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Geological Evaluation of THE CHISHOLM LAKE COAL PROPERTY (N.T.S. 93L3) A report of the 1982 field exploration activities by John Davies, M.Sc., P. Geol. Coal Project Geologist Suncor Inc. Resources Group

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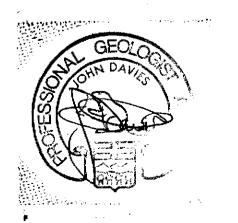
CHISHOLM LAKE COAL PROPERTY

(N.T.S. 93L3)

A report of the 1982 field exploration activities

C.L. # 7260 -7291 all for feited

by



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December 15.1982

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SUMMARY

The Chisholm Lake coal property of Suncor Inc. comprises 32 licences covering 9716 hectares and is situated 35 km to the south west of Houston, B.C.

Between June and September 1982, reconnaissance geological mapping and two phases of exploration drilling were carried out. The objective of this work was to establish whether an economic coal deposit existed within the property.

The Chisholm Lake licences lie within the intermontane belt of west central British Columbia and are underlain by strata of Mesozoic age. Lithologies present within the property comprise sandstone, siltstone, mudstone and shale, having a shallow to moderate dip.

The area has not been subjected to intense deformation, but rather contains broad open folds. However, considerable faulting has occurred separating the area into numerous fault blocks.

Surface mapping did not discover the presence of coal bearing strata. The two phases of drilling which incorporated 274 metres of diamond core and 704 metres of open hole also failed to encounter coal deposits.

It is recommended therefore that Suncor allow the Chisholm Lake licences to lapse.

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1. INTRODUCTION

1.1 Location

The licences held by Suncor are situated approximately 35 km southwest of Houston, B.C. and 60 km south of Smithers (fig. 1). The property lies within NTS sheet 93L3 (Lamprey Creek)

Access to the southern part of the property (south of the Morice River) is provided by a good network of gravel logging roads, which join Highway 16 some 5 km west of Houston. The area to the north of the Morice River is only accessible by helicopter, although aircraft equipped with floats may possibly land on Chisholm Lake and also Thomas Lake at the northwest corner of the property.

1.2 Land Status

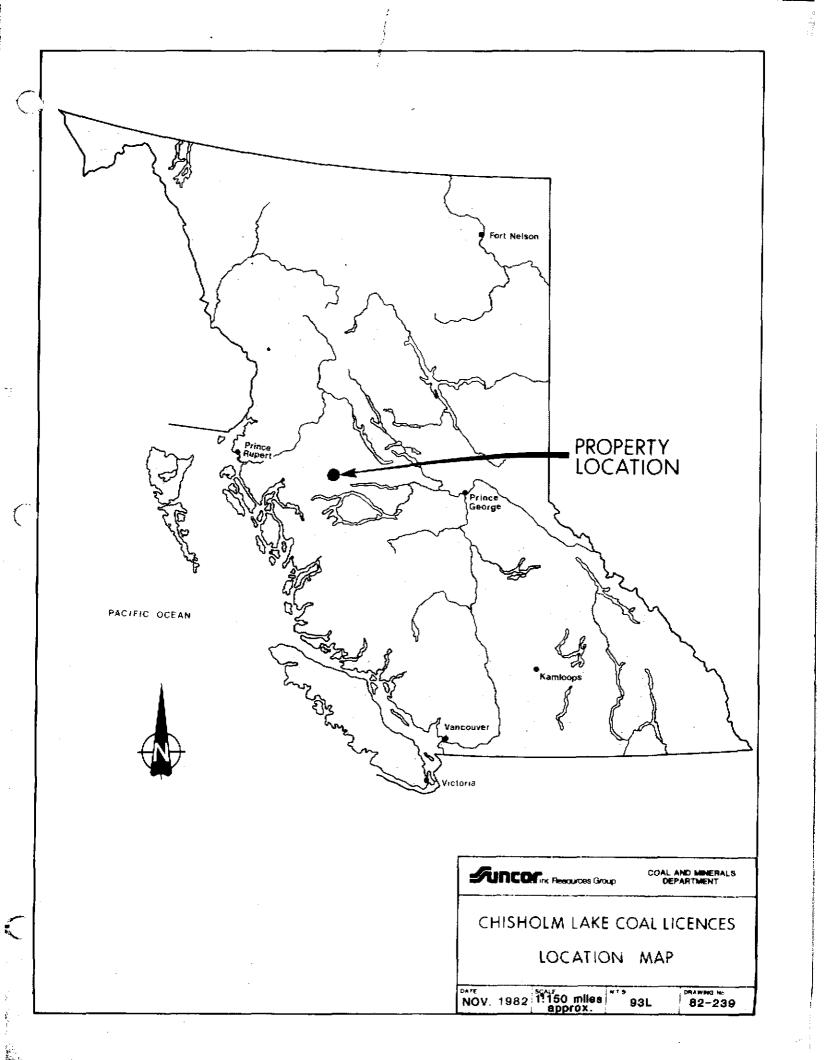
On 14th October, 1981, Suncor was issued coal licences (numbers 7260 to 7291 incl) covering 9716 hectares between Thomas Lake in the north and McBride Lake in the south. The licence configuration is shown in Appendix 1 and a list of licences, areas and date of issue is given in Table 1.

1.3 Previous Work

One of the earliest references to coal bearing strata and coal outcrops in the Chisholm Lake vicinity is contained in GSC Memoir 69 -" Coal Fields of B.C." (1915). It was reported by W. W. Leach that a seam incorporating about 1.0 metre of clean coal was discovered to the north of Chisholm Lake.

In 1954, G.S.C. Memoir 223 - "Mineral Resources of the Hazelton and Smithers Areas" was published and dealt briefly with the geology of the area. Two coal occurrences were noted near Chisholm Lake, being assigned to the U. Jurassic/L. Cretaceous Hazelton Group.

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Work in the Smithers map area was undertaken periodically from 1964 to 1973 by Carter, Church, Kirkham, Richards and Tipper culminating in 1976 with the publication of G.S.C. Open File 351, "Geological Map of the Smithers Area - 93L". This document assigned the strata (including the coal) outcropping within Suncor's property to the L. Cretaceous (M. Albian) Red Rose Formation of the Skeena Group.

Although some doubt has recently been cast upon this classification, this report has largely adopted the termino-logy/age relationships presented in the above publication.

1.4 Physiography

The property lies near the western edge of the Interior Plateau of West-Central British Columbia, which is bounded by the Coastal Range to the west and the Omineca Mountains to the east.

Within the licence block the maximum elevation attained is 1160 metres, being on the ridge to the south of the Morice River. The land surface in the northern one third of the property rises from below 700 metres in the Morice River valley to just under 1,000 metres near Thomas Lake. To the south of the Morice River, the ground rises steeply to 1160 metres where a gently undulating plateau falls gradually in a south westerly direction towards Collins Lake at an elevation of 830 m. On both the east and west sides of Collins Lake ridges rises steeply to elevations in excess of 1,000 metres, whereas to the south the ground continues to fall to 800 m at McBride Lake. The southern most portion of the property, to the north of Lamprey Lake, is gently undulating with a maximum elevation in the order of 980 m.

The principal river of the area is the Morice which flows west to east across the northern part of the property. It originates in Morice Lake some 10 km to the west and flows into the Bulkley River 6 km west of Houston.

TABLE 1

CHISHOLM LAKE COAL LICENCES

Licence No.	Date Issued	MAP AREA	UNITS	HECTARES
7260	Oct. 14/1981	93L3 Block B	47,48,57,58	304
7261	Oct. 14/1981	93L3 Block B	49,50,59,60	304
7262	Oct. 14/1981	93L3 Block B	67,68,77,78	304
7263	Oct. 14/1981	93L3 Block B	69,70,79,80	304
7264	Oct. 14/1981	93L3 Block B	87,88,97,98	304
7265	Oct. 14/1981	93L3 Block B	89,90,99,100	0 304
7266	Oct. 14/1981	93L3 Block C	41,42,51,52	304
7267	Oct. 14/1981	93L3 Block C	61,62,71,72	304
7268	Oct. 14/1981	93L3 Block C	81,82,91,92	304
7269	Oct. 14/1981	93L3 Block G	5,6,15,16	304
7270	Oct. 14/1981	93L3 Block G	7,8,17,18	304
7271	Oct. 14/1981	93L3 Block G	21,22,31,21	304
7272	Oct. 14/1981	93L3 Block G	23,24,33,34	304
7273	Oct. 14/1981	93L3 Block G	25,26,35,36	304
7274	Oct. 14/1981	93L3 Block G	41,42,51,52	304
7275	Oct. 14/1981	93L3 Block G	43,44,53,54	304
7276	Oct. 14/1981	93L3 Block G	45,46,55,56	304
7277	Oct. 14/1981	93L3 Block G	61,62,71,72	304
7278	Oct. 14/1981	93L3 Block G	63,64,73,74	304
7279	Oct. 14/1981	93L3 Block G	65,66,75,76	304
7280	Oct. 14/1981	93L3 Block G	83,84,93,94	303
7281	Oct. 14/1981	93L3 Block J	1,2,11,12	303
7282	Oct. 14/1981	93L3 Block J	3,4,13,14	303
7283	Oct. 14/1981	93L3 Block J	21,22,31,32	303
7284	Oct. 14/1981	93L3 Block J	23,24,33,34	303
7285	Oct. 14/1981	93L3 Block J	25,26,35,36	303
7286	Oct. 14/1981	93L3 BlocK J	41,42,51,52	303
7287	Oct. 14/1981	93L3 Block J	43,44,53,54	303
7288	Oct. 14/1981	93L3 Block J	45,46,55,56	303
7289	Oct. 14/1981	93L3 Block J	61,62,71,72	303
7290	Oct. 14/1981	93L3 Block J	63,64,73,74	303
7291	Oct. 14/1981	93L3 Block J	65,66,75,76	303

32 Licences

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TOTAL AREA = 9716

The northern part of the property is drained by several minor creeks, the principal of which is Thomas Martin Creek which originates in Thomas and Oval Lakes. It flows southwards through the central part of the property and joins the Morice River. Two small creeks flow into Chisholm Lake which itself drains via Tagit Creek into the Morice River.

South of the Morice River, two main creeks provide drainage, Cedric Creek to the west and Lamprey Creek to the east. Lamprey Creek is the more important of these, originating in Lamprey Lake just south of the property. It flows in a north easterly direction along the eastern property boundary, draining Collins Lake and the central portion of the property before discharging into the Morice River. Much of the drainage in the southern one third of the property is to McBride Lake which is drained at its western end by McBride Creek and thus into Morice Lake.

Almost the entire area is heavily forested, although active logging to the south of the Morice River has provided numerous clearings. These cleared areas will probably be of a temporary nature as tree planting was being carried out over the summer. Natural clearings occur around the many lakes where the high water table promotes marsh development.

No precise climatic records were kept during the field season, however, in general, weather conditions were favourable to exploration. The property was first visited in early May when large areas still showed snow covering. By early June the property was virtually snow free although creeks were in spate and low areas exceptionally wet. June proved to be very dry and hot particularly towards the middle and end of the month. In July and August the weather was more variable, becoming wetter in August and cooling towards the end of the month. Early September was showery with occasional frosts at night.

There are no settlements within the property boundaries and no agriculture is practiced. Settlements indicated on the 1:50,000 map (1968 survey) have now disappeared leaving only the occasional derelict building to mark their existance.

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1.5 1982 Field Work

The objective of the 1982 field season was to establish whether an economic coal deposit was present within the Suncor property. For this purpose, both reconnaissance geological mapping and exploration drilling were carried out between the beginning of June and the middle of September. The following personnel were involved throughout the summer:

> John Davies - Project Geologist Rob Booker - Senior Geological Assistant John Alguire - Junior Geological Assistant Tom Brooks - Pilot - Highland Helicopter Dave Hocking - Pilot - Highland Helicopter

The reconnaissance mapping was undertaken during June by a two man field crew. The personnel were accommodated in a Smithers motel and supported by both a 4 x 4 truck and Bell 206B helicopter. The truck was used whilst working to the south of the Morice River where a good network of logging roads permitted reasonable access to the property. Due to the poor accessibility of the area north of the Morice River, helicopter support was required and was scheduled to coincide with the phase 1 drilling.

Exploration drilling activities were split into two phases. Phase 1 of the program commenced on 14th June, 1982 and was completed by 23rd June, 1982. This involved drilling two diamond core holes in the northern one third of the property where access problems required the use of a helicopter portable rig and logging unit. Both pieces of equipment were successfully handled by a Bell 206B Jetranger III. A week prior to the commencement of drilling, a contract crew was flown into the area to prepare the drill and helicopter landing pads. Immediately after completion of the drilling the same crew were recalled to reclaim the two drill sites. Additionally, surveyors were also transported to the area to accurately locate and provide elevations for the drill holes. All personnel were accommodated in Smithers for the duration of the drilling program and flown to the site either early morning or evening, a flight time of approximately 20 minutes.

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The second phase of drilling was confined to the area south of the Morice River, commencing on the 9th September, 1982 and terminating on the 15th September 1982. A truck mounted rig and logging unit were used for the three rotary open holes. The personnel involved were accommodated at a motel in Houston and drove daily to the drill site, a journey of approximately one hour. Upon completion, all three holes were surveyed for location and elevation.

2. REGIONAL GEOLOGY

2.1 Stratigraphy

The Chisholm Lake coal licences lie at the western edge of the Intermontane Belt of west central British Columbia and are underlain primarily by strata of Mesozoic age.

The oldest known rocks of the area are of Permo-Triassic age and consist of massive limestone, basaltic breccias, tuffs and conglomerates. They are probably analagous to the Cache Creek/Takla Group described further north.

Towards the end of the Triassic, subsidence marked the development of the Hazelton Trough, into which were deposited lower to middle Jurassic sediments and volcanics. The lower most member of the Hazelton Group, the Telkwa Formation, is of Sinemurian to earliest Pliensbachian age and comprises a thick suite of calc-alkaline volcanics covering the entire region. Overlying the Telkwa Formation is the Nilkitkwa Formation of early Pliensbachian to Middle Toarcian age. It represents a distinct facies change and generally rests conformably upon the underlying strata. It comprises up to 1,000 metres of interbedded greywacke, andesitic to rhyolitic tuff and minor limestone. The overlying Smithers Formation is of Middle Toarcian to Lower Callovian age and comprises a primarily clastic sequence with occasional tuffaceous beds.

During the Middle and Upper Jurassic, uplift resulted in the formation of the Skeena Arch which effectively terminated deposition in the Chisholm Lake area. The Hazelton Trough was thus separated into two isolated basins, the Bowser Basin to the north and the Nechako Basin to the south.

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This major hiatus lasted from the Oxfordian to the Hauterivian with the result that in the Chisholm Lake area erosion has removed much of the Hazelton Group, leaving only the lower most Telkwa Formation exposed. Prior to the recommencement of deposition in the area, the existing strata were deformed resulting in an unconformable relationship with the overlying deposits.

In the Hauterivian a marine transgression invaded the region from the west, gradually inundating the non-marine sediments and coal basins by mid to late Albian times. A final phase of volcanism in the Cenomanian brought to a close this episode of deposition. This assemblage, deposited during the lower and middle Cretaceous, has been assigned to the Skeena Group. The lower most member is the Kitsun Creek Formation (Hauterivian to Aptian) comprising conglomerates, greywackes, shale and minor coal. Penecontemporaneous volcanism resulted in the Rocky Ridge Volcanics, a suite of hornblende andesites, augite porphyrys and breccias. The overlying Red Rose Formation is of Albian age and contains marine and non-marine sediments including coal. The final member of the Skeena Group is the Brian Boru Formation of Upper Cretaceous age which is entirely volcanic in nature (tuffs and andesitic breccia).

A final phase of sedimentation occurred in the Maestrichtian and Eocene, comprising conglomerates, greywacke, shale and coal. This assemblage has been tentatively assigned to the Sustut Group.

The youngest rocks of the region originated from successive phases of volcanic activity throughout the Tertiary and are primarily of a basaltic and andesitic lithology.

During the Pleistocene large tracts of the lower lying areas were covered by glacial till and gravel, in places attaining thicknesses in excess of 30 metres. Finally, the larger river valleys have considerable accummulations of alluvium.

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TABLE 2

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Stratigraphic Column

PORMATION	AGE	LITHOLOGY
ALLOVIUM GLACIAL DEPOSIT	PLEISTOLENE	Till, Gravel and Sand
POPLAN BITTE VOLOWICS	MICEDE TO PLICEDE	Olivine Basalt
PIDNO GROUP	LATE EXCENT IS EARLY FICTOR	
a) Chine Nome Breccie b) Buck Creek Volcanics	Oligocene to Early Micoune Late Excene and Oligocene	Basaltic Breccia Andesite and Dacita
TOTELY LAKE DATALSTVES	DCEME	Symmoniachite and Cabbro
BABINE INTRATIVES	50C2942	Diorite and Granodiorite
KASTNERG/NEWIRA INSTRUSIVES	EXINE	Pelsite, Quartz Honmonite and Quartz Dye Porphyry (
COTSA LAKE GROUP	LATE CRETACEDES to EXCENE	
a) Goosly Lake Volcanics b) Tiptophili Volcanics	Maestrichtian	Trachyte and Rhyolite Andesite and Davite
SUSTUT CROUP	LATE CRETACEULE to EDCENE	
a) Brothers Pask Formation	Palecene	Ounglomerate, Sandatone, Tuff and Hinor Opal
b) Tango Creek Formation	Centratian	Conglamerate, Sandstone and Hinter Coal
BULKLEY INTRUSTIVES	LATE CRETACIOLE	Granodiorite. Quarti Monzonite, (Amelgold Gabbro)
SKEDA GROUP	EARLY to LATE ORTACEOUS	
a) Brian Boru Formation	Centranyan	Porphyritic Tuff and Andesitic Breccia
b) Rud Rose Formation	Middle to Upser Albian	Greywecke, Sandstone, Shale and Coal
c) Rocky Ridge Volcanics	Albian	Augite Porphyry, Andesite and Breccia
d) Ritsun Creek Sediments	Hauterivian to Albian	Conglowerste, Greywocke, Shale and <u>Coal</u>
CHINESA INTRUSIVES	EARLY CRETACIOUS	Granitic and Dioritic Intrusives
BONGER LANG GROUP	MIDDLE to LATE JURAGEIC	— — —
a) Upper	Oxfordian to Rimmeridgian	Sandstone. Shale, Ornglowerste and Obel
b) Lower (Ashman Formation) (Trout Creak Baim/Netalrul Volcanics)	Cailovian and L. Oxfordian	Shale and Sandstone with Minor Conglomerate and Greywacke
MIELTON GROUP	EARLY to MICOLE JURASSIC	~ ~ ~ ~
e) Shithers Formation	Bajocian and Bathonian	Sandatone, Greywacke, Shale Conglomerate,
b) Nilkithwe Pormation	Pleinsbachian to Bajodian	Numer Tuff Besalt Breccis and Tuff Greding up to
(1) Red Tuff Himber		Shale and Sandstone Tuff, Basait, Andesite,
	Toercien and Beyodien	Decite and Rhyolite
(11) Ankwell Member		Andesite, Breccia, Tuff, Minor Greywacke and Lumestone
c) Telkus formation	Sintemurian	Basaltic to Rhyslitic Levas, Minor Greywacke
		and Shale
TOPLEY INTRUSTVES	EARLY JURASEIC	Quartz Monzonite, Quartz Diorite and Granodiorite
TAKLA GROUP	LATE TRUASSIC	Andesite, Basalt, Minor Greywecke and Argilite
	·	
ASTTHA CHOUP	<u>PERKIAN</u>	Rhyolite, Tuff, Andesite, Agglomerate, Minor Lumestone
ULINWATION	CARBO-PERMILAN	Serpentinite
CACHE CHEEK CHOUP	CARBO-PERMIAN	Argillite, Merble,
		Chert, Besalt.

2.2 Structure

The first phase of deformation to affect the region was probably of mid to late Triassic age. This resulted in the folding of the Permo-Triassic strata, however their limited exposure precludes any further description. It was probably this orogenic event that initiated the subsidence which resulted in the formation of the Hazelton Trough.

The initial movements of the Columbian and Pacific Orogenies probably resulted in the raising of the Skeena Arch, however little deformation is thought to have accompanied this uplift. The culmination of these Orogenies in the mid to late Cretaceous produced broad, open folds within the Mesozoic strata, although the structure becomes more complex in an easterly direction towards the Ominecas.

Although folding was relatively gentle, the area's structure has been complicated by repeated, closely spaced block faulting. The principal faults, which show most movement, have a northwest to southeast trend.

3. PROPERTY GEOLOGY

3.1 General

The work undertaken on the Suncor property in 1982 has not established any definite stratigraphic relationships amongst the formations encountered. However, this was not its aim. The reconnaissance mapping accomplished over the summer was designed only to ascertain whether or not coal bearing strata outcropped within the property or its immediate vincity. The time alloted to this task was of necessity limited and the traverses undertaken were further restricted by access difficulties. The accompanying geological map (Appendix) shows the traverse localities and drill hole positions. The principal faults and fold axes have been included, although the latter are mainly inferred from air photo interpretation. Finally, the principal areas of drift cover have been indicated, however this is not meant to imply that all other areas comprise extensive rock outcrop.

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3.2 Stratigraphy

The strata outcropping within the property boundary have been assigned to the Red Rose Formation of the Cretaceous Skeena Group. Precise age relationships are uncertain, however a palynological study undertaken recently has clarified the situation somewhat. The youngest strata within the property appears to occur in the region of drill hole DDH-2. Here a sample of grey, carbonaceous mudstone from 20.0 metres yielded a palynomorph assemblage indicative of latest Albian/ earliest Cenomanian age. Samples analysed from 47.5 m, 80.2 m and 130.8 m in the same drill hole indicate a successively older assemblage. The lower most sample indicates a middle Albian age. A surface sample from locality Al (a fine grained micaceous sandstone) 2.5 km to the west of DDH-2, is of middle to late Albian age. DDH-1, 1.0 km northwest of 1A was also sampled for palynomorph assemblages at 22.6, 51.8, 111.4 and 129.5 metres. The uppermost sample indicated a late Albian age, whilst the lowest was middle Albian. These age relationships tend to support the presence of an anticlinal axis between DDH-2 and DDH-2 which had been inferred from dip measurements.

The strata to the south of the Morice River were also analysed for palynomorph assemblages. Localities 4A, 6B (dark grey shales) and 6D (fine grained sandstone) gave a middle Albian age whilst 8A (medium grained sandstone) indicated middle to latest Albian. Several other samples were analysed but unfortunately did not yield any palynomorphs. The inferrence from these results is that the area to the south of the Morice River is older than that to the north, probably indicating an east-west fault along the Morice.

The principal lithologies outcropping within the property are as follows:

Sandstone - primarily fine to medium grained ranging in colour from grey to green to salt and pepper. They are generally micaceous and glauconitic with occasional cross bedding and load casts. Bedding varies from

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laminated to massive and geophysical logs in the drill holes suggest many contain a fair proportion of silt.

- Siltstone generally dark grey, laminated to medium bedded and containing frequent interbedded sandstone and mudstone layers. They are usually gradational and do not themselves form thick units.
- Mudstone This term has been applied to the argillaceous units encountered which do not exhibit a marked fissility. They are almost always dark grey in colour, sometimes carbonaceous, thinly bedded and gradational into siltstone.
- Shale True shales are rare within the property, the largest outcrop being on the west side of Collins Lake in the vicinity of localities 7G and 7F. Here the shale is black, concretionary, slightly silty with a marked fissility.
- Coal No coal seams were found within the property although a known outcrop some 2.5 km west of the licence boundary was visited. Thin coal stringers were seen in the sandstone and mudstone core from DDH-2. These were generally less than 1.5 cm thick, rich in vitrinite and probably represent isolated coalified logs.

The geological map of the property shows the individual outcrops where noted but due to the poor exposure, no attempt has been made to link these points. The more resistant sandstone units provide the majority of outcrop, usually forming ridges and knolls. The lower ground is most probably underlain by siltstones, mudstones and shales, a supposition borne out by the drill hole data.

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The sequence of deposits encountered during the field work is indicative of both non marine and marine environments. The area north of the Morice River is characterized by non marine and brackish sedimentation. The majority of the deposits are fluviatile, lacustrine and deltaic in origin with a shoreline situated somewhere to the south and west. Minor marine transgressions appear to have occurred periodically but have not contributed greatly to the accummulated strata.

South of the Morice an almost entirely marine sequence has been deposited. Many of the samples indicate a considerable distance from shore, particularly the shales of locaclities 7G and 7F and the mudstone in drill hole RH-03. The sandstones of this southern area exhibit a more pronounced greenish colour, possibly due to glauconite which is indicative of marine sedimentation. These sands probably represent both offshore bars and turbidite deposits, as both fining and coarsening upwards cycles can be seen.

3.3 Structure

The principal structural trend throughout the property is north east to south west with subsidiary east-west features.

Folding appears to have been relatively gentle resulting in broad open folds with dips rarely exceeding 60°. It is not possible to trace individual folds for any great distance due in part to the poor exposure and also to faulting.

The area has been broken up into several blocks by a series of high angled faults. There is no evidence of major thrusting within the property. The principal east-west fault is the Morice Fault which has downthrown the Upper Albian/Cenomanian to the north against the Middle Albian of the southern block. The amount of throw of this fault is open to conjecture but palynological data suggests movement possibly of no more than one or two hundred metres.

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There is evidence for a major fault along Tagit Creek to the west of the property. Here Aptian or older strata have been upthrown against Middle to Upper Albian rocks. Additional faults have been assumed in the vicinities of drill holes DDH-1 and DDH-2. The former was drilled near the base of a sandstone scarp, which would now appear to be a fault scarp as evidenced by the brecciation and calcite veining present in the core. The fault would seem to be of a high angle and downthrows to the south. The latter hole was located close to Thomas Martin Creek and also shows considerable brecciation and calcite veining of the core. The fault plane may in fact intersect the drill hole at about 69.0 metres where a distinct kick occurs on the geophysical log. Downthrow would appear to be to the east as older strata occurs to the west. The amount of throw in both faults is considered to be small.

South of the Morice Fault, two major faults have been inferred from air photo interpretation. The first of these is Lamprey Fault which follows Lamprey Creek and forms an eastern boundary to the block on which the Suncor property is contained. It probably downthrows to the west, preserving the Skeena Group as a downfaulted block. If so, then the throw of this fault must be substantial. The second fault is Cedric Fault, along Cedric Creek, which forms the western boundary of the property. This fault probably downthrows to the east but the amount of throw seems less than that of the Lamprey Fault. The only other fault which deserves mention is McBride Fault which may be a westerly splay of the Lamprey Fault. It diverges from ths latter some 4.5 km north east of McBride Lake and enters the eastern end of the lake, probably influencing the orientation of this part of the lake.

4. Conclusion

The initial phase 1 drilling operations indicated that the area to the north of the Morice River has potential for coal occurrence. However, subsequent palynological studies has shown that the stratigraphic sequence encountered in the drill holes is substantially younger than the age assigned to the known coal outcrop west of the licences. It would seem therefore that although conditions necessary for coal

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deposition may have been present in the Chisholm Lake area during the Aptian, subsequent tectonic activity has resulted in the downthrow of such coal seams several hundred metres below the Suncor property.

The area to the south of the Morice River was drilled in phase 2 with the knowledge that the palynological study had indicated older strata to be present. Despite drilling to a depth of almost 250 metres no coal was encountered, indeed no strata indicative of possible coal deposition were seen. The data obtained from these drill holes suggests a completely marine sequence and that a coal forming environment was never present in the area.

5. RECOMMENDATIONS

The exploration work undertaken during the 1982 field season failed to find any coal within the Chisholm Lake property. Coal possibly occurring at depth is considered to be so deep and structurally complicated that an economic mining operation would not be feasible.

It is recommended therefore that the company does no further exploration on the licences and allows them to lapse.

ACKNOWLEDGEMENTS

The author gratefully acknowledges the assistance provided throughout the project by Rob Booker, both in the field and office, John Alguire, the staff of the Highland Helicopters base at Smithers, B.C. and Mary Lynn Richardson, palynologist.

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APPENDIX 1

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Licence Configuration

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Exploration Division



1982 12 14

MINISTRY OF ENERGY, MINES AND PETROLEUM RESOURCES

DEC 15 1982

MINERAL TITLES FILE ROOM

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Ministry of Energy, Mines and Petroleum Resources Parliament Buildings Victoria, BC V8V 1X4

Province of British Columbia

Attention: Mr. Paul Hagen Coal Administrator

Dear Mr. Hagen:

Geological Evaluation of the CHISHOLM LAKE Coal Re: Property - Coal Licence Nos. 7260 to 7291, N.T.S.93L3

In compliance with the B. C. Coal Act Regulations, Suncor herewith submits duplicate copies of the final report concerning their Chisholm Lake Coal Licences.

Both the field work and preparation of the report were conducted by Mr. John Davies who has recently resigned from Suncor and returned to England. If you have any questions pertaining to this report, would you please direct them to Mr. R. D. Moss.

Best wishes for Christmas and the New Year.

Yours truly.

SUNCOR INC.

1 (.... / 10311

(1.5) Harold M. Fowler Land Supervisor

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Harold M. Fowler	C.G.C.		
11.371	D.C.G.C		
Harold M. Fowler	G.C.		
Land Supervisor	F.M.C.		<u></u>
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	P.L.C.R.		_
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	D.G.C	{	
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218			
P.O. Box 38, 500 - 4th Avenue S.W., Calgary, Alberta, T2P 2V5, Teleph	1076112080269-8	190	
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DATE

ANTONNED TO

INITIALS

For Statemnt Purposes Only. Licence Forfeit.



Province of British Columbia

Ministry of Energy, Mines and Petroleum Resources

APPLICATION TO EXTEND TERM OF LICENCE

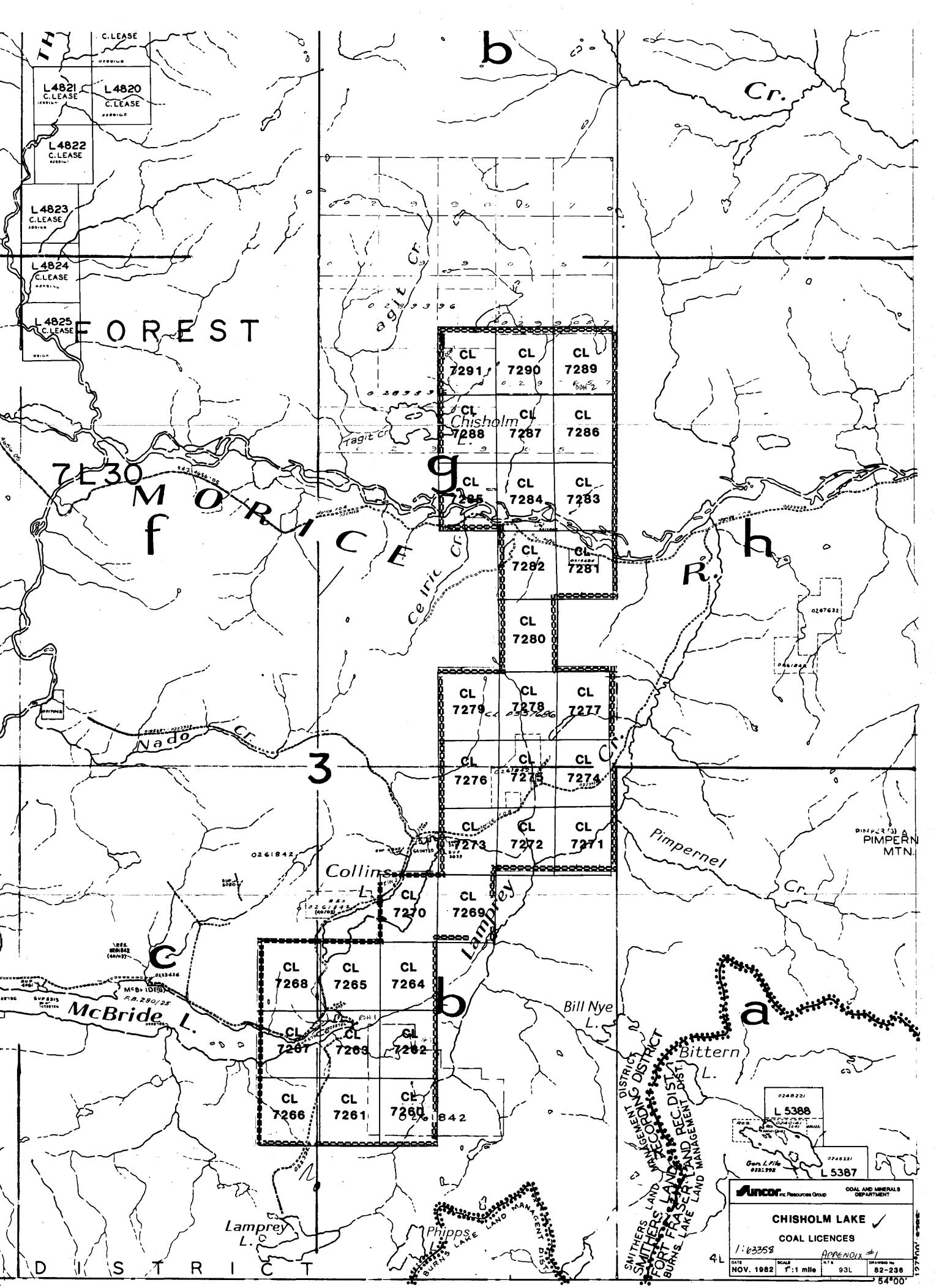
	i,	agent for
	500 - 4 Avenue, S. W. PO Box (Address)	38 (Address)
	Calgary, Alberta T2P 2V5	· · · · · · · · · · · · · · · · · · ·
		Valid FMC No. 244770
	hereby apply to the Minister to extend the term of Coal	Licence(s) No(s), N/A
		• • • • • • • • • • • • • • • • • • • •
	for a further period of one year.	
2.	Property name Chisholm Lake	· · · · · · · · · · · · · · · · · · ·
3.	I am allowing the following Coal Licence(s) No(s), to fo	rfeit. 7260. to. 7291. inclusive
	•••••	•••••••••••••••••••••••••••••••••••••••
4.	I have performed, or caused to be performed, during the	period October. 14, 1981 to
	October 12	, work to the value of at least \$
	on the location of coal licence(s) as follows:	

CATEGORY OF WORK

	Licence(s) No(s).	Apportioned Cost
Geological mapping		15,638
Surveys: Geophysical	<u>N/A</u>	
Geochemical	N/A	• • • • • • • • • • • • • • • • • • • •
Other		
Road construction	N/A	
Surface work	N/A	
Underground work	N/a	
Drilling	7263, 7270, 7277,7287	,7291 69,362
Logging, sampling, and testing	7260 to 7291	20,000
Reclamation	7287, 7291	
Other work (specify)	7260 to 7291	24,000
Off-property costs	N/A	
5. 1 wish to apply \$ NIL	, of this value of work on Coal Licence	(s) No(s)N/A
6. I wish to pay cash in lieu of work in th		
	••••••	
7. The work performed on the location(s)	is detailed in the attached report entitle	d.Geological.evaluation
of the Chisholm Lake	Coal Property	
· · · · · · · · · · · · · · · · · · ·		• • • • • • • • • • • • • • • • • • • •
(Date)		(Signature)
	John Da	yiqs (
	Coal Pr	ject Geologist
(FORMS AN	D REPORT TO BE SUBMITTED IN DUP	LICATE)

GEOLOGICAL MAPPING Yes No Doution Are Breared Seate Doution Reconsistance .7116 .115,p,840 .June 1/82.to.June Detail: Surface .7116											
Are Hitcared Sale Durison Reconsistance 9716 .1:15,540 June 1/82.to.June 1 Defail Surface				Var	នា		No	n			
Reconsistance	GEOLOGICAL MAPPING	Area (Hectares)	182	20	Scala	NO			Ourstion	
Detail: Surface Underground Other 'tapecity) GEOPHYSICAL/GEOCHEMICAL SURVEYS GEOPHYSICAL/GEOCHEMICAL SURVEYS GEOPHYSICAL/GEOCHEMICAL SURVEYS GEOPHYSICAL/GEOCHEMICAL SURVEYS GEOPHYSICAL/GEOCHEMICAL SURVEYS GEOPHYSICAL/GEOCHEMICAL SURVEYS Vs: No ES Northor 'tapecity) ROAD CONSTRUCTION Northor 'tapecity) ROAD CONSTRUCTION No ES UNDERGROUND WORK Longith No ES UNDERGROUND WORK Vs: No ES No	D			7	16	•					
Underground Other "(specify)										-	30,
Other* (specify) Total Cost \$ 15,638 GEOPHYSICAL/GEOCHEMICAL SURVEYS Yes No No GEOPHYSICAL/GEOCHEMICAL SURVEYS Yes No No Grid Topographic PF.111. Hole Lacestico, and Elsyvation Other* (specify) Total Cost \$ 3,000 Total Cost \$ 3,000 ROAD CONSTRUCTION Yes No S0 ROAD CONSTRUCTION Yes No S0 SURFACE WORK Yes No S0 SURFACE WORK Yes No S0 SURFACE WORK Yes No S0 Surfaces to - Total Cost \$ S0 UNDERGROUND WORK Yes No S0 Total Cost \$ S0 S0 S0 DRILLING Yes No S1 S1,69,362 Other * (specify) S0 Cost S1,69,362 Draid Cost \$ S0 Cost S1,59,362 Core Diamond S0 Cost Wrine NO S0 S0 S1											
GEOPHYSICAL/GEOCHEMICAL SURVEYS Ves No E Method	-										
Method Grid Grid Dref (specify) Total Cost \$3,0,00 ROAD CONSTRUCTION Yes No ED Length Width Cost \$3 SURFACE WORK Yes No ED Length Width Depth Cost Trenching Seam Tracing Construing Griff (specify) Total Cost \$ UNDERGROUND WORK Yes No ED No of Addre Maximum Length No of Hole Total Marter Cost Test Addis Other " (specify) Cost and the Size No of Hole Total Marter Cost Wirding Cost and the Size No. of Hole Total Marter Cost Total Cost \$ DRILLING Yes No Of Cost Wirding Cost and the Size No. of Hole Total Marter Cost Total Cost \$ DRILLING Yes No Of Cost Wirding Cost and the No. of Hole Total Marter Cost Cost and Size No. of Marter Cost Under Size Constructing Cost and the No. of Hole Total Marter Cost Cost and Size No. of Marter Cost Cost and Size Cost and Size No. of Marter Cost Cost and Size Cost and Size No. of Marter Cost Cost Cost and Size Cost and Size No. of Marter Cost Size Cost S							Total	Cost	\$15.,.63	8	
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Rotary: Conventional	Wireline	NQ.		2.				282			
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Where is the core stored? .Charlie, Lake, B, C,	Contractor D.W. COA	tes: Canw	est Dril	 lina	• • • •			• • •	• • • • • • • •	•••••	
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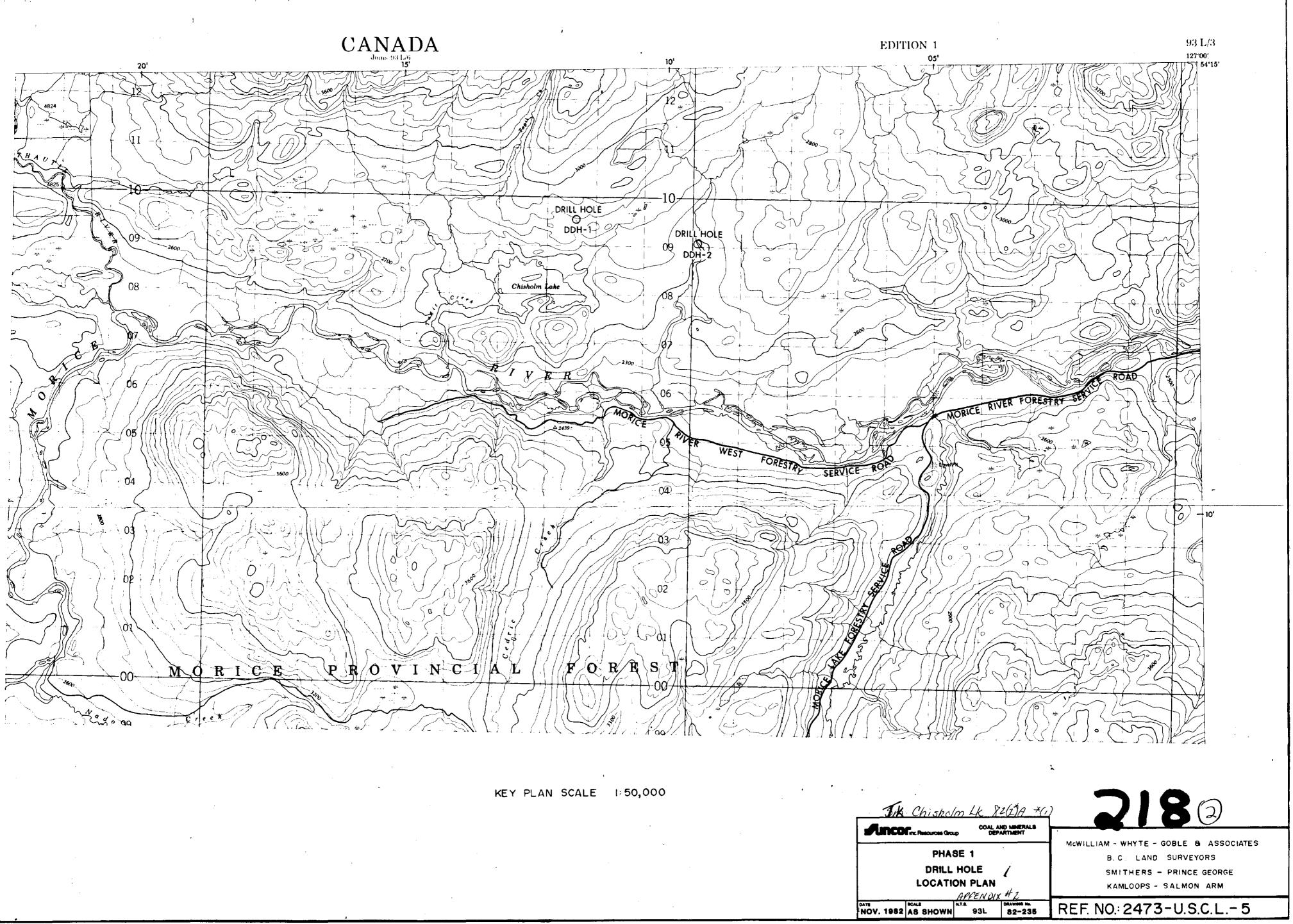
TR. Chisholm Lake 81(2*)A *(1)

APPENDIX IT

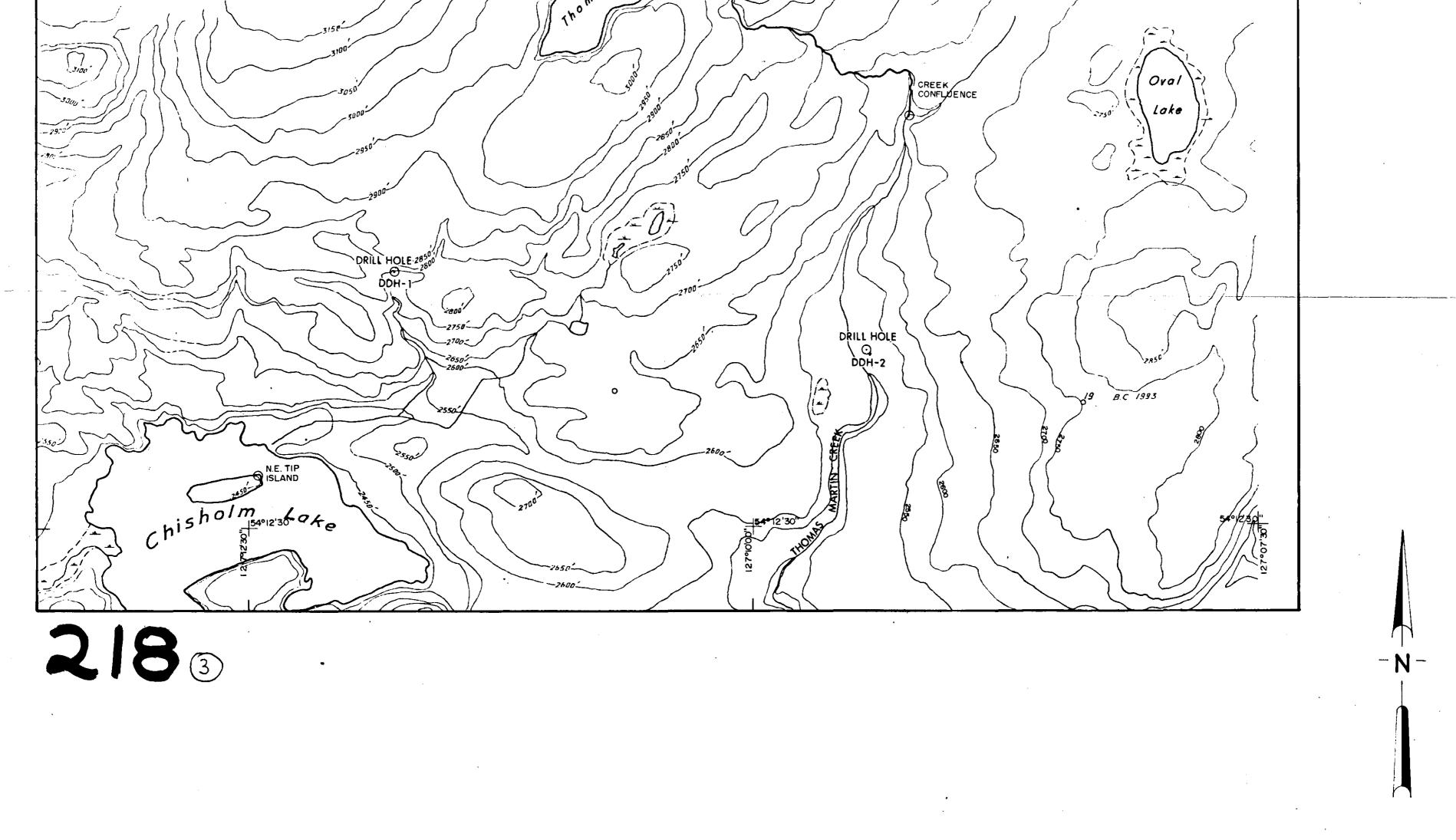
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Phase 1 Drill Hole Location Map



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	54°15'00" 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	54°15'00" 0 0 0 0 0	54 °15'00'1	
	PLAN SHOWING DRILL HOLE LOCATIONS IN VICINITY OF CHISHOLM LAKE, UNSURVEYED CROWN LAND, RANGE 5, COAST DISTRICT. 93L/6b utm. zone 9u SCALE 1:15,840	U.T.M. CO-ORDINAT DRILL HOLE # I N6,009,107; E 620 DRILL HOLE # 2 N6,009,529; E 617 N.E. TIP UNNAMED ISLAND N6,008,400; E 616 CHISHOLM LAKE CONFLUENCE OF TWO UNNAMED N6,010,420; E 620 CREEKS NORTHEAST OF CHISHOLM LAKE	20, 118 770 (2525 ft) 7, 615 838 (2750 ft.) 6, 875	
	COORDINATES AND ELEVATIONS ARE IN METRES UNLESS OTHERWISE NOTED	Loke 630	No.	



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APPENDIX III

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Phase 1 Lithological Logs

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Proje Locat Eleva	ior tio	1 N 1 7	6009 70 m	etres D	18 Dip/Direct ate(s) Drilled 18 TO 22 JUNE B2Date Longe	ORE LOG Hole No.	CHL/DDH-1/82 JD/RB
Deoth	Ð 9	83	82	Structure Desc.	Cope Description	Remarks	ROD % 20 0 3
2.71					Drift - primarily sandy cley		
			¢ FR	80°;11.23 28 12.34 §545 ^{turs} 16.03 28 17.23	Augular, some minor pyrite		6, 71 642 8, 53 102 11,58 102 14,63 102
.12	P		t t	80 ⁸ -pyrite 21.33 to 21.95 60 ⁹	-Sandstone - green-grey, fine grained:	- çalcite vaining present	
		-		27.62 31.70 fault zone brecciated	 thin bedded, strong: Thin bartligs of mudstone becoming slightly codfser with fewer partings of mudstone from 35, 37 	throughout core, polynology sample from 22:50 to 22.70	26.32 97% 97%
ليتقيل فيتقلب			at i	60 ⁸	Continued		95% 95%

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					SUNCOR INC.	SUNCOR INC.					
Proje Locat Eleva	io tio	n 7	70 n	CHISHOLM 1 107: E6201 hetres D	18 Dip/Direction ate(s) Drilled 18 to 22 JUNE 82 Date Looped	COAL CORE LOG Hole No. CHL/DDH-1/82					
Depth	Smol	22	22	Structure Desc.	Core Description	Remarks	RQD % 200%				
	Р		F A	brecciated 80° 80° 61.15 brecciated, calcitic fracture zone-67.10	<pre>Sandstone - as before - calcareous, dark grey, fine grained and very strong from 39.53 to 39.75 - shelly sandstone from 51.96 to 52.16 - medium grained and dark grey from 54.35 to 54.50 - calcareous sandstone (as before) 59.50 to 59.60 - calcareous sandstone from 67.20 to 67.40 - numerous calcite veins from 70.02 to 72.54</pre>	Palynology sample from 51.80 to 51.96					

Project Location Elevation	n N		CHISHOLM L 107; E62011 etresD;	AKE COAL COF B B B B B COAL COF Dip/Direction Dip/Direction Dip/Direction Coal COF Dip/Direction	VERTICAL Logged		
)epth 3		23	Structure Desc.	Core Description	Remarks	ROD % 200	
		FR	fracture zone 7599 to 7689	<u>Sandstone</u> - as before - silty intercalations - numerous calcite veins from 79.64 to 81.69		7559 7864 9	
		F	fault zone 84.60 to 86.28	- calcareous from 81.90 to 82.00		64.69 9 1 1 1 1 1 1	
بالمعال		∮ F	80 ⁰ 88.00 to 88.60 slickensideo	- calcareous layer from 88.90 to 89.60		47.78	
a a a a a a a a a a a a a a a a a a a		F	93.23 - 60 ⁰	- sandstone becomes darker and finer		9266	
		FR	96.61 to 97.00 brecciated			95.71	
ماسيمان		F	101.73 brecciated 70 ⁰	- becoming coarser from 99.35		906 	
يعليبينك	•		fracture zone 105,48	-			
معدولهم		F J	106.71 brecciated 80 ⁰	- 4			

Elevatio	2 n . N	16009 70 m	CHISHOLM 1 107:E62011 etres Da	8	COAL CO Dip/Direction 22 JUNE 82 Date Logged			CHL/DDH-1 JD/RB	• • • • • • • • • • • • • • • • • • •
Depth	85	83	Structure Desc.	Core	Description	Remarks			RC %
		F F F F F	109.60 to 110.20 brecciated calcitic 111.50 115.57 slickensided 119.23-119.38 brecciated 120.97 brecciated calcitic 130.25 brecciated 80°	- coarser from	efore, darker and finer 112.60 silty from 126.52	Palynology sample	111.60		-111.25 -111.25 -114.31 -117.55 -987 -117.55 -987 -107
142.34 END		FR F J FR	fracture zone 133.55 to 134.15 136.00 with gouge 80° fracture zone 142.16	Hole cemented on	completion				1009 133.20 135.40 139.23 1007 142.34

(_!¥ ¥¢	tio Lic			M LAKE 1529;E61.76 Netres D	ate(s) Drilled 14 to 17 JUNE '82 Date Logged	moie no.	CHL/DDH-2/82 JD/RB
Depth		87	87	Structure Desc.		Remarks	ROD % 200 %
- 18.29 -			J	80° slickensided	<u>Glacial Drift</u> - sand, gravel and stiff blue clay. <u>Mudstone</u> - highly weathered, dark grey, silty, medium bedded, weak		
- 20,27 -	P		J	45°slicken- sided + calc	 slickensided, coal stringers. ite 	Palynology sample 19.91 to 20.07	862
21.59			J	60°	<u>Sandstone</u> - dark grey, fine grained faintly weathered, medium bedded mod. strong, coal stringers.		
23,61					<u>Mudstone</u> - dark grey, v.silty, faintly weathered, thin bedded, weak slick. Dark grey sandstone between 22.17 and 22.55.		
				75° calcite	<u>Sandstone</u> - dark to light grey, fine grained, thick bedded, strong, coal stringers, cross bedded.	,	23,47 26,82 00%
<u>34,44</u> a		 	F	Calcite at 32.36	Sandstone - light and dark grey speckled,		32.61 98% 100%
<i>v</i> o 33				80°	medium grained. Faintly weathered, thick bedded, strong, coal stringers, occ. cross bedded.		38.71 - - - - - - - - - - - - - - - - - - -
54.25	C P			80° calcite 80° calcite	Sandstone - Medium grey, medium grained, fresh, thick bedded, strong, cross bedded, coarse with lenses of coal (1.5 cm) from 46.63 to 47.85. Finer and darker from 51.82	Coal sample 46.63 to 47.85 Palynology sample 47.45 to 47.00	44,81,-207 47,85,-007 50,96
					Continued	47.00	-5395

Proje Locat Eleva	10	 תי מי	16009	HISHOLM LAKE 2529: E6176 netres D	L5 ate(s) Drilled 14 to 17 JUNE 82 Dip/Direction Date Logged	VERTICAL LOGGING.	•-•	JD/		• • • • • • • •	
Depth	Smpl		201	Structure Desc.	Core Description	Remarks	RC	20	•/•	R R C	3%
- 54.25-			F F J	fracture zone at 54.25 55.78 fault zone 60.35 to 6187 6218 to 6462,90	Sandstone - light and dark grey, medium grained thick bedded, strong, occ. fine					7/1 60.0 60.1	107% 05 100 % 100 % 18 63 % 58
68.63 69.70 71.02			F	67.97 calcite	layers, some cross bedding <u>Sandstone</u> - dark grey, fine grained, grading <u>to coarse, stong</u> <u>Sandstone</u> - medium grey, medium grained, <u>strong</u> , thin bedded						1002 97 100?
73 91-			3	80 ⁰ calcite	Sandstone - dark grey, medium grained, med-						
75.29			<i>J</i>	80 ⁰	<pre>ium bedded, plant remains, strong <u>Sandstone</u> - dark grey, fine grained, thin bedded, plant remains, carbonaceous moderately strong (Continued)</pre>					د. مراجع	100%

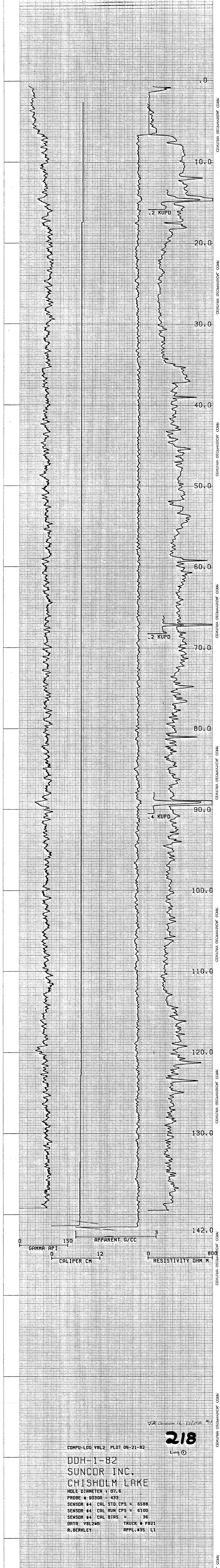
Proje Locat Eleva	ю tю	n	N6(838	ISHOLM LAKE 209529:E61 3 metres D a	7.615. Tete(s) Drilled 14.to 17. JUNE 82 Date Logged	VERTICAL LOOOR BY	CHL/DDH-2 JD/RB	2/82
Depth	Smpl			Structure Desc.	Core Description	Remarks	RQD %	Rec %
- 85, 34		C P	F	60 ⁰ slickenside 80.77m 70 ⁰ calcite 82.30m	Sandstone- (Continued) from 79.86 to 81.08 several lenses and stringers of coal (vitrinitic)	coal sample from 79.86 to 81.08 palynology sample from 80.16 to 80.31		-36.00 - 1007
			F	fault zone 87.48 to 89.00	<u>Siltstone</u> - dark grey, very thin bedded, moderately strong, occ. sandy horizons and mudstone intercalations. Becoming more argillaceous. bentonite and calcite between 90.10 and 90.55	broken core from 87.78 to 101.80 with mineralization and slickensided		85.65 1007 88.70 1007
91:14 -92:66					Mudstone - dark grey, very thin bedded weak, silty, occ. thin marly bands Limestone - as above			987
92.91					- marly at 101.50 <u>Siltstone</u> - dark grey, strong, laminated with partings of mudstone	inner barrel unlocked, core lost		98.88 96.98 1002 98.46 2 7 1002
-101.80 -103.85								

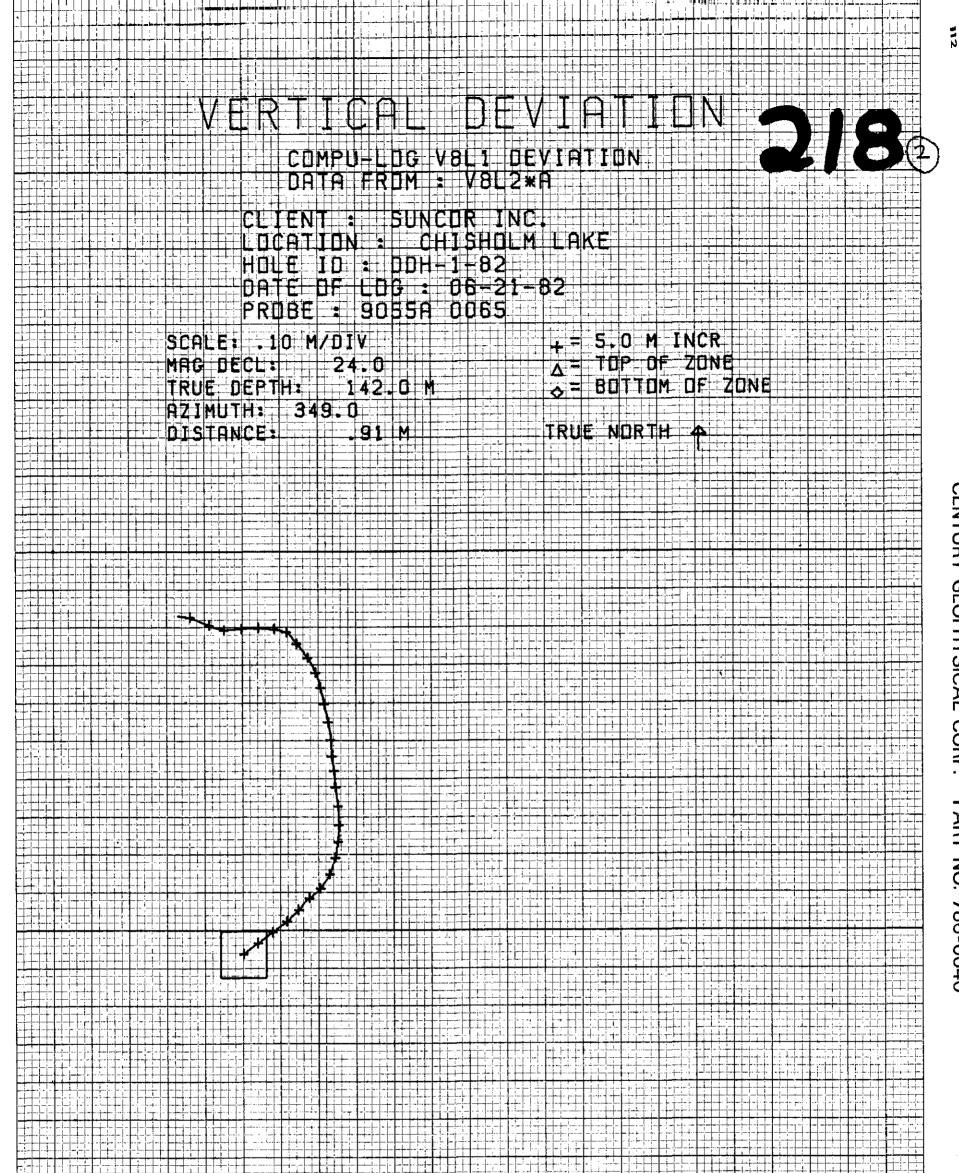
Eleva	io tic	n	16009 83	11SHOLM LAKE 529; E61761 8 metres Da		NELOG VERTICAL 17 JUNE 82 Hole No. Logged By Page 4	CHL/DDH-2/	
Depth	Smpl	88	82	Structure Desc.	Core Description	Remarks	RQD %	πΩ.
-103.85					Continued <u>Mudstone</u> - as before with siltstone intercalations calcite and bentonite between 105.85			104.85
-10938 -11070			F	108.20	and 106.40 <u>Siltstone</u> - dark grey, laminated, strong	core broken from 108.81 to 110.03 and 110.64 to 111.2		B9%
-110.00					<u>Mudstone</u> - as before <u>Siltstone</u> - as before			111.23 -114.3 107%
-115.35			F "J	117.35 124.59	Mudstone - dark grey, laminated moderately strong, silty occ. interbeded siltstones becoming shaly and more argillaceous	core generally broken palynology sample from 130.76 to 130.91		82% 117.65 120.70 120.70 95% 124.05
131.67	P							127.10 100% 130.15 100% 131.67
END					 Hole cemented on completion 	-		

APPENDIX IV

• 2.5

Phase 1 Geophysical Logs





CENTURY GEOPHYSICAL CORP. PART NO. 786-0040

112

÷ ·└─╽╺┟╼╽╌ T ╅╼╊╌┢ -----+ <u>|</u>- | -| -+-+-----i ...' -----+-+ + -÷--· - - - · · · _____ -----i t t • . . · |---+ | -|-|----| - -1 · | | +-Ŀŀ ł ch È. -1 ┝┥┿ -----. - - - - -++++ ÷⊢ -+--+--3.41 ŤΕ -14 ļ., ------; 4 Ŀ +-Ŧ. 1.11 ł -------: :--- | ÷Ť -1 <u>l</u>rit. - 1 - 4 - I ...F -+-|--1-1 t ΤĒ -----j-l 1.1.4 ------- |- | ╸┥╍╞╾┅╴┝┉╎╴┥ ------

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CENTURY GEOPHYSICAL CORPORATION

* * * * * * * * VERTICAL DEVIATION * * * * * * *

COMPU-LOG VSLI DEVIATION

CLIENT : SUNCOR INC.

HOLE ID : DDH-1-82

LOCATION : CHISHOLM LAKE

DATE OF LOG : 06-21-82 PROBE : 90558 0065

218

-

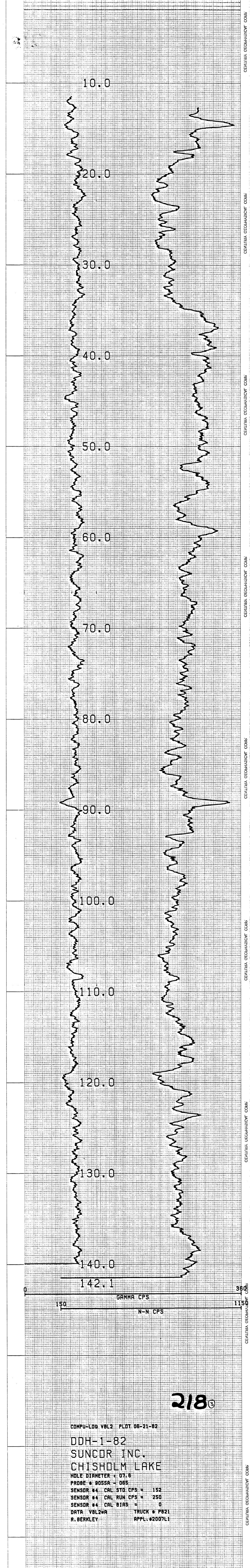
-

· · _:

DATA FROM (V8L2*A

- TD = TOTAL DEPTH
- T = TOP OF ZONE B = BOTTOM OF ZONE

DEPTH 100 10100 15100 25100 25100 36100 35100 40100 45100	TRUE DEPTH .00 4.99 9.99 14.99 19.99 24.99 24.99 34.99 39.99 44.99	NORTH DEV .00 .02 .05 .08 .11 .14 .17 .21 .25 .29	ERST DEV .00 .03 .07 .11 .14 .17 .20 .22 .24 .25	DISTANCE .00 .04 .09 .14 .18 .22 .26 .31 .35 .38	AZIMUTH .0 53.5 53.5 53.1 51.3 49.6 49.6 47.3 43.8 40.3	5A 8 5 5 5 4 4 4 5 5 4 4 5 5 4	SAB 53.5 53.5 52.2 45.1 42.3 49.6 33.5 18.7 9.7
50.00 55.00 60.00 70.00 70.00 75.00 90.00 90.00 105.00 115.00 125.00 130.00 135.00 140.00 140.00	49.99 54.99 59.99 64.99 69.99 74.99 84.99 94.99 94.99 104.99 104.99 104.99 124.99 124.99 124.99 124.99 129.99 124.99 129.99 124.99 129.99 124.99 129.99 124.99 129.99 129.99 134.99 134.99 134.99 134.99 139.99 134.99 134.99 139.99 139.99 141.99	.33 .38 .43 .48 .52 .56 .56 .50 .57 .50 .57 .50 .57 .50 .57 .50 .55 .85 .85 .85 .85 .89 .89 .89	.25 .24 .23 .23 .23 .22 .22 .22 .22 .22 .22 .22	. 42 . 46 . 53 . 57 . 60 . 65 . 65 . 65 . 779 . 85 . 86 . 85 . 85 . 85 . 85 . 90 . 91	36.7 32.0 29.0 26.4 24.2 20.1 17.9 16.4 2.6 359.5 356.5 356.5 351.0 349.0	455444555545545455469	9.7 2.3 356.8 352.3 354.6 351.2 356.6 351.6 347.9 342.2 347.9 342.2 331.0 322.8 318.2 285.0 274.3 267.8 265.2 287.7 293.5 275.6



CENTURY GEOPHYSICAL CORPORATION

* * * * * * * * VERTICAL DEVIATION * * * * * * *

COMPU-LOG VALI DEVIATION

CLIENT SUNCOR INC. LOCATION : CHISHOLM LAKE HOLE ID : DDH-2-82

DATE OF LOG : 06-18-82

DATA FROM - VSL2*A

PROBE = 9055A 0065

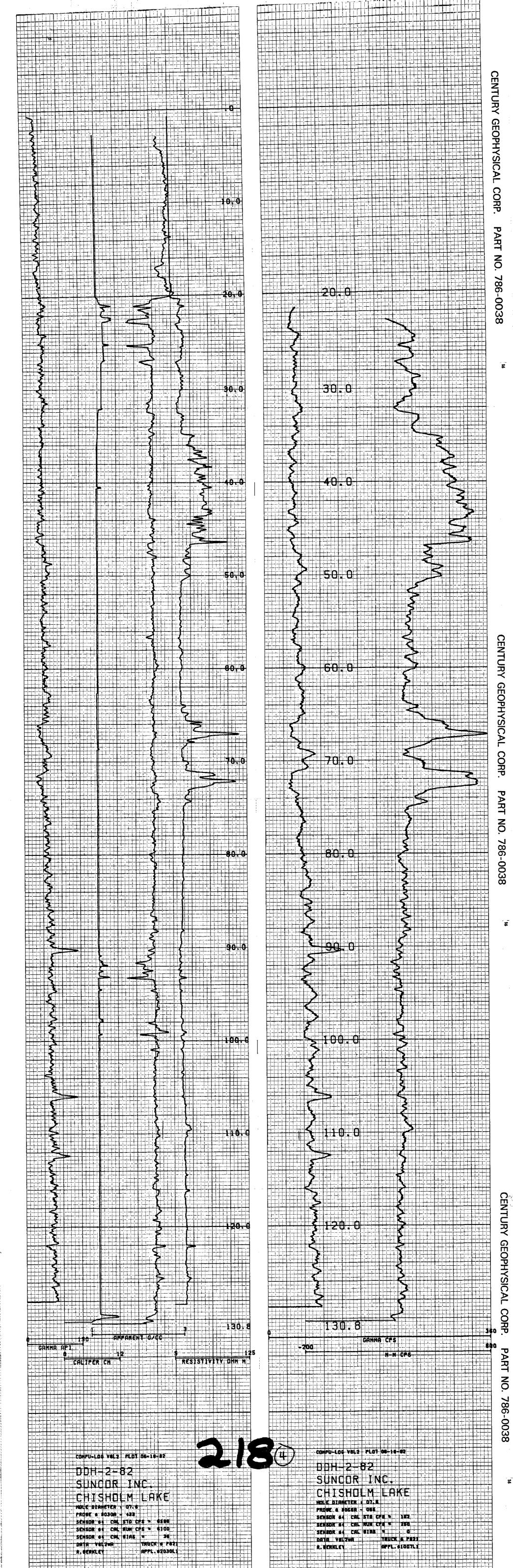
- TD = TOTAL DEPTHT = TOP OF ZONE B = BOTTOM OF ZONE

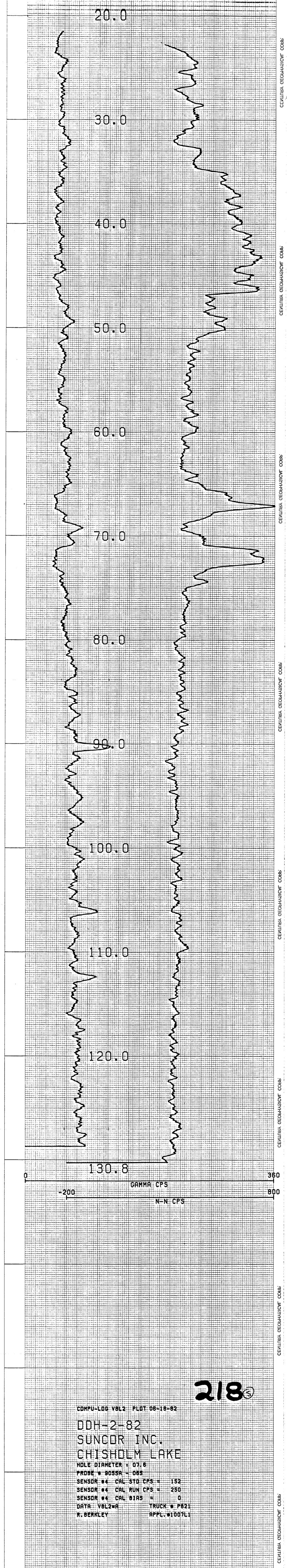
DEPTH	TRUE DEPTH	NORTH DEV	ERST DEV	DISTANCE	AZIMUTH	SA	SAB
. សិស	.00	. មាល	. 88	. 88	. 0	. O	
5.00	4.99	- 04	- 14	. 14	252.1	1.7	252.1
10.00	9,99	09	28	. 29	252.1	1.7	252.1
15.00	14.99	13	42	44	252.1	1.7	252.1 -
20.00	19.99	18	- 56	. 59	252.1	1.7	252. <u>I</u>
25.00	24.98	23	70	. 74	251.8	1.6	250.3
30.00	29.98	-,28	80	. 85	250.1	1.2	239.3
35.00	34.98	33	91	. 97	249.7	1.4	246.9
40.00	39.98	39	-i.04	1.11	249.3	1.5	246.3
45.00	44.98	44	-1.15	1.24	248.9	1.4	245.4
50.00	49.98	49	-1.27	1.36	248.8	1.4	247.4
55,00	54.97	53	-1.38	1.48	248.8	1.3	248.8
60.00	59.97	57	-1.50	1.60	249.1	1.4	252.3
65.00	64.97	60	-1.61	1.72	249.4	1.3	254.4
70.00	69.97	62	-1.72	1.83	249.9	1.1	257.6
75,00	74.97	62	-1.81	1.91	251.0	1.0	273.2 -
80.00	79.97	58	-1.90	1.99	253.1	I, Z	294.4
85.00	84.97	53	-2.01	2.08	255.2	1.3	294.2
90.00	89.97	- 49	-2.12	2.17	256.9	1.2	288.8
95.00	94.96	-,43	-2.23	2.27	258.9	1.4	296.2
100.00	99.96	38	-2.35	2.38	260.7	1.4	294.9
105.00	104.96	- 32	-2.46	2,49	262.4	1.5	295.8
110.00	109.96	26	-2.59	2.60	264.2	1.6	296.0
115.00	114.96	20	-2.72	2.73	265.8	1.6	296.8
120.00	119.95	13	-2.85	2.35	267.2	1.6	295.6
125.00	124.95	- 08	-2.98	2.98	268.4	1.6	293.3
130.00	129.95	- 03	-3.11	3.11	269.3	1.5	289.8
TD 130.70	130.65	- 03	-3.12	3.12	269.4	1.4	291.4

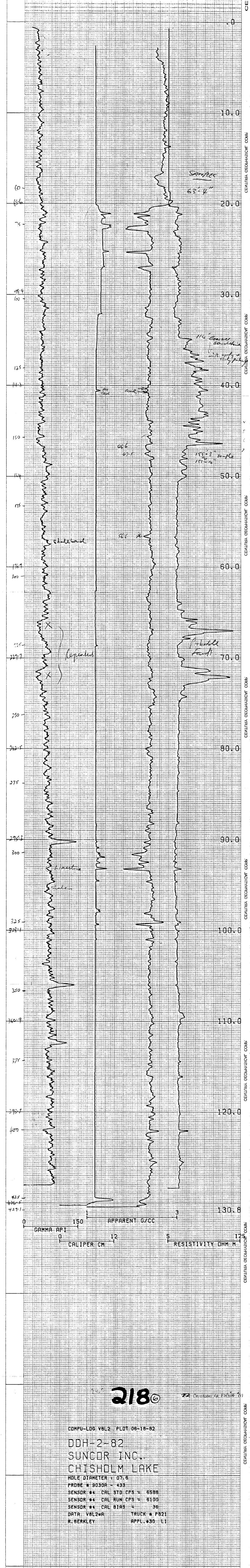
2/8

VERTICAL DEVIATION COMPU-LOG V8L1 DEVIATION DATA FROM : V8L2*A	
(L. C. D. D. B. D. L. A. L. A	
CLIENT : SUNCOR INC.	
LOCATION : CHISHOLM LAKE	
HOLE ID: DDH-2-82	
DATE OF LOG : 06-18-82	
PROBE : 9055A 0065	
SCALE: $.25 \text{ M/DIV}$ $= 5.0 \text{ M} \text{INCR}$	
TRUE DEPTH: 130.7 M	
AZIMUTH: 269.4 DISTANCE: 3.12 M TRUE NORTH	
	•

CENTURY GEOPHYSICAL CORP. PART NO. 786-0040







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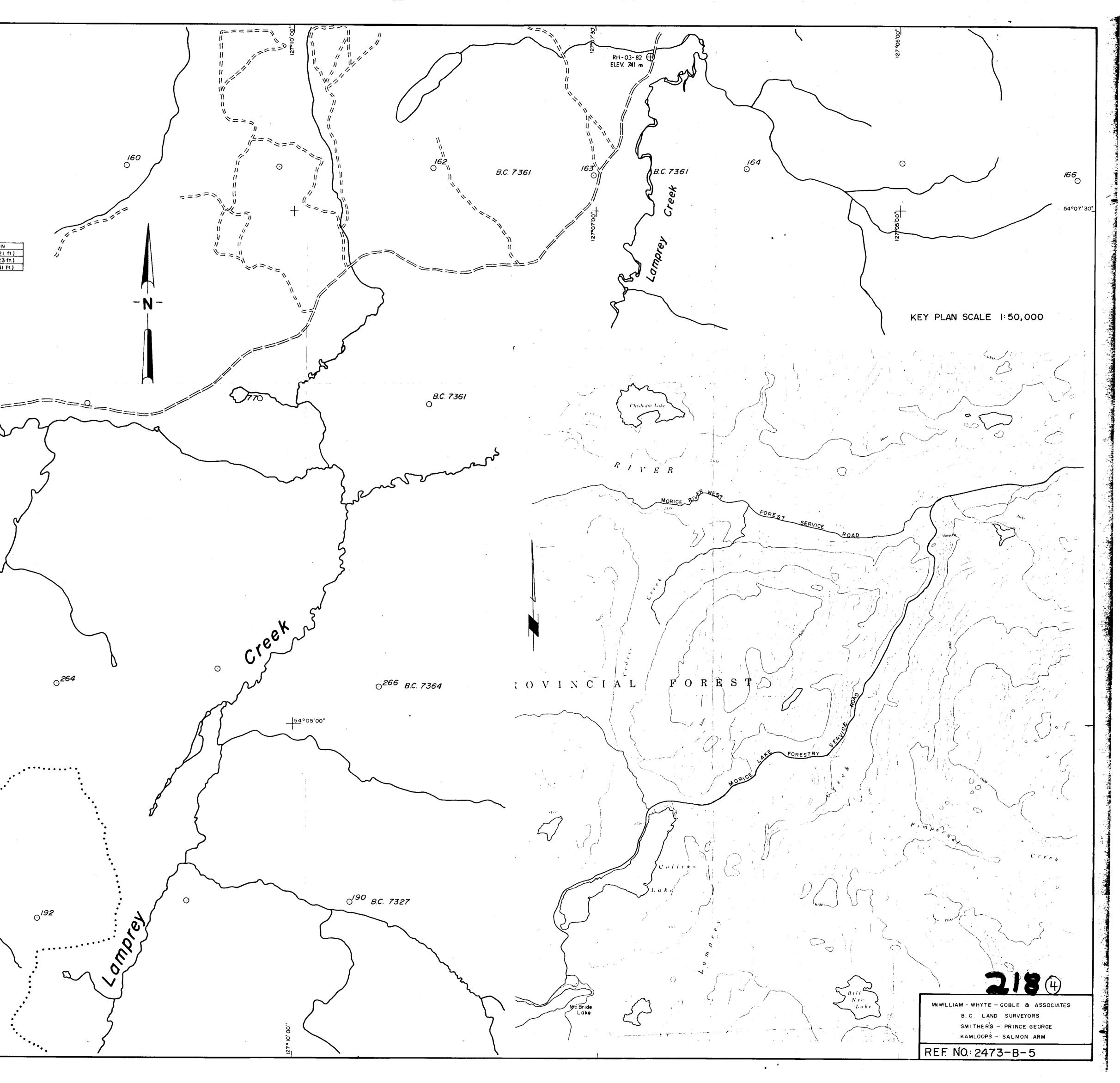
j

Phase 2 Drill Hole Location Map

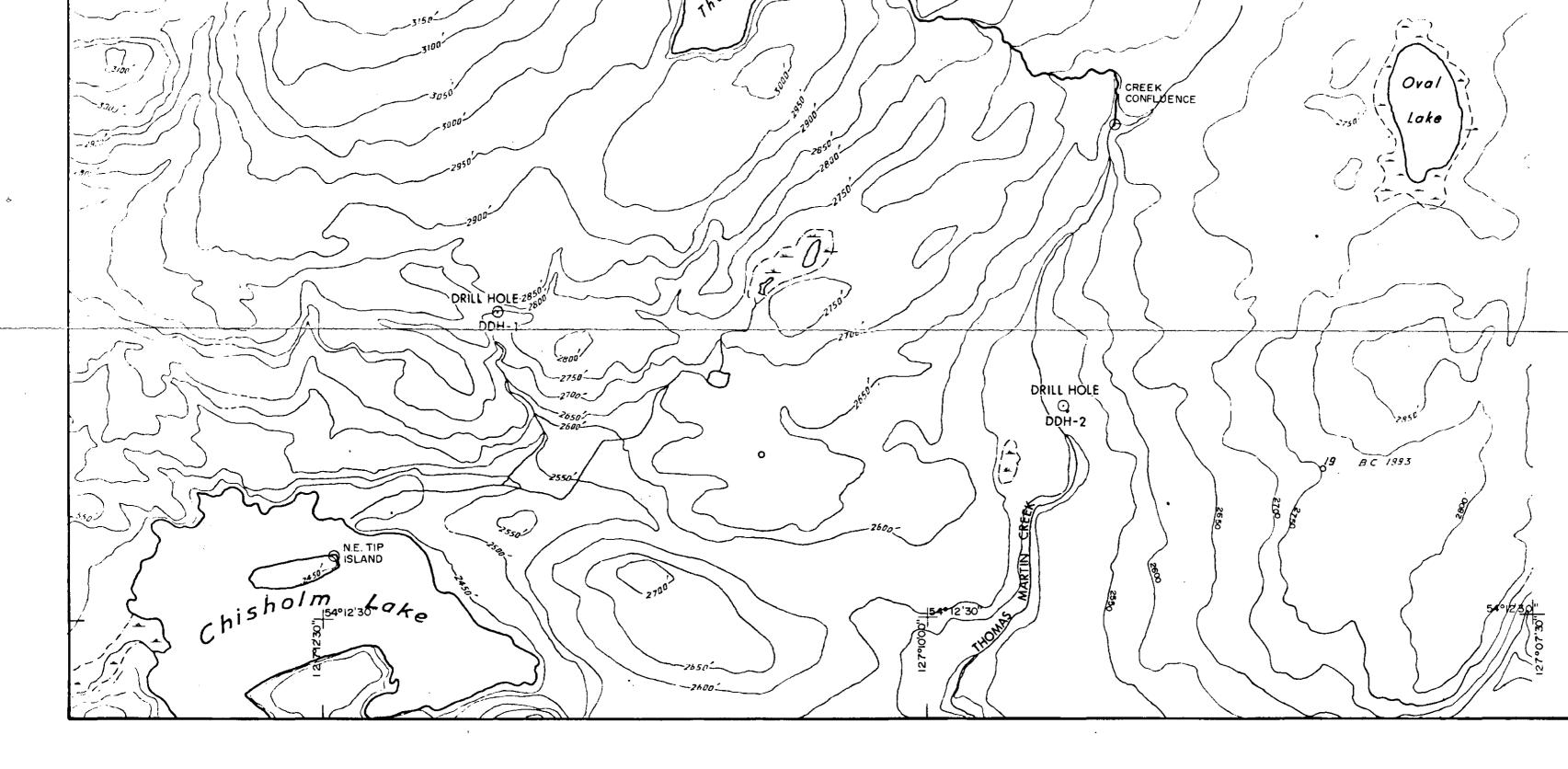
APPENDIX V

· · ·

J.K. Chisholm Lk 82 (2*)A *(1) PLAN SHOWING DRILL HOLE LOCATIONS IN THE VICINITY OF COLLINS LAKE, UNSURVEYED CROWN LAND, RANGE 5, COAST DISTRICT. 93 L/6a-b, 93 E/14 f-g-h. SCALE 1:15,840 CO-ORDINATES AND GEODETIC ELEVATIONS ARE IN METRES. CERTIFIED CORRECT November 1982. <u>54</u>° 07' 30" R.J. GOBLE, B.C.L.S. U.T.M. CO-ORDINATES N 5,991,615; E 615,492 N 5,995,435; E 616,578 N 6,000,241; E 623,005 ELEVATION 799 (2621 ft.) 830 (2723 ft.) 741 (2431 ft.) DRILL HOLE # 1 DRILL HOLE # 2 DRILL HOLE # 3 **79** ======== ି**ଂ** B.C. 7361 Ø 0 RH-02-82 ELEV. 830⁻m , 1 i n s 261. B.C. 7364 ~ 0^{\ .} \mathbf{O} <u>54</u>°05'00" • • • • • • • • • • 1===== B.C. 7327 ,*95* 0 ⊙^{/92} \odot 2 McBride Lake Ĩ•.



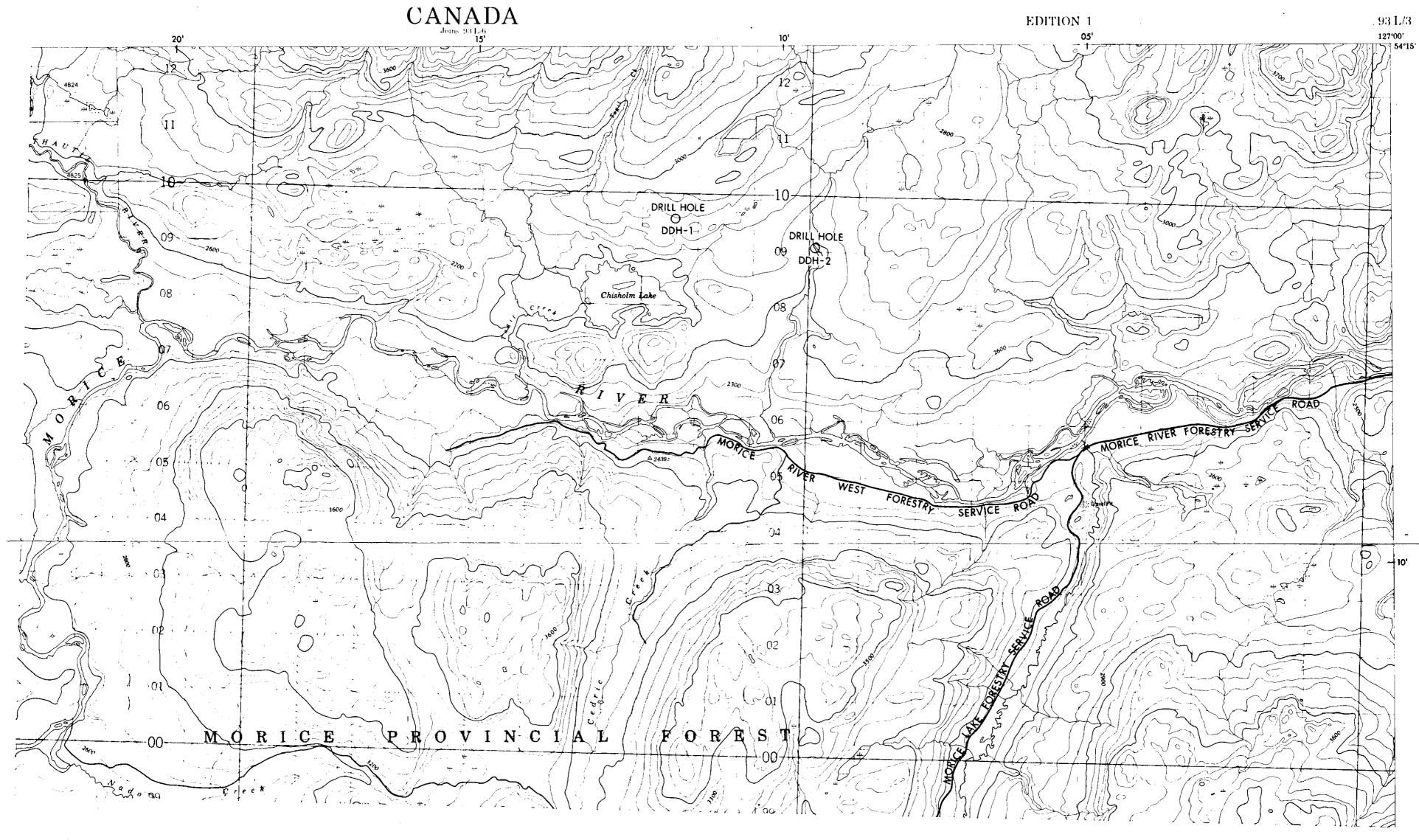
			• •
54°15'00"	54°15'00"	54 °15'00'1	
PLAN SHOWING DRILL HOLE LOCATIONS IN VICINITY OF CHISHOLM LAKE, UNSURVEYED CROWN LAND, RANGE 5, COAST DISTRICT. 93L/6b u.t.m. zone 9u SCALE 1:15,840	UTM CO-ORDINATES DRILL HOLE # 1 N6,009,107; E 620, 118 DRILL HOLE # 2 N6,009,529; E 617, 615 N.E. TIP UNNAMED ISLAND N6,008,400; E 616, 875 CHISHOLM LAKE CONFLUENCE OF TWO UNNAMED N6,010,420; E 620,350 CREEKS NORTHEAST OF CHISHOLM LAKE	ELEVATION 770 (2525 ft) 838 (2750 ft)	
R.J. GOBLE, B.C.L.S.			ŗ



EDITION 1

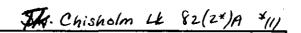
. 93 L/3

N -



KEY PLAN SCALE 1:50,000

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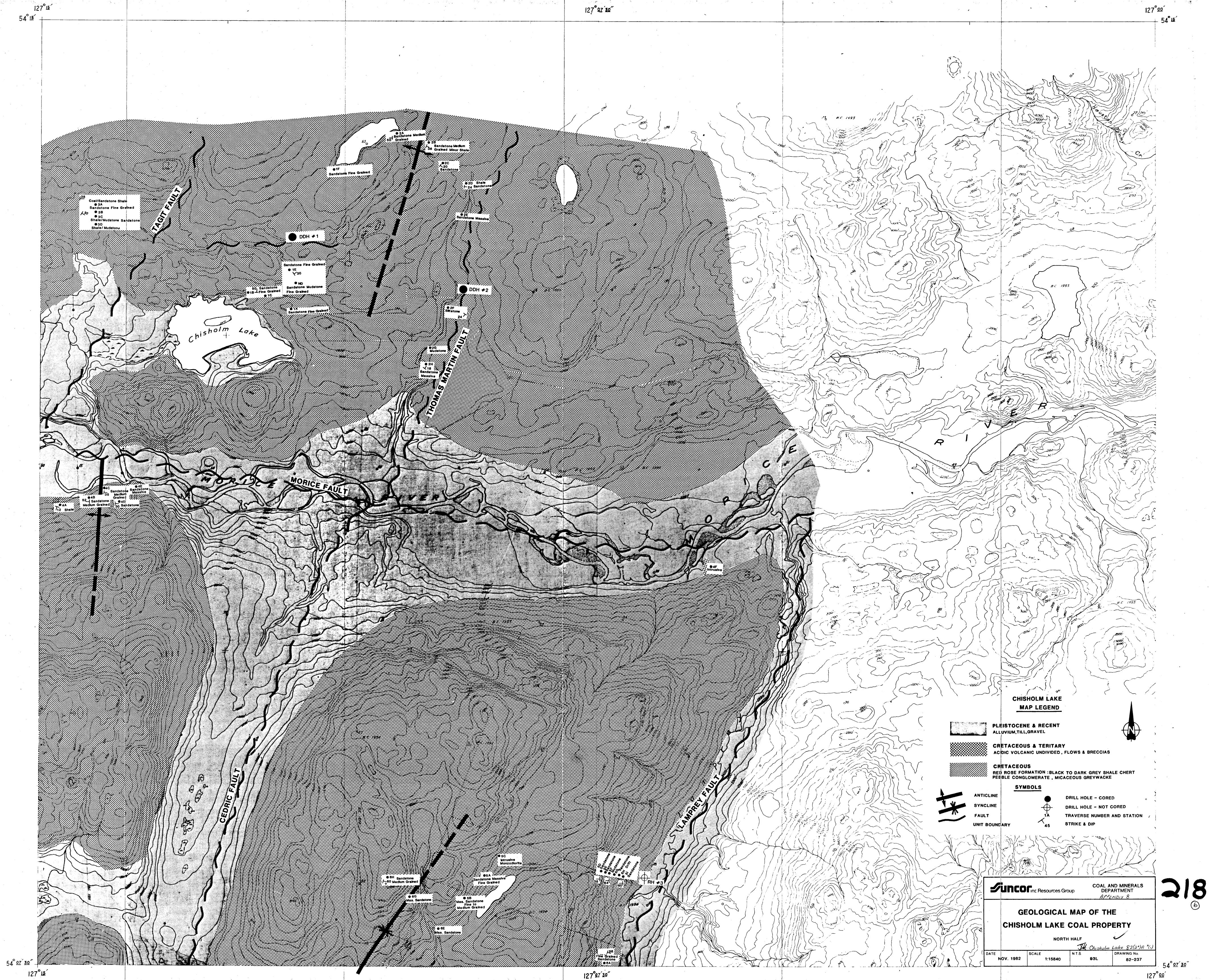
COAL AND MINERALS DEPARTMENT -MCWILLIAM - WHYTE - GOBLE & ASSOCIATES PHASE 1 B.C. LAND SURVEYORS , DRILL HOLE SMITHERS - PRINCE GEORGE LOCATION PLAN KAMLOOPS - SALMON ARM DATE SCALE N.T.L. DRAWING No. NOV. 1982 AS SHOWN 93L 82-235 REF. NO.: 2473-U.S.C.L.-5 -

APPENDIX VIII

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Geological Map (North Half)



APPENDIX VI

Phase 2 Lithological Logs

al	Drill Hol	e Log		Project: CHISHOIM LAKE Area HOUSTON, B: C Location: N5991615; Ecil	3		Hole Ant	900
	Hole DLa	meter:	1 30mm	Elevation: 799 metres		handle and the second		lied: 9-11 SEPT a
	Core Dia	· · · · · · · · · · · · · · · · · · ·	N/A	Cal., 4		1., Res.,	-	ged 9-11 SEPT 3
				GEOPHYSICAL LOGS: Dev., (<u>Janma</u> , A	1933. ·····	Loggsd 8	JD/RB
X	DEPIN AT					CORE		FRAC
2	BOX TOP	METERS -	LEGEND	LITHOLOGICAL DESCRIPTION	SMPLE	2040 60 80	R.C.C. 8	TOG REMARKS
	4			GLACIAL TILL			สกับกับ	50mm CASING set a 6.00
								meters
4								
Ĩ	* ·							
Í		6.00 -	<u> </u>	1				
		7.40		SILISTONE - black, muddy, sprong				
ł			•	SANDSTONE - medium grey, medium				
				grained, strong. siltstone band				
Į		10.00		from 10.40 to 11.00				
ĺ								
			ł		- 			
		14.00°		n an	13.76			
		* <u>1</u> 4', 00'		STLTSTONE - muddy	-1 E3*70			
ļ		່ 36 <u>ກ</u> ບ ສະສະເລີດ		The second second second second	4			
		16 -20,		Lange the second s	-			
	· · · · · · · · · · · · · · · · · · ·			SANDSTONE - medium grey, medium grained, occasional siltatone				
				layers	1 2 3 4 4			
		20 -			19,81			
ł								
Į					i,			
		23.80	et Rege	A STATE OF THE A STATE OF				
Ĩ	•:		Л	SILTSTONE - dark grey with sand-				
ļ				stone interBeds	25.91			
		27.06						
<u> </u>				SANDSTONE - nedium grey, medium	Ť.			
ļ		ns 29, 20		spatned, moderately sprong				
	- <u>}</u> ≢8	30			-#			
	and the second states of the	A STATE AND A STATE OF	and the second	Convinued on Mast Bage	Same come -			Haro the set of the second

				Continued	Hole Nu.	RH-01-82		Page_	2 0[8
	OR INC, RE Drill Hol			Project: <u>CHISHOLM LAKE</u> <u>Area</u> : Location:	<u> </u>		liole Azir liole Anu Date Dri	le :	
	Hole Dia	meter:		Elevation:			Date Log		<u> </u>
	Core Dia	meter:		Cal., D	en., Neu	1., Res.,	_	-	
·····			·····	GEOPHYSICAL LOGS: Dev., G	<u>amma, Sc</u>		Logaed By		
BOX NO.	DEPTH AT BOX TOP	DEPTH	LEGEND	LITHOLOGICAL DESCRIPTION	SAMPLE	CORE RECOVERY &		FRAC.	REMARKS
		40.00		SILTSTONE - dark grey, with numerous thin sandstone interbeds	32.00 38.10 44.20	2040 60 30	20.40 50 22		
		50.00 56.50 60.00		SANDSTONE - medium grey, medium grained, strong	50.29				

. .

				Continued	Hole No.	<u>RH-01-82</u>	······································	Page 3 Of	8
	OR INC. R	<u>مەرىپى بەر بىر بىر بەر مۇلغانىس</u>		Project: CHISHOLM I	LAKE - 06080		Hole Azi Nole Ana	10 :	
	Hole Di		·····	Location:		<u> </u>	Date Dri	lled:	
				Elevation:	, Den., Neu	Bag	Date Log	aed :	
	Core Di			GEOPHYSICAL LOGS: Dev.	, <u>Gamma</u> , So	nic	Logged B	v	
BOX NO.	DEPTH AT BOX TOP	DEPTH	LEGEND	LITHOLOGICAL DESCRIPTION	SAMPLE	OORE RECOVERY &	R.O.D. 8	FRAC. LOG REMARKS	
		63.00		<u>SILTSTONE</u> - dark grey, sandy	62.48		20 40 60 80		
		66.40		<u>SANDSTONE</u> - medium grey, medium grained					
		70.00		SILTSTONE - dark grey, strong with interbedded sandstones	68.58				
		مرا ور مراجع			74.68				
		<u>79.30</u> 80.00	· · · · · · · · · · · · · · · · · · ·	<u>SANDSTONE</u> - medium grey, medium grained, becoming increasingl silty					
					86.87				
		90.00	1	Continued on Next Page					

				Continued	Hole No	RH-01-82		Page 4 Of	8
SUNC	OR INC. R	ESOURCES		Project: CHISHOLM LAK	E - 06080				
Co. 1		1	,	Area :			<u>Hole Azi</u>		
LOAI	Drill Ho	The second s		Location:	· · · · · · · · · · · · · · · · · · ·		l <u>lole Ang</u> Date Dri		—
	<u>Hole Dia</u>			<u>Elevation:</u>			Date Log		
	Core Di	ameter:		GEOPHYSICAL LOGS: Dev.,	Den., New	1., Res.,	•	•	-
вох	DEPTH AT	T	<u> </u>	Contraction norms, Dev.,	Gamma, SC		Logaed B		
10.	BOX TOP	DEPTH	LEGEND	LITHOLOGICAL DESCRIPTION	SAMPLE	CORE RECOVERY %	R.O.D. %	FRAC. LOG REMARKS	•
				SANDSTONE - continued		20 40 60 80	20 40 60 80		
				<u>SANDSTONE</u> - dark grey, fine graine silty	-d, 92.96				
		100.00 102.80							
		بر این این مراجع		SANDSTONE - medium grey, medium grained, becoming increasingly silty.					
		110.00							
		116.90			_				
		- 118.40-		<u>SILTSTONE</u> - dark grey, muddy	117.35				
		120.00		<u>SANDSTONE</u> -					
		-		Continued on Next Page					

			····,·				a i canadana serie i cara a cara a cara a
				Continued -	Hole No.	RH-01-82	Page 5 Of 8
SUNC	OR INC. RE	SOURCES		Project: CHISHOLM LAKE	- 06080		Hole Azimuth:
]				Area :			Hole Angle :
	Drill Hol			Location:			Date Drilled:
	Hole Dia			Elevation;		<u> </u>	Date Logged :
	<u>Core Di</u> a	meter:		GEOPHYSICAL LOGS: Dev., G	en., neu amma. So	., Res.,	Logged By
BOX	DEPTH AT			1		CORE	FRAC
NO.	BOX TOP	DEPTH	LEGIND	LITHOLOGICAL DESCRIPTION	SAMPLE	RECOVERY *	R.O.D. & LOG REMARKS
				<u>SANDSTONE</u> - continued - dark grey, fine grained with coarser bands	123.44	2040 60 80	20 40 60 50
		128.50 130.00		SANDSTONE - medium grey, coarse grained with finer grained interbeds	129.54		
	-	134.60		SILTSTONE- dark grey, with numerous fine to medium grained sandstone interbeds	135.64		
		140.00			141.73		
	-	149.60 150.00		Continued on Next Page	147.83		

			Co	ntinued	Hole No.	RH-01-82		<u>Page</u>	6 Of 8
SUNC	OR INC. R	ESOURCES		Project: CHISHOLM LAK	<u>e - 06080</u>		Hole Az	imuth	
Coal	Drill Ho	le Log		<u>Area</u> :			Hole An		
	Hole Di	in the second		Location:			Date Dr	illed	
	Core Di			Elevation:	Don No.	Det u	Date Lo	ared	
				GEOPHYSICAL LOCS: Dev.	Gamma, Sc	u., Res., onic	Logaed	• • •	<u>د المعالم المعا</u>
BOX NO.	DEPTH AT BOX TOP	DEPTH	LEGEND		7	CORE		FRAC	
				LITHOLOGICAL DESCRIPTION SANDSTONE - dark grey, medium to	SAMPLE	RECOVERY 8 2040 60 80	R.O.D. 9 20,40,60 B		REMARKS
		F		coarse grained			<u>ו װ ווווו</u>	TII	
		152.90							
		5		SILTSTONE - dark grey with inter-	153.92				
		F		bedded fine grained sandstone					
		E							l
		F]						
			1						
		E 3	1						
			1		160.02				
		160.00 161.10]						
		-		SANDSTONE - medium to coarse graine	a				
		162.70							
		164.00		<u>SILTSTONE</u> - sandy				<u>}</u>	
		E		SANDSTONE - medium grained]]]	
		165.50	d	THE REAL MORTHE REALING					
		F]	SILTSTONE - with fine grained	166.12				l
ļ		F :	4	sandstone interbeds					Į
		E T						i II	
		170.00]						Hole col-
			1						lapsed at
		E :			120 24				171.10 m.
		F T	1		172.21				No geo-
	•	F :							physical 1
1		F 7							beyond thi
		t :	ł						depth
		F 7	}						
		178.31			178.31				
	-		}		1 1/0.31				
		180.00 -		SANDSTONE					
		100.00		Continued on NextPage					

				Continued -	Hole No.	RH-01-82	Page 7 Of 8	,
SUNC	OR INC. RE	ESOURCES		Project: CHISHOLM LAKE	- 06080		Hole Azimuth.	
Coal	Drill Hol		·	Area :			Hole Angle :	
	Hole Dia			Location:		<u> </u>	Date Drilled:	
	Core Dia			<u>Elevation;</u> Cal.,D	en. Neu	., Res.,	Date_Logged_:	
_				GEOPHYSICAL LOGS: Dev., G	amma, Sc	nic	Logged By	-
BOX	DEPIH AT				[CORE	FRAC.	
NO.	BOX TOP	DEPTH	LEGEND	LITHOLOGICAL DESCRIPTION SANDSTONE - continued	SAMPLE	RECOVERY 8	R.O.D. & LOG REMARKS	-
		terifaturifaturi		<u>SANDSIONE</u> - continued medium grey, medium grained with occasional thin bands of black muddy siltstone	184.40	20 40 60 80	20 40 60 50	
		190.00			190.50			
					196.60			
	,	200.00			202.69			
		210.00			208.79			

			Co	ontinued			ole No.	RH-01-8	32			Page	8_0F 8	3
SUNC	OR INC. RI	ESOURCES			Project: CHISH	OLM LAKE -	06080			11- - 1		muth:		
Coal	Drill Ho	le Log			Area :							<u>le :</u>		
	Hole Dia				Location:					Date	Dri	1led:		
	Core Dia		<u> </u>		Elevation:	Cal., De	n., Neu	Res	• #	Date	Log	aed :		
				GEO	DPHYSICAL LOGS:	Dev., Ga	tuma, Sc	<u>nic</u>		Logo	ed_B	¥i		
BOX NO.	DEPTH AT BOX TOP	DEPTH	LEGEND		ICAL DESCRIPTION		SAMPLE	CORE RECOVER	nv a	ЪO	D. %	FRAC.	REMARKS	
					E - continued		DAMPLIC	20 40 60		20.40	60 80		REPRICES	
		E			_									
			1											
		214.88					214.88							
· ·				SILTSTON	\underline{E} - black, muddy w	vith		1						
					ional interbedded d, grey sandstone	medium								
	:			Q	-,,									
		220.00					220.98							
														ŧ
		E	1											
		Ē	1											
														1
		227.08					227.08							ه
					<u>IE</u> - medium grey, m Ed, occasional sil									1
		230.00-		bands										i
		1											Hole wet	
		233.17	3										from 6.00	שו
		F 23311/	۹ <u> </u>	Hote com	pleted 233.17 m and	d cemented	· · · · ·	╉ ╎╎┥┧┥┥	┼┼┼┠┤	┝┼╀╎┼			· · · · · · · · · · · · · · · · · · ·	<u> </u>
		F T	3	INTE COM	Freed Freed W and	, cemented								[
		E i	1			ļ								l
		F	\$											
			5											
		E	1											
		<u> </u>	1											

-					Hole Nu	TR -02-82	Chisholm LK)A *(1) 1 Of 9
SUNC	COR INC. R	ESOURCES	4	Project: CHISHOLM LAN					
01		• • •		Area : Houston, B.			Hole Azi		
COA.	Drill Ho	The second s		Location: N5995435; E6			<u>Hole Ang</u>		
	Hole Di	ameter:	130 mm	Elevation: 830.0m					: 12-14 SEPT82 12-14 SEPT 82
	Core Di	ameter: 1	N/A	Cal.	Den., Nei	1., Res.,	Date Log	aed	12 14 JEFT 02
	<u></u>	T	· · · · · ·	GEOPHYSICAL LOGS: Dev.,	Ganma, Se	paix.	Logged B	<u> </u>	JD/RB
BOX NO.	DEPIH AT	DEDOT				CORE		FRAC	
10.	BOX TOP	METERS .	LEGEND	LITHOLOGICAL DESCRIPTION	SAMPLE	RECOVERY 8			REMARKS
		METERS 10 20 22.60		SILTSTONE - black, muddy, occasional thin fine, grained sandstone partings SANDSTONE - medium grey, medium grained becoming finer grained and silty from 25.30	13.72 19.81 25.91		20 40 60 80		150 mm casing set at 6.0m
		30.00							
		<u> </u>		Continued on Next Page					

				CONTINUED	Hole No.	<u>RH-02-82</u>	<u> </u>	Page 2 Of 9
SUNC	OR INC. RE	SOURCES		Project: CHISHOLM LAK	E - 06080		Hole Azir	
			•	Area :			liole And	
Coal	Drill Hol	- I A A A A A A A A A A A A A A A A A A		Location:			Date Dri	
	<u>Hole Dia</u>			Elevation:			Date Log	red :
	<u>Core Dia</u>	meter:		GEOPHYSICAL LOCS: Dev.	Den., Neu Gamma, Sc	1., Res.,	Logged By	
BOX	DEPIH AT		1		South and A So	CORE		FRAC
NO.	BOX TOP	DEPTH	LECEND	LITHOLOGICAL DESCRIPTION	SAMPLE	RECOVERY &		LOG REMARKS
				MUDSTONE - black, silty		2040 60 80	20 40 60 80	
			3		32.00			
		33.60						
				SILTSTONE - grey, sandy				
		È	1					
		36.80						· · · · · · · · · · · · · · · · · · ·
		37.80	•	MUDSTONE - black				
		Ē		SANDSTONE - medium grey, fine	38.10			
		40	-	grained, silty				
			-					
		41.80		MUDSTONE - black				
		42.50		SANDSTONE - medium grey, fine	—			
		F		grained, silty	44.20			
		45.20	<u>-</u>					
				MUDSTONE - black, silty with	-			
		Ę	1	occasional thin partings of siltstone				
			1					
		50	3					
			4		50.29			
		<u> </u>	3					
:	6	E	3					
			4					
		Ē	3					
		E '			56.39			
		Ē	-					
		E 60 .	4					
		<u> </u>	1	Continued on Next Page				

				CONTINUED	Hole No.	RH-02-82		Page	<u>3 Of 9</u>
SUNC	OR INC. RE	SOURCES		Detection and	- 0/080				
	•		,		<u>F - 06080</u>		Hole Azi		
Coal	. Drill Hol	e Log		<u>Area :</u> Location:	····		<u> Hole Ang</u>		
	Hole Dia	meter:		Elevation:			Date Dri	1160:	
	Core Dia				Den., Neu	Res.	Date Log	ged :	
				GEOPHYSICAL LOGS: Dev.	<u>Canma, Sc</u>	onic	Logged B	v:	
BOX	DEPTH AT		[CORE		FRAC	
NO.	BOX TOP	DEPTH	LEGIND	LITHOLOGICAL DESCRIPTION	SAMPLE	RECOVERY &	ROD 8		REMARKS
		60.60	4	MUDSTONE - continued		20406080	20 40 60 80		
				SANDSTONE - medium grey, medium	(2.40				
			4	grained, increasingly silty from 62.00	62.48				
		64.00			_				
	,			SILTSTONE - black, muddy					
1		È	1						
		68.40 .			68.58				
			-						
		70	3	SANDSTONE - medium grey, fine to					
		È		medium grained, silty, with					
				occasional siltstone bands					
					74.68				
			1						
		Ε :							
		77,60]]	
				MUDSTONE - black, silty with					
		80	3	occasional siltstone horizons	80.77				
	1		4		ļ				
			4						
			1						
		86.80	d		86.87				
		88.30 -	3	<u>SANDSTONE</u> - silty					
		90.00	4	MUDSTONE - block stitu	[▋▌▏!!!!!!!			
		90.00		<u>MUDSTONE</u> - black, silty					
		-	1	Continued on Next Page					

				CONTINUED	Hole No.	RH-02-82	<u></u> ,	Page 4 Of 9
SUNC	OR INC. RE	SOURCES		Project: CHISHOLM LAKE	- 06080			
Coal	Drill Hol	e Log		<u>Area :</u>			<u>Hole Azi</u> Hole Ang	
	Hole Dia			Location:			Date Dri	the second se
	Core Dia			Elevation; Cal	Den. Nei	1., Res.,	Date Log	ged :
		· · · · · · · · · · · · · · · · · · ·	·····	GEOPHYSICAL LOGS: Dev.	Catuma Sc	onic	Louged B	X
BOX NO.	DEPIH AT BOX TOP	DEPTH	LEGIND		[CORE		FRAC.
			LEGEND	LITHOLOGICAL DESCRIPTION SANDSTONE - medium grey, fine	SAMPLE	RECOVERY 8 20 40 60 80	R.O.D. 20,40,60,80	LOG REMARKS
ł		92.50		grained with siltstone bands			וווזיווו	
				SANDSTONE - dark grey, muddy	92.96			
		99.50			99.06			
		100.40		SANDSTONE - medium grained, silty	1 33.00			
				SILTSTONE - with thin sandstone bands				
				Janus				
		103.60			-			
		104.80		SANDSTONE-medium grained, silty	105.16			
				SILTSTONE & MUDSTONE - interbedded.				
		107.30			-			
		108.50		SANDSTONE - medium grained, silty	-			
		110		SANDSTONE & SILTSTONE				
				- interbedded, medium grey	111.25			
l								
		117.70	· · · · · · · · · · · · · · · · · · ·		117.35			E E E
		119.00		SANDSTONE - medium grained				
		120 -						
				Continued on Next Page				

				CONTINUED	Hole No.	RH-02-82		Page 5 Of 9
	OR INC. RE		5	<u>Project: CHISHOLM</u> Area :	LAKE - 06080		Hole Az	
Coal	. Drill Hol	e Log		Location:				<u>ile :</u>
	Hole Dia	meter:		Elevation;			Date Dr	
	Core Dia				., Den., Neu		Date Loc	iged :
			·····	GEOPHYSICAL LOCS: Dev	., Ganma, Sc	onic	Logged I	<u> </u>
BOX NO.	DEPIH AT BOX TOP	DEPTH	LEGEND	LITHOLOGICAL DESCRIPTION	SAMPLE	CORE RECOVERY %	R.O.D. %	FRAC LOG REMARKS
				SILTSTONE - dark grey with this interbeds of fine sandstone mudstone	n	20.40 60 80	20 40 60 80	
		<u>128.40</u> <u>129.50</u> 130		SANDSTONE - medium grained MUDSTONE - black, silty	129.54			
		<u>132.20</u> 135.90		SANDSTONE - medium grey, silty	135.64			
		<u>136.60</u> 140		MUDSTONE - black, silty <u>SANDSTONE</u> - medium grey, fine grained, generally silty. Occasional coarser grained horizons and siltstone bands				
	, ,		l a cardena car		141.73			
					147.83			
		150						

CONTINUED Hole No. RH-02-82 Page 6 0f 9 SUNCOR INC. RESOURCES Project: CHISHOLM LAKE -06080 Hole Azimuth: Coal Drill Hole Log Arca Uole Azimuth: Hole Diameter: Location: Date Drilled; Core Diameter: GEOPHYSICAL LOGS: Dev., Gamma, Sonic Date Logged : BOX DEPTH AT DEPTH LECEND LITHOLOGICAL DESCRIPTION SAMPLE CORE R.O.D. % FRAC NO. BOX TOP DEPTH LECEND LITHOLOGICAL DESCRIPTION SAMPLE RCOVERY % R.O.D. % LOG REMARKS
Coal Drill Hole Log Area : Location: Hole Azimuth: Location: Hole Azimuth: Hole Diameter: Location: Date Drilled: Core Diameter: Cal., Den., Neu., Res., GEOPHYSICAL LOCS: Dev., Camma, Sonic Date Logged : BOX DEPTH AT NO. BOX TOP DEPTH LECEND LITHOLOGICAL DESCRIPTION SAMPLE CORE RECOVERY % R.O.D. % LOG SANDSTONE - continued 2040 60 80 2040 60 80 2040 60 80 2040 60 80
Coal Drill Hole Log Area : Location: Date Drilled; Elevation: Hole Angle : Date Drilled; Hole Diameter: Elevation: Core Diameter: Cal., Den., Neu., Res., GEOPHYSICAL LOGS: Dev., Gamma, Sonic Date Logged : Logged By : BOX DEPTH AT NO. BOX TOP DEPTH LECEND LITHOLOGICAL DESCRIPTION SAMPLE CORE RECOVERY % R.O.D. % LOG FRAC REMARKS SANDSTONE - continued SAMPLE 2040 60 80 2040 60 80 2040 60 80
Hole Diameter: Location: Elevation: Date Drilled: Core Diameter: Cal., Den., Neu., Res., GEOPHYSICAL LOGS: Dev., Gamma, Sonic Date Logged : BOX DEPTH AT NO. BOX TOP DEPTH LECEND LITHOLOGICAL DESCRIPTION SAMPLE CORE RECOVERY % FRAC R.O.D. % FRAC LOG SANDSTONE - continued SAMDLE 2040 60 80 20 40 60 80 20 40 60 80 20 40 60 80
Hole Diameter: Elevation: Date Logged: Core Diameter: Cal., Den., Neu., Res., Date Logged: GEOPHYSICAL LOGS: Dev., Gamma, Sonic Logged By: BOX DEPTH AT DEPTH LEGEND LITHOLOGICAL DESCRIPTION SAMPLE CORE FRAC NO. BOX TOP DEPTH LEGEND LITHOLOGICAL DESCRIPTION SAMPLE RECOVERY % R.O.D. % LOG SANDSTONE - continued SAMDLE 2040 60 80 20 40 60 80 20 40 60 80 20 40 60 80
Core Diameter: Cal., Den., Neu., Res., Date Logged : GEOPHYSICAL LOGS: Dev., Gamma, Sonic Logged By : BOX DEPTH AT Core FRAC BOX DEPTH AT Core FRAC BOX DEPTH AT Core FRAC BOX DEPTH LECEND LITHOLOGICAL DESCRIPTION SAMPLE RECOVERY % R.O.D. % LOG REMARKS SANDSTONE Continued 2040 60 80 20 40 60 80 <t< th=""></t<>
BOX DEPTH AT CORE FRAC NO. BOX TOP DEPTH LECEND LITHOLOGICAL DESCRIPTION SAMPLE CORE FRAC NO. BOX TOP DEPTH LECEND LITHOLOGICAL DESCRIPTION SAMPLE RECOVERY % R.O.D. % LOG REMARKS SANDSTONE Continued 2040 60 80 2040 60 80 2040 60 80 100
BOX DEPTH AT CORE FRAC. NO. BOX TOP DEPTH LECEND LITHOLOGICAL DESCRIPTION SAMPLE RECOVERY % R.O.D. % LOG REMARKS SANDSTONE continued 2040 60 80 2040 60 80 2040 60 80 2040 60 80
NO. BOX TOP DEPTH LEGEND LITHOLOGICAL DESCRIPTION SAMPLE RECOVERY % R.O.D. % LOG REMARKS SANDSTONE - continued 2040 60 80
SANDSTONE - continued 20 40 60 80 20 40 60 80
SUITSTONE - dark grey with
occasional thin sandstone bands
160.02
SANDSTONE - medium grained
<u>SILTSTONE</u> - sandy
SANDSTONE - medium grained
168.20
$\frac{\text{SILTSTONE} - \text{sandy}}{170}$
SANDSTONE - medium grained 172.21
= 174.60 SILTSTONE - sandy
175.70 SANDSTONE - medium grained
SILTSTONE - medium grey with
Interbedded thin sandstones
Continued on Next Page

				CONTINUED	Hole No.	. RH+02-82	Page 7 Of 9
SUNC	OR INC. R	ESOURCES	:	Project: CHISHOLM LAK	— 06080		
Coal	Drill Ho		-	Area : Location:			Hole Azimuth: Hole Angle : Date Drilled:
	Hole Dia		<u> </u>	Elevation:			Date Logged :
	Core Dia	<u>meter:</u>		GEOPHYSICAL LOGS: Dev.,	Den., New Cauma Sc	u., Res.,	Logged By
BOX NO.	DEPTH AT BOX TOP	DEPTH	LEGEND			CORE	FRAC.
	BAA ILP	186.40 189.90		SILTSTONE - continued SANDSTONE - medium grey, fine grained with siltstone partings SILTSTONE - black, muddy	184.40	RU:00VERY 8 20 40 60 90	R.O.D. 8 LOG REMARKS
	-	198.80		SANDSTONE - medium grey, medium grained	196.60		
	1	200 203.90		<u>SILTSTONE</u> - black, sandy <u>SANDSTONE</u> - medium grey, medium grained becoming increasingly finer grained and silty	202,69		
		210		Continued on Next Page	200.79		

				CONTINUED	Hole No.	RH-02-82		Page 8 Of 9	
SUNCOR INC. RESOURCES			Project: CHISHOLM LAKE - 06080			Hole Azimuth:			
Coal	Drill Hol	le Log		Area :			Hole And	<u>ile_:</u>	
	Hole Dia			Location: Elevation:	······································		Date Dri		
	Core Dia			Cal.,	Den., Neu	1., Res.,	Date Log	iged	
D ov			r	GEOPHYSICAL LOGS: Dev.,	Gamma, Sc		Logged I		
BOX NO.	DEPTH AT BOX TOP	DEPTH	LEGEND	LITHOLOGICAL DESCRIPTION	SAMPLE	CORE RECOVERY &	R.O.D. 8	FRAC.	
		211.00		SANDSTONE - continued		2040 60 80	20 40 60 80		
		213,00		SANDSTONE - medium grey, medium. grained					
		-		SILTSTONE - dark grey	214.88				
		216.60	·						
				SANDSTONE - medium grey with siltstone interbeds					
		220.10							
		221.80		<u>MUDSTONE</u> - black, silty	220.98				
				SANDSTONE - medium grey, medium grained, silty with occasional thin siltstone bands					
					227.08				
	I	230			233.17				
		239.27 240		Continued on Next Page	239.27				

				CONTINUED	Hole No	<u>RH-02-82</u>		9 Of 9		
SUNC	OR INC. RE	SOURCES		Project: CHISHOLM LAKE						
Coal	. Drill Hol	e Log		<u>Area :</u>			Hole Azimuth: Hole Angle :			
	Hole Dia			Location: Elevation:			Date Drilled:			
	Core Dia				Den. Nei		Date Logged +			
				GEOPHYSICAL LOGS: Dev.,	Ganuna, So	onic	Logged By :			
BOX	DEPIH AT					CORE	FRAC.			
NO.	BOX TOP	DEPTH	LEGEND	LITHOLOGICAL DESCRIPTION	SAMPLE	RECOVERY %		REMARKS		
				<u>SANDSTONE</u> - medium grey, medium grained		20406080	20 40 60 80	• • •		
				graineu				ole wet		
		244.00	-		244.00			rom 6.00m.		
				Hole completed at 244.00 metres						
				and cemented						
								4		
								· · · · · · · · · · · · · · · · · · ·		
			}							
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			L							

	ран с					. RH-03-82	The Chisholm L Pac	ahe 82(3)4 +(1) 10 1 Of 3
SUNC	COR INC. RE	ESOURCES	<u>;</u>	Project: CHISHOLM LA	<u>KE - 06080</u>			
Coal	L Drill Hol	le Log		Area : Houston B			<u>Hole Azimut</u> Hole Angle	
		ameter:	130 mm	Location: N6000241; E	4623005	- <u></u>		ed: 14-15 SEPT 82
		ameter:		<u>Elevation; 740.6m</u> Cal.,	. Den., Net	NAXXXX	Date Logged	
				Cal., GEOPHYSICAL LOGS: Dev.,	Galuma, S	MAXXXXXXXX	Logaed By	. RB
BOX NO.	DEPTH AT BOX TOP) Destruct	TOMBO			CORE	FR	
	- Bun Tur	DEPTH Meters	LEGEND	LITHOLOGICAL DESCRIPTION GLACIAL TILL	SAMPLE	RECEIVERY &	R.O.D. % LO	G REMARKS
i	1	, Meters	1	GLACIAL TILL		20406080	20 40 60 80	150mm casing set at 25.00m
	1	E 7	3		1			
	1	E 10	<u>1</u>					
1	1							
	1	<u>ب</u>	-		'			
1	1	Ē	1					
	Ι '	20	1					
ļ	1	24.00	1		/			
[1 '	E 7		MUDSTONE - black, silty with	25.91			
1	1 '	E	-	occasional thin partings of	'			
	1	1 30 L	4	siltstone and fine grained sandstone	32.00			
	1 1	E .7						1
1	1	E F	3		38.10			
[, /	40	-					
	. 1	Ê f	4		44.20			
1	, ł	Ē			44.20			
1	, F	F _ ?			1 1			
1	, F				50.29			
	, , , , , , , , , , , , , , , , , , ,	E I			1 1			
		E 7	4		1 1			
	, r	60	.		62.48			
	, , ,	É	4 '		02.40			
	, ł	Ë J	4 '		1			
	, F	É _	· · · · · · · · · · · · · · · · · · ·		68.58			· · ·
	, F	70	• ' =					
	, F	E I	' <u>'</u>	1	74.68			
		<u> </u>	<u>/</u> /	Continued on Next Page				

				CONTINUED	Hole No.	RH-03-82	Page 2 Of 3			
	OR INC. RE		•		Hole Azimuth.					
Coal	Drill Hol	e Log		Area : Location:			Hole Angle :			
1	Hole Dia	meter:		Elevation:			Date Drilled:			
	Core Dia				Den. Nei	BAG	Date Logged :			
·····				Cal., Den., Neu., Res., Qate Logged : GEOPHYSICAL LOCS: Dev., Gamma, Sonic Logged By						
BOX	DEPIH AT		F			CORE	FRAC.			
NO.	BOX TOP	DEPTH	LEGEND	LITHOLOGICAL DESCRIPTION	SAMPLE	RECOVERY %	R.O.D. & LOG REMARKS			
		80		MUDSTONE AS ABOVE	80.77	2040 60 80	20 40 50 50			
					86.87					
		90			92.96					
		100			99.06					
					105.16					
		110			111.25					
		117.40	_ <u> , ,</u>		117.35					
		120		SANDSTONE - medium grey, fine grained, silty with numerous partings of siltstone and medium grained sandstone	123.44					
	ι.	130			129.54					
					135.64					
		140			141.73					
		150			147.83					
		150		Continued on Next Page						

				CONTINUED	Hole No.	RH-03-82	. <u></u> 4	Page	<u>3 Qf 3</u>
SUNC	OR INC. RE	SOURCES	•	Project: CHISHOLM LAKE	- 06080		<u>Hole Azi</u>	muth:	
Coal Drill Hole Log				Area : Location:			Uole Angle : Date Drilled:		
	<u>Hole Dia</u>	meter:		Elevation:			Date Log	aed :	
	<u>Core Dia</u>	meter:		GEOPHYSICAL LOGS: Dev., G	en., Nei Samma Sc	1., Res.,	Logged B	-	
вох	DEPTH AT					CORE		FRAC	· · · · · · · · · · · · · · · · · · ·
NO.	BOX TOP	DEPTH 	LEGEND	LITHOLOGICAL DESCRIPTION	SAMPLE	RECOVERY % 20 40 60 80	R.Q.D. 8 .20 40 60 80	LOG	REMARKS
		158.80 158.80		<u>MUDSTONE</u> - black, silty <u>SILTSTONE</u> - dark grey with partings of mudstone and fine grained sandstone	153.92				
		170		- fine grained silty sandstone	166.12				
		180 184.90		between 177.20 and 178.40 and from 183.00 to 184.90	178.31 184.40				· · ·
		190		MUDSTONE - black, silty with occasional thin fine grained sandstone and siltstone horizons	190.50				
		E -			196.60				
		200			202.69				
	,	210			208.79				
					214.88				
		220		Hole Completed at 227.08 meters	220.98				Hole dry completio

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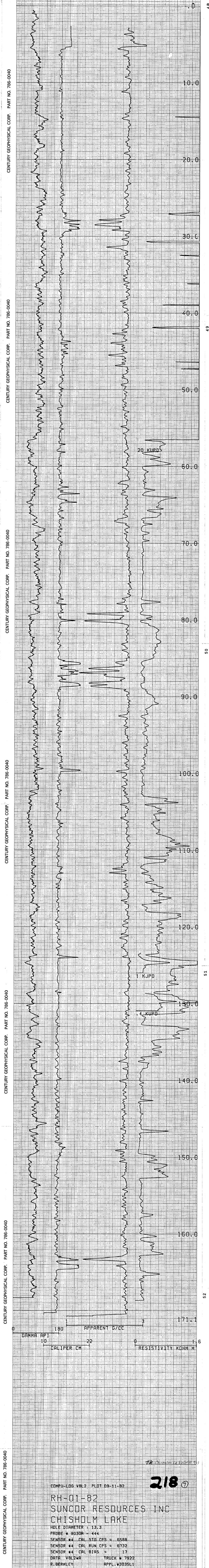
APPENDIX VII

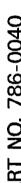
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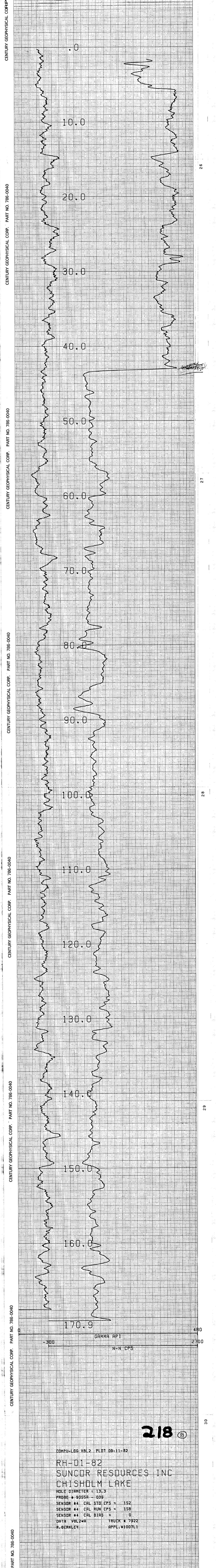
بر (

Piase 2 Geophysical Logs



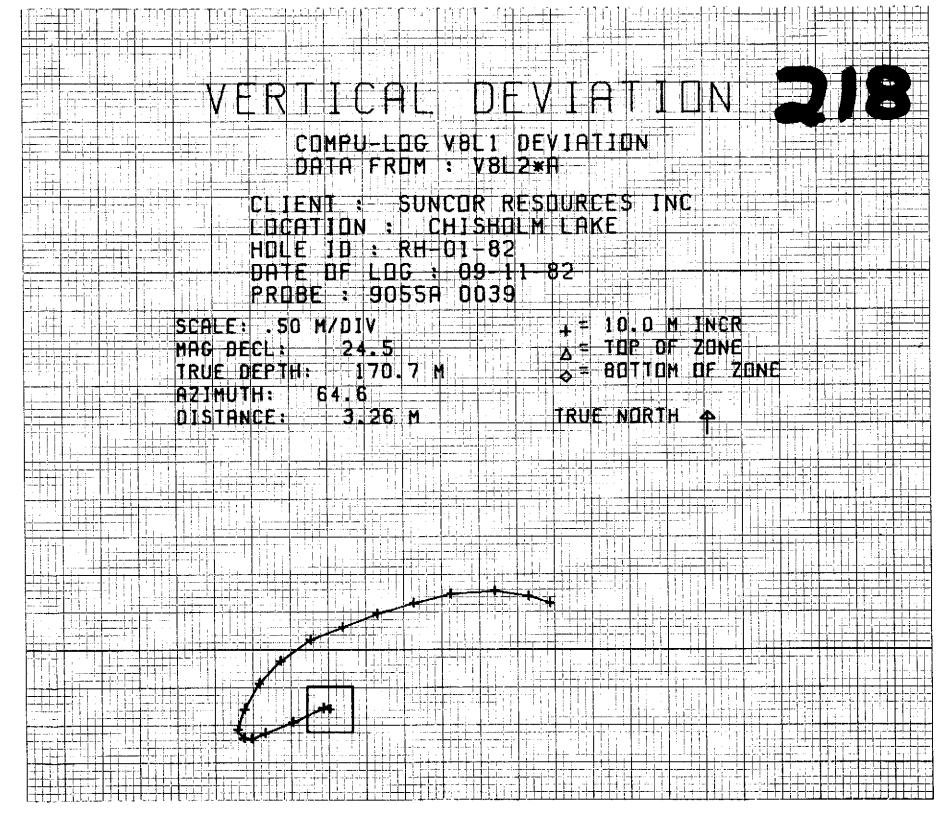


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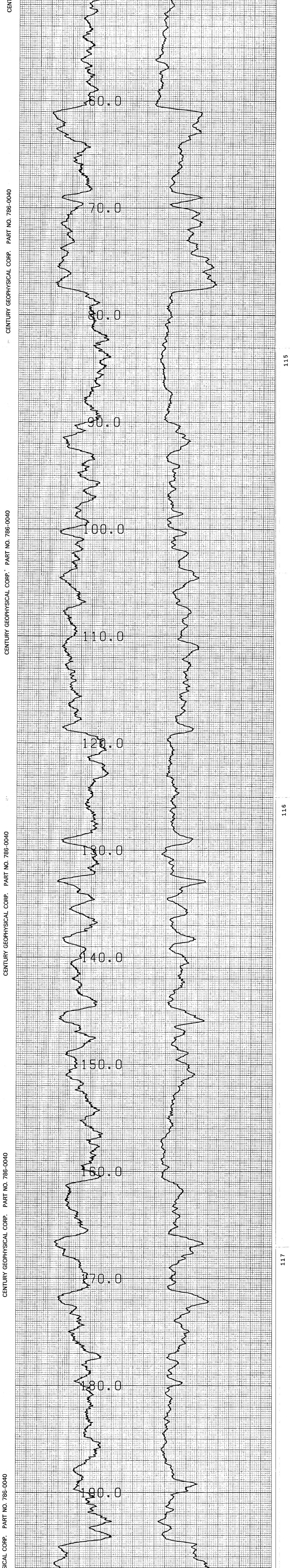


Martin Providence

PART NO. 786-0040



+ TK (mshchm LL SZ(31A +11) BOREHOLE KH-02-82 UNITIOPERATOR T922 K. KERCLEY 09-14-82 FIELD OFFICE CALGART CENTURY GEOPHYSICAL CORPORATION Tulsa, Oklahoma EQUIPMENT DATA COMPANY 9 SUNCOR RESOURCES INC. 9050/55 9080 9030 PROBE MODEL 9010 1.# 1.07" PROBE DIAMETER 1.07" 2.0 BOREHOLE RH-02-82 Nal Nal DETECTOR TYPE Nat Nel .5" x 3.0" .875° x 4.0° DETECTOR SIZE .875" x 1.25" 1.125" ± 4.5" ELEVATION AREA 1.62 x 10 -1 .558 x 10 -1 STO. K-FACTOR 1.58 x 10 ** CHESHOLM LAKE 1µж 1.18 1.000 STD. DEADTINE 1µ.... GAMMA STATE NU. COUNTY B.C CALIB. MODEL LOC. -CALIB DATE ----RANGE TOWNSHIP _ K-FACTOR x 10 " SECTION DEADTIME MINC TEST READING — HOLE DATA _ WATER FACTOR CASING FACTOR ----13.3 cm 244.0m BIT SIZE : TOTAL DEPTH - DRILLER : SIEL 15.2cm. 232.1 m Nat CASING - TYPE & SIZE DETECTOR TYPE Nel : TOTAL DEPTH --- LOGGER 5" x 1.5" .5" x 3.0" DETECTOR SIZE <u>.0m</u> _ : 132.1 m CASING DEPTH TOTAL FOOTAGE LOGGED Cation Ca¹³⁷ SOURCE TYPE h10 40m BOREHOLE FLUID : LOGGING SPEED SOURCE NO. : — MEN. 1 ٩ŕ SOURCE STRENGTH ____ @ FLUID RESISTIVITY : REFERENCE LEVEL : Glinns SOURCE SPACING _ 8.1+A (Rod. 9055A-39 SOFTWARE LEVEL : PROBE NO. : : SCALE SELECTION TAKE 4 1 TINK# 4 -He DETECTOR TYPE _ DESILENG 1.0" x 8.0" DETECTOR SIZE -____ CAN-WEST REMARKS: SOURCE TYPE ł AmBe -----71+20 ----SOURCE NO. ------ HOLE BRENGED AT 232. I mETERS SOURCE STRENGTH _ l Ci 45.70 SOURCE SPACING _ CAL SUD. 158 1.4"D x 2.5"L 1.1"D x 2.5"L 1.4"D x 2.5"L SNGL PT RESISTANCE _ a" FOCUSED RESISTIVITY -----YES YES SELF POTENTIAL YES ----_ YES TEMPERATURE ____ NO / YES DEVIATION -----CALIPER YES CT-112 REV. 2/11/80 Э 11 ٩. <u>†</u>___ TΓ 11-5 1 1-1-1 € PART NO. 786-0040 CENTURY GEOPHYSICAL CORP. 20 E 2 -0040 PART NO. 786-0 タ 11 CENTURY GEOPHYSICAL CORP.

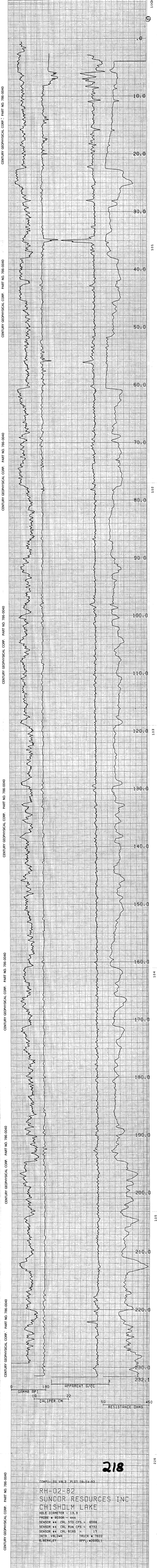


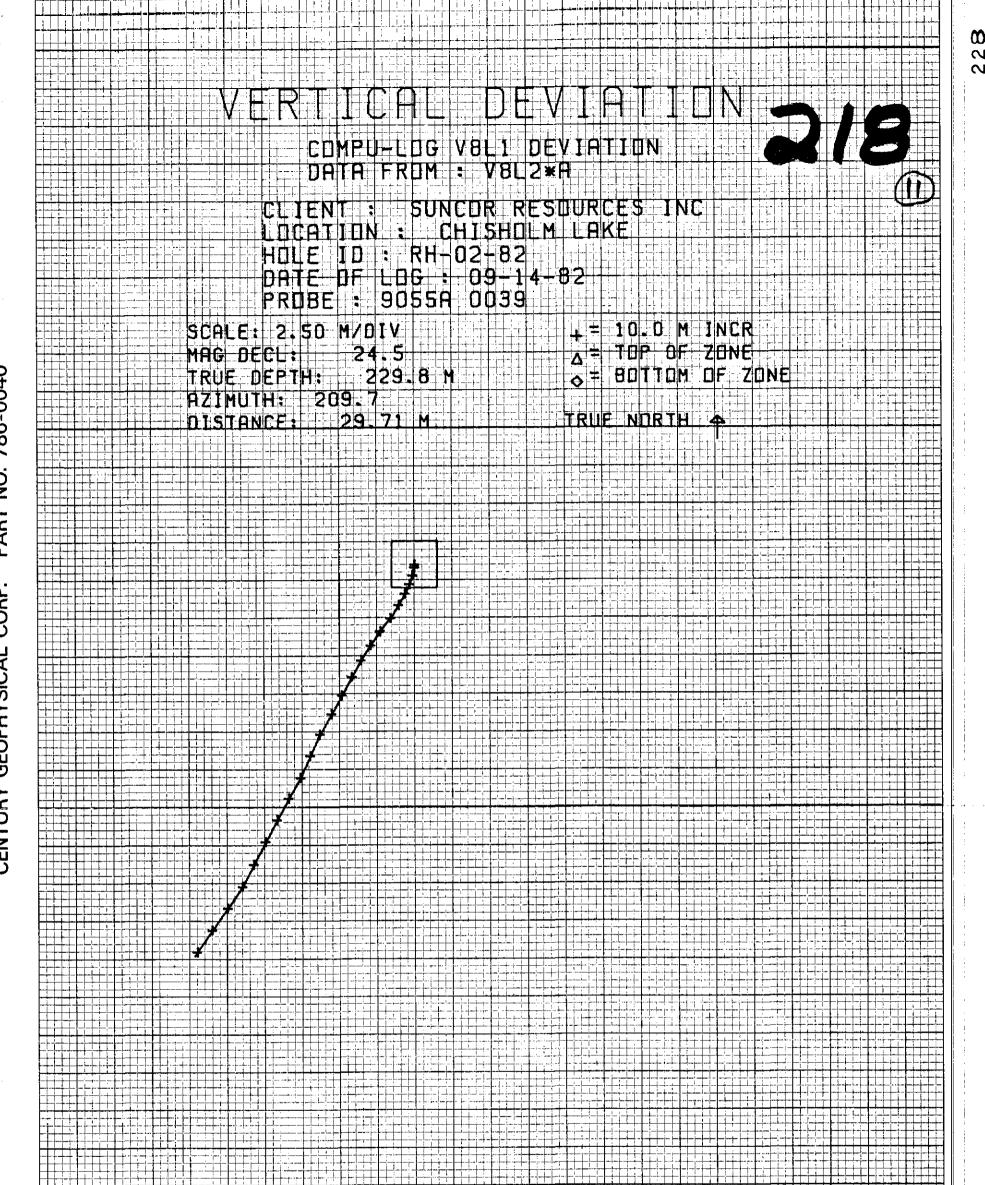
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CORP. PART NO. 786-0040		
CENTURY GEOPHYSICAL	232.1 GAMMA AP1	36(
	N-N XCPS	
786-0040		
GEOPHYSICAL CORP. PART NO. 78	COMPU-LOG V8L2 PLOT 09-14-82 RH-02-82	
CENTURY GEC	SUNCER RESEURCES INC CHISHELM LENKE HOLE DIAMETER: 13.3 PROBE # 9055A = 039 SENSOR #4 CAL STO CPS = 152 SENSOR #4 CAL STO CPS = 158 SENSOR #4 CAL BIAS = 0 DATA V8L2*A TRUCK # 7922 R.BERKLEY APPL. #1007L1	

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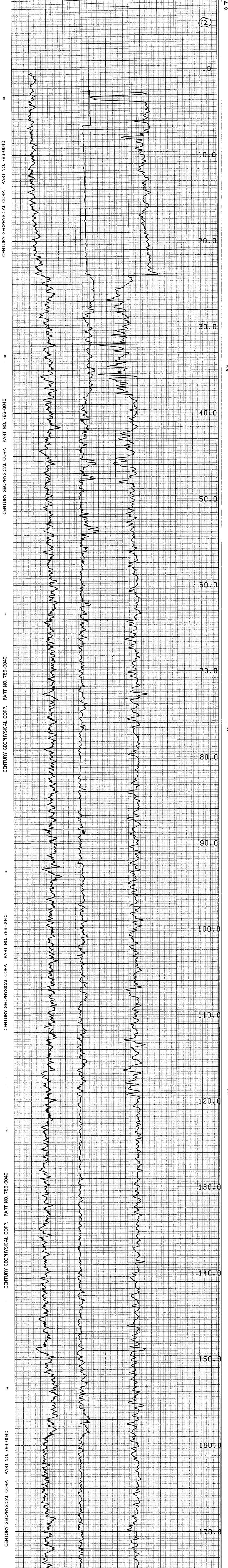




PART NO. 786-0040 CENTURY GEOPHYSICAL CORP. 228

786-0040

الاستهاجات ويتعاوز وينفر أورجه تنافجها أترقن فاعار الالت	الرجا أشأر الأثلاث الأكال الأكال فيتتحددون والمنتهينية فالباد والمتحد والمتعادينية		▖▋▖▏▝▕▎▌▋▎▌▕▕▕▕▋▙▖▖▖▖▙▖▙▖▙▖▙▖▙▖▙▖▙▖▙▖▙▖▙▖▙▖▙▖▙▖▙▖▙▖
╶┣╍╍╊╍╶┝╍╍╊╍╍┣╍╍╋╍╍╋╍╍╋╍╍╊╍╍┦╌╍╋╍╍╋╌╍┠╼┯╍╋╼┪╶╍╋╍	┣╺╸╍╷┉╴┉╎╷║╴╘╻╷╶┟╌╪╴┠╍╸╵╅╌╪╌╴╌┣╼╬╼┍╶┟┉╧╶┨╌╬╼┝╍╫╾╠╍╫╍╫╍╫╍╫╍╫╸╫╸╂╴╏┉╸┝╶	╶╏╌╴┝╴╘╺╌╢┄┈┪╸╋╌┾╾┼╍┼╌┟╌┟╌╆╌┼╶┿╌┎┈┽╌╂╌┬╸╽╌┼╌┼╴┠╌╤╾╀╶╎╴	الالت والمركابي والمركان والمتكاسي والمتكاف والمترك والمترك والمترك والمترك والمترك والمترك والمترك المراك
had been a second and the second se	har an an a base of a local set of the set	┍╬╍┧╌╧╌┼╌┿╌┠╶┽╌└└╶┼╾╆╼╏╍┿╺┕╍╔┉╎┉╿╾┠╾┝╍╢╼╆╌┾╌┠╌╀╌╢╌┧╌	┉┠┉┼┉╉┉┾┉┊┉╉╼╄┉╪┉┼┉╎┉┠┉┼┉┼┉┠┉┝┉┠┉┼┉┼┉┼┉┼┉┼┉┼┉╂┉┾┉╂┉┼┉╂┉┼┉╂┉┼┉╂┉┼┉╂┉┼┉╂┉┼
			╷╶ <mark>╷╶┊╴┊╴┊╴╽╴┨╴╎╴╎╴╎╴╎╴╎╴╎╴╎╶╎╴╎╴╎╴╎╴╎╴╎╴╎╴┝╸</mark> ┹┚╴╙╸╊╍╢╸┿┿┥╖╸╄╍╎┍╸┡╍╞╺╋╼┿╸╋╝┥
╶┟╌╢╌╄╼╄╾╎╼╎╌╎─┼╌╂╴╂╌┼╍┾╴╗╾┯┯╉╌┝╴╷─┼─╂			
┢╼╊╌┼┉╋┉┢┉╠┉┶╌╎╴╆╌╢╴╏╶┼╍┾╌┥╸╧╾╋╴┾╌┊╼┟╌┞╴	┟╌╧╌╾┱╌┤┙╴╊╴╸╼┶╼┝╌┅┟╴┠╌┧╌╡╶┝╌┙╴╂╌┙╌┧╸╎╴┡╺┡╶┾╸┾╼┾╼┾╼┿╸┣╾┆╼┾╌┆╼┝╌╂╌┉╼╆┈┾╌	╶╉╌┾╾┊─┼╴╎─┠─╆╼┧╴┼╸┼╾╋╾┝╸┢╾╽╌╜╎╺┫╍┧╺┽╴╻┈╆╴╂┈┩╼┾╌┼╴	┍─╆╸┟╾╽╾┝╼╞╼┥┲┥╗┙╢┍┝┝┥┼┑┽╍┝╸╎ ╶╉ ┙┼╼╿╺┝┽┶╎┝╍╎╍┝ ╸╢┙┼╸┝╸╢╸┝╸┝╸┝╸┝╸ ┝╸┝╸┝╸┝╸┥╸╡╸╢╸╡╌╢╖┾╌┨╴║
		للمحمد معتر والمستحد المستحد المستحم المستحد المستحم المستحم المستحم المستحم المستحم المستحم المستحم الم	╷╴┠╺╦╼╪╸╴╴╴╴┟╸┨╖┟╸╽╖┟╸┠┓┥┯╽╸╢┯╧╋╶╪╼┾╴╢╼┼╼╴╢╼┼╸╗┝╌┼╸╢╸┼╸╸╴╋╴┼╸╋╴┼╸╢╸┼╸┼╸╢╸┼╸┼╸╢╸╎╸┼╸
	والتكالي الأكارة الأكرافية والمتنا لعندوا ويتبادهم والمتحدي والمتحد والمحدية والمحديد		
┢╴┇╺╉╴┋╍╎╌╋╶╡╺╄╌┟╴╣╶╢╸┝╌╞╴┥╴╉╴┨╴┾╌╝╼╡╌┦╸	┫╼╬╴┑╤╍╶═╫╺╖╬╼╴╔╍╫╪╍╢┍╍╬╍╢╋┉╬╍╎╫┙╋╈┲╠┓╸╔╍╢╋╝╵┚┞┳╵┝╌╌┲┲╌╏╶╴╎╌╖╴╴╬╌╢╔┯┿╸┎╶╫╼	والمراجع ويرجز والمراجع	
الساعية مقابل المتعاوية والمتعامية والمتعادية و	<u>┢╸┢╍╎┶╸┲┈╎╴┟╌╎╶╷┧╌╁╾╁╸</u> ┟╌╷╽╸┢┲╎╍╎╌┠╴┟╌┥╌╫╴└╼╿╸┍╶┝╴┇╌╧╾╉╌╵┶╴┝╌╎╴┝╴╢╌╡╼╗╴╋╸╴	╶┠╌┽┄┽┈┝╼╗┉╎┉╏╾┰╾└╌╎╌╎╌┨╌┟╌┽╌╉╌┼╌╂╌╍╌┤╌╢╌┰╌╆┅┝═╉╴┟╍	┍╶╊╍┊╍┊╴╘╌╏╌╢╌╢╌╡╌┊╌╢╴┨┻┊╍╎┾╍╢┉┱╺┫╸┢╼╂┵╢┉┡╍╋╍╢╍┾╴╊╍╢┉┠╌╁╴╎╌┿╌┾╾╂╌┇╌┊╌╎╴╢╌╋╸┼╍┦╾╂┈╢╴╢
		╷╢╍╎╍╢╸╎╴┨╶╢╴╎╴╎╴┨╶╎╴╢╶┼╴┨╶┾╍┝╍┿┉╢┈┠╶┽╼╈╼╢╍	┝╍┠╼└╌┝╸┝╴┊┓╂╍╞╍╪╸╅╺┼┉┠╍╌┉╎┉╎╌┟╴┨╶╎╶╊╌╎╼╎╴┨╶┊╴╎╴╎╴╏╴╎╴╎╴┨╴┼╴╎╴┫╴┱╴┝╶┝┉┢╸╊╴┢┅╡╾╼┿╪╺┨╴║╵
		TECTER 1 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	▞▕▌▙▕▏▌▕▌▌▏▝▕▙▎▏▋▖▌▕▏ ▖▋ ▕▏ <mark>▋</mark> ▕▕ <mark>▙▕▁▋▌▖▎▁▁▁▋<u>▖</u>▖▖▖▋▖▋▝▝▁▁┉▋▁▙▁▖▌▝</mark>
╶┨╾┨╾┟ ╶╿╍┥ ╖╊╾ ┥╶┋╶╽╶╢╶╢┍╎╸┆╍┥╍┫┍╎╶┊╍┢╶╿	┠╴╪╶╪╌╍╴┊┈╉╌┟╶╢╾╪╾╎╴┨╴┊╌╻╏╌┊╌╽╴╪╶╢╴╡╴┨╴╪╴┪╼┊╺╡╴║╸╵╸╎╶┯╌╞╴╊╍╌┈╉╼┢═	┉╊╼┝╾┽╍┶┶┼╍┾╾┾╾┾╾┽╼┼╼┼╼┼╌╢╍╎╼┽╴╗╼╫╺╩╵┱╄╖╋╸┥╺╋╸╷╸┝╍┢╸	الأفاصية وتعتقا فالتجاب والتناقي والمتحاد والمتحاد والمتحاد والمتحاد والمتحاد والمتحاد
		┍╉┈╎╌╎╌╎╌╎╼┼╌╢╼┝╍┿╍╬╍╬╍╬╍╬╌╢╌╏╴╎╶┼╶┾╴	┍╌╂╶╞╼╎╾╎╾┠╾┼╾┥╼╌┝╌╊╼┼╼┼╸┼╸┥╼┼╸┼╸┼╸┥╸┥╸┥╸┥╸┥╸┥╸┥╸┥╸┥╸┥╸┥╸┥╸┥
			╘┉╢┉╉╌┼╼╞╼┾╼╫╼┿╼╘╼╅╼┺┉┧╼╧╍┼╼┱┦╌╧╼╃┉╧╼┍╶┠╌╧┙╵┾╴╤╍╂╶┼╍┼╺╪╶╧╼╋╌┼╍╢╺╬╍╊╍┾╍╢╼╋╍╊╍┝╍╬╼╪═┫╢╟
╶┝──╂╌┥━─┾┙┆╾┝━┥╌┧╌┆╾╸╎──┧╍┟━┤┈┉╫┅┝┈╽┅┯╸┥╖╺┯┯┽			▖▋▖▝▖▖▋▋▌▖▖▖▖▋▋▖▖▌▋▖▖▋▖▖▖▖▖▖▋▋▖▖▖▖▖▋▖▖▖▖▖▖▖▖
╶╏─┦╌╄╼┝╍┵╍┠╼┦╌┊╌┟╌╎╌┨╶╋┉╅╺╋╼┾━┣╼┼╴┟╌┽╶╄	┠┈┠╌┊╌┊╌┊╌╪╌┊╌╎╌┠┈┊╌╴╏╌┠┈┊╌╴╸╍╬╺┉┝╼┠╌╞╍╡╍┲╤╌╎╴┠╌╎╌┊╴┱╌┊╴┠╴╎╴┼╴┊╴	╺╏╾╅╾╬╼╠╍╟╍┢╸┢╸╫┙╎╵┊╍╎╸╏╍┑╼┢╍╋╸╺╍╊╴╒┈╇╌╬╴┢╴┢╴╫┼╪╼	المعتمالة تصنف لألبها المتناقبات المتعالية لتتناقب والمتناقب التصاحب والمتعاص والمتعاط والمتعاد والمتنا
		╶┨────┼─┼─┼─┼╗╗╗╷┝┉╎╼╎╸┏╋┍┿╶╤╼╎╼╼╴╊─┼╴┍╾┼╾┽╴┠─┝╍┼╾┽╴	┍╴╆╶╬╴┼╴┝╌┥╌┟┶╊╌┼╴┝╍╡╺╪╸┢╍╎┉╈╍╽╼┊┉┣━┆┉╈╌╩╍┿╼╋━╔┈╋╌┾╾┍╸┢╴┼╌┿╼┾╌╊╴╟╍┵╼╂╼┊╌┼╴╋╴╅╌╊╸╬╸╬╸┫╴║
			▞▖ ▌ <u>▖</u> ▝▁▕▁▕▁▕▁▕▁▋▁▋▁▌▁▋▁▋▁▋▁▌▁▌▁▌▁ <mark>▁</mark> ▋ <mark>▁▁▁▁▁▁▁▋▁▌▁▁▋▁▋▁▋▁▋▁▋▁▋▁▋▁▋▁▌▁▌▁▋▁▌▁▋</mark> ▁▋
╶┟╼╾╁╼╍┶╍┉╆╍┟╍╼┟╌╾╅╍╴┟╼╍┧╼╸╎╼╍┼╼╍╎╾┅┾╾┝╍╴╋╼╍┝╸╴┥╼╍╅╺╍╉┉	┣╍┢╍╔╍┆╺╍┉┾┅┝┉┝━╞┛╷┉┾╌╏╌╕╶╾╸┢╌╌╸┟╌╌╌╌╧╡╴╉╼┼╴╎╩╵╴╨╹╹╢╺╸╹╎╹╗┹╘╜╏╶╿╴╿╶╿╴		
┠┶╌╎┉┢┶┲┝┊╶╎╌┝╶╿╴╋╶┽╼┼╍┿╍┣╺┾╌┼╼┼╾┿	<mark>┠╌┠╌┇┈╎╴╖╴╬╾┧╌╎┉└╶╎╴┠╌┧╶╎╴┨╶╹╴┫╶╘╸╴╴┍╍┧╼╊╌┾╼╪╍┼╍┊╍╊╶╪╍┿╴╵╴╴┼╶┊╶╎╶┾╴</mark>	╶╋╶┥╴╄╼╎╌┞┅╋╾┾╾╞╾╞╼╞╾┲╼╋╾┲╼╋╾┱╋╍╗╸╋╍╗╴╋╌╗╴╄╶╄╌╠╍╠╌┊╴	
	<u>▶ </u>	╶┫╾┥╾╎╌┥┶┑╋╌╢╶╎╴╬╶╢╴┣╍┫╼╎╍╣╸┝╾╿╼╎╴┥╸┝╸┥┥┥┥╴┝╸┝╴┝╴	┉╊╧┊╖┶╘╍╋╧┥╤┥╋┿╧╧╧╅╋╧╧╧╌┓╏╌╧╧┟┾┢╂┼┥╎╧╉┼╈┍┿╋╩╊┿┢┪┯┨║
╶┠╼┽═╋╍╋╍╡╍╽╍┿╌┾╍┲╍┾╴┠╌┽╾╸╌╍╴┾╌┨╌╷╾┾╸┿╸┿	╏╺╂╼╊╍╗╍┉╶┾╴┊╾╞╌╷╸┆╍┟╼┾╌╋╌╋╌╉╌╋╴┨╌╤╍╶────┨╌┼╴┝╌┾╴╬╾╂┉┆╍╬╌╝╵╴╬╌╋╌╟╵┯┯╴	╺╋╾╬╾┝╌╎╌┠╸┠┷┟╾┝╼╎╌╎╌╢┷╷╌╎╼╖╎┈╠ ┈┠╸┍╶╿╴╿╴╏╴╏╶╶	╡╉╫┇┇╢╊┟╽┊╽╋┯╗╦┋╋┲┇┆╱╋┆╡╡┊╊╏╽╘╿┨╨┯╉╨ ║ ┇╔╟║╢
┠╶┟╶╧━╊╍╈╍╉╌┢╌╎╴╅┅╎╴┠╶╁┅╺╍┅╘╾╎╸┣╌┧╴┽╌┤╌┼	<mark>┟╶┊╴┨╶┧╌┊╼╞╶┊─┝╌┊╴┟╶╎</mark> ┝┝ <mark>╞╶┥</mark> ╶╢╴╘╾┈┉╺╍╽╼┡╌╿╸╠╍┦╴┼╌┨╌╇╶┽╶╄╌╋╌┙╌╟╌┿─	╶┫╌╴└╌┊╶╶┊╌┊╴┨╼╞┻╎╌╎┫┙╈╍┨╍ぺ╌╌╼┥╌┊╴╊╌┞╌┼╌┼╌┧╌╂╌┸╌╂╌┼╴	<u>┍╶╋╶┼╴┊╌╶</u> ╞╌┫─┊╌┊─┼╴┊╴╊╼┾╾╪╺╅╌╞╺┠╸╪╺┾─┼╶┽╌┠╸┾┶╘╸╎╴╽╵╋╍╈╼┥╼┿┅╪┳╿╲┩╴╎┳╇╍╎╼╊╍╢╶╋╾┼╾┼╌┨╴║
	▋▋₿₿₰₰₰₰₮₵₮₶₰₰₰₰₰₰₰₰₯₯₯₺₰₦₦₰₼₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽	كالملاء والمعارجة والمتحاج والمتحاج والمتحاج والمحاج و	┶╌╠╾╬╌╦┿╌┼╌┨╶╧╍╧╶┰╌╪╴┠╌╎╍╢╍╢┙┢╖╡┉╎╧┙┩╸╷╶╫┉╿╸┝╌╄╺┿╌╵╊╌╦╌┶╌╧╌┝╼╊╼╡╌┥╶╄╸╋╶╋╼╄╾┼╌┾╌┨╶║
╶┠ ╺┥╍╞╍╞╼╞╼╋╍╿╸┊╶╙┅┊╶┠╶╽╸┊╼╵╸┊╼╿╸┊╺╿╸╵		والأراد المتحاد والمتحد والمتحد والمتحد والمتحد والمتحد والتحاد	. الالالة الألية الأراد الإيلام الأراد الإيلا الأنتيان الأكال المتكالية المتحد المتحد وتحديد والمتحد والمراد ا
المتعاصية سطي إن المحيط والمعار معار معالم المحاصر والمحاص والم	┠╍┷╸┇╸╉╌└╌┠╌╴╎╾╎╾╎╼╎╼┦╾╎╼┶╌┼┯╡╼┨╌╵╴┯╌╴╼╌┩┯┽╼┿╼┿┿┿┿╋╌┥┈╞╸╬┉╎┉┠╍┉┉┢┉┉┉	╷┠╺╎╼┊ <u>╼┿</u> ╼┑ <u>╾╊</u> ╌╿ <u>┯╪╌</u> ╬ ╼┎┋╶┊┈┊┈┋ ╌╞╾┣╌┞┯┡┉╞┉╞┉┆╍┠╺╡╍╎╓╣╺	╷╷╊┅╞┉┊┉┉┉┋┉╏┉┋┉┊┉┊╸╷╸┣┉┝╾╈┉╆┉╈╶╊╌┰┈╎╼╢╾╈╶╊╶┿╌┼╌┆╼╌ <u>┣╶┽╌┡╌┾╶╄╶╄╶┼╶┝╌╄╶╊╴╀╼┇┯┼┯</u> ╋╋║
	▋▝▐▋▝▕▋		╆╌┫╌╢┈╫┈╎╴╢╌╢┲╩╌╢╶╢╌╢╌╢╌╢╌╢╌╢╌╢┲╢╌╢╴╢╌╢╌╢╴╊╍╢╌╖┝╴╢╌╗╌╟╌╫╌╢╌╢╌╢╌╢╌╢╌╢╴╢╴╢╴
╶╏─┊╶╬╸╋╾┽╾┢╴┟╶┤┈┼┅╴┢╶┟╸╷╸╴╼╾╷╸┥╵┑┤╍┱╸┼╼┾╴			
┣╍┽╍╕┸╪┥┨╌┡╌┝╌╬╌╢╌╎╌╕╌╌╴┥╌┤╺╁╌┤╌╎╴		╶╋╌╆╌┿┶╵┄╺┅╂╍╈╌╦┈┼╼┈╾┫╌╢╌╾╼╄┈╵╌╂╌┼╌╃╌┩╌╩╴┣╸┍╸╎╸╵	
		╶┦╌┥╌┥╌┝╌╌╌┠╌┢╌┼╌╎╴╺╸╬╷╎╴╸╍╬╾┥╴┠╺┿╸╵┝╍╋╌┵╌┨╌┽╌┼╌┤╌	┊┍┠╺┊╍┊╸╾╍╸┠╼╡╾┊╸┊╾╎╶┨╴╴└╌╂╼┉┟╾╡╼╪╍┨╼┼╸╉╼╁╍┝╶┽╸╔┝┠╋╼╉╼╫┲┿┝╋╸╗┝╖┠╖╋╸╋╸┾╺╄╌┼╸┨╸╋╼╉╸┫╸║
		. #	
╊ ╪╪╡╋┊╋┊╋┊╋┥ ╋╋┿		تثالانا الأنواديها الأوودي وغزونني ابرنايد فرداد	
╏╌┾╼┼╾┺╼┝╶╏┉╈╼╎╴╡╶╏╌╎─┝╌╌╼╾╊╾┝╶┣─┝╸	┠╍┊╶┫╌┫╌╄╌╋╼╸╾╾┼╴┊╾┠╺┊╾╿╺┊╸└╴┠╌┠╌╁╌┾╴╶┈╴┢╴╤╌┦╌┽┈╅╸╊╌┼╌┤╌╈╍╎╴┠╍┤╺┊┈╿╴	╸╬╸╷╶╌╡┉┑┥┉┝╌┨╼╌┶╌╞╴╗╴╅╼╋╼╂╌┽╌╋╍┝╍╊╼╊╍╅╼╲╼┲╲┣┛╶╍┚╝╶╬╸	┊╴┠┍┊┉╣╸┇╴╣╺╢╴╬╍╬╍╅╍╱┊╴┠╺╬╍╬╍╊╸╄╼╋╸┝╴╻━┾╸╆╌╊═╄╍┽╧╧╌╌╂╌┼┼┼┼┼┼╌┨╴╋╍┼┼┼┨╌┨╌┾╌┢╼╄╶┠╝┨║
		_╏ <u></u> ┪┟┠╂и╊┙╷┢┣→┣━┫┙┑┅┯╆╸┝╸┣╺┢┯┝╌┽─╵ [╡] ─╵ [┥] ─╵ [┿] ╽──┿	╁╌┫╼╪╾╽╴┈╌╄╌┠╌┰╌┺┾╖┟┅┟┅┨╌┙┥╌┟╌╅╴┨╴╎╌┊╌┼╌┾╴╊╴┩╸┝╍╡┅┽┙╊╌┿╌┽╼┯╍┝╌╋╾╊╴┼┈┾╾╄╌╂╼┾╍┽╾┾╌┦╶╢╶║
╶┟╌┾╍┝╍┥┉┝╼┢╍┢╍┾╍┾╴┽╾╄╌╋╍┿╍┑╶┯┙┯╴┡╼┢╍┑╍┞╾┾╸	┨┲┼╴┤╸╞╸┽┄┧╼╴╺╴╌╞╍┥╌┠╌┾╌╵╴┠╌╂╌┿╌┑╌╌╴┠╌╡╌┝╾╎╺╴╶╎╴╀╴┽╌╌╌╢╶┨╌┑╌┼╌╂╴		الألاحد وتحديد ويتقاده وتتكري والتكري والتتابية وتدريبهم وتدريبه والمعرفي وأوتهاه فا
الشكر بمشعط المستحد والمستحد والمستحم والمستحم والمستحم والمستحم والمستحم والمستحد وولمستحد وولمستحد والمستحد وولمستحم والمستحم والمستحم والمستحم والمستحم والمستحم والمستحم والمستحم والمستحم والمستحم وولمستح وولمو وال	┨┈╽╶┷╌╧╌╧╌╧╌╧╌╧╌╧╌╧╌╧╌╧╌╧╧╌╧╶╧╴╧╌╧╌╧╶╧╴╧╌╧╶╧╴╧╌╧╶╧╌╧╌╧╶╧╌╧╌╧╶╧╌╧╴╧	╶╫╌╴╴└┈╫╴╎╴╏╍╽╍╷┉╎╴┝╍┠╍┠╍┟╼┼╼╉╼┿╌┣╌╵─┼╌┪─╎╌╂╍१═┽─┾╌	┟╍╊╍╟╍┇╍╴╼┨╍╊╍╊╼┠┅╶╍┠┉╊╴╘╸┢╍┇╸┊╼╊╾╶╍┺═╈╸┟╍┠╍┼╼┼╼╉╌┣╶╫┿┼╸╏╸╊╍┠╼┲╼┼╸┠╸╋╸╋╸╋╸╝╝╝╝╝
<u><u></u> </u>	الشقائل الاجتباب البران والأزان المحتفات والمتحاف والمتحاف والمتحاف والمحاف		
╶┠╼╈╼╋╼┢╍┪╍┢╍┾╼┿╼┿┯┥╼╋╌╗╺┡╸╵┈┉╼╉┉┝╼┾╼┾╸┝╴	┠╌╞╾╞╌╢╾┠╱┨╾┝╴┶╴┶╾┿╾╏╌╌┼╌╵╾╋╌┠╴╎╌┆╌┆╶╴╝╸╉╴╄╶┿╸╵━╵┺╴╊╌╄╴╫╴╢╴╢╴╝╴	╶╂╌┽╌╢┄╶╴╽┄╋╍╋═┥╼┝╍┢╌╏╌╃╌┝╌╢╌┧╶┨╌┦╌╲╌╎╶┆╴┣╴╽┉┦╴┯╸	
		╷┠╍┪╍╎╴╻╌╁╴╋╌╎╌┟╌╁╶╧╷┠╌╧╼┧╌┟╸┾╴╋═╅╸┷╸╽┉┪╼╏╼┾╺┝╸┆╸	⋨⋼╞╌╓╴╞╌╔╴┊┉╂╴┟╍┛╾╴╾┢╷┠┉┥╍╓╒┧╌╵┉╋╼╄╌╅┯╬┯╎╌┦┯┿╼╆╴╬╌╅╴┨╌┾╌╟╌┧╼╄╌╅╴┾╺┟╾╁╼┼╸┨╴╆╴╋╼╋╼╊╸╢╶╿
			╪╌┥╌┊╌┥╴┫╴╎╴┊╴╴┥╴┫╴┫╴╝╌┥╴╡╶┥╾┊╾╎╸┝╸┝╍┝╍┝╍┝╍┝╍┝╍┝╍┝╍┝╍┝╸┝╸┝╸┝╸┥╸┥╸┥╸┥╸
╶┠─┋─╎─┼╌╄┈╊─┼╍╇╾┼┉╅╺╋╾╪─╬╾┿─┆─┣╌┼╌╢┯┯╤╝			
╶┠╾┋╍╁╾╆╸╏┈╋╼╁╺╬╼╞╼╁╺╂╴╊╸╊╸╊╸┝╸┆╸╿╺┿╼┾╍╎╸╪╸	<mark>┟╾╵╌╄╶┥╶┠╌╂╶╪╌┼╴┈┈┝╶╂╶┝╷╎╴┈┽╼╂╌</mark> ┇╼┫╸┝╹┝╵╊╾┽╸┥╴╺╌┝╖┠ ╸┍╤╸┝┈╡╵╊╶┽╸ ┾┯┿╌	╺┠╼╬╍╫╶╬╍╠╍╠╸┝╴╡╍┲╸┟╴┠╴╬╍╫╍┥┉┲╌┇┈┟╌╎╍┽╾┼╌╢╍╄╼┾╍╬	
		╤┨╤╬╌┧╥┨╌╬╌╫╍╬╍╬╍╬╍╋╍╍╍╘╍╬╍┾╍┦═┾╼┿╍┾╼┾╶╢╌┼┈┼╌┼╴	<u>┶╼╪╶╶╶┽╶┼╶┽╶╃╶┼╴╌┶╌╆╶┟╌┽╌╌┝╶╂╌╌┝╶┱╴╶╊╌┥╌┊╌╌┆╴╊┍┿╾┾╍╢╸╄┉╂╼┶╼</u> ╄╌╋ ╸╋╸╋╗╋╍ ╋┱╋╍┫
			<u>╸┚╴┠╶┊╴┟╴┠╷╫╴╫╶╎╶╷╴╡╴╫╶╵╴┥╴╹╶╎╴╢╶╢╴╢╸┝╴╫╶┧╶╹╌</u> ╌╴┡╍╈╍╈╶┝╾╈╍╢╍┿╍┥╼╬╍┿╾╊╸╵╍┾╍┿╾╃╌╢╵╹
╶┠╌┼┯╅╍╗╞╾┥╌┠╺┧╌╅╼╞╍┼╼┠╼┊╌┠┙┝╌┟╌╏╴┝┑┟╺┝╴┧	┇╍╎╷╞┉╎┉╻╶╽╴╎┶╴╺┉╸╎╴║╍╎┼┼┼┼┼┲╖┲╼╪┉╠╴┝╶╉┯┿╺╟╍╝╶╠╴╏╴╹╶╵╫╼╎╵╢╸╿╌╵╌		
╶┠╌╪╾╪╼╬╼╬╾╢╾╞╼╄╴┠╌┠╌╂╼┦╍╎╼┼╼╊╾╸╾╢╍╪╍┾╸	┞╴┊╌┇╌╅╍┫╴┫╌╢┈╪╌╴╴╪╴┠╌┽╼┟╼┝╸┝╶╊╶╬╶┫╴╢╼╞╌┫╴╆┯╎┯┝╶┡╴┯╌╵╖┼╾┾┱┨┯┿╌╎┯┦╌	╶┢╌╢╴┝╴┫╺┝╸╊╍╢╌╢╌╖╾┢╾┣╾╎╾╢╴╆╍┥╍╉╍┝╴┉╴╎╴┝╌┣╵┱╸║╍╢╴	
	<u>┫╶╎╶┥╌┝╴╵╷┨╶╽╷┶╶╶╷╶</u> ┇╾┢╴┊╺╎╖╘┉╎╌┢╌┊╌ <u>╆╶┿╌╪╌╄╌┾╌╡</u> ╌┿╌┧╴┢╌┆╴┿╌╫╸┠╼┇╴┾╌┆╶╈╌	┉╊╍╎┉╅┉╉╼╎╺╼╉╸┽┉┾╍╎╍┉╸┠┉┝╼╺╺╆╍┉╸┡╍┾╺┟╸┾╌┾╾╊╾╋╍┾╼╎╸	╧┲╅╍┶╸╬╼╽╾╋┶╢╾╪╌╢╌╄╌┫╾┽╧╢╌╄╌╧╌┼╌┙╾╋╌╡╺╬╌╤╌╧╌╊╸╤╌┼╌┿╍╇╶╊╌╪╍┼╼╧╍┝╴┠╍╇╍╆╍╤╾┨║╹
			<u>╡╶╢╼╎╴╧╶┊╴╎╴┨╶╷╶┤╶╎╶╢╶╎╶╢╶╎╶╢╶╢╴┢╶┥</u> ╴╵╌╟╌╧╍╹╌┡╌╚╍ [┝] ┓╹┓┝╸╄┓┝┓┠╺┢╍┝╍╔┥┙┯ <mark>╋╍┶╖</mark> ┾┯┿╍┽╴╢╶╏
╶┠╍┽╍┢╍┽╌╢╌╋╍┅┅┾╍╅╍╎╍┠╾┝╴┠╶┠╌┼╴╊╍╌╍┝╶┾╌╌	┫╴┲╌╋┉╪┈╎╴┠╴╎┶╎┲╸╼╶╶┨╾┨╼┍╼╊╼╬╼╋╼╄╼╬╸┲╊╼┨┲╢╼┼╴┨╜╎╜┨┈╢┉┲╾╿╌╂╼╊╍╈╶╫╼╉╼		
╎╎╍┽╍╋╍┶╍╬╍┊╌┆╌┇╌╽╌┫╴┟╍┽╼╋╍╬╍╋╴┶╶┊╌┊╌┼╴	<u><u></u></u>	┉╊═┹┅╆╸┫╾┾┈╬╌┼╌┾╌╉╌┝╌╌┼┙┽╌┟╌┟╴╄╺╄╼╆╸╎═┢╴╖═┝╸┯	. 5 ها ها الان الا الا الا الا الله الله ال
	L	╶╏╴┝╾╽╴╴┑┥╾┠╌┊╌┊╌╞╌╸┥╴┥╌┥╌┟╌┥╶┠╌┥╌┼┯┿┅╸╸╏╸┊╾╽╍╍╸	╎╺╏╼┝╍┆╍╡╍╡━╉╼╘╍┟╍╵╍╢╍╠╍┥┲╅╼╬╍╅╌┨╌╡╌╝╸╋╍┟╾┠╍┽╌┽╌┥╴┶╶╂╴╊╌┾╌┾╾┽╶╋╶╞╌╢╴╋╶╎╌╋╶╎╌╋╴┼╌┫╴┝╴╽╸╢
			╧╌┫╌┥╷╺┊╌┓┻╴┊╌┫╴┝╌┝╌┑╌┥╸┫╼╎┥╌┫╸┊╼╽╴┫╌╅╴┥╴╝╌╢╴╢╺╋╍┥╴╓╶╿╶┊╶╊┈┥┯╧╸┝╍┝╸╠╍┅╼╘╍╎╸╘╌╋╌┶╼┹╍┷╌┦╸┨╵╽
╶┟┉┾╖╋╾┾╼┝╍╋╾┟╌┝╌┼╾┊╌╄╌┼╾┿╴╉╾╉╾┨╶┙╾┿╌╵╾┿	┢╴┾╾╪╼╬╾╬╼╊╾╋╍╪╼┲╍╪╴┊═╍╧╧╌┊╌╊╌┊╸┦┉┋╼┋╼┋╛╝╴╧╸┽╼╤╌╊═╎╌╧╴╢╶╉╌╣╴╂╌┤	╶┲╶╢╌┇┈╽╍╖╴┏╶┾╍┿╸┝╌╧╌┣╶┼╾┿╝╖╴┏╶┲╴╔╴┣╶┿╸╢╴╿╴╎╶┝	
المراجع ويعاديه بعلوهم المحادية والمحادية والمحاصل والمراجعة	╊╌└─│┉┪┯┶╾╊╾╊╾╊╌╄╌╬╸╴┷╆╌╧╴╶┥╼╎╴╋╼╎╴┉╺╹┉╿╴╊╴╋╶┍╍┞╌╍╺╋╌╄╴╅╴┽╸┽╸┼╸╢╼┼╼┼╸┿	╶╌╠╌╌╢╌╴╬╌╌┊╍╴╢╍╴╞╼╍╎╍╴╞╌╌╞╶╌╣╶╌╡╌┉╇╌┅╞╌┥╌┦┯╌┨╌┥╌╄╌╶┱╌╌┠╍╴╿╼┑┪╌╌╟╴	╪╌┠╍╩╍╉┉╹╾┉╺┠╌┲╼╬╼╬┉╬┉╬┉╂╸┠╺╪╍┉┉┉┊╶┨╍┲╴╋╾┼╾╅╵╂┅╝╴┼┉┦╸┲┈╢╾╔╍╼─┼┅┼╼╂╴┾╌┼╼┾╸┼╌┨╌┊╾┾╌┾╾┼╌┨╶║
		والأر الأسادة المشبعة بطرط والمشيطية إليالي أعطيت المؤررا يواريك	┊╾┠╍╽╵┊╴╽╸╵╴┶┹┈┑╼╘╸╎╴╎┛┠╵╧╶┨╍╬┙╞╾╢┈╎╼╡╺┥╴┠┉╊╌┡╼┽╼┿╶┠╌┼╴╧╌╁╌┼╾╋╼╬╌╠╌┼╌╉╌╪╾┡╌┼╼┿╸╏╵╏
<mark>┟╌┼┉┼╾┼╾</mark> ┍╾┣╴ <u>╞╌┧╶┧╴</u> ┣╌┤╸┥╌╗╍╋╴╊╌┼╌┼╴┼	┫╴╎╌┼╌┼╌╴╋┍┨┲┼┉╌┾╶┼╌┆╍┝┉╓╸╣╺╦╌┼╶╅╌╠╴║╶┱╌┩╌┼╌╋╌┝╌╫╌╢╌╠╴╽╴╎╌╢╶╢		<u>╵┠┇╹╉╻┠╎╘┇┇╏┠╹╎╎┊┊╡╎┟╎┧┠┇╏┇╡┺╓╴╴┋╎┠</u> ┶┼┶┺╫╓╝╧┼╍╝╹
╶┠╌┼╌╅╾╬╾╂╍╬╴┨╾┤╶┚╴┨╶╬╼╪╌╊╶┨╴╋╌╵╶╧╶┼╌╧	<u>┫╶┝┙┝╶┥╴╴┫╶┊╴┫╶┟╌╶┝┅┥╼</u> ╡╍┿╸┿╸╪╸┊╌┊╌┊╌┊╌╡╴╵╴┨╴┊╍╎╍┾╾┼╜┣┉┿╾┆╸┽╍	╺┫═┽╺┿╶┅╺┥╴┠╸╸╴╴┼╌┥╴┫╸┾╸┉┉┉┼╸┫╺┾═┝╼┽═┨┉┠╸╢╖╧┅┼╸	. المراجع بذلك وبالأحلاق في الأحداث الأخلاف في الألا الأولي ويوجع من في أخر الأخل ال
والمتعادية والمتحدث وال	<u>┛╴╧╍┝┉╽╶╬╷╢╶╢╷╢╴╎╌┑╷┝╌╢╶╎╴╘╴┨╶╧╷╵╷╶┇╻╢╌┥╶</u> ┆┉╨╍┵╸╠╾┝╌╧╍┝╧╧╸┠╸╵╾╡╾┼╴	╺┠╾┝╌╪╼┺┉┠┉┠┉╈┉╓╷╵╴╎┉┣╼╎╼╢┈╪┈┝╼╊┈┝╼┝╼┥╼╀╼╋╼╢╍┶╍┾╸	┊╧╍┠╼┊╼╪╼┥╼┶╴┣╼╪╼┫╾┶╼┣╍┣╍╘╼┥╼┯╼╪╸╉╌┟╶╌╴┼╶┿╶╊╾╊╍┍╶┽╼╧╸╉╴╢┻┆╴╒╍┼╸┡╺╋╸┢╾┢╺┇╴┨╍┆╼┝┯┯┿┯┿╼┨╴║
		<u></u>	<u>┦╴┠╷┧╴┟╶┷╖┠╷┽╴┶╶╵┤╷╢╴┶╶┧┉╢┑┢╸</u> ┨╻┝ ╶┨╸┝┅┙╺┣╺┟╸ ┝╶╎╓ <u>╢╴┫╴┼╼╄╶┾╼╄╶┾╼╄╌╶╉</u> ┿┝┿┿╸┥
╶╻╏╾╋╍┼╾┼╴┞╴╋╺╈╺┡╸┿╍╄┄┨╌┟╴╞╌╇╶┽╶╀╴┝╸╼╶┆╍や	┢╸╽╼╞═┾╼╾╴╊╷╇╍╆╺┾╍╤╴┟╌╧╌┟╌╧╌╢╌╉╶╪╼┥╌╢╸╉╶╪╼╨╛┊╺╢╵╏┲╴╵╖┶╋╾┊╶╊╌┯╌╶┼╴		
┠╼╫╾╁┉╧┉╠╌┠╌╎╴┫╶┊╌┞╌┖╴┠╶┼╌╾┝╌┤╴	┠╾┕╌┊╌╡╌┽╌╉┄╬╌┹╌╪╾╌╌┣┅┊╴╅╸┊╼╅╼╋╺╅╼╈╼╈╼╋╴┝╌╍╌╅╌╵╸╿╌╴╵╬╴┦╌┊╵╋╶╢╴┆╶┼╌	╶╴┫╸╺┫╼╾╪╸╶┺╼╌╪╴┄╊╌╌╎┷╴┇┉┑╼┥┿╍┠╌┝╼╾┝╼╸╆╼┿╼┲╋╌╌┾╸╴┾╼┥┑┈┥╸┠╸┝╵╅╼╏╍	┟╷╞╍╞╺┇┑┊╺┓╴╞╍╎╶┊╍┊╍╪╍┨╺╻╴╪╍╪┉╬╴┨╶╋╼╪╍╬╵╒╌┾╸╔╍╎┅┿╺╎╍╡╼╂╌╢╌╋╼╌╌ <u>┝╶╉╶╢╶╋╼╎╴╋╶</u> ╋┙╟┷╋╌╟┻┫
		<u>╴┠╴┝╷┧┈╘┈┟┉╏╶╅╶╡╷╢╶</u> ┪╴┠╴┟╼ <u>┝</u> ┯┝╍┢╌╅┈╘╼┽╌┶╖┠╾╽╾┿┯╇╸	╪╼┠╍╪┈┽┉╙╼┰╾┠╍╎╷┊┉┿┅╁╶╂╼╎╍╆╍╬╍╬╼╬╌╇╸┡╌╿┉╢┈╢╶┟╴┝╸╊┅┦╼╢╌╫┯╪╼╋┉┝╶╂╍╪╼╊╾┡╼┱┠╼┟╌╈╼┊╾┿╼┨╹╽
╶┟╴┥╶┥╶┥╶╢╌╽╍╽╌┼╸┨╼┇╌┝╌┤╶╉┈┠╌╿╶─╴╵┷┈╵╴		╶┨╶┊╷╷┨╎╎╵╿┨ <u>╎╢╢╢╢╢╫╫╫╖╲╎╵┠╟╵</u> ╽	╡ <u>╢╶╎╢╎┊╢┊╙╷╢╟┊┊╷┊╢╢╢╧╢╢┝╖╘╷╧╷╘╻╢╴┊╘╢╖╧┊╓╘╢╖╴</u> ╷╢ <u>┝╢╶╢╶╢╶╢</u>
· · · · · · · · · · · · · · · · · · ·	<u>┟┉╘╼╞╼╞╴┇╶╪╶╎╾</u> ╆╾┶╼╞╼╼╾┝╴╪┉╆╸ <mark>┟╶┼┈┼╸</mark> ┝╶╢╸╝╸┚╸┨╸╊╸┝╍╼╴╶┊╴┠╸╿╵║╼╖┈╸╊╸╢╸╝╝		
	┺╼┓╾┱┯┹┯┹┫┈╧╌╇╌┡╾╍╌╊╌╌╍╺┓┣┉╿╼┨┙╆╾┨╾╼╌╿╼╋╼┽┯┝╾┯╍┽┯┣╾┇╍╄┄┇┄╹╴┟╴┇╴╹╴╴	╴┠╸╺┉╆┉┊┉╽┉┣┉┉┉╟┉╺┉┆┉┠╺┉╸╟┷╽╼┢╍╿┊╵╇┉╢╺╬╼╋╾┝╍╦╼╺╴	╡╶ <u>╊┉</u> ╡┉╪┉╕┉┧┉┧┉╅┉┽╴┉┉┉╶╊┉┯┉╅┉╗┉╡╼┠┉┉┉╪┉╉┉╅╴┨┉╎┉╸╴╎┉┝╼╊╴╞╍┰┈╡┉╿╼┠┉╡╺┱┉╋╶╄╸┣╖┱┝┺┎╨╝╶┨ <mark>╶</mark> ┨
		and the second	┊╴┣╌┇╼╧╼╎╌╗╧╌┇╼╤╼┥┥┉╅╼┫┲┥╢╖╅╼╤╌┧╌┠╼╗╶╖┙╼╗╡╍┡╌╏━╞╌╢╼╶╎╼╞╸┨┲╸╡╍┍┢╸┆┓┝╴╋╺╋╸┲╤╼┣╌┦╴┠╴╷╍┿┲┱╼╊╼┨╶║
	┨╍┟╌╂╴┩╾┝╼┨┄┪╴┢╸┢┉┝╍╞╸╌╌┝╌╡╌┽╾╂╌┼╌╎╌┯╌╎╌╊╌┽╌┾╌╎╌╎╴┨╌╸╶┊╶┽╍┽╴┨╺┾╶╴┿╌	╶╏┈┽╾┼╾┼╌╡╼┠╾┨╴╢╾┅╌╞╾┨╾┍╍┝╼┚╾╬╾╋╍╫╍┝╍┝╍╄╾╋╼╉╼╉╸╋	╪╍╞╾╪╾┼╴╟╌┆╴╄╌╤┥┥╗┿┲╋╌┼┉╋╼┊╾┼╌╿╼┊┈┦╼┊┅╊╍╏═┥╗┑╌┆╴╟╴┠╸┩╍┢╍┝╸┆╸┝╶╋╺╋╍┼╼┣╾┾╍┠┈╍┯┿╍┿╾╋╼┤╽



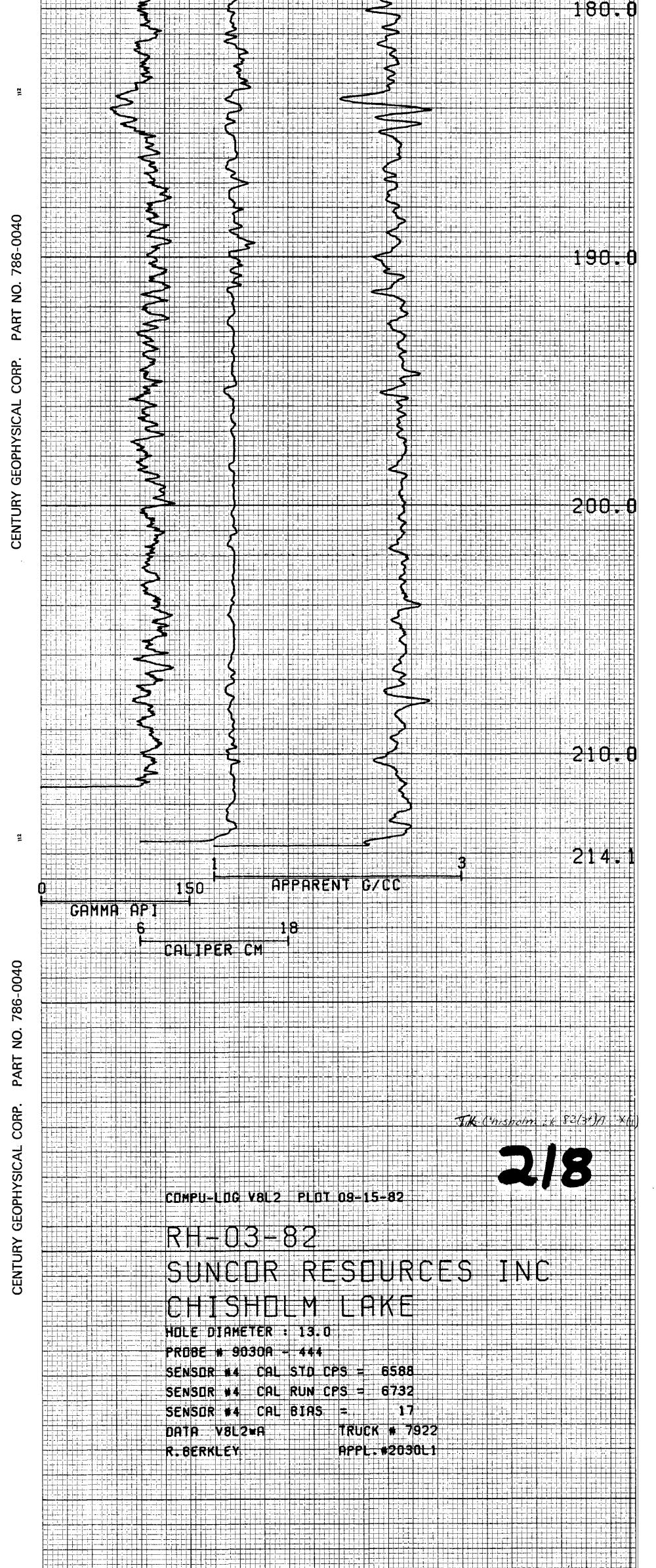
91

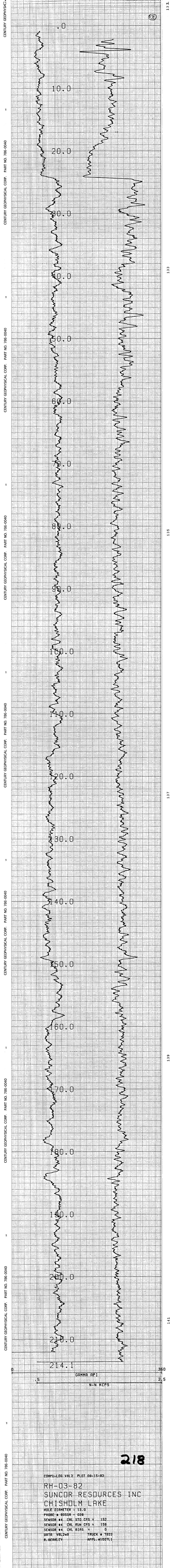




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APPENDIX IX

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Geological Map (South Half)

