

001954

Our file: 92-530A

October 30, 1992

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Mr. Bill Dunn, P.Eng.
Chief Engineer
Curragh Resources Inc.
P.O. Box 1000
Faro, Y.T.
Y0B 1K0

Dear Mr. Dunn:

Re: Stability Assessment of Grum Southeast
Overburden Extension Waste Dump

In accordance with the scope of geotechnical work and associated budget contained in our fax of September 29, 1992, Piteau Associates Engineering Ltd. (PAEL) has completed a review of waste dump foundation conditions, and prepared design criteria for the proposed Southeast Overburden Extension Dump. Site inspections and test pit logging were conducted by Mr. A.F. Stewart on September 23 and 24, 1992.

BACKGROUND

An investigation of the Southeast Overburden Dump, summarized in our report of August 14, 1992, was based on an office evaluation of previously proposed dump configurations. All relevant data, plans, reports, etc. available at that time were reviewed. The suitability of the originally proposed dump design was assessed and recommendations were provided for alternate dump configurations. Preliminary recommendations included lift thicknesses, overall slope angles and setbacks. Revised estimates of dump volumes by Curragh Resources now indicate that, due to additional overburden, the Southeast Overburden Dump will require a larger area than originally anticipated. This has provided the basis for the most recent test pitting program in the Southeast Overburden Extension Dump area.

ENGINEERING GEOLOGY AND FOUNDATION CONDITIONS

Topography in the area of the proposed Southeast Overburden Extension Dump is similar to that under the Southeast Overburden Dump. In this regard, the maximum foundation slope angle in the proposed dump area is about 6°.

Thirteen test pits were excavated northeast of the powerline in the general area of the Southeast Overburden Extension Dump during the recent test pitting, sampling and laboratory testing program. Prior to this program, test pitting, sampling and laboratory testing were also performed by Steffen Robertson Kirsten (SRK) for the active portion of the Southeast Overburden Dump northwest of the



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powerline. As noted in a 1977 report by Monenco, a limited number of test pits have been excavated at the northern end of the Southeast Overburden Dump. Locations of all these test pits are shown in Fig. 1. A brief inspection of shallow trenches excavated through the Southeast Overburden Dump site for drainage purposes was also conducted prior to the recent test pitting program.


Detailed engineering geology logs of recently excavated test pits are included in Appendix A. Soil conditions encountered in these test pits are generally consistent with those previously described for the Southeast Overburden Dump. In all but one test pit, a shallow (0.1 to 0.4m thick) layer of organic material containing silt and sand was encountered. Below this layer, a well to poorly graded, medium dense to dense sand and gravel, 1.0 to 2.2m thick, was noted in a majority of the test pits. Underlying the sand and gravel is a 0.2 to 4.6m thick, soft to hard sandy silt to clayey silt. This unit, which appears to be a glacial till, was present in all but one of the test pits. Phyllite bedrock underlies the glacial till in all test pits. The bedrock ranged from weathered to fresh and was generally easily excavatable. Groundwater seepage, which was observed in 5 of the 13 test pits, generally coincided with the top of the bedrock or the top of the glacial till.

It appears that the general soil profile described above persists across most of the Southeast Overburden Extension Dump. However, the sand and gravel layer appears to pinch out upslope, being absent from Test Pits P10 to P13.

STRENGTH PARAMETERS

Strength parameters for the foundation materials that were assumed to underlie the Southeast Overburden Dump (see our August 14, 1992 report) were critically re-evaluated by comparing the most recent test pit logs and laboratory results with the results of previous test pitting and laboratory testing programs, particularly that conducted by SRK and discussed in their report of June 26, 1992. As in our August 14, 1992 report, both long and short term strength parameters have been considered.

Based on recent test pitting information, we continue to anticipate that the relatively thin layer of organic topsoil will typically consolidate very rapidly under applied load, and tend to behave as a frictional material in both the short and long term. This uppermost layer should not have a significant impact on stability. The sand and gravel layer, which is present in the western portion of the dump area, has a relatively low fines content, and can be expected to behave as a frictional material, with a minimum friction angle $\phi = 35^\circ$. Grain size curves of the sand and gravel (see Fig. 2) indicate the granular nature of this soil unit. This unit would be classified as an SW-GW to GP-GM material based on the Unified Soil Classification System (USCS).



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The lowermost soil unit directly overlying the bedrock is a glacial till. It is believed that this material could exhibit either frictional or undrained behaviour, depending on its density, fines content, water content and loading conditions. The upper zone of the till, which is reported on the test pit logs as being a soft to firm clayey silt, will likely tend to shear in an undrained state (short term), particularly near the powerline where the till is saturated, and in areas where the sand and gravel layer is not present to assist in draining excess pore pressures. This material is characterized by laboratory testing as being primarily a low plasticity, silty clay and would be classified as a CL-ML material based on the USCS. Atterberg limits testing results are shown in Fig. 3 and on the test pit logs.

Pocket penetrometer measurements of the glacial till unit indicate undrained strengths (S_u) of 50 to >150 kPa, with the lower strengths generally measured in the upper zones of the till. Remolded strengths are expected to be approximately 25% of these values. It is noteworthy that these field testing results appear to confirm back analyses of short term stability conducted by PAEL and SRK on a dump failure at the Southeast Overburden Dump. In these analyses, the dumped waste material was estimated to have a shear strength of between 50 and 120 kPa, similar to some of the lower undrained strengths measured during recent test pitting. Furthermore, the upper till in the foundation was estimated to have an S_u of 14 to 50 kPa at the time of failure. These back analysis results are in general agreement with our expected remolded strength values.

As discussed in our August 14, 1992 report, frictional strengths are applicable for the long term strength of the upper till. The 35° friction angle assumed for long term strength in previous stability assessments appears to be reasonable, in light of the new test pit information.

The deeper, more consolidated and denser tills would likely dilate upon shearing and thus are considered likely to behave primarily as a frictional material when subjected to dump loading and subsequent shear stresses. The assumed friction angle of $\phi = 35^\circ$ in both the long and short term cases also appears to be reasonable.

STABILITY ASSESSMENT

Our August 14, 1992 report summarizing the results of the Southeast Overburden Dump assessment recommended that lifts of 6m thickness should result in acceptable short term and long term stability. With regard to the final configuration of the Southeast Overburden Dump, it was recommended that it be built to an overall slope angle of 2.5 horizontal to 1 vertical (i.e. 22°).

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October 30, 1992

Stability analyses on dumps up to 45m thick indicated that this configuration should have an overall factor of safety above 1.2, providing that excess pore pressures dissipate and the foundation soils consolidate.

Factor of safety calculations presented in our August 1992 report were for a specific spoil pile geometry and cross-section. The section analyzed coincided with Section E-E' from the original 1989 water license application report. For purposes of assessing the Southeast Overburden Extension Dump, this section has been extended farther north to E" (see Fig. 1) to incorporate the area of recently acquired test pitting information. The extended cross-section is shown in Fig. 4. A review of this section and subsurface information indicates that there are no significant differences from the foundation conditions assumed for the previous analyses, and that conditions are generally more favourable. For example, the foundation slopes at a maximum of approximately 6° in the extended portion of the dump, which is slightly less than the foundation for the Southeast Overburden Dump previously analyzed. Also, the depth to bedrock in the extended portion of the dump is generally less than in the original dump area.

Due to the similarities in the foundation topography and the generally good agreement between the foundation and waste strength properties measured during the recent field investigation, and the properties assumed for the stability analyses conducted in our previous report, additional stability analyses were not considered necessary. Thus, the general recommendations contained in our August 14, 1992 report are considered valid for the Southeast Overburden Extension Dump. Therefore, assuming a similar maximum dump thickness for the extended portion of the dump, stability should be favourable and a Factor of Safety greater than about 1.2 should be expected.

The performance of the Southeast Overburden Dump is currently being confirmed by field trials. Dumping of overburden is proceeding from the bottom up, and will not extend onto the steeper portion (i.e. >6°) of the dump site, below about the 1244m elevation. It is understood that, to achieve a slow rate of crest advance, as much of the dump crest as possible is currently being utilized during dumping. This should allow the waste material to consolidate and the pore pressures in the foundation soils to dissipate, thus minimizing the likelihood of dump failure.

SETBACK OF WASTE DUMP TOE FROM EXISTING INFRASTRUCTURE

Due to the importance of maintaining the powerline and settling pond, a conservative approach has been taken in establishing the recommended setback distance from the toe of the dump to these facilities. Although we believe the current design and dumping constraints will minimize instability, this cannot be

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guaranteed, given the variable nature of the dump and foundation materials. It is also difficult to predict waste dump failure runout, as this depends on many factors, some of which can be controlled (e.g. material quality and operational factors), and some which cannot be controlled (e.g. precipitation). Other factors include topography and soil conditions. The role and relative importance of each factor has not been clearly defined in the present state-of-the-art.

Notwithstanding the above, the setback distance will depend directly on the height of the spoil pile (i.e. higher dumps require larger setbacks). For design, it is common to use a runout angle defined by the angle from the point which might be impacted by failure debris (in this case, the settling pond or the powerline), to the crest of the spoil pile. This concept is illustrated in Fig. 4. Based on the quality of the dump materials, the relatively flat topography of the foundation and field observations of runout from a dump failure in this area, a runout angle of 15° is considered adequate for design. Based on this constraint, a representative dump toe location has been shown which will provide adequate setback for a spoil pile constructed to the 1320m elevation. Once mine planning has finalized overburden volumes, and subsequently dump crest elevations, actual dump toe locations could be determined by geometrical techniques such as those illustrated on Fig. 4.

We trust the above is sufficient for your needs at this time. If you have any questions, please do not hesitate to contact the undersigned.

Yours very truly,

PITEAU ASSOCIATES ENGINEERING LTD.



Alan F. Stewart, P.Eng.

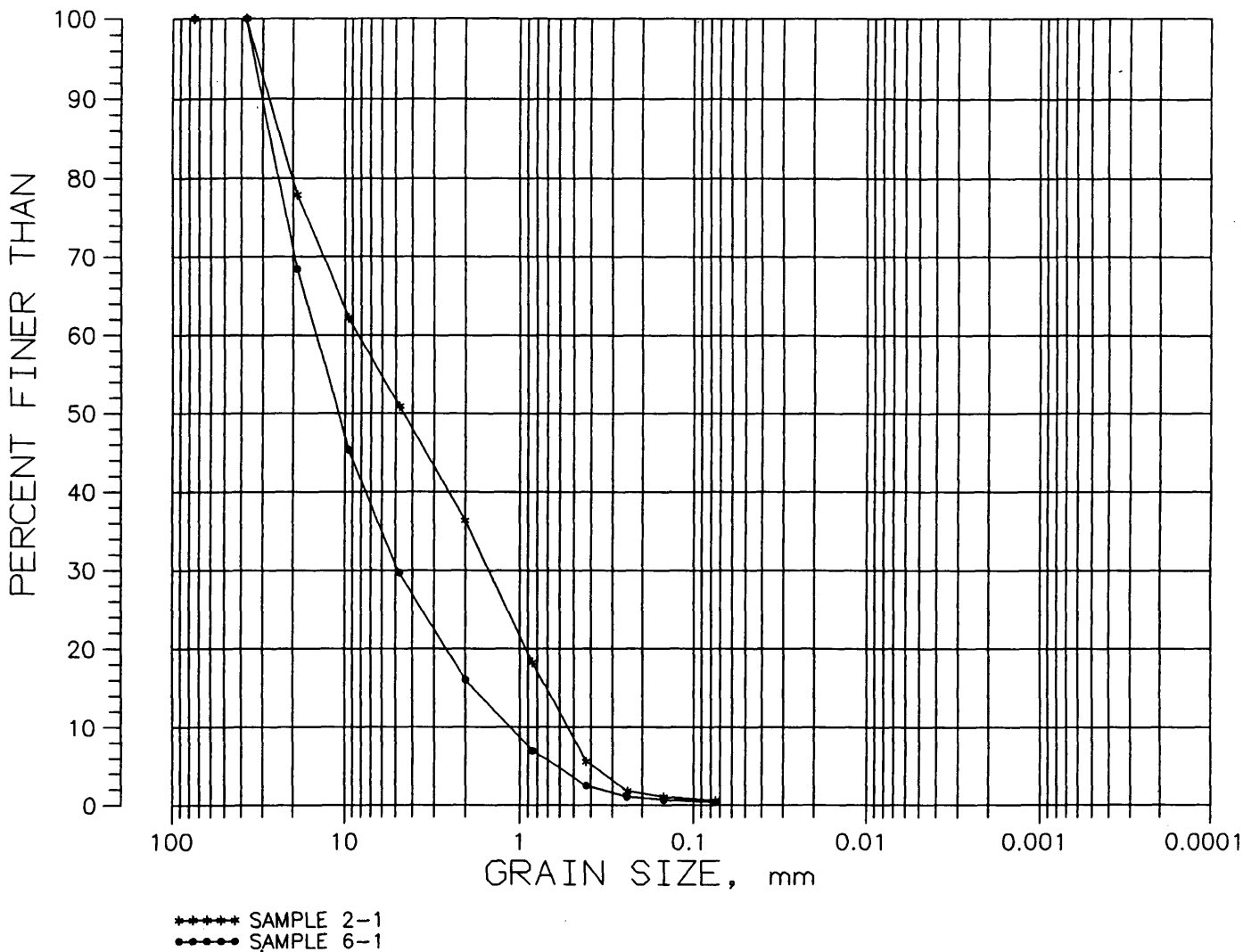


H. Warren Newcomen, P.Eng.

AFS/HWN/ef

Att.

Figures



MIT Scale	coarse	medium	fine	coarse	medium	fine	fine grained	
COBBLE SIZE	GRAVEL SIZE		SAND SIZE			SILT SIZE	CLAY SIZE	

NOTE: See Fig. 1 for sample locations.

FIG. 2

CURRAGH RESOURCES LTD.
GRUM DEPOSIT
SOUTHEAST OVERBURDEN EXTENSION DUMP



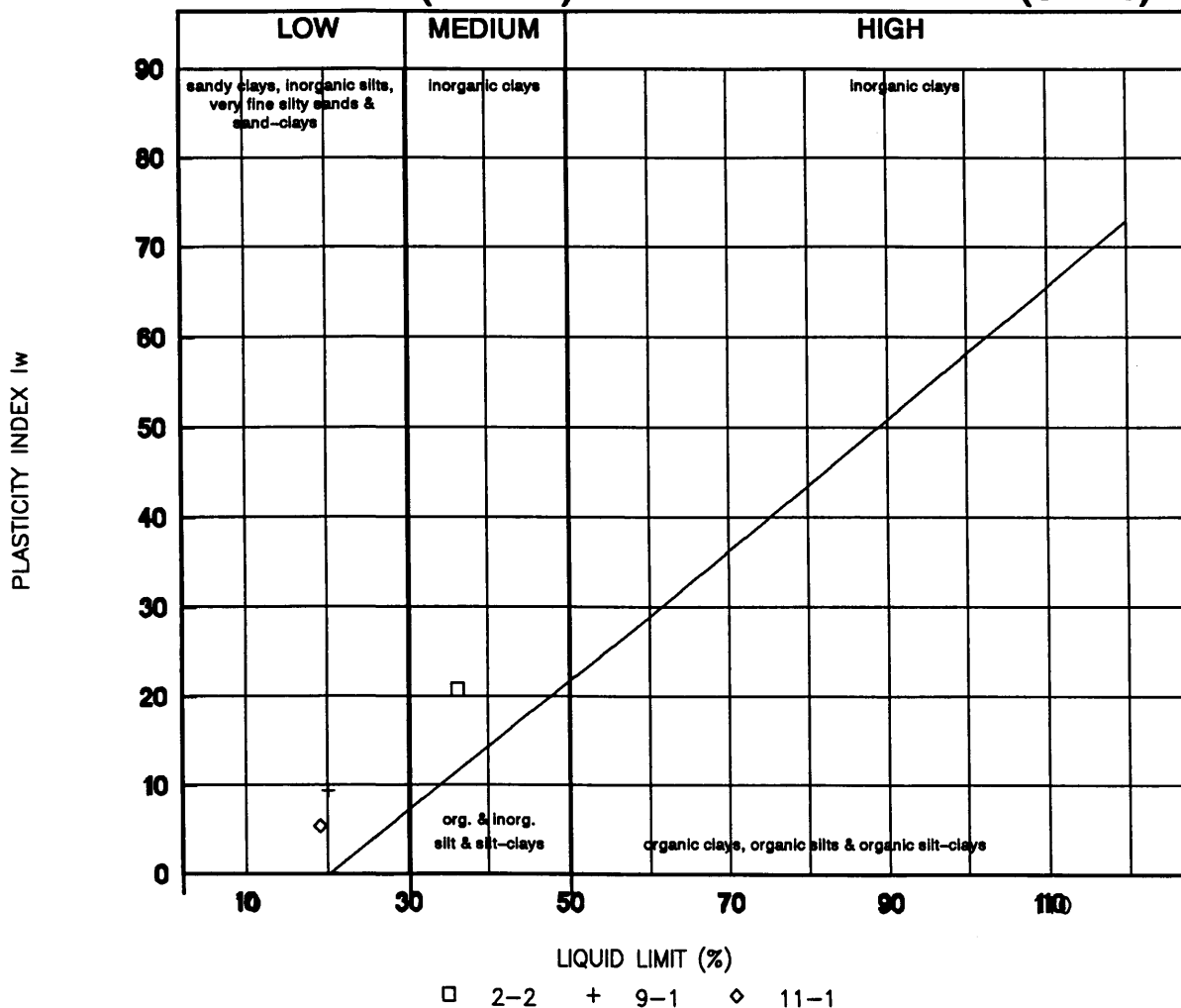
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 VANCOUVER CALGARY

GRAIN SIZE DISTRIBUTION CURVES

BY:	HWN	DATE:	OCT.92
APPROVED:	AFS	DWG:	

SAMPLE No.	DEPTH (m)	MOISTURE CONTENT (%)	LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX I_w	SOIL TYPE	UNIFIED CLASS
2-2	2.2	18.0	36.2	15.4	20.8	SILTY CLAY	CL
9-1	2.3	13.3	20.1	10.7	9.3	SILTY CLAY	CL
11-1	1.9	13.8	19.1	13.8	5.3	SILTY CLAY TO SANDY SILT	CL-ML

PLASTICITY (CLAYS) OR COMPRESSIBILITY (SILTS)



NOTE: See Fig. 1 for sample locations.

FIG. 3

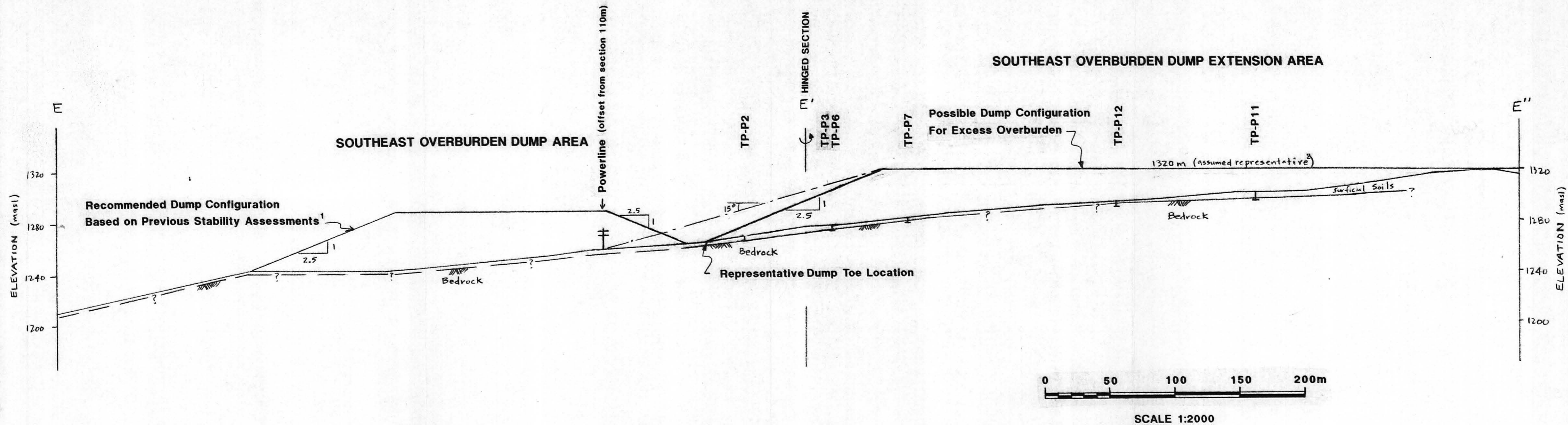
CURRAGH RESOURCES LTD.
GRUM DEPOSIT
SOUTHEAST OVERBURDEN EXTENSION DUMP



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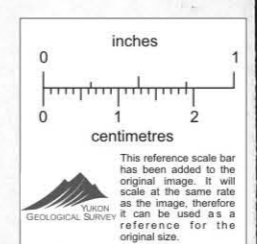
PLASTICITY CHART

BY: HWN	DATE: OCT.92
APPROVED: AFS	DWG:



- NOTES: 1. Stability assessments were conducted as part of Piteau Associates' August 1992 report. Dump to be constructed from bottom upwards in 6m lifts, as per the recommendations of this report.
2. A representative dump elevation of 1320m was chosen to illustrate setback from the powerline.
3. See Fig. 1 for section location. Note hinge/offset of section.
4. See Appendix A for detailed test pit logging information.

FIG. 4



CURRAGH RESOURCES LTD. GRUM DEPOSIT SOUTHEAST OVERBURDEN EXTENSION DUMP	PITEAU ASSOCIATES GEOTECHNICAL CONSULTANTS VANCOUVER CALGARY	BY:	DATE:
		HWN	OCT.92
CROSS-SECTION E-E'-E''		APPROVED:	DWG:
		AFS	

APPENDIX A
TEST PIT LOGS

JOB NUMBER 92-530A

Date Excavated: 09/23/92

Location: SE Overburden Dump

Date Logged: 09/23/92

Logged By: AFS

Coordinates: 5130.5 N, 3404.4 E

Excavation Method: CAT 235 Backhoe

Elev.: 1293.2 m

DEPTH		SYMBOL	SOIL/ROCK CLASS	TERRAIN CLASS	DESCRIPTION/COMMENTS	SAMPLES	TESTS
m	ft						
			OL		DK. brn. to blk. ORGANICS w/ cbrt roots, some silt, some sand. Compressible		
2.0			SM		Brn. to dk. gr. med. dense Silty SAND to Sandy SILT, some gravel and occ. cobbles & boulders to 30cm φ. [Till/Colluvium]		
4.0					PHYLLITE Bedrock		
6.0					↘ flooded to 1.8 m depth		
8.0					TD 2.4 m		
10.0							
12.0							
14.0							



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LOG OF TEST PIT NO. P1

BY: HWN	DATE: 10/14/92
APPROVED: AFS	DWG: A-1

JOB NUMBER 92-530A

Date Excavated: 09/23/92

Location: SE Overburden Dump

Date Logged: 09/23/92

Logged By: AFS

Coordinates: 5332.6 N, 3117.6 E

Excavation Method: CAT 235 Backhoe

Elev.: 1273.1 m

DEPTH		SYMBOL	SOIL/ROCK CLASS	TERRAIN CLASS	DESCRIPTION/COMMENTS	SAMPLES	TESTS
m	ft						
			OL		Brn. to blk. ORGANICS w/ abdt. roots; little Silt and Sand.		
2.0			GP-GM		Lt. to rst. brn dense GRAVEL and SAND w/ tr. to little Silt and occ. Cobbles. -some bedding, defined by fine and coarse layers.	(1)	G
6.0			CL		Brn. to gr. firm to stiff Silty CLAY w/ little Sand and Gravel. ▽ [Till]	(2)	P _p =1.0 - A 2.0 W _n =18.0% W _L =36.2% W _p =15.4%
8.0					PHYLLITE Bedrock TD=? (pit flooded)		
10.0							
12.0							
14.0							



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LOG OF TEST PIT NO.

P2

BY:	HWN	DATE:	10/14/92
APPROVED:	AFS	DWG:	A-2

JOB NUMBER 92-530A

Date Excavated: 09/23/92

Location: SE. Overburden Dump

Date Logged: 09/23/92

Logged By: AFS

Coordinates: 5356.6 N, 3163.1 E

Excavation Method: CAT 235 Backhoe

Elev.: 1278.6 m

DEPTH		SYMBOL	SOIL/ROCK CLASS	TERRAIN CLASS	DESCRIPTION/COMMENTS	SAMPLES	TESTS
m	ft						
			OL		Brn. to blk. ORGANICS w/ abdt. roots, little silt and sand.		
2.0			SP-GP		Brn. to rst. brn. med. dense to dense, fine to coarse SAND and GRAVEL, w/ tr. silt.		
6.0			ML		Brn. to grey, very stiff Clayey SILT w/ little sand and gravel, some boulders up to 1m ϕ . [Till]		$P_p = 3.0$
12.0					Weathered PHYLLITE Bedrock		
4.0					TD 3.6 m		
					Dry		



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LOG OF TEST PIT NO.

P3

BY: HWN	DATE: 10/14/92
APPROVED: AFS	DWG: A-3

JOB NUMBER 92-530A

Date Excavated: 09/23/92

Location: SE Overburden Dump



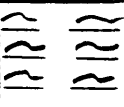
Date Logged: 09/23/92

Logged By: AFS

Coordinates: 5146.3 N, 3217.5 E

Excavation Method: CAT 235 Backhoe

Elev: 1275.7 m

DEPTH		SYMBOL	SOIL/ROCK CLASS	TERRAIN CLASS	DESCRIPTION/COMMENTS	SAMPLES	TESTS
m	ft						
			OL		Brn. to blk. ORGANICS		
	2.0		SW-GW		Brn. to rst. brn. med. dense to dense SAND and GRAVEL w/ some cobbles and tr. to little silt.		
	6.0				PHYLLITE Bedrock		
	8.0				TD=?		
	10.0						
	12.0						
	14.0						



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LOG OF TEST PIT NO. P4

BY: HWN	DATE: 10/14/92
APPROVED: AFS	DWG: A-4

JOB NUMBER 22-530A

Date Excavated: 09/23/92

Location: SE Overburden Dump

Date Logged: 09/23/92

Logged By: AFS

Coordinates: 5188.1 N, 3274.3 E

Excavation Method: CAT 235 Backhoe

Elev.: 1282.6 m

DEPTH		SYMBOL	SOIL/ROCK CLASS	TERRAIN CLASS	DESCRIPTION/COMMENTS	SAMPLES	TESTS
m	ft						
			OL		Brn. to blk ORGANICS		
2.0			SW-GW		Rst. brn. med. dense to dense SAND and GRAVEL w/ occ. cobbles and tr. silt. [Colluvium]		
4.0			ML		Brn. to gr. firm to hard fine Sandy SILT w/ tr. to little med. to crs sand and gravel. [Till]		
6.0					PHYLLITE Bedrock		
8.0							
10.0					TD 3.0 m		
					Dry		
12.0							
14.0							



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LOG OF TEST PIT NO.

P5

BY: HWN	DATE: 10/14/92
APPROVED: AFS	DWG: A-5

JOB NUMBER 92-530A

Date Excavated: 09/23/92

Location: SE Overburden Dump

Date Logged: 09/23/92

Logged By: AFS

Coordinates: 5252.1 N, 3217.2 E

Excavation Method: CAT 235 Backhoe

Elev.: 1279.7 m

DEPTH		SYMBOL	SOIL/ROCK CLASS	TERRAIN CLASS	DESCRIPTION/COMMENTS	SAMPLES	TESTS
m	ft						
			OL		Brn. to blk. ORGANICS		
	2.0		GW-SW		Brn. to rst. brn. med. dense to dense fine to crs. GRAVEL and SAND w/ tr. silt and cobbles.	①	G
	1.0						
	4.0						
	6.0						
2.0	8.0		ML		Brn. v. stiff Clayey SILT w/ tr. to little sand and gravel, cobbles and boulders. [Till]	②	P _p = 2.0 - 3.0 W = 9.4%
					PHYLLITE Bedrock		
3.0	10.0				TD 3.0 m		
	12.0						
	14.0						

↙ slight seepage



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LOG OF TEST PIT NO. P6

BY: HWN	DATE: 10/14/92
APPROVED: AFS	DWG: A-6

JOB NUMBER 22-530A

Date Excavated: 09/23/92

Location: SE Overburden Dump

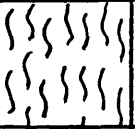

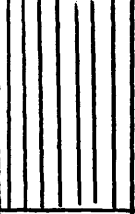
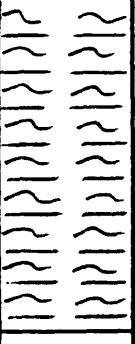
Date Logged: 09/23/92

Logged By: AFS

Coordinates: 5287.1 N, 3265.2 E

Excavation Method: CAT 235 Backhoe

Elev.: 1286.9 m

DEPTH		SYMBOL	SOIL/ROCK CLASS	TERRAIN CLASS	DESCRIPTION/COMMENTS	SAMPLES	TESTS
m	ft						
			OL		Brn. to blk. ORGANICS		
2.0			SW-GW		Brn. to rst. brn. med. dense to dense fine to crs. SAND and GRAVEL w/ some cobbles and boulders to 25 cm ϕ .		
8.0			ML		Brn. v. stiff to hard Sandy Clayey SILT. [Till]		P _p ≥ 3.0
12.0					Weathered PHYLLITE Bedrock		
14.0					TD 4.2m Dry		



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LOG OF TEST PIT NO.

P7

BY:	HWN	DATE:	10/14/92
APPROVED:	AFS	DWC:	A-7

JOB NUMBER 22-530A

Date Excavated: 09/23/92

Location: SE Overburden Dump



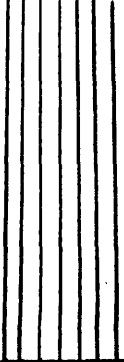

Date Logged: 09/23/92

Logged By: AFS

Coordinates: 5438.2 N, 3206.0 E

Excavation Method: CAT 235 Backhoe

Elev.: 1286.2 m

DEPTH		SYMBOL	SOIL/ROCK CLASS	TERRAIN CLASS	DESCRIPTION/COMMENTS	SAMPLES	TESTS
m	ft						
			OL		Brn. to blk. ORGANICS		
2.0			SW-GW		Lt. brn. to rst. brn. fine to crs. SAND and GRAVEL w/ tr. silt and occ. cobbles and boulders up to 30 cm ϕ .		
8.0			ML		Brn. stiff clayey SILT w/ tr. sand and gravel. [Till]		P _p =1.5-3.0
12.0					PHYLLITE Bedrock		
4.0					TD 3.8m Photo 1-22		
14.0					Dry		



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LOG OF TEST PIT NO.

P8

BY: HWN	DATE: 10/14/92
APPROVED: AFS	DWG: A-8

JOB NUMBER 92-530A

Date Excavated: 09/23/92

Location: SE Overburden Dump

Date Logged: 09/23/92

Logged By: AFS

Coordinates: 5423.7 N, 3124.3 E

Excavation Method: CAT 235 Backhoe

Elev.: 1279.0 m

DEPTH		SYMBOL	SOIL/ROCK CLASS	TERRAIN CLASS	DESCRIPTION/COMMENTS	SAMPLES	TESTS
m	ft						
			OL		Brn. to blk. ORGANICS		
2.0			SW-GW		Lt. brn. med. dense fine to crs. SAND and GRAVEL w/ tr. silt, occ. cobbles and boulders to 25 cm ϕ .		
8.0			CL		Brn. soft to firm Clayey SILT w/ tr. to little sand and gravel. [Till] - bedrock contact not well defined. Water seepage occurs at contact?	①	A $W_n = 13.3\%$ $W_L = 20.1\%$ $W_p = 10.7\%$
10.0					TD = ? (pit flooded)		



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LOG OF TEST PIT NO.

P9

BY:	DATE:
HWN	10/14/92
APPROVED:	DWG:
AFS	A-9

JOB NUMBER 22-530A

Date Excavated: 09/23/92

Location: SE Overburden Dump


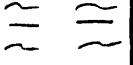
Date Logged: 09/23/92

Logged By: AFS

Coordinates: 5442.8N, 3404.9E

Excavation Method: CAT 235 Backhoe

Elev.: 1297.4 m

DEPTH		SYMBOL	SOIL/ROCK CLASS	TERRAIN CLASS	DESCRIPTION/COMMENTS	SAMPLES	TESTS
m	ft						
			CL		Lt. brn. firm Clayey SILT w/ tr. to little sand & gravel. Some organics. [Till]		
2.0					PHYLLITE Bedrock TD 0.3 m Dry		
1.0							
4.0							
6.0							
2.0							
8.0							
3.0							
10.0							
12.0							
4.0							
14.0							



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LOG OF TEST PIT NO.

P10

BY: HWN	DATE: 10/15/92
APPROVED: AFS	DWG: A-10

JOB NUMBER 92-530A

Date Excavated: 09/23/92

Location: SE Overburden Dump


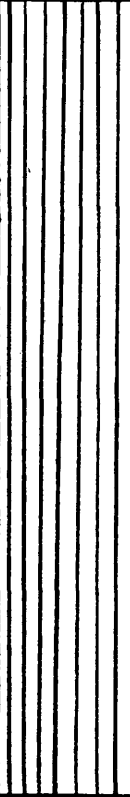
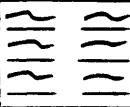
Date Logged: 09/23/92

Logged By: AFS

Coordinates: 5427.6 N, 3503.1 E

Excavation Method: CAT 235 Backhoe

Elev.: 1306.0 m

DEPTH		SYMBOL	SOIL/ROCK CLASS	TERRAIN CLASS	DESCRIPTION/COMMENTS	SAMPLES	TESTS
m	ft						
			OL		Brn. to blk. ORGANICS		
			ML		Brn. stiff to v. stiff Clayey SILT w/ tr. sand and gravel and occ. cobbles [T:11]		
4.0							
2.0						①	A W _n =13.8% W _L =19.1% W _p =13.8% P _p =2.5
8.0							
12.0							
4.0							
16.0							
					PHYLLITE Bedrock - slight seepage at contact		
6.0					TD 6.0 m		
20.0							
24.0							
8.0							



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LOG OF TEST PIT NO.

P11

BY:	HWN	DATE:	10/15/92
APPROVED:	AFS	DWG:	A-11

JOB NUMBER 92-530A

Date Excavated: 09/23/92

Location: SE Overburden Dump


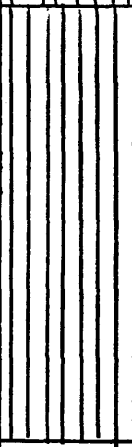
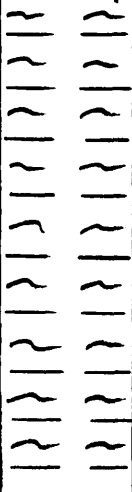
Date Logged: 09/23/92

Logged By: AFS

Coordinates: 5311.3 N, 3443.0 E

Excavation Method: CAT 235 Backhoe

Elev.: 1298.7 m

DEPTH		SYMBOL	SOIL/ROCK CLASS	TERRAIN CLASS	DESCRIPTION/COMMENTS	SAMPLES	TESTS
m	ft						
			OL		Brn. to blk ORGANICS		
2.0			ML		Brn. stiff to v. stiff clayey SILT w/ tr. sand and gravel, occ cobbles and boulders up to 1m ϕ . [Till]		
6.0					PHYLLITE Bedrock		
10.0							
12.0					TD 3.2 m		
14.0					Dry		



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LOG OF TEST PIT NO.

P12

BY: HWN

DATE: 10/15/92

APPROVED: AFS

DWO: A-12

JOB NUMBER 92-530A

Date Excavated: 09/23/92

Location: SE Overburden Dump



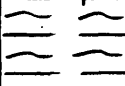
Date Logged: 09/23/92

Logged By: AFS

Coordinates: 5078.5 N, 3567.9 E

Excavation Method: CAT 235 Backhoe

Elev.: 1304.1 m

DEPTH		SYMBOL	SOIL/ROCK CLASS	TERRAIN CLASS	DESCRIPTION/COMMENTS	SAMPLES	TESTS
m	ft						
			OL		Brn. to blk. ORGANICS		
2.0			ML		Brn. stiff to v. stiff Clayey SILT w/ tr. to little sand and gravel, occ. cobbles and boulders to 60 cm ϕ .		P _p = 1.5 - 3.0
1.0							
4.0							
6.0							
2.0							
8.0							
10.0							
12.0					Weathered PHYLLITE Bedrock		
4.0					TD 3.8m Dry		
14.0					Photo 1-23		



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LOG OF TEST PIT NO.

P13

BY: HWN

DATE: 10/15/92

APPROVED: AFS

DWG: A-13