MAR 19800001: WOOD BUFFALO

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SMD MINING CO. LTD.

WOOD BUFFALO PROJECT

QUARTZ MINERAL EXPLORATION PERMITS

6878110001 AND 6878110002

SUMMARY REPORT OF 1980 EXPLORATION ACTIVITIES

[redacted]
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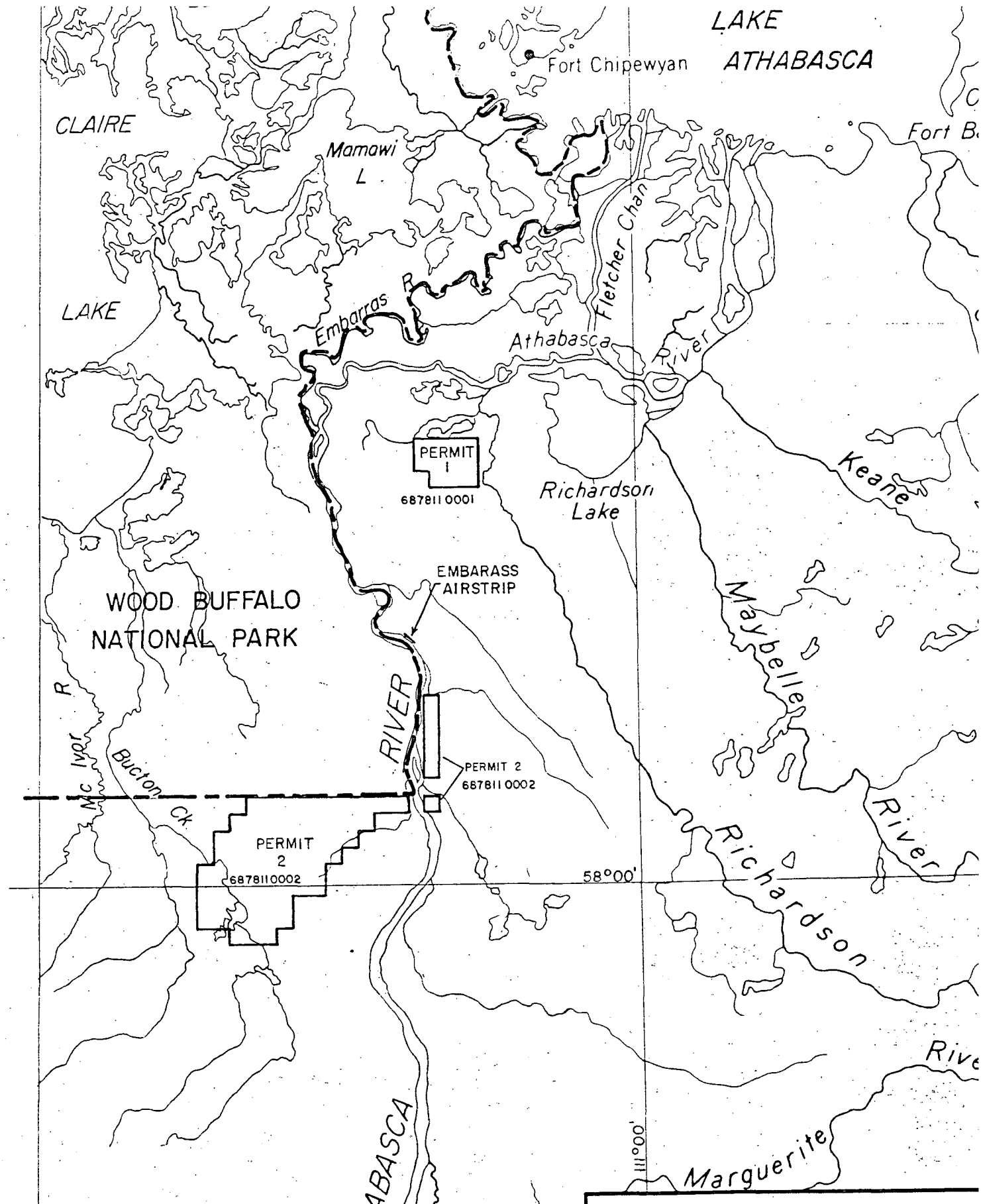
November 4, 1980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SMD MINING CO. LTD.
WOOD BUFFALO PROJECT
PERMIT
LOCATIONS
19800001
FIGURE 1

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INTRODUCTION

SMD Mining Company's Wood Buffalo project comprises two quartz mineral exploration permits numbers 6878110001 and 6878110002 (hereafter referred to as permits 1 and 2 respectively) located on the south shore of Blanche Lake, Tp. 108, R8 and 9 and adjacent to the south boundary of Wood Buffalo National Park, Tp. 103-104, R9-11. Exploration activity to the value of $246,884 was completed in this area during 1980. This consists of (a) an airborne Input and Magnetometer survey and (b) diamond drilling. An itemised cost statement is attached (Attachment 1).

AIRBORNE GEOPHYSICAL SURVEY

During April of 1980, 560 line km of airborne Input EM and magnetometer survey were flown by Questor Surveys Ltd., Mississauga, Ontario (Attachement 2). A total of 116 line km were flown over permit 1 and 444 line km over permit 2, using a line spacing of 400 m and a bird height of approximately 42 m above ground.

In general the Input EM survey proved to be ineffective because of a thick cover of very conductive overburden which masked conductor response from the underlying formations. Hence with the possible exception of one area SW of Ronald Lake, the two permits are void of any bedrock anomalies. The Input anomalies southwest of Ronald Lake display extremely strong E.M. responses and might be associated with a fault zone, possibly the SW extension of the NE-SW fault previously inferred by SMD.

The principal information obtained from the magnetometer survey is the substantiation of a strong ENE magnetic break on permit 2 coincident with the previously inferred ENE fault. A belt of low magnetic susceptibility runs down to this break from the NE. This feature is inferred to overlie a belt of metasediments in the basement. The ENE magnetic break appears to disrupt the strike of the metasedimentary belt.

No significant structural breaks can be inferred from the magnetic map of permit 1.

DIAMOND DRILLING

Four diamond drill holes totalling 836m were drilled in the permit area during August and September, 1980 by D. W. Coates Enterprises Ltd., Richmond, B.C. One hole totalling 191.2 m was drilled on permit 1 and three holes totalling 644.8 m were drilled on permit 2 (see maps. Attachments 3 and 4). Holes WB-1, WB-3 and WB-4 were radiometrically logged by SMD personnel using SMD owned downhole logging equipment.

Hole WB-1 on permit 1 was located on the Richardson River ERTS linear and the coincident inflection point of a weak NNW-trending gradient seen on the Questor magnetic maps of the permit area. This hole intersected a coarse-grained quartz feldspar biotite gneiss at 154.5 m after penetrating 60.6 m of Athabasca sandstone. The basal 4 m of Athabasca sandstone is weakly kaolinised and chloritised. The top 15.5 m of gneiss is heavily hematised and kaolinised. A small gamma kick (30-80 cps) was recorded in a 2 m interval of Athabasca sandstone approximately 4.25 m above the basement contact.

Holes WB-2 to WB-4 on permit 2 were located on a NNW section line across the inferred ENE basement fault where it cuts the belt of basement metasediments. Precambrian rocks were intersected at 205-206 m depth after penetrating an average thickness of 103 m of overburden and 102 m of Devonian carbonate and shale.

The Devonian in all three holes consists essentially of an upper 40-55 m of intertidal to supratidal dolomites, dolomatised biohermal limestones and argillaceous, dolomitic, subtidal bioclastic limestones. This is underlain by 40-60 m of green mudstones and evaporites. Porous and fractured sections of the upper carbonate unit are extensively tar-soaked in all the holes.

The Precambrian basement intersected in hole WB-4 essentially consists of granite and granite gneiss showing very weak hematite/chlorite alteration in the top 5 m. A thick bedded meta-arkose to metapelite sequence was intersected in WB-3. Moderate to strong hematite, chlorite, epidote and kaolinite alteration is developed in the top 10-15 m of this sequence. Three 2-3 m thick zones in this altered section kick up to 185 cps on the gamma log. Hole WB-2 had to be abandoned in the top of the Devonian mudstone unit due to extremely difficult drilling caused by tar seeping into the hole and seizing the drill rods.

TENTATIVE CONCLUSIONS

The presence of weakly-altered Athabasca Formation and Precambrian basement underlying permit 1, together with the evidence of small amounts of radioactive material indicated by the gamma log, increases somewhat the uranium potential of this area. Further details of basement structure in this area are required before further drilling is warranted.

Although no Athabasca sandstone is present in the drilled area of permit 2 the presence of altered basement metasediments with associated weak gamma anomalies may indicate the pre-Athabasca basement surface is preserved below the present Devonian cover. If so, then the ENE basement structure has potential for localising uranium at the unconformity surface. In addition the depositional environment suggested for the upper Devonian reefal carbonate unit indicates a similar geological setting to that at Pine Point, NWT, where significant Pb-Zn deposits are found.

PROPOSED PROGRAM FOR 1981

Permit 1 - During 1981, chemical analysis of selected core samples from WB-1 will be required to identify the radioactive elements present and to compare the alteration with that of known Athabasca type uranium deposits. In addition, an in-depth review of currently available geophysical data for this area will be made and, depending on availability, a magnetotelluric depth sounding survey or an airborne gradiometer survey will be run to identify any basement structure.

Permit 2 - A similar geochemical and geophysical program is proposed for this permit. In addition, geochemical analysis of cores from the Devonian, particularly the reefal carbonates in WB-3, will be undertaken to look for geochemical zoning patterns similar to those present around some important carbonate hosted Pb-Zn deposits.

ESTIMATED EXPENDITURES

Data evaluations and geochemical analysis	$11,400
Geophysical work and evaluation	$38,600
TOTAL Expenditures 1981	$50,000

Individual expenditures on each permit will be prorated by acreage.

LIST OF ATTACHMENTS

1. Itemised cost statement - prepared by SMDC

2. Questor Geophysical Report on the Input Survey (separate report)

3. Final Plan of 1980 Exploration, Permit 1 (in pocket)

4. Final Plan of 1980 Exploration, Permit 2 (in pocket)

5. Radiometric Logs (in pocket)

6. Geological Logs

ATTACHMENT 1

ITEMISED COST STATEMENT

ASSESSMENT COST REPORT

WOOD BUFFALO - 1980 FIELD WORK

DIRECT COSTS	ALTA. PERMIT 1 687811-0001	ALTA. PERMIT 2 687811-0002	TOTALS
Geophysics - Airborne Input Svy. Contractor - Questor Surveys	2,943.85	13,413.40	16,357.25
Diamond Drilling			
Contractor - [redacted]	25,221.96	80,014.03	105,235.99
SMDC Salaries	2,073.37	4,733.24	6,806.61
Copter Support	14,851.00	63,347.00	78,198.00
Field Supplies (core boxes etc)	211.87	635.63	847.50
Instrument Usage (borehole logger)	568.66	1,914.59	2,483.25
TOTAL DIRECT COST	45,870.71	164,057.89	209,928.60
Support Costs			
Camp Supplies + Operations (SMDC)	72.09	764.51	836.60
Report Writing, SMDC Salaries	152.00	688.00	840.00
Field Management - SMDC Salaries	583.49	1,964.51	2,548.00
Drafting - SMDC Salaries	26.34	88.66	115.00
TOTAL SUPPORT COST	833.92	3,505.68	4,339.60
Travel + Transportation			
Fares + Related	294.10	541.04	835.14
Air Charter - Fixed Wing	987.16	5,336.35	6,323.51
Helicopter T + T	681.27	2,293.73	2,975.00
Freight	38.00	---	38.00
TOTAL TRAVEL + TRANSPORTATION	2,000.53	8,171.12	10,171.65
TOTAL FIELD COST	48,705.16	175,734.69	224,439.85
ADMINISTRATION 10%	4,870.52	17,573.47	22,443.99
TOTAL ASSESSMENT COST	53,575.68	193,308.16	246,883.84

ATTACHMENT 6

GEOLOGICAL LOGS

DIAMOND DRILL FIELD RECORD

Drill Hole Number WB-1

Project Wood Buffalo, Alta Disposition 6878110001 Grid or place name Blanche Lake

Location:
Grid Coordinates _____ Elevation: Collar 722 ft

Surveyed Coordinates NE¼ 17-108-8-W4 Land surface 715 ft

Initial inclination 90° Acid tests

	Depth	Dip angle (corrected)
Azimuth _____		
Total depth 627 ft		
Casing length 308 ft		
Size NW		

Bit sizes: From/to 0'-308'; 3 7/8 Tricone; 308'-627' 2 63/64" NQ bit

Commenced Aug. 24, 1980 Completed Aug. 28, 1980

Drilling Contractor D.W. Coates Enterprises Ltdl Machine type Longyear 38

Core stored at SMDC Uranium City, Saskatchewan

Downhole radiometric logging by Siegfried Grabs Date Aug. 27, 1980

Logging instrument Mount Sopris 1000-C

Conditions: Steel casing to 308', steel rods to 614', plastic casing to N/A

Logging rate: Down _____ Up 4m/min

Data processing by _____

Geological log by Siegfried Grabs Date Aug. 30, 1980

Overburden depth: 308 ft.

Lost 100 ft of NW casing in hole.

All depths of core are recorded from collar.

SMDC GEOLOGICAL LOG

Drill Hole No. WB-1 NE¼ 17-108-8 W4

Depth From	Depth To	Lithology	Rock Type	Description	Mineralization Alteration Fracturing	∝ to C.A.
0	308		Overburden	Interbedded sand, clay and gravel - boulder beds at 186-190, 282-286 and 302-306'.		
308	506.75			Athabasca sandstone.		
308	337		Ortho quartzite	Finely banded pink to gray coloured, hematitic, medium to coarse and very coarse grained sandstone to arkosic sandstone. Contains few well rounded quartz pebbles 1-3" diameter. Quartz grains are generally subrounded to subangular, moderate to well sorted. Cement is generally quartz and hematite + pale pink to gray white clay minerals, minor white mica. Few pale chloritic patches present, eg from 334-336.	Hematite in matrix + few grains hematite and magnetite. Weakly fractured (80-90° core angle) Trace pyrite in these patches.	
337	338		Conglomerate	Well rounded to subangular quartz, quartzite and mica schist pebbles in red hematite mud matrix + green chlorite in intersticial voids.	Trace pyrite with chlorite.	
338	372		Massive othoquartzite	Coarse to medium grained quartz sandstone as above, generally well rounded and sorted grains. Contain few pebble bands as at 345-353 in laminated, poorly sorted fine to medium sand and silt. From 354 matrix contains up to 2% pale green chlorite and approx. 3% kaolinite.	Weakly fractured (90° to core axis)	80-90°
372	425		Banded sandstone	1-2' bedded, mm-cm laminated and riple crossbedded pink to pale and medium gray, fine to medium grained quartz sandstones, general quartz cement with varying quantities of hematite, chlorite, kaolin and muscovite providing colour banding. Several coarser grained beds with occasional pebble bands and individual pebbles (as above) occur, eg 377-381, 387-394 and 408-417. Generally moderate to good sorting, poor in coarser bands. @ 422.5 plebs of pyrite occurs in fine sand associated with pale chlorite, also 3 veins of pyrite and marcasite (core angle 40°)	trace fine pyrite in darker gray laminae Trace marcasite at 406-407 and marcasite + pyrite up to 2% in 1" zone @ 418.5.	80-90°

SMDC GEOLOGICAL LOG

Drill Hole No. WB-1

Depth From	Depth To	Lithology	Rock Type	Description	Mineralization Alteration Fracturing	∝ to C.A.
425	435		Massive sandstone	Coarse to medium grained, massive to weakly banded, pink to red coloured quartz sandstone. Subrounded grains, moderate to poor sorting, hematite and quartz cement - contains a few rounded quartz pebble bands towards the base.		
435	455		Laminated sandstone	Finely laminated and riple cross laminated, red to pink and pale gray coloured, fine grained sandstone with siltstone and mudstone bands (1-1½" thick) matrix and cement generally hematite and pale chlorite + trace to 2% keolinite and white mica - colour banding reflects variations in hematite content, finer bands tend to be richer in hematite. A 2' coarse sand bed occurs @ 445.	Trace pyrite @ 439 in fractures and as blebs in grayer bands Also @ 444.	75-90°
455	486		Massive sandstone to banded sandstone	Massive to weakly and moderately laminated, medium to coarse grained quartz sands - rounded to sub-rounded grains, moderate to good sorting - colour banding varies from pale pink to gray and red brown as above - also contains a few well rounded pebbles - matrix as above - trace of feldspar in lower half. Thin cross laminated bands @ 470-472 and 474-476, contains reduced blebs and bands from 482-486 which are rich in pale green chlorite and kaolinite.	Trace pyrite and ?marcasite in weak fracturing and in grayer laminae, eg 457-458.	
486	494		Massive sandstone and pebble conglomerate	Coarse grained, massive, pink to red brown hematite rich, poorly sorted quartz rich sand passing down into banded, pale pink to crean kaolinised mudstone and pebble conglomerate.	A general kaolinisation of the Athabasca Sandstone starts at the top of this band and increases downwards + trace pale green-yellow chlorite.	80-90°

SMDC GEOLOGICAL LOG

Drill Hole No. WB-1

Depth From	Depth To	Lithology	Rock Type	Description	Mineralization Alteration Fracturing	∝ to C.A.
494	506.75		Micro-conglomerate and mudstone	6" to 2' banded medium gray-gray green to red brown and pale gray, coarse grained immature microconglomerate with subangular to subrounded fragments dominantly of quartz + bands of pale pink to green kaolinised silt and micaceous mudstone as at Pre-Cambrian contact. Gray and gray green bands are chlorite and kaolin rich. Matrix is predominently kaolin and pale chlorite + minor pale hematite and quartz.	Moderate to strong kaolinisation and weak pale green to yellow chloritisation.	80-90°
506.74	627			PreCambrian Basement		
507.75	557.5		Altered basement	Coarse grained feldspar, biotite rich rock with 1-2' thick contorted gray to gray green metapelite bands and fine schistose biotite rich semipelite. From 521' kaolin is essentially restricted to feldspar crystals - chlorite changes from pale yellow green to bright green at base.	Moderate to strong hematite, kaolinite and chlorite alteration, passing down through hematite/chlorite to essentially chlorite alteration.	
557.5	592		Quartz feldspar biotite gneiss	Coarse grained gneiss with a few 6" bands of gray medium grained metaquartzite to arkosic quartzite eg @ 601.	Trace to ½% pyrite disseminated and in patches, from 555' to 585'.	
592	627		Metaquartzite	Fine-medium grained gray massive metaquartzite with minor to 5% feldspar + a little biotite and chlorite in places. Also three 1½" bands of coarse grained biotite rich feldspar quartz gneiss with green chlorite @ 607-608, 612-614 and 616-621.	Probably healed shear zones.	40-50°
	T.D. 627'			Siegfreid Grabs.		

DIAMOND DRILL FIELD RECORD

Drill Hole Number WB-2

Project Wood Buffalo Disposition 6878110002 Grid or place name Ronald Lake

Location:
Grid Coordinates _____ Elevation: Collar 882 ft

Surveyed Coordinates NW¼ 28-104-10-W4 Land surface 875 ft

Initial inclination 90° Acid tests

	Depth	Dip angle (corrected)
Azimuth _____		
Total depth 581 ft		
Casing length 345 ft		
Size NW		

Bit sizes: From/to 0-345: 3 7/8" Tricone Bit; 345-581: 2 35/36" Huddy Diamond Bit

Commenced Sept. 18, 1980 Completed Sept. 27, 1980

Drilling Contractor DW Coates Ent. Ltd. Machine type Longyear 38

Core stored at SMDC Uranium City, Saskatchewan

Downhole radiometric logging by _____ Date Not done

Logging instrument Mount Sopris 1000-C

Conditions: Steel casing to 328', steel rods to 581', plastic casing to -

Logging rate: Down _____ Up _____

Data processing by _____

Geological log by Terry Walker Date 22/Oct/1980

Hole abandoned @ 581' due to extremely difficult drilling.

SMDC GEOLOGICAL LOG

Drill Hole No. WB-2 NW¼ 28-104-10 W4

Depth From	Depth To	Lithology	Rock Type	Description	Mineralization Alteration Fracturing	∢ to C.A.
0	345		Overburden	Interbedded sands, clay & gravel - probably recent fluvial valley fill.		
345	365		Vuggy sparite reef lime-stone	Pale gray white to medium gray fine grained sparite to micrite with several thin bands of ¼-4" dark gray organic laminated lime mudstone - well developed clay coated stylolites and wavy laminations. Secondary calcite spar occludes a good primary porocity - generally friable. From 356' more micritic, shows good algal laminated bands and is in part brecciated. Majority of vugs or fractures are tar filled as are more porous matrix areas - overall tar content prob. 2-5%. Tar rich (10%+) sections occurs from 357-364 ft.		75-80°
365	389		Algal lst & lime mud-stone	Top 2-3' is finely laminated, medium gray-gray brown algal lst and shale passing down into dominantly dark gray shaly slump brecciated lime mudstone + fine spary calc arenites + black organic shale bands @ 373-374'. Fine gray brown calcarenite band with secondary calcite cement - 374-376' breccia (maybe karstic), angular fragments of algal lst & calcilutite in dark gray lime mud matrix. 376-389' wavy irregularly laminated (probably algal) microsparite to micritic limestone.		80-90° 0-90°
389	397		Fault breccia	Fault gauge of dark brown to black calcareous mud + brecciated limestone as above, heavily fractured. This section is heavily tar soaked, last 2' of recovered core is massive tar - core recovery less than 60%.		

Depth From	Depth To	Lithology	Rock Type	Description	Mineralization Alteration Fracturing	∠ to C.A.
397	406		Dolomite	Medium-dark gray brown fine sucrosic dolomite, moderate to good intergranular porocity. Top 1' is well laminated Top 3' is irregularly soaked with heavy oil or tar. Moderately fractured, most of the fracture surfaces are tar coated.	Trace fine dissem. pyrite.	80-90°
406	434		Bioclastic dolomite	Fossiliferous fine sucrosic dolomite to porous spary dolomite and porcellanous dolostone - includes bivalves, ostracods, brachs, gastropods - moderate to poor (5%). 2nd intergranular porocity formed by dissolution of spar cem. which is now dolomite - whole section is irregularly and patchily oil or tar soaked, fracture planes are coated by tar as are the abundant microvugs - locally zones containing 5-30% fossils are developed. From 420-425 well laminated, 424-425 tabulate coral band.	Few py cubes and lim. staining.	80-90°
434	445.5		Bryzoan reef	Dark brown to gray porous fine sucrosic to porcell. dolomite, 1-2% tar in filling vugs and fractures, irregular patches of pore space filled with heavy oil Also contains crinoids, pelecy pods and bracks - vugs locally lined with calcite crystals.		
445.5	454		Sucrosic dolomite (?originally calcarenite)	Massice to weakly banded gray brown fine sucrosic dolomite + few crinoid ossicles, secondary moldic porosity developed from dissolution of fossil fragments &/or spar & evaporate filled cavities generally 1% or less. From 446.5-453 more vuggy por. probably 2-5% and contains irregular patches of tar staining and tar coating on a few fractures.	Trace fine pyrite on organic partings	80-90°
454	468		Laminated organic dolomite	Well laminated (mm) gray to dark gray brown very fine grained organic dolomite, generally dense with poor porocity, occasional thin 1-2" bands with vuggy porocity developed by dissolution of secondary calc filled vugs - few crinoid ossicles, thin shelled bracks and ostracods. Occasional fractures are tar	Trace fine pyrite associated with calcite in vugs or along argillaceous laminae.	90°

Depth From	Depth To	Lithology	Rock Type	Description	Mineralization Alteration Fracturing	∝ to C.A.
				coated. From 460.25 core is darker, more fossiliferous, essentially massive dololutite with occasional cross laminated dolomitic silts, eg @ 463-464. Basal 2' is transitional into underlying bioherm.		80-90°
468	475		Stromatoporoid reef	Massive to irregularly banded medium gray to dark gray brown stromatoporoid bioherm-dolomitised to very fine-fine sucrosic dolomite quite argillaceous and muddy - secondary porocity produced by dolomatisation has been occluded by tertiary pale gray and white calcite, contains local, fossil rich bands containing crinoid ossicles, brachs (spiriferids and productids) and bryozoan in a dark gray brown to black organic mud - brach shells are filled with sparry calcite and show good geopetal structures - reef is weakly fractured, fractures are tar coated, top 1' of reef was brecciated, the fragments being set in dolomatised mudmatrix.		
475	498		Black shaley dolomite/ limestone and shale	Finely laminated (mm) dark gray brown to black argillaceous and carbonaceous shaley dolomite and limestone. From 485-488 essentially medium-dark gray, very fine grained to fine sucrosic fissile shaley limestone. Contains locally fossiliferous bands with stromatoporoids, crinoids, brachs and bryozoans - lower section (ie below 484) contains thin bands with low angle, small scale, crossbedded lime silts containing pyrite, eg @ 485, 492. Below 488 is essentially calcareous shale and dolomite shale - occasional tar coated fractures.	Wispy disseminated pyrite in silts.	85-90°
498	514		Biohermal limestone	Medium gray brown massive to irregularly banded stromatoporoid and brach rich limestone - very fine grained silty to porcellaneous. Fossil rich sections contain crinoids, brachs, and bryozoan as well as the stromatoporoids and are generally in a darker mud rich and carbonaceous matrix. From 509 the fossils		75-90°

SMDC GEOLOGICAL LOG

Drill Hole No. WB-2

Depth From	Depth To	Lithology	Rock Type	Description	Mineralization Alteration Fracturing	∡ to C.A.
				especially crinoids tend to be more evenly distributed throughout a medium gray brown silty micritic limestone. Base is transitional into underlying limestone. Occasional tar coatings on fractures.		
514	536		Dolomitic limestone	Massive compact medium gray brown microcrystalline to very fine sucrosic dolomitic micrite to silty calcarenite - lower half is more dolomitic, weakly fossiliferous with predominent crinoid ossicles dispersed throughout rock,+ few thin laminated lime mud-silt bands with bioclastic laminae. Last 2' is a microcrystal bioturbated dolomite which is oil soaked. Fractures in above or generally tar coated.		80-90°
536	537		Mudstone	Pale gray green mudstone with good enterolitic texture probably bioturbated also. Top half is tar stained.		
537	580		Anhydrite/ gypsum	Finely laminated and veined pale gray white to gray green and brown anhydrite with gypsum veins. 537-547 white very soft and friable. Few fractures are filled with coarse selenite crystals. Black shale/shale breccia occurs @ 559-560.5. Some open fractures and selenite filled fractures are tar coated, possible fault gauge @ 546.		
580	581		Mudstone	Pale green shaly mudstone with gypsum veins may in part be fault gauge in last ½'.		
				Hole abandoned @ 581 due to extreme drilling difficulty caused by tar invading the hole and blocking the rods.		

T.D. 581.

T. Walker

DIAMOND DRILL FIELD RECORD

Drill Hole Number WB-3

Project Wood Buffalo, Alta Disposition 6878110002 Grid or place name Ronald Lake

Location:
Grid Coordinates _____
Surveyed Coordinates NE¼ 21-104-10-W4

Elevation:
Collar 882 ft
Land surface 875 ft

Initial inclination 90°

Acid tests

	Depth	Dip angle (corrected)
Azimuth _____		
Total depth 787 ft		
Casing length 320 ft		
Size NW		

Bit sizes: From/to 0-320': 3 7/8 Tricone; 320'-787': 2 63/64 NQ bit

Commenced Sept 10, 1980 Completed Sept 17, 1980

Drilling Contractor D. W. Coates Ent. Ltd. Machine type Longyear 38

Core stored at SMDC Uranium City, Saskatchewan

Downhole radiometric logging by Siegfried Grabs Date Sept. 16-17, 1980

Logging instrument Mount Sopris 1000-C

Conditions: Steel casing to 320', steel rods to 317', plastic casing to N/A

Logging rate: Down _____ Up 4m/min

Data processing by _____

Geological log by Terry Walker Date 24/Oct/1980

Overburden depth: 320 ft.

All core depths measured from collar.

SMDC GEOLOGICAL LOG

Drill Hole No. WB-3 NE¼ 21-104-10 W4

Depth From	Depth To	Lithology	Rock Type	Description	Mineralization Alteration Fracturing	∡ to C.A.
0	320		Overburden	Interbedded sand and clay with gravel beds, bouldery in last 10'.		
320	382.25		Calcarenite (dolomitised)	Massive to ripple cross lain pale buff brown to gray fine sucrosic to crystalline dolomite + minor dol. limestone. Ripple laminations confined to top 25' which is extensively tar soaked, i.e. more porous coarser grained sections are - underlying massive to irregularly lam. dolomite, may well be algal and/or evaporitic. Tar soaking here tends to be confined to fractures and occasional porous sections. Generally porous, is low, good primary por. being occluded by second generation dolomite and/or calcite.		75-90° 80-90°
382.25	393		Sabkha Dolomite	Medium gray blue to pink buff nodular and wavy nodular micro crystalline to very fine sucrosic dolomite, wispy blue gray laminae are argillaceous, nodular formations are dolomitic replacements of nodular gypsum (indicates sabkha deposition). Top 2' is richly fossiliferous containing abundant diminitive (?dwafted) gastropods, bivalves and ostracods, shells are completely gone leaving open casts some preserving good internal details. This section has moderate vuggy porosity - vugs and fractures are tar filled (1-2%).		
393	395		Evaporitic dolomite	As in lower section of 320-383.		
395	475		Dolomite to bioclastic dolomite	Massive medium pale gray brown and buff. Fine sucrosic to microcrystalline dolomite, generally poor porosity due to second dolomite cement but with moderately porous zones, which are tar soaked, eg 395-397, 402-405. Tar is confined to fractures in rest of core - bioclastic rich section occur @ 398-399, 407-403, 412-417. Fossils mainly as above.		

Depth From	Depth To	Lithology	Rock Type	Description	Mineralization Alteration Fracturing	∝ to C.A.
				Some thin wavy nodular and algal laminated beds occur, e.g. 410-412 + few gypsum/anhydrite veins in top 20'.		
				Below 417 rocks is buff, moderately porous, sucrosic dolomite with several large calc spar filled vugs, e.g. @ 427 with good geopetal structures. Pyrite occurs as very fine wisps and crystals in these and other vugs. Weakly calcareous in places. Becomes gray then passes into wavy banded bioclastic medium to pale gray microcrystalline dolomite @ 455'. Dominant fossils are crinoid ossicles + few brachiopods and ostrocods. Wavy nodular banding suggests evaporite/ dolomite sedimentation. A moderate to poor secondary porocity is developed in a few sections due to leaching of the fossils. Darker colour produced due to increase in mud content. The voids are generally tar coated or filled as is the weak fracturing - this section passes down into the underlying fossil rich argillaceous shale.	Very fine wisps pyrite and crystals in vugs Wispy pyrite in argillaceous laminae and spar filled vugs.	75-90°
475	489		Bioclastic argillaceous dololutite	Medium-dark gray irregular to well laminated crinodal argillaceous dolomite mudstone. Fossils are mainly crinoid ossicles + thin shelled brachs + few ostracods and stromatoporoid bryozoans. Tar coats some fractures. Some sections are quite argillaceous.	Wispy, fine pyrite in argillaceous laminae.	80-90°
489	494		Slump or bioturbation breccia	Medium-dark gray patchy wavy nodular slightly argillaceous and fossiliferous, fine, sucrosic dolomite.		75-80°
494	532		Bioclastic dolomite and black shale	Finely laminated (mm), dark gray to black bioclastic dolomitic and carbonaceous shale with medium gray dol-arenites which show some cross bedding (½ to 6" thick). Unit contains bioclastic rich dolomites as at 510 and unusual breccia zones @ 506-512.5 and 518-521, angular fragments of sucrosic dolomite and bioclastic dolomite occurs in dark gray argillaceous	Fine wisps of pyrite on shale partings	90°

Depth From	Depth To	Lithology	Rock Type	Description	Mineralization Alteration Fracturing	∝ to C.A.
				dolomitic mud matrix - could be talus breccias. Basal 12' below a gray mudstone band is a wavy laminated bioclastic rich dolomite containing poorly developed bryozoan colonies, crinoid ossicles and brachs. More porous dol-arenite bands are generally tar or oil soaked, eg @ 517. Few percent of fractures are tar coated or filled, as are some vugs.		
532	554		Dolostone	Massive wavy laminated medium gray brown, very fine sucrosic to microcrystalline dolomite, wavy lamination are darker gray argillaceous muds. Contains a few thin (1-2") fossiliferous argillaceous dolomitic bands.	Fine wisps of pyrite in argillaceous laminations	75-90°
554	556.25		Cementstone	Hard porcellaneous pale gray brown bioturbated dolo-lutite -bottom 2" banded brown buff and gray shale.		
556.25	557.25		Limestone	Medium gray medium grained crystalline limestone.		
557.25	606.5		Evaporites	Mm-cm banded pale gray green to dark gray and black anhydrite with veins of gypsum (¼-1" thick, 45-90° core angles) and selenite, some anhydrite is stained brown esp. from 579' and contains buff mudstone bands 1-2" thick gypsum porphyroblasts are common throughout core but esp. close to gypsums veins. Several prominent green to black gypsiferous shales occur at 573.7-575.7, 587-589.4, 593.7-595 & 598.5-600. Bottom 3' contains pale mud bands.		90° 80-90°
606.5	621		Mudstone (brecciated)	Strongly veined and in part brecciated gray-pale green mudstone and gypsiferous mudstone, veins are filled with gray gypsum or anhydrite.		
621	623		Dolomite	Pale cream to brown, very fine, recrystalised dolomite cementstone with small (mm) gypsum porphyroblasts.		

SMDC GEOLOGICAL LOG

Drill Hole No. WB-3

Depth From	Depth To	Lithology	Rock Type	Description	Mineralization Alteration Fracturing	∡ to C.A.
623	671.9		Mudstone	Pale green gypsiferous, weakly veined mudstone as above changing colour to red brown mudstone @ around 628'. Some mottled green reduced section occurs from around 640.- two feet pale buff clay rich quartz sandstone occurs @ 632', red brown, tar soaked quartz sands @ 656.5-658, 659-660 and 661.5-662.	Trace of wispy, very fine pyrite in sand.	
				From 667.8-671.9 tar soaked quartz sands or silty red brown mudstone (2-4" beds) alternate. bottom 6" of the mudstone is reduced.		80-90°
671.9	678		Tarsand	Coarse immature quartzitic pebbly arkose heavily tar soaked (tar forms matrix) with thin green mudstone beds (1-2"). Bottom 1" is red sandy mudstone with weathered PreCambrian fragments passing into tar soaked gruss.		
678	687		PreCambrian Meta-arkose and semi-pelite	Basement contact appears to be @ 45° to core axis - roughly banded, medium grained, dirty immature meta-arkose to sub-lithic meta-arkose with 1" to 1' beds of dark gray green semi-pelitic schist- arkoses contain occasional quartz pebble bands and are chlorite/biotite rich. Strongly altered clay rich "delithified" zone at 682 and 685.	Pervasive hematisation, chloritic (dark green) alteration of biotite, pale yellow epidote alteration of K feldspar - generally moderate with more strongly altered zones	45-60°
687	692		Banded sub-arkose/semi-pelite/pelite	Finely banded (½-2") mediun fine grained meta sub-arkose with clay rich pebble bands, metapelite and meta-semipelite schists strongly altered and broken down. In some places feldspars are completely destroyed and replaced by casts and skeletal pseudomorphs of hematite stained kaolinite - contains 1" red mudstone/siltstone band @ 687.5.	Pervasive hematisation, strong pale-dark green chloritisation of mafics, strong lemon yellow epidotisation of feldspars	50-80°
692	698		Meta subarkose and semipelite	Roughly banded and brecciated (cataclastic) meta-arkose to sublithic arkosic gneiss with few thin semipelite bands, eg @ 697. Few pegmatitic sections as @ 695.5. Moderately-strongly altered. Feldspars strongly altered @ 693-694 and 696-698.	Pervasive hematisation, dark green chlorite alteration of mafics, yellow epidotisation of feldspars	

SMDC GEOLOGICAL LOG

Drill Hole No. WB-3

Depth From	Depth To	Lithology	Rock Type	Description	Mineralization Alteration Fracturing	∝ to C.A.
698	702		Quartzfeldspar gneiss	More compact gneissic banded fine-coarse grained feldspar and biotite rich rock, could be meta-arkose with ½-1½" chlorite rich bands and 1-2" quartz feldspar pegmatite bands - weaker alteration.	Hematisation of ground mass feldspar and clay minerals. Chlorite alteration of mafics. Weak epid & kaolinisation of porphyritic feldspars.	75-90°
702	734		Quartzfeldspar biotite gneiss & granite gneiss	Massive coarse grained weakly banded quartz feldspar biotite rock probably coarse meta arkose, with chloritised biotite rich bands ¼-2" thick and 6"-2' red feldspar/quartz granite gneiss bands. Below 722 is dominantly granite gneiss. @ 732 mm-cm banded pale-dark green chloritic schist with fine quartz feldspar bands. Last 1' very coarse grained.	Hematite staining of feldspar and ground mass, weak chlorite alteration of mafics, weak patchy epidotisation and kaolinisation of feldspars. Later decreasing with depth.	75-90°
734	758		Meta-arkose to psammite and metapelite	Well banded 1"-2' and laminated (mm) red arkose to lithic sandstone, gray green pelite and semipelite. Sandstones show relict stratification and upward decrease in grain size, banded semipelite and pelite maybe the interbedded silt and clay on top of cycle. Alteration is generally weak. Last few feet contain thick very coarse to coarse grained quartz and red feldspar rock and grades down into underlying unit.	Strong hematite staining of ground mass and feldspar + moderate weak chlorite and epidote alteration of fine sediments and epidote kaolinitic alteration feldspars.	75-90°
758	787		Granite gneiss	Massive quartz and red feldspar granite gneiss, coarse to very coarse grained with pegmatoid patches and a few bands of purple gray to gray blue slaty pelite and semipelite @ 762-763, 775-777.	Predominent hematite staining and pseudomorphing of feldspars and some mafics + patchy epidotisation and kaolinisation of feldspar particularly at and near shears or fractures.	80-90°

T.D. 787'

T. Walker

DIAMOND DRILL FIELD RECORD

Drill Hole Number WB-4

Project Wood Buffalo, Alta Disposition 6878110002 Grid or place name Ronald Lake

Location:
Grid Coordinates _____ Elevation: Collar 882 ft

Surveyed Coordinates NE¼ 16-104-10-W4 Land surface 875 ft

Initial inclination 90° Acid tests

	Depth	Dip angle (corrected)
Azimuth _____		
Total depth 743 ft		
Casing length 324 ft		
Size NW		

Bit sizes: From/to 0-324': 3 7/8 Tricone; 324'-743': 2 63/64 NQ bit

Commenced Aug. 30, 1980 Completed Sept. 9, 1980

Drilling Contractor D.W. Coates Ent. Ltd. Machine type Longyear 38

Core stored at SMDC Uranium City, Saskatchewan

Downhole radiometric logging by Siegfried Grabs Date Sept. 7, 1980

Logging instrument Mount Sopris 1000-C

Conditions: Steel casing to 324', steel rods to 730', plastic casing to N/A

Logging rate: Down _____ Up 4m/min

Data processing by _____

Geological log by Terry Walker Date 23/Oct/1980

Overburden depth: 322 ft.

Lost 70 ft NW casing + casing shoe

All core depths measured from collar.

SMDC GEOLOGICAL LOG

Drill Hole No. WB-4 NE¼ 16-10-104 W4

Depth From	Depth To	Lithology	Rock Type	Description	Mineralization Alteration Fracturing	∢ to C.A.
0	324		Overburden	Interbedded fluvial sands and clay beds, boulder till from 284-324 ft.		
324	420		Algal Dolomites	Finely laminated gray brown to buff coloured, fine sucrosic dolomites, algal dolomite and dolomitic limestones - moderately fractured. 412-417' massive white vuggy dolomite, tar coats most fractures and in fills, vuggs and intergranular porocity - especially heavy tar soaking from 336-412 ft.		
420	447		Porous dolomite	Massive to weakly laminated buff fine sucrosic dolomite - good intergranular and moldic porocity filled with tar. Moderately fractured, fractures are tar filled.		
447	449		Breccia	?Fault brecciated dolomites as above with heavy tar soaking - fractures 30-45° to core axis.		
449	465		Bioclastic dolomite	Moderate to weakly banded gray brown argillaceous dolomites, crinoidal bioclastic dolomite and brown sucrosic dolomite - bioclastic dolomites contain crinoid ossicles, bryozoans, ostracods and pelecypods floating in a micritic matrix. Poor vuggy porocity developed in places. Tar fills most fractures and vuggs.	Trace of pyrite associated with tar in vugs.	
465	497		Argillaceous bioclastic limestone	Finely banded medium to dark gray brown argillaceous bioclastic limestone with solitary rugose corals thin shelled bracks + crinoid ossicles and ostracods. tar coating fractures. Little tar below 478.	Trace of pyrite in black micrite matrix esp. from 496-497.	80-90°
497	507		Stromatoporiod reef	Dark brown to black biomicrite to biosparite containing mainly stromatoporoid growths, crinoid ossicles, ostracods and bracks. Moderate-weak wavy banding - well developed geopetal structures developed in some vugs now filled with white calcite spar.	Traces of pyrite in muddy bottoms of vug fillings.	75-90°

SMDC GEOLOGICAL LOG

Drill Hole No. WB-4

Depth From	Depth To	Lithology	Rock Type	Description	Mineralization Alteration Fracturing	∝ to C.A.
507	539		Reefal debris	Above passes down into banded to massive medium gray brown sparry dolomite, biosparite and biomicrite. Top 3' contains stromatoporiods, rest crinoid ossicles, bryozoan fragments, gastropods, ostracods and few corals. 535.5 to 539 - slump brecciated.	Trace pyrite as above	
539	541		Argillaceous limestone/ mudstone	Dark gray, fine grained argillaceous limestone and mudstone + brown algal dolostone - extensively fractures, the fractures being filled with yellow to yellow green sulphur and gypsum.		
541	589		Limemudstones	Finely banded, massive cementstone and porcellaneous micrite with thin shale bands compact and impervious, contains a few brecciated gray green mudstone bands @ 557-559 and 572.5-573.5. This section is fractured and veined with fibrous gypsum and calcite.	Trace of pyrite with gypsums in veinlets.	80-90°
589	667		Mudstones	Dence, often micaceous, massive to finely laminated gray to gray green mudstone. From 635.5 mudstones are red brown in colour. From 589-635 rock is moderately fractured and veined with gypsum and anhydrite (C/A 10-90°). @ 653' is a 2' sandy section which is tar soaked. From 653 the mudstones are interbedded with 1-2" fine sand and silt bands which are generally tar soaked and green coloured (reduced)		80-90°
667	672		Granite wash	Fine to medium grained immature arkose containing ¼-½" fragments of the underlying Precambrian basement - generally red brown in colour and tar soaked.		
672	675		Granite gneiss	Fractured, tar soaked coarse grained to pegmatitic granite gneiss.	Gray to pink 672-687 weak to very weak hematite and chlorite alteration.	

SMDC GEOLOGICAL LOG

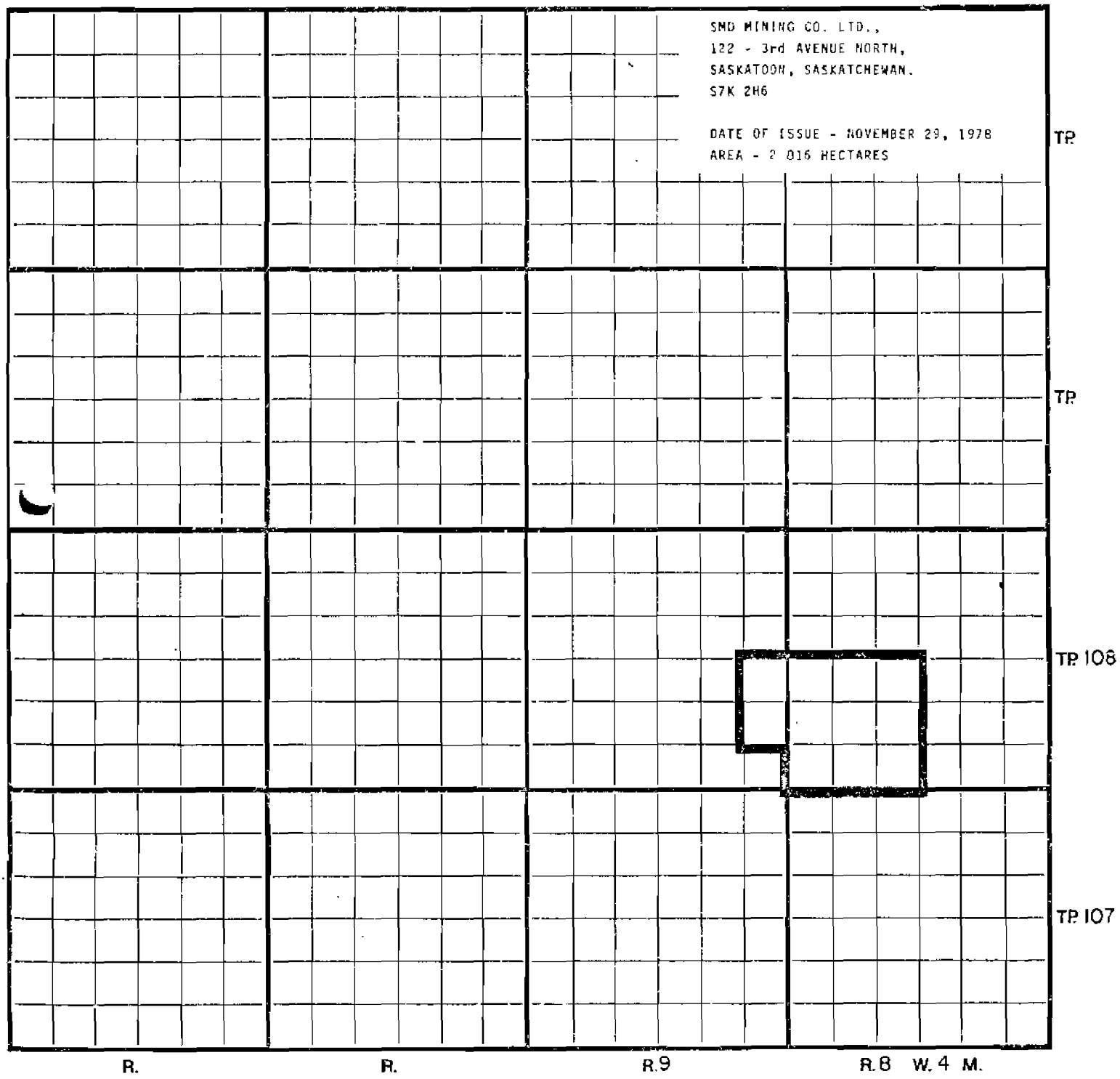
Drill Hole No. WB-4

Depth From	Depth To	Lithology	Rock Type	Description	Mineralization Alteration Fracturing	∠ to C.A.
675	743		Granite gneiss	Gray to pink, coarse grained quartz feldspar granite gneiss and pegmatite grading into biotite rich granite gneiss.		

T.D. 743'

T. Walker

QUARTZ MINERAL EXPLORATION PERMIT No. 687811000I




R11
R10
R9
R8W4
111°45'
111°30'
111°15'
NATIONAL PARK
AREA TO BE FLOWN
6878110002
PERMIT 2
TP 105
TP 104
TP 103
58°00'
Kenny Woods
SMD MINING CO. LTD.
PROPOSED 1980 WORK
19800001
PROJECT WOOD BUFFALO
NTS 74-
DISPOSITION 6878110002
WORK BY
SCALE 1:50,000
DRAWN
DATE JAN /80
MAP 2


R11
R10
R9
R8
R7W4
111° 30'
111° 15'
58° 15'
TP 108
TP 107
TP 106
WOOD BUFFALO
NATIONAL PARK
RICHARDSON LAKE
LIMON LAKE
BLANCHE LAKE
ATHABASCA RIVER
Old Fort
687811 0001
PERMIT I
AREA TO BE FLOWN
Embarras
2 1 0 1 2 3 4 Kilometres
SMD MINING CO. LTD.
PROPOSED 1980 WORK
1980001
PROJECT WOOD BUFFALO
NTS 74-L
DISPOSITION 687811 0001
WORK BY
SCALE 1:50,000
DRAWN
DATE JAN./80
MAP 3


R11
R10
R9
R8W4
111°45'
111°30'
111°15'
58°00'
TP 105
TP 104
TP 103
NATIONAL PARK
NATIONAL PARK
21 AIR km
PERMIT 2
PERMIT 2
PERMIT 2
6878110002
AREA FLOWN BY QUESTOR SURVEYS LTD. DURING APRIL, 1980
WB 2
WB 3
WB 4
DD HOLES DRILLED DURING SEPT., 1980.
SMD MINING CO. LTD.
FINAL PLAN
1980 EXPLORATION
PROJECT WOOD BUFFALO
NTS 74-L
DISPOSITION 687811 0002
WORK BY
SCALE 1:50,000
DRAWN
DATE OCT. /80
Att. 4

19800001

SMD
MINING CO. LTD.
122-3rd Avenue North,
Saskatoon, Saskatchewan
S7K 2H6 Telex 074-2864
Ph. 664-5000

1980 January 8

80 JAN 31 A10:47

Mr. G. Fulford
Director
Exploration Review Branch
Department of Energy & Natural Resources
9915 - 108th Street
EDMONTON, Alberta
T5K 2C9

Dear Sir:

Re: Quartz Mineral Exploration Permits 687811-0001,687811-0002
(SMD Permits 1 & 2, Wood Buffalo Project)

Work completed on this project to date consisted of:

(1) A study of all available geological and geophysical data over a broad area covering and surrounding the permits.

(2) Plotting of maps showing structural trends in basement rock, contours on the basement rock surface, probable extent of Athabasca sandstone and Devonian sediments and inferred faults.

(3) Reconnaissance of the area in the field by helicopter.

Costs incurred to date (to December 31, 1979):

Salaries	$ 5,845	
Transportation & Travel	1,702	(includes helicopter
Land Costs	12,126	reconnaissance of property)
Legal & Miscellaneous	393	
Overhead at 10%	2,007	
	$22,073	

The proposed program and budget for calendar year 1980 are attached hereto. All of this work will be completed before the permit

anniversary date of November 29th, 1980.

Attached please find the following maps:

Permit Locations - 1:500,000
Plan of Permit 1 & 2 - 1:50,000

Please note that the proposed airborne EM and magnetic survey will cover both permits, except that portion of Permit 2 lying east of the Athabasca River, with east-west flight line spaces 400 metres apart.

Ground geophysical follow-up will be confined to a few small selected areas. Cut, chained and picketed control lines will be required within these areas. Obviously the exact location and extent of such ground follow-up cannot be specified until results of the airborne survey are received and interpreted.

Diamond drilling is planned to test targets defined by the airborne and ground surveys. Again the exact location and number of holes cannot be specified until after completion of surveys. Present plans are to move the diamond drill to and between drill sites by helicopter.

Environmental impact of the proposed program should be minimal:

(1) It is proposed that a camp to service the property will be maintained at Embarass near the airstrip. No timber cutting anticipated.

(2) Line cutting and picketing will be required as control for ground follow-up geophysics. This will be done in selected areas which cannot be precisely defined until receipt of airborne results; a few helicopter pads may also be necessary.

(3) Since drill moves will be done by helicopter, roads will not be required; it will be necessary to clear an area about 50 metres x 50 metres at each drill site and possibly also helicopter pads at pump locations.

Yours sincerely,

[redacted]

J. S. Kermeen
Senior Exploration Geologist

JSK/mam
cc: L. A. Clark
T. Walker
W. Plumb
R. Beckett
A.J. Peter, Ft. McMurray
R. Hopse, Ft. Chipewyan

Revised 1980 January 7

WOOD BUFFALO - 1980 PROGRAM

Introduction

Available geophysical and geological data suggest that the Athabasca Delta area is underlain by a NE-SW trough containing Athabasca Formation and Devonian carbonates. The Athabasca Formation may extend SW along this trough as far as the Athabasca River and underlie Permit 1. A number of major regional fault structures, including the Black Bay fault which in Saskatchewan is associated with important uranium deposits, can be projected into this trough. The intersection of any of these faults with the Athabasca unconformity would be favourable loci for uranium deposition.

Permit 1 lies on a NW-trending linear just south of its intersection with the projection of a NE-trending fault believed to lie under Lake Athabasca. Permit 2 overlies the intersection of the SW projection of the Black Bay fault and a basement mag linear believed to be the SW extension of a large displacement fault in the Carswell Structure. The Athabasca Formation may not extend this far SW but if the Athabasca unconformity surface is preserved below the Phanerozoic cover this area would have considerable uranium potential.

A belt of porous dolomites and dolomitic limestones with pinnacle reef developments extends NW from the Fort McMurray area into Permit 2. This plus the extension of the two faults mentioned above under this permit suggests a geological environment similar to that at Pine Point. The recent discovery of significant lead mineralization in Athabasca sandstone near the projection of the Black Bay fault past old Fort Bay further enhances the potential for base metal deposits in Permit 2.

Proposed 1980 Program

(1) Airborne electromagnetic-magnetic survey on both permits.

(2) Follow-up by ground EM and magnetic surveys in selected areas for initial diamond drilling.

(3) Diamond drilling to test sites selected on the basis of geophysical surveys.

T. Walker
Project Geologist

Revised 1980 January 7

WOOD BUFFALO - 1980 BUDGET

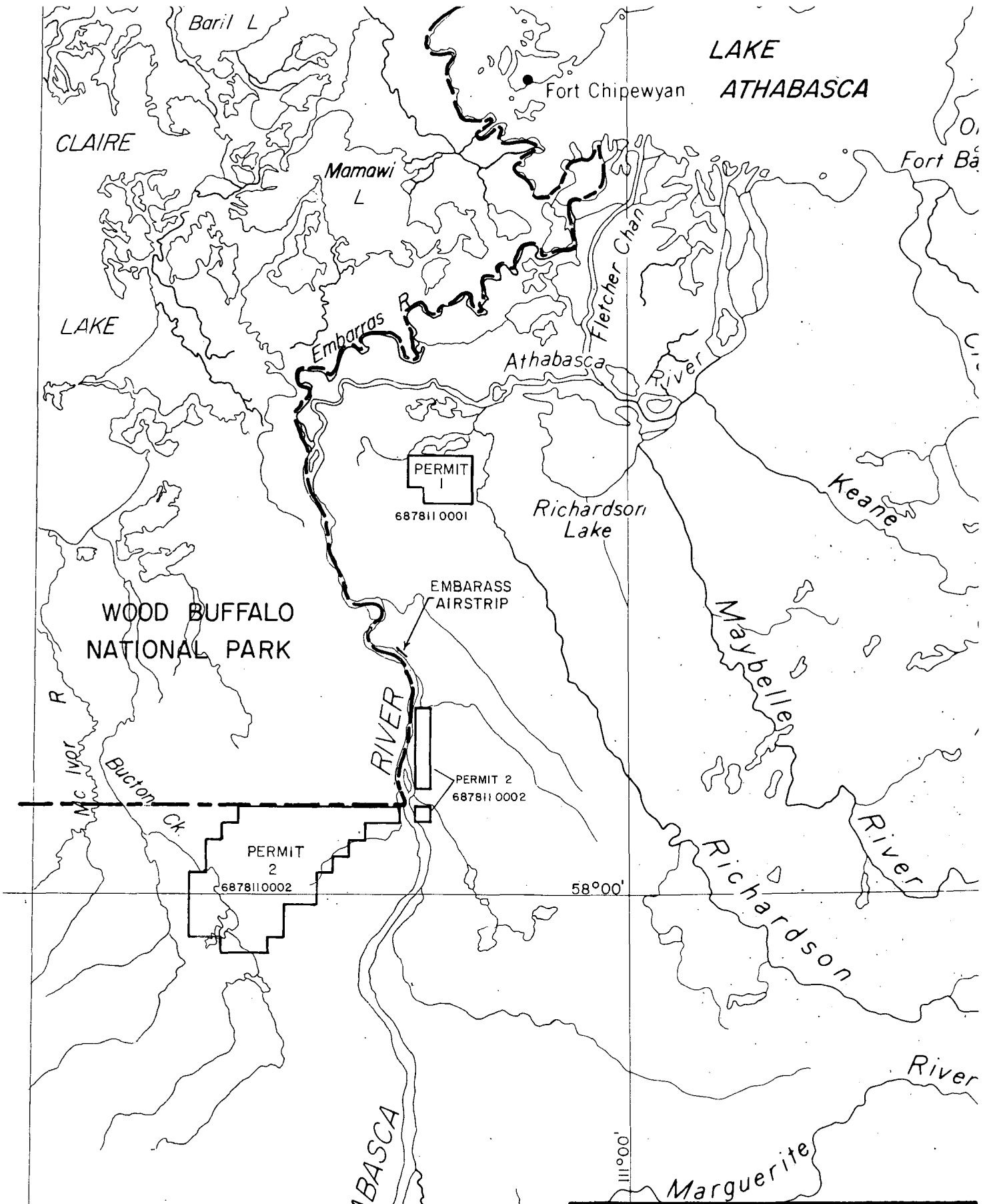
	$000
Personnel - Permanent	8.4
- Temporary	2.6
Camp	3.5
Survey Equipment	2.0
Transportation & Travel	17.3
Analyses	1.0
Contingency & Miscellaneous	5.6
Land Costs	10.0
Field Office Support Costs	3.5
Sub-Total	53.9
Contract Work:	
Airborne EM-Mag Survey	16.1
Diamond Drilling 550 m @ $200	130.0
Total Contract	146.1
GRAND TOTAL	200.0

Rate of Expenditures Forecast, $000's:

January to March	18.5
April to June	1.7
July to September	170.0
October to December	9.8

Direct Project Costs $200,000

SMDC Share = 100%



SMD MINING CO. LTD.

WOOD BUFFALO PROJECT

PERMIT
LOCATIONS

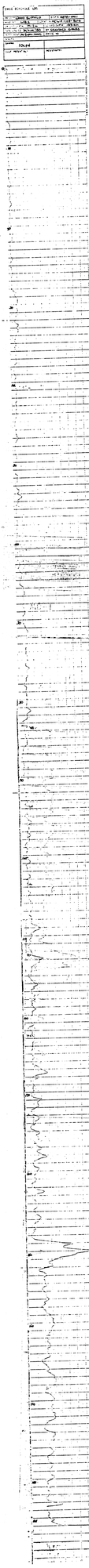
1980000/

FIGURE 1


R11
R10
R9
R8
R7W4
111° 30'
111° 15'
58° 15'
WOOD BUFFALO
NATIONAL PARK
RICHARDSON LAKE
TP 108
TP 107
TP 106
ATHABASCA
ATHABASCA RIVER
BLANCHE LAKE
LIMON LAKE
D.D HOLE DRILLED DURING AUGUST 1980
WB 1
687811 0001
PERMIT 1
AREA FLOWN BY QUESTOR SURVEYS LTD DURING APRIL, 1980
20 AIR km
D.D. CAMP
WOOD BUFFALO
N
0 1 2 3 4 Kilometres
SMD MINING CO. LTD.
FINAL PLAN
1980 EXPLORATION
PROJECT WOOD BUFFALO
NTS 74-L
DISPOSITION 687811 0001
WORK BY
SCALE 1:50,000
DRAWN
DATE OCT./80
Att. 3

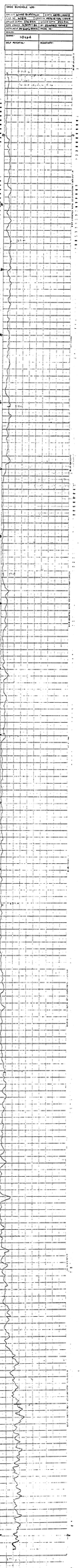
19800001

WB-1



WB-3

WB-4



SMD MINING CO. LTD.

RADIOMETRIC
BORE HOLE LOGS

PROJECT WOOD BUFFALO	
NTS 74-L	DISPOSITION 6878-0001 & 6878-0002
WORK BY	SCALE VERT: 1cm = 2metres
DRAWN	DATE OCT. / 80 | AN. S

19800001