B.Y.G.

Natural Resources Inc.

Initial Environmental Evaluation
Mt. Nansen Development

Volume 2 - Appendices

November, 1994.

YUKON ENERGY, MINES
& RESOURCES LIBRARY
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Appendix I-I
Seismic Evaluation

ENERGY, MINES AND RESOURCES CANADA
GEOLOGICAL SURVEY OF CANADA

ENERGIE, MINES ET RESSOURCES CANADA
COMMISSION GEOLOGIQUE DU CANADA

SEISMIC RISK CALCULATION *

CALCUL DE RISQUE SEISMIQUE *

REQUESTED BY/ DEMANDE PAR: IAN BRUCE / KLOHN LEONOFF CONSULTANTS MJG

SITE: MT. NANSEN, YUKON

LOCATED AT/ SITUE AU: 62.05 NORTH/NORD 137.17 WEST/OUEST

PROBABILITY OF EXCEEDENCE PER ANNUM/ PROBABILITE DE DEPASSEMENT PAR ANNEE	0.010	0.005	0.0021	0.001
PROBABILITY OF EXCEEDENCE IN 50 YEARS/ PROBABILITE DE DEPASSEMENT EN 50 ANS	40 %	22 %	10 %	5 %
PEAK HORIZONTAL GROUND ACCELERATION (G) / ACCELERATION HORIZONTALE MAXIMALE DU SOL (G)	0.057	0.074	0.095	0.117
PEAK HORIZONTAL GROUND VELOCITY (M/SEC) / VITESSE HORIZONTALE MAXIMALE DU SOL (M/SEC)	0.126	0.163	0.217	0.262

* REFERENCES

1. NEW PROBABILISTIC STRONG SEISMIC GROUND MOTION MAPS OF CANADA: A COMPILATION OF EARTHQUAKE SOURCE ZONES, METHODS AND RESULTS. P.W. BASHAM, D.H. WEICHERT, F.M. ANGLIN, AND M.J. BERRY EARTH PHYSICS BRANCH OPEN FILE NUMBER 82-33, OTTAWA, CANADA 1982.

2. ENGINEERING APPLICATIONS OF NEW PROBABILISTIC SEISMIC GROUND-MOTION MAPS OF CANADA A.C. HEIDEBRECHT, P.W. BASHAM, J.H. RAINER, AND M.J. BERRY CANADIAN JOURNAL OF CIVIL ENGINEERING, VOL. 10, NO. 4, P. 670-680, 1983.

3. NEW PROBABILISTIC STRONG GROUND MOTION MAPS OF CANADA. P.W. BASHAM, D.H. WEICHERT, F.M. ANGLIN, AND M.J. BERRY, BULLETIN OF THE SEISMOLOGICAL SOCIETY OF AMERICA, VOL. 75, NO. 2, P. 563-595, 1985.

4A. SUPPLEMENT TO THE NATIONAL BUILDING CODE OF CANADA 1985, NRCC NO. 23178. CHAPTER 1: CLIMATIC INFORMATION FOR BUILDING DESIGN IN CANADA. CHAPTER 4: COMMENTARY J: EFFECTS OF EARTHQUAKES.

4B. SUPPLEMENT DU CODE NATIONAL DU BATIMENT DU CANADA 1985, CNRC NO 23178F. CHAPITRE 1: DONNEES CLIMATIQUES POUR LE CALCUL DES BATIMENTS AU CANADA. CHAPITRE 4: COMMENTAIRE J: EFFETS DES SEISMES.

SITE MT. ANSEN, YUKON

ZONING FOR ABOVE SITE/ ZONAGE DU SITE CI-DESSUS

1985 NBCC/CNBC: ZA = 2; ZV = 4; V = 0.20 M/S

ACCELERATION ZONE/ ZONE D'ACCELERATION ZA=2
ZONAL ACCELERATION/ ACCELERATION ZONALE 0.10 G

VELOCITY ZONE/ ZONE DE VITESSE ZV=4
ZONAL VELOCITY/ VITESSE ZONALE 0.20 M/S

1985 NBCC/CNBC **
SEISMIC ZONING MAPS/ CARTES DU ZONAGE SEISMIQUE

PROBABILITY LEVEL: 10% IN 50 YEARS
NIVEAU DE PROBABILITE: 10% EN 50 ANNEES

G OR M/S	ZONE	ZONAL VALUE/ VALEUR ZONALE
0.00		
	0	0.00
0.04		
	1	0.05
0.08		
	2	0.10
0.11		
	3	0.15
0.16		
	4	0.20
0.23		
	5	0.30
0.32		
	6*	0.40

* ZONE 6: NOMINAL VALUE/ VALEUR NOMINALE 0.40;
SITE-SPECIFIC STUDIES SUGGESTED FOR IMPORTANT PROJECTS/
ETUDES COMPLEMENTAIRES SUGGEREES POUR DES PROJETS D'IMPORTANCE.

** FOR NBCC APPLICATIONS, CALCULATED ZONE VALUES AT A SITE SHOULD BE REPLACED BY EFFECTIVE ZONE VALUES [ZA(EFF) OR ZV(EFF)] AS SHOWN BELOW/
POUR APPLICATIONS SELON LE CNBC, ON DOIT REMPLACER LES VALEURS ZONALES CALCULEES POUR UN SITE PAR LES VALEURS EFFECTIVES [ZA(EFF) OU ZV(EFF)] COMME MONTRE CI-DESSOUS:

1. IF/SI (ZA - ZV) > 1, ===> ZA(EFF) = ZV + 1.

OR/OU

2. IF/SI (ZA - ZV) < 1, ===> ZA(EFF) = ZV - 1.

OR/OU

3. IF/SI ZV=0 AND/ET ZA > 0, ===> ZV(EFF) = 1.

(SEE REFERENCE 2 CITED ABOVE, PAGE 677)
(VOIR PAGE 677 DE LA REFERENCE 2 CI-DESSUS)

19-OCT-88 18.57:40

Appendix I-II
Test Pit Logs and Borehole Logs

TEST HOLE LOG

STARTED: 94/07/16 FINISHED: 94/07/16
DRILLING METHOD: SOLID STEM AUGER
GROUND ELEV(m):
COORDINATES(m):

DEPTH(m)	SPT BLOWS PER 0.15m	OTHER TESTS	SAMPLE TYPE AND NUMBER	SYMBOL	DESCRIPTION OF MATERIALS	PIEZOMETER DETAILS
					Silty SAND (SM); silty fine to medium sand, top 0.25 m is moss.	
					0.8	
1					Silty SAND (SM); sand medium to coarse, trace to little silt, frozen hard, salt and pepper, ice crystals, no visible ice lenses.	
					1.2	
					Gravelly beginning at 1.2 m. Changed to Carrel Tube and solid stem.	
					1.8	
2					SAND (SW); fine to medium sand with layers of coarse sand and pebbles, frozen, no visible ice.	
					2.1	
					SAND (SW); medium sand, medium brown, trace silt, some coarse sand, little rounded pebbles.	
					2.6	
3					SAND (SW); fine to medium sand, light brown (blond), little coarse sand.	
					3.1	
					SAND (SW); clean fine to medium sand, trace silt, frozen, no visible ice, cross bedded, light brown.	
					SAND (SW); fine to medium clean sand, well rounded gravelly layer 5 to 7.5 cm thick at 3.7 m.	
4					4.1	
			CT 1		SAND (SW); fine to medium clean sand with trace coarse sand and silt, frozen, no visible ice, cross bedding visible in sand, well rounded.	
5						
6			CT 2		Sand becoming coarser at 6.1 m.	
7						
8					Gravelly layer at about 8.4 m.	
					8.5	
9			CT 3		SAND (SW); clean medium sand, well rounded, light brown, no visible ice, at 9.1 m gravel angular to sub-rounded, cross bedded, teperature reading = 0.0 degrees celsius, Photo 1 at 9.0 m.	
10					...Cont'd	

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB
REMOLD ◇ □
▲UC/2 △P.PEN/2
● SPT N
W_P% W% W_L%
× ····· ○ ····· ×
10 30 50 70 90

PROJECT NO.: PB5314 03
PROJECT: MT. NANSEN
LOCATION: SITE #4
LOGGED BY: BST CHECKED BY:
SHEET 1 OF 3 HOLE NO.: DH94-01

Klohn-Crippen
FORM: SI01-3

TEST HOLE LOG

STARTED: 94/07/16 FINISHED: 94/07/16
DRILLING METHOD: SOLID STEM AUGER
GROUND ELEV(m):
COORDINATES(m):

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB
REMOLD ◇ □
▲UC/2 △P.PEN/2
● SPT N
W_P% W% W_L%
10 30 50 70 90

DEPTH(m)	SPT BLOWS PER 0.15m	OTHER TESTS	SAMPLE TYPE AND NUMBER	SYMBOL	DESCRIPTION OF MATERIALS	PIEZOMETER DETAILS
11					SAND (SW); (continued) Gravelly layer at 10.7 m. Gravelly layer at 10.8 m. Gravelly layer at 11.3 m.	
					11.3 SAND (SW); medium grey fine sand, trace silt, no visible ice.	
12					11.6 SAND (SW); medium grey fine to medium sand, trace to little silt, no undisturbed sample recovered in tube (fell out).	
					12.2 SAND (SW); grey fine to medium sand with trace silt and little coarse sand and gravel, organics, no visible ice.	
13					13.1	
			CT 4		SAND (SW); very fine sand with little to some silt, frozen hard, no visible ice, some organic layers and organic smell.	
14					13.7 Sample taken at 13.4 m. SAND (SW); medium grey fine to medium sand with trace to little silt, organics, organic smell, no visible ice.	
15						
16						
			CT 5			
17						
18			CT 6			
19					19.1 GRAVEL (GRAVEL) Very rocky at 19.8 m.	
20					...Cont'd	

PROJECT NO.: PB5314 03
PROJECT: MT. NANSEN
LOCATION: SITE #4
LOGGED BY: BST CHECKED BY:
SHEET 2 OF 3 HOLE NO.: DH94-01

FORM: SH01e3

TEST HOLE LOG

STARTED: 94/07/16 FINISHED: 94/07/16
DRILLING METHOD: SOLID STEM AUGER
GROUND ELEV(m):
COORDINATES(m):

DEPTH(m)	SPT BLOWS PER 0.15m	OTHER TESTS	SAMPLE TYPE AND NUMBER	SYMBOL	DESCRIPTION OF MATERIALS	PIEZOMETER DETAILS
20					20.1 Refusal at 20.1 m.	
					END OF TEST HOLE AT 20.1 m.	
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

Su - kPa
20 60 100 140 180
VANE FIELD LAB
PEAK ◆ ■ ▲ UC/2
REMOLD ◇ □ △ P.PEN/2
● SPT N
W_P% W% W_L%
× ····· ○ ····· ×
10 30 50 70 90

PROJECT NO.: PB5314 03
PROJECT: MT. NANSEN
LOCATION: SITE #4
LOGGED BY: BST CHECKED BY:
SHEET 3 OF 3 HOLE NO.: DH94-01

Klohn-Crippen
FORM: SI01-3

TEST HOLE LOG

STARTED: 94/07/17 FINISHED: 94/07/17
DRILLING METHOD: SOLID STEM AUGER
GROUND ELEV(m):
COORDINATES(m):

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB
REMOLD ◇ □
▲UC/2 △P.PEN/2
● SPT N
W_P% W% W_L%
10 30 50 70 90

DEPTH(m)	SPT BLOWS PER 0.15m	OTHER TESTS	SAMPLE TYPE AND NUMBER	SYMBOL	DESCRIPTION OF MATERIALS	PIEZOMETER DETAILS
					MOSS (ORGANICS); 0.3 m cover over frozen soil.	
0.3					SAND (SW); organic rich fine to medium sand with some small pebbles.	
0.9			CT 1		SAND (SW); organic rich at top, grading to little organics by 1.2 m, fine to medium sand with trace to little silt, 5 ice lenses each 1 mm thick in silty or organic-rich layer at 1.2 m depth, otherwise sand shows no visible ice, sand is medium brown, well rounded.	
2.3					Ice cuttings at 1.8 to 2.1 m.	
2.4			CT 2		SAND (SW); dark brown, fine to med., trace silt & organics, no vis. ice.	
					SAND (SW); light brown fine to medium sand becoming coarser with depth, trace silt, some pebbles, no visible ice, 40% angular rock below 2.9 m. Sample taken at 2.4 m.	
3.7					SAND (SW); fine to medium sand, trace silt, trace to little pebbles, no visible ice.	
4.3					Silty SAND (SM); organic, rich brown, silty to sandy, ice rich with many 0.5-1.0 mm ice lenses in organics. Sample taken at 4.4 m. High ice content in cuttings (4.6 to 5.3 m).	
5.3			CT 3		Silty SAND (SM); silty fine to medium sand with organics and roots, numerous ice crystals to 3 mm in size, ice rich layers of frozen peat.	
6.1					Sample taken at 5.8 m.	
					Silty SAND (SM); silty fine sand with organics, strong organic odour, numerous roots, some visible ice crystals.	
6.7					Silty SAND (SM); highly organic silty sand, brown.	
7.0			CT 4		SAND (SW); light grey fine to medium sand, trace to little silt, bedding visible in sand, no visible ice, angular pebbles at 7.6 m, organics melt to very soft consistency.	
7.6					Silty SAND (SM); silty fine to medium sand, frozen, sand well rounded, trace to some silt.	
8.2				?	Attempted Carrel sample but sample fell from tube - no recovery.	
9.2					Silty SAND (SM); (same as from 7.6 to 8.2 m)	
					Refusal (on bedrock?) at 10.0 m. ...Cont'd	

PROJECT NO.: PB5314 03
PROJECT: MT. NANSEN
LOCATION: SITE #4 RIGHT ABUTMENT
LOGGED BY: BST CHECKED BY:
SHEET 1 OF 2 HOLE NO.: DH94-02

FORM: SI01-3

TEST HOLE LOG

DEPTH(m)	SPT BLOWS PER 0.15m	OTHER TESTS	SAMPLE TYPE AND NUMBER	SYMBOL	DESCRIPTION OF MATERIALS	PIEZOMETER DETAILS
					STARTED: 94/07/17 FINISHED: 94/07/17	
					DRILLING METHOD: SOLID STEM AUGER	
					GROUND ELEV(m):	
					COORDINATES(m):	
10					10.0	
					END OF TEST HOLE AT 10.0 m.	
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Su - kPa

20 60 100 140 180

VANE PEAK ◆ FIELD ■ LAB ▲ UC/2
REMOLD ◇ □ △ P.PEN/2

● SPT N

W_P% W% W_L%

× ····· ○ ····· ×

10 30 50 70 90

PROJECT NO.: PB5314 03	
PROJECT: MT. NANSEN	
LOCATION: SITE #4 RIGHT ABUTMENT	
LOGGED BY: BST	CHECKED BY:
SHEET 2 OF 2	HOLE NO.: DH94-02

TEST HOLE LOG

STARTED: 94/07/18 FINISHED: 94/07/18
DRILLING METHOD: SOLID STEM AUGER
GROUND ELEV(m):
COORDINATES(m):

Su - kPa: 20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB
VANE REMOLD ◇ □
▲ UC/2 △ P.PEN/2
● SPT N
W_P% W% W_L%
× ····· ○ ····· ×
10 30 50 70 90

DEPTH(m)	SPT BLOWS PER 0.15m	OTHER TESTS	SAMPLE TYPE AND NUMBER	SYMBOL	DESCRIPTION OF MATERIALS	PIEZOMETER DETAILS
					Frozen PEAT (PEAT); significant ice in cuttings.	
					0.8	
1			CT 1		0.9 Frozen PEAT (PEAT); with silt, sand and pebbles - ice rich.	
					SAND (SW); fine to medium grey sand with little silt, some organic rich layers to 10 mm thick, no visible ice, solidly frozen.	
					1.5	
2					SAND (SW); medium light brown sand, very clean, very well rounded, some fine gravel, zero to trace silt.	
					2.3	
			CT 2		SAND (SW); organic rich, fine to medium sand, trace to some pebbles, trace silt, ice rich but no discrete ice layers.	
					2.6	
3					3.0 SAND (SW); fine to medium sand, light brown to grey cross bedded, very well rounded.	
					SAND (SW); grey-brown fine to medium sand, trace silt, well rounded.	
					3.8	
4			CT 3		SAND (SW); fine to medium sand with trace silt, trace pebbles, sand well rounded, cross bedded, some layers slighty organic.	
					4.6	
					SAND (SW); fine to medium sand with pebble layers.	
5					5.3	
			CT 4		SAND (SW); fine to medium sand with trace to some silt, gravel layer at 5.8 m, sampler refused, no visible ice.	
					5.8	
6					SAND (SW); fine to medium grey-brown sand, pebbly.	
7						
8						
					8.5	
					Sandy SILT (SM); trace pebbles, low plastic.	
					8.8	
9					SAND AND GRAVEL (SG); trace silt.	
					9.5	
			CT 5		SAND (SW); fine to medium sand, some pebbles to pebbley, trace silt, no visible ice, trace gravel, dark grey-brown. ...Cont'd	
10						

PROJECT NO.: PB5314 03
PROJECT: MT. NANSEN
LOCATION: SITE #4 VALLEY CENTRE
LOGGED BY: BST CHECKED BY:
SHEET 1 OF 2 HOLE NO.: DH94-03

FORM: SI01-3

TEST HOLE LOG

STARTED: 94/07/18 FINISHED: 94/07/18
DRILLING METHOD: SOLID STEM AUGER
GROUND ELEV(m):
COORDINATES(m):

DEPTH(m)	SPT BLOWS PER 0.15m	OTHER TESTS	SAMPLE TYPE AND NUMBER	SYMBOL	DESCRIPTION OF MATERIALS	PIEZOMETER DETAILS
					SAND (SW); (continued)	
					10.4	
11					SAND AND Coarse GRAVEL (SG); very dense, dark grey-brown, trace silt, possibly glacial till.	
					11.4	
			CT 6		11.6	
12					11.4 to 11.6 m: Silty SAND AND GRAVEL (SG); some silt, gravel angular to sub-rounded (possibly glacial till), no visible ice, dense. Sample bagged at 11.6 m.	
13						
14					Silty SAND (SM); grey brown silty to sandy (possibly glacial till) with numerous rocky layers, rocks angular to sub-rounded, very hard drilling, dense, rocky.	
15						
16					Refusal at 16.2 m. Assumed bedrock.	
					16.2	
17					END OF TEST HOLE AT 16.2 m.	
18						
19						
20						

Su - kPa
20 60 100 140 180
VANE PEAK ◆ FIELD ■ LAB
REMOLD ◇ □
▲ UC/2
△ P.PEN/2
● SPT N
W_P% W% W_L%
× ····· ○ ····· ×
10 30 50 70 90

PROJECT NO.: PB5314 03
PROJECT: MT. NANSEN
LOCATION: SITE #4 VALLEY CENTRE
LOGGED BY: BST CHECKED BY:
SHEET 2 OF 2 HOLE NO.: DH94-03

FORM: SI01-3

FIELD TEST PIT LOG

CLIENT B.Y.G NATURAL RESOURCES JOB No. PB5314 03 PIT No. 9401 SHEET No. 1 of 1

PROJECT MT. NANSEN GOLD MINE WEATHER CLEAR INSPECTOR B. TRENHOLME

SITE SITE #4, MT NANSEN TEMP. 25 °C STARTED ____ .M. ____ 19__

LOCATION: LATITUDE ____ DEPTH 1.0 m FINISHED ____ .M. ____ 19__

DEPARTURE ____ WIDTH ____ ELEVATIONS: DATUM ____

CONTRACTOR I CAN DIG IT CONTRACTING LENGTH ____ GROUND SURFACE ____

METHOD OF EXCAVATION BACK HOE WATER LEVELS ____

LOG LEGEND: SILT, SAND, CLAY, GRAVEL

* SAMPLE CONDITION: GOOD, DISTURBED, FAIR, LOST

** SAMPLING METHOD: B - THIN WALL TUBE; C - PISTON SAMPLER; E - AUGER; G - SHOVEL; H - CARVED BLOCK

** SHIPPING CONTAINER: O - TUBE; P - WATER CONTENT TIN; Q - GLASS JAR; R - CLOTH BAG; S - PLIOFILM BAG; T - METAL CAN; U - WOODEN BOX

SKETCH	LOG	ELEVATION	DEPTH	SAMPLE *	SAMPLE ** TYPE	SAMPLE NO.	SAMPLE SIZE	SAMPLE RET'D.	DESCRIPTION AND FIELD NOTES: COLOUR, CONSISTENCY, DENSITY, TEXTURE, STRUCTURE, SHAPE AND SURFACE CONDITION OF GRAINS, TESTING AND SAMPLING PROCEDURES AND EQUIPMENT, WATER AND GAIN, ODOUR, ETC.
PEAT			0.2						0-15 cm Peat
									15cm - 1m fine to medium clean grey SAND, trace silt. 10cm thick ice lens at 80 cm. Water inflow at 40 cm.
SAND			0.4						
			0.6						
ICE			0.8						Refusal on solidly frozen ground at 1.0 m
SAND			1.0						
FROZEN SAND ↓									

KLOHN-CRIPPEN

Klohn-Crippen

JOB No. PB5314 03 LOGGED BY BBT

PROJECT MT. NANSEN

LOCATION MT. NANSEN MINE

HOLE No. 9401 INSPECTOR BBT

APPROVED BBT DATE 16 JULY 94

FIELD TEST PIT LOG

CLIENT B.Y.G NATURAL RESOURCES — JOB No. PB5314 03 — PIT No. 9402 — SHEET No. 1 of 1

PROJECT MT. NANSEN GOLD MINE — WEATHER CLEAR — INSPECTOR B. TRENHOLME

SITE SITE #4, MT NANSEN — TEMP. 25 °C — STARTED ____ .M. ____ 19__

LOCATION: LATITUDE ____ — DEPTH 1.5 m — FINISHED ____ .M. ____ 19__

DEPARTURE ____ — WIDTH ____ — ELEVATIONS: DATUM ____

CONTRACTOR I CAN DIG IT CONTRACTING — LENGTH ____ — GROUND SURFACE ____

METHOD OF EXCAVATION BACK HOE — WATER LEVELS ____

LOG LEGEND: SILT, SAND, CLAY, GRAVEL

* SAMPLE CONDITION: GOOD, DISTURBED, FAIR, LOST

** SAMPLING METHOD: B - THIN WALL TUBE; C - PISTON SAMPLER; E - AUGER; G - SHOVEL; H - CARVED BLOCK

** SHIPPING CONTAINER: O - TUBE; P - WATER CONTENT TIN; Q - GLASS JAR; R - CLOTH BAG; S - PLIOFILM BAG; T - METAL CAN; U - WOODEN BOX

SKETCH	LOG	ELEVATION	DEPTH (m)	SAMPLE *	SAMPLE ** TYPE	SAMPLE NO.	SAMPLE SIZE	SAMPLE RET'D.	DESCRIPTION AND FIELD NOTES: COLOUR, CONSISTENCY, DENSITY, TEXTURE, STRUCTURE, SHAPE AND SURFACE CONDITION OF GRAINS, TESTING AND SAMPLING PROCEDURES AND EQUIPMENT, WATER AND GAIN, ODOUR, ETC.
Brown PEAT			0.2						0-50 cm brown peat
			0.4						50cm - 1.0 m medium grey fine to medium SAND, some organics, containing ice crystals
fine dark grey SAND			0.6						1.0m - 1.5m dark grey fine SAND, trace silt ice crystals
			0.8						
			1.0						1.5m - Refusal on solidly frozen ground
			1.2						
solidly frozen ↓			1.4						
			1.6						

KLOHN-CRIPPEN

Klohn-Crippen

JOB No. PB5314 03 LOGGED BY BST

PROJECT MT. NANSEN

LOCATION MT NANSEN MINE

HOLE No. 9402 INSPECTOR BST

APPROVED BST DATE 16 JULY 94

FIELD TEST PIT LOG

CLIENT B.Y.G NATURAL RESOURCES JOB No. PB5314/03 PIT No. 9403 SHEET No. 1 of 1

PROJECT MT. NANSEN GOLD MINE WEATHER CLEAR INSPECTOR B. TRENHOLME

SITE SITE #4, MT NANSEN TEMP. 25 °C STARTED ___ .M. ___ 19__

LOCATION: LATITUDE ___ DEPTH 0.6 m FINISHED ___ .M. ___ 19__

DEPARTURE ___ WIDTH ___ ELEVATIONS: DATUM ___

CONTRACTOR I CAN DIG IT CONTRACTING LENGTH ___ GROUND SURFACE ___

METHOD OF EXCAVATION BACK HOE WATER LEVELS ___

LOG LEGEND: SILT, SAND, CLAY, GRAVEL

* SAMPLE CONDITION: GOOD, FAIR, DISTURBED, LOST

** SAMPLING METHOD: B - THIN WALL TUBE; C - PISTON SAMPLER; E - AUGER; G - SHOVEL; H - CARVED BLOCK

** SHIPPING CONTAINER: O - TUBE; P - WATER CONTENT TIN; Q - GLASS JAR; R - CLOTH BAG; S - PLIOFILM BAG; T - METAL CAN; U - WOODEN BOX

SKETCH	LOG	ELEVATION	DEPTH	SAMPLE *	SAMPLE ** TYPE	SAMPLE NO.	SAMPLE SIZE	SAMPLE RET'D.	DESCRIPTION AND FIELD NOTES: COLOUR; CONSISTENCY; DENSITY; TEXTURE; STRUCTURE; SHAPE AND SURFACE CONDITION OF GRAINS; TESTING AND SAMPLING PROCEDURES AND EQUIPMENT; WATER AND GAIN; ODOUR, ETC.
ORGANIC SOIL									0-5cm organic soil
SAND trace silt			0.2						5cm - 60 cm fine to medium SAND, Trace silt, little pebbles. Pebbles angular
solidly frozen ↓			0.4						
			0.6						Refusal on solidly frozen soil at 60 cm no visible ice
			0.8						
			1.0						

KLOHN-CRIPPEN

Klohn-Crippen

JOB No. PB5314 03 LOGGED BY BBT

PROJECT MT. NANSEN

LOCATION MT NANSEN MINE

HOLE No. 9403 INSPECTOR BBT

APPROVED BBT DATE 16 JULY 94

FIELD TEST PIT LOG

CLIENT B.Y.G NATURAL RESOURCES JOB No. PB5314 03 PIT No. 9404 SHEET No. 1 of 1

PROJECT MT. NANSEN GOLD MINE WEATHER CLEAR INSPECTOR B. TRENHOLME

SITE SITE #4, MT NANSEN TEMP. 25 °C STARTED ____ .M. ____ 19__

LOCATION: LATITUDE ____ DEPTH 2.1 m FINISHED ____ .M. ____ 19__

DEPARTURE ____ WIDTH ____ ELEVATIONS: DATUM ____

CONTRACTOR I CAN DIG IT CONTRACTING LENGTH ____ GROUND SURFACE ____

METHOD OF EXCAVATION BACK HOE WATER LEVELS ____

LOG LEGEND: SILT, SAND, CLAY, GRAVEL

* SAMPLE CONDITION: GOOD, DISTURBED, FAIR, LOST

** SAMPLING METHOD: B - THIN WALL TUBE; C - PISTON SAMPLER; E - AUGER; G - SHOVEL; H - CARVED BLOCK; O - TUBE; P - WATER CONTENT TIN; Q - GLASS JAR; R - CLOTH BAG; S - PLIOFILM BAG; T - METAL CAN; U - WOODEN BOX

SKETCH	LOG	ELEVATION	DEPTH	SAMPLE *	SAMPLE ** TYPE	SAMPLE NO.	SAMPLE SIZE	SAMPLE RET'D.	DESCRIPTION AND FIELD NOTES: COLOUR, CONSISTENCY, DENSITY, TEXTURE, STRUCTURE, SHAPE AND SURFACE CONDITION OF GRAINS, TESTING AND SAMPLING PROCEDURES AND EQUIPMENT, WATER AND GAIN, ODOUR, ETC.
Moss & Roots									0-10 cm moss & roots
			0.2						10 cm - 2.1 m uniform fine to med SAND little pebbles trace silt no visible ice, cross-bedded, med brown
			0.4						
			0.6						
			0.8						
SAND			1.0						
			1.2						
			1.4						
			1.6						
			1.9						
			2.0						
frozen hard ↓			2.2						

KLOHN-CRIPPEN

Klohn-Crippen

JOB No. PB5314 03 LOGGED BY BST

PROJECT MT. NANSEN

LOCATION MT NANSEN MINE

HOLE No. 9404 INSPECTOR BST

APPROVED BST DATE 16 JULY 94

FIELD TEST PIT LOG

CLIENT B.Y.G NATURAL RESOURCES JOB No. PB5314 03 PIT No. 9405 SHEET No. 1 of 1

PROJECT MT. NANSEN GOLD MINE WEATHER CLEAR INSPECTOR B. TRENHOLME

SITE SITE #4, MT NANSEN TEMP. 25 °C STARTED ____ .M. ____ 19__

LOCATION: LATITUDE ____ DEPTH 2.0 m FINISHED ____ .M. ____ 19__

DEPARTURE ____ WIDTH ____ ELEVATIONS: DATUM ____

CONTRACTOR I CAN DIG IT CONTRACTING LENGTH ____ GROUND SURFACE ____

METHOD OF EXCAVATION BACK HOE WATER LEVELS ____

LOG LEGEND: SILT, SAND, CLAY, GRAVEL

* SAMPLE CONDITION: GOOD, DISTURBED, FAIR, LOST

** SAMPLING METHOD: B - THIN WALL TUBE; C - PISTON SAMPLER; E - AUGER; G - SHOVEL; H - CARVED BLOCK

** SHIPPING CONTAINER: O - TUBE; P - WATER CONTENT TIN; Q - GLASS JAR; R - CLOTH BAG; S - PLIOFILM BAG; T - METAL CAN; U - WOODEN BOX

SKETCH	LOG	ELEVATION	DEPTH	SAMPLE *	SAMPLE ** TYPE	SAMPLE NO.	SAMPLE SIZE	SAMPLE RET'D.	DESCRIPTION AND FIELD NOTES: COLOUR, CONSISTENCY, DENSITY, TEXTURE, STRUCTURE, SHAPE AND SURFACE CONDITION OF GRAINS, TESTING AND SAMPLING PROCEDURES AND EQUIPMENT, WATER AND GAIN, ODOUR, ETC.
ORGANIC SOIL									10 cm organic soil
med. brown SAND			0.2						10 cm - 20 cm med brown fine to medium SAND
light brown SAND			0.4						20 cm - 2.0 m light brown fine to medium clean SAND, little pebbles cross bedded, pebbles angular to sub-rounded no visible ice
			0.6						
			0.8						
			1.0						
			1.2						
			1.4						
			1.6						
			1.8						
frozen solidly ↓			2.0						
			2.2						

KLOHN-CRIPPEN

Klohn-Crippen

JOB No. PB5314 03 LOGGED BY BST

PROJECT MT. NANSEN

LOCATION MT NANSEN MINE

HOLE No. 9405 INSPECTOR BST

APPROVED BST DATE 16 JULY 94

FIELD TEST PIT LOG

CLIENT B.Y.G NATURAL RESOURCES — JOB No. PB5314 03 — PIT No. 9406 — SHEET No. 1 of 1

PROJECT MT. NANSEN GOLD MINE — WEATHER CLEAR — INSPECTOR B. TRENHOLME

SITE SITE #4, MT NANSEN — TEMP. 25 °C — STARTED ____ .M. ____ 19__

LOCATION: LATITUDE ____ — DEPTH 2.5m — FINISHED ____ .M. ____ 19__

DEPARTURE ____ — WIDTH ____ — ELEVATIONS: DATUM ____

CONTRACTOR I CAN DIG IT CONTRACTING — LENGTH ____ — GROUND SURFACE ____

METHOD OF EXCAVATION BACK HOE — WATER LEVELS ____

LOG LEGEND: SILT, SAND, CLAY, GRAVEL

* SAMPLE CONDITION: GOOD, DISTURBED, FAIR, LOST

** SAMPLING METHOD: B - THIN WALL TUBE; C - PISTON SAMPLER; E - AUGER; G - SHOVEL; H - CARVED BLOCK

** SHIPPING CONTAINER: O - TUBE; P - WATER CONTENT TIN; Q - GLASS JAR; R - CLOTH BAG; S - PLIOFILM BAG; T - METAL CAN; U - WOODEN BOX

SKETCH	LOG	ELEVATION	DEPTH	SAMPLE *	SAMPLE ** TYPE	SAMPLE NO.	SAMPLE SIZE	SAMPLE RET'D.	DESCRIPTION AND FIELD NOTES: COLOUR; CONSISTENCY; DENSITY; TEXTURE; STRUCTURE; SHAPE AND SURFACE CONDITION OF GRAINS; TESTING AND SAMPLING PROCEDURES AND EQUIPMENT; WATER AND GAIN; ODOUR, ETC.
organic soil / med. brown SAND			0.2						0-5cm organic soil
									5cm-20cm medium brown fine SAND, some roots, Volcanic ash mixed in top 5cm
light brown SAND			0.4						
			0.6						20cm-2.5m fine to medium clean SAND, cross bedded, medium dense no visible ice, light brown
			0.8						
			1.0						
			1.2						Refusal on solidly frozen ground at 2.5m
			1.4						
			1.6						
			1.8						
			2.0						
			2.2						
			2.4						
Solidly frozen									

KLOHN-CRIPPEN

Klohn-Crippen

JOB No. PB5314 03 LOGGED BY BST

PROJECT MT. NANSEN

LOCATION MT NANSEN MINE

HOLE No. 9406 INSPECTOR BST

APPROVED BST DATE 16 JULY 94

FIELD TEST PIT LOG

CLIENT B.Y.G NATURAL RESOURCES JOB No. PB5314 03 PIT No. 9407 SHEET No. 1 of 1

PROJECT MT. NANSEN GOLD MINE WEATHER CLEAR INSPECTOR B. TRENHOLME

SITE SITE #4, MT NANSEN TEMP. 25 °C STARTED ____ .M. ____ 19__

LOCATION: LATITUDE ____ DEPTH 0.5m FINISHED ____ .M. ____ 19__

DEPARTURE ____ WIDTH ____ ELEVATIONS: DATUM ____

CONTRACTOR I CAN DIG IT CONTRACTING LENGTH ____ GROUND SURFACE ____

METHOD OF EXCAVATION BACK HOE WATER LEVELS ____

LOG LEGEND: SILT, SAND, CLAY, GRAVEL

* SAMPLE CONDITION: GOOD, DISTURBED, FAIR, LOST

** SAMPLING METHOD: B - THIN WALL TUBE; C - PISTON SAMPLER; E - AUGER; G - SHOVEL; H - CARVED BLOCK

** SHIPPING CONTAINER: O - TUBE; P - WATER CONTENT TIN; Q - GLASS JAR; R - CLOTH BAG; S - PLIOFILM BAG; T - METAL CAN; U - WOODEN BOX

SKETCH	LOG	ELEVATION	DEPTH	SAMPLE *	SAMPLE ** TYPE	SAMPLE NO.	SAMPLE SIZE	SAMPLE RET'D.	DESCRIPTION AND FIELD NOTES: COLOUR, CONSISTENCY, DENSITY, TEXTURE, STRUCTURE, SHAPE AND SURFACE CONDITION OF GRAINS, TESTING AND SAMPLING PROCEDURES AND EQUIPMENT, WATER AND GAIN, ODOUR, ETC.
Moss & peat									0-20cm Moss & Peat
			0.2						
SAND									20cm-50cm Medium SAND clean, no visible ice salt & pepper texture
			0.4						
REFUSAL FROZEN SOLID			0.6						Refusal at 50cm in solidly frozen SAND, as above

KLOHN-CRIPPEN

Klohn-Crippen

JOB No. PB5314 03 LOGGED BY BST

PROJECT MT. NANSEN

LOCATION MT NANSEN MINE

HOLE No. 9407 INSPECTOR BST

APPROVED BST DATE 16 JULY 94

FIELD TEST PIT LOG

CLIENT B.Y.G NATURAL RESOURCES JOB No. PB5314 03 PIT No. 9408 SHEET No. 1 of 1
PROJECT MT. NANSEN GOLD MINE WEATHER CLEAR INSPECTOR B. TRENHOLME
SITE SITE #4, MT NANSEN TEMP. 25 °C STARTED ____ .M. ____ 19__
LOCATION: LATITUDE ____ DEPTH 0.5 m FINISHED ____ .M. ____ 19__
DEPARTURE ____ WIDTH ____ ELEVATIONS: DATUM ____
CONTRACTOR I CAN DIG IT CONTRACTING LENGTH ____ GROUND SURFACE ____
METHOD OF EXCAVATION BACK HOE WATER LEVELS ____

LOG LEGEND: SILT, SAND, CLAY, GRAVEL
* SAMPLE CONDITION: GOOD, DISTURBED, FAIR, LOST
** SAMPLING METHOD: B - THIN WALL TUBE; C - PISTON SAMPLER; E - AUGER; G - SHOVEL; H - CARVED BLOCK
** SHIPPING CONTAINER: O - TUBE; P - WATER CONTENT TIN; Q - GLASS JAR; R - CLOTH BAG; S - PLIOFILM BAG; T - METAL CAN; U - WOODEN BOX

SKETCH	LOG	ELEVATION	DEPTH	SAMPLE *	SAMPLE ** TYPE	SAMPLE NO.	SAMPLE SIZE	SAMPLE RET'D.	DESCRIPTION AND FIELD NOTES: COLOUR, CONSISTENCY, DENSITY, TEXTURE, STRUCTURE, SHAPE AND SURFACE CONDITION OF GRAINS, TESTING AND SAMPLING PROCEDURES AND EQUIPMENT, WATER AND GAIN, ODOUR, ETC.
ORGANIC SOIL & ROOTS			0.2						0-30 cm Organic soil and roots
SAND			0.4						30 cm - 50 cm fine to medium SAND, little silt (source of silt may be ash?) salt & pepper no visible ice
FROZEN SAND ↓			0.6						
			0.8						
			1.0						Refusal on solidly frozen sand, as above, at 50 cm

KLOHN-CRIPPEN
Klohn-Crippen

JOB No. PB5314 03 LOGGED BY BST
PROJECT MT. NANSEN
LOCATION MT NANSEN MINE
HOLE No. 9408 INSPECTOR BST
APPROVED BST DATE 16 JULY 94

FIELD TEST PIT LOG

CLIENT B.Y.G NATURAL RESOURCES JOB No. PB5314 03 PIT No. 9409 SHEET No. 1 of 1
PROJECT MT. NANSEN GOLD MINE WEATHER CLEAR INSPECTOR B. TRENHOLME
SITE SITE #4, MT NANSEN TEMP. 25 °C STARTED ____ .M. ____ 19__
LOCATION: LATITUDE ____ DEPTH 1.0 M FINISHED ____ .M. ____ 19__
DEPARTURE ____ WIDTH ____ ELEVATIONS: DATUM ____
CONTRACTOR I CAN DIG IT CONTRACTING LENGTH ____ GROUND SURFACE ____
METHOD OF EXCAVATION BACK HOE WATER LEVELS ____

LOG LEGEND: SILT, SAND, CLAY, GRAVEL
* SAMPLE CONDITION: GOOD, DISTURBED, FAIR, LOST
** SAMPLING METHOD: B - THIN WALL TUBE; C - PISTON SAMPLER; E - AUGER; G - SHOVEL; H - CARVED BLOCK
** SHIPPING CONTAINER: O - TUBE; P - WATER CONTENT TIN; Q - GLASS JAR; R - CLOTH BAG; S - PLIOFILM BAG; T - METAL CAN; U - WOODEN BOX

SKETCH	LOG	ELEVATION	DEPTH	SAMPLE *	SAMPLE ** TYPE	SAMPLE NO.	SAMPLE SIZE	SAMPLE RET'D.	DESCRIPTION AND FIELD NOTES: COLOUR, CONSISTENCY, DENSITY, TEXTURE, STRUCTURE, SHAPE AND SURFACE CONDITION OF GRAINS, TESTING AND SAMPLING PROCEDURES AND EQUIPMENT, WATER AND GAIN, ODOUR, ETC.
organic soil & roots / ASH			0.2						0-10 cm organic soil & roots
SAND			0.4						10 cm - 12 cm volcanic ash mixed with underlying sand & overlying organics
			0.6						12 cm - 1.0 m medium brown fine to medium clean SAND trace silt, no visible ice
			0.8						
frozen SAND ↓			1.0						Refusal at 1.0 m on solidly frozen SAND, as above
			1.2						

KLOHN-CRIPPEN
Klohn-Crippen

JOB No. PB5314 03 LOGGED BY BST
PROJECT MT. NANSEN
LOCATION MT NANSEN MINE
HOLE No. 9409 INSPECTOR BST
APPROVED BG DATE 16 JULY 94

FIELD TEST PIT LOG

CLIENT B.Y.G NATURAL RESOURCES JOB No. PB5314 03 PIT No. 9410 SHEET No. 1 of 1

PROJECT MT. NANSEN GOLD MINE WEATHER CLEAR INSPECTOR B. TRENHOLME

SITE SITE #4, MT NANSEN TEMP. 25 °C STARTED ____ .M. ____ 19__

LOCATION: LATITUDE ____ DEPTH 0.5 m FINISHED ____ .M. ____ 19__

DEPARTURE ____ WIDTH ____ ELEVATIONS: DATUM ____

CONTRACTOR I CAN DIG IT CONTRACTING LENGTH ____ GROUND SURFACE ____

METHOD OF EXCAVATION BACK HOE WATER LEVELS ____

LOG LEGEND: SILT, SAND, CLAY, GRAVEL

* SAMPLE CONDITION: GOOD, DISTURBED, FAIR, LOST

** SAMPLING METHOD: B - THIN WALL TUBE; C - PISTON SAMPLER; E - AUGER; G - SHOVEL; H - CARVED BLOCK

** SHIPPING CONTAINER: O - TUBE; P - WATER CONTENT TIN; Q - GLASS JAR; R - CLOTH BAG; S - PLIOFILM BAG; T - METAL CAN; U - WOODEN BOX

SKETCH	LOG	ELEVATION	DEPTH (m)	SAMPLE *	SAMPLE ** TYPE	SAMPLE NO.	SAMPLE SIZE	SAMPLE RET'D.	DESCRIPTION AND FIELD NOTES: COLOUR, CONSISTENCY, DENSITY, TEXTURE, STRUCTURE, SHAPE AND SURFACE CONDITION OF GRAINS, TESTING AND SAMPLING PROCEDURES AND EQUIPMENT, WATER AND GAIN, ODOUR, ETC.
organic soil & roots			0.2						0-10 cm organic soil & roots
SAND			0.4						10 cm - 50 cm grey-brown fine to coarse SAND, trace silt, some pebbles sand rounded, pebbles angular to sub-rounded, larger fragments more angular. No visible ice
frozen SAND ↓			0.6						
			0.8						Refusal on frozen SAND as above at 50 cm

KLOHN-CRIPPEN

Klohn-Crippen

JOB No. PB5314 03 LOGGED BY BST

PROJECT MT. NANSEN

LOCATION MT NANSEN MINE

HOLE No. 9410 INSPECTOR BST

APPROVED BST DATE 16 JULY 94

FIELD TEST PIT LOG

CLIENT B.Y.G NATURAL RESOURCES JOB No. PB5314 03 PIT No. 9411 SHEET No. 1 of 1
PROJECT MT. NANSEN GOLD MINE WEATHER CLEAR INSPECTOR B. TRENHOLME
SITE SITE #4, MT NANSEN TEMP. 25 °C STARTED ___ .M. ___ 19__
LOCATION: LATITUDE ___ DEPTH 1.2 m FINISHED ___ .M. ___ 19__
DEPARTURE ___ WIDTH ___ ELEVATIONS: DATUM ___
CONTRACTOR I CAN DIG IT CONTRACTING LENGTH ___ GROUND SURFACE ___
METHOD OF EXCAVATION BACK HOE WATER LEVELS ___

LOG LEGEND: SILT, SAND, CLAY, GRAVEL
* SAMPLE CONDITION: GOOD, FAIR, DISTURBED, LOST
** SAMPLING METHOD: B - THIN WALL TUBE; C - PISTON SAMPLER; E - AUGER; G - SHOVEL; H - CARVED BLOCK
** SHIPPING CONTAINER: O - TUBE; P - WATER CONTENT TIN; Q - GLASS JAR; R - CLOTH BAG; S - PLIOFILM BAG; T - METAL CAN; U - WOODEN BOX

SKETCH	LOG	ELEVATION	DEPTH	SAMPLE *	SAMPLE ** TYPE	SAMPLE NO.	SAMPLE SIZE	SAMPLE RET'D.	DESCRIPTION AND FIELD NOTES: COLOUR; CONSISTENCY; DENSITY; TEXTURE; STRUCTURE; SHAPE AND SURFACE CONDITION OF GRAINS; TESTING AND SAMPLING PROCEDURES AND EQUIPMENT; WATER AND GAIN; ODOUR, ETC.
ORGANIC SOIL, ROOTS									0-10cm organic soil & roots
~~SAND, ASH~~			0.2						
			0.4						10cm-12cm mixed sand and volcanic ash
SAND			0.6						
			0.8						12cm-1.2m medium brown SAND trace silt sand well rounded, no visible ice. loose
			1.0						
ROCKY AT BOTTOM			1.2						Refusal on frozen SAND, as above at 1.2 m
frozen hard ↓			1.4						Some angular rock fragg at base of pit - may be close to bedrock?

KLOHN-CRIPPEN Klohn-Crippen

JOB No. PB5314 03 LOGGED BY BST
PROJECT MT. NANSEN
LOCATION MT NANSEN MINE
HOLE No. 9411 INSPECTOR BST
APPROVED BST DATE 16 JULY 04

FIELD TEST PIT LOG

CLIENT B.Y.G NATURAL RESOURCES JOB No. PB5314 03 PIT No. 9412 SHEET No. 1 of 1

PROJECT MT. NANSEN GOLD MINE WEATHER CLEAR INSPECTOR B. TRENHOLME

SITE SITE #4, MT NANSEN TEMP. 25 °C STARTED ___ .M. ___ 19__

LOCATION: LATITUDE ___ DEPTH ___ FINISHED ___ .M. ___ 19__

DEPARTURE ___ WIDTH ___ ELEVATIONS: DATUM ___

CONTRACTOR I CAN DIG IT CONTRACTING LENGTH ___ GROUND SURFACE ___

METHOD OF EXCAVATION BACK HOE WATER LEVELS ___

LOG LEGEND: SILT, SAND, CLAY, GRAVEL

* SAMPLE CONDITION: GOOD, DISTURBED, FAIR, LOST

** SAMPLING METHOD: B - THIN WALL TUBE; C - PISTON SAMPLER; E - AUGER; G - SHOVEL; H - CARVED BLOCK

** SHIPPING CONTAINER: O - TUBE; P - WATER CONTENT TIN; Q - GLASS JAR; R - CLOTH BAG; S - PLIOFILM BAG; T - METAL CAN; U - WOODEN BOX

SKETCH	LOG	ELEVATION	DEPTH	SAMPLE *	SAMPLE ** TYPE	SAMPLE NO.	SAMPLE SIZE	SAMPLE RET'D.	DESCRIPTION AND FIELD NOTES: COLOUR, CONSISTENCY, DENSITY, TEXTURE, STRUCTURE, SHAPE AND SURFACE CONDITION OF GRAINS, TESTING AND SAMPLING PROCEDURES AND EQUIPMENT, WATER AND GAIN, ODOUR, ETC.
ORGANICS									0-20cm organics
SAND			0.2						20cm - 30cm oxide stained salt & pepper SAND fine to medium
FROZEN ↓			0.4						Refusal on frozen SAND, as above at 30cm

KLOHN-CRIPPEN Klohn-Crippen

JOB No. PB5314 03 LOGGED BY BST

PROJECT MT. NANSEN

LOCATION MT NANSEN MINE

HOLE No. 9412 INSPECTOR BST

APPROVED BST DATE 16 JULY 91

FIELD TEST PIT LOG

CLIENT B.Y.G NATURAL RESOURCES JOB No. PB5314 03 PIT No. 9413 SHEET No. 1 of 1
PROJECT MT. NANSEN GOLD MINE WEATHER CLEAR INSPECTOR B. TRENHOLME
SITE SITE #4, MT NANSEN TEMP. 25 °C STARTED ____ .M. ____ 19__
LOCATION: LATITUDE ____ DEPTH 1.2 M FINISHED ____ .M. ____ 19__
.DEPARTURE ____ WIDTH ____ ELEVATIONS: DATUM ____
CONTRACTOR I CAN DIG IT CONTRACTING LENGTH ____ GROUND SURFACE ____
METHOD OF EXCAVATION BACK HOE WATER LEVELS ____

LOG LEGEND: SILT, SAND, CLAY, GRAVEL
* SAMPLE CONDITION: GOOD, DISTURBED, FAIR, LOST
** SAMPLING METHOD: B - THIN WALL TUBE; C - PISTON SAMPLER; E - AUGER; G - SHOVEL; H - CARVED BLOCK
** SHIPPING CONTAINER: O - TUBE; P - WATER CONTENT TIN; Q - GLASS JAR; R - CLOTH BAG; S - PLIOFILM BAG; T - METAL CAN; U - WOODEN BOX

SKETCH	LOG	ELEVATION	DEPTH	SAMPLE *	SAMPLE ** TYPE	SAMPLE NO.	SAMPLE SIZE	SAMPLE RET'D.	DESCRIPTION AND FIELD NOTES: COLOUR, CONSISTENCY, DENSITY, TEXTURE, STRUCTURE, SHAPE AND SURFACE CONDITION OF GRAINS, TESTING AND SAMPLING PROCEDURES AND EQUIPMENT, WATER AND GAIN, ODOUR, ETC.
ORGANIC SOIL & ROOTS									0-15cm organic soil & roots
			0.2						15cm - 1.2m
			0.4						Clean, fine to medium SAND, med. brown, no visible ice med dense, some angular pebbles - Angular broken rock at base of pit - close to bedrock?
SAND			0.6						
			0.8						
angular rock at base			1.0						
△ ◇ △			1.2						Refusal on frozen SAND @ above at 1.2m
frozen ↓			1.4						

KLOHN-CRIPPEN
Klohn-Crippen

JOB No. PB5314 03 LOGGED BY BST
PROJECT MT. NANSEN
LOCATION MT NANSEN MINE
HOLE No. 9413 INSPECTOR BST
APPROVED BST DATE 16 JULY 04

FIELD TEST PIT LOG

CLIENT B.Y.G NATURAL RESOURCES JOB No. PB5314 03 PIT No. 9414 SHEET No. 1 of 1
PROJECT MT. NANSEN GOLD MINE WEATHER CLEAR INSPECTOR B. TRENHOLME
SITE SITE #4, MT NANSEN TEMP. 25 °C STARTED ___ .M. ___ 19__
LOCATION: LATITUDE ___ DEPTH 1.5M FINISHED ___ .M. ___ 19__
DEPARTURE ___ WIDTH ___ ELEVATIONS: DATUM ___
CONTRACTOR I CAN DIG IT CONTRACTING LENGTH ___ GROUND SURFACE ___
METHOD OF EXCAVATION BACK HOE WATER LEVELS ___

LOG LEGEND: SILT, SAND, CLAY, GRAVEL
* SAMPLE CONDITION: GOOD, DISTURBED, FAIR, LOST
** SAMPLING METHOD: B - THIN WALL TUBE; C - PISTON SAMPLER; E - AUGER; G - SHOVEL; H - CARVED BLOCK
** SHIPPING CONTAINER: O - TUBE; P - WATER CONTENT TIN; Q - GLASS JAR; R - CLOTH BAG; S - PLIOFILM BAG; T - METAL CAN; U - WOODEN BOX

SKETCH	LOG	ELEVATION	DEPTH	SAMPLE *	SAMPLE ** TYPE	SAMPLE NO.	SAMPLE SIZE	SAMPLE RET'D.	DESCRIPTION AND FIELD NOTES: COLOUR, CONSISTENCY, DENSITY, TEXTURE, STRUCTURE, SHAPE AND SURFACE CONDITION OF GRAINS, TESTING AND SAMPLING PROCEDURES AND EQUIPMENT, WATER AND GAIN, ODOUR, ETC.
ORGANIC SOIL, ROOTS									0-10cm organic soil & roots
			0.2						10cm-1.5m
									colluvial soil, SAND,
			0.4						trace to little silt,
									some angular pebbles
			0.6						no visible ice
SANDY COLLUVIUM									
			0.8						Refusal on fractured
									rock at 1.5m
			1.0						
			1.2						
			1.4						
X 1 fractured rock ↓			1.6						

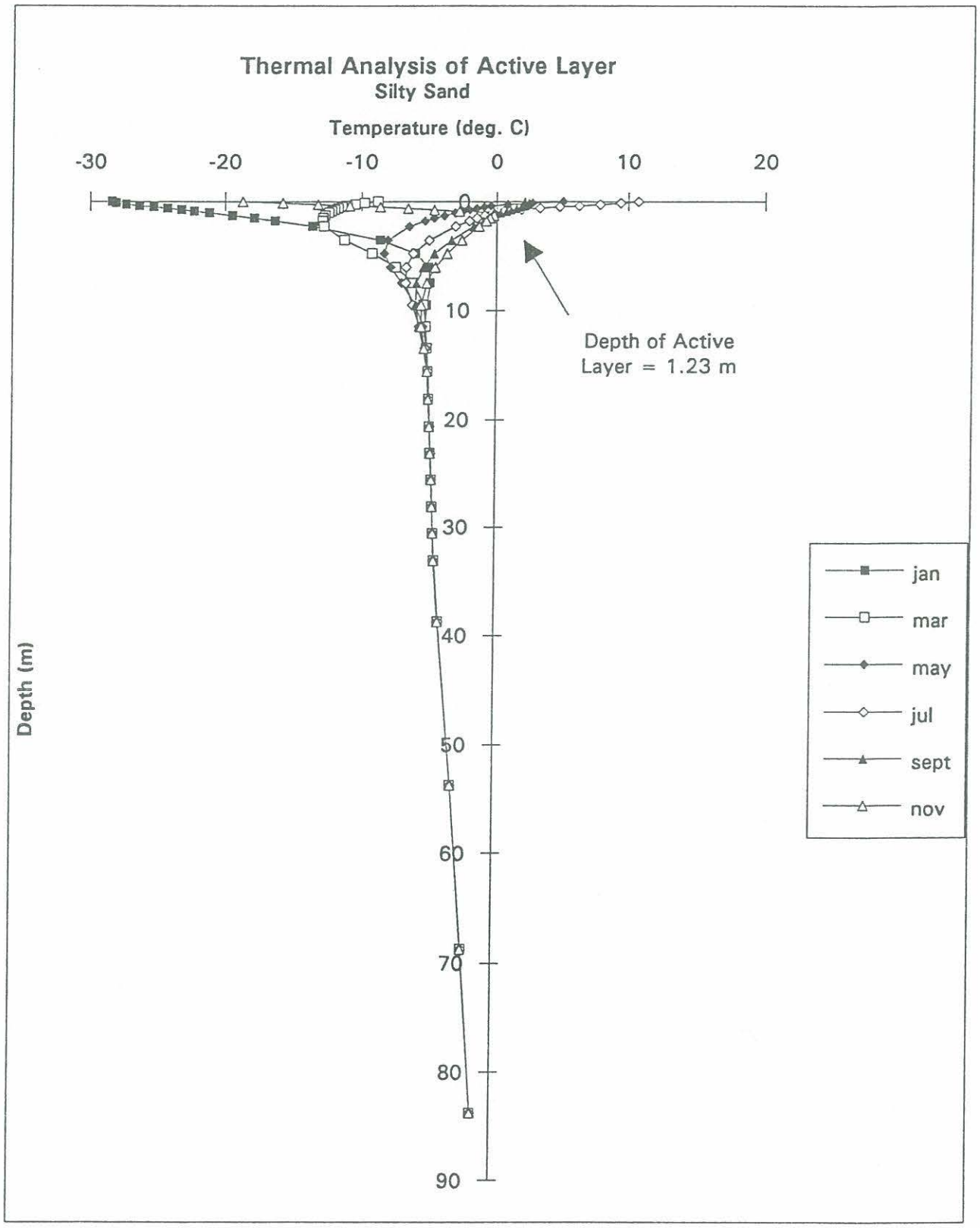
KLOHN-CRIPPEN
Klohn-Crippen

JOB No. PB5314 03 LOGGED BY BST
PROJECT MT. NANSEN
LOCATION MT NANSEN MINE
HOLE No. INSPECTOR BST
APPROVED DATE 16 JULY 94

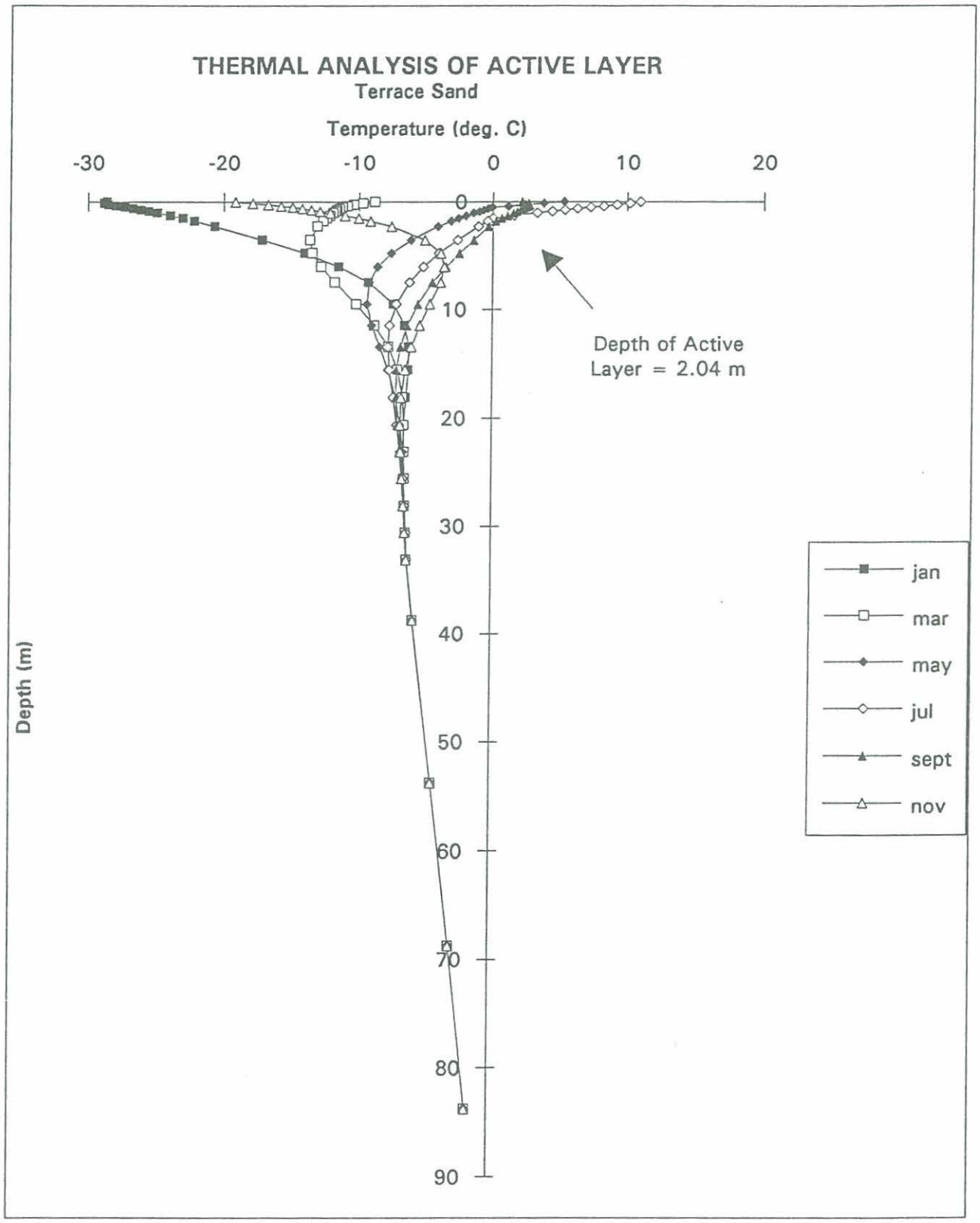
Appendix I-III
Thermal Analysis

APPENDIX III
THERMAL ANALYSIS

Thermal analyses were carried out to determine the depth of the active layer. Two plots are shown (terrace sand and silty sand) representing the two main soil types on site. The terrace sand will probably be used for low construction.


Thermal Analysis of Active Layer
Silty Sand
Temperature (deg. C)
-30
-20
-10
0
10
20
Depth (m)
0
10
20
30
40
50
60
70
80
90
Depth of Active Layer = 1.23 m
jan
mar
may
jul
sept
nov

D8_50YR.XLC


THERMAL ANALYSIS OF ACTIVE LAYER
Terrace Sand
Temperature (deg. C)
-30
-20
-10
0
10
20
0
10
20
30
40
50
60
70
80
90
Depth (m)
Depth of Active Layer = 2.04 m
jan
mar
may
jul
sept
nov

Appendix I-IV
Stability Analysis for Foundation Liquefaction

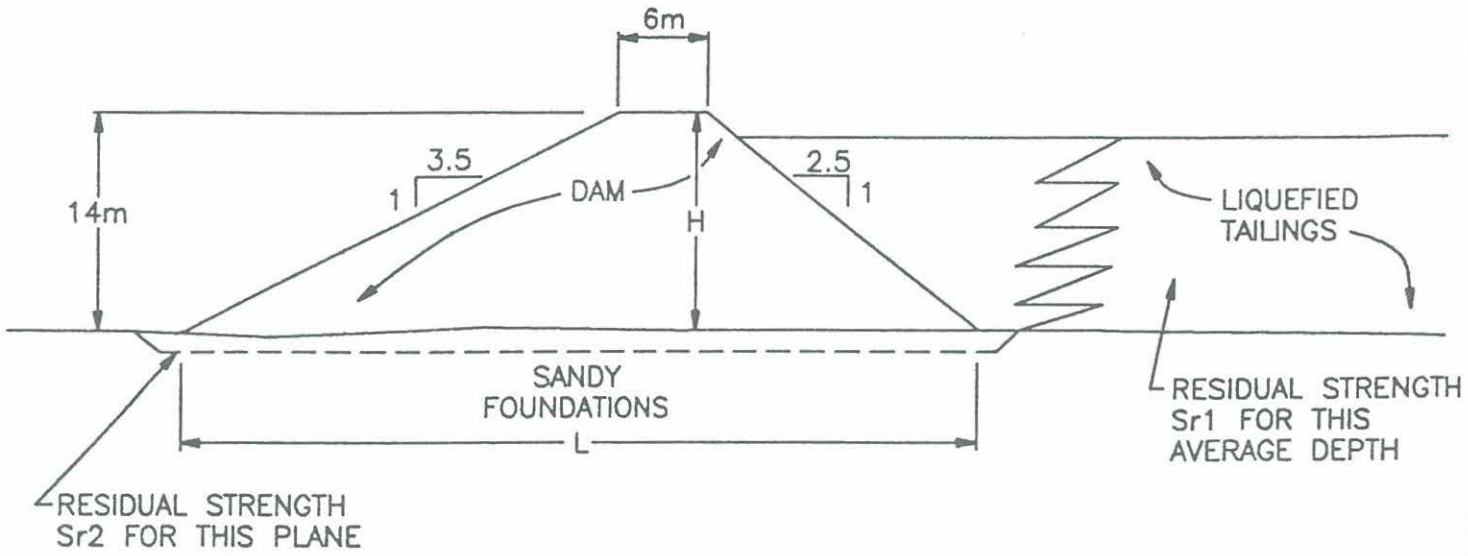
APPENDIX IV

STABILITY ANALYSIS FOR FOUNDATION LIQUEFACTION

There is a small potential for thawing of the foundations, particularly at the beginning of operations. This could result in loose sands which may be subject to liquefaction under seismic conditions. The residual strength of the tailings following liquefaction (S_{r1}) has been assessed using relationships developed from case histories (see Figure IV.1). Using these relationships, the residual strength can be estimated as a fraction of the initial vertical stress (σ_{v0}') related to the $(N_1)_{60}$ value. The $(N_1)_{60}$ value is normally derived from cone penetration tests. However, this is impossible in frozen ground. Based on previous experience, $(N_1)_{60}$ values in the range of 8 to 10 are conservatively assumed for the thawed foundation sands and for the tailings. From the lower bound of the plot of $(N_1)_{60}$ vs. S_r/σ_{v0}' (see Figure IV.1 after Stark and Mesri, 1992), a value of 0.09 is implied for S_r/σ_{v0}'. Consequently, a residual strength for liquefied tailings and foundation sands of 0.09 times the vertical stress is assumed for design.

For the overall stability of the embankment, a simple two-dimensional model is used to calculate a factor of safety (see Figure IV.2). It is assumed that the entire saturated mass of tailings behind the embankment will liquefy. It is also assumed that a layer of saturated sand in the foundations will also liquefy, producing a potential horizontal failure path underneath the dam. The dry density of the tailings is assumed to be about 1.25 tonnes/m^3 (12.26 kN/m^3). The dry density of the compacted sand embankment is assumed to be about 1.75 tonnes/m^3 (17 kN/m^3). The residual strength following liquefaction (S_{r1}) of the tailings is calculated according to the average depth of tailings, or about 6 m:

$$S_{r1} = (0.09)(12.26\ \text{kN/m}^3)(6\ \text{m}) = 6.6\ \text{kPa}$$



Sr1 = RESIDUAL STRENGTH OF LIQUEFIED TAILINGS

Sr2 = RESIDUAL STRENGTH OF LIQUEFIED SANDS ALONG THE HORIZONTAL FAILURE SURFACE.

L = HORIZONTAL WIDTH OF DAM BASE

H = AVERAGE DEPTH OF THE FAILURE SURFACE.

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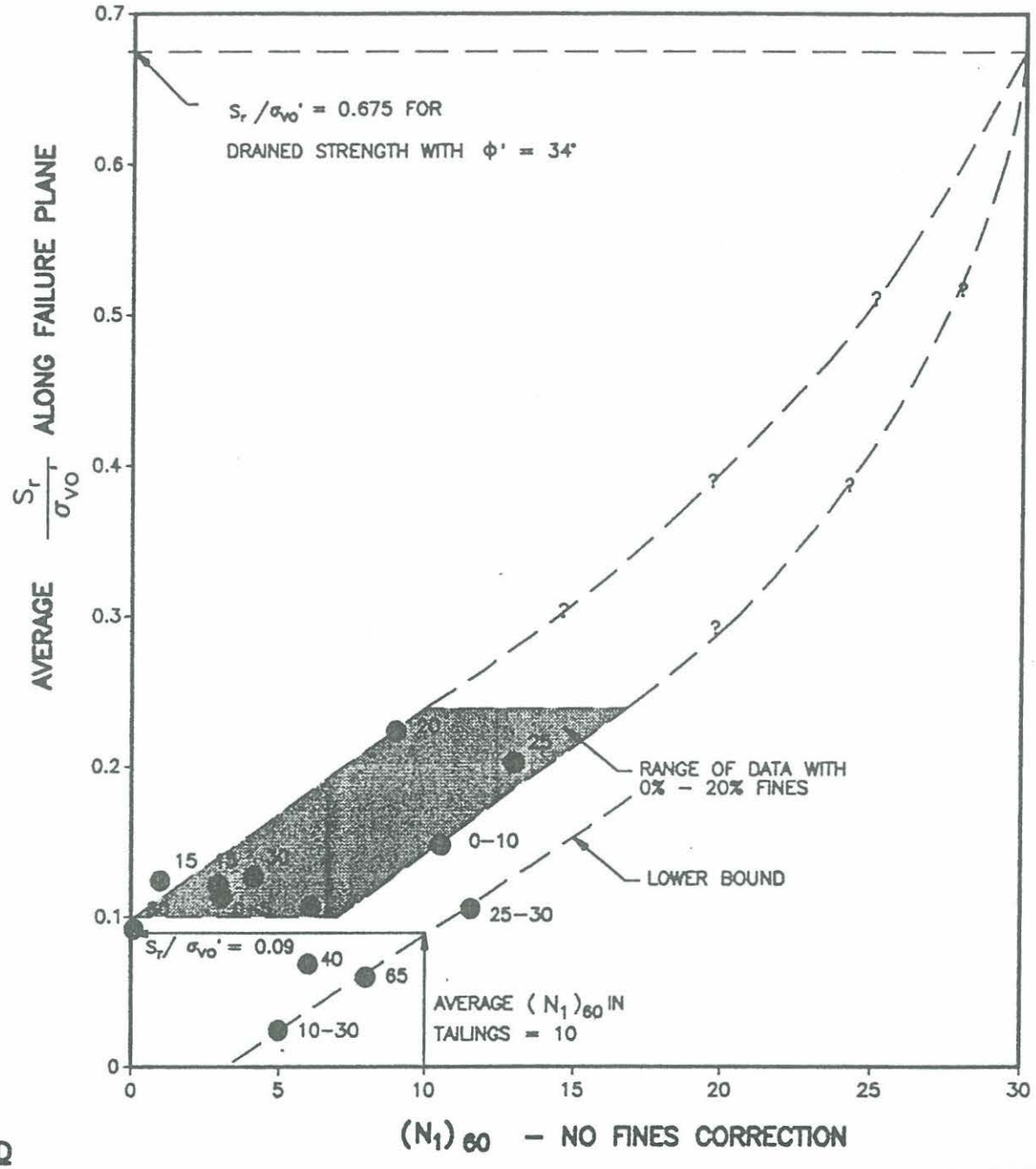
SCALE NOT TO SCALE

KLOHN-CRIPPEN

PROJECT: MT. NANSEN GOLD PROJECT

TITLE: LIQUEFACTION FAILURE MODEL

CLIENT:	DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
B.Y.G. NATURAL RESOURCES INC.	APPROVED Klohn-Crippen	PB531403	FIG IV-2	



LEGEND

10 — 10% FINES

AFTER STARK AND MESRI (1992)

NOTES:

S_r = AVERAGE RESIDUAL SHEAR STRENGTH BACKCALCULATED ALONG FAILURE PLANE IN LIQUEFIED SOIL MASS USING POST–FAILURE GEOMETRY

σ_{vo}' = AVERAGE INITAIL VERTICAL STRESS IN LIQUEFIED SOIL MASS PRIOR TO FAILURE.

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SCALE

KLOHN-CRIPPEN

PROJECT: MT. NANSEN GOLD PROJECT

TITLE: STRESS – NORMALIZED S_r VERSUS $(N_1)_{60}$ FROM CASE HISTORIES

CLIENT:	DATE OF ISSUE	PROJECT No.	DWG. No.	REV.
B.Y.G. NATURAL RESOURCES INC. (Klohn-Crippen)		PB531403	FIG. IV–1	

The driving force (P_d) is generated by the hydrostatic head of the liquefied tailings (behaving as a dense slurry) behind the embankment, less a small strength component calculated from the residual strength (S_{r1}). The driving force is calculated according to the following equation:

$$P_d = 0.5\ \gamma\ h^2 - 2\ S_{r1}$$

$$P_d = (0.5)(12.26)12^2 - (2)(6.6) = 869\ \text{kN/m}$$

If we assume that the average depth of embankment dam above the foundation failure surface is about 8 m, then the residual strength (S_{r2}) along the basal failure plane is:

$$S_{r2} = (0.09)(17\ \text{kN/m}^3)(8\ \text{m}) = 13.8\ \text{kPa}$$

The length (L) of the failure surface times the residual strength (S_{r2}) gives the force resisting failure (P_r). Assuming a foundation length of 100 m, the resisting force is calculated according to the following equation:

$$P_r = L\ S_{r2}$$

$$P_r = (100)(13.8) = 1377\ \text{kN/m}$$

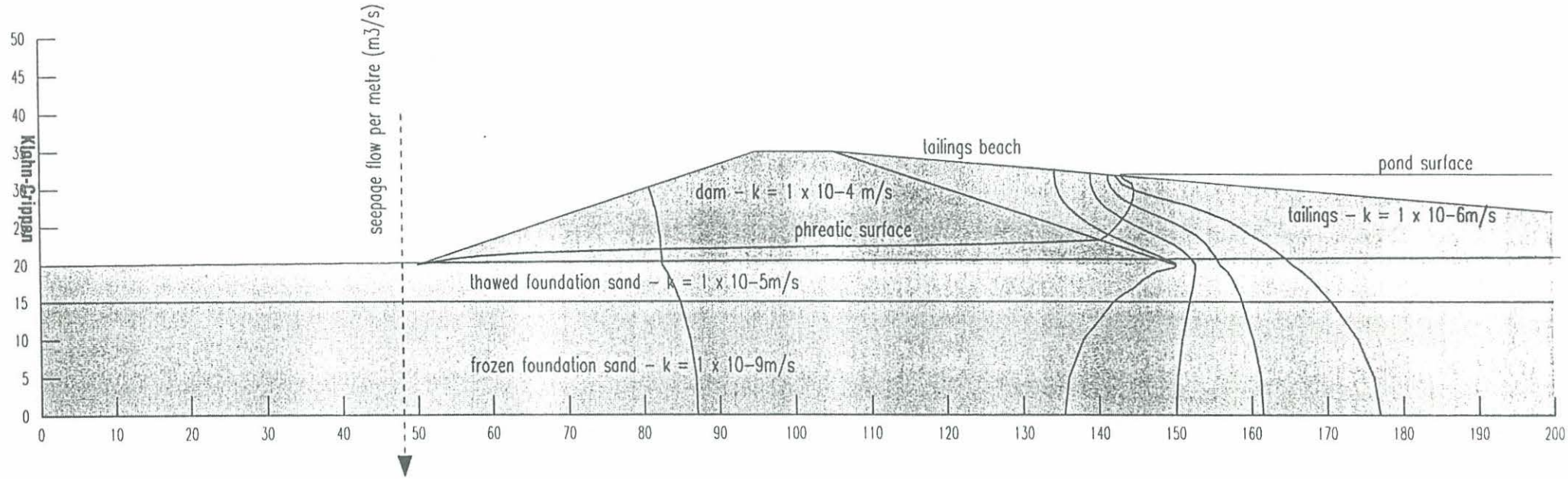
So the factor of safety against failure is equal to the ratio of the resisting force over the driving force:

$$F = P_r / P_d = 1377/869 = 1.6$$

From this it can be seen that the factor of safety is proportional to the length of the failure surface, or the width of the dam. For this situation, a factor of safety of 1.1 is considered appropriate for design. A factor of safety of 1.1 is achieved when the dam base width is about 80 m.

Appendix I-V
Seepage Analysis

SEEPAGE ANALYSIS RESULTS



Appendix I-VI
Water Balance Analysis

Water Balance for Mt. Nansen

Average Year

Description	Units	Year 1											
		Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Beginning of the Month WL		1137.0	1138.3	1138.9	1138.9	1138.9	1138.8	1138.8	1138.8	1138.8	1138.7	1141.3	1141.8
INFLOWS													
Annual Precipitation	mm	271											
Monthly Precipitation	mm	35.2	27.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	* 122.0	40.7	46.1
Natural Catchment	sq.km.	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Runoff Coefficient		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Runoff Volume	cu.m.	9,723	7,480	0	0	0	0	0	0	0	33,658	11,219	12,715
Direct Inflow	cu.m.	1,409	1,084	0	0	0	0	0	0	0	4,878	1,626	1,843
Solids Inflow	cu.m.	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318
Total Inflow	cu.m.	14,451	11,882	3,318	3,318	3,318	3,318	3,318	3,318	3,318	41,854	16,164	17,876
OUTFLOWS													
Annual Evaporation	mm	453											
Monthly Evaporation	mm	79.7	37.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.8	120.5	107.8
Evaporation Loss	cu.m.	576	360	0	0	0	0	0	0	0	1,175	2,245	2,231
Loss to Voids	cu.m.	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667
Total Losses	cu.m.	4,243	4,027	3,667	3,667	3,667	3,667	3,667	3,667	3,667	4,841	5,912	5,898
Net Inflow	cu.m.	10,208	7,855	-348	-348	-348	-348	-348	-348	-348	37,013	10,252	11,978
Existing Volume	cu.m.	19,655	29,862	37,717	37,369	37,020	36,672	36,323	35,975	35,626	35,278	72,291	82,543
Total Volume in Pond	cu.m.	29,862	37,717	37,369	37,020	36,672	36,323	35,975	35,626	35,278	72,291	82,543	94,521
End of the Month WL	m	1138.3	1138.9	1138.9	1138.9	1138.8	1138.8	1138.8	1138.8	1138.7	1141.3	1141.8	1142.3

* Cumulative precipitation from
October through May

Water Balance for Mt. Nansen

Average Year

Description	Units	Year 2											
		Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Beginning of the Month WL		1142.3	1142.7	1143.0	1142.9	1142.9	1142.9	1142.9	1142.9	1142.9	1142.9	1144.1	1144.4
INFLOWS													
Annual Precipitation	mm	271											
Monthly Precipitation	mm	35.2	27.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	* 122.0	40.7	46.1
Natural Catchment	sq.km.	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Runoff Coefficient		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Runoff Volume	cu.m.	9,723	7,480	0	0	0	0	0	0	0	33,658	11,219	12,715
Direct Inflow	cu.m.	1,409	1,084	0	0	0	0	0	0	0	4,878	1,626	1,843
Solids Inflow	cu.m.	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318
Total Inflow	cu.m.	14,451	11,882	3,318	3,318	3,318	3,318	3,318	3,318	3,318	41,854	16,164	17,876
OUTFLOWS													
Annual Evaporation	mm												
Monthly Evaporation	mm	79.7	37.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.8	120.5	107.8
Evaporation Loss	cu.m.	1,834	918	0	0	0	0	0	0	0	2,763	3,890	3,644
Loss to Voids	cu.m.	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667
Total Losses	cu.m.	5,501	4,584	3,667	3,667	3,667	3,667	3,667	3,667	3,667	6,429	7,556	7,311
Net Inflow	cu.m.	8,950	7,298	-348	-348	-348	-348	-348	-348	-348	35,425	8,607	10,565
Existing Volume	cu.m.	94,521	103,471	110,769	110,420	110,072	109,723	109,375	109,026	108,678	108,329	143,754	152,362
Total Volume in Pond	cu.m.	103,471	110,769	110,420	110,072	109,723	109,375	109,026	108,678	108,329	143,754	152,362	162,927
End of the Month WL	m	1142.7	1143.0	1142.9	1142.9	1142.9	1142.9	1142.9	1142.9	1142.9	1144.1	1144.4	1144.7

* Cumulative precipitation from October through May

Water Balance for Mt. Nansen

Average Year

Description	Units	Year 3											
		Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Beginning of the Month WL		1144.7	1144.9	1145.0	1145.0	1145.0	1145.0	1145.0	1145.0	1145.0	1145.0	1145.9	1146.0
INFLOWS													
Annual Precipitation	mm	271											
Monthly Precipitation	mm	35.2	27.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	* 122.0	40.7	46.1
Natural Catchment	sq.km.	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Runoff Coefficient		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Runoff Volume	cu.m.	9,723	7,480	0	0	0	0	0	0	0	33,658	11,219	12,715
Direct Inflow	cu.m.	1,409	1,084	0	0	0	0	0	0	0	4,878	1,626	1,843
Solids Inflow	cu.m.	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318
Total Inflow	cu.m.	14,451	11,882	3,318	3,318	3,318	3,318	3,318	3,318	3,318	41,854	16,164	17,876
OUTFLOWS													
Annual Evaporation	mm												
Monthly Evaporation	mm	79.7	37.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.8	120.5	107.8
Evaporation Loss	cu.m.	2,844	1,377	0	0	0	0	0	0	0	4,082	5,290	4,864
Loss to Voids	cu.m.	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667
Total Losses	cu.m.	6,511	5,044	3,667	3,667	3,667	3,667	3,667	3,667	3,667	7,748	8,956	8,531
Net Inflow	cu.m.	7,940	6,838	-348	-348	-348	-348	-348	-348	-348	34,106	7,207	9,346
Existing Volume	cu.m.	162,927	170,867	177,705	177,356	177,008	176,659	176,311	175,962	175,614	175,265	209,371	216,578
Total Volume in Pond	cu.m.	170,867	177,705	177,356	177,008	176,659	176,311	175,962	175,614	175,265	209,371	216,578	225,924
End of the Month WL	m	1144.9	1145.0	1145.0	1145.0	1145.0	1145.0	1145.0	1145.0	1145.0	1145.9	1146.0	1146.2

* Cumulative precipitation from
October through May

Water Balance for Mt. Nansen

200-Year Wet Year

Description	Units	Year 1											
		Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Beginning of the Month WL		1137.0	1139.0	1140.1	1140.1	1140.1	1140.1	1140.1	1140.0	1140.0	1140.0	1143.2	1143.9
INFLOWS													
Annual Precipitation	mm	370											
Monthly Precipitation	mm	48.1	37.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	* 166.5	55.5	62.9
Natural Catchment	sq.km.	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Runoff Coefficient		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Runoff Volume	cu.m.	17,701	13,616	0	0	0	0	0	0	0	61,272	20,424	23,147
Direct Inflow	cu.m.	1,924	1,480	0	0	0	0	0	0	0	6,660	2,220	2,516
Solids Inflow	cu.m.	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318
Total Inflow	cu.m.	22,943	18,414	3,318	3,318	3,318	3,318	3,318	3,318	3,318	71,250	25,962	28,981
OUTFLOWS													
Annual Evaporation	mm	453											
Monthly Evaporation	mm	79.7	37.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.8	120.5	107.8
Evaporation Loss	cu.m.	576	430	0	0	0	0	0	0	0	1,530	3,270	3,315
Loss to Voids	cu.m.	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667
Total Losses	cu.m.	4,243	4,097	3,667	3,667	3,667	3,667	3,667	3,667	3,667	5,197	6,936	6,982
Net Inflow	cu.m.	18,700	14,318	-348	-348	-348	-348	-348	-348	-348	66,053	19,026	22,000
Existing Volume	cu.m.	19,655	38,355	52,672	52,324	51,975	51,627	51,278	50,930	50,581	50,233	116,286	135,312
Total Volume in Pond	cu.m.	38,355	52,672	52,324	51,975	51,627	51,278	50,930	50,581	50,233	116,286	135,312	157,311
End of the Month WL	m	1139.0	1140.1	1140.1	1140.1	1140.1	1140.1	1140.0	1140.0	1140.0	1143.2	1143.9	1144.5

* Cumulative precipitation from October through May

Water Balance for Mt. Nansen

200-Year Wet Year

Description	Units	Year 3											
		Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Beginning of the Month WL		1144.7	1145.1	1145.4	1145.4	1145.4	1145.4	1145.4	1145.4	1145.4	1145.4	1146.7	1147.0
INFLOWS													
Annual Precipitation	mm	370											
Monthly Precipitation	mm	48.1	37.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	* 166.5	55.5	62.9
Natural Catchment	sq.km.	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Runoff Coefficient		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Runoff Volume	cu.m.	17,701	13,616	0	0	0	0	0	0	0	61,272	20,424	23,147
Direct Inflow	cu.m.	1,924	1,480	0	0	0	0	0	0	0	6,660	2,220	2,516
Solids Inflow	cu.m.	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318
Total Inflow	cu.m.	22,943	18,414	3,318	3,318	3,318	3,318	3,318	3,318	3,318	71,250	25,962	28,981
OUTFLOWS													
Annual Evaporation	mm												
Monthly Evaporation	mm	79.7	37.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.8	120.5	107.8
Evaporation Loss	cu.m.	2,844	1,433	0	0	0	0	0	0	0	4,367	6,107	5,727
Loss to Voids	cu.m.	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667
Total Losses	cu.m.	6,511	5,100	3,667	3,667	3,667	3,667	3,667	3,667	3,667	8,034	9,773	9,394
Net Inflow	cu.m.	16,432	13,314	-348	-348	-348	-348	-348	-348	-348	63,216	16,189	19,587
Existing Volume	cu.m.	162,927	179,359	192,673	192,325	191,976	191,628	191,279	190,931	190,582	190,234	253,450	269,639
Total Volume in Pond	cu.m.	179,359	192,673	192,325	191,976	191,628	191,279	190,931	190,582	190,234	253,450	269,639	289,226
End of the Month WL	m	1145.1	1145.4	1145.4	1145.4	1145.4	1145.4	1145.4	1145.4	1145.4	1146.7	1147.0	1147.4

* Cumulative precipitation from
October through May

Water Balance for Mt. Nansen

10-Year Dry Year

Description	Units	Year 1											
		Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Beginning of the Month WL		1137.0	1138.0	1138.5	1138.5	1138.4	1138.4	1138.4	1138.3	1138.3	1138.3	1140.4	1140.8
INFLOWS Annual Precipitation	mm	200											
Monthly Precipitation	mm	26.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	* 90.0	30.0	34.0
Natural Catchment	sq.km.	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Runoff Coefficient		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Runoff Volume	cu.m.	7,176	5,520	0	0	0	0	0	0	0	24,840	8,280	9,384
Direct Inflow	cu.m.	1,040	800	0	0	0	0	0	0	0	3,600	1,200	1,360
Solids Inflow	cu.m.	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318
Total Inflow	cu.m.	11,534	9,638	3,318	3,318	3,318	3,318	3,318	3,318	3,318	31,758	12,798	14,062
OUTFLOWS Annual Evaporation	mm	453											
Monthly Evaporation	mm	79.7	37.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.8	120.5	107.8
Evaporation Loss	cu.m.	576	336	0	0	0	0	0	0	0	1,052	1,879	1,838
Loss to Voids	cu.m.	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667
Total Losses	cu.m.	4,243	4,003	3,667	3,667	3,667	3,667	3,667	3,667	3,667	4,719	5,546	5,505
Net Inflow	cu.m.	7,291	5,635	-348	-348	-348	-348	-348	-348	-348	27,039	7,253	8,557
Existing Volume	cu.m.	19,655	26,946	32,581	32,232	31,884	31,536	31,187	30,839	30,490	30,142	57,181	64,433
Total Volume in Pond	cu.m.	26,946	32,581	32,232	31,884	31,536	31,187	30,839	30,490	30,142	57,181	64,433	72,990
End of the Month WL	m	1138.0	1138.5	1138.5	1138.4	1138.4	1138.4	1138.3	1138.3	1138.3	1140.4	1140.8	1141.3

* Cumulative precipitation from
October through May

Water Balance for Mt. Nansen

10-Year Dry Year

Description	Units	Year 3											
		Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Beginning of the Month WL		1144.7	1144.8	1144.9	1144.9	1144.9	1144.9	1144.9	1144.9	1144.8	1144.8	1145.5	1145.6
INFLOWS													
Annual Precipitation	mm	200											
Monthly Precipitation	mm	26.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	* 90.0	30.0	34.0
Natural Catchment	sq.km.	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Runoff Coefficient		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Runoff Volume	cu.m.	7,176	5,520	0	0	0	0	0	0	0	24,840	8,280	9,384
Direct Inflow	cu.m.	1,040	800	0	0	0	0	0	0	0	3,600	1,200	1,360
Solids Inflow	cu.m.	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318	3,318
Total Inflow	cu.m.	11,534	9,638	3,318	3,318	3,318	3,318	3,318	3,318	3,318	31,758	12,798	14,062
OUTFLOWS													
Annual Evaporation	mm												
Monthly Evaporation	mm	79.7	37.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	107.8	120.5	107.8
Evaporation Loss	cu.m.	2,844	1,358	0	0	0	0	0	0	0	3,984	4,967	4,523
Loss to Voids	cu.m.	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667	3,667
Total Losses	cu.m.	6,511	5,025	3,667	3,667	3,667	3,667	3,667	3,667	3,667	7,650	8,633	8,190
Net Inflow	cu.m.	5,023	4,613	-348	-348	-348	-348	-348	-348	-348	24,108	4,165	5,872
Existing Volume	cu.m.	162,927	167,950	172,563	172,215	171,866	171,518	171,170	170,821	170,473	170,124	194,232	198,397
Total Volume in Pond	cu.m.	167,950	172,563	172,215	171,866	171,518	171,170	170,821	170,473	170,124	194,232	198,397	204,269
End of the Month WL	m	1144.8	1144.9	1144.9	1144.9	1144.9	1144.9	1144.9	1144.8	1144.8	1145.5	1145.6	1145.7

* Cumulative precipitation from
October through May

Appendix I-VII
Waste Dump Stability



KLOHN-CRIPPEN

November 02, 1994

B.Y.G. Natural Resources Inc.
208, 3190 St. John Street
Port Moody, British Columbia
V3H 2C7

Mr. Jim Smith,
Vice President Operations

Dear Mr. Smith

Mt. Nansen Gold Project, Carmacks, Yukon
Geotechnical Stability of Waste Dumps

At your request, we have completed a review of the geotechnical stability of the proposed waste dumps at the Mt. Nansen Mine site.

The proposed geometry for the waste dumps was provided by BYG, as shown on the attachments to your letter of October 30, 1994, a copy of which is attached. The waste dump location is near the top of the valley side, adjacent to the proposed open pit, and would occupy a plan area of 6.8 ha. The main dump surface is at an elevation of about 1272 m. At its lowest point, the toe of the dump is at about elevation 1250 m, resulting in a maximum dump height of about 22 m. Foundation slopes beneath the waste dumps are less than 10°. Dump slopes are to be built at an angle of about 28° to facilitate reclamation. This is about 10° flatter (and consequently more stable) than the natural angle of repose for waste rock which is usually about 38°.

From previous work by Klohn-Crippen, foundation soils in the elevation range of the proposed dumps are expected to consist of relatively thin (mostly less than about 1 m), mainly gravelly to bouldery colluvial materials overlying bedrock. These soils have been inspected in test pits and exploration trenches in the area. Although some of the foundation soils are expected to be permanently frozen, they are not expected to be ice-rich because of their coarse gradation and well drained nature. These soils will provide excellent foundation conditions. We understand that you intend to strip and stockpile any topsoil prior to dump development.

PB 5314 04 03
941102

Because of the dump's position near the top of the ridge, there is expected to be little surface water runoff from above. The ditch uphill of the road which forms the northern perimeter of the dump will divert most of what little flow there might be. Because the dump will be developed by end dumping in several lifts, natural segregation of coarse rock is expected at the bottom of each lift. This will result in a coarse layer near the ground surface, which will promote good internal drainage and avoid development of high pore water pressures in the dump.

We have carried out stability analysis of the dump based on the following criteria:

- the dump geometry is as defined by the attached drawings from your letter;
- foundation soils have strength parameters of phi = 32° and C = 0
- dump materials have strength parameters of phi = 38° and C = 0
- a phreatic surface, as shown on Figure 1 and Figure 2, attached. This level of phreatic surface is considered conservative;
- The peak horizontal ground acceleration for seismic design were taken from the National Building Code of Canada (1990). The site lies between the 0.04g contour and the 0.08g contour. A value of 0.08g was chosen for design. This is a conservative value for design.

Two dimensional limit equilibrium stability analyses were carried out on Section A provided with your letter. This section has the steepest overall foundation slope. The minimum factor of safety calculated for static conditions is 1.5 (see Figure 1). For the seismic case, using a horizontal ground acceleration of 0.08g, the minimum factor of safety calculated is 1.2 (See Figure 2).

We conclude that the waste dump will have excellent geotechnical stability. The dumps are of only moderate height (maximum 22 m), will be founded on shallow slopes with strong foundation soils, will be well drained and have no significant runoff from upslope. The stability analysis performed on the highest section and steepest foundation slope demonstrated ample factor of safety. No special dump operation practices are required.

We trust that this letter meets your needs at the current time. Please call if you have any questions.

Yours truly,

KLOHN-CRIPPEN CONSULTANTS LTD.

Blair S. Trenholme, P.Eng.
Project Manager

Peter C. Lighthall, P.Eng.
Director, Mining Projects

BST:PCL:fh

Encls.

FIGURE 1 – STATIC STABILITY ANALYSIS

Stability Analysis on Section A-A

Bishop's Method

Factor of safety calculated for 12 circle tangents for each of 121 circle centres for a totoal of 1452 different cases

Factor of safety contours displayed on grid

Minimum factor of safety = 1,48

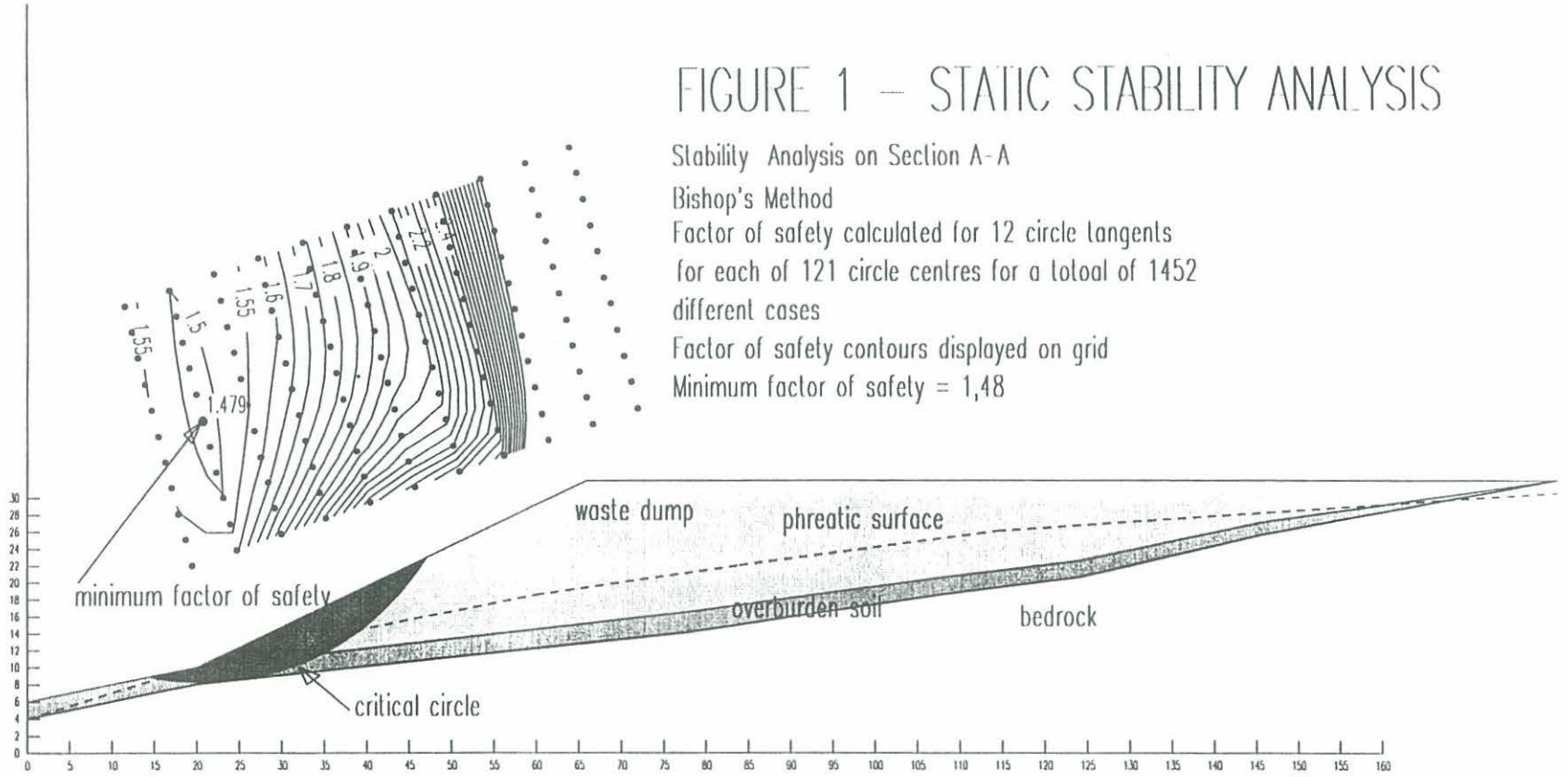
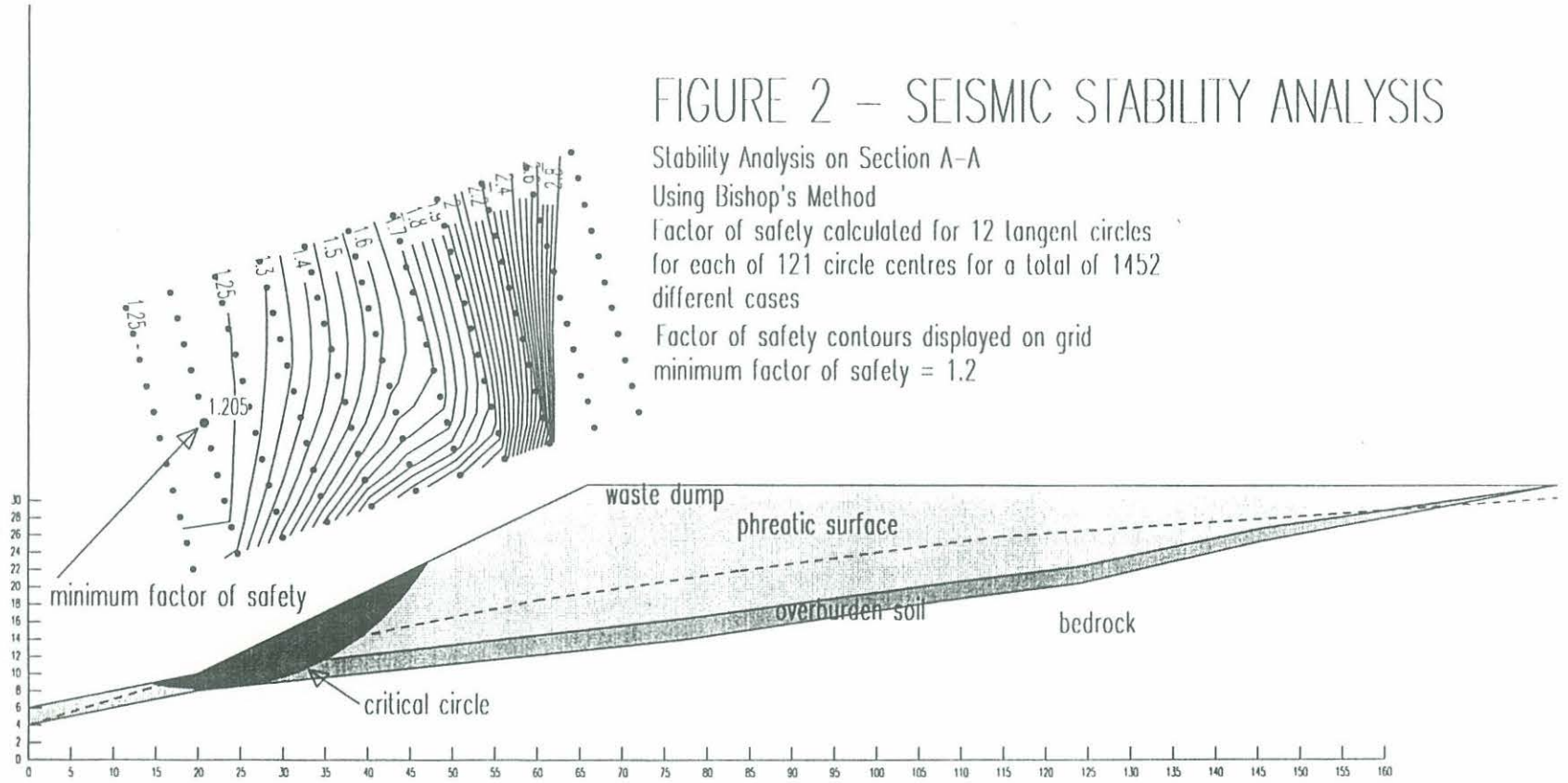
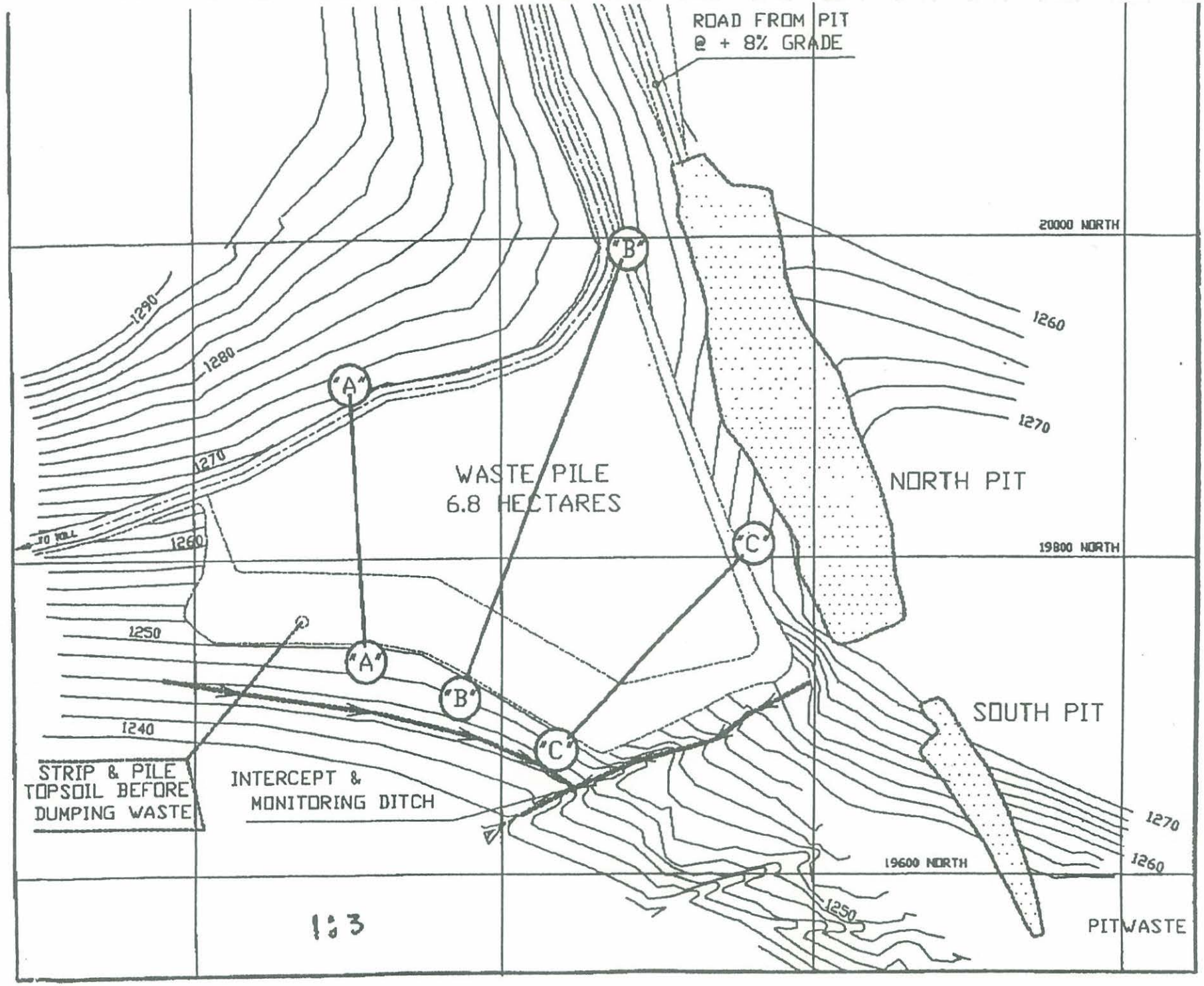
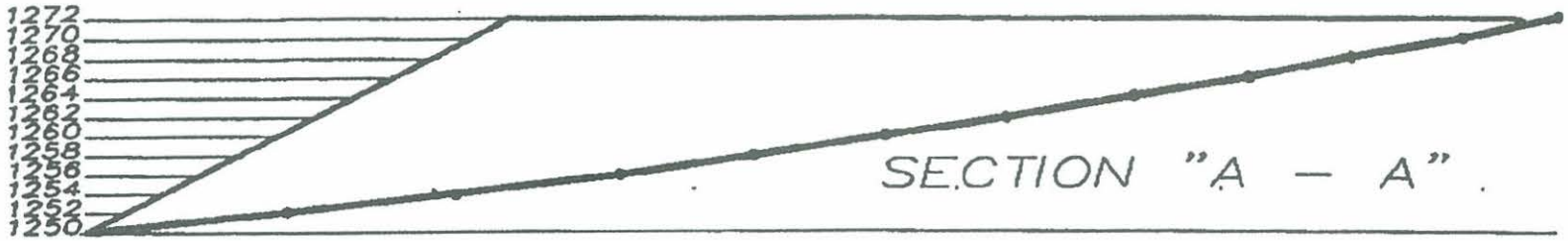


FIGURE 2 – SEISMIC STABILITY ANALYSIS

Stability Analysis on Section A-A
Using Bishop's Method
Factor of safety calculated for 12 tangent circles for each of 121 circle centres for a total of 1452 different cases
Factor of safety contours displayed on grid
minimum factor of safety = 1.2




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NORTH PIT
SOUTH PIT
PITWASTE
STRIP & PILE
TOPSOIL BEFORE
DUMPING WASTE
INTERCEPT &
MONITORING DITCH
1:3



SECTION "A – A"



SECTION "B –B"



SECTION "C – C"



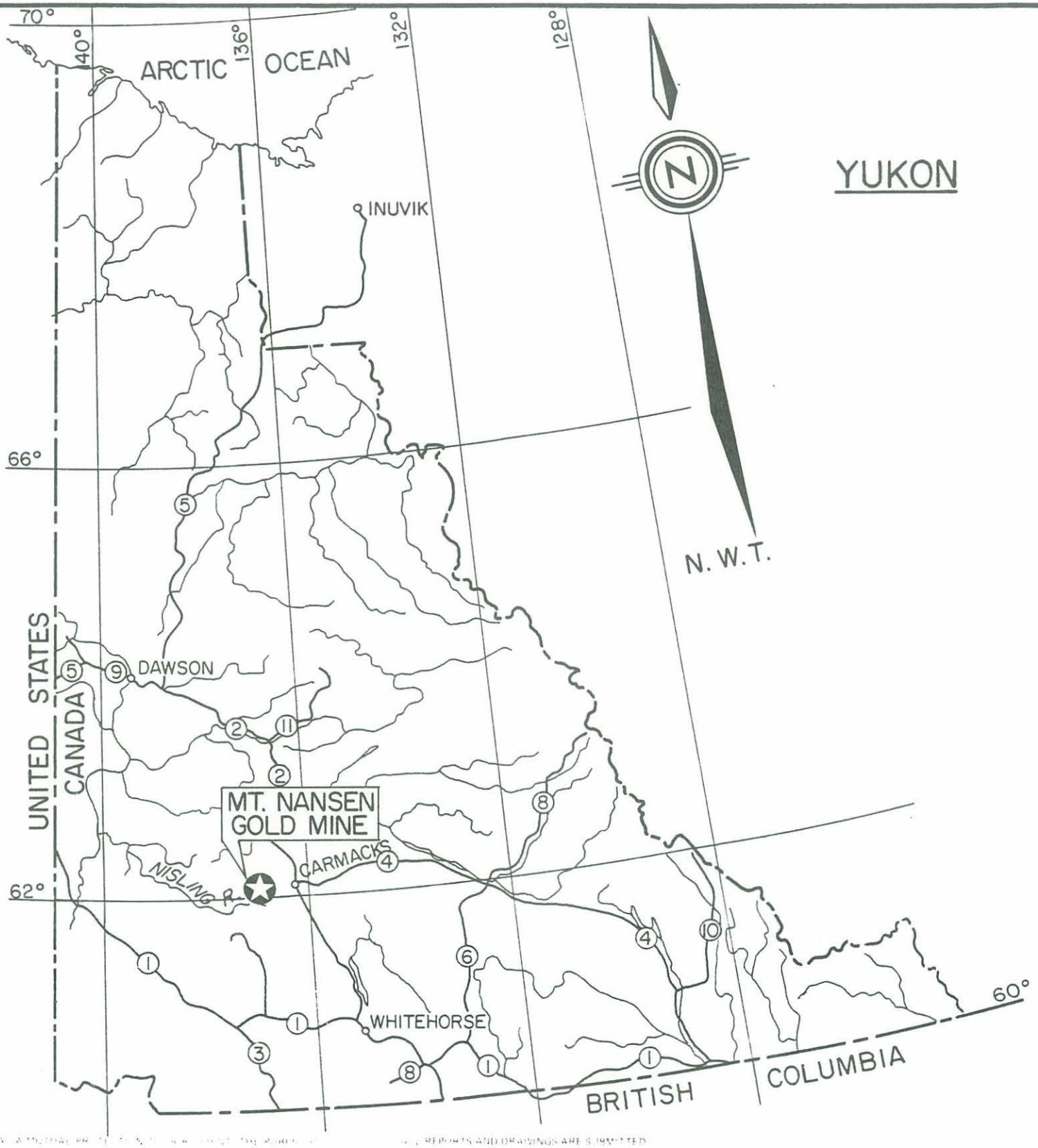
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Drawings

Location Plan (A-3001)

General Arrangement Plan (D-3002)

Plan, Section and Profile, Site #4 (D-3003)



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KLOHN-CRIPPEN

PROJECT: MOUNT NANSEN GOLD PROJECT

TITLE: SITE LOCATION

CLIENT: B.Y.G. NATURAL RESOURCES INC.

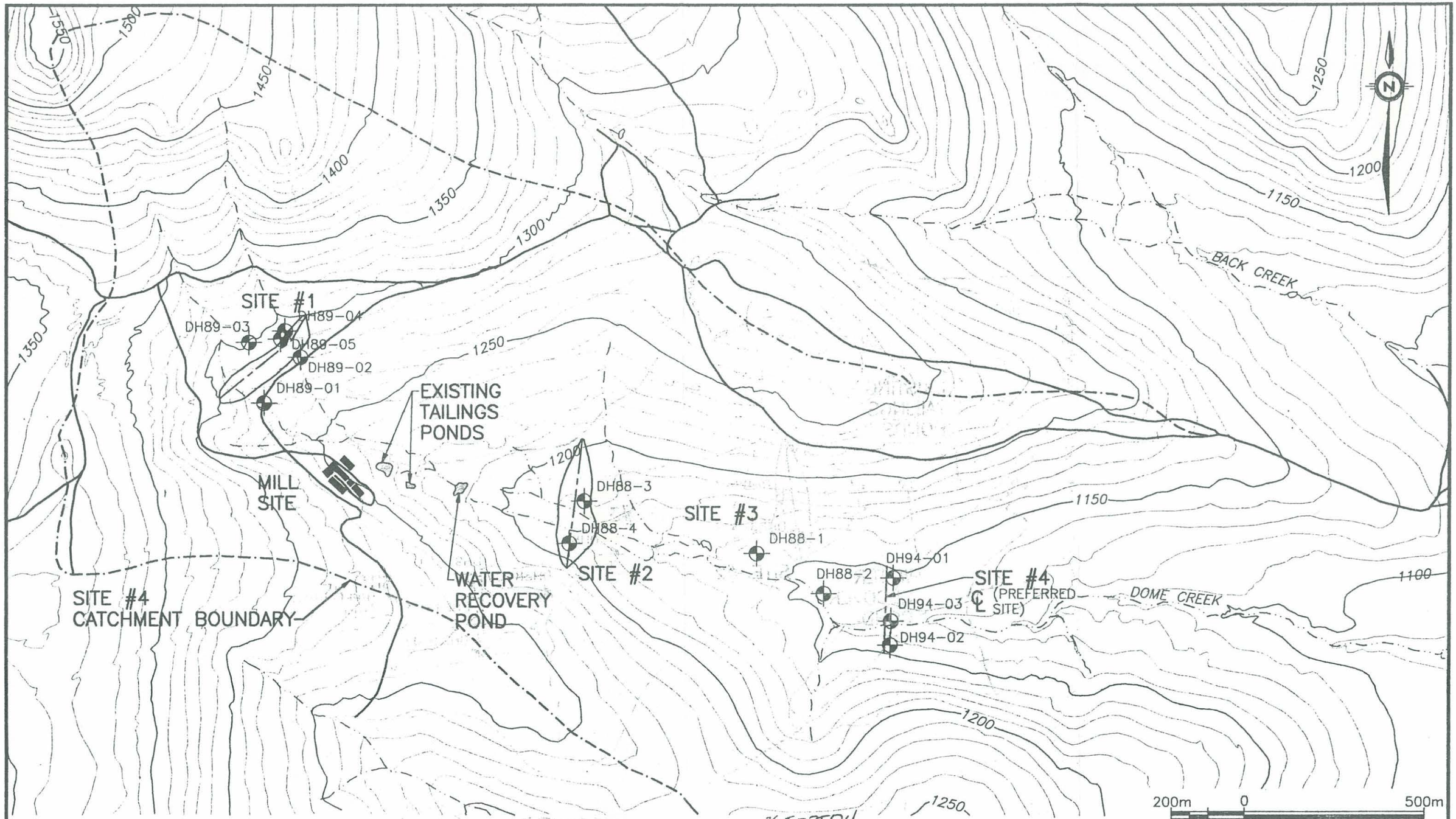
DATE OF ISSUE: 26 SEPT 94

APPROVED:

PROJECT No.: PB5314 03

DWG. No.: A-3001

REV.



TO BE READ WITH KLOHN-CRIPPEN REPORT DATED 26 SEPT 94

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DESIGNED	BEGT	
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RECOMMENDED		
APPROVED	BBS	09/94

KLOHN-CRIPPEN

CLIENT: B.Y.G. NATURAL RESOURCES INC.

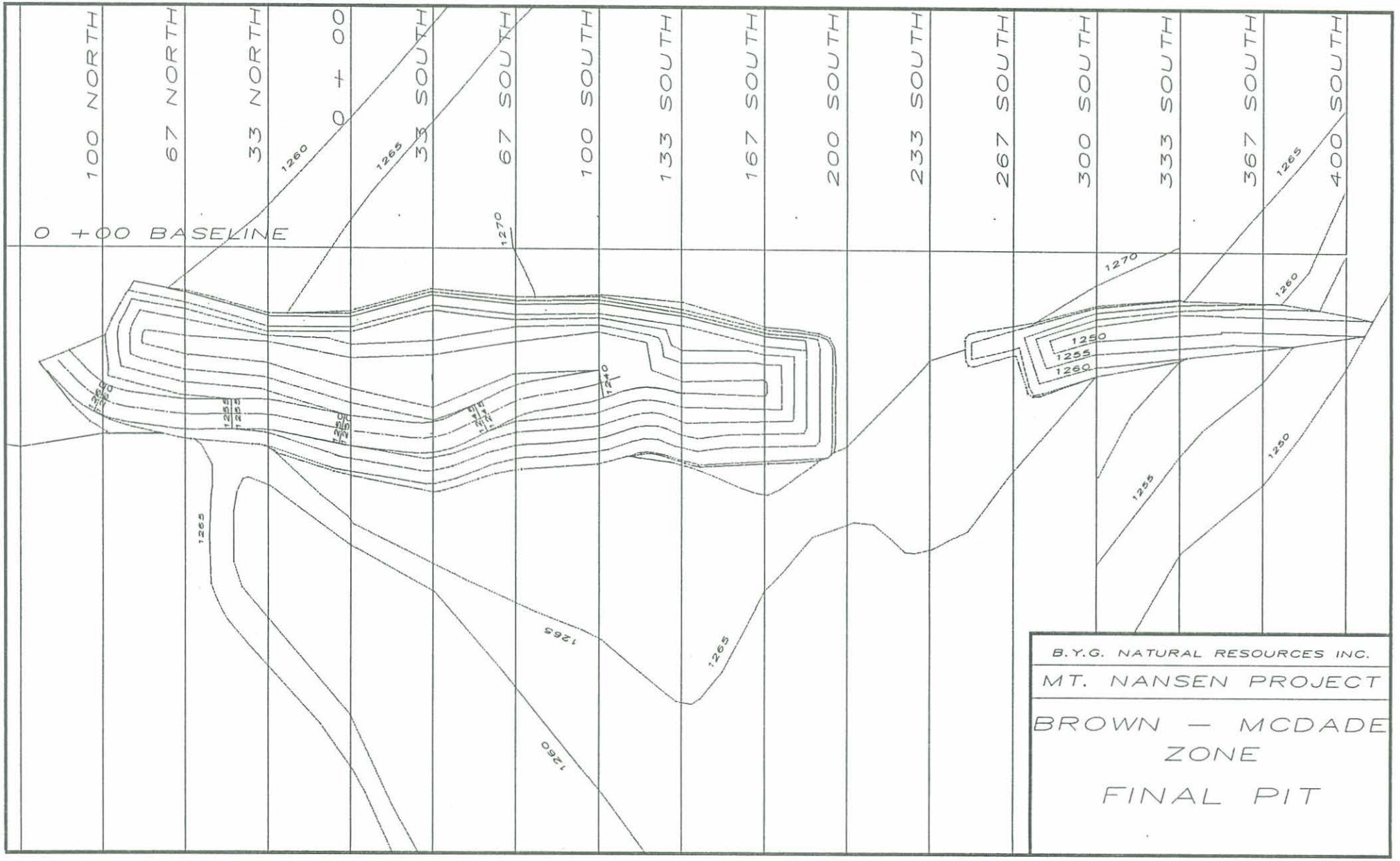
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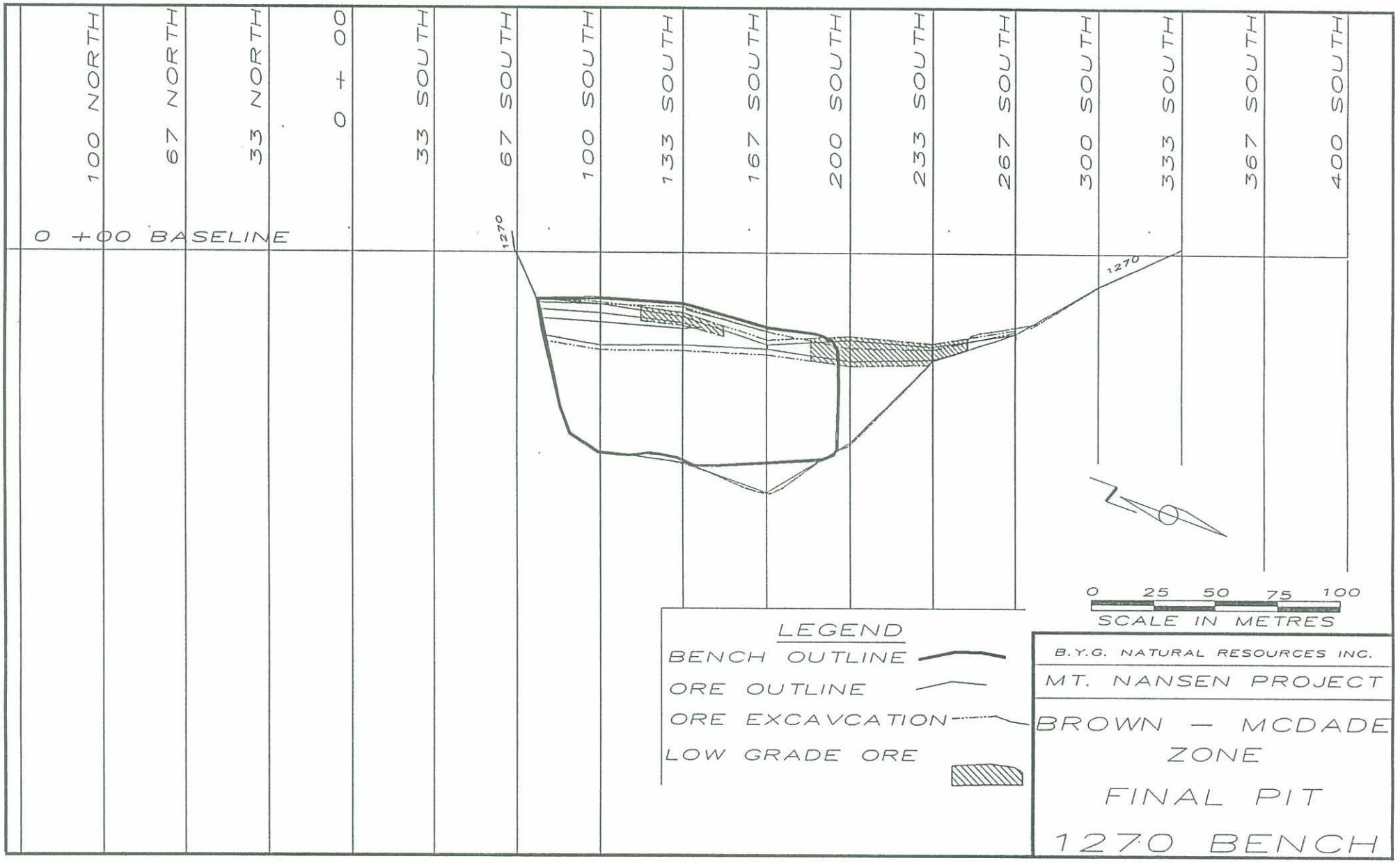
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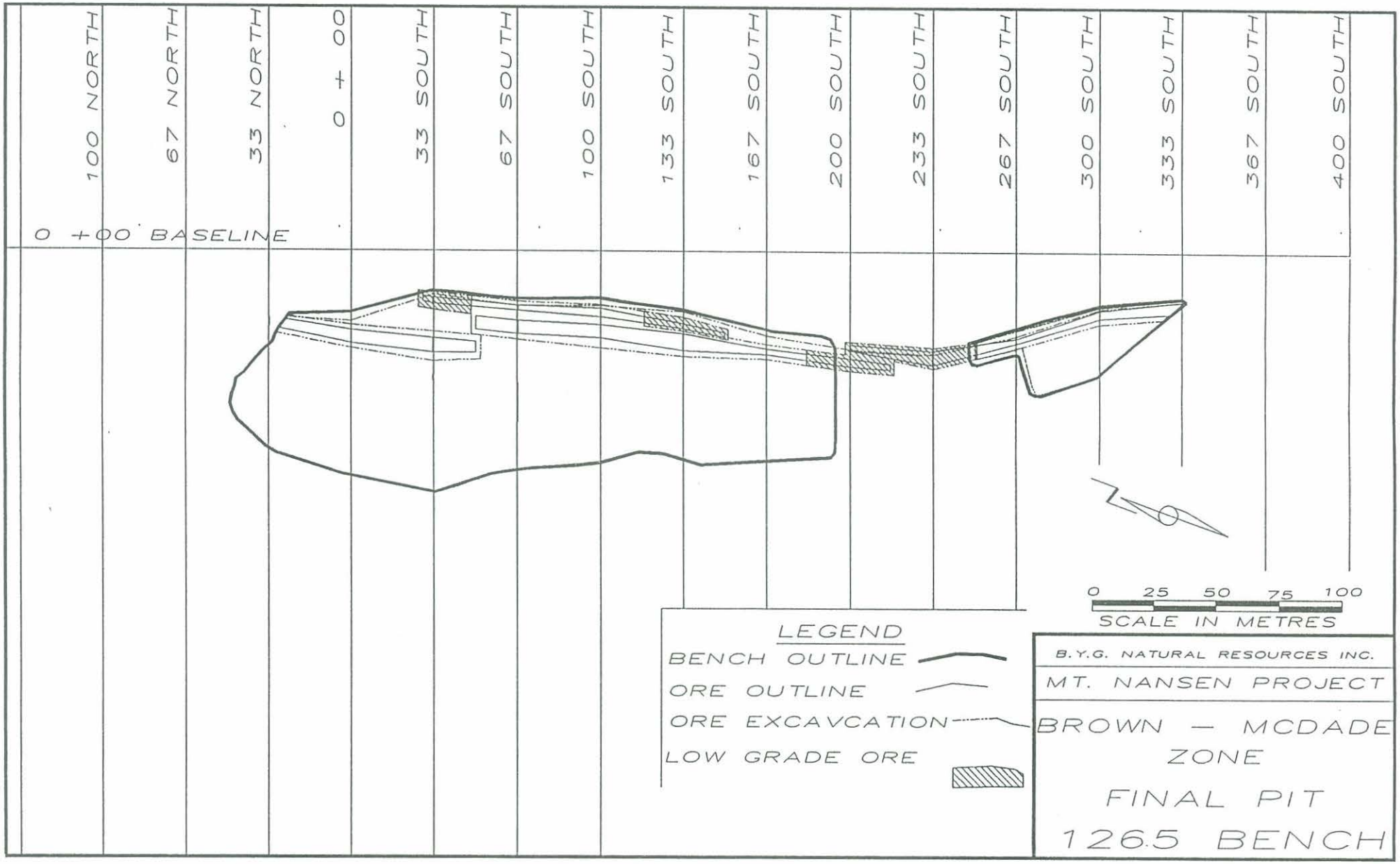
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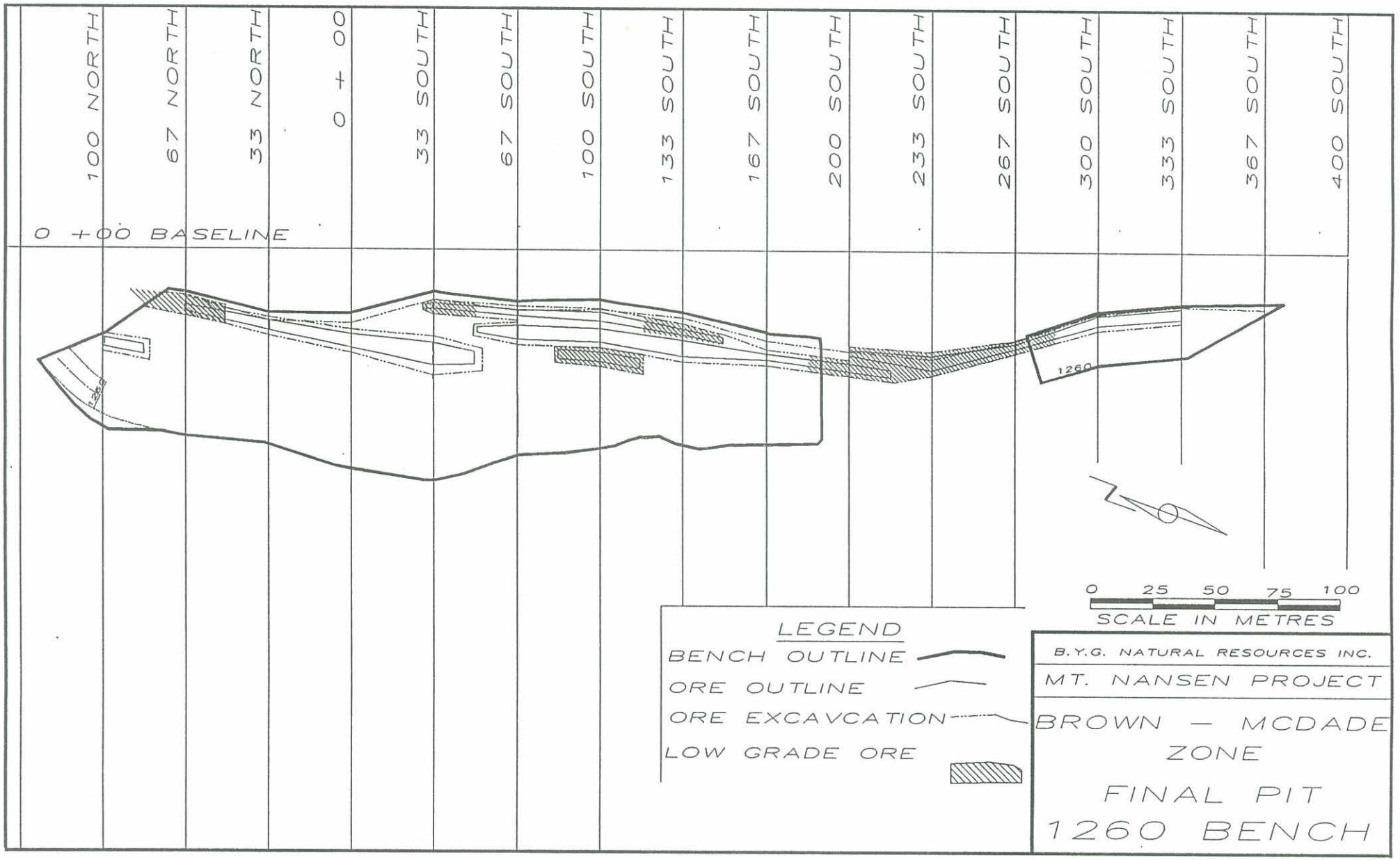
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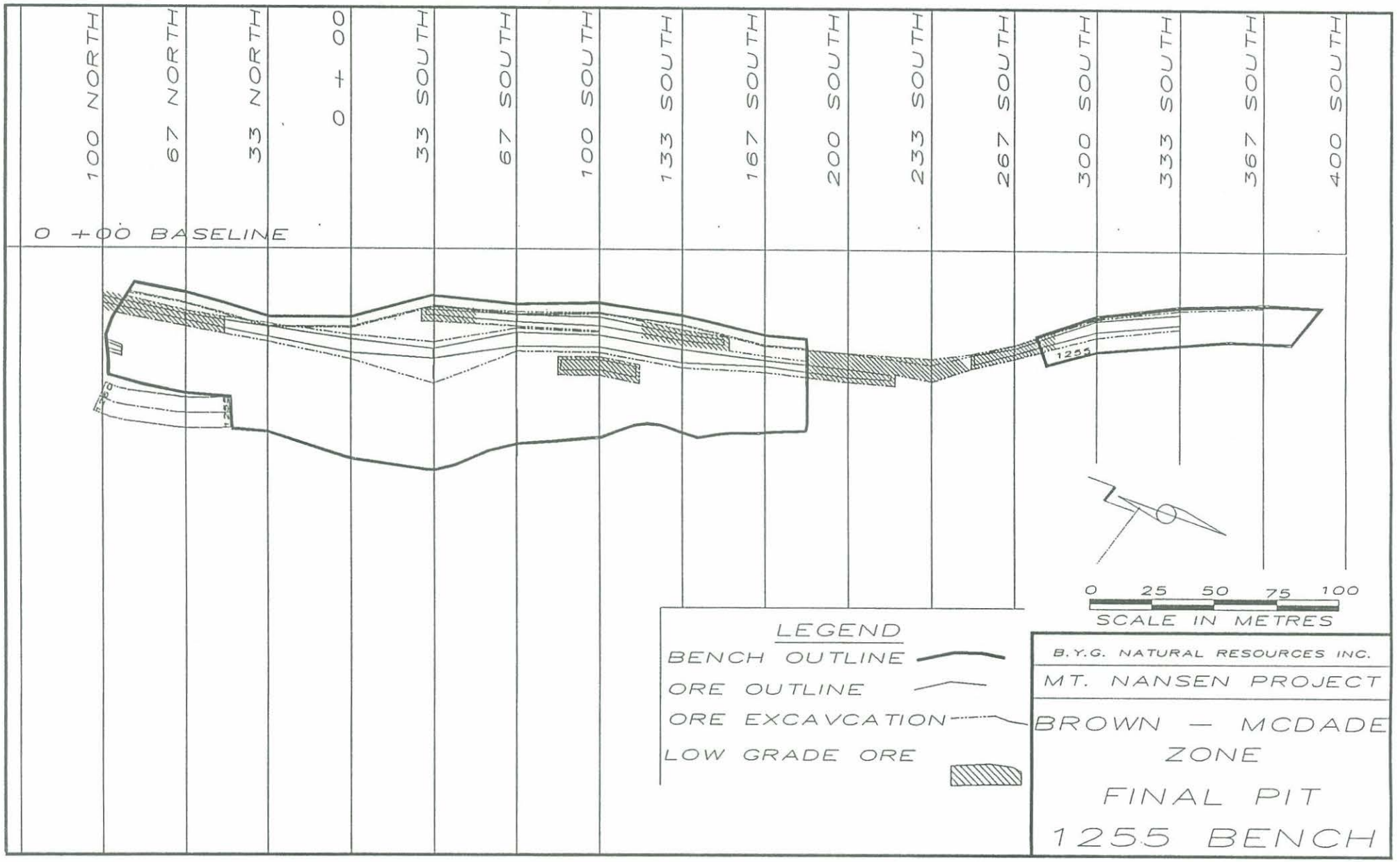
Appendix III Pit Design Drawings

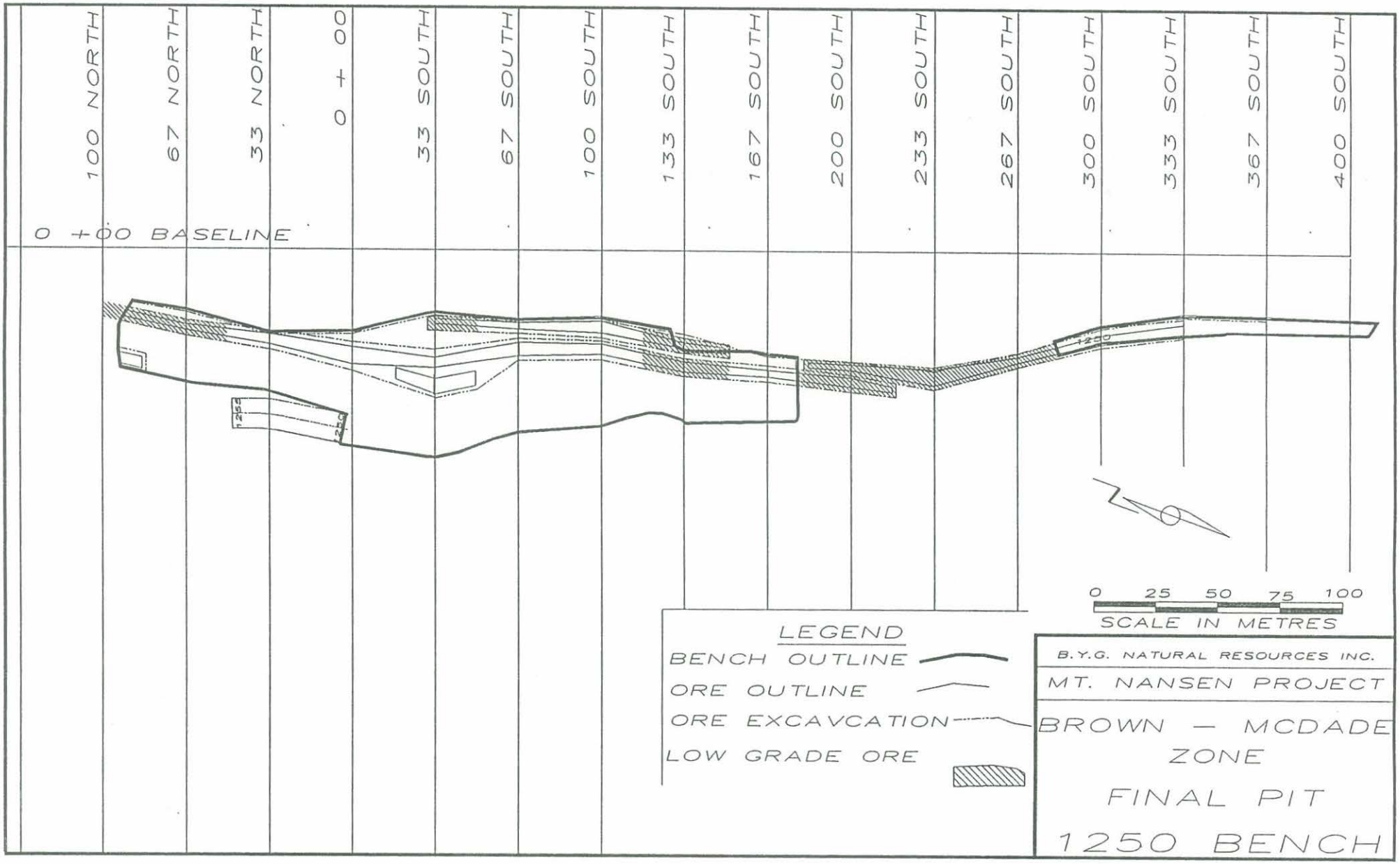

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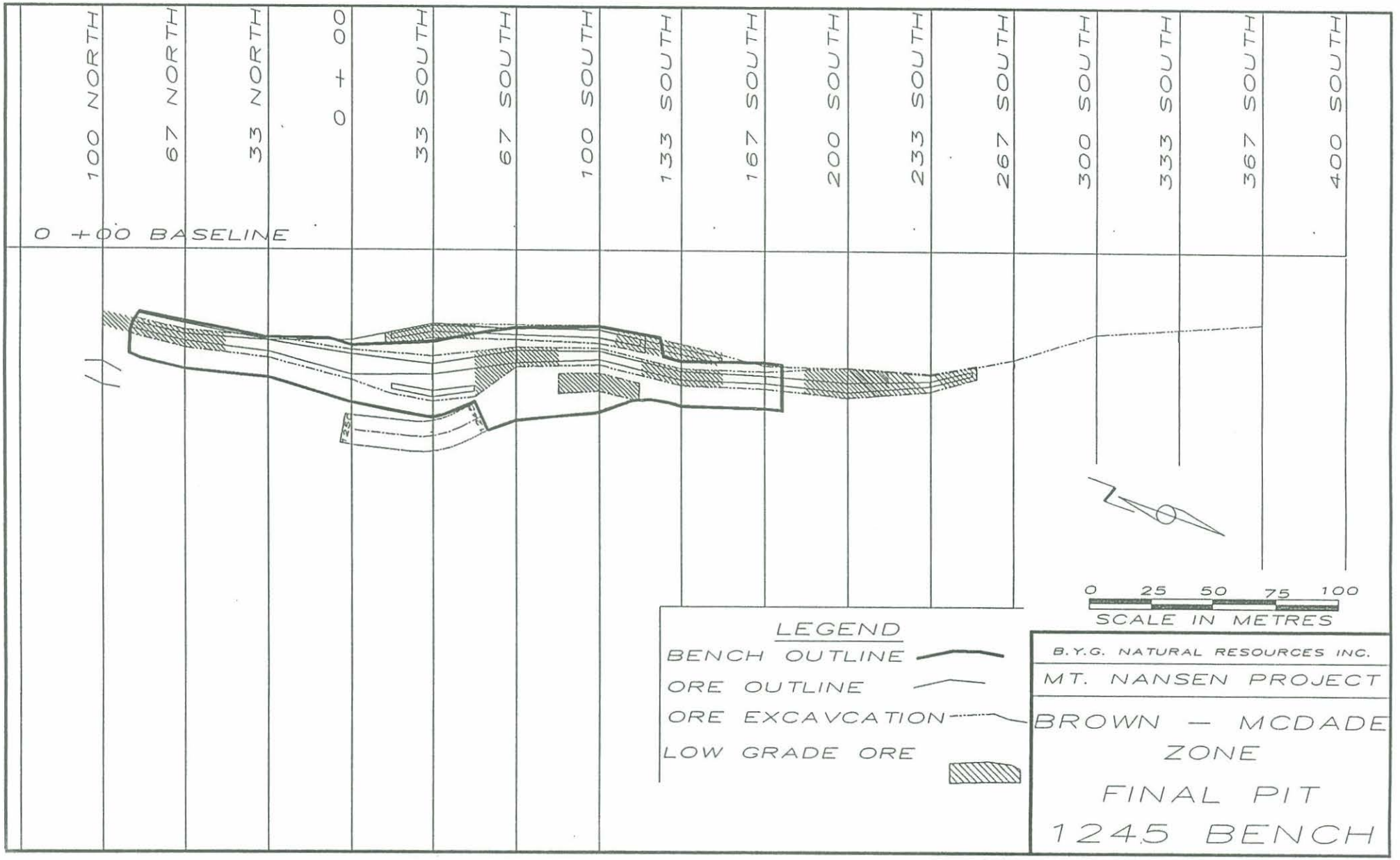

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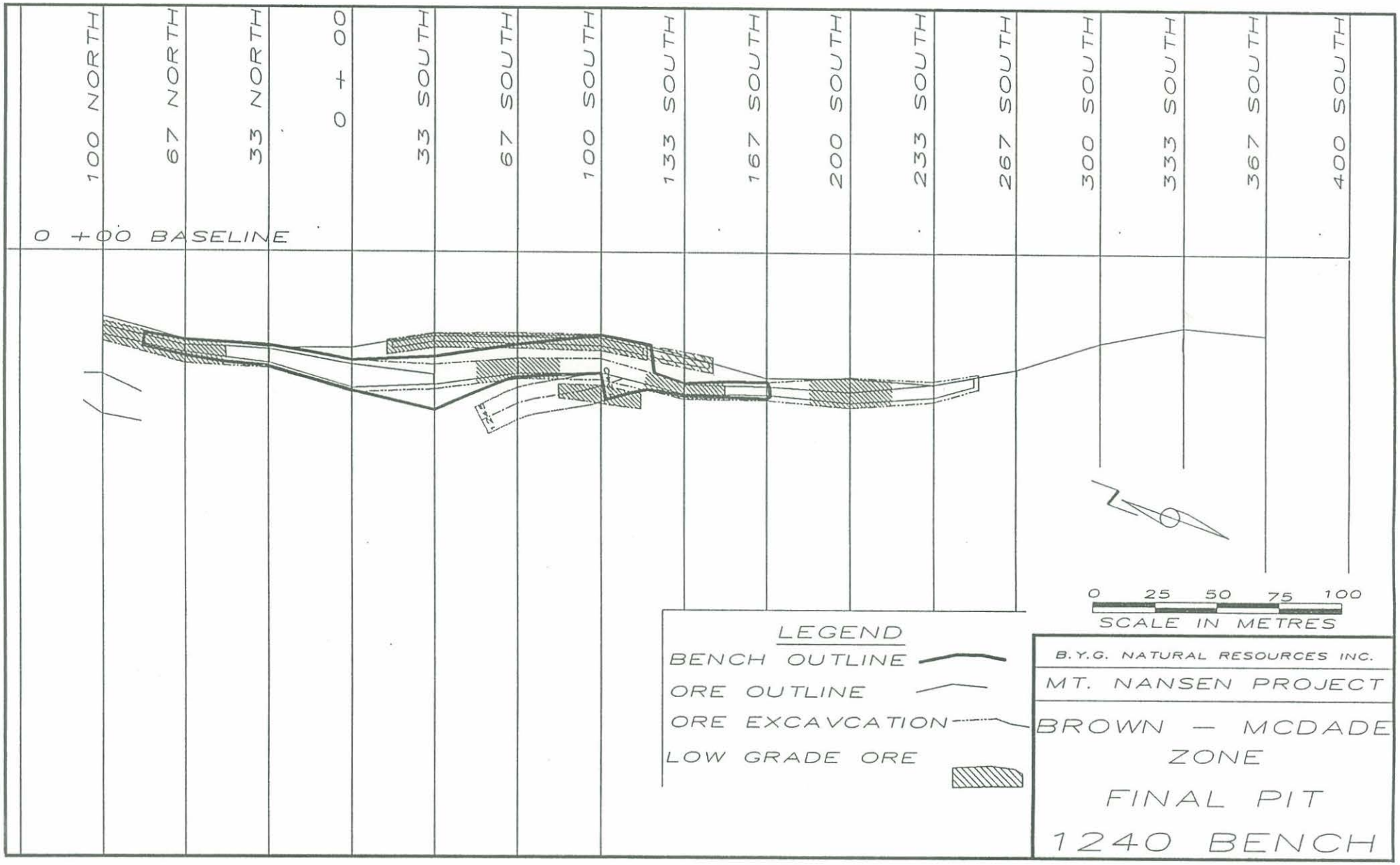

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LOW GRADE ORE
B.Y.G. NATURAL RESOURCES INC.
MT. NANSEN PROJECT
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FINAL PIT
1240 BENCH

Appendix IV Tailings Treatment Test Report

LABORATORY EVALUATION OF THE INCO SO_2/AIR CYANIDE REMOVAL PROCESS FOR THE MOUNT NANSEN GOLD PROJECT

Prepared for:

BYG Natural Resources Inc.
#208-3190 St. John's Street
Port Moody, B.C.
V3H 2C7

Prepared by:

Process Research Associates Ltd.
9145 Shaughnessy Street
Vancouver, B.C.
V6P 6R9

Bernhard Klein

Bernhard Klein, Ph.D.
Senior Process Metallurgist

September 9, 1994

1 SUMMARY

Process Research Associates Ltd received 178 samples of pulverized drill core from the Mount Nansen property in the Yukon Territory which were combined to create a composite weighing 33 kg. A 20 kg split of the sample was subjected to CIP cyanide leaching and the barren pulp was treated using the Inco SO_2/air cyanide removal process.

The gold and silver grades of the material were determined to be 6.34 g/t and 65.1 g/t, respectively. Cyanide leaching extracted 80.8% of the gold and 38.2% of the silver.

The main process variables for the SO_2/air treatment process are the SO_2/CN_T ratio (SO_2 was added as an aqueous $Na_2S_2O_5$ solution), the copper dosage, the dissolved oxygen level, the pH and the reactor retention time. Based on the level of dissolved copper in the barren solution (83 mg/L), no copper addition was required for the process. The pH controller was set at 8.5, however even after 9 hours of continuous operation, the pH did not drop below the set point and therefore no lime addition was required.

An SO_2/CN_T ratio of 4.2/1 with a reactor retention time of 60 minutes reduced picric acid cyanide (CN_P) levels from 109 mg/L to as low as 0.06 mg/L and CN_T levels from 98.5 mg/L to 0.09 mg/L. At a lower ratio of 3.7/1 the best CN_P achieved was 1.6 mg/L. Decreasing the retention time to 30 minutes resulted in a CN_P level of only 8.0 mg/L. Further testing is required to optimize the SO_2 dosage.

Aging the treated effluent for 7 days reduced the CN_T level to 0.005 mg/L.

SO_2/air treatment reduced the copper concentration from 83 mg/L to 0.8 mg/L. Aging for seven days reduced the copper level to the 0.2 to 0.3 mg/L range. The SO_2/air treatment caused arsenic to dissolve increasing the concentration from 1.95 mg/L to 4.85 mg/L. Aging for up to 14 days did not reduce As levels which increased slightly during this period to 5.6 mg/L.

An acid base accounting test performed on the treated effluent residue revealed that the material contained 0.59 % sulphide sulphur and the net neutralization potential (NNP) was -5.61. Despite the negative NNP, it is not expected that acid rock drainage would be a problem since the sulphide sulphur content is very low.

2 INTRODUCTION

BYG Natural Resources Inc. commissioned Process Research Associates Ltd to conduct testing for the detoxification of cyanidation effluent for the Mount Nansen Gold project. The testwork was performed on an ore sample which was cyanide leached (CIP) to produce the barren cyanidation effluent sample for testing. This report describes the procedures and summarizes the results of the test program.

The SO_2/air cyanide removal process is patented by Inco and is used commercially at numerous locations under license.

3 EXPERIMENTAL PROCEDURES

A composite sample of Mount Nansen ore was leached with cyanide and the barren solution was used in subsequent cyanide removal testwork. The following describes testing procedures that were used.

3.1 Sample Preparation

A total of 178 pulverized diamond drill hole samples weighing between 50 g and 350 g each were combined to produce a composite. The sample numbers, reported gold grades and weights are presented in Appendix I. Approximately 20 kg was riffled from the 33 kg composite sample for cyanide leaching. A representative split was obtained and assayed for gold, silver and ICP metals.

3.2 Cyanidation leaching

The 20 kg composite sample was subjected to carbon in pulp (CIP) cyanide leaching to produce barren slurry for SO_2/air detoxification testwork. The cyanide leach conditions established by Melis[1] were used and are as follows:

Grind (% -200 mesh)	70.0
pH	10.5 - 11.0
Solids content (%)	50.0
Cyanide concentration, g NaCN/L	0.3
Leach retention time, hours	24
Carbon adsorption retention time, hours	5
Carbon pulp loading, g/L	20

A sieve analysis of the composite sample revealed that 80.9% of the material was finer than 200 mesh which is finer than the target grind of 70% -200 mesh. As a result, the sample was not ground prior to cyanide leaching. Cyanide leaching was performed in a 100 L overhead stirred tank reactor.

The pH was adjusted to 10.5 by adding lime. Cyanide was added at 0.3 g NaCN/L. The pH and NaCN concentration were monitored and controlled to maintain the target levels. Following 24 hours of leaching, 20 g/L of activated carbon was added to the reactor to absorb the gold. Extraction with carbon was continued for 5 hours.

The carbon, leach residue and barren leach solution were assayed for gold and silver. The solution was also analyzed for copper, iron, nickel, zinc, total cyanide, thiocyanate, weak acid dissociable cyanide, picric cyanide, ammonia, nitrate, nitrite, sulphate, sulphide and ICP metals. The remaining pulp was used for SO_2/air detoxification testing.

Foot Note: 1. Report Melis Engineering Ltd., January 1992, "Mount Nansen Gold Project Mill and Surface Facilities Feasibility Study".

4 RESULTS

The results of the cyanide leaching and detoxification testwork are as follows.

4.1 Head Sample Analysis and Cyanide Leaching

The gold and silver grades of the head sample were 6.34 g/t and 65.1 g/t, respectively. The metal result, presented in Appendix II, show that the sample contained high levels of arsenic (6,237 ppm), antimony (542 ppm), lead (4,307 ppm), copper (496 ppm) and iron (5.88%).

As mentioned above, the CIL cyanide leaching procedures proposed in the feasibility study by Melis (1992) were followed. The test results are presented in Appendix III. Gold and silver extractions of 80.8% and 38.1% were achieved. The cyanide level, maintained at 0.3 g/t for the entire leach, resulted in a total NaCN consumption of 0.7 kg/t. Controlling the pH at 10.5 for the leach consumed 7.8 kg lime/t as $Ca(OH)_2$.

The calculated gold head grade was lower than the measured grade (6.09 g/t versus 6.34 g/t). There is no obvious explanation for the discrepancy. The residue gold and silver grades were 1.12 g/t and 48 g/t, respectively.

The barren leach solution was stored in sealed 20 litre buckets for subsequent detoxification testwork.

4.3 SO_2/Air Cyanide Removal

The results of analyses for the barren cyanide leach solution are presented in Appendix VI along with the analyses of the treated effluent. The solution contained 98.5 mg/L CN_T, 1.95 mg/L As, 13.5 mg/L Cu and less than 0.03 mg/L Fe.

Theoretical reagent dosages were calculated based on the following preliminary analyses of the barren solution:

CN_p	(mg/L)	109
Cu	A.A. (mg/L)	83
Fe	A.A. (mg/L)	<0.1
Ni	A.A. (mg/L)	<0.1
Zn	A.A. (mg/L)	0.1

The estimated levels of reagents are lower than proposed by Melis (feasibility report, 1992). Copper levels were sufficiently high so that no copper was required. The required $Na_2S_2O_5$ dosage was estimated to be 600 mg/L which corresponds to a SO_2/CN_T ratio of 3.7/1. A retention time 0.5 hours was estimated to be more than sufficient for kinetic considerations. The recommended pH level was 8.5.

Aging the treated effluent caused the total cyanide level to drop to less than 0.005 mg/L within seven days. The arsenic levels were not effected by aging and remained at levels of 4.86 to 5.6 for at least two weeks following treatment. No discernable difference was observed between samples stored under either open or closed conditions. A more detailed analyses of the aged treated effluent is presented in Appendix VI.

4.3.4 Acid Base Accounting

The residue from the treated effluent was submitted for a standard acid base accounting test. The acid base accounting report is presented in Appendix VII. Despite the negative net neutralization potential of -5.61 tonnes of $CaCO_3$ per 1000 tonnes of material, the low sulphide sulphur content of 0.59% suggests that acid generation should not be a concern with tailings.

APPENDIX I - SAMPLE IDENTIFICATION, WEIGHTS AND GRADES

Sample Number	Weight (g)	Gold Grade (oz/t)
S-01163	267.0	0.74
S-01164	236.7	0.48
S-01165	232.7	0.91
S-01166	244.6	1.37
S-01167	240.9	0.83
S-01168	273.4	0.85
S-01169	256.8	0.96
S-01170	266.4	0.56
S-01171	231.5	1.53
S-01172	245.6	0.91
S-01173	263.4	0.61
S-01174	233.8	0.34
S-01175	225.2	1.05
S-01176	267.3	0.14
S-01177	163.8	1.22
S-01178	241.2	1.44
S-01179	239.3	1.30
S-01180	213.7	0.90
S-01186	248.1	1.22
S-01187	242.0	0.92
S-01188	240.7	1.21
S-01189	219.4	0.92
S-01190	243.5	0.48
S-01191	259.9	0.43
S-01192	241.4	1.53
S-01211	291.6	0.98
S-01212	259.9	0.24
S-01213	241.5	0.31
S-01214	226.9	0.55
S-01215	306.5	0.66
S-01216	227.6	1.53
S-01217	276.2	0.31
S-01218	234.6	0.30
S-01219	244.0	0.60
S-01220	214.0	0.55
S-01221	253.4	0.37
S-01222	80.6	0.92
S-01223	272.6	0.60
S-01224	300.6	1.53
S-01225	258.4	0.61
S-01226	222.8	0.61
S-01227	236.4	1.52
S-01228	241.2	1.22
S-01310	236.0	1.04
S-01311	325.7	0.76
S-01312	213.1	0.46
S-01313	200.4	1.53

Sample Number	Weight (g)	Gold Grade (oz/t)
S-01314	243.6	0.81
S-01315	152.7	0.35
S-01316	217.1	0.36
S-01317	259.3	0.94
S-01318	204.3	0.59
S-01319	190.2	0.91
S-01320	207.9	0.50
S-01321	284.5	0.72
S-01322	279.5	0.88
S-01323	237.8	0.34
S-01324	285.5	0.96
S-01325	281.8	0.56
S-01326	230.6	0.69
S-01327	245.9	0.60
S-01328	206.7	0.24
S-01329	223.5	0.41
S-01330	343.1	0.85
S-01331	275.2	0.26
S-01332	263.4	0.34
S-01333	302.5	0.60
S-01334	247.8	0.58
S-01495	204.4	0.91
S-01496	155.5	1.10
S-01497	73.9	0.42
S-01498	142.9	0.38
S-01499	90.2	1.14
S-01500	145.0	0.16
S-01527	106.5	0.50
S-01528	87.1	0.87
S-01529	60.1	0.23
S-01530	117.5	0.53
S-01531	107.2	0.47
S-01532	125.1	0.29
S-01533	120.1	1.11
S-01534	149.7	0.42
S-01535	114.8	0.98
S-01536	169.8	0.54
S-01537	152.2	0.26
S-01538	165.8	0.90
S-01539	133.1	0.36
S-01734	156.1	1.53
S-01735	152.5	0.51
S-01736	143.4	1.01
S-01737	187.5	0.24
S-01738	211.0	0.75
S-01739	216.2	0.49
S-01753	143.2	0.92

Sample Number	Weight (g)	Gold Grade (oz/t)
S-01754	119.5	1.52
S-01755	99.0	1.04
S-01756	139.3	0.18
S-01757	154.9	0.92
S-01758	137.4	0.45
S-01759	160.6	0.40
S-01810	175.5	0.84
S-01811	194.7	0.69
S-01812	101.9	1.22
S-01813	140.1	1.37
S-01814	106.2	0.52
S-01815	183.9	0.55
S-01816	173.9	0.35
S-01817	121.7	0.56
S-01818	83.5	1.14
S-01819	160.8	0.38
S-01820	269.8	1.53
S-01842	207.4	1.53
S-01843	232.0	0.68
S-01844	128.1	0.84
S-01845	197.0	1.52
S-01846	165.8	0.49
S-01847	189.9	0.65
S-01848	215.3	0.39
S-01849	207.4	1.52
S-01850	197.9	0.89
S-01851	136.6	0.64
S-01852	138.1	0.11
S-01853	178.4	0.91
S-01854	146.9	0.20
S-01855	222.9	0.89
S-01912	182.6	1.52
S-01913	205.7	1.15
S-01914	61.9	0.37
S-01915	86.3	0.58
S-01916	149.3	0.30
S-01917	196.4	0.65
S-01918	190.1	0.85
S-01919	94.6	0.67
S-01920	147.6	0.63
S-01921	160.4	0.30
S-01922	33.6	0.60
S-01923	86.2	0.60
S-01924	192.7	0.92
S-01925	158.5	0.63
S-01940	110.6	1.81
S-01941	91.2	0.65

Sample Number	Weight (g)	Gold Grade (oz/t)
S-01942	2.7	1.53
S-01943	100.8	0.33
S-01944	147.0	0.98
S-01945	107.5	1.13
S-04373	164.9	0.91
S-04374	5.0	0.50
S-04375	91.1	1.02
S-04376	162.6	0.92
S-04377	94.3	0.61
S-04378	94.3	1.22
S-04525	215.6	0.70
S-04526	211.8	0.82
S-04527	162.6	0.58
S-04528	146.9	0.94
S-04529	233.9	0.54
S-04530	212.9	0.99
S-04531	210.7	0.37
S-04532	243.7	0.26
S-04533	254.1	0.38
S-04534	236.2	0.51
S-04553	247.5	0.61
S-04554	244.9	0.92
S-04555	172.3	0.95
S-04556	178.2	0.57
S-04557	242.7	0.33
S-04558	187.1	0.55
S-04559	225.2	0.35
S-04560	165.0	0.29
S-04561	181.4	0.36
S-04562	212.5	0.75
S-04563	240.1	0.42
S-04564	205.1	0.76
S-04571	175.9	1.52
S-04572	125.5	1.53
S-04573	123.2	0.15
S-04574	185.1	1.07
S-04575	236.3	1.06

APPENDIX II - HEAD SAMPLE ANALYSES

Analysis of Mount Nansen Project Composite Ore Sample

Fire assay	
Au (g/t)	6.34
Ag (oz/t)	65.1
ICP Analysis	
Ag (ppm)	64.7
Al (%)	0.36
As (ppm)	6237
Au (ppm)	9
B (ppm)	3
Be (ppm)	60
Bi (ppm)	33
Ca (%)	0.59
Cd (ppm)	17.9
Co (ppm)	1
Cr (ppm)	32
Cu (ppm)	496
Fe (%)	5.88
K (%)	0.41
La (ppm)	4
Mg (%)	0.09
Mn (ppm)	968
Mo (ppm)	1
Na (%)	0.01
Ni (ppm)	2
P (ppm)	0.041
Pb (ppm)	4307
Sb (ppm)	542
Sr (ppm)	57
Th (ppm)	2
Ti (%)	< 0.01
U (ppm)	< 5
V (ppm)	16
W (ppm)_	< 1
Zn (ppm)	1335

APPENDIX III - CYANIDATION TEST RESULTS

CYANIDATION TEST REPORT

Project no : 94-043 Date : 18-Jul-94
Test no : C1
Sample description: Composite of the as-recieved sample
Procedure: Carbon-in-pulp cyanidation with carbon addition at 24 hour.

INITIAL CONDITIONS

Feed solids weight :	19930 g	NaCN :	0.3 g/L
Water weight :	19930 g	pH :	10.5
% solids :	50.0 %	Carbon :	20 g/L

TEST PROGRESS

Time (hr)	NaCN [g/L]	NaCN (g)	Ca(OH)2 [g/L]	Ca(OH)2 (mL)	Initial pH	Final pH	dO2 [mg/L]
0.0	0.30	5.91	109.50		5.7	10.5	8.2
1.0	0.10	3.99	17.10		9.9	10.7	
3.0	0.20	1.99	22.10		10.2	11.0	7.9
4.0	0.30					10.7	
5.0	0.18	2.39				10.5	
21.0	0.18	2.39	6.90				
24.0					10.1	10.5	
29.0	0.10					10.2	7.2

Reagent consumption

NaCN = 0.8 kg/t
Lime Ca(OH)2 = 7.8 kg/t

Reducing power

RP = 140 mL of N/10 KMnO4 per litre solution

EXTRACTION PROFILE

	Time (hr)	Assay (mg/L) Au	Assay (mg/L) Ag	Distribution (%) Au	Distribution (%) Ag
Solution	24	0.08	0.04	1.5	0.1
Carbon		8.75	56.00	79.3	38.1
Residue		1.17	48.00	19.2	61.9
				100.0	100.1
		Total Extraction =		80.8	38.2

	Au (g/t)	Ag (g/t)	Au (oz/ton)	Ag (oz/ton)
Calculated Head	6.09	77.6	0.178	2.26
Measured Head	6.35	65.2	0.185	1.90

Process Research Associates Ltd.

APPENDIX IV - INCO SO2/AIR BATCH TEST RESULTS

SO_2/AIR DETOXIFICATION OF THE MOUNT NANSEN TAILINGS

BATCH TEST SUMMARY

Time	$Na_2S_2O_5$ Dos. (mL/min)	pH	ORP (mV)	Diss. O_2 (ppm)	CN_P (ppm)	Fe (ppm)	Cu (ppm)
0	1.41	9.8	113	6.4	109	<0.1	83
2		9.7	89				
5		9.5	71				
10		9.1	39				
15		9.0	31				
20		8.8	28				
30		8.7	34	6.8	0.52	<0.1	2.0
40		8.5	69				
50		8.7	64				
60		8.5	73		0.26	<0.1	0.1

Notes: $Na_2S_2O_5$ feed solution concentration, 17.4 g/L
$Na_2S_2O_5$ flow rate, 1.41 mL/min
ORP measured using Ag/AgCl reference electrode
Reactor volume, 1.23 L
Pulp density, 50% solids by weight
Temperature, 20°C

Batch reagent consumptions
$Na_2S_2O_5$ - 30 minutes, 594 mg/L
- 60 minutes, 1,188 mg/L
$CuSO_4$, 0.0 g/L
CaO, 0.0 g/L

APPENDIX V - INCO SO2/AIR CONTINUOUS TEST RESULTS

SO_2/AIR DETOXIFICATION OF THE MOUNT NANSEN TAILINGS
CONTINUOUS TEST 1 SUMMARY

Time	Feed Rate (mL/min)		pH	ORP	Diss. O_2	CN_P	Cu
	Pulp	$Na_2S_2O_5$		(mV)	(ppm)	(ppm)	(ppm)
0	41.0	1.4	10.1	54		109	83
15			9.5	39			
30			9.2	22	5.1		
60	20.5	1.5	9.0	14	5.6	8.0	29.7
120			9.0	40		3.8	12.3
180		1.5	8.9	48		3.4	9.3
240		1.5	8.8	56	5.5	1.4	4.8
300			8.8	56		1.6	5.0
360			8.9	53		3.0	7.9

Notes:
$Na_2S_2O_5$ feed solution concentration (<60 min), 17.4 g/L
$Na_2S_2O_5$ feed solution concentration (>60 min), 8.7 g/L
$Na_2S_2O_5$ flow rate, 1.41 mL/min
ORP measured using Ag/AgCl reference electrode
Reactor volume, 1.23 L
Pulp density, 50% solids by weight
Temperature, 20°C

Reagent consumptions
$Na_2S_2O_5$, 600 mg/L
$CuSO_4$, 0.0 g/L
CaO, 0.0 g/L

SO_2/AIR DETOXIFICATION OF THE MOUNT NANSEN TAILINGS
CONTINUOUS TEST 2 SUMMARY

Time	Feed Rate (mL/min)		pH	ORP	Diss. O_2	CN_P	Cu
	Pulp	$Na_2S_2O_5$		(mV)	(ppm)	(ppm)	(ppm)
0	20.5	1.41	8.90	67	6.3	109	83
15		1.46	8.80	58			
30		1.54	8.68	53			
60		1.51	8.57	66		0.44	3.2
90		1.50	8.52	72		0.36	1.7
120	20.5	1.51	8.51	68	5.4	0.32	1.5
150		0.5	8.59	70		2.0	4.9
180		1.48	8.53	73		0.22	0.8
240		1.47	8.50	72	5.2	0.40	1.7
300			8.50	73		0.12	1.0
360			8.50	75		0.06	1.4
420	21.8	1.46	8.50	76	5.3	0.30	1.3
480	20.0	1.47	8.47	78	5.3	0.28	0.8
540	20.2	1.45	8.45	79	5.1	0.38	1.4

Notes: $Na_2S_2O_5$ feed solution concentration, 9.85 g/L
$Na_2S_2O_5$ flow rate, 1.41 mL/min
ORP measured using Ag/AgCl reference electrode
Reactor volume, 1.23 L
Pulp density, 50% solids by weight

Batch reagent consumptions
$Na_2S_2O_5$ 680 mg/L
$CuSO_4$, 0.0 g/L
CaO, 0.0 g/L
Temperature, 20°C

APPENDIX VI - EFFLUENT ANALYSES

ACID BASE ACCOUNTING TEST REPORT

Project No: 94-043
Sample: Treated cyanidation effluent
Date: Aug.16, 1994

Item	Quantity
S (tot) %	1.70
S (S=) %	0.59
S (SO4) %	1.11
Paste pH	8.5
NP	12.8
MPA	18.4
Net NP	-5.61

Notes:

1 Analytical methods employed here are described in "Field and Laboratory Methods Applicable to Overburden and Minesoils", EPA 600/2-78-054, pp.45-55, 1978.

2 NP = Neutralization Potential as determined by acid consumption test
MPA = Maximum Potential Acidity (%S(as sulphide) x 31.25)
Net NP = NP - MPA

3 NP, MPA and Net NP are expressed in tonnes $CaCO_3$ equiv. per 1000 tonnes sample.

4 Samples with negative Net NP are potential acid producers.

Appendix V ARD Assessment Test Report

Process Research Associates Ltd.
9145 Shaughnessy Street, Vancouver, B.C. V6P 6R9
Telephone: (604) 322-0118 Fax: (604) 322-0181

November 14, 1994

BYG Natural Resources Inc.
208-3190 St. John's Street
Port Moody, B.C.
V3H 2C7

Attention: Mr. J.B. Smith
Vice President, Operations

Dear Mr. Smith:

Re: Environmental testwork on waste rock samples.

Waste rock samples were submitted for acid base accounting (ABA) tests and ICP whole rock and metals analyses. Five composites were prepared from the waste rock samples and subjected to distilled water leach tests. The following summarizes the test procedures and results.

Procedures

A total of 37 waste rock samples weighing between 0.5 kg and 5 kg were received; a list of the samples and their weights is presented in Table 1. The samples were subjected to ABA and ICP whole rock and metals analyses.

The ABA analyses included determining the paste pH, the neutralization potential (NP) and the maximum potential acidity (MPA). For the paste pH determination, 10 g of -60 mesh sample was mixed with 5 mL of distilled deionized water. A calibrated pH electrode was placed in the paste and the pH was recorded.

The NP was determined using the Sobek et. al.[1] method. The volume and normality of hydrochloric acid used was determined from a "fizz test". For the fizz test, one or two drops of 1:3 HCl solution were added to approximately 0.5 g of -60 mesh sample. The presence of $CaCO_3$ was indicated by a bubbling or audible "fizz". The fizz was rated as: none, slight, moderate or strong. The rating corresponds to volume and normality of HCl required for the neutralization potential test. A 2.00 g sample of -60 mesh sample and the determined volume and normality of HCl solution were added to a 250 mL Erlenmeyer flask. The mixture was heated to boiling and the flask was swirled every five minutes until no gas evolution was observed. Distilled water was

added to increase the volume to 125 mL and the suspension was boiled for one minute. The flask was capped with a rubber stopper and cooled to room temperature. The sample was titrated to pH 7.0 using a standardized NaOH solution. The neutralization potential was calculated from the amount of acid consumed expressed as kg of $CaCO_3$ equivalent/ton of material.

The MPA is based on the sulphide sulphur content and assumes that all sulphide sulphur oxidizes to produce sulphuric acid. The sulphide sulphur content was calculated from the difference between the total sulphur (determined by Leco) and the sulphate (determined gravimetrically). The MPA was expressed as tons of $CaCO_3$ equivalent/thousand tons of material.

The net neutralization potential (net NP) was calculated from the difference between the NP and the MPA.

Five composite samples were prepared by combining equal weights of each sample according to the groupings shown in Table 1. ICP metals and whole rock analyses were performed on representative splits of each composite.

A representative 20 g sample from each composite was subjected to a distilled water leach test. The sample was added to a 250 mL flask along with 100 mL of distilled deionized water. The flask was placed on a shaker where it was agitated for 24 hours. The suspension was filtered and the filtrate was weighed and analyzed for pH, sulphate and ICP metals.

1. *Sobek et. al., "Field and Laboratory Methods Applicable to Overburden and Mine Soils", EPA-600/2-78-054, 1978.*

Results

The results of the acid base accounting tests on the 37 samples are presented in Table 2. The net NP values for most samples are significantly positive. Three samples (2, 10 & 32) had negative NP values and three samples (12, 18 & 19) had NP values less than 10.0. Of these samples, one is upper altered granodiorite (composite 1), two are lower altered granodiorite (composite 2), one is lower feldspar porphyry (composite 4) and two are footwall granodiorite (composite 5). The results show that low or negative NP values are not concentrated in a particular rock grouping. The remaining samples in each rock grouping (see Table 1) had NP values greater than 10.0 which would help to neutralize the acid generating potential of the low NP samples.

ICP metals and whole rock analysis results for the samples are presented in Tables 3 and 4, respectively. Arsenic levels range from a low of 22 pm to a high of 5899 pm (sample I.D.88-83 0-15 m). The arsenic level in sample 88-83 0-15 m is anomalously high; no other sample had an arsenic concentration greater than 687 pm. Of the 37 samples, 31 had antimony concentrations less than ore equal to 10 pm. The highest antimony concentration was in sample 88-92 0-5 m which was 75 pm. Copper levels varied from 3 to 256 pm, lead levels varied from 12 to 3354 pm and zinc levels varied from 50 to 5406 pm.

Five composite samples were prepared from the samples based on rock groupings (see Table 1). Equal weights of each sample was added to prepare the composites. The results of ICP metals and whole rock analyses on the five composites are presented in Tables 5 and 6, respectively. Composite 3, which is upper feldspar porphyry, had a high arsenic concentration of 1076 pm. This composite also had the highest concentration of lead at 820 pm. Zinc concentrations ranged from 553 to 2404 pm and copper concentrations from 51 to 165 pm.

The composite samples were subjected to a distilled water leach test. The filtrate from each composite was analyzed for metals (by ICP) and the results are presented in Table 7. Most metal concentrations were at or below detection limit (e.g. As <0.05 pm, Sb <0.05 pm, Cu <0.01 pm, Pb<0.01 pm). Some zinc did leach from composite 4 (0.28 pm) and composite 2 (0.10 pm). The results indicate that metals do not leach readily from any of the five main rock types.

If you have any questions regarding the test procedures or the results, please call me.

Sincerely yours,
Process Research Associates Ltd.

Bern Klein, Ph. D.
Senior Process Metallurgist

TABLE 1. BYG NATURAL RESOURCES - SAMPLE LIST

Mount Nansen

Project no : 94-043

Description	Composite No.	Sample I.D.	Sample Weight (g)
Upper Altered Granodiorite	Composite 1	88-57 0-15 m	4158
		88-63 0-15 m	4996
		88-67 0-15 m	3659
		88-68 0-15 m	3636
		88-71 0-12 m	3636
		88-72 0-15 m	2885
		88-73 0-15 m	2892
		88-75 0-15 m	3227
		88-104 0-9 m	1791
Lower Altered Granodiorite	Composite 2	88-57 15-30 m	4865
		88-63 15-20 m	2421
		88-67 15-22 m	2669
		88-72 15-32 m	4911
		88-75 15-30 m	4177
		88-82 15-20 m	1795
Upper Feldspar Porphyry	Composite 3	88-55 0-15 m	4042
		88-56 0-7 m	2117
		88-60 0-5 m	609
		88-82 0-15 m	2178
		88-83 0-15 m	3313
		88-92 0-5 m	1285
		88-97 0-14 m	3057
Lower Feldspar Porphyry	Composite 4	88-55 15-24 m	3570
		88-68 15-35 m	5297
		88-73 15-20 m	1172
Footwall Granodiorite	Composite 5	88-55 50-54 m	3196
		88-57 47.4-48.6 m	748
		88-68 54-55 m	2846
		88-71 22-24 m	2195
		88-72 40-42 m	1470
		88-73 29-34 m	712
		88-77 48-52 m	1992
		88-80 23-33 m	2598
		88-82 29-33 m	1284
		88-83 24-30 m	1784
		88-92 12-15 m	2001

TABLE 2. ACID BASE ACCOUNTING TEST REPORT

BYG Natural Resources Inc.
#208-2190 St.John Street
Port Moody, B.C.
V3H 2C7

File No. : 94-043

Report No. : 1

Date Reported : 6-Sep-94

Attention : Mr. J.B. Smith, Vice President, Operations

Project : Mount Nansen

	Sample I.D.	S (tot) %	S (SO4) %	S(S2-) %	Paste pH	NP	MPA	Net NP
1.	88-55 0-15 m	0.35	0.04	0.31	8.0	30.4	9.69	20.7
2.	88-55 15-24 m	0.56	0.35	0.21	5.8	2.82	6.56	-3.74
3.	88-55 50-54 m	0.96	0.07	0.89	8.1	73.7	27.8	45.9
4.	88-56 0-7 m	0.20	0.14	0.06	7.6	30.9	1.88	29.0
5.	88-57 0-15 m	0.37	0.12	0.25	7.9	33.2	7.81	25.4
6.	88-57 15-30 m	0.39	0.08	0.31	7.9	52.1	9.69	42.4
7.	88-57 47.4-48.6 m	0.31	0.01	0.30	7.9	40.4	9.38	31.0
8.	88-60 0-5 m	0.38	0.05	0.33	8.0	31.0	10.3	20.7
9.	88-63 0-15 m	0.34	0.01	0.33	8.0	56.4	10.3	46.1
10.	88-63 15-20 m	0.20	0.02	0.18	6.6	4.30	5.75	-1.45
11.	88-67 0-15 m	0.14	0.03	0.11	8.2	31.6	3.44	28.2
12.	88-67 15-22 m	0.52	0.05	0.47	7.9	23.0	14.7	8.31
13.	88-68 0-15 m	0.06	0.03	0.03	8.1	13.1	0.94	12.2
14.	88-68 15-35 m	0.33	0.12	0.21	7.4	27.2	6.56	20.7
15.	88-58 54-55 m	0.60	0.07	0.53	8.6	26.7	16.6	10.2
16.	88-73 0-15 m	0.27	0.01	0.26	8.2	30.4	8.13	22.3
17.	88-73 15-20 m	0.83	0.01	0.82	8.4	90.8	25.6	65.2
18.	88-73 29-34 m	0.42	0.15	0.27	7.1	10.7	8.44	2.29
19.	88-71 0-12 m	0.25	0.15	0.10	7.4	8.57	3.13	5.45
20.	88-71 22-24 m	0.12	0.01	0.11	9.0	22.2	3.44	18.8

Peter Tse, AScT.
Laboratory Manager

Notes :

1. Analytical methods employed according to procedures described in "Field and Laboratory Methods Applicable to Overburden and Minesoils", EPA 600/2-78-054, pp. 45-55, 1978
2. NP = Neutralization Potential as determined by acid consumption test
   MPA = Maximum Potential Acidity (%S (S2-) × 31.25)
   Net NP = NP - MPA
3. NP, MPA and Net NP are expressed in kg CaCO3 equiv. per tonne sample
4. Samples with negative Net NP are potential acid producers

TABLE 2. (CONT.) ACID BASE ACCOUNTING TEST REPORT

BYG Natural Resources Inc.
#208-2190 St.John Street
Port Moody, B.C.
V3H 2C7

File No. : 94-043

Report No. : 1

Date Reported : 6-Sep-94

Attention : Mr. J.B. Smith, Vice President, Operations

Project : Mount Nansen

	Sample I.D.	S (tot) %	S (SO4) %	S(S2-) %	Paste pH	NP	MPA	Net NP
21.	88-72 0-15 m	0.24	0.07	0.17	8.0	45.4	5.31	40.1
22.	88-72 15-32 m	1.45	0.67	0.78	6.8	44.9	24.4	20.5
23.	88-72 40-42 m	0.50	0.04	0.46	7.8	40.6	14.4	26.2
24.	88-75 0-15 m	0.14	0.04	0.10	8.1	44.7	3.13	41.6
25.	88-75 15-30 m	0.30	0.03	0.27	8.0	37.9	8.44	29.5
26.	88-77 48-52 m	0.50	0.01	0.49	8.5	36.0	15.3	20.6
27.	88-80 23-33 m	0.11	0.01	0.10	8.6	43.1	3.13	40.0
28.	88-82 0-15 m	0.66	0.01	0.65	8.2	85.8	20.3	65.5
29.	88-82 15-20 m	0.22	0.01	0.21	8.2	54.6	6.56	48.0
30.	88-82 19-33 m	1.16	0.01	1.15	8.5	53.4	35.9	17.4
31.	88-83 0-15 m	0.23	0.10	0.13	7.8	47.4	4.06	43.3
32.	88-83 24-30 m	1.02	0.01	1.01	8.8	17.7	31.6	-13.9
33.	88-92 0-5 m	0.08	0.14	-0.06	8.0	57.3	-1.88	59.1
34.	88-92 12-15 m	0.11	0.12	-0.01	8.2	27.2	-0.31	27.5
35.	88-97 0-14 m	0.04	0.04	0.00	8.3	34.0	0.00	34.0
36.	88-97 23-27 m	0.07	0.01	0.06	8.5	47.1	1.88	45.2
37.	88-104 0-9 m	0.33	0.01	0.32	8.1	30.8	10.0	20.8

Peter Tse, AScT.
Laboratory Manager

Notes :

1. Analytical methods employed according to procedures described in "Field and Laboratory Methods Applicable to Overburden and Minesoils", EPA 600/2-78-054, pp. 45-55, 1978
2. NP = Neutralization Potential as determined by acid consumption test
   MPA = Maximum Potential Acidity (%S (S2-) × 31.25)
   Net NP = NP - MPA
3. NP, MPA and Net NP are expressed in kg CaCO3 equiv. per tonne sample
4. Samples with negative Net NP are potential acid producers

TABLE 3. BYG NATURAL RESOURCES - ICP REPORT

Mount Nansen

Project no : 94-043

Sample I.D.	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	Al %	Na %	B %	Si %	W ppm	Be ppm
88-55 0-15 m	2	45	346	1068	2.0	1	7	1883	1.78	137	5	36	11	1	6	9	0.84	0.05	14	32	0.13	420	0.01	0.33	0.01	0.01	0.02	1	1
88-55 15-24 m	2	79	554	961	5.9	1	6	1718	2.30	550	5	25	18	38	6	4	0.34	0.04	13	106	0.06	103	0.01	0.23	0.01	0.01	0.02	1	1
88-55 50-54 m	2	113	77	753	1.6	2	4	2276	3.15	82	5	89	6	1	1	32	2.29	0.09	8	65	0.69	71	0.01	0.80	0.04	0.01	0.02	4	1
88-56 0-7 m	3	84	900	1087	3.9	1	4	930	3.09	145	5	55	5	4	1	14	1.00	0.07	14	89	0.25	164	0.01	0.46	0.02	<0.01	0.02	3	1
88-57 0-7 m	2	41	669	2097	2.6	4	6	4566	3.91	316	5	30	15	1	1	37	1.11	0.13	13	53	0.15	296	0.01	0.52	0.02	0.01	0.02	4	1
88-57 15-30 m	2	40	152	1842	1.1	1	4	2836	3.90	86	5	29	11	5	1	57	1.56	0.15	12	53	0.30	219	0.01	0.46	0.02	0.01	0.02	4	1
88-57 47.4-48.6 m	4	64	47	1236	1.1	1	3	2076	2.17	41	5	76	12	3	1	16	1.27	0.07	108	63	0.52	49	0.01	0.90	0.03	0.01	0.02	4	1
88-60 0-5 m	4	207	152	3122	1.8	3	7	6557	2.03	687	5	19	39	45	1	7	1.07	0.07	22	73	0.06	63	0.01	0.09	0.02	0.01	0.02	2	1
88-63 0-15 m	3	47	215	1201	1.6	7	5	2893	2.56	96	5	34	15	1	1	19	1.69	0.08	9	107	0.31	267	0.01	0.27	0.02	0.01	0.02	5	1
88-63 15-20 m	3	87	172	1264	1.4	9	4	2641	3.13	135	5	30	16	2	1	15	0.16	0.06	7	121	0.07	250	0.01	0.16	0.01	<0.01	0.02	4	1
88-67 0-15 m	1	14	105	526	0.2	9	6	1633	2.22	75	5	24	4	1	1	20	0.94	0.05	6	86	0.24	232	0.01	0.54	0.01	<0.01	0.02	2	1
88-67 15-22 m	1	30	90	413	0.5	10	10	1500	3.08	86	5	19	1	4	1	34	0.91	0.14	10	114	0.19	374	0.01	1.18	0.01	0.01	0.02	1	1
88-68 0-15 m	1	3	33	229	0.1	3	5	506	1.83	32	5	20	1	1	1	23	0.64	0.06	11	92	0.12	660	0.01	0.69	0.02	<0.01	0.02	1	1
88-68 15-35 m	1	256	206	4566	1.8	10	12	5522	3.61	71	5	35	60	4	1	34	0.94	0.09	17	69	0.13	184	0.01	0.66	0.02	<0.01	0.02	1	1
88-68 54-55 m	2	11	20	276	0.1	5	8	722	1.81	22	5	54	2	1	1	28	1.03	0.07	6	74	0.49	518	0.01	0.65	0.04	0.01	0.02	5	1
88-73 0-15 m	2	67	81	1011	0.3	5	10	1752	2.48	30	5	31	11	1	1	32	1.16	0.09	17	71	0.27	151	0.02	0.69	0.03	<0.01	0.02	2	1
88-73 15-20 m	2	151	730	2003	2.1	3	10	2915	3.44	48	5	121	22	8	1	34	2.53	0.11	18	58	0.75	107	0.01	0.79	0.03	0.01	0.02	6	1
88-73 29-34 m	2	207	82	1242	0.3	7	10	2223	2.49	192	5	38	11	15	1	32	0.60	0.08	11	56	0.48	205	0.05	0.95	0.03	0.01	0.02	2	1
88-71 0-12 m	2	45	164	3597	0.9	5	10	3051	2.24	206	5	20	34	10	1	14	0.21	0.05	8	78	0.06	63	0.01	0.38	0.01	<0.01	0.02	1	1
88-71 22-24 m	3	53	15	229	0.5	5	13	859	2.93	44	5	51	2	5	1	57	0.97	0.16	5	67	1.07	31	0.16	1.32	0.04	<0.01	0.02	4	1
88-72 0-15 m	1	46	111	5406	1.2	3	8	5227	2.04	279	5	23	65	10	2	7	1.28	0.05	6	64	0.17	420	0.01	0.30	0.01	<0.01	0.02	1	1
88-72 15-32 m	1	116	1952	4570	10.2	8	5	4017	4.58	262	5	30	40	23	4	22	1.66	0.08	5	57	0.37	90	0.01	0.36	0.02	0.02	0.02	1	1
88-72 40-42 m	1	38	88	1722	0.9	7	10	2360	2.99	41	5	33	12	1	1	46	1.36	0.14	8	114	0.56	72	0.04	0.82	0.04	0.01	0.02	2	1
88-75 0-15 m	1	12	23	93	0.4	3	8	553	2.42	27	5	26	1	1	2	40	1.63	0.09	20	103	0.26	339	0.01	0.75	0.02	<0.01	0.02	2	1
88-75 15-30 m	2	13	104	427	1.3	3	8	511	2.49	36	5	37	3	1	1	40	1.40	0.08	15	52	0.26	295	0.01	0.67	0.01	<0.01	0.02	2	1
88-77 48-52 m	2	7	12	50	0.1	5	7	723	2.07	36	5	55	1	1	1	36	1.36	0.09	5	82	0.71	186	0.06	1.04	0.04	0.01	0.02	1	1
88-80 23-33 m	1	15	33	321	0.4	1	7	1133	1.10	30	5	52	6	3	4	10	1.66	0.03	3	99	0.21	49	0.01	0.52	0.02	<0.01	0.02	1	1
88-82 0-15 m	2	71	406	1318	1.7	3	13	3725	3.35	71	5	90	16	3	1	33	2.61	0.12	22	80	0.44	146	0.01	0.47	0.03	0.01	0.02	5	1
88-82 15-20 m	1	106	69	2079	1.0	5	16	3694	4.42	40	5	34	15	5	1	66	1.70	0.15	19	73	0.28	391	0.01	0.62	0.03	<0.01	0.02	7	1
88-82 29-33 m	1	9	14	165	0.5	2	10	1178	2.99	32	5	79	1	7	1	44	2.03	0.12	32	70	0.85	47	0.02	1.25	0.04	0.01	0.02	5	1

TABLE 3. (CONT.) BYG NATURAL RESOURCES - ICP REPORT

Mount Nansen

Project no : 94-043

Sample I.D.	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	Al %	Na %	B %	Si %	W ppm	Be ppm
88-83 0-15 m	2	86	3354	3747	11.1	13	7	4709	4.74	5899	5	84	51	22	1	41	1.52	0.09	26	63	0.16	210	0.01	0.54	0.03	<0.01	0.02	1	1
88-83 24-30 m	1	8	148	192	0.2	1	2	414	1.06	257	5	35	2	1	1	16	0.78	0.03	3	108	0.29	63	0.02	0.62	0.03	<0.01	0.01	1	1
88-92 0-5 m	1	82	653	1219	1.4	10	7	3652	3.14	537	5	65	8	75	1	46	1.93	0.04	3	105	0.24	843	0.01	0.91	0.02	<0.01	0.02	2	1
88-92 12-15 m	3	56	37	248	0.3	2	10	889	3.61	104	5	165	1	3	1	60	1.58	0.19	7	64	0.93	54	0.14	1.54	0.07	<0.01	0.02	1	1
88-97 0-14 m	1	21	28	344	0.1	3	6	1055	1.72	89	5	31	1	5	1	19	1.29	0.07	11	80	0.12	591	0.01	0.52	0.01	<0.01	0.02	1	1
88-97 23-27 m	1	33	24	411	0.2	6	12	1362	2.99	28	5	46	3	1	1	44	1.73	0.06	10	86	0.64	331	0.01	1.33	0.03	<0.01	0.02	4	1
88-104 0-9 m	3	92	119	660	0.4	2	5	1230	2.09	87	5	38	7	10	1	10	0.90	0.06	33	64	0.24	225	0.01	0.34	0.01	<0.01	0.02	2	1

TABLE 4. BYG NATURAL RESOURCES - WHOLE ROCK ANALYSIS REPORT

Mount Nansen

Project no : 94-043

Sample I.D.	SiO2 %	Al2O3 %	Fe2O3 %	MgO %	CaO %	Na2O %	K2O %	P2O5 %	TiO2 %	MnO %	BaO %	Cr2O3 %	SrO %	LOI %	Total %
88-55 0-15 m	67.20	14.22	3.28	0.45	3.30	0.23	3.30	0.047	0.279	0.216	0.168	0.029	0.015	4.5	93.9
88-55 15-24 m	66.63	12.85	3.88	0.37	0.50	0.11	3.81	0.003	0.217	0.186	0.098	0.036	0.012	4.5	93.2
88-55 50-54 m	56.32	15.72	5.38	1.29	4.27	3.59	2.40	0.053	0.423	0.245	0.093	0.032	0.057	5.1	95.0
88-56 0-7 m	63.20	12.96	4.88	0.57	1.48	0.14	3.00	0.037	0.296	0.096	0.073	0.040	0.025	5.5	92.3
88-57 0-15 m	57.49	16.18	5.97	0.41	1.66	0.16	2.88	0.098	0.598	0.464	0.113	0.036	0.019	7.2	93.2
88-57 15-30 m	56.85	16.97	5.97	0.55	2.38	0.14	2.38	0.078	0.560	0.293	0.121	0.037	0.023	8.1	94.5
88-57 47.4-48.6 m	59.45	15.63	3.54	0.89	2.20	2.05	2.30	0.032	0.516	0.210	0.111	0.027	0.029	6.0	93.0
88-60 0-5 m	69.61	10.43	3.46	0.20	1.65	0.07	2.92	0.016	0.330	0.692	0.107	0.033	0.004	3.6	93.0
88-63 0-15 m	63.11	14.78	4.32	0.61	2.59	0.11	3.30	0.035	0.329	0.301	0.163	0.058	0.012	6.3	96.0
88-63 15-20 m	66.94	13.03	5.11	0.28	0.15	0.09	3.36	0.027	0.256	0.275	0.111	0.047	0.007	4.7	94.6
88-67 0-15 m	65.06	14.39	3.56	0.42	1.34	0.41	3.00	0.001	0.220	0.170	0.175	0.036	0.015	5.7	94.5
88-67 15-22 m	63.79	15.77	4.70	0.31	1.19	0.11	2.80	0.080	0.416	0.150	0.200	0.046	0.011	6.8	96.4
88-68 0-15 m	63.47	15.77	2.63	0.22	1.18	1.54	2.65	0.017	0.269	0.048	0.206	0.032	0.030	5.4	93.5
88-68 15-35 m	62.62	15.80	5.67	0.31	1.44	0.30	2.86	0.077	0.420	0.574	0.132	0.036	0.014	6.7	97.0
88-68 54-55 m	63.76	16.18	3.54	1.06	3.70	4.46	2.00	0.044	0.342	0.080	0.266	0.032	0.085	2.5	98.1
88-73 0-15 m	61.14	16.89	4.47	0.68	2.58	2.35	2.64	0.056	0.390	0.196	0.179	0.032	0.044	5.1	96.7
88-73 15-20 m	58.45	13.70	5.64	1.36	4.27	0.97	2.60	0.063	0.452	0.315	0.103	0.030	0.029	7.1	95.1
88-73 29-34 m	61.25	17.07	4.67	1.04	2.46	2.18	2.01	0.042	0.417	0.249	0.101	0.030	0.044	5.3	96.9
88-71 0-12 m	67.10	14.66	3.28	0.19	0.35	0.16	4.20	0.023	0.284	0.302	0.229	0.031	0.016	5.3	96.1
88-71 22-24 m	58.47	17.11	6.61	2.23	5.60	3.91	2.47	0.084	0.703	0.125	0.133	0.034	0.080	2.3	99.8
88-72 0-15 m	68.08	13.38	3.62	0.52	2.12	0.11	3.80	0.050	0.250	0.568	0.144	0.031	0.008	4.4	97.1
88-72 15-32 m	60.86	11.76	7.03	0.80	2.53	0.07	2.74	0.040	0.352	0.407	0.065	0.042	0.007	7.3	95.0
88-72 40-42 m	56.73	15.81	5.75	1.53	4.23	2.16	2.26	0.094	0.583	0.269	0.098	0.052	0.037	5.1	94.8
88-75 0-15 m	64.42	16.73	3.79	0.46	2.60	0.64	2.92	0.036	0.363	0.052	0.202	0.038	0.024	3.3	95.6
88-75 15-30 m	61.10	17.06	3.84	0.47	2.15	0.48	3.00	0.038	0.382	0.055	0.228	0.025	0.019	7.1	96.0
88-77 48-52 m	61.61	15.96	4.18	1.50	4.33	3.98	2.50	0.053	0.383	0.104	0.184	0.034	0.075	5.8	100.7
88-80 23-33 m	68.12	14.10	1.85	0.36	2.92	2.07	4.30	0.001	0.133	0.121	0.177	0.033	0.035	3.2	97.4
88-82 0-15 m	59.68	14.84	5.34	0.84	4.01	0.11	3.00	0.057	0.502	0.405	0.135	0.038	0.015	7.8	96.8
88-82 15-20 m	60.19	15.49	6.72	0.47	2.75	0.11	1.26	0.085	0.564	0.387	0.118	0.057	0.009	8.3	96.6
88-82 29-33 m	56.72	15.85	5.08	1.55	4.35	3.59	1.94	0.071	0.436	0.129	0.123	0.032	0.063	5.0	94.9

TABLE 4. (CONT.) BYG NATURAL RESOURCES - WHOLE ROCK ANALYSIS REPORT

Mount Nansen

Project no : 94-043

Sample I.D.	SiO2 %	Al2O3 %	Fe2O3 %	MgO %	CaO %	Na2O %	K2O %	P2O5 %	TiO2 %	MnO %	BaO %	Cr2O3 %	SrO %	LOI %	Total %
88-83 0-15 m	55.48	14.50	7.73	0.59	2.79	0.23	3.25	0.067	0.658	0.517	0.090	0.041	0.013	7.4	93.3
88-83 24-30 m	70.21	14.42	1.61	0.48	2.38	3.82	3.40	0.001	0.144	0.030	0.284	0.032	0.063	1.6	98.5
88-92 0-5 m	64.69	14.14	4.91	0.50	3.05	0.05	1.96	0.016	0.258	0.403	0.133	0.046	0.010	7.1	97.2
88-92 12-15 m	55.54	17.05	7.48	1.78	6.57	4.14	1.78	0.015	0.692	0.133	0.087	0.035	0.124	3.1	98.7
88-97 0-14 m	69.12	16.04	2.74	0.25	2.05	0.09	2.20	0.040	0.352	0.110	0.163	0.033	0.013	2.7	95.9
88-97 23-27 m	65.22	14.00	5.01	1.21	2.82	1.77	2.92	0.028	0.489	0.144	0.114	0.036	0.026	4.6	98.4
88-104 0-9 m	68.69	12.77	3.16	0.60	1.33	0.07	3.42	0.035	0.350	0.123	0.117	0.026	0.006	4.0	94.7

TABLE 5. BYG NATURAL RESOURCES - ICP REPORT

Mount Nansen

Project no : 94-043

Sample I.D.	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	Al %	Na %	K %	W ppm
Comp 1	1	51	149	1450	1.1	6	2	2186	2.27	111	5	24	15	1	12	19	0.97	0.07	15	65	0.18	260	0.01	0.35	0.01	0.19	1
Comp 2	1	70	408	1658	2.2	8	4	2464	3.65	105	5	28	14	1	6	37	1.19	0.11	12	68	0.24	246	0.01	0.41	0.01	0.19	1
Comp 3	3	91	820	1692	3.7	5	4	3298	2.96	1076	5	52	20	17	7	24	1.46	0.07	15	71	0.19	329	0.01	0.28	0.01	0.22	1
Comp 4	3	165	489	2404	4.2	8	5	3411	3.22	257	5	61	34	16	6	22	1.28	0.07	14	68	0.31	129	0.01	0.34	0.01	0.23	1
Comp 5	3	55	46	553	0.3	6	4	1346	2.45	56	5	59	5	1	1	31	1.34	0.09	17	71	0.61	159	0.03	0.76	0.03	0.18	1

TABLE 6. BYG NATURAL RESOURCES - WHOLE ROCK ANALYSIS REPORT

Mount Nansen

Project no : 94-043

Sample I.D.	SiO_2 %	Al_2O_3 %	Fe_2O_3 %	MgO %	CaO %	Na_2O %	K_2O %	P_2O_5 %	TiO_2 %	MnO %	BaO %	Cr_2O_3 %	SrO %	LOI %	Total %
Comp 1	66.47	14.52	3.81	0.62	2.24	0.58	3.19	0.150	0.293	0.220	0.152	0.029	0.017	6.0	98.3
Comp 2	65.87	14.66	5.09	0.59	1.81	0.16	2.58	0.189	0.384	0.232	0.128	0.037	0.009	7.1	98.8
Comp 3	68.64	13.41	4.25	0.57	2.57	0.16	2.83	0.126	0.343	0.207	0.111	0.032	0.010	6.2	99.6
Comp 4	66.77	13.45	4.79	0.82	2.12	0.42	3.10	0.180	0.338	0.324	0.105	0.034	0.016	5.9	98.4
Comp 5	63.89	14.89	4.26	1.41	3.72	3.08	2.39	0.204	0.403	0.140	0.131	0.033	0.056	4.2	98.9

Process Research Associates Ltd.
9145 Shaughnessy Street, Vancouver, B.C. V6P 6R9
Telephone: (604) 322-0118 Fax: (604) 322-0181

October 26, 1994

BYG Natural Resources Inc.
208-3190 St. John's Street
Port Moody, B.C.
V3H 2C7

Attention: Mr. J.B. Smith
Vice President, Operations

Dear Mr. Smith:

Re: Distilled water leach test on SO_2/air treatment residue.

A residue sample of Mount Nansen ore that had been subjected to cyanide leaching and SO_2/air detoxification was subjected to a series of leach tests to determine the stability of metals. The procedures for the tests were provided by T.W. Higgs Associates Ltd. The following summarizes the procedures and results.

Procedures

A sample of Mount Nansen ore that had been cyanide leached and subjected to SO_2/air detoxification was produced during previous testing at Process Research Associates Ltd. (report by B. Klein dated September 9, 1994). Representative sub-samples were subjected to the distilled water leach test with and without the addition of ferric sulphate.

A 20 g residue sample was added to a 250 mL flask along with 100 mL of distilled deionized water. The flask was placed on a shaker where it was agitated for 24 hours. The suspension was filtered and the filtercake was washed with approximately 100 mL of distilled deionized water. The leach and wash filtrate solutions were combined, weighed and analyzed for pH, sulphate and ICP metals.

The leach procedure was repeated two times using the filtered solids producing a total of three leachate solutions for analyses (labelled LH1a, LH1b and LH1c).

Three distilled water leach tests were performed with ferric sulphate added. For these test, three flasks containing a 20 g residue sample and 100 mL of distilled deionized water were prepared. Ferric sulphate was added to each flask (from a stock solution containing 400 mg/L Fe^{3+}) to concentrations of 20 mg/L, 50 mg/L and 100 mg/L of ferric iron (referred to as tests LH2, LH3 and LH4, respectively). The flasks were placed on a shaker and agitated for 24 hours. The suspensions were filtered and the filtercakes were washed with approximately 100 mL of distilled deionized water. The leach and wash filtrate solutions were combined, weighed and analyzed for pH, sulphate and ICP metals.

Results

The results of the distilled water leach tests are presented in Tables 1 and 2.

For test LH1, the three consecutive leaches on the solid sample yield high levels of arsenic (2509 ppb to 4213 ppb) and antimony (356 ppb to 489 ppb) and show no decrease in concentration with each subsequent leach. It is suspected that the ferric arsenate and ferric antimonate in the ore continue to dissolve until equilibrium is reached with the solution. Other species, such as SO_4^{-2}, Ca, Na and K, dissolved most in the first leaching stage and less with each subsequent stage indicating the leachable quantities were depleted.

The addition of ferric sulphate caused the levels of As and Sb to decrease; from 2509 ppb As and 489 ppb Sb with no ferric iron added to 572 ppb As and 332 ppb Sb with 100 mg/L ferric iron added. The decrease in As and Sb concentrations is likely due to the precipitation of basic ferric arsenate and basic ferric antimonate.

If you have any questions concerning these results, please call me.

Sincerely yours,
Process Research Associates Ltd.

Bern Klein

Bern Klein, Ph. D.
Senior Process Metallurgist

Table 1. Results of distilled water leach tests on SO2/air treatment residue.

Test	Filtrate weight g	Initial pH	Final pH	Sulphate mg/L
LH1a	199.3	8.67	8.01	936
LH1b	192.1	9.10	8.15	38
LH1c	217.6	8.53	8.26	3
LH2	189.2	8.36	8.06	936
LH3	201.4	7.86	8.07	910
LH4	233.0	7.14	7.98	858

Table 2. ICP metals analyses for distilled water leach tests on SO2/air treatment residue.

Test	Mo ppb	Cu ppb	Pb ppb	Zn ppb	Ag ppb	Ni ppb	Co ppb	Mn ppb	Fe ppb	As ppb	U ppm	Au ppb	Th ppb	Sr ppb	Cd ppb	Sb ppb	Bi ppb	V ppb	Ca ppm	P ppb	La ppb	Cr ppb	Mg ppm	Ba ppb	Ti ppb	B ppb	Al ppb	Na ppm	K ppm	W ppb
LH1a	7	12	10	5	2	17	4	62	318	2509	0.1	36	<5	473	1	489	<20	<5	658	12	<5	20	13	14	<2	171	48	26	14	87
LH1b	<5	6	<5	<5	4	4	<2	14	258	4213	<.1	29	6	68	<1	470	<20	<5	73	83	<5	<20	1.6	40	<2	136	16	2.3	1.9	92
LH1c	<5	5	<5	<5	2	5	<2	12	245	3536	<.1	23	6	50	<1	356	<20	<5	40	62	<5	<20	1.1	41	<2	131	61	1.6	0.8	63
LH2	<5	15	5	293	5	57	4	77	312	1786	0.1	35	<5	507	2	500	<20	<5	701	28	<5	<20	15	30	<2	148	53	26	14	51
LH3	<5	5	<5	73	<2	6	2	87	354	1405	0.1	15	<5	549	1	453	<20	<5	700	13	<5	<20	14	26	<2	80	64	25	14	45
LH4	<5	13	<5	17	<2	41	3	106	228	572	0.1	17	<5	495	2	332	<20	<5	629	<10	<5	<20	14	23	<2	89	45	22	12.0	54

Note : LH1a = first distilled water leachate
LH1b = second distilled water leachate
LH1c = third distilled water leachate
LH2 = 20 mg/L Fe leachate
LH3 = 50 mg/L Fe leachate
LH4 = 100 mg/L Fe leachate

TABLE 7. BYG NATURAL RESOURCES - LEACHATE ICP REPORT

Mount Nansen

Project no : 94-043

Leachate from distilled water test.

Sample I.D.	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe ppm	As ppm	U ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca ppm	P ppm	La ppm	Cr ppm	Mg ppm	Ba ppm	Ti ppm	Al ppm	Na ppm	B ppm	W ppm
Comp 1	<.01	<.01	<.1	<.01	<.01	<.01	<.01	0.01	<.5	<.05	<.2	0.1	<.01	<.05	<.05	<.01	36	<.05	<.01	<.01	7.4	0.07	0.1	<.1	8	0.02	<.05
Comp 2	<.01	<.01	<.1	0.10	<.01	0.03	<.01	0.24	<.5	<.05	<.2	0.5	<.01	<.05	<.05	<.01	240	<.05	<.01	<.01	37	0.03	0.10	<.1	13	0.02	<.05
Comp 3	<.01	<.01	<.1	0.03	<.01	<.01	<.01	<.01	<.5	<.05	<.2	0.20	<.01	<.05	<.05	<.01	40	<.05	<.01	<.01	6.5	0.06	0.1	<.1	13	0.02	<.05
Comp 4	<.01	<.01	<.1	0.28	<.01	0.04	<.01	0.43	<.5	<.05	<.2	0.8	<.01	<.05	<.05	<.01	219	<.05	<.01	<.01	37	0.04	<.01	<.1	14	0.02	<.05
Comp 5	<.01	<.01	<.1	0.03	<.01	<.01	<.01	0.06	<.5	<.05	<.2	0.2	<.01	<.05	<.05	<.01	48	<.05	<.01	<.01	10	0.02	<.01	<.1	21	0.02	<.05

Appendix VI Water Quality Data

Appendix VI-I Water Quality Data - Norecol

Appendix VI-II Water Quality Data - EPS

Appendix VI-I
Water Quality Data - Norecol

TABLE 1

ANALYTICAL RESULTS FOR WATER SAMPLES FROM MOUNT NANSEN PROJECT

Sampling Date: October 11, 1985

ANALYTICAL PARAMETER	SITE A1	SITE B1	SITE C1	SITE D1	SITE D2	SITE M1	SITE N1	SITE N2	SITE P1	SITE V1	SITE V2	SITE W1
Temperature (°C)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
pH	7.3	7.3	7.2	7.3	7.0	6.9	7.5	7.8	7.5	7.7	7.5	7.1
Alkalinity ($mgCaCO_3/L$)	192	67	28	236	58	22	50	55	89	69	61	43
Turbidity (NTU)	6	48	4.5	30	3.7	2.5	5.5	5.5	5.2	0.8	9	5.8
Conductance (µmhos/cm)	660	150	67	1200	350	51	126	136	264	140	125	150
Total Solids (mg/L)	782	248	112	1435	370	96	144	144	269	120	154	170
Suspended Solids (mg/L)	1	57	<1	14	<1	<1	7	4	1	2	16	<1
EDTA-Hardness ($mgCaCO_3/L$)	535	94	39	963	212	24	72	77	162	83	69	83
Sulfate (mg/L)	334	31	15	694	156	<1	29	25	82	11	17	44
Ammonia (mgN/L)	0.063	0.053	0.011	0.342	0.010	0.006	0.006	<0.005	0.081	<0.005	<0.005	0.005
Nitrate (mgN/L)	0.092	0.021	0.013	0.117	0.015	0.030	0.035	0.023	0.037	0.044	0.037	0.011
Nitrite (mgN/L)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Total Phosphorus (mgP/L)	0.026	0.113	0.008	0.077	0.017	0.006	0.014	0.014	0.017	0.008	0.024	0.008
Total Cyanide (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TOTAL METALS: (mg/L)												
Ag	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As	0.062	0.024	0.004	0.072	0.019	<0.001	0.002	0.002	0.016	<0.001	0.004	0.005
Ba	0.023	0.12	0.041	0.072	0.046	0.048	0.056	0.042	0.050	0.067	0.071	0.033
Cd	0.0070	0.0004	<0.0002	0.0021	<0.0002	<0.0002	<0.0002	<0.0002	0.0089	<0.0002	<0.0002	<0.0002
Cu	0.0022	0.0063	0.0019	0.0031	0.0014	0.0028	0.0083	0.0077	0.19	0.0015	0.0028	0.0011
Fe	0.85	4.14	0.78	8.8	1.04	0.83	0.64	0.54	1.42	0.12	0.77	1.18
Hg (µg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pb	<0.001	0.0035	<0.001	0.0017	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zn	1.19	0.0093	0.0009	0.65	0.013	0.0015	0.0030	0.0022	0.95	0.0010	0.0026	0.0010
DISSOLVED METALS: (mg/L)												
Ag	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
As	0.005	0.006	0.003	0.007	0.012	<0.001	<0.001	0.001	0.012	<0.001	0.001	0.004
Ba	0.020	0.12	0.040	0.058	0.044	0.046	0.041	0.040	0.050	0.059	0.069	0.030
Cd	0.0054	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0071	<0.0002	<0.0002	<0.0002
Cu	0.0012	0.0046	0.0019	0.0025	0.0013	0.0026	0.0075	0.0075	0.11	0.0015	0.0025	0.0010
Fe	0.036	0.51	0.48	0.033	0.56	0.46	0.22	0.14	0.81	0.10	0.09	0.52
Pb	<0.001	<0.001	<0.001	<0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zn	1.10	0.0042	0.0010	0.39	*-	*-	*-	*-	0.77	0.0010	0.0022	*-

*Samples stored and analysed at a later date. All dissolved values were equal to or less than totals indicated.

(0318d)

TABLE 2

ANALYTICAL RESULTS FOR WATER SAMPLES FROM MOUNT NANSEN PROJECT

Sampling Date: March 4, 1986

ANALYTICAL PARAMETER	SITE W1
Temperature (°C)	0.0
pH	6.8
Alkalinity ($mgCaCO_3/L$)	80
Turbidity (NTU)	0.65
Conductance (μmhos/cm)	183
Total Solids (mg/L)	181
Suspended Solids (mg/L)	<1
EDTA-Hardness ($mgCaCO_3/L$)	123
Sulfate (mg/L)	50
Ammonia (mgN/L)	0.039
Nitrate (mgN/L)	0.007
Nitrite (mgN/L)	<0.002
Total Phosphorus (mgP/L)	<0.003
Total Cyanide (mg/L)	<0.001
TOTAL METALS: (mg/L)	
Ag	<0.0005
As	<0.001
Ba	0.057
Cd	<0.0002
Cu	0.0006
Fe	0.09
Hg (μg/L)	<0.05
Pb	<0.001
Zn	0.0046
DISSOLVED METALS: (mg/L)	
Ag	<0.0005
As	<0.001
Ba	0.055
Cd	<0.0002
Cu	0.0006
Fe	0.037
Pb	<0.001
Zn	0.0010

(0318d)

TABLE 3

ANALYTICAL RESULTS FOR WATER SAMPLES FROM MOUNT NANSEN PROJECT

Sampling Date: June 9, 1986

ANALYTICAL PARAMETER	SITE A1	SITE B1	SITE C1	SITE D1	SITE D2	SITE M1	SITE N1	SITE N2	SITE P1	SITE V1	SITE V2	SITE W1
Temperature (°C)	1.0	5.0	5.0	3.0	4.0	3.0	5.0	7.0	4.0	3.5	3.0	3.0
pH	7.4	7.3	7.6	7.5	7.3	7.3	7.6	7.7	7.5	7.7	7.8	7.4
Alkalinity ($mgCaCO_3/L$)	172	26	21	128	40	19	24	28	30	44	41	37
Turbidity (NTU)	3.6	150	1.2	6.2	0.5	1.0	29	23	3.0	2.0	11	0.8
Conductance (µmhos/cm)	805	105	69	940	410	42	74	82	103	87	88	115
Total Solids (mg/L)	825	1563	175	1044	424	116	242	198	169	150	171	152
Suspended Solids (mg/L)	3	1418	5	6	<1	<1	108	50	5	14	42	1
EDTA-Hardness ($mgCaCO_3/L$)	547	35	29	641	234	20	36	41	55	49	48	59
Sulfate (mg/L)	368	19	11	496	187	<1	14	14	23	7	9	22
Ammonia (mgN/L)	0.026	0.043	<0.005	0.230	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrate (mgN/L)	0.336	0.096	0.027	0.223	0.010	0.058	0.064	0.030	0.054	0.070	0.078	0.022
Nitrite (mgN/L)	0.005	<0.002	<0.002	0.009	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Total Phosphorus (mgP/L)	<0.003	2.18	<0.003	<0.003	<0.003	<0.003	0.176	0.076	<0.003	<0.003	0.040	<0.003
Total Cyanide (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TOTAL METALS: (mg/L)												
Ag	0.0002	0.0028	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0002	<0.0002
As	0.049	0.168	<0.001	0.021	0.012	<0.001	0.006	0.004	0.015	<0.001	0.005	0.001
Ba	0.017	0.18	0.031	0.027	0.038	0.038	0.053	0.038	0.031	0.032	0.034	0.030
Cd	0.0061	0.0025	<0.0002	0.0050	<0.0002	<0.0002	0.0004	0.0003	0.0017	<0.0002	<0.0002	<0.0002
Cu	0.0064	0.08	0.0019	0.0042	0.0018	0.0025	0.019	0.015	0.034	0.0025	0.0038	0.0021
Fe	0.64	45.5	0.37	1.04	0.24	0.81	2.73	1.96	0.81	0.33	1.12	0.24
Hg (µg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pb	0.0013	0.08	<0.001	0.0019	<0.001	<0.001	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001
Zn	1.36	0.27	0.0019	2.47	0.04	0.0040	0.018	0.012	0.14	0.0018	0.0018	0.0015
DISSOLVED METALS: (mg/L)												
Ag	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
As	0.005	0.037	<0.001	0.018	0.009	<0.001	0.003	0.002	0.011	<0.001	0.002	<0.001
Ba	0.016	0.095	0.023	0.026	0.038	0.036	0.025	0.019	0.029	0.028	0.030	0.026
Cd	0.0058	0.0006	<0.0002	0.0041	<0.0002	<0.0002	<0.0002	<0.0002	0.0015	<0.0002	<0.0002	<0.0002
Cu	0.0061	0.0057	0.0017	0.0027	0.0018	0.0024	0.0068	0.0073	0.031	0.0020	0.0023	0.0015
Fe	0.45	6.85	0.34	0.37	0.16	0.74	0.79	0.71	0.67	0.09	0.35	0.16
Pb	<0.001	0.0025	<0.001	0.0017	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zn	1.34	0.014	0.0011	2.37	0.04	0.0037	0.0041	0.0040	0.13	0.0015	0.0018	0.0015

(0318d)

TABLE 4

ANALYTICAL RESULTS FOR WATER SAMPLES FROM MOUNT NANSEN PROJECT

Sampling Date: September 4, 1986

ANALYTICAL PARAMETER	SITE A1	SITE B1	SITE C1	SITE D1	SITE D2	SITE M1	SITE N1	SITE N2	SITE P1	SITE V1	SITE V2	SITE W1
Temperature (°C)	2.0	8.0	7.0	6.5	7.5	6.0	10.0	8.0	8.0	9.0	8.5	8.5
Dissolved Oxygen (mg/L)	-	11.2	10.9	7.4	8.3	10.7	8.4	10.9	-	9.7	9.7	9.4
pH:												
Field	6.8	7.7	7.7	7.5	7.5	7.1	7.8	8.2	7.7	7.8	7.8	7.7
Laboratory	7.7	7.8	7.6	7.6	7.6	7.3	7.7	8.0	7.8	8.0	8.0	7.6
Alkalinity ($mgCaCO_3/L$)	208	47	24	85	46	18	39	43	31	60	52	49
Turbidity (NTU)	10	110	2.5	6.8	1.5	3.5	6.9	4.3	16	4.2	40	46
Conductance (µmhos/cm)	900	135	65	330	230	39	110	106	89	115	115	156
Total Solids (mg/L)	850	1167	179	362	219	115	134	117	128	101	567	485
Suspended Solids (mg/L)	9	965	2	32	3	9	15	6	23	8	322	363
EDTA-Hardness ($mgCaCO_3/L$)	601	69	32	194	118	22	54	56	46	62	61	80
Sulfate (mg/L)	420	40	10	126	130	<1	21	18	18	9	16	38
Ammonia (mgN/L)	0.078	0.119	0.008	0.104	0.014	0.005	0.009	0.009	0.065	0.008	0.020	0.024
Nitrate (mgN/L)	0.220	0.057	0.010	0.066	0.006	0.005	0.020	<0.005	0.048	0.019	0.022	0.006
Nitrite (mgN/L)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Total Phosphorus (mgP/L)	0.059	0.693	0.091	0.054	0.059	0.043	0.038	0.041	0.084	0.024	0.223	0.374
Total Cyanide (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TOTAL METALS: (mg/L)												
Ag	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
As	0.050	0.056	0.004	0.010	0.026	0.001	0.002	0.002	0.011	<0.001	0.024	0.021
Ba	0.011	0.15	0.021	0.031	0.018	0.038	0.026	0.020	0.051	0.044	0.10	0.09
Cd	0.0051	0.0026	<0.0002	0.0005	0.0003	0.0002	0.0003	0.0002	0.0004	<0.0002	0.0010	0.0006
Cu	0.0023	0.027	0.0022	0.0021	0.0025	0.0034	0.0083	0.0058	0.0027	0.0027	0.013	0.010
Fe	0.62	17.7	0.80	1.95	1.37	0.94	1.01	0.57	1.70	0.43	4.74	6.16
Hg (µg/L)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pb	<0.001	0.018	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.004
Zn	1.33	-	-	-	-	-	-	-	-	-	-	-
DISSOLVED METALS: (mg/L)												
Ag	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
As	0.013	0.006	0.003	0.005	0.008	<0.001	<0.001	0.002	0.006	<0.001	0.001	0.001
Ba	0.011	0.036	0.014	0.025	0.013	0.025	0.021	0.016	0.040	0.038	0.023	0.033
Cd	0.0051	0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	0.0002	0.0003
Cu	0.0008	0.0065	0.0022	0.0014	0.0025	-	0.0054	0.0046	-	0.0026	0.0066	0.0027
Fe	0.23	0.47	0.51	0.93	0.39	0.41	0.46	0.26	0.77	0.18	0.24	0.26
Pb	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zn	1.31	-	-	-	-	-	-	-	-	-	-	-

(0318d)

TABLE 5

ANALYTICAL RESULTS FOR WATER SAMPLES FROM MOUNT HANSEN PROJECT

SAMPLING DATE: JULY 4, 1987

ANALYTICAL PARAMETER	SITE A1	SITE B1	SITE C1	SITE D1	SITE D2	SITE M1	SITE M1	SITE M2	SITE P1	SITE V1	SITE V2	SITE W1
Temperature (°C)	1.5	11.0	5.5	7.0	8.0	5.5	5.5	9.5	8.0	6.0	7.5	7.0
Dissolved Oxygen (mg/L)	–	–	–	–	–	–	–	–	–	–	–	–
pH	7.5	7.6	7.1	7.3	7.3	7.0	7.1	7.3	7.3	7.4	7.4	7.5
Alkalinity (mg $CaCO_3$/L)	182	58	29	104	72	20	25	36	72	41	41	52
Turbidity (NTU)	11	50	3.2	40	4.6	1.6	25	33	10	37	49	2.8
Conductance (μmhos/cm)	910	190	97	670	480	45	82	110	240	94	95	160
Total Solids (mg/L)	798	392	95	1684	384	80	222	155	198	183	201	156
Suspended Solids (mg/L)	6	135	<1	145	2	<1	124	59	<1	88	105	<1
EDTA Hardness (mg $CaCO_3$/L)	570	88	43	376	251	23	36	51	46	46	47	73
Sulfate (mg/L)	401	47	20	271	194	1	16	21	60	8	10	30
Ammonia (mg N/L)	0.127	0.083	<0.005	0.123	0.009	<0.005	0.011	0.018	0.039	0.013	0.017	0.013
Nitrate (mg N/L)	0.300	0.137	0.024	0.019	0.026	0.019	0.057	0.051	0.051	0.053	0.052	0.028
Nitrite (mg N/L)	<0.002	0.005	<0.002	0.005	<0.002	<0.002	<0.002	<0.002	0.004	<0.002	<0.002	0.004
Total Phosphorus (mg P/L)	0.070	0.370	0.040	0.815	0.050	0.048	0.195	0.183	0.057	0.215	0.235	0.030
Total Cyanide (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TOTAL METALS: (mg/L)												
Ag	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
As	0.094	0.034	0.005	0.061	0.042	<0.001	0.012	0.010	0.039	0.002	0.004	0.009
Ba	0.023	0.29	0.039	0.21	0.055	0.047	0.079	0.063	0.063	0.089	0.10	0.043
Cd	0.0049	0.0022	<0.0002	0.0012	<0.0002	<0.0002	0.0010	0.0005	0.0021	0.0003	0.0004	<0.0002
Cu	0.0053	0.017	0.0019	0.030	0.0018	0.0035	0.020	0.021	0.013	0.016	0.018	0.0013
Fe	2.89	7.4	0.71	11.8	1.41	0.54	3.02	3.01	1.89	2.99	3.79	1.09
Hg (μg/L)	<0.05	<0.05	–	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pb	<0.001	0.011	<0.001	0.007	<0.001	<0.001	0.005	0.004	<0.001	0.003	0.003	<0.001
Zn	1.01	0.07	0.0006	0.24	0.014	0.0017	0.03	0.03	0.13	0.012	0.015	0.0011
DISSOLVED METALS: (mg/L)												
Ag	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
As	0.008	0.009	0.004	0.004	0.024	<0.001	0.002	0.002	0.032	<0.001	<0.001	0.006
Ba	0.023	0.077	0.032	0.072	0.041	0.040	0.026	0.024	0.057	0.038	0.039	0.035
Cd	0.0044	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0013	<0.0002	<0.0002	<0.0002
Cu	0.0013	0.0029	0.0018	0.0013	0.0017	0.0029	0.0068	0.0061	0.0096	0.0050	0.0045	0.0011
Fe	0.15	0.85	0.52	0.66	0.66	0.38	0.54	0.34	1.09	0.38	0.30	0.74
Pb	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zn	0.83	0.0051	0.0006	0.0063	0.0095	0.0017	0.0026	0.0017	0.11	0.0014	0.0010	0.0010

TABLE 6

ANALYTICAL RESULTS FOR WATER SAMPLES FROM MOUNT HANSEN PROJECT

SAMPLING DATE: AUGUST 28, 1987

ANALYTICAL PARAMETER	SITE A1	SITE B1	SITE C1	SITE D1	SITE D2	SITE M1	SITE N1	SITE N2	SITE P1	SITE V1	SITE V2	SITE W1
Temperature (°C)	3.5	6.0	5.0	6.0	6.0	4.5	6.5	7.5	6.0	6.0	6.0	5.5
Dissolved Oxygen (mg/L)	–	–	–	–	–	–	–	–	–	–	–	–
pH	7.3	7.5	7.1	7.8	7.5	7.1	7.3	7.4	7.2	7.6	7.5	7.3
Alkalinity (mg $CaCO_3$/L)	80	42	20	184	57	19	33	39	47	50	49	50
Turbidity (NTU)	3.0	220	3.8	6.7	1.0	2.0	15	110	17	3.8	25	4.8
Conductance (µmhos/cm)	400	165	66	1300	360	47	116	125	290	111	120	168
Total Solids (mg/L)	299	508	91	1138	289	104	145	283	272	100	139	144
Suspended Solids (mg/L)	2	242	<1	2	<1	21	21	79	9	10	25	<1
EDTA Hardness (mg $CaCO_3$/L)	206	79	30	817	183	26	52	57	147	54	59	81
Sulfate (mg/L)	144	38	9	657	132	3	24	26	102	9	14	36
Ammonia (mg N/L)	0.119	0.123	<0.005	0.193	0.006	0.012	0.011	0.009	0.123	0.011	0.013	<0.005
Nitrate (mg N/L)	0.026	0.090	0.008	0.081	<0.005	<0.005	0.028	0.020	0.180	0.025	0.026	0.009
Nitrite (mg N/L)	<0.002	<0.002	<0.002	0.008	<0.002	<0.002	<0.002	<0.002	<0.002	0.011	<0.002	<0.002
Total Phosphorus (mg P/L)	0.017	0.900	0.020	0.053	0.020	0.333	0.187	0.310	0.065	0.020	0.078	0.010
Total Cyanide (mg/L)	–	–	–	–	–	–	–	–	–	–	–	–
TOTAL METALS: (mg/L)												
Ag	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0003	0.0002	<0.0002	<0.0002	<0.0002
As	0.016	0.42	0.004	0.014	0.018	0.002	0.005	0.015	0.095	<0.001	0.016	0.009
Ba	0.028	0.18	0.031	0.039	0.035	0.077	0.059	0.11	0.057	0.046	0.061	0.039
Cd	0.0016	0.0046	<0.0002	0.0013	<0.0002	<0.0002	0.0003	0.0008	0.020	<0.0002	0.0003	<0.0002
Cu	0.0017	0.05	0.0023	0.0026	0.0019	0.0035	0.012	0.04	0.34	0.0042	0.0055	0.0013
Fe	1.36	21.1	0.60	0.96	0.34	1.33	1.96	10.5	3.52	0.47	2.00	1.14
Hg (µg/L)	<0.05	0.07	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pb	<0.001	0.016	0.001	<0.001	<0.001	<0.001	<0.001	0.009	0.002	<0.001	0.001	<0.001
Zn	0.18	0.11	0.0006	0.48	0.011	0.0026	0.014	0.06	1.44	0.0055	0.0080	0.0013
DISSOLVED METALS: (mg/L)												
Ag	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
As	0.011	0.10	0.003	0.006	0.015	0.001	0.002	0.006	0.013	<0.001	0.003	0.006
Ba	0.028	0.065	0.023	0.027	0.024	0.045	0.031	0.032	0.055	0.042	0.045	0.036
Cd	0.0014	0.0006	<0.0002	0.013	<0.0002	<0.0002	<0.0002	<0.0002	0.015	<0.0002	<0.0002	<0.0002
Cu	0.0016	0.011	0.0021	0.0015	0.0018	0.0035	0.0044	0.0071	0.08	0.0022	0.0021	0.0010
Fe	0.96	4.51	0.39	0.10	0.24	0.23	0.28	0.66	0.33	0.11	0.18	0.58
Pb	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zn	0.18	0.020	0.006	0.41	0.011	0.0022	0.0022	0.0053	0.98	<0.0005	0.0007	0.0008

TABLE 7
ANALYTICAL RESULTS FOR WATER SAMPLES
FROM MOUNT NANSEN PROJECT
SAMPLING DATE: MAY 27, 1988

ANALYTICAL PARAMETER	SITE B1	SITE D1	SITE D2	SITE P1	SITE V1	SITE V2
Temperature (°C)						
pH	7.3	7.6	7.3	7.1	7.3	7.4
Alkalinity (mg $CaCO_3$/L)	25	112	42	37	36	37
Turbidity (NTU)	16	7.0	6.5	8.0	10	14
Conductance (µmhos/cm)	90	690	350	180	78	85
Total Solids (mg/L)	169	589	289	173	115	112
Suspended Solids (mg/L)	86	7	<1	18	40	39
EDTA-Hardness (mg $CaCO_3$/L)	43	391	174	86	40	41
Sulfate (mg/L)	24	252	154	54	7	11
Ammonia (mg N/L)	0.017	0.230	<0.005	0.040	<0.005	<0.005
Nitrate (mg N/L)	0.035	0.062	0.005	0.086	0.033	0.046
Nitrite (mg N/L)	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Total Phosphorus (mg P/L)	0.220	0.050	0.013	0.063	0.063	0.077
Total Cyanide (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
TOTAL METALS: (mg/L)						
Ag	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Al	1.22	0.050	0.019	0.36	0.77	0.81
As	0.008	0.039	0.011	0.013	0.001	0.002
Ba	0.07	0.028	0.032	0.060	0.050	0.050
Cd	0.0004	0.0007	<0.0002	0.0034	<0.0002	<0.0002
Cu	0.0066	0.0033	0.0016	0.034	<0.0005	<0.0005
Fe	1.80	1.04	0.22	1.25	0.74	0.96
Hg (µg/L)	<0.05	<0.05	<0.05	0.13	<0.05	<0.05
Pb	<0.001	0.002	<0.001	<0.001	<0.001	<0.001
Zn	0.0061	0.19	0.0044	0.22	<0.0005	0.0029
DISSOLVED METALS: (mg/L)						
Ag	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Al	0.11	<0.01	0.019	0.13	0.28	0.09
As	0.003	0.008	0.008	0.009	<0.001	0.001
Ba	0.037	0.024	0.031	0.047	0.035	0.034
Cd	<0.0002	0.0005	<0.0002	0.0030	<0.0002	<0.0002
Cu	0.0034	0.0015	0.0016	0.027	<0.0005	<0.0005
Fe	0.38	0.40	0.18	0.83	0.31	0.17
Pb	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zn	0.0022	0.16	0.0044	<0.0005	<0.0005	<0.0005

Appendix VI-II
Water Quality Data - EPS

APPENDIX II TABLE 1 MOUNT NANSEN MINES WATER QUALITY DATA, JULY 1988

STATION #	DISCHARGE (m^3/sec)	TEMP (°C)	pH INSITU	pH LAB	IN SITU COND. (umhos/cm)	LAB COND. (umhos/cm)	DISSOLVED OXYGEN (mg/L)	% DISSOLVED OXYGEN SATURATION	COLOR (REL. U.)	TURBIDITY (FTU)	TOTAL ALK. (asCaCO3) (mg/L)
		*	*		*		*				
1	0.003	3.0	6.74	8.1	60	113	9.7	87	20	0.3	39
				7.9		113			20	0.6	42
				7.9		113			20	0.3	39
2	0.002	13.5	7.82	8.3	350	580	9.8	108	30	7.3	118
				8.4		550			30	7.3	118
				8.4		550			30	7.3	118
3	0.002	11.2	7.62	8.3	810	1130	8.8	92	20	2.3	162
				8.4		1130			20	4.3	162
				8.3		1130			20	3.8	160
4	0.008	13.0	6.89	---	140	---	10.3	110	---	---	---
				7.8		235			100	0.3	37
				7.8		245			100	0.3	37
5	0.150	8.0	6.89	6.7	47	88	9.0	87	200	2000.0	44
				6.7		85			200	2300.0	44
				6.7		85			200	2000.0	44
6	0.008	9.5	7.13	7.9	85	155	8.9	89	70	28.0	45
				7.9		155			60	28.0	45
				7.9		155			70	23.0	45

< detection limit

* only one measurment in situ

APPENDIX II TABLE 1 MOUNT NANSEN MINES WATER QUALITY DATA, JULY 1988 (continued)

STATION #	DISCHARGE (m^3/sec)	TEMP (°C)	pH INSITU	pH LAB	IN SITU COND. (umhos/cm)	LAB COND. (umhos/cm)	DISSOLVED OXYGEN (mg/L)	% DISSOLVED OXYGEN SATURATION	COLOR (REL.U)	TURBIDITY (FTU)	TOTAL ALK. (asCaCO3) (mg/L)
		*	*		*		*				
7	0.070	14.0	7.28	6.9	60	83	9.0	98	500	1800.0	33
				6.9		83			100	1800.0	33
				6.9		83			200	1800.0	33
8	1.160	9.0	7.50	7.9	50	73	9.6	94	80	28.0	36
				7.9		80			70	23.0	33
				7.8		73			80	28.0	33
9	1.700	10.0	9.24	7.6	55	78	11.4	116	200	130.0	34
				7.6		78			100	130.0	34
				7.7		78			100	130.0	33
10	1.590	10.1	7.46	7.7	60	83	9.5	94	100	100.0	33
				7.6		83			100	215.0	33
				7.7		83			100	130.0	35
11	0.280	7.5	6.81	7.2	22	33	10.0	94	100	0.2	13
				7.2		33			100	0.2	13
				7.1		33			100	0.2	12
12	1.490	12.0	7.40	7.8	52	88	10.1	105	80	8.0	36
				7.8		88			80	7.3	35
				7.9		88			80	6.8	37

< detection limit

--- no sample for analysis

* only one measurment in situ

APPENDIX II TABLE 1 MOUNT NANSEN MINES WATER QUALITY DATA, JULY 1988 (continued)

STATION #	HARDNESS (asCaCO3) (mg/L)	TOTAL HARDNESS (mg/L)	SULPHATE (mg/L)	CHLORIDE (mg/L)	TOTAL P (mg/L)	NITRITE (mg/L)	NITRITE+ NITRATE (mg/L)	AMMONIA (mg/L)	FR (mg/L)	NFR (mg/L)
1	54	57	15	2.7	0.050	<0.005	0.062	0.007	99	34
	53	56	15	2.7	0.081	<0.005	0.064	0.013	97	50
	54	57	15	2.8	0.064	<0.005	0.064	0.008	95	40
2	310	315	180	3.2	0.029	<0.005	0.087	0.065	463	16
	296	300	180	3.2	0.029	<0.005	0.088	0.067	457	12
	299	303	190	3.3	0.028	<0.005	0.089	0.067	446	16
3	684	690	550	3.5	0.055	<0.005	0.198	0.289	1040	28
	684	689	550	4.0	0.046	<0.005	0.199	0.304	1060	29
	738	745	540	4.0	0.041	<0.005	0.201	0.305	1050	16
4	124	125	---	---	---	---	---	---	---	---
	116	117	90	4.1	0.013	<0.005	0.009	0.013	226	<5
	117	118	80	4.1	0.012	<0.005	0.015	0.039	222	<5
5	351	957	22	5.0	10.500	<0.005	0.505	0.230	48	11100
	357	914	22	4.2	8.900	0.006	0.453	0.330	31	10500
	385	975	20	4.1	10.600	<0.005	0.249	0.382	140	2930
6	92	103	33	4.2	0.106	<0.005	0.008	0.043	630	138
	84	95	38	4.2	0.196	<0.005	0.006	0.024	630	159
	84	95	37	4.3	0.109	<0.005	0.016	0.024	162	114

< detection limit
--- no sample for analysis

DRAFT

APPENDIX II TABLE 1 MOUNT NANSEN MINES WATER QUALITY DATA, JULY 1988 (continued)

STATION #	HARDNESS (asCaCO3) (mg/L)	TOTAL HARDNESS (mg/L)	SULPHATE (mg/L)	CHLORIDE (mg/L)	TOTAL P (mg/L)	NITRITE (mg/L)	NITRITE+ NITRATE (mg/L)	AMMONIA (mg/L)	FR (mg/L)	NFR (mg/L)
7	211	602	23	4.4	5.800	0.006	0.224	0.224	170	5780
	219	611	21	4.3	6.000	0.009	0.159	0.199	170	5930
	225	625	20	4.6	6.400	<0.005	0.180	0.207	140	5920
8	42	49	8	1.0	0.080	<0.005	0.036	0.028	340	88
	43	50	7	3.9	0.085	<0.005	0.039	0.023	370	84
	41	48	7	4.0	0.079	<0.005	0.032	0.016	350	493
9	62	113	8	4.3	0.500	<0.005	0.052	0.032	96	507
	60	107	8	4.3	0.533	<0.005	0.041	0.026	97	77
	66	119	8	4.3	0.460	<0.005	0.042	0.027	50	510
10	62	90	10	4.3	0.400	<0.005	0.050	0.053	60	440
	61	98	10	4.5	0.400	<0.005	0.041	0.034	120	490
	58	91	11	4.6	0.859	<0.005	0.047	0.042	110	540
11	19	21	6	4.8	0.030	<0.005	0.008	0.032	170	<5
	18	20	5	4.9	0.023	<0.005	0.014	0.036	180	<5
	18	19	5	5.0	0.018	<0.005	0.008	0.029	190	<5
12	48	55	9	4.6	0.058	<0.005	0.039	0.025	101	56
	48	54	9	4.6	0.065	<0.005	0.041	0.024	100	57
	47	54	10	4.8	0.053	<0.005	0.044	0.027	101	70

< detection limit

APPENDIX II TABLE 2 MOUNT NANSEN MINES WATER QUALITY DATA, JULY 1988

STATION #	EXTRACTABLE METALS													
	Ag (mg/L)	Al (mg/L)	As (mg/L)	B (mg/L)	Ba (mg/L)	Be (mg/L)	Ca (mg/L)	Cd(GF) (mg/L)	Co (mg/L)	Cr (mg/L)	Cu(GF) (mg/L)	Fe (mg/L)	Mg (mg/L)	Mn (mg/L)
1	<0.01	0.32	<0.05	<0.01	0.030	<0.001	16.6	0.0001	0.008	<0.005	0.0030	0.459	3.0	0.018
	<0.01	0.34	<0.05	<0.01	0.030	<0.001	16.4	0.0003	<0.005	<0.005	0.0034	0.446	2.9	0.022
	<0.01	0.37	<0.05	<0.01	0.031	<0.001	16.7	0.0002	0.006	<0.005	0.0039	0.473	3.0	0.023
2	<0.01	0.19	0.08	<0.01	0.038	<0.001	84.8	0.0013	<0.005	<0.005	0.0019	1.200	24.0	0.422
	<0.01	0.12	<0.05	<0.01	0.036	<0.001	81.0	0.0013	<0.005	<0.005	0.0026	1.100	22.8	0.399
	<0.01	0.13	<0.05	<0.01	0.037	<0.001	81.7	0.0013	<0.005	<0.005	0.0020	1.140	23.1	0.411
3	<0.01	0.07	0.07	<0.01	0.049	<0.001	167.0	0.0003	<0.005	<0.005	0.0034	1.400	64.8	0.973
	<0.01	0.09	<0.05	<0.01	0.049	<0.001	167.0	0.0003	0.006	<0.005	0.0039	1.440	64.8	0.975
	<0.01	0.15	0.08	<0.01	0.055	<0.001	180.0	0.0004	0.008	<0.005	0.0042	1.860	69.9	1.090
4	<0.01	0.11	<0.05	<0.01	0.027	<0.001	32.5	<0.0001	<0.005	<0.005	0.0026	0.285	10.4	0.017
	<0.01	0.05	<0.05	<0.01	0.024	<0.001	30.5	<0.0001	<0.005	<0.005	0.0026	0.262	9.6	0.016
	<0.01	0.13	<0.05	<0.01	0.025	<0.001	30.8	0.0001	<0.005	<0.005	0.0025	0.268	9.7	0.016
5	<0.01	70.60	<0.05	<0.01	3.600	0.005	88.3	*0.019	0.327	0.072	*0.329	111.000	31.7	6.340
	<0.01	65.80	0.06	<0.01	3.360	0.005	88.7	*0.021	0.329	0.076	*0.334	99.100	32.8	6.510
	<0.01	68.10	<0.05	<0.01	3.390	0.005	95.7	*0.023	0.342	0.079	*0.364	110.000	35.4	6.930
6	<0.01	1.05	<0.05	<0.01	0.088	<0.001	27.0	0.0005	0.006	<0.005	0.0115	3.090	5.9	0.094
	<0.01	0.96	<0.05	<0.01	0.081	<0.001	24.8	0.0004	0.010	<0.005	0.0115	2.890	5.4	0.089
	<0.01	0.95	<0.05	<0.01	0.082	<0.001	24.7	0.0005	0.009	<0.005	0.0129	2.940	5.4	0.088

< detection limit

* ICP SCAN replaces GF analysis result due to GF sample loss

APPENDIX II TABLE 2 MOUNT NANSEN MINES WATER QUALITY DATA, JULY 1988 (continued)

STATION #	EXTRACTABLE METALS													
	Ag (mg/L)	Al (mg/L)	As (mg/L)	B (mg/L)	Ba (mg/L)	Be (mg/L)	Ca (mg/L)	Cd(GF) (mg/L)	Co (mg/L)	Cr (mg/L)	Cu(GF) (mg/L)	Fe (mg/L)	Mg (mg/L)	Mn (mg/L)
7	<0.01	40.60	0.18	<0.01	2.070	0.003	53.8	*0.014	0.231	0.043	*0.227	87.800	18.7	3.160
	<0.01	41.50	0.08	<0.01	2.000	0.003	55.7	*0.014	0.230	0.041	*0.235	87.400	19.4	3.240
	<0.01	42.40	0.10	<0.01	1.840	0.004	56.4	*0.016	0.248	0.044	*0.242	87.400	20.4	3.340
8	<0.01	0.80	<0.05	<0.01	0.063	<0.001	11.4	0.0002	0.005	<0.005	0.0075	1.260	3.3	0.069
	<0.01	0.85	<0.05	<0.01	0.064	<0.001	11.8	0.0002	<0.005	<0.005	0.0073	1.280	3.3	0.070
	<0.01	0.80	<0.05	<0.01	0.062	<0.001	11.2	<0.0001	0.005	<0.005	0.0091	1.220	3.2	0.070
9	<0.01	5.50	<0.05	<0.01	0.226	<0.001	15.7	0.0019	0.044	0.009	0.0370	11.000	5.5	0.403
	<0.01	4.96	<0.05	<0.01	0.220	<0.001	15.3	0.0018	0.030	0.006	0.3000	10.000	5.3	0.395
	<0.01	5.75	<0.05	<0.01	0.244	<0.001	16.7	0.0018	0.035	0.010	0.0310	11.400	5.8	0.430
10	<0.01	2.99	<0.05	<0.01	0.169	<0.001	16.6	0.0009	0.015	<0.005	0.0280	5.540	5.1	0.303
	<0.01	3.99	<0.05	<0.01	0.173	<0.001	16.0	0.0010	0.022	0.006	0.0180	7.400	5.2	0.306
	<0.01	3.69	<0.05	<0.01	0.164	<0.001	15.0	0.0011	0.022	0.009	0.0190	6.830	4.9	0.292
11	<0.01	0.22	<0.05	<0.01	0.042	<0.001	5.8	0.0002	<0.005	<0.005	0.0036	0.336	1.2	0.006
	<0.01	0.17	<0.05	<0.01	0.041	<0.001	5.5	0.0003	<0.005	<0.005	0.0032	0.312	1.1	0.007
	<0.01	0.17	<0.05	<0.01	0.039	<0.001	5.4	0.0005	<0.005	<0.005	0.0034	0.310	1.0	0.007
12	<0.01	0.70	<0.05	<0.01	0.063	<0.001	13.3	0.0007	<0.005	<0.005	0.0053	1.340	3.7	0.071
	<0.01	0.66	<0.05	<0.01	0.062	<0.001	13.2	0.0009	<0.005	<0.005	0.0053	1.260	3.6	0.070
	<0.01	0.74	<0.05	<0.01	0.063	<0.001	12.9	0.0013	0.005	<0.005	0.0069	1.430	3.6	0.073

< detection limit

* ICP SCAN replaces GF analysis result due to GF sample loss



APPENDIX II TABLE 2 MOUNT NANSEN MINES WATER QUALITY DATA, JULY 1988 (continued)

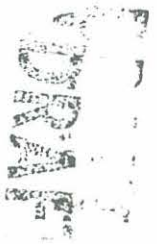
STATION #	EXTRACTABLE METALS												
	Mo (mg/L)	Na (mg/L)	Ni (mg/L)	P (mg/L)	Pb(GF) (mg/L)	Sb (mg/L)	Se (mg/L)	Si (mg/L)	Sn (mg/L)	Sr (mg/L)	Ti (mg/L)	V (mg/L)	Zn (mg/L)
1	<0.01	1.5	<0.02	<0.1	<0.0005	<0.05	<0.05	5.85	<0.05	0.059	0.010	<0.01	0.003
	<0.01	1.5	<0.02	<0.1	0.0031	<0.05	<0.05	5.76	<0.05	0.058	0.010	<0.01	0.016
	<0.01	1.5	<0.02	<0.1	0.0016	<0.05	<0.05	5.87	<0.05	0.058	0.010	<0.01	0.013
2	<0.01	4.5	<0.02	<0.1	<0.0005	<0.05	<0.05	5.81	<0.05	0.212	0.007	<0.01	0.218
	<0.01	4.2	<0.02	<0.1	<0.0005	<0.05	<0.05	5.54	<0.05	0.202	0.006	<0.01	0.209
	<0.01	4.3	<0.02	<0.1	<0.0005	<0.05	<0.05	5.58	<0.05	0.203	0.006	<0.01	0.210
3	<0.01	7.8	<0.02	<0.1	0.0005	<0.05	<0.05	3.86	<0.05	0.392	0.006	<0.01	0.109
	<0.01	7.8	<0.02	<0.1	0.0005	<0.05	<0.05	3.87	<0.05	0.393	0.006	<0.01	0.112
	<0.01	8.4	<0.02	<0.1	0.0009	<0.05	<0.05	4.22	<0.05	0.425	0.009	<0.01	0.132
4	<0.01	2.4	<0.02	<0.1	<0.0005	<0.05	<0.05	4.95	<0.05	0.087	<0.002	<0.01	0.022
	<0.01	2.3	<0.02	<0.1	<0.0005	<0.05	<0.05	4.64	<0.05	0.081	<0.002	<0.01	0.021
	<0.01	2.3	<0.02	<0.1	<0.0005	<0.05	<0.05	4.70	<0.05	0.081	<0.002	<0.01	0.021
5	<0.01	2.9	0.08	2.7	*0.34	<0.05	0.14	54.30	<0.05	0.554	0.253	0.33	0.905
	<0.01	2.9	0.08	2.7	*0.33	<0.05	0.08	49.40	<0.05	0.555	0.238	0.34	0.961
	<0.01	3.4	0.08	3.4	*0.36	<0.05	0.12	55.20	<0.05	0.609	0.342	0.36	0.996
6	<0.01	3.2	<0.02	<0.1	0.0008	<0.05	<0.05	6.84	<0.05	0.147	0.049	0.01	0.071
	<0.01	2.9	<0.02	<0.1	0.0008	<0.05	<0.05	6.31	<0.05	0.134	0.042	<0.01	0.067
	<0.01	3.0	<0.02	<0.1	0.0010	<0.05	<0.05	6.32	<0.05	0.133	0.045	<0.01	0.067

< detection limit

* ICP SCAN replaces GF analysis result due to GF sample loss

APPENDIX III TABLE 1 MOUNT NANSEN WATER QUALITY DATA, AUGUST 1988 (continued)

STATION #	HARDNESS (asCaCO3) (mg/L)	TOTAL HARDNESS (mg/L)	SULPHATE (mg/L)	CHLORIDE (mg/L)	TOTAL P (mg/L)	NITRITE (mg/L)	NITRITE+ NITRATE (mg/L)	AMMONIA (mg/L)	FR (mg/L)	NFR (mg/L)
7	299	667	28	0.8	3.060	0.011	0.084	0.138	140	7080
	301	658	28	1.0	3.210	<0.005	0.087	0.078	150	6990
	283	642	29	<0.5	3.120	<0.005	0.076	0.039	130	6170
8	75	91	9	<0.5	0.380	0.008	0.058	0.010	114	156
	78	95	10	<0.5	0.400	0.007	0.062	0.005	115	163
	79	95	10	<0.5	0.159	<0.005	0.060	0.005	109	166
9	86	96	11	<0.5	0.112	<0.005	0.071	0.005	115	95
	78	88	12	<0.5	0.103	<0.005	0.068	0.005	112	100
	76	85	12	<0.5	0.100	<0.005	0.074	0.005	118	116
10	76	84	13	<0.5	0.096	<0.005	0.071	0.005	119	112
	79	87	14	<0.5	0.106	<0.005	0.074	0.005	119	129
	79	88	12	<0.5	0.075	<0.005	0.060	0.005	116	97
11	29	32	4	<0.5	0.019	<0.005	0.014	0.008	88	5
	26	28	3	<0.5	0.010	<0.005	0.010	0.008	76	8
	28	31	3	<0.5	0.010	<0.005	0.011	0.009	83	8
12	96	135	11	<0.5	0.350	<0.005	0.037	0.012	130	510
	90	131	12	<0.5	0.410	<0.005	0.038	0.021	120	510
	86	127	13	<0.5	0.380	<0.005	0.059	0.034	120	500



APPENDIX III TABLE 2 MOUNT NANSEN WATER QUALITY DATA, AUGUST 1988

STATION #	EXTRACTABLE METALS													
	Ag(GF) (mg/L)	Al (mg/L)	As (mg/L)	B (mg/L)	Ba (mg/L)	Be (mg/L)	Ca (mg/L)	Cd(GF) (mg/L)	Co (mg/L)	Cr (mg/L)	Cu(GF) (mg/L)	Fe (mg/L)	Mg (mg/L)	Mn (mg/L)
1	<0.0001	0.71	<0.05	<0.01	0.043	<0.001	17.3	0.0003	<0.005	<0.005	0.0021	0.751	3.0	0.063
	<0.0001	0.60	<0.05	<0.01	0.039	<0.001	16.9	0.0002	<0.005	<0.005	0.0020	0.591	2.9	0.060
	<0.0001	0.57	<0.05	<0.01	0.039	<0.001	17.2	0.0001	<0.005	<0.005	0.0020	0.591	2.9	0.057
2	0.0001	0.10	<0.05	<0.01	0.033	<0.001	81.0	0.0015	<0.005	<0.005	0.0015	0.984	21.8	0.505
	<0.0001	0.12	<0.05	<0.01	0.034	<0.001	83.3	0.0015	<0.005	<0.005	0.0015	1.010	22.4	0.517
	<0.0001	0.09	0.07	<0.01	0.032	<0.001	79.1	0.0016	<0.005	<0.005	0.0018	0.967	21.3	0.494
3	0.0003	<0.05	<0.05	<0.01	0.043	<0.001	197.0	0.0006	<0.005	<0.005	0.0021	1.190	87.3	0.879
	0.0003	<0.05	<0.05	<0.01	0.045	<0.001	207.0	0.0006	<0.005	<0.005	0.0015	1.260	91.9	0.921
	0.0003	<0.05	<0.05	<0.01	0.047	<0.001	214.0	0.0006	<0.005	<0.005	0.0011	1.290	95.2	0.948
4	<0.0001	0.06	<0.05	<0.01	0.029	<0.001	54.2	0.0001	<0.005	<0.005	0.0015	0.817	18.3	0.140
	<0.0001	<0.05	<0.05	<0.01	0.029	<0.001	52.2	0.0002	<0.005	<0.005	0.0014	0.798	17.7	0.137
	<0.0001	<0.05	<0.05	<0.01	0.029	<0.001	53.6	0.0001	<0.005	<0.005	0.0015	0.808	18.2	0.140
5	0.0003	25.60	<0.05	<0.01	0.875	0.002	45.6	0.0080	<0.005	0.029	*0.191	38.400	18.6	2.290
	0.0002	23.80	<0.05	<0.01	0.876	0.002	45.8	0.0081	<0.005	0.028	*0.191	36.200	18.3	2.270
	0.0002	26.30	<0.05	<0.01	0.901	0.002	46.4	0.0081	<0.005	0.031	*0.203	43.600	19.7	2.390
6	<0.0001	0.07	<0.05	<0.01	0.057	<0.001	33.4	0.0003	<0.005	<0.005	<0.0005	1.040	7.3	0.046
	<0.0001	<0.05	<0.05	<0.01	0.053	<0.001	31.8	0.0003	<0.005	<0.005	0.0068	0.873	6.9	0.042
	<0.0001	<0.05	<0.05	<0.01	0.053	<0.001	32.0	0.0002	<0.005	<0.005	0.0068	0.856	6.9	0.043

* ICP SCAN results replace GF analysis due to sample loss

< detection limit

APPENDIX III TABLE 2 MOUNT NANSEN WATER QUALITY DATA, AUGUST 1988 (continued)

EXTRACTABLE METALS

STATION #	Ag(GF) (mg/L)	Al (mg/L)	As (mg/L)	B (mg/L)	Ba (mg/L)	Be (mg/L)	Ca (mg/L)	Cd(GF) (mg/L)	Co (mg/L)	Cr (mg/L)	Cu(GF) (mg/L)	Fe (mg/L)	Mg (mg/L)	Mn (mg/L)
7	0.0002	40.50	0.07	<0.01	1.590	0.004	72.0	0.0110	<0.005	0.045	*0.305	74.600	29.1	3.780
	0.0002	39.50	<0.05	<0.01	1.530	0.004	72.0	0.0110	<0.005	0.046	*0.309	71.600	29.5	3.790
	0.0002	40.60	<0.05	<0.01	1.650	0.003	68.9	0.0120	<0.005	0.041	*0.288	69.600	27.0	3.590
8	0.0001	1.87	<0.05	<0.01	0.127	<0.001	19.5	0.0003	<0.005	<0.005	0.0121	2.790	6.3	0.176
	0.0001	1.95	<0.05	<0.01	0.137	<0.001	20.4	0.0003	<0.005	<0.005	0.0131	2.960	6.6	0.189
	0.0001	1.85	<0.05	<0.01	0.135	<0.001	20.8	0.0003	<0.005	<0.005	0.0124	2.840	6.7	0.186
9	<0.0001	1.11	<0.05	<0.01	0.100	<0.001	23.2	0.0002	<0.005	<0.005	0.0081	1.860	6.9	0.165
	0.0001	1.05	<0.05	<0.01	0.090	<0.001	21.0	0.0002	<0.005	<0.005	0.0081	1.800	6.2	0.151
	0.0001	1.04	<0.05	<0.01	0.088	<0.001	20.3	0.0002	<0.005	<0.005	0.0082	1.750	6.0	0.148
10	0.0001	0.87	<0.05	<0.01	0.084	<0.001	20.4	0.0002	<0.005	<0.005	0.0079	1.630	6.0	0.145
	<0.0001	0.89	<0.05	<0.01	0.087	<0.001	21.2	0.0002	<0.005	<0.005	0.0074	1.590	6.3	0.151
	0.0001	1.09	<0.05	<0.01	0.086	<0.001	21.2	0.0003	<0.005	<0.005	0.0072	1.730	6.3	0.153
11	<0.0001	0.20	<0.05	<0.01	0.056	<0.001	8.7	<0.0001	<0.005	<0.005	0.0016	0.864	1.7	0.074
	<0.0001	0.24	<0.05	<0.01	0.050	<0.001	7.7	<0.0001	<0.005	<0.005	0.0015	0.741	1.6	0.064
	<0.0001	0.20	<0.05	<0.01	0.055	<0.001	8.4	<0.0001	<0.005	<0.005	0.0015	0.818	1.7	0.071
12	0.0003	4.29	<0.05	<0.01	0.192	<0.001	24.2	0.0015	<0.005	<0.005	*0.030	8.180	8.5	0.351
	0.0002	4.48	<0.05	<0.01	0.180	<0.001	22.6	0.0015	<0.005	<0.005	*0.031	8.630	8.1	0.335
	0.0003	4.55	<0.05	<0.01	0.171	<0.001	21.5	0.0015	<0.005	<0.005	*0.029	8.530	7.7	0.320

* ICP SCAN results replace GF analysis due to sample loss

< detection limit

APPENDIX III TABLE 2 MOUNT NANSEN WATER QUALITY DATA, AUGUST 1988 (continued)

STATION #	EXTRACTABLE METALS												
	Mo (mg/L)	Na (mg/L)	Ni (mg/L)	P (mg/L)	Pb(GF) (mg/L)	Sb (mg/L)	Se (mg/L)	Si (mg/L)	Sn (mg/L)	Sr (mg/L)	Ti (mg/L)	V (mg/L)	Zn (mg/L)
1	<0.01	1.6	<0.02	<0.1	<0.0005	<0.05	<0.05	6.29	<0.05	0.057	0.019	<0.01	0.010
	<0.01	1.6	<0.02	<0.1	<0.0005	<0.05	<0.05	6.09	<0.05	0.055	0.013	<0.01	0.008
	<0.01	1.6	<0.02	<0.1	<0.0005	<0.05	<0.05	6.27	<0.05	0.056	0.014	<0.01	0.007
2	<0.01	4.3	<0.02	<0.1	<0.0005	<0.05	<0.05	5.90	<0.05	0.199	0.006	<0.01	0.224
	<0.01	4.5	<0.02	<0.1	<0.0005	<0.05	<0.05	6.08	<0.05	0.205	0.006	<0.01	0.229
	<0.01	4.3	<0.02	<0.1	<0.0005	<0.05	<0.05	5.80	<0.05	0.191	0.006	<0.01	0.219
3	<0.01	7.4	<0.02	<0.1	0.0056	<0.05	<0.05	3.93	<0.05	0.441	0.003	<0.01	0.227
	<0.01	7.8	<0.02	<0.1	0.0062	<0.05	<0.05	4.13	<0.05	0.467	0.002	<0.01	0.237
	<0.01	8.1	<0.02	<0.1	0.0060	<0.05	<0.05	4.25	<0.05	0.483	0.002	<0.01	0.245
4	<0.01	3.6	<0.02	<0.1	0.0008	<0.05	<0.05	5.55	<0.05	0.136	0.003	<0.01	0.011
	<0.01	3.5	<0.02	<0.1	0.0018	<0.05	<0.05	5.35	<0.05	0.131	0.003	<0.01	0.012
	<0.01	3.6	<0.02	<0.1	0.0016	<0.05	<0.05	5.51	<0.05	0.135	0.003	<0.01	0.011
5	<0.01	3.3	0.02	0.8	*0.57	<0.05	<0.05	27.00	<0.05	0.284	0.263	0.10	0.528
	<0.01	3.3	0.02	0.8	*0.56	<0.05	<0.05	25.60	<0.05	0.285	0.230	0.09	0.513
	<0.01	3.3	0.03	0.8	*0.59	<0.05	<0.05	32.50	<0.05	0.291	0.205	0.11	0.568
6	<0.01	4.7	<0.02	<0.1	<0.0005	<0.05	<0.05	6.06	<0.05	0.175	0.006	<0.01	0.052
	<0.01	4.5	<0.02	<0.1	<0.0005	<0.05	<0.05	5.76	<0.05	0.166	0.004	<0.01	0.047
	<0.01	4.4	<0.02	<0.1	<0.0005	<0.05	<0.05	5.79	<0.05	0.165	0.004	<0.01	0.048

* ICP SCAN results replace GF analysis due to sample loss

< detection limit

APPENDIX III TABLE 2 MOUNT NANSEN WATER QUALITY DATA, AUGUST 1988 (continued)

STATION #	EXTRACTABLE METALS												
	Mo (mg/L)	Na (mg/L)	Ni (mg/L)	P (mg/L)	Pb(GF) (mg/L)	Sb (mg/L)	Se (mg/L)	Si (mg/L)	Sn (mg/L)	Sr (mg/L)	Ti (mg/L)	V (mg/L)	Zn (mg/L)
7	<0.01	3.8	0.04	2.9	*0.80	0.05	0.06	43.10	<0.05	0.421	0.416	0.17	0.815
	<0.01	3.9	0.04	2.8	*0.78	<0.05	<0.05	43.00	<0.05	0.426	0.397	0.17	0.824
	<0.01	3.5	0.03	2.4	*0.75	<0.05	0.06	41.60	<0.05	0.401	0.328	0.15	0.741
8	<0.01	2.0	<0.02	<0.1	<0.0005	<0.05	<0.05	7.04	<0.05	0.202	0.042	<0.01	0.018
	<0.01	2.1	<0.02	<0.1	0.0016	<0.05	<0.05	7.33	<0.05	0.215	0.041	<0.01	0.019
	<0.01	2.1	<0.02	<0.1	0.0011	<0.05	<0.05	7.39	<0.05	0.221	0.037	<0.01	0.018
9	<0.01	2.4	<0.02	<0.1	0.0005	<0.05	<0.05	7.22	<0.05	0.229	0.029	<0.01	0.013
	<0.01	2.2	<0.02	<0.1	0.0007	<0.05	<0.05	6.67	<0.05	0.208	0.028	<0.01	0.011
	<0.01	2.2	<0.02	<0.1	0.0005	<0.05	<0.05	6.44	<0.05	0.196	0.031	<0.01	0.012
10	<0.01	2.2	<0.02	<0.1	<0.0005	<0.05	<0.05	6.23	<0.05	0.194	0.027	<0.01	0.011
	<0.01	2.3	<0.02	<0.1	<0.0005	<0.05	<0.05	6.43	<0.05	0.203	0.023	<0.01	0.010
	<0.01	2.3	<0.02	<0.1	0.0027	<0.05	<0.05	6.54	<0.05	0.202	0.033	<0.01	0.011
11	<0.01	1.9	<0.02	<0.1	0.0005	<0.05	<0.05	7.80	<0.05	0.041	0.005	<0.01	0.003
	<0.01	1.8	<0.02	<0.1	<0.0005	<0.05	<0.05	6.90	<0.05	0.035	0.006	<0.01	0.003
	<0.01	1.9	<0.02	<0.1	<0.0005	<0.05	<0.05	7.60	<0.05	0.040	0.006	<0.01	<0.002
12	<0.01	2.5	<0.02	0.2	<0.0005	<0.05	<0.05	11.00	<0.05	0.221	0.124	0.02	0.100
	<0.01	2.4	<0.02	0.2	0.0370	<0.05	<0.05	10.90	<0.05	0.201	0.141	0.02	0.098
	<0.01	2.2	<0.02	0.2	0.0355	<0.05	<0.05	10.70	<0.05	0.189	0.147	0.02	0.096

* ICP SCAN results replace GF analysis due to sample loss

< detection limit

APPENDIX III TABLE 3 MOUNT NANSEN WATER QUALITY DATA, AUGUST 1988

STATION #	TOTAL METALS													
	Ag(GF) (mg/L)	Al (mg/L)	As (mg/L)	B (mg/L)	Ba (mg/L)	Be (mg/L)	Ca (mg/L)	Cd(GF) (mg/L)	Co (mg/L)	Cr (mg/L)	Cu(GF) (mg/L)	Fe (mg/L)	Mg (mg/L)	Mn (mg/L)
1	0.0001	3.47	<0.05	<0.01	0.067	<0.001	19.3	0.0003	<0.005	<0.005	0.0044	1.690	3.5	0.075
	<0.0001	2.53	<0.05	<0.01	0.053	<0.001	17.6	0.0003	<0.005	<0.005	0.0046	1.240	3.2	0.064
	<0.0001	2.28	<0.05	<0.01	0.053	<0.001	18.6	0.0003	<0.005	0.007	0.0036	1.150	3.4	0.063
2	0.0001	0.32	<0.05	<0.01	0.038	<0.001	90.9	0.0015	<0.005	<0.005	0.0015	1.260	25.1	0.558
	<0.0001	0.39	<0.05	<0.01	0.038	<0.001	91.9	0.0015	<0.005	<0.005	0.0017	1.290	25.3	0.566
	0.0001	0.36	<0.05	<0.01	0.036	<0.001	87.0	0.0016	<0.005	<0.005	0.0023	1.200	24.0	0.537
3	0.0003	<0.05	<0.05	<0.01	0.043	<0.001	203.0	0.0008	<0.005	<0.005	0.0024	1.240	92.3	0.895
	0.0003	<0.05	<0.05	<0.01	0.044	<0.001	204.0	0.0009	<0.005	<0.005	0.0016	1.250	92.0	0.898
	0.0003	<0.05	0.06	<0.01	0.048	<0.001	220.0	0.0008	<0.005	<0.005	0.0016	1.330	100.0	0.963
4	<0.0001	0.05	<0.05	<0.01	0.029	<0.001	54.1	0.0002	<0.005	<0.005	0.0020	0.859	18.9	0.137
	<0.0001	0.07	<0.05	<0.01	0.032	<0.001	57.7	0.0002	<0.005	<0.005	0.0012	0.896	20.0	0.148
	<0.0001	<0.05	<0.05	<0.01	0.034	<0.001	61.0	0.0001	<0.005	<0.005	0.0016	0.934	21.3	0.157
5	0.0038	143.00	0.62	<0.01	1.350	0.005	57.2	0.0091	<0.005	0.206	*0.515	298.000	55.2	4.080
	0.0044	173.00	0.70	<0.01	1.550	0.005	54.0	0.0084	<0.005	0.209	*0.502	362.000	54.4	3.950
	0.0044	166.00	0.67	<0.01	1.440	0.005	51.3	0.0086	<0.005	0.203	*0.487	350.000	52.7	3.790
6	<0.0001	0.26	<0.05	<0.01	0.059	<0.001	34.3	0.0005	<0.005	<0.005	<0.0005	1.200	7.6	0.046
	<0.0001	0.13	<0.05	<0.01	0.055	<0.001	33.3	0.0004	<0.005	<0.005	0.0076	0.943	7.4	0.043
	<0.0001	0.10	<0.05	<0.01	0.052	<0.001	32.0	0.0004	<0.005	<0.005	0.0067	0.892	7.1	0.043

* ICP SCAN results replace GF analysis due to sample loss

< detection limit



APPENDIX III TABLE 3 MOUNT NANSEN WATER QUALITY DATA, AUGUST 1988 (continued)

STATION #	TOTAL METALS													
	Ag(GF) (mg/L)	Al (mg/L)	As (mg/L)	B (mg/L)	Ba (mg/L)	Be (mg/L)	Ca (mg/L)	Cd(GF) (mg/L)	Co (mg/L)	Cr (mg/L)	Cu(GF) (mg/L)	Fe (mg/L)	Mg (mg/L)	Mn (mg/L)
7	0.0050	233.00	0.89	<0.01	2.250	0.007	81.4	0.0120	<0.005	0.306	*0.718	489.000	81.7	5.840
	0.0050	246.00	0.81	<0.01	2.240	0.006	78.2	0.0110	<0.005	0.286	*0.698	482.000	78.0	5.610
	0.0040	227.00	0.87	<0.01	2.180	0.007	85.6	0.0110	<0.005	0.312	*0.754	456.000	83.4	6.140
8	<0.0001	14.80	<0.05	<0.01	0.224	<0.001	23.7	0.0004	<0.005	0.015	*0.030	15.900	9.5	0.310
	<0.0001	14.30	<0.05	<0.01	0.220	<0.001	22.5	0.0003	<0.005	0.016	*0.028	14.900	9.2	0.301
	<0.0001	13.40	<0.05	<0.01	0.202	<0.001	21.4	0.0003	<0.005	0.015	*0.029	13.800	8.7	0.279
9	<0.0001	7.24	<0.05	<0.01	0.126	<0.001	21.1	0.0003	<0.005	0.009	*0.011	7.790	7.3	0.194
	<0.0001	7.22	<0.05	<0.01	0.129	<0.001	21.7	0.0003	<0.005	0.008	0.0095	7.780	7.5	0.197
	<0.0001	7.82	<0.05	<0.01	0.139	<0.001	22.6	0.0003	<0.005	0.005	0.0092	8.550	7.9	0.211
10	<0.0001	7.20	<0.05	<0.01	0.128	<0.001	22.3	0.0003	<0.005	0.007	0.0090	7.770	7.6	0.198
	<0.0001	7.10	<0.05	<0.01	0.128	<0.001	22.4	0.0003	<0.005	<0.005	0.0087	7.610	7.7	0.199
	<0.0001	7.56	<0.05	<0.01	0.135	<0.001	23.6	0.0003	<0.005	<0.005	0.0078	8.240	8.0	0.211
11	<0.0001	0.22	<0.05	<0.01	0.054	<0.001	8.4	0.0001	<0.005	<0.005	0.0019	0.836	1.7	0.071
	<0.0001	0.20	<0.05	<0.01	0.059	<0.001	9.2	0.0001	<0.005	<0.005	0.0016	0.898	1.9	0.074
	<0.0001	0.30	<0.05	<0.01	0.061	<0.001	9.3	0.0001	<0.005	0.005	0.0015	0.903	2.0	0.076
12	* 1.5	32.50	<0.05	<0.01	0.318	<0.001	25.9	0.0011	<0.005	0.031	*0.067	45.800	14.0	0.582
	0.0003	28.30	0.07	<0.01	0.310	<0.001	25.7	0.0012	<0.005	0.037	*0.070	43.500	13.6	0.565
	0.0003	29.90	0.07	<0.01	0.342	<0.001	27.0	0.0011	<0.005	0.036	*0.074	51.900	15.1	0.627

* ICP SCAN results replace GF analysis due to sample loss

< detection limit

APPENDIX III TABLE 3 MOUNT NANSEN WATER QUALITY DATA, AUGUST 1988 (continued)

STATION #	TOTAL METALS												
	Mo (mg/L)	Na (mg/L)	Ni (mg/L)	P (mg/L)	Pb(GF) (mg/L)	Sb (mg/L)	Se (mg/L)	Si (mg/L)	Sn (mg/L)	Sr (mg/L)	Ti (mg/L)	V (mg/L)	Zn (mg/L)
1	<0.01	1.8	<0.02	0.1	0.0016	<0.05	<0.05	9.34	<0.05	0.065	0.076	<0.01	0.030
	<0.01	1.5	<0.02	<0.1	0.0022	<0.05	<0.05	7.95	<0.05	0.057	0.053	<0.01	0.017
	<0.01	1.7	<0.02	<0.1	0.0009	<0.05	<0.05	7.95	<0.05	0.061	0.052	0.01	0.018
2	<0.01	4.8	<0.02	<0.1	<0.0005	<0.05	<0.05	6.24	<0.05	0.219	0.014	<0.01	0.269
	<0.01	4.9	<0.02	<0.1	<0.0005	<0.05	<0.05	6.35	<0.05	0.223	0.015	<0.01	0.303
	<0.01	4.6	<0.02	<0.1	<0.0005	<0.05	<0.05	6.03	<0.05	0.208	0.015	<0.01	0.259
3	<0.01	7.4	<0.02	<0.1	0.0080	<0.05	<0.05	3.69	<0.05	0.450	0.004	<0.01	0.246
	<0.01	7.4	<0.02	<0.1	0.0085	<0.05	<0.05	3.70	<0.05	0.447	0.005	<0.01	0.248
	<0.01	8.1	<0.02	<0.1	0.0090	<0.05	<0.05	3.95	<0.05	0.493	0.006	<0.01	0.271
4	<0.01	3.5	<0.02	<0.1	<0.0005	<0.05	<0.05	5.05	<0.05	0.136	0.005	<0.01	0.016
	<0.01	3.9	<0.02	<0.1	<0.0005	<0.05	<0.05	5.36	<0.05	0.145	0.008	0.01	0.026
	<0.01	4.0	<0.02	<0.1	<0.0005	<0.05	<0.05	5.61	<0.05	0.155	0.007	<0.01	0.057
5	0.07	5.1	0.07	2.8	*0.57	<0.05	0.06	89.60	<0.05	0.407	5.160	0.52	1.800
	0.08	4.9	0.07	2.9	*0.58	<0.05	0.09	102.00	<0.05	0.378	6.500	0.52	1.810
	0.08	4.6	0.07	2.8	*0.56	<0.05	0.07	90.70	<0.05	0.362	6.200	0.51	1.750
6	<0.01	4.6	<0.02	<0.1	<0.0005	<0.05	<0.05	5.84	<0.05	0.177	0.015	<0.01	0.061
	<0.01	4.5	<0.02	<0.1	<0.0005	<0.05	<0.05	5.56	<0.05	0.170	0.009	0.01	0.054
	<0.01	4.4	<0.02	<0.1	<0.0005	<0.05	<0.05	5.34	<0.05	0.163	0.009	0.01	0.048

* ICP SCAN results replace GF analysis due to sample loss

< detection limit

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APPENDIX III TABLE 3 MOUNT NANSEN WATER QUALITY DATA, AUGUST 1988 (continued)

STATION #	TOTAL METALS												
	Mo (mg/L)	Na (mg/L)	Ni (mg/L)	P (mg/L)	Pb(GF) (mg/L)	Sb (mg/L)	Se (mg/L)	Si (mg/L)	Sn (mg/L)	Sr (mg/L)	Ti (mg/L)	V (mg/L)	Zn (mg/L)
7	0.10	6.1	0.09	6.0	*0.69	<0.05	0.20	99.40	<0.05	0.553	9.860	0.77	2.430
	0.09	5.8	0.10	5.6	*0.65	0.09	0.20	103.00	<0.05	0.537	9.600	0.73	2.340
	0.10	6.4	0.10	6.0	*0.68	<0.05	0.29	93.40	<0.05	0.588	8.830	0.79	2.520
8	<0.01	3.2	<0.02	0.1	0.0019	<0.05	<0.05	20.90	<0.05	0.261	0.404	0.03	0.093
	<0.01	3.1	<0.02	0.2	0.0022	<0.05	<0.05	20.10	<0.05	0.252	0.418	0.03	0.084
	<0.01	2.9	<0.02	0.1	0.0020	<0.05	<0.05	19.10	<0.05	0.234	0.367	0.03	0.072
9	<0.01	2.7	<0.02	0.1	0.0028	<0.05	<0.05	13.20	<0.05	0.210	0.230	0.02	0.042
	<0.01	2.7	<0.02	0.1	0.0024	<0.05	<0.05	13.20	<0.05	0.216	0.225	0.02	0.049
	<0.01	2.7	<0.02	0.1	0.0025	<0.05	<0.05	14.20	<0.05	0.228	0.238	0.02	0.057
10	<0.01	2.8	<0.02	<0.1	0.0025	<0.05	<0.05	13.40	<0.05	0.218	0.243	0.02	0.062
	<0.01	2.8	<0.02	0.1	0.0023	<0.05	<0.05	13.20	<0.05	0.221	0.232	0.02	0.047
	<0.01	2.7	<0.02	0.1	0.0028	<0.05	<0.05	14.10	<0.05	0.236	0.244	0.02	0.052
11	<0.01	1.7	<0.02	<0.1	0.0005	<0.05	<0.05	6.88	<0.05	0.040	0.003	<0.01	0.021
	<0.01	1.9	<0.02	<0.1	0.0005	<0.05	<0.05	7.43	<0.05	0.043	0.006	<0.01	0.028
	<0.01	2.0	<0.02	<0.1	0.0005	<0.05	<0.05	7.51	<0.05	0.044	0.009	0.02	0.033
12	<0.01	3.5	<0.02	0.1	0.0949	<0.05	<0.05	46.50	<0.05	0.243	1.110	0.09	0.277
	0.01	3.5	<0.02	0.4	0.0887	<0.05	<0.05	41.40	<0.05	0.238	1.050	0.08	0.267
	<0.01	3.6	<0.02	0.4	0.0869	<0.05	<0.05	42.10	<0.05	0.257	1.260	0.09	0.311

* ICP SCAN results replace GF analysis due to sample loss

< detection limit

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APPENDIX IV TABLE 1 MOUNT NANSEN MINES PERCENT PARTICLE SIZE DISTRUBUTION, AUGUST 1980

STATION #	SIZE RANGE (%) very fine silt/clay %	fine sand %	medium sand %	course sand %	very course sand %	sand %	gravel %	TOTAL %
1	13.8	24.6	36.2	16.3	4.8	2.3	2.0	100
	15.4	27.3	37.0	14.3	3.5	1.6	1.0	100
	15.8	25.9	36.4	15.7	4.0	1.5	0.8	100
2	2.0	2.1	3.0	4.3	2.8	2.9	83.1	100
	0.6	0.9	1.9	2.8	2.4	3.8	87.5	100
	1.7	2.1	2.4	2.9	2.4	3.5	85.0	100
3	13.2	13.4	21.7	15.6	10.3	11.6	14.2	100
	21.3	18.3	23.2	14.5	7.9	3.1	11.8	100
	1.5	3.8	5.8	3.2	1.6	1.9	82.1	100
4	0.5	2.2	6.4	50.6	38.0	2.2	0.1	100
	0.5	1.6	5.5	54.5	35.5	2.1	0.4	100
	0.7	1.9	6.2	43.6	42.2	4.9	0.6	100
5	2.5	6.9	6.1	6.2	5.0	6.7	66.6	100
	5.0	11.6	7.2	5.6	6.9	8.1	55.6	100
	2.0	6.0	4.2	4.7	6.5	9.4	67.1	100
6	1.3	2.4	1.4	1.5	2.9	4.2	86.4	100
	1.0	1.9	1.0	1.2	2.3	3.7	88.9	100
	18.0	24.3	10.6	5.0	4.9	6.4	30.8	100
7	4.2	9.7	7.3	8.5	6.6	6.7	57.0	100
	4.5	7.2	5.2	5.3	6.4	7.2	64.2	100
	6.5	15.6	7.7	4.9	3.5	2.8	59.0	100
8	3.6	9.7	12.8	10.5	3.6	5.6	54.2	100
	2.6	5.0	8.1	9.1	3.7	4.7	66.8	100
	34.8	47.5	12.0	3.4	1.2	0.8	0.3	100
9	5.1	5.9	3.3	6.4	7.1	3.9	68.2	100
	18.3	16.9	7.1	8.6	5.3	3.3	40.5	100
	34.2	14.7	1.9	1.4	0.4	1.7	45.7	100
10	2.1	4.8	4.5	5.0	5.3	6.7	71.5	100
	2.7	5.9	5.9	7.7	8.9	10.7	58.3	100
	13.3	27.9	7.9	3.3	1.7	2.1	43.8	100
11	0.4	7.0	33.9	50.9	7.2	0.5	0.2	100
	1.5	17.1	44.6	30.4	5.4	0.6	0.4	100
	4.1	24.5	42.0	21.2	4.6	0.9	2.7	100
12	43.6	42.8	9.5	2.5	0.6	0.4	0.7	100
	45.6	39.7	11.7	1.7	0.5	0.2	0.6	100
	13.5	27.1	6.9	1.9	0.7	0.9	49.1	100

Wentworth Size Classes:

very fine silt/clay < 0.063 mm ≥ fine sand < 0.125 mm ≥ medium sand < 0.25 mm ≥ course sand < 0.50 mm ≥ very course sand < 1.0 mm ≥ sand < 2.0 mm ≥ gravel

note: 3 replicate samples were taken at each station

APPENDIX IV TABLE 2 MT. NANSEN MINES SEDIMENT CHEMISTRY DATA, AUGUST 1988

STATION #	Ag (ug/g)	Al (ug/g)	As (ug/g)	Ba (ug/g)	Be (ug/g)	Ca (ug/g)	Cd(GF) (ug/g)	Co (ug/g)	Cr (ug/g)	Cu (ug/g)	Fe (ug/g)	Mg (ug/g)
1	<2	12100	120	129	0.2	5970	0.89	<20	13	12	14900	2580
	2	12600	97	128	0.3	5900	0.63	<20	14	11	13800	2640
	<2	12200	87	125	0.2	5680	0.63	<20	13	11	13700	2610
2	3	16100	166	237	0.4	11500	* 3.6	<20	30	33	28500	5020
	<2	9960	361	428	0.3	8820	* 22.1	<20	36	13	34300	3670
	<2	14900	539	444	0.4	13800	* 26.4	<20	26	35	41300	4810
3	2	12200	2510	344	0.4	13000	* 31.2	<20	27	61	49400	4400
	2	13900	1390	207	0.4	11600	* 11.0	<20	23	69	44800	4750
	<2	10000	754	135	0.3	7250	* 8.4	<20	19	50	28700	3230
4	2	6690	1340	89	0.2	6640	* 6.3	<20	15	18	22400	3170
	2	6290	2170	102	0.3	7610	* 13.0	<20	16	31	22900	3100
	2	6280	2760	106	0.3	8240	* 14.0	<20	14	39	24700	3130
5	2	7440	52	105	0.2	5230	0.43	<20	18	10	19700	2620
	2	10500	38	118	0.4	6370	1.00	<20	21	14	18000	3170
	2	8750	38	111	0.3	5420	0.64	<20	19	11	17100	2900
6	2	12000	54	149	0.3	6050	1.20	<20	27	19	20700	3820
	<2	11900	62	156	0.3	6120	2.00	<20	24	19	20600	3750
	2	13000	46	159	0.3	6200	0.92	<20	20	14	19100	3850

* ICP SCAN analysis replaces graphite-furnace result due to GF sample loss

APPENDIX IV TABLE 2 MT. NANSEN MNES SEDIMENT CHEMISTRY DATA, AUGUST 1988 (continued)

STATION #	Ag (ug/g)	Al (ug/g)	As (ug/g)	Ba (ug/g)	Be (ug/g)	Ca (ug/g)	Cd(GF) (ug/g)	Co (ug/g)	Cr (ug/g)	Cu (ug/g)	Fe (ug/g)	Mg (ug/g)
7	2	11100	17	129	0.3	5850	0.61	<20	45	11	44400	3270
	2	12300	33	150	0.3	5540	0.93	<20	25	15	21700	3660
	2	9110	26	118	0.3	6240	0.40	<20	29	8	27900	2800
8	2	11400	17	124	0.3	6520	0.24	<20	25	23	28900	3240
	2	11500	22	120	0.3	5970	0.23	<20	21	30	26600	3540
	<2	12200	24	127	0.3	5930	0.25	<20	18	24	17200	3800
9	2	11500	29	128	0.5	5880	0.41	<20	24	22	26000	3930
	2	12100	50	125	0.3	5780	0.47	<20	20	24	23700	4740
	2	12100	43	128	0.4	5550	0.56	<20	19	27	22300	5190
10	2	10700	39	124	0.3	5590	0.38	<20	24	18	27100	3290
	2	10400	31	125	0.2	5570	0.39	<20	25	18	26900	3220
	2	9990	25	109	0.3	5450	0.37	<20	17	16	16600	3260
11	2	6450	10	83	0.2	5150	0.10	<20	19	2	21000	2120
	<2	6860	18	103	0.2	5670	0.10	<20	27	2	32300	2220
	3	7500	19	85	0.2	6450	0.10	<20	34	2	38300	2320
12	2	15400	58	170	0.4	5870	0.72	<20	22	33	23800	5700
	2	11400	48	135	0.4	4710	0.46	<20	17	22	19200	4560
	2	10400	35	118	0.3	4510	0.38	<20	15	17	15600	3690

* ICP SCAN analysis replaces graphite-furnace result due to GF sample loss

APPENDIX IV TABLE 2 MT. NANSEN MINES SEDIMENT COMPOSITION, AGUST 1988 (continued)

STATION #	Mn (ug/g)	Mo (ug/g)	Na (ug/g)	Ni (ug/g)	P (ug/g)	Pb(GF) (ug/g)	Si (ug/g)	Sn (ug/g)	Sr (ug/g)	Ti (ug/g)	V (ug/g)	Zn (ug/g)
1	376	2	230	8	860	22	342	<8	30	669	45	116
	320	3	250	7	840	28	336	<8	30	741	44	109
	297	3	240	9	850	24	353	<8	29	716	43	108
2	2550	7	230	19	960	33	470	<8	55	958	71	496
	16300	9	250	32	930	* 48	1320	32	49	673	56	3030
	14100	10	330	24	950	* 60	1410	<8	69	698	62	3600
3	20400	10	240	23	810	* 530	1190	<8	62	584	65	4680
	3550	8	260	10	810	* 386	759	<8	47	692	59	1810
	4460	7	200	10	720	* 215	463	<8	32	628	52	1370
4	930	5	200	8	700	* 470	309	<8	29	490	45	555
	1320	7	100	9	750	* 887	410	<8	30	356	42	876
	1310	5	100	7	800	* 1030	384	<8	31	301	42	1010
5	242	5	160	9	980	24	344	<8	26	770	57	58
	273	5	180	9	1100	20	425	<8	34	912	54	81
	280	4	180	10	980	27	381	<8	28	811	51	78
6	361	5	250	10	790	21	444	<8	38	807	53	212
	347	5	250	10	790	25	494	<8	40	826	52	214
	222	4	260	10	770	16	470	<8	41	892	47	135

* ICP SCAN analysis replaces graphite-furnace result due to GF sample loss

APPENDIX IV TABLE 2 MT. NANSEN MNES SEDIMENT CHEMISTRY DATA, AUGUST 1988 (continued)

STATION #	Mn (ug/g)	Mo (ug/g)	Na (ug/g)	Ni (ug/g)	P (ug/g)	Pb(GF) (ug/g)	Si (ug/g)	Sn (ug/g)	Sr (ug/g)	Ti (ug/g)	V (ug/g)	Zn (ug/g)
7	284	9	200	10	1000	17	449	<8	31	1190	160	67
	252	5	220	10	840	21	445	<8	33	942	68	90
	248	6	180	8	1100	16	371	<8	31	1020	91	58
8	303	8	220	9	970	9	387	<8	43	1080	85	55
	301	10	220	9	940	11	363	<8	41	980	73	65
	273	6	250	5	830	10	318	<8	43	980	46	64
9	327	7	230	8	910	19	370	<8	39	961	74	78
	359	7	280	10	760	29	369	<8	43	980	60	95
	372	8	280	10	740	* 43	411	<8	43	918	51	110
10	310	8	230	10	840	12	373	<8	37	944	81	76
	311	7	210	9	870	12	373	<8	37	864	79	57
	259	6	220	9	850	11	324	<8	35	841	48	53
11	243	5	170	7	900	2	256	<8	23	709	57	26
	328	7	170	9	910	2	308	<8	25	860	91	26
	298	8	190	9	1000	2	310	<8	30	1010	110	24
12	458	8	300	10	700	26	416	<8	49	1010	55	108
	343	7	220	10	660	20	475	<8	36	771	44	84
	272	5	220	10	640	14	388	<8	34	695	38	74

* ICP SCAN analysis replaces graphite-furnace result due to GF sample loss

APPENDIX V TABLE 2 MT. NANSEN MINES BENTHIC ENUMERATION, AUGUST 1988

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		STATION #								
		2	4	* 5	* 7	8	* 9	10	11	12
	Ephemeroptera									
1	Baetis sp					137	20	109	18	118
2	Epeorus albertae					1				
3	Epeorus longimanus					4				3
4	Cinygmula sp					2	1	2	19	1
5	Ephemeralla (attenuatela) sp						1		1	4
6	Ameletus sp							2		
	Plecoptera									
7	Podmosta sp	464	102	5	4	497	48	54	90	241
8	Utaperla sp					3				
9	Capnia sp					2	2	4		2
10	Zapada sp					8	1			
11	Visoka cateractae					1				
12	Sweltsa group					1		2		
13	Skwala (paralella) sp					5		2		3
14	Trichoptera							1		
15	Trichoptera pupae, unid	1								
16	Dicosmoecus sp		2			1	4	3	3	
17	Brachycentrus sp					2				3
18	Chyranda sp					1	1	5		
	Homoptera									
19	Cicadellidae	2			1					
20	Aphididea	9							1	2
	Hymenoptera									
21	Sphecoidea					1				
	Coleoptera									
22	Haliplus sp						1			
	Diptera									
23	Chironomidae pupae	8		1	2				2	
24	Chironomidae unid J/D								2	
25	Euryhapsis sp	5			1				1	
26	Psectrocladius sp A	5		1					2	
27	Cricotopus sp	2		2		1		2		1
28	Diamesa sp	10			1	5		1		5
29	Diplocladius sp	10								
30	Eukiefferiella sp	6				7			6	7
31	Parakiefferiella sp	2								

Appendix VII Benthic Invertebrate Data - EPS

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APPENDIX V TABLE 2 MT. NANSEN MINES BENTHIC ENUMERATION, AUGUST 1988 (continued)

		STATION #								
		2	4	* 5	* 7	8	* 9	10	11	12
	Diptera (cont'd)									
32	Tanytarsus sp	1							2	
33	Cardioclidius sp				1				1	
34	Heterotrissocladius sp					3				
35	Potthastia sp					12	2	2		13
36	Thienemannimyia sp							5		2
37	Psedodiamesa sp								1	
38	Orthocladius sp								1	
	Tripulidae									
39	Antocha sp	1			1	3	3	4	1	7
40	Tipula sp	2				23	5	10	12	
41	Muscidae sp		1							
42	Lispe sp				1					
	Empididae									
43	Chelifera sp									2
44	Simulidae adult		1							1
45	Simulium sp								15	
46	Simulium sp pupae								1	
47	Hydracarina					1		5	1	4
48	Gastropoda									
49	Stagnicola arctica	1								
	Oligochaeta									
50	Enchytraeidae	10	4	3	2	39	10	36	6	9
51	Kincaidiana hexatheca				1					
52	Lumbriculus variegatus				1	35	11	13		5
53	Tubificidae					2		1		
54	Nematoda	2		1						
Sample Population		531	110	13	16	797	110	263	186	433
Individuals at Genus Level		509	105	8	11	753	100	218	174	417
Genera Identified		12	3	3	6	20	13	15	15	16
Diversity (H')		0.21	0.06	0.39	0.82	0.54	0.73	0.70	0.73	0.56
Evenness (J')		0.19	0.13	0.82	0.91	0.41	0.66	0.60	0.62	0.46

* all stations with 3 baskets except stations 5, 7 (1 basket each) and 9 (2 baskets)

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APPENDIX V TABLE 1 MT. NANSEN MINES TAXONOMIC LIST, AUGUST 1988 (cont'd)

	Order:	Diptera
	Family:	Chironomidae
23		Chironomidae pupae
24		Chironomidae unid J/D
25		Euryhapsis sp
26		Psectrocladius sp A
27		Cricotopus sp
28		Diamesa sp
29		Diplocladius sp
30		Eukiefferiella sp
31		Parakiefferiella sp
32		Tanytarsus sp
33		Cardioclidius sp
34		Heterotrissocladius sp
35		Potthastia sp
36		Thienemannimyia sp
37		Psedodiamesa sp
38		Orthocladius sp
	Family:	Tripulidae
39		Antocha sp
40		Tipula sp
41	Family:	Muscidae
42		Lispe sp
	Family:	Empididae
43		Chelifera sp
44	Family:	Simulidae adult
45		Simulium sp
46		Simulium sp pupae
47	Order:	Hydracarina
	Phylum:	Molluska
48	Class:	Gastropoda
	Family:	Lymnaeidae
49		Stagnicola arctica
	Phylum:	Annalida
	Class:	Oligochaeta
	Order:	Basommatophora
50	Family:	Enchytraeidae
51		Kincaidiana hexatheca
52		Lumbriculus variegatus
	Order:	Haplotaxida
53	Family:	Tubificidae
54	**Phylum:**	Nematoda

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APPENDIX V TABLE 3 MT. NANSEN PERCENT BENTHIC FAUNA BY ORDER, AUGUST 1988

			STATION #								
			2	4	* 5	* 7	8	* 9	10	11	12
Phylum:	Arthropoda										
Class:	Insecta										
Order:	Ephemeroptera	n	0	0	0	0	144	22	113	38	126
		%	0.0	0.0	0.0	0.0	18.1	20.0	43.0	20.4	29.1
	Plecoptera	n	464	102	5	4	517	51	62	90	246
		%	85.7	92.7	38.4	25.0	64.8	46.3	23.5	48.3	56.8
	Trichoptera	n	1	2	0	0	4	5	9	3	3
		%	0.1	1.8	0.0	0.0	0.5	4.5	3.4	1.6	0.6
	Hemiptera	n	11	0	0	1	0	0	0	1	2
		%	2.0	0.0	0.0	6.2	0.0	0.0	0.0	0.5	0.4
	Hymenoptera	n	0	0	0	0	1	0	0	0	0
		%	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
	Coleoptera	n	0	0	0	0	0	1	0	0	0
		%	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0
	Diptera	n	52	2	4	7	54	10	24	47	38
		%	9.6	1.8	30.7	43.7	6.7	9.0	9.1	25.2	8.7
	Hydracarina	n	0	0	0	0	1	0	5	1	4
		%	0.0	0.0	0.0	0.0	0.1	0.0	1.9	0.5	0.9
Phylum:	Mollusca										
Class:	Gasropoda										
Order:	Basommatophora	n	1	0	0	0	0	0	0	0	0
		%	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Lumbriculida	n	10	4	3	4	74	21	49	6	14
		%	1.8	3.6	23.0	25.0	9.2	19.0	18.6	3.2	3.2
	Haplotaxida	n	0	0	0	0	2	0	1	0	0
		%	0.0	0.0	0.0	0.0	0.2	0.0	0.3	0.0	0.0
Phylum:	Nematoda	n	2	0	1	0	0	0	0	0	0
		%	0.3	0.0	7.6	0.0	0.0	0.0	0.0	0.0	0.0
TOTALS:	STATION	n	541	110	13	16	797	110	263	186	433
	PERCENT	%	100	100	100	100	100	100	100	100	100

* all stations with 3 baskets except stations 5, 7 (1 basket each) and 9 (2 baskets)