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June 30, 2015

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Cont. No.:VA15-02703

ISO 9001 - FS 64925
ISO 14001 - EMS 550121
OHSAS 18001 - OHS 550122

Mr. John Thompson
President and Chief Operating Officer
Sona Resources Corporation
501 - 3292 Production Way
Burnaby, British Columbia
Canada, V5R 4A4

Dear John,

Re: Blackdome Mine Tailings Storage Facility Assessment - Response to Memorandum Issued by Ministry of Energy and Mines to Blackdome-Sona Resources Corp. on February 3, 2015

1 – PROJECT DESCRIPTION

The Blackdome Mine is located in southwestern British Columbia, approximately 70 km northwest of Clinton. The mine is an underground gold mine, which was operated at a rate of 225 tonnes per day from 1986 to 1990, at which time mining operations were suspended. J-Pacific Gold Inc., formerly Claimstaker Resources Ltd., of Vancouver, B.C., subsequently obtained ownership of the mine and resumed mining operations in the fall of 1998 following restoration of the mill and an expansion to the Tailings Storage Facility (TSF). Mining operations were suspended in May of 1999, and the mine has since been operating on a Care and Maintenance basis. J-Pacific Gold changed its name to Sona Resources Corporation in January 2010. The Mine Site Plan is shown on Figure 1.

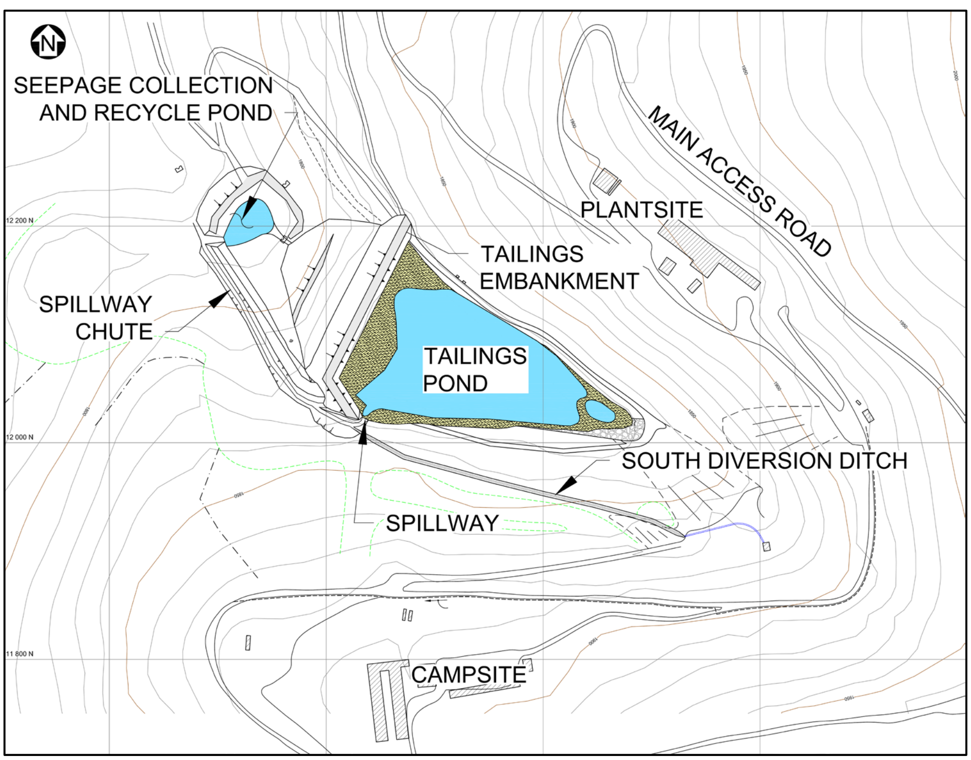


Figure 1 Mine Site Plan

The TSF is approximately 250 m long by 150 m wide. The TSF embankment is approximately 36 m high, as measured from the embankment crest to the downstream toe. The TSF has a “Significant” dam classification according to the 2014 Canadian Dam Association (CDA) – Technical Bulletin: Application of Dam Safety Guidelines to Mining Dams.

2 – PROJECT HISTORY

Stage 1 Design and Construction

The original TSF was designed by Reimchen Urlich Geological Engineering, who also supervised construction of the first stage of the dam during 1985. The Stage 1 dam was built to a height of 21 m (crest El. 1,815.4 m). The original design concept allowed for two years of tailings disposal within the Stage 1 impoundment. The Stage 1 embankment was constructed from predominantly glacial till material obtained from within the tailings impoundment. It was constructed as a homogeneous earthfill dam that included a coarse drainage zone along the base of the downstream shell. The drainage blanket was overlain by a filter zone of sandy and silty gravel.

Stage 2 Design and Construction

The Stage 2 expansion (1987 extension) was designed by Robinson Dames and Moore as a centreline embankment raise to an elevation of 1,821 m. The downstream section of the embankment included a zone of mine waste rock up to El. 1,805 m, overlain by compacted glacial till. An upstream toe drain was installed to control the phreatic surface in the beaches. The upstream toe drain included a 150 mm diameter perforated drain pipe with filter fabric surround that was placed along the upstream face of the embankment. The perforated drain pipe connects into a solid PVC pipe which extends through the left abutment of the tailings embankment.

Stage 3 Design and Construction

The Stage 3 expansion to the tailings embankment was designed by SRK-Robinson Inc. as an upstream raise to elevation 1,825.6 m. The Stage 3 crest raise was approximately 5 m high and was constructed during 1988. The design incorporated wick drains within the sandy tailings beach, and an overlying gravel drain that connected to the previously installed upstream toe drain.

Stage 4 Design and Construction

The Stage 4 expansion of the TSF was designed in 1998 by Knight Piésold. The Stage 4 design included a 2.8 m centreline embankment raise on top of the Stage 3 embankment. This increased the Stage 4 crest elevation to 1,828.4 m.

The TSF has a spillway constructed at the left abutment which has been effective in controlling the water level of the pond during the Care and Maintenance period.

3 – TAILINGS DAM ASSESSMENT

The Ministry of Energy and Mines requested an assessment be completed to determine if the Tailings Storage Facility was at risk due to one of the following:

1. Undrained shear failure of silt and clay foundations
2. Water balance adequacy, and
3. Filter adequacy.

The response to each specific assessment has been provided below in the following format.

  a. **Ministry of Energy and Mines required assessment in bold.**
     KP responses are provided below.

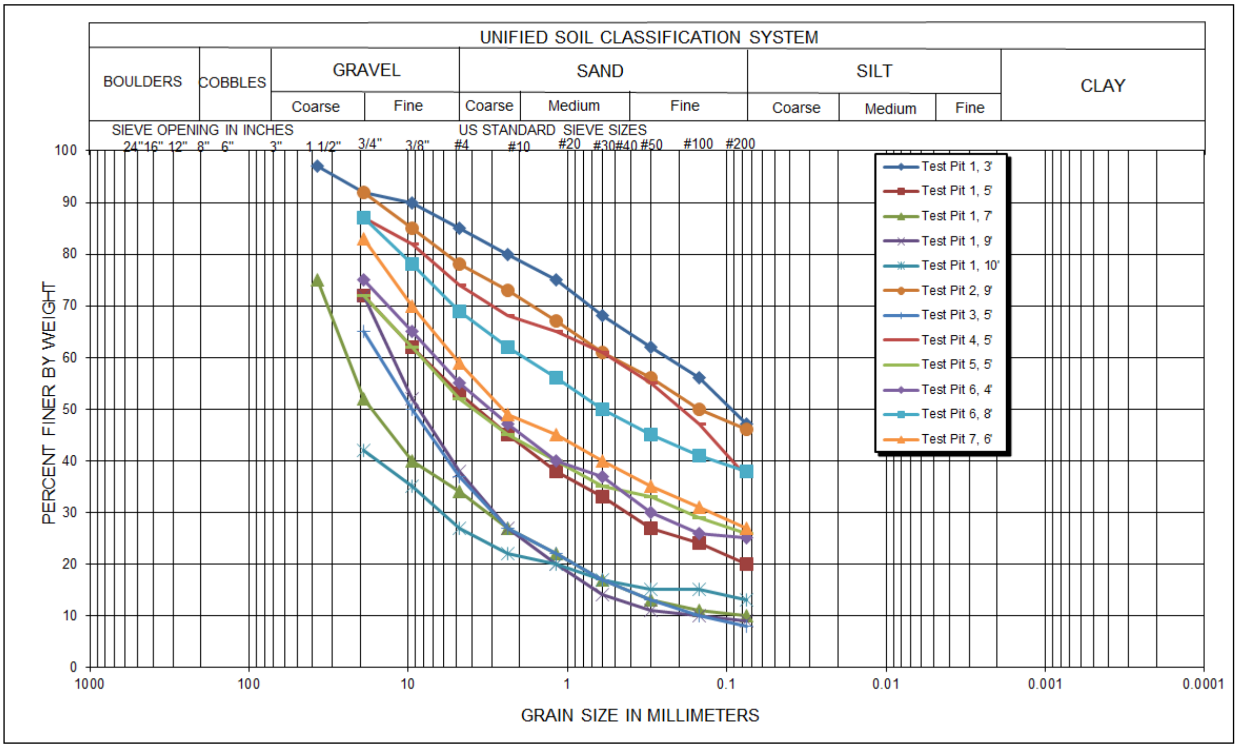
1. **Undrained shear strength of silt and clay foundations:**

   a. **Including a determination with respect to whether or not similar foundation conditions exist below the Blackdome Mine TSF embankment.**

Field investigations consisting of 4 boreholes, 8 test pits and 3 test trenches were completed in the area of the TSF during the site investigation and construction phases of the project. Laboratory testing of collected field samples included moisture content determinations, gradation analyses, soil classification, compaction and permeability testing, and strength testing. The results of the investigations are presented in Reimchen Urlich Geological Engineering's Reports "Field Exploration Program for Blackdome Project Tailings Disposal System", dated November 1984, "Tailings Dam Design for Blackdome Project Tailings Disposal System, dated June 1985, and "Tailings Dam Construction for Blackdome Project Tailings Disposal System, dated November 1985.

The Field Exploration Program Report describes the overburden soils as follows: *"Overburden soils appear to consist of pale brown to yellow and reddish brown gravel, sand and silt with variable clay content, numerous cobbles, and occasional boulders up to 2 ft. (0.6m) in size. We have classified this material as being glacio-lacustrine in origin…*"

A summary gradation analysis of samples collected in the area of the TSF has been summarized on Figure 2.



NOTES

1. Reference Report on Tailings Dam Design for Blackdome Project Tailings Disposal System, by Reimchen Urlich Geological Engineering, June 1985.
2. Sample Test Pit 7, 6' was collected in the footprint of the embankment.

Figure 2 Site Investigation Particle Size Distribution Summary

The summary of gradation analyses indicates the material is glacial till in origin, not glacio-lacustrine. The material can generally be classified as well graded gravel-sand-silt mixtures with more than 12% fines, where a glacio-lacustrine deposit would be poorly graded and predominately clay and silt based. The historical data indicates a foundation of well graded gravel-sand-silt mixture which is not considered silt and clay foundation.

b. **Whether or not significant site investigations have been completed to have confidence in this interpretation.**

   The site investigation program, summarized above in item 1.a, included; two trenches, one excavated along the centerline of the tailings dam and another upstream of the tailings dam in the bottom of the valley, one borehole in the bottom of the valley along the centerline of the tailings dam, and two test pits in the footprint of the embankment. This is believed to be sufficient to have confidence in the foundation conditions for the relatively small embankment; 120 m in length and approximately 8,500 square meters in area as the historical data is very consistent.

c. **If present, whether or not the dam design properly accounts for these materials.**

   Weak glacio-lacustrine foundation soils were not found to be present in the footprint of the Blackdome Mine TSF embankment. It should be noted stability analyses were completed using parameters derived by strength testing completed on materials borrowed from site. The analyses, summarized in the attached letter, concluded the dam design is safe.

d. **If any gaps have been identified, a plan and schedule for additional sub-surface investigations.**

   No gaps have been identified and there are no plans to further investigate the foundation conditions at the TSF.

2. **Water balance adequacy:**

a. **Including the total volume of surplus mine water (if any) stored in the TSF.**

   The surface area of the TSF pond is approximately 16,000 m^2. Assuming an average depth of 1 m, the pond volume is in the order of 16,000 m^3. The volume of water in the TSF pond is controlled by the spillway invert elevation and has remained relatively constant during the Care and Maintenance phase.

b. **The volume of surplus water added to the TSF over each of the last five years.**

   The mine is operating under Care and Maintenance conditions and the TSF pond volume has remained steady during this time as the pond elevation and volume are controlled by the spillway.

c. **Any plans in place or under development to release surplus mine water to the environment.**

   Surplus water in the TSF is currently routed to the environment through a spillway located on the left abutment. The spillway has been effective in managing the pond elevation during the Care and Maintenance period.

d. **Recommended beach width and the ability of the mine to maintain these widths.**

   The current beach width varies and is in the order of 10 to 30 m. The beach width is considered to be adequate for the TSF. The beach width, which is controlled by the pond elevation (spillway invert elevation), has been fairly constant since the mine entered the Care and Maintenance phase in 1999.

e. **The ability of the TSF embankments to undergo deformation without the release of water.**

   The current pond elevation is approximately 4.5 m below the TSF crest elevation as the mine operations were suspended in 1999 after construction of the Stage 4 raise. The embankment crest elevation is approximately 4.4 m higher than the operating spillway invert; significantly greater than the Stage 4 TSF freeboard design allowance of 1.3 m. Based on the current configuration, the TSF embankment crest would have to deform over 4 to 4.5 m, approximately 14% of the embankment height as measured at the centerline of the embankment, to release water from the TSF pond over the embankment. Therefore the TSF embankment is considered to have the ability to undergo deformation without overtopping.

f. Provisions and contingencies in place to account for wet years.

The TSF has a spillway to route surplus water to the environment. Surplus water does not accumulate in the pond.

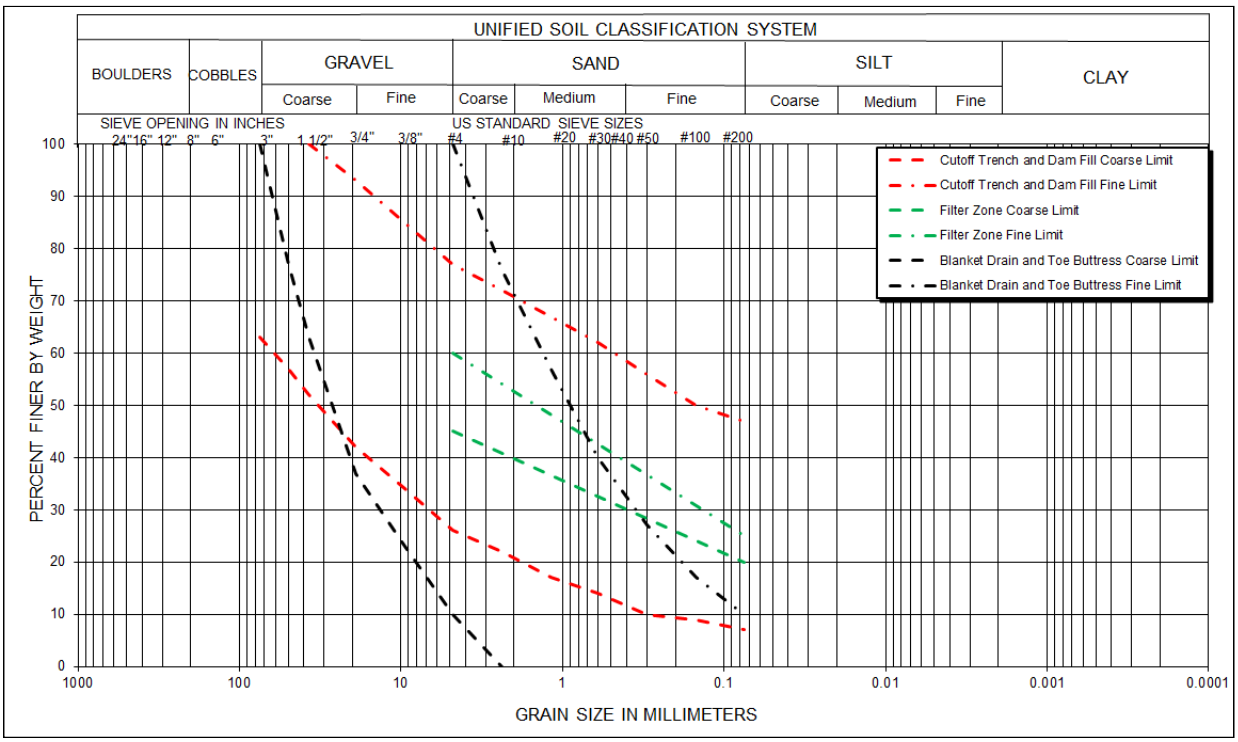
g. If any gaps have been identified, a plan and schedule for addressing these issues.

There are no gaps in the water balance adequacy.

3. Filter Adequacy

a. Evaluation of the beach width and filter specification necessary to prevent potential piping.

An assessment has been completed on historical information using the United States Department of Agriculture, Part 633 National Engineering Handbook, Chapter 26 – Gradation Design of Sand and Gravel Filters, dated October 1994. The handbook presents criteria for determining the grain size distribution of sand and gravel filters needed to prevent internal erosion or piping soil in embankments of foundations of hydraulic structures. The handbook categorizes the base soil, establishes filter and permeability criteria, determines maximum and minimum particle size, and establishes criteria to prevent segregation or gap-grading. The embankment fill construction materials gradation specifications from the original designers are summarized on Figure 3.



NOTES:

1. Cutoff trench and dam fill and blanket drain and toe buttress, reference report on tailings dam design for Blackdome project tailings disposal system, by Reimchen Urlich Geological Engineering, June 1985, Figure 12.
2. Filter zone reference report on tailings dam construction for Blackdome project tailings disposal system, by Reimchen Urlich Geological Engineering, November 1985, Table 1.

Figure 3 TSF Embankment Fill

The original design of the Stage 1 TSF Embankment did not incorporate a filter zone, however during construction it was found that the drain blanket rock particles were near the coarser limit of the specified gradation range and the blanket drain was overlain by a filter zone of sandy and silty gravel originating from the mill bench strippings. The filter was constructed approximately 0.8 m thick to an elevation of 1,796 m as shown on Figure 4.

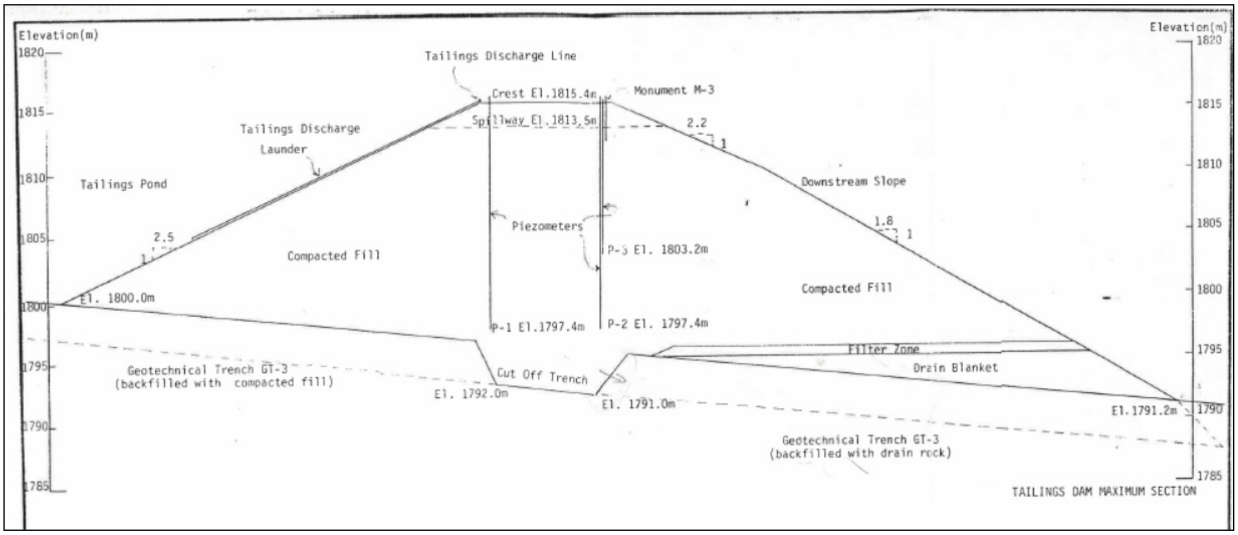


Figure 4 TSF Embankment Cross Section

The assessment concluded the filter zone met the necessary filter criteria (D_{15max} is less than 0.7 mm for category two base soils with 40 to 85% passing #200 sieve after regrading). However, the filter did not meet the permeability criteria (D_{15min} is not greater than 4 x d_{15} of the base soil or greater than 0.1 mm) and it is potentially gap graded (the ratio between the coarse and fine filter zone limits is greater than 5 for the material passing between 45 and 60% and the filter band has a coefficient of uniformity greater than 6). The assessment was not able to evaluate if the filter zone met minimum and maximum particle size or segregation criterion (relationship between D_{90} and D_{10}) with the data provided.

The assessment included evaluation of the blanket drain to act as a filter for the filter zone which concluded the blanket drain did meet the permeability criteria and filter band limits based on the Tailings Dam Construction Report. However, the blanket drain was found to not meet the necessary filter criteria and has the potential to be gap graded and could have segregated during construction.

b. Whether or not the filter has been constructed in accordance with the design.

The original design of the Stage 1 TSF Embankment did not incorporate a filter zone. The filter zone was installed during construction as a field design change.

c. If any gaps have been identified, a plan and schedule for addressing these issues.

The assessment concluded the filter zone met the necessary filter criteria. However, the filter did not meet the permeability criteria and it is potentially gap graded. The blanket drain was also found to not meet the necessary filter criteria and has the potential to be gap graded and could have segregated during construction.

Sinkholes have been observed along the north flank of the facility during the annual inspections (1998 to 2014). The sinkholes are above the water level of the tailings pond and no water is flowing into them. The sinkholes resulted when tailings material migrated through permeable talus and rockfill in the embankment foundation. Previous evaluations recognized the sinkholes and associated seepage through the embankment foundations were unlikely to pose a risk to dam stability, as the foundation materials were considered to be non-erosive.

The TSF will continue to be monitored during the Care and Maintenance period in accordance with the schedule outlined in the CDA guidelines. Annual inspections to date indicate the facility is functioning as designed. However, the site conditions must be re-evaluated prior to either resuming operations at the mine or shutting the mine down for closure.

Yours truly,
Knight Piésold Ltd.

PROFESSIONAL PROVINCE OF L.J. GALBRAITH 25493 BRITISH COLUMBIA ENGINEER

Prepared: June 30/15 Reviewed:

Les Galbraith, P.Eng.
Specialist Engineer | Associate

FOR Bruno Borntraeger, P.Eng.
Specialist Geotechnical Engineer | Associate

Approval that this document adheres to Knight Piésold Quality Systems:

Attachments:
Appendix A Reimchen Urlich Geological Engineering Letter, Tailings Dam Design, July 15, 1985

References

Field Exploration Program for Blackdome Project Tailings Disposal System, November 1984
Tailings Dam Design for Blackdome Project Tailings Disposal System, June 1985
Tailings Dam Construction for Blackdome Project Tailings Disposal System, November 1985
1998 Annual Inspection Report (Ref No. 10832/1-1), dated July 1998
Report on Design of Stage 2 Expansion (Ref No. 10832/2-1), dated August 1998

Copy To: (Al Hoffman, Chief Inspector of Mines)

/lg

Knight Piésold
CONSULTING

APPENDIX A

REIMCHEN URLICH GEOLOGICAL ENGINEERING LETTER, TAILINGS DAM DESIGN, JULY 15, 1985

(Pages A-1 to A-6)

REIMCHEN URLICH GEOLOGICAL ENGINEERING

4381 GALLANT AVENUE, NORTH VANCOUVER, B.C. V7G 1L1 CANADA
PHONE: (604) 929 2377 TELEX: 04 - 352858

July 15, 1985

File: 53-06

Blackdome Exploration Ltd.
#904-675 West Hastings Street
VANCOUVER, B. C.
V6B 1N2

Attention: Mr. Carl Lalonde, Project Manager

Dear Sir:

Re: **TAILINGS DAM DESIGN - BLACKDOME PROJECT, BRITISH COLUMBIA**

As an extension to our report dated June 30, 1985, on the design of a tailings disposal system for the Blackdome Project, we have completed additional strength tests on the proposed borrow materials at the site. This letter presents the results of the tests, a reassessment of dam stability and our comments. This letter forms an addendum to our formal report.

The original triaxial compression tests were completed on Bulk Sample A (from Test Pits 2, 4 and 6) compacted to about 86 percent of maximum Modified Proctor density. This material represented the finest gradation of soils with significant clay content. The more representative coarse material, although not the coarsest, was represented by Bulk Sample B. Because the first tests were completed on a sample at relatively low density and the results provided quite low strength parameters, it was decided to complete another series of tests on Sample B at a higher compaction level.

For these latest tests, two samples were prepared, at compaction levels of 94 and 92.5 percent. The first was tested at a confining pressure of 10.9 psi. The second was tested at a confining pressure of 31.6 psi, and prior to failure reconsolidated to 59.6 psi to provide a second Mohr's circle. The results of the tests indicated much higher strength values as shown below.

"Consultants in Resource Development and Geotechnical Engineering"

Sample	Compaction	C'	Ø'
A	86%	28kPa	18°
B	92.5 - 94%	35kPa	39° ?

For completeness we have provided Figures A-5 and A-6 which present the compaction curves for the two materials, and the Mohr's strength envelopes, respectively. Figure A-5 was inadvertently omitted from the original report.

We consider the results of these most recent triaxial tests to be much more representative of the average strength of the materials to be placed for the dam for the following reasons:

1. The compaction is more representative of what will occur based on our specifications of 95%.

2. The average soil conditions in the borrow areas will be closer to Sample B than Sample A.

However, we have reanalyzed the overall dam stability using a conservative assumption that 50 percent of the fill would be Sample A material at 86% compaction and 50 percent would be Sample B at 93.3% compaction. Therefore the stability impact parameters for the fill, as compared to our original report assumptions, average:

Average Fill Strength Parameters

Material Combination	C'	Ø'	tan Ø'
Original Report			
(75%-30° 35kPa, 25%-18° 28kPa)	33.25kPa	27.2°	0.514
New Results			
(50%-39° 35kPa, 50%-18° 28kPa)	31.5kPa	29.5°	0.567

With these parameters the critical stability surfaces are similar to those presented in the report. The minimum factors of safety are:

Loading Condition	Upstream Slope	Downstream Slope
Static a = 0	2.63	1.62
Seismic a = 0.075 g	2.25	1.35

Figure 13 of the report has been included herein, showing the critical slip surfaces. In the report the slope designation for circles 3 and 4 were shown as upstream, whereas they were actually downstream. Please correct this in the report.

We conclude that the dam is designed safely based on the new laboratory tests and a conservative estimation of material types to be used as fill. With sufficient better quality more granular borrow soils, the compaction criteria could be reduced to an average of 93% of Modified Proctor with the acceptance of occasional densities as low as 90%.

Yours very truly,

REIMCHEN URLICH GEOLOGICAL ENGINEERING

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA K. E. ROBINSON

KE Robinson

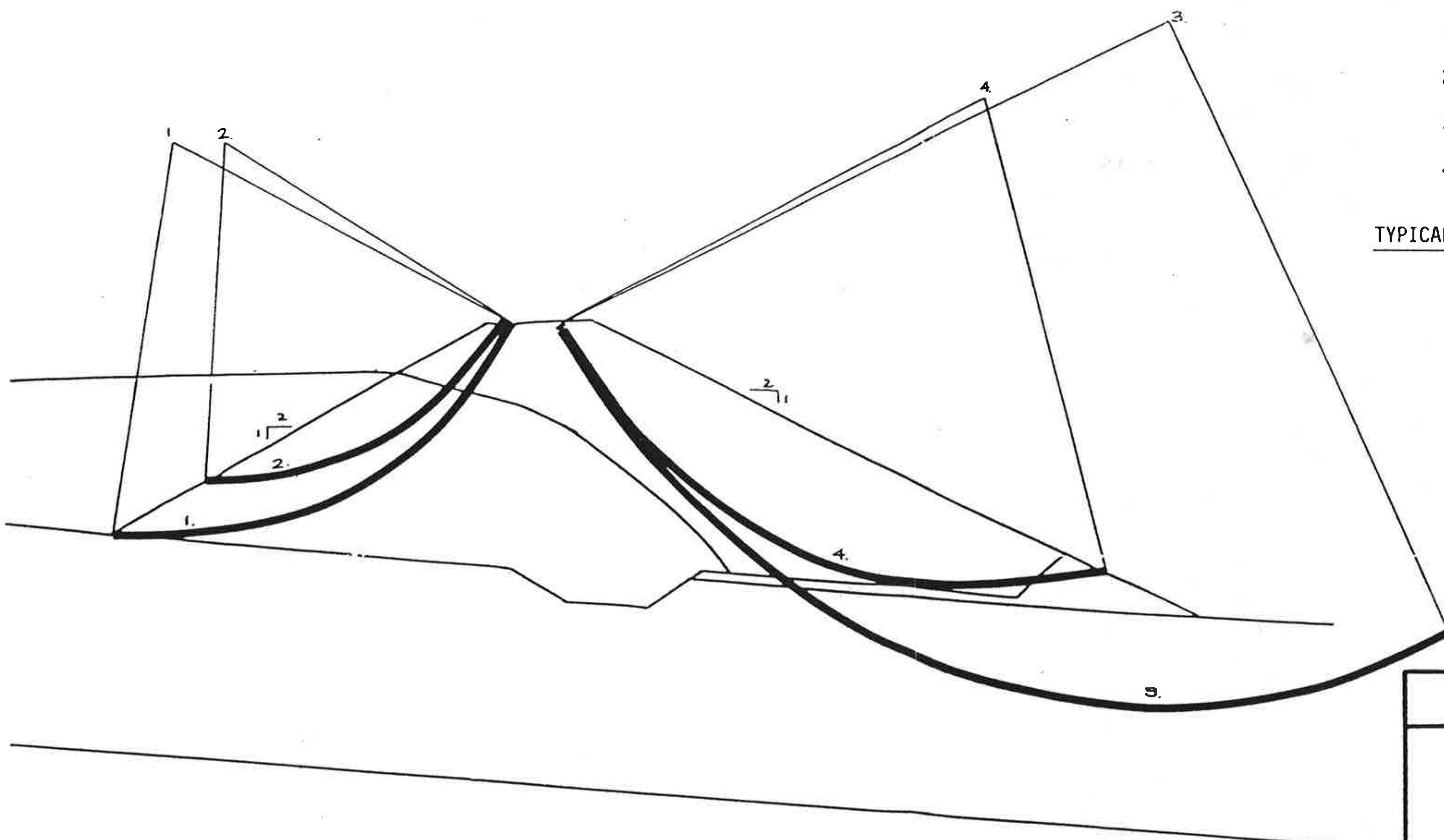
K. E. Robinson, P.Eng.
ROBINSON DAMES AND MOORE
Review Consultant

KER:BG

Enclosures: Figures 13, A-5 and A-6

cc F.J.T. Hancock, P.Eng.
Ministry of Energy, Mines & Petroleum Resources
Kamloops, B. C.

R.T. Martin, M.Sc., P.Eng.
Ministry of Energy, Mines & Petroleum Resources
Victoria, B. C.



FACTORS OF SAFETY

Circle	Slope	Static	Seismic
1	Upstream	3.78	3.19
2	Upstream	2.63	2.25
3	Downstream	1.62	1.35
4	Downstream	1.84	1.53

TYPICAL STABILITY RESULTS

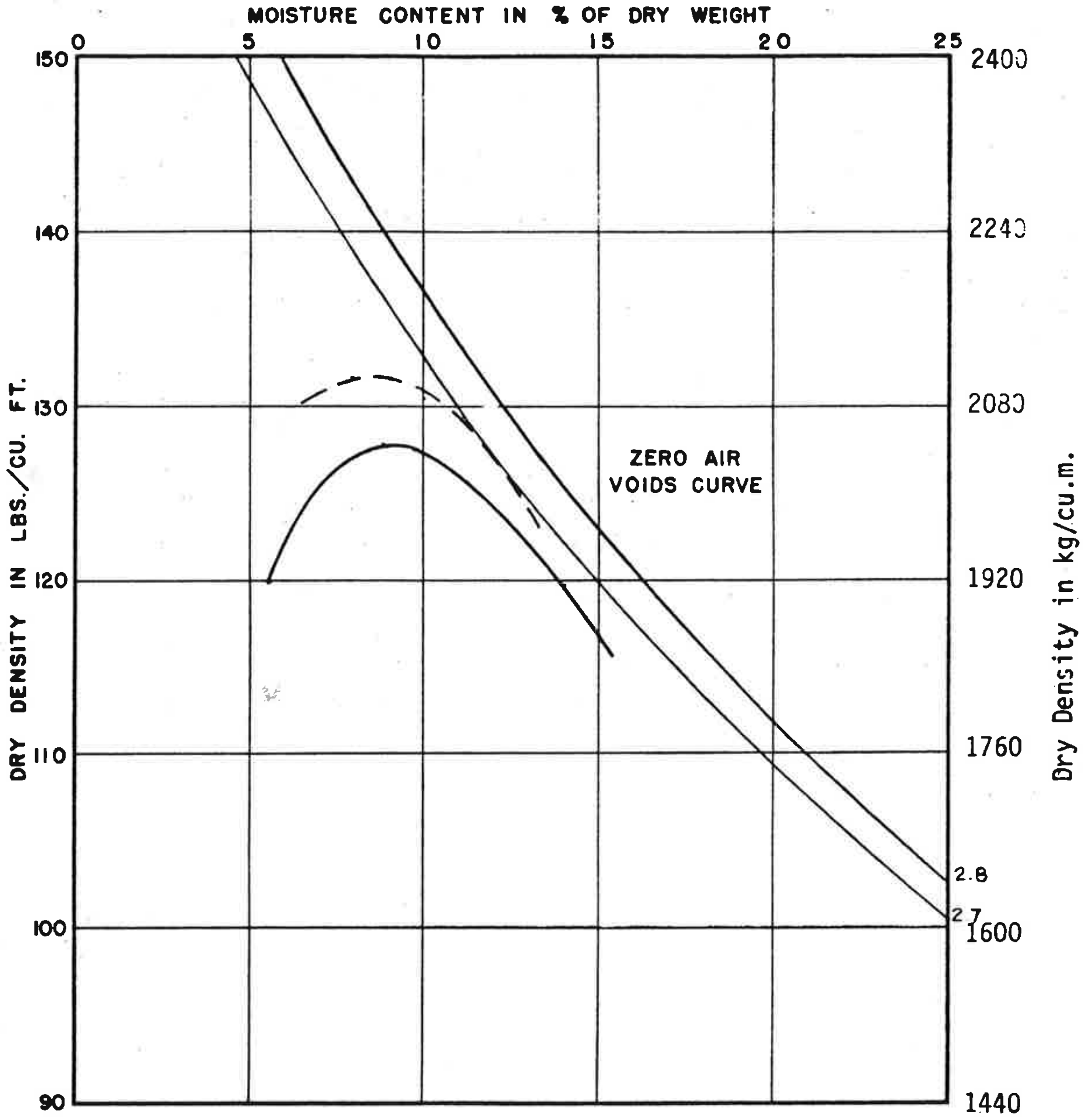
BLACKDOME EXPLORATION LTD.

STABILITY ANALYSES

TO ACCOMPANY REPORT BY

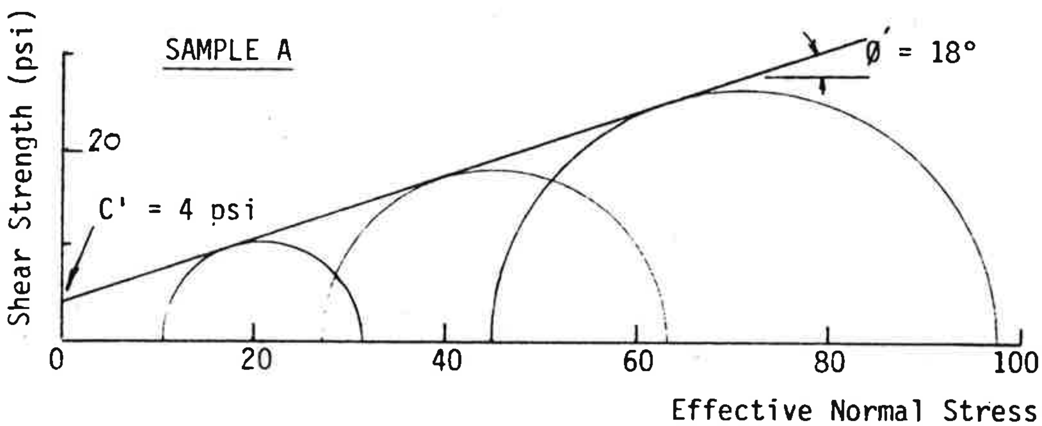
REIMCHEN URLICH GEOLOGICAL ENGINEERING	SCALE 1:400	DATE JUNE 1985
	FILE 53·06	FIGURE 13
	DRAWN JAS	CHKD CU/KR/LL

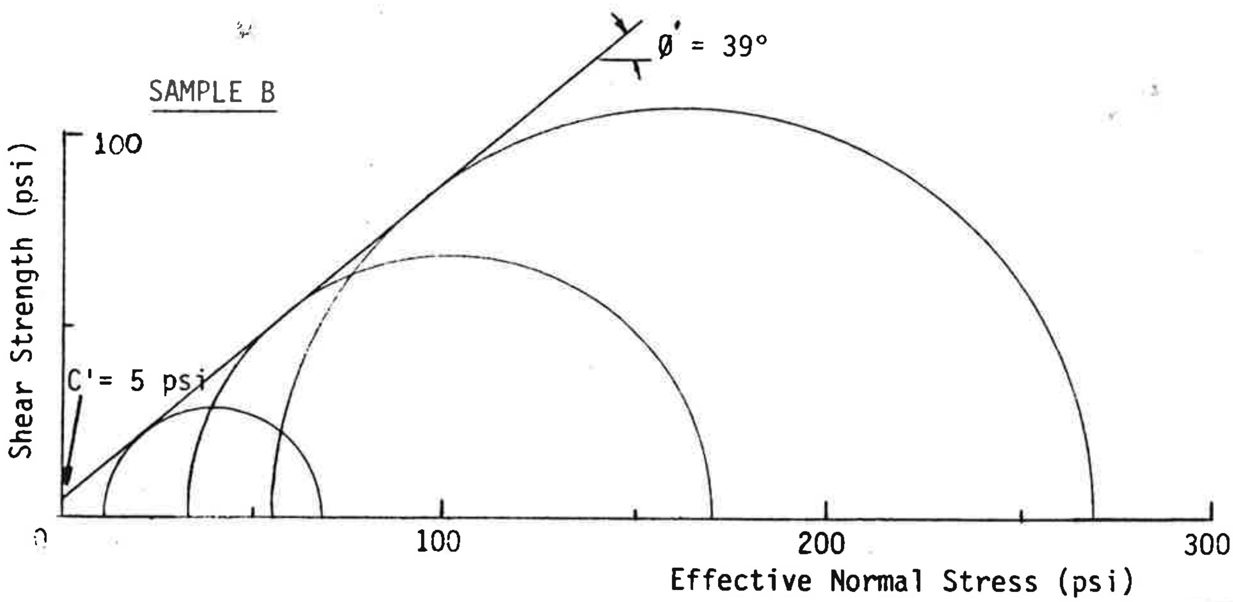
	A	B
SOIL	A	B
LOCATION	———	- - - -
OPTIMUM MOISTURE CONTENT (%)	8.8	8.0
MAXIMUM DRY DENSITY (kg/m³)	2045	2105
METHOD OF COMPACTION	ASTM D-1557	



BLACKDOME EXPLORATION LTD.		
COMPACTION TEST RESULTS		
TO ACCOMPANY REPORT BY		
REIMCHEN URLICH GEOLOGICAL ENGINEERING	SCALE	DATE June 85
	FILE 53-06	FIGURE A-5
	DRAWN LL	CHKD KER/LL

Sample	Test No.	Sample Data: Dry Density (pcf)	Sample Data: Moisture Cont. (%)	Effective Confining Pressure (psi)	Maximum Deviator Stress (psi)	Stresses at Failure: Minor Principal Stress (psi)	Stresses at Failure: Major Principal Stress (psi)	L/D Ratio
A	1	109.5	16.1	10.64	20.51	10.38	38.89	2.26
	2	-	-	31.96	36.41	26.98	63.39	-
	3	-	-	56.41	52.78	44.77	97.55	-
B	1	124.0	7.1	10.86	54.88	11.72	66.6	2.19
	2	122.0	7.8	31.63	138.38	32.98	171.4	-
	3	-	-	59.59	213.7	55.15	268.9	-





BLACKDOME EXPLORATION LTD.		
TRIAXIAL STRENGTH TEST		
TO ACCOMPANY REPORT BY		
REIMCHEN URLICH GEOLOGICAL ENGINEERING	SCALE	DATE June 85
	FILE 53-06	FIGURE A-6
	DRAWN LL	CHKD KER/LL