TK-Thautil River 81(1)A

THAUTIL RIVER COAL PROPERTY*

SHELL CANADA RESOURCES LTD.

OPERATOR: CROWS NEST RESOURCES LTD.

C.L.# 4299-4240

SMITHERS AREA 93 L/6

Work done: May to August 1981

Authors: D. Handy
S. Cameron

Submitted: December 15 1981

* This section taken from a whole (TK-Smithers 81(1)A) which is held in confidential. Thautil River property coal licences were surrendered.

1.0 Summary

The Smithers Area Coal Prospects are contained within 58 B.C. Coal Licences which cover 14,236 hectares. In addition Shell/CNRL hold 3,886 hectares under option agreements. The licences are held by Shell Canada Resources Limited and are operated by its wholly-owned subsidiary, Crows Nest Resources Limited.

The area in general, and the Telkwa licences in particular, lie in proximity to the Canada National Railway, 360 km east of the port of Prince Rupert. Existing infrastructure, the proximity of a coal handling port and the good quality of the coal make some of these prospects attractive.

The Chisholm Lake and Thautil River prospects are approximately 10 km from an existing good logging road on the south side of the Morice River which runs east for 50 km to the town of Houston.

The primary objective of the exploration program was to locate and delineate areas of large reserves amenable to mining.

Based on the 1981 exploration the Thautil River and Chisholm Lake licences have been surrendered.

Chisholm Lake	N.Lat.54°14' N.Long.127°13'	-	immediately north of Chisholm Lake ✓ see TK-Chisholm Lake 8(c)A
Thautil River	N.Lat.54°16' N.Long.127°20'	-	along the Thautil River north of its confluence with the Morice River ✓

2/BYa.14

Crows Nest Resources LIMITED
Eau Claire Place, 525 - 3rd Avenue S.W., Calgary, Alberta (403) 232-4355
P.O. Box 2699, Station M, Calgary, Alberta T2P 2M7 Telex 03-822505

December 8, 1981

Ministry of Energy, Mines and Petroleum Resources
British Columbia

Enclosed please find our report on the Smithers Area Coal Prospects.

This report has been prepared by Mr. D. Handy and Mr. S. Cameron, both of whom are employed by Crows Nest Resources Limited as geologists.

Mr. D. Handy, Honours B.Sc., graduated in Geology from the University of Waterloo in 1977. Prior to his graduation, Mr. Handy worked as an assistant for two geotechnical companies and after graduation as a geologist for a major exploration company in Saskatchewan. Mr. Handy has been employed by Crows Nest Resources Limited as a Project Geologist since 1979.

Mr. S. Cameron, B.Sc., in Geology graduated from the University of Calgary in 1981. Prior to graduation Mr. Cameron worked as an assistant for a major exploration company in the North West Territories. He also worked for Crows Nest Resources Limited as a geological assistant in 1980. Mr. Cameron has been employed by Crows Nest Resources Limited as a Geologist since May 1981.

Their work was carried out under the supervision of our District Manager, British Columbia, Mr. Frank Martonhegyi.

In my opinion, all of these personnel are fully qualified, by training and experience to prepare this report and this account of work done under their direct supervision.

Yours very truly,

H.G. Rushton, P. Geol.
Vice-President - Exploration.

7.0 Thautil River Property

7.1 Summary of Previous Work

During the 1979 field season the following exploration work was performed:

- o 1:10,000 scale geological mapping
- o Hand trenching
- o one diamond drill hole
- o location survey of diamond drill hole
- o drill site reclamation

No exploration work was performed during 1980.

7.2 Work Done in 1981

The 1981 field operations were supervised by Dave Handy of Crows Nest Resources Limited. The following exploration work was performed.

- o diamond drilling
- o drill site reclamation
- o geophysical survey

Four diamond drill sites were cleared in 1981, however holes were drilled on only three of these sites. These drill holes were completed to a total depth of 560 metres.

The total cost of the 1981 exploration work was $186,244.

7.3 Thautil River Stratigraphy

General

The basement rocks of the Thautil property consist of upper Jurassic/lower Cretaceous volcanics of the Hazelton Group. These volcanics consist mainly of basalt, andesite, trachyte, rhyolite and agglomerate.

These volcanics are unconformably overlain by upper Jurassic/lower Cretaceous sediments also of the Hazelton Group. In the Thautil area these sediments are composed mainly of conglomerate, with some sandstone, shale and minor coal capping the section. The sedimentary section at Thautil River ranges from 0 to over 275 metres.

Younger intrusives bound the sedimentary basin to the north.

Coal Stratigraphy

One coal seam of approximately 1.5 metres thickness is present in outcrop at the northern part of the property. This seam which was not encountered in any drill holes to the south, has been eroded over most of the property. However, a large areal extent of coal measures is unlikely to the north because the sediments are terminated by intrusives.

Thautil Structure

The Thautil River area appears to be a northerly plunging synclinal structure, relatively undisturbed by faulting. A northerly plunge to the syncline would explain why the small coal seam is not present in any drill holes to the south. The seam may be present at depth to the north. Dips on the Thautil property do not exceed 25°.

On the basis of the results of 1979 and 1980 exploration programs the Thautil River licences have been surrendered.

Encl 13

606 000 E | 607 000 E | 608 000 E | 609 000 E | 610 000 E | 611 000 E

6 022 000 N

KTi

GABRIEL CREEK

Volcanics

Volcanic O.C.

Red Volcanic

L 4817
CL 4233

JKv

CL 4224

Subcutcrop & Volcanic Float seen along most of the Creek

Volcanics

Volcanics

Volcanic O.C.

Congl. East dip

JKs

Sandst. O.C.

Hand trenches 1.2 to 1.5m of soft coal beneath, O.B. dipping west ~20°.

Red Volcanic Outcrop

Coal Seam Outcrop

DDH-Th-1(-90)
El. 997.32
OB to 10.62
JKv at 10.62
TD at 49.07 (JKv)
(1979)

L 4818
CL 4234

CL 4225

6 020 000 N

Congl.

Terrain flattens out - no outcrop

Red congl. 10-15m exposed ~15-20° east

TH-81D-101
No Coal
O.B. to 28.5m
T.D. at 268m (JKs)

Congl. ~15° west dip.

6 019 000 N

Massive Congl Outcrop

No exposure on this creek

L 4819
CL 4235

CL 4226

This volcanic outcrop faulted badly.

No outcrop

No outcrop seen along creek, mainly volcanic float.

THAUTIL RIVER

6 018 000 N

6 017 000 N

606 000 E | 607 000 E | 608 000 E | 609 000 E | 610 000 E | 611 000 E

TOPOGRAPHIC LEGEND

- CONTOURS
- INTERMITTENT STREAM
- RIVER OR LAKE
- TREED AREA
- ROAD
- TRAIL
- APPROXIMATE COAL LICENCE BOUNDARY

True North | Grid North | Magnetic North

UTM 9

127°30' 54°30' | 127°00' 54°30'

93L/6

127°21' 54°21'

THAUTIL RIVER AREA

127°30' 54°15' | 127°00' 54°15'

54°13' 127°21'

93L/3

54°00' 127°30' | 54°00' 127°00'

0 500 1000m
1:10 000

GEOLOGIC LEGEND

AIR PHOTO OBSERVED DIP
- 3°-10°
- 10°-25°
- 25°-45°

JKs U. JURASSIC / L. CRETACEOUS SEDIMENTS — HAZELTON GP.
JKv U. JURASSIC / L. CRETACEOUS VOLCANICS — HAZELTON GP.
JKi U. CRETACEOUS OR LATER INTRUSIVE

- BEDDING ATTITUDE
- OUTCROP
- UNCOMFORMABLE CONTACT (MOSTLY INFERRED FROM AIR PHOTO INTERPETATION)
- DEFINED FAULT
- POSSIBLE FAULT
- DIAMOND DRILL HOLE (LOC'N SURVEYED)
- DIAMOND DRILL HOLE (1981)
- CLEARED DRILL SITE (1981)

TK-Thautil River 81(2)A * 1

Crows Nest Resources Limited
EXPLORATION

WEST CENTRAL BRITISH COLUMBIA

241 (1)

THAUTIL RIVER AREA
SMITHERS PROJECT

NORTH PART

NTS-93L/6

AUTHOR: D. HANDY	SCALE: 1:10 000	ENCLOSURE No.: 12
DATE: NOV. 29, 1979	REVISED: DEC. 31, 1981	DRAWING No: HH-39A
To Accompany		

6 017 000 N

606 000 E

607 000 E

608 000 E

609 000 E

610 000 E

611 000 E

6 016 000 N

6 015 000 N

6 014 000 N

6 013 000 N

6 012 000 N

6 011 000 N

6 010 000 N

L. 4821
CL 4237

CL 4236
L. 4820

CL 4227

L4822
CL 4238

CL 4229

CL 4228

L4823
CL 4239

CL 4230

L4824
CL 4240

CL 4231

CL 4241
L 4825

CL 4232

JKv

JKs

B

B'

C

C'

TH-81D-102 (102 A)
No Coal
O.B. to 11.60 m
T.D. at 95.0 m (JKs)

Congl.
west dip, shallow

No outcrop between conglomerates, Numerous sandst. float seen.

No outcrop from the Thautil R. to the JKv outcrop. Traces of sandst. float where found.

No outcrop

Congl. under water

Drill Site Cleared (1981)

TH-81D-103
No Coal
T.D. at 193.5 m (JKs)

Section measured here

Black Carb. Shale / Congl faulted (mistaken for coal from the air)

No outcrop from the Thautil to the congl., only vol. cobbles & boulders. No coal or sed. float.

Very small streams -flat terrain- no exposures.

Similar attitude

Congl. with dark Carbonaceous Shaley bed at W.L.

Congl.

Terrain very flat
No exposure in this creek.

THAUTIL RIVER

0 500 1000 METRES
1:10000

TOPOGRAPHIC LEGEND

- CONTOURS
- INTERMITTENT STREAM
- RIVER OR LAKE
- TREED AREA
- ROAD
- TRAIL
- APPROXIMATE COAL LICENCE BOUNDARY

True North / Grid North / Magnetic North

UTM 9

127°30' 127°00' 54°30' 54°15' 54°00'
93L/6
93L/3
127°21' 54°21' 54°13'
THAUTIL RIVER AREA

LEGEND

AIR PHOTO OBSERVED DIP
- 3° - 10°
- 10° - 25°
- 25° - 45°

JKs U. JURASSIC / L. CRETACEOUS SEDIMENTS — HAZELTON GP.
JKv U. JURASSIC / L. CRETACEOUS VOLCANICS — HAZELTON GP.
JKi U. CRETACEOUS OR LATER INTRUSIVE
BEDDING ATTITUDE
OUTCROP
UNCONFORMABLE CONTACT (MOSTLY INFERRED FROM AIR PHOTO INTERPRETATION)
DEFINED FAULT
POSSIBLE FAULT
DIAMOND DRILL HOLE (LOC'N SURVEYED)
DIAMOND DRILL HOLE (1981)
CLEARED DRILL SITE (1981)

TR-Thautil River 81C23A *1

Crows Nest Resources Limited
EXPLORATION

WEST CENTRAL BRITISH COLUMBIA

THAUTIL RIVER AREA
SMITHERS PROJECT

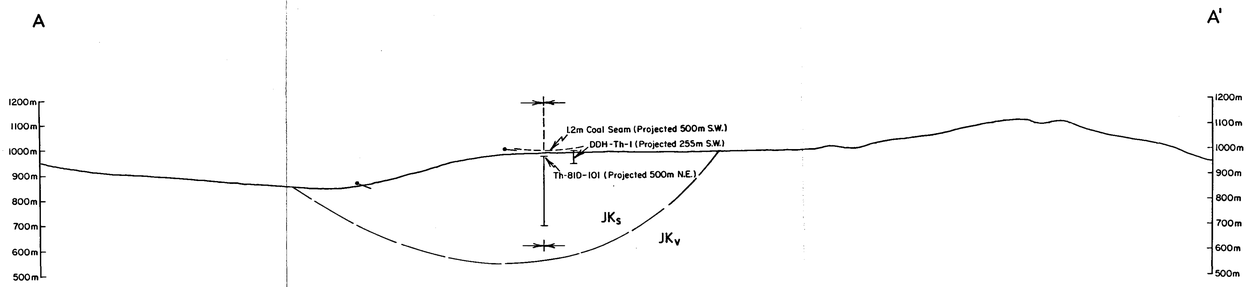
241
(2)

NTS-93L/6,3 SOUTH PART

AUTHOR: D. HANDY	SCALE: 1:10 000	ENCLOSURE No: 13
DATE: NOV 29, 1979	REVISED: DEC. 31, 1981	DRAWING No: HH-39A
To Accompany		

2 of 2

Encl 14



241 Tk-Thautil River 81C(2)A #1

1 of 3

GEOLOGICAL LEGEND

JKs	- U. Jurassic/L. Cretaceous Sediments
JKv	- U. Jurassic/L. Cretaceous Volcanics
—— ——	- Unconformable contact
	- Apparent dip in line of section
	- Drill hole
	- Fault (arrows indicate relative movement)

Crows Nest Resources Limited
EXPLORATION

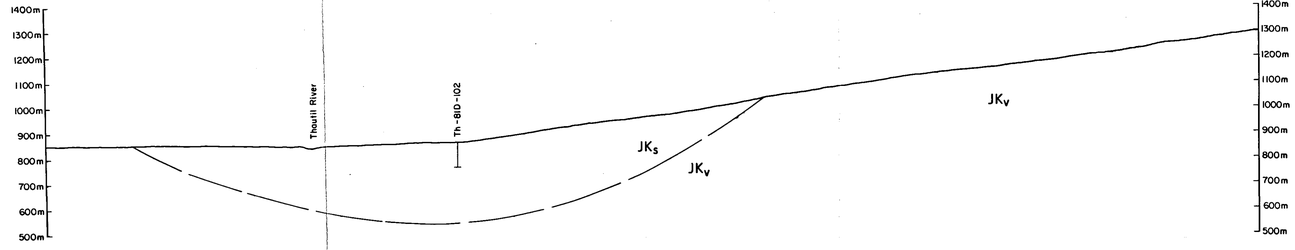
THAUTIL RIVER AREA (SMITHERS PROJECT)
WEST CENTRAL, B.C.

CROSS SECTION A-A' (3)

AUTHOR: S. Cameron	SCALE: 1:10,000	ENCLOSURE No: 13
DATE: Dec. 15, 1981	REVISED:	DRAWING No: HK-90F
To Accompany 1981 Smithers Geological Report		

B

B'



241

7K-Thautil River 81(2)A */

2 of 3

GEOLOGICAL LEGEND

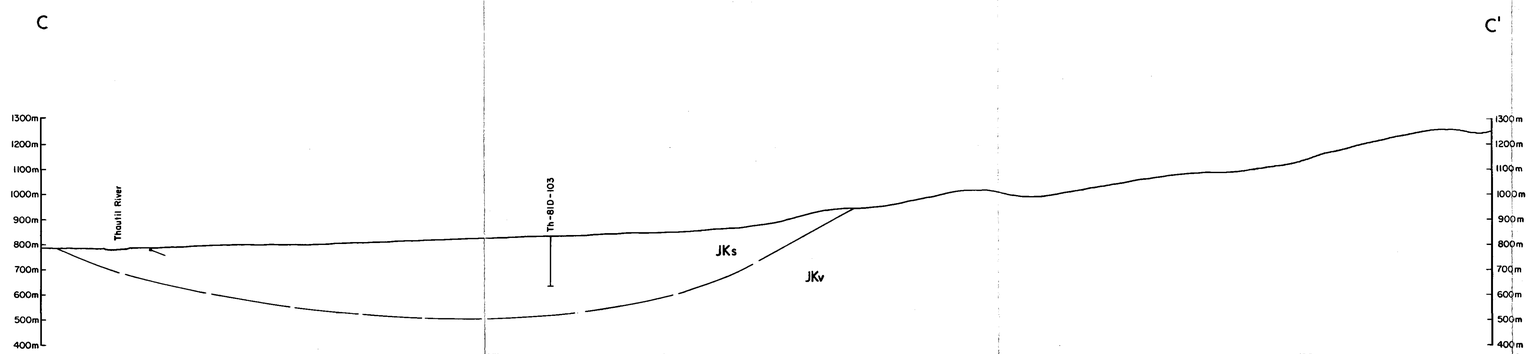
JKs	- U. Jurassic/L. Cretaceous Sediments
JKv	- U. Jurassic/L. Cretaceous Volcanics
—— ——	- Unconformable contact
\	- Apparent dip in line of section
⊥	- Drill hole
⇌	- Fault (arrows indicate relative movement)

Crows Nest Resources Limited
EXPLORATION

THAUTIL RIVER AREA (SMITHERS PROJECT)
WEST CENTRAL, B.C.

CROSS SECTION B-B' (4)

AUTHOR: S. Cameron	SCALE: 1:10,000	ENCLOSURE No.: 13
DATE: Dec. 15, 1981	REVISED:	DRAWING No: HK-90G
To Accompany 1981 Smithers Geological Report		



241 TK-Thautil River 81(2)A *1

3 of 3

GEOLOGICAL LEGEND

JKs	- U. Jurassic/L. Cretaceous Sediments
JKv	- U. Jurassic/L. Cretaceous Volcanics
—— ——	- Unconformable contact
\	- Apparent dip in line of section
|	- Drill hole
⇌	- Fault (arrows indicate relative of movement)

Crows Nest Resources Limited
EXPLORATION

THAUTIL RIVER AREA (SMITHERS PROJECT)
WEST CENTRAL, B.C.

CROSS SECTION C-C' (5)

AUTHOR: S. Cameron	SCALE: 1:10,000	ENCLOSURE No.: 13
DATE: Dec. 15, 1981	REVISED:	DRAWING No: HK-90H
To Accompany 1981 Smithers Geological Report		

Encl 15-1

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

DATE	BEGIN	05/31/81
	END	06/16/81

HOLE No. TH-81D-101

HOLE PARTICULARS

LOCATION	N - 6019610 E - 608070		
ELEVATION	955	HOLE BEARING (AZ°)	-
TOTAL DEPTH	268.19m	HOLE ANGLE (°)*	-90°

LOGGING

LOGS RUN	GRN, FBL, DIR, CAL, DEN
LOGGED BY	ROKE
OTHER TESTS	

COAL CORING PERFORMANCE

CORE DIAMETER		NQ- 1 7/8"
TOTAL	CORE RECOVERED	-
	LENGTH CORED	-
	CORE RECOVERY	- %

EXAMINATION

LOG USED	GRN
No. OF SEAMS SAMPLED	NONE
EXAMINER (S)	Patenaude Scowen
DATE	06/10/81

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC. FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
1	22.85	0	22.85	2283		- OVERBURDEN													
		22.83			CONG	- Coarse pebbles Congl. interbedded with fine to medium grained sandstone units and very few coal lenses. Pebbles angular to sub-rounded.			R3										
	25	22.83	23:6	.77		- Fine to medium grained sandstone no grading sequence. Some very thin lenses of coal dispersed in S.S. unit. When exposed in fracture coal is shiny and slickenside. No plants or fossil grey is in color.		75°	R2										
		23.6	24.31	.71		- Mainly it is sandstone (fine grained) with Congl. units at 23.6 - 23.7 (red and green pebbles average size 1mm. well sorted). At 23.78 - 23.88 (red and green pebbles average size 2.5mm) At 24.12 - 24.16 (red and green small pebbles with small coal particles. Bottom of this unit fractured exposing dull slickensided coal surface). At 24.26 - 24.31 (medium size red and green pebbles, well sorted).		64°										
								84°											
								76°											
		24.31	25.11	.80		- This whole length is a rubble of broken piece of sandstone congl., and coal. This coal is shiny and very brittle. The S.S. and Congl. are very fine to fine grained. No bedding angle possible.				.68	35%								
	26	25.11	26.01	.90		- Recovery of first 3 meters of core 2.94/3. Fine grained congl. white, green, red pebbles. Fractures on the plane of weakness of coal surface exposed is dull and wavy. Some small lenses of coal spread in unit. Well sorted, no grading		74°											

ALL LINEAR UNITS IN METRES

* : MEASURED FROM THE HORIZONTAL PLANE

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH-81D-101

FILE No. BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-211A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH - 101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
1		26.01	27.35	1.34	SS	- This whole unit is very fine grained S.S. at places fine enough to be a siltstone. The unit is broken into sticks of varying length. The S.S. is dotted with coal particles and lenses. When coal is exposed in fracture it is dull and wavy. No grading sequence.		79°	R2										
		27.35	27.89	.54	CONG / SS	- Congl. well sorted pebbles (red, white and green) of fine to medium size. No grading sequence.			R3										
		27.89	28.64	.75		- Very fine grained sandstone for the first 18cm of this unit grading into siltstone for the rest of it.		71° 70°		0	42%								
2	29	28.64	29.41	.77	SLST	- Continuation of the siltstone logged in Box 1. A section of 26cm is broken rubble of siltstone. The 29 meters marked is placed at 29.20. Thus 20cm gained through spread out of core.		69°	S5										
		29.41	29.69	.28		- Fine grained Congl. with a 4cm unit in which the pebbles are coarser (angular red, green and white). Thin elongated threads of coal are present in this unit.		86°	R3										
		29.69	30.86	1.17		- Reappearance of silstone core is broken in sticks of approx. 10cm. At 30.58 we get a lense of coal. Approaching the end of this siltstone unit are two beds of medium grained sandstone each approx. 1cm thick. One at 30.66, the other 30.72.		76° 79°	S5										

ALL LINEAR UNITS IN METRES

* : MEASURED FROM THE HORIZONTAL PLANE

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• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. 81D-TH - 101

FILE No. BA - 267
REVISED Feb. 1981
FORMERLY FILE No. BA - 212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH - 101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M. %	F.C. %	F.S.I.	C.V.
2		30.86		.32		- Very coarse sandstone (about .42mm in		77°	R3										
						diameter). Small threads of coal are													
			31.118			dispersed in this unit.				1.01	58%								
	32	31.18		1.15	CONG	- This whole unit is a Congl. of very coarse			R3										
						pebbles (red and green and grey). The													
						average size i 1cm with some reaching													
						4cm in size. The pebbles are angular													
						to sub-rounded. No definite grading													
						sequence. Poor to fair sorting. No													
			32.33			coal. Recovery 29-32 (99%).													
		32.33		2.23		- The first 30cm of this unit represents a													
						medium grained sandstone. The rest is a			R2										
						coarse grained Congl. with the average													
						pebbles 4 - 5cm and some up to 8cm in size.													
						Pebbles are sub-rounded to rounded. Very													
						sparse coal threads: on surface exposed													
						by fracture the Cong. pebbles appear to													
						have been sheared. Pebbles look like a			R3										
						mixture of sedimentary and volcanic rocks.													
						Bedding and angle cannot be measured.													
			34.56																
						AS A WHOLE BOX 2 SEEMS TO BE REPRESENTING													
						A FINING UPWARD SEQUENCE FROM COARSE GRAINED													
						CONGLOMERATE TO A SILTSTONE.													

ALL LINEAR UNITS IN METRES

* : MEASURED FROM THE HORIZONTAL PLANE

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. 81D-TH - 101

FILE No. BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. TH - 81D-101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
						RECOVERY LENGTH FROM MARKERS													
						32 - 35. 96% (2.89m/3m)													
3																			
		34.56		1.81		Very coarse grained conglomerate; average			R3										
						size of clasts - 4cm.; angular to sub-rounded;				1.03	60%								
	35					coarse SS matrix; no grading sequence, poor													
						sorting. No cha available. Broken sticks													
		36.37		1.3				63°											
					SS.	Very fine grained SS., grades into fine SS.			S5										
						very tiny coal particles - dispersed. No													
			37.67			crossbedding or depositional features													
						observed.													
		37.67		2.9	CONG.	Coarse grained conglomerate, sandstone matrix,		71°	R3										
						pebbles average size - 3cm, pebbles -													
						sedimentary and volcanic origin, angular to													
						sub-rounded, poorly sorted, no grading				1.43	67%								
			40.57			observed. BROKEN STICKS WITH 1cm OF RUBBLE.													
						RECOVERY OF CORE FROM MARKERS													
						35 - 38 (2.98/3) 99%													
4		40.57		2.7		Coarse pebble conglomerate													
						40.57 - 40.80 - rubble			R3										
						42.49 - 42.69 - rubble				1.34	40%								
	41					broken stick elsewhere													
						fine SS matrix													
						sub-rounded to rounded pebbles													
						average size - 2cm													
						no grading													
						poorly sorted													
			43.27			At 40.97 SS bed (0.65m thick)		(42°)											
								(45°)											

ALL LINEAR UNITS IN METRES

* : MEASURED FROM THE HORIZONTAL PLANE

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH - 81D-101

FILE No. BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH - 101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG.	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
4		43.27		0.29		SS. - fine grading into medium grained			R3										
						- very few coal particles present													
						- no depositional features													
						- joints (13°													
			44.06			(19° with core axis													
		44.06		1.87		Conglomerate - coarse pebbles													
						SS. matrix				.34	45%								
						- angular to rounded pebbles			R3										
						- poorly sorted													
			45.93			- no grading													
		45.93		0.73		SS. - fine grained		67°	R3										
						- wisps of coal present		65°											
						- a few small pebbles present throughout													
						RECOVERY BETWEEN MARKERS 41 - 44													
						(2.87/3.00) 95% RECOVERY													
						RECOVERY BETWEEN MARKERS 44 - 47													
						(2.99/3.00) 100% RECOVERY													
5		46.66		0.33		SS. - fine grained with 0.03m of coal at 46.86													
						Coal - dull and brittle, broken to rubble													
			46.99																
		46.99		1.55		Conglomerate - pebble average size 2cm			R3	.67	60%								
	47		48.54			sub-rounded to rounded													
		48.54		0.75		Conglomerate - fine to medium sized pebbles			R3										
						- not as coarse as above conglomerate. Coarsening upwards (bedding reversal?)													
						- bottom 0.03m is coal													
			49.29			shiny, conchoidal fracture													
		49.29		0.22		Siltstone - - light gray			S5										
						- coal lenses present		71°											
						- At 49.45 - 4cm fining upward		70°											
			49.51			sequence of conglomerate		72°											

ALL LINEAR UNITS IN METRES

* : MEASURED FROM THE HORIZONTAL PLANE

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. 81D-TH - 101

FILE No BA-267
REVISED Feb.1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH - 101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG.	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
5		49.51		0.17		Conglomerate - fining upward			R3										
						- pebble average: at bottom - 1cm													
			49.68			: at top - 1mm													
		49.68		0.20		SS. - fine grained carbonaceous													
						- coal 4cm thick at 49.82		63°	R1										
			49.88			dull and brittle, broken													
		49.88		2.80		Conglomerate - fining upward													
						- pebbles sub-rounded to				1.34	82%								
	50					rounded													
						- SS matrix													
						- no coal													
			52.60			- broken stick													
						RECOVERY BETWEEN 47 - 50 MARKERS													
						(2.9/3.0) 97%													
						RECOVERY BETWEEN 50 - 53 MARKERS													
						(2.98/3.00) 99%													
6		52.60	53.34	0.74		Conglomerate - coarse pebbles													
		53.34		1.5		Conglomerate - fining upward			R3	1.34	78%								
	53					- pebble average: at bottom 3cm													
						: at top - 2mm													
			54.84			- angular to sub-rounded													
		54.84		3.74		Conglomerate - fining up sequence repeated			R3	1.35	74%								
	56		58.58			at intervals of 0.90m													
						RECOVERY BETWEEN 53 - 56 MARKERS													
						(2.95/3.00) 98%													
						RECOVERY BETWEEN 56 - 59 MARKERS													
						(2.93/3.00) 97.7%													
7		58.58		3.0		Conglomerate - poorly fining upward			R3										
						- poorly sorted				1.01	72%								
	59					- angular to sub-rounded		72°											
						- pebbles - red, green and white													
						4cm - 1mm													
			61.58			- SS Matrix													

ALL LINEAR UNITS IN METRES

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FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. 81D-TH - 101

FILE No. BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH - 101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
7		61.58		2.64		Fining upward sequence:													
						61.58 - 61.97 - siltstone (.39m thick)		68°	S5										
						61.97 - 62.47 - SS. - fining upward (.50m thick)		73°											
						- fine grained to very				.67	66%								
	62					fine grained													
						62.47 - 64.22 - conglomerate			R3										
						pebbles decrease in size													
			64.22			upwards													
		64.22		0.20		Upper part of fining upward sequence													
						SS. - fine grained		75°	R3										
			64.42			- a few coal particles present													
						RECOVERY BETWEEN MARKERS 59 - 62													
						(2.96/3.00) 98.7%													
						RECOVERY BETWEEN MARKERS 62 - 65													
						(2.80/3.00) 93.3%													
8		64.42	64.62	0.20		Continuation of above SS.													
		64.62		3.78		Bottom of fining upward sequence of which													
						the SS is the top				1.07	56%								
	65					Conglomerate - pebbles slightly decreasing			R3										
						in size upward													
						- SS. matrix													
						- pebbles poorly sorted													
			68.40			angular to sub-rounded.													
		68.40		1.80	SL ST/ SS	Another fining upward sequence													
						68.40 - 68.42 - dull coal (.02m thick)													
						68.42 - 68.83 - dark siltstone (.41m thick)		73°	S5										
						- at bottom - dull lens of													
						68.83 - 68.88 coal approx. 0.05m thick				.66	49%								
	68					68.88 - 70.10 - SS. fining upward (1.22)													
			70.20			70.10 - 70.20 - SS - coarse grained			R1										
						(0.10m thick)													
						RECOVERY BETWEEN MARKERS 65 - 68													
						(3.00/3.00) 100%													

ALL LINEAR UNITS IN METRES

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FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. 81D-TH - 101

FILE No BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH - 101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
						RECOVERY BETWEEN MARKERS 68 - 71													
						(3.00/3.00) 100%													
						RECOVERY BETWEEN MARKERS 71 - 74													
						(3.00/3.00) 100%													
9		70.20	70.28	0.08		Siltstone - very brittle													
		70.28		0.12		Conglomerate - pebbles fine upward		70°											
						- small coal particles present													
		70.40		0.24		SS. - fine grained, containing a 0.02m		71°											
			70.64			thick bed of coarse SS.													
		70.64		1.20	CONG:	Conglomerate - poorly graded													
						- fining upward			R3										
						- poorly sorted													
			71.84			- pebbles angular to sub-rounded													
		71.84		0.49		SS. - fine grained													
						- no grading		60°											
						- very small coal particles				0	61%								
	71		72.33			- sharp contact with next conglomerate													
		72.33		1.36		Conglomerate - fining upward													
						- poorly sorted			R3										
			73.69			- pebbles 3cm - 0.5cm in size													
		73.69		1.01		73.69 - 73.91 - siltstone - light grey (.22m)		65°											
						73.91 - 74.17 - SS - medium grained			R2										
						(0.26m thick0													
						74.17 - 74.70 - conglomerate poorly sorted													
						pebble size - 2cm													
			74.70			(0.53m thick)													
		74.70		0.75	SLST/	Siltstone to very fine grained SS		73°	S3	.66	79%								
	74				SS	coal at 74.77m and 75.39m													
			75.45			Coal - shiny - conchoidal fracture													
		75.45		0.65		SS - fine to medium grained													
			76.10			thin threads of coal present			R3										

ALL LINEAR UNITS IN METRES

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FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. 81D-TH - 101

FILE No. BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH - 101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
10						RECOVERY BETWEEN MARKERS													
						74 - 77 (2.95/3) 98% RECOVERY													
		76.10		1.2	CONG	- Congl. unit. Average size at the top			R3										
						approx. 1cm at the bottom approx. 4cm.													
						broken sticks to rubble fining upward													
			77.3			sequence. Sub-angular to rounded													
		77.3		.05		COAL - Dull & Brittle													
			77.35																
		77.35		.15		- SS. very coarse grained, coal throughout				.67	53%								
	77		77.50			in small wisps.													
		77.50		.95		- Congl. Fining upward sequence average													
			78.45			size at top 1cm at bottom about 3cm													
		78.45		.49		- SS. medium to fine grained at the top			S3										
						of this unit. Coal throughout in													
			78.94			small threads.													
		78.94		1.14		- Congl. average pebble size 1cm. No													
			79.08			grading sequence. Fair sorting.													
		79.08		.18		- S.S. medium grained with a few pebbles													
			79.26																
		79.26	79.31	.05		- Siltstone. Dark grey, uniform		60°	S5										
		79.31		.76		- S.S. Fine to medium grained. Thin coal													
						at 79.85 and at 79.95 and at 80.07.													
			80.07			Dull and brittle COAL													
						RECOVERY BETWEEN MARKERS													
						77 - 80 (2.96/3) 98%													
11		80.07		.19		- Congl. with small pebbles			R3	.67	56%								
	80					of average size 2mm. Fining upwards													
			80.26			Grading sequence													
		80.26		.06		- S.S. fine grained. No grading		55°											
			80.32			Uniform													
		80.32		.04		- Congl. average size of pebbles 5mm													
			80.36			Fining DOWNWARD													
		80.36		1.67		- Sandstone. Very coarse grain at top and		70°	R3										
						fine grained at bottom. Fining downward													
						Broken sticks													

ALL LINEAR UNITS IN METRES

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▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. 81D-TH - 101

FILE No. BA-267
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CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH - 101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	FRAC FREQ.	RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
11						COAL at 80.66m - exposed surface is slickensided. Dull													
						COAL at 80.93 - 80.95 - Dull and brittle (.02m thick)													
			82.03																
		82.03		.58		- Congl. Range in pebble size from 2mm to 3cm. No grading. Poor sorting.			R3										
			82.61			Sub-angular to rounded. Broken sticks													
		82.61		2.71	SS	- Sandstone. Broken sticks to sticks.		68°											
						Carbonaceous matter on surface exposed by													
						fracture. S.S. is medium to fine grained				.66	28%								
	83					carbonaceous film at 82.81 - 82.84													
						- At 83.23 we have a thin bed of rounded 2mm pebbles													
						- At 83.89 - 83.91 we get some more silty carbonaceous matter.		71°											
						- At 84.54 - 84.59 carbonaceous siltstone			S5										
						- At 84.79 - 84.87 carbonaceous siltstone			S5										
			85.32																
						RECOVERY FROM MARKERS 80 - 83 100%													
						RECOVERY FROM MARKERS 83 - 86 100%													
		85.32		7.42	CONG.	- Congl. sticks to broken sticks to rubble			R3	.33	63%								
	86					The whole box and the top box 13 is a													
						continuous cycle of fining upward congl.													
12						sequence. The first sequence is from				.34	93%								
	89					85.32 to 86.60m			R4										
						2nd is from 86.70 to 87.16													
						3rd is from 87.16 to 88.56													
						4th is from 88.56 to 90.28				.34	65%								
	92					5th is from 90.28 to 91.63													
			92.74			6th is from 91.68 to 92.74													
						RECOVERY BETWEEN MARKERS 86 - 89 (2.93/3) 98%													
						RECOVERY BETWEEN MARKERS 89 - 92 (2.94/3) 98%													

ALL LINEAR UNITS IN METRES

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HOLE No. 81D-TH-101

FILE No. BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. TH - 81D-101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG.	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
13		92.74		.30		- S.S. Fine grained. Threads of coal													
			93.04			dispersed in unit													
		93.06		.22		- Siltstone. Dark grey carbonaceous matter													
			93.28			present.													
		93.28		2.64	SS /	- S.S. Medium grained. Uniform no grading			S5										
					CONG.	sequence.													
						Joint #1 Angle: 15° at 93.38													
						Joint #2 Angle: 18° at 93.48													
						(Angle measured from core axis). Threads		73°		0	56%								
	95					of coal present throughout sandstone.													
			95.92			Broken sticks.													
		95.92		.45		- Congl. Large pebbles. 5cm average size			R3										
			96.37			No grading. Fair sorting													
		96.37		.73		- S.S. Medium grained. Rubbles and broken													
						stick. COAL exposed on fracture surface			R3										
			97.10			at 96.37 dull and brittle													
		97.10		.20		- Congl. Pebbles average 3cm. Sub-angular													
			97.5			to rounded.													
		97.3		.79		- S.S. Very fine grained and carbonaceous			S5										
						at the top of the unit and coarse grained													
						at the bottom. Thus fining upward													
			98.09			sequence. No bedding angle possible.													
						RECOVERY BETWEEN MARKERS													
						92 - 95 100%													
						RECOVERY BETWEEN MARKERS													
						95 - 98 100%													
										1.0	62%								
14	98	98.09		.34		- Congl. Average size 5mm fining upward			R3										
			98.43			sequence													
		98.43		.54		- S.S. Medium to fine grained lots of COAL		75°	S3										
			98.97			filaments. Broken sticks to rubble.		68°											
		98.97		.30		- Congl. Rounded pebbles average size													
						2cm. S.S. matrix. No grading. Fair													
			99.27			sorting													
		99.27		.30		- S.S. fine grained. No grading. Uniform		55°?	S5										
			99.57																

ALL LINEAR UNITS IN METRES

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▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH - 81D-101

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CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH - 101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M. %	F.C. %	F.S.I.	C.V.
14		99.57		.94		- Congl. Pebbles are sub-angular to rounded													
						average size 2cm. No grading. Fair													
			100.51			sorting. SS. Matrix.													
		100.51		3.1	SS	- S.S. Fine to medium grained. Broken sticks			R4										
	101					no grading sequence				.33	48%								
			103.61			At 100.81 - 100.91 Carbonaceous Siltstone													
		103.61		.75		At 103.63 we have COAL: Dull and brittle													
						this is included in a dark grey siltstone.													
15			104.36			At 104.34 - 104.35. COAL seam shiny with				.72	28%								
						pyrite grains													
						RECOVERY BETWEEN MARKERS													
						98 - 101 100%													
						RECOVERY BETWEEN MARKERS													
						101 - 104 92%													
		104.36		.93		- Sandstone. Coarse grained fined at the													
						bottom of the unit. Thus fining downward													
			105.29			sequence.													
		105.29		.44		- Silstone. Dark grey. Carbonaceous		65°	S5										
			105.73																
		105.73		1.0	CONG	- Congl. and S.S. layers interbedded.		45°											
						Pebbles rounded. Average size 3mm. S.S.		50°											
			106.73			is very coarse grained. Broken sticks													
		106.73		1.4		- Congl. Broken sticks to rubble. Average													
						size of pebbles 4cm. Poorly graded				.92	67%								
	107		107.13			S.S. matrix.													
		107.13		.37		- S.S. very coarse grained. No grading,		73°											
			107.50			very slightly coarser at bottom of unit													
		107.50		1.1		- Congl. Rounded pebbles. Average size													
			108.6			3mm. No grading. Poorly sorted													
		108.6		.14		- Sandstone. Very coarse grained. No			R4										
			108.74			grading. No bedding angle available													

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CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. TH - 81D-101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
15		108.74		3.4		- Congl. Only first 75cm from Box 15. The													
16						rest is part of Box 16. All of this is													
	110					part of and unique fining downward sequence.				1.03	67%								
						At top pebbles are about 2cm in size and													
						at the bottom 2mm. They are rounded.													
			112.14			Broken sticks			R3										
						RECOVERY BETWEEN MARKERS													
						104 - 107 3.25/3 Gain space into													
						rubble													
						RECOVERY BETWEEN MARKERS													
						107 - 110 (2.91/3) 97%													
		112.14		.52		- Very coarse grained sandstone. Grades		70°											
			112.66			into conglomerate from both ends.			R3										
		112.66		5.37		- Congl. The first 2.81m are from Box 16.				.33	81%								
	113					The rest goes into Box 17. Pebble range													
17						in size from 5cm to 2mm. No real grading				0	82%								
	116		118.03			Poor sorting.													
						RECOVERY FROM MARKERS													
						110 - 113 100%													
						RECOVERY FROM MARKERS													
						113 - 116 (2.3/3) 96%													
		118.03	118.04	.01		COAL: Hard and bright													
		118.04		.41		- S.S. Medium to coarse grained. No													
			118.45			grading or bedding angle available.													
		118.45		1.07	SL/ST	- Siltstone. With small threads of coal		65°											
			119.52			present				.69	70%								
	119	119.52		1.14	SS	- Sandstone. Medium grained at the top and													
						gets finer as we go down thus fining		52°											
						downward sequence. Broken sticks, Fractures			R3										
						occur on the plane of weakness where coal													
			120.66			films can be found.													

ALL LINEAR UNITS IN METRES

* : MEASURED FROM THE HORIZONTAL PLANE

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH - 81D-101

FILE No BA-267
REVISED Feb.1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH - 101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M. %	F.C. %	F.S.I.	C.V.
17		120.66		1.10	CONG	CONGL. The first 75cm are in Box 17. The rest of this unit is in Box 18. Large			R3										
18						pebbles at top average size 2cm and smaller pebbles at the bottom 5mm. Thus fining													
			121.76			downward sub-angular to rounded.													
						RECOVERY FROM MARKERS 116 - 119 (2.89/3) 96%													
						RECOVERY FROM MARKERS 119 - 122 (2.93/3) 98%													
		121.76		1.05	SLST	- Siltstone. Dark grey to black carbonaceous in places. Broken sticks to rubble			R2	.68	53%								
	122		122.81																
		122.81		1.23	SS	- Sandstone. Broken sticks. Joint: Angle 16° at 123.11. COAL at 123.57. Shiny, Bright and Hard.			R3										
						S.S. is fine grained throughout. No grading		59°											
			124.04			Joint: Angle 19° at 123.59		60°											
		124.04		3.64	CONG	- CONGL. Broken sticks to rubble. Does not appear to be any grading. Poor sorting.			R2	.35	56%								
			127.68			Average pebble size approx. 2cm. Sandstone matrix.													
						RECOVERY BETWEEN MARKERS 122 - 125 (2.99/3) 99%													
						RECOVERY BETWEEN MARKERS 125 - 128 (3.00/3) 100%													
19		127.68		0.43		Conglomerate - bottom of unit described above		71°											
			128.11					70°											
		128.11		0.10		Fining upward sequence:													
						Pebbles at bottom (average size 2mm)			R3										
			128.20			S.S. - fine grained at top													
		128.20		0.33		S.S. - medium grained													
			128.53			- no grading - uniform		72°	R4										

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HOLE No. 81D-TH - 101

FILE No BA-267
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CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH - 101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
19		128.53		5.00		Conglomerate - (128 Marker 63cm from top of unit													
						- fining upward sequence of				1	76%								
	128					pebbles repeated at intervals													
						of 1.2m													
						- pebble size: range 5cm - 1mm													
						- S.S. matrix				1.40	71%								
	131					- angular to rounded pebbles													
			133.53			- no bedding evident													
						- (131 Marker 134cm from bottom													
						of unit)													
						RECOVERY BETWEEN MARKERS													
						128 - 131 (2.85/3.00) 95% RECOVERY													
						RECOVERY BETWEEN MARKERS													
						131 - 134 (2.96/3.00) 98.7% RECOVERY													
20		133.53		0.59		Conglomerate - fining upward			R3										
						- pebble size range: 7cm to 0.5cm													
						- SS. Matrix													
						- angular to subrounded													
			134.12			- broken stick													
		134.12		0.14		Siltstone - broken to rubble		72°											
			134.26			- dark gray													
		134.26		1.21		Conglomerate - no grading													
						- pebble size range: some are													
						approx. 10cm			R3										
						- angular to subrounded pebbles													
						- no preferred orientation				1.01	75%								
	134					- clasts are volcanic and													
						sedimentary in origin													
			135.47			- wood fragments in some pebbles													
		135.47		0.04		SS. - uniform		61°											
			135.51			- fine grained		67°	S3										
		135.51		1.18		Coarsing upward sequence:													
						135.51 - 136.12: Conglomerate with pebbles			R4										
						ranging in size from 2cm													
						to 2mm.													
						Subrounded to rounded													

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HOLE No. TH - 81D-101

FILE No. BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH - 101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M. %	F.C. %	F.S.I.	C.V.
						Conglomerate cont. - wisps of coal													
						136.12 - 136.27: SS. - medium grained													
						- not graded.													
						136.27 - 136.28: Coal - dull and brittle													
						136.28 - 136.69: SS. - fine to very fine													
						grained													
			136.69			Joint - 10°		73°											
		136.69		0.85		Coarsening upward sequence:													
						136.69 - 137.16: Conglomerate - pebble													
						average size 1cm			R3										
						137.16 - 137.54: Conglomerate - pebble													
						average size 2mm													
			137.54			contains coal wisps													
		137.54		0.90		Same as above													
						137.54 - 138.25 - Conglomerate - coarse grained													
			138.44			138.25 - 138.44 - Conglomerate - fine grained			R3										
						137 MARKER MISSING													
		138.44		1.00		Conglomerate - pebble size average - 1cm													
						angular to subrounded 4cm			R2										
						thick medium grained SS.													
			139.44			at 138.85m													
						RECOVERY FROM MARKERS													
						134 - 140 (6.05/6.00) 100%													
21		139.44		0.31		Conglomerate - pebble size: Average 2cm		75°											
						- at bottom - fracture exposing			R3										
			139.75			coal - dull													
		139.75		0.13		SS. - medium grained													
						- well sorted			R2										
			139.88																
		139.88		0.38		Conglomerate													
						139.88 - 140.08 - fine grained													
						pebble size average 1mm			R3										
						rounded													
			140.26			140.08 - 140.26 - coarse													

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▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. 81D-TH - 101

FILE No BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH-101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG.	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
21		140.26	140.50	0.24		SS. - thin bed of pebbles at 140.47		78°	R2										
		140.50		4.87		Conglomerate - very poorly sorted				1.32	51%								
	140					- pebble size: range 2mm to 7cm				.67	75%								
	143					- some pebbles covered by carbonaceous film													
			145.37			140 marker at 1.06m from top of unit			R3										
						143 marker at 0.69m from bottom of unit													
						RECOVERY BETWEEN MARKERS													
						140 - 143 (2.96/3.00) 98.7%													
						RECOVERY BETWEEN MARKERS													
						143 - 146 (2.99/3.00) 99.7%													
22		145.37		0.64		Conglomerate - coarse grained except a 23cm band at 145.58m which is fine grained - average pebble size 2mm subangular to rounded SS. matrix														
			146.01																
		146.01		0.18		SS. - fine grained, uniform		87°	R2										
						- light green colour		83°											
						broken stick to stick													
			146.19			- a few coal threads													
		146.19		1.10		Conglomerate - pebbles - medium sized													
						- average size 0.5cm			R3										
						- angular to subrounded													
						- SS. matrix													
			147.20			- clasts sedimentary in origin													
		147.20		0.10		SS. - very fine grained, uniform			R2										
			147.30			- wisps of coal present				.66	90%								
	146																		
		147.30		2.25		Conglomerate - alternating beds of medium and small sized pebbles			R3										
						- size range: 1mm - 5cm													
						- angular to rounded													
			149.55			- SS. matrix													

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HOLE No. 81D-TH-101

FILE No. BA-267
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CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH - 101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
22		149.55		1.70	SS,	SS. - fine grained		73°											
						- beds of small pebbles at 149.88m		75°	R4	.33	68%								
	149					(1cm thick), 150.23m (12cm thick),		74°											
						150.55m (1cm thick), 150.70m													
						(5cm thick)													
			151.25			pebbles smaller than 2mm													
						- broken stick													
						RECOVERY FROM MARKERS													
						146 - 149 (3.03/3.00) 101%													
						RECOVERY FROM MARKERS													
						149 - 152 (2.90/3.00) 96.7%													
23		151.25		0.68		SS. - medium grained		71°	R4										
			151.93			- well sorted													
		151.93		5.21	CONG	Conglomerate - pebble size: range 2mm - 6cm													
						- sedimentary and volcanic origin			R3										
						- plant matter in some pebbles													
						- At 152.74 (48cm thick) core is				1.03	55%								
	152					rubble along the pebbles													
						broken stick to rubble													
						- At 156.71 fracture filled with													
						coal, dull and brittle. 39°													
						- At 156.58 1cm thick coal - dull													
						and brittle				.64	54%								
	155					- At 155.74 fracture filled by													
			157.14			coal													
						RECOVERY BETWEEN MARKERS													
						152 - 155 (3.10/3.00) 103%													
24		157.14		6.08		Conglomerate - no preferred pebble orientation													
						- pebble size: range 5cm to 2mm			R3										
						- SS. matrix													
						- pebbles subangular to rounded				.33	74%								
	158					- volcanic and sedimentary origin													
						- At 161.09 siltstone bed 4cm		86°	R2										
						thick													
						- in some places pebble have a		83°											
						preferred orientation of 55°													
						with core axis													
			163.22			- At 162.96 pebbles are smaller													

ALL LINEAR UNITS IN METRES

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CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH-101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M. %	F.C. %	F.S.I.	C.V.
						No. 161 MARKER													
						RECOVERY BETWEEN MARKERS													
						158 - 164 (5.55/6.00) 92.5%													
25		163.22		5.97		Conglomerate - medium grained, some cobbles occur throughout													
						- (At 164.69 - 17cm of sandstone)													
						- (At 165.62 - 12cm of sandstone)			R2										
	164					- pebbles angular to rounded				1.8	68%								
						- sandstone units are fine to medium grained			R3										
						- conglomerate is poorly sorted													
			169.19			- no apparent grading													
						RECOVERY BETWEEN MARKERS													
						164 - 167 (3.00/3.00) 100%													
26		169.19		2.80		Conglomerate - medium to coarse pebbles				1.33	76%								
	167					- pebble size: range 4cm - 13cm													
						- subangular to rounded													
						- sandstone matrix													
						- no grading, poorly sorted													
			171.99			- core broken along pebbles													
		171.99		0.27		Siltstone at top grading into fine grained sandstone at base. Carbonaceous matter in			R1										
			172.26			sandstone.				.32	60%								
	170	172.26		2.86		Conglomerate - very coarse grained pebbles (3 - 7cm)			R3										
						- At 174.85 bed of smaller pebbles (12cm. thick), average size - 3mm.			R3										
						- pebbles angular to subrounded of sedimentary and possibly volcanic origin													
			175.12																
						RECOVERY BETWEEN MARKERS													
						167 - 170 (3.06/3.00) 102%													
						RECOVERY BETWEEN MARKERS													
						170 - 173 (3.00/3.00) 100%													

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CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
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HOLE No. 81D-TH-101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M. %	F.C. %	F.S.I.	C.V.
27		175.12		3.36		conglomerate - coarse pebbles, occasional			R3	.66	77%								
	173					beds of smaller pebbles													
						- At 177.16m sandstone (8cm thick)													
						average size of large pebbles													
						6cm													
						- pebbles angular to subrounded													
						- sandstone matrix													
						- broken stick - fractures around													
			178.48			pebbles													
	176	178.48	178.88	0.40		siltstone - small threads of coal present		57°											
		178.88		0.48		sandstone - small coal threads found		73°											
			179.36			- fine grained													
						- well sorted													
		179.36	179.44	0.08		conglomerate - pebble size: average 1mm			R3										
						- slightly fining upward													
		179.44	179.69	0.25		sandstone - fine grained, with bits of coal													
		179.69	179.92	0.23		conglomerate - pebble size: average 1cm			R3										
						- no grading													
						- angular to subrounded													
		179.92	180.98	1.06	SLST,	siltstone to very fine grained sandstone.													
						broken pieces show carbonaceous matter.													
						coal particles dispersed through the unit			S3										
						RECOVERY BETWEEN MARKERS													
						173 - 176 (3.05/3.00) 102%													
						RECOVERY BETWEEN MARKERS													
						176 - 179 (2.92/3) 97%													
28		180.98		.80		- Siltstone medium to dark grey coal. Particles			S3	.34	59%								
	179		181.78			in places. No visible bedding													
		181.78		1.6	SS	- Fine grained sandstone at the top and coarse		66°	R4										
			183.38			grained at the bottom. Broken sticks.		64°											
		183.38		1.34	CONG	- Conglomerate average pebble size 1-2cm.													
						Sub-angular to rounded. No grading. Poor				1	85.3%								
	182		183.72			sorting.													

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CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH-101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
28		183.72		.40		- sandstone dark grey fine grained. No		70°	R3										
			184.12			grading. Uniform grain size		65°											
						RECOVERY BETWEEN MARKERS													
						179 - 182 (3/3) 100%													
						RECOVERY BETWEEN MARKERS													
						182 - 185 (3.01/3) 100%													
		184.12		1.95		conglomerate - The first 1.65m are from Box 28			R3										
29						the rest is in Box 29. Range in pebble size													
						is 5mm to 7cm average size being 1cm. Pebbles													
						larger at top of unit than at the bottom.													
			186.07			Rounded.													
		186.07	186.47	.40		- siltstone. Black and very carbonaceous			R1										
		186.47	186.74	.27		- sandstone. Medium grained. No visible													
	185					bedding. Broken sticks.				.66	64.7%								
		186.74		.26		- conglomerate. Average pebble size 5mm.													
			187.00			pebbles larger at top of the unit than at													
						the bottom.		71°											
		187.00		1.33	SS	- sandstone. Fine to medium grained. Silty		77°											
						in places. Bits of coal dispersed through		71°	R3	.68	86.3%								
			188.33			unit.													
	188	188.33		3.12	CONG	- conglomerate. Range in pebble size is 10cm													
						to 2mm with average size 1cm. Sub-angular			R3										
						to rounded.													
						RECOVERY BETWEEN MARKERS													
						185 - 188 (2.95/3) 98%													
						RECOVERY BETWEEN MARKERS													
						188 - 191 (2.98/3) 99%													
30		191.45		2.67		- conglomerate. Continuation of unit described				1.01	79.2%								
	191		194.12			in Box 29. Same characteristics													
		194.12		.27		- sandstone. Fine grained with bits of coal		69°											
						throughout the unit		63°											
			194.39					68°											

ALL LINEAR UNITS IN METRES

R : MEASURED FROM THE HORIZONTAL PLANE

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. 81D-TH-101

FILE No. BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH-101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M. %	F.C. %	F.S.I.	C.V.
30		194.39		2.84		- conglomerate (The last 16cm of this unit are in box 31). Conglomerate has same characteristics as the one described above. Plus some small beds of sandstone throughout.		69°	R3	1.01	74.3%								
								60°											
			197.23																
						RECOVERY BETWEEN MARKERS													
						191 - 194 (2.08/3) 99%													
						RECOVERY BETWEEN MARKERS													
						194 - 197 (2.97/3) 99%													
31		197.23		.18		- sandstone. Coarse grained at the top and medium grained at the bottom. Wisps of coal throughout. Broken sticks		75°	R3										
			197.41																
		197.41		5.08		- conglomerate. Range in size is from 20cm to 2mm. Average size 1cm. No grading. Poor sorting. Broken sticks. Sub-angular to rounded. Sandstone matrix. No bedding angle available			R3	1.35	48%								
	197									0	82.7%								
	200		202.49																
		202.49		.30		- sandstone. Fine grained with wisps of coal throughout. Grain size uniform. No grading.		76°	R3										
								78°											
			202.79					77°											
		202.79		.40		- conglomerate. Only first 9cm in Box 31. The remaining unit is in Box 32. Average size 4mm. Pebbles sub-angular to rounded. Sandstone matrix.													
32			203.19																
						RECOVERY BETWEEN MARKERS													
						197 - 200 (2.96/3) 98%													
						200 - 203 (2.96/3) 98%													
		203.19		.59		- sandstone. Fine grained with coal particles throughout. No observable bedding. Silty in places otherwise uniform grain size. Grades into conglomerate at the base.			R3										
			203.78																
		203.78		2.53		- conglomerate. Pebble size range from 10cm to 2mm. No grading - poorly sorted - broken sticks. Sandstone matrix. Sub-angular to sub-rounded.			R3	0.34	66%								
	203																		
			206.31																

ALL LINEAR UNITS IN METRES

* : MEASURED FROM THE HORIZONTAL PLANE

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. 81D-TH-101

FILE No. BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH-101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	ANALYTICAL DATA MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
32		206.31		.28		- sandstone. Very coarse grained, wisps of coal			R3										
						through unit and very small pebbles about		45°											
			206.59			2mm in size.													
		206.59		1.26		- conglomerate. Sandstone units interbedded in		50°	R3										
	206		206.85			this conglomerate. Average size of pebbles		43°		0	82.5%								
						5mm, broken sticks													
		206.85		.26		- sandstone. Coarse grained, wisps of coal		75°	R3										
						through unit, getting coarser downward		74°											
			207.11			grading into a conglomerate.													
		207.11		1.12		(The first 45cm are in Box 32, the rest goes in													
33						Box 33). Conglomerate - average size about			R3										
						3mm, size of pebbles gets larger towards the													
						base, angular to rounded pebbles, broken sticks,													
			208.23			sandstone matrix.													
						RECOVERY BETWEEN MARKERS													
						203 - 206 (2.98/3) 99%													
						206 - 209 (2.97/3) 99%													
		208.23		.46		- sandstone. Fine grained at base, some small		78°	R3										
			208.69			coal particles throughout.													
		208.69		1.54		- conglomerate. Pebble size range from 5cm to			R3										
	209					2mm, average around 2mm. At 209.45 there is				0	79.5%								
						a bed of conglomerage, very well sorted													
						pebbles about 2mm all the way through. Bed													
			210.23			70cm thick with chunks of coal throughout.													
		210.23		.22		- sandstone. Coarse grained, well sorted, no			R4										
			210.45			coal, no bedding													
		210.45		3.65		- conglomerate. pebbles size range 10cm to 5mm.													
						average 1cm, sub-angular to rounded.													
	212					sandstone matrix, broken sticks, no grading,				0	78.7%								
34			214.10			poorly sorted. The last 87cm are in Box 34.													
						RECOVERY BETWEEN MARKERS													
						209 - 212 (2.97/3) 99%													
						212 - 215 (2.91/3) 97%													

ALL LINEAR UNITS IN METRES

* : MEASURED FROM THE HORIZONTAL PLANE

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• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. 81D-TH-101

FILE No. BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH-101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
34		214.10		.50		- sandstone. Medium to fine grained with coal bits scattered throughout. Bottom 30cm of			R1										
			214.60			this unit is silty and very carbonaceous.													
		214.60		3.85		- conglomerate. Pebbles range from 10cm to		61°											
						1cm, sandstone matrix, pebbles sub-angular				1.37	6190								
	215					to rounded, no grading, poor sorting, broken			R3	0	78.7%								
	218		218.53			sticks.													
		218.53	218.83	.30		- sandstone. Fine grained, well sorted													
						RECOVERY BETWEEN MARKERS													
						215 - 218 (3/3) 100%													
						218 - 221 (3/3) 100%													
35		218.83		1.3		- conglomerate. Range in size of pebbles 15cm			R3										
						to 3mm, with average size 4mm, not graded,													
						poorly sorted, pebbles are sub-rounded,													
						broken sticks. Base is a sharp contact with		82°											
			220.13			siltstone.													
		220.13		.79		- siltstone. Dark grey to black carbonaceous.			S4										
						At 220.23 we have a 5cm coal seam, dull and													
			220.92			brittle, broken sticks to rubble		70°											
		220.92		1.0	SS /	- sandstone. Medium to coarse grained, no													
	221		221.92		SLST.	visible bedding, vew coal fragments				.66	71.3%								
		221.92		1.19		- siltstone. Dark grey to black, carbonaceous,													
			223.11			no visible bedding angle.													
		223.11		.51		- siltstone and sandstone interbedded.													
						sandstone is fine grained, well sorted with		61°	S4										
						coal fragments. siltstone is dark grey and		62°											
			223.62			carbonaceous.													
	224	223.62	224.02	.40		- sandstone. Fine grained, well sorted		71°	R3	0	88.3%								
		224.02		1.21		(The first 75cm are in Box 35).													
						- conglomerate. Size range of pebbles 3cm to			R3										
36			225.23			2mm, average 5mm, fairly well sorted.													
						RECOVERY BETWEEN MARKERS													
						221 - 224 (2.98/3) 99%													

ALL LINEAR UNITS IN METRES

* : MEASURED FROM THE HORIZONTAL PLANE

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• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. 81D-TH-101

FILE No. BA-267
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CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH-101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M. %	F.C. %	F.S.I.	C.V.
						RECOVERY BETWEEN MARKERS													
						224 - 227 (3/3) 100%													
		225.23		0.49		Siltstone - grading into medium grained sandstone													
						At 225.26 - coal, very thin bed		85°	S4										
						At 260.23 - coal, very thin bed		86°											
						At 265.23 - sandstone is fractured, fracture filled by coal													
			225.72			Coal is dull and brittle													
		225.72		1.63	CONG	Conglomerate - pebbles larger at bottom at top													
						average size - 2mm. at bottom													
						average size - 1cm													
						- pebbles angular to rounded													
						At 225.74 - coal seam (2cm thick), coal is dull and brittle													
						At 243.72 - coal, very thin bed				1.0	81%								
	227		227.35			At 263.72 - coal, very thin bed													
		227.35		0.20		Sandstone - medium grained, no grading, small coal fragments present			R2										
			227.55																
		227.55		3.15		Conglomerate - average pebble size at top 1cm, size gradually increases to approximately 10cm													
						- sandstone matrix			R3										
						- poorly sorted													
						- core broken around bigger pebbles													
						- pebbles angular to rounded				.67	97%								
	230		230.60			- broken stick													
						RECOVERY BETWEEN MARKERS													
						227 - 230 (2.97/3.00) 99%													
						RECOVERY BETWEEN MARKERS													
						230 - 233 (2.95/3.00) 98.3%													
37		230.60		2.36		Conglomerate - very big pebbles													
						At 296.60 - sandstone bed?													
						- pebble average size 5cm			R3										
						- poorly sorted													
			232.96			- angular to rounded													

ALL LINEAR UNITS IN METRES

R : MEASURED FROM THE HORIZONTAL PLANE

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FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. 81D-TH-101

FILE No BA-267
REVISED Feb. 1981
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CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH-101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M. %	F.C. %	F.S.I.	C.V.
37		232.96		0.33		Conglomerate - smaller pebbles, well sorted,													
			233.29			average size 1mm													
										.68	82%								
	233	233.29		1.60		Conglomerate - bigger pebbles, average size													
						4cm, angular to rounded, broken													
			234.89			stick													
		234.89	235.01	0.12		Sandstone? - could be boulder in above													
						conglomerate													
		235.01		1.50		Conglomerate - average pebble size 2cm, angular													
						to rounded, no grading, poorly				1.0	95.3%								
	236		236.51			sorted													
						RECOVERY BETWEEN MARKERS													
						233 - 236 (3.01/3.00) 100.3%													
						RECOVERY BETWEEN MARKERS													
						236 - 239 (3.70/3.00) 123%													
38		236.51		1.10		Conglomerate - coarse pebbles, average size			R3										
						3cm													
						- angular to rounded													
						- some pebbles are big enough to													
			237.61			look like beds													
		237.61		0.38		Conglomerate - small pebble, average size 2mm													
						- well sorted													
			237.99			- no grading													
		237.99		1.51		Conglomerate - pebble size: range 5mm - 6cm													
						- no grading				.65	88%								
	239		239.50			- poorly sorted													
		239.50		0.22		Sandstone - fine grained with flow features		87°	R4										
			239.72			- small bits of coal present													
		239.72	241.17	1.45		Conglomerate - as above.													
		241.17	241.37	0.20		Sandstone - fractures filled with calcite(?)													
		241.37		0.60		Conglomerate - pebbles smaller at top than at													
			241.97			base, average size at top 2mm													
						average size at bottom cobble size													

ALL LINEAR UNITS IN METRES

: MEASURED FROM THE HORIZONTAL PLANE

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• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. 81D-TH-101

FILE No. BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH-101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG.	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	ANALYTICAL DATA MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
						RECOVERY BETWEEN MARKERS													
						239 - 242 (2.93/3.00) 97.7%													
						RECOVERY BETWEEN MARKERS													
						242 - 245 (3.02/3.00) 100.7%													
										1.71	90.3%								
39	242	241.97		0.87		Conglomerate - coarse pebble, average size 5cm													
			242.84			subrounded, sedimentary origin													
		242.84		0.14		Sandstone - fine grained, no grading present,		83°	R3										
			242.98			broken stick, carbonaceous													
		242.98		2.38		Conglomerate - very large cobbles, a few beds			R3	.66	86%								
						of small pebbles interspersed,													
						core broken around bigger													
			245.36			pebbles													
		245.36		0.32		Sandstone - fine grained, very carbonaceous		81°	R3										
			245.68			no grading													
		245.68	247.80	2.12		Conglomerate - as above													
						RECOVERY BETWEEN MARKERS													
						245 - 248 (2.91/3.00) 97.0%													
						RECOVERY BETWEEN MARKERS													
						248 - 251 (3.11/3.00) 103.7%													
										.69	89.3%								
40	248	247.80		1.81		Conglomerate - pebble size, range 2mm - 3cm			R3										
						- no grading													
						- no sorting													
						- angular to subrounded pebbles													
						- sandstone matrix													
			249.61			- broken stick to rubble													
		249.61		0.15		Sandstone - top - medium grained, this grades		79°	R5										
						gradually into a small pebble													
						conglomerate, pebble size,													
			249.76			average 1mm													

ALL LINEAR UNITS IN METRES

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FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. 81D-TH-101

FILE No. BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH-101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC. FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M. %	F.C. %	F.S.I.	C.V.
40		249.76		3.98		Conglomerate - pebble size, range 1cm - 16cm													
						pebbles angular to rounded													
						- no grading													
	251					- no sorting				.96	75%								
						- very carbonaceous in places													
						- plant matter visible in places													
						- broken stick													
			253.74			- sandstone matrix													
						RECOVERY BETWEEN MARKERS													
						251 - 254 (2.93/3.00) 97.7%													
41		253.74		0.97		Conglomerate - pebble size, range 1cm - 4cm													
	254					- angular pebbles			R3	1.37	89.7%								
			254.61			- broken stick													
		254.61	254.76	0.15		Siltstone - very carbonaceous			S5										
		254.76	255.21	0.45		Conglomerate - as above													
		255.21		0.18		Sandstone - fine grained		70°											
						- very carbonaceous		65°											
						- light gray to dark gray													
			255.39			- broken stick													
		255.39		4.16		Conglomerate - generally large pebbles, average													
						size 3cm. In places beds of				1.34	74%								
	257					sorted smaller pebbles (average													
						size 3mm) are present. Broken													
						surfaces are carbonaceous													
			259.55			pebbles rounded													
						RECOVERY BETWEEN MARKERS													
						254 - 257 (2.99/3.00) 99.7%													
						RECOVERY BETWEEN MARKERS													
						257 - 260 (2.75/300) 91.7%													
42		259.55	260.28	0.73		Conglomerate - as above				1.09	70%								
	260																		
		260.28	260.32	0.04		Siltstone - very dark and carbonaceous													

ALL LINEAR UNITS IN METRES

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▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. 81D-TH-101

FILE No. BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. 81D-TH-101 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC. FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M. %	F.C. %	F.S.I.	C.V.
42		260.32		0.68		Conglomerate - well sorted													
			261.00			- average pebble size 2mm													
		261.00		1.88		Conglomerate - very large cobbles, average size													
						6cm. In some instances broken			R3										
						surfaces show slickensided coal,													
						rounded pebbles, poorly sorted,													
			262.88			no grading													
		262.88		0.23		Conglomerate - well sorted													
			263.11			- average pebble size 2mm													
										1.86	81%								
	263	263.11	264.23	1.12		Conglomerate - medium to large pebbles													
		264.23	264.31	0.18		Conglomerate - well sorted													
						- average pebble size 2mm													
		264.31	265.39	1.08		Conglomerate - pebble size, range 1cm - 6cm													
						- shiny coal exposed on broken													
						surfaces													
						RECOVERY BETWEEN MARKERS													
						260 - 263 (3.23/3.00) 108%													
						RECOVERY BETWEEN MARKERS													
						263 - 266 (2.86/3.00) 95.3%													
						RECOVERY BETWEEN MARKERS													
						266 - 268 (1.72/2.0) 86.0%													
43		265.39		2.64		Conglomerate - as above				1.75	59%								
	266					- broken stick to rubble													
						- very carbonaceous on broken			R3										
			268.03			surfaces													
										1.74	44%								
	268	268.03	268.19	0.16		Sandstone - very fine grained													
			268.19			END OF HOLE													

ALL LINEAR UNITS IN METRES

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FF — FRACTURE FREQUENCY

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HOLE No. 81D-TH-101

FILE No. BA-267
REVISED Feb. 1981
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CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS

DATE		
	BEGIN	JUNE 7/81
	END	JUNE 11/81

HOLE No.	TH 103

HOLE PARTICULARS

LOCATION	NORTHING 6012 950 EASTING 607 270		
ELEVATION	830 m	HOLE BEARING (AZ°)	
TOTAL DEPTH	194.6 m	HOLE ANGLE (°)▲	90

LOGGING

LOGS RUN	GAMMA RAY NEUTRON LOG
LOGGED BY	BPB
OTHER TESTS	

COAL CORING PERFORMANCE

CORE DIAMETER		NQ
TOTAL	CORE OF INTER.	
	LENGTH CORE	
	CORE REC. INTER.	%

EXAMINATION

LOG USED	
No. OF SEAMS SAMPLED	0
EXAMINER (S)	L. PETRAS
DATE	June 20/82

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC. FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M. %	F.C. %	F.S.I.	C.V.
1		0	16.35		OVERBURDEN														
		16.35	17.29	0.94	SS	Fine grain to medium grain. Very soft and crumbly. Medium grey in color		64											
		17.29	18.44	1.15	SS	Fine grain, medium grey sandstone with occasional bands (1cm - 2cm) of carbonaceous shale, fossiliferous													
		18.44	19.1	.66	SS	Medium grain, light grey, carbonaceous, soft and flakey		60											
		19.1	19.37	.27	SS	Medium grain, dark grey, very soft		68											
		19.37	19.5	.13	SS	Medium grain, light grey sandstone, fractured slickensides													
		19.5	20.6	1.10	SS	Medium grain, light grey sandstone with occasional bands of very small pebbles coarsening downwards. Core is fairly hard but broken													
						MARKER BLOCK 17 - 20 2.9 RECOVERY 96.7%													
		20.6	21.7	.31	SS	Fine to medium grain, dark grey sandstone, occasional bands small pebbles coarsening downwards													
						MARKER BLOCK 20 - 23 RECOVERY 95%													
2		21.7	21.93	.23	SS	Fine grain, dark grey sandstone, major carbonaceous bands, soft and crumbly		65											
		21.93	23.04	1.10	SS	Fine grain, light grey, occasional minor carbonaceous traces and quite hard													

ALL LINEAR UNITS IN METRES

R MEASURED FROM THE HORIZONTAL PLANE

† • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH 103

FILE No BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-2114

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS

HOLE No. TH 103 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	∠ TO CORE AXIS (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V M %	F C %	F S I	C V
		23.04	23.92	.88	SS	Fine grain, light grey, soft crumbly													
		23.92	24.4	.48	SS	Medium grain, light grey, thin bands small pebble conglomerate													
		24.4	25.8	1.4	SS	Medium grain, light grey, quite hard													
		25.8	26.28	.48	SS	As above, with thin beds conglomerate pebble size 1-2mm sub rounded													
		26.28	26.92	.64	SLST	Carbonaceous (major)		72											
		26.92	27.04	.12	SS	Medium grained, light grey, very soft and crumbly													
		27.04	27.43	.39	CONG	Light brown, coarsening downwards, pebble size 1mm-1mm at bottom, fine sandstone matrix, pebble subangular to rounded													
		27.43	27.88	.45	SS	Fine grain, light grey, very soft													
3	28	27.88	28.1	.22	MDST	Major carbonaceous grading into sandstone		70											
		28.1	28.4	.30	SS	Fine grain, light grey, very soft													
		28.4	28.45	.05	SS	Same as above, hard and fractured		69											
		28.45	30.27	1.82	SS	Medium grain, light grey, very soft and crumbly													
		30.27	31.12	1.15	SS	Medium grained, grading into fairly hard sandstone, light to medium grey		68											
		31.12	32.67	.90	SS	Medium grained, dark grey to light green, iron staining calcite filled fractures													
						MARKER BLOCKS 26 - 32 5.9 RECOVERY 98%													
		32.67	32.95	.28	SS	Medium grain, dark brown, soft and crumbly		60											
		32.95	35.15	2.2	SS	Medium grained, light grey sandstone with occasional calcite filled fracture, hard													

ALL LINEAR UNITS IN METRES

@ MEASURED FROM THE HORIZONTAL PLANE

∠ ANGLE MEASURED FROM CORE AXIS

† • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

ff — FRACTURE FREQUENCY

HOLE No. TH 103

FILE No BA-267
REVISED Feb. 1981
FORMERLY FILE No BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS

HOLE No. TH 103 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO	ANALYTICAL DATA MOIST % a.r.b	MOIST % residual	ASH %	V M %	F C %	F.S.I.	C V
						MARKER BLOCKS RECOVERY 32 - 35 93%													
		35.15	39.70	4.55	SS	Medium grained, light green, occasional trace calcite, dull pink staining present throughout very hard													
5	39																		
		39.70	43.80	4.1	SS	Medium grained, light grey, chert ? lenses throughout section. Sandstone weathered, very hard.													
						MARKER BLOCKS RECOVERY 41 - 44 3 100%													
		43.80	44.67	.87	SS	Fine grain, rust colored, highly oxodized, broken and crumbly													
		44.67	44.98	.31	CONG	Poorly sorted, pebble size 1-2cm., fine grained sandstone matrix pebbles angular to subangular													
6	45																		
		44.98	45.23	.25	SS	Fine grained, light grey, very brittle and broken													
		45.23	48.57	3.34	CONG	Poorly sorted, pebble size 1-5 cm. At 48.17 Hematite present (1.5 cm).													
						MARKER BLOCKS RECOVERY 44 - 47 93%													
		48.57	49.21	.64	SS	Medium grain, light grey, 1-2mm pebbles throughout, grading into conglomerate (coarse) - hard													
		49.21	50.33	1.12	CONG	Rust colored, poorly sorted, pebble size 1mm-3cm., weathered and broken, occasional fractures													
						MARKER BLOCKS RECOVERY 47 - 50 2.84 94%													
		50.33	51.17	.84	SS	Medium grain, light grey, very solid, occasional carbonaceous threads													

ALL LINEAR UNITS IN METRES

* MEASURED FROM THE HORIZONTAL PLANE

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH 103

FILE No BA-267
REVISED Feb. 1981
FORMERLY FILE No BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS

HOLE No. TH 103 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V M %	F.C. %	F.S.I.	C.V.
7		51.17	53.4	2.23	SS	Medium grain, light grey, thinly bedded sandstone with a few calcite filled fractures, solid and hard COAL lenses		60											
						MARKER BLOCKS 50 - 53 2.8 RECOVERY 93%													
		53.4	54.8	1.4	SLST	Light brown, muddy, broken with occasional bands (1-2 cm) fine graind sandstone													
		54.8	56.32	1.52	SS	Medium grain, light grey, thinly bedded													
						MARKER BLOCKS 53 - 56 2.64 RECOVERY 88%													
		56.32	57.01	.69	CONG	Muddly fractured conglomerate with very fine grain sandstone. Matrix conglomerate broken and weathered													
8		57.01	58.4	1.39	MDST	Light brown, extremely weathered with occasional band sandstone (fine grain) 1-3 cm		75											
		58.4	58.48	.08	SS	Medium grain, dark grey, broken and very soft													
		58.48	58.61	.13	CONG	Poorly sorted, pebble size 1mm-1cm fining downwards													
		58.61	59.22	.61	SLST	Major carbonaceous to 58.91, grading into fine sandstone													
						MARKER BLOCKS 56 - 59 RECOVERY 90%													
		59.22	59.64	.42	SS	Very fine grain, dark grey, coarsening downwards into conglomerate		80											
		59.64	59.92	.28	CONG	Poorly sorted pebble size 1mm-1cm, coarsening downwards													
		59.92	60.03	.11	SS	Fine grain, light grey, thinly bedded													
		60.03	60.5	.47	SLST	Dark grey, minor carbonaceous		75											

ALL LINEAR UNITS IN METRES

* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No. TH 103

FILE No BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS

HOLE No. TH 103 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO	ANALYTICAL DATA MOIST % a.r.b.	ANALYTICAL DATA MOIST % residual	ASH %	V M %	F C %	F S I	C V
		60.5	60.63	.13	CONG	Fairly well sorted, pebble size 1-3mm, fining downwards													
		60.63	61.81	1.18	SLST	Light grey, grading into sandstone													
		61.81	61.99	.18	SS	Fine grain, light grey, fractured, COAL threads													
		61.99	62.54	.55	CONG	Sorting - fair matrix medium grain sandstone pebble size 1mm-1cm, thin bands sandstone throughout													
		62.54	63.08	.54	CONG	Poorly sorted pebble size varies from 1mm-2cm matrix fine sandstone													
9		63.08	63.44	.36	SS	Fine grain, light grey, COAL lenses		77											
		63.44	63.96	.52	CONG	Very poorly sorted, pebble size 1mm-7cm, fining downwards													
		63.96	64.05	.09	SS	Fine grain, light grey, thinly bedded													
		64.05	64.70	.65	CONG	Sorting fair, pebble size 1-3mm, grading into sandstone													
		64.70	65.16	.46	SS	Fine grain, medium grey, minor carbonaceous													
						MARKER BLOCKS 59 - 65 5.4 RECOVERY 90%													
		65.16	65.37	.21	CONG	Poorly sorted, pebbles range from 1mm-2mm, No bedding angle, sub rounded													
		65.37	65.64	.27	SLST	Light grey, broken, grading into sandstone													
		65.64	66.21	.57	SS	Coarse grain, light grey with 2cm band of fine pebble conglomerate at 65.95													
10		66.21	67.22	1.01	CONG	No sorting pebble size varies from 1mm-1.5 cm., fining downwards into sandstone. Matrix medium grain sandstone angular-sub angular													
		67.22	67.7	.48	SS	Fine grain, light grey, major carbonaceous													

ALL LINEAR UNITS IN METRES

* MEASURED FROM THE HORIZONTAL PLANE

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• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH 103

FILE No BA-267
REVISED Feb. 1981
FORMERLY FILE No BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS

HOLE No. TH 103 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO	ANALYTICAL DATA MOIST % a.r.b.	ANALYTICAL DATA MOIST % residual	ASH %	V M %	F C %	F S I	C V
		67.7	67.76	.06	SHALE	Brittle and broken, minor carbonaceous													
						MARKER BLOCKS 65 ~ 68 3.1 RECOVERY 103%													
		67.76	68.34	.58	SS	Very fine, medium grey, broken and weathered													
		68.34	68.39	.05	SS	Coarse grain, light grey sandstone grading into fine sandstone		76											
		68.39	69.59	1.2	SS	Very fine grain, dark grey, minor carbonaceous													
		69.59	69.70	.11	SHALE	Major carbonaceous, bedding angle well defined		85											
		69.70	70.85	1.15	SS	Fine grain, light grey, occasional COAL thread													
		70.85	71.85	1.0	CONG	Pebble size 1-1mm, angular sorting-good, fining downwards		62											
		71.85	73.41	1.56	SS	Medium grain, dark grey, broken fairly soft		68											
		73.41	73.61	.20	SHALE	Major carbonaceous		84											
		73.61	74.36	.75	SS	Medium grain, light grey, thinly bedded													
11		74.36	75.69	1.33	SLST	Major carbonaceous COAL lenses and threads throughout, very soft and broken. 3 cm conglomerate band at 74.84, poor sorting, pebble size 1-2mm, mean size 1 mm.		68											
		75.69	76.19	.50	SLST	Dark grey, occasional small pebbles 1-3 mm, otherwise uniform		86											
						MARKER BLOCKS 68 - 74 5.81 RECOVERY 96%													
		76.19	76.39	.20	SS	Coarse grain, light to medium grey, fining downwards		64											
		76.39	76.67	.28	SLST	Dark grey, thinly bedded, minor carbonaceous		70											
		76.67	76.93	.26	CONG	Poorly sorted, pebble size 1mm-1cm, sub rounded, fining downwards		70											

ALL LINEAR UNITS IN METRES

MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No. TH 103

FILE No BA-267
REVISED Feb. 1981
FORMERLY FILE No BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS

HOLE No. TH 103 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V M %	F C. %	F.S.I.	C V.
		76.93	77.13	.20	SLST	Light grey, minor carbonaceous													
								68											
		77.13	77.19	.06	SLST	Major carbonaceous													
								60											
		77.19	77.36	.17	CONG	Sorting fair, pebble size 1-7mm, sub rounded fining downwards													
		77.36	77.77	.41	SS	Fine grain, major carbonaceous vitrain stringers													
		77.77	77.87	.10	CONG	Sorting-fair, pebble size ¼-1mm rounded													
		77.87	80.67	2.8	SLST	Dark grey, occasional 1mm pebble, otherwise uniform		75											
						MARKER BLOCKS 74 - 77 2.9 RECOVERY 96%													
12																			
		80.67	82.35	1.68	CONG	Poor sorting, pebble size varies from 1mm-4cm. Matrix medium grain sandstone pebbles angular to sub angular													
						MARKER BLOCKS 77 - 80 2.7 RECOVERY 90%													
		82.35	84.75	2.4	CONG	Very poor sorting, pebble size 1mm-5cm. sub angular to sub rounded. Matrix very weathered rust colored, fine grained sandstone, igneous pebbles													
						MARKER BLOCKS 80 - 83 2.8 RECOVERY 93%													
		84.75	85.12	.37	SS	Medium grain, light grey, calcite filled fractures													
13	85																		
		85.12	86.39	1.27	CONG	Light green pebble size 1-4cm poor sorting, pebbles sub rounded													
		86.39	88.93	2.54	SS	Medium grain, light grey, calcite filled fractures are oxodized while others are light purple. Very hard.													
		88.93	89.13	.20	SS	Fracture zone, oxodized													

ALL LINEAR UNITS IN METRES

▲ MEASURED FROM THE HORIZONTAL PLANE

H & / OR S — GOLDER ASSOCIATES HARDNESS CODE

RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH 103

FILE No BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS

HOLE No. TH 103 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V M %	F.C. %	F.S.I.	C.V.
		89.13	89.86	.73	SS	Medium grain, light grey, occasional small pebbles size 1-1mm, very hard													
						MARKER BLOCKS 86 - 89 2.84 RECOVERY 94%													
		89.86	90.03	.17	SS	Medium grain, rust colored, fracture zone. Intensive ? some large pebbles present. Possibly siderite ? Massive, very hard.													
		90.03	91.23	1.2	SS	Medium grain, dark grey to light green. Small black specks (chert ?) throughout 1-1mm													
		91.23	92.11	.88	SS	Dark grey to light green, entire section fractured, very hard, appears to be sill or dyke													
						MARKER BLOCKS 89 - 92 2.9 RECOVERY 96%													
14	91																		
		92.11	92.34	.23	SS	Light grey, medium grain, granitized													
		92.34	93.57	1.23	SS	Rust colored, highly oxodized and fractured, very hard, intrusive ?													
		93.57	93.75	.18	SS	Light grey, medium grain, very hard, massive													
		93.75	94.89	1.14	CONG	Rust colored, pebble size 1mm-5cm, angular, very hard matrix, broken in places													
		94.89	95.91	1.02	SS	Light grey, medium grain, spotted and weathered, oxodized in places, very hard													
						MARKER BLOCKS 92 - 95 2.9 RECOVERY 96%													
		95.91	96.37	.46	CONG	Dark brown, very brittle and broken, pebble size 1mm-1cm, pebbles sub rounded													
		96.37	96.61	.24	CONG	Rust colored, 2 large chunks (6mm) mean pebble size 1mm fining downwards													

ALL LINEAR UNITS IN METRES

* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No. TH 103

FILE No BA-267
REVISED Feb.1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS

HOLE No. TH 103 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO	ANALYTICAL DATA MOIST % a.r.b.	ANALYTICAL DATA MOIST % residual	ASH %	V M %	F.C. %	F.S.I.	C.V
		96.61	97.90	1.29	CONG	Rust colored, muddy, multi colored pebbles. Pebble size 1mm-1cm, mean size 3mm.													
15	97																		
						MARKER BLOCKS 95 - 98 2.97 RECOVERY 99%													
		97.90	98.2	.30	CONG	Dark grey, soft crumbly matrix, pebble size 1-3mm, mean 2mm, sub angular, fining downwards													
		98.2	98.65	.45	SS	Medium grain, light grey, very hard, bedding angle well defined at end of sequence		56											
		98.65	100.58	1.93	CONG	Light brown, poorly sorted, pebble size 1mm-3cm angular, fining downwards													
						MARKER BLOCKS 98 - 101 2.58 RECOVERY 86%													
		100.58	101.36	.78	CONG	Light green, fine conglomerate with fine grain sandstone matrix, pebble size 1mm-1mm, pebbles rounded, fining downwards													
		101.36	101.44	.08	SS	Medium grain, light grey, no bedding angle apparent													
		101.44	101.75	.31	SS	Fine grain, dark green, coarsening downwards. No Bedding angle													
		101.75	102.37	.62	CONG	Very poorly sorted, matrix very hard. Some calcite present in fractures, pebble size 1mm-2cm sub rounded, fining downwards													
		102.37	102.45	.08	SS	Coarse grain, light grey, fractured, no apparent bedding angle, very hard													
16	102.4																		
		102.45	102.65	.20	SS	Fine grain, light green, soft and crumbly, coarsening downward													
		102.65	103.05	.40	SS	Medium grain, light green, occasional small black (chert) pebble 1mm													
		103.05	103.13	.08	SS	Very hard, black shiny, possibly boulder in sandstone interval													

ALL LINEAR UNITS IN METRES

R : MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No. TH 103

FILE No BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-21

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS

HOLE No. TH 103 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	∠ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V M %	F.C. %	F.S.I.	C.V
		103.13	103.74	.61	CONG	Sorting-fair, pebble size 1-4mm, pebbles angular. Dark grey in color. Matrix medium grain sandstone													
		103.74	104.09	.35	CONG	Light brown, weathered and very soft, poorly sorted pebble size 1mm-2cm. Mean size 5mm.													
						MARKER BLOCKS 101 - 104 3 RECOVERY 100%													
		104.09	104.44	.35	SS	Light green, very fine grain, no bedding angle visible, coarsening downwards													
		104.44	104.58	.14	CONG	Good sorting, light grey, pebble size 1-1mm rounded, faulted, half of core is conglomerate while other half is medium grain sandstone													
		104.58	106.83	2.25	SS	Medium grain, dark grey, weathered, first 30 cm fractured accompanied by rust staining.													
						MARKER BLOCKS 104 - 107 2.9 RECOVERY 96%													
		106.83	107.41	.58	SS	Medium grain, dark grey, weathered, fractured throughout													
17	108																		
		107.41	110.49	3.08	SS	Medium grain, light grey, bedding angle apparent at start of interval otherwise massive		80											
						MARKER BLOCKS 107 - 110 2.88 RECOVERY 96%													
		110.49	113.19	2.7	SS	Medium grain, light grey massive sandstone. Weathered with occasional calcite filled small fractures, coarse grained sandstone, pebbles throughout 1mm-5cm.													
						MARKER BLOCKS 110 - 113 3.15 RECOVERY 105%													
18	112																		

ALL LINEAR UNITS IN METRES

R MEASURED FROM THE HORIZONTAL PLANE

∠ ANGLE MEASURED FROM CORE AXIS

† • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No. TH 103

FILE No 8A-267
REVISED Feb. 1981
FORMERLY FILE No. 8A-2

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS

HOLE No. TH 103 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO	ANALYTICAL DATA MOIST % a.r.b.	ANALYTICAL DATA MOIST % residual	ASH %	V.M. %	F.C. %	F.S.I.	C.V
18																			
		113.19	113.66	.47	CONG	Dark green, medium grained matrix, very hard pebbles size 5mm-1cm sub rounded, highly weathered and crumbly													
		113.66	114.56	.90	SS	Medium grain, light grey, faulted, no bedding angle, very hard													
		114.56	115.33	.77	SS	Light to dark green, weathered sandstone pebbles throughout. Pebbles 1-3cm. Calcite filled fractures													
		115.33	116.38	1.05	CONG	Dark brown, very brittle and broken matrix, pebbles very hard and sub angular, size 1mm-3cm, coarsening downwards													
19	120					MARKER BLOCKS 113 - 119 5.9 RECOVERY 98%													
		116.38	120.05	3.67	SS	Medium grained, light green massive sandstone, weathered sandstone pebbles throughout. Calcite filled fractures minimal, pebbles 1-5cm													
						MARKER BLOCKS 119 - 122 2.87 RECOVERY 95%													
		120.05	122.55	2.5	SS	Same as above. 8cm sample taken at 121.37													
		122.55	122.67	.12	CONG	Light green fine sandstone matrix. Sorting good, pebble size 1mm-1cm average 5mm, coarsening downward, pebbles sub angular to sub rounded													
		122.67	122.89	.22	SS	Light green, medium grain, very crumbly and broken. No bedding angle													
		122.89	123.61	.72	SS	Light green, medium grain, hard massive, tiny purple pebbles (sandstone) 1-1mm towards end of interval. 4cm sample taken at 246.05													
		123.61	124.59	.98	CONG	Light brown, very crumbly, pebble size 1mm-4cm angular, poorly sorted													

ALL LINEAR UNITS IN METRES

* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No. TH 103

FILE No BA-267
REVISED Feb. 1981
FORMERLY FILE No BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS

HOLE No.	TH 103
CONTINUED	

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V M %	F C %	F.S.I.	C V
		124.59	125.00	.41	SS	Light brown, fine grain, very brittle and broken grading into harder coarser sandstone													
		125.00	125.07	.07	SS	Light green, medium grain, very hard. No bedding angle													
		125.07	126.53	1.46	SS	Light green coarse sand calcite filled fractures. Very brittle from 125.11 to 125.36													
						MARKER BLOCKS 122 - 128 4.8 RECOVERY 80%													
21		126.53	129.23	2.7	SS	Light grey, medium grain sandstone, weathered, massive, no apparent bedding angle													
						MARKER BLOCK 128 - 131 3 RECOVERY 100%													
		129.23	129.46	.23	SHALE	Light brown, coarsening downwards, shiny		69											
		129.46	130.56	1.1	SLST	Dark grey, coarsening into sandstone, bedding angle apparent at start of interval		72											
		130.56	130.77	.21	SS	Fine grain light grey, coarsening downward													
		130.77	131.58	.81	CONG	Very poorly sorted, pebble size varies from 1mm-1cm angular matrix consists of fine grain sandstone													
		131.58	132.25	.67	SS	Dark grey, very fine grain, coarsening downwards													
		132.25	132.53	.28	CONG	Poorly sorted, pebble size 1-3mm sub angular, matrix fine grain sandstone, fining downwards													
		132.53	133.07	.54	SS	Fine grain, light grey, coarsening downwards, No bedding angle													
		133.07	133.70	.63	CONG	Poorly sorted, pebble size 1mm-1cm angular, matrix fine grain sandstone, fining downwards													
						MARKER BLOCKS 131 - 134 2.5 RECOVERY 83%													

ALL LINEAR UNITS IN METRES

* MEASURED FROM THE HORIZONTAL PLANE

† - R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH 103

FILE No BA-267
REVISED Feb. 1981
FORMERLY FILE No BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS

HOLE No. TH 103 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO	ANALYTICAL DATA MOIST % ar.b.	MOIST % residual	ASH %	V M %	F C %	F S I	C V
		133.70	136.8	3.1	SS	Medium grain, light grey, massive sandstone, no apparent bedding angle													
						MARKER BLOCKS 134 - 137 2.84 RECOVERY 94%													
		136.8	137.29	.49	CONG	Poorly sorted, pebble size 1mm-2cm angular, 6 cm sandstone (medium grain) band at 137.01													
		137.29	137.5	.21	SS	Fine grain, light grey, coarsening downward		65											
22	138																		
		137.5	138.47	.97	CONG	Poorly sorted, angular, pebble size 1mm-1cm fining downwards, medium grain matrix													
		138.47	138.87	.40	SS	Fine grain, light grey, massive. No bedding angle													
		138.87	139.13	.26	CONG	Sorting good, pebble size 1-2mm rounded, fining downwards													
		139.13	140.49	1.36	SS	Medium grain, light grey, massive, core very hard													
						MARKER BLOCKS 137 - 140 2.9 RECOVERY 96%													
		140.49	140.8	.31	CONG	Poorly sorted, pebble size 1-4 mm sub angular													
		140.8	141.08	.28	SS	Medium grain, light grey massive, coarsening into conglomerate													
		141.08	142.4	1.32	CONG	Very poorly sorted, pebble size 1mm-2cm angular medium grain matrix. 10 cm band medium grain sandstone at 141.35 weathered													
		142.4	142.49	.09	SS	Medium grain, light grey		70											
		142.49	142.73	.24	CONG	Sorting good, pebble size 1-2mm fine grain sandstone matrix, fining downwards													
						MARKER BLOCKS 140 - 143 2.9 RECOVERY 96%													

ALL LINEAR UNITS IN METRES

R : MEASURED FROM THE HORIZONTAL PLANE

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH 103

FILE No BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS

HOLE No. TH 103 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO	ANALYTICAL DATA MOIST % a.r.b.	ANALYTICAL DATA MOIST % residual	ASH %	V M %	F C %	F.S.I.	C.V.
		142.73	143.17	.44	SS	Fine grain, light grey. Calcite filled fractures for first 3 cm of interval, core fairly soft													
		143.17	143.4	.23	CONG	Sorted poorly, pebble size 1mm-2cm sub angular, fining downwards													
		143.4	144.38	.98	SS	Coarse grain, medium grey, very weathered and broken													
23	144																		
		144.38	144.49	.11	CONG	Sorting fair, pebble size 1-3mm sub rounded													
		144.49	145.5	1.01	SS	Medium grain, light grey, massive, no apparent bedding angle MARKER BLOCKS 143 - 146 2.5 RECOVERY 83%													
		145.5	145.97	.47	SLST	Light black minor carbonaceous, brittle													
		145.97	146.17	.20	CONG	Sorting fair, pebble size 1mm-1cm, average size 5mm, sub angular													
		146.17	146.82	.65	SS	Medium grain, light grey, odd calcite filled fracture		86											
		146.82	146.99	.17	CONG	Sorting fair, pebble size 1-2mm, sub rounded, coarsening downwards													
		146.99	148.38	1.39	CONG	Poorly sorted, pebble size 1mm-1cm, sub angular Sandstone bands 1-3cm throughout MARKER BLOCKS 146 - 149 3 RECOVERY 100%													
		148.38	149.37	.99	SS	Medium grain, light grey, 10cm conglomerate band at 148.78, 2cm conglomerate band at 149.12		75											
		149.37	149.5	.13	CONG	Fair sorting, pebble size 1-3mm sub rounded, fining downwards													

ALL LINEAR UNITS IN METRES

* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

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• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No. TH 103

FILE No BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS

HOLE No. TH 103 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V M %	F C %	F.S.I	C V
		149.5	149.67	.17	SLST	Light grey, brittle, coarsening down													
24	149.3																		
		149.67	150.42	.75	SS	Fine grain, medium grey sandstone, coarsening downwards		78											
		150.42	150.54	.12	CONG	Sorting good, pebble size 1-3mm, fining downwards angular													
		150.54	151.81	1.27	SLST	Dark grey, minor carbonaceous, slickenside													
		151.81	151.94	.13	CONG	Sorting very good, pebble size 1mm, rounded coarsening downwards													
		151.94	152.09	.15	SS	Very fine grain, light grey, thinly bedded		82											
						MARKER BLOCKS 149 - 152 2.9 RECOVERY 96%													
		152.09	152.27	.18	SLST	Light black, major carbonaceous, brittle, thinly bedded		87											
		152.27	152.71	.44	SLST	Dark grey, occasional minor carbonaceous thread													
		152.71	153.04	.33	SS	Medium grain, light grey, massive sandstone coarsening into conglomerate													
		153.04	153.52	.48	CONG	Sorting fair, pebble size 1mm-1mm sub rounded matrix very fine sandstone		89											
		153.52	153.98	.46	SS	Fine grain, light grey massive sandstone													
						MARKER BLOCKS 152 - 155 2.6 RECOVERY 73%													
		153.98	155.78	1.80	SS	Fine grain, light grey, thinly bedded. Interbedded bands (1-2cm) conglomerate throughout, sorting good, pebble size 1mm-1mm		80											
		155.78	155.84	.06	SLST	Dark grey, major carbonaceous													
		155.84	156.89	1.05	SLST	Light grey, weathered, minor carbonaceous threads throughout													

ALL LINEAR UNITS IN METRES

* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No. TH 103

FILE No BA-267
REVISED Feb.1981
FORMERLY FILE No BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS

HOLE No. TH 103 CONTINUED

BOX No	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V M %	F C %	F S I	C V
		156.89	157.99	1.1	SS	Light grey, medium grain. Massive calcite filled fractures, occasional pebble 1-2mm., weathering present around pebbles													
						MARKER BLOCKS 155 - 158 2.8 RECOVERY 93%													
		157.99	159.34	1.35	CONG	Light grey, very weathered for first 30cm., pebble size 1-2mm angular, poor sorting very brittle, fining downwards													
		159.34	159.48	.14	SS	Light grey, medium grain, massive sandstone													
26	159.4																		
		159.48	162.42	2.94	SS	Medium grain, light grey, large weathered sandstone, pebbles 1-2cm., calcite filled fractures, very hard													
						MARKER BLOCKS 158 - 161 2.9 RECOVERY 96%													
		162.42	163.12	.70	SS	Coarse grained, medium grey sandstone, very hard, massive													
		163.12	163.93	.81	SS	Fine grain, light grey massive sandstone, very hard													
						MARKER BLOCKS 161 - 164 3 RECOVERY 100%													
		163.93	164.94	1.01	SS	Medium grain, light grey sandstone with small bands interbedded conglomerate, pebble size 1mm-2cm angular, some pebbles light green and light pink		75											
		164.94	165.07	.13	SS	Fine grain, light grey, massive, no apparent bedding angle													
		165.07	165.37	.30	SLST	Dark grey, quite soft and broken													
27	165.3																		
		165.37	165.99	.62	SS	Very fine grain, dark grey, crumbly at beginning of interval harder near end													

ALL LINEAR UNITS IN METRES

* MEASURED FROM THE HORIZONTAL PLANE

† :• R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• ROD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH 103

FILE No BA-267
REVISED Feb.1981
FORMERLY FILE No BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS

HOLE No. TH 103 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M. %	F.C. %	F.S.I.	C.V.
		165.99	166.84	.85	SLST	Dark green, minor carbonaceous, very soft and crumbly													
		166.84	168.34	1.5	CONG	Poorly sorted, light to dark green, pebble size 1mm-2cm mean size 3mm angular matrix medium grain sandstone, extremely weathered													
		168.34	168.76	.42	SLST	Dark grey, major carbonaceous		72											
		168.76	169.35	.59	CONG	Poorly sorted, pebble size 1-5mm, fractured throughout, calcite traces													
						MARKER BLOCKS 167 - 170 2.9 RECOVERY 96%													
		169.35	173.58	4.23	SS	Medium grain, light green with pinkish tinge, calcite filled fractures throughout, contains													
28	172					weathered pebbles of sandstone													
						MARKER BLOCKS 170 - 173 2.94 RECOVERY 98%													
		173.58	173.89	.31	SS	Medium grain, interbeds of solidified sandstone with muddy soft sandstone, extremely weathered													
		173.89	174.45	.56	SS	Medium grain, light grey, massive sandstone, calcite filled fractures													
		174.45	176.42	1.97	CONG	Very muddy, poorly sorted, pebbles consist of sandstone and igneous rocks, pebble size 1mm-4cm. Core color dark brown to dark green													
						MARKER BLOCKS 173 - 176 2.9 RECOVERY 96%													
		176.42	176.84	.42	SS	Medium grain, light grey, very hard, massive													
		176.84	177.03	.19	SS	Dark brown, very muddy and soft													
		177.03	179.73	2.7	SS	Medium grained, light greenish, calcite filled													
29	178					fractures throughout, extremely weathered, oxodised													

ALL LINEAR UNITS IN METRES

* MEASURED FROM THE HORIZONTAL PLANE

▲ ANGLE MEASURED FROM CORE AXIS

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

HOLE No. TH 103

FILE No BA-267
REVISED Feb. 1981
FORMERLY FILE No BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS

HOLE No. TH 103 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V M %	F C %	F.S.I.	C.V.
		179.73	180.06	.33	SS	Medium grain, granitized, extremely fractured. Calcite present in large quantities													
						MARKER BLOCKS 176 - 179 2.8 RECOVERY 93%													
		180.06	182.76	2.7	CONG	Very poorly sorted, medium grain sandstone matrix is very muddy and soft, pebble sizes range from 1mm-3cm., calcite filled fractures abundant													
30	182																		
		182.76	183.84	1.08	SS	Medium grain, dark green, extremely fractured, minor carbonaceous													
		183.84	184.05	.21	CONG	Sorting fair, pebble size 1-3mm., calcite filled fractures, fining downwards													
		184.05	184.25	.20	SS	Fine grain, light grey, thinly bedded													
		184.25	185.19	.94	SS	Medium grain, light grey, weathered sandstone pebbles throughout, traces of calcite. Numerous oxodized fractures													
						MARKER BLOCKS 176 - 185 5.9 RECOVERY 98%													
		185.19	185.37	.18	SS	Medium grain, light grey massive sandstone, calcite filled fractures		75											
		185.37	187.53	2.16	SS	Medium grain, light grey, weathered reworked sandstone pebbles throughout													
						MARKER BLOCKS 185 - 188 2.9 RECOVERY 96%													
		187.53	188.38	.85	SS	Fine grain, light brown, oxodized crumbly sandstone													
31	189																		
		188.38	188.65	.27	SLST	Dark grey, very soft and weathered, odd granitized pebble													
		188.65	188.76	.11	SS	Medium grain, light grey, solid and massive													

ALL LINEAR UNITS IN METRES

MEASURED FROM THE HORIZONTAL PLANE

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• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH 103

FILE No BA-267
REVISED Feb.1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS

HOLE No. TH 103 CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO	ANALYTICAL DATA MOIST % a.r.b.	ANALYTICAL DATA MOIST % residual	ASH %	V M %	F C %	F.S.I	C V
		188.76	189.15	.39	CONG	Very muddy, poorly sorted, pebble size 1mm-1cm. Muddy medium grain sandstone matrix													
		189.15	190.05	.90	SS	Medium grain, light grey, massive .01mm calcite fracture at top contact with conglomerate													
		190.05	191.39	1.34	CONG	Poorly sorted, medium grain muddy sandstone matrix, pebble size 1mm-5mm													
						MARKER BLOCK 188 - 191 2.7 RECOVERY 90%													
		191.39	193.26	1.87	SS	Medium grain, light grey sandstone. Weathered sandstone, pebbles throughout, at 192.46 faulted, slickenside and calcite, major carbonaceous													
		193.26	194.14	.88	CONG	Light pinkish green, very poorly sorted, weathered and crumbly, oxodized, pebble size 1mm-1cm													
						MARKER BLOCKS 191.194 2.6 RECOVERY 86%													
		194.14	194.5	.36	SS	Very fine, light grey, massive, calcite filled fractures													
		194.5	194.61	.11	SS	Dark brown, oxodized, very soft, fine grain													
		194.61	194.96	.35	SS	Dark grey, fairly soft													
						MARKER BLOCKS 194 - 195.5 1.3 RECOVERY 86%													
						TOTAL DEPTH.													

ALL LINEAR UNITS IN METRES

¶ MEASURED FROM THE HORIZONTAL PLANE

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• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH 103

FILE No BA-267
REVISED Feb.1981
FORMERLY FILE No BA-212A

Fk - Thuitil River 81(3)A *1

ROKE

GAMMA RAY
SIDEWALL DENSILOG
CALIPER

OIL ENTERPRISES LTD. CALGARY, ALBERTA

Log #1

241

FILE NO.
LSD
SEC
TWP
RGE
W M

COMPANY CROWSNEST RESOURCES LTD.
WELL TH - 81 D - 101
LOCATION THUITIL RIVER
FIELD SMITHERS PROJECT
PROVINCE BRITISH COLUMBIA
Other Services: GRN, FBL, DIR

Permanent Datum RIG FLOOR Elev.
Log Measured from RIG FLOOR
Well Depths Measured from RIG FLOOR Above Perm. Datum
K.B.
CSG
G.L.
METRIC

Run. No.	ONE	TWO
Date	6 JUNE 1981	6 JUNE 1981
First Reading	265.0 m	266.0 m
Last Reading	0	0
Footage Logged	265.0	266.0
Depth Reached	267.2	267.0
Depth Driller	268	268
Casing Roke	30.5	30.5
Casing Driller	30.5	30.5
Fluid Type	WATER/MUD	WATER/MUD
Liquid Level		
Min. Diam.	NO	NO
Operating Time	1½ HOURS	2 HOURS
Truck No.	FU - 3	FU - 3

Recorded By FAGERNESS
Witnessed By HANDY

GENERAL				GAMMA RAY				SIDEWALL DENSILOG			
RUN	DEPTHS		SPEED	T.C.	SENS	ZERO	API G.R. UNITS	T.C.	SENS	ZERO	CPS/ DIV
NO.	FROM	TO	M/ MIN	SEC.	SETTINGS	DIV.L OR R	PER LOG DIV.	SEC.	SETTINGS	DIV.L OR R	
1	0	265.0	4	3	500	0	15				
2	0	266.0	8					0.5	5000	1.37 R	199.61
2	0	266.0	8		CALIPER						

REMARKS
DENSITY TOOL #241AS
CALIPER TOOL #857

ROKE

ENGINEERING OIL WELL SERVICES

ROKE OIL INC. 1 Landmark Square, Suite 1600, Stamford, CT 06901

Well No. 2

Lease

Field

County

State

Location

Other Services

Permanent Datum

Log Measured From

Drilling Measured From

Date

Run No.

Depth-Driller

Depth-Logger

Bottom Logged Interval

Top Logged Interval

Type Fluid in Hole

Salinity, PPM Cl

Density

Level

Max. Rec. Temp. Deg. F

Equip. No. & Location

Recorded By

Witnessed By

EQUIPMENT DATA

GAMMA RAY	NEUTRON
Run No.	Run No.
Gamma Ray Tool No.	Neutron Tool No.
Diameter	1 7/8 in
Gamma Ray Source No.	
Type	
Location	
Gamma Ray Detector No.	
Type	
Location	
Logged Thru Casing	
Casing Thickness	
Casing Fluid Level	
Hole Diameter	
Hole Fluid Level	

NEUTRON
Run No.
Neutron Tool No.
Diameter
Neutron Source No.
Type
Location
Neutron Detector No.
Type
Location
Logged Thru Casing
Casing Thickness
Casing Fluid Level
Hole Diameter
Hole Fluid Level

LOGGING DATA

GAMMA RAY								NEUTRON							
Run No.	Depth Driller	Depth Logger	Bottom Logged Interval	Top Logged Interval	Casing Driller	Casing Logger	Bit Size	Run No.	Depth Driller	Depth Logger	Bottom Logged Interval	Top Logged Interval	Casing Driller	Casing Logger	Bit Size

Remarks: GAMMA RAY/NEUTRON 1" = 20' MAIN SCALE

GAMMA RAY

1

NEUTRON

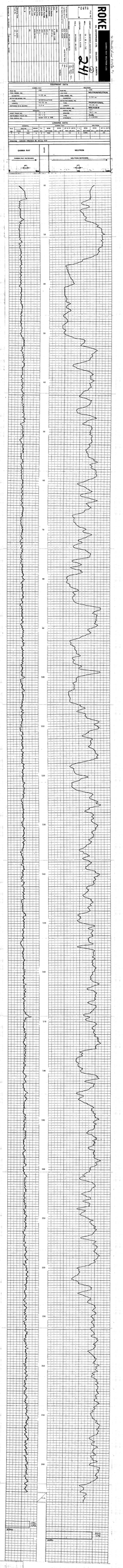
GAMMA RAY INCREASES →

← NEUTRON INCREASES

API Units 0 — 100

API Units 100 — 0

Scale



Base Log

API#

Base Log

API#

TK-Thutil River 81(3)*A *1

ROKE

FOCUSED BEAM LOG 20 CM

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO.

LSD
SEC
TWP
RGE
W___M

COMPANY CROWSNEST RESOURCES LTD. ③

WELL TH - 81 D - 101

LOCATION THUTIL RIVER

241

FIELD SMITHERS PROJECT

PROVINCE BRITISH COLUMBIA

Other Services: GRN, GR, DENS, CAL, DIR

Permanent Datum RIG FLOOR Elev.

Log Measured from RIG FLOOR Above Perm. Datum

Well Depths Measured from RIG FLOOR

K.B.
CSG
G.L.

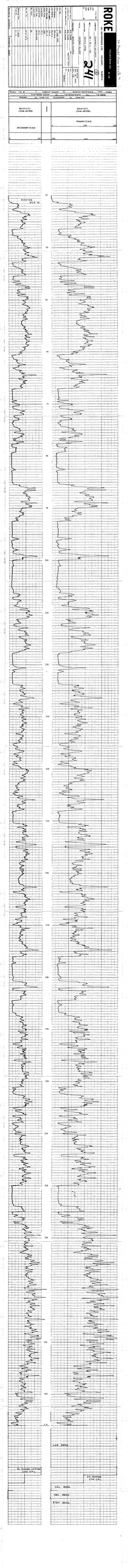
METRIC

Run. No.	ONE		
Date	6 JUNE 1981		
First Reading	266.0 m		
Last Reading	30.0 m		
Footage Logged	236.0		
Depth Reached	267.0		
Depth Driller	268		
Casing Roke	30.5		
Casing Driller	30.5		
Fluid Type	WATER/MUD		
Liquid Level			
Min. Diam.	NO		
Rm @ °C	58 @ 25°C		
Operating Time	1 HOUR		
Truck No.	FU -3		
Recorded By FAGERNESS		Witnessed By HANDY	

Remarks FBL # 4 CURRENT RANGE HI MUDFISH RESISTANCE 1000 OHMS

7 ELECTRODE SONDE 20 CM BEAM WIDTH 100 CM ARRAY

PRIMARY 10 OHM/DIV SECONDARY 20 OHM/DIV



Encl 15-2

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

NOTE: TH102 Abandoned

PAGE 1 OF 14

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

DATE		
	BEGIN	05/09/81
	END	06/09/81

HOLE No. TH-81D-102A

HOLE PARTICULARS

LOCATION	N - 616570 E - 607610		
ELEVATION	870	HOLE BEARING (AZ°)	-
TOTAL DEPTH	95.32m	HOLE ANGLE (°)*	-90°

LOGGING

LOGS RUN	GRN, FBL, CAL, DEN
LOGGED BY	ROKE
OTHER TESTS	

COAL CORING PERFORMANCE

CORE DIAMETER		NQ-1 7/8"
TOTAL	CORE RECOVERED	-
	LENGTH CORED	-
	CORE RECOVERY	%

EXAMINATION

LOG USED	GRN
No. OF SEAMS SAMPLED	NONE
EXAMINER (S)	Patenaude Hartmann
DATE	06/15/81

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC. FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
1		0	11.59			-Overburden													
		11.59		2.90	SS	-Very weathered SST reduced to rubble													
						in some places. SST is light grey & medium													
						grained with occasional bands of 1mm-2mm		84°											
						of pebbles. Broken surfaces have a rusty			R1										
	14		14.49			coating.				2.06	0								
		14.49		2.96		-First 75cm - rubble broken SST pieces			R1										
						& pebble (/cm in 5/ E) all weathered													
						-18 cm: well defined fining upward			R2										
						sequence, coarse grained SST grading													
						into a conglomerate. Average pebble													
						size is 1cm - 1.5cm.													
						-The rest of interval is fine grained		60°	R1										
						SSt with bands of pebbles at													
						regular intervals of about 33cm.													
2	17					Core is weathered overall.				3.32	03								
			17.45			Occasional carbonaceous threads													
		17.45		2.96															
						Same pattern as above i.e. fine to													
						medium grained SST with pebbles		71°											
						bands throughout.													
						Fracture zones occur where		77°											
						SST is most carbonaceous i.e.													
						planes of weakness.													

ALL LINEAR UNITS IN METRES

* : MEASURED FROM THE HORIZONTAL PLANE

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH-81D-102A

FILE No. BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-211A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No.	TH -81D
CONTINUED	102A

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
						Coal-filled fracture at 14.44 coal is													
						shiny and brittle													
						9 cm of coaly MDST at 19.76			S3	1.71	32.7								
	20		20.41																
						RECOVERY, Markers 14 -- 17													
						2.96 98.7%													
						Markers 17 -- 20													
						3.45 115%													
		20.41		.08	COAL	COAL; Shiny with dull spots brittle			R5										
						reasonable clearage, breaks													
						easily. PYRITE													
			20.49																
		20.49		1.27	SS	Med. grained light grey SST with			R3										
						very thin beds of conglomerate at			R3										
						20.69, 21.29, consisting of very		45											
						small pebbles. SST is very		47											
						carbonaceous, with coal lenses													
						throughout													
			21.76																
		21.76		.52	CONG	Conglomerate, finding upwards, size		65	R3										
						range of pebbles; 3mm at top to													
						3cm at bottom. Coal lenses													
						throughout med. grained SST matrix													
						pebbles subangular to rounded													
			22.28																
		22.28		.36	SS	Light grey coarse grained SST, very			R3										
						carbonaceous													
			22.64																
3		22.64		.72		Very broken up, cracked, carb. MDST			S5										
						grading into carb. Cse. grained SST				1.36	46.1								
	23		23.36																
		23.36		1.08	MDST	Very carb. MDST grading to SST			S5										
						broken up			R3										
			24.44																
		24.44		.45		Conglomerate with Coal lenses			R3										
						throughout, pebble size ranges from													
						3mm to 2cm. No grading,													
						poorly sorted													
			24.89																
		24.89		1.04	SL ST	Carbonaceous SLST with a SST bed at			S5										
						25.51 for 4cm, med. grained													
			25.93																

ALL LINEAR UNITS IN METRES

* : MEASURED FROM THE HORIZONTAL PLANE

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH-81D-102A

FILE No. BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. TH-81D-102A CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
		25.93		.24	CONG	-Conglomerate, pebble size decreasing			R4	1.58	21.7								
	26					downward, coal lenses throughout													
						SST matrix. Pebble from 3mm to													
			26.17			3cm													
						RECOVERY - from Markers 20 - 23													
						2.95 98.3%													
						23 - 26													
						2.53 84.3%													
		26.17		.29		- very carbonaceous silt stone													
						light brown, soft. Sharp contact			S5										
						with well lithified sandstone with		58°											
						coal threads. The first 3cm are													
						siltstone the remaining 20cm is			R4										
			26.46			the sandstone													
		26.45		.01		- Coaly shale													
			26.47																
		26.47		.21		- Congl. Light colour. coarsening towards			R4										
			26.68			The bottom with cobbles up to 3cm													
		26.68	26.76	.08		- very coaly shale - easy plan or breakage													
		26.76		.32		- siltstone: Medium grey pebbles at the			S3										
			27.08			top.													
		27.08		.15		. moderately well sorted congl.													
						. fining downward													
						. pebbles size range from coarse sand													
						to 3cm cobble													
			27.23			. siltstone matrix													
		27.23		.93		- alternating brown carb. slts with													
						grey medium grainted sandstone													
						. 1cm of coaly shale or 27.61		70°											
						. 2cm of congl. from 27.61 to 27.63 with			R3										
						mud matrix													
						. several large pebble .5cm towards bottom													
			28.16			of interval													
		28.16		.93		- Dirty carbonaceous loosely endurated													
4						siltstone			R1										
						. Medium to coarse SS Bed at 28.39													
						. 1cm of carbonaceous shale at 28.54													
						. Grading in very fine grained SS			R2	.67	43.3								
	29		29.09																
		29.09		.22		- Very fine grained dark grey carbonaceous			S5										
			29.31			sandstone. Uniform													

ALL LINEAR UNITS IN METRES

* : MEASURED FROM THE HORIZONTAL PLANE

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH-81D-102A

FILE No BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. TH-81D-102A CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M. %	F.C. %	F.S.I.	C.V.
		29.31		.07		- Rubbly pebble congl. average			R2										
						size of pebbles 2mm siltstone													
			29.38			matrix.													
		29.38		.74		- Dark mudstone			R2										
						. Occasional 1mm pebbles													
						. Sudden coarsening at 29.82 into													
						muddy congl. easily broken													
			30.12			. Further coarsening at the bottom													
		30.12	30.24	.12		- Siltstone dark grey													
		30.24		1.24	CONG	- CONGL - Poorly sorted			R2										
						- Occasional 2cm siltstone bands													
						- No bedding angl.													
						- pebbles range from 1mm to													
						6cm, mean at .5mm													
			31.48			- 6cm corse SS bed at 31.24													
		31.48		.62		- Carbonaceous mudstone, siltstone			R1										
						sandstone all interbedded with				1.02	20.3								
	32		32.10			Very fine sandstone at the bottom													
						Recovery 26 - 29													
						2.98 99%													
						Recovery 29 - 32													
						2.93 98%													
		32.10	32.28	.18		- Very rubbly mudstone			S3										
		32.28		.23		- Light coloured congl.			R3										
						. Coarse SS Matrix													
						. Mean pebbles size 3mm													
			32.51			. No grading													
		32.51	32.58	.07		- Fine to medium grained sandstone													
		32.58		.14		- Extremely coarse grained SS with													
			32.72			occasional .5cm pebbles													
		32.72		1.21		- Extremely coarse congl. with mean													
						cobble size of 1-2cm. Range of													
						.5cm to 11cm													
						. coarse grain matrix grain size 1mm													
			33.93			. Poorly sorted - no grading													
5		33.93	33.96	.03		- Coaly siltsone			S5										
		33.96		.03		- CONGL. Well sorted. No grading			R3										
			33.99			Mean size 2mm													
		33.99		.33		- Medium grained SS light grey													
						coal threads and inclusions of coal													
						. At 34.01 we have 2mm of shale		60°											
			34.32			. Grading into Carbonaceous shale													

ALL LINEAR UNITS IN METRES

: MEASURED FROM THE HORIZONTAL PLANE

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• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH-81D-102A

FILE No BA-267
REVISED Feb. 1981
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CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. TH-81D-102A CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
5		34.32		.12		- Congl. corsening at bottom													
			34.44			Mean grain size of .5cm		70°											
		34.44		.56		- Sandstone fining to mudstone			R1	1.67	63.6								
	35		35.00			Then coarsening to SS again													
		35.00	35.10	.10		- Siltstone dark grey													
		35.10		.25		- Siltstone with medium grained SS			R2										
			35.35			lenses													
		35.35		.07		- Clean non-graded fine			R4										
			35.42			grained sandstone													
		35.42		.29		- Very well sorted congl.													
						.4cm bed of cobbles at top of unit													
						.15cm of uniform pebbles mean													
			35.71			size 2mm at bottom of unit													
		35.71		.09		- Fine grained, well sorted, clean													
						light grey, quartzite, carbonaceous		65°											
			35.80			at the bottom													
		35.80		.92		- CONGL. Alternating with bands of			R4										
						very fine grained light grey SS													
			36.72			- Occasional coal inclusion throughout													
		36.72	36.82	.10		- Cabonaceous mudstone			S5										
		36.82	36.86	.04		- Siltstone			R1										
		36.86	36.87	.01		- Broken up mudstone													
		36.87		.26		- Siltstone with a band of sandstone													
						at 36.91 and 2 thin very carbonaceous													
			37.13			bands near the bottom													
		37.13		.92		- Rounded pebble congl. moderately			R4										
						well sorted. Mean size of 1cm with													
						coarse sand matrix. Occasional				.67	63.5								
	38		38.05			coal inclusions, no grading													
						RECOVERY 32 - 35													
						2.99 99%													
						RECOVERY 35 - 38													
						2.97 99%													
		38.05		.10		- Congl. Coarsening at the bottom			R3										
						grain size .5cm. Reasonably well													
			38.15			sorted													
		38.15		.17		- Fine to medium grained sandstone													
						slightly carbonaceous with coarser													
						band throughout. Thin 1cm mudstone			R1										
			38.32			bed at 38.28													

ALL LINEAR UNITS IN METRES

: MEASURED FROM THE HORIZONTAL PLANE

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• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH-81D-102A

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CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. TH-81D-102A CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
5		38.32		.18		Fairly uniform size pebble in													
						Congl. mean pebble size .5cm													
						coarse SS Matrix. Sub-angular			R3										
						pebble. Grading into coarse sand		63°											
			38.50			in places.													
		38.50		.15		- Carbonaceous siltstone. Very easily													
			38.65			broken													
		38.65		.96	SS	- Mainly Fine grained light crown sandstone													
						with scattered pebbles and occasional													
						cobbles becoming congl. for the last 20cm													
						.2cm carbonaceous silt bed at 38.75			R1										
			39.61			. A .5cm carb. silt bed at 38.90													
6		39.61		1.38	SLST/ CONG	- Carbonaceous siltstone grading into Congl.													
						until 39.95. Then alternating carbonaceous													
						siltstone and congl. beds up to 10.34.													
						then 8cm of medstone with coal threads			R2										
						(some pypite). No cleavage, breaks into													
						chunks - the rest of this unit is congl.													
						well endurated. Poorly sorted size range				1.68	63%								
	41		40.99			from 2mm to 4cm													
		40.99		.60		- Congl. with occasional thin siltstone			R3										
						bands. Finer at bottom. Range 3mm to													
			41.59			2cm. Sub-angular to sub-rounded													
		41.59		.18		- Carbonaceous siltstone with congl.		55°											
			41.77			lenses													
		41.77		.14		- Congl. size range 3mm to 1cm			R3										
						well sorted although coarser towards													
			41.91			Bottom angular to sub-angular													
		41.91		.29		- 2cm of coaly slts grading into													
						fine grained SS with occasional													
			42.20			2mm pebbles			S3										
		42.20	42.22	.02		- Medstone													
		42.22	42.27	.05		- Light brown siltstone													
		42.27	42.31	.04		- Fine grained congl. mean size 3mm													
		42.31		.14		- Light brown siltstone. Several													
			42.45			coal inclusions													
		42.45		.24		- Congl. Fine downward well													
						rounded, well sorted coarse													
			42.69			Sandstone matrix, mean size 3mm			R2										

ALL LINEAR UNITS IN METRES

* : MEASURED FROM THE HORIZONTAL PLANE

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH-81D-102A

FILE No. BA-267
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CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. TH-81D-102A CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	FRAC FREQ.	RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
		42.69		1.29	SS	- Very fine grained sandstone. Grading			S5										
						into carbonaceous siltstone at 42.89													
						. Then 6cm of very coarse grained													
						SS poorly sorted. Mean size 1mm													
						. Then 21cm of carbonaceous siltsone													
						. Then 7cm of coarse grained sandstone													
						poorly sorted mean size 1mm.													
						. Then 5cm of light grey siltstone													
						. Then 9cm of fine grained ss													
						with occasional coal inclusion													
						. Then 8cm of carbonaceous slts													
						. Then 4cm of poorly sorted fine grained SS													
						. Then 2cm of carbonaceous slts			S3										
						. Then 27cm of fine grain congl.mean													
						size 2mm with coarser bands throughout													
						. Remainder of interval is carbonaceous				.68	39%								
	44		43.98			silt with sand size granules													
						RECOVERY From Markers 38 - 41													
						2.97 99%													
						RECOVERY From Markers 41 - 44													
						2.92 97%													
		43.98		.43		Conglomerate, with a 6cm MDST bed at 44.02			R3										
					CONG/SS	Cong. finer at top, size ranges from													
						3mm to 4cm, mostlz angular pebbles, in													
						a MDST matrix.													
			44.41																
		44.41		.93		Broken up MDST grading into			S5										
						medium grained SST. Conglomerate			R4										
						bed 5cm thick at 44.69, and		70	R4										
			45.34			one 20cm thick at 44.85		74											
7		45.34		.77		Conglomerate, fining upward, with			R3										
						MDST bed at 45.45, (6cm thick), another													
						MDST bed a5 46.0 (3cm thick). Cong. pebble													
						size range from 4mm to 4cm. Predominantly													
						angular. MDST matrix, light brown		80											
			46.11																
		46.11		.45		Light brown f.g. SST with occasional			R3										
						.5cm pebbles, otherwise uniform													
			46.56																

ALL LINEAR UNITS IN METRES

* : MEASURED FROM THE HORIZONTAL PLANE

† : • R &/OR S — GOLDER ASSOCIATES HARDNESS CODE

• RQD — ROCK QUALITY DESIGNATION (%)

FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH-81D-102A

FILE No. BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. TH-81D-102A CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
		46.56		.46		Conglomerate, coarsening downward, size			R3										
						ranges (3mm to 4cm). Angular to sub-rounded.													
			47.01			f.g. SST matrix. Poorly sorted				.67	57%								
	47	47.01		.76		First 5cm fig. SST, grading			R3										
						into coarsening downwards (Cong. Pebble													
						size range 1mm to 3.5cm. predominantly													
						angular. f.g. SST matrix.													
			47.77																
		47.77		.12		Very carbonaceous SLST, very			S3										
						loose cohesion, with thin coal lenses.													
			47.89																
		47.89		.97		Conglomerate with occasional beds		85°	R3										
						F.G. SST													
						Cong. pebbles are predominantly													
						6 mm. except for cobble bed at													
						48.19 with mean size 8cm.													
						SST beds occur at 48.68 and at 48.74													
			48.86																
		48.86		.64		V.f.g. light brown SST with a bed			R3										
						of carb. SLST at 49.04, and 2													
						pebble bed of 4cm with pebble size													
						mean of 1mm at 49.36		65°											
			49.50																
		49.50		.41		Conglomerate, coarser at top and			R3										
						bottom. Finer in middle. Mean size													
						1.5cm at top and bottom,													
						coarse sand size in middle													
						Poor sorting, mainly angular				1.02	57.3								
	50		49.91																
						RECOVERY Markers 44 - 47													
						2.97 99%													
						Markers 47 - 50													
						2.92 97.3%													
		49.91		.58		- Congl. cobble size at top and bottom													
						pebble size in middle. Well sorted			R3										
						in middle grading into medium													
			50.49			grained S.S. with con. fragments													
		40.49		.08		- Extremely carbonaceous siltstone			R2										
			50.57			grading into fine grained sandstone													

ALL LINEAR UNITS IN METRES

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FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH-81D-102A

FILE No BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No.	TH-81D-102A
CONTINUED	

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG.	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
7		50.57		.51		- Medium to coarse grained sandstone			R3										
						with concentration of 2mm pebbles													
						and a siltstone band at 50.83													
			51.08			(2cm thick).													
8		51.08		.74		- Congl. very coarse - mean cobble			R3										
						size 3cm. Finer well sorted band													
			51.82			in middle of interval. S.S. Matrix													
		51.82		.25		- Medium grained SS grading into													
						very coarse grained sandstone													
						at bottom. At 51.86 a 5cm													
			52.07			siltstone band													
		52.07		.61		- Brown rubbly carbonaceous			S3										
						siltstone grading into a 3mm													
						congl. which is very muddy													
						unlithified, carbonaceous, and													
			52.68			soft.													
		52.68		.20		- Congl. 2cm cobble at top. Change			R3										
						abruptly to coarse grained SS													
						grading into a 1cm pebble				1.34	54%								
	53		52.88			Pebbles													
		52.88		.49		- Congl. mean size of pebbles													
			53.37			.5cm no grading SS matrix													
		53.37		.36		- Very coarse poorly sorted sandstone													
						grading into a medium grainte													
						C.S. and a 2cm pebbles congl.													
			53.73			band at bottom of interval													
		53.73		.09	~	- Fine grained sandstone		55°	R2										
			53.82			very well lithified													
		53.82		.06		- Very crumbly siltstone with			S3										
			53.33			sand size pebbles near bottom													
		53.88		.32		- Congl. top is 2cm pebbles grading			R2										
						into very corase sand and finally													
						grading into a 2cm pebbles congl.													
			54.20			at bottom mud cement													
		54.20		.12		- Carbonaceous siltstone with													
			54.32			small pebbles throughout													
		54.32		1.23	CONG	- Very coarse congl. with a size			R2										
						range from 1mm to 6cm. Very				1.10	26%								
	56		55.55			poorly sorted. Very loose mud Matrix													
						RECOVERY between Markers 50 - 53													
						2.97 or 99%													
						RECOVERY between Markets 53 - 56													
						2.72 or 90%													

ALL LINEAR UNITS IN METRES

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FF — FRACTURE FREQUENCY

▲ ANGLE MEASURED FROM CORE AXIS

HOLE No. TH-81D-102A

FILE No. BA-267
REVISED Feb. 1981
FORMERLY FILE No. BA-212A

CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. TH-81D-102A CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
		55.55		.06		- Fine grained quartzite sandstone			R4										
			55.61			No sedimentary feature													
		55.61	55.65	.04		- Muddy Congl.													
		55.65		.49		- Carbonaceous sandstone. Light			S5										
						brown. Coarsening towards													
			56.14			bottom of interval													
		56.14		.33		- Coarse sand and Congl. with			R3										
			56.47			several large cobbles at bottom													
		56.47		.06		- Medium grained light grey													
			56.53			sandstone. Slightly fractured													
		56.53		.69		- Congl. with 11cm of carbonaceous		58°	R2										
						siltstone at 55.68. Congl. is													
9			57.22			poorly sorted. No grading													
		57.22		.53		- Carbonaceous interbedded siltstone			S4										
						and sandstone grading to medium													
			57.75			-grained sandstone at bottom													
		57.75		.87		- Congl. moderately well lithified			R3										
						poorly sorted not graded. Pebble													
						size 3mm to 4cm with sandstone				.67	50%								
	59		58.62			matrix													
		58.62		.51		- Moderately well lithified Congl.			R3										
						finer at bottom. At 58.82 we have													
			59.13			a 1cm siltstone band.													
		59.13		.44		- Very crumbly silty pebbles congl.			S5										
						mean size of 3mm. Grading to a													
						carbonaceous siltstone grading													
						into a medium grained sandstone													
						2cm congl., medium grained													
			59.57			sandstone at end of interval													
		59.57		.23		- Purplish igneous rock with			R4										
						calcite filled cavities throughout													
			59.80			possibly a boulder in congl. unit													
		59.80		1.13	SS	- Very coarse sandstone poorly			R4										
						sorted with maximum grain size of													
						3mm. Clay pebble bed 21cm thick													
						at 59.89. 13cm thick cobble bed at													
						60.27. The rest of interval is													
			60.93			coarse grained sandstone													
		60.93	61.35	.42		- Very crumbly carbonaceous siltstone			S3										
		61.35		.26		- Congl. size range from 3mm to 1cm													
						fining downwards with			R3	.67	66%								
	62		61.61			large pebbles at bottom of unit													

ALL LINEAR UNITS IN METRES

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CROWS NEST RESOURCES LIMITED

CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. TH-81D-102A CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
						RECOVERY Between Markers 56 - 59													
						2.97 99%													
						RECOVERY Between Markers 59 - 62													
						2.97 99%													
		61.61		.51		Conglomerate. Fairly well sorted,			R3										
						average pebble size of 5mm, only													
						occasional cobbles throughout.													
						f.g. SST matrix.													
			62.12																
		62.12		.36		First 22cm crumbled SLST grading			S5										
						into a 1cm - pebble cong. with													
						SLST Matrix.													
			62.48																
10		62.48		.75	SLST/	First 16cm very dark SLST,		70	S5										
					CONG	then 4cm thick cong. bed													
						another cong. bed at 62.73. Last		68	R3										
						41cm is a cong. bed coarsening													
						downward, pebble size range from													
						3mm to 3cm.													
			63.23																
		63.23		.78		First 7cm very carb. SLST, grading			R1										
						to f.g. SST, grading to Cong.			R3										
						with MDST matrix and angular													
						pebbles with average size at 1cm.													
			64.01																
		64.01		.85		Conglomerate, no grading, poorly			R3										
						sorted, pebble size range 3mm													
						to 4cm. Predominantly angular				.68	63.3								
	65		64.86			pebbles, some rounded.													
		64.86		.04		Coaly SLST													
			64.90																
		64.90		.23		Conglomerate, no grading, pebble		68	R3										
						size mean 2cm, v.f.g. matrix.													
			65.13																
		65.13		.48		v.f.g. SST grading to c.g. SST,			R4										
						(with 2 carb. 5cm SLST band			(S5)										
						at 65.25).													
			65.61																
		65.61		.99		Coarsening downward Cong., pebble			R3										
						size at top 3mm, 3cm at bottom.													
						Occasional cobble. Thin SST bed													
						at 65.66 and at 66.47													
			66.60																

ALL LINEAR UNITS IN METRES

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▲ ANGLE MEASURED FROM CORE AXIS

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CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. TH-81D-102A CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	FRAC FREQ	RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
		66.60		.35		v.f.g. SST. (SLST bed 5cm		70	R3										
						thick at 66.66), thin pebble beds			(S5)										
						at 66.81 and 66.90													
			66.95																
		66.95		.54		Coarsening downward cong.			R3										
						Begins with v.c.g. SST, grading			R3										
						into a cong. with mean pebble													
						size of 4cm.													
			67.49																
		67.49		.26		Very carbonaceous medium grained SST			S3										
						Uniform, no grading. 9cm at													
						bottom of a dark SLST.				1.1	59								
	68		67.75																
						RECOVERY Markers 62 - 65													
						2.96 98.7%													
						Markers 65 - 68													
						2.85 95%													
		67.75		.61		Very carb. SLST with pebbles			R1										
						throughout. Pebble size average													
						3mm with some 5cm. Very													
						dark SLST, non-cohesive													
11			68.36																
		68.36		.82	SLST/ CONG.	Very dark SLST with same features			R1										
						as above, plus broken surfaces are			S5										
						slickensided and shiny.													
			69.18																
		69.18		1.76		Conglomerate with very coarse			R1										
						particle size embedded in a SLST			R1										
						matrix. Overall dark appearance			R1										
						Pebble size mean 6cm. sub-rounded			R3										
			70.94			No grading				1.0	33.3								
	71	70.94		2.97		Conglomerate, same as above, except			R3										
						for calcite rims around the pebbles													
			73.91																
		73.91		.41		Carb. dark SLST with pebbles a few			R3	.36	81								
	74					mm's in size scattered throughout													
						Pebbles are well sorted and rounded													
			74.32																
						RECOVERY Markers 68 - 71													
						3.00 100%													
						Markers 71 - 74													
						2.80 93.3%													

ALL LINEAR UNITS IN METRES

% : MEASURED FROM THE HORIZONTAL PLANE

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CORE & COAL CORE DESCRIPTION

PROJECT	THAUTIL RIVER
AREA	SMITHERS, B.C.

HOLE No. TH-81D-102A CONTINUED

BOX No.	DEPTH AT TOP OF BOX	DEPTH FROM	DEPTH TO	TH.	LITHO DESCRIPTION MAIN	LITHO DESCRIPTION AMPLIFIED (INCLUDE COAL RECOVERY FOR EACH SEAM)	SEAM DESIG.	▲ BEDDING ANGLE (°)	SUMMARY GEOTECH HARDNESS	SUMMARY GEOTECH FRAC FREQ.	SUMMARY GEOTECH RQD	SAMPLE NO.	ANALYTICAL DATA MOIST % a.r.b.	MOIST % residual	ASH %	V.M.%	F.C.%	F.S.I.	C.V.
		88.31		.90	SS?	Dirty SST f.g., medium sized			R3										
						pebbles scattered throughout.													
						No grading, poor sorting.				.62	59%								
	89		89.20																
		89.20		2.3		Same as previous interval													
			91.50																
		91.50		.20		V.f.g. SST light grey, no			$4										
						pebbles. Uniform throughout													
			91.70																
		91.70		.50		Very dirty SST matrix in a			R3										
						conglomerate, with small pebbles													
						scattered throughout.													
	92		92.20							1.04	76								
15		92.20		.48		Very dirty grey SST, only very		70	R3										
						few pebbles. Shows some flow													
						features													
			92.68																
		92.68		2.64		Conglomerate, see above interval			R3										
						from 91.70 to 92.20													
	95		95.32							.97	88								
						T.D. 95.32m													
						RECOVERY Markers 86 - 89													
						3.18m 106%													
						Markers 89 - 92													
						2.88m 96%													
						Markers 92 - 95													
						3.09m 103%													
						* NOTE: CONGLOMERATES THROUGHOUT HOLE													
						FREQUENTLY CONTAINED PEBBLES													
						OF VOLCANIC ORIGIN.													

ALL LINEAR UNITS IN METRES

: MEASURED FROM THE HORIZONTAL PLANE

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TK-Thankful River 8(C3)*A *1

ROKE DIRECTIONAL SURVEY

OIL ENTERPRISES LTD.

241

COMPANY CROWSNEST RESOURCES
DRILLHOLE TH 81D-101
LOCATION THUTH RIVER
FIELD SMITHERS PROJECT
PROVINCE BC

LATITUDE
DEPARTURE
ELEVATION
MAGNETIC DECLINATION
CORRECTION OF

DATE SURVEYED 6 JUNE 1981
SURVEY BY FAGERNESS
WITNESSED BY HANDY
CALCULATIONS BY
FOR GRID

SLANT ANGLE FROM VERTICAL, BEARINGS FROM MAGNETIC NORTH

Number	Cable Depth M	Slant Angle °	Slant Angle Bearing °	Number	Cable Depth	Slant Angle	Slant Angle Bearing	Number	Cable Depth	Slant Angle	Slant Angle Bearing
0	0	0.90	251	11	165	0.30	264	22			
1	15	0.50	330	12	180	0.10	289	23			
2	30	0.20	227	13	195	0.4	20	24			
3	45	1.00	191	14	210	0.4	193	25			
4	60	0.60	263	15	225	0.4	333	26			
5	75	0.70	351	16	240	1.1	85	27			
6	90	0.20	72	17	255	1.5	156	28			
7	105	0.10	213	18	262	1.1	344	29			
8	120	0.20	320	19				30			
9	135	0.30	341	20				31			
10	150	0.20	168	21				32			

The Pinnacle River 81(3)A/1

ROKE

FOCUSED BEAM LOG 20 CM

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO. 4

COMPANY CROWNEST RESOURCES LTD.

WELL 7-11-81-10-W

LOCATION SHUTTLE RIVER

FIELD SHUTTLE RIVER

PROVINCE BRITISH COLUMBIA

Other Services: CBHC, CBL, BHC, CBL, GR, CCL

Permanent Datum: GROUND LEVEL Elev.

Log Measured from: GROUND LEVEL Above Perm. Datum

Drlg Meas. from: GROUND LEVEL

241

LSD SEC TWP RGE W of M

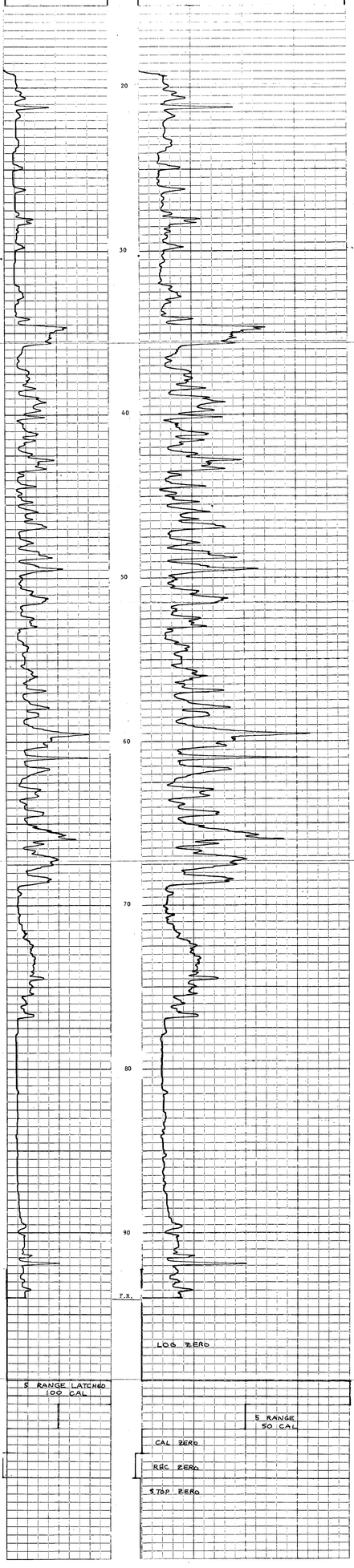
Run No.	ONE
Date	9 JUNE 1981
Last Reading	1940.0 M
First Reading	1870.0 M
Footage Logged	75.0
Depth Reached	1945.0
Depth Driller	1945.0
Depth Logger	1945.0
Casing Driller	178.3
Casing Logger	178.3
Fluid Type	WATER/MUD
Fluid Level	FULL
Max. Rec. Temp.	46 @ 25°C
Equip. Location	3/4 BOOK
Recorded By	JHUGHESS
Witnessed By	MURRAY

Remarks FBL # 4 CURRENT RANGE 112 MUDFISH RESISTANCE 850 OHMS

7 ELECTRODE SONDE 20 CM BEAM WIDTH 100 CM ARRAY

PRIMARY 5 OHM/DIV SECONDARY 10 OHM/DIV

RESISTIVITY (OHM-METERS)	Depths	RESISTIVITY (OHM-METERS)
SECONDARY SCALE 0 — 100		PRIMARY SCALE 0 — 50 — 100; 130 — 230 — 330



ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

GAMMA RAY NEUTRON LOG

FILE NO.

SEC. TWP. RGE. PAGE

COMPANY CROMBIE REFORDEX LTD.

WELL TR - 88 D - 103

LOCATION BRITTEN COLDSTREAM

FIELD BRITTEN COLDSTREAM

PERMANENT DATUM GROUND LEVEL

Elev.: K.B. 1365

D.F. 1362

G.L. 1358

Log Measured from KELLY BUSHING

Drilling Measured from KELLY BUSHING

Date 1-3-75

Run No. ONE

Depth-Driller 1365

Depth-Logger 1365

Bottom Logged Interval 1365

Top Logged Interval SURFACE

Type Fluid in Hole WATER

Salinity, PPM Cl

Density LB/GAL

Level FULL

Max. Rec. Temp. Deg. F. 90

Equip. No. & Location SCRU 125 A 006

Recorded By JACOBSEN

Witnessed By WATT

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The Provincial Museum of Alberta

EQUIPMENT DATA

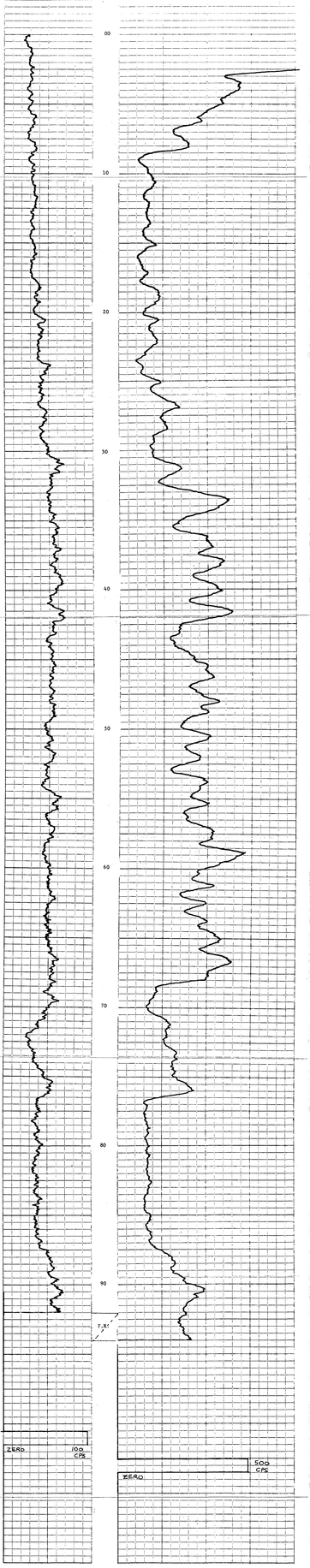
GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.		LOG TYPE	NEUTRON/NEUTRON
DIAMETER	3.18 cm	TOOL MODEL NO.	
DETECTOR MODEL NO.		DIAMETER	3.18 cm
TYPE	SCINTILLATION	DETECTOR MODEL NO.	
LENGTH	10.16 cm	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	2.0 m	LENGTH	15.24 cm
GENERAL		SOURCE MODEL NO.	MRC-N-SS-W
HOIST TRUCK NO.	FU - 3	SERIAL NO.	127
INSTRUMENT TRUCK NO.	FU - 3	SPACING	38.1 cm
TOOL SERIAL NO.	SCRU 125 A 006	TYPE	AmBe
		STRENGTH	3 CURIES

LOGGING DATA

GENERAL					GAMMA RAY				NEUTRON			
RUN NO.	DEPTH FROM	DEPTH TO	SPEED FT./MIN.	T.C. SEC.	SENS SETTINGS	ZERO DIV. L. OR R.	API G. R. UNITS PER LOG DIV.	T.C. SEC.	SENS SETTING	ZERO DIV. L. OR R.	API N. UNITS PER LOG DIV.
1	0	94.0	6	1	500	0	12	1	1000	0	50

REMARKS LOGGED TOOH WITH NO METAL ROD

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



ROKE

OIL ENTERPRISES LTD.

CALGARY ALBERTA

SIDEWALL DENSILOG

GAMMA RAY CALIPER

FILE NO. 241

COMPANY CHEMERCITY RESOURCES LTD.

WELL 7H - 8 D - 100

FIELD LOCATION BUTTRESS 7H-8-D-100 BUTTRESS PROJECTS

PROVINCE BRITISH COLUMBIA

Permanent Datum: GROUND LEVEL

Log Measured from: GROUND LEVEL

Drilling Measured from: GROUND LEVEL

Elev.: K.B. 1345 D.F. G.L. 1335

Date: 3-Jan-1985

Run No. One

Depth Driller 1345

Depth Logger 1345

Bottom Logged Interval 96.0

Top Logged Interval 95.0

Casing Driller 10.0 @ 95.0

Casing Logger 10.0 @ 95.0

Bit Size 7 7/8

Type Fluid in Hole WATER BASED

Density 10.0

Viscosity 50

pH 11.0

Fluid Loss 10.0

Source of Sample CIRC.

Rm @ Meas. Temp. 0.1 @ 23°C

Rmf @ Meas. Temp. 0.1 @ 23°C

Rmc @ Meas. Temp. 0.1 @ 23°C

Source of Rmf & Rmc MEAS.

Rm @ BHT 0.1 @ 23°C

Time Since Circ. 3 HRS

Time on Bottom 11 HRS

Max. Rec. Temp. 23°C

Equipment No. 2KDDRESS

Recorded By MOODY

Witnessed By MOODY

Other Services: GEM - TEL

Elev.: K.B. G.L.

NOTES

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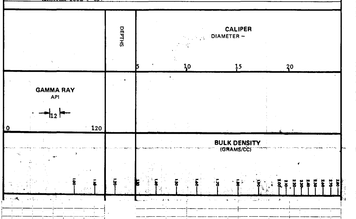
The Thunder River Kid's

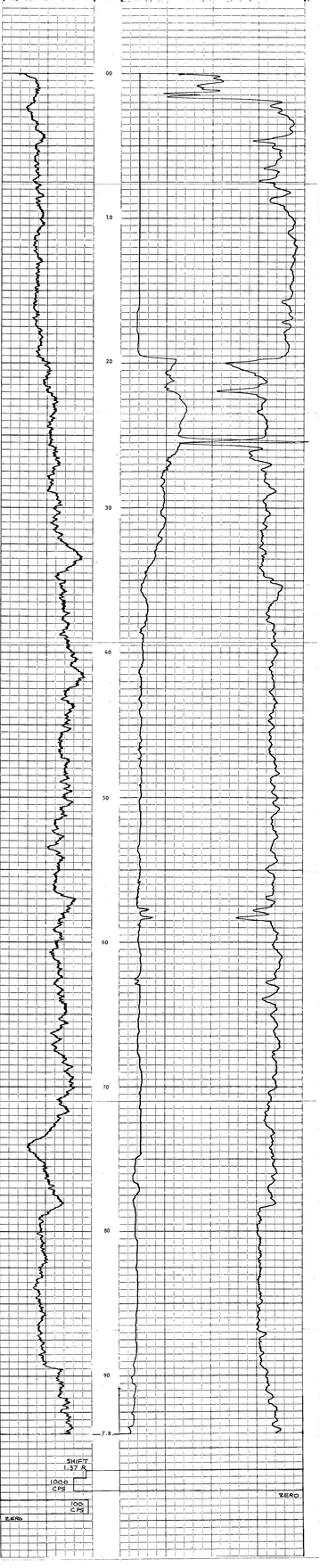
GENERAL				GAMMA RAY				SIDEWALL DENSILOG			
Run No.	DEPTH FROM	DEPTH TO	SPEED M/MIN.	T/C SEC.	SENS SETT'NGS	ZERO SUP'N DIV'NS	API G.R. UNITS PER LOG DIV.	T/C SEC.	SENS SETT'NGS	ZERO DIV'NS	CPS/DIV
1	0	94.0	4	3	500	0	12				
1	0	94.0	8					0.3	5000	1.37 R	199.61
1	0	94.0	8		(CALIPER)						

REMARKS

DENSITY TOOL # 261 AS

CALIPER TOOL # 807





ROKE

OIL SERVICES LTD.

CALGARY, ALBERTA, CANADA

COMPANY: ANDERSON EXPLORATION LTD.

WELL: 10-36-23-4 W4M

FIELD: WILDCAT

COUNTY: NEWELL

PROVINCE: ALBERTA

LOCATION: 10-36-23-4 W4M

OTHER SERVICES: GAMMA RAY NEUTRON CCL

PERMANENT DATUM: GROUND LEVEL

ELEV.: K.B. 2241 D.F. G.L. 2236

LOG MEASURED FROM: K.B. 5 FT. ABOVE PERM. DATUM

DRILLING MEASURED FROM: K.B.

Date	Run No.	Type Log	Depth Driller	Depth Logger	Bottom Logged Interval	Top Logged Interval	Casing Driller	Casing Logger	Bit Size	Type Fluid in Hole	Density	Viscosity	pH	Fluid Loss	Source of Sample	Rm @ Meas. Temp.	Rmf @ Meas. Temp.	Rmc @ Meas. Temp.	Source of Rmf & Rmc	Rm @ BHT	Time Since Circ.	Max. Rec. Temp.	Equip. Location	Recorded By	Witnessed By
23-SEPT-81	ONE	GAMMA RAY NEUTRON	1000	1000	1000	SURFACE	1000	1000	7 7/8	GEL CHEM	9.2	40	9.5	8.4	FLOWLINE	1.0 @ 70°F	0.75 @ 70°F	1.2 @ 70°F	MEASURED	0.5 @ 120°F	4 HRS.	120°F	2241	R. SCHMIDT	

EQUIPMENT DATA

GAMMA RAY		RECEIVER	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.		LOG TYPE	NEUTRON/NEUTRON
DIAMETER	3.25 in.	TOOL MODEL NO.	
DETECTOR MODEL NO.		DIAMETER	3.25 in.
TYPE	SCINTILLATION	DETECTOR MODEL NO.	
LENGTH	10.50 in.	LENGTH	PROPORTIONAL
SOURCE TYPE, SOURCE	2.0 M.	SOURCE MODEL NO.	10.75 in.
		SOURCE	MAG 10.00 M
GENERAL		SPACING	18.1 in.
LOGIC TRACK NO.	24 - 1	SPACING	36.1 in.
INSTRUMENT TRACK NO.	22 - 1	TYPE	Amtex
FINAL SERIAL NO.	RANG 123 & 009	STRENGTH	5 curies

LOGGING DATA

GENERAL		GAMMA RAY				NEUTRON			
RUN	RECORD	SPEED	DATE & TIME	T.C.	SPEED	DATE & TIME	T.C.
ONE	NO.	30	23-SEPT-81	1	30	23-SEPT-81	1
	LOG IN	1	1000		1	1000	
	LOG OUT	1	1100		1	1100	

REMARKS: LOGGED THROUGH 7IN. DRILL PIPE

GAMMA RAY	Scale	NEUTRON
GAMMA RAY INCREASES →		← NEUTRON INCREASES
API 0 — 100		API 1000 — 500