached	3[illegible].5
Depth Driller	42.[illegible]
Casing Roke	2
Casing Driller	1.8
Fluid Type	[illegible]
Liquid Level	1.[illegible]
Min. Diam.	13.[illegible]
Operating Time	0.5 [illegible]
Truck No.	[illegible]

Recorded By PUNAKZ Witnessed By [illegible]

GENERAL				GAMMA RAY				SIDEWALL DENSILOG			
RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED M/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	CPS/DIV
1	36	0	4	2	100	0	12	2	1000	2,098	66.38

REMARKS DEN TOOL #452
CAL TOOL #776



TW-07

TK-SMITHERS 79(3)A

BROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO

LSD SEC TWP RGE W M

COMPANY CANADA NORTHWEST ENERGY LTD.

WELL K - TW - 07

LOCATION TELKWA AREA

FIELD TELKWA PROPERTY

PROVINCE BRITISH COLUMBIA

Permanent Datum Elev.

Log Measured from Above Perm. Datum

Well Depths Measured from K.B. / GRD / G.L.

Other Services TKN CE - DEN - GR

Run No.	ONE
Date	12 APR 1979
First Reading	24.M
Last Reading	0
Footage Logged	24
Depth Reached	24.4
Depth Driller	24.4
Casing Rigs	5.2
Casing Driller	5.1
Fluid Type	WATER
Liquid Level	1.6 M
Min Diam.	13 CM
Rm @ °	23° C
Operating Time	0.4 HR
Truck No	TV 4
Recorded By	
Witnessed By	

232

Remarks: FBL #6 7 ELECTRODE SONDE
CURRENT #1 20 CM BUSH
MUDFISH RESISTANCE 700 OHMS 1 M ARRAY

RESISTIVITY — OHM METERS — 0 — 400

Depths

RESISTIVITY — OHM METERS — 0 — 100 — 200

520 — 920 — 1320

00

FLUID LEVEL 1.6 M

10

20

f.s.

LOGGED ON 20 RANGE

CAL ON 20 RANGE

CAL ON 20 RANGE

CAL ZERO

REC ZERO

STOP ZERO

DETAIL SECTION

10

12

14

TW-07

TK-SMITHERS 29(3)A

BORE

OIL ENHANCE SERVICES LTD. CALGARY, ALBERTA

FILE NO.
LSD
SEC
TWP
RGE
W M

COMPANY
WELL TW-07
LOCATION TERRA NOVA
F. ELEV.
Permanent Datum
Log Measured from
Drill Depth Measured from
Above Perm. Datum
K.B.
D.F.
G.L.
Other Services
CNL FDL

Run No.
Date
First Reading
Last Reading
Footage Logged
Depth Reached
Depth Driller
Casing Rate
Casing Driller
Fluid Type
Liquid Level
Max Diam
Operating Time
Truck No
Recorded By
Witnessed By

2320

GENERAL				GAMMA RAY				SIDEWALL DENSILOG				
RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED M./MIN	T.C. SEC.	SENS SETTINGS	ZERO DIV. OR R	API G.R. UNITS PER LOG DIV.	T.C. SEC.	SENS SETTINGS	ZERO DIV. OR R	CPS/ DIV
1	24	0	4	2	100	0	12	2	1000	2.09	66.38

REMARKS: DENSITY TOOL #47
CALIPER TOOL #776

DEPTHS

CALIPER
(DIAMETER – CM)
30 25 20 15 10

GAMMA RAY
API
12
0 120

BULK DENSITY
(GRAMS/CC)

00
OVERBURDEN
10
0.70
1.36
IGNEOUS
P.B.
0 100 CPS
1000 CAS 0
SHIFT 2.09 R
DETAIL SECTION
8
10
12
14

TW-07

TK-SMITHERS 79(3)A

ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

COMPANY CROWS NEST RESOURCES LTD.

WELL K-TW-07

LOCATION TERRA AREA

FIELD TERRA PROPERTY

PROVINCE BRITISH COLUMBIA

Permanent Datum GROUND LEVEL Elev.

Log Measured from GROUND LEVEL Above Perm. Datum

Drlg. Measured from GROUND LEVEL K.B. / D.F. / G.L.

Other Services: FBL GR-DEN-CAL

LSD SEC TWP RGE M M

FILE NO

Run No.	ONE
Date	12 AUG 79
Loc. Reading	24 M
Mnc. Reading	0
Footage Logged	24
Depth Reached	24.2
Depth Driller	24.4
Csg. Size Rate	6.2
Csg. Depth Driller	6.1
Fluid Type	WATER
Fluid Level	1
Depth	1.3 CM

Witnessed By: TIM JOY

FU 04 — 0.6 HR

232 (19)

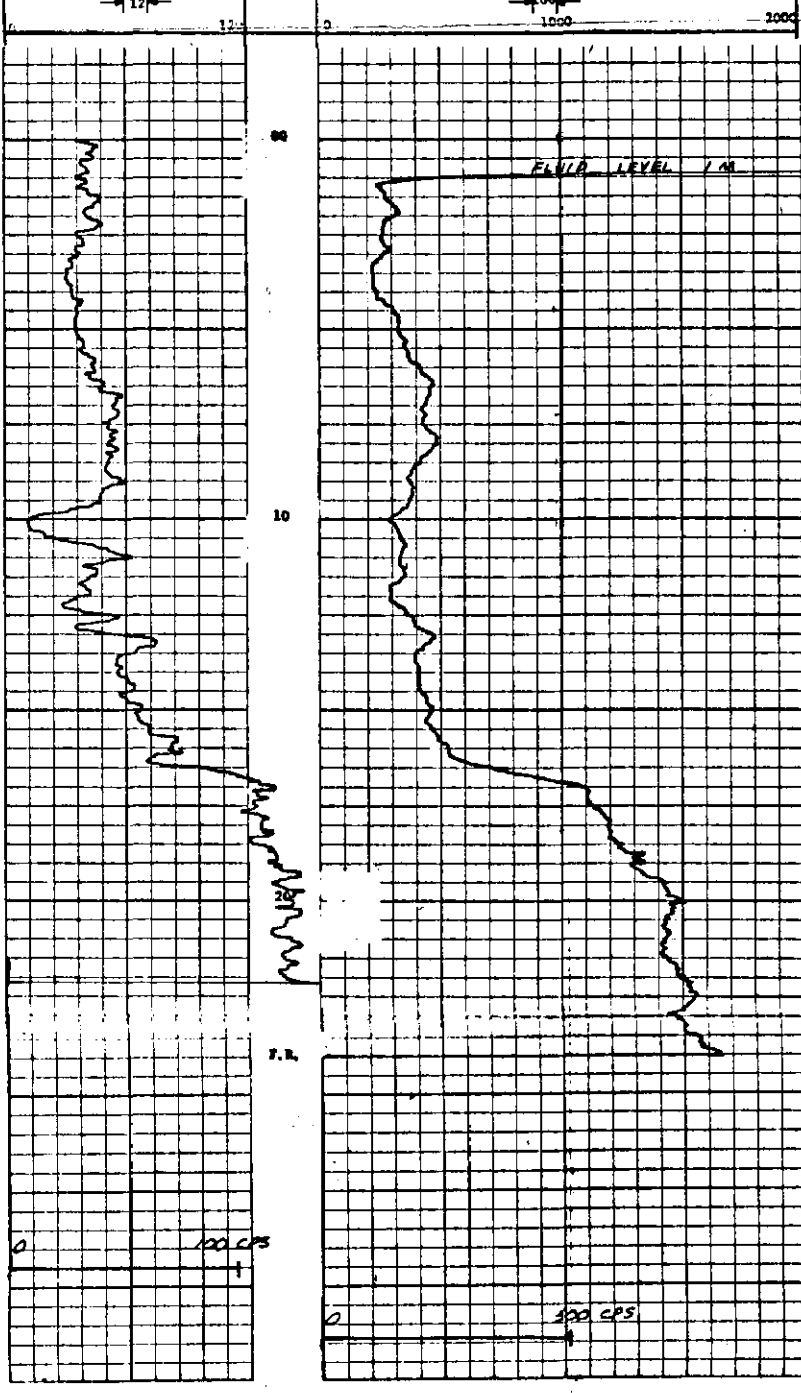
EQUIPMENT DATA

GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.	125	LOG TYPE	NEUTRON/NEUTRON
DIAMETER	3.2 CM	TOOL MODEL NO.	125
DETECTOR MODEL NO.		DIAMETER	3.2 CM
TYPE	SCINTILLATION	DETECTOR MODEL NO.	
LENGTH	10 CM	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	2.07 M	LENGTH	15 CM
GENERAL		SOURCE MODEL NO.	MRC-N-SS-W
HOIST TRUCK NO.		SERIAL NO.	171
INSTRUMENT TRUCK NO.	FU 04	SPACING	43 CM
TOOL SERIAL NO.	002	TYPE	AmBe
		STRENGTH	3 CURIES

LOGGING DATA

GENERAL RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED M/MIN	GAMMA RAY T.C. SEC.	GAMMA RAY SENS SETTINGS	GAMMA RAY ZERO DIV. L OR R	GAMMA RAY API G. R. UNITS PER LOG DIV.	NEUTRON T.C. SEC.	NEUTRON SENS SETTINGS	NEUTRON ZERO DIV. L OR R	NEUTRON API N. UNITS PER LOG DIV.
1	24	00	4	2	100	0	12	3	1000	0	100

REMARKS



TW-08

TK-SMITHERS 29 (3) A

OKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FOCUSED RESISTIVITY LOG

FILE NO

COMPANY OKE OIL ENTERPRISES LTD.

WELL B - TK - 08

LOCATION TELKWA AREA

FIELD TELKWA PROPERTY

PROVINCE BRITISH COLUMBIA

OTHER SERVICES CN-DEN-CAL

Permanent Datum: G.L. Elev. ____ Above Perm. Datum: K.B. ____ D.F. ____ G.L. ____

Log Measured from: K.B. ____ Ft. Above Perm. Datum

Drilling Measured from: K.B.

Date	13 AUG 1979
Run No.	ONE
Depth Driller	23 M
Depth Logger	23
Bottom Logged Interval	23
Top Logged Interval	23.5
Casing Driller	24.7
Casing Logger	0
Bit Size	0
Type Fluid in Hole	WATER
Fluid Level	4.7 M
Max. Rec. Temp.	13 CN
Equip. Location	156.8 M 3.215°C
Recorded By	
Witnessed By	
Operating Time	0.5 HR
Truck No.	PC #6

232 (20)

Remarks: CAL 86 7 ELECTRODE SONDE
CURRENT AT 20 CM BEAM
MIDFIELD RESISTANCE 560 OHMS 1 M ARRAY

RESISTIVITY	Depths	RESISTIVITY
OHM METERS 0 400		OHM METERS 0 100 200
		20 920 1320

FLUID LEVEL 4.7M

LOG ZERO

CAL ON 20 RANGE

CAL ZERO

LOGGED ON 20 RANGE

CAL ON 20 RANGE

DETAIL SECTION

00 10 20 F.R. 11 13 15

TW-08

TK-SMITHERS 79 (3) A

ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

COMPANY: CROWS NEST RESOURCES LTD.

WELL: R - TK - 08

LOCATION: TELKWA AREA

FIELD: TELKWA PROPERTY

PROVINCE: BRITISH COLUMBIA

Other Services: F.D.C. CN-GEN-GR

FILE NO

LSD SEC TWP RGE W ____ M

Permanent Datum ____ Elev. ____

Log Measured from ____ Above Perm. Datum

Drlg. Depths Measured from ____

K.B. ____ D.F. ____ G.L. ____

Run. No.	ONE		
Date	13 DEC 79		
First Reading	23 M		
Last Reading	0		
Footage Logged	23		
Depth Reached	23.5		
Depth Driller	24		
Casing Rotes	0		
Casing Driller	WATER		
Fluid Type	3.1		
Liquid Level	13		
Min. Diam.	13 CM		
Rm @			
Truck No.	FU #4		
Operating Time	0.3 HR		
Recorded By	P.[illegible]	Witnessed By	MR[illegible]

232 (21)

EQUIPMENT DATA

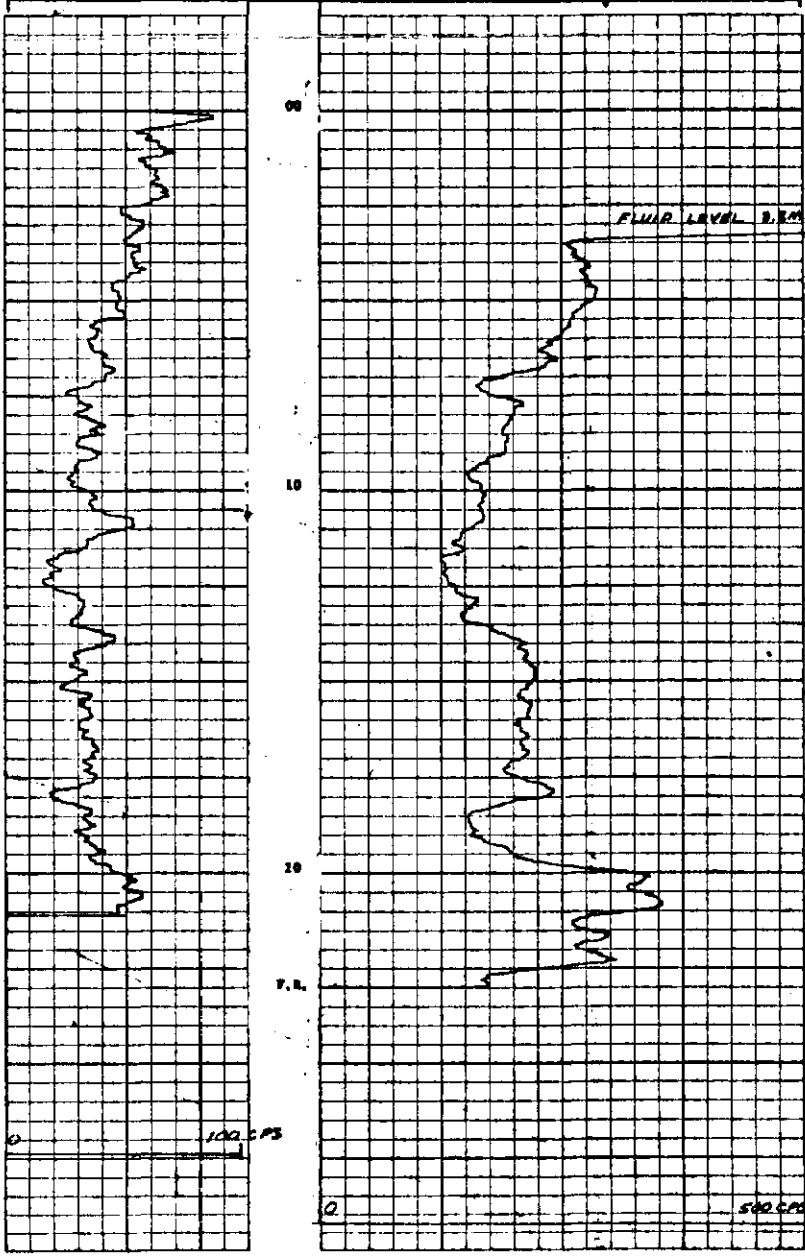
GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.	115	LOG TYPE	NEUTRON/NEUTRON
DIAMETER	3.2 CM	TOOL MODEL NO.	125
DETECTOR MODEL NO.		DIAMETER	3.2 CM
TYPE	SCINTILLATION	DETECTOR MODEL NO.	
LENGTH	10 CM	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	2.07 M	LENGTH	15 CM
GENERAL		SOURCE MODEL NO.	MRC-N-SS-W
HOIST TRUCK NO.		SERIAL NO.	171
INSTRUMENT TRUCK NO.	FU #4	SPACING	43 CM
TOOL SERIAL NO.	002	TYPE	AmBe
		STRENGTH	3 CURIES

LOGGING DATA

GENERAL				GAMMA RAY				NEUTRON			
RUN NO.	DEPTH FROM	DEPTH TO	SPEED M/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	23	0	4	2	100	0	12	3	1000	0	50

REMARKS

GAMMA RAY	DEPTHS	NEUTRON
GAMMA RAY INCREASES →		NEUTRON INCREASES →
API 12		API 50
0 — 120		0 — 500 — 1000



TW-08

TK-SMITHERS 79(3)A

C.L. ENTERPRISES LTD. CALGARY, ALBERTA

232 (22)

GENERAL				GAMMA RAY				SIDEWALL DENSILOG			
RUN NO.	DEPTHS FROM	TO	SPEED FT/MIN	T.C. SEC	SENS SETTINGS	ZERO DIVISIONS	API OR UNITS PER LOG DIV.	T.C. SEC	SENS SETTINGS	ZERO DIVISIONS	CPS/DIV
1	23	0	4	2	100	0	12	2	1000	2.09R	66.38

REMARKS: DEN TOOL #457
CAL TOOL #776

DEPTHS

CALIPER (DIAMETER - IN)
30 25 20 15 10

GAMMA RAY API
0 120

BULK DENSITY (GRAM/CC)

00

OVERBURDEN

0.30 DIRTY COAL

0.85 DIRTY COAL

1.15 CLEAN COAL

0.40 DIRTY COAL

1.30 DIRTY COAL

20

F.R.

1000 CPS. 0

ADC CPS

SHIFT. 8:00A

GNEOUS

DETAIL SECTION

11

13

15

TW-09

TIC - SMITHERS 79 (3) A

ROKE

OIL ENTERPRISES LTD CALGARY, ALBERTA

FILE NO.

LSD SEC TWP RGE W

COMPANY

WELL

LOCATION TEXACO AREA

FIELD TEXACO SMITHERS

PERMANENT DATUM ROUND TABLE Elev.

Log Measured from ROUND TABLE Above Perm. Datum

Other Services

Run No. ONE

Date 13 AUG 79

First Reading 22 M

Last Reading 0

Footage Logged 22

Depth Reached 22.7

Depth Driller 24.7

Casing Rote 0

Casing Driller 0

Fluid Type WATER

Liquid Level 0

Min Diam 13 CM

Operating Time 0.5 HR

Truck No PU #4

Recorded By P. [illegible]

Witnessed By HANDY

232 (23)

GENERAL				GAMMA RAY				SIDEWALL DENSILOG			
RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED M/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	CPS/ DIV
1	22	0	4	2	100	0	12	2	1000	2.09R	466.38

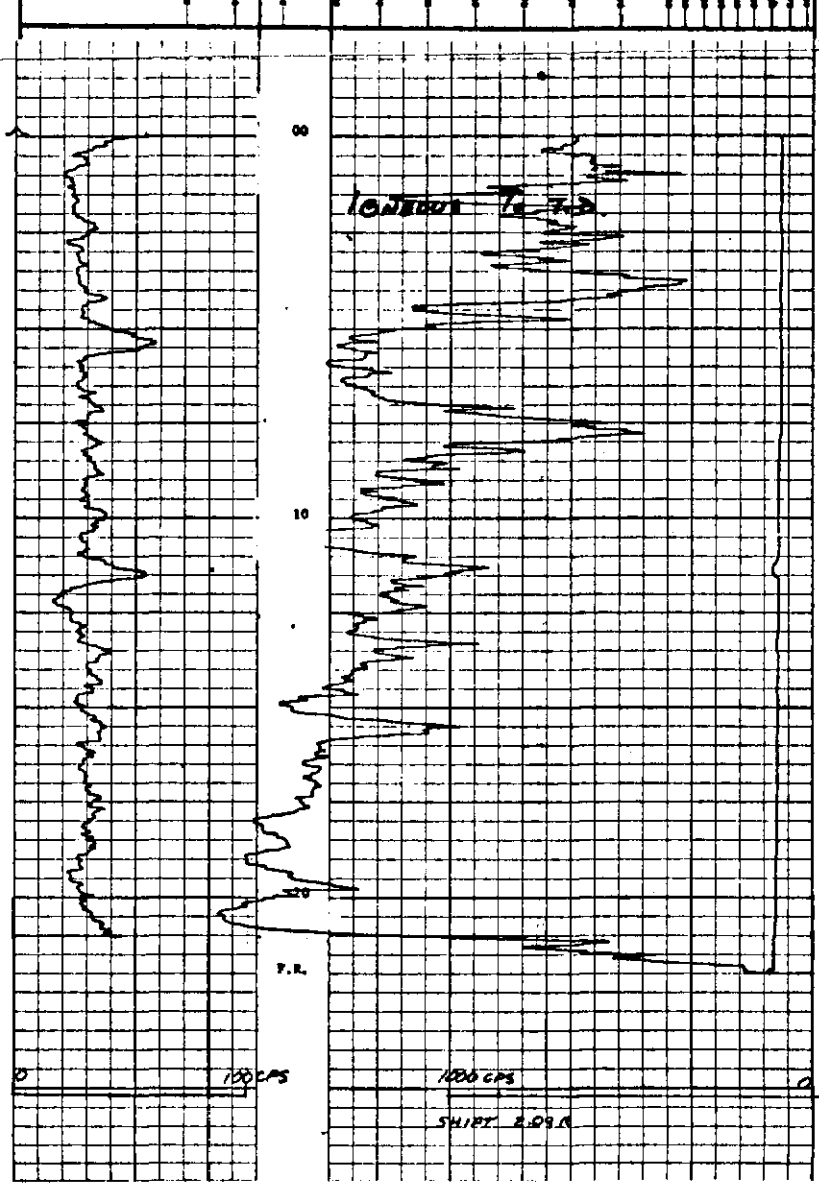
REMARKS DEN TOOL 9457
CAL TOOL 9776

DEPTHS

CALIPER
DIAMETER — CM
30 25 20 15 10

GAMMA RAY
API
12
0 120

BULK DENSITY
(GRAMS/CC)



TW-09

TK-SMITHERS 79(3)A

ROKE

ROKE OIL ENTERPRISES LTD. CALGARY, ALBERTA

Well 2-09-

Field CHINCHAGA

Location 10-

Elevation 2232 KB

Permanent Datum

Log Measured From

Drilling Measured From

Date

Run No.

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 @ Measured Temp

Rmf @ Measured Temp

Rmc @ Measured Temp

Source of Rmf and Rmc

Rm @ BHT

Time Since Circulation

Time Since Circulation

Max. Rec. Temp. Deg. F

Equipment No. and Location

Recorded By

Witnessed By

232 (24)

EQUIPMENT DATA

GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.	125	LOG TYPE	NEUTRON/NEUTRON
DIAMETER	3.2 CM	TOOL MODEL NO.	125
DETECTOR MODEL NO.		DIAMETER	3.2 CM
TYPE	SCINTILLATION	DETECTOR MODEL NO.	
LENGTH	10CM	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	2.07 M	LENGTH	15CM
GENERAL		SOURCE MODEL NO.	MRC-N-SS-W
HOIST TRUCK NO.		SERIAL NO.	171
INSTRUMENT TRUCK NO.	FT 64	SPACING	43CM
TOOL SERIAL NO.	002	TYPE	AmBe
		STRENGTH	3 CURIES

LOGGING DATA

GENERAL				GAMMA RAY				NEUTRON			
RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED M./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	23	0	4	2	1000	0	12	3	1000	0	50

REMARKS

GAMMA RAY	DEPTHS	NEUTRON
GAMMA RAY INCREASES →		NEUTRON INCREASES →
API 0 120		API 0 500 1000
	00	
	10	
	20	
	T.D.	
0 100 CPS		0 500 CPS

TW-09

TK-SMITHERS 79(3) A

ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO

COMPANY

WELL

LOCATION

FIELD

PROVINCE

LSD SEC TWP RGE W M

Permanent Datum

Log Measured from

Drilling Measured from

Elev. Above Perm. Datum

K.B.

D.F.

G.L.

Other Services

Run No.

Date

Depth Driller

Depth Logger

Bottom Log Int.

Top Log Int.

Casing Size

Casing Depth

Fluid Type

Fluid Level

Max. Rec. Temp.

Equip. No.

Location

Recorded By

Witnessed By

Operating Time

Truck No.

232

Remarks

RUN No. 1 ELECTRODE SONDE

CURRENT 20 MA BEAM

BOREHOLE RESISTANCE 600 OHMS 1 M ARRAY

RESISTIVITY	Depths	RESISTIVITY
OHM METERS 0 200		OHM METERS 0 100 200

FLUID LEVEL 3.5 M

10

20

E.E.

LOG ZERO

CAL ON 20 RANGE

CAL ZERO

REC ZERO

STOP ZERO

LOGGED ON 20 RANGE

CAL ON 20 RANGE

TW-10

TK-SMITHERS 79(3)A

ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO.
LSD SEC TWP RGE W
COMPANY CROSS WEST EXPLORATION LTD.
WELL R-TW-10
LOCATION TERRA ALTA
FIELD TERRA ALTA
Permanent Datum
Log Measured From
Rig Depths Measured From
Elev. Above Perm. Datum
K.B.
G.L.
Other Services

Run No. ONE
Date 18 AUG 79
First Reading 127 M
Last Reading 0
Footage Logged 127
Depth Reached 127.5
Depth Driller
Casing Driller 0
Casing Rdg.
Fluid Type
Liquid Level
Min. Diam.
Rm @
Operating Time 1.2 HR
Truck No. TU #4
Recorded By
Witnessed By

232 (26)

EQUIPMENT DATA

GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.	125	LOG TYPE	NEUTRON/NEUTRON
DIAMETER	3.2 CM	TOOL MODEL NO.	125
DETECTOR MODEL NO.		DIAMETER	3.2 CM
TYPE	SCINTILLATION	DETECTOR MODEL NO.	
LENGTH	10 CM	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	2.07 M	LENGTH	15 CM
GENERAL		SOURCE MODEL NO.	MRC-N-SS-W
HOIST TRUCK NO.		SERIAL NO.	171
INSTRUMENT TRUCK NO.	TU #4	SPACING	41 CM
TOOL SERIAL NO.	002	TYPE	AmBe
		STRENGTH	3 CURIES

LOGGING DATA

GENERAL				GAMMA RAY				NEUTRON			
RUN NO.	DEPTH FROM	DEPTH TO	SPEED M/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	127	0	4	2	100	0	8	3	1000	0	50

REMARKS LOGGED THROUGH DRILL STEM DRILL STEM TOO SHALL AT 128 M

GAMMA RAY	DEPTH	NEUTRON
GAMMA RAY INCREASES →		NEUTRON INCREASES →
API 0 — 8 — 80		API 0 — 500 — 1000

00 10 20 30 40 50 60 70 80 90

450
340
240
110
120

F.F.

0 — 30 CPS

0 — 500 CPS

TW-12

TR-SMITHERS 79(3)A

OIL ENTERPRISES LTD. CALGARY, ALBERTA

LEASE COMPANY CANADA CITIES SERVICE RESOURCES LTD.

WELL TW-12

LOCATION TWIN FALLS AREA

FIELD TWIN FALLS AREA

PROVINCE BRITISH COLUMBIA

Witnessed By VANDY

Run No. ONE

Date 23 AUG 79

Depth-Driller 46 M

Depth-Logger 46

Bottom Log Interval 46.5

Top Log Interval 48.3

Casing-Driller 6

Casing-Logger 6.1

Bit Size

Type Fluid WATER

Density

Viscosity 0

pH

Fluid Loss 13 CM

Source of Sample

Rm @ Meas. Temp.

Rmf @ Meas. Temp.

Rmc @ Meas. Temp.

Source of Rmf & Rmc

Rm @ BHT

Time Since Circ. 0.9 HR.

Time on Bottom FR. PM

Max. Rec. Temp. Deg. F.

Equip. No. & Location FH 84

Recorded By

Witnessed By VANDY

232 (27)

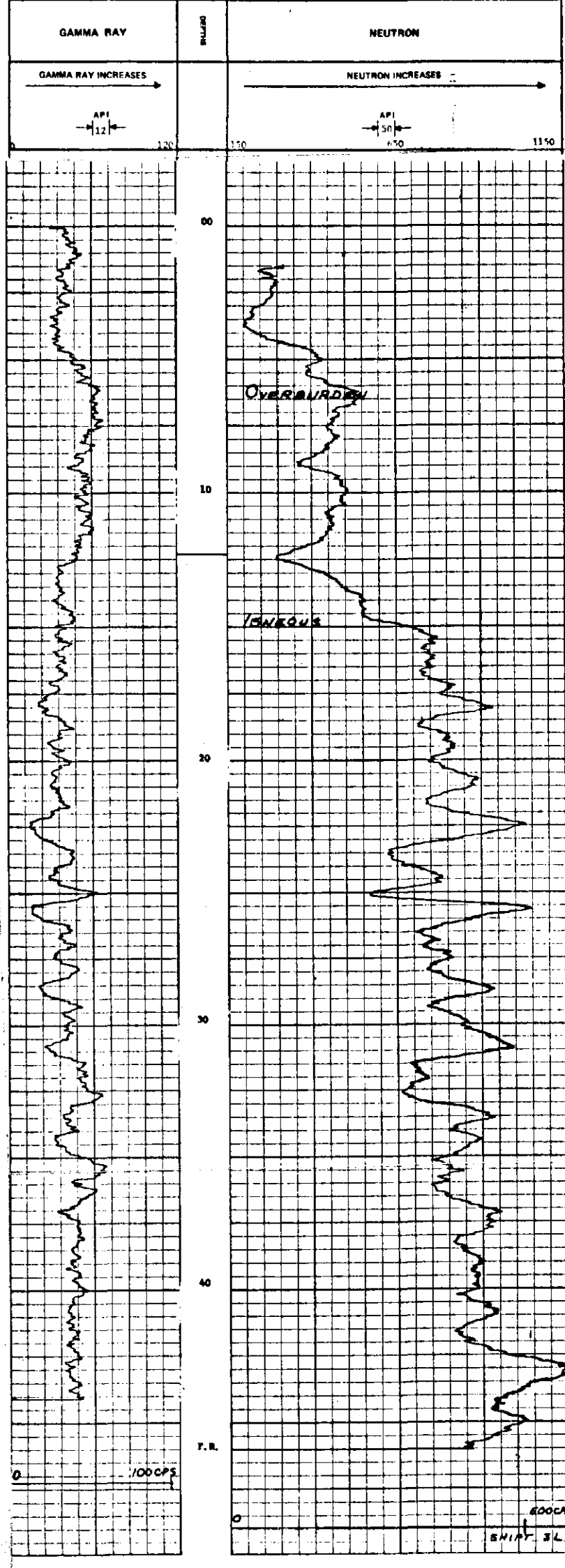
EQUIPMENT DATA

GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.	125	LOG TYPE	NEUTRON/NEUTRON
DIAMETER	3.2 CM	TOOL MODEL NO.	125
DETECTOR MODEL NO.		DIAMETER	3.2 CM
TYPE	SCINTILLATION	DETECTOR MODEL NO.	
LENGTH	10 CM	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	2.07 M	LENGTH	15 CM
		SOURCE MODEL NO.	MRC-N-SS-W
GENERAL		SERIAL NO.	171
HOIST TRUCK NO.		SPACING	43 CM
INSTRUMENT TRUCK NO.	FH 84	TYPE	AmBe
TOOL SERIAL NO.	002	STRENGTH	3 CURIES

LOGGING DATA

GENERAL				GAMMA RAY				NEUTRON			
RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED M/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	46	0	4	2	100	0	12	3	1000	3L	50

REMARKS



TW-13

TK-SMITHERS 79(3)A

ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO

COMPANY [redacted]

WELL R-TW-13

LOCATION TELKWA AREA

FIELD TELKWA PROPERTY

PROVINCE BRITISH COLUMBIA

LSD SEC TWP RGE M

Permanent Datum Elev.

Log Measured from Above Perm. Datum

Well Depths Measured from K.B. C.B.G.L.

Other Services GDN, FDL, DIR

Run No.	
Date	25 Oct 1979
First Reading	119
Last Reading	0
Footage Logged	119
Depth Reached	119.8
Depth Driller	128
Casing Rake	2.5
Casing Driller	2.7
Fluid Type	WATER
Liquid Level	3
Min. Diam.	13 CM
Operating Time	1.0 HR
Truck No.	[redacted]

Recorded By [redacted] Witnessed By HANDY

232 (28)

GENERAL				GAMMA RAY				SIDEWALL DENSILOG			
RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED M/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	CPS/ DIV
1	119	0	4	2	100	0	12	3	1000	2.098	66.38

REMARKS DEN TOOL #457

CAL TOOL #776

DEPTHS

CALIPER (DIAMETER – CM)

30 25 20 15 10

GAMMA RAY API

12

0 120

BULK DENSITY (GRAMS/CC)

OVERBURDEN

1.80

2.65

SEDIMENTARY TO T.D.

0 100 CPS 1000 CPS 0

SHIFT 2.09 R

DETAIL SECTION

TW-13

TK-SMITHERS 29(3)A

ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. P 8455

COMPANY: ROKE OIL ENTERPRISES LTD.

WELL: 3-14-33

LOCATION: 3 MILES ATTA

FIELD: TATLA LAKE

PROVINCE: BRITISH COLUMBIA

TWP. 14 RGE. 3 W6 SEC. 33

Permanent Datum: GROUND LEVEL — Elev.

Log Measured from: 20 FT. ABOVE PERM. DATUM — Elevation: K.B.

Drilling Measured from: GROUND LEVEL — D.F. G.L.

Run No.	ONE
Date	20 AUG 79
Depth Driller	123.1 M
Depth Logger	123
Bottom Logged Interval	122.9
Top Logged Interval	114
Casing Driller	2.3
Casing Logger	2.3
Bit Size	10 7/8
Type Fluid in Hole	WATER
Density	1.1
Viscosity	50
pH	10
Fluid Loss	20 CC
Source of Sample	FLOWLINE
Rm @ Meas. Temp.	.3 @ 15°C
Rmf @ Meas. Temp.	.3 @ 15°C
Rmc @ Meas. Temp.	.3 @ 15°C
Source of Rmf & Rmc	MEASURED
Rm @ BHT	.2 @ 15°C
Time Since Circ.	3 HRS
Max. Rec. Temp. Deg. C	15
Equip. Location	3 MILES
Recorded By	WHITE
Witnessed By	WATTS

28

RUN ONE

EQUIPMENT DATA

NEUTRON — SONDE NO. 132 — SOURCE STRENGTH 5 MC — SOURCE TYPE AM-BE — SPACING 15 CM — DETECTOR TYPE HE3 — DETECTOR SPACING 15 CM — MUD CORR. NO — BOREHOLE CORR. NO — MATRIX LIME — HOLE SIZE 10 7/8 — CASING SIZE 7 — CASING WGT. 20 — CASING DEPTH 122 M

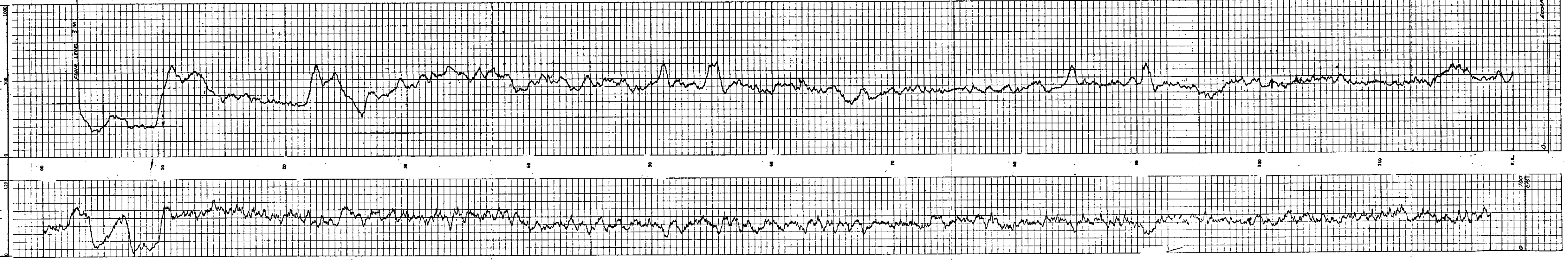
DENSITY — SONDE NO. 132 — SOURCE STRENGTH 5 MC — SOURCE TYPE CS-137 — SPACING 15 CM — DETECTOR TYPE GM — DETECTOR SPACING 15 CM — MUD CORR. NO — BOREHOLE CORR. NO — MATRIX LIME — HOLE SIZE 10 7/8 — CASING SIZE 7 — CASING WGT. 20 — CASING DEPTH 122 M

CASING DATA

	SIZE	WGT.	GRADE	FROM	TO
SURFACE	7	20	J-55	0	122
PRODUCTION					

NEUTRON — NEUTRON INCREASES — API 1000 500 0

CASING RAY — CASING RAY INCREASES — API 0 150



TK-SMITHERS 79(3)A TW-13

ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FORMATION EVALUATION LOG

FILE NO

LSD SEC TWP RGE M

COMPANY CENTRAL WEST RESOURCES LTD.

WELL T-TK-13

LOCATION TEXAN AREA

FIELD PEIGIA PROPERTY

PROVINCE EASTERN ONTARIO

Permanent Datum: Elev.
Log Measured from: Above Perm. Datum
Drill Depths Measured from: K.B. G.L.

Other Services: CBIL DIR CN-DEN-GAL

Run. No.	ONE		
Date	25 AUG 1979		
First Reading	119 M		
Last Reading	0		
Footage Logged	119		
Depth Reached	119.5		
Depth Datum	120		
Casing Rule	2.5		
Casing Driller	2.7		
Fluid Type	WATER		
Liquid Level	2.7		
Bhm. Depth	13		
Rm. @ °C	20 @ 25°		
Operating Time	1.2 HR		
Truck No.	EL 44		

Recorded By

Witnessed By HANDY

232 (30)

Remarks: FDL #6 7 ELECTRODE SONDE
CURRENT 11 20 CM BEAM
MUDFISH RESISTANCE 400 OHMS 1 M ARRAY

RESISTIVITY	Depths	RESISTIVITY
OHM METERS 0 400		OHM METERS 0 100 200 320 920 1320

FLUID 2.7M

LOG ZERO

CAL ON EC RANGE

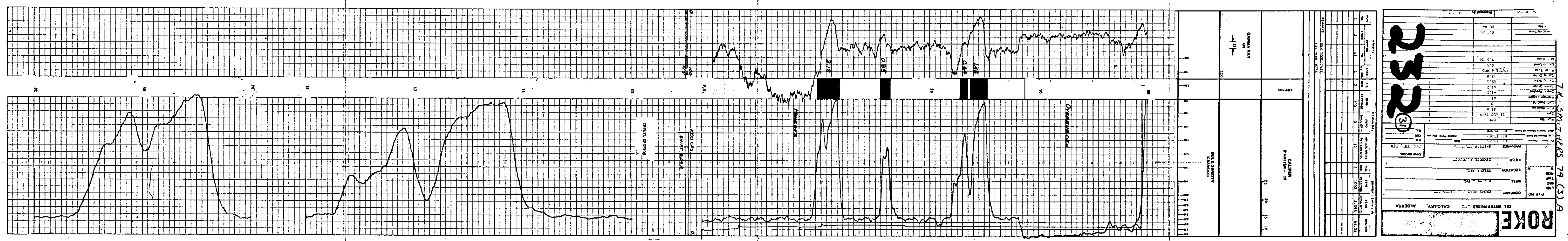
CAL ZERO

LOGGED ON EC RANGE

CAL ON EC RANGE

CAL ZERO

DETAIL SECTION


ROKE
OIL ENTERPRISES LTD. CALGARY, ALBERTA
FILE NO
COMPANY
WELL
LOCATION
FIELD
PROVINCE
DATE
DEPTHS
GAMMA RAY
CALIPER
RESISTIVITY
SPONTANEOUS POTENTIAL
MICRO SFL
MICRO INVERSE
MICRO NORMAL
ZONE
ZONE
ZONE
ZONE
PRIMARY
SECONDARY
TK-SOUTHERS 79(3)A
D-22-01

D-22-01

232 (32)

TK-SMITHERS 79(3)A

ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO

LSD SEC TWP RGE W

COMPANY

WELL 2-22-01

LOCATION

FIELD

PROVINCE

Permanent Datum

Log Measured From

All Depths Measured From

Elev.

Above Perm. Datum

K.B.

D.F.

G.L.

Other Services

Run No.

Date

First Reading

Last Reading

Footage Logged

Depth Reached

Driller

Casing Driller

Casing Rate

Fluid Type

Fluid Level

M. Diam.

Truck No.

Operating Time

Recorded By

Witnessed By

EQUIPMENT DATA

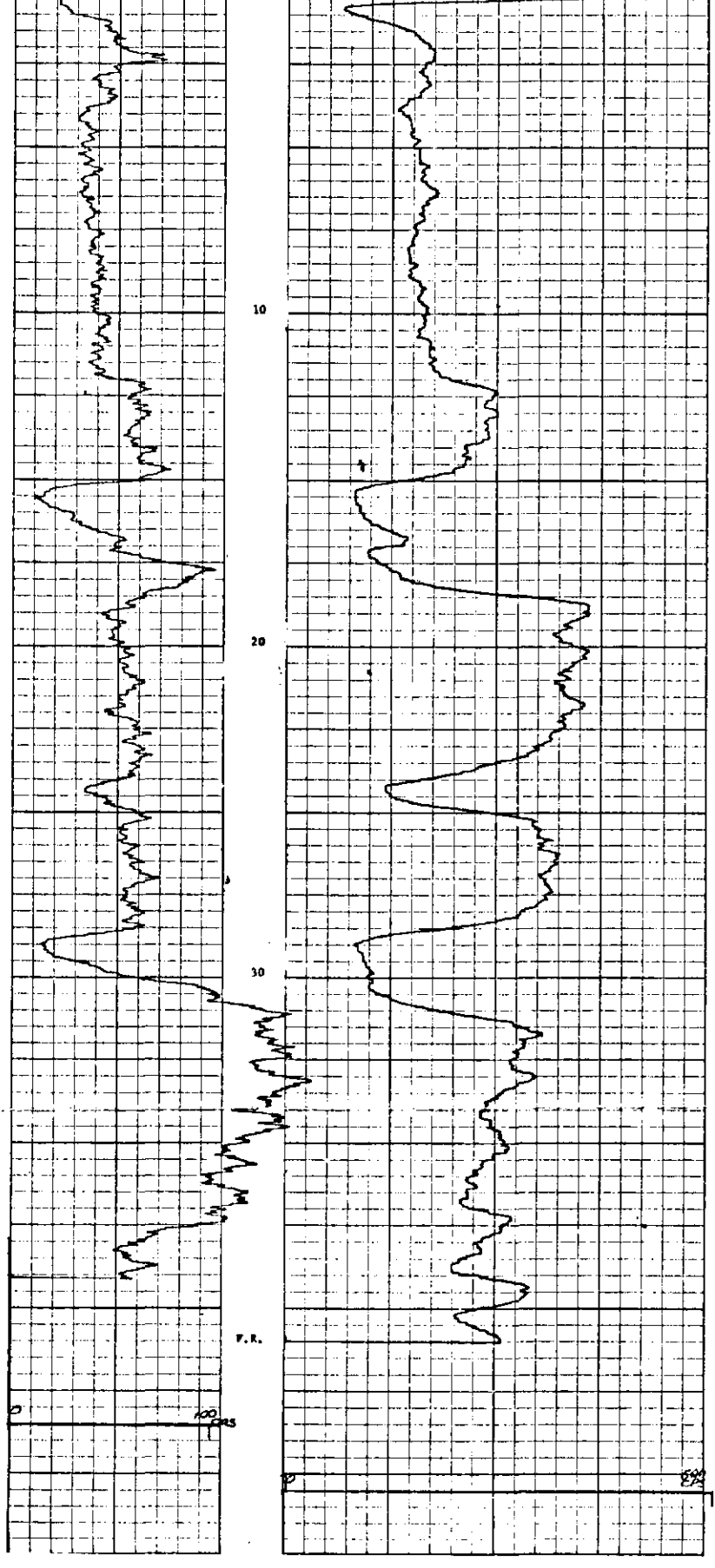
GAMMA RAY		NEUTRON	
RUN NO.	002	RUN NO.	002
TOOL MODEL NO.	135	LOG TYPE	NEUTRON/NEUTRON
DIAMETER	3.2 CM	TOOL MODEL NO.	125
DETECTOR MODEL NO.		DIAMETER	3.2 CM
TYPE	SCINTILLATION	DETECTOR MODEL NO.	
LENGTH	10 CM	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	2.05 M	LENGTH	10 CM
GENERAL		SOURCE MODEL NO.	MRC-N-SS-W
HOIST TRUCK NO.		SERIAL NO.	171
INSTRUMENT TRUCK NO.	FD 74	SPACING	41 CM
TOOL SERIAL NO.	002	TYPE	AmBe
		STRENGTH	3 CURIES

LOGGING DATA

GENERAL				GAMMA RAY				NEUTRON				
RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED M/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	41	4	3	100	0	12	3	1000	0	20

REMARKS

GAMMA RAY	DEPTHS	NEUTRON
GAMMA RAY INCREASES →		NEUTRON INCREASES →
API 0 — 120		API 0 — 500 — 1000



D-22-01

TK- SMITHERS 29(3)A

OKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FOCUSED BEAM LOG

FILE NO

COMPANY CPOG WEST RESOURCES LTD.

WELL D-22-03

LOCATION TEKWA AREA

FIELD ZYMOTIZ PROPERTY

PROVINCE BRITISH COLUMBIA

Elev.

Above Perm. Datum

Other Services: DIL, GRN CP-ZDC-CAL

Permanent Datum

Log Measured from

Drlg Measured from

Rge

Twp

Sec

LSD

Run No. ONE

Date 11 AUG 1979

First Reading 41 M

Last Reading 00

Bottom Logged 41.2

Bottom Driller 41.2

Top Logged 12.1

Casing Driller 12.8

Casing Depth

Fluid Type SALT WATER GEL

Fluid Level 0.5

Max. Temp. 9.6

Time @ 25°

Recorded By

Witnessed By

Operating Time 0.6 HR

Truck No. PG 54

Remarks FBL #6 7 ELECTRODE SONDE

CURRENT 1E 20 CM BEAM

MUDFILM RESISTANCE 330 OHMS 1 M ARRAY

RESISTIVITY	Depths	RESISTIVITY
OHM METERS 0 1000		OHM METERS 0 100 200 1330 2300 3360

00
10
20
30
40 F.L.
13
15
17
19
28
30
32

LOG ZERO

CAL 100 RANGE

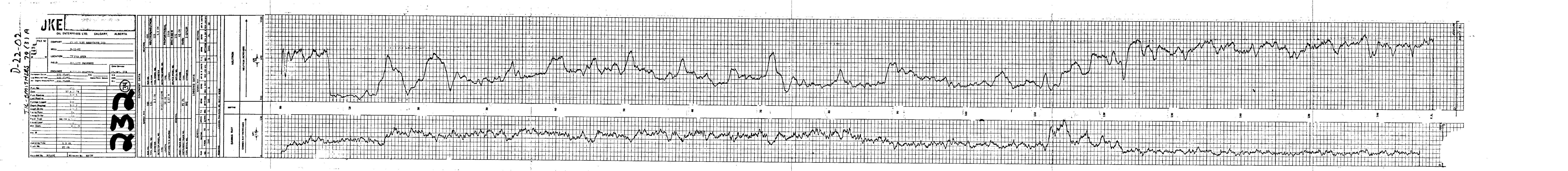
CAL ZERO

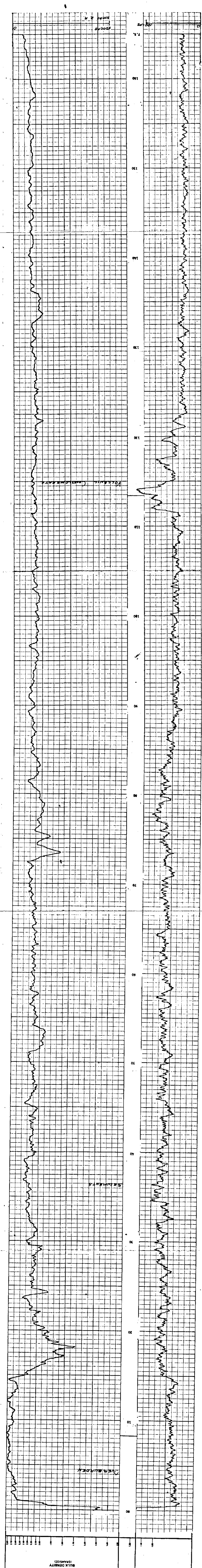
RES ZERO

STOP ZERO

CAL 20 RANGE

DETAIL SECTION


D-22-02
JKE
JKE ENTERPRISES LTD. CALGARY, ALBERTA
COMPANY
WELL
LOCATION
FIELD
ENGINEER
RUN No.
Date
Depth-Driller
Depth-Logger
Btm. Log Int.
Top Log Int.
Type Fluid in Hole
Salinity
Density
Level
Max. Temp.
Equip. No.
Location
Recorded By
Witnessed By
EQUIPMENT DATA
CASING DATA
SURFACE
INTERMEDIATE
PRODUCTION
LINER
TUBING
OPEN HOLE
PERFORATIONS
TYPE LOG
SCHLUMBERGER
GAMMA RAY
NEUTRON
NEUTRON (PATENTED)
GAMMA RAY (PATENTED)
CASING COLLAR LOCATOR
CALIPER
SPONTANEOUS POTENTIAL
RESISTIVITY
FORMATION DENSITY
SONIC
CORRELATION
PROPOSITIONAL
REMARKS
RUN NUMBER
TIME MARK
TIE-IN
LOGGING DATE
TIME
TIME SINCE CIRC.
MAX. REC. TEMP.
EQUIP. LOCATION
RECORDED BY
WITNESSED BY
TIE-SMITH 29-21A
NE/4


ROKE
OIL ENTERPRISES LTD. CALGARY, ALBERTA
COMPANY
WELL D-22-02
LOCATION TELKWA AREA
FIELD
PROVINCE
FILE NO
LSD
SEC
TWP
RGE
W
Permanent Datum
Log Measured from
Elev.
Above Perm. Datum
Run No ONE
Date 17 AUG 1979
First Reading 165 M
Last Reading 0
Footage Logged 165
Depth Reached 169.2
Depth Driller 169.2
Casing Rote 14
Casing Driller 14
Fluid Type WATER & MUD
Liquid Level 0
Min Diam. 9.6 CM
Operating Time 2.0 HR
Truck No FL 14
Recorded By
Witnessed By
Other Services
GEN. DIS
K.B.
CSG
G.L.
GENERAL
RUN NO 1
DEPTHS FROM 165 TO 0
SPEED M./MIN. 4
T.C. SEC. 2
SENS. SETTINGS 100
GAMMA RAY DIV'L. CR. M 25 MV 0
AM G.R. UNITS PER LOG DIV. 12
SIDEWALL DENSILOG T.C. SEC. 2
SENS. SETTINGS 1000
DIV'L. CR. M 2K
CPS/ DIV 29.4
REMARKS
GENERAL NOTE: LOGGED THROUGH ID DRILL RODS. NOTE POSITION OF RODS IN TIE
DRILL HOLE MUST BE TAKEN INTO CONSIDERATION WHEN USING THE DENSITY SCALE
DENSITY TOOL #437 CALIPER TOOL #776
DEPTHS
GAMMA RAY API
0 12 120
BULK DENSITY (GRAMS/CC)
2.70 2.65 2.60 2.55 2.50 2.45 2.40 2.35 2.30 2.25 2.20 2.15 2.10 2.05 2.00 1.95 1.90 1.85 1.80 1.75 1.70 1.65 1.60 1.55 1.50 1.45 1.40 1.35 1.30 1.25 1.20 1.15 1.10 1.05 1.00
BULK DENSITY (GRAMS/CC)
GAMMA RAY
SIDEWALL DENSILOG
GENERAL
DEPTHS
REMARKS
OVERBURDEN
SEDIMENTS
VOLCANIC (ANDESORITE)
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
35
TK-SMITHERS 79(3)H
D-22-02

D-TH-01

TK - SMITHERS 79(3)A

JKE

DIL ENTERPRISES LTD. CALGARY, ALBERTA

COMPANY [illegible] TEST RESOURCES LTD.

WELL D-TH-01

FIELD [illegible] PROPERTY

SECTION [illegible] AREA

Elev. Above Perm. Datum

K.B.

D.F.

G.L.

Other Services

232 (36)

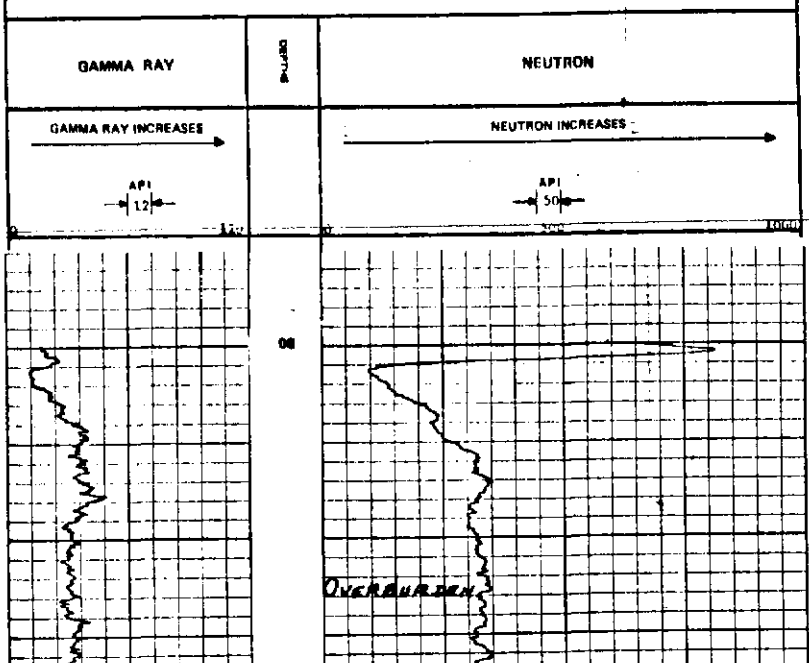
EQUIPMENT DATA

GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.	125	LOG TYPE	NEUTRON/NEUTRON
DIAMETER	3.2 CM	TOOL MODEL NO.	125
DETECTOR MODEL NO.		DIAMETER	3.2 CM
TYPE	SCINTILLATION	DETECTOR MODEL NO.	
LENGTH	10 CM	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	2.07 M	LENGTH	14 CM
GENERAL		SOURCE MODEL NO.	MRC-N-SS-W
HOIST TRUCK NO.		SERIAL NO.	171
INSTRUMENT TRUCK NO.	FU #4	SPACING	43 CM
TOOL SERIAL NO.	002	TYPE	AmBe
		STRENGTH	3 CURIES

LOGGING DATA

GENERAL				GAMMA RAY				NEUTRON			
RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED M/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	46	0	4	2	100	0	12	3	1000	0	50

REMARKS: LOGGED THROUGH HQ DRILL RODS



D-TH-01

TH-SMITHERS 79 (3)A

ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO

LSD
SEC
TWP
RGE
W ____ M

COMPANY GROS ROSE PETROLEUMS LTD.

WELL D-TH-01

LOCATION TELKWA AREA

FIELD TELKWA PROPERTY

PROVINCE BRITISH COLUMBIA

Other Services

GSN
CSG
G L

Permanent Datum ____ Elev. ____
Log Measured from RIG FLOOR — Above Perm. Datum
Elev. Depths Measured from RIG FLOOR

Run No.	ONE
Date	23 AUG 79
First Reading	44 M
Last Reading	0
Footage Logged	44
Depth Reached	44.9
Depth Driller	49
Casing Make	10
Casing Driller	10
Liquid Type	WATER
Liquid Level	0
Max. Chem.	9.6 C°
Operating Time	1.1 HR
Truck No	FU #4

Recorded By ____ Witnessed By ____

(21)

GENERAL — RUN NO. 1 — DEPTH FROM 44 TO 0 — SPEED 4 — T.C. SEC. 2

GAMMA RAY — ZERO DIVISIONS 0 — SENS. API UNITS/DIV. 12 — T.C. SEC. 2 — RANGE 100

BOREHOLE SPINNER LOG — T.C. SEC. 2 — RANGE BOTTOM 500 — SENS. CPM/DIV. 2.09K — CPM DIV. 79.4

REMARKS: INITIAL HOLE TEST RUN TAKEN THROUGH OPEN HOLE FROM BOTTOM OF HOLE TO END OF CASING. CORONAL SCALE INDICATES THE DENSITY SCALE. DENSITY TOOL #4577 CALIPER TOOL #376

DEPTHS

GAMMA RAY API — 0 — 120

BULK DENSITY (GRAMS/CC) — 2.20 — 1.20

STOOGE SWIFT POINT

Recorded By ____ Witnessed By ____

MAPS &
STRATIGRAPHIC SECTIONS

NATIONAL TOPOGRAPHIC SYSTEM

BRITISH COLUMBIA

THIRD STATUS EDITION — January 15th, 1969.

SHEET 93 L

SMITHERS

BRITISH COLUMBIA

COAST LAND DISTRICT — RANGE 5

ACCESS MAP

ENCLOSURE: #2

Scale 1:250,000 or approximately 1 Inch to 4 Miles

Miles 5 0 5 10 15 20 Miles

Scale of Kilometres

5 0 5 10 15 20 25 30

Magnetic Declination approximately 26°45' East of Centre of sheet, 1969.
Decreasing approximately 3'41" annually

Maps and indexes with price lists may be obtained from the Map Production Division, Brunk Columbus Lands Service, Parliament Buildings, Victoria, B.C.

ZYMOETZ RIVER AREA

TELKWA NORTH AREA

TENAS CREEK AREA

CABINET CREEK AREA

DENY'S CREEK AREA

THAUTIL RIVER AREA

CHISHOLM LAKE AREA

CASSIAR LAND DISTRICT

COAST LAND DISTRICT

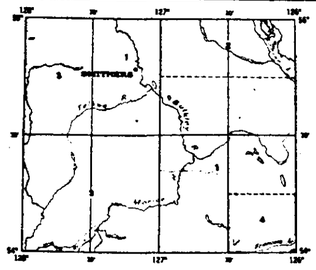
To Prince Rupert-219 miles
To Hazelton-28 miles

To Smithers Landing-6 Miles

To Prince George-176 miles
To Burns Lake-16 miles

To Colleymount-18 Miles

COAST LAND DISTRICT — RANGE 4 — COAST LAND DISTRICT — RANGE 5



RELIABILITY DIAGRAM

1. Standard Provincial Topographic Surveys, 1:31,680, 1950-54.
2. Provisional Air Survey Template Mapping, 1:31,680, 1951.
3. Preliminary compilation from B.C. Dept's Air Photos, 1949.
4. Controls adapted from Mines and Technical Surveys, Ottawa, 1950.
5. Planimetry compiled from B.C. Dept's Air Photos, 1948.
6. Contours from Mines and Technical Surveys, Ottawa, 1951.

Roads revised from B.C. Dept's air photos, 1968.

Form Sheets Edition, compiled and produced by Geographic Division, Surveys and Mapping Branch, Dept. of Lands & Forests, Victoria, B.C., 1953.
Third Series Edition revised 1969.

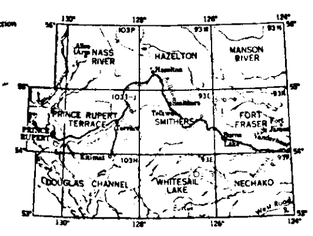
REFERENCE

- Land glimpsed or covered by application under the Land Act
- Surveyed Timber or Pulp Lease, Timber or Pulp Licence (T L or PL)
- Indian Reserve
- Government Reserve (G.R.)
- Land District Boundary
- Provincial Forest Boundary
- Tree Farm Licence
- Municipality
- Water Supply Area
- Park
- Park less than 40 acres
- Campground
- Forest Service Lookout
- Settlement or Locality
- Post Office (P.O.)
- School (Sch.)
- Hospital (Hos.)
- Mine
- Dyke
- Historic Monument
- Mile Post
- International Boundary and Monument

REFERENCE

- Road, Hard Surface, All Weather
- " Loose Surface, All Weather
- " Loose Surface, Less than 2 lanes
- " Private (Logging, Mining etc.)
- " Four Wheel Drive
- Trail
- Railway
- Main Telephone Line
- Main Electric Power Line
- Horizontal Control Station
- Contours (Interval 500 feet)
- Elevation in feet above mean sea-level
- Intermittent Stream
- Intermittent Lake or Seasonal Inundation
- Swamp or Marsh
- Glacier or Icefield
- Spring
- Dam
- Customs Office
- Lighthouse (occupied)
- Airport or Airstrip
- Anchorage or Seaplane Anchorage
- Abandoned Railway

Universal Transverse Mercator Projection



On the above map index, the maps published are shown thus:

With District lot land status

Without

Land Commissioners' Offices are located in Smithers and Burns Lake.

Mineral Claims are not shown on this sheet.

District land lots, 5 acres or less may not be shown due to the scale of this map.

232 (1)

TK-SMITHERS 79(2)A

COAL TITLES REFERENCE MAP 101

DEPARTMENT OF MINES AND PETROLEUM RESOURCES, VICTORIA, B.C.

FOR INFORMATION AND MAP COPIES APPLY TO THE OFFICE OF THE CHIEF GOLD COMMISSIONER, VICTORIA, B.C.

CASSIAR LAND

RANGE 5 COAST

55°00'

128°00'

152 151 150 149 148 147 T 144 146 145 144 143 142 141 140

55

50

Kitsuns Creek

Kitsegueclà River

THE NIPPLES

John Brown

ROCKY RIDGE

BOLD(G)

SUNS(G)

HANKIN(G)

COAL(G)

PRANCER(G)

Hankin Lake

Louise L.

Bud Lake

Coal Creek

Sandstone Cr.

Sandstone Lake

Red Canyon Cr.

Kitsegueclà L.

Taltzen L.

TALTZEN

C H E L A N S K I R I V E R

		C.L. L.5581 4259	L.5580	L.5579	L.5866
	C.L. L.5562 4258	C.L. L.5570 4257	C.L. L.5571 APP.	L.5572	L.5865
C.L. L.5563 4259	C.L. L.5561 4255	C.L. L.5560 4254	L.5559	L.5863	L.5864
C.L. L.5563 4251	C.L. L.5554 4252	C.L. L.5555 4253	APP L.5556		
L.5540		L.2277			

L.3397 C.G.

L.3396 C.G.

L.3394 C.G.

L.3393 C.G.

L.3395 C.G.

L.5434

L.2549

S.T.L. 7813"

S.T.L. 7811"

L.467

S.T.L. 7809

PASS

S.T.L. 7812"

S.T.L. 7810"

a b c d e f g h i j

LEGEND

RCE

CPR

CNR

RAILWAY SKETCH

MAP AREA

INDEX MAP

T.K. SMITHERS, 79 Oct 8

Crows Nest Resources Limited

EXPLORATION

TELKWA AREA
B.C.

232②

LAND MAP

AUTHOR: COAL	SCALE: 1:50000	ENCLOSURE No: 4
DATE: FEB. 1979	REVISED:	

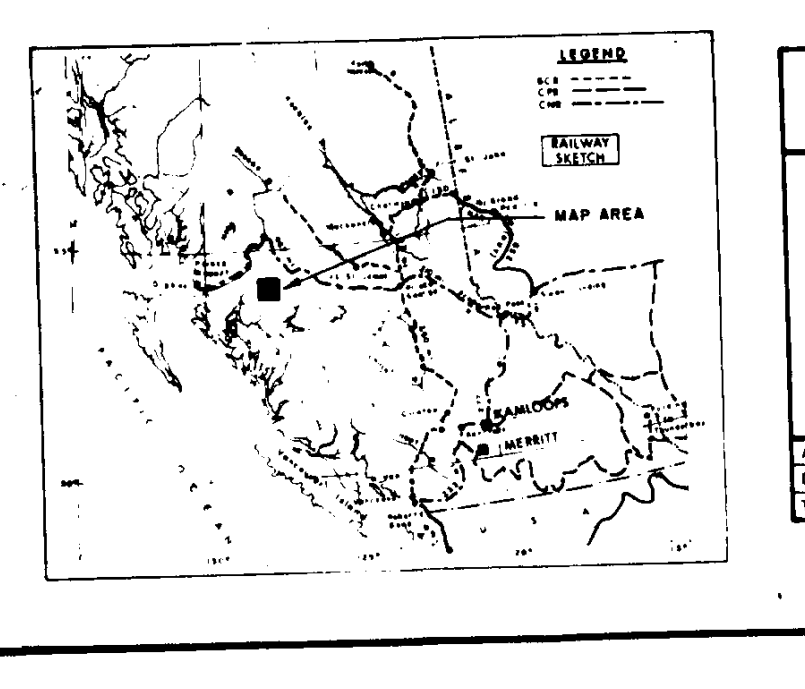
COAL TITLES REFERENCE MAP C93L/3E & W

DEPARTMENT OF MINES AND PETROLEUM RESOURCES, VICTORIA, B.C.

FOR INFORMATION AND MAP COPIES APPLY TO THE OFFICE OF THE CHIEF GOLD COMMISSIONER, VICTORIA, B.C.

232 ③

TK-SMITHERS 79 (2) A



Crows Nest Resources Limited

EXPLORATION

TELKWA AREA
B.C.

LAND MAP

SHELL - CNRL LICENCES TELKWA 93-L-11,12
ZYMOETZ 93-L-11,12
DENY'S 93-L-6E,6W
THAUTIL 93-L-3W,6W
CHISHOLM 93-L-6E,3W

AUTHOR: COAL	SCALE: 1:50 000	ENCLOSURE No: 5
DATE: FEB. 1979	REVISED:	DRAWING No: HH-18D(Red)
To Accompany		

78,500N

77,500N

74,500N

72,500N

7,500E

80,500E

JKv

(air observed)

JKv

(air observed)

CL 4258

CL 4256

CL 4255

CL 4252

CL 4251

L.5562

L.5553

L.5540

L.5539

L.5541

DDH "A" EL. 809.85 (-90°)
O.B. to 4.75
0.67 at 30.08
0.67 at 41.42
0.67 at 50.32
3.51 at 64.92
JKv at 70.10
TD at 75.00(JKv)

DDH "1" (-90°)
O.B. at 5.18
0.61 at 184.10
0.61 at 192.94
1.83 at 201.78
0.91 at 224.64
1.52 at 226.16
JKv at 242.00
TD at 259.69 (JKv)

DDH "2" (-90°)
O.B. to 5.79
0.61 at 188.67
0.30 at 195.33
1.83 at 212.75
0.91 at 228.30
0.61 at 240.79
1.22 at 243.54
JKv at 260.91
TD at 263.04 (JKv)

DDH "3" (-90°)
O.B. to 15.85
1.22 at 235.92
TD at 251.16 (JKs)

DDH "D"
EL. 830.58(-90°)
O.B. to 8.26
0.91 at 17.86
0.76 at 28.07
1.55 at 43.59
4.88 at 54.38
JKv at 66.84
TD at 67.97(JKv)

D-ZZ-2 EL. 843.2
O.B. to 8.24
JKv at 111.76
TD at 169.16 (JKv)
(No COAL)

D-ZZ-1 E
O.B. to 11.23
2.50 (2.09 at
D.85 at 23.
2.13 at 28
JKv at
TD at 42

DDH "B" E
O.B. to 2.
2.04 at 8.
2.62 at 17.
JKv at 20.
TD at 23.

Old camp

Coal seam Outcrops

Section A2-3

Measured Section A2-2

Seam outcrops

Measured section A1-1, A1-2 & A2-1

Measured Strat. section

Chopper pad

Coal float

No outcrop, some sed. float (no Coal-float)

Ss./congl

Congl. (20m cliff)

Good Coa

Congl.

Ss.

Ss / carb. Sh. / mud St.

Ss.

Mud St.

Congl. faulted over carb. Sh./Coal/mud

15 m. of congl. overlying Ss.

KTi

Dacite porphyry

Maroon Ss.

Maroon Ss.

Qtz. felspar porphyry

JKs

Ss. outcrop

Flat lying sediments. carb. Sh. / Ss.

232a

L 5581
CL 4259

L 5862
CL 4258

L 5570
CL 4257

L 5571

L 5572
CL 4255

L 5573
CL 4254

L 5574
CL 4253

L 5575
CL 4252

L 5576
CL 4251

L 5577
CL 4250

L 5578
CL 4249

L 5579

L 5580

L 5581

L 5582

L 5583

L 5584

L 5585

L 5586

L 5587

L 5588

L 5589

L 5590

L 5591

L 5592

L 5593

L 5594

L 5595

L 5596

L 5597

L 5598

L

L.135
CL 4242

L.136
CL 4243

6 035 000 N

6 034 000 N

6 033 000 N

6 032 000

6 031 000 N

6 030 000 N

6 029 000 N

2.45m Coal Seam

JKs

JKv

L.138
CL 4245

L.137
CL 4244

L4806
CL 4247

L.139
CL 4246

L.140

L4807
CL 5178

L4808
CL 4248

L4809
CL 4249

L4812
CL 5180

L4811
CL 4250

L4810
CL 5179

L4813
CL 5181

L4814
CL 5182

L4815
CL 5183

Volcanic O.C.

Volcanic

Volcanic O.C.

Volcanics

Volcanic Float
No Sed. or Coal Float

Chopper Pad

A lot of Coal Float

Coal Float

Coal Float

Coal Float

Mudst./Carb. Shale/Minor Coal. A lot of coal in soil above mudst.

Mudst./Carb. mudst.

Rhyolite Sub O.C.(?)

A lot of coal in bank slough from above.

Andesite O.C.

Chopper Pad

Minor Coal Float

Borehole -3 (-90) 1915
Upper seam only
TD @ 225 m

DDH-1(70)
0.58 @ 122.04
1.01 @ 138.14
1.34 @ 165.35
TD @ 209.04 (Jkv)

Old Camp

DDH-3(-70)
0.61 @ 137.16
1.16 @ 172.67
2.32 @ 190.80
TD @ 236.52 (Jkv)

Small O.C. of W.L. thinbedded greywacke (~5mm)

Borehole -1(-90) 1915
3 seams
TD @ 170 m

DDH-2(-70)
1.25 @ 81.72
0.61 @ 96.93
1.07 (0.891) @ 125.27
TD @ 160.32 (Jkv)

Sandst. O.C. slumped

DENY'S CREEK

Coal Float

Volcanic O.C

Chopper Pad

Borehole -2(-90)
TD @ 109 m

Chopper Pad

Bulldozer Trenches
2 seams
0.5 - 1.0 each

Igneous O.C.

Volcanic O.C.

Sandst. O.C.

Minor Coal with Mudst.

Coal Float

Coal O.C.(Slump)

0.6/m Coal O.C. (Slumped)

Chopper Pad

Chopper Pad

Chopper Pad

Chopper Pad

Sluffed Bank

Chopper Pad

Volcanic Float

Volcanic O.C.

Volcanic Float

Volcanic O.C.

Volcanic O.C.

Volcanic O.C.

DENY'S

LEGEND

- JKs — U. JURASSIC / L. CRETACEOUS SEDIMENTS — HAZELTON GP.
- JKv — U. JURASSIC / L. CRETACEOUS VOLCANICS — HAZELTON GP.
- BEDDING ATTITUDE
- OUTCROP
- UNCONFORMABLE CONTACT (MOSTLY INFERRED FROM AIR PHOTO INTERPRETATION)
- DEFINED FAULT
- POSSIBLE FAULT
- DIAMOND DRILL HOLE (BETHLEHEM COPPER 1968)
- BOREHOLE (PRINCE RUPERT COAL FIELDS 1915).

232 (5) TK-SMITHERS 79(2)A

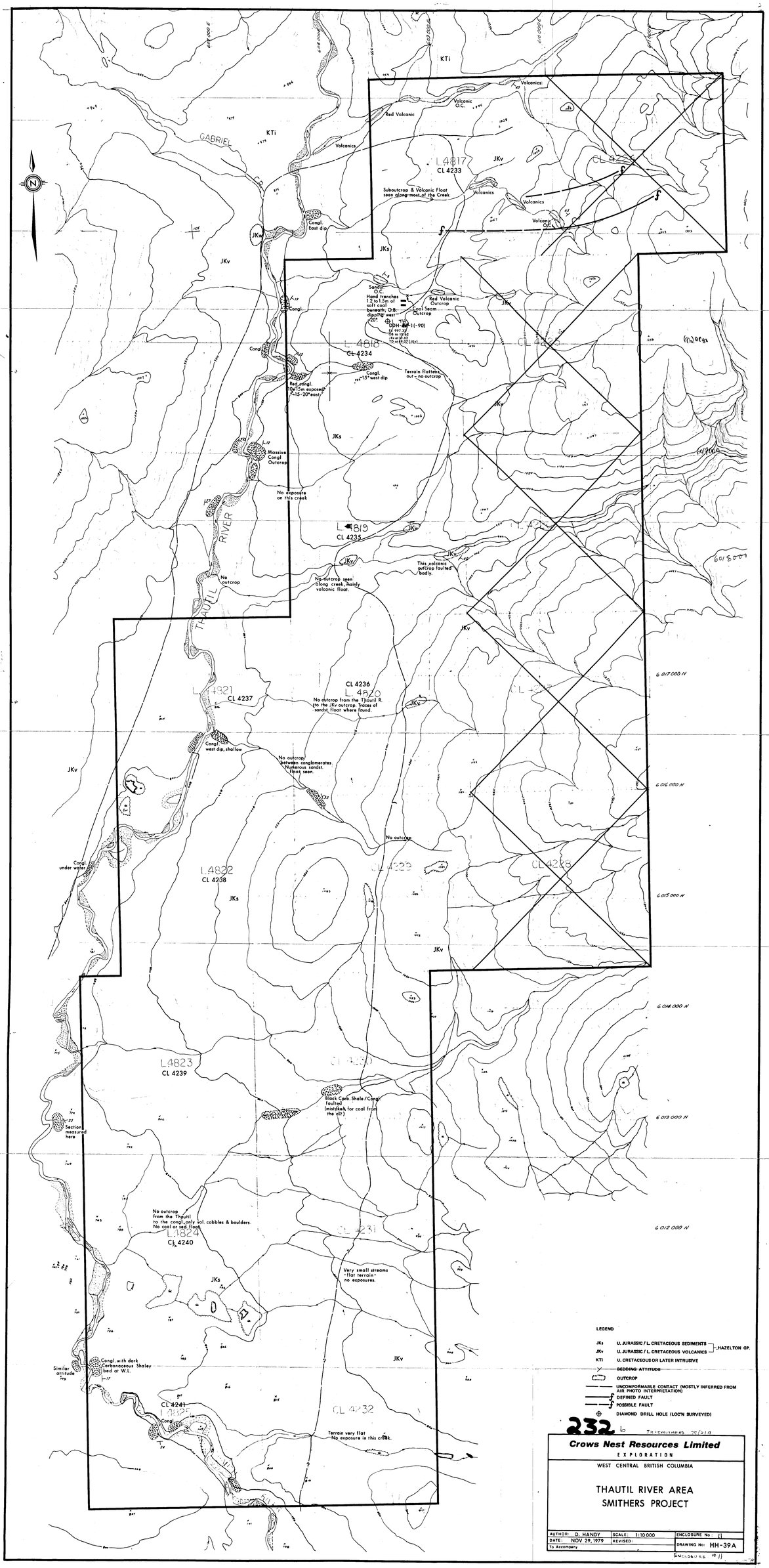
Crows Nest Resources Limited
EXPLORATION

WEST CENTRAL BRITISH COLUMBIA

DENY'S CREEK AREA
SMITHERS PROJECT

AUTHOR: D. HANDY	SCALE: 1:10 000	ENCLOSURE No: 10
DATE: NOV 29, 1979	REVISED:	DRAWING No: HH-39 B
To Accompany		

ENCLOSURE: #10


KTi
Volcanics
Volcanic O.C.
Red Volcanic
GABRIEL CR.
L 4817
CL 4233
JKv
Subcrop & Volcanic Float seen along most of the Creek
JKv
Congl. East dip
JKs
Sandst. O.C.
Hand trenches 1.2 to 1.5m of soft coal beneath; O.B. dipping west 20°
Red Volcanic Outcrop
Coal Seam Outcrop
DDH 80-1(-90)
54 to 77.32
77.32 to 87.82
10 m of CL(Ks)
L 4818
CL 4234
Congl.
Terrain flattens out - no outcrop
Red congl. 10m x 1.5m exposed 15-20° east
Congl. 15° west dip
Massive Congl Outcrop
No exposure on this creek
THAUTIL RIVER
L 4819
CL 4235
No outcrop
No outcrop seen along creek, mainly volcanic float.
This volcanic outcrop faulted badly.
CL 4236
L 4820
No outcrop from the Thautil R. to the JKv outcrop. Traces of sandst. float where found.
L 4821
CL 4237
Congl. west dip, shallow
No outcrop between conglomerates. Numerous sandst. float seen.
No outcrop
Congl. under water
L 4822
CL 4238
CL 4239
CL 4228
Black Carb. Shale / Congl. faulted (mistaken for coal from the air)
Section measured here
No outcrop from the Thautil to the congl. only vol. cobbles & boulders. No coal or sed. float.
L 4824
CL 4240
CL 4231
Very small streams - flat terrain - no exposures.
Congl. with dark Carbonaceous Shaley bed at W.L.
Similar attitude
CL 4241
L 4825
CL 4232
Terrain very flat No exposure in this creek.
6 017 000 N
6 016 000 N
6 015 000 N
6 014 000 N
6 013 000 N
6 012 000 N
601 800 E
602 000 E
602 200 E
602 400 E
602 600 E
602 800 E
603 000 E
603 200 E
603 400 E
603 600 E
603 800 E
604 000 E
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°60.15.000 N

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°613,000 E

°615,000 E

°617,000 E

Volcanic Float No O.C.

Volcanic Float

Landing

Chopper Pad

Vol O.C.

Landing

Volcani Some

CL 5189

CL 5188

JKv

JKv

Chopper Landing

Volcanic Rk.

Volcanic O.C.

CL 5187

CL 5186

Chopper Landing

Volcanic & Intrusive Rks in float

JKv

Coal Float

Slumped bank Shale/Sandst. O.C.

CL 5185

CL 5190

Coal/Sandst. Float

Sandst/Coal 1.5m Section Measured

Coal Float on Gravel Bar (mostly vol.)

JKs

Helicopter Pad

Fossil, ferous Sed. overlying Volcanics

Volcanic O.C.

Faulted along creek

Vol. O.C.

CL 5184

WL. 752.3

E 615,000

E 617,000

E 619,000

E 620,000

CL 5189

CL 5188

CL 5187

CL 5186

CL 5190

CL 5185

CL 5184

Volcanic Float No O.C.

Volcanic Float

Landing

Chopper Pad

Vol O.C.

Landing

Volcanic Float Some sub outcrop

JKv

JKv

Chopper Landing

Volcanic Rk.

Volcanic O.C.

Mostly Volcanic Float but some Sandst. with Carb. smears.

Chopper Landing

Volcanic & Intrusive Rks in float

WL. 902.3

JKv

Coal Float

Grey-greenish med. gr. equigranular intrusive rk. (fine gr. monzonite (abundant magnetite))

Slumped bank Shale / Sandst. O.C.

Coal / Sandst. Float

Sandst / Coal 1.5 m Section Measured

Coal Float on Gravel Bar (mostly vol.)

JKs

Helicopter Pad

Fossil, ferous Sed. overlying Volcanics

Volcanic O.C.

Faulted along creek

Vol. O.C.

WL. 752.3

RIVER

LEGEND

JKs U. JURASSIC / L. CRETACEOUS SEDIMENTS

JKv U. JURASSIC / L. CRETACEOUS VOLCANICS

BEDDING ATTITUDE

OUTCROP

UNCONFORMABLE CONTACT

DEFINED FAULT

POSSIBLE FAULT

232 (7)b

TK. SMITHERS 79(2)A

Crows Nest Resources Limited

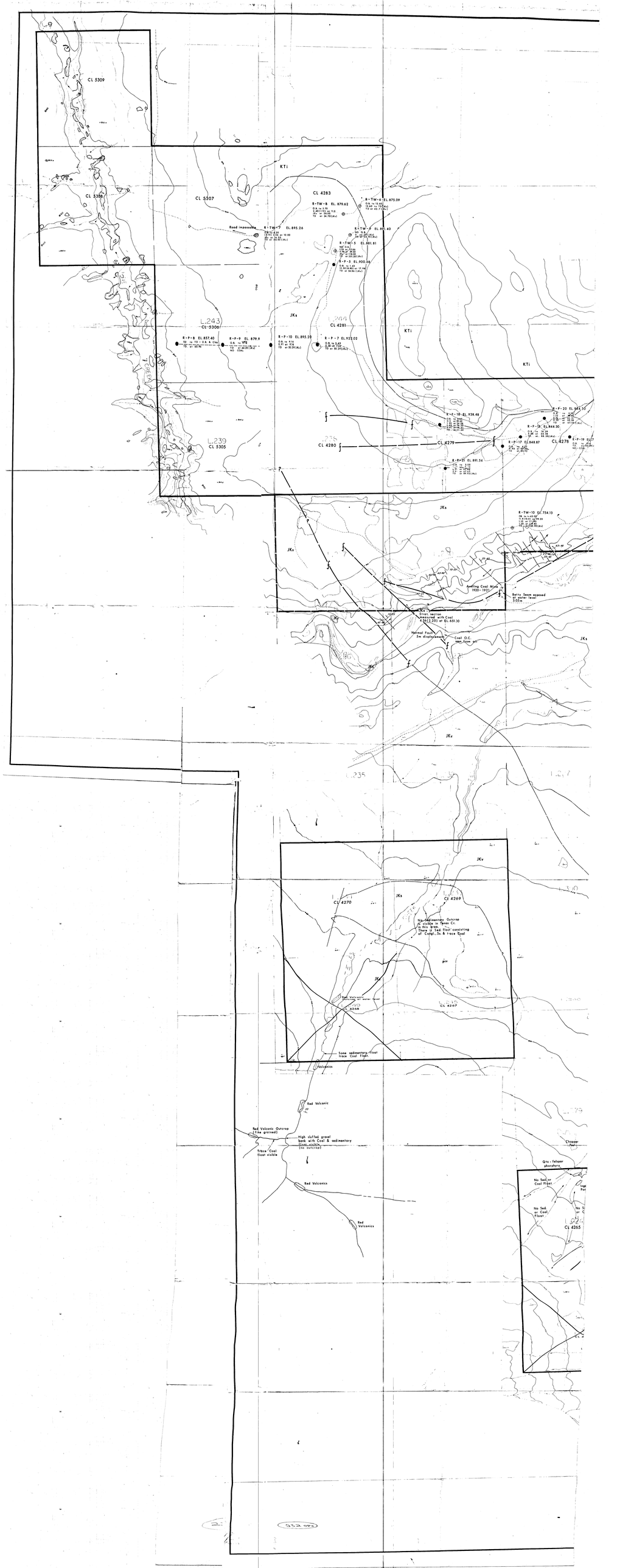
EXPLORATION

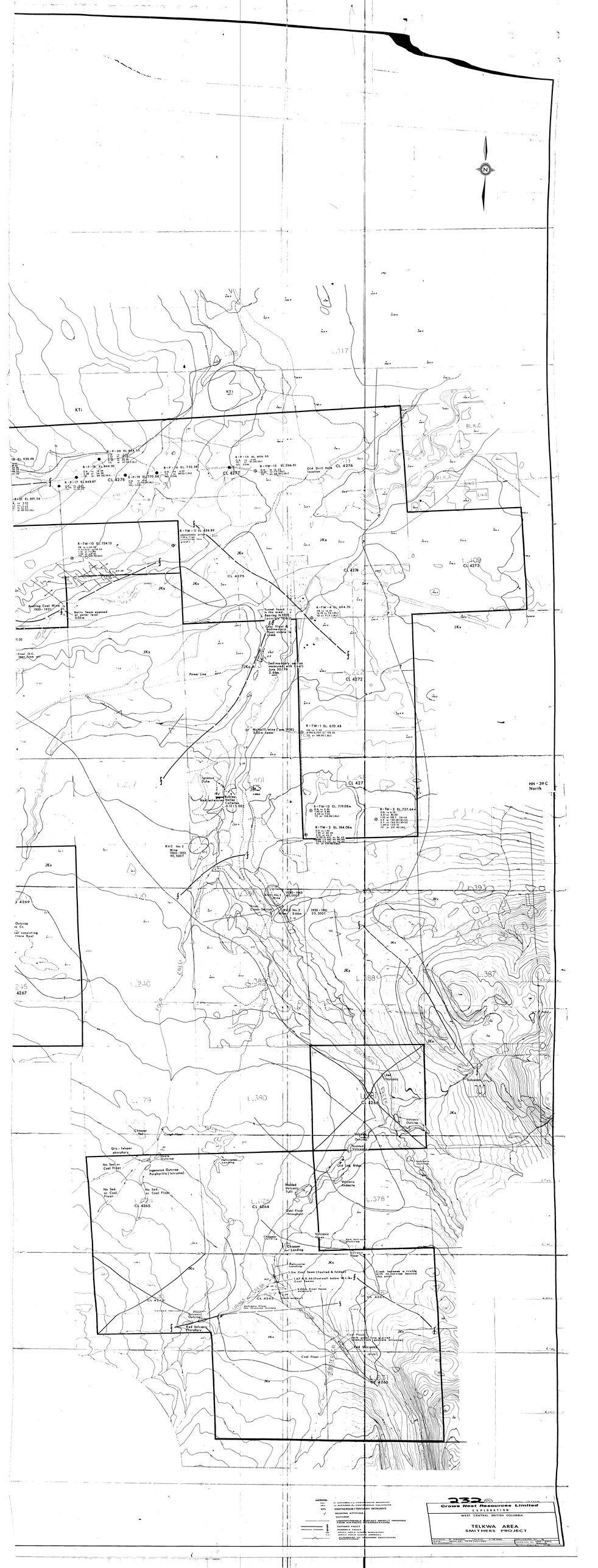
WEST CENTRAL BRITISH COLUMBIA

CHISHOLM LAKE AREA
SMITHERS PROJECT

AUTHOR: D. HANDY	SCALE: 1:10 000	ENCLOSURE No: 12
DATE: NOV 29, 1979	REVISED:	DRAWING No: HH-39
To Accompany		

ENCLOSURE: #12


CL 5309
CL 5308
CL 5307
KTi
CL 4283
R-TW-8 EL 878.62
R-TW-6 EL 875.09
Road impassable
R-TW-7 EL 895.26
R-TW-9 EL 891.40
R-TW-5 EL 881.81
R-P-3 EL 900.68
L.243
CL-5306
L.244
CL 4281
JKs
R-P-8 EL 857.40
R-P-9 EL 879.9
R-P-10 EL 895.20
R-P-7 EL 922.02
KTi
R-P-18 EL 938.68
R-P-20 EL 842.36
R-P-16 EL 844.30
R-P-19 EL
L.239
CL 5305
L.235
CL 4280
CL 4279
CL 4278
R-P-17 EL 848.87
R-P-21 EL 891.34
JKs
JKv
R-TW-10 EL 754.13
Abandoned Coal Mine 1920-1921
Batty Seam exposed at water level 3.00m
Streak sedimentary with Coal EL 632.203 or EL 631.30
Normal Fault 5m displacement
Coal O.C. seen from pit
JKs
JKv
L.235
L.247
JKv
CL 4270
JKs
CL 4269
No Sedimentary Outcrop is visible in Tanon Cr. in this area. There is Sed. float consisting of Congl., Ss. & trace Coal
gap
JK
Some volcanics with sedimentary float
CL 4268
CL 4267
Some sedimentary-float trace Coal float
Volcanics
Red Volcanic
Red Volcanic Outcrop (fine grained)
High slufted gravel bank with Coal & sedimentary (base visible (no outcrop)
Trace Coal float visible
Red Volcanics
Red Volcanics
Chopper
Qtv - Feldspar phenophyric
No Sed or Coal Float
No Sed. or Coal float
CL 4265


N
KTi
JKv
JKs
CL 4278
CL 4272
CL 4276
CL 4273
CL 4275
CL 4274
CL 4271
CL 4270
CL 4269
CL 4268
CL 4267
CL 4266
CL 4265
CL 4264
CL 4263
CL 4262
CL 4260
Old Drill Hole Location
Power Line
Coal O.C. approx. 30°
Outcrop in Creek consisting trace Spud
Chopper Landing
Volcanic Tuff
Coal Float
Volcanic Outcrop
Volcanic Breccia
Qtz - feldspar phorphyry
Ingneous Outcrop Porphyritic (intrusive)
No Sed. or Coal Float
Helicopter Landing
Coal Float throughout
Volcanic Float
Red Volcanic Phorphyry
Red Volcanic Tuff (massive bedding) (multiple thickness)
Coal Float
1.5m Coal Seam (faulted & folded)
1.67 & 0.66 (footwall below W-1.5)
1.00m Coal Seam
Coal between a trickle and 1.5 metres beyond this point
Ingneous Dyke
Bentonite Veins (Tuff) Collected 1915-1921
B.V.C. No. 2 Mine 1943-1951 90,500T
B.V.C. No. 1 1950-1963 69,000T
No. 3 3.66m
1950-1951 23,500T
Tunnel found in this area Bearing N 220° E
Old Flood & Sedimentary Float within this area
Sedimentary rocks measured with Coal) Dip 20-25° Strike N 30° W
Mitchell mine (1930) 3.05 m seam
Awaiting Coal Work 1920-1923
Barry Seam exposed at water level 3.05m
Coal O.C. approx. 30°
R-TW-10 EL 754.13
R-TW-11 EL 658.89
R-TW-4 EL 604.70
R-TW-1 EL 670.48
R-TW-13 EL 719.08m
R-TW-3 EL 727.64m
R-TW-2 EL 744.08m
R-TW-12 EL 598.91
R-P-13 EL 606.55
R-P-20 EL 845.16
R-P-16 EL 722.39
R-P-19 EL 770.54
R-P-18 EL 848.87
R-P-17 EL 844.30
R-P-21 EL 891.54
R-P-15 EL 936.48
HH - 39 C North
BLK.C
BLK.A
BLK.E
L.317
L.318
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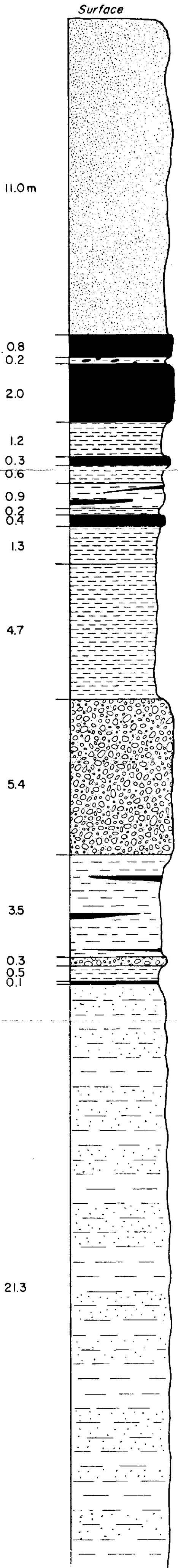
L.356



11.0 m	Brown arkosic sandstone
0.8	Clean coal
0.2	Gray shale with sandy beds and sandy concretions
2.0	Coal
1.2	Gray shale
0.3	Coal
0.6	Gray shale
0.9	Coal and carbonaceous shale
0.2	Gray shale
0.4	Coal
1.3	Gray shale
4.7	Brown stained gray shale
5.4	Conglomerate with 15 cm sandy beds
3.5	Carbonaceous shale with minor coal
0.3	Conglomerate
0.5	Gray shale
0.1	Coal parting
21.3	Interbedded brown sandstone and gray shale

Crows Nest Resources, Ltd.
Stratigraphic Section, 300 Meters WNW
from Aveling Mine, Telkwa River, B.C.
W.D.Tompson and David Handy June, 1979
Scale, 1:100

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TK-SMITHERS 79(2) A