AKHM

June 15, 2011

Director, Mineral Resources
Department of Energy, Mines and Resources
P.O. Box 2703
Whitehorse, YT
Y1A 2C6

Attention: Robert Holmes, Director, Mineral Resources

Dear Mr. Holmes:

Re: 2010 Annual Quartz Mining Licence Report - RESUBMISSION, Quartz Mining Licence QML-0009
Bellekeno Mine, Yukon

Enclosed please find one unbound copy and one PDF of our report entitled "*Alexco Keno Hill Resource Corp, Bellekeno Mine, 2010 Annual Quartz Mining Report - Resubmission, Quartz Mining Licence QML-0009*". Additional copies in CD format will be delivered to your office early in the week of June 22nd, 2011.

If you have any questions or require further details, please contact the undersigned at (604) 633-4888.

Sincerely,
ALEXCO KENO HILL MINING CORP.

Vanessa Benwood
Site Environmental Coordinator

Head Office
T. 604 633 4888

Alexco Resource Corp.
200 Granville Street
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Vancouver, BC V6C 1S4
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AKHM

ALEXCO KENO HILL MINING CORPORATION

2010 ANNUAL REPORT - Resubmission

Submitted to YG Energy, Mines, and Resources

Quartz Mining Licence QML-0009

Distribution:

YG Energy, Mines, and Resources	1 original unbound
	1 copy bound
	1 copy (CD format)
Alexco Corporate	1 original bound

Date:

June 2011

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1. INTRODUCTION

Alexco Keno Hill Mining Corp. (AKHM) was issued Quartz Mining Licence (QML) QML-0009 on November 17th, 2009. Pursuant to the paragraphs of the QML, AKHM submitted a number of operational plans for approval by the Chief. These plans were submitted and approved in advance of the start of production activities. On August 20th, 2010, Water Licence QZ09-092 was issued to Alexco Keno Hill Mining Corp for operation of the Bellekeno mine and mill. Subsequently, on September 7th, 2010, the Bellekeno Mine became a “mine under development” as defined in subsection 1(1) and subsection 1(2) of the federal Metal Mining Effluent Regulations (MMER).

This report serves to fulfill the reporting requirements of the QML as defined under paragraphs 14.1 to 14.5 of QML-0009 and Section 13.0 of the Monitoring and Surveillance Plan.

Location

The Bellekeno Mine, owned and operated by AKHM, is located in the vicinity of Keno City (63° 55’N, 135° 29’W) in central Yukon, 354 km (by air) due north of Whitehorse. Access to the property is via a paved, two-lane highway from Whitehorse to Mayo (407 km) and an all-weather gravel road northeast from Mayo to Elsa (45 km); a total distance of 452 km. The property lies along the broad McQuesten River valley, with three prominent hills to the south of the valley. Figure 1.1 shows the general project location within Yukon while Figure 1.2 shows the location on a smaller scale. The Bellekeno area is located approximately 3 km east of Keno City, while the Keno District Mill site is 1.2 km to the west (Figure 1.3).

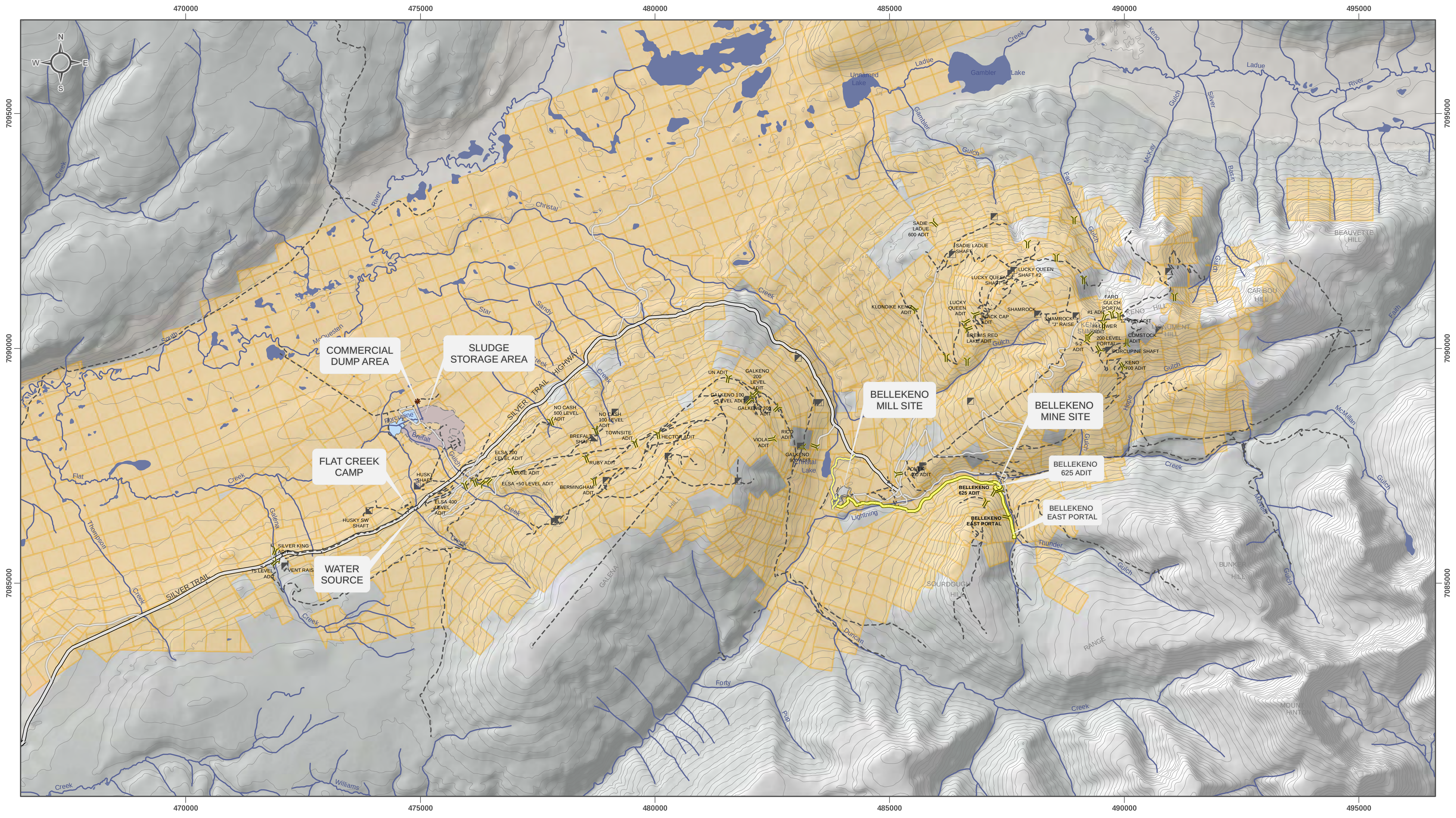
ALEXCO RESOURSE CORP.

2010 ANNUAL QUARTZ MINING LICENCE REPORT, QML-0009

FIGURE 1-1
PROJECT LOCATION

DRAWN BY MD	VERIFIED BY VB

I:\ALEX-05-01\Bellekeno\GIS\mxd\Overview_Maps\Project_Location\Project_Location.mxd
(*09/06/2011/14:45 PM*)



National Topographic Data Base (NTDB) compiled by Natural Resources Canada at a scale of 1:50,000. Cadastral data compiled by Natural Resources Canada. Reproduced underlicense from Her Majesty the Queen in Right of Canada, Department of Natural Resources Canada. All rights reserved. Quartz claim boundaries and ownership current as of February 24th, 2011. Data source: http://geomaticsyukon.ca.

Datum: NAD 83; Map Projection: UTM Zone 8N

1:75,000 (when printed on 11 x17 inch paper)

0 0.5 1 2 3 Kilometers

Adit	Haul Road	Highway	100 meter contour
Shaft	Mill Access	Local	Watercourse
Alexco Quartz Claims		Trail	Waterbody

ALEXCO

ACCESS CONSULTING GROUP

2010 ANNUAL QUARTZ MINING LICENCE REPORT, QML-0009

FIGURE 1-2

KENO HILL PROPERTY LOCATION MAP

DRAWN BY MD	JUNE 2011	VERIFIED BY SD

I:\ALEX-05-01\Bellekeno\GIS\mxd\Annual_Reports\2010\Fig_1-2_KenoHill_Property.mxd
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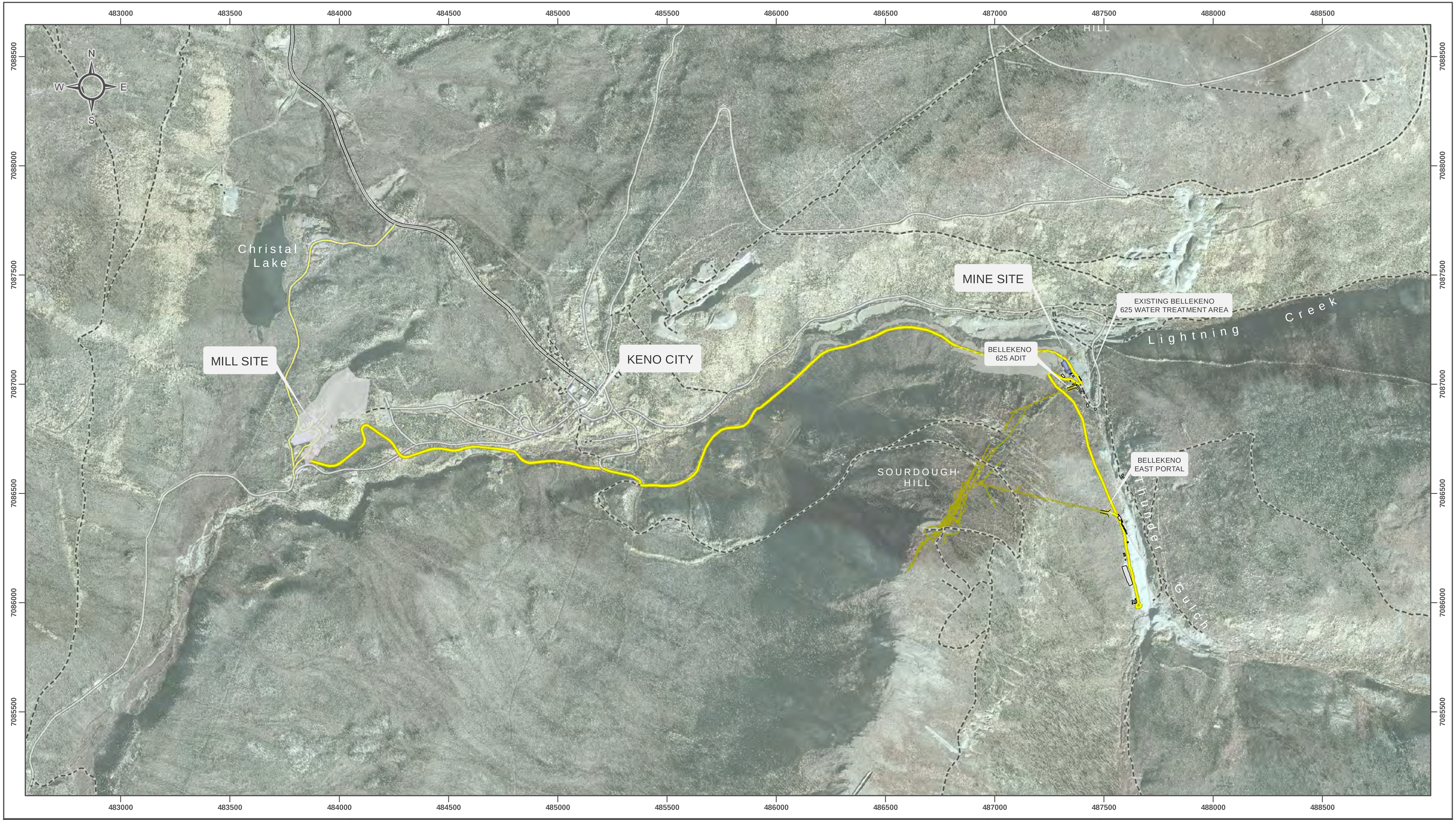


Aerial photograph obtained from Geodesy Remote Sensing Inc., Calgary Alberta. Imagery acquired September 13 and 14 2006. Site hydrography and contours provided by Aero Geometrics LTD, derived from aerial photograph.

Datum: NAD 83; Map Projection: UTM Zone 8N

1:16,000 (when printed on 11 x17 inch paper)

Meters
0 125 250 500 750 1,000

Silver Trail Highway
Haul Road
Mill Access
Local
Track
Underground workings

ALEXCO

ACCESS

2010 ANNUAL QUARTZ MINING LICENCE REPORT, QML-0009

FIGURE 1-3
BELLEKENO LOCATION MAP

DRAWN BY MD	JUNE 2011	VERIFIED BY VB

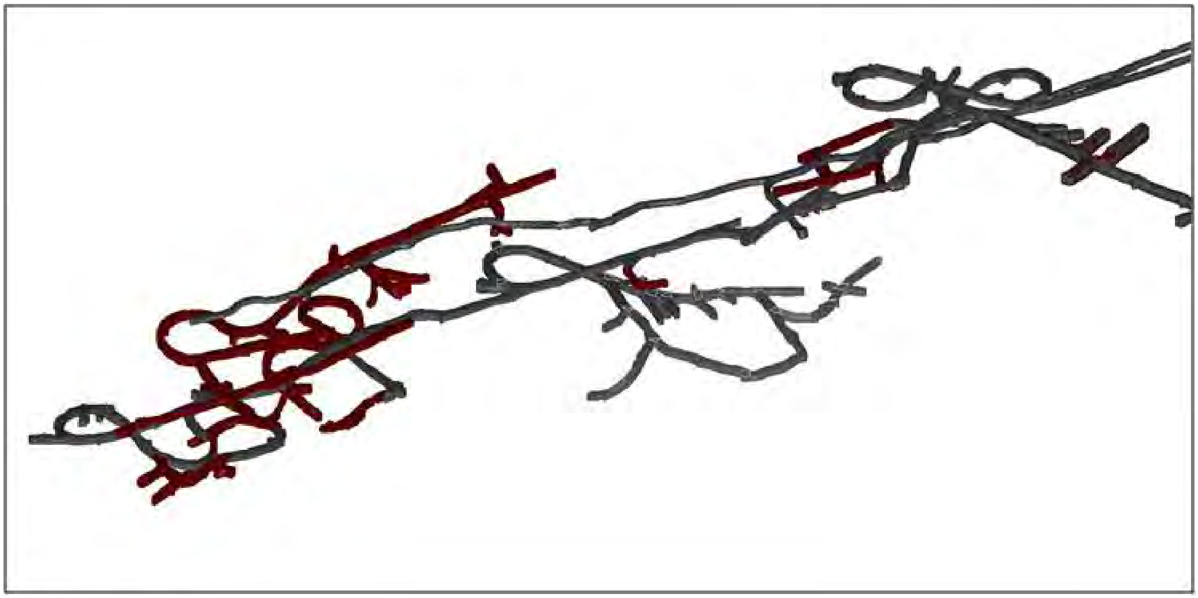
I:\ALEX-05-01\Bellekeno\GIS\mxd\Annual_Reports\2010\Fig_1-3_Bellekeno_Overview_v2.mxd
(*Last edited by: mducharme;10/06/2011/10:13 AM*)

2. MINING ACTIVITIES

Underground development at Bellekeno re-commenced in January 2010. Initial development consisted of excavating central remucks in the Bellekeno East Decline and the widening and heightening of the existing ramps down to the Southwest Zone. By March 2010 the majority of this work was completed and a new incline and decline were driven from a central location in the Southwest portion of the mine. Various ore accesses off these ramps were also driven. At the bottom of the mine the existing 850 Decline was extended and an exploration drilling platform was excavated. During this time, minor ore access development in the 99 Zone was ongoing. Pre-production mining of mineralized vein material commenced in September 2010 and continued through till December 2010 in various stopes located throughout the mine. There were no temporary or permanent closures, or stability issues that occurred in 2010.

Figure 2.1 shows an isometric view looking down to the North East direction, with all new development for 2010 shown in red.

Figure 2.1 Bellekeno 2010 Development



Production activities were carried out in accordance with the Operation Plans submitted as per paragraph 13.1 of QML-0009, and as described in the Project Description of Water Licence Application QZ09-092.

2.1 Life of Mine and Reserves

The Bellekeno Project Updated Preliminary Economic Assessment (PEA) Technical Report (NI 43-101) was prepared for Alexco Resource Corp. (Alexco) by Wardrop Engineering Inc. (Wardrop), and SRK Consulting (Canada) Inc. (SRK) to provide a detailed overview of the economic potential of extracting and processing mineralized material from the Bellekeno polymetallic deposits.

This report, released in November 2009, has not been updated. Until this report is updated for official release, known ore reserves, resources, and life of mine are as stated in the 2009 NI 43-101.

The resource estimate was prepared by SRK and signed off internally by Mr. Stan Dodd (P.Geo. V.P. Exploration, Alexco). Mr. Dodd is a Qualified Person as defined in National Instrument 43-101. The mineral resources for the Bellekeno project were estimated in conformity with generally accepted CIM “Estimation of Mineral Resource and Mineral Reserves Best Practices” guidelines and are reported in accordance with Canadian Securities Administrators’ National Instrument 43-101.

Using an NSR cut-off of $185/t, mineral resources for the Bellekeno Southwest, 99, and East zones are listed in Table 2.1. The majority of the resources are classified as Indicated Mineral Resources following the CIM Definition Standards for Mineral Resources and Mineral Reserves (December 2005) guidelines. The lower East Zone resources remain as Inferred Mineral Resources.

Table 2.1 Consolidated Mineral Resource Statement* – November 9, 2009

Category	Zone	Tonnes	Ag (g/t)	Pb (%)	Zn (%)	Au (g/t)
Indicated	Southwest†	215,800	997	12.6	7.2	0.662
Indicated	99†	91,700	995	7.5	4.2	0.293
Indicated	East‡	93,500	672	3.9	6.9	0.330
Total Indicated		401,000	921	9.4	6.5	0.500
Inferred	East‡	111,100	320	3.1	17.9	0.340
Total Inferred		111,100	320	3.1	17.9	0.340

***** Mineral resources are not mineral reserves and do not have demonstrated economic viability. All figures have been rounded to reflect the relative accuracy of the estimates.

† Reported at an NSR cut-off of $185/t using metal prices of US$15.25/oz Ag, US$0.675/lb Pb, and US$0.80/lb Zn. Ag and Zn grades not capped. Lead grades capped at 450,000 ppm. Metallurgical recoveries applied (see Section 16.0).

‡ Reported at an NSR cut-off of $185/t using metal prices of US$14.50/oz Ag, US$0.60/lb Pb, and US$0.90/lb Zn. Ag and Zn grades not capped. Lead grades capped at 450,000 ppm. Metallurgical recoveries applied (see Section 16.0).

Based on the current updated mineral resource estimate (Alexco October 2009) the LOM production schedule is shown in Appendix A.

2.2 Mining Methodology

The Bellekeno project is comprised of one primary vein, the 48 vein, a subsidiary structure, the 49 vein, and at least 9 other ancillary structures present in the Southwest, 99, and East zones. Most of the historical mining (totaling approximately 40,000 t) at Bellekeno occurred on the 48 vein in the 99 zone intermittently between the 1950's and mid 1980's. The veins have variable dip, strike, and thickness. Dips range from 60° to 80° to the east or west. The average strike direction is approximately 030 azimuth. Vein thickness varies from a few centimeters to several meters in an apparent "shoot-like" configuration.

Based on the geotechnical and physical characteristics of the veins, a mining method review was conducted and cut-and-fill mining methods have been selected as the most appropriate for Bellekeno. Cut-and-fill and shrinkage stopping methods typically offer a high degree of selectivity that generally translates into high mineralization extraction and low waste dilution. Significant geotechnical study and design has been completed by SRK and a ground control management plan has been developed to address potential unstable ground conditions encountered in the vein material. Backfill of mined out stopes will be accomplished by using cemented rock and tailings as fill. Filtered tailings from the mill process will be backhauled underground and used as backfill.

2.3 Proposed Development

Proposed 2011 development at the Bellekeno mine is focused in the SW Zone of the mine. The 650 Ramp and the 700 Ramp, driven off of the SW Central Incline to gain ore access, have been completed to date, as well as other minor development consisting of remucks and short ore accesses/re-accesses. The 850 Decline (re-named the Southwest Main Ramp) is being extended further and deeper into the Southwest Zone to gain access to the lower most portion of the mine, and will be extended out further to provide a new exploration diamond drilling platform. Installation and commissioning of the underground paste backfill plant is also expected to be completed in 2011.

Commercial production at the Bellekeno mine commenced January 1, 2011 and is planned to continue through all of 2011, operating initially at 250 tonnes per day of ore and increasing to 400 tonnes per day. Production mining has occurred within the Southwest Zone and the 99 Zone using conventional overhand cut and fill mining with plans of transitioning into a mix of both overhand cut and fill as well as long-hole stope mining later in 2011.

3. CONSTRUCTION ACTIVITIES

Construction activities carried out at the Bellekeno mine involved both surface and underground regions. As-built drawings for these construction areas can be seen in Appendix B.

In accordance with our efforts to minimize the impact of construction activities on the residents of Keno City, the majority of construction materials were delivered using the Christal Lake road to bypass Keno City.

3.1 Road Construction

Approximately 1.5 km of new haul road was constructed from the Sourdough Trail (BKR 5) to the Keno Hill District Mill crusher. A bridge was installed over Lightening Creek (Type B Water Licence MS10-029) for the haul road 350 meters downstream from BKR 5..

The Christal Lake road was upgraded and a new 250 m spur was built to allow direct access to the Keno Hill District Mill from the Silver Trail Highway, bypassing Keno City. This road was used for essentially all construction deliveries and will remain the primary access for operations.

A 1.8 km long, 69kV electrical transmission line was constructed by Yukon Energy Corporation from the Silver Trail Highway ROW to the Keno Hill District Mill site. Alexco then constructed a 2.5 MVA substation to power the mill operation as well as an associated motor control centers (MCC) for the mill building and crushing plant.

3.2 Mill Site Construction

Construction of a conventional flotation mill at the Flame and Moth site for processing ore and producing concentrate began in February 2010.

Mill site construction included:

- Two stage crushing & screening plant
- Fine ore stacker conveyor and stockpile cover
- Fine ore reclaim tunnel
- A 180m by 60m pre-engineered steel building to house processing equipment, including:
    - Primary ball mill
    - Lead flotation circuit
    - Zinc flotation circuit
    - Reagent preparation area

    - Thickeners and pressure filters for lead concentrates, zinc concentrates, high pyrite tailing and low pyrite tailings
    - Concentrate loading dock with truck scale
- Office trailers and wash room facilities
- Process water pond
- Dry-stack tailing facility

As-built drawings of this construction can be seen in Appendix B-1.

3.3 Mine Site Construction

Development of the Bellekeno deposit is the first of potentially many in the Keno Hill District. Because the Bellekeno mine involves the reopening of an existing underground mine, use of existing infrastructure such as water treatment facilities,and the reuse of the previously impacted historic Flame and Moth site and the Christal Lake haul road, 'new' environmental footprint is limited in scope. See Appendix B-2 for as-built drawings of this construction and an overview of the Bellekeno mine site which includes access/haul roads, underground workings, proposed non-AML waste rock disposal area, and ancillary facilities.

Construction activities in 2010 included the following areas of development:

- Underground development
- Surface Facilities at Bellekeno East
    - New office for Alexco Mine staff
    - New mine dry/office
    - New 4-toilet wash car
    - Concrete slab for maintenance shop
- New intake air fan and portal heater at 625
- New compressor at 625
- Up-grades to haul road from BKR 18 to BKR 6 (2.5km)

3.4 Elsa Camp Facilities

Alexco owns three trailer camps at Flat Creek, located approximately one kilometer southwest of Elsa (see Figure 1-3). The 36 person trailer camp was approved under

MLU Approval LQ00186, and an additional 41 person trailer camp unit was added under MLU Approval LQ00240. Water use and waste water disposal is regulated according to Licence QZ07-078 and an approved YG Environmental Health septic system is on site. The trailer camp facilities have individual rooms, washroom facilities, laundry rooms and a TV-recreation room.

A kitchen/dining facility is also located at the Flat Creek camp. An extension was constructed on the existing dining hall to accommodate up to 75 persons per meal, sitting. A recreation facility was installed to accommodate a small fitness/health center which features weights and fitness equipment.

3.5 Annual Inspection

In accordance with Section 14.1 to 14.3 of (QML) QML-0009, an “annual inspection of the physical stability of all engineered structures, works and installations located at the site is conducted by an engineer by August 1st of each year”.

Construction activities were not completed by August 1st, 2010, therefore an inspection was completed on November 20th, 2010. The surface structures noted in the QML (e.g. waste rock disposal facilities, DSTF, etc.) had not yet been constructed, therefore the first Annual Physical Inspection report was limited to underground structures. A full construction inspection will be conducted prior to August 1st, 2011 and included in the 2011 Annual Report.

The mine and associated infrastructure was inspected by Senior Mining Engineer (P.Eng.) Robert Baldwin and Yukon (P.Eng.) stamped by Mine Manager, Scott Smith.

The mine and infrastructure was found to be in good condition and required no immediate remedial action. Table 3.1 illustrates the inspected workings and qualitative ratings per area. See Appendix C for a copy of the inspection report which includes an as-built PDF plan map of the Bellekeno underground for location reference.

3.6 Upcoming Maintenance

Routine maintenance of the mine and mill areas will continue into 2011. Projects include continued development of the mine ore pad, continued grading of various areas within site to improve drainage, and upgrading of the Bellekeno Haul Road (see Appendix J).

Table 3.1: Inspected Areas and Qualitative Ratings

ALEXCO

License: QML009
Physical Inspection Report: Alexco Bellekeno Mine
Main Haulage and Underground Infrastructure Inspection

Heading Name	Date	Engineer	Ground Conditions	Ground Support	Status	Action? (and/or Comments)
625 Portal to Tail Drift	20-Nov-10	RB	Good	Good	OK	None
49 Vein Splay drift	20-Nov-10	RB	Good	None	OK	Rope Off
48 Vein Splay drift	20-Nov-10	RB	Good	Good	OK	None
600 Tail Drift	20-Nov-10	RB	Good	Good	OK	None
600 North	20-Nov-10	RB	Good	Good	OK	None
Old Shop	20-Nov-10	RB	Good	Good	OK	None
600 Incline	20-Nov-10	RB	Good	Good	OK	None
Main Ramp (old shop to 99-800 Ramp)	20-Nov-10	RB	Good	Good	OK	None
99-800 Ramp to 800 Sump	20-Nov-10	RB	Fair	Good	OK	None
750 Flats	20-Nov-10	RB	Good	Good	OK	None
SW Main Ramp	20-Nov-10	RB	Fair	Good	OK	None
SW Main Vent Raise	20-Nov-10	RB	Good	Good	OK	None
Central Incline	20-Nov-10	RB	Good	Good	OK	None
SW 630 Vent Raise	20-Nov-10	RB	Fair	Good	OK	None
Central Decline	20-Nov-10	RB	Good	Good	OK	None
800 Vent Raise & Escapeway	20-Nov-10	RB	Good	None	OK	None
600 South	20-Nov-10	RB	Fair	Fair	OK	Old Timber support
600 Bypass	20-Nov-10	RB	Good	Good	OK	None
600 Bypass (timber area)	20-Nov-10	RB	Poor	Good	OK	None
BK East Decline	20-Nov-10	RB	Good	Good	OK	None
BK 625 Sump	20-Nov-10	RB	Good	Good	OK	None
BKE Dirty Water Sump	20-Nov-10	TH	Good	Good	OK	None
BKE Clean Water Sump	20-Nov-10	TH	Good	Good	OK	None
BK 800 Dirty Sump	20-Nov-10	TH	Good	Fair	OK	Dated ground support
BK 800 Clean Sump	20-Nov-10	TH	Good	Fair	OK	Dated ground support
BK 625 Treatment Ponds	20-Nov-10	TH	Good	Good	OK	None

Stamped:
Scott Smith, Mine Manager, Alexco Resource Corp
P.Eng Mining Engineer, BC and Yukon
P.Eng Certification Number:
Expire Date:

4. MILLING OPERATIONS

The mill is estimated to run at approximately 250 tonnes per day for years one and two, increasing to 400 tonnes per day for years three to five. A potential increase in tonnage beyond 250 tonnes per day may be considered in 2011 and may require a QML amendment. Commissioning of the mill occurred throughout most of November and December 2010, therefore these production volumes were varied.

The mill process employs conventional crushing, grinding, flotation, and dewatering processes. The primary valuable sulphides in the mill feed are recovered by conventional differential flotation with a cyanide-free zinc suppressing regime. Silver and lead minerals are recovered together to produce a silver-lead bulk concentrate and zinc minerals with some silver value are recovered to a separate zinc concentrate.

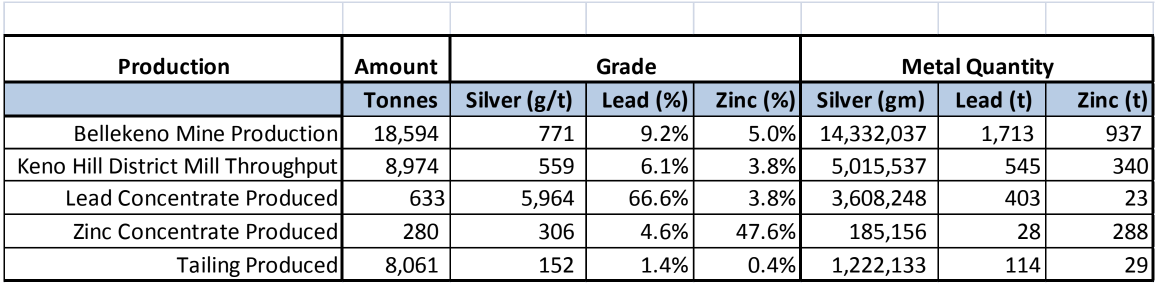
Storage and disposal of mill tailings is in a dry-stack tailings facility (DSTF) located adjacent to the mill. See DSTF Design in Appendix D for details. See Appendix B for as-built drawings of the mill area, including the DSTF.

4.1 Production

Mill throughput for 2010 was 8,974 tonnes at an average head grade of 559ppm silver (Ag), 6.1% lead (Pb), and 3.8% zinc (Zn). The total lead concentrate produced was 633 dry metric tonnes (dmt) while the total zinc concentrate was 280 dmt.

For a listing of production values see Table 4.1.

Table 4.1 Keno Hill Operations 2010 Productions Statistics



Production	Amount	Grade			Metal Quantity		
	Tonnes	Silver (g/t)	Lead (%)	Zinc (%)	Silver (gm)	Lead (t)	Zinc (t)
Bellekeno Mine Production	18,594	771	9.2%	5.0%	14,332,037	1,713	937
Keno Hill District Mill Throughput	8,974	559	6.1%	3.8%	5,015,537	545	340
Lead Concentrate Produced	633	5,964	66.6%	3.8%	3,608,248	403	23
Zinc Concentrate Produced	280	306	4.6%	47.6%	185,156	28	288
Tailing Produced	8,061	152	1.4%	0.4%	1,222,133	114	29

5. WASTE MANAGEMENT

5.1 Tailings Management

A detailed design of the DSTF for the Keno Hill District mill was completed by EBA Engineering Consultants and issued for review in March, 2011. The report details additional information regarding all aspects of the DSTF, and is attached in Appendix D.

5.1.1 Tailings Handling

The Tailings Management Plan was designed for approximately 50% of final flotation tailings to be stored on surface by dry stacking and for 50% to be stored underground, most likely as cemented or paste backfill. This design allows final flotation tailings to be used as backfill to provide support for the excavated underground voids and to reduce surface environmental impact.

The Keno Hill District mill was designed to produce both a high and a low pyrite tailings product. If an appreciable amount of pyrite is contained in the mill ore it would be substantially removed and reported to the zinc scavenger tailings stream, which has been referred to as the high pyrite tailings product.

No appreciable amount of pyrite has been encountered since the mill was commissioned and consequently the mill is producing a single tailings product.

5.1.2 Dry Stack Tailings Disposal Procedure

Tailings are placed in 300 mm lifts and compacted with a 10-tonne vibratory compactor. Tailings will be compacted to at least 95% of the maximum dry density using standards effort (as per American Society for Testing and Materials [ASTM] D698). The organic soils will be left in place beneath the DSTF to provide some insulation and slow the rate of permafrost thaw.

Construction of the DSTF will occur within a five year period, as the tailings are generated by the mill. A total of 8,061 tonnes of tailings were placed in the DSTF in 2010 at 11% water retention volume (~887 tonnes). There were no tailings placed underground in 2010.

Details can also be seen in Table 5.1. See Appendix D for EBA design details.

Table 5.1 2010 DSTF Volume Summary

Production	Amount
	Tonnes
Tailing Produced	8,061
5% H20 Ret. (t)	887

5.2 Waste Rock Management

The Waste Rock Management Plan (WRMP) outlines practices for management of waste rock to be excavated during the Bellekeno mine development. The plan ensures that appropriate management procedures are followed during excavation activities in order to minimize the impacts of stored rock on land and water resources. Monitoring following excavation activities is intended to assess the effectiveness of the management measures, ensure that adaptive management approaches are implemented, and to ensure that appropriate information is obtained by Alexco to assist in closure planning.

Detailed discussion of the 2010 WRMP results can be seen in Appendix E.

5.2.1 Tonnages

Development in the Bellekeno mine generated an estimated 55,070 tonnes of excavated material which has been sampled, classified, and verified by lab analysis in 2010. Table 5.2 shows a breakdown of the 55,070 tonnes of material which lab analysis results have been received for. The total Non-AML waste generated in 2010, which has been verified by lab analysis, was an estimated 49,992 tonnes while the total P-AML waste generated in all of 2010, which has been verified by lab analysis, was an estimated 5,078 tonnes.

Table 5.2 Keno Hill 2010 Mine Waste Rock Statistics

Category	Tonnes	Storage Location	Tonnes
Non-AML Waste Rock (excavated)	49992	Surface	48824
		BK PAG PAD	584
		U/G Storage	584
		U/G Backfill	0
P-AML Waste Rock (excavated)	5078	Surface	2032
		BK PAG PAD	1063
		U/G Storage	1983
		U/G Backfill	0
Total			**55070**

5.2.2 Storage Location

Potentially acid-generating and/or metal leaching ground material not suitable for general construction purposes was stored on the lined storage area near the Bellekeno mine portal area (see Appendix B) or stored underground in the Bellekeno mine below the previous static water level (defined as the Bellekeno 625 portal elevation). In 2010 a total of 3,095 tonnes of this material was stored on surface while 1,983 tonnes was stored underground.

Non-acid-generating and non-metal leaching ground material may be used for general construction purposes and is stored on the BKR haul road at 625, by BKR road marker 5, and from BKR 5 to the mill. All of this material is classified as road material or general construction material. A total of 49,408 tonnes were stored on surface while 584 tonnes were stored underground.

The majority of non-AML waste rock from 2010 will be used for construction material in 2011. For a summary of this information see Table 5.1

Construction of the Non-AML WRDA was not commenced during 2010. Prior to commencement of construction of the Non-AML WRDA, Alexco will conduct additional geotechnical investigations to define conditions at the toe of the slope. The results of these investigations will be incorporated into detailed design for this facility and submitted as part of the annual report.

5.2.3 Waste Rock Monitoring and QA/QC

The samples collected in 2010 were prepped on site at the Bellekeno prep lab facility located at the Bellekeno 625 Adit. Sample pulps were then composited and sent to AGAT Laboratories for ABA and ICP-OES analysis (Jan.-Aug. data) and ALS Chemex for ABA and ICP-MS analysis (Sep.-Dec.). A total of 115 samples plus 7 duplicates (representing 6% of the total samples) were submitted for analysis. A comparison of sample analytical results to anticipated results based on visual criteria was done for each assay certificate. Samples showing significant differences were re-analyzed and reject material was re-examined. Therefore, 30 samples were re-analyzed, (25% of all samples) resulting in satisfactory comparisons for all samples.

The outlined sampling schedule, which was proposed in 2009, has been followed and proven useful in continuing to build a comprehensive geochemical dataset to better assess waste rock for characterization. The compositing frequency was adequate enough to confirm the general rock characteristics of Non-AML rock while verifying the accuracy of the field screening classification. The additional ABA data collected from all

P-AML composites has added to the understanding of the correlation between lithology and geochemical characteristics.

Results of this analysis can be seen in Appendix E.

5.2.4 Mine Wall Monitoring

Monitoring in both the excavated areas and the rock storage areas form an integral and vital component of any waste rock management program as it determines the effectiveness of the management measures and provides valuable information for waste rock management strategies of future developments and closure measures. Mine wall testing at the Bellekeno mine during development will provide additional confirmation of the geochemical character of the mine walls through multi-element and acid-base accounting analysis.

Mine wall testing was undertaken for underground development, completed during 2010 in accordance to the Mine Wall Testing Plan, and submitted in 2008 under the Water Use Licence QZ07-078. The sampling was done in a systematic way by a team of Alexco geologists.

During the sampling process, it was noted that there was no visible oxidation of the mine wall rocks. A moderate amount of oxidation of the steel ground support had occurred in areas, but was localized to only a few areas of the mine. Significant amounts of dust and muck had been noted on mine walls in areas, which may contain Pb and Zn due to ore production blasting and storing in recently excavated headings.

A detailed discussion of results can be seen in Appendix F.

5.2.5 Humidity Cell and Geochemical Tests

No humidity cell testing was scheduled for 2010 in the WRMP, which was included in the Construction Site Plan submitted in November 2009.

Results of water quality monitoring for the Bellekeno East Temporary Waste Rock Storage Facility (KV-78) were included in the 2010 WUL QZ0-092 Annual Report submitted in March 2011. This report can be seen in Appendix G

In depth site wide Geo-Environmental Rock Characterization was completed in 2008 by Altura Environmental Consulting, the results of which can be seen in WRMP GeoEnviro Investigation completed by Access Consulting Group. This report is attached in Appendix H.

6. MONITORING

6.1 Monitoring and Surveillance Plan

Site environmental monitoring and surveillance was carried out at the site in accordance with the Monitoring and Surveillance Plan. Water quality and groundwater monitoring have been carried out in accordance with the Type A water licence QZ09-092. Results of this monitoring were included within the Type A water licence Annual Report. This report was submitted in March 2011 and is appended to this document in Appendix G. Permafrost monitoring through geotechnical programs installed at the site of the future Non-AML Waste Rock Disposal Area and the Dry Stack Storage Facility is monitored routinely by Alexco personnel and/or the engineers of record (EBA Engineering Consultants Ltd) in accordance with the DSTF OMS Manual, which forms part of the DSTF Construction and Operation Plan.

A revised Monitoring and Surveillance Plan is currently being developed and will be submitted for review and approval later in 2011. This updated plan will include monitoring and surveillance to reflect changes resulting from the water Licence (QZ09-092, received August 19, 2010) and also to reflect updates to other terrestrial monitoring (e.g. dust monitoring) which have been developed to keep pace with development.

6.1.1 Physical Inspections

Physical Inspections were carried out in accordance with a recently developed Physical Inspections and Reporting Plan under QZ09-092. Results of these inspections are included in the Type A WUL QZ09-092 Annual Report, which is appended to this document in Appendix G.

6.1.2 Meteorological Monitoring

Weather monitoring data has been collected continuously over 2010 and remains ongoing at the Galena Hill weather station. In addition, a second weather station was installed in early June 2011 at the Keno Hill District mill site. In accordance with QZ09-092, a snow course was also implemented around the mill site during the 2010/2011 winter season.

6.1.3 Permafrost Monitoring

Ground temperature and permafrost monitoring is currently in place at the Waste Rock Storage Area and the DSTF. Monitoring commenced in early 2011 and will be reported in the 2011 QML-0009 Annual Report.

6.1.4 Noise Impacts and Sound Monitoring

The objective of noise impact monitoring is to reduce and mitigate impacts of noise produced during the development and operations of the Bellekeno mine and Keno Hill District mill on local residents and the environment.. To achieve this goal, AKHM identified potential noise sources and receivers in the Noise Abatement Plan, and will continue to do so during development and production as a part of monitoring.

To date, no significant noise impacts (defined as exceedences of daytime or nighttime noise levels as recommended in the Decision Document) have been observed in Keno City as a result of operations.

6.1.5 Dust Abatement and Monitoring

Dust monitors were installed in early 2011 to the west and east of the Bellekeno mill site. Monitoring will be carried out in accordance with Section 8.0 of the Monitoring and Surveillance Plan and submitted as a part of the 2011 QML-0009 Annual Report.

6.1.6 Wildlife Monitoring Plan

Ongoing wildlife monitoring in accordance with the Wildlife Protection Plan is completed through the wildlife observation log. The most common sightings involved moose, which frequented Christal Lake and remained in the area throughout the construction phase.

No significant encounters or incidents occurred during 2010.

6.1.7 Environmental Effects Monitoring

AHKM is currently preparing the first study design for the Environmental Effects Monitoring (EEM) program required under the MMER. Access Consulting Group and Minnow Environmental have been retained to prepare and implement the first study design on behalf of AHKM. The first study design submission is due by September 7, 2011 which is 12 months after the date which the mine became subject to Section 7 of the MMER. Sub-lethal toxicity testing of effluent from the BK625 treatment pond decant was conducted during 2010 and no significant adverse effects were noted during these tests.

6.2 Adaptive Management Plan

Pursuant to Clause 90 and Clause 91 of QZ09-092, Alexco developed a Bellekeno Adaptive Management Plan (AMP), which was submitted to Yukon Water Board in April, 2011. Until this Bellekeno AMP came into effect, the Keno District AMP, developed under Type B Water licences QZ06-074 and QZ07-078, guided adaptive management activities at site. No adaptive management triggers or activities were undertaken during 2010.

Reporting for the Bellekeno AMP, including a summary of any adaptive management triggers and actions, will be prepared for the 2011 QZ09-092 Annual Report..

7. UNAUTHORIZED DISCHARGE

7.1 Reportable Spills

There was one reportable spill of ferric chloride on December 6th, 2010. In accordance with AKHM Water Use Licence QZ09-092 the spill was immediately reported with the investigation completed and submitted by December 16th, 2010. For details of the spill please see attached spill report in Appendix I.

7.2 Permit Exceedences

There were four permit exceedences during the course of 2010 in which advanced exploration transitioned to production activities. All exceedences occurred at the Bellekeno 625 treatment discharge location (KV-43) and included two Total Suspended

Solids (TSS) events, one lead level (associated with the high TSS), and one daphnia failure.

Details of these exceedences can be seen in Section 2.4 of 2010 Annual Report for Water Use Licence QZ09-092 attached in Appendix G.

8. CARE AND MAINTENANCE AND RECLAMATION

The care and maintenance activities at the Keno Hill District are the primary objective of Water Use Licence QZ07-078. Bellekeno Care and Maintenance and water management activities in 2010 pertained largely to the Bellekeno mine development. On August 20th, 2010, Type A Water Licence QZ09-092 was issued to AKHM for operation of the Bellekeno mine and mill complexes. A production unit was defined, and AKHM assumed the liability for that area. Shortly after the Type A licence for production was issued, Elsa Reclamation and Development Company (ERDC) and Alexco applied for amendments to Type B Water Licences QZ06-074 and QZ08-078, respectively. The aim of these amendments is to remove the production area and associated liabilities from the existing licences, fully transferring jurisdiction over the Bellekeno mine and mill areas to QZ09-092. As of the time of writing, no licence amendment has been issued by the Board.

8.1 Care and Maintenance Activities

Prevention of environmental degradation the at Keno Hill District is accomplished largely by the daily operation of lime-addition water treatment systems at Galkeno 900, Galkeno 300, Silver King 100, and Bellekeno 625 adits. The Valley Tailings Facility is also treated on an as-required basis during spring and early summer. Care and Maintenance activities and performance monitoring (i.e. water quality testing) is undertaken by ERDC, using on-site laboratory facilities for daily and weekly water quality analysis. Monitoring of surface and groundwater sites as well as physical conditions is completed as per WL monitoring schedules.

A detailed discussion of these results and other Care and Maintenance activities can be found in the 2010 Annual Water Licence report submitted to the Yukon Water Board as per Water Use Licence QZ06-074 in February 2011.

8.2 Reclamation Activities

Reclamation activities were limited in 2010 as the primary focus at the Bellekeno mine site was the development of the mine and mill for operation. As part of development and construction activities, the overburden was stockpiled and organic materials were stripped in preparation for reclamation activities in 2011.

8.2.1 Bioreactor Design and Operation Plan

AKHM will submit to the Board a plan of the design and operation of the future Bellekeno bioreactor on or before August 20th, 2011, as per Clauses 88 and 89 of QZ09-092. This plan will also be submitted to YG EMR at that time.

ALEXCO KENO HILL MINING CORP.

QUARTZ MINING LICENCE QML-0009

2010 ANNUAL REPORT - RESUBMISSION

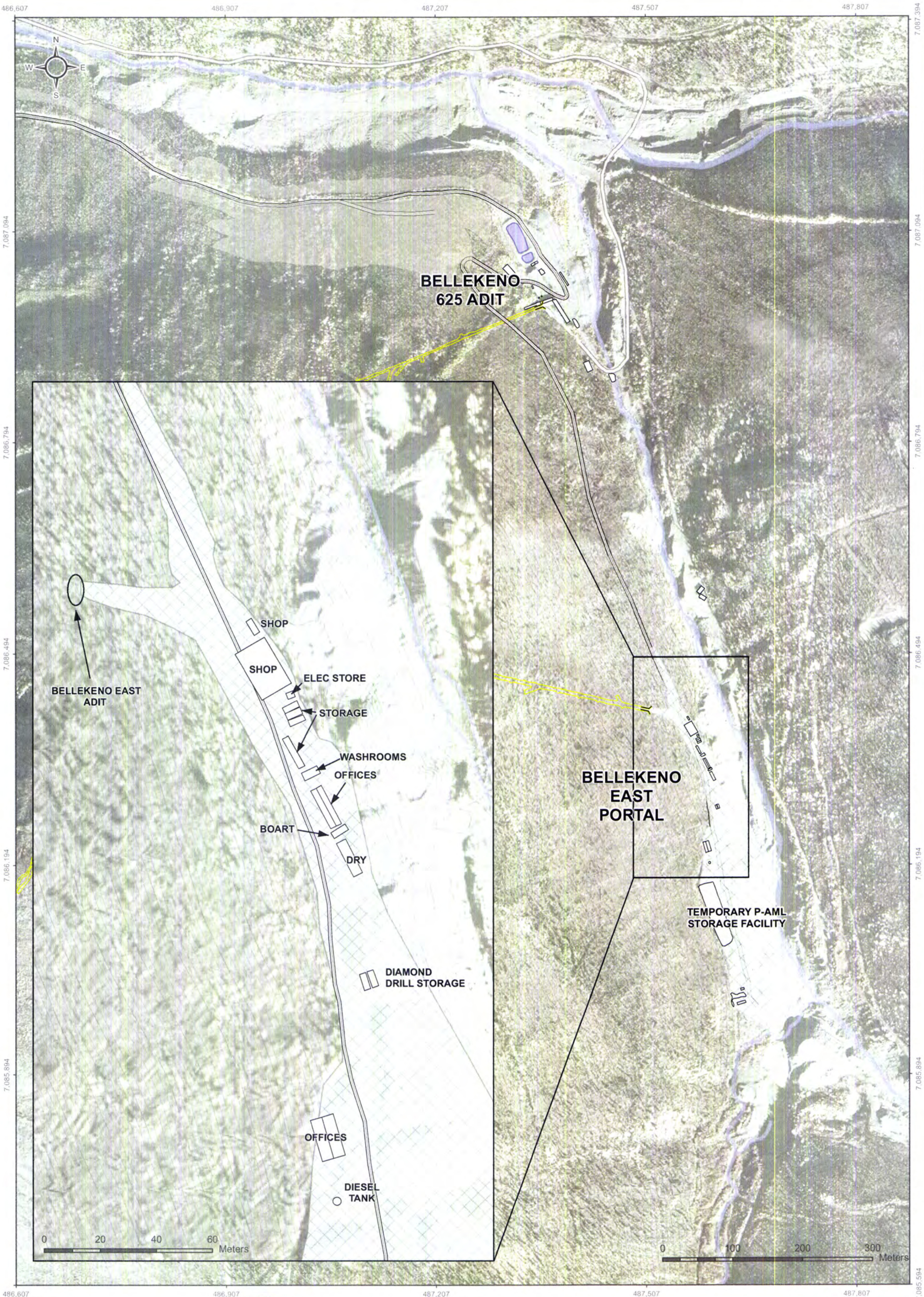
BELLEKENO MINE SITE

KENO HILL SILVER DISTRICT

YUKON

APPENDIX A

MINE SITE LAYOUT



Ⲩ Adit	☐ Building/Structure	▨ Portal Area
Underground Workings	🟪 Pond	▨ Conceptual design of waste rock disposal Area
═ Haul Road	═ Local Road	

Aerial photography flight date: July 13th 2006. Ortho-rectification produced by Challenger Geomatics Ltd.

Datum: NAD 83; Projection: UTM Zone 8N

Main map: 1:5,000
Inset map: 1:1,250
(when plotted on 11x17 inch sheet)

PROFESSIONAL ENGINEER
YUKON TERRITORY
SCOTT A. SMITH

ALEXCO

ACCESS
CONSULTING GROUP

2010 ANNUAL QUARTZ MINING LICENCE REPORT, QML-0009

APPENDIX A
MINE SITE LAYOUT

DRAWN BY MD	JUNE 2011	VERIFIED BY VB

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ALEXCO KENO HILL MINING CORP.

QUARTZ MINING LICENCE QML-0009

2010 ANNUAL REPORT - RESUBMISSION

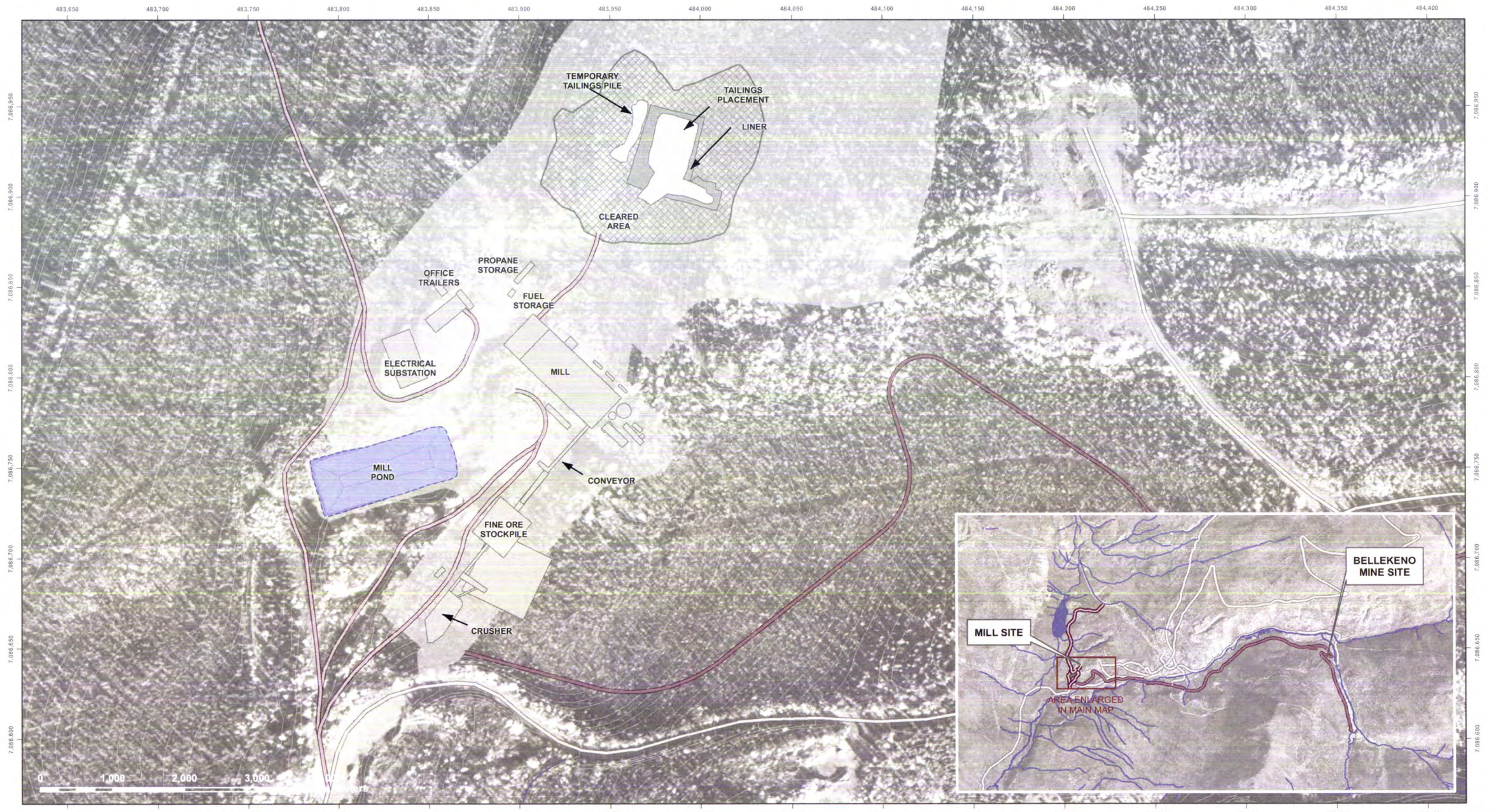
BELLEKENO MINE SITE

KENO HILL SILVER DISTRICT

YUKON

APPENDIX B

MILL SITE LAYOUT



Aerial photography flight date: July 13th 2006. Ortho-rectification produced by Challenger Geomatics Ltd. Mill pond spatial data obtained from Y.E.S. Mill structures, dry stack tailing facility featureas and haul road surveyed by Alexco personnel December 2010.

Datum: NAD 83; Projection: UTM Zone 8N

PROFESSIONAL ENGINEER
YUKON TERRITORY
SCOTT A. SMITH

Main Map: 1:2,000 Inset Map: 1:50,000
(when printed on 11 x17 inch paper)

▢ Building	▬ Mill Access Road
▢ Pond	▬ Haul Road
▨ Cleared Area	▬ Local Road

ALEXCO

ACCESS
CONSULTING GROUP

2010 ANNUAL QUARTZ MINING LICENCE REPORT, QML-0009

APPENDIX B
MILL SITE LAYOUT

Drawn By MD	JUNE 2011	Verified by SD

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ALEXCO KENO HILL MINING CORP.

QUARTZ MINING LICENCE QML-0009

2010 ANNUAL REPORT - RESUBMISSION

BELLEKENO MINE SITE

KENO HILL SILVER DISTRICT

YUKON

APPENDIX C

ANNUAL PHYSICAL INSPECTION REPORT

ALEXCO

November 21, 2010

Mr. Tim Smith
Manager, Mining Lands, Gov' . Of Yukon
Energy, Mines and Resources
P.O. Box 2703
Whitehorse, Yukon
Y1A 2CC

RE: QML 0009, Alexco Bellekeno Mine, Annual Underground Infrastructure Inspection

An annual inspection was completed November 20th, 2010 of the Bellekeno Underground Mine located approximately 3 km east of Keno City, Yukon.

As Stated in Alexco's QML 009 license and in compliance to sections 14.1 and 14.2, this report is being submitted as compliance to the Licensee conditions.

Summary:

The mine and associated infrastructure was inspected by Senior Mining Engineer (P.Eng) Robert Baldwin and Yukon P.Eng stamped by Mine Manager, Scott Smith.

The mine and infrastructure was found to be in good condition and requires no immediate remedial action. Attached is a table of the inspected workings (**Table 1**) and qualitative ratings per area. Also attached is a PDF plan map (**Figure 1**) of the Bellekeno underground asbuilt for location reference.

The surface structures noted in the QML (e.g. waste rock disposal facilities, DSTF, etc.) have not yet been constructed, therefore this first Annual Physical Inspection report is limited to underground structures.

Please call if you have questions or comments regarding the content this report.

Sincerely;

Tim Hall
General Manager, Alexco Resource Corp, Keno Hill Mines

Signed:__________________________ Scott Smith, P.Eng
Scott Smith, Yukon P.Eng and Mine Manager, Alexco Resource Corp.

Cc:
Alexco Corp Office
Access Mining and Consulting, subsidiary Alexco Resource Corp
C. Nauman, B. Thrall, R. McIntyre, J. Harrington, S. Davidson
Dennis Buyck, Mngr NND Lands Branch, landsmanager@nndfn.com
Kurt Dieckmann, Chief Mine Inspector YT WCB. Kurt.Dieckmann@gov.yk.ca

Head Office T. 604 633 4888

Alexco Resource Corp.
200 Granville Street
Suite 1150
Vancouver, BC V6C 1S4

Bellekeno Project
Elsa, Yukon
T. 867.995.3113

Table 1: Inspected Areas and Qualitative Ratings

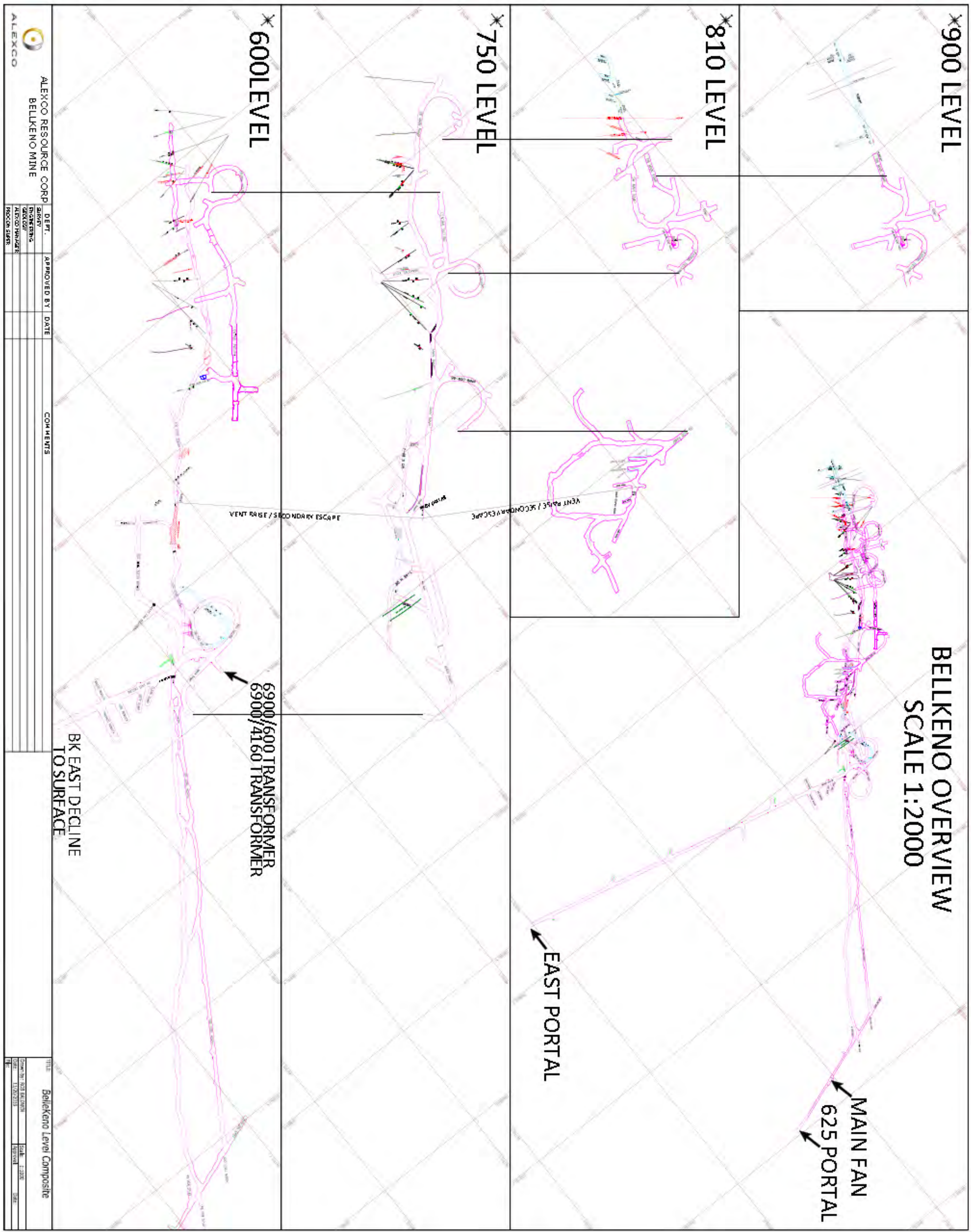
License: QML009
Physical Inspection Report: Alexco Bellekeno Mine
Main Haulage and Underground Infrastructure Inspection

Heading Name	Date	Engineer	Ground Conditions	Ground Support	Status	Action? (and/or Comments)
625 Portal to Tail Drift	20-Nov-10	RB	Good	Good	OK	None
49 Vein Splay drift	20-Nov-10	RB	Good	None	OK	Rope Off
48 Vein Splay drift	20-Nov-10	RB	Good	Good	OK	None
600 Tail Drift	20-Nov-10	RB	Good	Good	OK	None
600 North	20-Nov-10	RB	Good	Good	OK	None
Old Shop	20-Nov-10	RB	Good	Good	OK	None
600 Incline	20-Nov-10	RB	Good	Good	OK	None
Main Ramp (old shop to 99-800 Ramp)	20-Nov-10	RB	Good	Good	OK	None
99-800 Ramp to 800 Sump	20-Nov-10	RB	Fair	Good	OK	None
750 Flats	20-Nov-10	RB	Good	Good	OK	None
SW Main Ramp	20-Nov-10	RB	Fair	Good	OK	None
SW Main Vent Raise	20-Nov-10	RB	Good	Good	OK	None
Central Incline	20-Nov-10	RB	Good	Good	OK	None
SW630 Vent Raise	20-Nov-10	RB	Fair	Good	OK	None
Central Decline	20-Nov-10	RB	Good	Good	OK	None
800 Vent Raise & Escapeway	20-Nov-10	RB	Good	None	OK	None
600 South	20-Nov-10	RB	Fair	Fair	OK	Old Timber support
600 Bypass	20-Nov-10	RB	Good	Good	OK	None
600 Bypass (timber area)	20-Nov-10	RB	Poor	Good	OK	None
BK East Decline	20-Nov-10	RB	Good	Good	OK	None
BK 625 Sump	20-Nov-10	RB	Good	Good	OK	None
BKE Dirty Water Sump	20-Nov-10	TH	Good	Good	OK	None
BKE Clean Water Sump	20-Nov-10	TH	Good	Good	OK	None
BK 800 Dirty Sump	20-Nov-10	TH	Good	Fair	OK	Dated ground support
BK 800 Clean Sump	20-Nov-10	TH	Good	Fair	OK	Dated ground support
BK 625 Treatment Ponds	20-Nov-10	TH	Good	Good	OK	None

Stamped:
Scott Smith, Mine Manager, Alexco Resource Corp
P.Eng Mining Engineer, BC and Yukon
P.Eng Certification Number:
Expire Date:

**The rating system is calibrated on Excellent, Good, Fair and Poor. With Excellent as new and poor as needing scheduled remediation*

Figure 1; Plan View of the Bellekeno Mine Underground Asbuilt



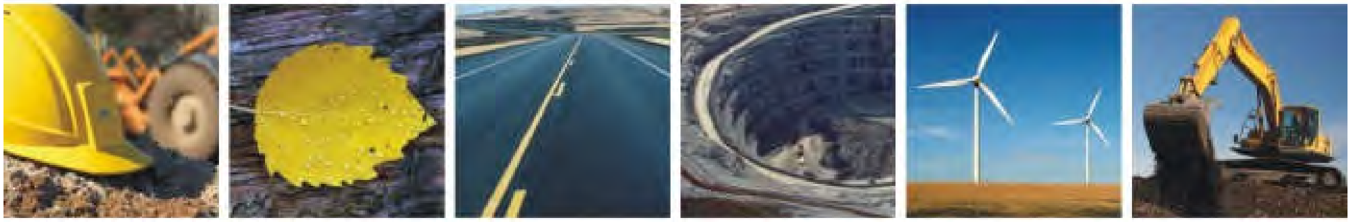
ALEXCO KENO HILL MINING CORP.
QUARTZ MINING LICENCE QML-0009
2010 ANNUAL REPORT - RESUBMISSION
BELLEKENO MINE SITE
KENO HILL SILVER DISTRICT
YUKON

APPENDIX D

DRY STACK TAILINGS FACILITY (DSTF)
DESIGN REPORT

ALEXCO RESOURCE CORP

DETAILED DESIGN DRY-STACKED TAILINGS FACILITY KENO HILL DISTRICT MILL SITE, YUKON



REPORT

MAY 2011
ISSUED FOR USE
EBA FILE: W14101178.011

creating & delivering | BETTER SOLUTIONS

A TETRA TECH COMPANY

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1.0 INTRODUCTION

Alexco Resource Corp. (Alexco) is operating a silver, lead, zinc concentrating mill in the Keno Hill Silver District, Yukon. Alexco retained EBA, a Tetra Tech Company (EBA), to provide a detailed design for the Dry-Stacked Tailings Facility (DSTF) at the Keno Hill District Mill Site.

2.0 BACKGROUND

Alexco began preparatory earthworks and foundation work for the Keno Hill District Mill in the summer of 2009. EBA conducted a preliminary geotechnical investigation, consisting of thirty-one testpits excavated to varying depths, and a detailed geotechnical investigation consisting of drilling eleven boreholes with a mini-sonic drill rig. The preliminary investigation is summarized in the letter “Geotechnical Evaluation – Proposed Mill (Option 3) and DSTF” dated August 7, 2009. The detailed investigation is summarized in the report “Preliminary Engineering Design and Management Plan, Dry-Stacked Tailings Facility” issued by EBA in January 2010. A detailed design subject to additional confirmatory drilling in the vicinity of the proposed DSTF was completed by EBA in the summer of 2010.

Confirmatory drilling in August 2010 led to the discovery of massive ice not previously encountered and the requirement for EBA to revisit the detailed design of the DSTF. The details of the confirmatory drilling findings were summarized in a letter submitted on September 24, 2010 entitled “DSTF Detailed Drilling Findings and Revised DSTF Location”. To prevent disruption to production timelines, EBA issued “Quarter 1 Tailings Placement Provisions” on September 7, 2010 which detailed the construction of a tailings containment facility to accommodate three months worth of tailings production during the finalizing of the detailed design for the DSTF.

This report summarizes the findings of the confirmatory drill investigation conducted in August 2010 and presents the detailed design for the DSTF.

3.0 DRY-STACKED TAILINGS FACILITY DESIGN ASSUMPTIONS

The design of the DSTF at the Keno Hill District Mill Site is based on the following information, provided by Alexco:

- Tailings discharge rate of 7.75 dmt/h (dry-metric tonnes per hour) for Years 1 and 2 and 13.95 dmt/h for Years 3 and 4.
- Tailings specific gravity of 3.95.
- 60% of tailings stored on surface.
- The remaining 40% of tailings will be placed as backfill underground.
- An evapo-transpirative cover consisting of 0.5 m of vegetated soil will be used for closure of the DSTF.

The following assumptions were used by EBA in the design of the facility:

- 10% of the porewater in the DSTF will drain out of the pile in the long term.

- The design seismic event was selected to be 1:500 year return period, as recommended in "Mined Rock and Overburden Piles Investigation and Design Manual" (Piteau 1991).

The anticipated rate of tailings generation is 187 dmt (dry metric tonnes)/day for the first two years and 335 dmt/day for the next year and nine months. This information was provided to EBA by Alexco. The anticipated in place tailings volumes are summarized in Table 1.

Table 1 – Anticipated Yearly Tailings Volumes

Months of Operation	Tailings Produced (dmt)	Tailings Produced (m^3)	Tailings Stored Underground (m^3)	Tailings Stored on Surface (m^3)	Cumulative Tailings Stored on Surface (m^3)
0 – 12	67,890	39,940	15,970	23,970	23,970
12 – 24	67,890	39,940	15,970	23,970	47,940
24 – 36	122,200	71,890	28,750	43,140	91,080
36 – 45	91,070	53,570	21,430	32,140	123,220

4.0 GEOTECHNICAL INVESTIGATIONS

The preliminary geotechnical investigation was summarized in a letter "Geotechnical Evaluation – Proposed Mill (Option 3) and DSTF" dated August 7, 2009.

The detailed geotechnical investigation was summarized in a report "Preliminary Engineering Design and Management Plan, Dry-Stacked Tailings Facility" dated January 2010.

The confirmatory drilling geotechnical investigation was conducted between August 18 and September 11, 2010. EBA's representative on site was Mr. Justin Pigage, EIT. Ten boreholes were drilled using a track mounted air-rotary drill rig provided by Geotech Drilling of Prince George, BC. Approximate UTM (NAD83 datum) coordinates, noted on the attached borehole logs, were determined using a hand-held GPS unit. Elevations shown on the logs were determined using the approximate coordinates and 1 m contour information generated from topographic survey information provided by Alexco.

4.1 Surface Conditions

The site in the vicinity of the DSTF slopes generally west at approximately 15% to 20%. There is disturbance in the area from previous surface earthwork and historic mining. A trail runs roughly north with a ditch that follows it to convey runoff around the former Flame and Moth Mine. Vegetation in the area consists of mosses and small spruce trees. A ridge crosses the site in a north-south direction. The ridge slopes approximately 5% to 10% towards the south.

4.2 Subsurface Conditions

The subsurface conditions encountered during the confirmatory drill investigation consist of four distinct zones. A brief summary of each zone is included below and the assumed extent of each zone is shown in Figure 2. The detailed borehole logs are included in Appendix B.

- **Shallow Bedrock** – Unfrozen sand and gravel (till) underlain by bedrock within the top 4.5 m was encountered in BH26 and BH27.

- **Ice Rich Silt** – Varying depths of ice rich silt till were encountered in BH32 through BH35.
- **Massive Ice** – Varying thicknesses of massive ice were encountered in BH28, BH30, BH31 and BH35.
- **Gravel –** Unfrozen gravel underlain by bedrock was encountered in BH29.

4.3 Groundwater

No groundwater was encountered during the confirmatory drill investigation.

4.4 Permafrost

Permafrost was encountered throughout the proposed DSTF. The permafrost encountered ranged from non-visible, non-excess ice to massive ice. Ice volumes estimated as a percentage of the total soil volume vary between less than 5% and nearly 100%. The type and amount of ice inclusions within the permafrost generally follows the soil stratigraphy.

The permafrost in the ice rich silt area contains a combination of horizontally stratified ice lenses, randomly oriented ice inclusions, and non-visible excess ice. The top 3.5 m of the permafrost here is considered to be ice-rich, containing 10% to 35% randomly orientated ice crystals and non-visible excess ice by volume. Below this, the permafrost is considered to be ice-poor (moisture contents in the soil are below the 100% saturation moisture content).

The permafrost in the overall massive ice area contains a combination of horizontally stratified ice lenses, massive ice, and non-visible excess ice. The ice lenses are typically about 5 mm thick. The thickness of massive ice varies in this region between roughly 10 and 15 m. Massive ice was identified within the footprint of the proposed DTSF footprint in one borehole (BH35); 4 m of massive ice was encountered in BH35 at a depth below 11.5 m within this region.

Ground temperature instrumentation was installed in two locations: BH31, and BH32. Data collected from these instruments shows that the permafrost on site is very warm, between -0.2°C and -0.4°C. Ground temperature information for all instrumentation in the vicinity of the DSTF is shown in Appendix C.

4.5 Bedrock

Bedrock was encountered in all holes advanced during the confirmatory drill investigation. The bedrock was classified as a competent quartzite. The drilling method (air rotary) provides fragments of rock sufficient for classification only -- no additional information can be provided on the bedrock.

4.6 Earthquake Parameters

The DSTF has been designed based on PGA from 2005 NBC for Keno Hill area: 0.138 g for 1/476 years.

5.0 LABORATORY TESTING

EBA conducted laboratory tests on recovered samples from the drill program and tailings samples provided by Alexco. The following tests were conducted and are explained in more detailed below:

- Moisture Content

- Particle Size Distribution
- Moisture-Density
- Direct Shear

5.1 Moisture Content

Moisture content determination was conducted on all samples returned to EBA's Whitehorse laboratory. Results of the tests are reported on the borehole logs. The moisture content reported is defined as mass of water divided by mass of dry solids.

5.2 Particle Size Distribution

Particle size distribution determination was conducted by sieve hydrometer method on tailings samples returned to EBA's Whitehorse laboratory. Results for the tailings samples tested are in Appendix D.

5.3 Moisture-Density Relationship

Moisture-density testing was conducted on the tailings samples provided by Alexco to establish density values for use in slope stability modelling. The results are provided in Appendix D.

5.4 Direct Shear

Direct shear testing was conducted on the tailings samples provided by Alexco. The resulting strength values were used in slope stability modelling. The strengths are summarized in Table 2 and included in Appendix D.

Table 2 – Tailings Strength Parameters

Description	Peak Strength		Residual Strength	
	Cohesion (kPa)	Friction (Φ)	Cohesion (kPa)	Friction (Φ)
Tailings	33.5	32.6	10.5	31.6

6.0 DRY-STACKED TAILINGS FACILITY DESIGN

Much of the design was summarized in the report "Preliminary Engineering Design and Management Plan, Dry-Stacked Tailings Facility" issued by EBA in January 2010. The following sections contain additional design work completed since January 2010, as part of the detailed design of the DSTF.

The design configuration of the dry stack facility has been modified since the preliminary design was developed. The revised configurations are shown in Figures 1, 2, 3, and 4. The modifications were put forth to avoid most of the identified massive ice areas, and to create a relatively flat pile profile over the ice rich areas.

6.1 Geothermal Analysis

A geothermal analysis was carried out to investigate the long-term impact of dry-stacked tailings placement on the thermal regime of the underlying original ground in the DSTF area under climatic conditions including a climate change scenario (global warming). The analysis is presented in Appendix E. The following summarizes the analysis and results.

Analyses were carried out using EBA's proprietary two-dimensional finite element computer model, GEOTHERM. The model simulates transient, two-dimensional heat conduction with change of phase for a variety of boundary conditions. The heat exchange at the ground surface is modelled with an energy balance equation considering air temperatures, wind velocity, snow depth, and solar radiation.

Climate data for the analysis was synthesized from long term climate data from the Mayo station and the Galena Hill weather station near the site. Estimates of climate change magnitudes were obtained from a recent report prepared for CSA and The Adaptation and Impacts Research Section (AIRS) of Environment Canada (CSA 2010). The estimated mean annual temperature 100 years from present is 3.1°C.

The geothermal model was calibrated to the measured ground temperatures at the site. Good agreement was obtained between the measured and modelled temperatures.

The soil profile from BH35 was used in the DSTF thermal analysis. The model simulated dry stack tailings placed over the drainage blanket over the original ground. The initial ground temperature was assumed to be -0.35°C.

The analysis predicted that the frozen overburden and ice thawed in approximately 50 years. The rate of thaw varied slightly for different sensitivity parameters as presented in Table 8 in Appendix E.

6.2 Thaw Consolidation

Construction of the DSTF will involve placing and compacting relatively warm tailings on relatively cold ground. This will change the thermal equilibrium that exists on the site and eventually thaw the existing permafrost in the area.

EBA conducted thaw-consolidation testing on samples of undisturbed ice-rich permafrost recovered from BH23. An average C_v value of 0.0014 cm^2/s was determined using standard consolidation theory. The C_v value is low and accounts for volume changes due to melting ice within the soil profile. An assumption in thaw-consolidation theory is that drainage is not impeded from the top of the consolidating layer. EBA has assumed that a 0.5 m thick gravel drainage blanket sufficiently fulfills this. The potential for differential settlement under the DSTF exists. This may create localized pockets of elevated porewater pressure. EBA's opinion is that this will not affect overall stability of the pile. Furthermore, the entire site slopes to free draining gravel at the toe of the pile.

Using a C_v of 0.0014 cm^2/s and a rate of thaw of 1.2 m, in four months, the anticipated excess porewater pressure generated is R_u=0.35. This value was used in slope stability calculations, where appropriate.

6.3 Slope Inclinometer Data

Slope inclinometers (SI) were installed in August 2010 in two boreholes adjacent to the proposed DTSF, BH28 and BH30. Both boreholes are located in an area with ice rich soil on a slope.

The measured SI data is presented in Appendix F. Data is available for BH30 up to February 2011. Limited data is available for BH28 as the SI has been covered with snow and debris over the winter.

BH30 SI has no significant differential movement from the bedrock at the base of the SI to the overburden at the top of SI. This indicates that the slope is not currently creeping.

The data indicates some perpendicular and parallel movement in the pipe. The movement reverses direction within the ice rich zone. The pipe movement is not believed to be slope movement, as the top of the slope is not moving. It is speculated that the grout used to install the SI liberated heat of hydration during curing and melted ice around the SI pipe creating a void. The SI pipe is likely moving within this void.

6.4 Liquefaction Assessment

A liquefaction assessment was carried out to determine if the DSTF is susceptible to liquefaction under earthquake loading. The dry stack tailings themselves are not considered to be highly liquefiable since they are expected to be drained and unsaturated. The assessment was carried out on the foundation soils. The assessment was carried out using the NCEER SPT-based method (Youd et al. 2001).

Foundation soils beneath the proposed DSTF area are silty sand, gravel and sand, silt (ice-rich) or silt (till). The liquefaction assessment is a function the soil density as measured by the Standard Penetration Test (SPT) N-value of the soils. The SPTs conducted at the mine site in the area in or close to the proposed DSTF area in the unfrozen overburden soils are summarized in Table 3. SPTs in the frozen (permafrost) soil zones are not included in the table. SPTs ranged from 12 to 36 with an average of 21. The lowest SPT measured was 12; this was carried through the liquefaction assessment.

The ice-rich silt or silt till soils in the existing permafrost would thaw gradually during the mine operation and after closure based on the thermal analysis results. It is expected that the silt or silt till soils will consolidate with time after thawed. A summary of the assessment is presented in Table 4.

Table 3 Standard Penetration and Soil Property Summary

Borehole No.	Depth from the Ground Surface (m)	Soil Description in Borehole Logs	SPT N Value
BH17	3.3	Silt (till), gravelly, some sand, trace clay, firm, non-plastic, damp	19
BH24	3.2	Silt (till), gravelly, some/sandy, trace clay, very stiff, low to non-plastic, damp to moist, gravel particles, subangular	36
BH25	3.2	Sand and gravel, glaciofluvial, trace silt, compact, medium grained, well graded, damp, rounded to sub-rounded	21
BH26	1.7	Sand, silty, some gravel, damp, loose	12
BH27	1.8	Silt, sandy, trace gravel, moist, firm, non-plastic	18

Table 4 Liquefaction Assessment

Soil Profile and Properties Assumed	SPT N Value Assumed	Moment Magnitude of Earthquake, M_W	Peak Horizontal Acceleration at the Ground Surface, a_{max}, (g)	Calculated Factor of Safety against Cyclic Liquefaction
9 m dry-stacked tailings, 0.5 m gravel drainage layer; water table at 0.5 m below the original ground;	12	7.0	0.138	1.45
	12	7.5	0.138	1.22
	12	8.1	0.138	1.00
0.5 m gravel drainage layer; ground water table at 0.5 m below the original ground surface;	12	7.0	0.138	1.54
	12	7.5	0.138	1.29
	12	8.3	0.138	1.00

Under the design Peak Horizontal Acceleration of 0.138 g, the calculated factor of safety against cyclic liquefaction is ranges from 1.2 to 1.5 for high earthquake magnitudes (7.0 and 7.5). The FS is greater than or equal to 1.0 when the magnitude of earthquake is below 8.0 for the silty sand foundation soils. This is considered an extreme event with a low risk of occurring nearby to the mine. The consequence of liquefaction is expected to be limited movement and cracking of the dry stack facility as opposed to a catastrophic collapse. Given the extreme event and consequence of failure it judged that there is low risk of a significant failure event due to liquefaction.

6.5 Stability of the DSTF

The stability of the DSTF was determined using Geostudio 2007 – Slope/W module, which is a computer program that uses limit equilibrium theory to compute the factor of safety (FS) of slopes. The DSTF slopes were analyzed in several different conditions, including during construction (Years 1 through 4) and after closure activities in both static and pseudo-static scenarios.

Minimum FSs are suggested by the BC Mine Waste Rock Pile Research Committee (Piteau 1991). The suggested FS are provided for two cases: Case A and Case B. Case A is typically used when less rigorous analyses are conducted or when material properties and actual failure mechanisms are not well understood. Case B is typically used when more rigorous analyses are conducted or when material properties and failure mechanisms are well understood. EBA has chosen to compare the calculated FS against Case A except when the long-term strength of ice-rich frozen silt is considered in the analysis. The method used to determine the long-term strength of ice-rich silt is considered to be very conservative, and thus these scenarios should be compared against Case B.

The stability of the DSTF was analyzed along two sections in three scenarios:

- Permafrost
- Permafrost thawed to 1.0 m depth
- Permafrost fully thawed

Analyses were run for static and pseudo static conditions. The parameters used for and the results of each analysis are summarized in the subsequent sections.

6.5.1 Soil Strength Parameters

Six material types were used in the slope stability model:

- Bedrock
- Frozen ice-rich silt
- Thawed silt
- Tailings
- Gravel
- Loose Gravel

The material parameters are summarized in Table 5.

Table 5 – Slope Stability Model - Material Properties

Material Description	Unit Weight (kN/m^3)	Frictional Strength		Non-Frictional Strength
		Cohesion (kPa)	Friction (Φ)	c_u (kPa)
Bedrock	Bedrock is considered impenetrable in this model			
Frozen ice-rich silt	11.8	0	30°	50
Thawed silt	19.1	0	30°	N/A
Tailings	22.5	0	32°	N/A
Gravel	24.0	0	35°	N/A
Loose gravel	21.1	0	30°	N/A

All soils are expected to behave as frictional materials for any short-term loading conditions; these are modelled in the drained state. Short-term loading is considered to be during construction of the pile or during any pseudo-static analysis.

All soils, except for the frozen ice-rich silt, are also expected to behave as frictional materials during long-term loading conditions.

The properties of each soil type are discussed in more detail below.

6.5.1.1 Bedrock

The bedrock in the area is a competent quartzite. The strength of the bedrock is much greater than that of the overburden and therefore the bedrock will not control the stability. For modelling purposes, the Bedrock was assumed to be impenetrable.

6.5.1.2 Frozen Ice-Rich Silt

A conservative approach to determining the strength of a frozen soil is to assume that the internal angle of friction (Φ) of the soil is equal to 0, thus relying solely on the cohesive properties of the frozen soil. A relationship between shear strength and temperature is (Johnston 1981):

$$C_u = 35 + 28T$$

Where: T is in degrees °C below freezing (with a positive sign) and

C_u is lower limit of undrained shear strength.

Assuming that the temperature of the frozen ice-rich silt is -0.4°C, the long term shear strength would be 46 kPa. This value is considered to be the lower limit. Based on experience and engineering judgement a value of 50 kPa has been assumed in the stability analysis. The bulk density of the ice-rich silt was estimated assuming a moisture content of 90%. In short-term loading, it is expected that the ice-rich silt will behave as a frictional material with properties similar to those determined for the thawed state.

6.5.1.3 Thawed Silt

The thawed silt will behave as a frictional material in both short-term and long-term loading conditions. The strength was determined using direct shear test results.

6.5.1.4 Tailings

Tailings will behave as a frictional material in both short-term and long-term loading conditions. The strength of the tailings was determined using direct shear test results. The bulk density was determined by first determining the maximum dry density of the tailings (2080 kg/m^3) and then adding the mass of water (assuming moisture content of 15%).

6.5.1.5 Gravels

Gravel will behave as a frictional material in both short-term and long-term loading conditions. The friction angle of the gravel was conservatively assumed as 35° based on EBA's experience with gravels in the Keno City area. This was reduced to 30° for gravel placed in a loose state. The bulk density was based on a maximum dry density of 2,385 kg/m^3. It is assumed that the gravel would be placed at 95% density and 8% moisture for the drain area and 87% density and 4% moisture for the cover material.

6.5.2 Analysis Results

6.5.2.1 Permafrost Condition

This scenario is intended to model the condition where the tailings have been placed and the underlying soils have remained frozen. The factor of safety against long-term slope instability was determined using the long-term strength of ice-rich silt. This is considered a conservative lower bound strength assumption. A summary of the factors of safety for several conditions within this scenario are provided in Table 6. Slope stability analyses results are presented in Appendix G.

Table 6 – DSTF Slope Stability Factor of Safety – Fully Frozen Case

Stability Conditions	Factor of Safety - Suggested Minimum (Piteau 1991)		Calculated FS for DSTF	
	Case A	Case B	Alignment A	Alignment B
Stability of Surface				
Short-term (during construction – static)	**1.0**	*1.0*	1.8	2.0
Long-term (after closure – static)	*1.2*	**1.1**	1.9	2.0
Deep Seated Stability				
Short-term (during construction – static)	**1.3-1.5**	*1.1-1.3*	2.0	1.8
Short-term (during construction – pseudo-static)	**1.1-1.3**	*1.0*	1.3	1.2
Long-term (after closure – static)	*1.5*	**1.3**	1.4	1.3
Long-term (after closure – pseudo-static)	**1.1-1.3**	*1.0*	1.3	1.2

Bold values are recommended minimum for each condition.

Italic values are provided for information only.

6.5.2.2 Permafrost Thawed to 1.0 m Depth

This scenario is intended to model the condition where the tailings are placed and the underlying soils have thawed 1.0 m in four months. This rate of thaw is relatively quick. It was determined assuming that the tailings would remain at +20°C for four consecutive months. The porewater pressures developed due to this rate of thaw is R_u=0.35. This is considered an upper bound for thawing of the ice-rich silt. Any thaw beyond this initial 1.0 m will occur at a much slower rate. The slower rate of thaw will allow porewater to dissipate prior to developing excess porewater pressures. A summary of the factors of safety for several conditions within this scenario are provided in Table 7. Slope stability plots are found in Appendix H.

Table 7 – DSTF Slope Stability Factor of Safety – 1.0 m Thawed Case

Stability Conditions	Factor of Safety - Suggested Minimum (Piteau 1991)		Calculated FS for DSTF	
	Case A	Case B	Alignment A	Alignment B
Stability of Surface				
Short-term (during construction – static)	**1.0**	*1.0*	1.6	2.0
Long-term (after closure – static)	*1.2*	**1.1**	1.6	1.7
Deep Seated Stability				
Short-term (during construction – static)	**1.3-1.5**	*1.1-1.3*	1.9	1.6

Table 7 – DSTF Slope Stability Factor of Safety – 1.0 m Thawed Case Cont'd

Stability Conditions	Factor of Safety - Suggested Minimum (Piteau 1991)		Calculated FS for DSTF	
	Case A	Case B	Alignment A	Alignment B
Stability of Surface				
Short-term (during construction – pseudo-static)	**1.1-1.3**	*1.0*	1.3	1.1
Long-term (after closure – static)	*1.5*	**1.3**	1.4	1.3
Long-term (after closure – pseudo-static)	**1.1-1.3**	*1.0*	1.2	1.2

Bold values are recommended minimum for each condition.

Italic values are provided for information only.

6.5.2.3 Permafrost Fully Thawed

This scenario is intended to model the anticipated long-term condition where the tailings are placed and the underlying soils have fully thawed and consolidated. Due to the rate of thaw and the lack of excess ice below the ice-rich silt layer, no excess porewater pressure is anticipated. This should be considered a reasonable approximation of the DSTF's long-term state. A summary of the factors of safety for several conditions within this scenario are provided in Table 8. Slope stability plots are found in Appendix I.

Table 8 – DSTF Slope Stability Factor of Safety – Fully Thawed Case

Stability Conditions	Factor of Safety Suggested - Minimum (Piteau 1991)		Calculated FS for DSTF	
	Case A	Case B	Alignment A	Alignment B
Stability of Surface				
Short-term (during construction – static)	**1.0**	*1.0*	N/A[1]	
Long-term (after closure – static)	*1.2*	**1.1**	1.6	2.0
Deep Seated Stability				
Short-term (during construction – static)	**1.3-1.5**	*1.1-1.3*	N/A[1]	
Short-term (during construction – pseudo-static)	**1.1-1.3**	*1.0*	N/A[1]	
Long-term (after closure – static)	*1.5*	**1.3**	2.0	1.9
Long-term (after closure – pseudo-static)	**1.1-1.3**	*1.0*	1.4	1.4

Bold values are recommended minimum for each condition.

Italic values are provided for information only.

[1] Foundation will not be fully thawed during construction of the pile.

6.5.3 Creep

Ice and ice rich soils can creep over time. The magnitude of creep movement is a function of the shear stresses in the slopes.

Slope inclinometers installed at site indicate that there is no significant movement in ice rich soils in existing slopes. The DSTF is configured such that there are flat areas over the ice rich areas; therefore the shear stresses in the foundation soils should be similar or less than they are presently. This is expected to limit the creep deformation in the DSTF foundation soils.

Continued monitoring of the pile is recommended to confirm that movements are limited.

6.6 DSTF Foundation

The foundation for the DSTF consists of the drainage blanket, geosynthetic clay liner (GCL), and geocomposite drain. Proper construction and material specifications for the DSTF foundation are described in detail in the "Runoff Diversion Structure Specs" issued by EBA in September 2010. A summary of each component of the DSTF foundation is included in the following sections.

6.6.1 Drainage Blanket

The drainage blanket is a 0.6 m layer of gravel constructed over the existing organic cover without disturbing the surface, to limit the degradation of permafrost. The drainage blanket is designed to allow any water generated from thawing permafrost to drain from the DSTF. It also provides an acceptable surface for the placement of the GCL.

6.6.2 Geosynthetic Clay Liner

A properly bedded geosynthetic clay liner is to be placed above the drainage blanket to collect any seepage leaving the tailings stack. The liner will help prevent tailings and tailings porewater from infiltrating the coarser gravel material of the drainage blanket below. The GCL consists of a layer of bentonite clay sandwiched between a layer of woven geotextile and a layer of nonwoven geotextile. The nonwoven layer of geotextile shall be oriented upward to maximize friction between the GCL and the geocomposite drain.

6.6.3 Geocomposite Drain

A geocomposite drain is required above the GCL to help alleviate any potential porewater pressure buildup in the tailings stack. The geocomposite drain is a sheet of geo-net placed directly on the GCL and a layer of nonwoven geotextile above the geo-net. The tailings are to be placed and compacted directly over the nonwoven geotextile.

6.6.4 Stability of the DSTF Foundation

The stability of the DSTF foundation was determined using Geostudio 2007 – Slope/W module. The DSTF foundation was analyzed in both static and pseudo-static scenarios.

The minimum factors of safety suggested by the BC Mine Waste Rock Pile Research Committee used in the stability analysis of the DSTF were also used in the DSTF foundation analysis.

6.6.4.1 Material Strength Parameters

Soil and tailings strength parameters assumed in the DSTF foundation stability analysis were equal to the DSTF stability analysis (Section 6.5.1).

The strength of the geocomposite liner and drain was modeled as an interface frictional material. The interface friction value was based on review of relevant literature (State of California, 2006), (Lydic and Zagorski, 1991), and (Koerner, 2005). The properties of the manufactured materials are summarized in Table 9.

Table 9 – DSTF Foundation Stability Model – Material Properties

Material Description	Unit Weight (kN/m3)	Frictional Strength		Non-Frictional Strength
		Cohesion (kPa)	Friction (Φ)	C_u (kPa)
Geocomposite liner and drain	24.0	0	16°	N/A

6.6.4.2 Analysis Results

The factor of safety along the geocomposite liner and drain was determined by forcing the failure plane through the material. A summary of the factors of safety for the DSTF foundation is provided in Table 10. The stability plots are presented in Appendix J.

Table 10 – DSTF Foundation Stability Factor of Safety

Stability Conditions	Factor of Safety – Suggested Minimum (Piteau 1991)		Calculated Factor of Safety for DSTF Foundation	
	Case A	Case B	Alignment A	Alignment B
Short-term (during construction – static)	**1.3-1.5**	*1.1-1.3*	1.4	1.4
Short-term (during construction – pseudo-static)	**1.1-1.3**	*1.0*	1.1	1.1
Long-term (after closure – static)	*1.5*	**1.3**	1.4	1.4
Long-term (after closure – pseudo-static)	**1.1-1.3**	*1.0*	1.1	1.2

Bold values are recommended minimum for each condition.

Italic values are provided for information only.

7.0 OPERATION, MAINTENANCE, AND SURVEILLANCE MANUAL

Construction and operation of the DSTF will be carried out in accordance with the Operation, Maintenance, and Surveillance (OMS Manual) submitted to Alexco by EBA in September 2010.

8.0 DSTF CLOSURE PLAN

Since the DSTF will be constructed as a sidehill fill, progressive reclamation is feasible and will be conducted. Once tailings placement for a portion of the DSTF is complete, an evapo-transpirative cover (0.5 m of loosely placed gravel soil) will be placed over the surface of the compacted tailings to temporarily store runoff and allow it evaporate or to be used by plants. The surface water collection pond and diversion berms and ditches will be left in place. The water collection pond will be able to act as a bio-reactor if necessary, and the berms will continue to divert runoff water away from the DSTF area. The entire affected footprint will be re-vegetated with plants that promote soil evapo-transpiration, similar to those used at Brewery Creek Mine. This procedure has been successfully used at the Brewery Creek Mine, which was reclaimed by Alexco (Tremblay et al. 2001).

The DSTF will require an annual geotechnical inspection for at least five years after closure. This requirement should be reviewed after five years.

9.0 CLOSURE

We trust this report meets your present requirements. Should you have any questions or comments, please contact the undersigned.

EBA, A Tetra Tech Company

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Reviewed by:

J. RICHARD TRIMBLE
May 13/11

PERMIT TO PRACTICE
EBA ENGINEERING CONSULTANTS LTD.
SIGNATURE
Date May 13/11
PERMIT NUMBER PP003
Association of Professional
Engineers of Yukon

J. Richard Trimble, FEC, P.Eng.
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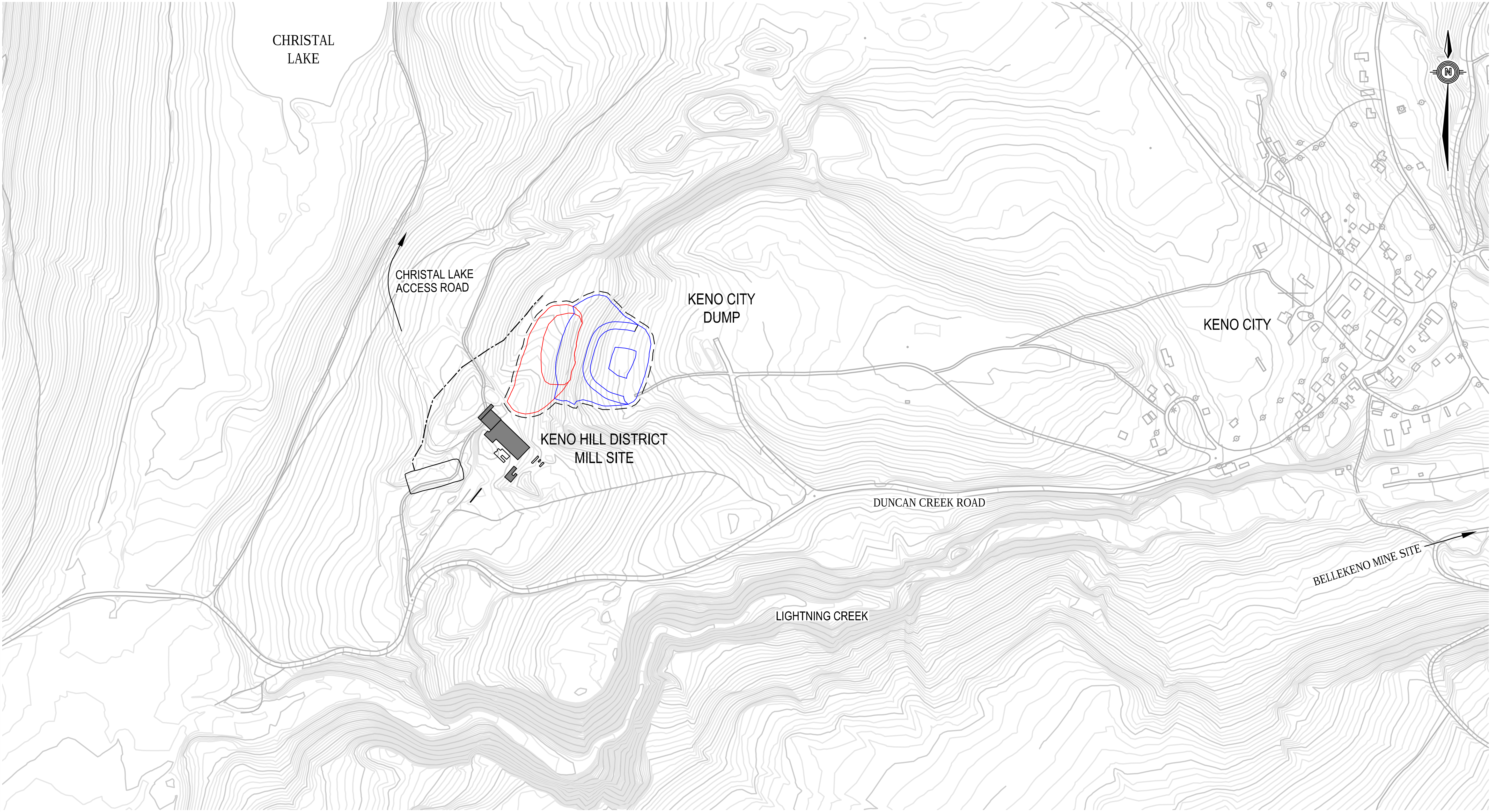
FIGURES

Q:\Whitehorse\Data\0201drawings\Keno\W14101178 Mill Site Search\W14101178.011\DSTSF Design Figures\DSTF Detailed Design IFU May 2011.dwg [FIGURE 1] May 13, 2011 - 3:05:43 pm (BY: BUCHAN, CAMERON)



LEGEND

0 250

Scale: 1: 5 000 (metres)

STATUS
ISSUED FOR USE

CLIENT

ALEXCO

eba
A TETRA TECH COMPANY

DRY STACKED TAILINGS FACILITY
KENO HILL DISTRICT MILL SITE, YUKON

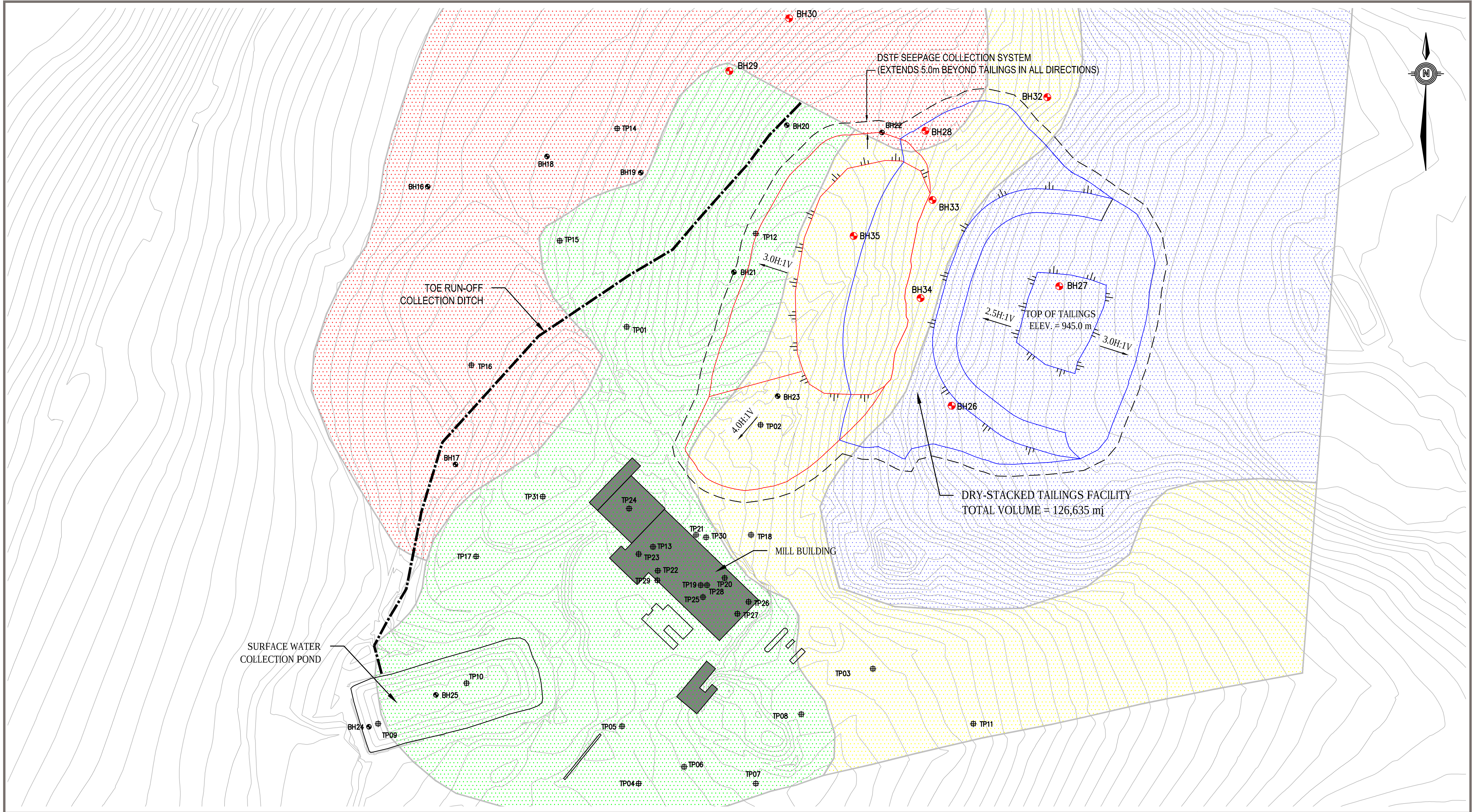
SITE LOCATION PLAN

PROJECT NO.	DWN	CKD	REV
W14101178.011	CB	JTP	0

OFFICE	DATE
EBA-WHSE	May 13, 2011

Figure 1

Q:\Whitehorse\Data\0201drawings\Keno\W14101178 Mill Site Search\W14101178.011\DSTSF Design Figures\DSTF Detailed Design IFU May 2011.dwg [FIGURE 2] May 13, 2011 - 3:06:24 pm (BY: BUCHAN, CAMERON)



LEGEND

- BOREHOLE LOCATION (CONFIRMATORY DRILLING)
- BOREHOLE LOCATION (PREVIOUSLY ADVANCED)
- TESTPIT LOCATION

🟩 - GRAVEL
🟥 - MASSIVE ICE
🟨 - ICE RICH SILT TILL
🟦 - SHALLOW BEDROCK

STATUS
ISSUED FOR USE

0 50
Scale: 1: 1 500 (metres)

CLIENT

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DRY STACKED TAILINGS FACILITY
KENO HILL DISTRICT MILL SITE, YUKON

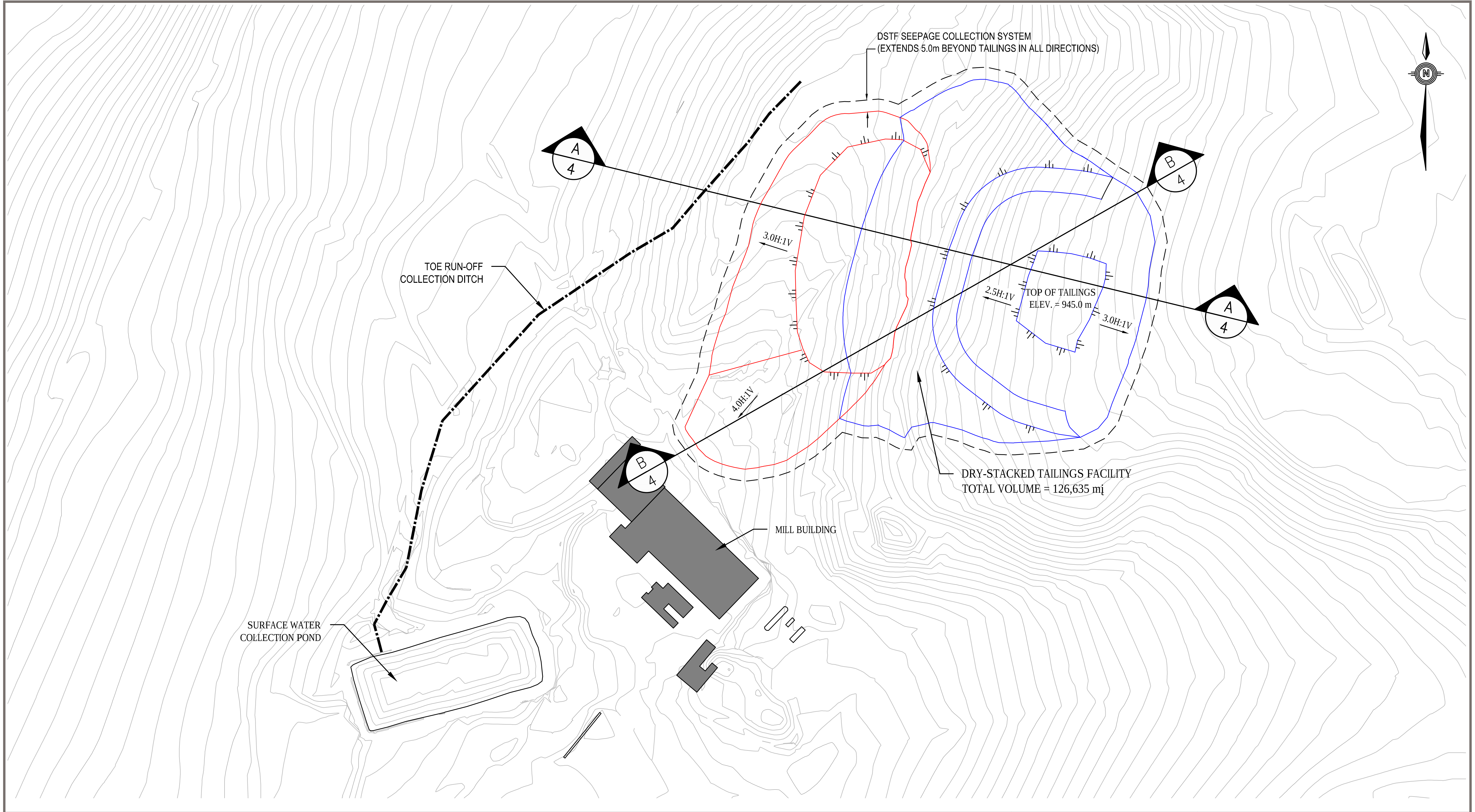
SITE PLAN SHOWING BOREHOLE LOCATIONS
AND ASSUMED SUBSURFACE CONDITIONS

PROJECT NO.	DWN	CKD	REV
W14101178.011	CB	JTP	0

OFFICE	DATE
EBA-WHSE	May 13, 2011

Figure 2

Q:\Whitehorse\Data\0201drawings\Keno\W14101178 Mill Site Search\W14101178.011\DSTSF Design Figures\DSTF Detailed Design IFU May 2011.dwg [FIGURE 3] May 13, 2011 - 3:07:01 pm (BY: BUCHAN, CAMERON)



LEGEND

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Scale: 1: 1 500 (metres)

STATUS
ISSUED FOR USE

CLIENT

ALEXCO

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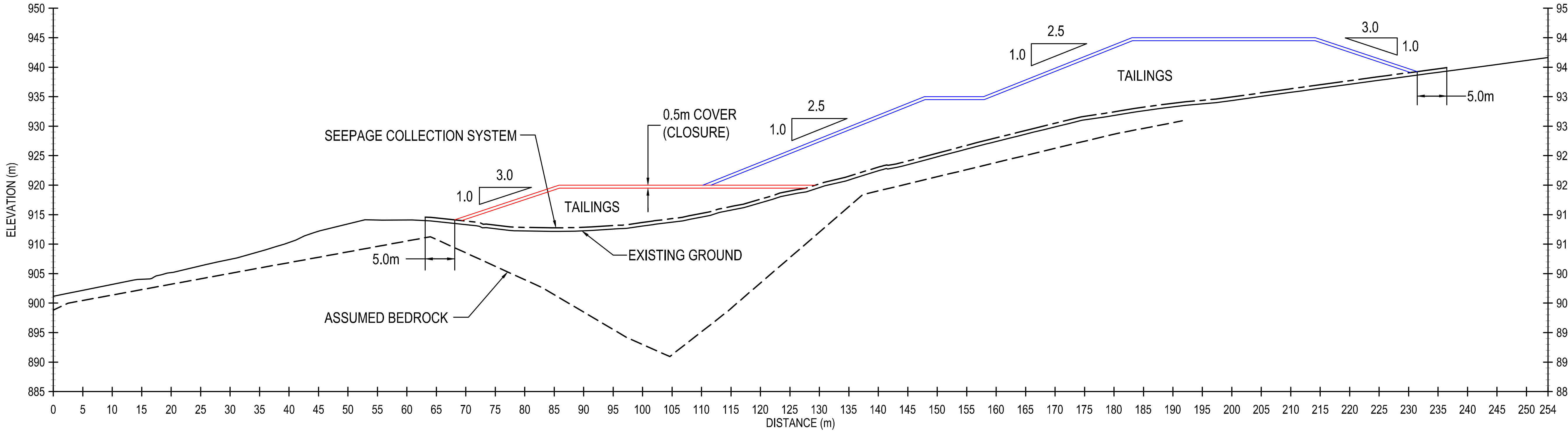
DRY STACKED TAILINGS FACILITY
KENO HILL DISTRICT MILL SITE, YUKON

DSTF PLAN VIEW

PROJECT NO.	DWN	CKD	REV
W14101178.011	CB	JTP	0
OFFICE	DATE		
EBA-WHSE	May 13, 2011		

Figure 3

Q:\Whitehorse\Data\0201drawings\Keno\W14101178 Mill Site Search\W14101178.011\DSTSF Design Figures\DSTF Detailed Design IFU May 2011.dwg [FIGURE 4] May 13, 2011 - 3:07:47 pm (BY: BUCHAN, CAMERON)



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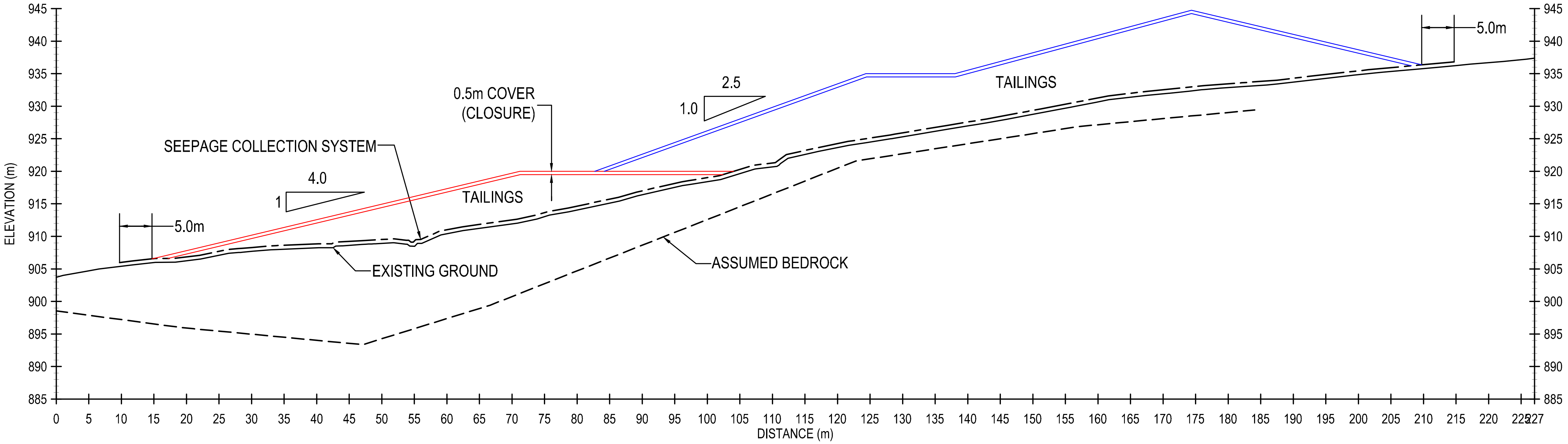
3



B
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LEGEND

0 25

Scale: 1: 750 (metres)

STATUS
ISSUED FOR USE

CLIENT

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DRY STACKED TAILINGS FACILITY
KENO HILL DISTRICT MILL SITE, YUKON

DSTF SECTIONS

PROJECT NO.	DWN	CKD	REV
W14101178.011	CB	JTP	0
OFFICE	DATE		
EBA-WHSE	May 13, 2011		

Figure 4

APPENDIX A

APPENDIX A EBA'S GENERAL CONDITIONS

GENERAL CONDITIONS

GEOTECHNICAL REPORT

This report incorporates and is subject to these "General Conditions".

1.0 USE OF REPORT AND OWNERSHIP

This geotechnical report pertains to a specific site, a specific development and a specific scope of work. It is not applicable to any other sites nor should it be relied upon for types of development other than that to which it refers. Any variation from the site or development would necessitate a supplementary geotechnical assessment.

This report and the recommendations contained in it are intended for the sole use of EBA's Client. EBA does not accept any responsibility for the accuracy of any of the data, the analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA's Client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA's instruments of professional service), only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by EBA shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. EBA's instruments of professional service will be used only and exactly as submitted by EBA.

Electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

3.0 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, EBA has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development on the subject site.

4.0 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. EBA does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

5.0 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

6.0 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. EBA does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

7.0 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

8.0 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

9.0 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known.

10.0 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

11.0 DRAINAGE SYSTEMS

Where temporary or permanent drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function.

12.0 BEARING CAPACITY

Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions assumed in this report in fact exist at the site.

13.0 SAMPLES

EBA will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client’s expense upon written request, otherwise samples will be discarded.

14.0 INFORMATION PROVIDED TO EBA BY OTHERS

During the performance of the work and the preparation of the report, EBA may rely on information provided by persons other than the Client. While EBA endeavours to verify the accuracy of such information when instructed to do so by the Client, EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

APPENDIX B

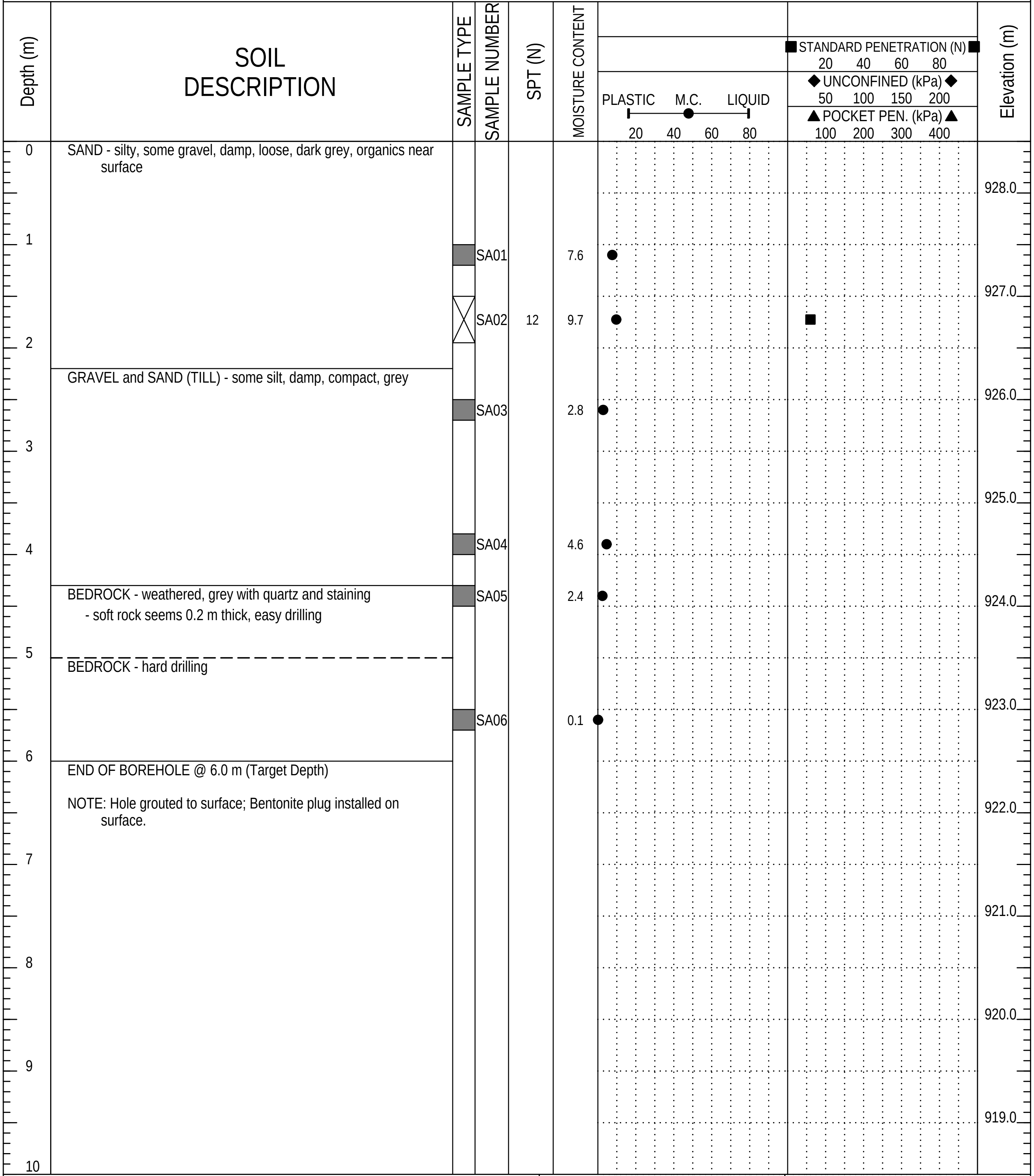
APPENDIX B BOREHOLE LOGS

Detailed DSTF Drilling	CLIENT: Alexco Resource Corporation	PROJECT NO. - BOREHOLE NO.
Keno Hill District Mill Site	DRILL: M5 Air Rotary	W14101178.011-BH26
Keno City, YT	7086870N; 484037E; Zone 8	ELEVATION: 928.5m

SAMPLE TYPE ▨ DISTURBED ⧄ NO RECOVERY ☒ SPT ☰ A-CASING ▥ SHELBY TUBE ▮ CORE

BACKFILL TYPE ▨ BENTONITE ⁘ PEA GRAVEL ▥ SLOUGH ⁘ GROUT ▧ DRILL CUTTINGS ⁘ SAND

SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SPT (N)	MOISTURE CONTENT
SAND - silty, some gravel, damp, loose, dark grey, organics near surface				
	▨	SA01		7.6
	☒	SA02	12	9.7
GRAVEL and SAND (TILL) - some silt, damp, compact, grey				
	▨	SA03		2.8
	▨	SA04		4.6
BEDROCK - weathered, grey with quartz and staining - soft rock seems 0.2 m thick, easy drilling	▨	SA05		2.4
BEDROCK - hard drilling				
	▨	SA06		0.1
END OF BOREHOLE @ 6.0 m (Target Depth) NOTE: Hole grouted to surface; Bentonite plug installed on surface.				



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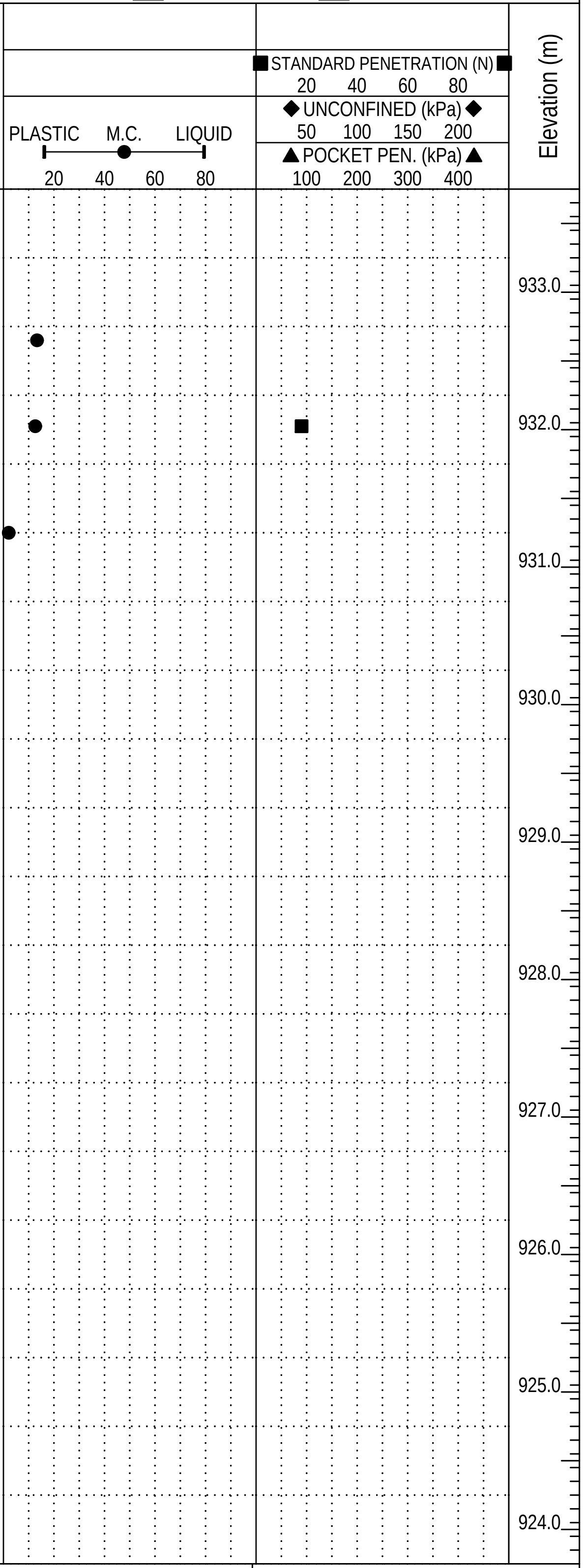
Detailed DSTF Drilling	CLIENT: Alexco Resource Corporation	PROJECT NO. - BOREHOLE NO.
Keno Hill District Mill Site	DRILL: M5 Air Rotary	W14101178.011-BH27
Keno City, YT	7086920N; 484082E; Zone 8	ELEVATION: 933.75m

SAMPLE TYPE	▨ DISTURBED	▧ NO RECOVERY	☒ SPT	☰ A-CASING	▥ SHELBY TUBE	▮ CORE
BACKFILL TYPE	▨ BENTONITE	⁘ PEA GRAVEL	▥ SLOUGH	⁘ GROUT	▧ DRILL CUTTINGS	⁘ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SPT (N)	MOISTURE CONTENT
0	SILT - sandy, trace gravel, moist, firm, non-plastic, olive brown, organics near surface				
1		▨	SA07		13.3
	- becomes sandier	☒	SA08	18	12.6
2	SAND and GRAVEL - some silt, dry, light grey				
	BEDROCK - grey, hard drilling	▨	SA09		2.1
3	END OF BOREHOLE @ 3.0 m (Target Depth) NOTE: hole filled with bentonite chips				
4					
5					
6					
7					
8					
9					
10					



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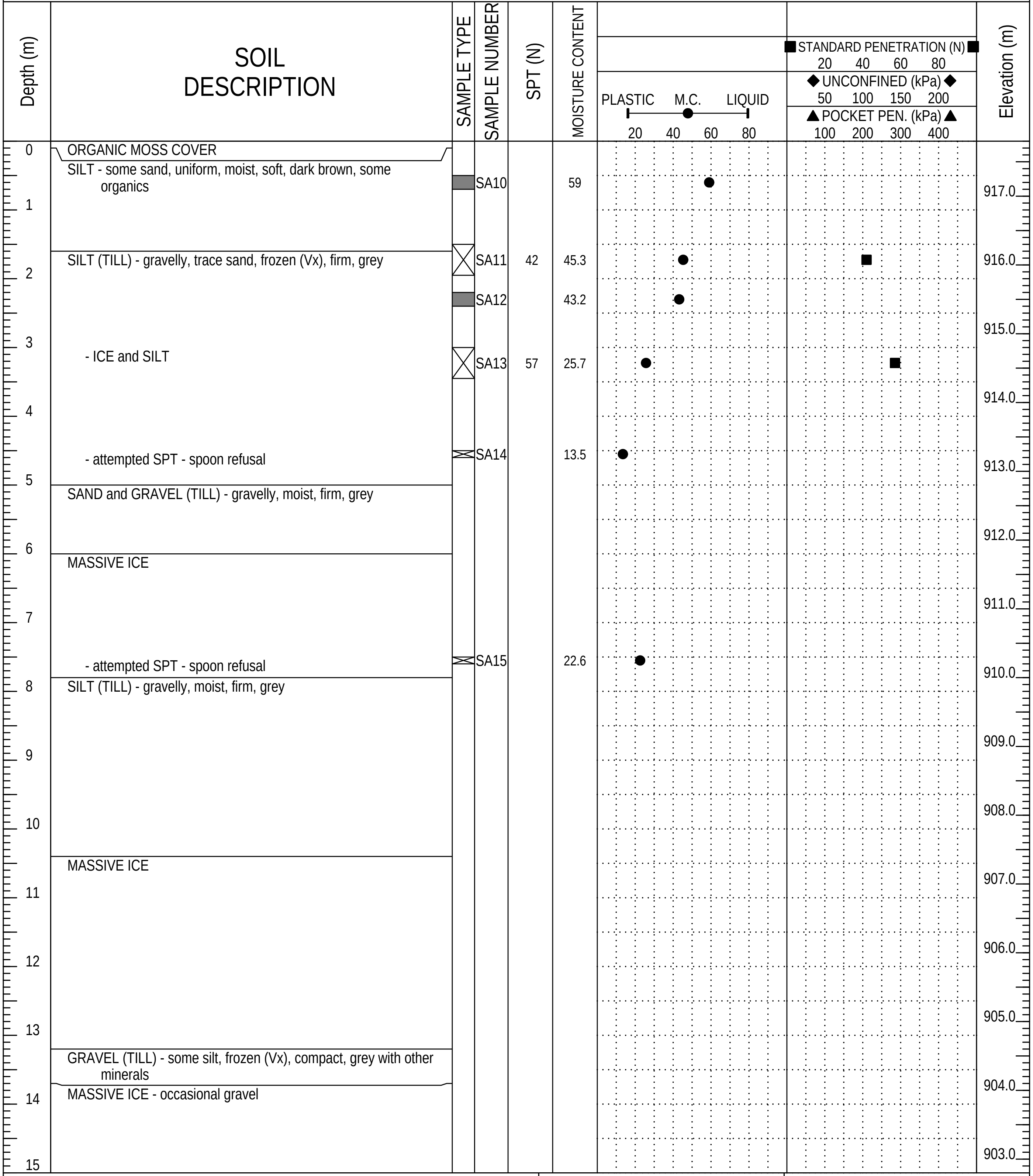
Detailed DSTF Drilling	CLIENT: Alexco Resource Corporation	PROJECT NO. - BOREHOLE NO.
Keno Hill District Mill Site	DRILL: M5 Air Rotary	W14101178.011-BH28
Keno City, YT	7086985N; 484026E; Zone 8	ELEVATION: 917.8m

SAMPLE TYPE ▆ DISTURBED ▨ NO RECOVERY ☒ SPT ☰ A-CASING ▥ SHELBY TUBE ▮ CORE

BACKFILL TYPE ▆ BENTONITE ▨ PEA GRAVEL ▥ SLOUGH ▨ GROUT ▧ DRILL CUTTINGS ▨ SAND

SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SPT (N)	MOISTURE CONTENT
ORGANIC MOSS COVER				
SILT - some sand, uniform, moist, soft, dark brown, some organics	▆	SA10		59
SILT (TILL) - gravelly, trace sand, frozen (Vx), firm, grey	☒	SA11	42	45.3
	▆	SA12		43.2
- ICE and SILT	☒	SA13	57	25.7
- attempted SPT - spoon refusal	☒	SA14		13.5
SAND and GRAVEL (TILL) - gravelly, moist, firm, grey				
MASSIVE ICE				
- attempted SPT - spoon refusal	☒	SA15		22.6
SILT (TILL) - gravelly, moist, firm, grey				
MASSIVE ICE				
GRAVEL (TILL) - some silt, frozen (Vx), compact, grey with other minerals				
MASSIVE ICE - occasional gravel				



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Detailed DSTF Drilling	CLIENT: Alexco Resource Corporation	PROJECT NO. - BOREHOLE NO.
Keno Hill District Mill Site	DRILL: M5 Air Rotary	W14101178.011-BH28
Keno City, YT	7086985N; 484026E; Zone 8	ELEVATION: 917.8m

SAMPLE TYPE ■ DISTURBED ▱ NO RECOVERY ☒ SPT ☰ A-CASING ▥ SHELBY TUBE ▮ CORE

BACKFILL TYPE ■ BENTONITE ⁘ PEA GRAVEL ▥ SLOUGH ⁘ GROUT ▧ DRILL CUTTINGS ⁘ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SPT (N)	MOISTURE CONTENT	PLASTIC M.C. LIQUID 20 40 60 80	■ STANDARD PENETRATION (N) ■ 20 40 60 80 ◆ UNCONFINED (kPa) ◆ 50 100 150 200 ▲ POCKET PEN. (kPa) ▲ 100 200 300 400	Elevation (m)
15								
16								902.0
17								901.0
18								900.0
19								899.0
20								898.0
21	GRAVEL (TILL) - silty, some sand, dry, dense, grey SILT (TILL) - gravelly, dry, stiff, grey with staining							897.0
22								896.0
23								895.0
24	SAND and GRAVEL (TILL) - trace silt, dry, dense, grey - grey rock seem 0.3 m thick - sand seem 0.2 m thick, tan - sand seem 0.2 m thick, tan							894.0
25	- becomes damp - becomes some silt							893.0
26								892.0
27	BEDROCK - hard drilling, light grey							891.0
28	END OF BOREHOLE @ 27.5 m (Target Depth) NOTES: Installed SI casing to 89' (27.13 m). Grouted hole to surface with tremie line (approx. 60 gal.)							890.0
29								889.0
30								888.0

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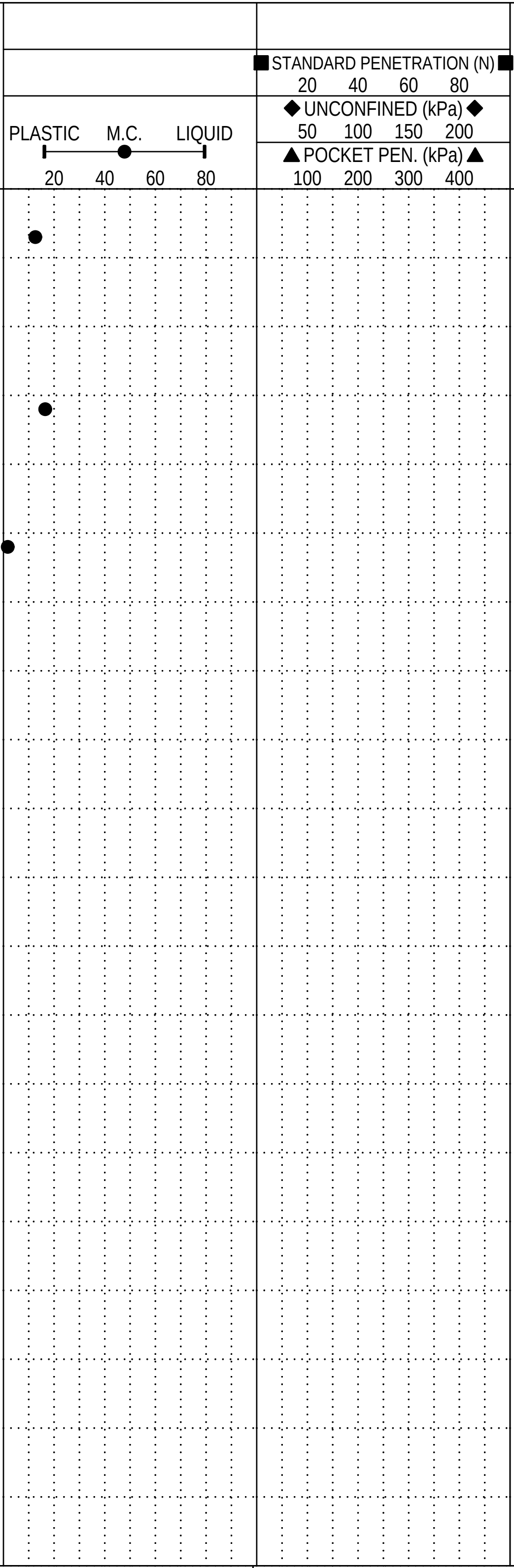
Detailed DSTF Drilling	CLIENT: Alexco Resource Corporation	PROJECT NO. - BOREHOLE NO.
Keno Hill District Mill Site	DRILL: M5 Air Rotary	W14101178.011-BH29
Keno City, YT	7087010N; 483944E; Zone 8	ELEVATION: 906.5m

SAMPLE TYPE ▩ DISTURBED ▨ NO RECOVERY ☒ SPT ☰ A-CASING ▥ SHELBY TUBE ▮ CORE

BACKFILL TYPE ▩ BENTONITE ▨ PEA GRAVEL ▥ SLOUGH ▨ GROUT ▧ DRILL CUTTINGS ▨ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT	Elevation (m)
0	MOSS COVER				
	SAND and GRAVEL - some silt, medium grained, well graded, sub-rounded, moist, compact (est.), dark brown, trace organics	▩	SA16	12.6	906.0
1	ROCK - fractured angular cuttings returned, various colours, some staining				905.0
	SILT - some sand, trace gravel, damp, firm (est.), non-plastic, olive grey hint of green	▩	SA17	16.5	
2	BEDROCK - hard drilling				904.0
		▩	SA18	1.7	
3	END OF BOREHOLE @ 3.0 m (Target Depth)				903.0
4					902.0
5					901.0
6					900.0
7					899.0
8					898.0
9					897.0
10					



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	REVIEWED BY: JRT	COMPLETE: 9/7/2010
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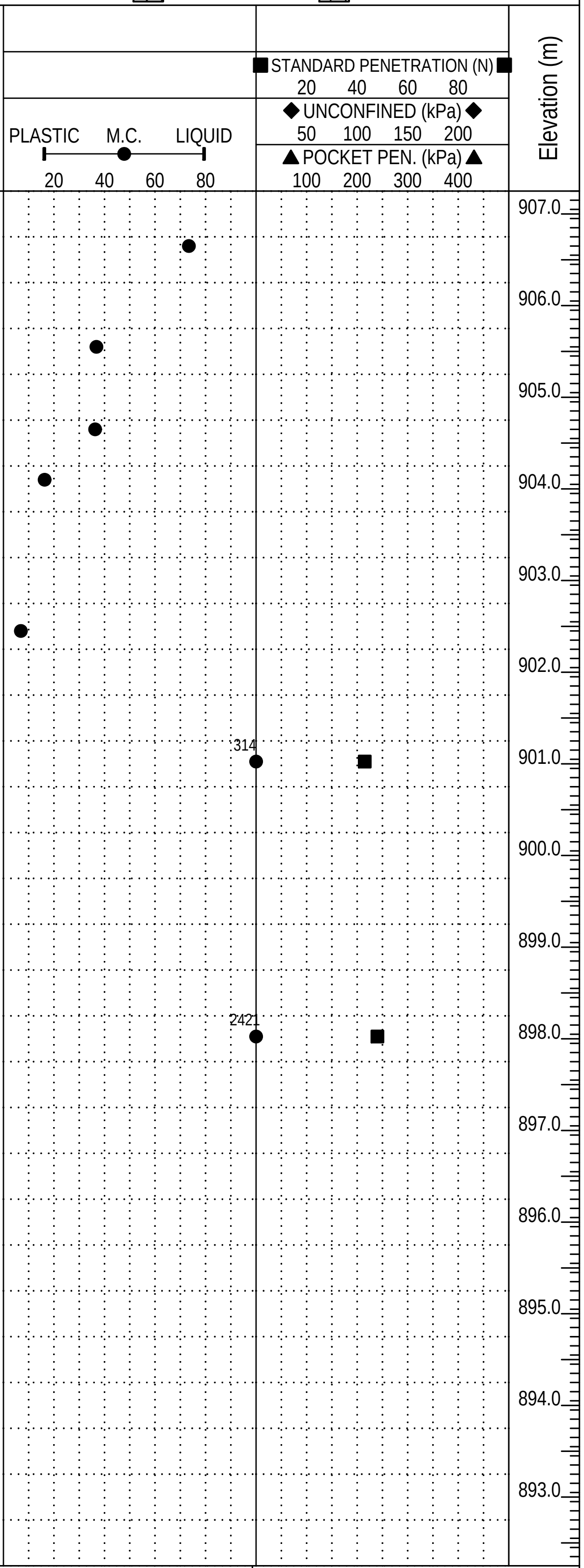
Detailed DSTF Drilling	CLIENT: Alexco Resource Corporation	PROJECT NO. - BOREHOLE NO.
Keno Hill District Mill Site	DRILL: M5 Air Rotary	W14101178.011-BH30
Keno City, YT	7087032N; 483969E; Zone 8	ELEVATION: 907.25m

SAMPLE TYPE ▩ DISTURBED ◸ NO RECOVERY ☒ SPT ☰ A-CASING ▥ SHELBY TUBE ▮ CORE

BACKFILL TYPE ▩ BENTONITE ⁘ PEA GRAVEL ▥ SLOUGH ⁘ GROUT ▧ DRILL CUTTINGS ⁘ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SPT (N)	MOISTURE CONTENT
0	SAND and GRAVEL (FILL) - trace silt, well graded, damp, brown				
	PEAT and ORGANICS - frozen, dark brown				
		▩	SA19		73.4
1	SILT (TILL) - some gravel, frozen (Nbn), brown				
	- becomes Vx				
	- attempted SPT - spoon refusal	☒	SA20		36.8
2	SAND and GRAVEL - trace silt, well graded, medium grained, sub-angular, frozen (Vx), grey				
		▩	SA21		36.3
3		☒	SA22		16.3
4	- less silt, sub-rounded				
	ROCK - fractured, angular, multi coloured	☒	SA23		
5		▩	SA24		6.9
	SILT (TILL) - some gravel, frozen (Vx)				
	ICE - massive ice with little or no soil				
6		☒	SA25	43	313.5
7					
8					
9		☒	SA26	48	2421.1
10					
11					
12					
13					
14	- contains some gravel for 0.3 m				
15					



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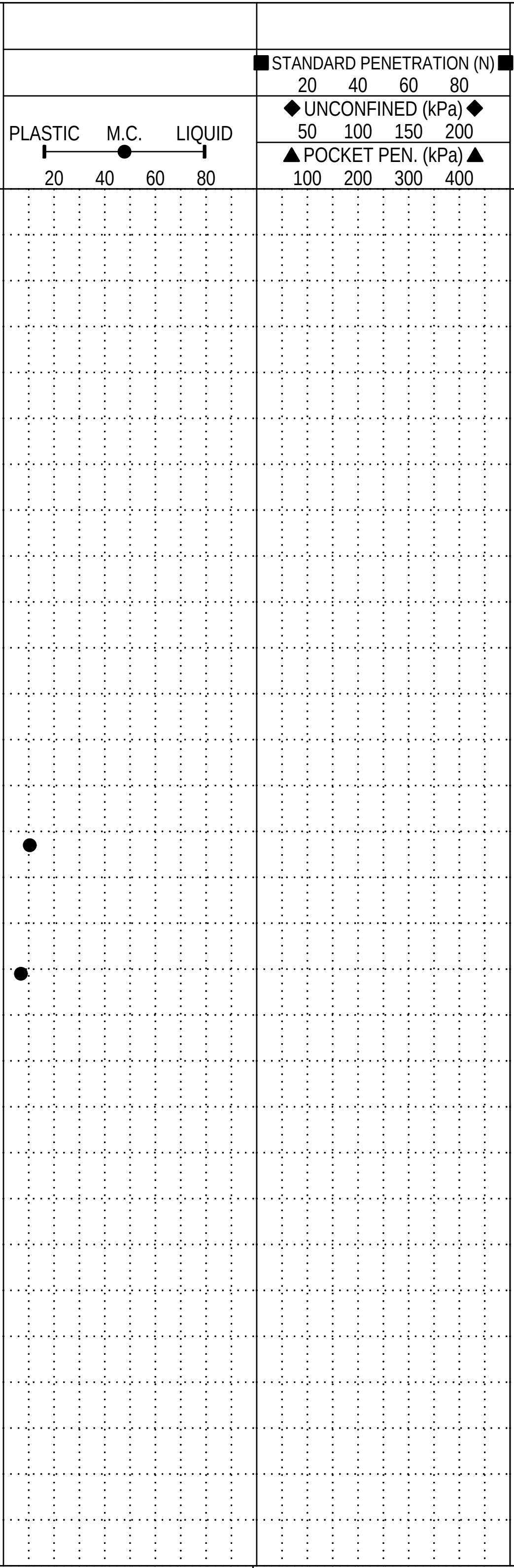
Detailed DSTF Drilling	CLIENT: Alexco Resource Corporation	PROJECT NO. - BOREHOLE NO.
Keno Hill District Mill Site	DRILL: M5 Air Rotary	W14101178.011-BH30
Keno City, YT	7087032N; 483969E; Zone 8	ELEVATION: 907.25m

SAMPLE TYPE ■ DISTURBED ◸ NO RECOVERY ☒ SPT ☰ A-CASING ▥ SHELBY TUBE ▮ CORE

BACKFILL TYPE ■ BENTONITE ⁘ PEA GRAVEL ▥ SLOUGH ⁘ GROUT ▧ DRILL CUTTINGS ⁘ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SPT (N)	MOISTURE CONTENT	Elevation (m)
15						892.0
16						891.0
17						890.0
	- contains some silt for 0.3 m					
18						889.0
19						888.0
20						887.0
21						886.0
	GRAVEL - some sand, some silt, frozen (Nbn), grey					
22		■	SA27		10.4	885.0
	- becomes Vx	■				
23	- becomes damp	■				884.0
		■	SA28		6.9	
24	- sand seem 0.2 m thick	■				883.0
	ROCK - easy drilling, dry, shiny black/grey	■				
	BEDROCK - hard drilling, grey					
25						882.0
26						881.0
	END OF BOREHOLE @ 26.0 m (Target Depth)					
27						880.0
28						879.0
29						878.0
30						



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	REVIEWED BY: JRT	COMPLETE: 9/8/2010
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Detailed DSTF Drilling	CLIENT: Alexco Resource Corporation	PROJECT NO. - BOREHOLE NO.
Keno Hill District Mill Site	DRILL: M5 Air Rotary	W14101178.011-BH31
Keno City, YT	7078058N; 484016E; Zone 8	ELEVATION: 907.8m

SAMPLE TYPE ▨ DISTURBED ◿ NO RECOVERY ☒ SPT ☰ A-CASING ▥ SHELBY TUBE ▮ CORE

BACKFILL TYPE ▨ BENTONITE ⁘ PEA GRAVEL ▥ SLOUGH ⁘ GROUT ▧ DRILL CUTTINGS ⁘ SAND

SOIL DESCRIPTION

PEAT - frozen, black/dark brown

SILT - trace gravel, frozen (Vx), brown

- organics (wood) for 1.5 m

SILT (TILL) - gravelly, trace sand, frozen (Vx), grey

- becomes some gravel

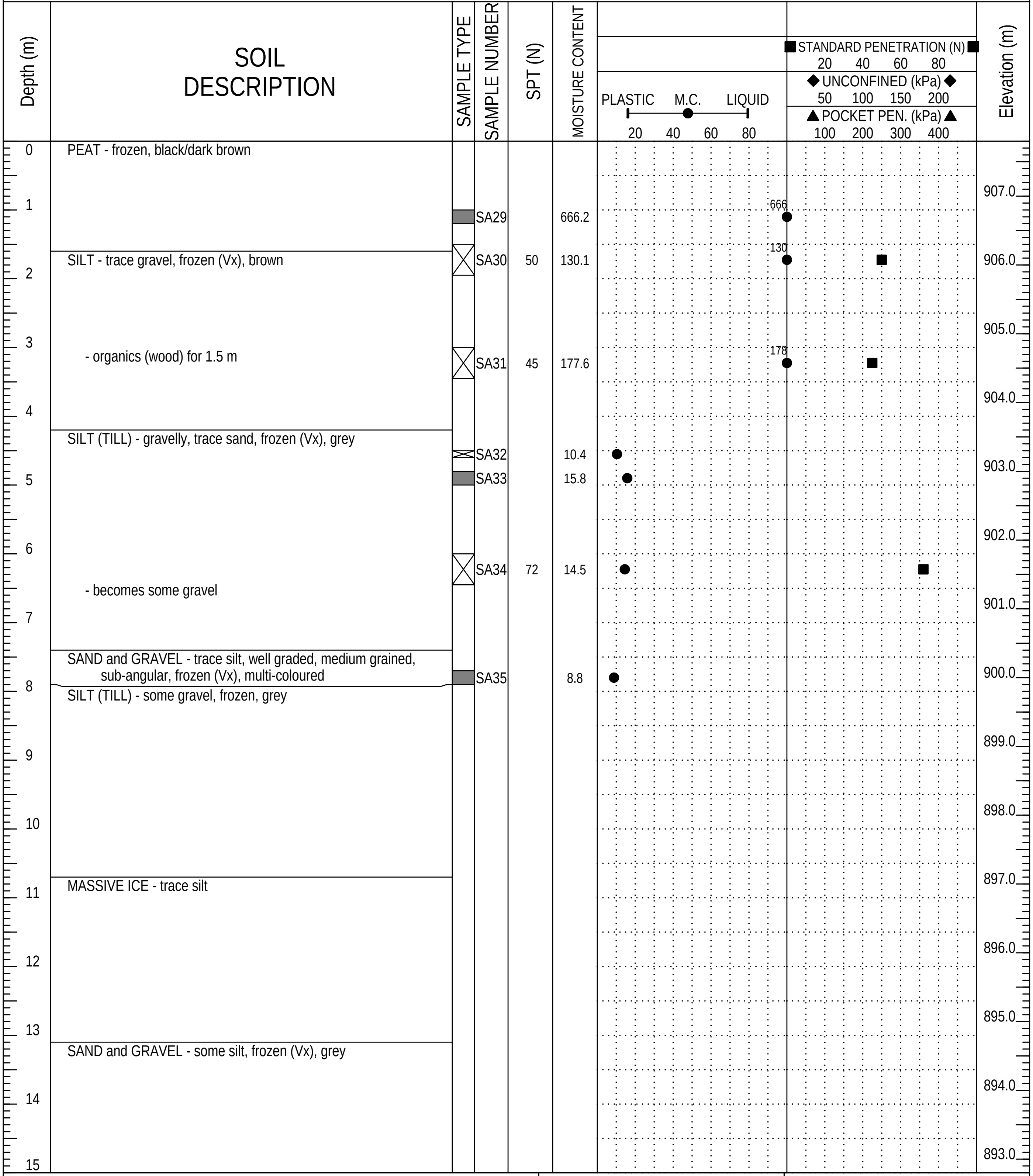
SAND and GRAVEL - trace silt, well graded, medium grained, sub-angular, frozen (Vx), multi-coloured

SILT (TILL) - some gravel, frozen, grey

MASSIVE ICE - trace silt

SAND and GRAVEL - some silt, frozen (Vx), grey

SAMPLE TYPE	SAMPLE NUMBER	SPT (N)	MOISTURE CONTENT
▨	SA29		666.2
☒	SA30	50	130.1
☒	SA31	45	177.6
☒	SA32		10.4
▨	SA33		15.8
☒	SA34	72	14.5
▨	SA35		8.8



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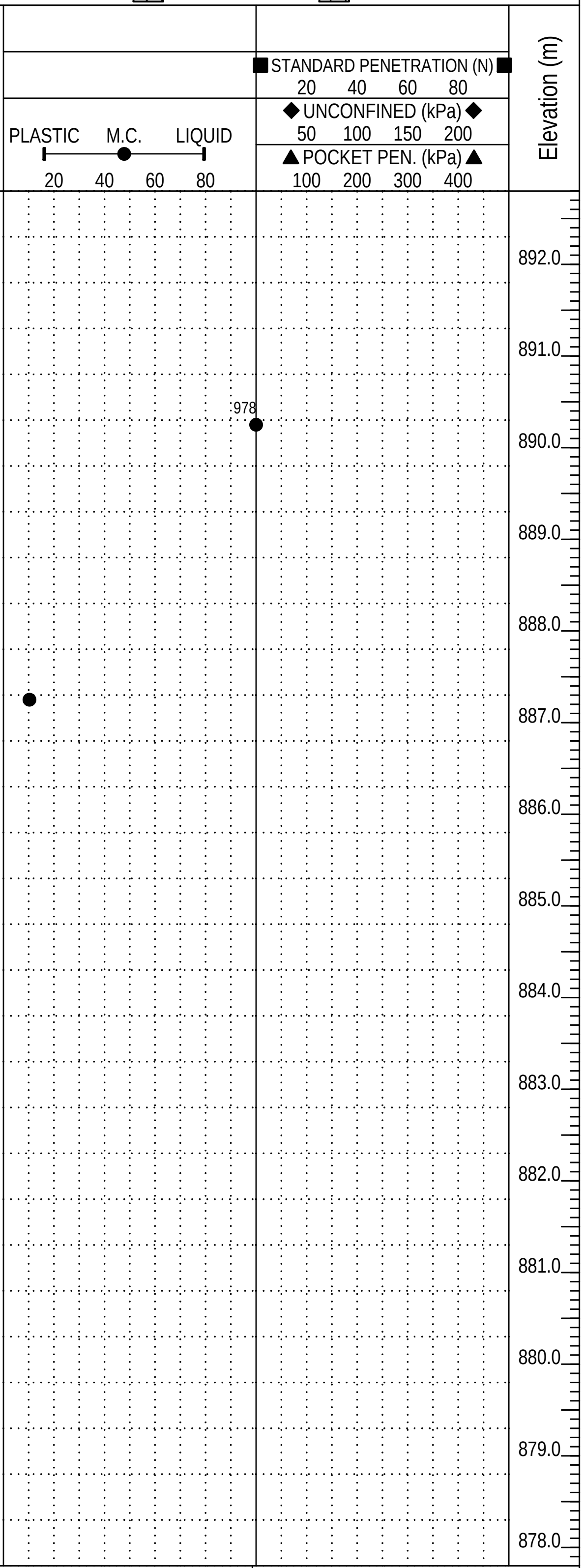
Detailed DSTF Drilling	CLIENT: Alexco Resource Corporation	PROJECT NO. - BOREHOLE NO.
Keno Hill District Mill Site	DRILL: M5 Air Rotary	W14101178.011-BH31
Keno City, YT	7078058N; 484016E; Zone 8	ELEVATION: 907.8m

SAMPLE TYPE ▆ DISTURBED ◺ NO RECOVERY ☒ SPT ▤ A-CASING ▥ SHELBY TUBE ▮ CORE

BACKFILL TYPE ▆ BENTONITE ⁘ PEA GRAVEL ▥ SLOUGH ⁘ GROUT ▧ DRILL CUTTINGS ⁘ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SPT (N)	MOISTURE CONTENT
15	MASSIVE ICE - trace silt				
		▆	SA36		977.9
20	SILT (TILL) - some gravel, frozen (Vx), grey				
		▆	SA37		10.3
22	ROCK - fractured, angular, damp, multi-coloured				
23	BEDROCK - hard drilling, grey				
24	END OF BOREHOLE @ 24.4 m (Target Depth)				
25					
26					
27					
28					
29					
30					



EBA Engineering Consultants Ltd.	LOGGED BY: JTP	COMPLETION DEPTH: 24.4m
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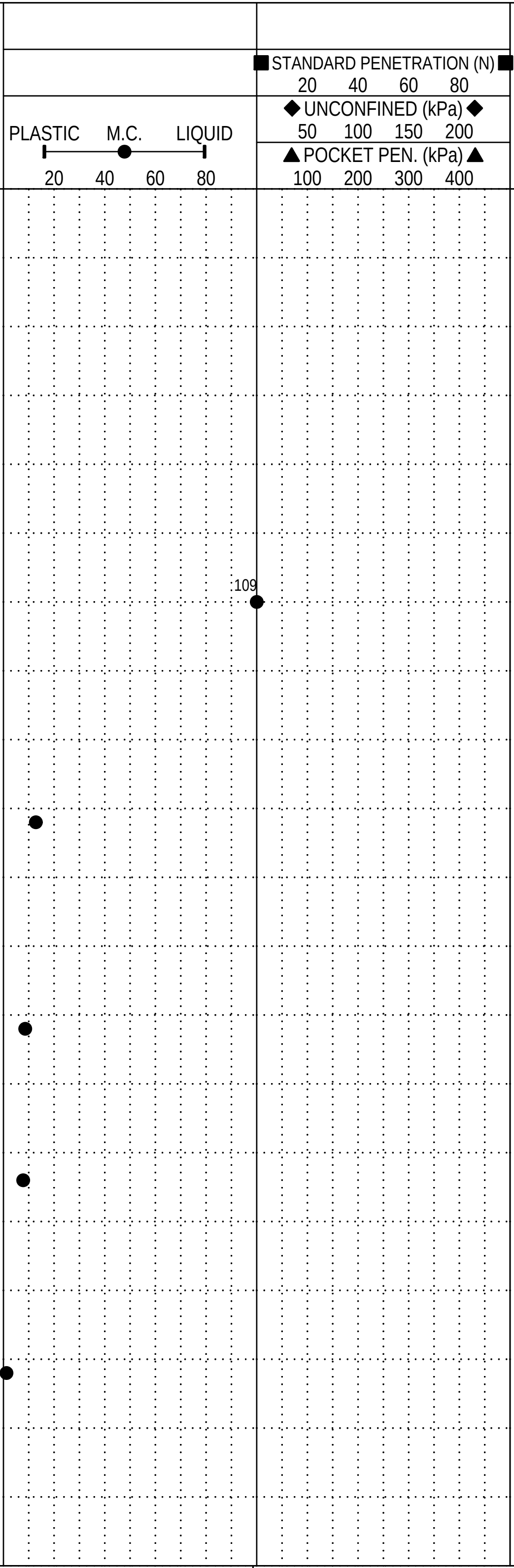
Detailed DSTF Drilling	CLIENT: Alexco Resource Corporation	PROJECT NO. - BOREHOLE NO.
Keno Hill District Mill Site	DRILL: M5 Air Rotary	W14101178.011-BH32
Keno City, YT	7086999N; 484077E; Zone 8	ELEVATION: 923.75m

SAMPLE TYPE ■ DISTURBED ▨ NO RECOVERY ☒ SPT ▤ A-CASING ▥ SHELBY TUBE ▮ CORE

BACKFILL TYPE ■ BENTONITE ⁘ PEA GRAVEL ▥ SLOUGH ⁘ GROUT ▧ DRILL CUTTINGS ⁘ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT
0	SAND and GRAVEL (FILL) - some silt, medium grained, well graded, sub-round, damp, loose, brown			
1				
	PEAT - frozen, black/dark brown			
2				
	SILT - some sand, frozen (Vx), grey			
3			SA38	109
4				
		☒	SA39	
	- hard drilling for 0.3 m - attempted SPT - spoon refusal	■	SA40	12.8
5				
6	- gravel content increases	■	SA41	8.6
7	BEDROCK - hard drilling, grey			
		■	SA42	7.8
8				
		■	SA43	1.2
9	END OF BOREHOLE @ 9.0 m (Target Depth)			
10				



Elevation (m): 923.0, 922.0, 921.0, 920.0, 919.0, 918.0, 917.0, 916.0, 915.0, 914.0

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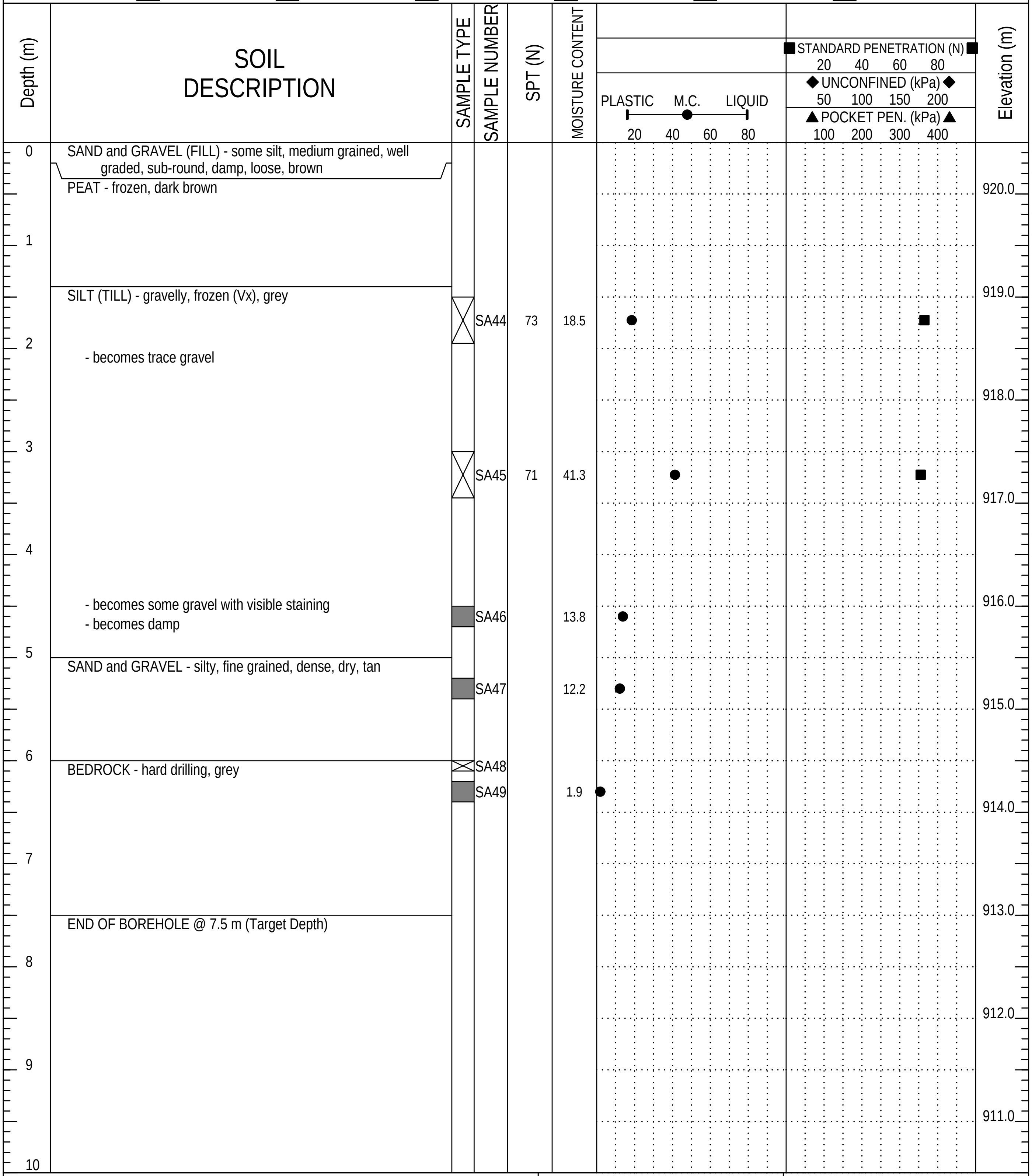
Detailed DSTF Drilling	CLIENT: Alexco Resource Corporation	PROJECT NO. - BOREHOLE NO.
Keno Hill District Mill Site	DRILL: M5 Air Rotary	W14101178.011-BH33
Keno City, YT	7086956N; 484029E; Zone 8	ELEVATION: 920.5m

SAMPLE TYPE ■ DISTURBED ◿ NO RECOVERY ☒ SPT ☰ A-CASING ▥ SHELBY TUBE ◧ CORE

BACKFILL TYPE ■ BENTONITE ⁘ PEA GRAVEL ▥ SLOUGH ⁘ GROUT ▨ DRILL CUTTINGS ⁙ SAND



SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SPT (N)	MOISTURE CONTENT
SAND and GRAVEL (FILL) - some silt, medium grained, well graded, sub-round, damp, loose, brown				
PEAT - frozen, dark brown				
SILT (TILL) - gravelly, frozen (Vx), grey	☒	SA44	73	18.5
- becomes trace gravel	☒	SA45	71	41.3
- becomes some gravel with visible staining - becomes damp	■	SA46		13.8
SAND and GRAVEL - silty, fine grained, dense, dry, tan	■	SA47		12.2
BEDROCK - hard drilling, grey	☒	SA48		
	■	SA49		1.9
END OF BOREHOLE @ 7.5 m (Target Depth)				

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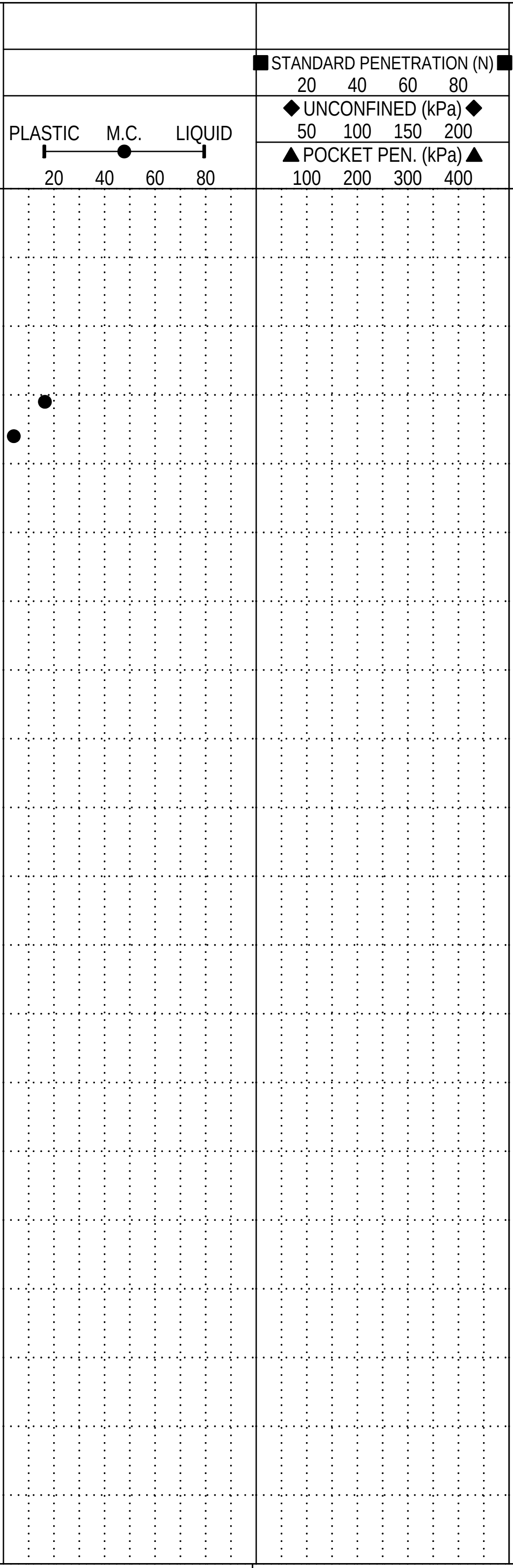
Detailed DSTF Drilling	CLIENT: Alexco Resource Corporation	PROJECT NO. - BOREHOLE NO.
Keno Hill District Mill Site	DRILL: M5 Air Rotary	W14101178.011-BH34
Keno City, YT	7086915N; 484024E; Zone 8	ELEVATION: 922m

SAMPLE TYPE	▩ DISTURBED	◪ NO RECOVERY	☒ SPT	☰ A-CASING	▥ SHELBY TUBE	▮ CORE
BACKFILL TYPE	▩ BENTONITE	⁘ PEA GRAVEL	▥ SLOUGH	⁘ GROUT	▧ DRILL CUTTINGS	⁘ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	MOISTURE CONTENT	Elevation (m)
0	SAND and GRAVEL (FILL) - trace silt, medium grained, well graded, sub-rounded, damp, loose, brown				922.0
	PEAT - frozen, dark brown				
1					921.0
	SILT (TILL) - gravelly, frozen (Vx), grey				
	- attempted SPT - spoon refusal	☒	SA50	16.4	
	BEDROCK - hard drilling, light grey	☒	SA51	4.1	
2					920.0
3	END OF BOREHOLE @ 3.0 m (Target Depth)				919.0
4					918.0
5					917.0
6					916.0
7					915.0
8					914.0
9					913.0
10					912.0



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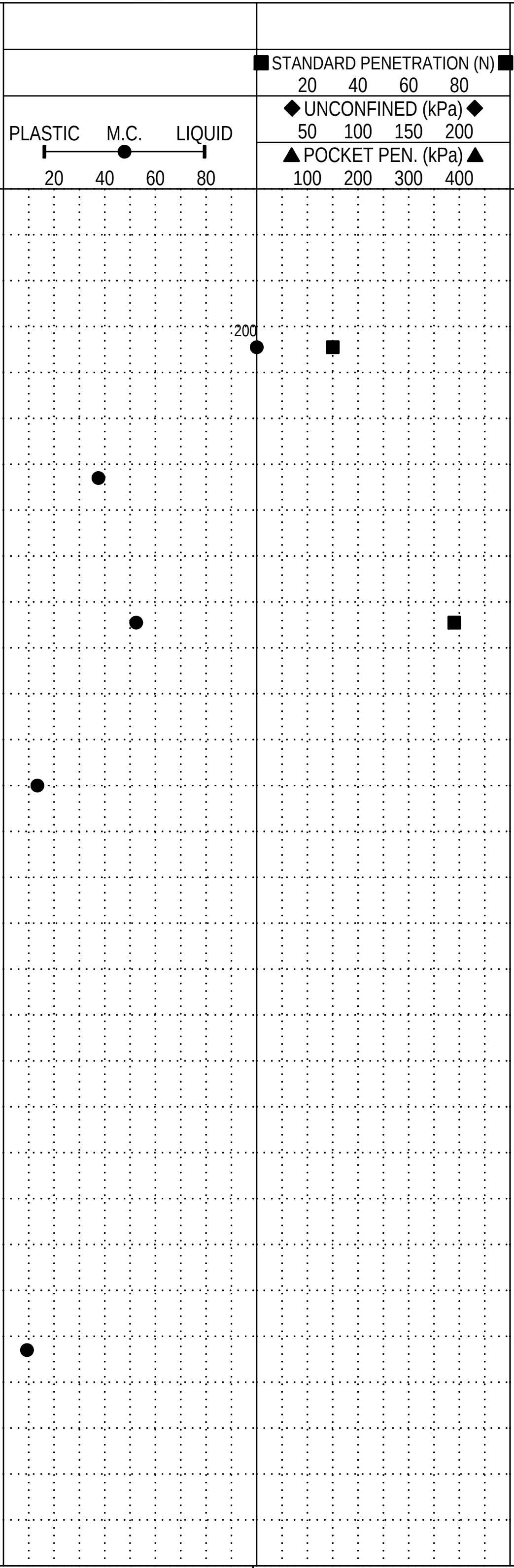
Detailed DSTF Drilling	CLIENT: Alexco Resource Corporation	PROJECT NO. - BOREHOLE NO.
Keno Hill District Mill Site	DRILL: M5 Air Rotary	W14101178.011-BH35
Keno City, YT	7086941N; 483996E; Zone 8	ELEVATION: 914.25m

SAMPLE TYPE ▨ DISTURBED ◿ NO RECOVERY ☒ SPT ☰ A-CASING ▥ SHELBY TUBE ▮ CORE

BACKFILL TYPE ▨ BENTONITE ⁘ PEA GRAVEL ▥ SLOUGH ⁘ GROUT ▧ DRILL CUTTINGS ⁘ SAND

Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SPT (N)	MOISTURE CONTENT	Elevation (m)
0	SAND and GRAVEL (FILL) - trace silt, medium grained, well graded, sub-rounded, damp, loose, brown					914.0
1	PEAT - frozen, dark brown					913.0
		☒	SA52	30	199.6	
2	SILT (TILL) - some gravel, frozen (Vx), grey					912.0
3		☒	SA53		37.5	911.0
4						910.0
5		☒	SA54	78	52.4	909.0
	- becomes gravelly	☒	SA55			
6		▨	SA56		13.4	908.0
7	- becomes some gravel					907.0
8						906.0
9	- becomes trace					905.0
10						904.0
11	- becomes SILT and GRAVEL					903.0
12	MASSIVE ICE - trace silt					902.0
	SILT and GRAVEL (TILL) - frozen (Vx), grey	▨	SA57		9.3	
13						901.0
14						900.0
	MASSIVE ICE - some gravel					
15						



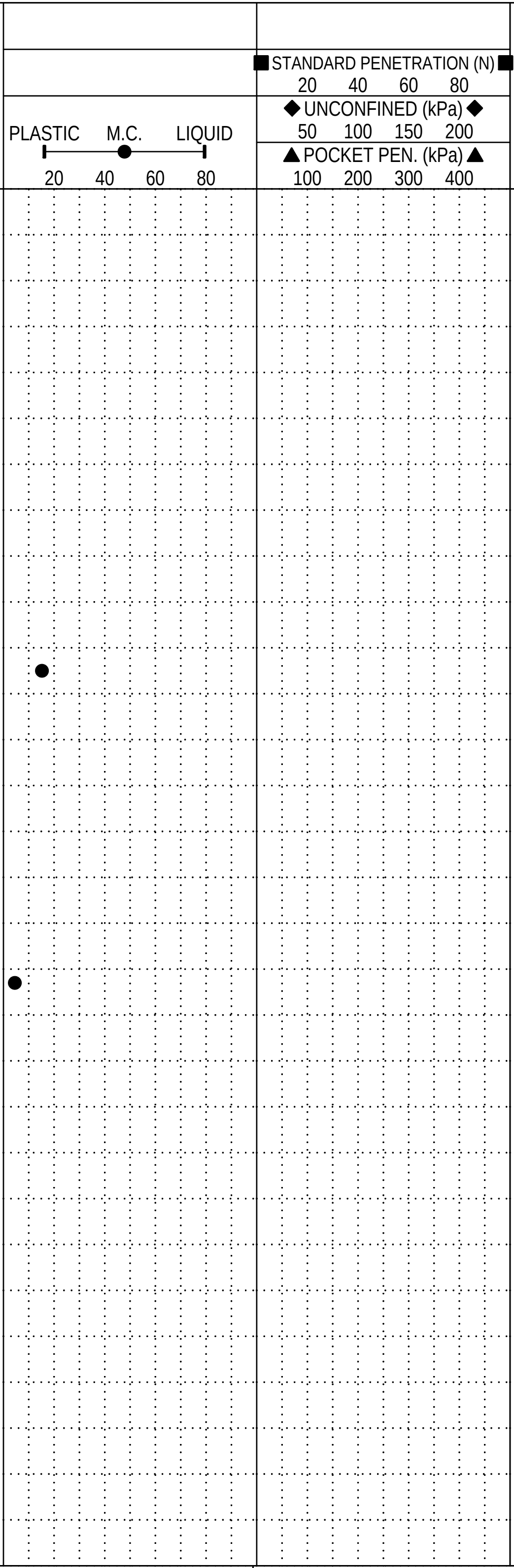
EBA Engineering Consultants Ltd.	LOGGED BY: JTP	COMPLETION DEPTH: 26m
	REVIEWED BY: JRT	COMPLETE: 9/11/2010
	DRAWING NO:	Page 1 of 2

Detailed DSTF Drilling	CLIENT: Alexco Resource Corporation	PROJECT NO. - BOREHOLE NO.
Keno Hill District Mill Site	DRILL: M5 Air Rotary	W14101178.011-BH35
Keno City, YT	7086941N; 483996E; Zone 8	ELEVATION: 914.25m

SAMPLE TYPE ▨ DISTURBED ⧄ NO RECOVERY ☒ SPT ☰ A-CASING ▥ SHELBY TUBE ▮ CORE

BACKFILL TYPE ▨ BENTONITE ⁘ PEA GRAVEL ▥ SLOUGH ⁘ GROUT ▧ DRILL CUTTINGS ⁘ SAND

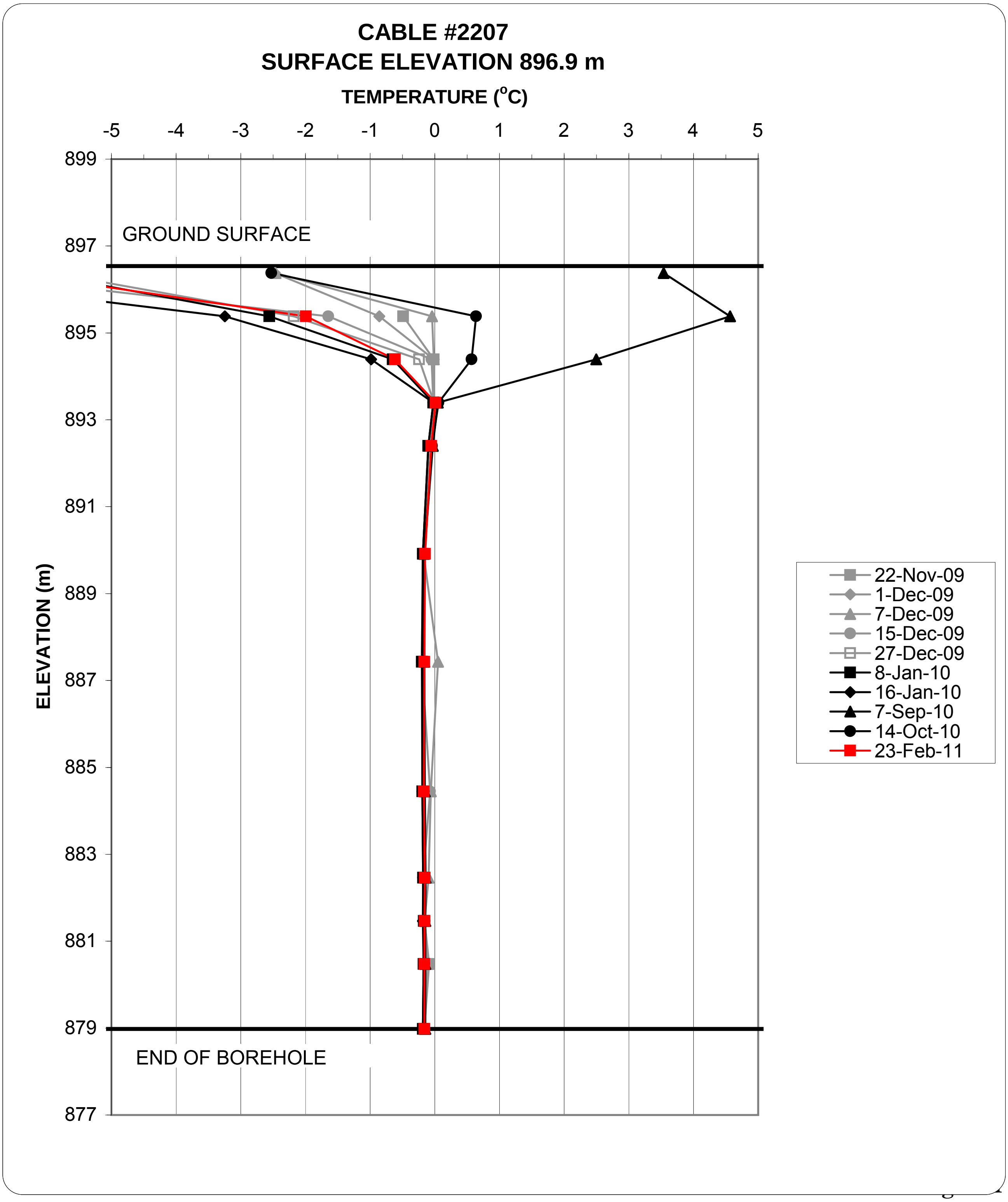
Depth (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	SPT (N)	MOISTURE CONTENT	Elevation (m)
15	- becomes trace silt					899.0
16						898.0
17	GRAVEL seem - frozen (Vx), hard drilling					897.0
18						896.0
19						895.0
20	SILT and GRAVEL (TILL) - frozen (Vx), grey	▨	SA58		15.2	894.0
21	- hard drilling for 1.0 m, possible rock					893.0
22	SAND - some silt, trace gravel, fine grained, compact (est.), dry, dark tan					892.0
23	BEDROCK - hard drilling - soft black rock seem, 0.3 m	▨	SA59		4.5	891.0
24						890.0
25						889.0
26	END OF BOREHOLE @ 26.0 m (Target Depth)					888.0
27						887.0
28						886.0
29						885.0
30						



EBA Engineering Consultants Ltd.	LOGGED BY: JTP
COMPLETION DEPTH: 26m	REVIEWED BY: JRT
COMPLETE: 9/11/2010	DRAWING NO:
Page 2 of 2	

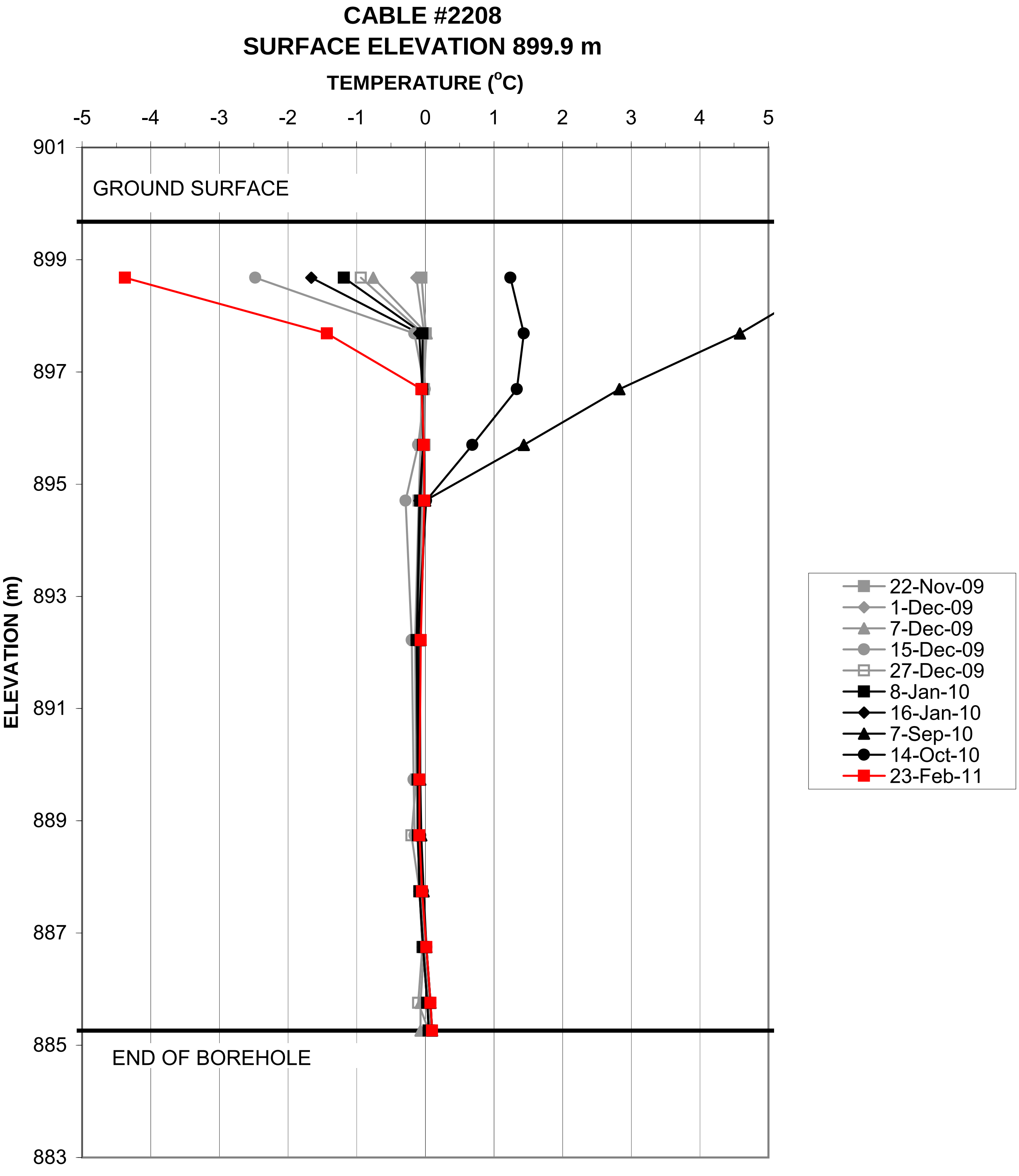
APPENDIX C

APPENDIX C GROUND TEMPERATURE PROFILES



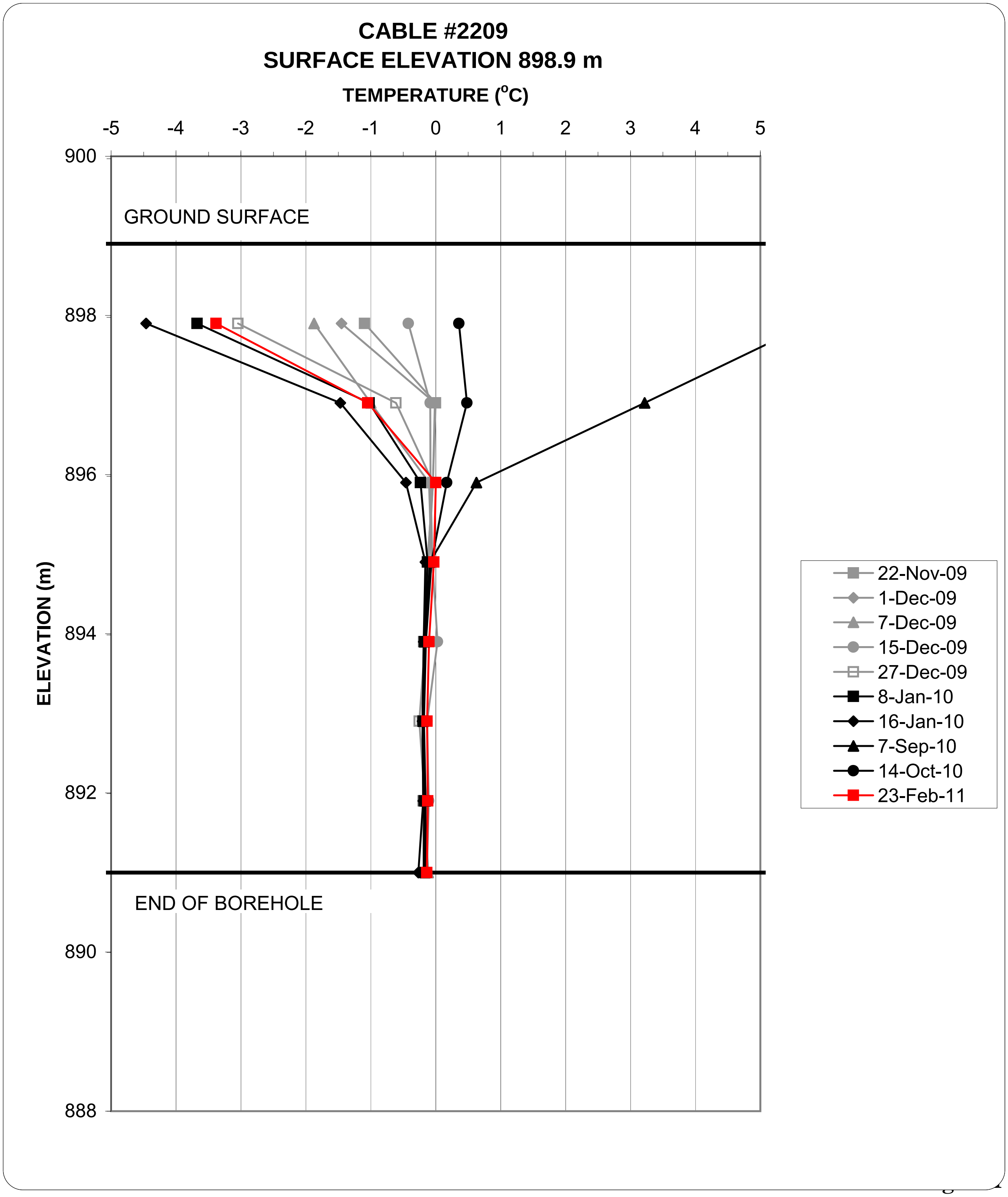
Drilled August 30, 2009

Ground Temperature Profile
Mill Site
Borehole #15 - Flame and Moth



Drilled August 30, 2009

Ground Temperature Profile
Mill Site
Borehole #17 - Flame and Moth

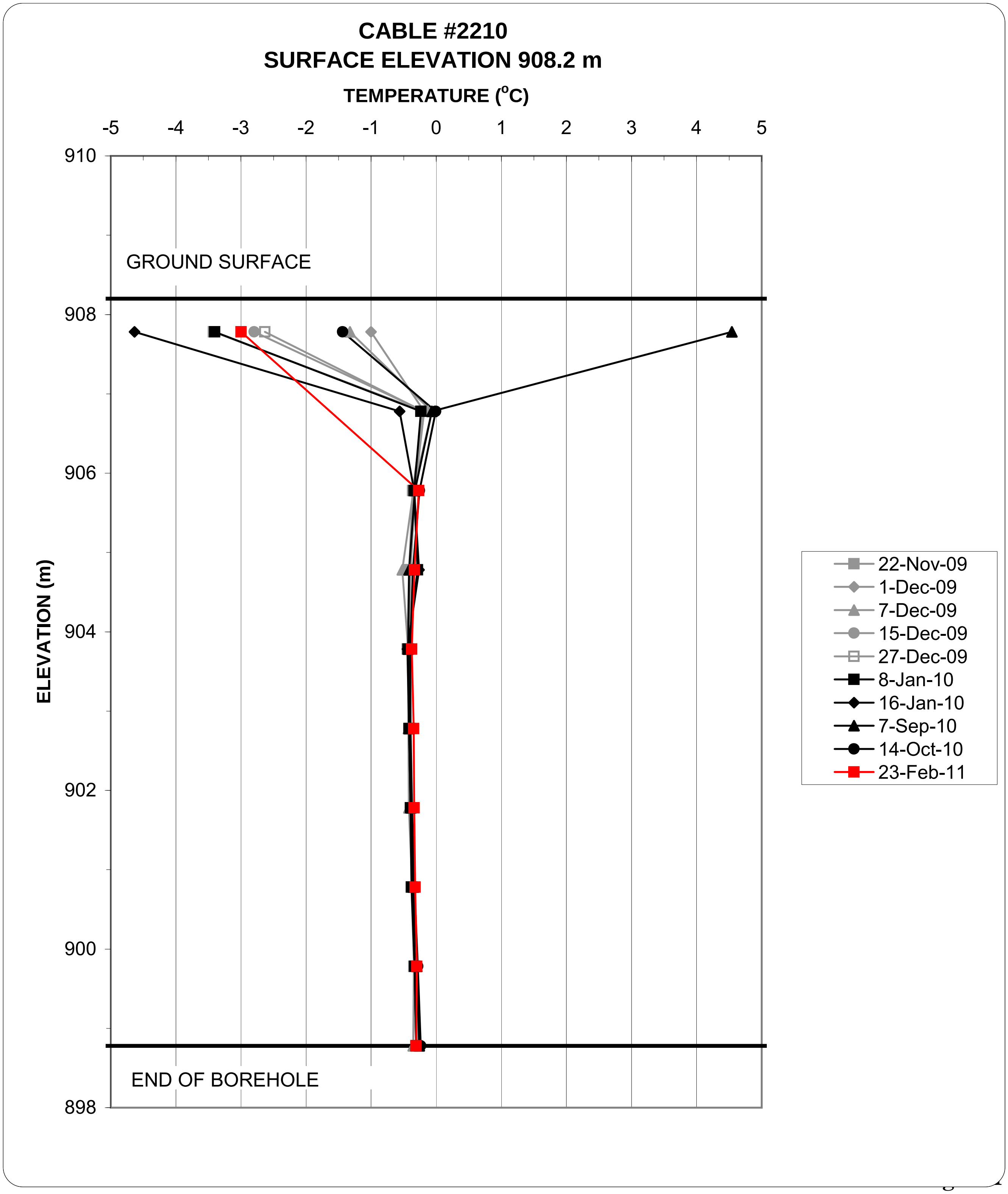


Drilled September 2, 2009

Ground Temperature Profile

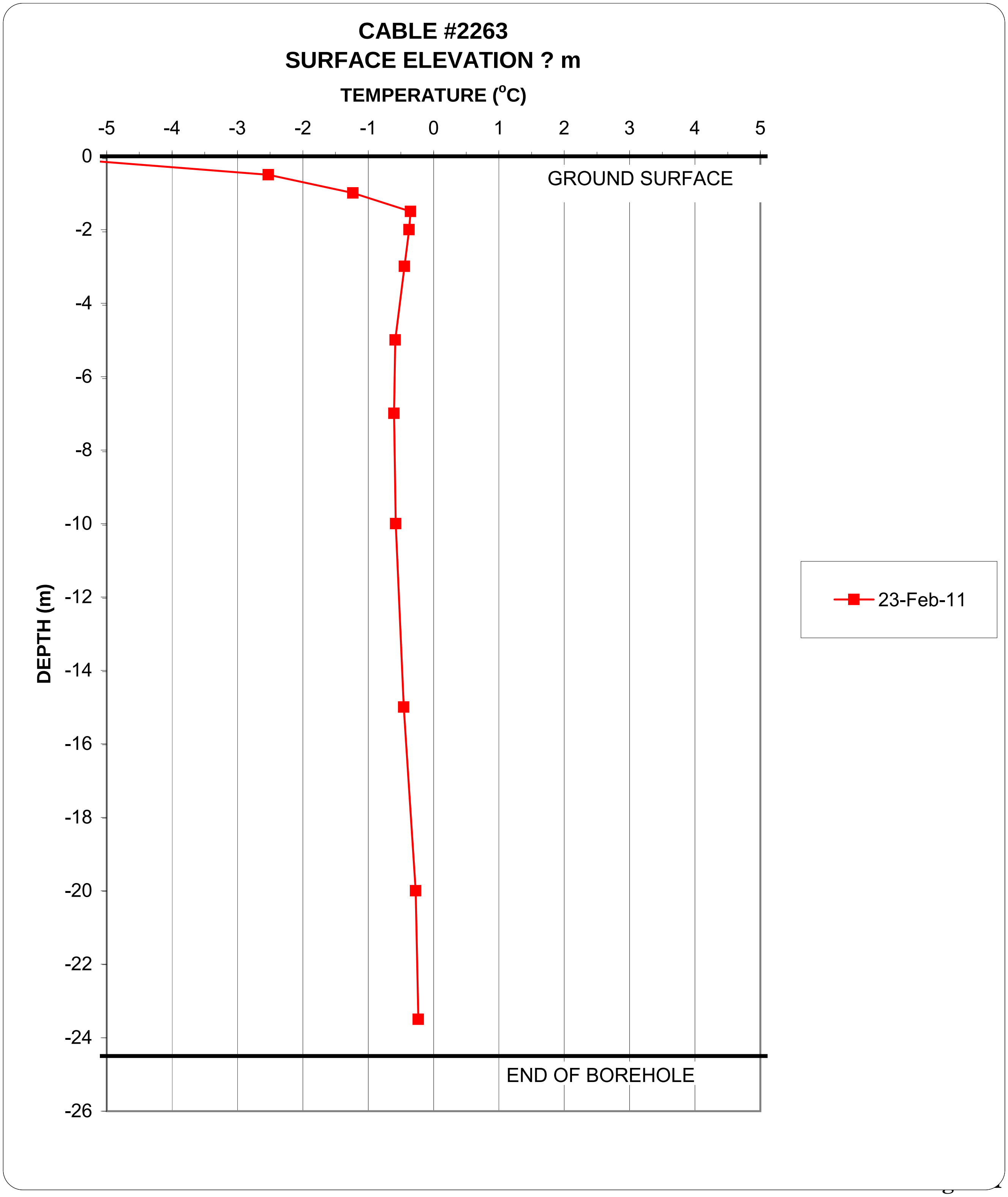
Mill Site

Borehole #18 - Flame and Moth



Drilled August 29, 2009

Ground Temperature Profile
Mill Site
Borehole #23 - Flame and Moth

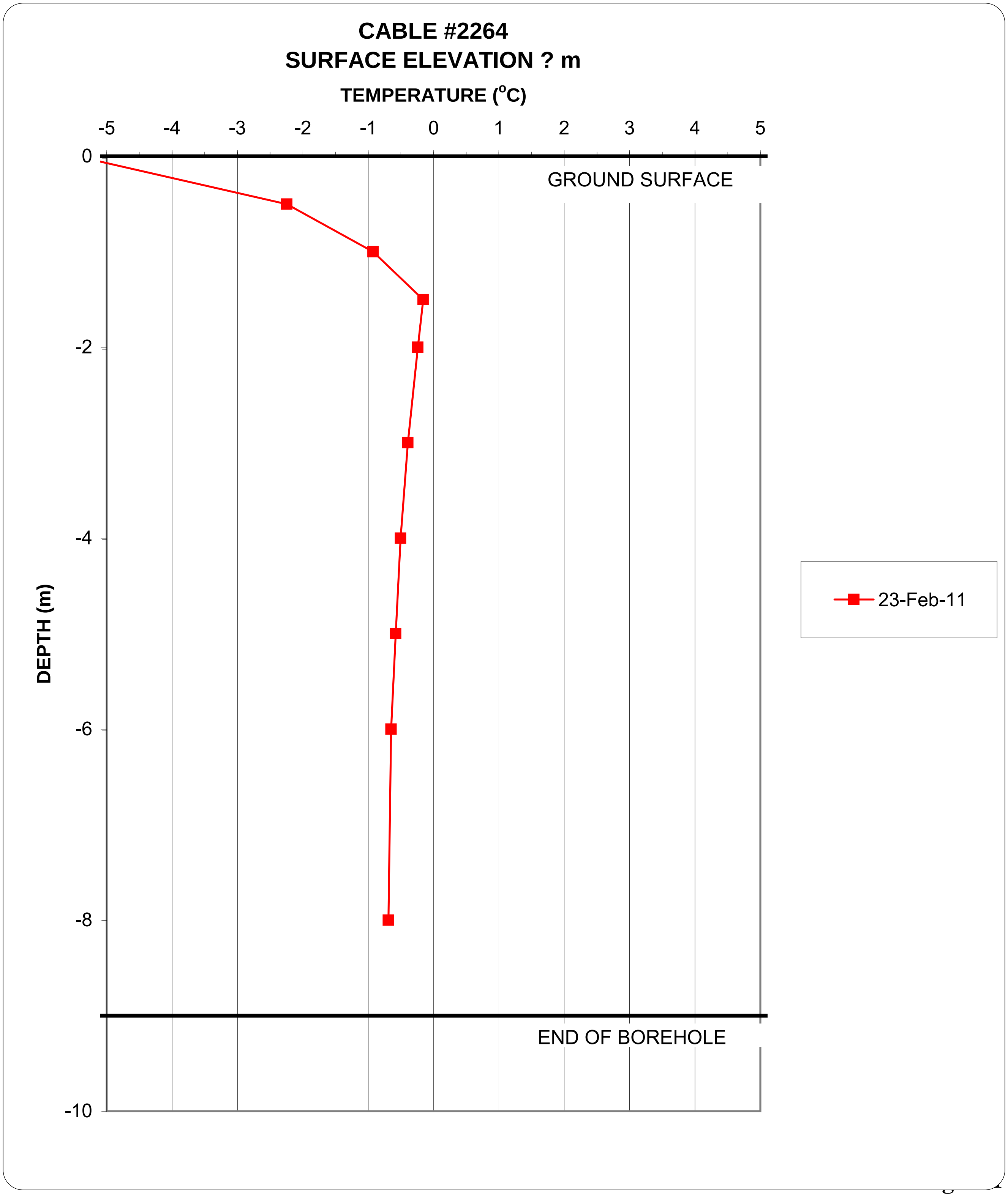


Drilled September 10, 2010

Ground Temperature Profile

DSTF

Borehole #31 - DSTF



Drilled September 10, 2010

Ground Temperature Profile
DSTF
Borehole #32 - DSTF

APPENDIX D

APPENDIX D LABORATORY TEST RESULTS - TAILINGS

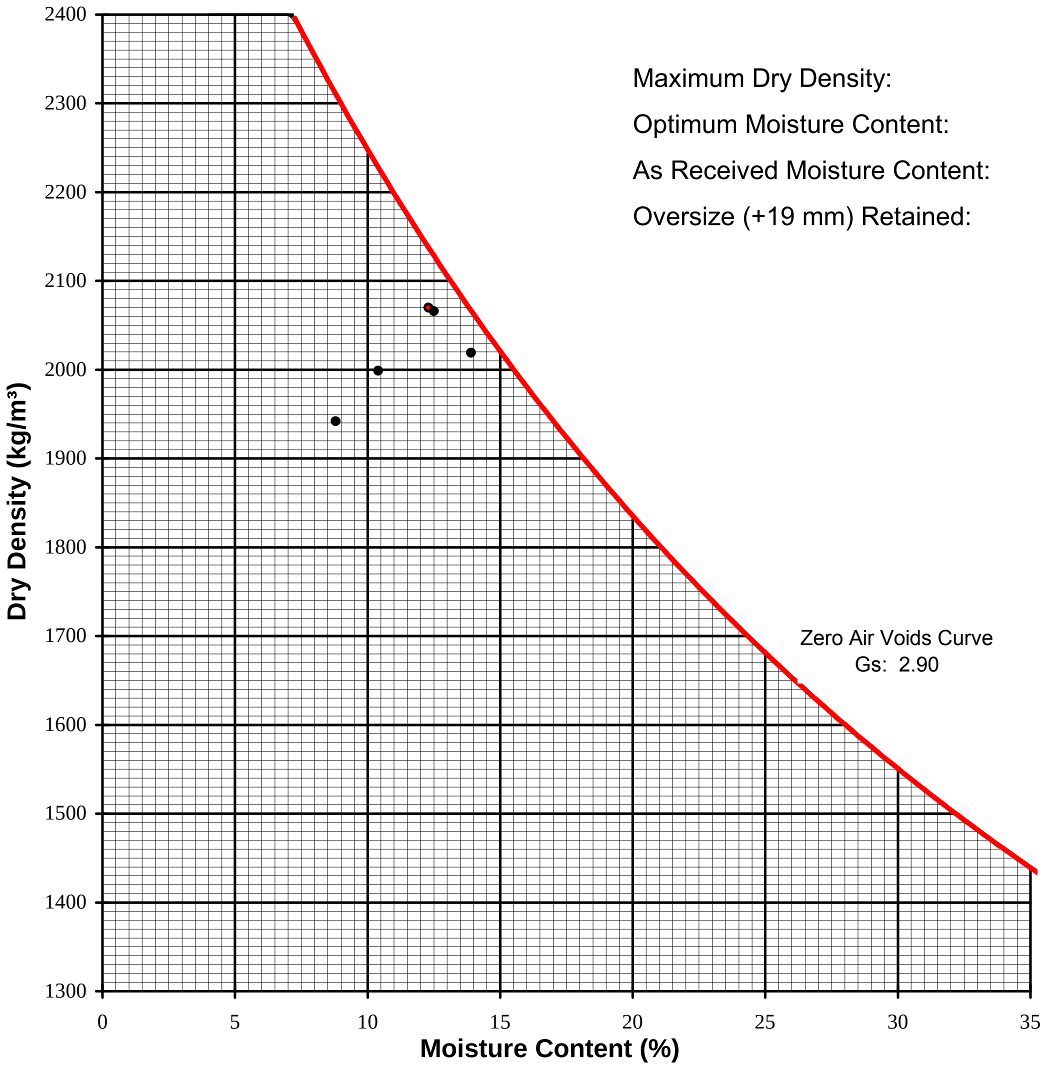
MOISTURE-DENSITY RELATIONSHIP (Proctor) REPORT

ASTM D698 (Standard Proctor)

Project:	Keno Hill District Mill - DSTF	Sample No.:	combined tailings
Project No.:	W14101178.011	Sampled By:	Alexco
Client:	Alexco Resource Corp.	Date Received:	3-Feb-11
Attention:	Scott Davidson	Test Date:	4-Feb-11
E-mail:		Test Method:	Method A
Source:	Combined Tailings	Compaction:	Manual

Sample Location: Tailings Stockpile

Sample Description: SAND, silty, trace clay - grey



Maximum Dry Density:	**2070**	kg/m³
Optimum Moisture Content:	**12.3**	%
As Received Moisture Content:	3.0	%
Oversize (+19 mm) Retained:	0.0	%

Remarks: ______________________________

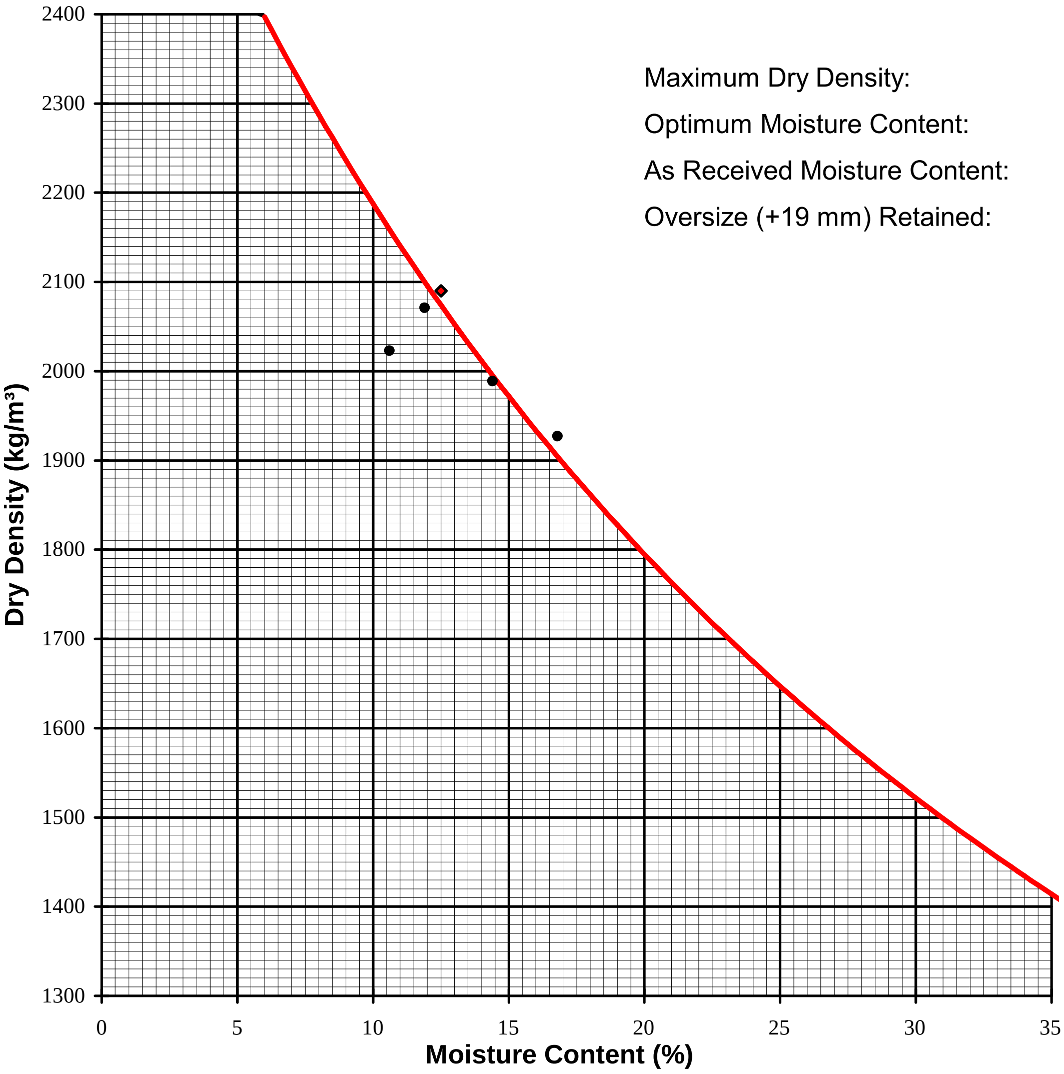
Reviewed By:______________________________

MOISTURE-DENSITY RELATIONSHIP (Proctor) REPORT

ASTM D698 (Standard Proctor)

Project: Keno Hill District Mill - DSTF
Project No.: W14101178.011
Client: Alexco Resource Corp
Attention:
E-mail:
Source: Tailings
Sample Location: Tailings Stockpile
Sample Description: SILT and SAND - trace clay

Sample No.: composite
Sampled By: Alexco
Date Received: 21-Jan-11
Test Date: 25-Jan-11
Test Method: Method A
Compaction: Manual



Maximum Dry Density:	**2090**	kg/m³
Optimum Moisture Content:	**12.5**	%
As Received Moisture Content:	0.0	%
Oversize (+19 mm) Retained:	0.0	%

Remarks:

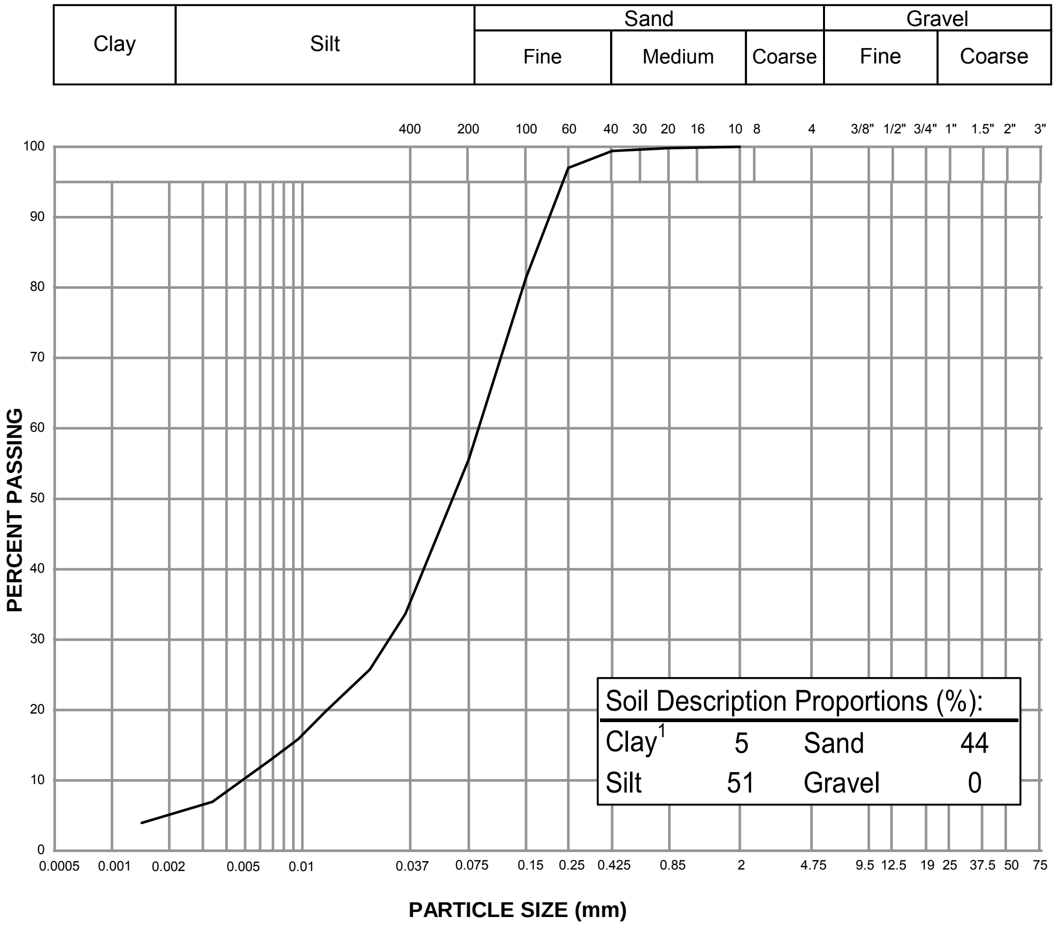
Reviewed By:____________________________

PARTICLE SIZE ANALYSIS TEST REPORT

ASTM D422, C136 & C117

Project:	Keno Hill District Mill - DSTF	Sample No.:	SA01
Project No.:	W14101178.011	Material Type:	Tailings
Site:	Keno City, YT	Sample Loc.:	
Client:	Alexco Resource Corp	Sample Depth:	
Client Rep.:		Sampling Method:	Grab
Date Tested:	January 24, 2011 By: SMS	Date sampled:	January, 2011
Soil Description[2]:	SILT and SAND - trace clay	Sampled By:	Alexco
		USC Classification:	Cu: 17.1
Moisture Content:	18.7%		Cc: 1.9

Particle Size (mm)	Percent Passing
75	
50	
38	
25	
19	
12.5	
10	
5	
2	100
0.85	100
0.425	99
0.25	97
0.15	81
0.075	56
0.0349	33.7
0.0226	25.7
0.0133	19.8
0.0095	15.8
0.0068	12.9
0.0034	6.9
0.0014	4.0



Notes: [1] The upper clay size of 2 um, per the Canadian Foundation Engineering Manual

[2] The description is visually based & subject to EBA description protocols

Specification: ____________________

Remarks: ____________________

Reviewed By: ____________________

PARTICLE SIZE ANALYSIS TEST REPORT

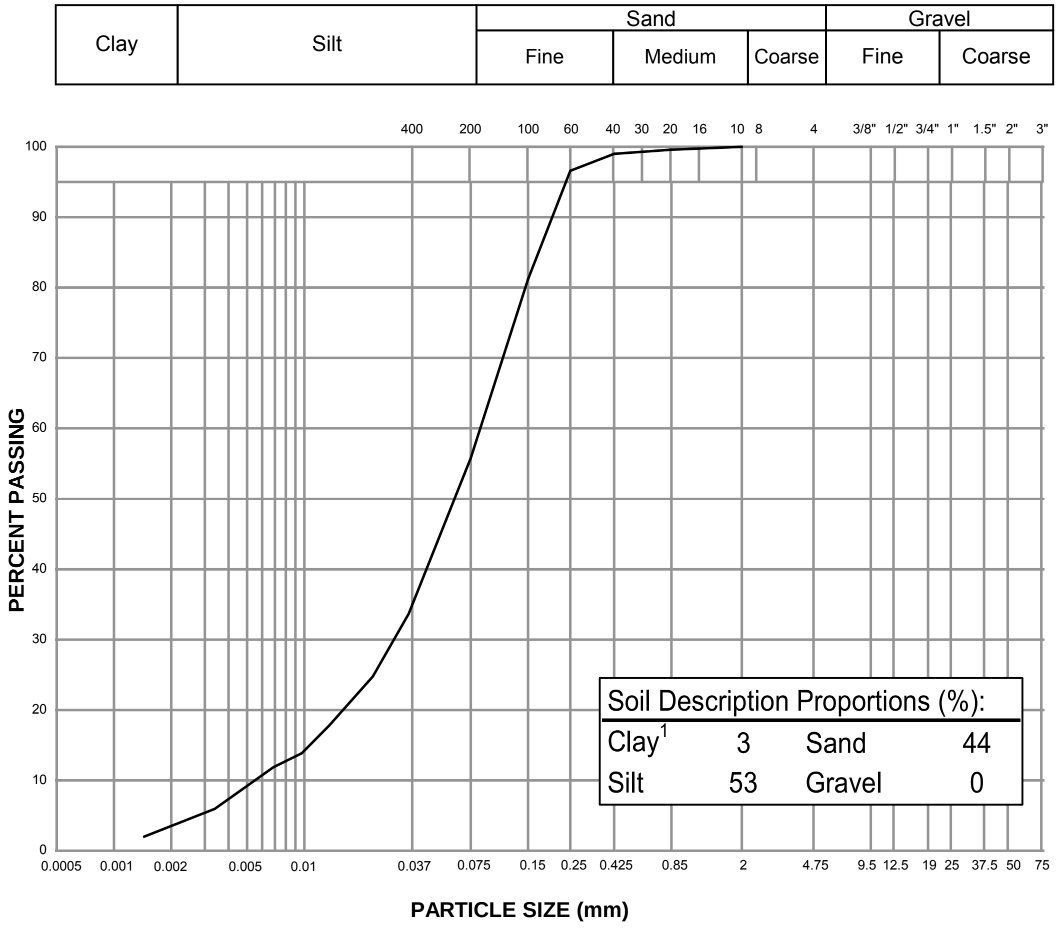
ASTM D422, C136 & C117

Project: Keno Hill District Mill - DSTF
Project No.: W14101178.011
Site: Keno City, YT
Client: Alexco Resource Corp
Client Rep.:
Date Tested: January 24, 2011 By: SMS
Soil Description[2]: SILT and SAND - trace clay

Sample No.: SA02
Material Type: Tailings
Sample Loc.:
Sample Depth:
Sampling Method: Grab
Date sampled: January, 2011
Sampled By: Alexco
USC Classification:
Cu: 15.2
Cc: 1.8

Moisture Content: 21.3%

Particle Size (mm)	Percent Passing
75	
50	
38	
25	
19	
12.5	
10	
5	
2	100
0.85	100
0.425	99
0.25	97
0.15	81
0.075	56
0.0354	33.7
0.0230	24.8
0.0135	17.8
0.0097	13.9
0.0069	11.9
0.0034	5.9
0.0014	2.0



Soil Description Proportions (%):

Clay[1]	3	Sand	44
Silt	53	Gravel	0

Notes: [1] The upper clay size of 2 um, per the Canadian Foundation Engineering Manual

[2] The description is visually based & subject to EBA description protocols

Specification:

Remarks:

Reviewed By:

A TETRA TECH COMPANY

PARTICLE SIZE ANALYSIS TEST REPORT

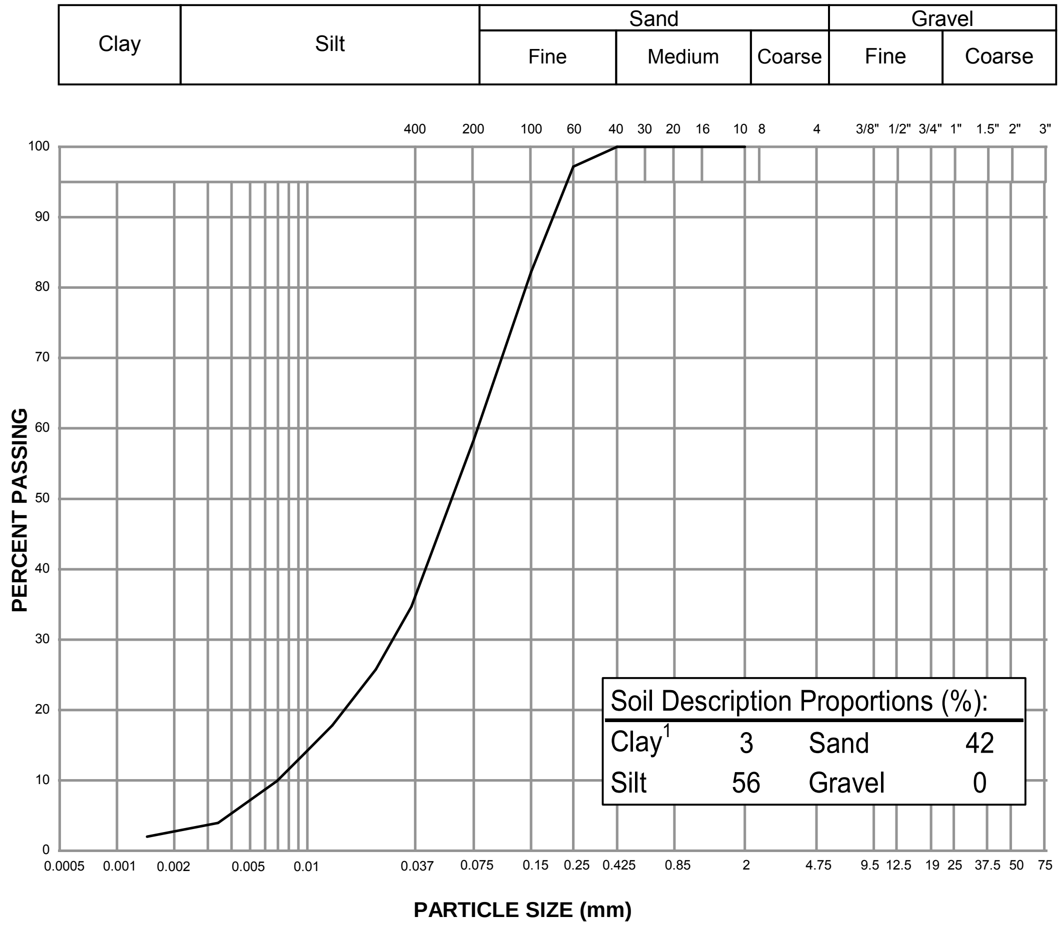
ASTM D422, C136 & C117

Project: Keno Hill District Mill - DSTF
Project No.: W14101178.011
Site: Keno City, YT
Client: Alexco Resource Corp
Client Rep.:
Date Tested: January 24, 2011 By: SMS
Soil Description[2]: SILT and SAND - trace clay

Sample No.: SA03
Material Type: Tailings
Sample Loc.:
Sample Depth:
Sampling Method: Grab
Date sampled: January, 2011
Sampled By: Alexco
USC Classification:
Cu: 11.5
Cc: 1.5

Moisture Content: 11.0%

Particle Size (mm)	Percent Passing
75	
50	
38	
25	
19	
12.5	
10	
5	
2	100
0.85	100
0.425	100
0.25	97
0.15	82
0.075	58
0.0352	34.7
0.0229	25.7
0.0135	17.8
0.0097	13.9
0.0069	9.9
0.0034	4.0
0.0014	2.0



Notes: [1] The upper clay size of 2 um, per the Canadian Foundation Engineering Manual

[2] The description is visually based & subject to EBA description protocols

Specification:

Remarks:

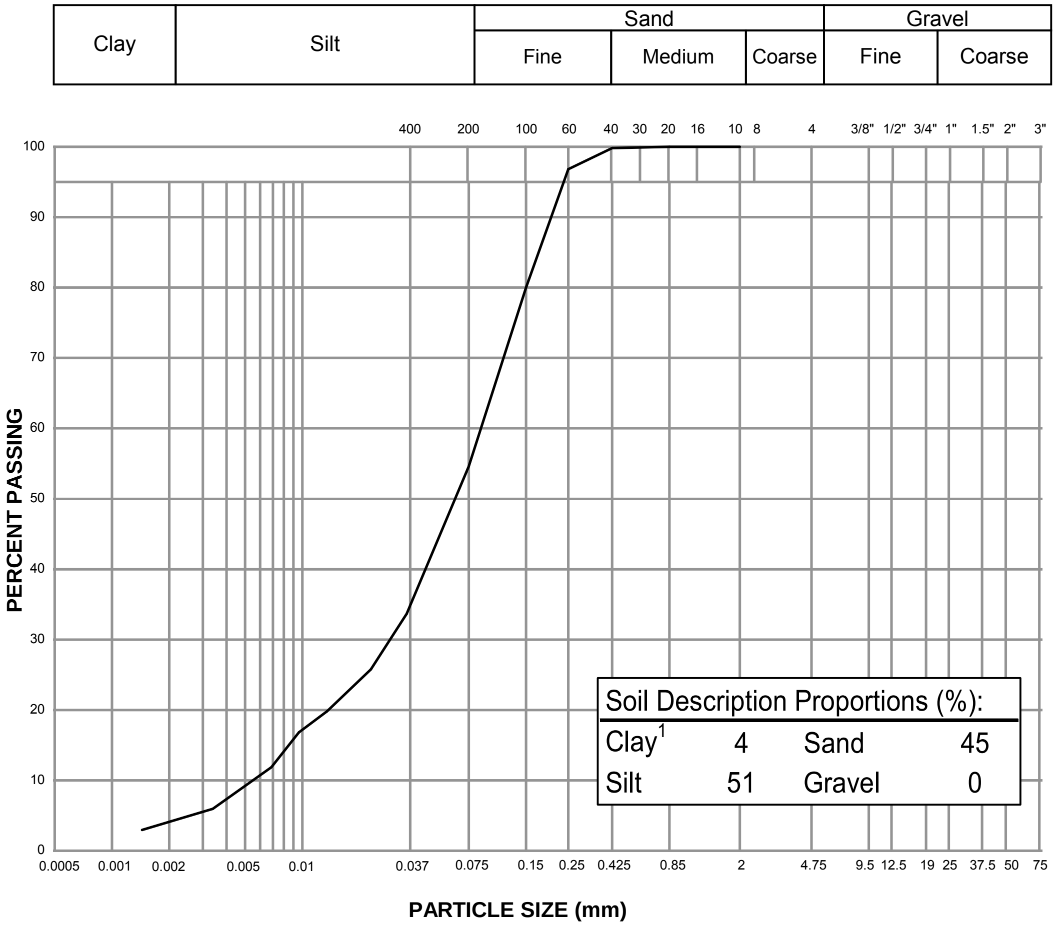
Reviewed By: ______________________

PARTICLE SIZE ANALYSIS TEST REPORT

ASTM D422, C136 & C117

Project:	Keno Hill District Mill - DSTF	Sample No.:	SA04
Project No.:	W14101178.011	Material Type:	Tailings
Site:	Keno City, YT	Sample Loc.:	
Client:	Alexco Resource Corp	Sample Depth:	
Client Rep.:		Sampling Method:	Grab
Date Tested:	January 24, 2011 By: SMS	Date sampled:	January, 2011
Soil Description[2]:	SILT and SAND - trace clay	Sampled By:	Alexco
		USC Classification:	Cu: 15.8
Moisture Content:	12.9%		Cc: 1.7

Particle Size (mm)	Percent Passing
75	
50	
38	
25	
19	
12.5	
10	
5	
2	100
0.85	100
0.425	100
0.25	97
0.15	80
0.075	55
0.0354	33.7
0.0229	25.7
0.0135	19.8
0.0096	16.8
0.0069	11.9
0.0034	5.9
0.0014	3.0



Soil Description Proportions (%):

Clay[1]	4	Sand	45
Silt	51	Gravel	0

Notes: [1] The upper clay size of 2 um, per the Canadian Foundation Engineering Manual

[2] The description is visually based & subject to EBA description protocols

Specification: ____________________

Remarks: ____________________

Reviewed By: ____________________

PARTICLE SIZE ANALYSIS TEST REPORT

ASTM D422, C136 & C117

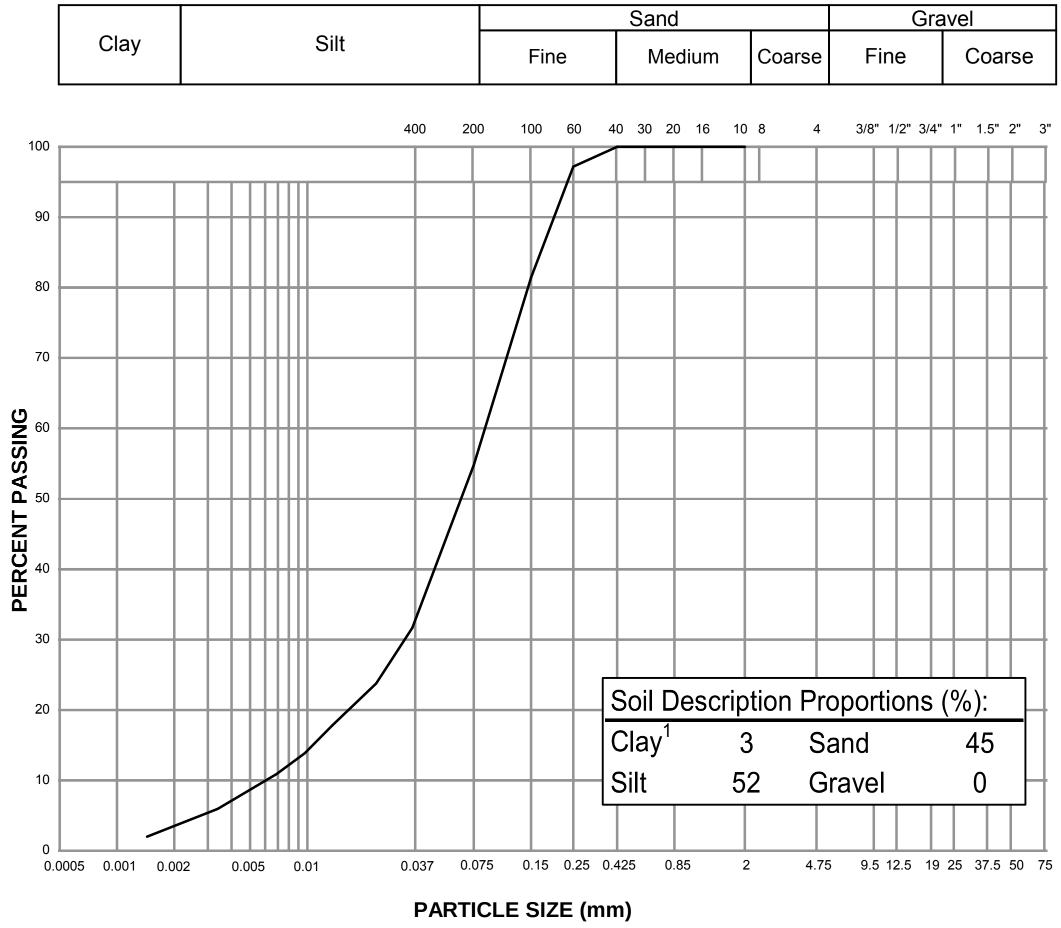
Project:	Keno Hill District Mill - DSTF	Sample No.:	SA05
Project No.:	W14101178.011	Material Type:	Tailings
Site:	Keno City, YT	Sample Loc.:	
Client:	Alexco Resource Corp	Sample Depth:	
Client Rep.:		Sampling Method:	Grab
Date Tested:	January 24, 2011 By: SMS	Date sampled:	January, 2011
Soil Description[2]:	SILT and SAND - trace clay	Sampled By:	Alexco
		USC Classification:	

Cu: 14.3

Moisture Content: 9.4%

Cc: 1.9

Particle Size (mm)	Percent Passing
75	
50	
38	
25	
19	
12.5	
10	
5	
2	100
0.85	100
0.425	100
0.25	97
0.15	81
0.075	55
0.0356	31.7
0.0230	23.8
0.0135	17.8
0.0097	13.9
0.0069	10.9
0.0034	5.9
0.0014	2.0



Soil Description Proportions (%):

Clay[1]	3	Sand	45
Silt	52	Gravel	0

Notes: [1] The upper clay size of 2 um, per the Canadian Foundation Engineering Manual

[2] The description is visually based & subject to EBA description protocols

Specification: ________________

Remarks: ________________

Reviewed By: ________________

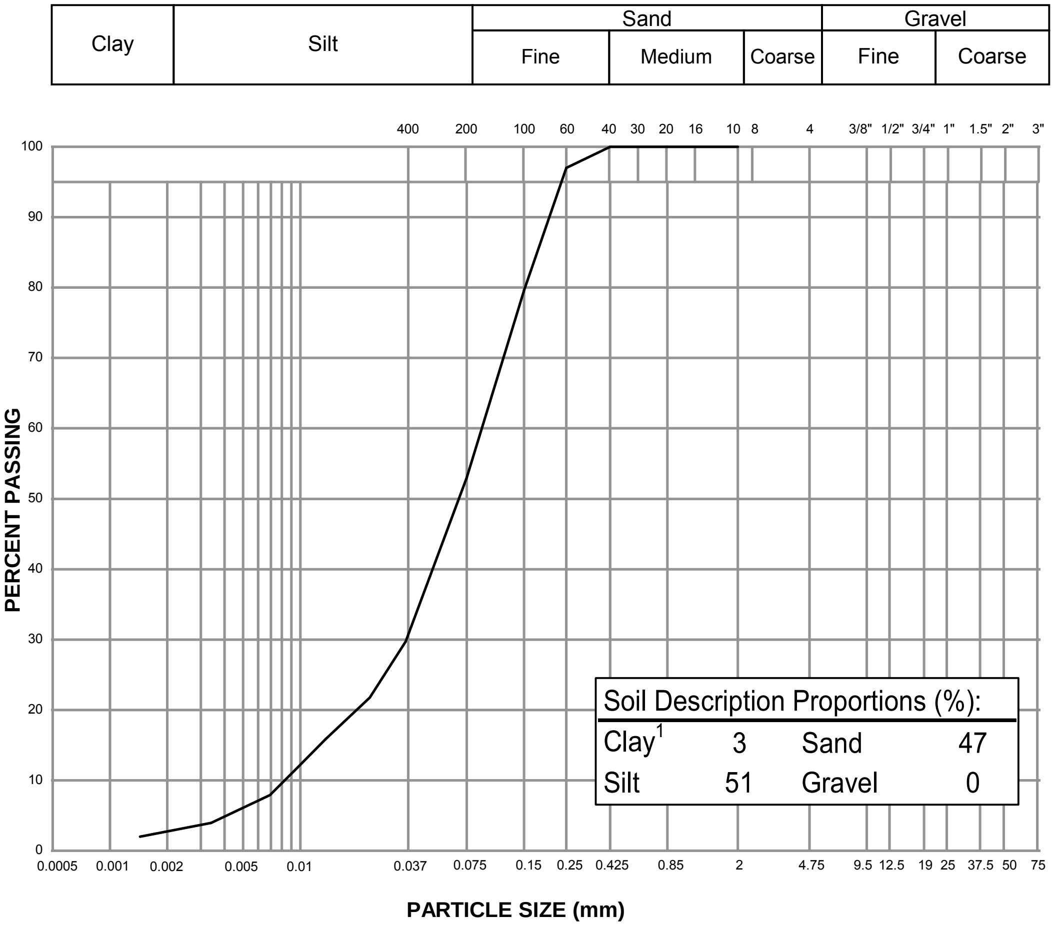
eba
A TETRA TECH COMPANY

PARTICLE SIZE ANALYSIS TEST REPORT

ASTM D422, C136 & C117

Project:	Keno Hill District Mill - DSTF	Sample No.:	SA06
Project No.:	W14101178.011	Material Type:	Tailings
Site:	Keno City, YT	Sample Loc.:	
Client:	Alexco Resource Corp	Sample Depth:	
Client Rep.:		Sampling Method:	Grab
Date Tested:	January 24, 2011 By: SMS	Date sampled:	January, 2011
Soil Description[2]:	SILT and SAND - trace clay	Sampled By:	Alexco
		USC Classification:	Cu: 11.3
Moisture Content:	8.6%		Cc: 1.7

Particle Size (mm)	Percent Passing
75	
50	
38	
25	
19	
12.5	
10	
5	
2	100
0.85	100
0.425	100
0.25	97
0.15	80
0.075	53
0.0358	29.7
0.0232	21.8
0.0136	15.8
0.0097	11.9
0.0069	7.9
0.0034	4.0
0.0014	2.0



Soil Description Proportions (%):

Clay[1]	3	Sand	47
Silt	51	Gravel	0

Notes: [1] The upper clay size of 2 um, per the Canadian Foundation Engineering Manual

[2] The description is visually based & subject to EBA description protocols

Specification:

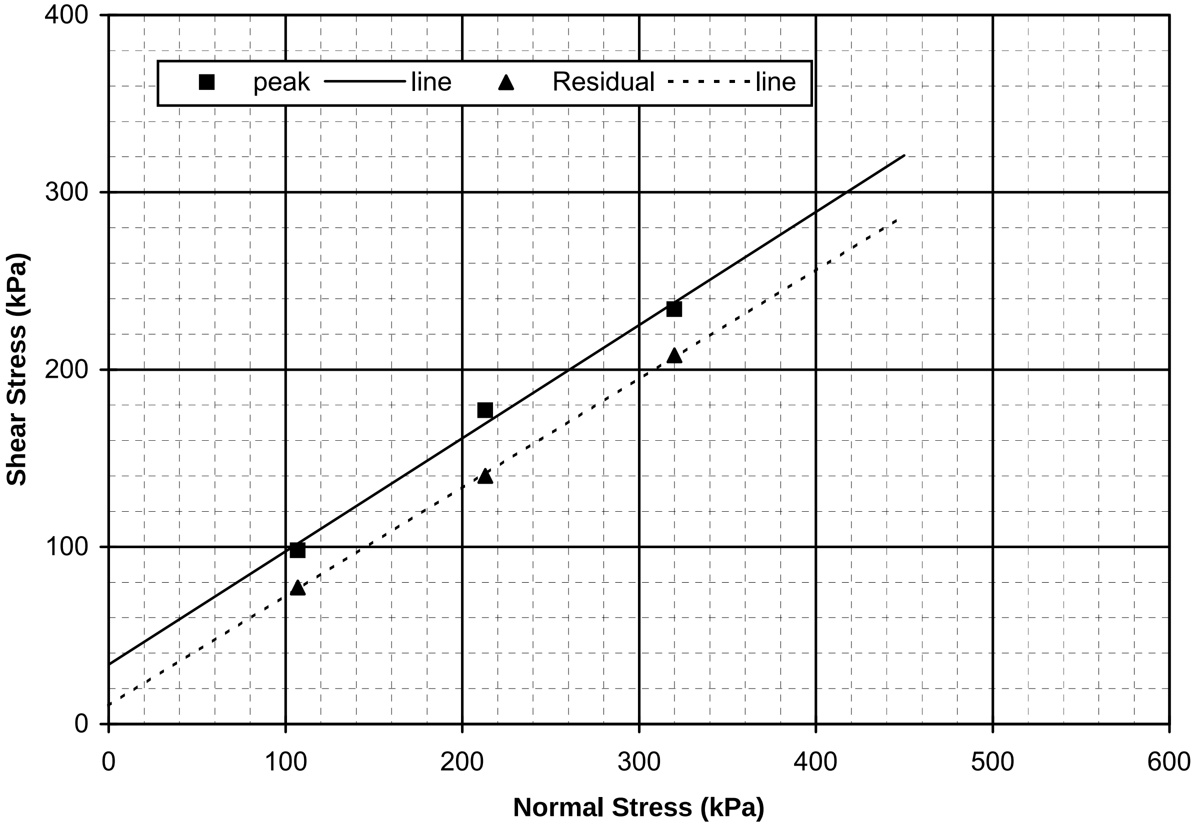
Remarks:

Reviewed By: ______________________

SUMMARY of DIRECT SHEAR TEST RESULTS

ASTM D3080

Project :	Keno Hill District Mill - DSTF	Test Hole :	Combined Tailings
Project No. :	**W14101178.011**	Depth:	
Client:	**Alexco Resource Corp**	Date :	11-02-10
		Tested By:	SK



Inferred Shear Strength Parameters :-

	Cohesion Intercept (kPa)	Inferred Angle of Shearing Resistance (Degrees)
Peak Strength:	33.5	32.6
Residual Strength:	10.5	31.6

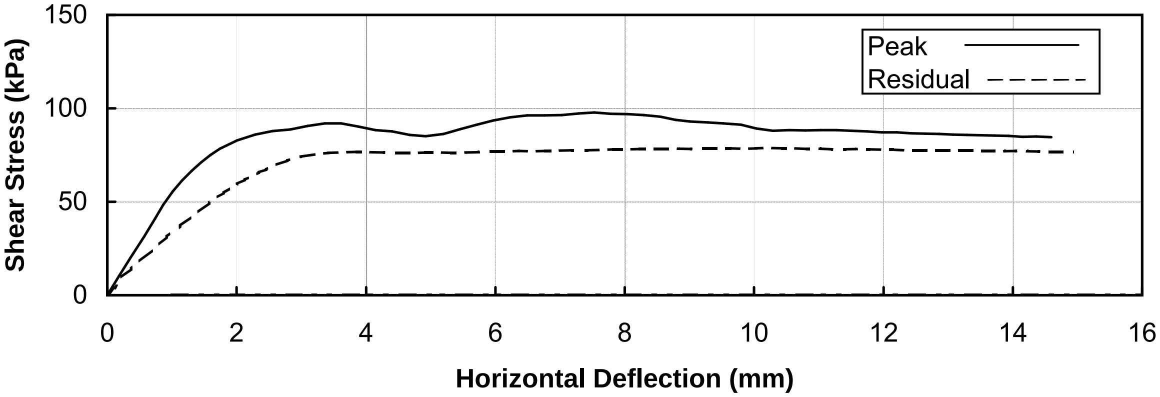
Reviewed By: ______________________________ P.Eng.

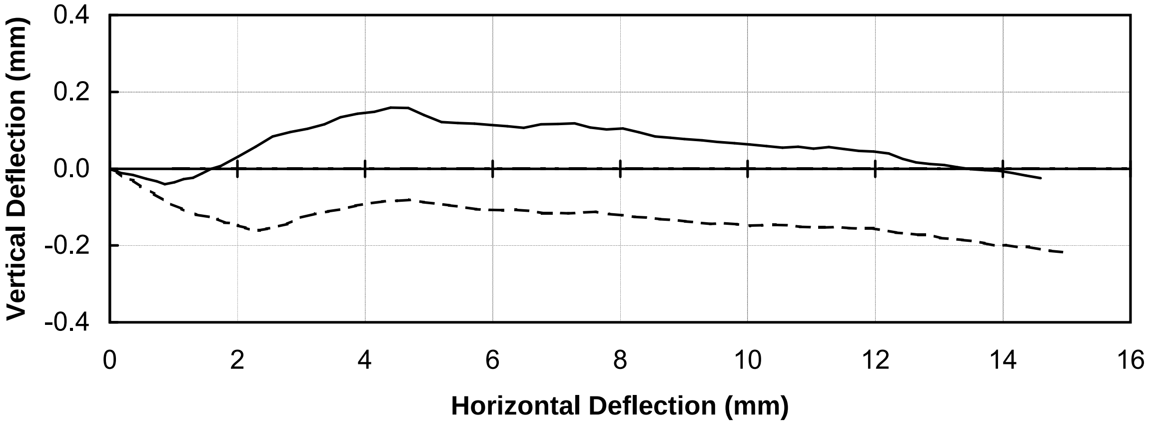
DIRECT SHEAR TEST

ASTM D3080

Project:	Keno Hill District Mill - DSTF	Test Hole No.:	Combined Tailings
Project No.:	W14101178.011	Depth:	
Client:	Alexco Resource Corp	Test No.:	DS-1
Date Tested:	11-02-07	Machine:	1
Descrition:	SAND, silty, trace clay	Preparation:	Remolded

Peak Stress (kPa) =	98	Normal Stress (kPa) =	107
Residual Stress (kPa) =	77	Displacement Rate (mm/min.) =	0.012
Shear Displacement (mm) =	14.6		





Remarks: ______________________________

Reviewed By: ______________________________ P.Eng.

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A TETRA TECH COMPANY

DIRECT SHEAR TEST

ASTM D3080

Project: Keno Hill District Mill - DSTF
Project No.: W14101178.011
Client: Alexco Resource Corp

Test Hole No.: Combined Tailings
Depth (m):
Test No.: DS-1
Date Tested: 11-02-07

	Initial	Final
Moisture Content (%)	12.8	16.3
Wet Density (Mg/m^3)	2.231	2.301
Dry Density (Mg/m^3)	1.978	1.978

Horizontal Displacement (mm)	Vertical Displacement (mm)	Shear Stress (kPa)	Horizontal Displacement (mm)	Vertical Displacement (mm)	Shear Stress (kPa)
0.00	0.000	0.0	7.53	0.107	97.7
0.18	-0.011	10.1	7.79	0.102	97.0
0.36	-0.016	20.2	8.04	0.105	97.0
0.57	-0.026	31.4	8.30	0.094	96.4
0.74	-0.033	40.9	8.55	0.084	95.5
0.86	-0.040	48.4	8.79	0.081	93.8
1.01	-0.036	55.6	9.00	0.077	92.9
1.16	-0.027	61.5	9.29	0.073	92.5
1.30	-0.024	66.7	9.52	0.070	91.9
1.45	-0.012	71.0	9.79	0.066	91.2
1.59	0.000	75.1	10.03	0.063	89.2
1.74	0.007	78.3	10.29	0.059	88.0
2.01	0.032	82.9	10.54	0.054	88.3
2.29	0.057	85.9	10.79	0.057	88.2
2.55	0.084	87.9	11.03	0.052	88.4
2.83	0.096	88.8	11.27	0.056	88.3
3.10	0.104	90.6	11.50	0.051	88.0
3.37	0.115	92.0	11.74	0.046	87.7
3.61	0.134	92.0	11.97	0.045	87.1
3.88	0.143	90.3	12.21	0.040	87.2
4.15	0.148	88.4	12.43	0.025	86.7
4.40	0.159	87.7	12.64	0.016	86.5
4.68	0.158	85.8	12.86	0.012	86.2
4.92	0.140	85.1	13.08	0.010	86.0
5.20	0.122	86.2	13.29	0.003	85.9
5.46	0.119	88.8	13.49	-0.002	85.7
5.71	0.117	91.3	13.72	-0.004	85.5
5.97	0.114	93.4	13.93	-0.005	85.3
6.23	0.110	95.2	14.15	-0.011	84.8
6.49	0.106	96.3	14.36	-0.018	84.9
6.76	0.116	96.3	14.59	-0.025	84.6
7.02	0.116	96.5			
7.29	0.118	97.2			

RESIDUAL STRENGTH TEST

ASTM D3080

Project: Keno Hill District Mill - DSTF

Sample No.: Combined Tailings

Horizontal Displacement (mm)	Vertical Displacement (mm)	Shear Stress (kPa)	Horizontal Displacement (mm)	Vertical Displacement (mm)	Shear Stress (kPa)
0.00	0.000	0.0	7.62	-0.113	77.7
0.11	-0.008	3.9	7.83	-0.118	78.0
0.22	-0.024	9.6	8.04	-0.121	78.1
0.37	-0.030	14.3	8.23	-0.125	78.2
0.48	-0.046	17.6	8.43	-0.127	78.3
0.70	-0.066	24.3	8.62	-0.131	78.3
0.92	-0.089	31.3	8.83	-0.133	78.4
1.13	-0.105	37.1	9.03	-0.137	78.3
1.35	-0.119	43.3	9.22	-0.141	78.4
1.58	-0.127	49.4	9.42	-0.144	78.4
1.69	-0.131	52.3	9.63	-0.142	78.5
1.80	-0.140	54.9	9.83	-0.145	78.4
1.91	-0.141	57.3	10.03	-0.148	78.6
2.01	-0.148	59.6	10.23	-0.148	78.7
2.13	-0.154	61.8	10.43	-0.146	78.7
2.24	-0.161	63.8	10.64	-0.147	78.5
2.35	-0.161	65.8	10.83	-0.152	78.3
2.46	-0.157	67.4	11.02	-0.152	78.3
2.56	-0.153	69.2	11.20	-0.153	78.1
2.78	-0.144	72.1	11.41	-0.152	78.1
2.99	-0.127	74.2	11.59	-0.154	78.2
3.22	-0.118	75.6	11.78	-0.156	78.1
3.43	-0.111	76.2	11.96	-0.155	77.9
3.63	-0.105	76.5	12.14	-0.161	77.9
3.85	-0.096	76.7	12.33	-0.166	77.6
4.07	-0.091	76.6	12.50	-0.169	77.6
4.28	-0.086	76.4	12.68	-0.172	77.5
4.49	-0.084	76.2	12.85	-0.172	77.5
4.71	-0.081	76.2	13.02	-0.180	77.6
4.92	-0.087	76.3	13.19	-0.183	77.4
5.13	-0.091	76.3	13.37	-0.185	77.5
5.32	-0.095	76.2	13.54	-0.189	77.3
5.54	-0.100	76.4	13.71	-0.194	77.3
5.74	-0.105	76.6	13.87	-0.200	77.1
5.95	-0.107	76.9	14.05	-0.199	77.1
6.16	-0.108	76.9	14.22	-0.204	77.0
6.36	-0.107	77.1	14.40	-0.204	76.8
6.57	-0.110	77.1	14.57	-0.210	76.7
6.77	-0.116	77.2	14.75	-0.214	76.7
6.98	-0.116	77.4	14.92	-0.218	76.5
7.19	-0.117	77.5			
7.42	-0.114	77.5			

DIRECT SHEAR TEST

ASTM D3080

Project:	Keno Hill District Mill - DSTF	Test Hole No.:	Combined Tailings
Project No.:	W14101178.011	Depth:	
Client:	Alexco Resource Corp	Test No.:	DS-2
Date Tested:	11-02-07	Machine:	2
Descrition:	SAND, silty, trace clay	Preparation:	Remolded

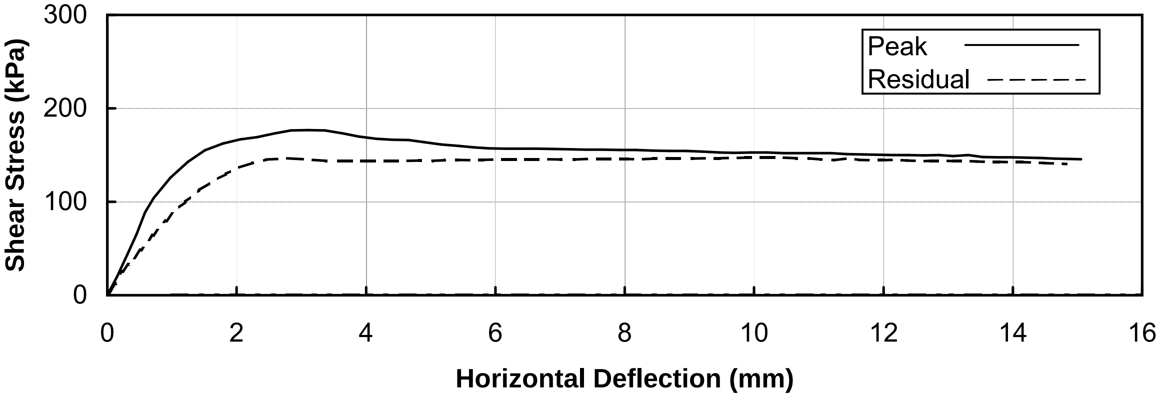
Peak Stress (kPa) = 177

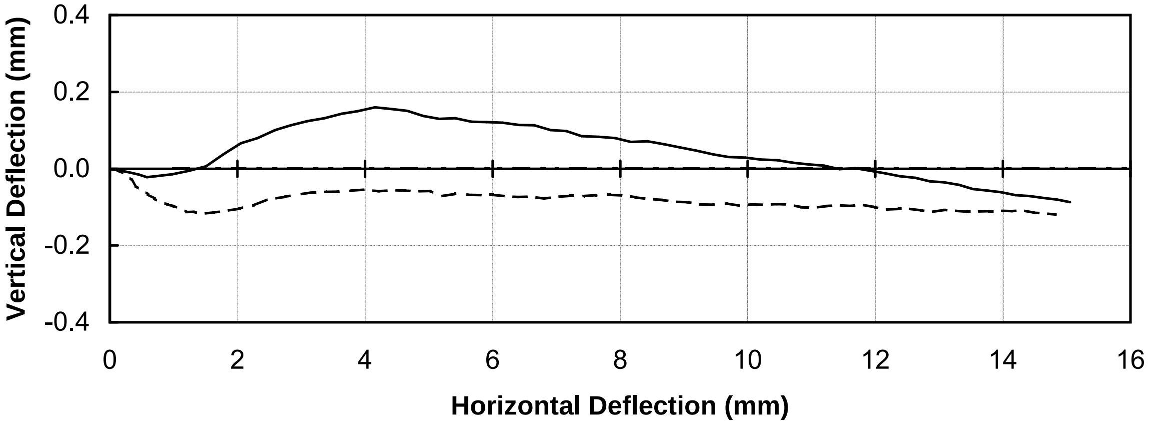
Residual Stress (kPa) = 140

Shear Displacement (mm) = 15.1

Normal Stress (kPa) = 213

Displacement Rate (mm/min.) = 0.012





Remarks:

Reviewed By: ________________________ P.Eng.

DIRECT SHEAR TEST

ASTM D3080

Project: Keno Hill District Mill - DSTF
Project No.: W14101178.011
Client: Alexco Resource Corp

Test Hole No.: Combined Tailings
Depth (m):
Test No.: DS-2
Date Tested: 11-02-07

	Initial	Final
Moisture Content (%)	12.7	16.1
Wet Density (Mg/m^3)	2.242	2.309
Dry Density (Mg/m^3)	1.989	1.989

Horizontal Displacement (mm)	Vertical Displacement (mm)	Shear Stress (kPa)	Horizontal Displacement (mm)	Vertical Displacement (mm)	Shear Stress (kPa)
0.00	0.000	0.0	7.92	0.079	155.6
0.15	-0.005	20.1	8.17	0.069	155.3
0.30	-0.009	43.1	8.43	0.071	154.8
0.46	-0.016	65.8	8.69	0.064	154.6
0.58	-0.022	88.7	8.94	0.055	154.3
0.72	-0.020	104.1	9.19	0.047	153.7
0.98	-0.015	125.6	9.46	0.037	152.9
1.24	-0.005	142.9	9.70	0.031	152.5
1.51	0.007	155.2	9.96	0.029	152.6
1.78	0.038	162.4	10.21	0.024	152.6
2.05	0.067	166.7	10.47	0.022	152.2
2.32	0.079	169.3	10.71	0.015	152.0
2.59	0.101	173.1	10.95	0.011	152.2
2.84	0.113	176.4	11.20	0.008	151.9
3.10	0.124	176.8	11.44	-0.001	151.1
3.36	0.131	176.4	11.68	0.001	150.8
3.63	0.143	173.2	11.92	-0.005	150.2
3.88	0.150	170.0	12.16	-0.012	150.0
4.16	0.160	167.5	12.39	-0.020	150.0
4.40	0.156	166.4	12.63	-0.024	149.8
4.66	0.151	166.0	12.86	-0.033	149.9
4.91	0.137	163.8	13.07	-0.036	149.0
5.16	0.130	161.4	13.31	-0.043	149.8
5.41	0.131	159.8	13.53	-0.053	147.9
5.67	0.122	158.3	13.77	-0.057	147.5
5.90	0.121	157.2	13.97	-0.062	147.5
6.15	0.120	156.7	14.20	-0.069	147.3
6.41	0.114	157.0	14.42	-0.071	146.9
6.65	0.113	156.9	14.64	-0.077	146.4
6.91	0.100	156.6	14.85	-0.081	145.8
7.16	0.098	156.3	15.05	-0.087	145.4
7.40	0.085	155.8			
7.66	0.083	155.7			

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RESIDUAL STRENGTH TEST

ASTM D3080

Project: Keno Hill District Mill - DSTF

Sample No.: Combined Tailings

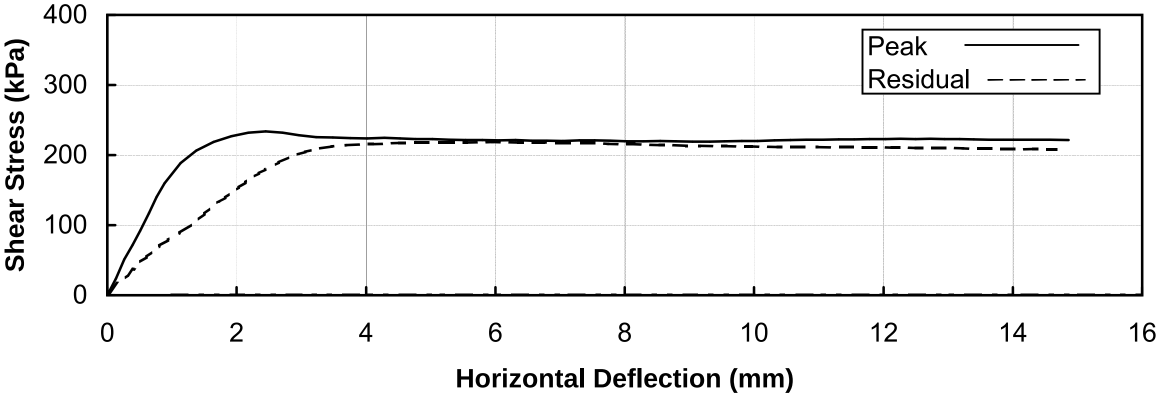
Horizontal Displacement (mm)	Vertical Displacement (mm)	Shear Stress (kPa)	Horizontal Displacement (mm)	Vertical Displacement (mm)	Shear Stress (kPa)
0.00	0.000	0.0	7.43	-0.072	145.8
0.13	-0.004	12.2	7.63	-0.069	145.8
0.23	-0.014	25.3	7.83	-0.068	146.0
0.33	-0.028	32.7	8.04	-0.070	146.0
0.41	-0.045	40.0	8.25	-0.075	145.7
0.51	-0.057	48.1	8.45	-0.079	146.2
0.60	-0.067	55.8	8.65	-0.081	146.2
0.70	-0.078	64.1	8.85	-0.086	146.2
0.80	-0.088	72.1	9.05	-0.087	146.4
0.91	-0.093	79.6	9.26	-0.093	146.5
1.01	-0.098	87.0	9.47	-0.094	146.6
1.11	-0.104	93.7	9.67	-0.091	146.9
1.20	-0.113	100.1	9.87	-0.096	147.2
1.32	-0.112	106.8	10.07	-0.093	147.4
1.42	-0.118	112.3	10.26	-0.094	147.4
1.63	-0.114	122.0	10.46	-0.092	147.3
1.83	-0.109	129.7	10.66	-0.093	146.6
2.04	-0.104	136.6	10.84	-0.100	146.7
2.25	-0.096	141.8	11.04	-0.102	145.2
2.46	-0.080	145.2	11.24	-0.097	144.6
2.75	-0.073	146.5	11.43	-0.096	146.2
3.17	-0.062	144.7	11.62	-0.097	144.8
3.38	-0.061	143.9	11.81	-0.094	144.6
3.59	-0.060	143.4	12.00	-0.101	144.4
3.80	-0.057	143.4	12.18	-0.106	144.8
4.01	-0.054	143.7	12.37	-0.105	144.2
4.22	-0.058	143.9	12.55	-0.105	143.5
4.42	-0.056	143.8	12.72	-0.109	143.7
4.63	-0.057	144.0	12.90	-0.112	143.7
4.83	-0.059	144.1	13.09	-0.108	143.6
5.03	-0.058	144.0	13.26	-0.110	143.5
5.22	-0.071	144.4	13.44	-0.112	143.3
5.42	-0.066	144.8	13.62	-0.111	142.9
5.61	-0.068	144.6	13.79	-0.111	142.8
5.81	-0.069	144.8	13.97	-0.109	142.6
6.00	-0.068	145.0	14.14	-0.111	142.3
6.20	-0.071	145.3	14.32	-0.109	142.0
6.40	-0.074	145.1	14.49	-0.115	141.4
6.60	-0.073	145.3	14.66	-0.116	141.1
6.81	-0.078	145.5	14.83	-0.119	140.3
7.02	-0.074	145.3			
7.23	-0.071	145.3			

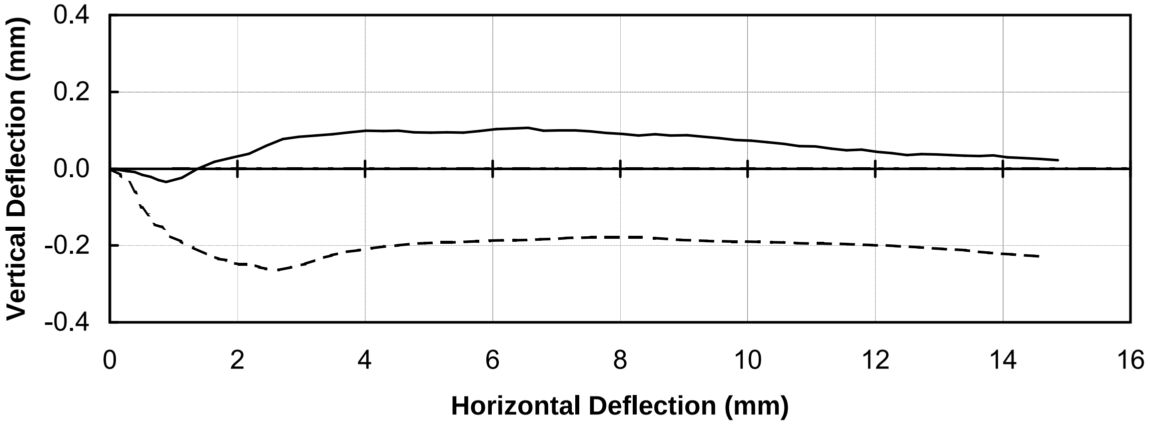
DIRECT SHEAR TEST

ASTM D3080

Project:	Keno Hill District Mill - DSTF	Test Hole No.:	Combined Tailings
Project No.:	W14101178.011	Depth:	
Client:	Alexco Resource Corp	Test No.:	DS-3
Date Tested:	11-02-07	Machine:	3
Descrition:	SAND, silty, trace clay	Preparation:	Remolded

Peak Stress (kPa) =	234	Normal Stress (kPa) =	320
Residual Stress (kPa) =	208	Displacement Rate (mm/min.) =	0.012
Shear Displacement (mm) =	14.9		





Remarks:

Reviewed By: ______________________________ P.Eng.

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DIRECT SHEAR TEST

ASTM D3080

Project:	Keno Hill District Mill - DSTF	Test Hole No.:	Combined Tailings
Project No.:	W14101178.011	Depth (m):	
Client:	Alexco Resource Corp	Test No.:	DS-3
		Date Tested:	11-02-07

	Initial	Final
Moisture Content (%)	12.7	15.9
Wet Density (Mg/m^3)	2.236	2.300
Dry Density (Mg/m^3)	1.985	1.985

Horizontal Displacement (mm)	Vertical Displacement (mm)	Shear Stress (kPa)	Horizontal Displacement (mm)	Vertical Displacement (mm)	Shear Stress (kPa)
0.00	0.000	0.0	7.53	0.097	220.9
0.13	-0.003	23.9	7.78	0.093	220.4
0.26	-0.006	51.3	8.03	0.090	219.7
0.39	-0.009	71.9	8.29	0.086	219.8
0.51	-0.016	92.3	8.55	0.089	220.0
0.64	-0.021	117.0	8.79	0.087	219.5
0.76	-0.030	140.0	9.05	0.087	219.0
0.88	-0.035	160.0	9.32	0.083	219.3
1.13	-0.024	188.5	9.55	0.079	219.7
1.37	0.000	206.5	9.81	0.075	220.1
1.64	0.018	218.8	10.05	0.073	220.2
1.92	0.029	227.1	10.31	0.069	220.8
2.18	0.038	231.9	10.56	0.064	221.7
2.45	0.059	233.6	10.81	0.058	221.8
2.71	0.077	232.2	11.06	0.058	222.1
2.96	0.083	228.5	11.31	0.052	222.2
3.23	0.086	225.7	11.55	0.048	222.4
3.49	0.090	225.2	11.79	0.049	222.8
3.76	0.095	224.2	12.03	0.044	223.1
4.02	0.098	223.9	12.26	0.040	223.2
4.29	0.098	224.5	12.50	0.036	223.1
4.53	0.099	223.8	12.72	0.038	223.2
4.77	0.095	223.1	12.95	0.037	223.1
5.03	0.094	222.6	13.18	0.036	222.8
5.29	0.095	221.9	13.40	0.034	222.5
5.54	0.094	221.7	13.63	0.033	222.1
5.80	0.098	221.4	13.85	0.035	221.9
6.06	0.103	221.2	14.07	0.030	221.9
6.31	0.104	221.4	14.29	0.028	221.8
6.56	0.106	220.5	14.58	0.026	221.8
6.80	0.099	220.5	14.86	0.022	221.7
7.05	0.099	220.2			
7.30	0.099	221.1			

RESIDUAL STRENGTH TEST

ASTM D3080

Project: Keno Hill District Mill - DSTF

Sample No.: Combined Tailings

Horizontal Displacement (mm)	Vertical Displacement (mm)	Shear Stress (kPa)	Horizontal Displacement (mm)	Vertical Displacement (mm)	Shear Stress (kPa)
0.00	0.000	0.0	7.15	-0.181	217.4
0.17	-0.016	18.0	7.35	-0.180	216.9
0.31	-0.035	28.1	7.54	-0.179	216.7
0.40	-0.061	36.8	7.74	-0.179	216.2
0.49	-0.102	46.5	7.94	-0.179	215.8
0.61	-0.121	54.9	8.15	-0.179	215.3
0.71	-0.146	63.1	8.33	-0.179	214.9
0.81	-0.152	70.9	8.55	-0.181	214.2
0.94	-0.175	78.8	8.75	-0.183	214.3
1.12	-0.190	89.2	8.95	-0.185	213.4
1.31	-0.206	101.3	9.16	-0.187	213.1
1.50	-0.222	116.3	9.36	-0.188	212.7
1.71	-0.235	132.2	9.56	-0.189	212.9
1.82	-0.238	139.5	9.76	-0.190	212.4
1.93	-0.245	146.9	9.96	-0.190	212.2
2.03	-0.249	154.1	10.17	-0.191	212.0
2.14	-0.249	161.1	10.37	-0.191	211.4
2.24	-0.251	167.9	10.58	-0.193	211.4
2.34	-0.256	173.9	10.77	-0.194	211.4
2.45	-0.261	179.4	10.98	-0.195	211.3
2.65	-0.264	189.6	11.17	-0.195	211.1
2.84	-0.256	198.2	11.37	-0.196	211.3
3.06	-0.248	204.5	11.56	-0.197	211.4
3.26	-0.235	209.0	11.74	-0.197	210.8
3.47	-0.226	212.2	11.94	-0.199	210.8
3.69	-0.217	214.1	12.13	-0.200	210.3
3.90	-0.212	214.9	12.32	-0.202	210.3
4.11	-0.207	215.6	12.50	-0.203	210.1
4.31	-0.202	216.5	12.68	-0.204	210.1
4.52	-0.200	217.6	12.87	-0.207	210.1
4.73	-0.196	217.9	13.05	-0.209	210.1
4.94	-0.194	218.0	13.23	-0.211	209.7
5.13	-0.193	218.3	13.41	-0.213	209.2
5.35	-0.192	218.1	13.60	-0.216	209.0
5.55	-0.190	217.9	13.78	-0.219	208.4
5.75	-0.189	218.1	13.96	-0.221	208.4
5.96	-0.188	218.6	14.14	-0.223	208.3
6.16	-0.187	218.1	14.32	-0.225	208.4
6.36	-0.186	218.0	14.50	-0.227	208.3
6.56	-0.186	218.3	14.67	-0.229	208.3
6.75	-0.184	218.1			
6.95	-0.183	217.6			

APPENDIX E

APPENDIX E THERMAL ANALYSIS

EBA, A Tetra Tech Company
14940 - 123 Avenue
Edmonton, AB T5V 1B4 CANADA
p. 780.451.2121 f. 780.454.5688

TECHNICAL MEMO

TO: Bill Horne

DATE: March 28 ,2011

C: Gordon Zhang

FROM: Hongwei Xia

EBA FILE: W14101178.011

SUBJECT: Thermal Analysis of Dry Stacked Tailings Facility Area, Keno Hill Silver District, YT

1.0 INTRODUCTION

EBA, a Tetra Tech Company (EBA) was retained by Alexco Resource Corp. (Alexco) to conduct thermal analyses for the proposed dry-stacked tailings facility (DSTF) area at the Bellekeno mine site in Keno Hill Silver District, Yukon. The purpose of the analysis was to investigate the long-term impact of dry-stacked tailings placement on the thermal regime of the underlying original ground in the DSTF area under climatic conditions including a climate change scenario (global warming). This memo summarizes the methodology, input data, and results of the thermal analyses. Conclusions drawn from the results are also presented in this memo.

2.0 PROJECT DESCRIPTION

2.1 General Site Condition

The proposed DSTF area generally slopes west at approximately 15% to 20%. The overburden thickness in the area varies with locations, typically increasing along the valley bed and decreasing on the valley slope. The overburden thickness in the area approximately ranged from 2 m to 25 m based on the available borehole information. The overburden soil generally consists of a peat or moss layer overlying ice-rich silt, sand, and glaciofluvial gravel underlain by predominately igneous rocks of quartzite (EBA 2010).

2.2 Permafrost Condition

A total of twenty boreholes were drilled at the mine site including ten boreholes drilled in and near the proposed DSTF area. Permafrost was encountered throughout the proposed DSTF area during the site investigation. The permafrost encountered ranged from non-visible, non-excess ice to massive ice lenses. Ice volumes estimated as a percentage of the total soil volume vary between less than 5% and nearly 100%. In eight of the boreholes drilled at the mine site, massive ice was encountered and the thickness of massive ice ranged from 1.0 m to 15 m (EBA 2010). The DSTF was located to avoid most of the ice rich permafrost; however one borehole within the proposed DSTF had a total of 4 m of massive ice below 9.5 m.

2.3 Ground Temperature

Two ground temperature cables (GTCs) were installed at the proposed DSTF area. Ground temperature data measured from the GTCs indicated that the ground temperature near the proposed DSTF area approximately ranged from -0.2°C and -0.4°C (EBA 2010).

2.4 Porewater Salinity

Six salinity tests were performed on the selected samples. The salinity test results indicated that porewater salinity ranged from 1 ppt to 3 ppt. The porewater salinity was assumed to be 2 ppt in the thermal analysis to consider the freezing point depression due to the impact of porewater salinity.

3.0 THERMAL ANALYSES MODEL

3.1 General

Analyses were carried out using EBA's proprietary two-dimensional finite element computer model, GEOTHERM. The model simulates transient, two-dimensional heat conduction with change of phase for a variety of boundary conditions. The heat exchange at the ground surface is modelled with an energy balance equation considering air temperatures, wind velocity, snow depth, and solar radiation. The model facilitates the inclusion of temperature phase change relationships for soils, such that any freezing depression and unfrozen water content variations can be explicitly modelled. The model has been verified by comparing its results with closed-form analytical solutions and many different field observations. The model has successfully formed the basis for thermal evaluations and designs of tailings dykes, dams, foundations, pipelines, utilidor systems, landfills, and ground freezing systems in both arctic and sub-arctic regions.

3.2 Climatic Data Input for Thermal Model

Climatic data required for the thermal analyses includes monthly air temperature, wind speed, solar radiation, and snow cover. No long-term climatic data is available at the DSTF. A meteorological station on Galena Hill in Keno Hill Silver District has been operated since June 2007 at an elevation of approximately 1380 m above sea level to record wind speed, air temperature, relative humidity, barometric pressure, solar radiation, and rainfall. The weather station is close the DSTF; however the weather station is at an elevation approximately 400 m higher. The available climatic data at this station are from June 2007 to November 2010.

Mayo is the closest meteorological station that has a long-term climate record for the region. The station is located at 63° 37' N, 135° 52' W and an elevation of 504 m, which is approximately 40 km northwest of Keno Hill. The station has daily air temperature records from January 1971 to November 2010. Measured long-term air temperatures at the Mayo station were obtained from Environment Canada (http://www.climate.weatheroffice.ec.gc.ca).

Comparison of the measured air temperatures between the Mayo station and Galena Hill station for the past four years of the overlapped period indicates that mean air temperatures at the Galena Hill station (1380 m) are approximately 3°C to 5°C warmer than those at the Mayo station (504 m) during winter periods, and approximately 5°C cooler than those at the Mayo station during summer periods. One possible reason for the temperature discrepancy in winter period is general winter temperature inversion in the Yukon where temperatures increase with height during winter (Wahl et al, 1987). Analysis of a 43-year period of data (1958-2000) from Whitehorse shows a long-term average lapse rate of approximately +8°C/km up to an elevation of 1500 m during the winter (Pinard, 2009). The positive sign indicates a warming with elevation, or an inversion. Long-term mean monthly air temperatures for this study were estimated based on the long-term monthly air temperatures at Mayo and then adjusted the air temperatures based on the measured monthly air temperature differences between the Mayo and Galena Hill stations during the overlapped period of 2007 to 2010.

Measured wind speed data from the Galena Hill station is available from June 2007 to September 2010. Long-term mean wind speed data is available from 1971-2000 at the Mayo station. Comparison between the measured wind speed data from the Mayo and Galena Hill stations indicated that the measured wind speed at the Mayo and Galena stations are very similar; therefore, the measured wind speed data at Galena Hill station were used in the thermal analysis.

No snow depth data is available from the Galena Hill station. The climate records from available climate stations near the Keno Hill Silver District shows a linear relationship can be established between mean annual precipitation and elevation at these available stations. The mean annual precipitation increases by an average 27 mm for every 100 m of elevation increasing (ACCESS 2009). Snow depth were predicted based on the snow depth data from Mayo station using the linear relationship.

Norman Wells and Whitehorse are the closet stations to the Keno Hill Silver District with long-term solar radiation data. The measured solar radiation data from the Galena Hill station is available between June 2007 and September 2010. Comparison of the available solar radiation data from the three stations indicated that the measured solar radiation data from the Galena Hill is close to these from Norma Wells and Whitehorse. Therefore, the average monthly solar radiation data from the three stations was used in this study.

The mean climatic data estimated for the DSTF for this study are summarized in Table 1.

Table 1: Mean Climatic Conditions at Keno Hill Used in Thermal Analyses

Month	**Estimated Mean Monthly Air Temperatures at Keno Hill (1971 to 2007)** [(a)] **(°C)**	**Measured Monthly Air Temperature at Keno Hill (2007-2010)** [(b)] **(°C)**	**Measured Monthly Wind Speed at Keno Hill**[(c)] **(km/h)**	**Estimated Monthly Snow Cover at Keno Hill**[(d)] **(m)**	**Estimated Daily Solar Radiation at Keno Hill**[(e)] **(W/m^2)**
January	-14.7	-16.7	7.7	0.57	9.1
February	-14.0	-14.3	5.4	0.57	38.3
March	-14.4	-12.2	12.4	0.53	101.4
April	-4.9	-3.8	11.8	0.41	181.8
May	3.4	4.1	8.8	0	233.5
June	9.6	9.0	7.5	0	242.9
July	10.8	10.7	8.2	0	218.4
August	8.0	8.1	8.7	0	162.0
September	1.9	2.3	8.5	0	96.4
October	-5.1	-6.2	8.0	0.34	41.5
November	-13.6	-10.5	8.9	0.48	13.2
December	-10.2	-15.2	5.5	0.56	4.5
Annual	-3.6	-3.7			

Notes:

(a) Based on measured monthly air temperatures at Mayo for the periods of 1971 to 2010, measured air temperatures at Galena Hill station for the period of 2007 to 2010

(b) Based on measured temperature data at Galena Hill station (2007-2010)

(c) Based on measured data at Galena Hill station for the period of 2007 to 2010

(d) Based on mean month-end snow data at Mayo (Climate Normals 1971-2000, Environment Canada website) and environmental conditions report (Access Consulting Group, 2009)

(e) Based on measured data at Galena Hill station (2007-2010), Norman Wells and Whitehorse (1951-1980)

3.3 Climate Change Projection

The historical air temperature data at Mayo for the period of 1970 to 2010 indicated that the long-term climatic trend at Mayo is warming, and a similar conclusion can be made at Keno Hill DSTF. Based on the observed warming trend in the historical air temperatures and state-of-practice, the thermal evaluations for this project should consider the long-term effects of climate change (or global warming).

The Adaptation and Impacts Research Section (AIRS) of Environment Canada recently produced a report (Environment Canada 2009) summarizing findings from the most recent modelling assessment for the Arctic. AIRS adopted an ensemble approach (multi-model means/medians) to reduce the uncertainty associated with any individual model. Model validation over the historical period from 1971-2000 was first used to identify those models which best reproduced the mean annual temperature of this period against the National Centre for Environmental Prediction global gridded dataset. Subsequently, only the four best-agreement models were used to produce the final ensemble projections. The four best ranking models within each sector were then used as an ensemble to produce projections of temperature change in the 2020s, 2050s, and 2080s for both the 'A1B' (middle of the road emission), and 'A2' (high emission) scenarios. CSA (2010) adopted the climate change projections in Environment Canada (2009).

The Keno Hill site (63° N 135° W) is located at the arctic zone W1 in Environment Canada (2009) and CSA (2010). The predicted mean temperature changes from 1970-2000 baseline under the moderate green-house gas emission scenario in zone W1 (CSA 2010) are presented in Table 2. These rates of the predicted temperature change were applied in the thermal evaluations. Table 3 summarizes the estimated monthly air temperatures at Keno Hill during the period of 1971 to 2000, 1981 to 2010, and in 2013 considering the rates of the projected climate changes in the period of 2011 to 2040. Comparing the estimated air temperatures in 2013 with the recent measured air temperatures at the Galena Hill station (2007 to 2010) indicates that the estimated mean annual air temperature is slightly colder than the measured at the Galena Hill station. This suggests that the projected air temperature changes for the period of 2011 to 2040 may not be conservative.

Table 2 Predicted Seasonal Air Temperature Changes in Zone W1 (CSA 2010)

Period	Predicted Seasonal Air Temperature Changes from 1971-2000 Baseline under Moderate Green-house Gas Emission Scenario (°C)			
	Winter	Spring	Summer	Autumn
2011–2040	0.9	0.9	0.6	0.6
2041–2070	2.3	2.0	1.6	2.2
2070-2100	4.3	2.8	2.5	2.9

Table 3: Estimated Monthly Air Temperatures at Keno Hill

Month	Estimated Mean Monthly Air Temperature at Keno Hill (1971-2000) (°C)[1]	Estimated Mean Monthly Air Temperature at Keno Hill (1981-2010) (°C)[2]	Estimated Mean Monthly Air Temperature at Keno Hill in 2013 Based on Projected Climate Change and 1971-2000 Air Temperatures (°C)[3]
January	-18.9	-15.1	-18.3
February	-15.4	-14.0	-14.8
March	-12.9	-13.7	-12.3
April	-4.7	-4.6	-4.1
May	3.1	3.6	3.7
June	8.6	9.5	9.1
July	10.8	10.7	11.2
August	7.7	7.9	8.2
September	1.7	2.0	2.1
October	-6.6	-5.3	-6.2
November	-14.4	-12.9	-14.0
December	-14.8	-11.3	-14.2
Annual	-4.6	-3.6	-4.1

1. Based on Mayo 1971 to 2000, adjusted to Keno using Galena Hill Data
2. Based on Mayo 1981 to 2010, adjusted to Keno using Galena Hill Data
3. Based on Mayo 1971 to 2000, adjusted to Keno using Galena Hill Data plus climate change estimate

4.0 CALIBRATION THERMAL ANALYSIS

A thermistor cable was installed on August 29, 2009 to a depth of 9.4 m in Borehole BH23 within the footprint of the proposed DSTF area. One-dimensional thermal analysis was used to calibrate the thermal model with measured ground temperatures at BH23.

The soil profile at BH23 for the calibration thermal analysis consisted of a 0.5 m peat layer overlying 2.4 m ice rich sand and silt, 2.4 m sand, 2.3 m sand and silt, 0.4 m gravel, 1.3 m silt, and 7.7 m gravel over bedrock.

The material properties used in the analysis are presented in Table 4. The index soil properties were estimated from borehole logs and past experience with similar soils. The soil thermal properties were determined indirectly from well-established correlations with soil index properties (Farouki, 1986; Johnston, 1981).

Table 4: Material Properties Used in Thermal Calibration Analysis for BH23

Material	Water Content (%)	Bulk Density (Mg/m^3)	Thermal Conductivity (W/m-°C)		Specific Heat (kJ/kg°C)		Latent Heat (MJ/m^3)
			Frozen	Unfrozen	Frozen	Unfrozen	
Peat	130	0.8	0.57	0.31	1.92	3.10	152
Silt and Sand No. 1	60	1.65	2.35	0.96	1.24	2.03	206
Sand	17	2.16	2.48	1.57	0.93	1.23	105
Silt and Sand No. 2	17.1	2.17	2.48	1.57	0.93	1.24	106
Gravel No. 1	10	2.31	2.67	2.01	0.86	1.05	70
Silt	10	2.20	2.23	1.74	0.86	1.05	67
Gravel No. 2	8	2.32	2.46	2.02	0.83	0.99	57
Bedrock	1	2.63	4.00	4.00	0.75	0.77	9

Table 5 compares the predicted and measured ground temperatures on December 27, 2009 and February 23, 2011 at BH23.

Table 5: Measured and Predicted Ground Temperatures at BH23

Depth below Ground Surface (m)	Measured on Dec. 27, 2009 (°C)	Predicted on Dec. 27, 2009 (°C)	Measured on Feb. 23, 2011 (°C)	Predicted on Feb. 23, 2011 (°C)
-0.4	-2.63	-2.43	-3.0	-2.94
-1.4	-0.20	-0.30	N/A	-0.35
-2.4	-0.33	-0.33	-0.27	-0.32
-3.4	-0.39	-0.35	-0.33	-0.32
-4.4	-0.42	-0.35	-0.37	-0.33
-5.4	-0.41	-0.35	-0.35	-0.33
-6.4	-0.40	-0.35	-0.34	-0.33
-7.4	-0.37	-0.35	-0.32	-0.33
-8.4	-0.32	-0.33	-0.30	-0.32
-9.4	-0.30	-0.33	-0.31	-0.32

Good agreement was obtained between the measured and predicted ground, which suggests that the thermal model is reasonable and can be used in the thermal evaluations for other locations at the mine site.

5.0 THERMAL ANALYSIS FOR DRY-STACKED TAILINGS FACILITY AREA

5.1 General

The purposes of the thermal evaluation are to investigate the impact of tailing placement on the thermal regime of the original ground and to predict the permafrost thaw rate under climatic conditions including the climate change scenario.

The following schedules and assumptions for the dry-stacked tailings facility area were adopted in the thermal analyses:

- Removing trees in the tailings placement area;
- Placing 0.5 m sand and gravel fill as drainage blanket over the area in February 2011;
- Placing tailings overlying the sand and gravel blanket beginning in June 2011;
- The total height of placed tailings was assumed to be 10 m by 2013;
- The initial temperature for sand and gravel drainage blanket was assumed to be -5°C; and
- The initial temperature for dry stacked tailings was assumed to be +20 °C.

Several cases were run in the thermal analyses to investigate the impact of tailings placement under different climate conditions as summarized in Table 6.

Table 6: Cases Simulated in Thermal Modelling

Case	Mean Monthly Air Temperatures Used	Vegetation Layer Cover	Running Time
1	1971-2000	Yes	Long-Term (100 years)
2	1971-2000	No	Long-Term (100 years)
3	Climate Change	Yes	Long-Term (100 years)
4	Climate Change	No	Long-Term (100 years)
5	1981-2010	Yes	Long-Term (100 years)
6	1981-2010	No	Long-Term (100 years)

5.2 Thermal Analysis

One-dimensional analyses were carried out for a representative soil profile based on BH35 drilled in the proposed DSTF area. The soil profile at BH35 consisted of a 1.0 m peat layer overlying 9.5 m ice rich silt, 1.0 m massive ice, 1.8 m silt and gravel, 2.7 m massive ice, 3.0 m gravel, 2.2 m silt and gravel, and 1.0 m sand over bedrock.

The index properties for the sand and gravel drainage blanket and dry-stacked tailings have been estimated from limited available information (Jim, 2005) and past experience. Thermal properties of the material were determined indirectly from well-established correlations with their index properties. Table 7 summarizes the material properties used in the thermal analyses.

Table 7: Material Properties Used in Thermal Analyses

Material	Water Content (%)	Bulk Density (Mg/m^3)	Thermal Conductivity (W/m-°C)		Specific Heat (kJ/kg°C)		Latent Heat (MJ/m^3)
			Frozen	Unfrozen	Frozen	Unfrozen	
Dry-stack Tailings	17	1.98	3.20	1.90	0.93	1.23	96
Sand and Gravel (Fill)	5	2.10	1.33	1.50	0.80	0.90	33
Peat before thaw consolidation	150	0.75	0.49	0.30	1.92	2.19	150
Peat after thaw consolidation	60	1.60	2.36	1.02	1.24	2.03	200
Silt (Till)	40	1.81	2.36	1.12	1.12	1.72	172
Ice		0.91	2.20	10.0	2.10	4.20	334
Silt and Gravel No 1	10	2.25	2.21	1.71	0.86	1.05	68
Gravel	10	2.31	2.67	2.00	0.86	1.05	70
Silt and Gravel No 2	15.5	2.19	2.59	1.70	0.92	1.20	98
Sand	10	2.25	2.27	1.73	0.86	1.05	68
Bedrock	1	2.63	4.00	4.00	0.75	0.77	9

5.3 Results and Discussions

One-dimensional thermal analyses were conducted for all six cases listed in Table 6. The predicted thaw rate and permafrost condition for each case are summarized in Table 8.

Table 8: Predicted Thaw Rate and Permafrost Condition in DSTF Area

Case	Mean Monthly Air Temperature Used	Vegetation Layer Cover	Thaw Rate in Soils (m/year)	Predicted Permafrost Condition
1	1971-2000	Yes	0.0 m/year (2013-2025) 0.15 m/year (2025-2038) 1.8 m/year (2038-2042)	Permafrost in soils would disappear in 29 years; the ice layer would disappear in 53 years
2	1971-2000	No	0.0 m/year (2013-2018) 0.17 m/year (2018-2036) 1.5 m/year (2036-2040)	Permafrost in soils would disappear in 27 years; the ice layer would disappear in 50 years
3	Climate Change	Yes	0.0 m/year (2013-2015) 0.13 m/year (2018-2034) 1.4 m/year (2034-2039)	Permafrost in soils would disappear in 26 years; the ice layer would disappear in 50 years
4	Climate Change	No	0.0 m/year (2013-2016) 0.17 m/year (2016-2036) 1.4 m/year (2036-2040)	Permafrost in soils would disappear in 27 years; the ice layer would disappear in 48 years
5	1981-2010	Yes	0.0 m/year (2013-2022) 0.16 m/year (2022-2039) 2.1 m/year (2037-2040)	Permafrost in soils would disappear in 27 years; the ice layer would disappear in 50 years
6	1981-2010	No	0.0 m/year (2013-2016) 0.17 m/year (2016-2032) 2.1 m/year (2032-2035)	Permafrost in soils would disappear in 22 years; the ice layer would disappear in 46 years

The following conclusions can be drawn from the thermal analysis results:

1) The predicted thaw depth below the original ground surface is 1.5 m by 2013 when the tailings placement in the study area is assumed to be completed.
2) The predicted rate of thaw into the permafrost soils is negligible during first several years after completion of the tailings placement and then starts to increase with time after that period.
3) The predicted rate of thaw into the permafrost interval from 1.5 m to 4.5 m below the original ground surface ranges from 0.13 m/year to 0.17 m/year, with an average of 0.15 m/year.

4) The predicted thaw rate dramatically increases after the top 4.5 m permafrost soils are completely thawed. The predicted rate of thaw into the depth interval from 4.5 m to 10.5 m below the original ground surface ranges from 1.4 m/year to 2.1 m/year, with an average of 1.7 m/year.
5) The permafrost in the soil layers is predicted thaw within 30 years but the ice layer is predicted to be thawed within 55 years under the climatic conditions evaluated.
6) Evapo-transpirative cover layer would slightly delay the permafrost degradation for several years.

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Farouki, O.T., 1986. Thermal Properties of Soils. TransTech Publications, Germany, 136 p.

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Johnston, G.H. (Editor), 1981. Permafrost, Engineering Design and Construction. Wiley & Sons Toronto, 540 p.

APPENDIX F

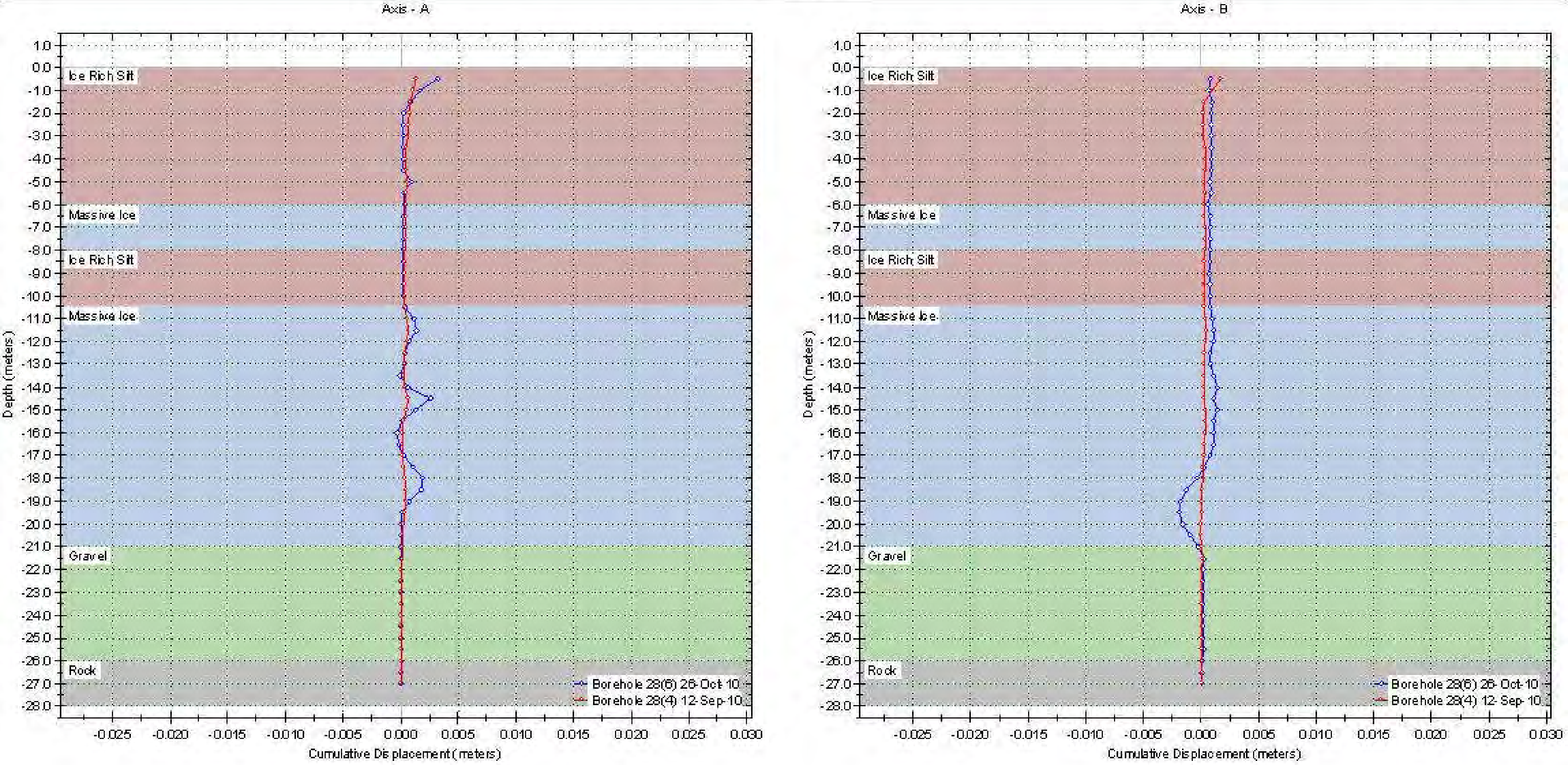
APPENDIX F SLOPE INCLINOMETER DATA

RST Instruments Ltd. CUMULATIVE DISPLACEMENT Inclinalysis v.2.40

Borehole : Borehole 28
Project : Keno Hill District Mill
Location : DSTF
Northing : 7086985
Easting : 484026
Collar :

Spiral Correction : N/A
Collar Elevation : 0.0 meters
Borehole Total Depth : 27.0 meters
North Groove Azimuth :
Base Reading : 2010 Sep 07 10:08
Axis A Azimuth : 0.0 degrees

SI Installed August 22



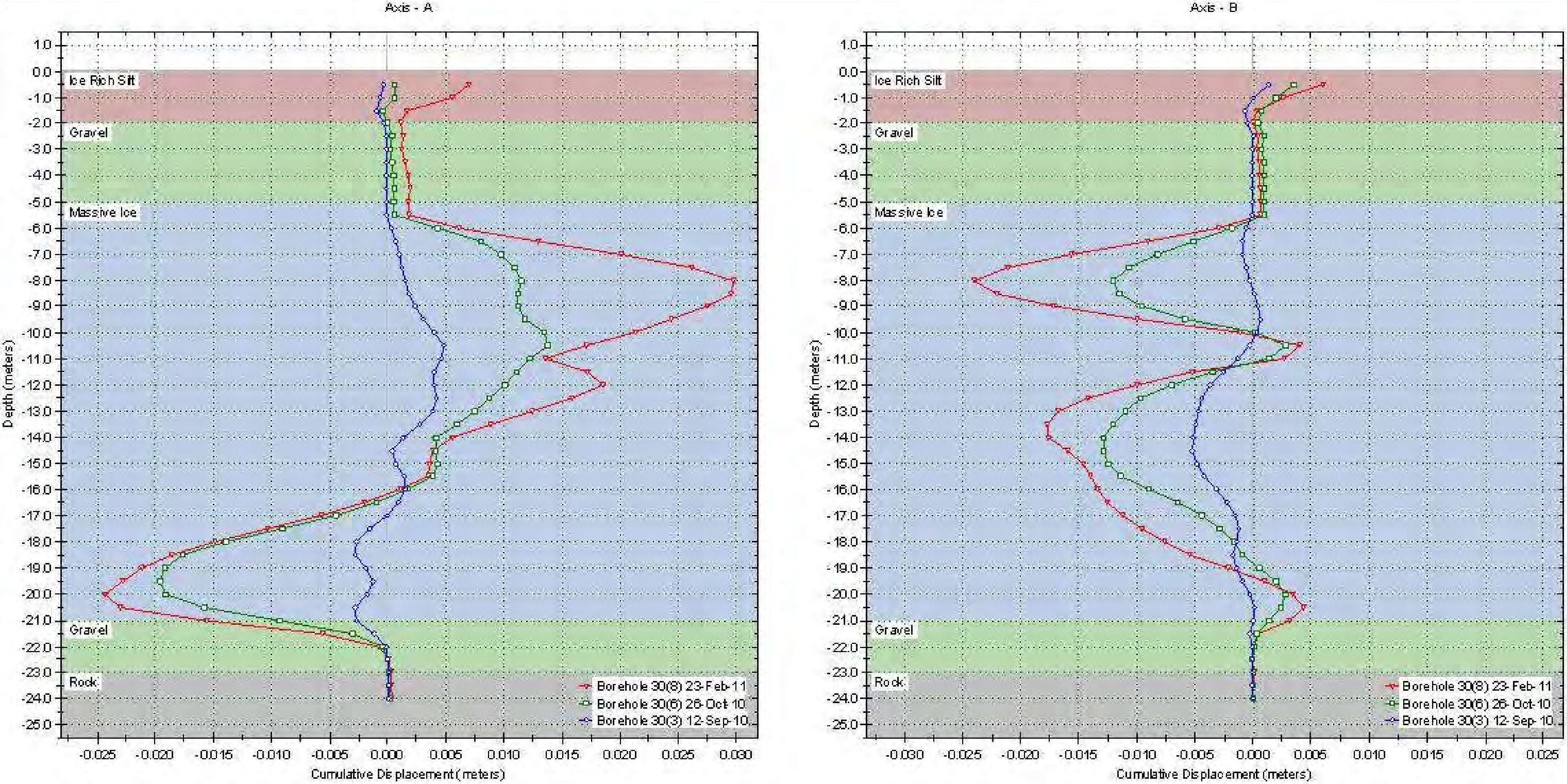
RST Instruments Ltd.

CUMULATIVE DISPLACEMENT

Inclinalysis v.2.40

Borehole : Borehole 30
Project : Keno Hill District Mill
Location : DSTF
Northing : 7087032
Easting : 483969
Collar :

Spiral Correction : N/A
Collar Elevation : 0.0 meters
Borehole Total Depth : 24.0 meters
North Groove Azimuth :
Base Reading : 2010 Sep 09 13:32
Axis A Azimuth : 0.0 degrees



APPENDIX G

APPENDIX G SLOPE STABILITY RESULTS – PERMAFROST CONDITION

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Description: Static w/o PWP Conditions (Frozen State)
File Name: W14101178.011_AlignmentA_R04A2_Static_NoPWP.gsz
Method: Morgenstern-Price
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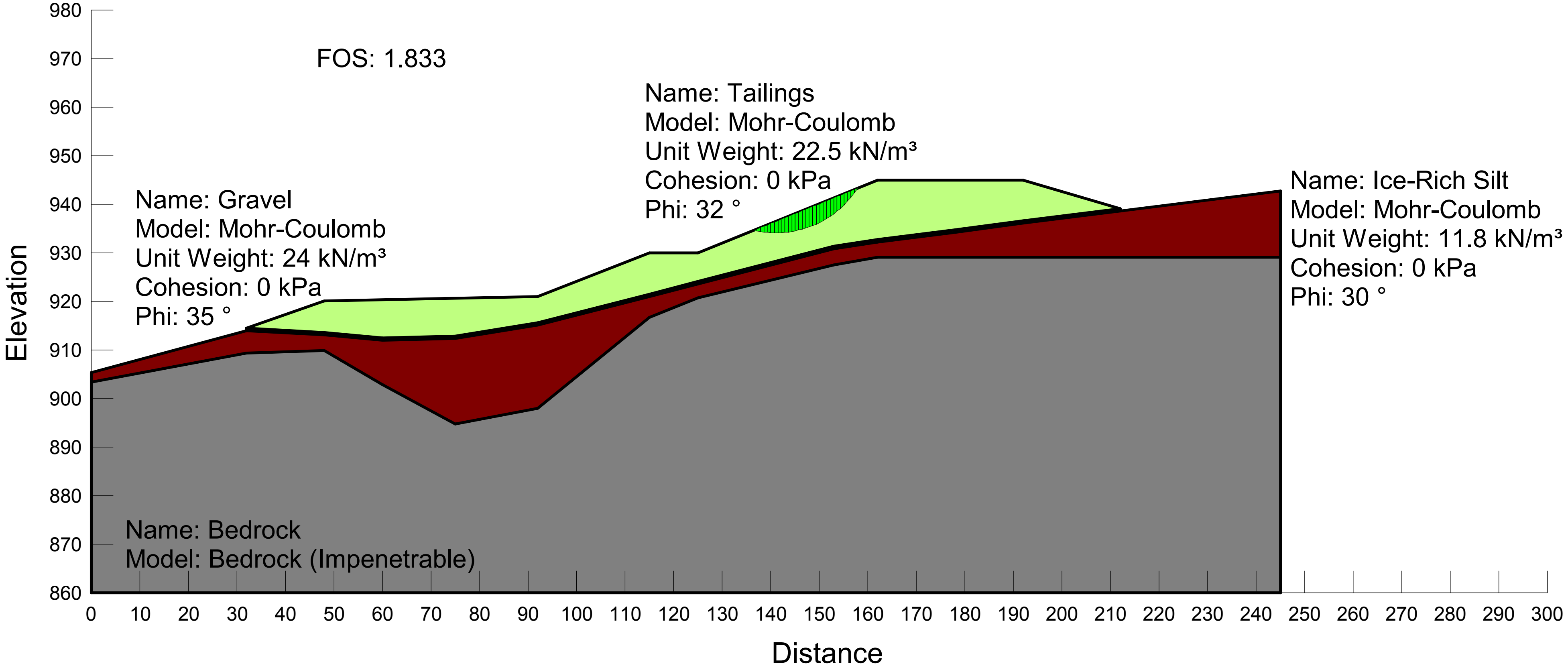
PWP Conditions Source: (none)
Length(L) Units: meters
Horizontal Scale: 1250
Vertical Scale: 1250
Minimum Slip Surface Depth: 1 m



Name: Alignment B
Description: Static w/o PWP Conditions (Fully Frozen)
File Name: W14101178.011_AlignmentB_R04A2_Static_NoPWP.gsz
Method: Morgenstern-Price
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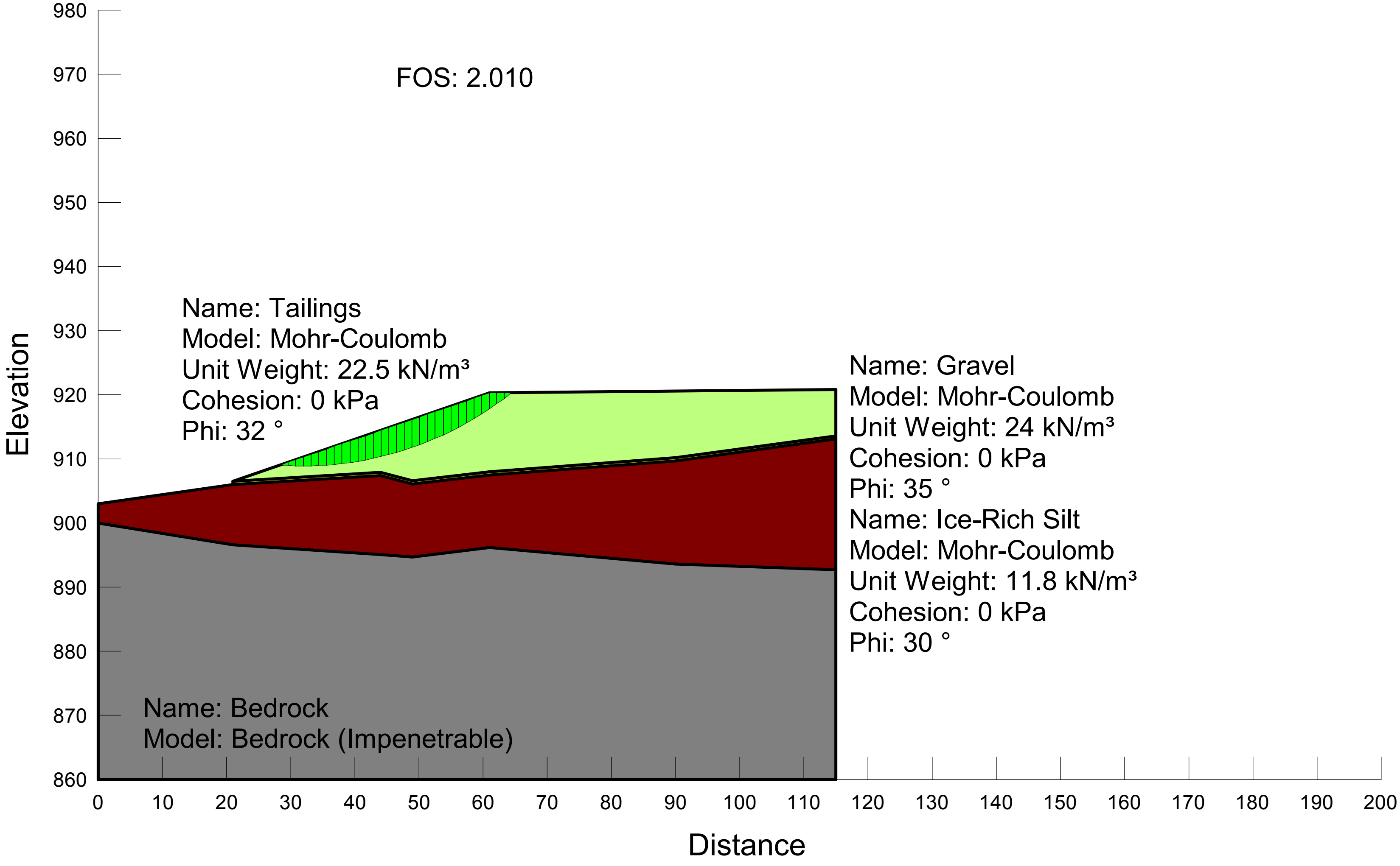
PWP Conditions Source: (none)
Length(L) Units: meters
Horizontal Scale: 1000
Vertical Scale: 1000
Minimum Slip Surface Depth: 1 m



FOS: 2.010

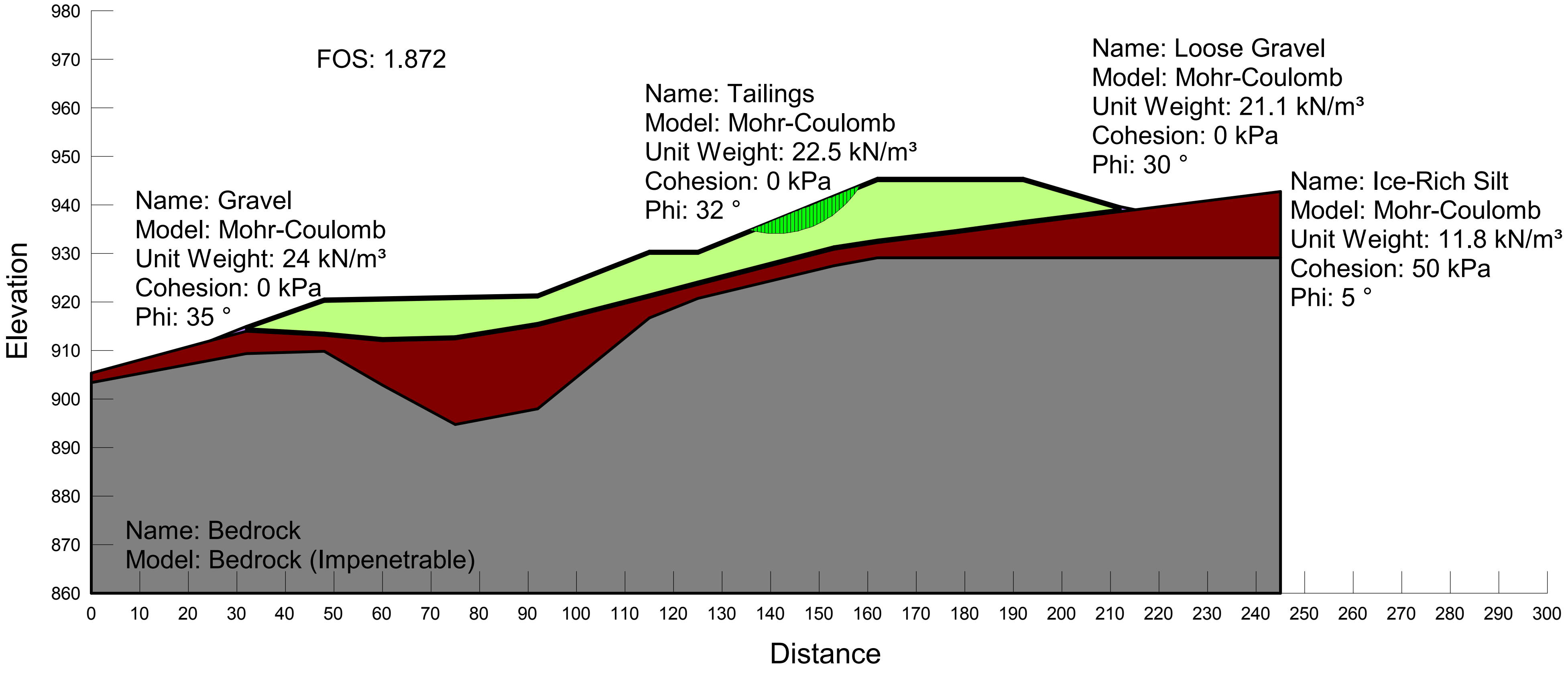
Name: Tailings
Model: Mohr-Coulomb
Unit Weight: 22.5 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Gravel
Model: Mohr-Coulomb
Unit Weight: 24 kN/m³
Cohesion: 0 kPa
Phi: 35 °

Name: Ice-Rich Silt
Model: Mohr-Coulomb
Unit Weight: 11.8 kN/m³
Cohesion: 0 kPa
Phi: 30 °

Name: Bedrock
Model: Bedrock (Impenetrable)

Name: Alignment A
Description: Static w/o PWP Conditions (Frozen State)
File Name: W14101178.011_AlignmentA_R10D2_Static_NoPWP.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0
PWP Conditions Source: (none)
Length(L) Units: meters
Horizontal Scale: 1250
Vertical Scale: 1250
Minimum Slip Surface Depth: 1 m



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Description: Static w/o PWP Conditions (Fully Frozen)
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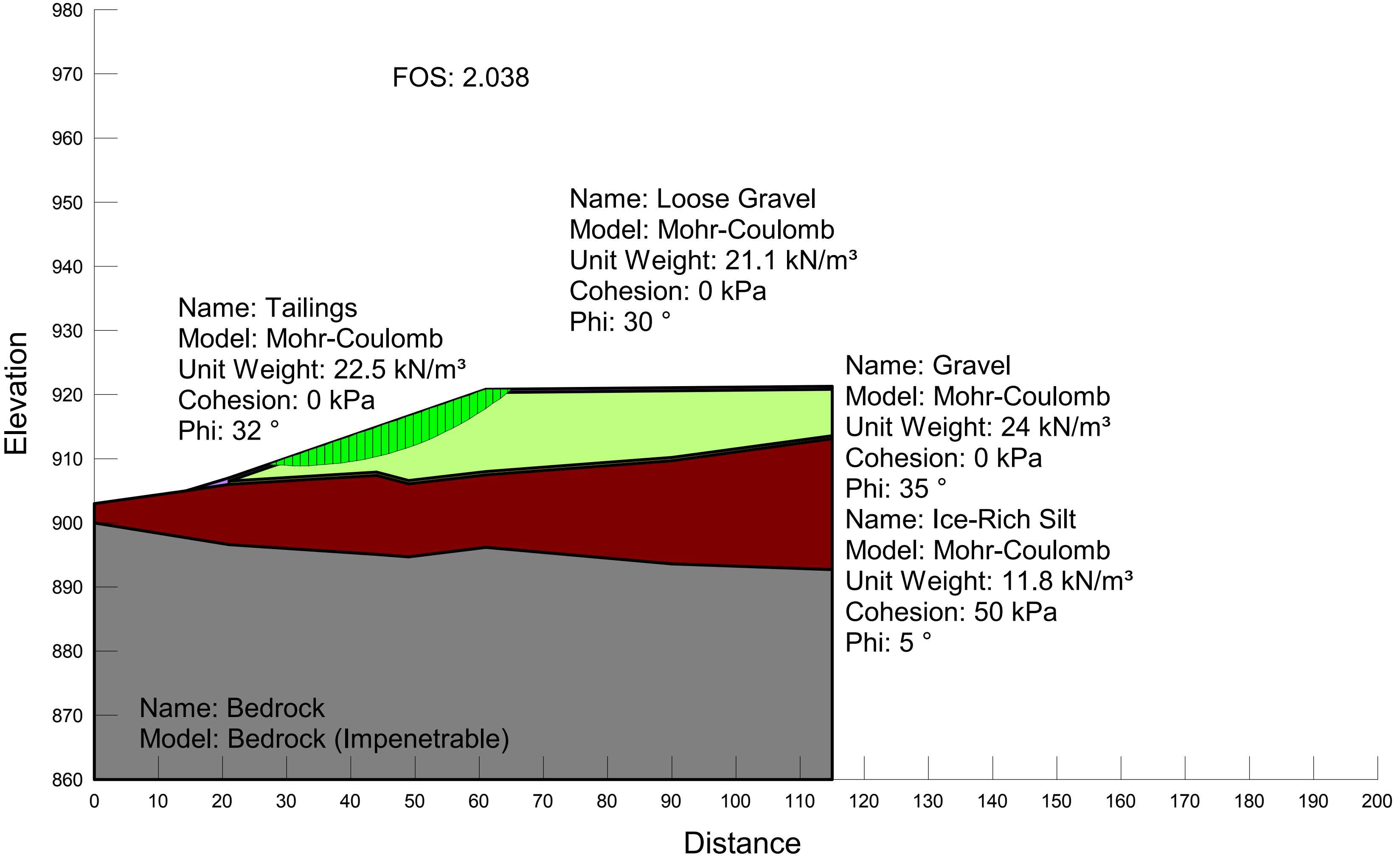
Horizontal Scale: 1000
Vertical Scale: 1000
Minimum Slip Surface Depth: 1 m



Name: Loose Gravel
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Unit Weight: 21.1 kN/m³
Cohesion: 0 kPa
Phi: 30 °

Name: Tailings
Model: Mohr-Coulomb
Unit Weight: 22.5 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Gravel
Model: Mohr-Coulomb
Unit Weight: 24 kN/m³
Cohesion: 0 kPa
Phi: 35 °

Name: Ice-Rich Silt
Model: Mohr-Coulomb
Unit Weight: 11.8 kN/m³
Cohesion: 50 kPa
Phi: 5 °

Name: Bedrock
Model: Bedrock (Impenetrable)

Name: Alignment A
Description: Static w/o PWP Conditions (Frozen State)
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Method: Morgenstern-Price
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PWP Conditions Source: (none)
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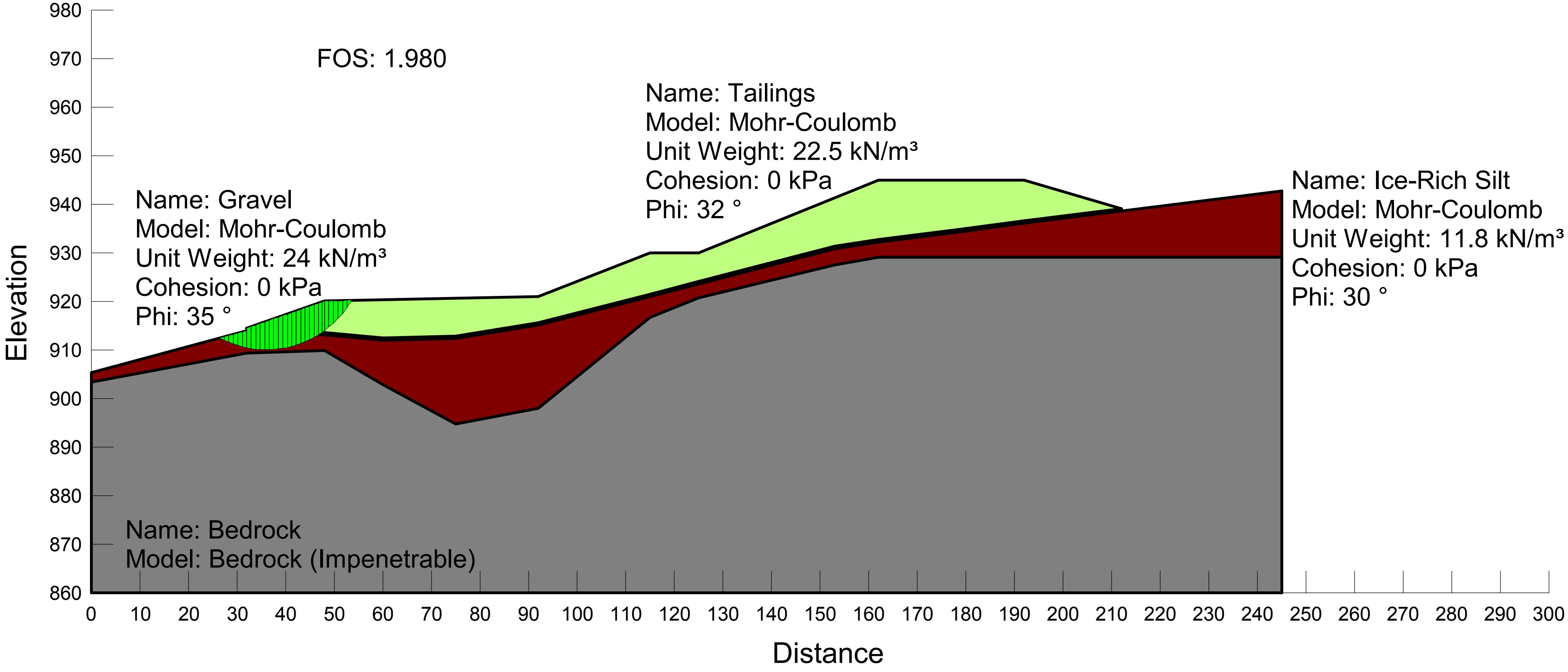
Horizontal Scale: 1250
Vertical Scale: 1250
Minimum Slip Surface Depth: 1 m



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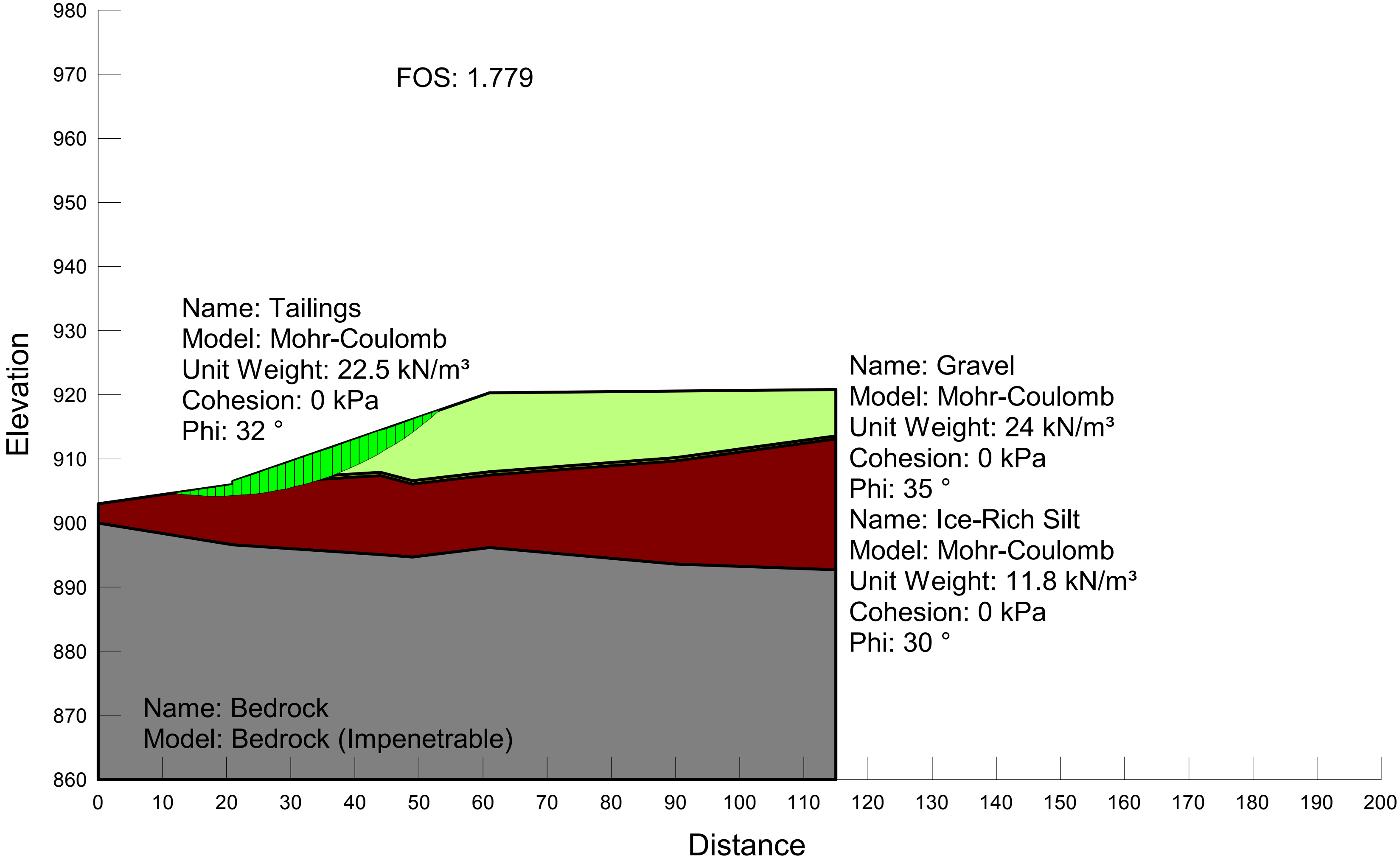
Vertical Scale: 1000
Minimum Slip Surface Depth: 1 m



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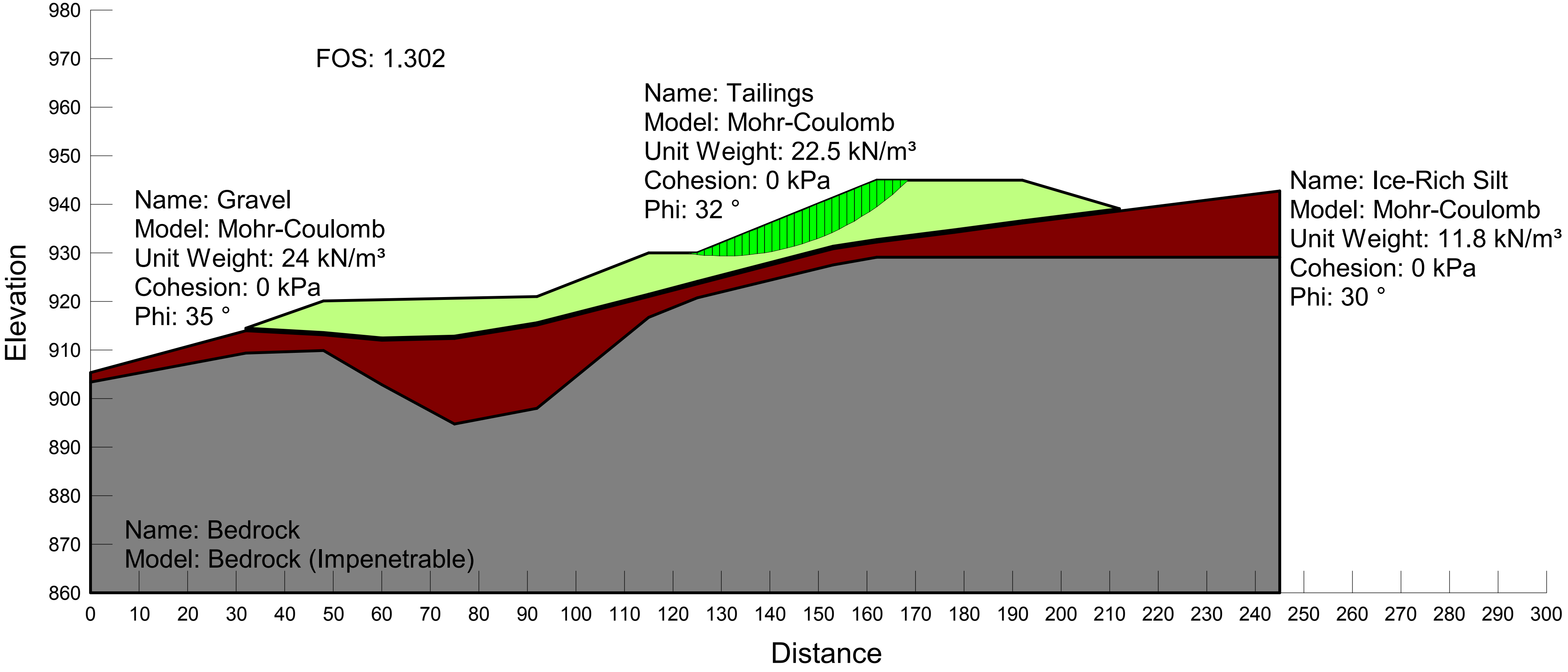
PWP Conditions Source: (none)
Length(L) Units: meters
Horizontal Scale: 1250
Vertical Scale: 1250
Minimum Slip Surface Depth: 1 m



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Description: Dynamic (1:475) w/o PWP Conditions (Fully Frozen)
File Name: W14101178.011_AlignmentB_R04C_Dynamic475_NoPWP.gs
Method: Morgenstern-Price
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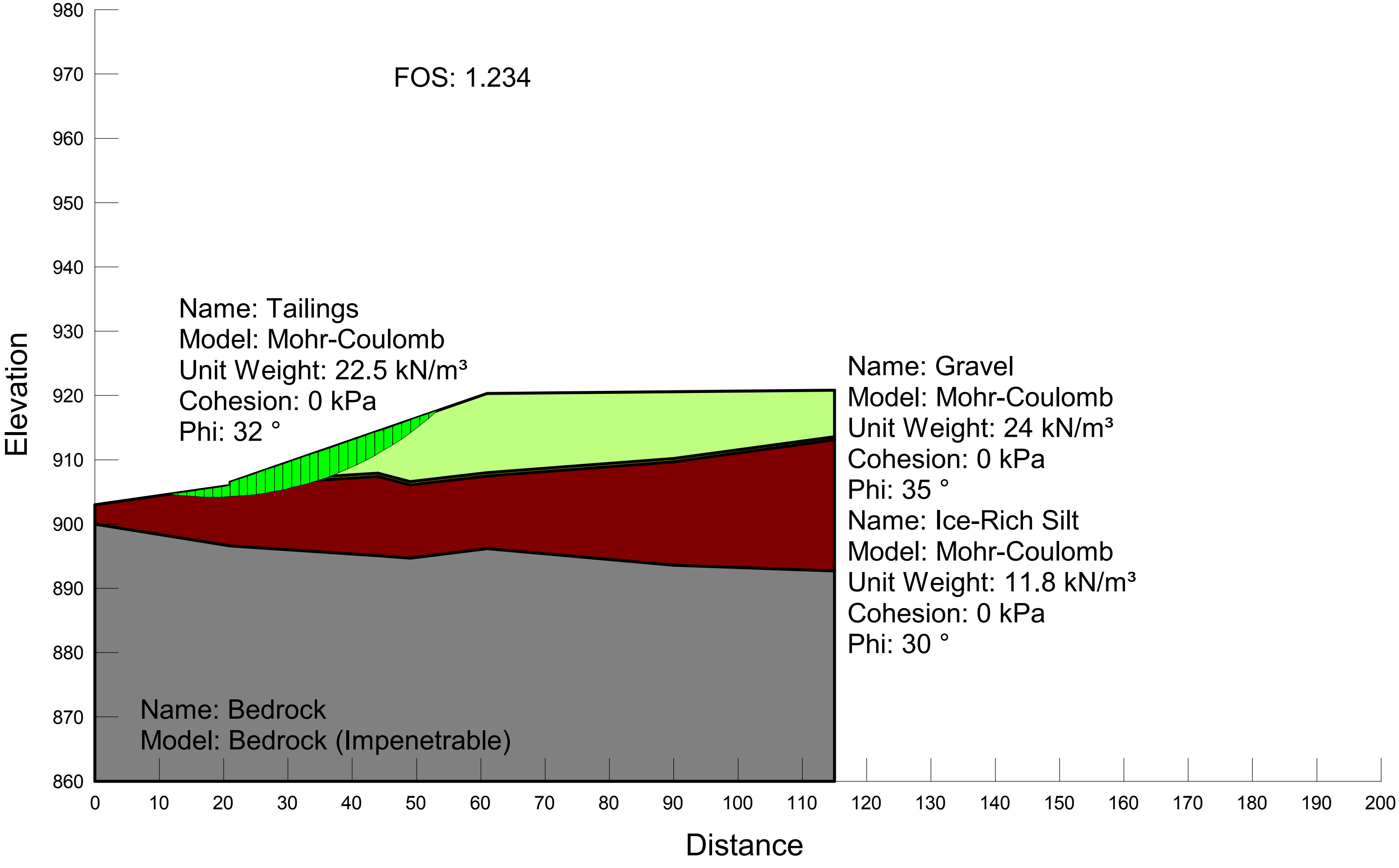
PWP Conditions Source: (none)
Length(L) Units: meters
Horizontal Scale: 1000
Vertical Scale: 1000
Minimum Slip Surface Depth: 1 m



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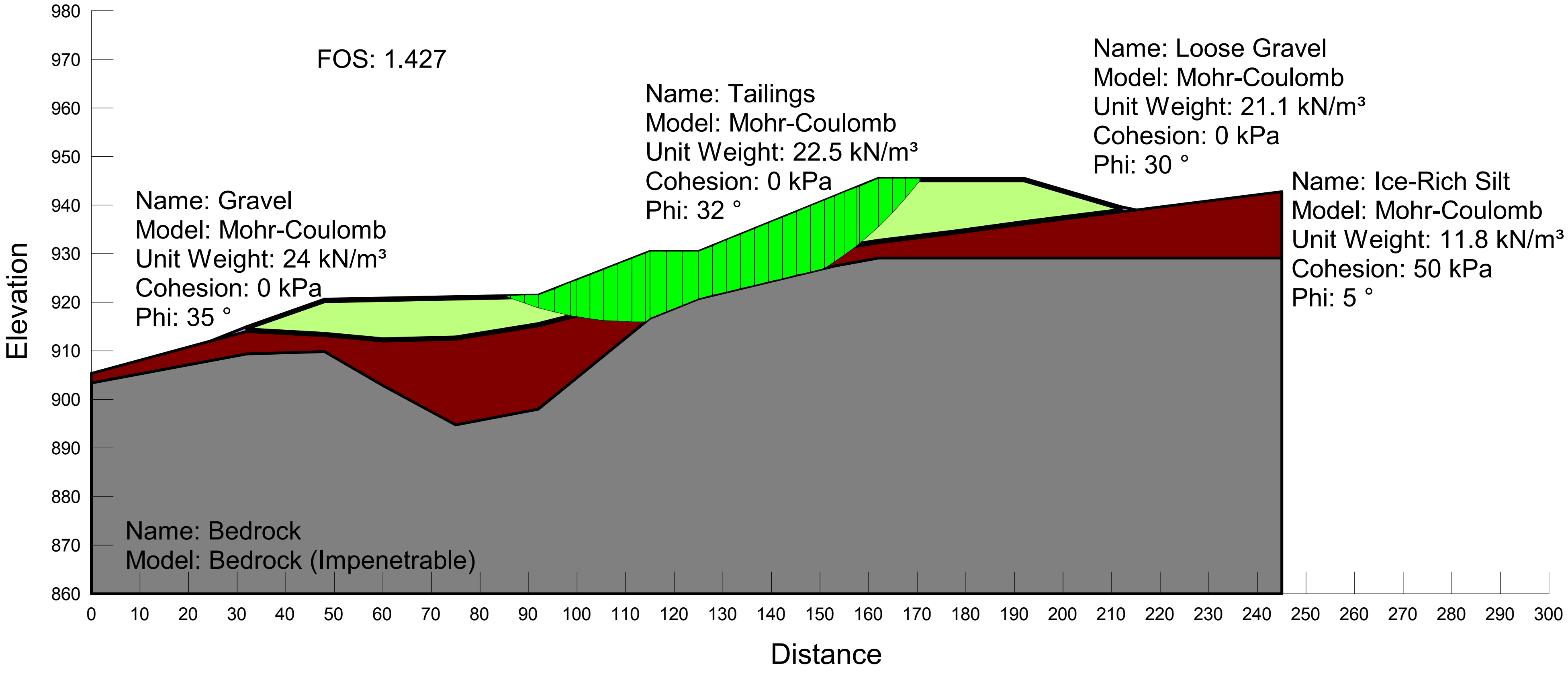
Vertical Scale: 1250
Minimum Slip Surface Depth: 1 m



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Vertical Scale: 1000
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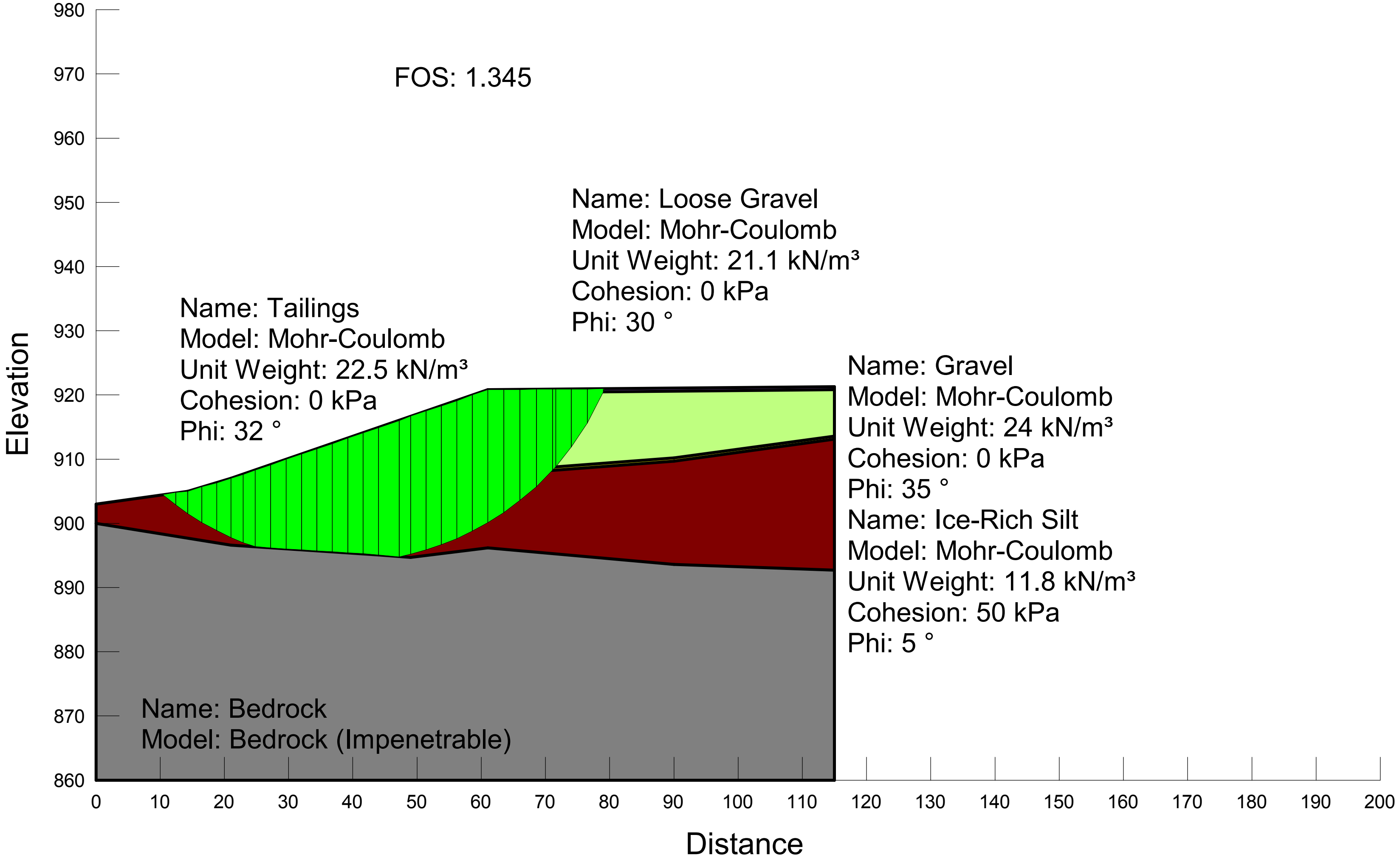

FOS: 1.345

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Unit Weight: 22.5 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Loose Gravel
Model: Mohr-Coulomb
Unit Weight: 21.1 kN/m³
Cohesion: 0 kPa
Phi: 30 °

Name: Gravel
Model: Mohr-Coulomb
Unit Weight: 24 kN/m³
Cohesion: 0 kPa
Phi: 35 °

Name: Ice-Rich Silt
Model: Mohr-Coulomb
Unit Weight: 11.8 kN/m³
Cohesion: 50 kPa
Phi: 5 °

Name: Bedrock
Model: Bedrock (Impenetrable)

Name: Alignment A
Description: Dynamic (1:475) w/o PWP Conditions (Frozen State)
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Method: Morgenstern-Price
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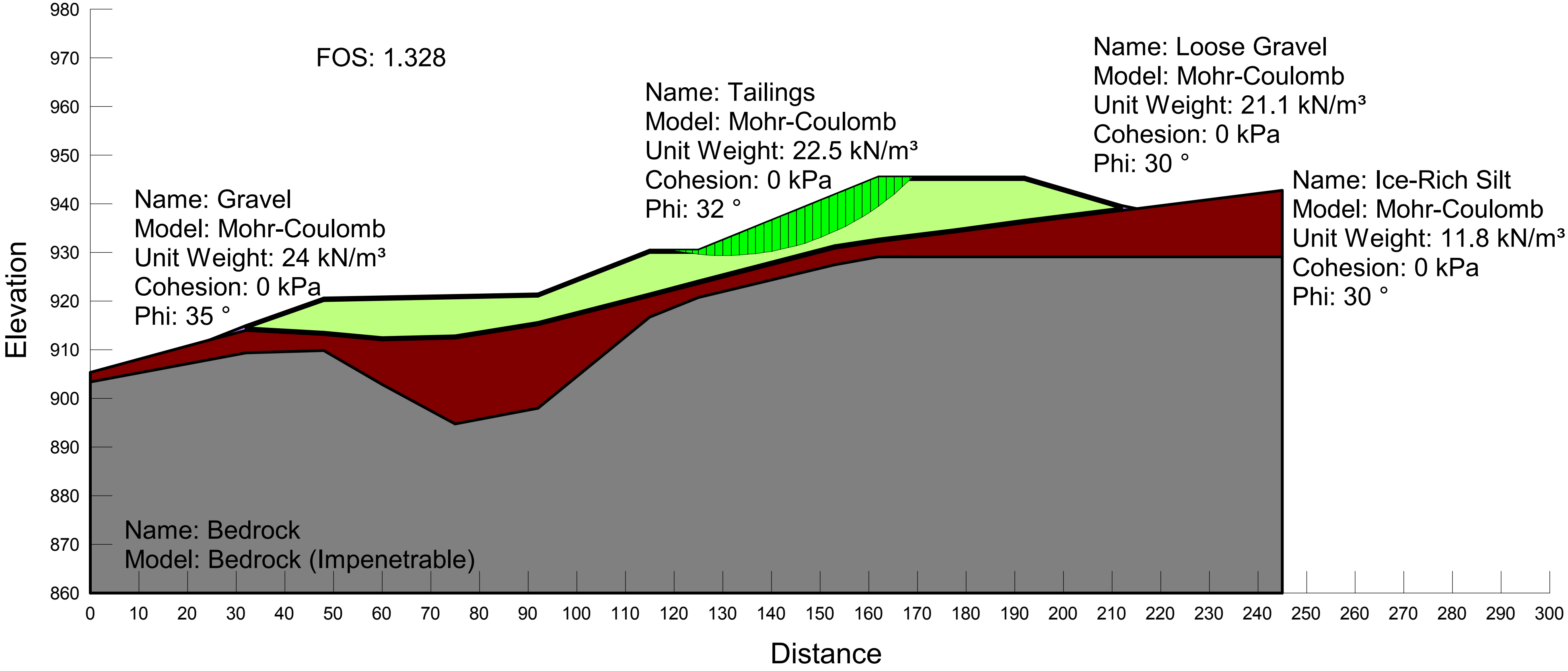
Horizontal Scale: 1250
Vertical Scale: 1250
Minimum Slip Surface Depth: 1 m



Name: Alignment B
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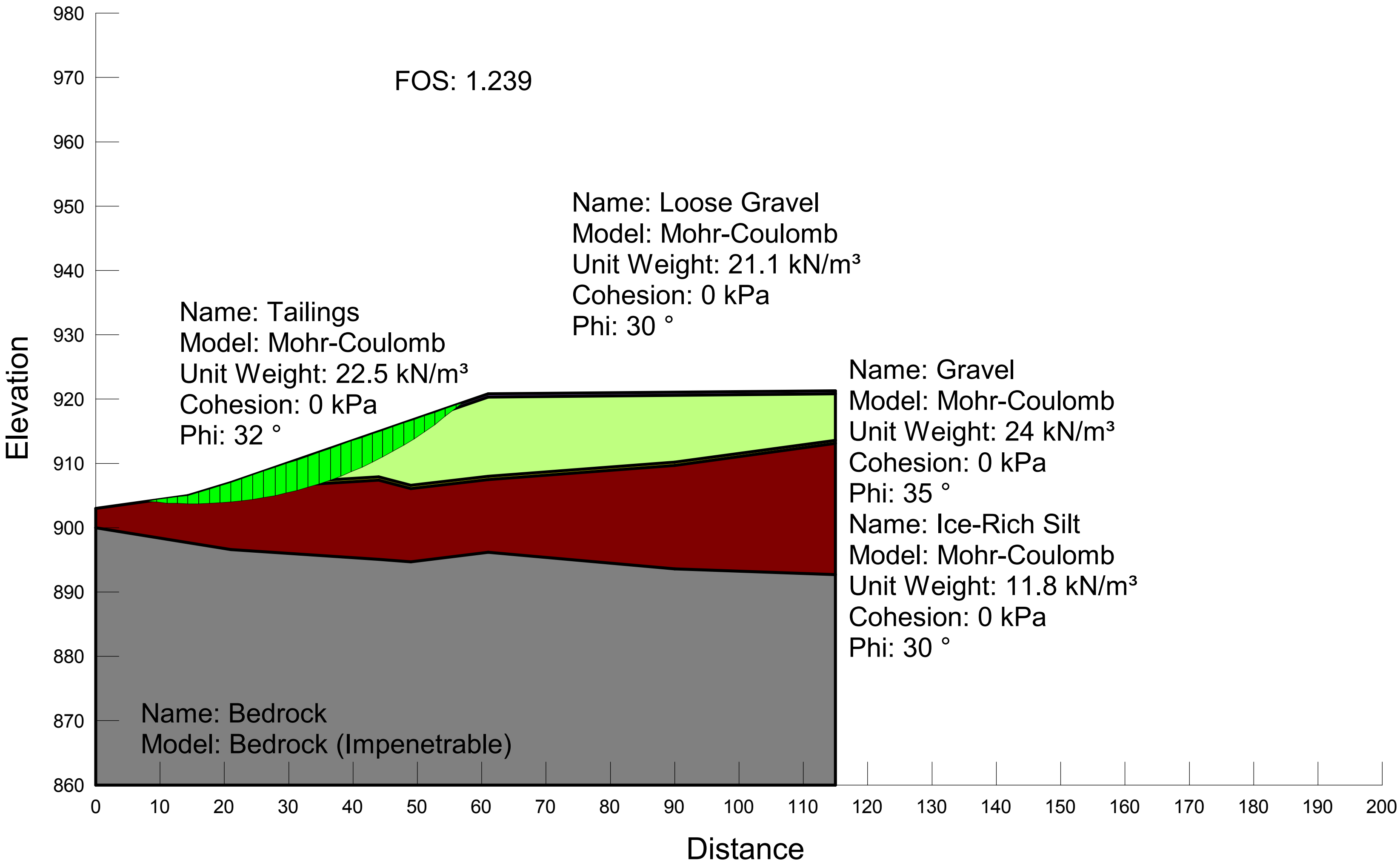
Vertical Scale: 1000
Minimum Slip Surface Depth: 1 m



APPENDIX H

APPENDIX H SLOPE STABILITY RESULTS – PERMAFROST 1.0 M THAWED

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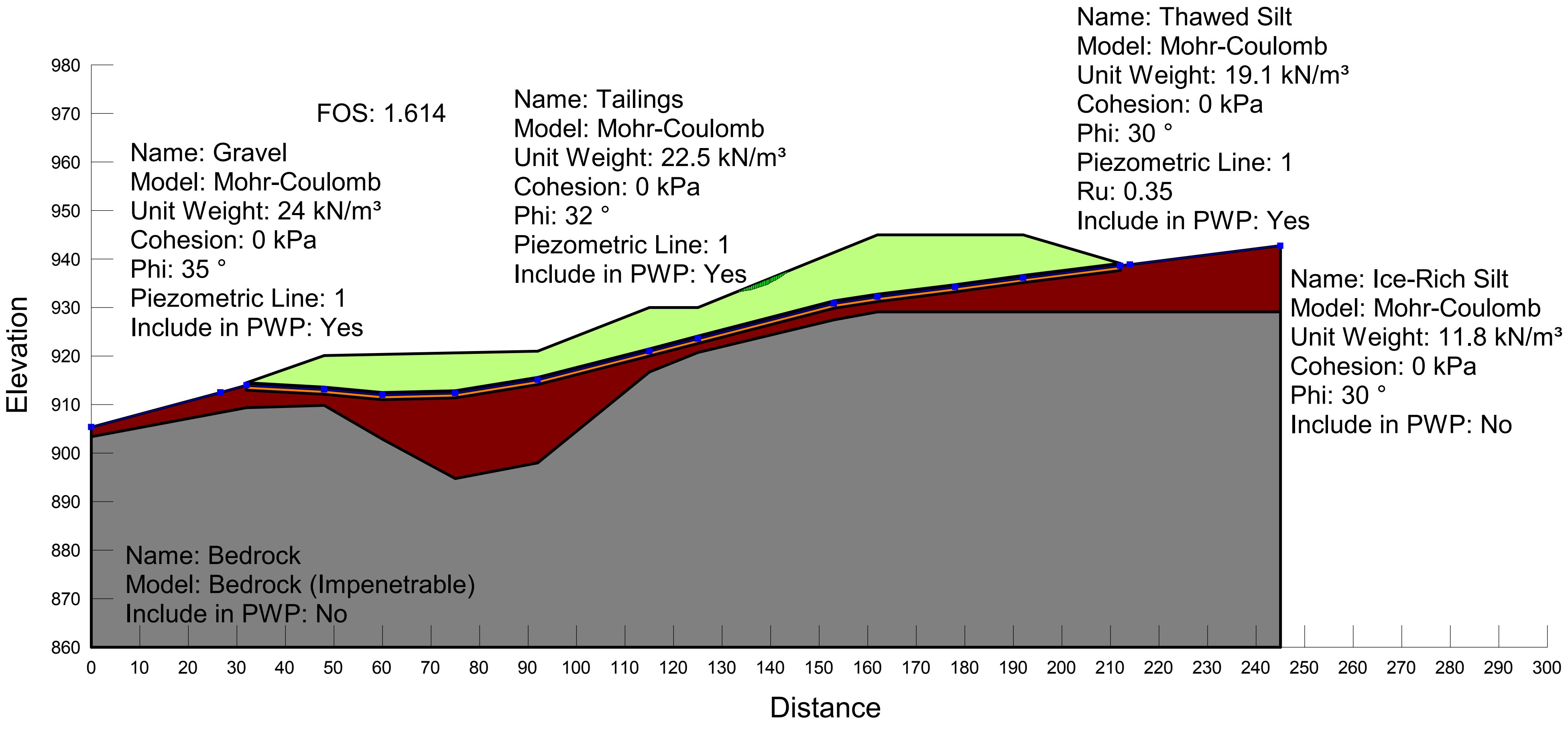
Vertical Scale: 1250
Minimum Slip Surface Depth: 1 m



FOS: 1.614

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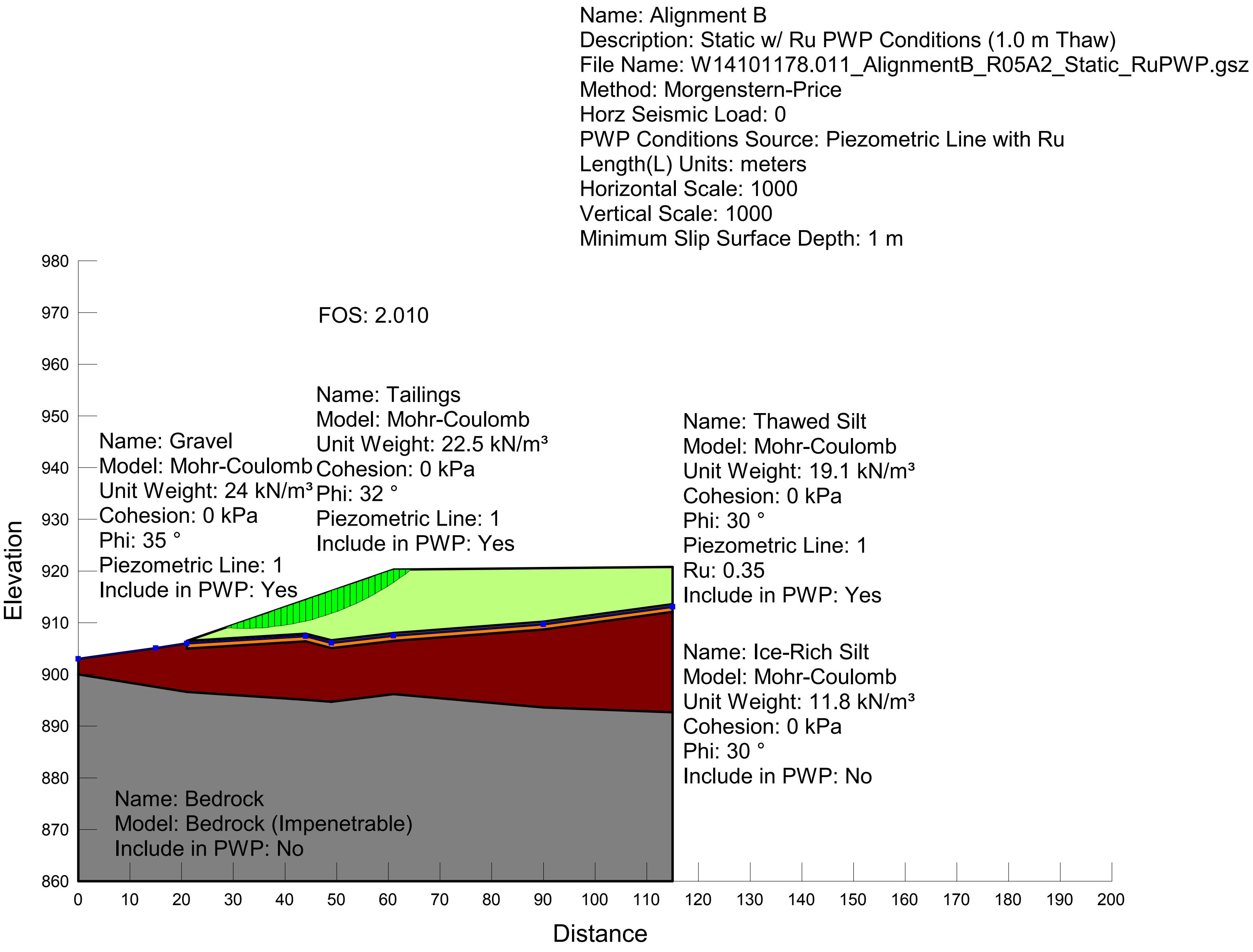
Unit Weight: 24 kN/m³
Cohesion: 0 kPa
Phi: 35 °
Piezometric Line: 1
Include in PWP: Yes

Name: Tailings
Model: Mohr-Coulomb
Unit Weight: 22.5 kN/m³
Cohesion: 0 kPa
Phi: 32 °
Piezometric Line: 1
Include in PWP: Yes

Name: Thawed Silt
Model: Mohr-Coulomb
Unit Weight: 19.1 kN/m³
Cohesion: 0 kPa
Phi: 30 °
Piezometric Line: 1
Ru: 0.35
Include in PWP: Yes

Name: Ice-Rich Silt
Model: Mohr-Coulomb
Unit Weight: 11.8 kN/m³
Cohesion: 0 kPa
Phi: 30 °
Include in PWP: No

Name: Bedrock
Model: Bedrock (Impenetrable)
Include in PWP: No



Name: Alignment B
Description: Static w/ Ru PWP Conditions (1.0 m Thaw)
File Name: W14101178.011_AlignmentB_R05A2_Static_RuPWP.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0
PWP Conditions Source: Piezometric Line with Ru
Length(L) Units: meters
Horizontal Scale: 1000
Vertical Scale: 1000
Minimum Slip Surface Depth: 1 m

FOS: 2.010

Name: Gravel
Model: Mohr-Coulomb
Unit Weight: 24 kN/m³
Cohesion: 0 kPa
Phi: 35 °
Piezometric Line: 1
Include in PWP: Yes

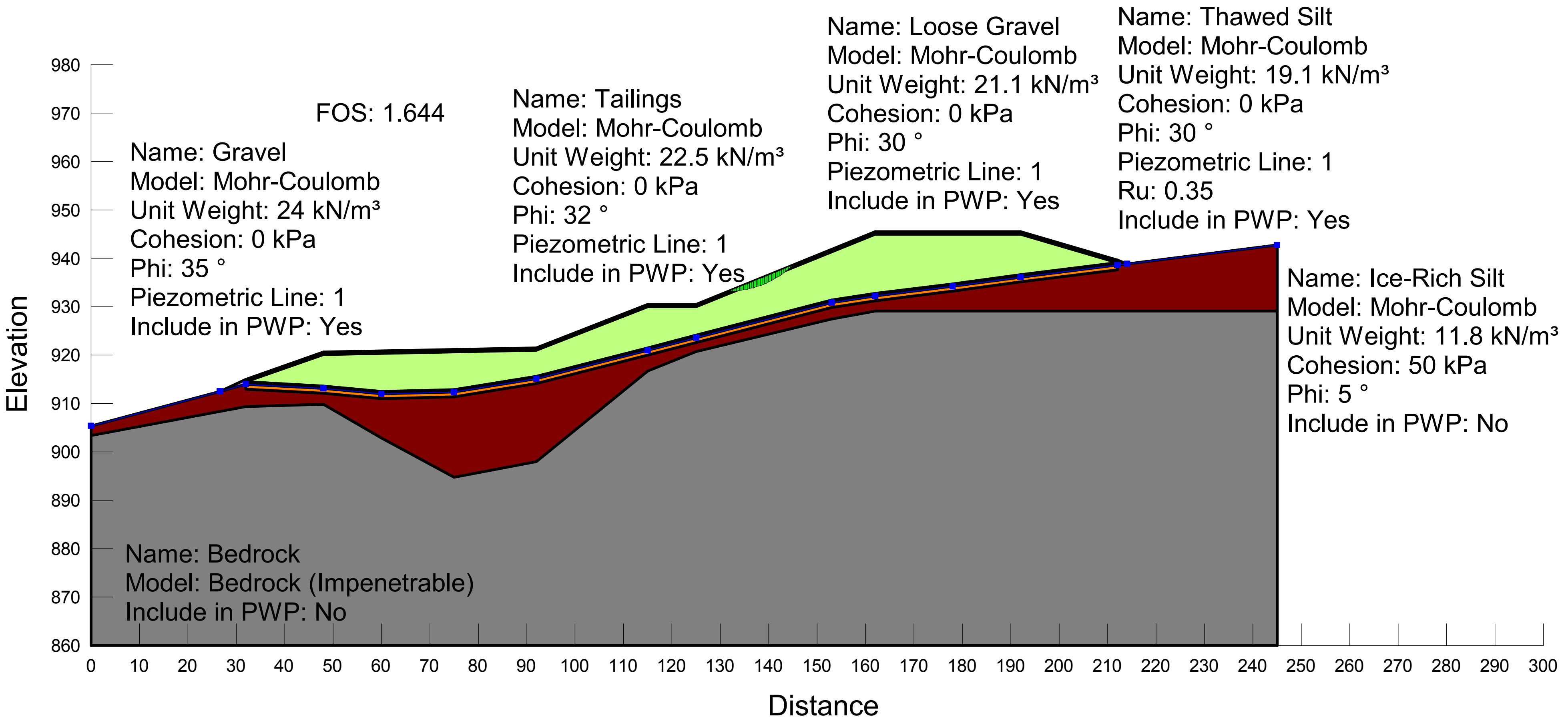
Name: Tailings
Model: Mohr-Coulomb
Unit Weight: 22.5 kN/m³
Cohesion: 0 kPa
Phi: 32 °
Piezometric Line: 1
Include in PWP: Yes

Name: Thawed Silt
Model: Mohr-Coulomb
Unit Weight: 19.1 kN/m³
Cohesion: 0 kPa
Phi: 30 °
Piezometric Line: 1
Ru: 0.35
Include in PWP: Yes

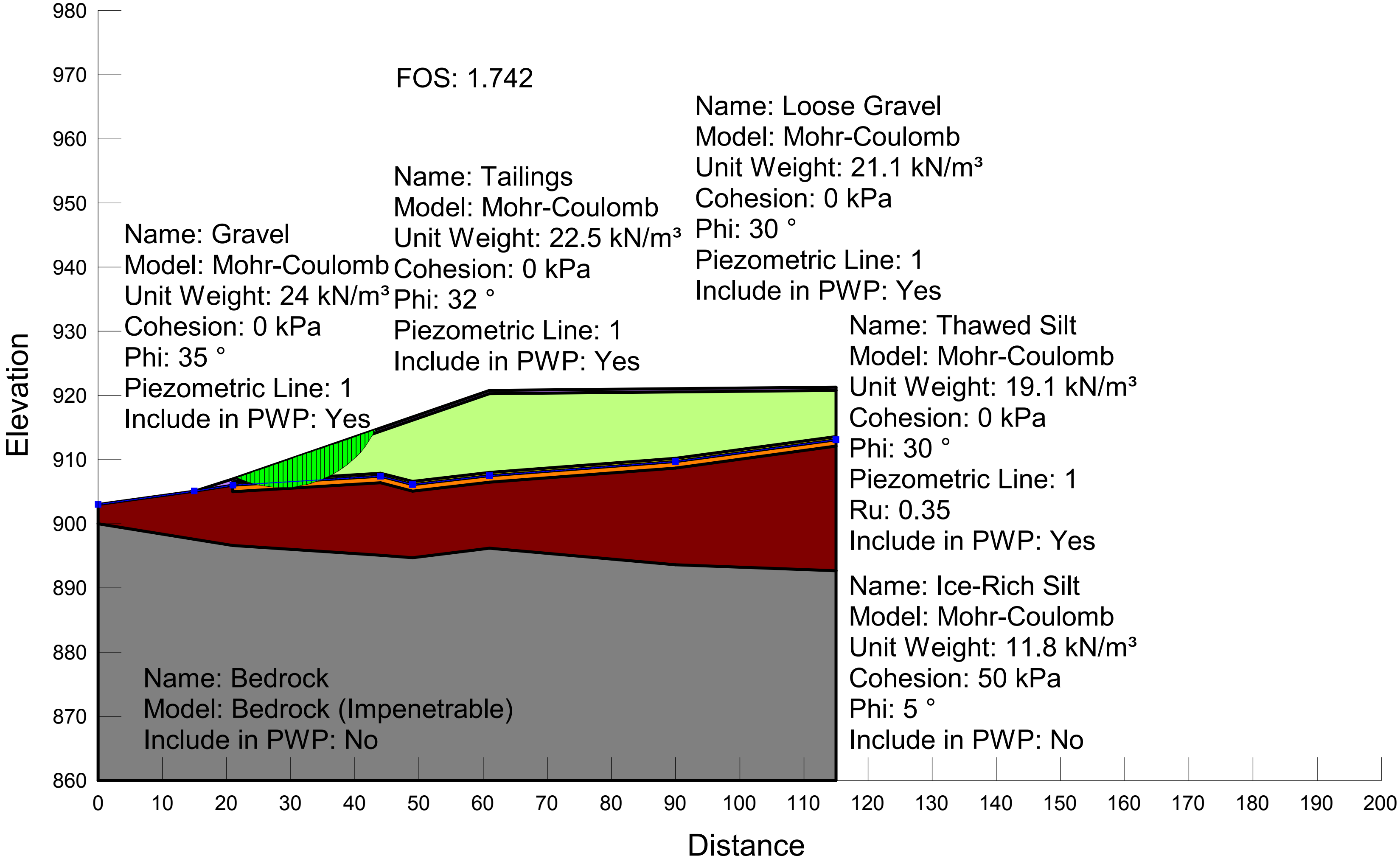
Name: Ice-Rich Silt
Model: Mohr-Coulomb
Unit Weight: 11.8 kN/m³
Cohesion: 0 kPa
Phi: 30 °
Include in PWP: No

Name: Bedrock
Model: Bedrock (Impenetrable)
Include in PWP: No

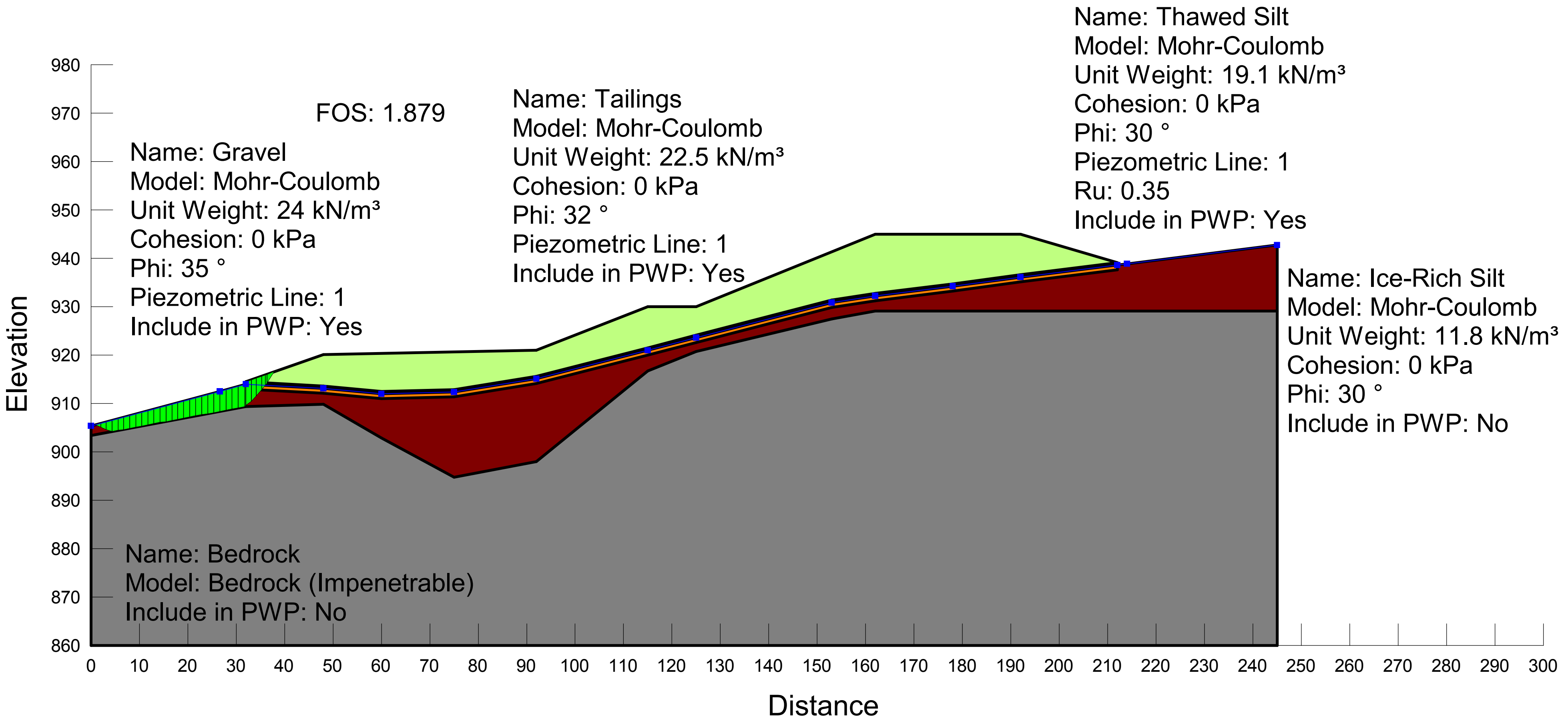
Name: Alignment A
Description: Static w/ Ru PWP Conditions (1.0 m Thaw)
File Name: W14101178.011_AlignmentA_R11D2_Static_RuPWP.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0
PWP Conditions Source: Piezometric Line with Ru
Length(L) Units: meters
Horizontal Scale: 1250
Vertical Scale: 1250
Minimum Slip Surface Depth: 1 m



Name: Alignment B
Description: Static w/ Ru PWP Conditions (1.0 m Thaw)
File Name: W14101178.011_AlignmentB_R11D2_Static_RuPWP.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0
PWP Conditions Source: Piezometric Line with Ru
Length(L) Units: meters
Horizontal Scale: 1000
Vertical Scale: 1000
Minimum Slip Surface Depth: 1 m



Name: Alignment A
Description: Static w/ Ru PWP Conditions (1.0 m Thaw)
File Name: W14101178.011_AlignmentA_R05A1_Static_RuPWP.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0
PWP Conditions Source: Piezometric Line with Ru
Length(L) Units: meters
Horizontal Scale: 1250
Vertical Scale: 1250
Minimum Slip Surface Depth: 1 m



FOS: 1.879

Name: Gravel
Model: Mohr-Coulomb
Unit Weight: 24 kN/m³
Cohesion: 0 kPa
Phi: 35 °
Piezometric Line: 1
Include in PWP: Yes

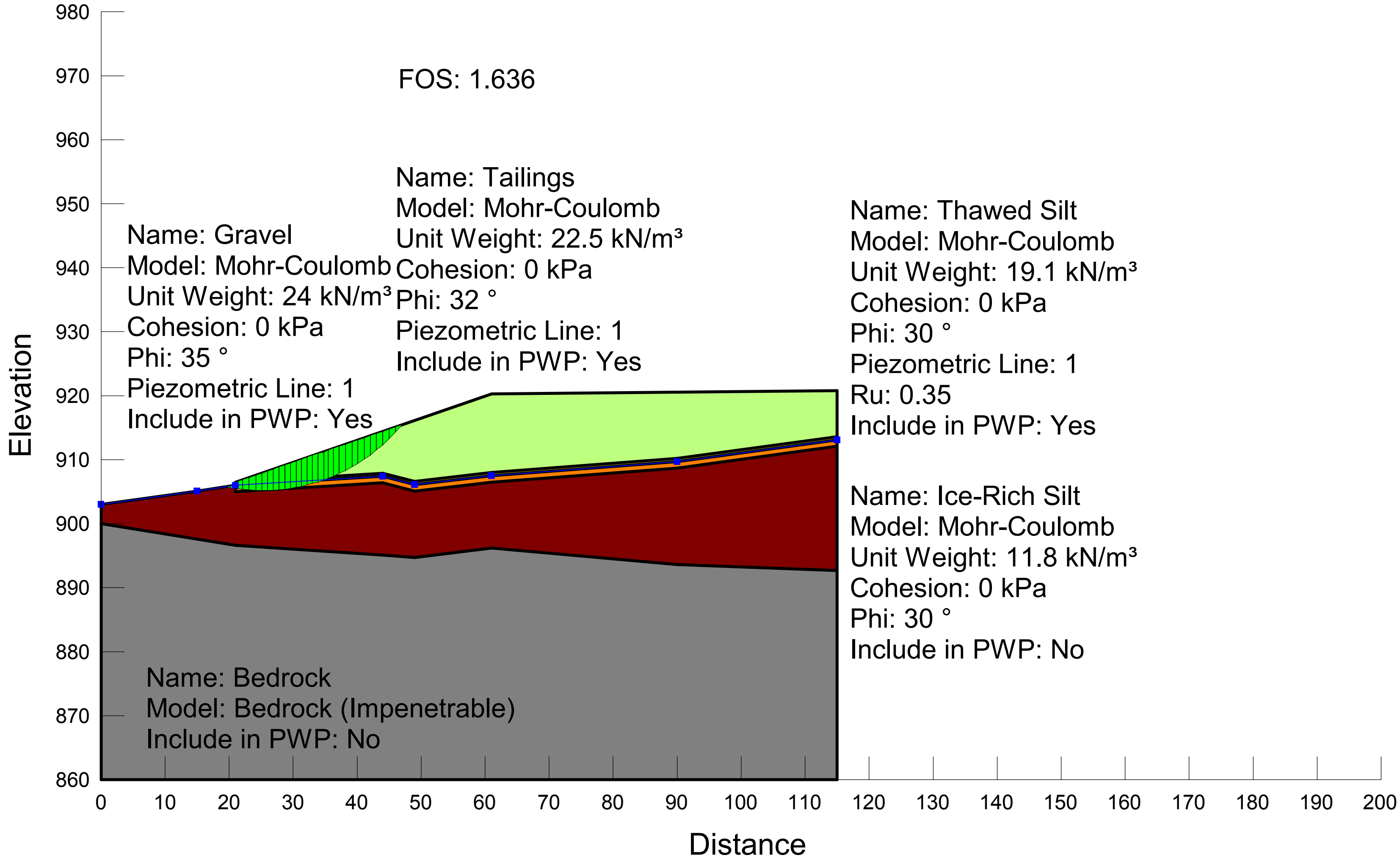
Name: Tailings
Model: Mohr-Coulomb
Unit Weight: 22.5 kN/m³
Cohesion: 0 kPa
Phi: 32 °
Piezometric Line: 1
Include in PWP: Yes

Name: Thawed Silt
Model: Mohr-Coulomb
Unit Weight: 19.1 kN/m³
Cohesion: 0 kPa
Phi: 30 °
Piezometric Line: 1
Ru: 0.35
Include in PWP: Yes

Name: Ice-Rich Silt
Model: Mohr-Coulomb
Unit Weight: 11.8 kN/m³
Cohesion: 0 kPa
Phi: 30 °
Include in PWP: No

Name: Bedrock
Model: Bedrock (Impenetrable)
Include in PWP: No

Name: Alignment B
Description: Static w/ Ru PWP Conditions (1.0 m Thaw)
File Name: W14101178.011_AlignmentB_R05A1_Static_RuPWP.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0
PWP Conditions Source: Piezometric Line with Ru
Length(L) Units: meters
Horizontal Scale: 1000
Vertical Scale: 1000
Minimum Slip Surface Depth: 1 m



FOS: 1.636

Name: Gravel
Model: Mohr-Coulomb
Unit Weight: 24 kN/m³
Cohesion: 0 kPa
Phi: 35 °
Piezometric Line: 1
Include in PWP: Yes

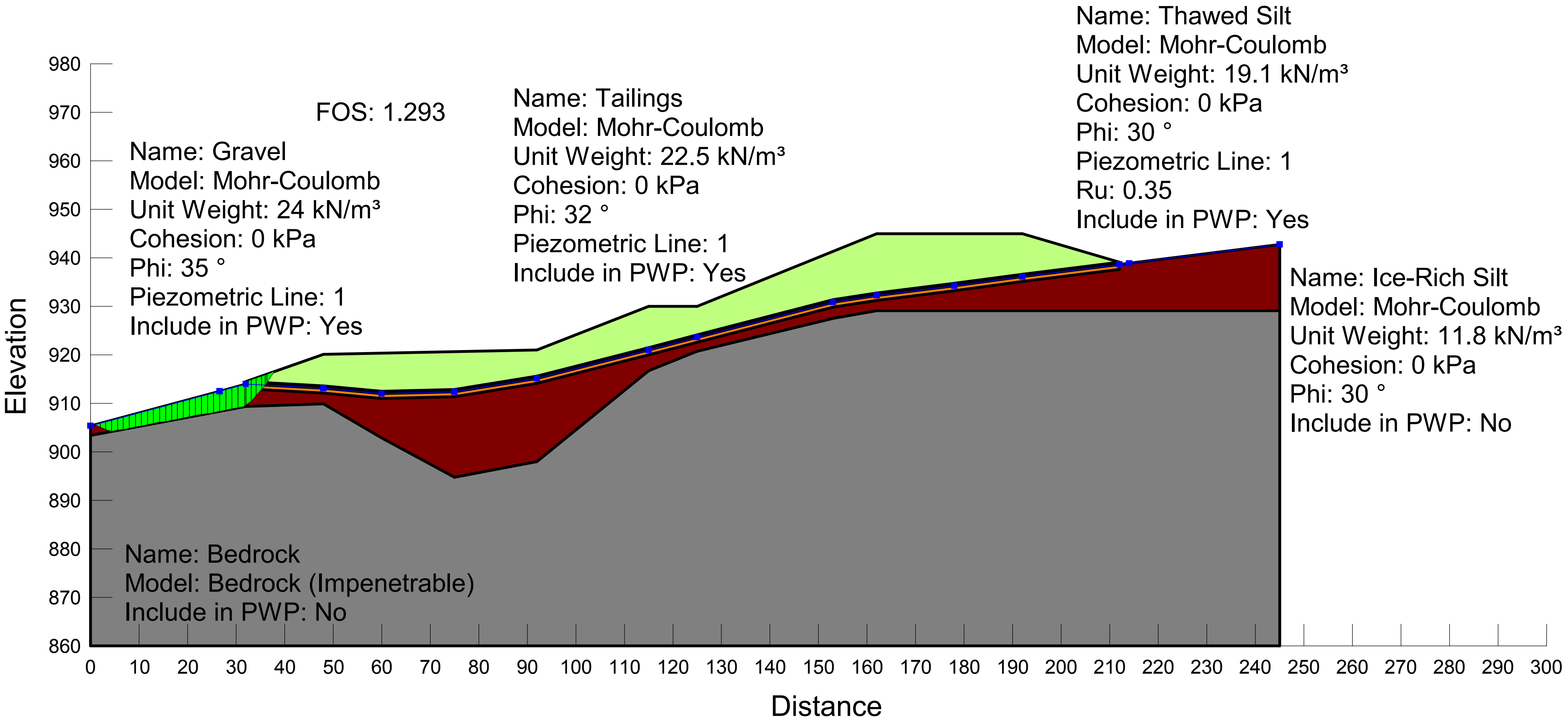
Name: Tailings
Model: Mohr-Coulomb
Unit Weight: 22.5 kN/m³
Cohesion: 0 kPa
Phi: 32 °
Piezometric Line: 1
Include in PWP: Yes

Name: Thawed Silt
Model: Mohr-Coulomb
Unit Weight: 19.1 kN/m³
Cohesion: 0 kPa
Phi: 30 °
Piezometric Line: 1
Ru: 0.35
Include in PWP: Yes

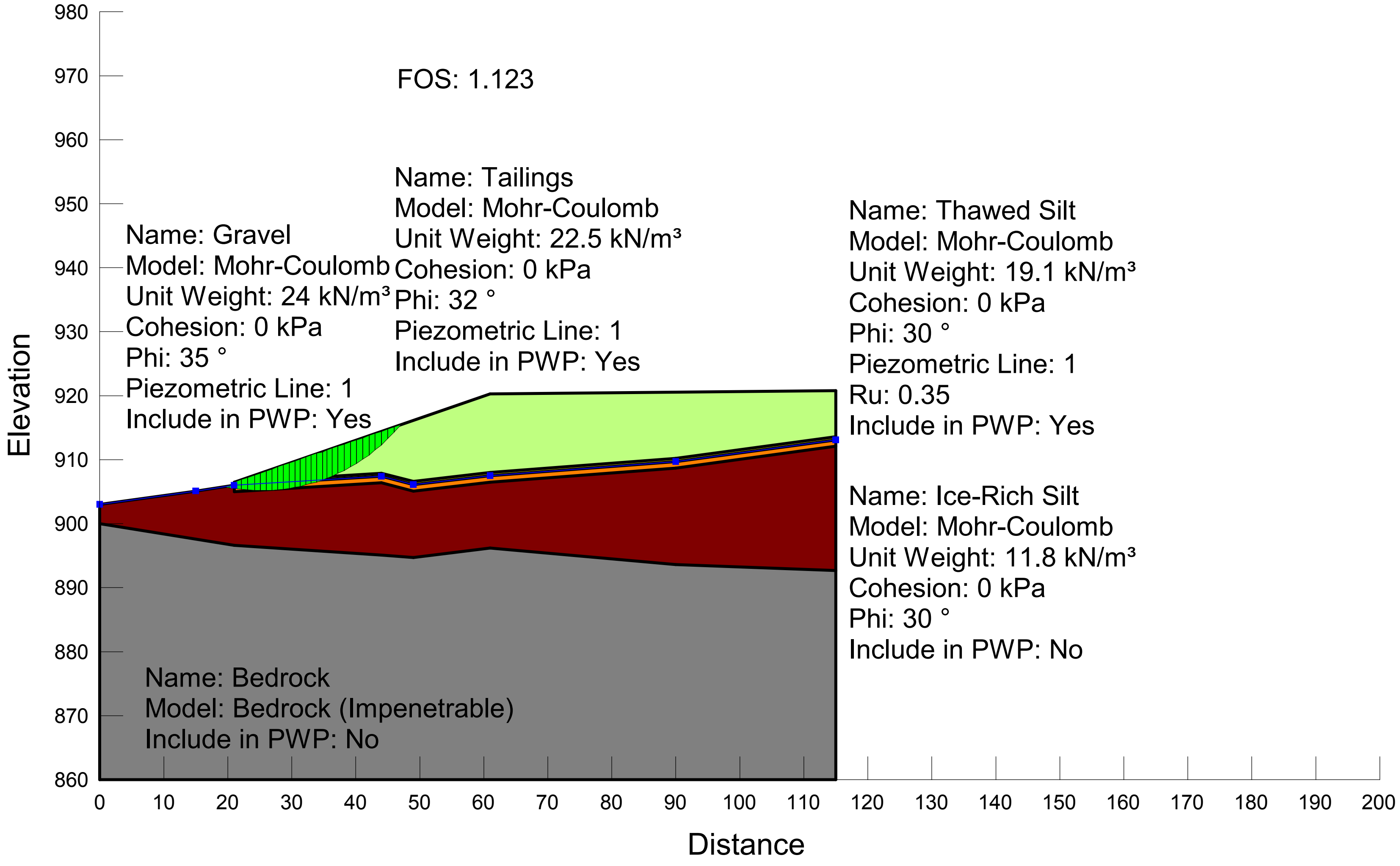
Name: Ice-Rich Silt
Model: Mohr-Coulomb
Unit Weight: 11.8 kN/m³
Cohesion: 0 kPa
Phi: 30 °
Include in PWP: No

Name: Bedrock
Model: Bedrock (Impenetrable)
Include in PWP: No

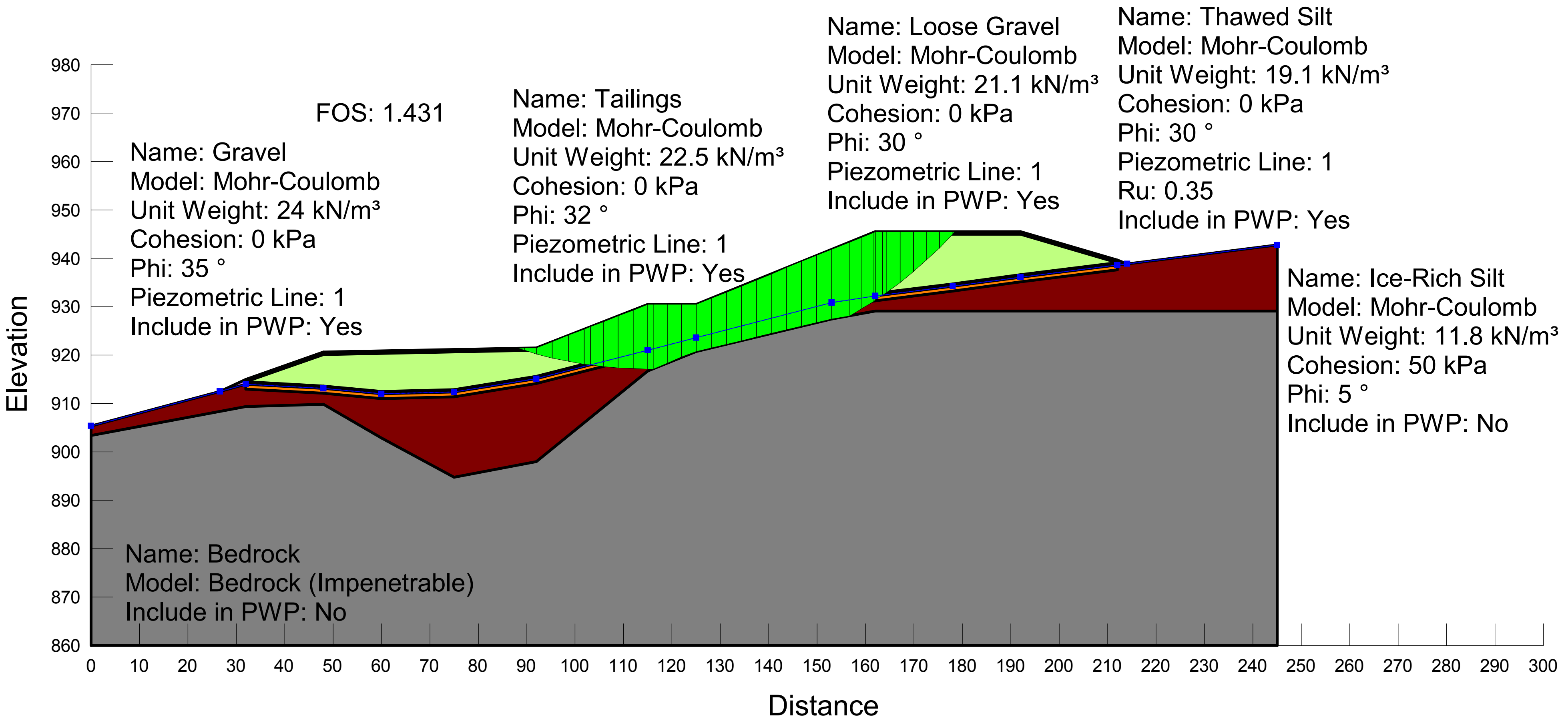
Name: Alignment A
Description: Dynamic (1:475) w/ Ru PWP Conditions (1.0 m Thaw)
File Name: W14101178.011_AlignmentA_R05C_Dynamic475_RuPWP.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0.138
PWP Conditions Source: Piezometric Line with Ru
Length(L) Units: meters
Horizontal Scale: 1250
Vertical Scale: 1250
Minimum Slip Surface Depth: 1 m



Name: Alignment B
Description: Dynamic (1:475) w/ Ru PWP Conditions (1.0 m Thaw)
File Name: W14101178.011_AlignmentB_R05C_Dynamic475_RuPWP.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0.138
PWP Conditions Source: Piezometric Line with Ru
Length(L) Units: meters
Horizontal Scale: 1000
Vertical Scale: 1000
Minimum Slip Surface Depth: 1 m



Name: Alignment A
Description: Static w/ Ru PWP Conditions (1.0 m Thaw)
File Name: W14101178.011_AlignmentA_R11D1_Static_RuPWP.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0
PWP Conditions Source: Piezometric Line with Ru
Length(L) Units: meters
Horizontal Scale: 1250
Vertical Scale: 1250
Minimum Slip Surface Depth: 1 m



FOS: 1.431

Name: Gravel
Model: Mohr-Coulomb
Unit Weight: 24 kN/m³
Cohesion: 0 kPa
Phi: 35 °
Piezometric Line: 1
Include in PWP: Yes

Name: Tailings
Model: Mohr-Coulomb
Unit Weight: 22.5 kN/m³
Cohesion: 0 kPa
Phi: 32 °
Piezometric Line: 1
Include in PWP: Yes

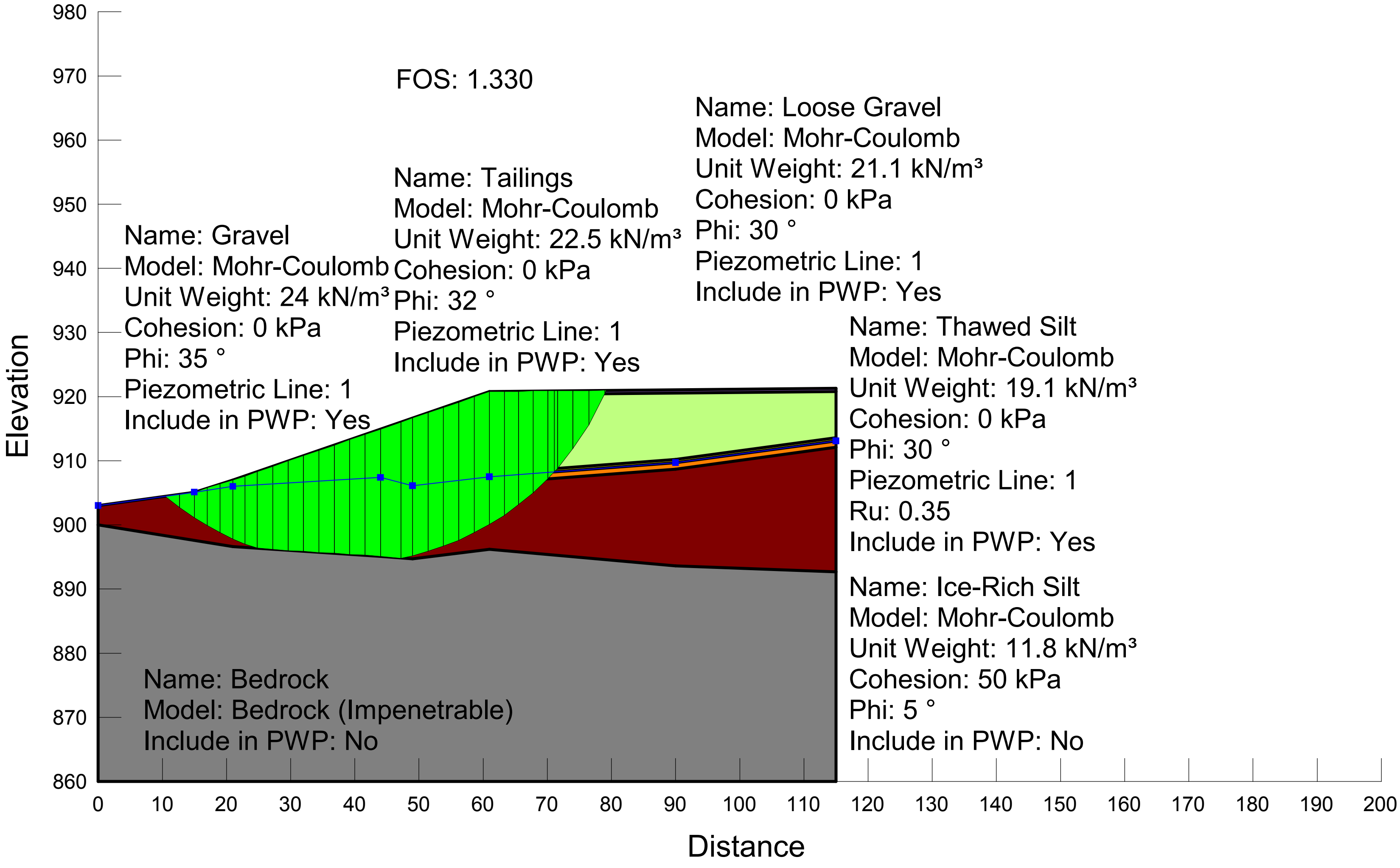
Name: Loose Gravel
Model: Mohr-Coulomb
Unit Weight: 21.1 kN/m³
Cohesion: 0 kPa
Phi: 30 °
Piezometric Line: 1
Include in PWP: Yes

Name: Thawed Silt
Model: Mohr-Coulomb
Unit Weight: 19.1 kN/m³
Cohesion: 0 kPa
Phi: 30 °
Piezometric Line: 1
Ru: 0.35
Include in PWP: Yes

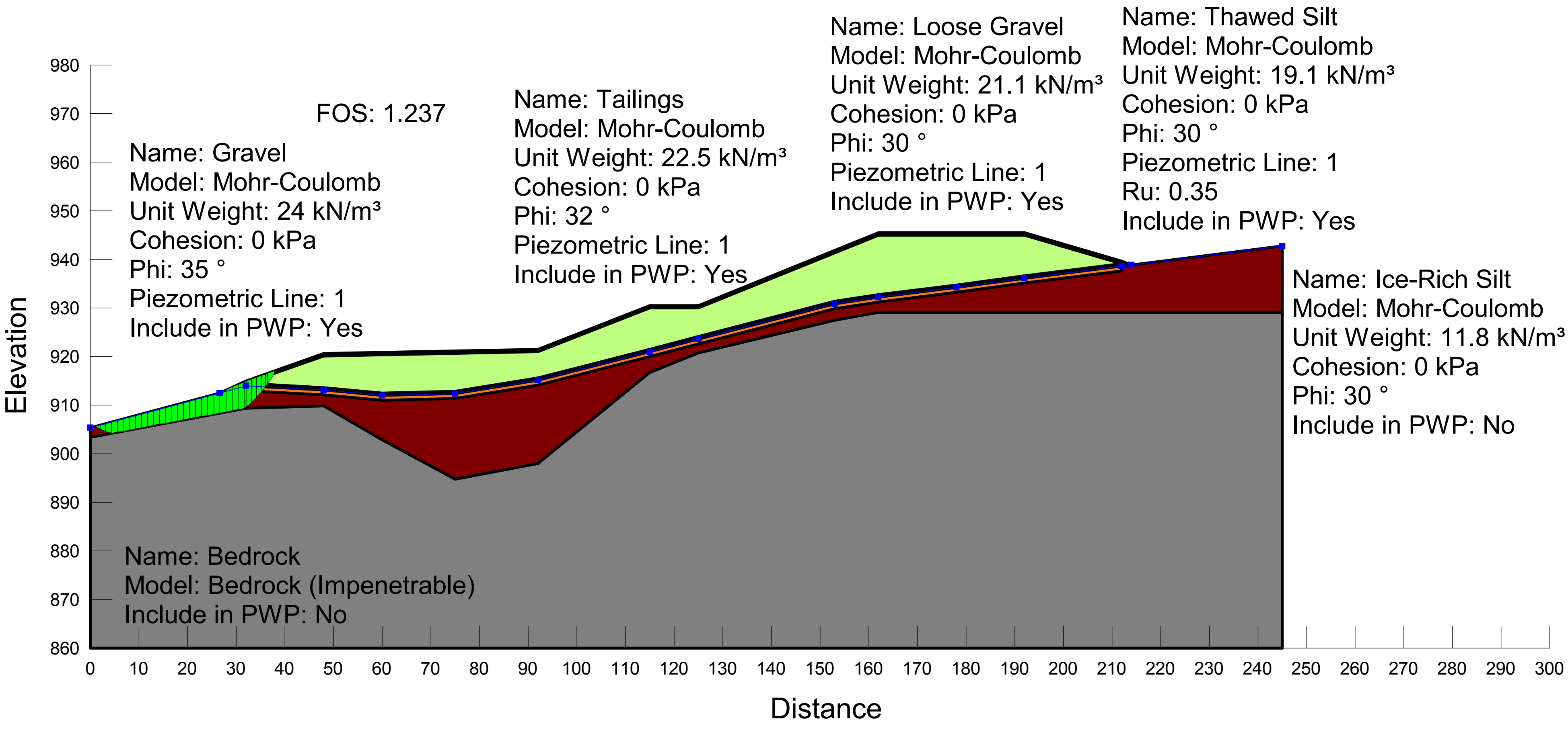
Name: Ice-Rich Silt
Model: Mohr-Coulomb
Unit Weight: 11.8 kN/m³
Cohesion: 50 kPa
Phi: 5 °
Include in PWP: No

Name: Bedrock
Model: Bedrock (Impenetrable)
Include in PWP: No

Name: Alignment B
Description: Static w/ Ru PWP Conditions (1.0 m Thaw)
File Name: W14101178.011_AlignmentB_R11D1_Static_RuPWP.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0
PWP Conditions Source: Piezometric Line with Ru
Length(L) Units: meters
Horizontal Scale: 1000
Vertical Scale: 1000
Minimum Slip Surface Depth: 1 m



Name: Alignment A
Description: Dynamic (1:475) w/ Ru PWP Conditions (1.0 m Thaw)
File Name: W14101178.011_AlignmentA_R05E_Dynamic475_RuPWP.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0.138
PWP Conditions Source: Piezometric Line with Ru
Length(L) Units: meters
Horizontal Scale: 1250
Vertical Scale: 1250
Minimum Slip Surface Depth: 1 m



Name: Gravel
Model: Mohr-Coulomb
Unit Weight: 24 kN/m³
Cohesion: 0 kPa
Phi: 35 °
Piezometric Line: 1
Include in PWP: Yes

Name: Tailings
Model: Mohr-Coulomb
Unit Weight: 22.5 kN/m³
Cohesion: 0 kPa
Phi: 32 °
Piezometric Line: 1
Include in PWP: Yes

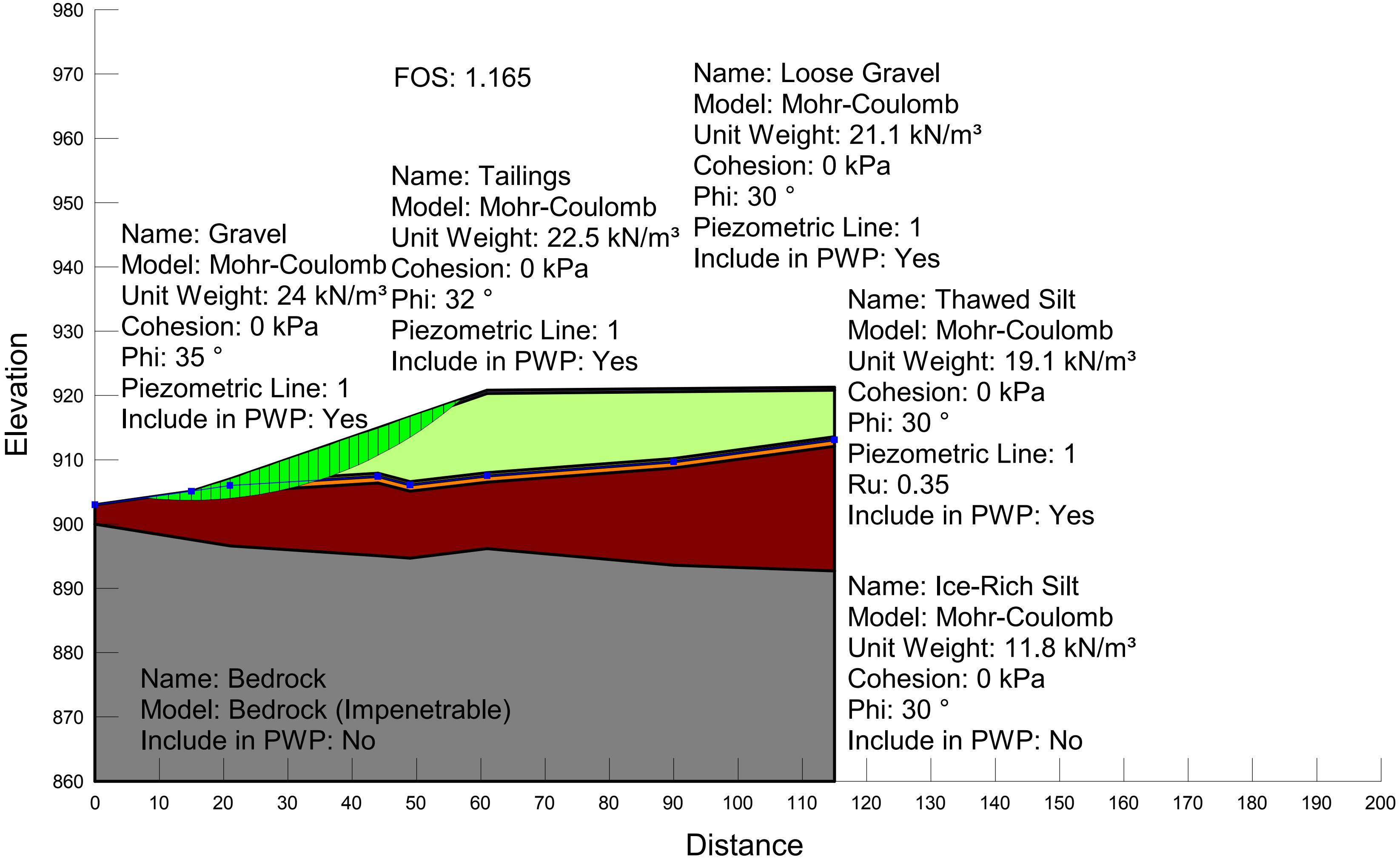
Name: Loose Gravel
Model: Mohr-Coulomb
Unit Weight: 21.1 kN/m³
Cohesion: 0 kPa
Phi: 30 °
Piezometric Line: 1
Include in PWP: Yes

Name: Thawed Silt
Model: Mohr-Coulomb
Unit Weight: 19.1 kN/m³
Cohesion: 0 kPa
Phi: 30 °
Piezometric Line: 1
Ru: 0.35
Include in PWP: Yes

Name: Ice-Rich Silt
Model: Mohr-Coulomb
Unit Weight: 11.8 kN/m³
Cohesion: 0 kPa
Phi: 30 °
Include in PWP: No

Name: Bedrock
Model: Bedrock (Impenetrable)
Include in PWP: No

Name: Alignment B
Description: Dynamic (1:475) w/ Ru PWP Conditions (1.0 m Thaw)
File Name: W14101178.011_AlignmentB_R05E_Dynamic475_RuPWP.gs
Method: Morgenstern-Price
Horz Seismic Load: 0.138
PWP Conditions Source: Piezometric Line with Ru
Length(L) Units: meters
Horizontal Scale: 1000
Vertical Scale: 1000
Minimum Slip Surface Depth: 1 m



FOS: 1.165

Name: Gravel
Model: Mohr-Coulomb
Unit Weight: 24 kN/m³
Cohesion: 0 kPa
Phi: 35 °
Piezometric Line: 1
Include in PWP: Yes

Name: Tailings
Model: Mohr-Coulomb
Unit Weight: 22.5 kN/m³
Cohesion: 0 kPa
Phi: 32 °
Piezometric Line: 1
Include in PWP: Yes

Name: Loose Gravel
Model: Mohr-Coulomb
Unit Weight: 21.1 kN/m³
Cohesion: 0 kPa
Phi: 30 °
Piezometric Line: 1
Include in PWP: Yes

Name: Thawed Silt
Model: Mohr-Coulomb
Unit Weight: 19.1 kN/m³
Cohesion: 0 kPa
Phi: 30 °
Piezometric Line: 1
Ru: 0.35
Include in PWP: Yes

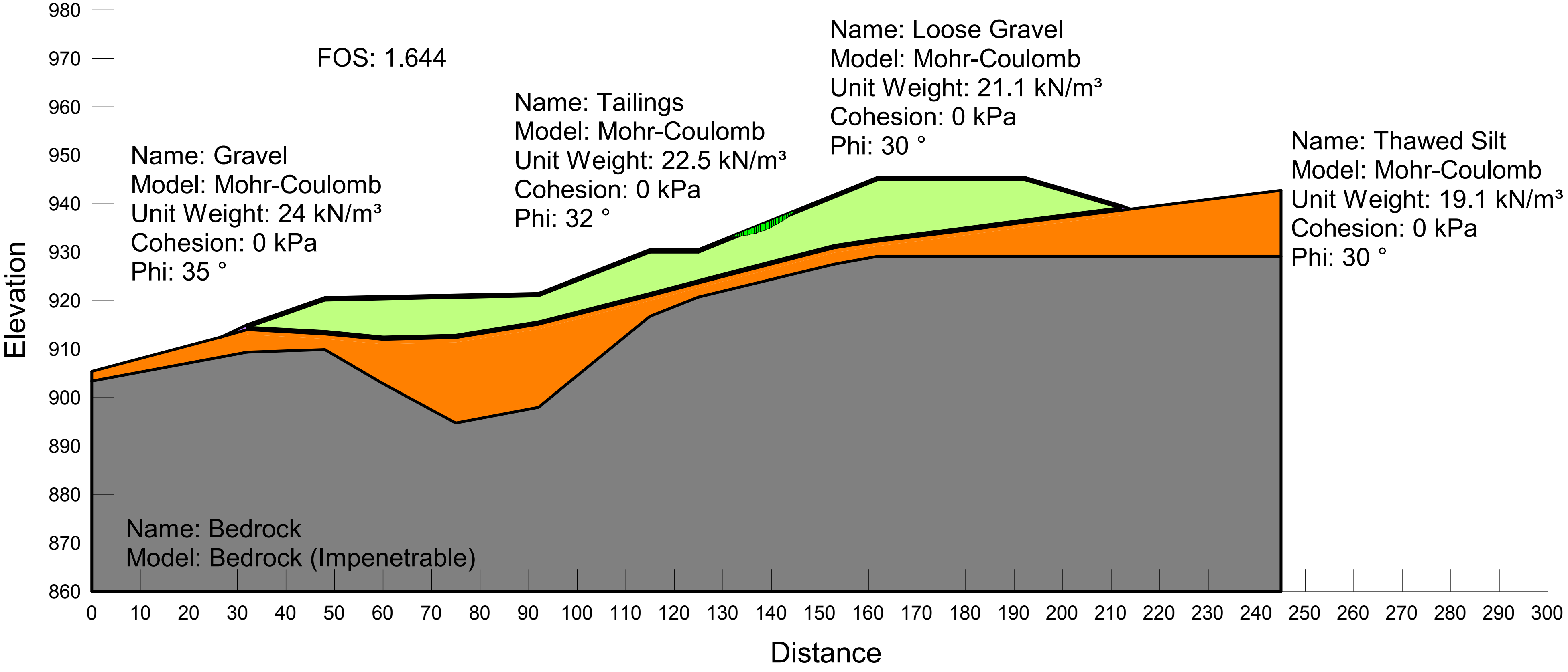
Name: Ice-Rich Silt
Model: Mohr-Coulomb
Unit Weight: 11.8 kN/m³
Cohesion: 0 kPa
Phi: 30 °
Include in PWP: No

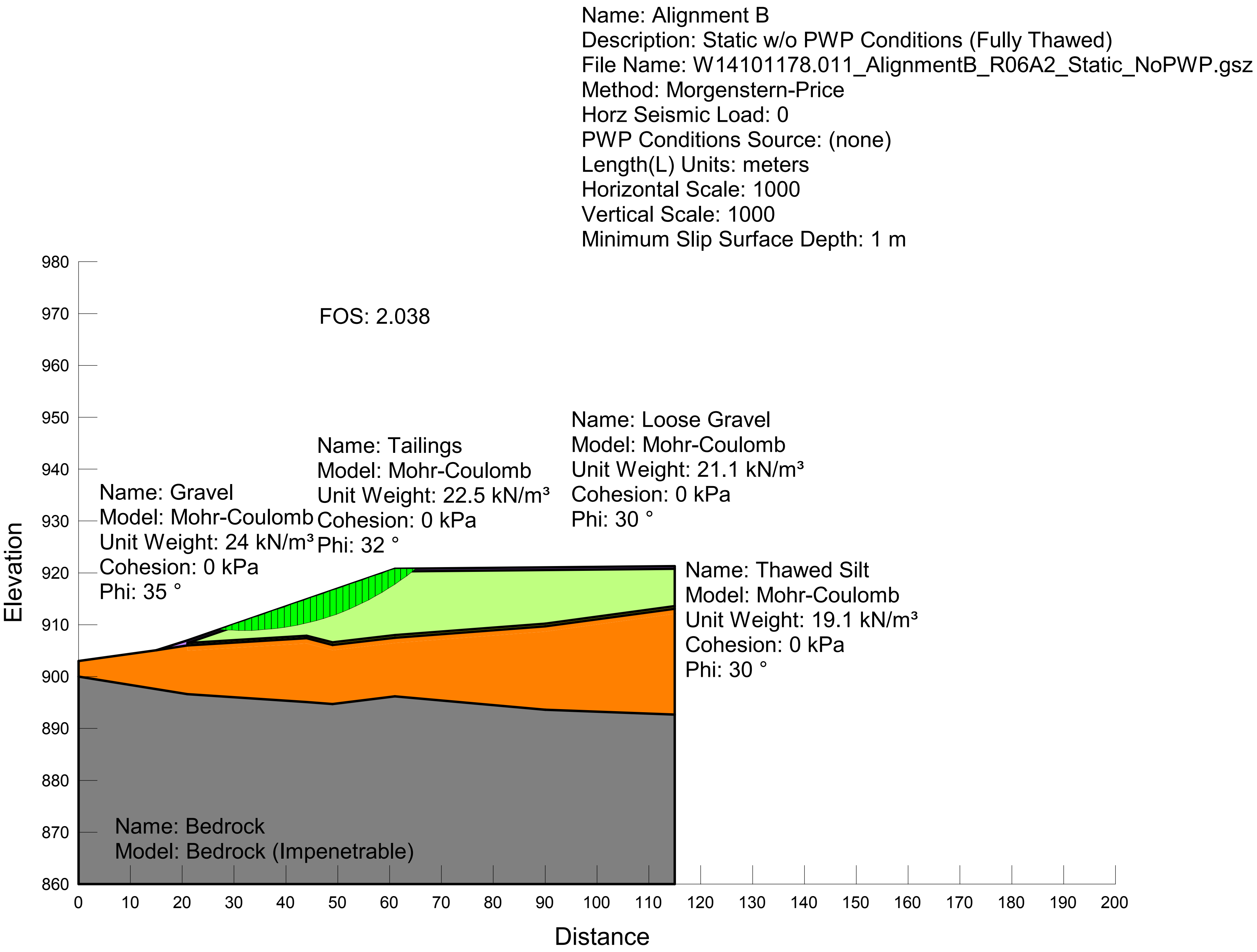
Name: Bedrock
Model: Bedrock (Impenetrable)
Include in PWP: No

APPENDIX I

APPENDIX I SLOPE STABILITY RESULTS – FULLY THAWED PERMAFROST

Name: Alignment A
Description: Static w/o PWP Conditions (Fully Thawed)
File Name: W14101178.011_AlignmentA_R06A2_Static_NoPWP.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0
PWP Conditions Source: (none)
Length(L) Units: meters
Horizontal Scale: 1250
Vertical Scale: 1250
Minimum Slip Surface Depth: 1 m





Name: Alignment B
Description: Static w/o PWP Conditions (Fully Thawed)
File Name: W14101178.011_AlignmentB_R06A2_Static_NoPWP.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0
PWP Conditions Source: (none)
Length(L) Units: meters
Horizontal Scale: 1000
Vertical Scale: 1000
Minimum Slip Surface Depth: 1 m

FOS: 2.038

Name: Gravel
Model: Mohr-Coulomb
Unit Weight: 24 kN/m³
Cohesion: 0 kPa
Phi: 35 °

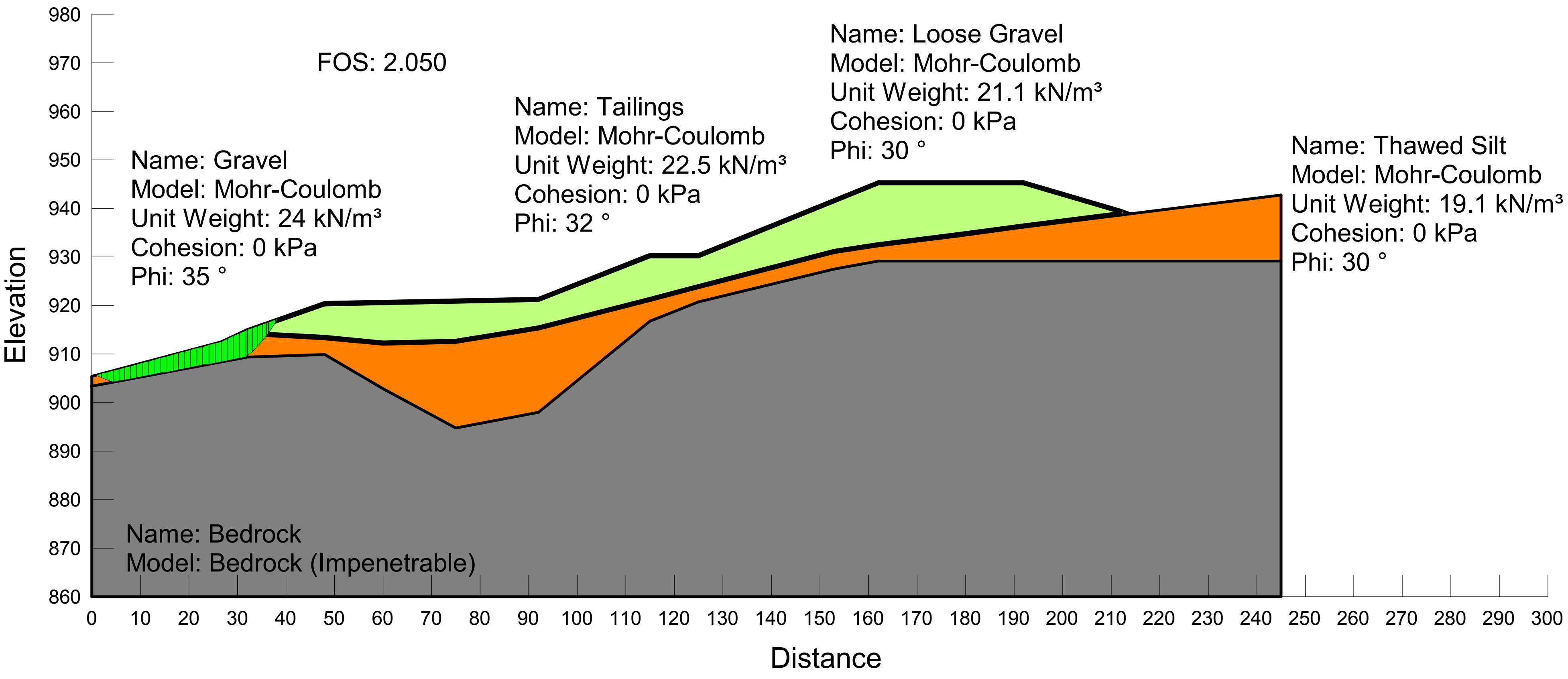
Name: Tailings
Model: Mohr-Coulomb
Unit Weight: 22.5 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Loose Gravel
Model: Mohr-Coulomb
Unit Weight: 21.1 kN/m³
Cohesion: 0 kPa
Phi: 30 °

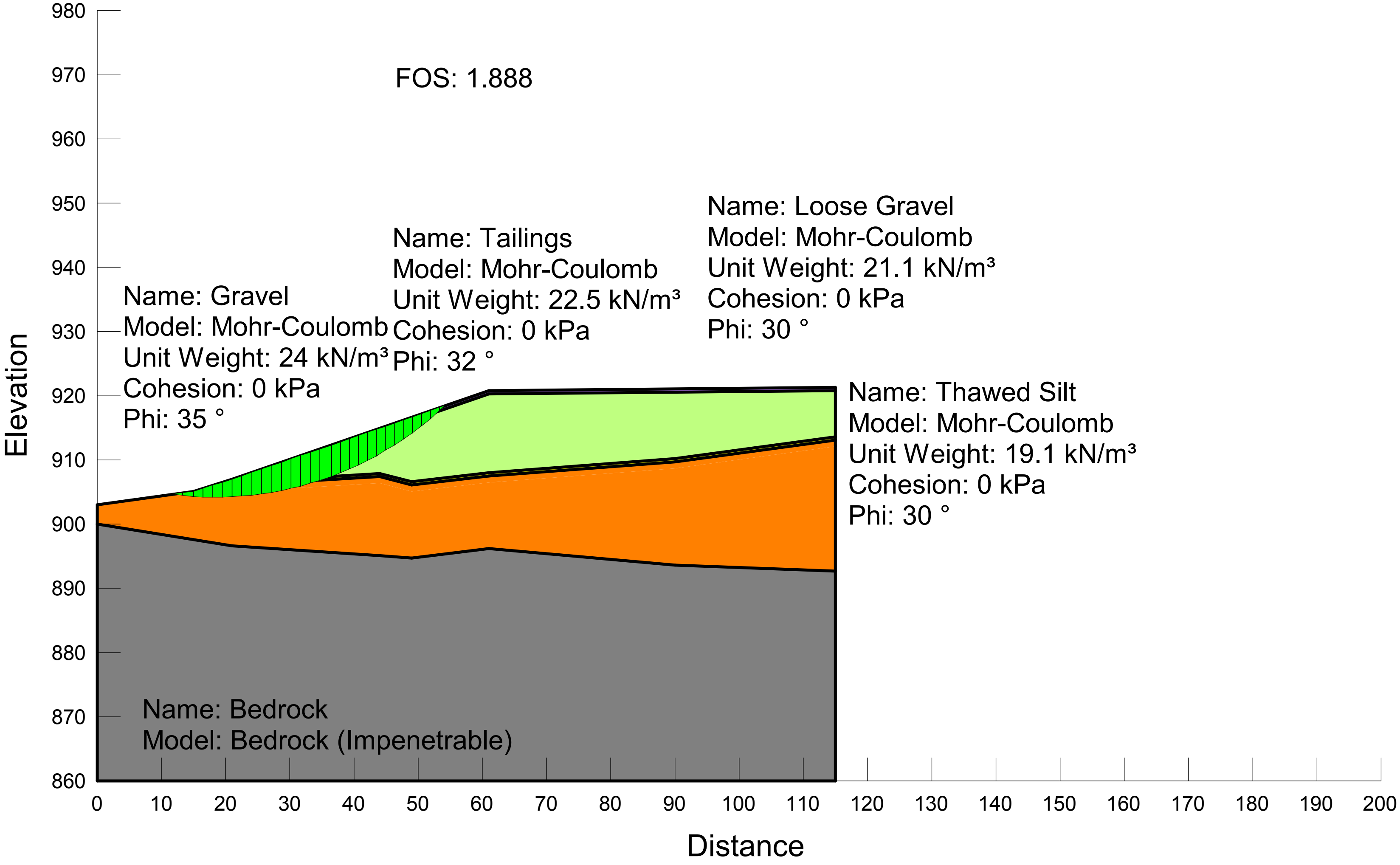
Name: Thawed Silt
Model: Mohr-Coulomb
Unit Weight: 19.1 kN/m³
Cohesion: 0 kPa
Phi: 30 °

Name: Bedrock
Model: Bedrock (Impenetrable)

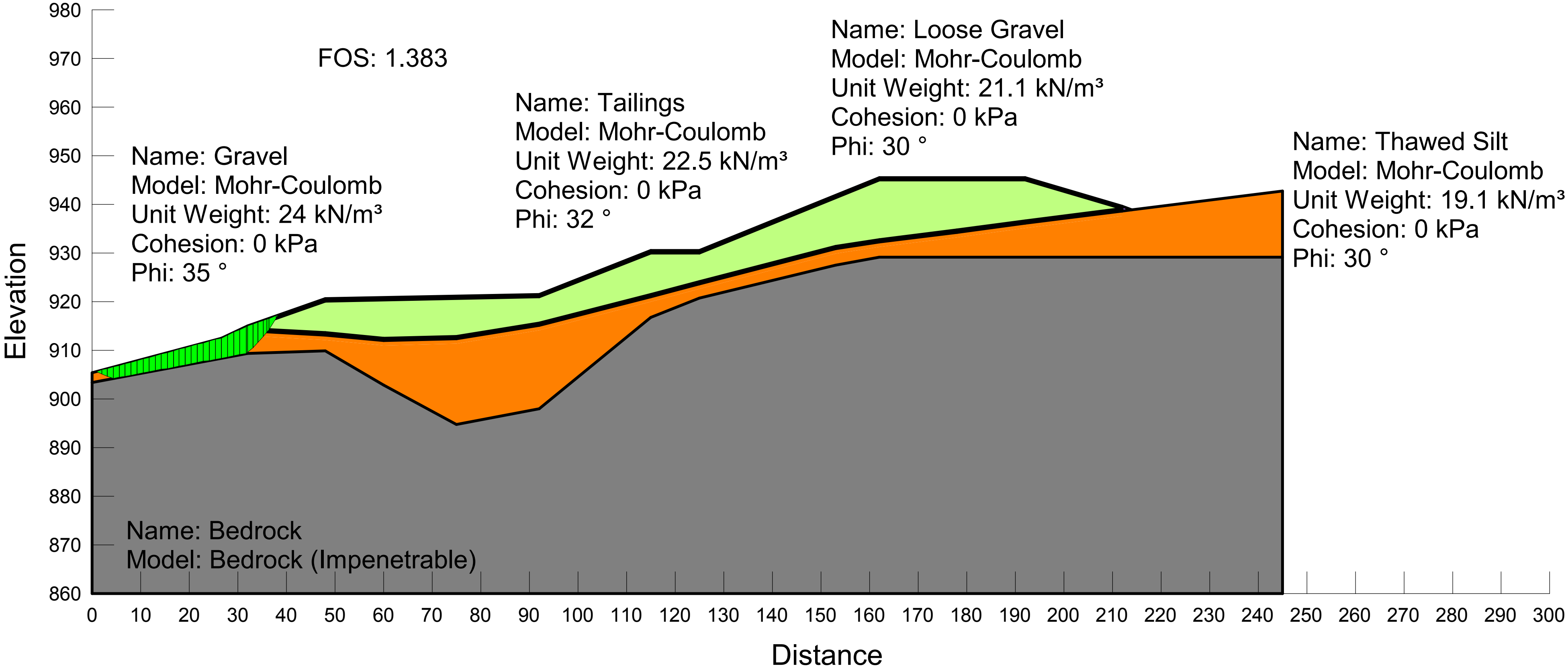
Name: Alignment A
Description: Static w/o PWP Conditions (Fully Thawed)
File Name: W14101178.011_AlignmentA_R06A1_Static_NoPWP.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0
PWP Conditions Source: (none)
Length(L) Units: meters
Horizontal Scale: 1250
Vertical Scale: 1250
Minimum Slip Surface Depth: 1 m

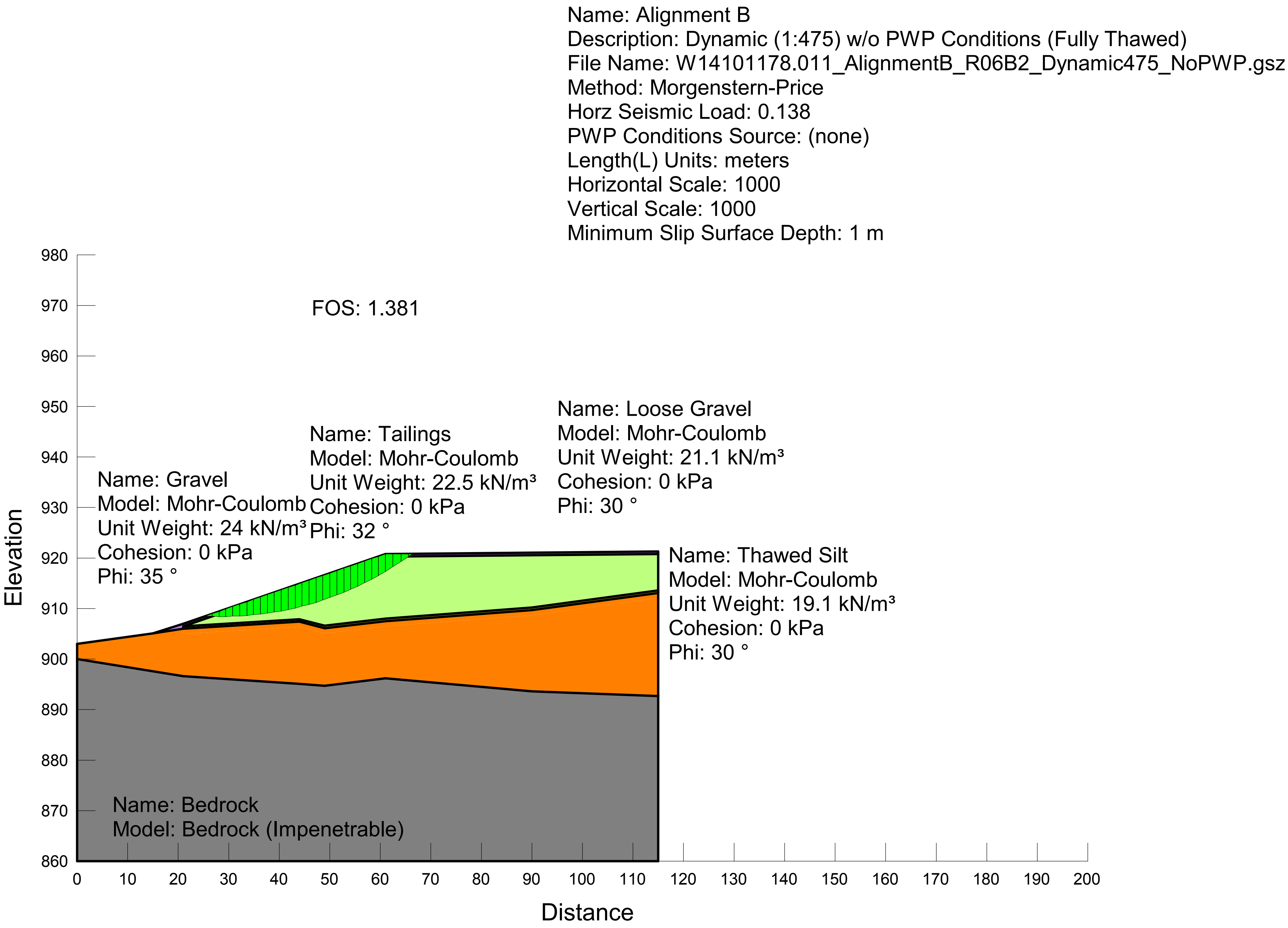


Name: Alignment B
Description: Static w/o PWP Conditions (Fully Thawed)
File Name: W14101178.011_AlignmentB_R06A1_Static_NoPWP.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0
PWP Conditions Source: (none)
Length(L) Units: meters
Horizontal Scale: 1000
Vertical Scale: 1000
Minimum Slip Surface Depth: 1 m



Name: Alignment A
Description: Dynamic (1:475) w/o PWP Conditions (Fully Thawed)
File Name: W14101178.011_AlignmentA_R06B1_Dynamic475_NoPWP.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0.138
PWP Conditions Source: (none)
Length(L) Units: meters
Horizontal Scale: 1250
Vertical Scale: 1250
Minimum Slip Surface Depth: 1 m

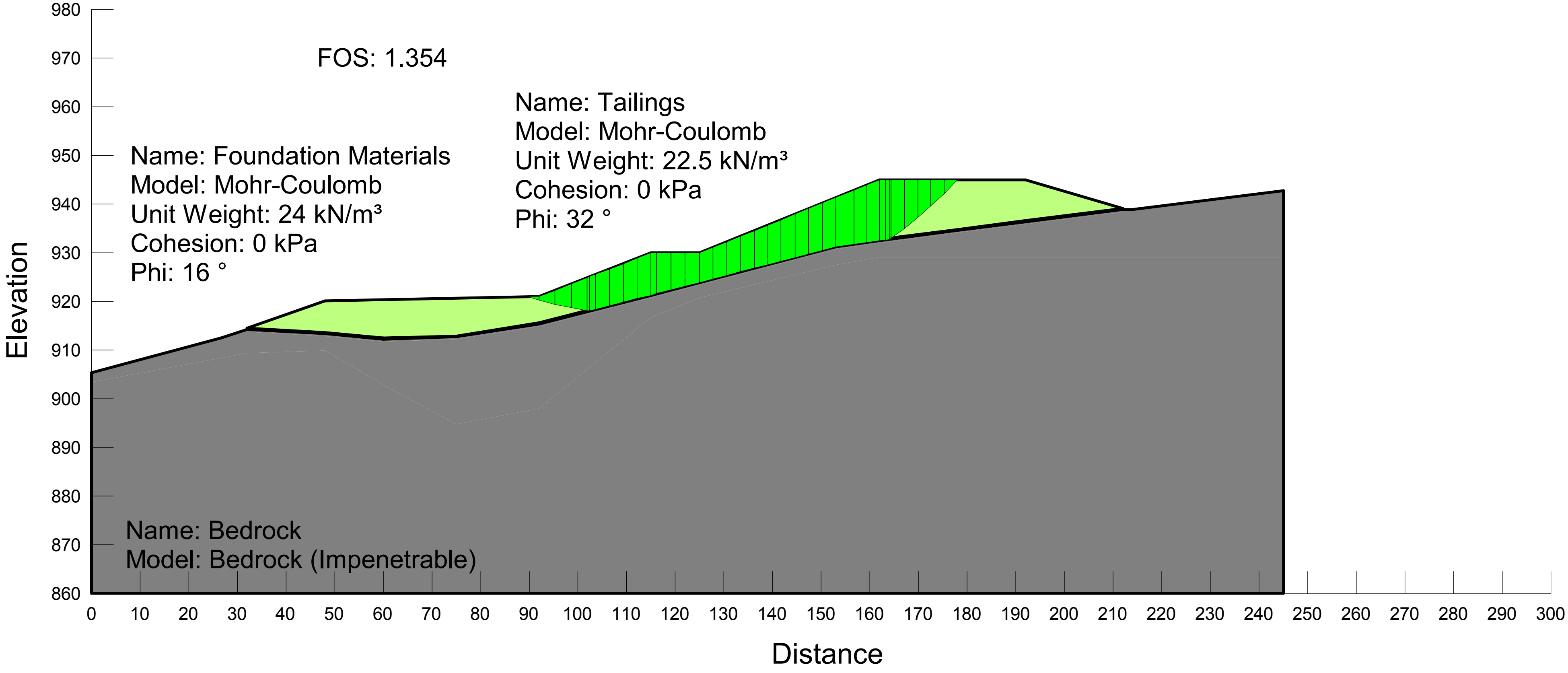



Name: Alignment B
Description: Dynamic (1:475) w/o PWP Conditions (Fully Thawed)
File Name: W14101178.011_AlignmentB_R06B2_Dynamic475_NoPWP.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0.138
PWP Conditions Source: (none)
Length(L) Units: meters
Horizontal Scale: 1000
Vertical Scale: 1000
Minimum Slip Surface Depth: 1 m
FOS: 1.381
Name: Gravel
Model: Mohr-Coulomb
Unit Weight: 24 kN/m³
Cohesion: 0 kPa
Phi: 35 °
Name: Tailings
Model: Mohr-Coulomb
Unit Weight: 22.5 kN/m³
Cohesion: 0 kPa
Phi: 32 °
Name: Loose Gravel
Model: Mohr-Coulomb
Unit Weight: 21.1 kN/m³
Cohesion: 0 kPa
Phi: 30 °
Name: Thawed Silt
Model: Mohr-Coulomb
Unit Weight: 19.1 kN/m³
Cohesion: 0 kPa
Phi: 30 °
Name: Bedrock
Model: Bedrock (Impenetrable)
Elevation
980
970
960
950
940
930
920
910
900
890
880
870
860
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
Distance

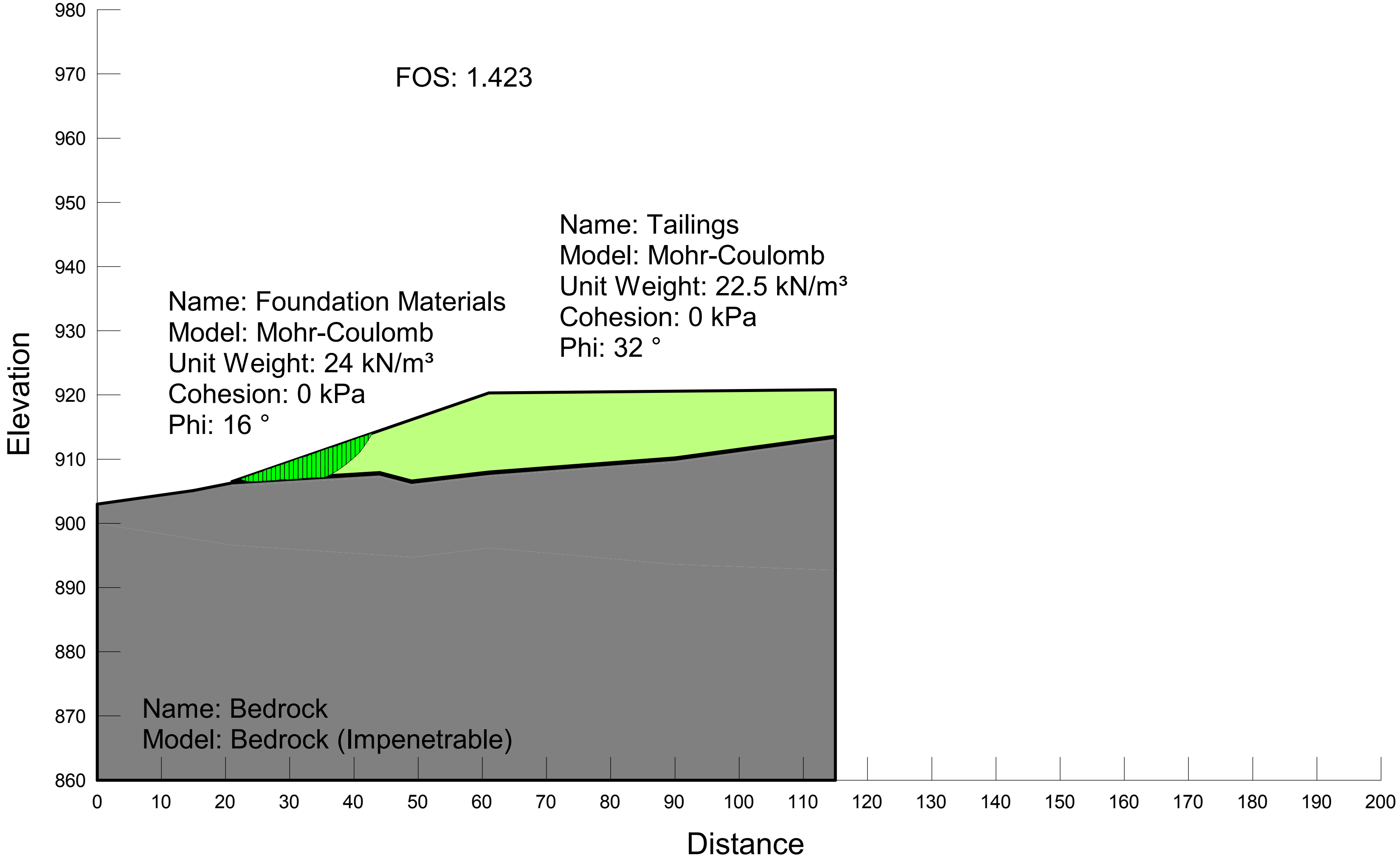
APPENDIX J

APPENDIX J SLOPE STABILITY RESULTS – DSTF FOUNDATION

Name: Alignment A
Description: Static (Foundation Analysis)
File Name: W14101178.011_AlignmentA_R12_Static_Geomaterial.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0
PWP Conditions Source: (none)
Length(L) Units: meters
Horizontal Scale: 1250
Vertical Scale: 1250
Minimum Slip Surface Depth: 1 m



Name: Alignment B
Description: Static (Foundation Analysis)
File Name: W14101178.011_AlignmentB_R12_Static_Geomaterial.gs
Method: Morgenstern-Price
Horz Seismic Load: 0
PWP Conditions Source: (none)
Length(L) Units: meters
Horizontal Scale: 1000
Vertical Scale: 1000
Minimum Slip Surface Depth: 1 m

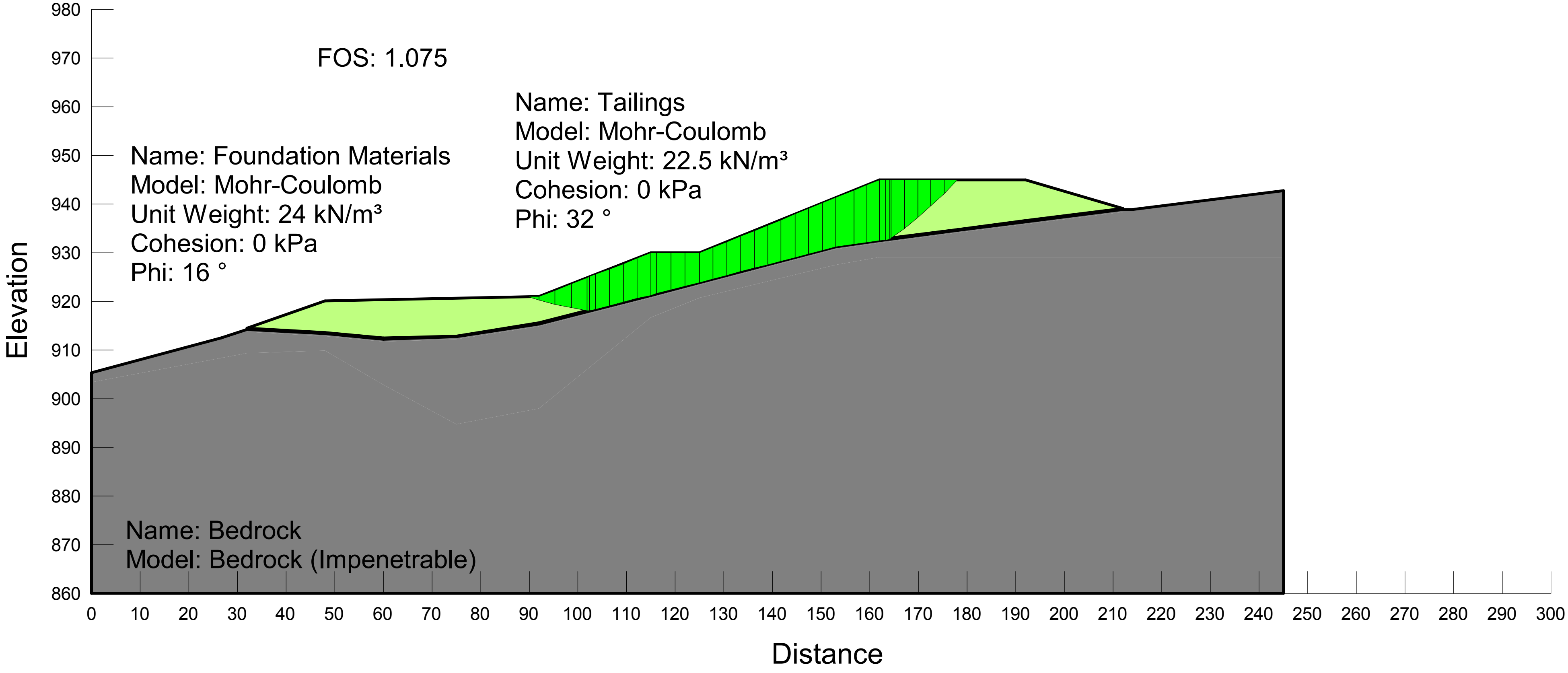

FOS: 1.423

Name: Tailings
Model: Mohr-Coulomb
Unit Weight: 22.5 kN/m³
Cohesion: 0 kPa
Phi: 32 °

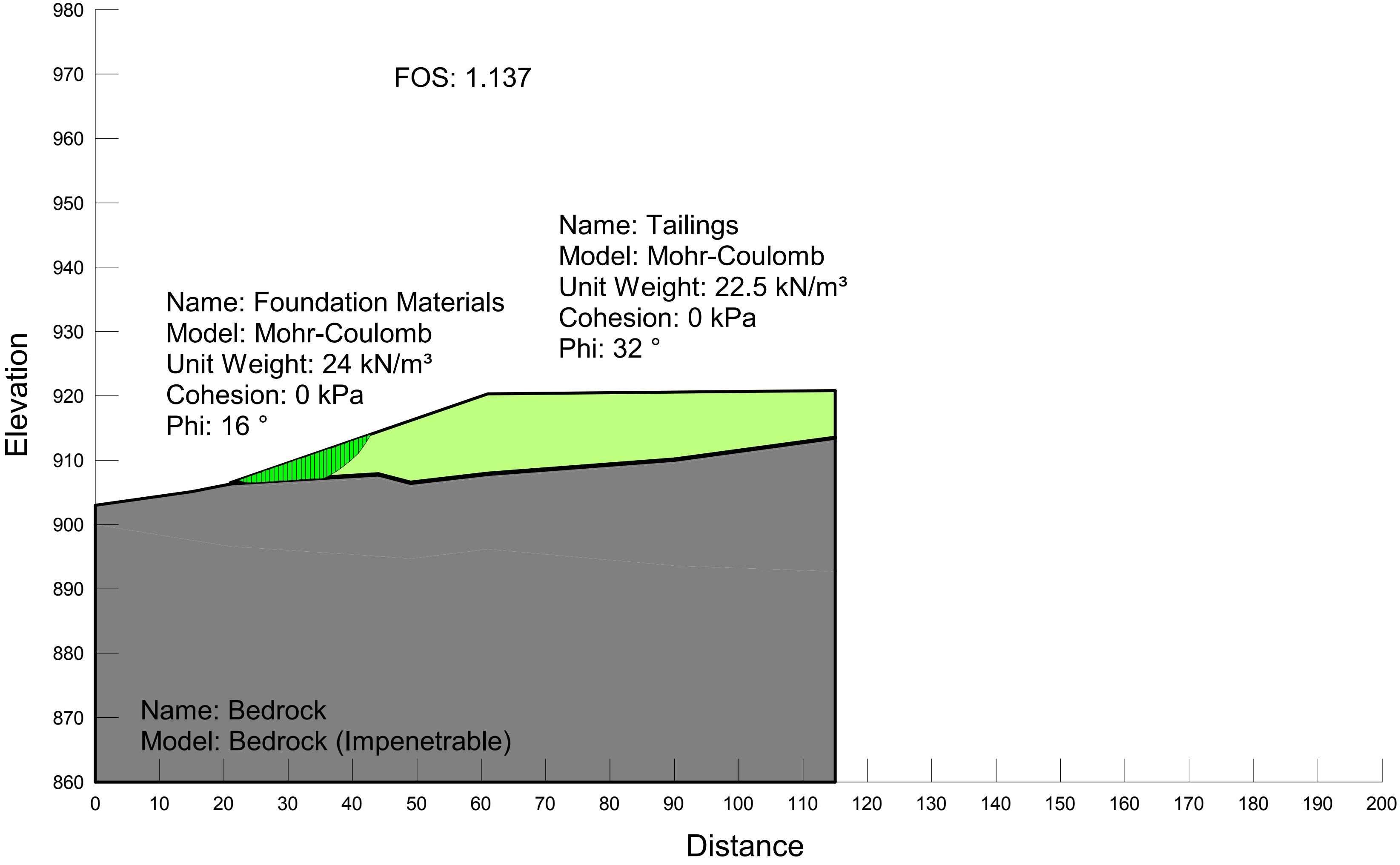
Name: Foundation Materials
Model: Mohr-Coulomb
Unit Weight: 24 kN/m³
Cohesion: 0 kPa
Phi: 16 °

Name: Bedrock
Model: Bedrock (Impenetrable)

Name: Alignment A
Description: Dynamic (1:475) (Foundation Analysis)
File Name: W14101178.011_AlignmentA_R13_Dynamic475_Geomaterial.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0.069
PWP Conditions Source: (none)
Length(L) Units: meters
Horizontal Scale: 1250
Vertical Scale: 1250
Minimum Slip Surface Depth: 1 m



Name: Alignment B
Description: Dynamic (1:475) (Foundation Analysis)
File Name: W14101178.011_AlignmentB_R13_Dynamic475_Geomaterial.gs
Method: Morgenstern-Price
Horz Seismic Load: 0.069
PWP Conditions Source: (none)
Length(L) Units: meters
Horizontal Scale: 1000
Vertical Scale: 1000
Minimum Slip Surface Depth: 1 m

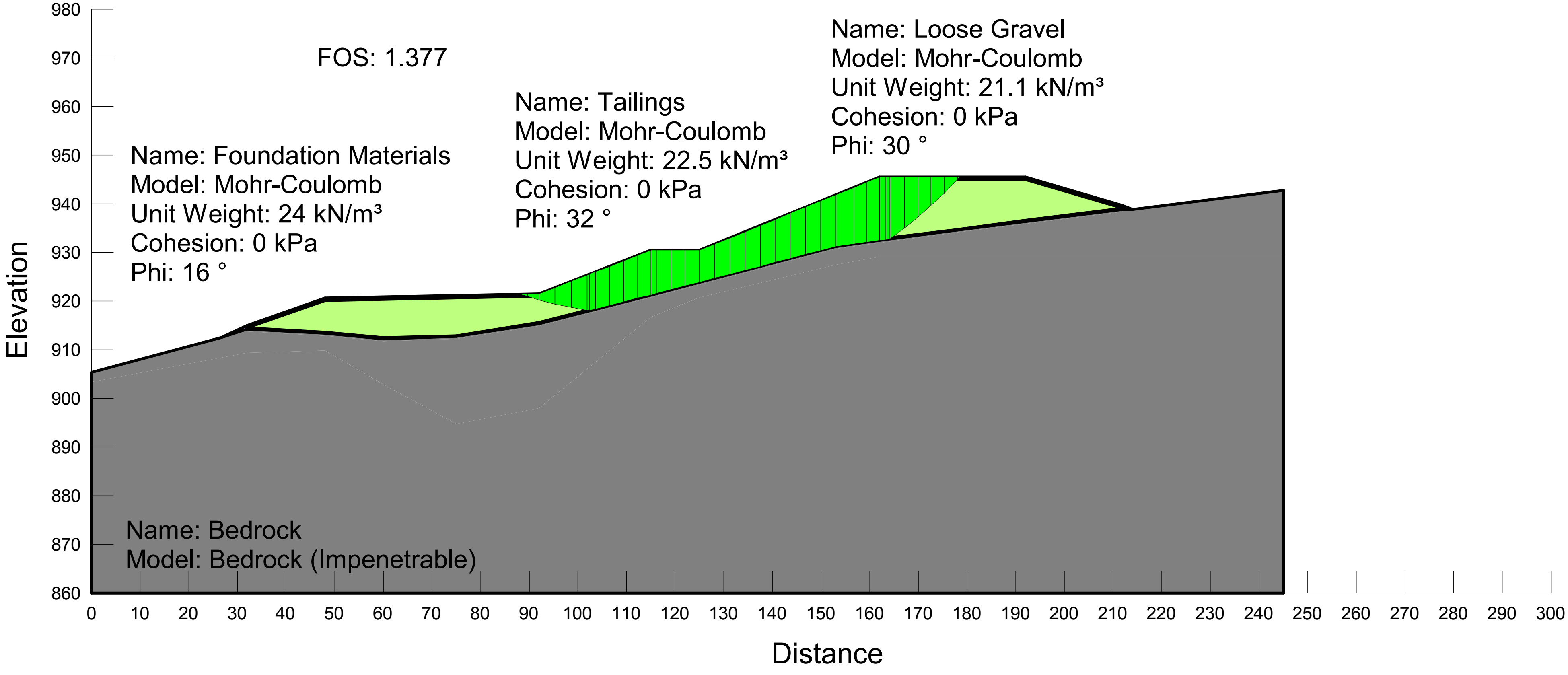


Name: Foundation Materials
Model: Mohr-Coulomb
Unit Weight: 24 kN/m³
Cohesion: 0 kPa
Phi: 16 °

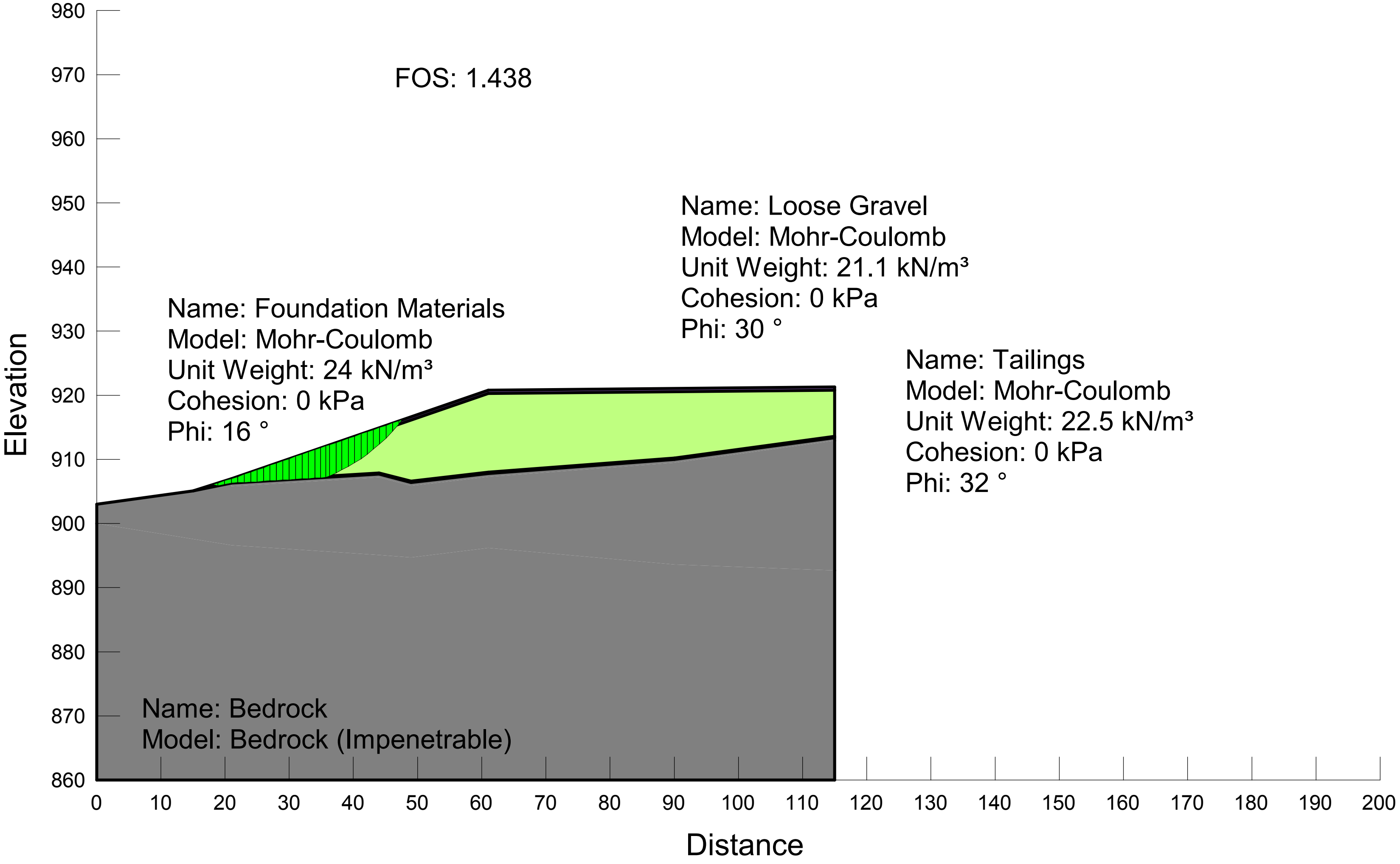
Name: Tailings
Model: Mohr-Coulomb
Unit Weight: 22.5 kN/m³
Cohesion: 0 kPa
Phi: 32 °

Name: Bedrock
Model: Bedrock (Impenetrable)

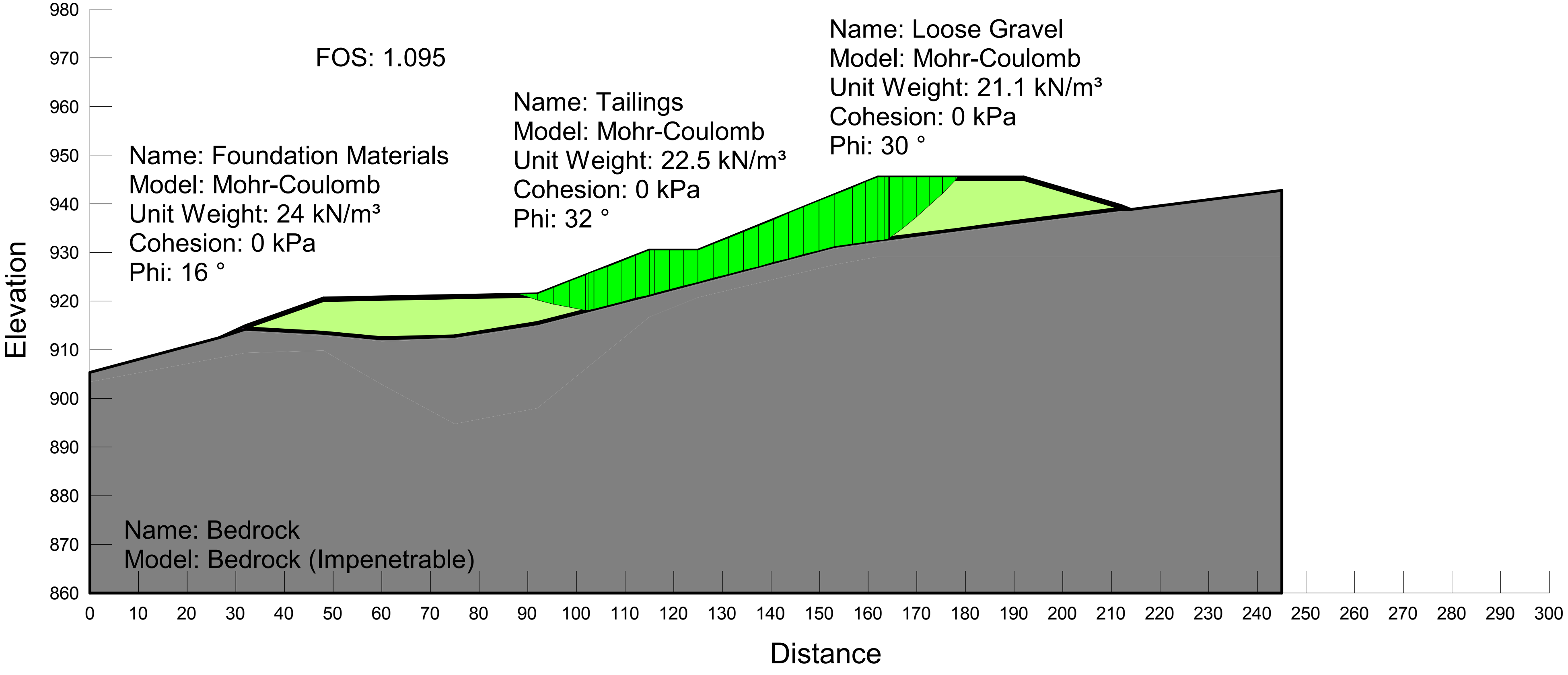
Name: Alignment A
Description: Static (Foundation Analysis)
File Name: W14101178.011_AlignmentA_R14_Static_Geomaterial.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0
PWP Conditions Source: (none)
Length(L) Units: meters
Horizontal Scale: 1250
Vertical Scale: 1250
Minimum Slip Surface Depth: 1 m



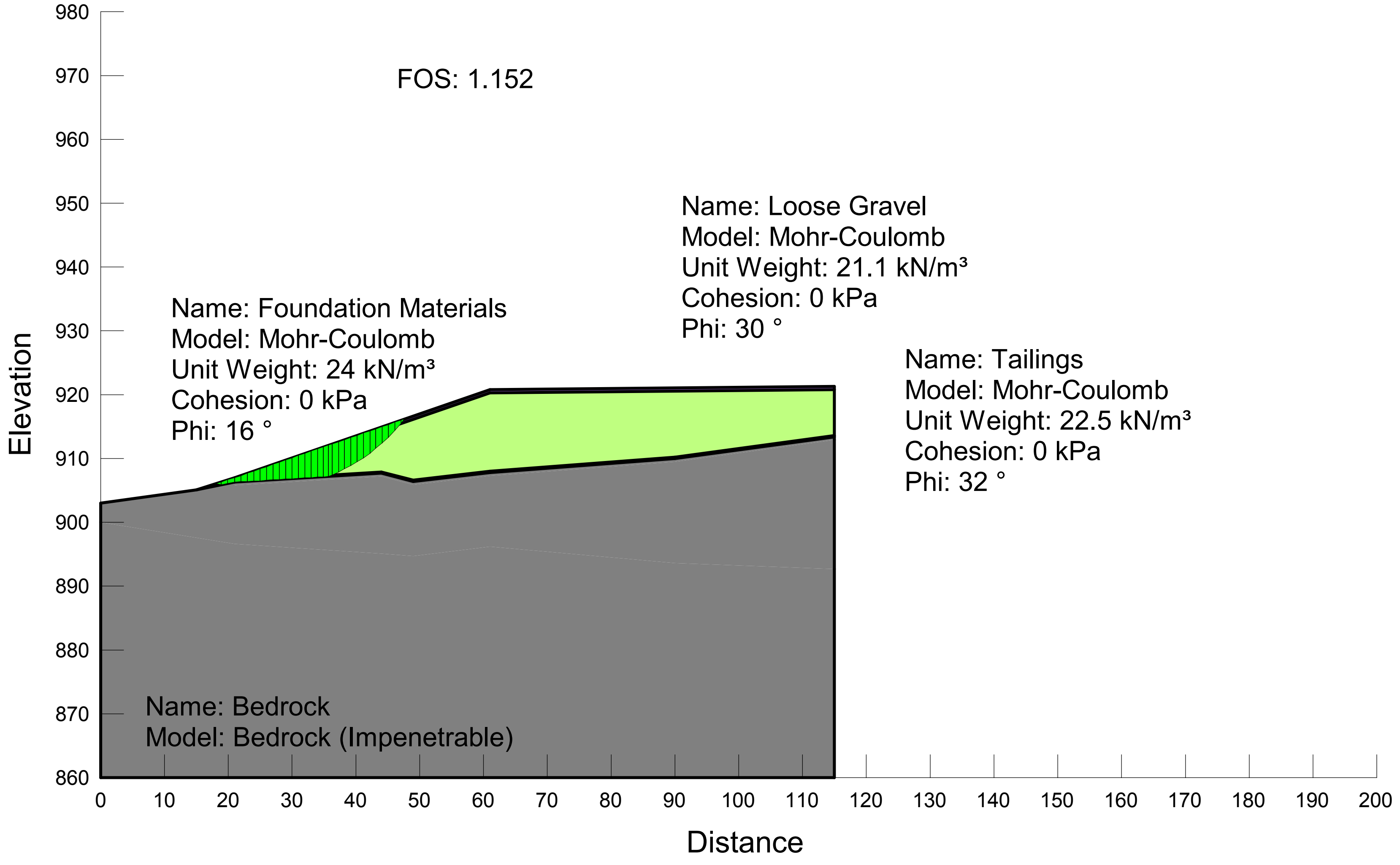
Name: Alignment B
Description: Static (Foundation Analysis)
File Name: W14101178.011_AlignmentB_R14_Static_Geomaterial.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0
PWP Conditions Source: (none)
Length(L) Units: meters
Horizontal Scale: 1000
Vertical Scale: 1000
Minimum Slip Surface Depth: 1 m



Name: Alignment A
Description: Dynamic (1:475) (Foundation Analysis)
File Name: W14101178.011_AlignmentA_R15_Dynamic475_Geomaterial.gs
Method: Morgenstern-Price
Horz Seismic Load: 0.069
PWP Conditions Source: (none)
Length(L) Units: meters
Horizontal Scale: 1250
Vertical Scale: 1250
Minimum Slip Surface Depth: 1 m



Name: Alignment B
Description: Dynamic (1:475) (Foundation Analysis)
File Name: W14101178.011_AlignmentB_R15_Dynamic475_Geomaterial.gsz
Method: Morgenstern-Price
Horz Seismic Load: 0.069
PWP Conditions Source: (none)
Length(L) Units: meters
Horizontal Scale: 1000
Vertical Scale: 1000
Minimum Slip Surface Depth: 1 m



ALEXCO KENO HILL MINING CORP.

QUARTZ MINING LICENCE QML-0009

2010 ANNUAL REPORT - RESUBMISSION

BELLEKENO MINE SITE

KENO HILL SILVER DISTRICT

YUKON

APPENDIX E

WRMP 2010 TECHNICAL MEMO

2010 Waste Rock Management Plan
September to December Addendum

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Waste Rock Management Activities

Introduction

Proposed waste rock management practices were outlined in the Project Proposal submitted to Yukon Environmental and Socio-Economic Assessment Board (YESAB) on February 6, 2008 in Section 2.5.1, the Waste Rock Management Plan (Appendix D) of the Project Proposal and in the Waste Rock Metals and Acid Base Accounting Testing Plan submitted to Yukon Water Board and Government of Yukon, Mining Land Use Department, under Sections 24 and 25 of Water License QZ07-078. These guidelines have been successfully put into practice in managing waste rock from the Bellekeno Mine. This plan augments those presented in the Project Proposal and Water Use License QZ07-078 by reviewing the effectiveness of the current plan.

This Waste Rock Testing Plan Summary will fulfill the following objectives:

- Review the method and effectiveness in which waste rock is sampled and classified using field screening criteria;
- Review all waste rock management data collected to date from the Bellekeno Mine operation;
- Review the sampling schedule for both ICP and ABA analyses based on a per tonnage basis

Methods

Bellekeno Underground Development 2010

Underground development at Bellekeno re-commenced in January 2010. Initial development consisted of excavating central remucks in the Bellekeno East Decline and the widening and heightening of the existing ramps down to the Southwest Zone. By March the majority of this work was completed and a new incline and decline were driven from a central location in the Southwest portion of the mine. Various ore accesses off of these ramps were also driven. At the bottom of the mine the existing 850 Decline was extended and an exploration drilling platform was excavated. During this time, minor ore access development in the 99 zone was ongoing. Production mining of mineralized vein material commenced in September and continued through till December in various stopes located throughout the mine. Figure 1 shows an isometric view looking down to the North East direction of all new development for 2010 in red.

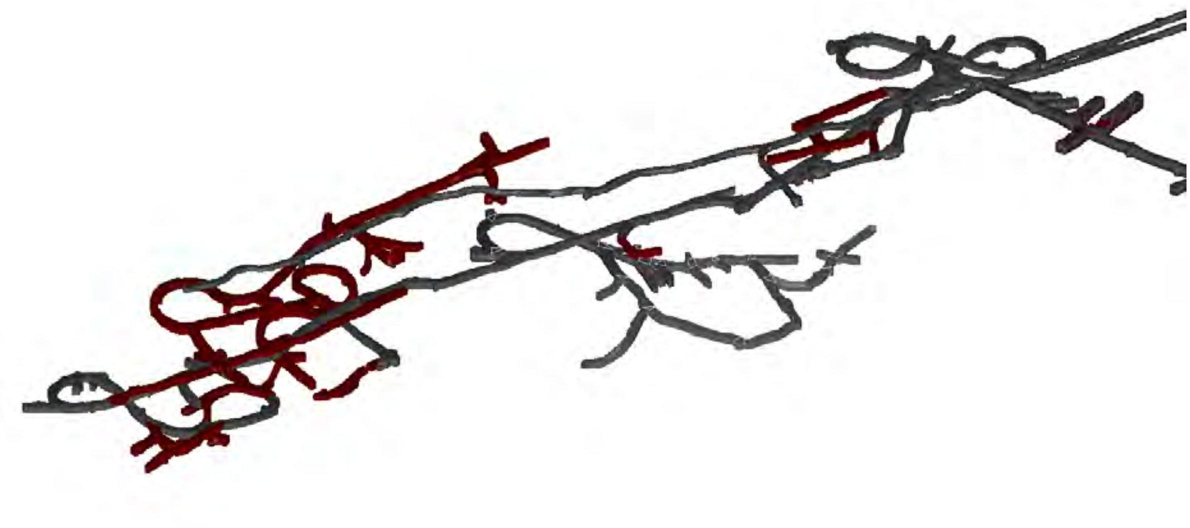

Figure 1 Isometric View showing new 2010 development in the Bellekeno Mine

Face sampling was conducted as outlined in Section 2.5.1 of the Project Proposal submitted to YESAB February 6, 2008. All face sampling was conducted by trained site geologists and sample preparation was done on site by a lab technician at the geology field laboratory. The laboratory was initially located at the Bellekeno 625 Adit and was moved to the Keno District Mill site in September. A total of 122 samples were analyzed using 44 element ICP-OES/ICP-MS, with 29 of these samples having an additional suite of ABA analysis.

Results

The ARD/ML sampling program in 2010 was moderately effective at recognizing material classified as P-AML rock to date. The field classification is based on essentially two independent variables, the CaCO3 vs. pyrite ratio as a proxy for acid base accounting and the quantity of various sulphides such as sphalerite and galena for metal leaching potential predictability. Prediction of neutralizing potential of low carbonate material in the field remained difficult, where as prediction of metal leaching potential from elevated levels of lead and zinc sulphide was very successful in field screening.

$CaCO_3$ Prediction

Carbonate estimation at the field level has remained difficult in samples with low to moderate amounts of available carbonate for neutralization (<100kg$CaCO_3$/tonne). Of the 29 samples run for ABA, only a single sample showed no reaction to the fizz test (fizz rating = 1) and only a single sample showed vigorous reaction to HCl (fizz rating = 4). All other samples rated between 2 and 3. The variability of measured neutralizing potential between these samples is shown below in Figure 2. All samples with an NP>100 had a NP:MPA ratio >3 showing no potential for acid generation. There were 16 samples with a fizz rating of 2 and an average value of NP = 46.5. Of these 16 samples only 5 samples (31%) had an NP:MPA ratio >3. The remaining 11 samples (69%) all had NP:MPA ratio <3. There were 11 samples with a fizz rating of 3 and averaging a value of

NP=92.9. Only one of these samples had an NP:MPA value <3 but the NP value was 95.8, greater than the average samples with a fizz rating = 3.

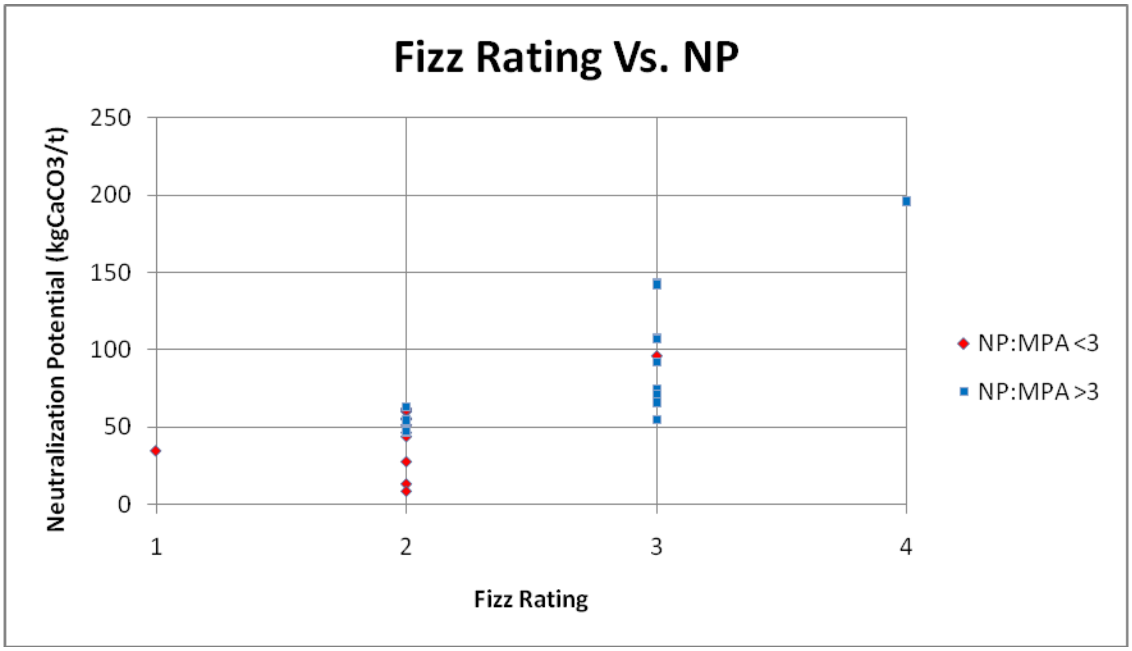

Figure 2 Distribution of Neutralization Potential in relation to Fizz Rating

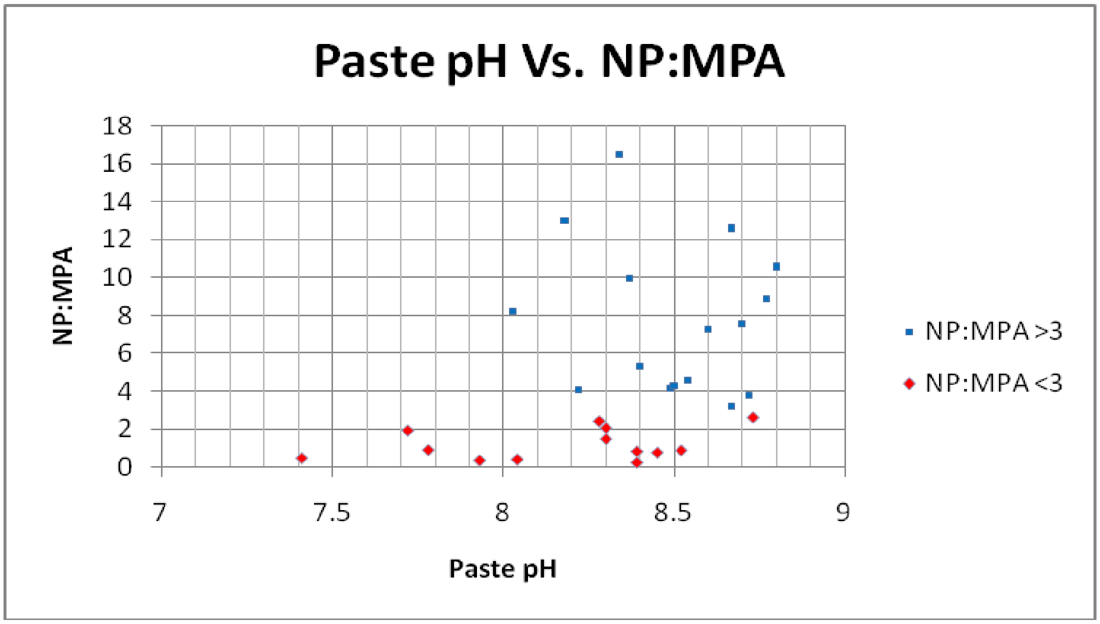

Figure 3 Distribution of Paste pH to NP:MPA ratio

The paste pH data from 2010 as shown in Figure 3 has no values < 6. The distribution of paste pH values in P-AML material is widespread between a pH of 7 to 9. All samples classified as Non-AML had a paste pH >8.

In general, the data supports higher fizz ratings >2 and paste pH >8 obtained in the field screening process show an increased probability of this material being net neutralizing.

However, these two criteria must be used in conjunction with other field observations to properly classify the acid producing potential of excavated material.

Pyrite Prediction

The dominant form of sulphide encountered in the 2010 development was Pyrite, with the exception of development in the ore accesses which also contained significant amounts of Galena and Sphalerite due to the proximity of the mineralized 48 Vein. Data collected from Lithology Verification samples show a good correlation between lithology type and sulphide content (Figures 4).

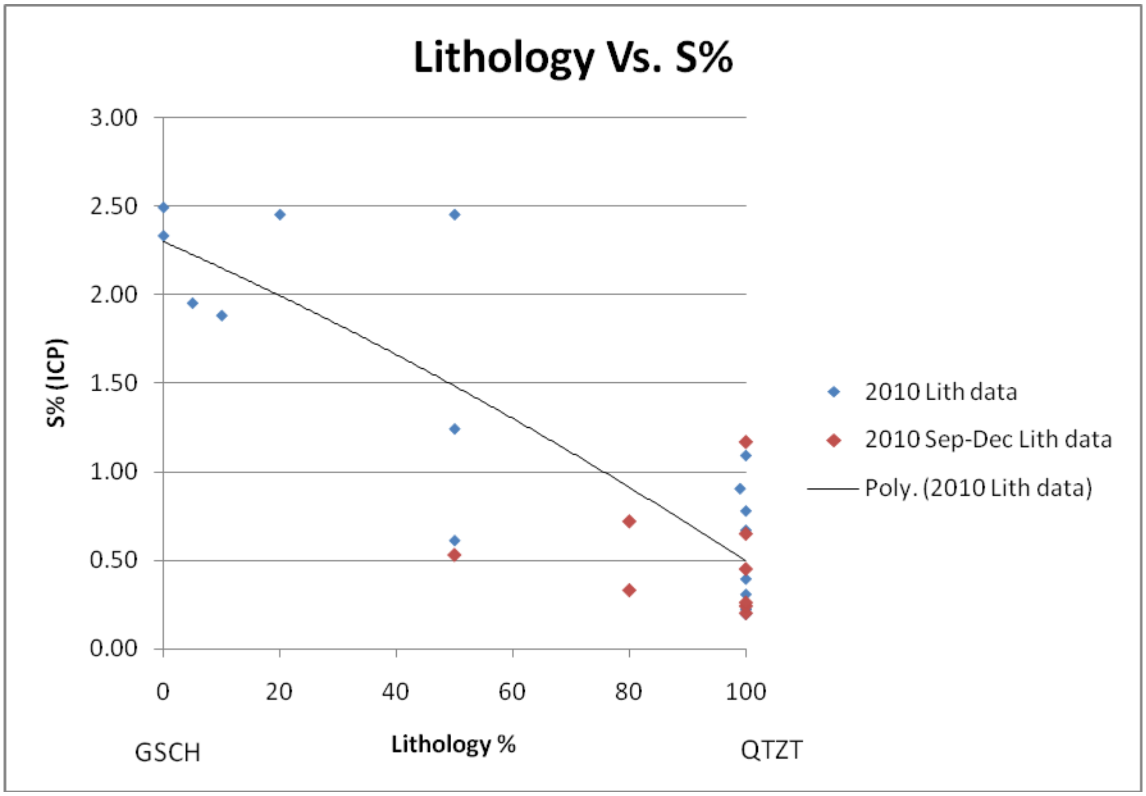

Figure 4 Correlation between Lithology and S%

ICP Geochemical Screening

ICP Geochemical screening for Pb and Zn showed four samples with potential for metal leaching (values >5000ppm). All four samples were identified in the field and sent as P-AML. Figure 5 shows both Pb and Zn values for all samples analyzed and which samples were field screened as P-AML. Field screening proved very effective and conservative at identifying elevated levels of both Pb and Zn.

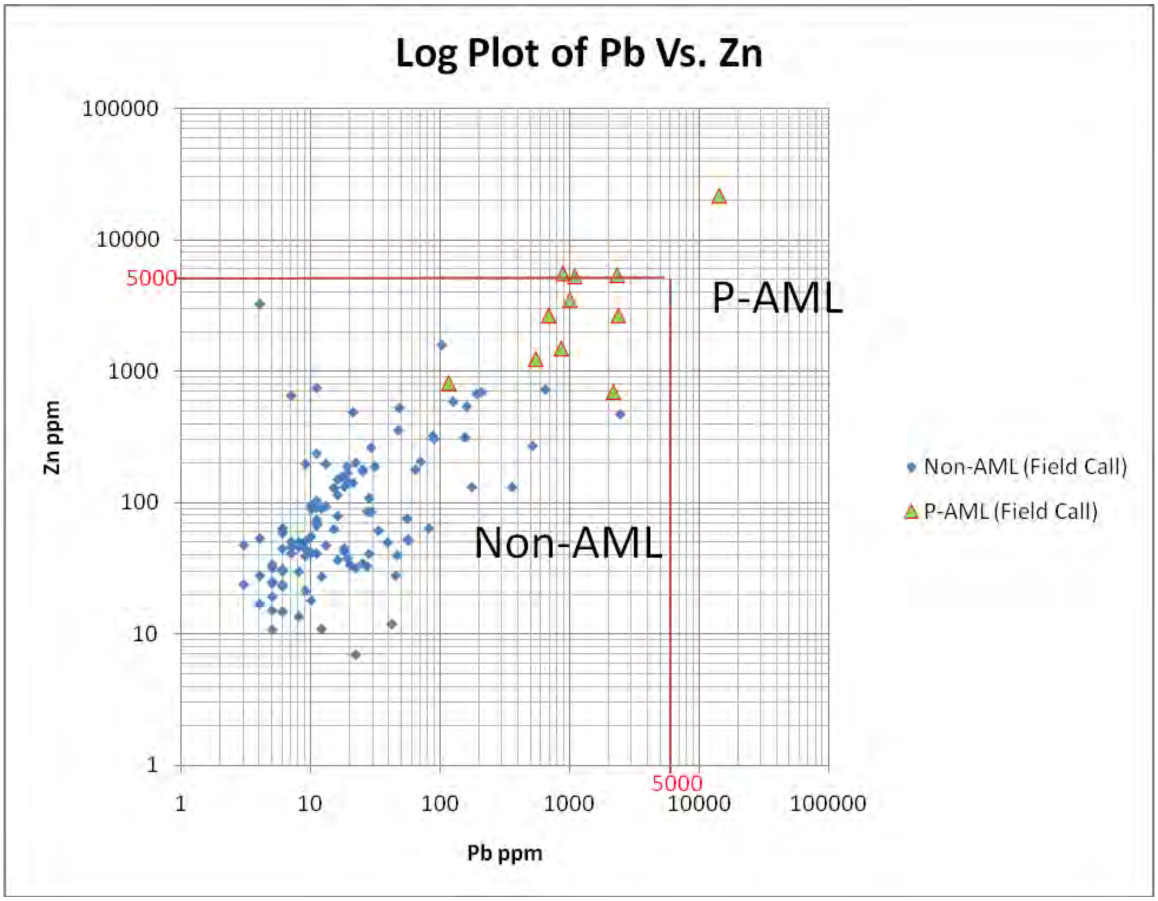

Figure 5 Log Plot of Pb Vs. Zn

Acid Base Accounting

Using the Modified ABA analysis, 19 different composite samples were analyzed with two of these samples re-submitted as duplicates. Of the 19 composite samples submitted, 7 samples showed potential for acid generation. Six of these seven composite samples were from material classified in field screening as P-AML as well as three other samples that did not meet the criteria for P-AML.

In addition to the composite samples, eight individual Lithology Verification samples were also submitted for Modified ABA analysis. One composite sample was not correctly field classified as P-AML, but after receiving confirmation of this, the composite had ABA analysis done on all 7 individual samples that comprised the composite. The remaining Lithology Verification sample which had ABA analysis was a sample from slashing of historic mine workings excavated in ~1994 to examine the chemical characteristics that longer term exposure to air and water on the rock would have.

Figure 6 shows a log plot of all of the ABA data to date from the Bellekeno mine. The data shows the four quadrants of potentially acid generating material. All NP:MPA values between 0 and 1 represent material with a net acid producing potential, with the exception of Sulphur values <0.25% which are assumed to be too low to sustain acidic pH values over time. The lower left quadrant contains samples with Sulphur values of between 0.25% and 1.5%. The lower right quadrant contains samples with Sulphur values >1.5%. All samples taken to date indicate that Sulphur values >1.5% have a net acid producing potential. The upper two quadrants contain samples with an NP:MPA ratio between 1 and 3, and represent samples with a net neutralizing potential where the effective neutralization potential may not be adequate to sustain a drainage pH of 6.0 or higher over time. The upper left quadrant represents samples with a Sulphur level between 0.25% and 1.5%. There are no samples represented by the sample population with S>1.5% that has an NP:MPA ratio >1. All samples that fall outside of these four quadrants represent NP:MPA values >3 and are unlikely to produce net acidity over time.

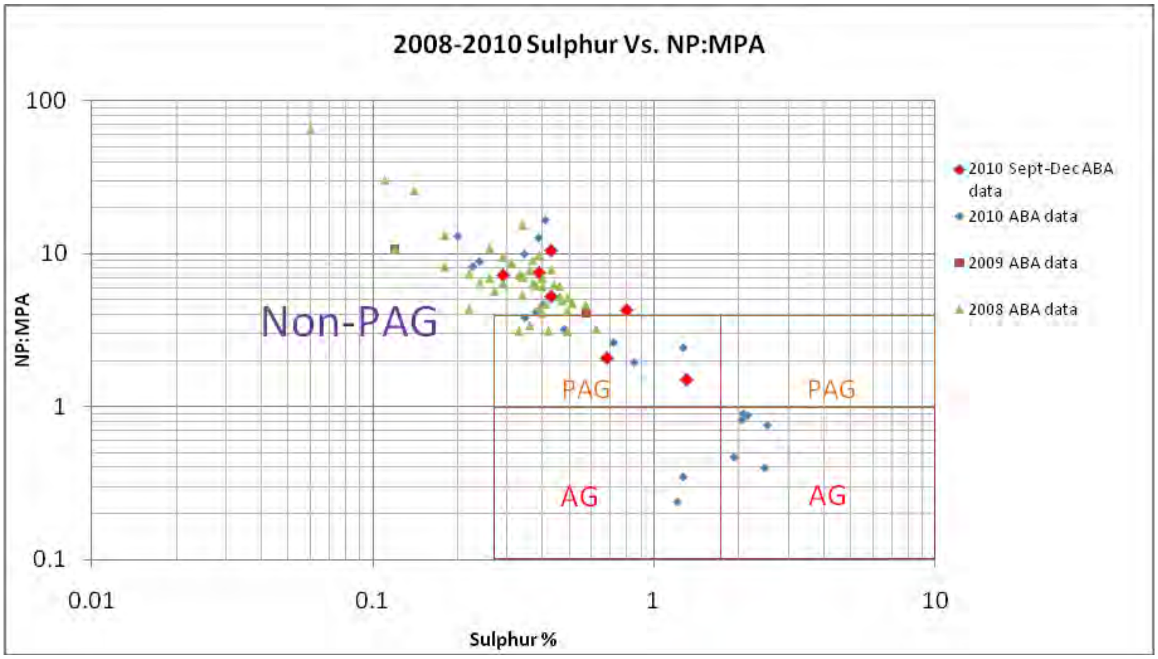

Figure 6 Log Plot of Sulphur% Vs. NP:MPA for all ABA data collected to date

Sulphur% (ICP) shows a very good correlation to Sulphur% (Leco) with a correlation coefficient on 0.982 (Figure 7, Table 1). Given the close correlation between the two methods of measuring Sulphur, especially at levels less than 1% (typical of waste rock), using S% (ICP) as a proxy for Leco Sulphide would be a reasonable estimate of the Sulphur in a waste rock sample given that it is not visibly oxidized.

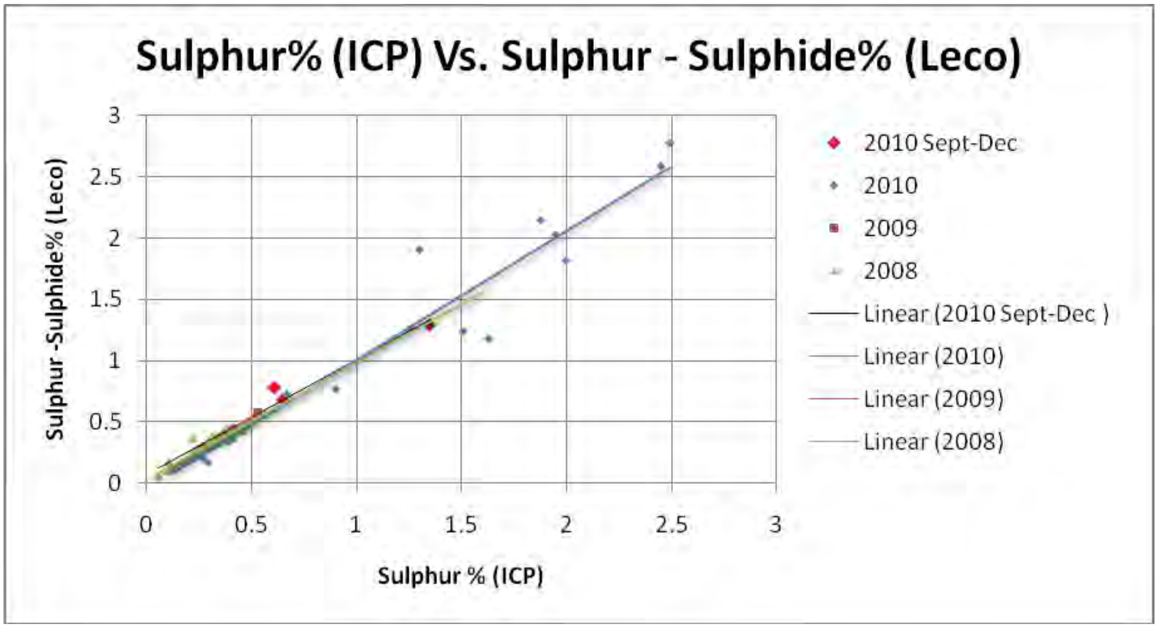

Figure 7 Sulphur% (ICP) Vs. Sulphur - Sulphide% (Leco)

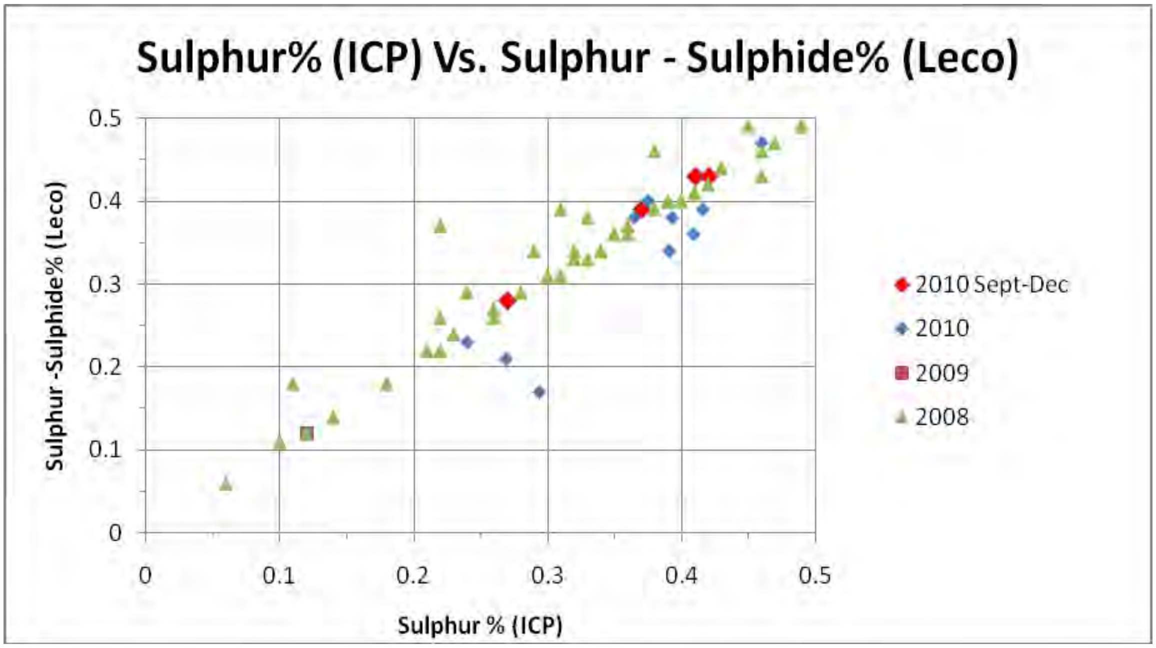

Figure 8 Low Level Sulphur Correlation

S% (ICP) - S% (Leco)		
Year	Correlation Coefficient	# of Samples
Total	0.982	76

Table 1 S% (ICP) – S% Sulphide (Leco) Correlation

An examination of Total Carbon via Leco furnace and its correlation to Neutralization Potential shows a fairly linear trend for data collected in 2008 and 2009, but data from 2010 is widely dispersed. Two possible factors contributing to the wide spread distribution of data from 2010 could be due to an increase in Carbon from more Graphitic Schist samples taken and analyzed in 2010, and a slightly different laboratory method used in 2010 for determining the Neutralization Potential (NP).

Minor amounts of Graphitic Schist were sampled throughout 2008 and 2009 but the majority of development occurred within Quartzite. Data from these two years plot very close to the theoretical NP values of pure $CaCO_3$. This implies that most Carbon present in the material sampled from these years was present in the form of $CaCO_{3.}$ Development in 2010 consisted of significantly more Graphitic Schist being excavated, and a higher weighting of Graphitic Schist samples versus Quartzite being analyzed for Leco Carbon due to the increased likelihood of this material being P-AML. Figure 8 shows in general higher Carbon values for the same NP value than previous years. This suggests that Leco Carbon may not be a good proxy for Neutralization Potential in areas with significant amounts of graphite.

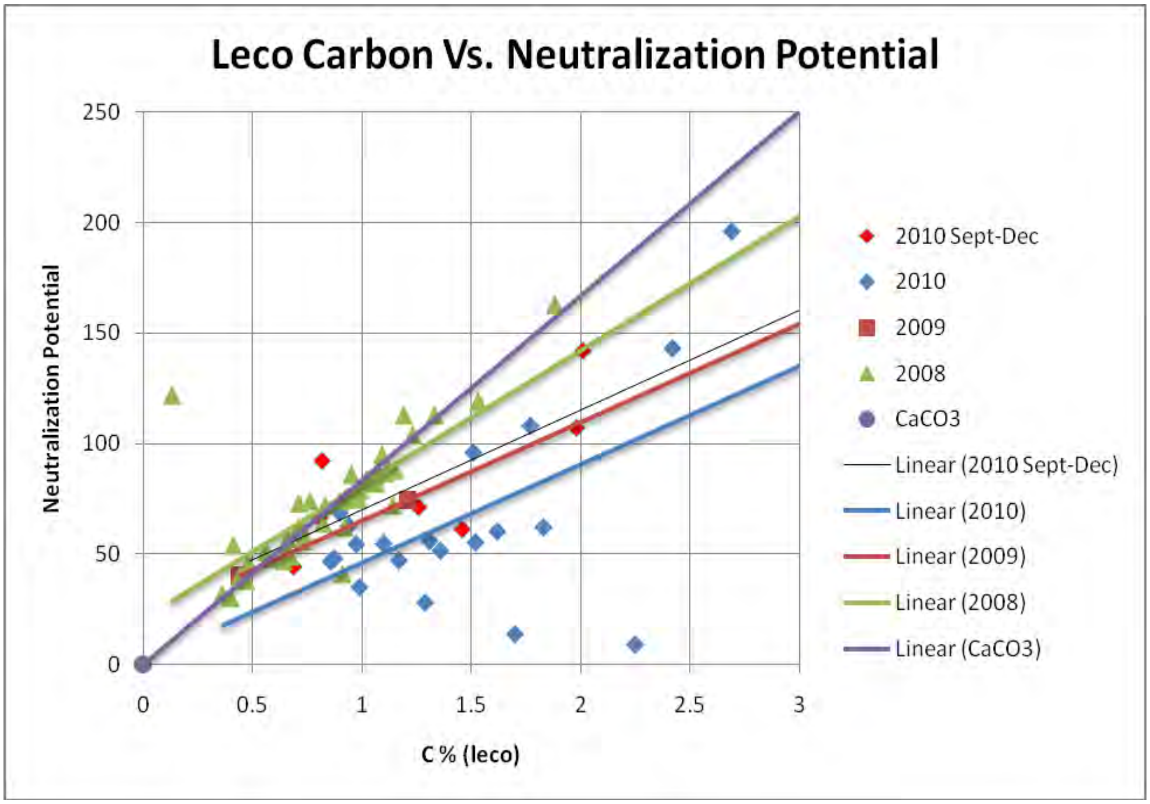

Figure 9 Carbon (Leco) Vs. Neutralization Potential

Correlation between Calcium (ICP) and the Neutralization Potential show a consistent trend year to year suggesting that the Ca% ($CaCO_3$) is fairly consistent in varying lithologies (Figure 9) as compared to the Carbon. The correlation coefficient between Ca% (ICP) and NP for 2008, 2010 Jan-Aug, 2010 Sept-Dec were 0.882, 0.958, and 0.702 respectively. There were too few data points for 2009 to statistically assess the correlation of Ca% and NP (Table 2). The correlation coefficient for all data between 2008 and 2010 was 0.891. There appears to be a minimum NP value for any given amount of Calcium present which could be used to predict a conservative statistical NP value based off of Ca% (ICP) in the future where ABA analysis is not available or cost prohibitive. This may prove useful in conjunction with S% (ICP) in re-interpreting existing drill core data. From the data collected to date this formula would be as follows.

$NP_{Calc.}=1.3384(Ca\%^2)+30.869(Ca\%)$

Equation 1 Neutralization Potential from Ca(ICP)

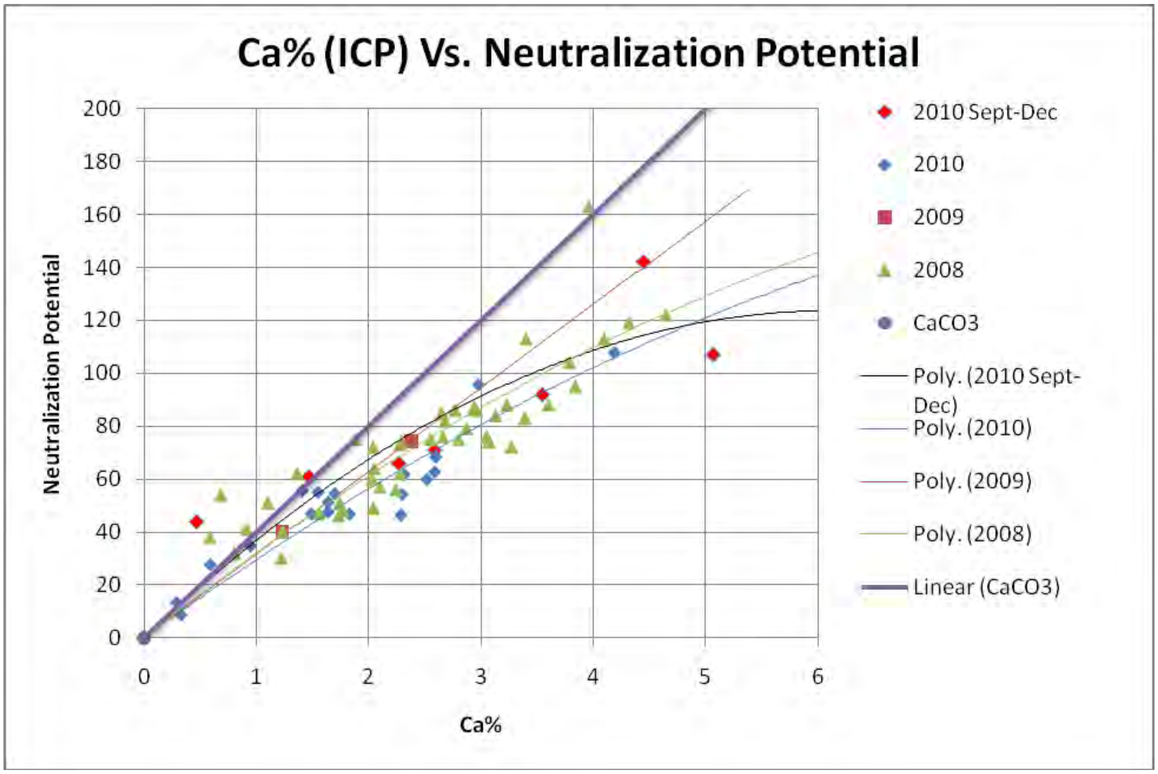

Figure 10 Ca% Vs. Neutralization Potential

Ca% - NP Correlation		
Year	Correlation Coefficient	# of Samples
2008	0.882	45
2009	NA	2
2010	0.958	22
2010 Sep-Dec	0.702	7
Total	0.891	76

Table 2 Ca% (ICP) - Neutralization Potential Correlation

Tonnages

Development in the Bellekeno Mine generated an estimated 55,070 tonnes of excavated material which has been sampled, classified, and verified by lab analysis in 2010. Table 3 shows a breakdown of the 55,070 tonnes of material which lab analysis results have been received for. The total Non-AML waste generated in all of 2010 which has been verified by lab analysis was an estimated 49,992 tonnes, while the total P-AML waste generated in all of 2010 which has been verified by lab analysis was an estimated 5,078 tonnes.

2010 Tonnage Summary		
Rock Classification	Tonnes	Percent
Non-AML Waste Rock (Field screened and verified)	48824	88.66%
Non-AML Waste Rock (Mis-classified as P-AML)	1168	2.12%
Potentially-AML Waste Rock (Field screened and verified)	3054	5.55%
Potentially-AML Waste Rock (Mis-classified as Non-AML)	2024	3.68%
Total Verified Non-AML Waste Rock	***49992***	*90.78%*
Total Verified Potentially-AML Waste Rock	***5078***	*9.22%*
Total Excavated Rock	**55070**	100.00%

Table 3 2010 Tonnage Summary

An estimated 2024 tonnes of material was misclassified in the field screening process as Non-AML but lab results from composite sampling determined this material to be P-AML. This material was sent to surface and mixed with Non-AML material. This material is represented by 3 sample composites, one of which had ABA/ICP analysis and two with only ICP analysis. Prediction of the NP value for the two was calculated using the NP calculation shown (Equation 1), while prediction of an AP value was calculated by multiplying the ICP Sulphur assay by 31.25 (Table 4). The weighted average of the material misclassified has an estimated net neutralizing potential of 2.6 kgCaCO$_3$/Tonne and an NP:MPA ratio of 1.1.

Misclassified Waste Rock										
SAMPLE	Tonnes	Classification	AP	NNP	NP	NP/MPA	S (total)	Sulfide	Ca% ICP	S% ICP
E605553	703	AG	56.8	-6	51.3	0.9	2.07	1.82	1.64	2
E605559	884	PAG	18.4	0.4	18.8	1.0			0.61	0.59
E605585	437	AG	48.1	20.0	68.1	1.4			2.25	1.54
Total	**2024**	**Average**	**38.2**	**2.6**	**40.7**	**1.1**			**1.32**	**1.28**

🟦 Values calculated using ICP data

Table 4 Misclassified Rock Characteristics

The material misclassified was entirely in areas of Graphitic Schist and an over estimation of the neutralizing carbonate content of this material at the field level is the most likely cause of the error in classification.

Discussion

The Bellekeno Mine Waste Rock Management Plan has been successfully implemented throughout 2010. With the addition of data collected from 2008 and 2009, a substantial amount of geochemical data has been compiled. This will help guide site geologists in determining the characteristics of rock to be excavated in the future and also in predicting amounts of P-AML material to be encountered in planned development. The effectiveness of the field screening process in identifying specifically Pb and Zn has still proven more than adequate for the limits set out in the Bellekeno WRMP. Estimation of the neutralization potential proved to be the single most difficult field screening criteria.

The samples collected in 2010 were prepped on site at the Bellekeno prep lab facility located at Bellekeno 625 Adit. Sample pulps were then composited and sent off site to AGAT Laboratories for ABA and ICP-OES analysis (Jan-Aug data) and ALS Chemex for ABA and ICP-MS analysis (Sep-Dec). A total of 115 samples plus 7 duplicates (representing 6% of the total samples) were submitted for analysis. A comparison of sample analytical results to anticipated results based on visual criteria was done for each assay certificate. Samples showing significant differences were re-analyzed and reject material was re-examined. As a result 30 samples were re-analyzed (25% of all samples) resulting in satisfactory comparisons for all samples.

The outlined sampling schedule (Table 5) which was proposed in 2009 has been followed and proved useful in continuing to build a comprehensive geochemical dataset to better assess waste rock for characterization. The compositing frequency was adequate enough to confirm the general rock characteristics of Non-AML while verifying the accuracy of the field screening classification. The additional ABA data collected from all P-AML composites has added to the understanding of the correlation between lithology and geochemical characteristics.

Recommendations

No changes in the sampling methodology are recommended at this time as the sampling process produces accurate and representative characterization of each blast round during the field screening process.

With the compilation of 3 years of underground geochemical data and underground exposure throughout all of the varying lithologies known in the Bellekeno mine, it is recommended that the Bellekeno Waste Rock Sampling Schedule be reviewed and a new sampling plan focusing on areas which the possibility of encountering P-AML material is moderate to high. Statistics from 2010 (Table 3) show that 89% of all material excavated in development of the Bellekeno mine have been identified and confirmed as Non-PAML. This leaves a remainder of 11% which was either identified and confirmed as P-AML or incorrectly identified. The focus of any ongoing sampling plan should be on the confirmation of daily field calls in difficult cases. The necessity of sampling, compositing, and analyzing material may change as the Bellekeno Mine matures into a full production cycle including extensive backfilling of excavated stopes. P-AML material should be preferentially used as backfill material to limit the environmental liability of storing this material on surface. A study of the estimated P-AML material generated for the life of the mine vs. the demand for backfill material over the life of the mine should be conducted as well as geochemical testing of cemented backfill material to determine if the concentrations of cement added to various types of backfill are enough to ensure long term neutralizing of any materials incorporated into the backfill.

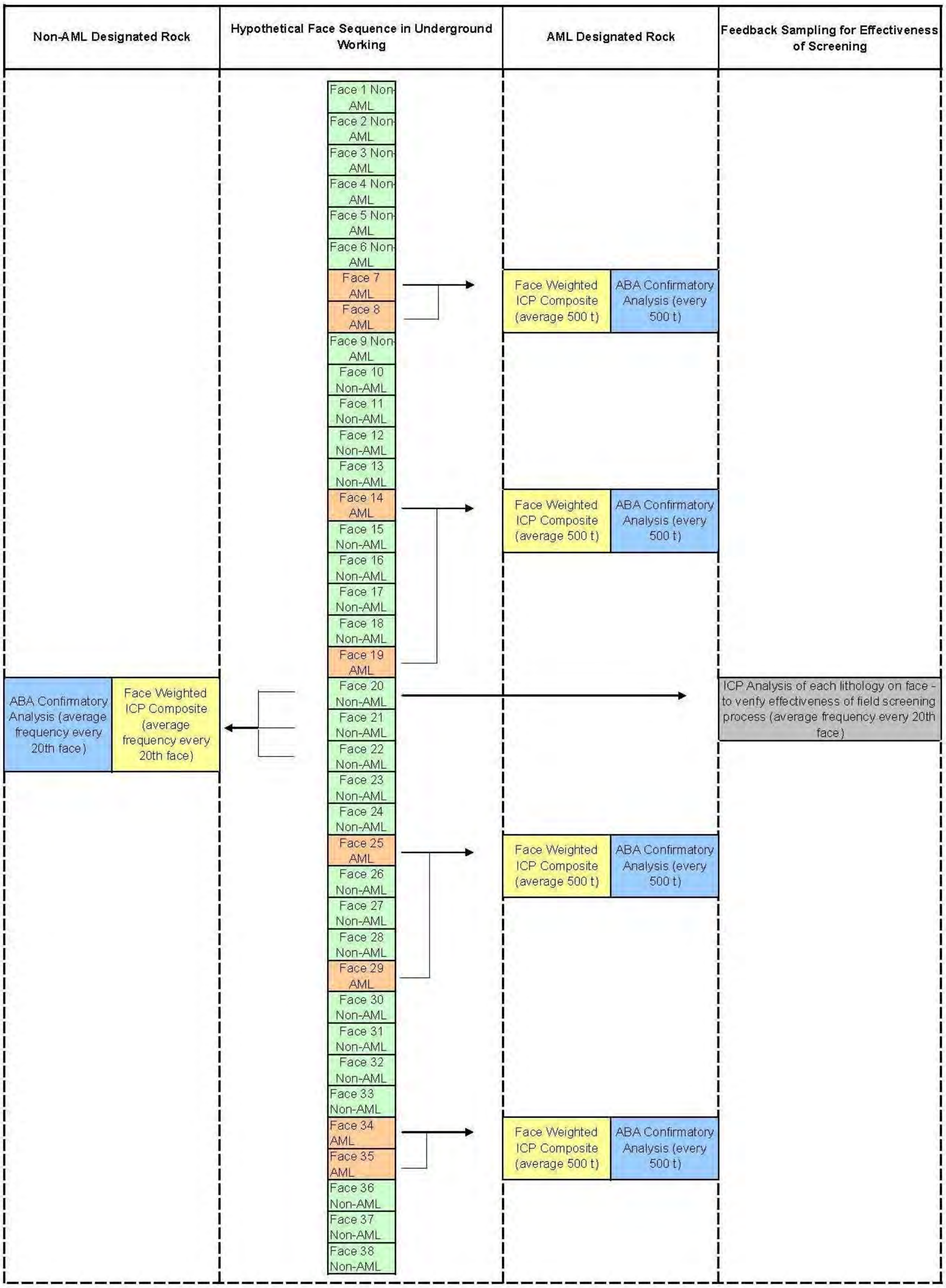

Table 5 Current Bellekeno Waste Rock Hypothetical Sampling Schedule

SAMPLE	Cert. #	Tonnes	Classification	Classification	Recvd Wt.	Fiz_Rate	AP	NNP	NP	Paste pH	NP_MPA	S (total)	Sulfate	Sulfide	C	CO2
NUMBER			Field	Geochem.	kg		kgCaCO3/t	kg CaCO3/t	kgCaCO3/t	pH	%	%	%	%	%	%
E605521	10V388093	204	P-AML	Non-AML	0.75	3	17.9	56.3	74.3	8.22	4.1	0.575	<0.01	0.57	1.21	4.4
E605522	10V388093	923	Non-AML	Non-AML	0.73											
E605523	10V388093	784	Non-AML	Non-AML	0.68											
E605524	10V388093	931	Non-AML	Non-AML	0.26											
E605525	10T393204	247	P-AML	Non-AML	0.27	2	14.7	32	46.9	8.67	3.2	0.478	0.01	0.47	1.17	4.3
E605528	10V400061	726	Non-AML	Non-AML	0.31	3	10.9	97	107.9	8.369	9.93	0.345	<0.01	0.34	1.77	6.5
E605529	10V400061	132	Non-AML	Non-AML	0.08											
E605530	10V400061	692	Non-AML	Non-AML	0.12											
E605531	10V400061	589	Non-AML	Non-AML	0.23											
E605532	10V400061	642	Non-AML	Non-AML	0.12											
E605535	10V400061	769	Non-AML	Non-AML	0.27											
E605536	10V400061	715	Non-AML	Non-AML	0.16											
E605538	10Y406415	180	Non-AML	Non-AML	0.19											
E605540	10Y406415	60	Non-AML	Non-AML	0.23											
E605541	10Y406415	160	Non-AML	Non-AML	0.21	3	6.6	48	54.6	8.03	8.24	0.226	0.01	0.21	1.1	4
E605542	10Y406415	200	Non-AML	Non-AML	0.21											
E605543	10Y406415	200	Non-AML	Non-AML	0.21											
E605544	10Y406415	140	Non-AML	Non-AML	0.15											
E605545	10Y406415	847	Non-AML	Non-AML	0.21											
E605546	10Y406415	835	Non-AML	Non-AML	0.24	3	5.3	63	68.5	8.18	12.98	0.2	0.03	0.17	0.9	3.3
E605547	10Y406415	879	Non-AML	Non-AML	0.25											
E605548	10Y412271	922	Non-AML	Non-AML	0.28											
E605549	10Y412271	961	Non-AML	Non-AML	0.24											
E605550	10Y412271	953	Non-AML	Non-AML	0.24											
E605551	10Y412271	974	Non-AML	Non-AML	0.24											
E605552	10Y412271	966	Non-AML	Non-AML	0.28											
E605553	10Y412271	703	Non-AML	P-AML	0.24	2	56.8	*6	51.3	7.78	0.9	2.07	0.25	1.82	1.36	5
E605554	10Y412271	966	Non-AML	Non-AML	0.28											
E605555	10Y412271	952	Non-AML	Non-AML	0.28											
E605556	10Y425871	954	Non-AML	Non-AML	0.34	3	11.3	131	143	8.67	12.6	0.388	0.02	0.36	2.42	9.1
E605557	10Y425871	815	Non-AML	Non-AML	0.29											
E605558	10Y425871	685	Non-AML	Non-AML	0.33											
E605559	10Y425871	884	Non-AML	P-AML	0.32											
E605560	10Y425871	861	Non-AML	Non-AML	0.31											
E605561	10Y425871	826	Non-AML	Non-AML	0.3	2	12.5	35	47.7	8.72	3.81	0.347	0.01	0.4	0.875	3.4
E605562	10Y425871	779	Non-AML	Non-AML	0.23											
E605563	10Y429405	399	P-AML	P-AML	0.29	2	38.8	*25	13.5	7.93	0.35	1.27	0.03	1.24	1.7	6.2
E605564	10Y429405	683	Non-AML	Non-AML	0.25											
E605565	10Y429405	261	P-AML	Non-AML	0.1											
E605566	10Y429405	471	Non-AML	Non-AML	0.24											
E605567	10Y429405	663	Non-AML	Non-AML	0.34											
E605568	10Y429405	459	Non-AML	Non-AML	0.47											
E605569	10Y429405	500	Non-AML	Non-AML	0.26											
E605570	10Y429405	460	Non-AML	Non-AML	0.24											
E605571	10Y429405	241	Non-AML	Non-AML	0.25											
E605572	10Y429405	458	Non-AML	Non-AML	0.11											
E605573	10Y429405	337	P-AML	P-AML	0.24	2	59.6	*32	27.8	7.41	0.47	1.93	0.02	1.91	1.29	4.7
E605577	10Y429405	540	Non-AML	Non-AML	0.2											
E605582	10Y429405	411	P-AML	P-AML	0.3	3	39.4	56	95.8	8.28	2.43	1.27	<0.01	1.26	1.51	5.5
E605583	10Y429405	414	P-AML	P-AML	0.3	2	36.8	*28	8.8	8.39	0.24	1.21	0.03	1.18	2.25	8.3
E605584	10Y429405	393	Non-AML	Non-AML	0.28											
E605585	10Y429405	437	Non-AML	P-AML	0.31											
E605586	10Y429405	901	Non-AML	Non-AML	0.32											
E605578	10Y429405	884	Non-AML	P-AML	0.32											
E605579	10Y429405	861	Non-AML	Non-AML	0.31											
E605580	10Y429405	826	Non-AML	Non-AML	0.3	2	11.3	36	47	8.49	4.16	0.38	<0.01	0.38	0.86	3.4
E605581	10Y429405	779	Non-AML	Non-AML	0.28											
E605574	10Y429405	954	Non-AML	Non-AML	0.34	4	11.9	184.1	196	8.34	16.47	0.41	0.02	0.39	2.69	9.9
E605575	10Y429405	815	Non-AML	Non-AML	0.29											
E605576	10Y429405	685	Non-AML	Non-AML	0.33											
E605851	WH11047581	896	Non-AML	Non-AML	0.2											
E605852	WH11047581	838	Non-AML	Non-AML	0.25											
E605853	WH11047581	869	Non-AML	Non-AML	0.19	3	25	82	107	8.5	4.28	0.8	0.02	0.78	1.98	7.3
E605854	WH11047581	896	Non-AML	Non-AML	0.22											
E605855	WH11047581	455	Non-AML	Non-AML	0.23											
E605856	WH11047581	312	Non-AML	Non-AML	0.21											
E605858	WH11047581	292	P-AML	Non-AML	0.23	3	9.1	57	66	8.6	7.28	0.29	0.01	0.28	0.81	3
E605859	WH11047581	905	Non-AML	Non-AML	0.22											
E605860	WH11047581	840	Non-AML	Non-AML	0.19											
E605861	WH11047581	419	Non-AML	Non-AML	0.2											
E605862	WH11047581	944	Non-AML	Non-AML	0.23	3	12.2	80	92	8.7	7.55	0.39	<0.01	0.39	0.82	3
E605863	WH11047581	928	Non-AML	Non-AML	0.24											
E605864	WH11047581	558	Non-AML	Non-AML	0.22											
E605865	WH11047581	674	Non-AML	Non-AML	0.27											
E605866	WH11047581	585	P-AML	P-AML	0.2											
E605867	WH11047581	912	Non-AML	Non-AML	0.23											
E605868	WH11047581	762	Non-AML	Non-AML	0.22	3	13.4	129	142	8.8	10.57	0.43	<0.01	0.43	2.01	7.4
E605869	WH11047581	905	Non-AML	Non-AML	0.18											
E605870	WH11047581	852	Non-AML	Non-AML	0.21											
E605871	WH11047581	947	Non-AML	Non-AML	0.25											
E605872	WH11047581	830	Non-AML	Non-AML	0.21	3	13.4	58	71	8.4	5.28	0.43	<0.01	0.43	1.26	4.6
E605873	WH11047581	911	Non-AML	Non-AML	0.22											
E605874	WH11047581	631	Non-AML	Non-AML	0.25											
E605875	WH11047581	716	Non-AML	Non-AML	0.27											
E605876	WH11047581	611	Non-AML	Non-AML	0.24											
E605877	WH11047581	257	P-AML	P-AML	0.2	2	21.3	23	44	8.3	2.07	0.68	<0.01	0.68	0.69	2.5
E605878	WH11047581	829	Non-AML	Non-AML	0.21											
E605879	WH11047581	998	Non-AML	Non-AML	0.22											
E605880	WH11047581	914	Non-AML	Non-AML	0.18											
E605881	WH11047581	409	Non-AML	Non-AML	0.26											
E605882	WH11047581	274	Non-AML	Non-AML	0.23											
E605883	WH11047581	390	P-AML	P-AML	0.22	2	40.9	20	61	8.3	1.49	1.31	0.02	1.29	1.46	5.4
E605884	WH11047581	164	P-AML	Non-AML	0.24											

SAMPLE	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	In	K	La	Li	Mg	Mn	Mo	Na	Ni	P	Pb	Rb	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
DESCRIPTION	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
E605521	10.7	0.89	2	128	<0.5	<1	2.38	8.3	10	3.2	376.5	1.5	35.2	3.02	<5	<1	0.33	6	4	0.17	3714	6.3	0.02	25.6	332	2188	23	0.53	13	2	<10		56	<10		<5	0.02	<5	<5	22.2	<1	3.3	691	12
E605522	0.9	1.28	1	163	<0.5	<1	1.27	8	12	3.7	416	1.8	36.4	2.94	<5	<1	0.42	6	6	0.21	2233	5.3	0.03	28.8	386	207	27	0.53	2	2	<10		41	<10		<5	0.03	<5	<5	30	<1	2.7	695	15
E605523	<0.5	3.39	15	388	1.1	<1	2.93	1.7	26	7.1	253.3	3.6	38.8	3.05	10	<1	1.06	13	26	0.41	381	3.9	0.17	33.6	575	29	63	1.20	4	7	<10		161	<10		5	0.08	<5	5	77.5	<1	6.1	263	32
E605524	<0.5	2.51	28	427	0.6	<1	3.30	2.4	19	7.5	292.1	2.8	69.6	3.42	6	<1	0.57	9	22	0.48	935	4.8	0.1	32.4	551	47	39	0.43	4	6	<10		111	<10		<5	0.09	<5	<5	70.8	<1	5	358	18
E605525	1.2	1.99	1	672	0.8	<1	1.83	3.3	12	4.7	167.2	5.3	10.8	1.78	45	<1	0.85	4	13	0.33	244	1.6	0.13	22.9	486	512	51	0.46	3	5	<10		170			<5	0.07	<5	<5	67.5	<1	4	272	24
E605528	<0.5	2.56	1	416	0.8	<1	4.19	<0.5	21	5.5	180.8	2.5	10.8	1.88	7	<1	0.62	10	11	0.5	255	1.7	0.11	21.6	520	3	35	0.39	<1	6	<10	<5	228	<10	<10	<5	0.11	<5	<5	57.3	<1	7	48	24
E605529	<0.5	1.57	<1	284	<0.5	<1	7.49	<0.5	13	2.5	133.9	1.9	3.3	1.3	<5	<1	0.41	8	10	0.32	234	1.4	0.07	11.6	482	5	24	0.36	<1	3	<10	<5	350	<10	<10	<5	0.05	<5	<5	33.1	<1	6	34	17
E605530	0.6	4.1	2	554	1.9	<1	5.69	0.5	20	16.8	156.7	2.5	62.2	4.19	12	<1	0.57	10	24	1.29	874	1.3	0.57	38.9	613	11	32	0.33	1	16	<10	<5	274	<10	<10	<5	0.4	<5	<5	150.5	<1	12	92	21
E605531	<0.5	2.43	<1	455	0.8	<1	4.30	<0.5	25	4.4	167.9	2.7	6.8	1.86	7	<1	0.67	13	14	0.44	264	1.7	0.08	20.4	576	4	38	0.46	1	5	<10	<5	224	<10	<10	<5	0.1	<5	<5	51.9	<1	6	54	26
E605532	<0.5	2.55	1	470	1	<1	3.16	<0.5	21	4.7	161.8	3.3	5.7	1.82	7	<1	0.69	12	10	0.41	363	1.5	0.09	19.8	567	6	43	0.37	1	6	<10	<5	185	<10	<10	<5	0.11	<5	<5	53	<1	5	59	25
E605535	<0.5	1.49	38	280	<0.5	<1	3.83	5.4	18	4.7	178.8	1.7	9	2.44	5	<1	0.39	10	13	0.32	5071	2	0.05	16.5	470	21	25	0.45	2	4	<10	<5	156	<10	<10	<5	0.07	<5	<5	37.5	<1	5	490	21
E605536	0.5	2.16	1	442	0.9	<1	1.84	0.6	18	5.1	231.8	2.5	10.4	1.76	7	<1	0.65	10	11	0.28	196	2.2	0.09	24.2	515	29	29	0.44	2	5	<10	<5	113	<10	<10	<5	0.11	<5	<5	53.1	<1	4	86	25
E605538	0.9	1.09	44	255	<0.5	<1	1.38	2	20	4.6	287	1.7	6.7	1	<5	<1	0.28	10	24	0.18	477	2.8	0.03	14.9	347	48	23	0.30	7	3	<10		56	<10		<5	0.05	<5	<5	26.7	<1	4	529	20
E605540	0.5	6.51	3	274	0.7	<1	7.33	0.8	25	59.9	97.8	11.4	277	9.82	25	<1	0.09	8	29	2.69	2170	1.4	1.61	41.1	792	19	<10	0.12	1	41	<10		285	<10		<5	1.33	<5	<5	388	<1	37	189	27
E605541	<0.5	1.13	8	175	<0.5	<1	1.70	0.7	17	3.9	168	1.1	5.4	1.09	<5	<1	0.23	9	10	0.21	155	2.3	0.03	13.2	235	16	15	0.27	1	2	<10		70	<10		<5	0.05	<5	<5	25.7	<1	3	115	15
E605542	0.8	1.65	10	339	0.5	<1	1.61	3.2	18	5.8	240	2	8.4	1.48	<5	<1	0.43	10	16	0.28	1510	3	0.04	19.2	356	87	44	0.59	2	5	<10		72	<10		<5	0.09	<5	<5	51	<1	4	324	30
E605543	7.7	0.71	4	135	<0.5	<1	3.92	8.6	9	2.8	202	0.6	20.1	0.82	<5	<1	0.13	6	14	0.16	205	2.5	0.02	12	268	645	12	0.52	6	1	<10		76	<10		<5	0.03	<5	<5	20	<1	3	730	14
E605544	0.6	1.04	5	303	<0.5	<1	3.68	1.9	16	3.4	343	1.3	8.4	0.91	<5	<1	0.21	7	18	0.18	218	4.4	0.03	14.9	399	27	24	0.48	2	3	<10		115	<10		<5	0.04	<5	<5	26.5	<1	4	86	29
E605545	0.5	0.67	1	167	<0.5	<1	3.41	0.5	11	2.9	166	0.7	5.3	0.74	<5	<1	0.14	6	9	0.22	116	3.1	0.02	12.8	426	33	11	0.36	<1	2	<10		73	<10		<5	0.03	<5	<5	21.2	<1	4	62	19
E605546	<0.5	0.62	<1	150	<0.5	<1	2.60	<0.5	10	3.1	383	0.8	6.4	0.79	<5	<1	0.16	4	5	0.26	185	3.4	0.01	14.3	410	16	19	0.29	<1	2	<10		54	<10		<5	0.03	<5	<5	20.6	<1	4	37	17
E605547	<0.5	1.02	<1	201	<0.5	<1	2.07	<0.5	8	2.8	366	1.1	8	0.87	<5	<1	0.18	4	14	0.16	128	3.9	0.03	16.2	310	13	18	0.47	<1	3	<10		63	<10		<5	0.03	<5	<5	25	<1	3	48	19
E605548	<0.5	0.74	<1	229	<0.5	<1	3.70	<0.5	6	2.4	224	0.9	7.2	0.78	<5	<1	0.18	3	9	0.22	210	3.3	0.01	10.9	358	7	13	0.43	<1	2	<10	<5	66	<10	<10	<5	0.03	<5	<5	23.5	<1	3	51	16
E605549	<0.5	0.74	<1	220	<0.5	<1	2.87	<0.5	9	2.5	274	0.7	5.1	0.77	<5	<1	0.15	4	8	0.22	161	2.8	0.02	10.7	397	5	<10	0.30	<1	2	<10	<5	68	<10	<10	<5	0.03	<5	<5	21.6	<1	3	25	15
E605550	<0.5	0.7	<1	226	<0.5	<1	4.28	<0.5	8	2.1	221	0.8	6.1	0.71	<5	<1	0.15	4	9	0.25	170	3.1	0.02	10.5	410	6	<10	0.40	<1	2	<10	<5	70	<10	<10	<5	0.03	<5	<5	20.8	<1	4	30	18
E605551	<0.5	0.55	<1	133	<0.5	<1	1.03	<0.5	4	1.5	288	0.6	4.6	0.52	<5	<1	0.11	2	9	0.05	91	3.1	0.01	9	173	20	<10	0.28	<1	1	<10	<5	24	<10	<10	<5	0.02	<5	<5	11.3	<1	2	34	12
E605552	<0.5	1.35	<1	348	<0.5	<1	2.59	<0.5	9	3.6	305	1.6	7.9	1.3	<5	<1	0.33	5	15	0.4	225	3.7	0.04	20.1	422	7	21	0.66	<1	3	<10	<5	76	<10	<10	<5	0.04	<5	<5	33.8	1	3	41	18
E605553	<0.5	3.81	3	419	1.8	<1	1.64	<0.5	7	11.9	219	3.8	39.6	4.39	18	<1	1.83	3	28	0.98	432	4.3	0.17	57.6	699	19	45	2.00	7	9	<10	<5	174	<10	<10	<5	0.05	<5	<5	161	<1	4	145	44
E605554	<0.5	1.13	<1	258	<0.5	<1	5.69	<0.5	10	2.2	215	1.1	5.8	0.79	<5	<1	0.19	6	25	0.19	140	2.5	0.06	11.5	285	5	11	0.61	<1	2	<10	<5	117	<10	<10	<5	0.04	<5	<5	24.5	<1	4	32	22
E605555	<0.5	1.05	<1	209	<0.5	<1	3.26	<0.5	11	2.4	240	1.3	3.6	0.8	<5	<1	0.26	6	12	0.16	118	2.4	0.04	10.4	319	5	14	0.49	1	2	<10	<5	84	<10	<10	<5	0.04	<5	<5	21.6	<1	3	24	15
E605556	<0.5	0.74	2	275	<0.5	<1	9.00	<0.5	9	2.1	187	0.8	7.8	0.61	<5	<1	0.15	6	16	0.23	109	2.2	0.02	13.3	865	6	10	0.41	<1	3	<10	<5	166	<10	<10	<5	0.03	<5	<5	18.2	<1	4	31	23
E605557	<0.5	0.49	2	116	<0.5	<1	3.67	<0.5	7	1.7	290	<0.5	8	0.5	<5	<1	0.08	4	16	0.09	136	3.2	0.01	10.3	530	9	<10	0.21	<1	2	<10	<5	65	<10	<10	<5	0.02	<5	<5	11.6	<1	2	22	14
E605558	<0.5	1.97	2	375	1	<1	3.27	<0.5	13	4.8	404	1.5	18.4	1.52	6	<1	0.32	6	55	0.15	203	4.4	0.05	25.8	631	11	24	1.13	<1	6	<10	<5	100	<10	<10	<5	0.06	<5	<5	40.7	<1	3	71	26
E605559	0.6	1.64	3	477	1	<1	0.61	<0.5	29	6.8	384	2.5	19.2	1.34	8	<1	0.83	14	15	0.25	165	3.8	0.06	26.5	1410	15	42	0.59	2	7	<10	<5	36	<10	<10	<5	0.1	<5	<5	66.1	<1	3	63	27
E605560	<0.5	1.84	3	437	0.8	<1	3.37	<0.5	21	4.1	364	2.3	12.5	1.08	6	<1	0.55	10	34	0.22	267	4.1	0.06	19	781	9	37	0.54	1	6	<10	<5	135	<10	<10	<5	0.07	<5	<5	39.9	<1	5	45	24
E605561	<0.5	1.31	2	285	0.8	<1	1.64	<0.5	17	4	373	1.6	10	0.92	<5	<1	0.38	8	32	0.19	267	3.8	0.04	17.2	741	8	23	0.38	1	4	<10	<5	67	<10	<10	<5	0.07	<5	<5	30.1	<1	4	51	21
E605562	<0.5	2.05	2	1100	0.9	<1	1.99	<0.5	12	5.2	393	2.3	17.8	1.52	6	<1	0.57	6	26	0.46	432	4.5	0.06	22.7	660	9	35	0.58	1	7	<10	<5	89	<10	<10	<5	0.05	<5	<5	47.5	<1	3	51	22
E605563	6.1	2.6	5	259	1.1	1	0.29	55.8	10	5.4	387	4.2	33.3	4.66	10	4	1.5	5	5	0.26	10900	13.8	0.09	30	514	1100	97	1.51	8	5	<10	19	82	<10	<10	<5	0.07	<5	<5	98.8	<1	3	5260	33
E605564	0.8	1.96	2	498	<0.5	<1	1.97	4.9	18	4	393	2.7	22.8	1.53	5	<1	0.67	10	8	0.37	901	11.5	0.06	25.4	621	159	47	0.54	3	4	<10	<5	104	<10	<10	<5	0.08	<5	<5	54.6	<1	5	543	28
E605565	2.3	1.1	1	207	<0.5	<1	2.41	25.6	15	3.1	449	1.6	22.8	2.87	<5	<1	0.39	9	4	0.27	7290	4.6	0.02	17.8	659	691	43	0.54	3	2	<10	8	51	<10	<10	<5	0.04	<5	<5	27.7	<1	6	2640	16
E605566	<0.5	0.4	1	166	<0.5	<1	3.14	<0.5	6	1	273	<0.5	6.4	0.47	<5	<1	0.06	3	7	0.09	51	3	0.01	9.3	375	8	<10	0.21	<1	<1	<10	<5	69	<10	<10	<5	0.02	<5	<5	10.4	<1	2	30	11
E605567	<0.5	0.6	<1	234	<0.5	<1	5.72	<0.5	7	1.1	258	0.6	8	0.53	<5	<1	0.09	4	7	0.1	75	2.9	0.02	10.4	419	6	<10	0.28	<1	1	<10	<5	106	<10	<10	<5	0.02	<5	<5	14.3	<1	3	23	14
E605568	<0.5	3.25	3	619	0.8	<1	2.28	0.9	9	6.4	408	3.1	34.3	2.89	8	<1	1.06	5	18	0.95	608	6	0.11	37.9	636	17	37	1.31	3	6	<10	<5	130	<10	<10	<5	0.12	<5	<5	89.3	<1	6	157	33
E605569	<0.5	0.29	<1	64	<0.5	<1	2.13	<0.5	3	0.7	136	<0.5	4.6	0.32	<5	<1	0.06	<2	4	0.06	44	1.8	<0.01	6	273	5	<10	0.17	<1	<1	<10	<5	33	<10	<10	<5	<0.01	<5	<5	6	<1	1	15	7
E605570	<0.5	3.62	2	732	0.8	<1	2.59	<0.5	21	7.6	288	2.8	17.5	2.85	11	<1	0.96	10	9	0.65	366	4.6	0.1	32.8	1000	11	35	0.55	1	7	<10	<5	183	<10	<10	6	0.16	<5	<5	96.5	<1	5	104	37
E605571	<0.5	3.41	4	640	0.7	<1	3.16	<0.5	21	10.5	304	3.7	19.4	2.49	9	<1	1.1	12	25	0.56	526	3.6	0.07	35.5	949	12	56	0.73	3	6	<10	<5	182	<10	<10	5	0.13	<5	<5	82.2	<1	5	91	34
E605572	<0.5	1.78	1	420	<0.5	<1	1.76	1.5	20	3.9	270	2	9.8	1.88	<5	<1	0.48	10	10	0.45	934	2.8	0.03	19.4	608	31	43	0.36	1	3	<10	<5	83	<10	<10	<5	0.08	<5	<5	43.2	<1	4	189	19
E605573	78	0.31	6	36	<0.5	3	0.59	201	4	3.2	295	0.5	96.6	6.43	<5	11	0.13	2	2	0.2	19700	2.6	<0.01	9.4	337	14400	18	1.30	77	<1	<10	28	8	<10	<10	<5	0.02	<5	<5	14.2	<1	4	21600	9
E605577	<0.5	0.51	1	112	<0.5	<1	1.91	<0.5	7	1.3	369	0.6	7.7	0.58	<5	<1	0.13	4	3	0.09	169	3.5	<0.01	11.7	291	9	13	0.23	<1	<1	<10	<5	48	<10	<10	<5	0.02	<5	<5	11.4	<1	2	40	12
E605582	<0.5	4.14	3	553	1	<1	2.98	<0.5	19	8.4	323	4.6	26.6	2.73	12	<1	1.23	9	12	0.66	389	4.8	0.11	36.4	806	10	46	1.26	1	8	<10	<5	157	<10	<10	<5	0.12	<5	<5	107	<1	5	96	39
E605583	0.6	3.41	5	400	2.1	<1	0.33	<0.5	5	13	248	6.5	34.7	3.51	20	<1	2.55	<2	14	0.37	272	3.3	0.27	68.3	999	13	77	1.63	3	6	<10	<5	119	<10	<10	<5	0.25	<5	<5	216	<1	2	198	64
E605584	1.1	2.81	3	339	0.6	<1	1.89	<0.5	24	6.5	443	3.4	25.9	2.61	7	<1	0.91	12	15	0.43	542	12.4	0.07	34.1	394	16	35	1.11	5	5	<10	<5	106	<10	<10	<5	0.08	<5	<5	74.9	<1	5	80	32
E605585	0.9	4.22	4	320	1.1	<1	2.25	<0.5	19	10	230	4.8	31.4	3.43	13	<1	1.77	8	20	0.87	751	20.4	0.15	49.1	925	28	50	1.54	5	8	<10	<5	161	<10	<10	<5	0.13	<5	<5	133	<1	5	109	55
E605586	4.1	0.49	1	121	<0.5	<1	2.62	<0.5	11	1.7	284	0.6	5.3	0.89	<5	<1	0.12	5	11	0.14	160	3.2	0.01	10.9	568	8	10	0.51	<1	<1	<10	<5	57	<10	<10	<5	0.02	<5	<5	13.4	<1	3	14	11
E605578	0.5	1.72	2	417	<0.5	<1	0.61	<0.5	15	4.6	434	2.6	16.4	1.32	7	<1	0.78	9	6	0.24	90	3.8	0.05	25.3	1080	11	39	0.60	3	4	<10	<5	42	<10	<10	<5	0.09	<5	<5	65	<1	3	68	25
E605579	<0.5	1.66	2	381	<0.5	<1	3.52	<0.5	20	2.7	397	2.6	9.5	0.96	<5	<1	0.51	12	14	0.17	131	4	0.05	18.5	602	11	35	0.49	1	3	<10	<5	146	<10	<10	<5	0.06	<5	<5	37.7	<1	5	41	21
E605580	<0.5	1.39	2	299	<0.5	<1	1.49	<0.5	15	3	429	2	9.1	0.99	<5	<1	0.39	8	12	0.19	123	4.1	0.04	19.6	600	7	24	0.37	2	3	<10	<5	76	<10	<10	<5	0.07	<5	<5	29.8	<1	4	46	19
E605581	<0.5	3.31	2	537	0.7	<1	1.84	<0.5	17	7.3	452	4.2	23	2.44	9	<1	1.02	8	9	0.82	420	5.7	0.09	34.5	773	10	55	0.93	1	6	<10	<5	116	<10	<10	<5	0.09	<5	<5	82.7	<1	5	90	27
E605574	0.7	0.76	2	305	<0.5	<1	9.80	0.7	12	1.1	193	0.9	6.6	0.63	<5	<1	0.15	7	6	0.21	66	2	0.02	10.2	598	25	11	0.42	<1	1	<10	<5	165	<10	<10	<5	0.04	<5	<5	18.9	<1	4	35	20
E605575	<0.5	0.51	1	133	<0.5	<1	4.63	<0.5	7	1	271	<0.5	6.7	0.51	<5	<1	0.07	4	6	0.1	87	2.9	0.01	9.8	425	12	<10	0.23	<1	1	<10	<5	87	<10	<10	<5	0.02	<5	<5	11.9	<1	3	28	13
E605576	<0.5	0.59	<1	141	<0.5	<1	1.70	<0.5	8	1.5	450	<0.5	8.3	0.65	<5	<1	0.08	4	9	0.1	93	4.2	0.01	14	400	18	<10	0.26	<1	1	<10	<5	43	<10	<10	<5	0.02	<5	<5	13.2	<1	2	45	13
E605851	0.6	0.96	6	150	<0.5	<2	2.9	0.5		2	245		5	0.77	<10		0.21	10		0.15	114	9	0.03	14	330	39		0.4	<5	2			72			<20	0.07	<10	<10	18	<10		50	
E605852	1.1	1.33	<5	210	<0.5	<2	2.03	0.6		3	301		6	0.82	10		0.29	10		0.16	83	12	0.04	17	320	56		0.3	<5	2			71			<20	0.1	<10	<10	26	<10		53	
E605853	1.4	1.54	8	230	<0.5	<2	5.07	0.6		3	249		13	0.93	<10		0.3	10		0.14	109	10	0.05	22	310	81		0.61	<5	2			126			<20	0.09	<10	<10	28	<10		64	
E605854	1.2	0.9	8	190	<0.5	2	4.99	3		2	290		6	1.03	<10		0.27	10		0.16	1630	12	0.02	14	310	154		0.36	<5	2			73			<20	0.06	<10	<10	19	<10		316	
E605855	0.9	0.64	11	140	<0.5	<2	1.47	<0.5		3	245		5	0.88	<10		0.15	10		0.21	183	9	0.02	15	310	55		0.33	<5	2			47			<20	0.06	<10	<10	17	<10		76	
E605856	1.2	0.47	10	100	<0.5	2	2.71	7.7		2	212		8	0.84	<10		0.14	10		0.13	566	9	0.01	22	340	125		0.34	<5	1			48			<20	0.05	<10	10	13	<10		590	
E605858	<0.5	0.82	<5	170	<0.5	<2	2.27	<0.5		3	268		5	0.74	<10		0.23	10		0.24	149	10	0.02	13	370	22		0.27	<5	2			65			<20	0.06	<10	10	20	<10		32	
E605859	0.9	0.76	19	150	<0.5	<2	1.59	2		3	228		5	0.94	<10		0.19	10		0.21	411	9	0.02	16	370	89		0.26	<5	2			42			<20	0.06	<10	<10	19	<10		203	
E605860	<0.5	1.11	<5	210	<0.5	<2	1.25	<0.5		2	233		23	0.79	<10		0.18	20		0.13	74	3	0.07	11	200	3		0.06	<5	2			55			<20	0.07	<10	<10	19	<10		7	
E605861	1.5	1.05	5	80	<0.5	<2	1.73	4		4	304		56	2.06	<10		0.1	10		0.23	624	4	0.03	15	210	45		0.51	10	2			62			<20	0.06	<10	<10	18	<10		308	
E605862	<0.5	0.99	<5	160	<0.5	<2	3.55	<0.5		3	270		7	0.95	<10		0.21	10		0.24	181	4	0.03	14	520	9		0.37	<5	2			86			<20	0.07	<10	<10	18	<10		24	
E605863	<0.5	1.13	6	230	<0.5	<2	2.75	<0.5		3	270		9	1	<10		0.26	10		0.2	152	4	0.04	15	430	12		0.47	<5	2			90			<20	0.08	<10	<10	24	<10		28	
E605864	1.1	1.46	10	230	0.5	<2	2.34	2.2		3	250		9	1.33	<10		0.43	10		0.26	699	4	0.03	14	490	56		0.65	<5	3			60			<20	0.09	<10	<10	28	<10		198	
E605865	<0.5	0.63	5	110	<0.5	<2	3.91	<0.5		2	156		3	0.76	<10		0.13	<10		0.2	145	2	0.02	8	520	7		0.37	<5	1			81			<20	0.04	<10	<10	13	<10		11	
E605866	1.7	3.16	54	620	0.9	<2	0.7	8.8		5	238		38	3.88	10		1.04	10		0.47	7110	8	0.08	47	330	116		0.98	<5	7			75			<20	0.15	<10	<10	77	<10		804	
E605867	<0.5	0.66	19	150	<0.5	<2	5.28	<0.5		2	253		5	0.88	<10		0.18	10		0.09	169	3	0.02	10	240	6		0.08	7	1			86			<20	0.05	<10	<10	12	<10		52	
E605868	0.9	3.53	57	660	0.9	<2	4.45	<0.5		6	185		13	1.97	10		0.88	20		0.47	467	2	0.1	25	620	10		0.41	6	7			196			<20	0.2	<10	<10	63	<10		656	
E605869	0.5	1.21	<5	180	<0.5	<2	4.89	<0.5		<1	182		5	0.8	<10		0.25	10		0.13	89	<1	0.03	11	290	46		0.54	<5	2			124			<20	0.07	<10	<10	21	<10		45	
E605870	<0.5	1.12	6	320	<0.5	<2	3.46	<0.5		1	245		11	0.94	<10		0.21	10		0.3	86	3	0.04	18	540	4		0.6	<5	2			82			<20	0.07	<10	<10	26	<10		42	
E605871	<0.5	0.52	7	70	<0.5	<2	3.73	<0.5		<1	270		4	0.79	<10		0.09	10		0.12	339	2	0.01	10	260	11		0.16	<5	1			78			<20	0.04	<10	<10	13	<10		40	
E605872	2.2	0.57	19	70	<0.5	<2	2.59	42.7		<1	231		12	2.2	<10		0.19	10		0.16	5810	1	0.01	9	320	356		0.42	<5	1			28			<20	0.03	<10	<10	12	<10		3260	
E605873	0.6	0.66	13	110	<0.5	<2	1.96	7.7		1	175		5	1.15	<10		0.15	10		0.19	1255	1	0.01	10	350	70		0.4	<5	1			50			<20	0.05	<10	<10	15	<10		749	
E605874	0.5	0.8	9	160	<0.5	<2	2.18	0.9		2	206		4	1.04	<10		0.18	10		0.16	438	1	0.02	11	380	42		0.62	<5	2			63			<20	0.06	<10	<10	17	<10		132	
E605875	3.3	0.67	6	140	<0.5	<2	1.61	2		2	263		7	0.88	<10		0.16	10		0.15	521	10	0.02	25	270	190		0.31	5	1			44			<20	0.05	<10	<10	17	<10		207	
E605876	<0.5	0.55	<5	140	<0.5	<2	2.54	<0.5		<1	161		2	0.55	<10		0.12	<10		0.18	179	<1	0.02	6	470	4		0.22	<5	1			53			<20	0.05	<10	<10	11	<10		12	
E605877	12.4	0.9	35	110	<0.5	<2	0.47	70.5		1	180		17	2.1	<10		0.31	10		0.14	4500	<1	0.01	9	590	2340		0.65	11	2			14			<20	0.06	<10	<10	15	<10		5370	
E605878	<0.5	3.15	58	510	0.8	<2	5.05	<0.5		3	195		10	1.76	10		0.74	20		0.45	516	<1	0.1	22	530	11		0.38	7	5			260			<20	0.17	<10	<10	52	<10		678	
E605879	<0.5	0.58	<5	140	<0.5	<2	2.47	<0.5		1	239		3	0.59	<10		0.12	<10		0.18	81	7	0.02	13	420	28		0.27	<5	1			53			<20	0.05	<10	<10	16	<10		28	
E605880	2.7	1.24	7	240	<0.5	<2	5.16	1.9		2	281		9	0.94	<10		0.3	10		0.25	296	10	0.04	15	240	174		0.36	<5	3			244			<20	0.06	<10	<10	27	<10		238	
E605881	<0.5	1.92	6	290	0.6	<2	3.59	<0.5		2	318		8	1.03	<10		0.38	10		0.13	93	1	0.1	19	460	13		0.79	<5	3			143			<20	0.11	<10	<10	35	<10		41	
E605882	<0.5	3.2	14	660	0.7	<2	3.09	0.5		5	226		40	2.43	10		0.97	20		1.32	514	16	0.1	37	410	26		1.02	<5	7			173			<20	0.17	<10	<10	84	<10		132	
E605883	6.3	3.17	63	550	0.9	<2	1.47	43.8		4	283		26	4.63	10		1.05	20		0.23	12400	6	0.07	26	940	1005		1.35	8	6			87			<20	0.14	<10	<10	68	<10		3490	
E605884	1	0.75	18	90	<0.5	<2	1.51	1.1		3	269		5	0.84	<10		0.14	10		0.11	489	10	0.02	20	180	80		0.2	<5	1			71			<20	0.06	<10	<10	16	<10		94	

SAMPLE	Cert. #	Tonnes	Classification	Classification	Recvd Wt.	Fiz_Rate	AP	NNP	NP	Paste pH	NP_MPA	S (total)	Sulfate	Sulfide	C	CO2
NUMBER			Field	Geochem.	kg		kgCaCO3/t	kg CaCO3/t	kgCaCO3/t	pH	%	%	%	%	%	%
E606203	10V388093	44	Non-AML	Non-AML	0.55											
E606243	10V388093	32	P-AML	Non-AML	0.35											
E606244	10V388093	46	P-AML	Non-AML	0.44											
E606777	10Y425871	114	Non-AML	Non-AML	0.16	2	7.1	56	62.8	8.77	8.87	0.239	0.02	0.23	0.941	3.6
E606782	10Y425871	145	Non-AML	Non-AML	0.22	2	11.8	43	54.3	8.54	4.61	0.401	0.02	0.38	0.975	3.6
E606788	10Y412271	94	Non-AML	P-AML	0.15											
E606788	10Y425871	94	Non-AML	P-AML	0.12	1	86.9	*52	34.8	8.04	0.4	2.48	0.02	2.78	0.991	4
E606789	10Y412271	22	Non-AML	Non-AML	0.22											
E606789	10Y425871	22	Non-AML	P-AML	0.14	2	22.8	37	60	8.73	2.63	0.717	0.01	0.73	1.62	6.1
E606792	10Y425871	163	Non-AML	P-AML	0.21	2	81.1	*19	61.9	8.45	0.76	2.53	0.06	2.59	1.83	6.8
E606794	10Y425871	129	Non-AML	P-AML	0.2	2	63.3	*8	55.7	8.52	0.88	2.15	<0.01	2.03	1.31	4.7
E606797	10Y425871	36	Non-AML	P-AML	0.2	2	67.2	*12	55.1	8.39	0.82	2.05	0.01	2.15	1.52	5.7
E606901	10Y425871	123	Non-AML	Non-AML	0.19											
E606904	10Y425871	105	Non-AML	Non-AML	0.19											
E606936	10Y429405	130	Non-AML	Non-AML	0.12											
E606937	10Y429405	90	Non-AML	Non-AML	0.14											
E606985	10Y429405	73	P-AML	P-AML	0.13											
E606986	10Y429405	70	P-AML	Non-AML	0.19											
E607039	10Y412271	NA	Non-AML	P-AML	0.13	2	24	22	46.5	7.72	1.94	0.849	0.08	0.77	0.86	3.2
E607081	10Y412271	56	Non-AML	Non-AML	0.23											
E607082	10Y412271	102	Non-AML	Non-AML	0.1											
E604790	WH11047581	143	Non-AML	Non-AML	0.19											
E604791	WH11047581	26	Non-AML	Non-AML	0.2											
E604897	WH11047581	112	P-AML	P-AML	0.22											
E604952	WH11047581	152	Non-AML	Non-AML	0.22											
E605257	WH11047581	40	Non-AML	Non-AML	0.2											
E605258	WH11047581	68	Non-AML	Non-AML	0.22											
E605259	WH11047581	92	Non-AML	Non-AML	0.25											
E605482	WH11047581	132	P-AML	Non-AML	0.18											
E606978	WH11047581	133	P-AML	Non-AML	0.21											

SAMPLE	**Ag**	**Al**	**As**	**Ba**	**Be**	**Bi**	**Ca**	**Cd**	**Ce**	**Co**	**Cr**	**Cs**	**Cu**	**Fe**	**Ga**	**In**	**K**	**La**	**Li**	**Mg**	**Mn**	**Mo**	**Na**	**Ni**	**P**	**Pb**	**Rb**	**S**	**Sb**	**Sc**	**Se**	**Sn**	**Sr**	**Ta**	**Te**	**Th**	**Ti**	**Tl**	**U**	**V**	**W**	**Y**	**Zn**	**Zr**
NUMBER	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
E606203	1.5	5.17	268	1479	0.8	<1	3.81	18.3	19	23.4	273.8	5	95.2	8.26	15	<1	1.04	9	57	1.74	3156	3	0.25	55.4	567	102	62	0.58	8	21	<10		108	<10		<5	0.45	<5	<5	234.1	5	12	1594	20
E606243	2.6	1.43	5	222	<0.5	<1	0.75	13.2	15	5	602.7	2.7	25.3	4.18	5	<1	0.64	9	4	0.21	6155	7	0.05	31.9	481	549	48	1.14	5	3	<10		36	<10		<5	0.04	<5	<5	42.4	1	3.3	1232	25
E606244	5.3	0.71	2	95	<0.5	<1	3.12	19.1	12	2.9	530.2	1.1	53.5	2.31	<5	<1	0.27	6	5	0.22	1121	6.7	0.01	26.2	367	863	19	0.32	7	2	<10		90	<10		<5	0.02	<5	<5	18.9	<1	5.7	1479	9
E606777	<0.5	0.67	2	113	<0.5	<1	2.59	<0.5	10	2	279	0.6	6.1	0.69	<5	<1	0.16	5	35	0.25	281	2.7	0.02	9.9	1220	6	11	0.24	<1	2	<10	<5	54	<10	<10	<5	0.02	<5	<5	13.3	<1	3	15	15
E606782	<0.5	0.58	2	126	<0.5	<1	2.30	<0.5	12	2.2	262	0.5	6.5	0.73	<5	<1	0.13	6	34	0.18	229	2.7	0.02	10.9	883	10	<10	0.39	1	2	<10	<5	57	<10	<10	<5	0.02	<5	<5	14.2	<1	3	18	17
E606788	0.5	3.22	3	326	2	<1	1.00	<0.5	16	12.9	340	5.3	53.1	4.09	18	<1	1.98	7	13	0.71	373	12.2	0.21	69.9	357	15	59	2.33	2	9	<10	<5	182	<10	<10	<5	0.1	<5	5	173	<1	4	130	68
E606788	0.5	4.02	5	479	3.5	<1	0.95	<0.5	20	17.3	352	5.7	75.3	3.98	26	<1	2.07	8	24	0.71	399	13.1	0.21	73.2	701	18	74	2.49	2	16	<10	<5	213	<10	<10	<5	0.18	<5	6	179	<1	4	133	82
E606789	<0.5	1.87	<1	542	0.6	<1	2.79	<0.5	10	4.5	230	2.5	15.5	1.88	<5	<1	0.61	5	6	0.88	376	12.8	0.06	21.7	369	8	36	0.78	<1	4	<10	<5	137	<10	<10	<5	0.03	<5	<5	49.7	<1	5	46	31
E606789	<0.5	1.75	2	507	1	<1	2.52	<0.5	19	5.1	262	2.4	23.9	1.67	6	<1	0.61	8	12	0.83	401	13.6	0.06	27.9	738	10	40	0.67	1	7	<10	<5	149	<10	<10	<5	0.04	<5	<5	50.6	<1	5	42	35
E606792	0.7	5.41	7	463	3.2	<1	2.32	<0.5	25	17.7	242	4.9	47.3	4.95	26	<1	1.86	11	25	1.31	586	5.7	0.18	64.6	628	19	50	2.45	3	19	<10	<5	251	<10	<10	6	0.18	<5	5	172	<1	6	169	76
E606794	<0.5	4.25	5	454	2.7	<1	1.41	<0.5	15	14.5	223	4.1	54.4	4.26	23	<1	1.79	6	33	0.98	495	2.6	0.14	60.6	672	16	58	1.95	5	17	<10	<5	161	<10	<10	<5	0.12	<5	<5	159	<1	4	151	54
E606797	<0.5	4.62	6	546	3.2	<1	1.55	<0.5	23	14	234	4	50.8	3.98	25	<1	1.91	8	61	0.95	437	4.9	0.18	59.5	1500	21	52	1.88	6	16	<10	<5	190	<10	<10	<5	0.17	<5	<5	170	<1	4	142	63
E606901	<0.5	0.33	2	120	<0.5	<1	2.54	<0.5	4	1.3	257	<0.5	5.8	0.42	<5	<1	0.06	<2	13	0.06	92	2.6	<0.01	9.8	399	5	<10	0.19	<1	1	<10	<5	44	<10	<10	<5	0.01	<5	<5	8.1	<1	2	11	10
E606904	<0.5	0.7	1	139	<0.5	<1	3.19	<0.5	7	1.7	211	0.5	5.3	0.42	<5	<1	0.09	3	22	0.08	109	2.4	0.02	8.5	449	4	<10	0.22	<1	2	<10	<5	67	<10	<10	<5	0.02	<5	<5	14.6	<1	2	17	17
E606936	<0.5	2.25	2	410	<0.5	<1	2.97	<0.5	19	3.8	379	3.5	13	1.51	5	<1	0.67	11	11	0.42	281	4.2	0.07	23.5	832	11	37	0.61	2	4	<10	<5	99	<10	<10	<5	0.06	<5	<5	50.5	<1	6	74	23
E606937	<0.5	3.27	4	417	1.1	<1	2.98	<0.5	15	5	507	4.7	14	1.78	8	<1	0.86	9	28	0.24	122	5	0.18	32.8	1070	10	46	1.24	3	5	<10	<5	195	<10	<10	<5	0.1	<5	<5	71.5	<1	5	91	26
E606985	0.6	4.56	5	278	1.8	<1	1.01	<0.5	8	14.7	398	4.9	63.4	4.07	20	<1	2.4	3	13	0.82	411	7.2	0.17	73.8	828	25	63	2.45	2	9	<10	<5	84	<10	<10	<5	0.21	<5	<5	207	<1	4	180	69
E606986	<0.5	1.28	2	315	<0.5	<1	2.06	<0.5	20	2.8	414	1.1	14.3	2.48	<5	<1	0.23	10	10	0.48	175	4.8	0.03	18.8	595	10	14	1.09	<1	3	<10	<5	83	<10	<10	<5	0.05	<5	<5	44.1	<1	4	56	16
E607039	1	1.51	5	348	0.5	<1	2.29	1.5	9	4.3	185	1.4	14.1	1.25	<5	<1	0.31	4	21	0.21	268	5.8	0.04	21.3	396	64	20	0.90	2	3	<10	<5	80	<10	<10	<5	0.06	<5	<5	43.6	2	3	179	30
E607081	<0.5	0.56	<1	99	<0.5	<1	1.39	<0.5	6	2.2	402	<0.5	6	0.69	<5	<1	0.06	3	14	0.16	103	3.6	0.01	14.4	195	5	<10	0.31	<1	1	<10	<5	37	<10	<10	<5	0.03	<5	<5	12.7	<1	2	19	18
E607082	<0.5	0.56	<1	188	<0.5	<1	2.30	<0.5	8	2.3	254	0.5	4.5	0.77	<5	<1	0.12	4	4	0.25	226	3	<0.01	10	371	6	<10	0.22	<1	2	<10	<5	41	<10	<10	<5	0.02	<5	<5	17.2	<1	3	31	13
E604790	<0.5	1.37	<5	240	<0.5	2	1.62	<0.5		3	334		11	1.2	<10		0.3	10		0.31	132	3	0.05	19	530	6		0.45	<5	3			87			<20	0.09	<10	<10	25	<10		24	
E604791	<0.5	0.81	6	170	<0.5	<2	2.92	0.7		3	324		8	1.02	<10		0.18	10		0.17	132	3	0.03	15	430	6		0.53	<5	2			76			<20	0.06	<10	<10	19	<10		64	
E604897	11.1	0.9	47	110	<0.5	<2	0.48	75.1		1	189		19	2.2	<10		0.31	10		0.15	4690	1	0.01	11	580	2390		0.65	12	2			10			<20	0.06	<10	<10	17	<10		5520	
E604952	<0.5	0.54	<5	110	<0.5	<2	1.92	2.3		1	373		6	0.94	<10		0.14	10		0.14	902	3	0.01	14	300	25		0.2	<5	1			37			<20	0.05	<10	<10	14	<10		174	
E605257	0.5	2.19	5	360	0.6	<2	4.66	<0.5		3	246		9	1.11	<10		0.47	10		0.21	93	9	0.07	16	360	18		0.72	<5	4			141			<20	0.13	<10	<10	39	<10		43	
E605258	<0.5	0.7	<5	110	<0.5	<2	7.18	<0.5		2	228		4	0.71	<10		0.14	10		0.14	129	9	0.02	13	230	19		0.24	<5	1			143			<20	0.05	<10	<10	13	<10		38	
E605259	17.1	1.29	6	200	<0.5	2	4.06	1.4		4	297		10	0.91	<10		0.34	10		0.1	213	12	0.04	19	750	2440		0.33	10	2			189			<20	0.08	<10	<10	25	<10		472	
E605482	<0.5	0.84	<5	180	<0.5	<2	2.35	<0.5		2	280		5	0.76	<10		0.24	10		0.25	158	11	0.02	15	380	27		0.26	<5	2			66			<20	0.07	<10	<10	20	<10		33	
E606978	4.7	2.72	40	450	0.7	2	2.42	32.1		5	273		23	5.05	10		0.95	30		0.25	13400	6	0.06	27	1340	890		1.17	5	6			75			<20	0.13	<10	<10	59	<10		2640	

ALEXCO KENO HILL MINING CORP.

QUARTZ MINING LICENCE QML-0009

2010 ANNUAL REPORT - RESUBMISSION

BELLEKENO MINE SITE

KENO HILL SILVER DISTRICT

YUKON

APPENDIX F

MWMP 2010 TECHNICAL MEMO

2010 Mine Wall Testing Plan
September to December Addendum

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2010 Mine Wall Testing Plan

Introduction

Mine wall testing was undertaken for underground development completed during 2010 in accordance to the Mine Wall Testing Plan submitted in 2008 under the Water Use Licence QZ07-078. The sampling was done in a systematic way by a team of Alexco Resource Corp. geologists. The sampling was done every 10 linear meters of development and the samples were analyzed with ICP MS by ALS Chemex Labs out of Vancouver, B.C. One sample every 40 linear meters was also analyzed with Acid Base Accounting (ABA) using the lab procedures outlined in the Mine Wall Testing Plan. A total of 36 samples were taken. All of the 36 samples were analyzed with ICP MS and 9 of these samples were also analyzed with ABA.

Methods

The method of sampling selected by the team of geologists was a linear chip sample along one of the ribs (mine wall). These samples varied in that they were taken perpendicular to the orientation of the metamorphic fabric to best represent what the geochemical characteristics of the excavated mine wall are. These samples were an average of 4kg.

Sample locations were measured from underground survey points and marked on the mine wall with spray paint. All data was recorded into a database and sample locations were also recorded into an Auto-Cad drawing of the mine.

The mine wall samples were graphed and compared to the composite samples from the Waste Rock Management Plan (WRMP) taken during excavation in order to assess what, if any, geochemical changes have occurred within the rocks and if those changes can lead to a prediction of the long-term geochemical rock characterization.

The sampling method of the samples taken for the Waste Rock Management Plan (WRMP) is outlined in Water Use Licence QZ07-07 along with the compositing procedures and schedule. The composites generally represent 10-12m of linear development and are comprised of multiple samples taken during the excavation. For each ~10m representing a composite sample, a Correlation ID was assigned to that sample. Due to the variability of these composites lengths, a 1:1 comparison is difficult between this data set (WRMP) and the Mine Wall Testing Plan (MWTP) data set. In cases where no MWTP samples fell within the area of the composite sample, no Correlation ID was assigned to that sample. There was an average of 1.8 MWTP samples for every WRMP composite sample.

Due to the infrequency of ABA analysis on both data sets, there was only 1 set of samples that directly correlate the acid base accounting characteristics over time.

Results

Calcium Correlation

Calcium correlation between MWTP samples and WRMP samples as shown in Figure 1 do not vary significantly between the two datasets indicating there is very little change in the neutralizing potential of the excavated mine workings over a 6-9 month period. Several individual WRMP composite samples have been correlated to multiple MWTP samples. Table 1 shows the summary statistics of the two Calcium (ICP) datasets. Both datasets have a mean/median value > 0.75%. The change in the mean value of Calcium over the 6-9 month lag time was 13%.

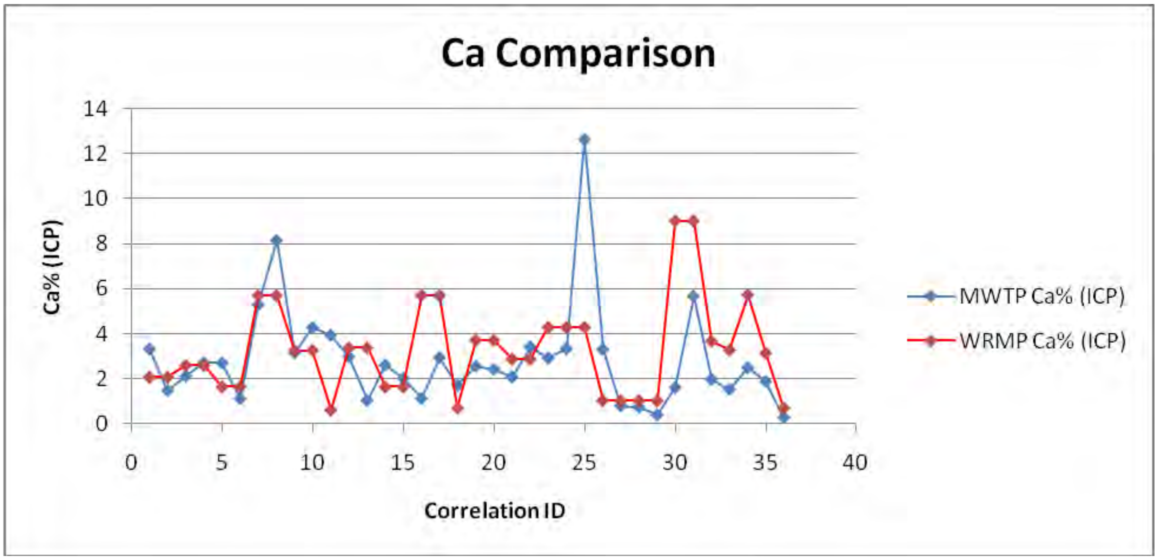

Figure 1 Ca% Comparison

Ca % MWTP		Ca% WRMP	
Mean	2.84	Mean	3.27
Median	2.52	Median	3.20
Standard Deviation	2.29	Standard Deviation	2.10
Range	12.38	Range	8.39
Minimum	0.27	Minimum	0.61
Maximum	12.65	Maximum	9.00
# of samples	*36*	*# of samples*	*36*

Table 1 Calcium Statistics

Sulphur Correlation

A comparison of Sulphur between the MWTP samples and the WRMP samples as shown in Figure 2 shows a very close correlation between the two datasets indicating very little change in the maximum acid generating potential of the excavated mine workings over a 6-9 month period. Table 2 shows the summary statistics for the two Sulphur (ICP) datasets. Both datasets have a mean/median value <1.5%. The change in the mean value of Sulphur over the 6-9 month lag time was 12%. Only one data point in the MWTP dataset has an S% >1.5% and can be classified as P-AML based on Sulphur alone. This section of underground workings was previously identified as P-AML based on the geochemical criteria in the WRMP.

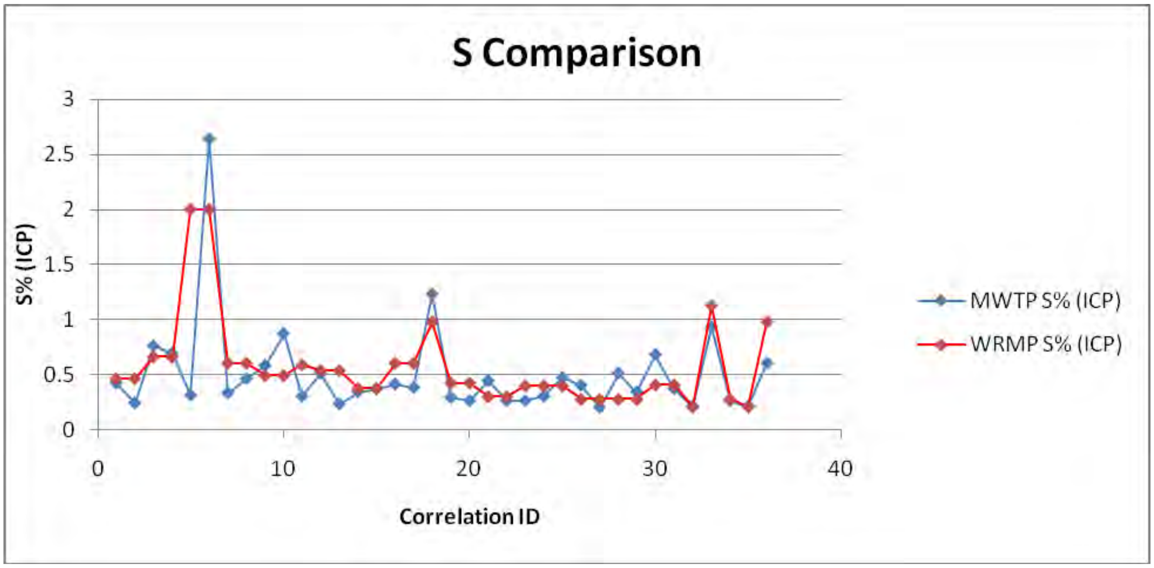

Figure 2 S% Comparison

S% MWTP		S% WRMP	
Mean	0.50	Mean	0.57
Median	0.38	Median	0.45
Standard Deviation	0.43	Standard Deviation	0.41
Range	2.44	Range	1.79
Minimum	0.20	Minimum	0.21
Maximum	2.64	Maximum	2.00
# of samples	*36*	*# of samples*	*36*

Table 2 Sulphur Statistics

Lead Correlation

A comparison of the Lead values in the MWTP and WRMP samples shows an interesting correlation. Figure 3 is a log plot of the Lead values for both datasets. There is a general trend showing relatively elevated levels of Lead in both corresponding datasets however, the MWTP samples are in all cases but one, higher than the WRMP samples. The mean Pb values for the mine wall samples as shown in Table 3 are ten times higher than the WRMP samples. Even excluding the one outlier sample in the MWTP (sample E605394 – 2680 ppm Zn), the mean value of the MWTP samples is 77ppm.

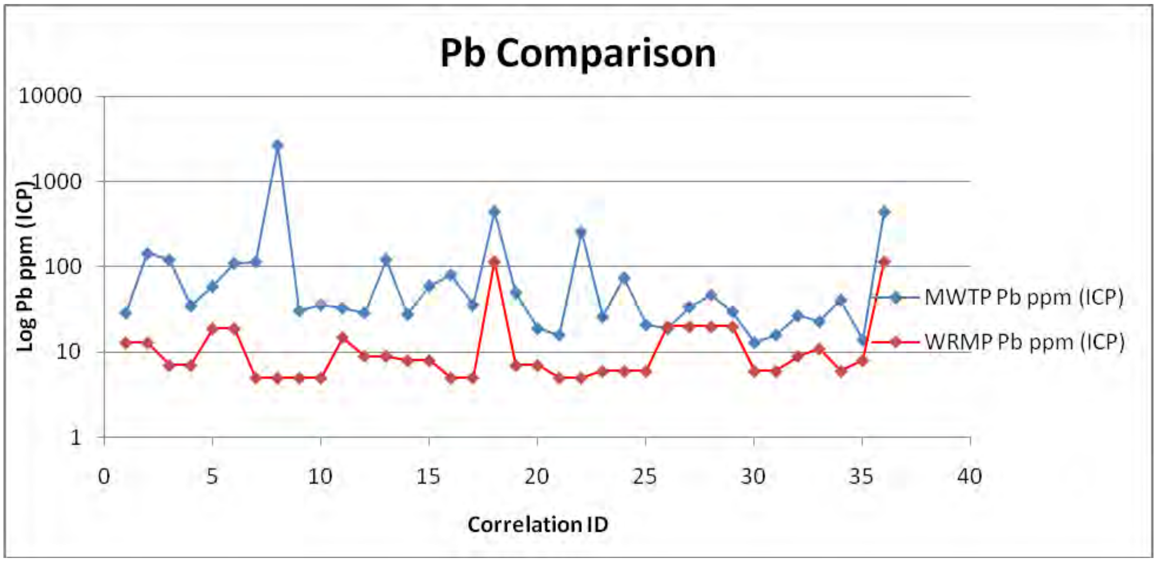

Figure 3 Pb ppm Comparison

Pb ppm MWTP		Pb ppm WRMP	
Mean	149	Mean	15
Median	36	Median	8
Standard Deviation	446	Standard Deviation	25
Range	2667	Range	111
Minimum	13	Minimum	5
Maximum	2680	Maximum	116
# of samples	*36*	*# of samples*	*36*

Table 3 Lead Statistics

Zinc Correlation

Similar to the Lead correlation, the Zinc MWTP samples also shows a good, yet slightly elevated correlation to the corresponding WRMP samples (Figure 4). The mean value of MWTP samples is 2.5 times higher than the WRMP samples (Table 4).

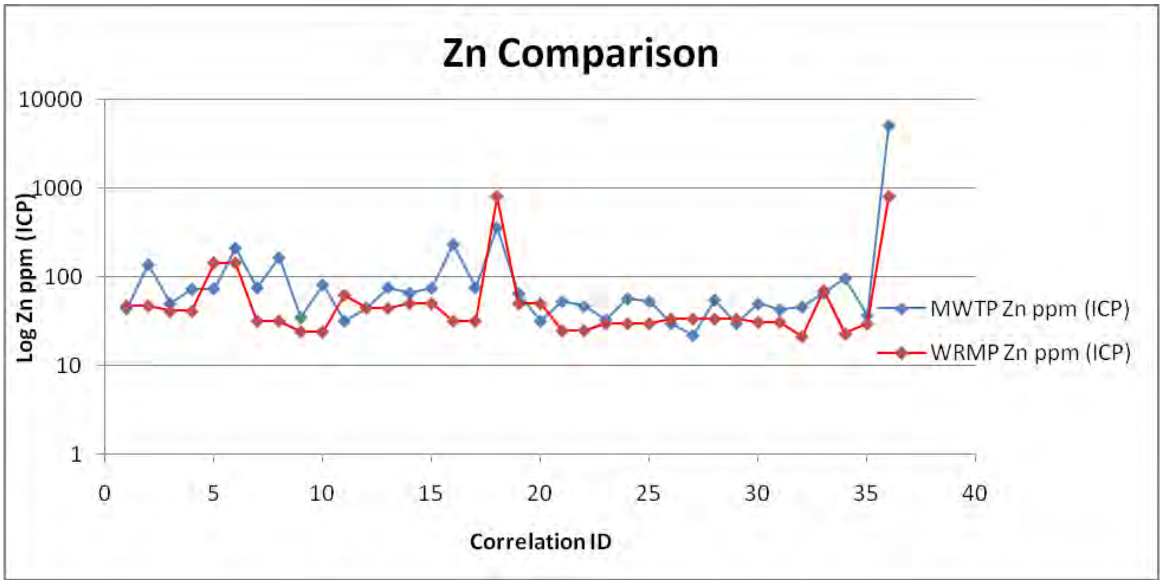

Figure 4 Zn ppm Comparison

Zn ppm MWTP		Zn ppm WRMP	
Mean	216	Mean	86
Median	56	Median	34
Standard Deviation	831	Standard Deviation	179
Range	5028	Range	783
Minimum	22	Minimum	22
Maximum	5050	Maximum	804
# of samples	*36*	*Count*	*36*

Table 4 Zinc Statistics

Discussion

The comparison of the geochemical data collected from the two datasets works well for Pb and Zn since each composite or sample was routinely analyzed using ICP. The comparison of NP:MPA ratio is much more problematic due to the slightly differing frequencies of ABA analysis that was conducted on each sample set. From the entire ABA dataset there is only 1 directly correlative set of MWTP and WRMP sample pairs. This is insufficient to draw any reasonable conclusions from.

Data collected supports the visible observation that there is no significant change in the acid generating potential of the mine wall exposed during excavation over a 6-9 month lag time, most importantly oxidation. Analysis of the datasets shows no change in several key indicators in which oxidation and delayed onset of PAG characteristics would manifest as. Expected trends of oxidation and delayed onset of PAG characteristics would include:

(a) Decrease in the S% as pyrite is oxidized
(b) Decrease in Ca% modified via carbonate flushing or oxidation/neutralization
(c) Decrease in NP:MPA ratio
(d) Decrease in paste pH
(e) Decrease in metals (Zn, Pb, Ag) due to metal leaching

Both the Ca% and the S% indicated that there are very minor changes occurring which are most likely due to the different sampling frequencies and type of sampling between the MWTP and the WRMP. There is not enough ABA data available to see any trends developing between the NP:MPA ratio or the paste pH ratio.

What is of interest is the overall increase in both Zn and Pb after a 6-9 month lag time. This increase was not seen in the data collected in the 2009 Mine Wall Testing Plan. The most likely explanation for this sharp increase in Pb and Zn is due to contamination related to commencing production mining of the high grade Pb/Zn ore body. During the mine wall sampling, a significant amount of dust coating the mine walls was noted in most parts of the mine. This is probably the result of both blasting and hauling ore grade material.

Recommendations

Due to the results obtained in 2009/2010 and a full review of the data collected, it is recommended that changes to the Mine Wall Testing Plan should be made. The proposed changes would consist of:

(1) Discontinuation of the Mine Wall Testing Plan as the data collected to date shows no significant changes to both Calcium and Sulphur have occurred over the 6-9 month lag from the time of excavation. With the discontinuation of the Mine Wall Testing Plan, visual inspection of all excavation completed by Alexco Resource Corp. over the life of the mine should be conducted, documented, and submitted annually. Inspections would be conducted by trained site geologists and would consist of visibly inspecting all mine walls for signs of oxidation. If at some point in time there is a change in the state of oxidation, local sampling of the mine wall should be conducted and the sample sent out for geochemical analysis. Due to increasing contamination from production mining, results obtained from any further testing of the mine wall in development headings will most likely be erroneous in both Lead and Zinc, as well as in Sulphur as the Lead and Zinc is predominantly in the form of PbS and ZnS. This increase in Sulphur due to contamination would have an impact on any results obtained from further ABA and ICP data collected.

Cert. #	SAMPLE	Heading	SAMPLE	MWTP	WRMP	Recvd Wt.	Fiz_Rate	Acid Potential	nnp	NP	Paste pH	NP_MPA	S (total)	Sulfate	Sulfide	C	CO2
	TYPE		DESCRIPTION	Classification	Classification	kg		kgCaCO3/t	kg CaCO3/t	kgCaCO3/t	pH		%	%	%	%	%
WH11047581	MWTP	SW CEN INC	E605378	Non P-AML	Non P-AML	0.26	2	13.1	77	90	8.2	6.86	0.42	<0.01	0.42	1.13	4.1
WH11047581	MWTP	SW CEN INC	E605379	Non P-AML	Non P-AML	0.19											
WH11047581	MWTP	SW CEN INC	E605380	Non P-AML	Non P-AML	0.2											
WH11047581	MWTP	SW CEN INC	E605381	Non P-AML	Non P-AML	0.25											
WH11047581	MWTP	SW CEN INC	E605391	Non P-AML	Non P-AML	0.27	2	9.4	64	73	8.2	7.79	0.3	0.01	0.29	0.93	3.4
WH11047581	**MWTP**	**SW CEN INC**	**E605392**	**P-AML**	**P-AML**	**0.25**											
WH11047581	MWTP	SW CEN INC	E605393	Non P-AML	Non P-AML	0.23											
WH11047581	MWTP	SW CEN INC	E605394	Non P-AML	Non P-AML	0.21											
WH11047581	MWTP	SW CEN INC	E605395	Non P-AML	Non P-AML	0.28	2	18.1	63	81	8.1	4.47	0.58	0.02	0.56	1	3.7
WH11047581	MWTP	SW CEN INC	E605398	Non P-AML	Non P-AML	0.23											
WH11047581	MWTP	SW CEN INC	E605399	Non P-AML	Non P-AML	0.22											
WH11047581	MWTP	SW CEN INC	E605400	Non P-AML	Non P-AML	0.27											
WH11047581	MWTP	SW CEN INC	E605403	Non P-AML	Non P-AML	0.27	2	8.1	23	31	8.8	3.82	0.26	<0.01	0.26	0.39	1.4
WH11047581	MWTP	SW CEN INC	E605404	Non P-AML	Non P-AML	0.24											
WH11047581	MWTP	SW CEN INC	E605417	Non P-AML	Non P-AML	0.23											
WH11047581	MWTP	720ACC	E605418	Non P-AML	Non P-AML	0.2											
WH11047581	MWTP	720ACC	E605419	Non P-AML	Non P-AML	0.22	2	12.2	76	88	8.4	7.22	0.39	<0.01	0.39	1.21	4.4
WH11047581	MWTP	840C2Acc	E605420	Non P-AML	Non P-AML	0.2											
WH11047581	MWTP	SW CEN DEC	E605430	Non P-AML	Non P-AML	0.23											
WH11047581	MWTP	SW CEN DEC	E605431	Non P-AML	Non P-AML	0.22											
WH11047581	MWTP	SW CEN DEC	E605432	Non P-AML	Non P-AML	0.26	2	14.1	47	61	8.3	4.34	0.45	<0.01	0.45	0.68	2.5
WH11047581	MWTP	SW CEN DEC	E605433	Non P-AML	Non P-AML	0.27											
WH11047581	MWTP	SW CEN DEC	E605434	Non P-AML	Non P-AML	0.23											
WH11047581	MWTP	SW CEN DEC	E605435	Non P-AML	Non P-AML	0.22											
WH11047581	MWTP	SW CEN DEC	E605446	Non P-AML	Non P-AML	0.23	3	14.7	312	327	8	22.26	0.47	<0.01	0.47	3.91	14.3
WH11047581	MWTP	780 ACC	E605447	Non P-AML	Non P-AML	0.24											
WH11047581	MWTP	780 RMK	E605448	Non P-AML	Non P-AML	0.21											
WH11047581	**MWTP**	**SW CEN DEC**	**E605449**	**P-AML**	**Non-AML**	**0.24**											
WH11047581	**MWTP**	**SW CEN DEC**	**E605450**	**AML**	**Non-AML**	**0.2**	**1**	**10.3**	**-2**	**8**	**8.1**	**0.78**	**0.33**	**<0.01**	**0.33**	**0.1**	**0.4**
WH11047581	MWTP	SW CEN DEC	E605455	Non P-AML	Non P-AML	0.25											
WH11047581	MWTP	SW CEN DEC	E605456	Non P-AML	Non P-AML	0.26											
WH11047581	MWTP	SW CEN DEC	E605457	Non P-AML	Non P-AML	0.23											
WH11047581	**MWTP**	**SW CEN DEC**	**E605458**	**P-AML**	**Non-AML**	**0.23**	**2**	**30.3**	**12**	**42**	**8.2**	**1.39**	**0.97**	**<0.01**	**0.97**	**0.53**	**1.9**
WH11047581	MWTP	820 Vent Acc	E605459	Non P-AML	Non P-AML	0.19											
WH11047581	MWTP	820 RMK	E605460	Non P-AML	Non P-AML	0.25											
WH11047581	**MWTP**	**840C2 X-cut**	**E605461**	**P-AML**	**P-AML**	**0.28**											

SAMPLE	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cs	Cu	Fe	Ga	In	K	La	Li	Mg	Mn	Mo	Na	Ni	P	Pb	Rb	S	Sb	Sc	Se	Sn	Sr	Ta	Te	Th	Ti	Tl	U	V	W	Y	Zn	Zr
DESCRIPTION	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
E605378	0.6	0.91	6	200	<0.5	<2	3.31	<0.5		2	256		8	0.77	<10		0.19	10		0.27	98	13	0.03	17	540	29		0.42	<5	2			61			<20	0.07	<10	<10	25	<10		44	
E605379	1.6	0.48	<5	120	<0.5	<2	1.47	1.7		1	353		5	0.49	<10		0.1	10		0.04	109	13	0.01	18	200	144		0.24	<5	1			23			<20	0.05	<10	<10	11	<10		138	
E605380	1.1	1.61	8	290	0.5	3	2.11	<0.5		3	340		7	1.06	<10		0.29	10		0.17	74	12	0.04	23	310	121		0.76	<5	3			73			<20	0.1	<10	<10	33	<10		50	
E605381	<0.5	1.92	<5	330	0.5	<2	2.7	0.7		4	251		9	1.27	10		0.37	10		0.34	163	8	0.07	18	430	35		0.69	<5	4			126			<20	0.11	<10	<10	40	<10		73	
E605391	0.5	0.88	7	160	<0.5	<2	2.69	0.8		3	251		7	0.81	<10		0.18	10		0.16	191	9	0.03	13	280	59		0.31	<5	2			92			<20	0.05	<10	<10	20	<10		74	
E605392	**1.5**	**7.72**	**17**	**540**	**2.2**	**<2**	**1.1**	**1.3**		**15**	**202**		**49**	**4.51**	**20**		**2.11**	**30**		**0.73**	**243**	**10**	**0.21**	**62**	**340**	**111**		**2.64**	**<5**	**16**			**237**			**<20**	**0.34**	**<10**	**<10**	**183**	**<10**		**211**	
E605393	1.3	0.82	6	130	<0.5	<2	5.29	0.9		2	208		4	0.57	<10		0.14	10		0.12	96	7	0.04	14	280	115		0.33	<5	2			114			<20	0.07	<10	<10	17	<10		76	
E605394	18.1	0.98	<5	180	<0.5	<2	8.15	2		1	181		8	0.64	<10		0.14	10		0.16	124	5	0.05	11	290	2680		0.46	18	2			172			<20	0.07	<10	<10	19	<10		165	
E605395	<0.5	1.47	<5	220	<0.5	<2	3.14	0.5		3	245		5	0.97	<10		0.36	10		0.18	91	9	0.05	23	770	31		0.58	<5	3			121			<20	0.1	<10	<10	28	<10		35	
E605398	0.6	2.15	13	330	0.7	<2	4.27	0.8		4	289		7	1.13	<10		0.47	10		0.16	89	10	0.11	25	470	36		0.87	<5	4			223			<20	0.13	<10	<10	41	<10		82	
E605399	<0.5	0.74	<5	110	<0.5	<2	3.93	<0.5		1	262		3	0.64	<10		0.17	10		0.14	92	9	0.03	10	380	33		0.3	<5	1			125			<20	0.06	<10	<10	13	<10		32	
E605400	0.5	1.63	11	240	0.5	<2	2.97	<0.5		3	234		5	0.89	<10		0.38	10		0.17	88	8	0.06	20	340	29		0.51	<5	3			193			<20	0.1	<10	<10	31	<10		45	
E605403	1.5	0.91	5	150	<0.5	<2	1.03	0.9		2	317		6	0.74	<10		0.21	10		0.16	85	13	0.04	33	300	122		0.23	<5	2			34			<20	0.09	<10	<10	20	<10		76	
E605404	<0.5	0.89	<5	140	<0.5	<2	2.59	0.5		2	271		8	0.83	<10		0.22	10		0.27	92	10	0.03	15	280	28		0.34	<5	2			65			<20	0.07	<10	<10	18	<10		66	
E605417	0.9	1.3	24	270	<0.5	<2	2.01	0.6		3	317		4	0.89	<10		0.36	10		0.25	160	12	0.04	16	270	60		0.37	<5	2			61			<20	0.09	<10	<10	25	<10		75	
E605418	1	1.94	<5	270	0.5	<2	1.12	2.5		4	350		8	1.09	10		0.44	10		0.19	111	13	0.05	22	400	81		0.41	<5	3			65			<20	0.14	<10	<10	40	<10		232	
E605419	<0.5	1.76	<5	450	<0.5	<2	2.93	0.5		5	261		7	1.81	<10		0.35	10		0.44	669	9	0.04	18	340	36		0.38	<5	4			112			<20	0.1	<10	<10	37	<10		76	
E605420	3.9	5.15	23	920	1.3	<2	1.7	3.5		10	269		46	2.54	10		1.54	20		0.51	586	22	0.11	45	410	446		1.23	<5	10			129			<20	0.26	<10	<10	120	<10		357	
E605430	0.7	0.76	<5	180	<0.5	<2	2.54	<0.5		3	252		6	0.68	<10		0.19	10		0.21	116	10	0.02	16	460	50		0.29	<5	2			50			<20	0.06	<10	<10	20	<10		65	
E605431	<0.5	0.48	<5	110	<0.5	2	2.41	<0.5		3	225		2	0.64	<10		0.1	10		0.19	91	9	0.01	13	390	19		0.26	<5	1			41			<20	0.05	<10	<10	13	<10		32	
E605432	<0.5	1.58	5	310	0.6	<2	2.07	<0.5		3	253		7	1.02	<10		0.27	10		0.29	98	9	0.04	19	410	16		0.44	<5	3			79			<20	0.12	<10	<10	37	<10		53	
E605433	1.9	0.47	5	120	<0.5	<2	3.41	<0.5		2	221		3	0.58	<10		0.09	<10		0.15	98	9	0.01	14	430	256		0.26	<5	1			68			<20	0.05	<10	<10	13	<10		47	
E605434	<0.5	0.43	<5	120	<0.5	<2	2.91	<0.5		2	235		3	0.57	<10		0.09	<10		0.13	79	9	0.01	12	400	26		0.26	<5	1			53			<20	0.05	<10	<10	13	<10		33	
E605435	0.7	0.51	<5	140	<0.5	<2	3.33	<0.5		2	224		4	0.6	<10		0.1	10		0.14	120	9	0.01	13	440	75		0.3	<5	1			60			<20	0.05	<10	<10	15	<10		57	
E605446	0.6	1.22	<5	280	<0.5	<2	12.65	<0.5		2	170		7	0.81	<10		0.23	10		0.33	85	7	0.03	14	510	21		0.47	<5	3			229			<20	0.09	<10	<10	28	<10		53	
E605447	<0.5	0.96	<5	210	<0.5	<2	3.3	<0.5		2	278		6	0.82	<10		0.18	10		0.25	98	11	0.02	17	410	19		0.4	<5	2			86			<20	0.09	<10	<10	25	<10		30	
E605448	<0.5	0.38	<5	90	<0.5	<2	0.79	<0.5		1	333		3	0.49	<10		0.06	<10		0.05	51	13	0.01	15	150	34		0.2	<5	1			19			<20	0.04	<10	<10	9	<10		22	
E605449	**1.1**	**1.3**	**<5**	**240**	**<0.5**	**<2**	**0.72**	**0.5**		**3**	**327**		**9**	**0.86**	**<10**		**0.18**	**10**		**0.1**	**60**	**13**	**0.04**	**24**	**300**	**47**		**0.51**	**<5**	**2**			**39**			**<20**	**0.1**	**<10**	**<10**	**28**	**<10**		**55**	
E605450	**0.9**	**1.13**	**<5**	**210**	**<0.5**	**<2**	**0.38**	**<0.5**		**2**	**340**		**6**	**0.68**	**<10**		**0.24**	**10**		**0.06**	**49**	**14**	**0.03**	**24**	**230**	**30**		**0.34**	**<5**	**2**			**26**			**<20**	**0.08**	**<10**	**<10**	**22**	**<10**		**30**	
E605455	<0.5	1.35	<5	260	<0.5	<2	1.6	<0.5		4	300		13	0.94	<10		0.2	10		0.13	57	12	0.04	25	270	13		0.68	<5	2			56			<20	0.1	<10	<10	29	<10		50	
E605456	<0.5	0.75	<5	180	<0.5	2	5.67	<0.5		2	196		7	0.55	<10		0.16	10		0.12	79	8	0.02	13	300	16		0.37	<5	2			83			<20	0.04	<10	10	15	<10		43	
E605457	0.6	0.56	<5	100	<0.5	<2	1.96	0.5		2	248		4	0.44	<10		0.15	10		0.06	79	10	0.01	14	220	27		0.21	<5	1			31			<20	0.04	<10	<10	10	<10		46	
E605458	**0.9**	**2.16**	**7**	**300**	**0.6**	**<2**	**1.51**	**0.5**		**4**	**245**		**11**	**1.5**	**<10**		**0.3**	**10**		**0.38**	**109**	**9**	**0.06**	**20**	**380**	**23**		**0.93**	**<5**	**5**			**65**			**<20**	**0.13**	**<10**	**<10**	**41**	**<10**		**66**	
E605459	1.4	0.6	<5	120	<0.5	<2	2.49	1		2	284		7	0.56	<10		0.08	10		0.09	123	11	0.03	13	300	41		0.26	<5	1			47			<20	0.05	<10	<10	12	<10		96	
E605460	<0.5	0.68	<5	130	<0.5	<2	1.87	<0.5		2	248		6	0.47	<10		0.08	10		0.08	58	10	0.02	12	360	14		0.21	<5	1			43			<20	0.06	<10	<10	14	<10		37	
E605461	**4.8**	**0.33**	**94**	**30**	**<0.5**	**3**	**0.27**	**59.2**		**2**	**278**		**30**	**4.41**	**<10**		**0.12**	**10**		**0.11**	**13650**	**10**	**0.01**	**12**	**230**	**441**		**0.6**	**<5**	**1**			**4**			**<20**	**0.03**	**<10**	**<10**	**8**	**<10**		**5050**	

ALEXCO KENO HILL MINING CORP.
QUARTZ MINING LICENCE QML-0009
2010 ANNUAL REPORT - RESUBMISSION

BELLEKENO MINE SITE
KENO HILL SILVER DISTRICT
YUKON

APPENDIX G

WATER USE LICENCE QZ09-092
2010 ANNUAL REPORT

ALEXCO KENO HILL MINING CORPORATION

2010 ANNUAL REPORT

Submitted to the Yukon Water Board

Water Use Licence QZ09-092

Distribution:

Yukon Water Board	1 original unbound
	6 copies (CD format)
First Nation of Na'cho Nyak Dun	1 original bound
	1 copy bound
	1 copy (CD format)
Alexco Corporate	1 original bound

Date:

March 2011

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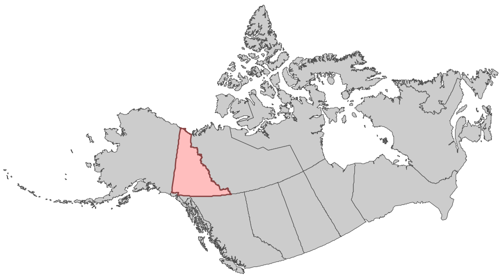
1. INTRODUCTION

On the 20th August 2010, Type A Water Licence QZ09-092 was issued to Alexco Keno Hill Mining Corp. (AKHM) for operation of the Bellekeno Mine and Mill complexes. The mine operating, closure and reclamation objectives are outlined in the Type A Water Licence QZ09-092, and in the Yukon Quartz Mining License QML-009, issued in November 2009. This report summarizes the 2010 monitoring data and activities relevant to both the Water Use and Quartz Mining Licences.

1.1 Location

The Bellekeno Mine, owned and operated by Alexco Keno Hill Mining Corp. (AKHM), is located in the vicinity of Keno City (63˚ 55'N, 135˚ 29'W), in central Yukon, 354 km (by air) due north of Whitehorse. Access to the property is via a paved, two-lane highway from Whitehorse to Mayo (407 km) and an all-weather gravel road northeast from Mayo to Elsa (45 km); a total distance of 452 km. The property lies along the broad McQuesten River valley with three prominent hills to the south of the valley. Figure 1.1 shows the general project location within Yukon while Figure 1.2 shows the location on a smaller scale. The Bellekeno area is located about 3 km east of Keno City, while the Flame and Moth site is about 1.2 km to the west (Figure 1.3).



KENO HILL SILVER DISTRICT

BELLEKENO MINE DEVELOPMENT

ALEXCO

ACCESS CONSULTING GROUP

TYPE A WATER LICENSE APPLICATION

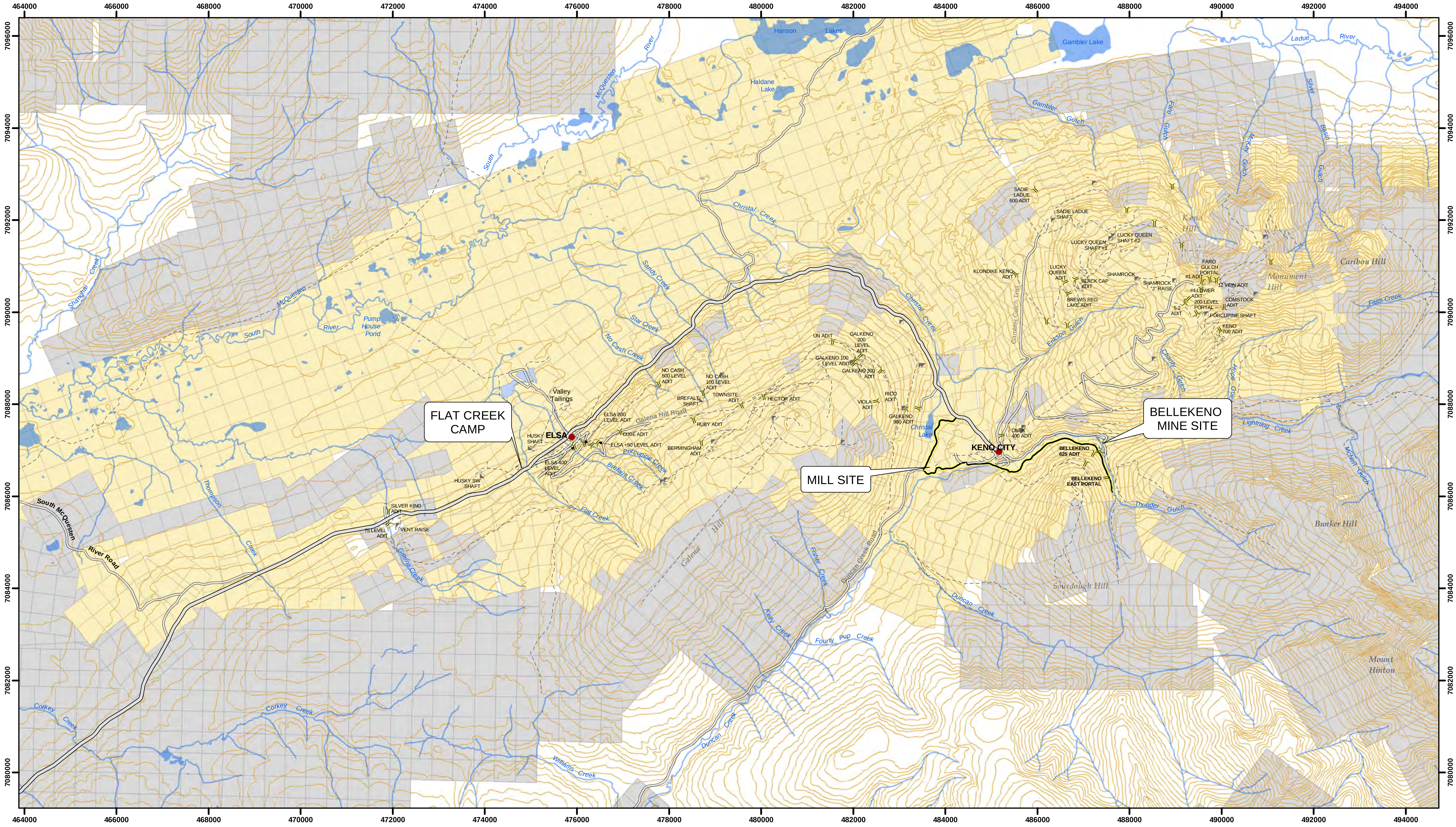
FIGURE 1-1

PROJECT LOCATION

August 2009

Drawn By: HD/MD	Checked By: RM

D:\Project\AllProjects\ALEX05-01\gis\mxd\Overview_MapsProject_Location.mxd



National topographic Data Base (NTDB) compiled by Natural Ressources Canada at a scale fo 1:50,000.
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Datum: NAD 83
Projection: UTM Zone 8N

Mineral claim boundaires and ownership are current as of August 3rd 2009.
Data obtained from Geomatics Yukon and Yukon Mining Recorder.

1:75,577 (when printed on 11 x17 inch paper)

0 0.5 1 2 3 4 5 km

N

● Town
Ⲩ Adit
◩ Shaft
Haul Road
Silver Trail Highway
Secondary Road
Limited Use Road
Countour
Watercourse
🟦 Waterbody
▨ Quartz Claims
🟨 Alexco Quartz Mining Claims

ALEXCO

ACCESS

BELLEKENO MINE PROJECT
TYPE A WATER LICENSE APPLICATION

FIGURE 1-2
KENO HILL PROPERTY LOCATION MAP

Drawn By: MD	AUGUST 2009	Verified by: RM

K:\Bellekeno\GIS\mxd\WUL_MLU_Applications\WUL_Aug_09\Fig_1_2_Property_Overview.mxd

National topographic Data Base (NTDB) compiled by Natural Ressources Canada at a scale fo 1:50,000.
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*2006 aerial photograph obtained from Geodesy Remote Sensing Inc., Calgary Alberta. Imagery acquired September 13 and14 2006.

Datum: NAD 83
Projection: UTM Zone 8N

N

0 125 250 500 750 1,000 metres

- Ɏ Adit
- Watercourse
- Contour
- Proposed Haul Road
- Haul Road
- Silver Trail Highway
- Secondary Road

ALEXCO

ACCESS

BELLEKENO MINE PROJECT
TYPE A WATER LICENSE APPLICATION

FIGURE 1- 3

BELLEKENO LOCATION MAP

Drawn By: MD	AUGUST 2009	Verified by: RM

D:\Project\AllProjects\ALEX-05-01\Bellekeno\GIS\mxd\WUL_MLU_Applications\WUL_Aug_09\fig_1_3_BK_LocationMap.mxd

2. BELLEKENO WATER MANAGEMENT ACTIVITIES

2.1 Water Use Operations Description

During the reporting period, water use at the site consisted of:

- Camp water use from Flat Creek (measured at 3500m^3 for 2010)
- Lime mixing for treatment at the Bellekeno 625 Treatment Facility
- Water makeup for the Flame and Moth Mill
- Drill water use for underground mining operations

Camp water is extracted from Flat Creek via a pipeline and pumped directly to the camp trailers. From there, some water is pumped into the vacuum truck and transported to other site buildings.

High metals-content water discharges continually from the Bellekeno mine. The quality of this effluent fails to comply with water licence QZ09-092; therefore water treatment is required on an ongoing basis. Treatment operations employ a simple lime-addition and sludge settling circuit. The treatment objective is to reduce zinc effluent concentrations to less than 0.50 mg/L, as required under Water Licence QZ09-092. Historic correlations between zinc concentrations and other metals (i.e. arsenic, lead and cadmium) indicate that the zinc discharge treatment objective ensures that other metals are also managed. For the management of ammonia and suspended solids, there are other measures that have been employed at the treatment facility.

The water used in lime treatment is pumped from the treatment pond at the Galkeno 300 Treatment Facility operated under WL QZ06-074 in the winter months and from Flat Creek for the balance of the year. The water is pumped and recorded by vacuum truck drivers each day and submitted at the end of the week for tabulation (see Section 2.2).

The Bellekeno 625 treatment system consists of the mechanical application of lime slurry ($CaO_{(s)}$ + $H_20_{(l)}$) to the mine discharge waters. The slurry acts to raise the pH, causing zinc and other metals to precipitate out of solution, forming solid metal hydroxide sludge. Two precipitate retention ponds are located at the treatment facility to assist metals precipitation and clarification of effluent prior to release into the receiving environment. Discharge to the environment occurs via a gravity-fed system through pond decants. Sludge is periodically removed from the primary settling pond and transported to a storage cell in the Valley Tailings.

Water is also retained in a sedimentation pond at the Flame and Moth Mill Site, for the dual purpose of settling out sludge solids from treated water at times when treatment is necessary, and as a source of water storage for the mill. Currently, mill water is drawn from the Galkeno 900 treatment facility, which is operated under WL QZ06-074. Water is pumped from the treatment pond into a vacuum truck and transported to the mill pond where it is stored for use in the mill. It is anticipated that during times of high meteoric runoff and net water production by the mill, water in the sedimentation pond will have to be treated and excess water will be discharged to the environment via the land application system. However, in 2010, there was no discharge from the mill pond.

Discharge samples are taken daily at the Bellekeno adit and treatment decant and analyzed on the on-site AA machine. Review and evaluation of these results is conducted by the AKHM Project Manager and discussed with the treatment system operators. These results allow the Project Manager to provide direction regarding the treatment process, including potential adaptive management measures (i.e. lime addition rates and pond clean-out activities).

Internal records are kept and used for analysis purposes and to achieve the highest possible standard of treatment.

After the issuance of WL QZ09-092 in late August, AKHM began production drilling and removal of ore from the mine in early October. The water source for underground mine operations is recirculated underground mine water, plus any additional fresh water that leaks into the mine workings.

Water is collected in the underground in sumps located throughout the various mine levels and pumped up to the main water storage sumps at the underground 600 level. Here, a transfer process occurs to settle solids from the water. Water is first collected in a ‘dirty’ water sump with a capacity large enough to allow for suspended solids to settle out. When the water has been polished, it flows into a ‘clean’ water sump where it is then returned to various working headings though piping, and may at this point be used in underground mine operations. Excess water from the clean water sump which is not returned to the underground is discharged through piping to the water treatment system. None of the water in the underground is discharged to the treatment facility before it travels through the main settling sumps. The treatment system at the Bellekeno 625 portal is a gravity-fed system. As a result, in the case of a power failure, there is no flow from the underground sumps to the treatment system.

2.2 Quantity of Water Consumed

The Bellekeno Mine is serviced by the camp located at Flat Creek. The camp at Flat Creek was established in 2007 to provide a base for care and maintenance services carried out under Elsa Reclamation and Development Company's (ERDC) Type B water licence QZ06-074. The camp has since grown to support exploration activities at the Keno Hill Property (the "Property"), as well as advanced exploration at the Bellekeno Mine, and will hopefully support future development at other mines located on the Property.

For logistical purposes, secondary facilities were established in 2010 with the issuance of QZ09-092 to support activities at the Bellekeno Mine. The facilities are located near the Bellekeno Mine and Mill sites, making it more convenient for production.

Flat Creek is the primary source for camp water for both Flat Creek and Bellekeno. Pipes convey water from the creek to Flat Creek camp where bulk usage is tracked via a meter in the kitchen. For Bellekeno, water is hauled in water vacuum trucks to holding tanks at the Bellekeno District facilities.

Water deposited in the lime treatment system at Bellekeno 625 and at the mill pond is recorded by vacuum truck drivers on operator logs.

Water used in underground operations is tracked at the 625-level portal where a meter registers the amount of water leaving the underground. Most of the water leaving the underground has been used in drilling activities and all of it has passed through the underground sumps for polishing prior to reaching the treatment facility. A second meter tracks the decant discharge at the other end of the treatment system, registering the total volume of effluent deposited to the environment. Because the system is a closed, gravity-fed system, both meters register about the same volume of water.

The total amount of water used by these activities is summarized in Table 2.1, below. The full dataset is presented in Appendix A.

Table 2.1 Summary of total water quality usage, Bellekeno Mine and Mill

	Total Water Removed for All Uses	Total Water Piped to Flat Creek Camp	Total Water Deposited at Treatment Facilities	Total Effluent Discharged from Bellekeno 625 Treatment Facility
Total (m^3)	4534.9	3500.0	2231.1	51693.76

2.3 Adaptive Management Plan

The Adaptive Management Plan (AMP) is designed to guide responses to unforeseen events respecting water quality and quantity and physical conditions of site workings and infrastructure. The adaptive management approach provides for assessment of mitigation measures and their effectiveness, and guides the orderly implementation of responses. Since it is not possible to predict the specific environmental condition that may arise which requires a management response, the AMP does not provide specific detailed descriptions of responses to a situation. Moreover, by not providing specific responses, the plan is more flexible to allow innovative contingency measures to be implemented. What the AMP does do is provide a range of possible responses to use as a guide to respond to specific conditions that may be encountered.

Site inspections and routine adjustments to the treatment systems were conducted for maintenance purposes in accordance with the adaptive management plan and water licence conditions. These records are maintained at the care and maintenance office, with copies held at the corporate office for review if necessary.

2.4 Management Issues and Response Summary

This section deals with management response activities at the Bellekeno Mine area for the full year of advanced exploration and production activities (January – December).

In February 2010, underground drilling commenced as a follow-up to the 2009 underground exploration program. This carried on to September, when production activities were initiated underground. Water management was coordinated with underground activities, and communication was essential for optimal treatment performance. Over the course of advanced exploration and production activities, coordination and management protocols have been initiated for treatment.

For a brief period in February, turbidity levels increased from the underground decant resulting in higher zinc discharge levels. Internal monitoring results for total zinc were marginally higher than the license discharge standard but within the margin of error for results from the site Atomic Absorption machine. The use of ferric chloride to aid in sludge particulate settling was initiated, resulting in low pH settings. The system was adjusted according to the new chemistry and reasonable pH was achieved.

On September 29th, a weekly total suspended solids sample collected at the Bellekeno 625 treatment discharge location (KV-43) reported a concentration of 47 mg/L, in exceedance of the 25mg/L discharge standard. The exceedance was related to freezing of water lines connected to the filtration system which required a temporary shutdown in order to install heat trace and enhance insulation to protect the system from freezing. In response to this event, a heat trace, insulation and heaters were added to the filtration building to prevent the system from freezing.

TSS remained high through the end of September and over the course of October as the treatment system at Bellekeno was optimized. The elevated TSS values were determined to be a result of improper re-circulation of water into Pond 1 of the treatment system at this location. This re-circulation resulted in re-suspension of sludge from Pond 1 which resulted in the higher TSS values in the discharge.

The standard operating procedure is to re-circulate water into the rapid mixing tan prior to Pond 1; however, this resulted in the tank overflowing. An investigation into the issues with the rapid mix tank revealed that the tank and drainage piping had settled. To address this issue, AHKM conducted repairs to the system to raise the tank and re-establish proper drainage into Pond 1.

The use of treated water for exploration drilling was a secondary contributing factor to the elevated TSS values. The drilling contractor installed re-circulation lines into the Pond 1 area without notifying site Water Treatment Operators. The lines were to prevent freezing of the water supply for exploration drilling but resulted in re-suspension of sludge from Pond 1. The Standard Operating Procedure for water usage was revised based on this event and treated water at the BK 625 treatment system is no longer available for use as a water supply for drilling. All contractors and mine personnel have been informed that permission to use water for any purposes must first be approved by the Keno Hill District Manager or Care and Maintenance Supervisor. Water treatment operators have been informed to report any unauthorized usage of water from the Bellekeno 625 system.

Lead and other total metals in effluent are treated in concert with the primary contaminant of concern, zinc. During treatment, these metals settle out into the sludge pond. When suspended solids are high, as they were during October, metals levels can similarly become elevated as they constitute a portion of the sludge. This was the case for lead, which spiked near the end of October, exceeding the compliance limit at 0.236mg/L.

Over the course of 2010, with implementation of QZ09-092 and the start of production activities, it was determined that a robust method of determining ammonia content internally would be paramount to successful treatment. Increased blasting in the underground would lead to increased use of explosives and exposure to ammonia therein, making constant ammonia monitoring necessary. The former method of ammonia testing was exchanged for a more robust Hach DR890 meter.

Figure 2.1 and Figure 2.2 presents the correlation between the internal on site ammonia analysis and the external analytical lab results. These comparisons represent the time period when the previous analytical method was being used, prior to the DR890 Hach method.

Figure 2.1 Bellekeno Treated Ammonia Discharge, internal ammonia vs. external lab ammonia results (prior to implementing the DR890 Hach method)

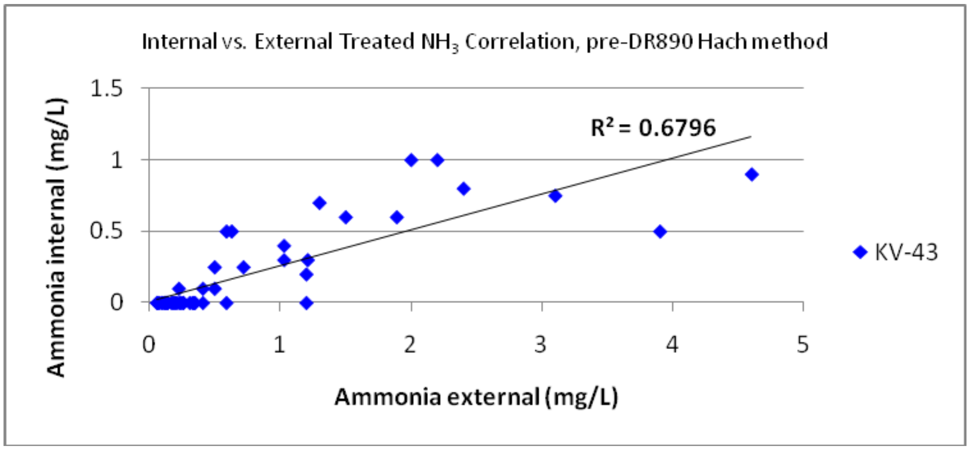
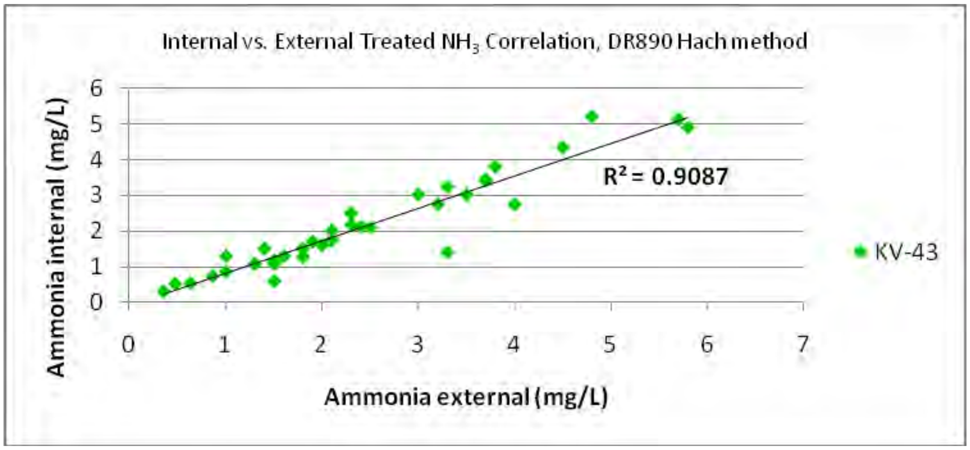


Figure 2.2 Bellekeno Treated Ammonia Discharge, internal ammonia vs. external lab ammonia results (DR890 Hach method)



Following the implementation of the improved ammonia analysis at site, the following table was compiled to summarize the internal and external ammonia results (Table 2.2).

The first two samples represent initial testing and optimization period with the new equipment, and may be disregarded as they contain a high level of user error. The remaining five pairs show internal sample results are approximately 88% of the external results. Going forward, a conservative 15% factor on top of our internal results will be applied to better reflect the external lab results.

Table 2.2 Internal and External Ammonia results from split samples following implementation of DR890 meter

	External Lab	Internal Analysis
Date	Ammonia (mg/L)	Ammonia (mg/L)
23-Jun-2010	3.3	1.4
1-Jul-2010	1.5	0.6
7-Jul-2010	5.8	4.9
9-Jul-2010	3.8	3.8
13-Jul-2010	2.1	1.74
14-Jul-2010	1.8	1.28
21-Jul-2010	0.86	0.74
27-Jul-2010	2	1.6
4-Aug-2010	2.5	2.11
18-Aug-2010	4.5	4.34
8-Sep-2010	3.7	3.4
15-Sep-2010	5.7	5.12
17-Sep-2010	4.8	5.2
22-Sep-2010	3.7	3.44
29-Sep-2010	2.3	2.5
7-Oct-2010	2.1	2.01
13-Oct-2010	2.4	2.12
20-Oct-2010	1.9	1.71
27-Oct-2010	1.5	1.17
2-Nov-2010	1.4	1.51
10-Nov-2010	1	1.3
17-Nov-2010	1.3	1.08
24-Nov-2010	1.3	1.08
1-Dec-2010	1.6	1.3
8-Dec-2010	1.5	1.08
15-Dec-2010	1	0.86
22-Dec-2010	0.63	0.54
29-Dec-2010	0.47	0.53
5-Jan-2011	0.35	0.31
12-Jan-2011	1.8	1.51
19-Jan-2011	3.2	2.75
26-Jan-2011	4	2.75
2-Feb-2011	3.3	3.24
9-Feb-2011	3	3.02
10-Feb-2011	3.5	3.02
16-Feb-2011	2.3	2.18

The treatment facility underwent significant upgrades over 2010. These upgrades were planned and carried out to combat the new water quality conditions produced by the underground, both now and those expected over the life of the mine. AKHM is currently preparing design drawings for additional modifications to the BK625 treatment system. The modifications will involve installation of a clarifier unit and an ion exchange system to remove ammonia from mine effluent. Copies of the design drawings will be provided to the Board once they have been finalized. It is anticipated that the implementation of these modifications will occur in the first half of 2011.

A formal plan and operations manual for the treatment system at Bellekeno was submitted to the Board under WL QZ09-092 on November 17th, 2010. This plan identifies the upgrades to the system that have been (and may in the future be) carried out to achieve compliance with water licence water quality standards. It also formally expounds the system components which existed before the upgrades.

3. WASTE DEPOSIT

3.1 Sludge Handling and Management

Sludge from the Bellekeno treatment facility is vacuum trucked from the ponds and delivered to a cell at the Valley Tailings Facility (Appendix C). Sludge from the BK625 treatment system is contained in a separate cell from the sludge generated from the other treatment systems operated under QZ06-074.

In late 2009, the Sludge Management Plan (SMP) for care and maintenance activities at the Keno Hill District was modified in order to increase the capacity for sludge removal at the Bellekeno Treatment Facility. The plans comprised building a temporary trench for sludge containment for a medium-scale sludge removal from the Bellekeno settling pond. These plans were carried out, and the pond was desludged *en masse*, thereby increasing the residence time for water in the settling pond. The program was not repeated subsequently during 2010, as sludge build-up was not an issue[1]. However; as production drilling continues, there may be the need in the future to consider carrying out additional interim remediation for sludge.

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[1] During the first half of 2010, no sludge was pumped from the Bellekeno treatment facility (Appendix C).

4. MONITORING PROGRAMS AND STUDIES

4.1 Monitoring Objectives

Overall, the monitoring objectives for the Bellekeno Mine are driven by valued environmental and socio-economic components (VCs). VCs are defined as elements of the environment, which are valued for environmental, scientific, social, aesthetic or cultural reasons. Protection of VCs to the highest degree possible is the objective of all monitoring programs carried out at the site.

Table 4.1provides a complete list of the VCs within both the Bellekeno Mine and Mill area and within a regional context that are affected by the project. VCs include water and sediment quality, aquatic resources (i.e. biota), heritage resources, soil stability, wildlife, harvesting berries including medicinal plants and human health and safety, and training and employment opportunities. Consultation with First Nations, the public and regulatory agencies, knowledge of local environmental conditions and best professional judgment lead to the selection of the project VCs.

Table 4.1 Identification of Valued Environmental and Socio-Economic Components

Valued Component	Spatial Boundaries	Rationale	Temporal Boundaries	Rationale
Environmental				
Surface Water Quality	Mayo River and the South McQuesten watershed, Lightning Creek and Christal Creek watersheds	Project receiving waters.	Bellekeno mine/mill Development and operations - 5 to 25 yrs	Existing water quality data collected during all project phases to ensure continued environmental protection.
Groundwater Quality	Immediate area around mill site including Keno City	Potential effects to municipal groundwater wells due to mine/mill operations.	Bellekeno mine/mill Development and operations - 5 to 25 yrs, DSTF a permanent structure	Groundwater quality and quantity data collected during all project phases to ensure continued environmental protection.
Fisheries Resources (grayling)	Lightning Creek / Mayo River drainage Christal Creek / South McQuesten	Fish bearing receiving waters.	Bellekeno mine/mill Development and operations - 5 to 25 yrs	Existing water quality data collected during all project phases to ensure continued environmental protection. Known fisheries utilization (Lightning Creek).
Wildlife Resources (Moose)	Regional Context	Range of wildlife resources is not confined to a specific area.	Bellekeno mine/mill Development and operations - 5 to 25 yrs	Direct effects to wildlife likely to occur during these project phases.
Socio-economic/ Cultural				
Traditional Use – Trapping	Actively Trapped Areas and concession holder areas. Regional context.	Trapping activities affected in the actively trapped areas and concession holder areas.	Bellekeno mine/mill Development and operations - 5 to 25 yrs	Potential effects to wildlife likely to occur during these project phases.
Traditional Use – Harvesting	Regional Context	Traditional use of the land not confined to a specific area.	Bellekeno mine/mill Development and operations - 5 to 25 yrs	Traditional activities potentially affected during these project phases.
Heritage Resources	Within Footprint of Project Area (i.e. old historic sites/buildings)	Potential for disturbances of historic buildings.	Bellekeno mine/mill Development and operations - 5 to 25 yrs	Limited potential for disturbances of historic buildings during these project phases.
Community Quality of Life (Keno City)	Regional Context	Current quality of life standard is very important to local residents	Flame and Moth mill Development and operations - 5 yrs	Potential for diminishing quality of life in Keno City during Mill operations at historic Flame and Moth Pit area.
Recreational & Tourism	Regional Context	Recreational and Tourism activities/ effects not confined to a specific area.	Bellekeno mine/mill Development and operations - 5 to 25 yrs	Potential for effects to occur during all project phases.

4.2 Water Quality Sampling Program

Surface water quality is monitored to assess and track changes in the condition of waters of the various watersheds on the property. Through monitoring, AKHM can characterize waters and identify changes or trends in water quality over time, identify specific existing or emerging water quality problems and determine whether goals, including compliance with pollution regulations and treatment objectives, are being met. The data are useful for building site-wide and localized loading balances for the site and in identifying closure issues and in closure planning.

The water quality surveillance program is designed to effectively meet water quality objectives at the site. The base program is outlined in Schedule A of WL QZ09-092. The program is comprehensive and covers all of the watersheds impacted by the project. As a part of the regulations of this licence, the program is continuously being reassessed for its effectiveness at canvassing the site and for its ability to help plan site activities. The results of surface water quality monitoring are presented in Appendices C-1 and C-2.

The network of sampling stations aims to address three main issues:

- To identify sources and sinks for contaminants along natural watercourses;
- To identify “background” water chemistry (i.e. in areas unaffected by mining); and,
- To determine what effect mine discharges may have on downstream water quality and aquatic life in the receiving environment.

4.2.1 Results and Discussion: Bellekeno Mine

The Bellekeno mine site is near the confluence of Thunder Gulch with Lightning Creek, a stream flowing from the north side of Sourdough Hill. Lightning Creek eventually flows into Duncan Creek, which drains into the Mayo River. The Bellekeno 625 treated decant water is discharged onto the surface but reports to ground and does not report directly via surface watercourse to either the Lightning Creek or Thunder Gulch watercourses. Water discharged from the BK625 treatment system eventually reports to placer mining sedimentation ponds which are located immediately downstream of the discharge point. The sedimentation ponds discharge into Lightening Creek further downstream towards Keno City.

All of these basins have undergone extensive placer mining activities both now and in the past, which impacts on aquatic conditions, and can make it difficult to distinguish the effects of placer mining from the effects of underground mining. Moreover, Lightening Creek drainage is heavily impacted by other historical mines in the district which continue to produce contaminated water.

Two periods of dewatering occurred in the history of the Bellekeno mine: in 1994 during exploration activities and again in 2008-09 during advanced exploration activities by Alexco. Data collected since the 1994 dewatering is sparse following the shutdown of operations at UKHM, however, consistent data at Bellekeno has been collected since 2005 at the adit and 2007 at the treatment decant. Based on the data from 1994 and later from 2005 onwards, it has been established that the natural chemistry of the mine drainage is constant with time, and there are no parameters which indicate that ARD is developing. There is sufficient alkalizing material in Bellekeno rock to neutralize the mine water. Bellekeno pH is slightly alkaline, and varies very little with no correlation whatever with the level of metals in the water. Leaching of zinc, probably from oxidation of zinc sulphides, is the only real concern from this adit.

The following characteristics of Bellekeno underground water have been firmly established:

- Consistent slightly alkaline pH values, between 7 and 8;
- No clear seasonal variations or trend in flow or drainage chemistry from the adit, implying that the impact of surface drainage to the underground workings is negligible;
- During periods of dewatering, flows from the mine vary significantly from day to day and from baseline conditions (Figure 4.1);
- During periods of dewatering and underground mining activity, total metals show a large degree of fluctuation, and in many cases have increased manifold during production activities as in the case of Aluminum, Arsenic, Cadmium, Copper, Iron, Lead, Nickel Silver and Zinc.
- Sulphate and total dissolved solids were removed from the list of tested parameters with the inception of WL QZ06-074, and as such little is known about the trends these parameters exhibit in recent years; however, for closure purposes, these parameters were reinstated into the sampling program in late 2010. Since this occurred, data show that there is no clear consistency in the levels of sulphate from the mine, nor is there a clear trend (Figure 4.2);
- Iron concentrations have generally remained low with occasional spikes in the levels over short periods, most notably during late 2008 and the first half of 2009, and again during late 2010. It has been suggested that exposure of high-iron content minerals may be responsible for this;

- Total metals results show an increase in adit metals during periods of underground activity. This is not likely reflective of the nature of water produced under static conditions;

Figure 4.1 Bellekeno 625 Adit Flows, Nov 2007 – Dec 2010

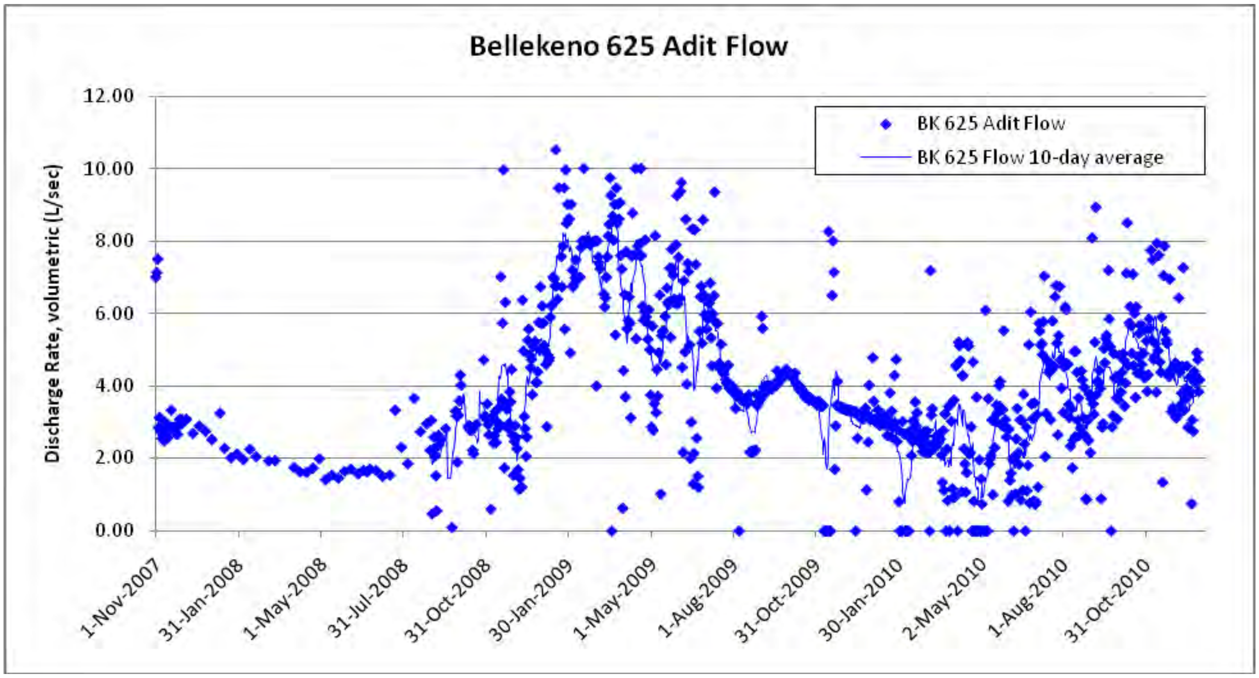
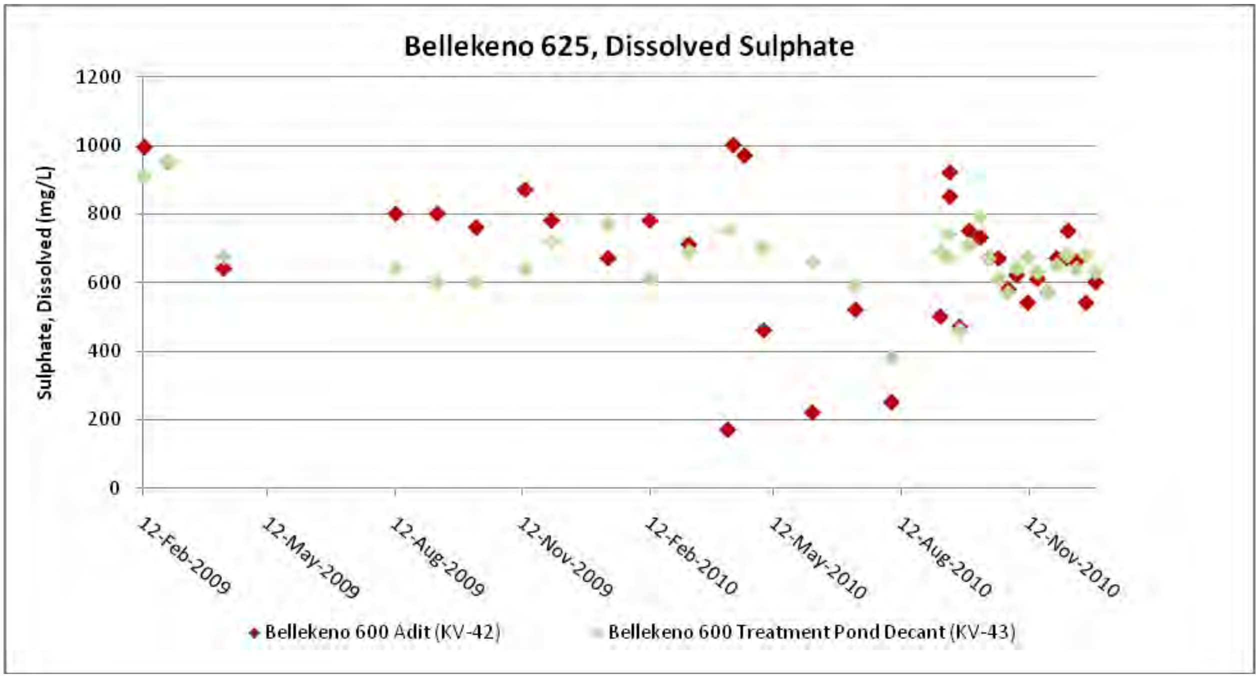


Figure 4.2 Bellekeno 625 Sulphate, Feb 2009 – Dec 2010



Conditions with respect to mine water have varied significantly since the period of advanced exploration dewatering was begun in December of 2008. Most importantly, mine water outflows have varied significantly from day to day, creating challenging circumstances for treatment. Water usage within the underground varies from day to day based on the needs of mine exploration and production. Significant variability has been seen in the levels of zinc in mine water, with a drop-off after exploration dewatering ceased (Figure 4.3), and an increase at the end of 2010.

In spite of the varying parameters within which treatment has operated, the system has performed well given its shortcomings before upgrades, and has performed excellently since upgrades were made (Figure 4.4).

As previously mentioned in the above water quality summary, as flow from the mine fluctuates, the water quality for given parameters also fluctuates. This is true for metals, turbidity (which is used as an indicator of total suspended solids) and ammonia.

Both turbidity and ammonia vary widely during fluctuations in flow (Figure 4.5 and

Figure 4.7). This is a direct result of the activities of underground mining. The use of bentonite in the drilling muds to enhance drill core recovery is a source of fine grained suspended solids in the mine adit discharge. There are two ponds for settling solid particles at Bellekeno 625; the first pond in sequence allows settling out of large particulate, while the second polishes the treated water before decanting. The system normally has sufficient residence time for treatment; however, very small particulate – such as bentonite – can bypass the system. This was a particular problem before the addition of a multimedia filter to the treatment system.

Concerns have been noted due to the use of ammonium nitrate in blasting for underground mining operations. This compound is use in explosives mixtures and contributes ammonia to the underground water circuit. Treatment has addressed this issue and operators closely monitor levels within the treatment inflows and outflows to assess treatment performance. To understand the potential impact to the receiving aquatic environment, analysis of the ionic composition of ammonia is carried out regularly. The major outcome of this analysis has been to determine that temperatures and pH levels are such that the problem species, NH_3, comprises only a small portion of the total ammonia. However, it should be noted that even at depressed temperatures, pH levels above 9 can cause ammonia to become toxic to aquatic organisms, and so it is important to closely monitor and regulate the treatment system pH. Further analysis is currently underway to assist in improving treatment efficacy.

Treatment of suspended solids and ammonia was variable during the period of time after underground activities were begun, but before the treatment site was outfitted for the types of issues that the mine water was expected to produce (Figure 4.6 and Figure 4.8). More recently, improvements have been seen with the upgrades.

Figure 4.3 Bellekeno 625 Adit Total Zinc Concentrations, Nov 2007 – Dec 2010

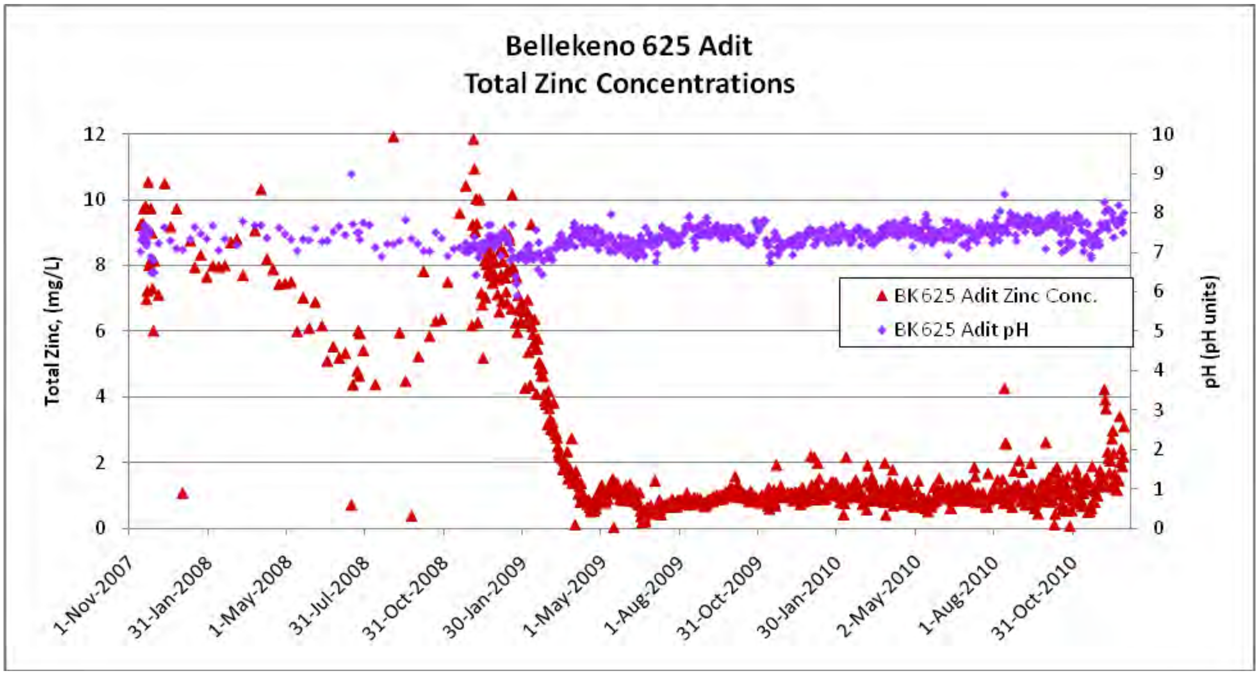


Figure 4.4 Bellekeno 625 Treated Total Zinc Concentrations, Nov 2007 – Dec 2010

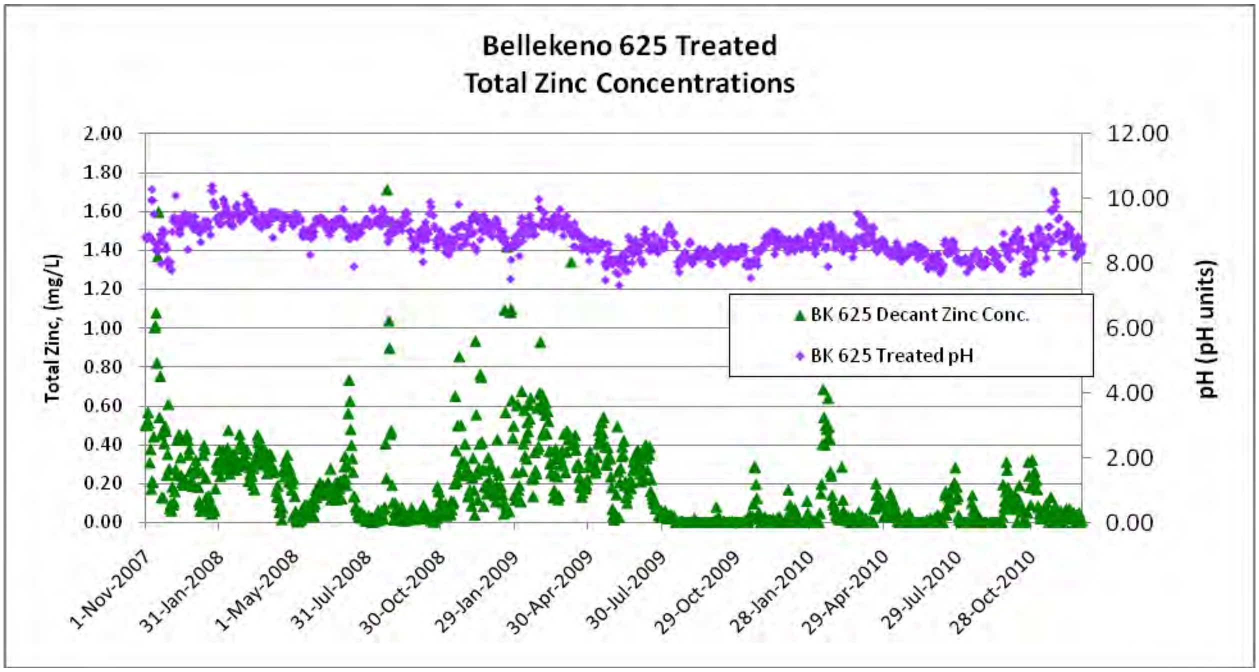


Figure 4.5 Bellekeno 625 Flow and Turbidity, Pre-Treatment

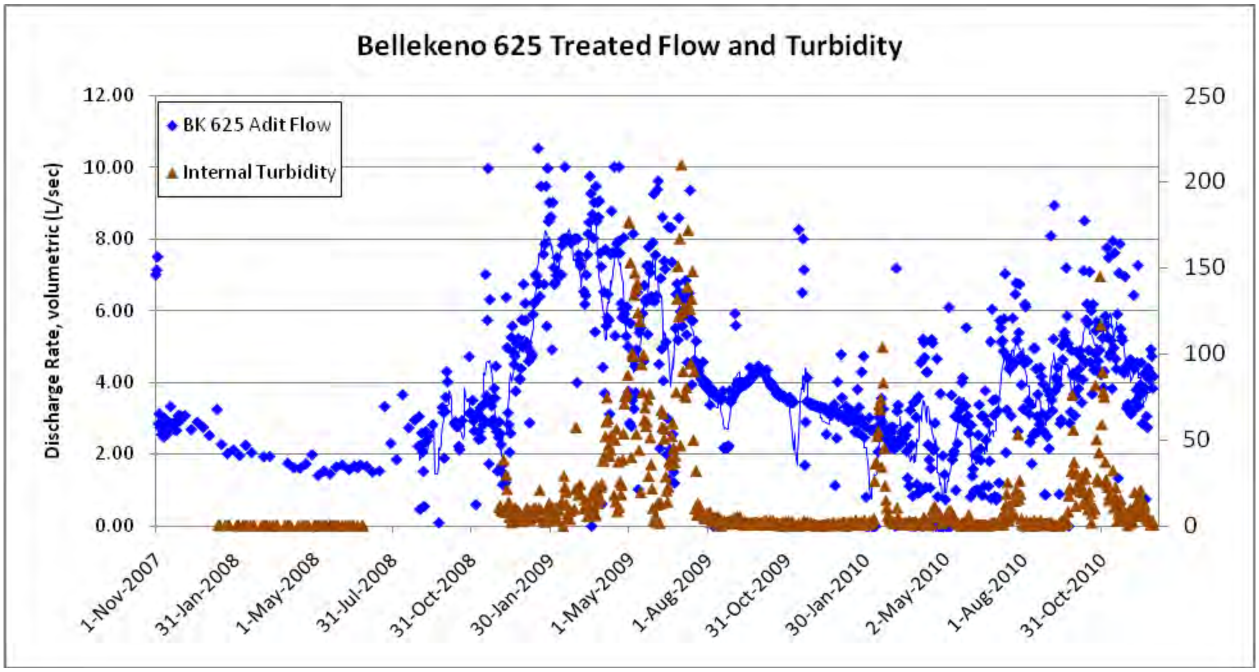


Figure 4.6 Bellekeno 625 Flow and Turbidity, Post-Treatment

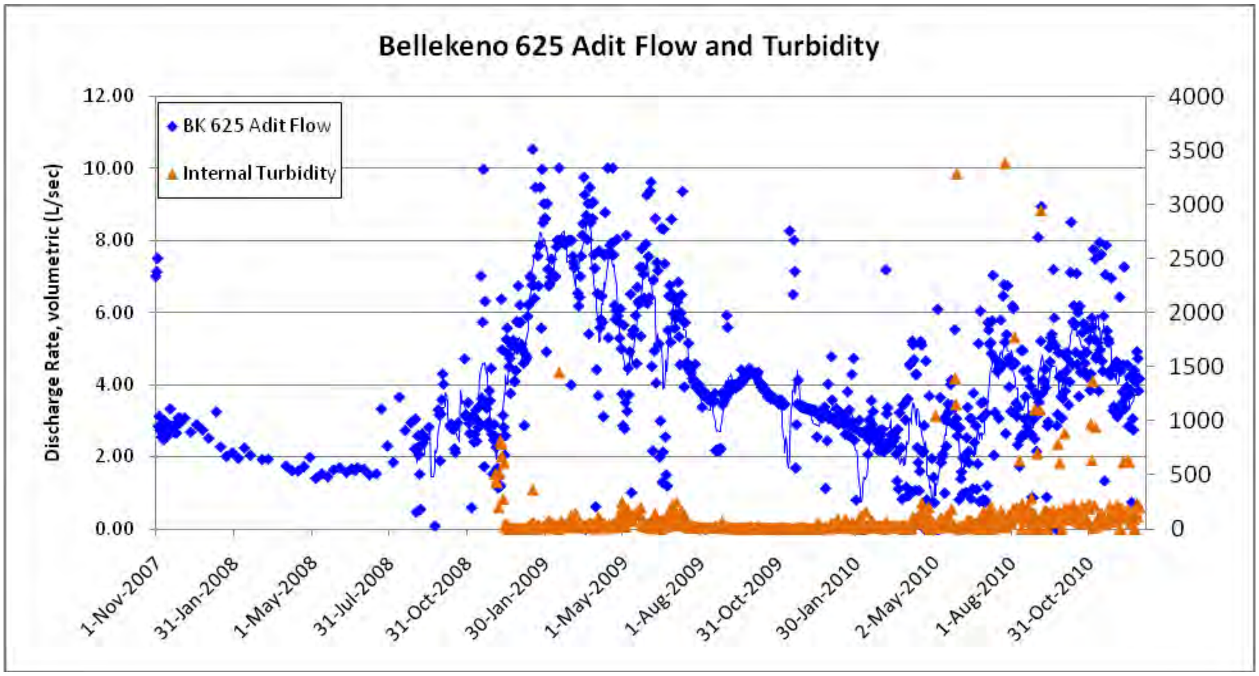


Figure 4.7 Bellekeno 625 Flow and Ammonia, Pre-Treatment

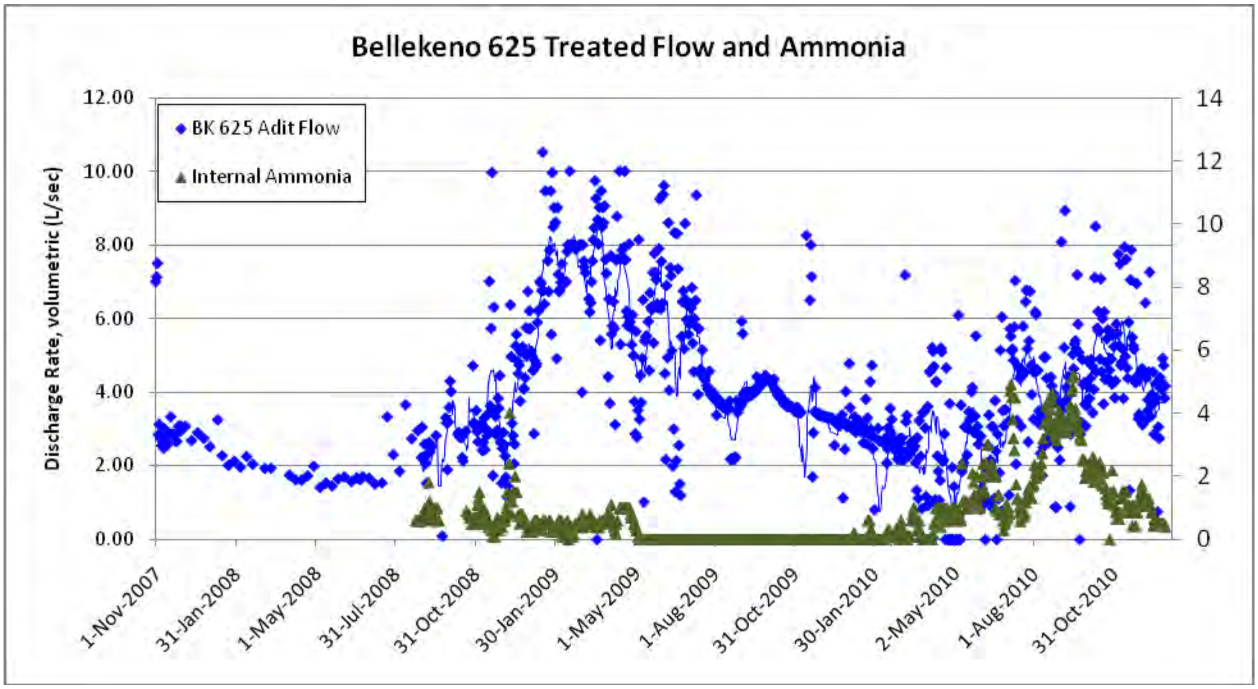
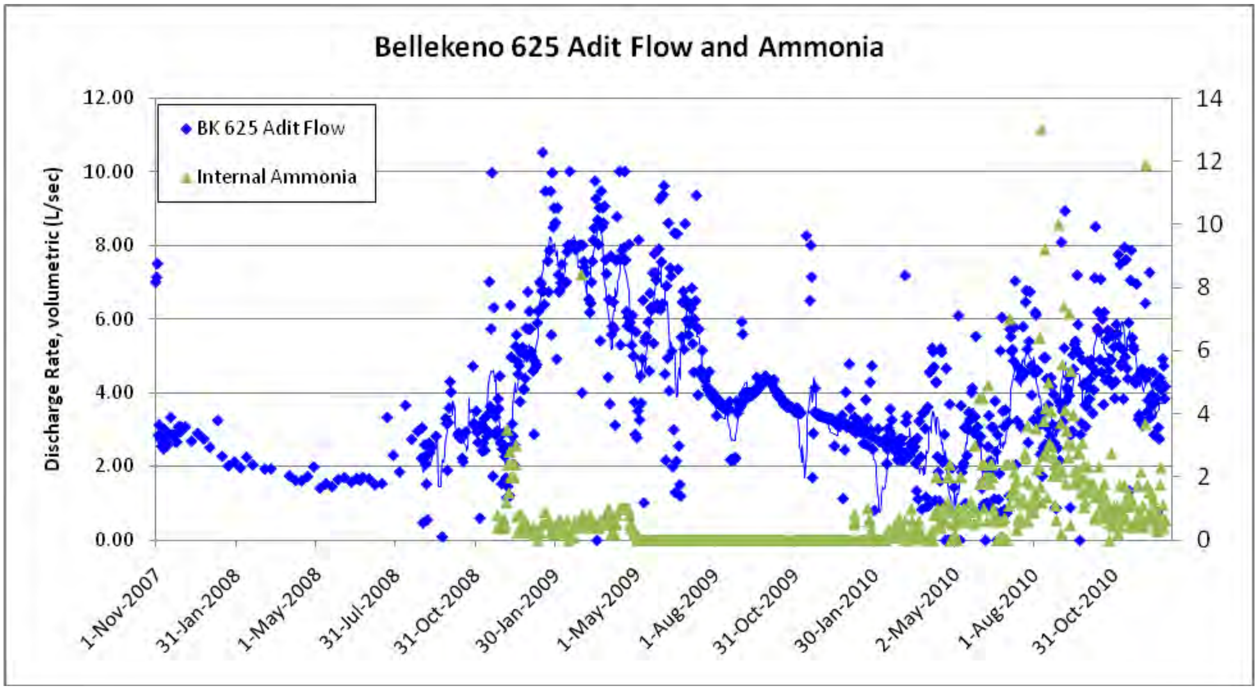


Figure 4.8 Bellekeno 625 Flow and Ammonia, Post-Treatment



4.2.1 Results and Discussion: Flame and Moth Mill Site

The Flame and Moth mill and sedimentation pond are located south of Christal Lake, and immediately north of Lightning Creek. The mill is situated such that any future discharges will enter the Christal Creek watershed. To-date, the mill has yet to produce a discharge to the receiving environment, and has proven to be a net consumer of water. As a result, there have been no impacts to Christal Creek from the Flame and Moth Mill. Over the course of 2011, measures will be implemented to discern the nature of mill water and drainage from the Dry Stack Tailings Facility (DSTF). The construction and placement of the DSTF was initiated in December 2010 during the commissioning of the mill.

4.2.2 Results and Discussion: Lightning Creek

Lightning Creek is within a narrow valley with a steep gradient flowing from the north side of Sourdough Hill into Duncan Creek, which drains into the Mayo River. Hope and Thunder Gulches flow into Lightning Creek within the bounds of the Keno Hill property. Discharge from the Bellekeno 625 Treatment Facility discharges to ground, before entering placer mining sedimentation ponds and mixing with this water before flowing into Lightning Creek. Lightning Creek has been the site of extensive placer mining upstream of Keno City and the Bellekeno mine development both historically and at the present time. The Lightning Creek drainage has also been affected by localized quartz mining activities; mine adit drainages from the former UKHM Bellekeno Mine and Keno 700 Adit report to the Lightning Creek drainage.

Placer mining has taken place on Lightning Creek and Thunder Gulch since at least the 1960s. It has a significant effect on water quality because of the sediment released during operations, and the potential for increase in metals discharge associated with the sediment. The extent to which Lightning Creek is impacted by placer mining on the main branch and tributary is not known, but it can be reasonably accepted that the natural water quality of this river has been altered as a result of placer mining.

The Lightning Creek watershed is largely impacted by the Keno 700 adit (and associated waste rock dump). 2010 zinc levels emanating from this adit are consistent with water quality over at least the last 10 years. Treatment is not carried at this site out due to a number of factors, not least of which is the site’s extremely remote location. Analysis of the data from the Keno 700 Adit shows high variability in seasonal flows, and a large margin of error in terms of the predicted impacts to Lightning Creek. The result is that the variability in the amount of metals contamination coming from Hope Gulch (and thus Keno 700 Adit) is greater than the magnitude of metals contamination from the current Bellekeno Mine.

It should be noted that the relative impacts of contaminants of concern in Hope and Thunder Gulches is not fully understood as a result of the impacts of placer mining activities and historical mining impacts on Thunder Gulch and the main branch of Lightning Creek. The results is that the relative impact of the Bellekeno mine cannot be discretely detected in measurements made in Lightning Creek. The treatment facility removes contaminants from Bellekeno 625 discharge effectively enough to be unable to discern a statistically significant impact to the creek. Moreover, the impact of Keno 700 adit discharge, placer mining operations, and the processes of attenuation are greater than the magnitude of measurable impact from Bellekeno 625. Ammonia is the only parameter which is produced solely from Bellekeno Mine operations, because of its origin in blasting.

Zinc concentrations at the background station on Lightning Creek (KV-37) are a small percentage of what they are downstream of mining impacts at station KV-38 (

Table 4.2[2]). Mine-related influences from Hope Gulch enter Lightning Creek just above KV-38. The primary source above KV-38 is the Keno 700 adit, which drains directly into Hope Gulch. At KV-38, zinc concentrations are more than four times (and in some years even greater) what they are at the background station upstream of Hope Gulch. Cadmium concentrations are also higher by more than ten times. At KV-41, cadmium concentrations fluctuate relative to the concentrations seen upstream at KV-38. The data suggest that cadmium is generally stable or decreasing between KV-38 and KV-41 (Table 4.2). Zinc is also comparable between the stations. This suggests that impacts from zinc and cadmium in Thunder Gulch between these two sites are minimal relative to the very large impact of Hope Gulch (and the Keno 700 Adit) on the overall chemistry in Lightning Creek.

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[2] In March 2008, high levels of cadmium and zinc were encountered during external testing at KV-37. The source of this level of contamination is not known. These data are greater than 3 standard deviations from the mean for both cadmium and zinc, and impact on the mean level of these contaminants for 2008 because of the small n (n=4) for these sample sets

Table 4.2 Change in TSS, zinc and cadmium concentrations at sites along Lightning Creek

Parameter	Year	KV-37	KV-38	KV-41	% change in conc. between KV-37 and KV-38	% change in conc. between KV-38 and KV-41
Zn, total	2004	0.008	0.051	0.040	538	-22
	2005	0.001	0.030	0.030	2900	0
	2006	0.006	0.025	0.021	353	-14
	2007	0.006	0.021	0.032	250	52
	2008[3]	0.005	0.026	0.043	478	65
	2009	0.001	0.025	0.026	1854	2
	2010	0.002	0.012	0.012	629	-5
Parameter	**Year**	**KV-37**	**KV-38**	**KV-41**		
Cd, total	2004	0.00001	0.00044	0.00051	4300	16
	2005	0.00001	0.00023	0.00021	2200	-9
	2006	0.00002	0.00023	0.00017	927	-27
	2007	0.00001	0.00016	0.00016	1500	0
	2008	0.00004	0.00022	0.00022	450	0
	2009	0.00002	0.00027	0.00024	1300	-8
	2010	0.00001	0.00015	0.00009	1031	-37
Parameter	**Year**	**KV-37**	**KV-38**	**KV-41**		
TSS	2004	5	5	20		
	2005	2	2	25		
	2006	6	4	8		
	2008	7	4	72		
	2009	4	5	76		
	2010	2	3	9		

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[3] 2008 dataset contains an outlier greater than 3 standard deviations from the mean which has been removed from analysis.

4.3 Groundwater Monitoring

Groundwater monitoring is a critical component of the Bellekeno water-resource-management program. The hydrologic connections between ground and surface waters mandate that the monitoring program for all water resources be closely linked. By acknowledging this close hydrologic connection, groundwater monitoring can provide critical support to the surface monitoring program. The results of the groundwater monitoring program are presented in Appendix C-2.

Groundwater quality monitoring is an integrated activity for obtaining and evaluating information on the physical, chemical, and biological characteristics of groundwater in relation to human health, aquifer conditions, and designated ground- and surface-water uses. In the case of the Bellekeno Project, this relates to the condition of groundwater within the Christal Creek and Lightning Creek watersheds, and the potential impacts to Keno City groundwater from activities relating to the Project, such as construction and use of the Dry Stack Tailings Facility. With accurate information, the current state of the project's groundwater resources can be assessed; water-resource protection, preservation, and abatement programs can be run more effectively; and trends in groundwater quality and the success of the management programs can be evaluated.

The full groundwater sampling program will commence after freshet 2011 when all groundwater wells are installed and the current wells already in place contain retrievable water. As of the end of 2010, the groundwater well installation work was being carried out. Cold weather operating conditions and frozen ground conditions inhibited the program. There was some success, with two wells being fully installed (see Appendix C-3 for results). The installation is expected to resume and be completed by April 2010, at which point the full sampling program will commence. At that time, well locations will be issued according to QZ09-092 Schedule B, Table 2.

4.4 Receiving Environment Study

A receiving environment study will be conducted in accordance with Clauses 75 through 78 of QZ09-092 and submitted to the Board by August 20th, 2012.

4.5 Flow and Level Monitoring

The flow and level monitoring program required under Clauses 37 through 40 of QZ09-092 had not been fully implemented as of the end of 2010. Over the course of winter 2010-2011, flow gauging stations and monitoring wells were established. Regular monitoring of these stations will begin as ground conditions permit, during Freshet 2011.

The results of the flow and level monitoring that were carried out during station installation are presented in Appendix D.

4.6 Meteorological Monitoring

A meteorological station has been received by AKHM, and will be deployed during spring 2011.

4.7 Water Balance Update

A Detailed Water Balance Report was submitted to the Board on February 20th, 2011, as per Clauses 69 through 73 of QZ09-092. The first update to the water balance model will occur at the end of the first water year, in 2012.

4.8 Sediment and Benthic Monitoring Program

The first sediment and benthic survey will be carried out during low flow of summer 2011. A sediment and benthic invertebrate characterization study will be conducted as per Clauses 47 through 49 of QZ09-092. Results of the study and interpretation will be included in the 2011 Annual Report.

4.9 Water Treatment Plant Performance Evaluation

As per Clause 57 of QZ09-092, a performance evaluation of the Bellekeno 625 Treatment Facility was conducted. The report covers the period between January 1, 2010 and December 31, 2010, and is attached as Appendix E.

4.10 Physical Inspections and Monitoring

A Physical Inspections and Reporting Plan was submitted to the Board on October 19th, 2010. The activities under this plan will commence in 2011 and be submitted to the Board in the 2011 Annual Report. The activities and processes described in the Plan adhere with Clauses 50, 51, 92, 93 and 94 of QZ09-092.

A physical inspection of underground mine structures was conducted in November 2010, in accordance with Clauses 52, 58 and 59 of QZ09-092 and Paragraph 14.1 of QML-009. At the time of the inspection, several major structures had not yet been constructed, including the

DSTF, mill pond, and water conveyance structures including pipelines and diversions. The report is attached as Appendix F.

4.11 Waste Rock Monitoring

Monthly waste rock monitoring described in Clause 53 of QZ09-092 will commence in May 2011 and be reported in the 2011 Annual Report, as per Clauses 60 and 61 of QZ09-092. Clause 53 describes monitoring of waste rock storage areas with respect to water management.

Underground waste rock characterization and the results of AML and non-AML screening are required under the Bellekeno Advanced Exploration Type B Water Licence QZ07-078 and Quartz Mining Licence QML-0009. These results can be found in the QZ07-078 2010 Annual Report.

4.12 Tailings Characterization

The Bellekeno mill is designed to produce a high and low pyrite tailings product. If an appreciable amount of pyrite is contained in the mill ore it would be substantially removed and report to the high zinc scavenger tailings stream which has been referred to as the high pyrite tailings product. No appreciable amount of pyrite has been encountered since the mill was commissioned and the mill is producing a single tailings product.

4.13 Hydrogeological Monitoring

A hydrogeological monitoring plan was submitted to the Board in November 2010, as per Clauses 81 through 84 of QZ09-092. Tracking of water volumes was initiated in December 2010 but there was insufficient information to include in this report. The results since commencement of the tracking will be submitted to the Board in the 2011 Annual Report, as per Clause 62 of QZ09-092.

5. DECOMMISSIONING AND RECLAMATION

No interim decommissioning and reclamation measures were carried out in 2010.

5.1 Bioreactor Design and Operation Plan

AKHM will submit to the Board a plan on the design and operation of the future Bellekeno bioreactor on or before August 20, 2011, as per Clauses 88 and 89 of QZ09-092.

ALEXCO KENO HILL MINING CORP.
QUARTZ MINING LICENCE QML-0009
2010 ANNUAL REPORT - RESUBMISSION
BELLEKENO MINE SITE
KENO HILL SILVER DISTRICT
YUKON

APPENDIX H

WRMP GEOENVIRONMENTAL INVESTIGATION

WASTE ROCK MANAGEMENT PLAN

FOR

WATER LICENCE APPLICATION &
MINING LAND USE APPROVAL AMENDMENT REQUEST

BELLEKENO ADVANCED UNDERGROUND
EXPLORATION & DEVELOPMENT
KENO HILL SILVER DISTRICT
YUKON

January 2008

Prepared by:

ACCESS CONSULTING GROUP

www.accessconsulting.ca

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1.0 INTRODUCTION

1.1 PURPOSE OF PLAN

This plan outlines practices for management of waste rock to be excavated during the proposed Bellekeno Advanced Underground Exploration and Development Program, to be undertaken commencing in 2008 by Alexco Resource Corp.

The plan is intended to ensure that appropriate management procedures are followed during excavation activities in order to minimize impacts of stored rock to land and water resources. Monitoring following excavation activities is intended to assess the effectiveness of the management measures, and to ensure that appropriate information is obtained by Alexco to assist in closure planning.

1.2 SCOPE OF PLAN

Aspects Included in this Plan are:

- Definition of rock categories based on potential for reactivity (specifically, acid generation and/or metal leaching);
- Estimation of quantities of each category to be excavated during the project;
- Operational categorization of excavated rock;
- Control measures as required to mitigate effects of potential acid generation and/or metal leaching;
- Monitoring activities after rock excavation; and
- Reporting of waste rock management activities.

Aspects not Included in this Plan are:

- Geotechnical design of waste rock storage areas (due to majority of material being used as road fill); and
- Closure and reclamation of rock storage areas –these aspects are addressed within the Water Licence Application & Mining Land Use Approval Amendment Request, section 2.8.2.

2.0 BACKGROUND INFORMATION

2.1 PROJECT OVERVIEW

The Keno Hill Mining District is located in the vicinity of the village of Keno City (63˚ 55'N, 135˚ 29'W), in central Yukon Territory, 354 km (by air) due north of Whitehorse. Access to the property is via a paved, two-lane highway from Whitehorse to Mayo (407 km) and an all-weather gravel road northeast from Mayo to Elsa (45 km); a total distance of 452 km. The property lies along the broad McQuesten River valley with three prominent hills to the south of the valley.

United Keno Hill Mines Ltd. and UKH Minerals Ltd. (collectively "UKHM") were the previous owners of the properties located on and around Galena Hill, Keno Hill and Sourdough Hill, collectively known as the Keno Hill Mining Property. In June 2005, Alexco Resource Corp. (Alexco) was selected to be the preferred purchaser of the UKHM assets, and in late 2007 the acquisition of UKHM assets was completed through Alexco's wholly owned subsidiary, Elsa Reclamation & Development Company Ltd. (ERDC).

2.1.1 Historical Overview

The Keno camp was first discovered in the early 1900's, and the various zones sporadically mined on both artesanal and mechanized scale since that time. Thus, the Keno Hill Camp and its numerous mineralized zones have undergone nearly a century of mining activity of various scales, producing Ag, Pb, and Zn in both concentrate and high grade ore form, and resulting in adits, waste rock dumps, and pits of various vintages throughout the area.

A series of NE trending veins crop out on the northern flank of Sourdough Hill where they are collectively referred to as the Bellekeno underground mine. The Bellekeno Mine was the last mine that UKHM developed. In August 1984, the Bellekeno 625 level (also referred to as 600 level) was collared, cross-cutting approximately 200 meters to the "48" vein. UKHM then drifted along the vein for approximately 975 meters. Over the years, the 625 level workings were connected to the 400 level and the 500 level was developed. In the mid-1990s, mechanized ramps were developed to reach the 700 and 800 levels and a mechanized ramp was driven up to the 500 level. The property was maintained until 2000, when it was abandoned and the lower Bellekeno workings allowed to flood.

2.1.2 Proposed Rock Excavation Activities

As a result of recent positive surface drilling results in the zone, Alexco is proposing development of an approximately 650 m long new Bellekeno East ramp, development of an approximately 450 m long drill lateral to allow for closer-spaced drilling of the resource, and rehabilitation of approximately 2300 m of historic underground workings in the zone.

Work is planned over a five-year period, with an estimated 118,500 tonnes of rock to be excavated during year 1, and 37,500 tonnes per year from years 2 to 5. Further details of the planned works are given in the Water Licence Application & Mining Land Use Approval Amendment Request.

2.2 ENVIRONMENTAL SETTING

A detailed description of the environmental conditions in the Keno Hill area was compiled and presented as part of the environmental assessment and licensing process associated with the UKHM 1996 Water Licence application including the *Site Characterization Report* (Access Mining Consultants Ltd., 1996).

A brief characterization of other environmental setting aspects of the Keno Hill Mines area is presented in Table 2-1.

Table 2 -1 Keno Hill Mines Setting Summary

Region:	Yukon
Topographic Map Sheets:	- NTS 105M/14 & 105M/13
Geographic Location Name Code:	- Keno City
Latitude:	- 63° 54' 32" N
Longitude:	- 135° 19’ 18” W
Drainage Region:	- Stewart River drainage region
Significant Watersheds:	- McQuesten River, Lightning Creek and Stewart River Watershed, Mayo River
Nearest Communities:	- Mayo, Keno City
Road Access:	- Silver Trail Highway
First Nations Traditional Territory:	- Nä-cho N’yak Dun
Surrounding Land Status:	- YG Land
Special Designations:	- None
Ecoregion:	- Yukon Plateau (North)
Study Area Elevation:	- 945 m asl (Above Sea Level)
Vegetation Communities:	- Northern boreal forests occupy lower slopes and valley bottoms spruce, pine and alder - Grasses and sedges, mosses occupy forest floor - Caribou, grizzly and black bear, moose, beaver, wolf, lynx, marten, wolverine, western tanager, magnolia warbler, white-throated sparrow, and bald eagle - Heavy moss and lichen growth resident as ground cover understory of shrub willow, - Open and forest fringe areas of willow and scrub birch, and various flowering plant species
Wildlife Species:	- Moose, dall sheep, grizzly and black bear, caribou; furbearers, small mammals - Various terrestrial bird species including ptarmigan, birds of prey, and migratory species, including various waterfowl species including snow geese; eagles, peregrine falcon, and gyrfalcon.
Fish Species:	- Bering and Beaufort Sea salmonids and freshwater species, including: Arctic grayling, Arctic char, lake trout, trout perch, lake whitefish, broad whitefish, burbot, inconnu, Arctic Cisco, Northern pike
Valued Environmental and Socio-economic Components (VC)	Water and sediment quality, aquatic resources (fish, plants invertebrates), wildlife (moose), soil and soil stability, heritage resources, human health and safety, trapping, traditional harvesting, tourist attraction.

2.3 GEOLOGY AND MAJOR ROCK TYPES AT BELLEKENO

The Keno Silver District is underlain by Yukon Group metasedimentary rocks, described in detail in the United Keno Hill Mines Limited Site Characterization Study (Access Mining Consultants, 1996).

The metasedimentary rocks have been divided locally into three formations; Upper Schist, Central Quartzite and Lower Schist. The Upper Schist (Hyland Group, pre-Cambrian to Cambrian age) consists of quartz-mica schist, quartzite, graphitic schist and minor limestone. The Central Quartzite (Keno Hill Quartzite, Mississippian age) contains thick-and thin-bedded quartzite, massive quartzite, graphitic phyllite, graphitic schist and calcareous schist. This unit is approximately 700 m (2300 ft) thick and hosts most of the major silver deposits in the area. The Lower Schist includes graphitic schist, argillite, thin-bedded quartzite, calcareous schist, phyllite, slate, sericite schist and minor thick-bedded quartzite. Conformable greenstone (altered diorite/gabbro) lenses and sills occur in places and narrow lamprophyre and quartz-feldspar porphyry dykes occur locally. Granite bodies have intruded the metasedimentary – greenstone package at several places to the north and south of the Keno Hill – Galena Hill area.

The Bellekeno zone is located approximately 1.5 km west of Keno City at Sourdough Hill, an area predominantly underlain by the Upper Schist above, and the mineralization-bearing Central Quartzite beneath. Near the schist-quartzite contact greenstone sills have been emplaced.

Principal rock units in approximate order of predominance at Bellekeno thus include quartzite, schist, and greenstone. Key aspects of these units and their respective sub-units are described in further detail below, as extracted from descriptions by Boyle (1962) in the 1996 Site Characterization Study.

<u>Quartzite (QTZT):</u> by far the most predominant unit at Bellekeno, quartzite may occur as either thinly bedded (inches to one foot or more thick) or thickly bedded (3 to 25 feet thick) sequences interbedded with assemblages of schist, argillite, and phyllite. Thin sections show that the quartzites consist essentially of quartz, with minor amounts of white mica (sericite) and, locally, carbonate minerals. Calcareous varieties contain up to 30 percent carbonate minerals (unit CQTZT). The black quartzites contain much carbonaceous material. Accessory minerals in all varieties include irregular patches and

specks of leucoxene, tourmaline, zircon, apatite, and pyrite. The pyrite occurs mainly as cubes, distorted cubes, and crystal groups.

Schist (SCH): The predominant varieties of schist found in the area include graphitic schists (GSCH), quartz sericite schist (SSCH), and chlorite schist (CHSCH).

The graphitic schists are black or greyish black, weather easily to a crumbly mass of small black schistose fragments, and occur in beds ranging from a fraction of an inch to a few feet in thickness and are everywhere intercalated with phyllites, slates, or thin- and thick-bedded quartzites. Under the microscope the principal mineral constituents are dense opaque carbonaceous matter (graphite), quartz, sericite, carbonate minerals, feldspar, chlorite, isotropic colloidal material, and numerous metacrysts of pyrite. In some sections microcrystalline pyrite is strung out along the graphitic laminae.

The quartz-sericite and chlorite schists are greenish or mottled greenish yellow, and like the graphitic schist, weather easily and form few prominent outcrops. In thin sections the quartz-sericite schists are seen to consist essentially of quartz and sericite with subordinate amounts of carbonate minerals and leucoxene. The main accessories are apatite, zircon, and tourmaline, and a few pyrite metacrysts are also present in most sections.

Greenstone (GNST): The greenstones are schistose, greyish green to dark green rocks that occur in conformable elongated lenses and sills, principally in the schistose formations and to a lesser extent in the quartzite formations. The greenstones weather differentially compared with the schists and quartzites and form prominent precipices and knobs. In most occurrences they are jointed and present a slabby appearance. In some bodies narrow shear zones, joints, and irregular fractures contain small lenses and masses of quartz, epidote, and calcite. In thin sections the greenstones present considerable variety both in mineral composition and texture. All are highly altered, and it is rare to find bodies with any original minerals. The principal minerals now present in the greenstones are hornblende, actinolite, saussurite (zoisite, epidote, albite, sericite, carbonate), plagioclase (oligoclase to andesine), chlorite, stilpnomelane, biotite, white mica (sericite), leucoxene, and carbonate minerals. Quartz, potash feldspar, illuminate, magnetite, limonite, and apatite are common minor constituents, and pyrite is present in some bodies. All these minerals are not necessarily found in any one greenstone mass.

Chlorite is generally present, commonly in considerable amounts, and biotite, sericite, quartz, and carbonate minerals are found in some bodies.

Vein (VN): Although strictly not a lithological unit, the economic mineralization in the Keno Silver District occurs in irregular shoots within vein systems developed along the vein faults, typically within the more brittle quartzite or greenstone units. Where the fault passes into soft phyllites or schists, the vein becomes less well defined and eventually dissipates. Two stages of vein mineralization are distinguished in the area. The first stage deposited quartz, pyrite, some arsenopyrite, trace gold and some sulphosalts in the vein faults. Following movement on the vein faults, a second stage of mineralization deposited siderite, galena, sphalerite, pyrite, freibergite, and pyrargyrite. Most of the economically mineable ore deposits to date have been stage two types. Supergene enrichment has occurred but is not believed to have been an important ore forming process. The oxidation zone extends from a few meters to 150 meters (10 - 500 feet) below surface. Within this zone, minerals such as limonite, pyrolusite, cerussite, and anglesite are common. Native silver, argentite and jarosite may occur locally. The principal gangue mineral is siderite.

3.0 ROCK CHARACTERIZATION

3.1 SUMMARY OF ROCK CHARACTERIZATION

Studies conducted throughout the Keno Hill camp and specifically within the Bellekeno zone, provide a foundation for correlating and understanding the weathering behaviour or 'geoenvironmental' tendencies of rock in the Keno area.

3.1.1 Study Overview

The geoenvironmental evaluation to support the Bellekeno Waste Rock Management Plan (WRMP) consisted of data analysis and integration of four specific data components: 1) site-wide studies on weathered rock (47 samples), 2) acid base accounting of 2006-2007 Bellekeno drill core (71 samples), 3) Bellekeno drillhole multi-element and lithology database (6478 samples), and 4) mineralogy and alteration logging data on acid base accounting samples.

An overall flowchart of data review and synthesis, and principal results are presented in Figure 3-1. Specifically, the study derived in the following components for the WRMP:

1) AML geochemical screening criteria;
2) estimated proportions AML and Non-AML material by rock type for Bellekeno; and
3) potential field criteria for differentiating AML and Non-AML rock during excavation activities.

Appendix 1 and 2 provide full details of the geoenvironmental evaluations.

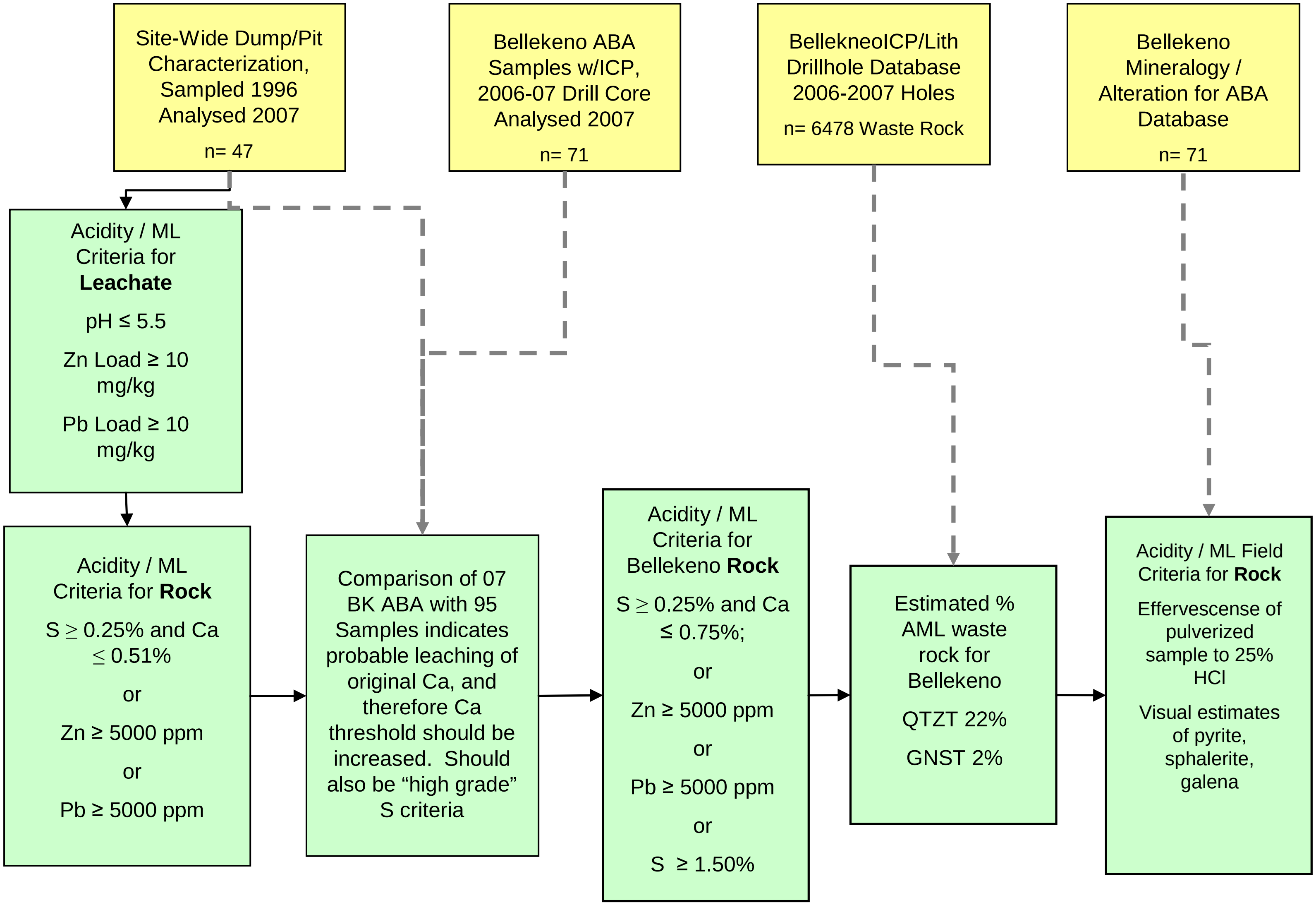
3.1.2 Summary of Results

3.1.2.1 AML Geochemical Screening Criteria

As discussed in Appendix 2, recommended geochemical screening criteria for identification of potentially AML Bellekeno rock are:

a) Ca% $\leq$ 0.75% and $S_{\text{via ICP}} \geq 0.25$ %
b) or $S_{\text{via ICP}} \geq 1.50$ %
c) or Pb $\geq$ 5000 ppm
d) or Zn $\geq$ 5000 ppm

Figure 3-1 – Bellekeno Waste Rock Characterization Study – Components and Key Results



3.1.2.2 Estimated Proportions of AML and Non-AML Rock for Bellekeno

Applying the geochemical screening criteria to the 6478-sample waste rock drillhole database, Table 3-1 shows the proportions of potentially AML rock are identified for each lithology.

Table 3-1 Proportions of Samples Filtered as Potentially AML in Bellekeno Waste Rock Drillhole Database

Lithology				
Description	**Code**	**Number of Samples in Database**	**# of Samples Screened as Potentially AML**	**% of Samples Screened as Potentially AML**
Chloritic Schist	CHSCH	222	27	**12%**
Calcareous Quartzite	CQTZT	505	54	**11%**
Greenstone	GNST	567	10	**2%**
Graphitic Schist	GSCH	870	562	**65%**
Quartzite	QTZT	3293	719	**22%**
Schist, Undifferentiated	SCH	775	299	**39%**
Sericitic Schist	SSCH	205	37	**18%**

3.1.2.3 Potential Field Screening Criteria

A potential “field filter” for identifying potentially AML rock is as follows:

a) Slight or no effervescence of pulverized sample with 25% HCl (eg. presence of none or only a few bubbles), and visual estimated pyrite >0.5%, or;

b) Any sample with one or more of the following:
   i. visual estimated sphalerite >0.75%
   ii. visual estimated galena >0.5%
   iii. visual estimated pyrite >2%
   iv. any Vein material not deemed to be in “Mineralized” category
   v. paste pH ≤ 6.0 (to be measured on any highly altered/oxidized samples)

The above evaluations may be readily and rapidly conducted at a site in a basic field office facility, using simple instruments and material such as a hand lens or binocular microscope, hydrochloric acid, distilled water, and pH meter.

As part of the development of a field program, the above criteria will require additional site testing, and be modified as required to ensure and good correlation with geochemistry across all lithological units, and consistency in application between personnel.

4.0 EXCAVATION PLAN

4.1 OVERVIEW OF PROPOSED WORK

Section 2.3 of the Water Licence Application & Mining Land Use Approval Amendment Request describes the proposed work program in detail. With respect to rock excavation activities, work will occur in two phases:

- Phase I (Year 1): New Bellekeno East decline development and rehabilitation of existing Bellekeno 625 underground workings, 108,500 t waste rock, 5,000 t mineralized rock, and 5,000 t Bellekeno 625 rehabilitation material expected; and
- Phase II (Years 2 to 5): Annual underground exploration, a total of 120,000 t waste rock and 10,000 t mineralized rock expected over the four year program.

4.2 ROCK MANAGEMENT CATEGORIES

Rock management categories include:

- Waste Rock, Potentially AML and non-AML: rock of non-economic grade, expected to be comprised of over 85% Central Quartzite unit (quartzite typically intercalated with minor amounts of schist), and less than 15% Greenstone. As presented below in section 4.3, the majority of the waste rock excavated is expected to be non-AML; rock will be field-classified as either potentially AML or Non-AML and stored in designated locations on site, in accordance with procedures discussed in section 4.4. In addition to waste rock excavated for new underground development, approximately 5,000 t of Bellekeno 625 rehabilitation material is anticipated, composed of loose and scaled rock mixed with wet fines. Although expected vary in geochemical composition, this material is considered potentially metal leaching due to its high water and fines content, so will be managed as an AML waste rock material.
- Mineralized Rock: rock of potential economic interest due to elevated Ag, Pb, and Zn mineralization, typically occurring as veins in quartzite. It is expected that several vein structures will be encountered during Phase I work on the Bellekeno East underground development, and subsequently in deeper levels of the Bellekeno main zone. Mineralized rock encountered during Phase I will be stockpiled on site for future processing, while it is expected that subsequently in Phase II, an up to 10,000 t bulk sample will be shipped offsite. Due to elevated

sulphide, Pb, and Zn content, all mineralized rock is considered to be potentially AML.

4.3 ESTIMATED ROCK QUANTITIES

Table 4-1 tabulates expected quantities of rock to be produced during Phase I and Phase II activities.

As previously discussed, the Greenstone unit has minimal potential for AML, with only 2 percent expected to be potentially reactive. An estimated 22 percent of the quartzite unit is potentially AML. Based on these proportions, during Phase I activities, 21,200 t of the 108,500 t of waste rock are anticipated to be characterized as potentially AML, along with 5,000 t of mineralized rock and 5,000 t of Bellekeno 625 rehabilitation material. During Phase II, 22,800 t of the 120,000 t waste rock is anticipated to be potentially AML.

It is important to note that these estimates of potentially AML waste rock tonnages should be considered as conservative and intended for planning purposes. This is because the approximately 6500 samples they are based on are centralized over the Bellekeno vein zone. Thus these samples are likely to contain elevated sulphides relative to much of the Bellekeno East adit which is situated off of the main mineralized structure.

4.4 ROCK MANAGEMENT DURING OPERATIONS

Table 4-2 summarizes key characteristics of the rock management categories: 1) Potentially AML Waste Rock, 2) Non-AML Waste Rock, and 3) Mineralized Rock. Included for each category are environmental characteristics, use and storage specifications, geochemical criteria, and field screening criteria.

Table 4-1   Tonnage Estimates and AML Classification

Basic Rock Type	Total estimated tonnage (metric tonnes)	Percentage of Unit Estimated to be characterized as potentially AML producing	Tonnes AML (approx)	Fate of AML Material	Tonnes non-AML (for general site construciton purposes)
Phase I New decline development & rehabilitation - year 1					
Greenstone	13,500	2%	300	Onek Pit	13,200
Quartzite	95,000	22%	20,900	Onek Pit	74,100
mineralized (vein) material	5,000	100%	5,000	temporary stockpile at 625	0
BK 625 Rehabilitation material	5,000	100%	5,000	temporary stockpile at 625	0
Total Phase I	**118,500**		**31,200**		**87,300**
Phase II Annual underground exploration - years 2 - 5*					
Greenstone	18,000	2%	400	Onek Pit	17,600
Quartzite	102,000	22%	22,400	Onek Pit	79,600
bulk sample mineralized rock	10,000	100%	10,000	shipped off site	0
Total -Phase II	**130,000**		**32,800**		**97,200**
Total Program	**248,500**		**64,000**		**184,500**

*30,000 tonnes per year for years 2-5 = 120,000 tonnes

4.4.1 Segregation

Consistent and reliable assignment of rock to the appropriate rock management category is a cornerstone in a successful waste rock management program. It is important to incorporate not only field-applicable screening criteria, but to plan a procedure that is well-integrated to the drill-blast-muck routine of an underground operation.

The proposed field screening criteria for assigning rock to a given management category is given in Table 4-2. These criteria will be further developed during the first quarter of 2008 and modified as required to ensure consistency in application, and good correlation with geochemistry across all lithological units. The field screening parameters correlate directly with assessment of the key AML factors: 1) sulphide content (via visual assessment of samples under magnification), 2) carbonate content (via degree of effervescence to HCl), and 3) galena and sphalerite content (via visual assessment of samples under magnification). In addition, a paste pH measurement will be conducted on any sample demonstrating a high degree of alteration or weathering, including presence of significant iron oxide.

Rock segregation will be conducted on the basis of an underground blast round, or the equivalent of 250 to 300 t.

Prior to a blast, the site geologist will outline lithological boundaries on the working face using spray paint, photograph. At least one chip sample will be taken of each lithological unit on the face.

Samples will be immediately assessed using the field screening parameters. The proportion of each lithology on the working face will be estimated based on the photograph; if required, the outlines may be digitized on computer and areas calculated (eg. in the case of a complex combination of lithologies on the working face).

Table 4-2 Rock Management Categories

	Potentially AML Waste Rock	**Non-AML Waste Rock**	**Mineralized Rock**
Environmental Characteristics	Potentially acid-generating and/or metal leaching	Non- acid-generating and non-metal leaching	Ag, Pb, and Zn grades of potential economic interest. Can contain materials with potential for net acidity and/or metal leaching
Uses and Storage	Not suitable for general construction purposes Storage on surface where water infiltration is minimized. Where there is potential for infiltration, provide for drainage collection. While some AML rock may be amenable to alternate storage options such as engineered blending or creating 'cells' of AML rock within non-AML material, detailed test work and design is required prior to implementing	May be used for general construction purposes	To be stockpiled for future metallurgical testing and/or processing Storage on surface where water infiltration is minimized. Where there is potential for infiltration, provide for drainage collection.
Geochemical Criteria	a) Ca% $\leq$ 0.75% and $S_{ICP} \geq 0.25$ % b) or $S_{ICP} \geq 1.50$ % c) or Pb $\geq$ 5000 ppm d) or Zn $\geq$ 5000 ppm	All waste rock samples not meeting AML criteria, namely: a) $S_{ICP} < 0.25$ % b) or Ca% > 0.75% and $S_{ICP} < 1.50$ % c) and Pb < 5000 ppm d) and Zn < 5000 ppm	a) Ag $\geq$ 100 ppm b) or Pb $\geq$ 10000 ppm c) or Zn $\geq$ 10000 ppm
Potential Field Screening Criteria	a) Slight or no effervescence of pulverized sample with 25% HCl (eg. presence of none or only a few bubbles), and visual estimated pyrite >0.5%, or; b) Any sample with one or more of the following: i. visual estimated sphalerite >0.75% ii. visual estimated galena >0.5% iii. visual estimated pyrite >2% iv. any Vein material not deemed to be in "Mineralized" category v. paste pH ≤ 6.0 (to be measured on any highly altered/oxidized samples)	All waste rock samples not meeting AML criteria, namely: a) Virtually no visible pyrite under magnification, or if some sulphides present: i. Steady effervescence of pulverized sample with 25% HCl (continuous stream of bubbles and visual estimated pyrite <2% b) and visual estimated sphalerite <0.75% c) and visual estimated galena <0.5%	Visual estimation of galena, sphalerite and sulphosalt minerals followed by confirmatory assay.

Based on the field screening parameters, each sample will be ranked as AML or Non-AML. This ranking will be weighted by the proportion of the given lithology on the working face, to arrive at an overall proportion of AML and Non-AML material on the working face.

If overall 30% or more of the working face is deemed as AML, the geologist shall assign the given blast round as “AML”, and the rock will be stored in an area designated for AML rock. Some discretionary decisions on the part of the geologist are necessary; for example in a case of 20% of the working face comprised of a highly sulphidic zone in an otherwise benign working face, the geologist may opt to designate the entire round as AML due to the high concentration of AML potential in a small zone. Alternatively, in certain situations it may be feasible to segregate the sulphidic material from the benign rock and thus allow the majority of the blast round to be managed as non-AML rock.

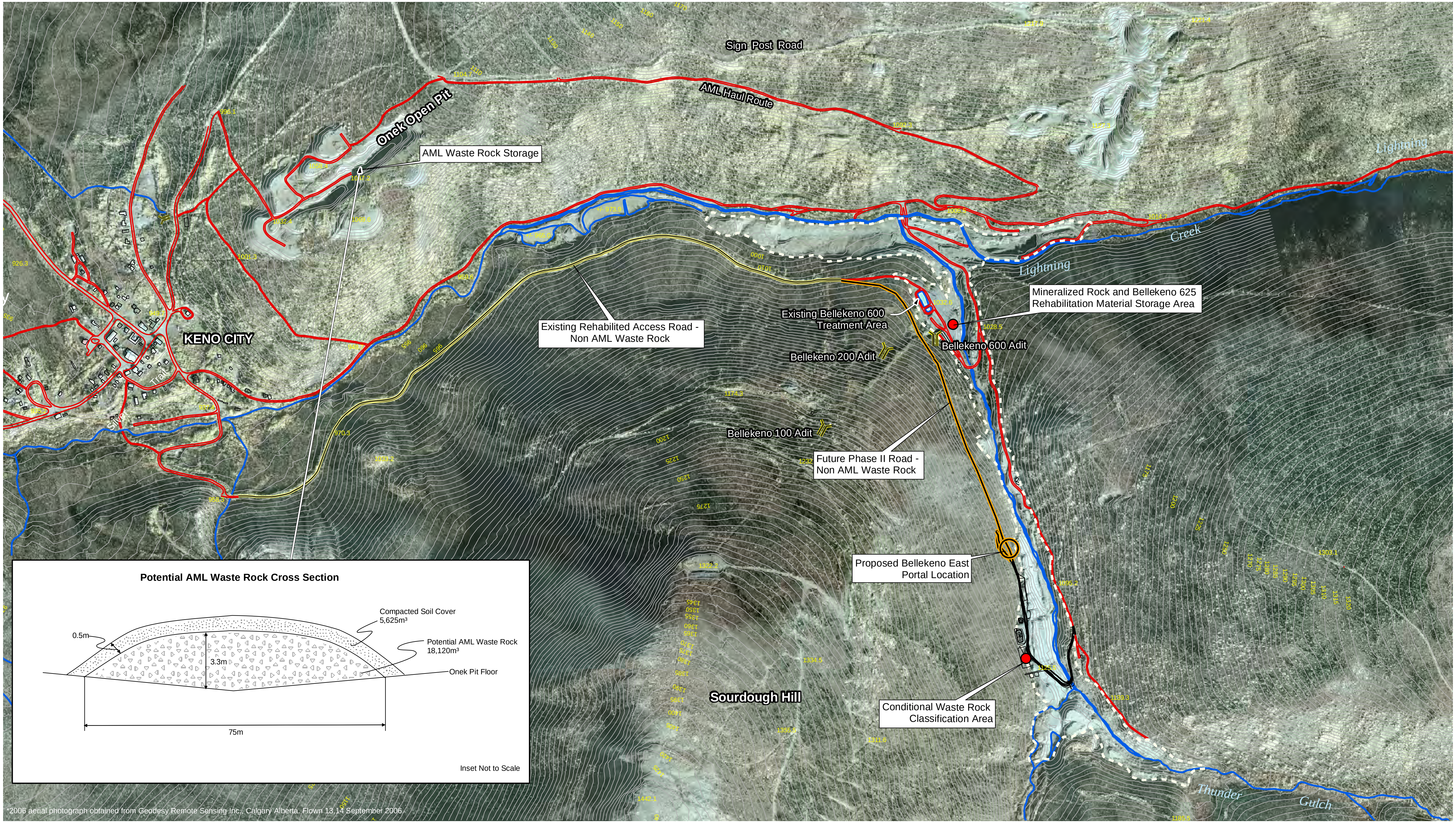
A sample evaluation form will be completed for each blast round, which will clearly show the AML rankings of each sample, and the overall rock categorization of the blast round.

4.4.2 Placement and Use

General criteria for storage and use of the various rock management categories are given in Table 4-2. Storage area locations are shown in Figure 4-1, with further detail given in the following sections. Note that closure considerations for the rock storage areas are discussed in section 2.8.2 of the Water Licence Application & Mining Land Use Approval Amendment Request.

4.4.2.1 Potentially AML Waste Rock

As shown in Table 4-1, up to 44,000 t of potentially AML waste rock and 5,000 t of Bellekeno 625 rehabilitation material is expected to be generated during the five year program. Potentially AML rock from the Bellekeno East development will be transported to the abandoned Onek pit and placed in a designated area of the pit not hydraulically connected to mine drainage and underlying workings (see Figure 4-1). The Bellekeno 625 rehabilitation material will be stored adjacent to mineralized rock at the 625 adit zone, as discussed in section 4.4.2.3.



*2006 aerial photograph obtained from Geodesy Remote Sensing Inc., Calgary Alberta. Flown 13,14 September 2006.

N

1:10,000
(when plotted on 11x17 inch sheet)

0 100 200 400 600 m

Legend

- Adit
- Proposed Portal Location
- Proposed Road
- Existing Rehabilitated Haul Road
- Public Road
- Exploration roads
- Contour
- Surface water (actual and potential)
- Placer Mining Area

ALEXCO RESOURCE CORP.

WATER LICENCE APPLICATION & MINING LAND USE
APPROVAL AMENDMENT REQUEST

BELLEKENO WASTE ROCK
MANAGEMENT AREAS

Drawn By: HD	Date: December 2007	**FIGURE 4-1**
Checked by: NS/DC	File: File: D:\Project\AllProjects\ALEX-05-01\gis\mxd\UKHM\Bellekeno_UG_WUL_MLU_Dec07\WRMP\Fig4_1_WasteRockArea.mxd	

Material taken to Onek pit will be end dumped. As shown in Figure 4-1, final closure considers contouring and placement of a 0.5 m thick compacted soil cover over this storage area to minimize infiltration.

4.4.2.2 Non-AML Waste Rock

The estimated 184,500 t of non-AML waste rock to be generated during the entire five year program is suitable for general construction purposes, and as such will be used for: 1) construction of surface work platforms for support facilities, 2) construction of the Phase II access road to Bellekeno East, and 3) rehabilitation of the Power Line road along the south slope of the Lightning Creek valley (see Figure 4-1).

4.4.2.3 Mineralized Rock

The estimated 5,000 t of mineralized rock expected during Phase I development of the Bellekeno East development will be stored on site in a designated stockpile at the 625 portal area for future processing. The estimated 5,000 t of waste rock excavated during Bellekeno 625 rehabilitation activities will be stored in this same area.

This rock storage area will be lined to allow for collection of drainage. The site will first be prepared by grading the surface divert any water flow around the storage area. An HDPE liner will be placed, followed by a 0.3 m protective sand and gravel overliner/drainage layer to permit rock dumping by truck or loader. The downgradient edge of the liner will be left exposed to allow for collection of any drainage for conveyance to the Bellekeno 625 treatment facility.

5.0 MONITORING AND REPORTING

5.1 MONITORING

Monitoring in both the excavated areas and the rock storage areas forms an integral and vital component of any waste rock management program, as it determines the effectiveness of the management measures, and provides valuable information for waste rock management strategies of future developments.

The monitoring program planned for Bellekeno is intended to fulfill the following objectives:

- characterize the rock encountered during excavation (through underground mapping and geochemistry);
- confirm the geochemical character of the various designated rock storage areas (through multi-element and acid-base accounting analysis); and
- establish ongoing surveillance for weathering of rock (through inspections and drainage monitoring and establishment of lysimeters).

5.1.1 Excavated Areas

Geological mapping will be conducted on all adits and crosscuts to document lithological units and major structural features. At least one geochemical sample will be taken for each 10 lineal metres of underground working for analysis by routine multi-element ICP, including sulphur. On average, one acid base accounting sample will be taken for each 40 lineal metres of workings.

5.1.2 Rock Storage Areas

5.1.2.1 Geochemical Characterization

The various rock storage areas will be geochemically characterized to derive an overall composition of the material stored.

Both multi-element ICP analyses (including sulphur) and acid base accounting analyses will be conducted, typically through a combination of surface sampling, test pits and drilling of the stored material. Sampling density will be greater in potentially AML storage areas, with an average of one ICP analysis per 500 tonnes, and one ABA analysis per 2000 tonnes. In non-AML rock areas, a lower sample density is appropriate, in the order of one ICP sample per 1000 tonnes, and one confirmatory ABA per 10,000 tonnes.

It is important to note that the above criteria represent a high sample density. This is in large part driven by the fact that the proposed work is the first rock excavation activity in the district under Alexco's management, and as such it is important to conduct relatively detailed monitoring to develop a sound information base for decision-making and enhancements to future waste rock management strategies. As the understanding increases, such a high sample density will likely no longer be justified.

5.1.2.2 Ongoing Surveillance

Waste rock storage areas will be monitored and inspected monthly from May through October for:

- stability (such as settling and excessive erosion)
- evidence of sulphide oxidation (such as snow melt areas, presence of oxidation products)
- occurrence of drainage or seeps from rock storage areas. If drainage is noted, flow volume will be estimated and basic field parameters of pH and conductivity recorded. More detailed monitoring will be initiated as required and based on specific results if field monitoring results indicate: i) pH significantly declining between measurements or dropping below 7.0, and/or ii) conductivity showing a significant increasing trend or conductivity above 2000 µS/cm.

One geomembrane-lined lysimeter ≥5m^3 will be installed in both AML and non-AML storage areas. Drainage volume will be monitored, with field parameters (pH and conductivity) measured on a monthly basis from May to October. Providing there is sufficient quantity of drainage, a full suite of water quality analyses will be conducted at least twice per year.

5.2 REPORTING

Documentation of waste rock management activities including operational field screening and segregation and ongoing monitoring will be compiled and included in the annual mining land use report.

6.0 REFERENCES

Access Mining Consultants Ltd., June 3, 1996. *United Keno Hill Mines Limited, Report No. UKH/96/01, Site Characterization.*

Altura Environmental Consulting, 2008a. *Review of Historic Keno Static Test Data to Define ARD/ML – Controlling and Correlating Factors.* Prepared for Access Consulting Group.

Altura Environmental Consulting, 2008b. *Geoenvironmental Rock Characterization, Bellekeno Zone.* Prepared for Access Consulting Group.

WASTE ROCK MANAGEMENT PLAN

FOR

WATER LICENCE APPLICATION &
MINING LAND USE APPROVAL AMENDMENT REQUEST

BELLEKENO ADVANCED UNDERGROUND
EXPLORATION & DEVELOPMENT
KENO HILL SILVER DISTRICT
YUKON

APPENDIX 1

REVIEW OF HISTORIC KENO STATIC TEST DATA TO DEFINE ARD/ML CONTROLLING & CORRELATING FACTORS

Altura Environmental Consulting

To: Dan Cornett, Rob McIntyre, Access Consulting Group

From: Diane Lister

Date: January 4, 2008

RE: **Review of Historic Keno Static Test Data to Define ARD/ML – Controlling and Correlating Factors**

1. *Scope*

Review static test data of 1996 Keno Hill site-wide waste rock characterization sampling that were analysed in 2006 for standard ICP multi-elements, acid base accounting, and leachate extraction. Objective is to identify any geochemical parameters that are controlling or are strongly correlated with generation of net acidity and/or Zn or Pb leaching. This purpose of this review is to provide a tool to assist in prediction of ARD/ML in any future development in the Keno Hill area, and to provide a basis for field classification of potentially reactive material during excavation.

2. *Background*

This study examines analyses carried out on 47 samples of dump and pit material from various sites at the Keno Hill Mine site in central Yukon. Sampling was conducted in 1996 using a backhoe to collect approximately 60 kg of rock per site, and duplicated locations sampled in 1995 and reported in the Keno Hill Mines Site Characterization Study (Access Mining Consultants, 1996).

Samples were labelled and sealed in plastic pails, and stored until 2006, when they were retrieved, their condition verified, and submitted to ALS Chemex Labs in North Vancouver for analysis.

Samples were analysed via 27-element ICP-AES with aqua regia digestion (including sulphur), modified acid-base accounting including sulphate via both sodium carbonate leach and HCl digestion, total inorganic carbon via coulometer, and paste pH at a 1:1 solids to water ratio. Twenty-four hour shake flask extractions were performed using a 3:1 water to solids ratio, and the filtrate analysed for pH and 33-element dissolved metals.

Data were compiled and for statistical analysis purposes, results above or below limits of detection were assigned a value equal to the respective detection limit. Metal loading in mg/kg was calculated by multiplying leachate concentration by the dilution factor of 3:1, and percent extraction by dividing the metal loading by its respective solids concentration in ppm. The zone and lithology of each sample was added to the database, based on the sample description information.

3. *Details of Analysis*

This review consisted of four phases:

i) conduct general review of data and generate of statistical summaries;

ii) identify reactive samples in dataset;

iii) analyse data for trends and database criteria that appear to control or correlate strongly with sample reactivity, and that can be used to isolate reactive samples; and

iv) check of criteria against the database to determine over or under-filtering.

3.1. *Summary of Data*

All analytical data is given in Appendix A1, and comprehensive summary statistics in Appendix A2. Statistics for acid base accounting and selected trace element parameters are given in Tables 1 and 2.

Samples show a range of geochemical characteristics, with paste pH ranging from 3.2 to 8.7, and a median value of 7.2. Total sulphur concentrations in solids is low to moderately elevated, ranging from detection-limit levels of 0.01% to 1.93%, with a median of 0.17%. Carbonate tends to be somewhat low with a median of 0.5%, with samples typically ranging up to 4 percent. Two outliers of 6.7% and 13.4%CO_2 occur in samples of quartzite and vein respectively. Neutralization potential (NP) tends to be low (median of 7 kg $CaCO_3$/t), with samples of more than 0.5% CO_2 tending to have NP's in 10 to 70 kg $CaCO_3$/t range.

An average of 40% of sulphur is in the soluble form of sulphate. Other elements with elevated soluble fraction are Ca, Co, Cd, Mn, and Zn (averaging 11%, 11%, 9%, 6% and 5% respectively).

Appendix A6 shows statistical box and whisker plots of key ABA and ICP parameters by lithology. The various lithologies show similar tendencies, however schist lithology samples tend to show the lowest paste pH in the dataset, while quartzite samples show the broadest range of sulphur (<0.01 to 2 percent).

Table 1. Summary Statistics of of Acid Base Accounting Parameters

Statistic	Paste pH	Fizz Rating	Total S (%)	Sulphate via Carbonate Leach (%)	Sulphate via HCl Leach (%)	Sulphide, Calculated (%)	Maximum Potential Acidity ($kgCaCO_3/t$)	Neutralization Potential ($kgCaCO_3/t$)	Net Neutralization Potential ($kgCaCO_3/t$)	Neutralization Potential : Maximum Potential Acidity	Inorganic Carbon (%)	CO_2, Calculated (%)
No. of observations	47	47	47	47	47	47	47	47	47	47	47	47
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	3.2	1	0.01	0.01	0.01	0.01	0.3	-5.0	-43.0	-0.26	0.05	0.20
Maximum	8.7	3	1.93	0.45	0.46	1.48	60.3	308.0	285.0	54.40	3.64	13.40
Median	7.2	1	0.17	0.02	0.03	0.06	5.3	7.0	3.0	2.29	0.06	0.20
Mean	6.9	1.6	0.35	0.11	0.11	0.24	10.9	23.9	13.0	4.93	0.33	1.23
Standard deviation	1.2	0.8	0.46	0.14	0.13	0.36	14.3	48.1	43.9	8.51	0.60	2.22
Geometric mean	6.8	1.5	0.12	0.04	0.05	0.08	3.7				0.13	0.52
Geometric standard deviation	1.2	1.6	5.16	4.29	4.31	5.04	5.2				3.42	3.31

Table 2. Summary Statistics of Selected Trace Element Parameters

	Trace Element Composition via ICP-AES						
Statistic	Ag (ppm)	As (ppm)	Ca (%)	Fe (%)	Pb (ppm)	S (%)	Zn (ppm)
No. of observations	47	47	47	47	47	47	47
No. of missing values	0	0	0	0	0	0	0
Minimum	1	5	0.02	0.45	18	0.01	57
Maximum	100	944	8.32	14.05	10000	2.00	10000
Median	20	85	0.15	2.81	896	0.17	489
Mean	37	219	0.64	3.37	2653	0.36	1731
Standard deviation (n)	39	248	1.36	2.66	3500	0.48	2655
Geometric mean	13	107	0.17	2.62	753	0.12	642
Geometric standard deviation	6	4	5.05	2.06	7	5.27	4

	Soluble Loading (mg product in leachate per kilogram of solid)						
Statistic	Ag	As	Ca	Fe	Pb	S[1]	Zn
No. of observations	47	47	47	47	47	47	47
No. of missing values	0	0	0	0	0	0	0
Minimum	0.00003	0.0004	2.2	0.090	0.001	0.01	0.012
Maximum	0.014	4.2	1644	1854	48.9	0.45	867
Median	0.0005	0.003	96.9	0.09	0.11	0.02	0.32
Mean	0.0017	0.117	380.3	60.9	1.99	0.11	70.6
Standard deviation (n)	0.003	0.609	521.8	280.7	7.17	0.14	209.0
Geometric mean	0.001	0.006	77.2	0.29	0.12	0.04	0.9
Geometric standard deviation	4.923	6.272	8.6	12.5	13.73	4.29	26.2

	Soluble Fraction (mass ratio of product product in leachate : product in solid, as percent)						
Statistic	Ag	As	Ca	Fe	Pb	S[1]	Zn
No. of observations	47	47	47	47	47	47	47
No. of missing values	0	0	0	0	0	0	0
Minimum	0.0%	0.0%	0.0%	0.0%	0.0%	3%	0.0%
Maximum	0.8%	5.1%	50.6%	10.1%	1.5%	100%	87.7%
Median	0.0%	0.0%	4.5%	0.0%	0.0%	33%	0.0%
Mean	0.0%	0.1%	11.2%	0.4%	0.1%	44%	5.2%
Standard deviation (n)	0.1%	0.7%	13.7%	1.6%	0.2%	29%	14.6%
Geometric mean	0.0%	0.0%	4.5%	0.0%	0.0%	34%	0.1%
Geometric standard deviation	5.44	8.92	4.85	15.02	7.01	226	18.05

[1] Calculated based on total sulphur via Leco furnace and sulphate via carbonate leach extraction.

3.2. Identifying Reactive Samples in Dataset

The leachate extraction dataset was examined to determine levels of leachate pH, Zn loading and Pb loading that serve to divide the “reactive” (those generating net acidity and/or Pb or Zn leaching) from non-reactive samples. Frequency distribution curves (histograms and cumulative distributions) were utilized.

Net Acidity. A leachate pH criteria ≤ 5.5 is selected to differentiate those samples generating net acidity. Histogram and cumulative distribution plots for leachate pH are shown in Figure 1. As seen, two very distinct populations are present: i) 5 acidic samples ranging in pH from 2.61 to 3.78; and ii) 41 weakly acidic to weakly alkaline samples ranging in pH from 5.74 to 7.87. Only one sample, at pH 4.99, lies between the two groups. A pH value of 5.5 isolates the larger, essentially non-reactive group, and conservatively assigns any between-population pH results to the acidic category.

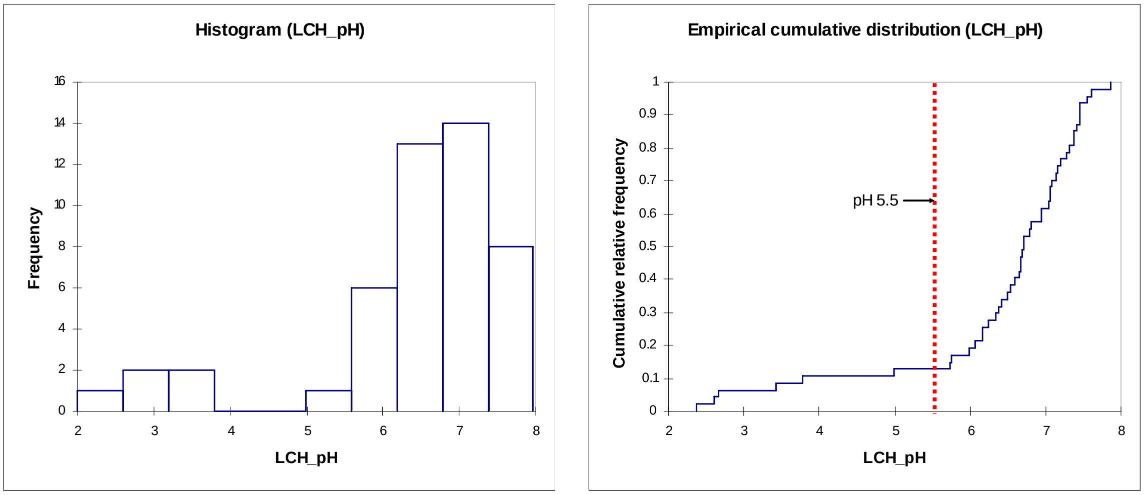


Figure 1. Frequency Distribution of Leachate pH and Selected Criteria

Metal Leaching. Criteria of 10 mg/kg Zn and 3 mg/kg Pb were selected based on the logarithmic distribution plots shown in Figures 2 and 3. For Pb, a horizontal inflection between $10^{0.087}$ and $10^{0.511}$ (1 to 3 mg/kg Pb) indicates a division between populations. Hence a 3 mg/kg Pb value would better serve to differentiate the lesser from the elevated loadings. In the case of Zn, the cumulative distribution curve demonstrates more uniform population than that of Pb, but nonetheless with a plateau in the cumulative curve between $10^{0.498}$ and $10^{1.044}$ (3 and 11 mg/kg Zn). Thus a value of 10 mg/kg Zn is selected distinguishes the elevated loadings in the dataset.

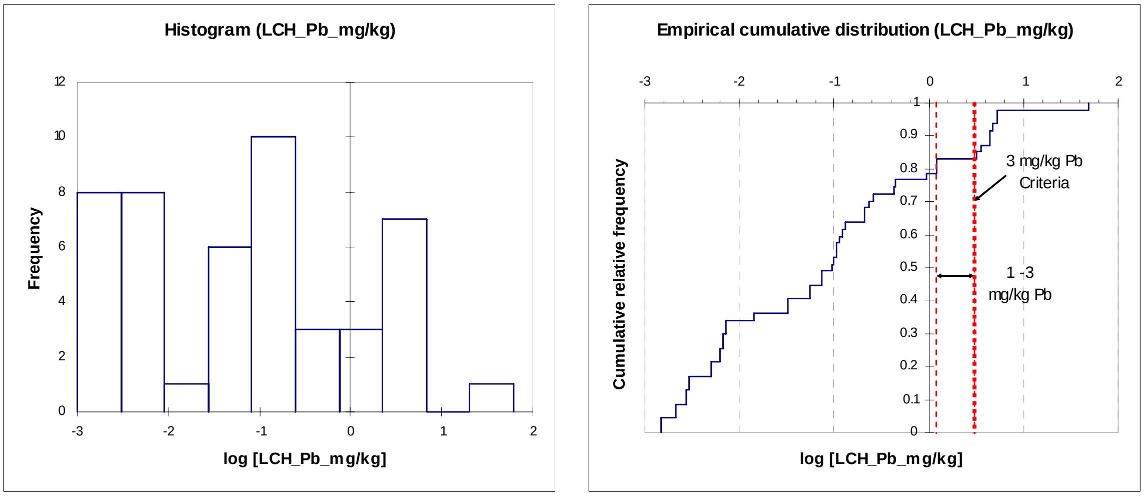


Figure 2. Frequency Distribution of Pb Loading and Selected Criteria

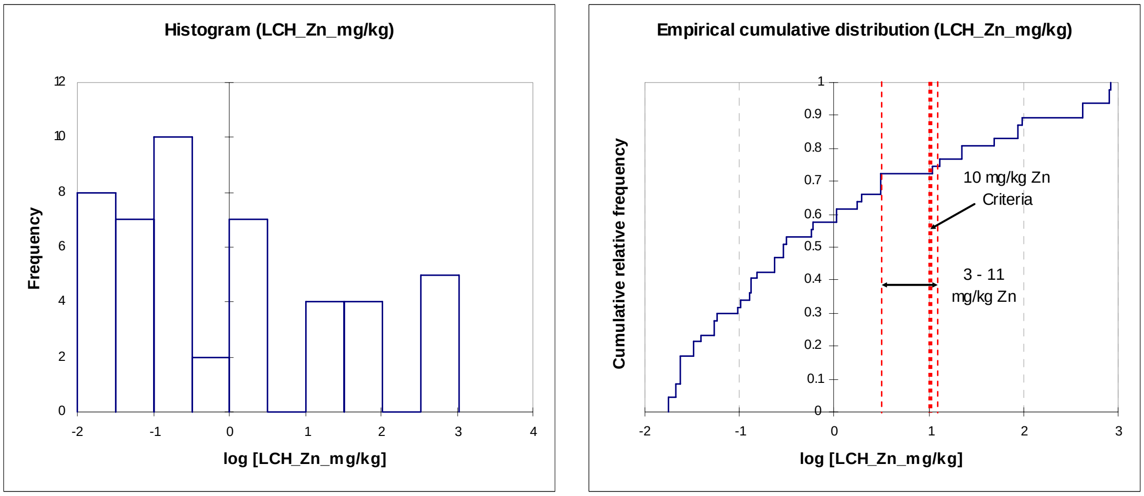


Figure 3. Frequency Distribution of Zn Loading and Selected Criteria

Tables 3 and 4 summarize the breakdown of reactive samples by rock type, and by zones sampled.

Of the 47 samples, 17 (36%) meet one or more of the "reactive" criteria, with 6 of the 17 being net acidic, 13 zinc-leaching, and 8 lead-leaching. The quartzite units sampled showed the highest proportion of reactive samples (46%), followed by mixed quartzite and schist (40%), and vein (25%). Pit wall samples appear to store less soluble products, (none of the pit wall samples were reactive), likely a function of the more exposed environment relative to a waste rock dump with limited infiltration and transport of solutes.

Table 3. Summary of 2006 Leachate Extraction Results by Major Rock Type

						Leachate Extraction Characteristics (# of Samples)		
Zone	Database Code	Total # of Samples	# Non-Reactive	# Reactive	% of Samples Reactive	Leachate pH ≤ 5.5	Zn load ≥ 10 mg/kg	Pb Load ≥ 3 mg/kg
All		47	30	17	36%	6	13	8
Mixed Quartzite & Schist	02	5	3	2	40%	1	2	1
Schist	10	10	8	2	20%	1	2	0
Quartzite	20	26	14	12	46%	4	8	6
Greenstone	30	1	1	0	0%	0	0	0
Vein	40	4	3	1	25%	0	1	1
Unspecified	01	1	1	0	0%	0	0	0

Table 4. Summary of 2006 Leachate Extraction Results by Zone

						Leachate Extraction Characteristics (# of Samples)		
Zone	Sample Type	Total # of Samples	# Non-Reactive	# Reactive	% of Samples Reactive	Leachate pH ≤ 5.5	Zn load ≥ 10 mg/kg	Pb Load ≥ 3 mg/kg
All		47	30	17	36%	6	13	8
Bellekeno Adit	Dump	1	1	0	0%	0	0	0
Bermingham Pit	Pit Wall	6	6	0	0%	0	0	0
Bermingham Pit	Dump	6	5	1	17%	0	1	1
Calumet 1-15 Pit	Pit Wall	2	2	0	0%	0	0	0
Calumet 1-15 Pit	Dump	3	0	3	100%	0	0	3
Dixie Adit	Dump	3	0	3	100%	3	3	0
Galkeno 900	Unspecified	1	0	1	100%	1	1	0
Hector Adit	Dump	3	0	3	100%	0	3	1
Hector Pit	Dump	1	0	1	100%	0	0	1
Husky SW	Dump	1	0	1	100%	1	1	0
Keno 700 Adit	Dump	2	2	0	0%	0	0	0
Miller Pit	Dump	1	1	0	0%	0	0	0
ONEK pit	Pit Wall	1	1	0	0%	0	0	0
ONEK pit	Dump	4	4	0	0%	0	0	0
Ruby Adit	Dump	3	3	1	33%	0	1	1
SIME 35 pit	Pit Wall	2	2	0	0%	0	0	0
SIME 4&6 pit	Dump	1	1	0	0%	0	0	0
SIME 4 pit	Pit Wall	1	1	0	0%	0	0	0
SIME 6 pit	Pit Wall	2	2	0	0%	0	0	0
Silver King Pit	Dump	1	0	1	100%	1	1	0
Townsite Adit	Dump	2	0	2	100%	0	2	1
UN Adit	Dump	1	1	0	0%	0	0	0

3.3. Key Controlling and Correlating Factors for Sample Reactivity

Parameters which are either readily available in an exploration database, or are easily measured in the field were examined to identify any factors potentially controlling net acidity and/or metal dissolution. Based on the information provided with the 47 samples for this review, these 'eligible' parameters include multi-element analyses via ICP, and the sample's 'fizz' rating (effervescence reaction of sample to dilute hydrochloric acid). Of this suite, the examination then focussed on those parameters which either demonstrate high mobility in the leachate extraction tests (specificially Ca, Cd, Co, Mg, and Zn) or are obviously anomalously elevated in the rock (Pb and Zn).

Key findings are summarized in the following text and illustrated by graphs.

As shown in Table 2, Ca showed the highest water soluble fraction during the leachate extraction tests relative to its ICP value in the rock, with a median calculated percent extraction of 4.5% (average of 11%). Values ranged from less than 1 to just over 50%. Other elements demonstrating a lesser, but notable water-soluble fraction were Cd, Co, Mg, and Zn (see Table 2 for Zn, and Appendix A4 for remaining elements).

The six samples yielding acidic leachate demonstrate a relatively wide range of sulphur values (0.28% to 1.25%), indicating a relatively low sulphur "cutoff" value under certain conditions. As is commonly observed in other deposits, calcium appears to influence the manifestation of net acidity – in the case of the Keno Hill samples the extraction data indicates that samples with leachate pH less than 3 show between 44 to 50% of total Ca in soluble form. Samples with leachate pH between 3.4 and 6.6 show intermediate values. Thus, it is likely that dissolution of Ca is occurring in response to localized acid generating reactions.

When Ca and S geochemistry of the 47 samples is plotted on a simple x-y graph, all samples with leachate pH less than 5.5 fall within a quadrant defined by S > 0.25% and Ca < 0.51% (see Figure 4), demonstrating that for this dataset, this criteria pair serves as a 'net acidity' threshold.

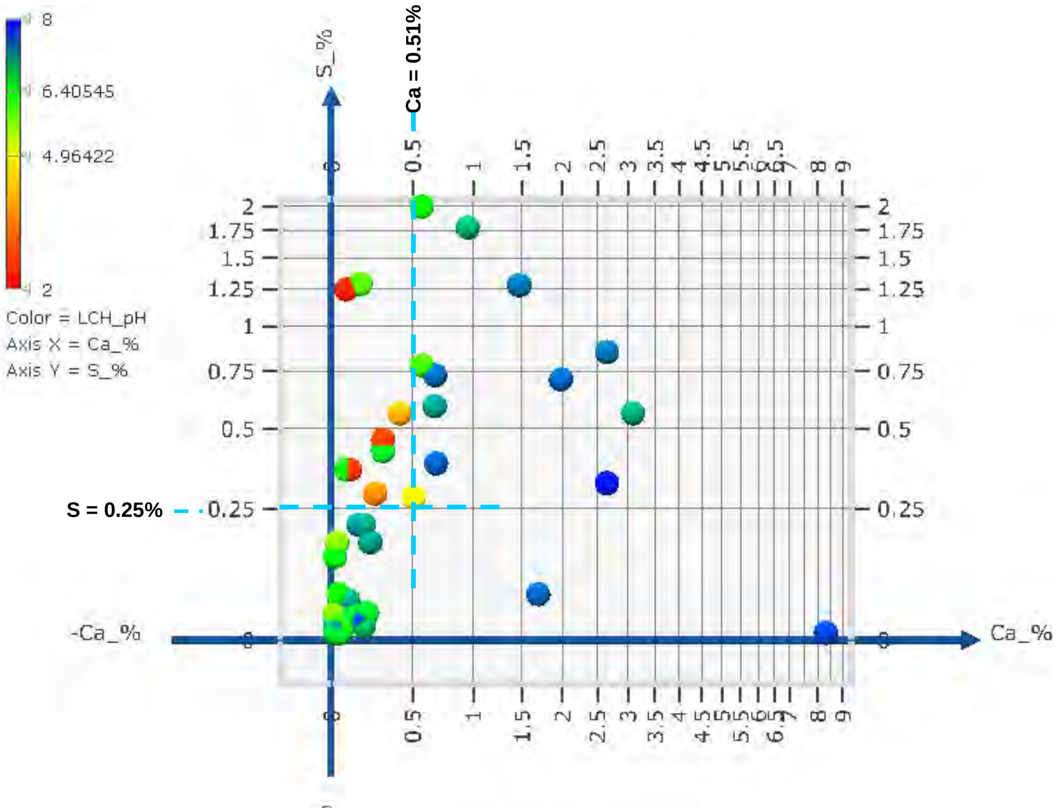


Figure 4. Ca vs. S in rock analyses. Note that low pH leachate samples (shown as yellow, orange and red data points) are clustered in a quadrant defined by S > 0.25% and Ca < 0.51%.

The mobility of Zn appears to be controlled by two mechanisms, as shown in Figures 5 and 6:

i) due to the increased mobility of Zn with decreasing pH, many of the samples with elevated Zn loading also fall within the 'net acidity' quadrant defined by S > 0.25% and Ca < 0.51%. Thus, most samples with net acidity also demonstrate elevated Zn dissolution;

ii) samples with anomalous Zn in the rock geochemistry (eg. > 5000 ppm Zn) tend to show elevated dissolution of Zn.

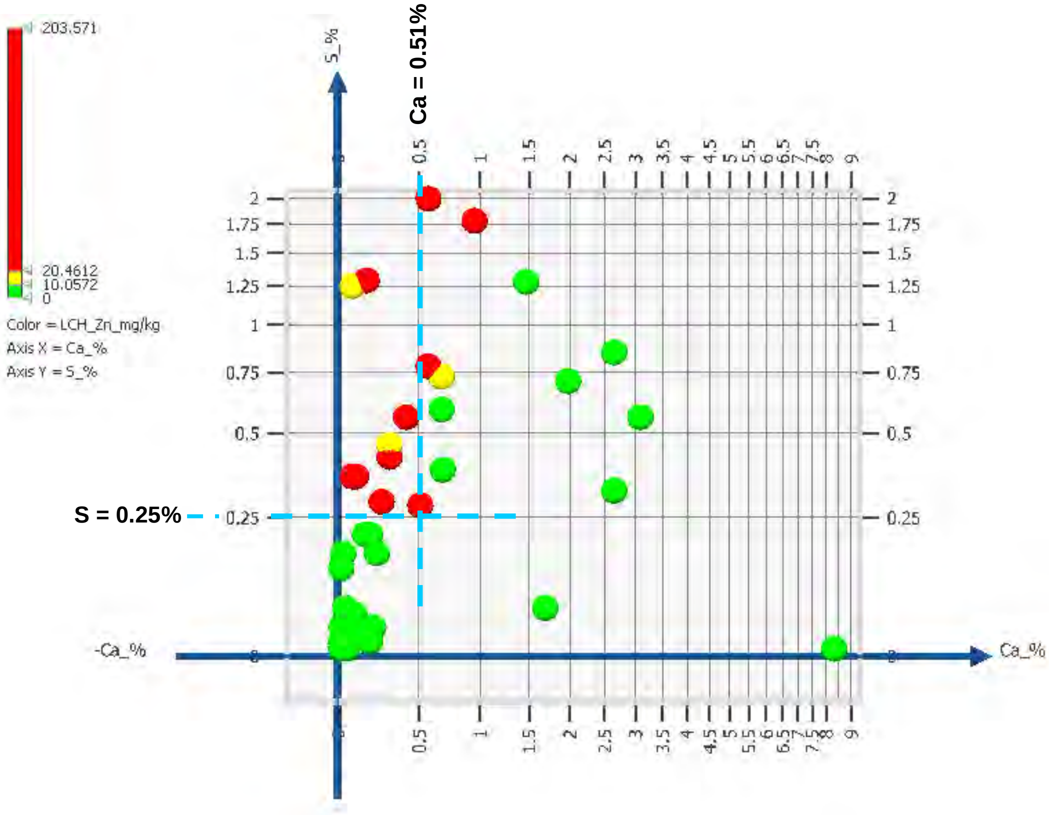
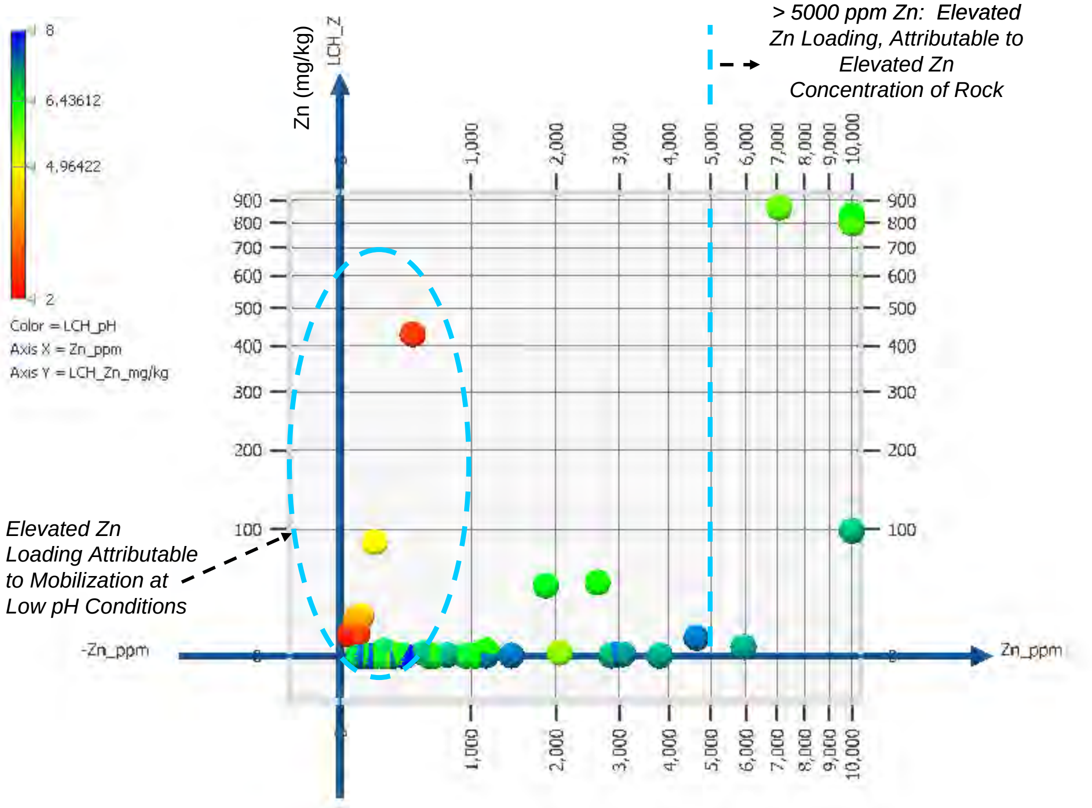


Figure 5. Ca vs. S in rock analyses. Note that many of the 13 elevated Zn loading samples (shown as yellow and red data points) are within the same quadrant occupied by the low leachate pH samples; see also Figure 4.



> 5000 ppm Zn: Elevated Zn Loading, Attributable to Elevated Zn Concentration of Rock

Elevated Zn Loading Attributable to Mobilization at Low pH Conditions

Figure 6. Zn in rock vs. Zn dissolution. Note the two apparent mechanisms for Zn dissolution: 1) low pH conditions (as shown by the red, yellow and orange data points), and 2) elevated Zn in rock.

Occurrences of elevated Pb dissolution is less frequent in the dataset than that of Zn (8 of the 47 samples showing ≥3 mg/kg) and appears to be purely a function of concentration of Pb in the rock, as shown in Figure 7. A threshold of 5000 ppm appears to segregate the samples with dissolution ≥3 mg/kg. Due to solubility constraints Pb dissolution occurs only at neutral to alkaline pH conditions.

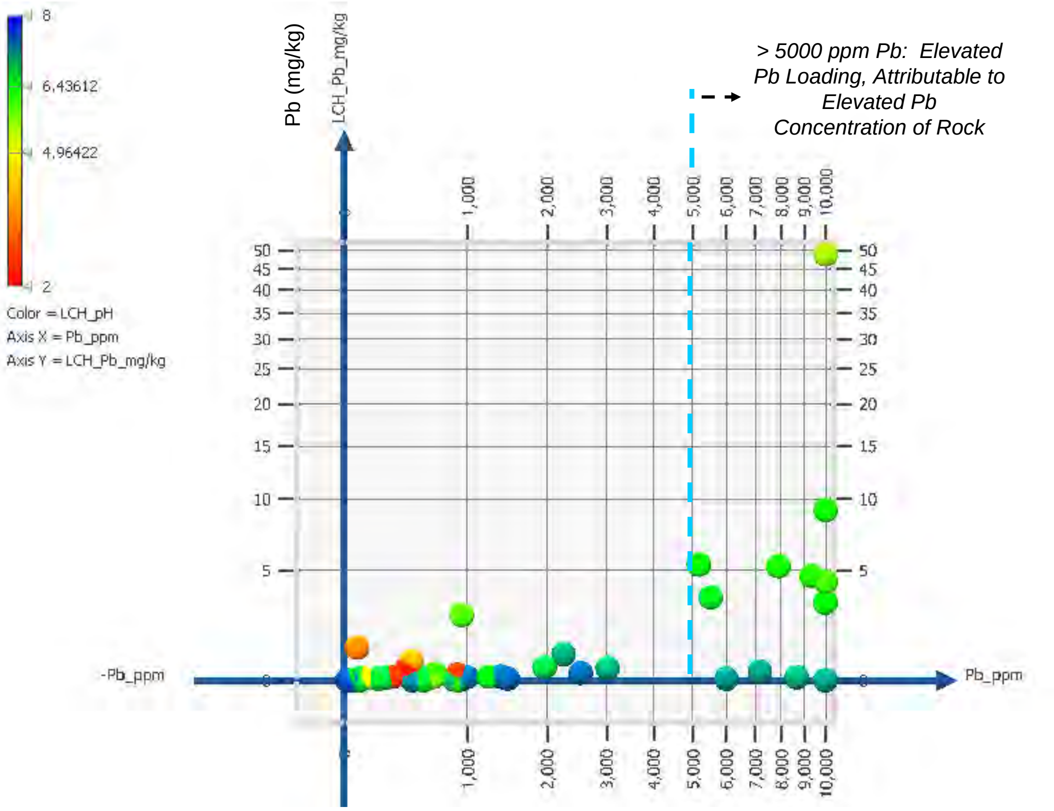


Figure 7. Pb in rock vs. Pb dissolution. Note that elevated Pb dissolution (≥ 3 mg/kg) appears to be largely a function of Pb concentration in rock. Also note the very low Pb dissolution under acidic conditions..

Based on the above graphics, the criteria of $S_{\text{via ICP}}$ ≥ 0.25% and Ca ≤ 0.51% was selected for identifying samples with net acidity ± metal leaching. Criteria of Pb ≥ 5000 ppm and Zn ≥ 5000 ppm were selected for segregation of samples showing elevated Pb and Zn solubility.

The above screening criteria were applied singly and then in combination to the 47-sample dataset to assess the degree of success in: i) isolating the reactive samples, and ii) minimizing "dilution" by non-reactive samples (in other words, minimizing the inclusion of any non-reactive samples in the samples isolated).

Results of the filtering are summarized in Table 5. When all three of the above criteria are applied to the 47-sample database, 20 samples are isolated, including 16 of the 17 reactive samples and 4 non-reactive samples. Only one marginally reactive sample showing 11 mg/kg Zn dissolution, 4640 ppm Zn, 0.73 %S, and leachate pH of 7.4 reports to the non-reactive category. In a waste rock segregation scenario, the occasional inclusion of a rock demonstrating marginally elevated Zn loading with no net acidity is acceptable as it is unlikely to have a significant effect on overall drainage water quality from a waste rock pile. Conversely, this filtering also shows that 13% of the non-reactive samples in the dataset are grouped by this filtering.

Similar results are obtained when substituting a Fizz Rating of <3 in place of ICP Calcium ≤ 0.51% – the reactive samples are filtered identically, however 'dilution' by non-reactive samples increases to 20%. Nonetheless, these results indicate Fizz Rating to be a potential screening parameter, which is of interest as a field screening tool for segregating rock during active mining.

Table 5. Summary of Results of Filter Criteria Trials, 2006 Leachate Extraction Analyses (selected criteria in bold)

	Criteria for Reactive Sample	# Samples	S% ≥ 0.25% *and* Ca ≤ 0.51%	S% ≥ 0.25% *and* Fizz Rating < 3	Pb ≥ 5000 ppm	Zn ≥ 5000 ppm	**S% ≥ 0.25%** *and* **Ca% ≤ 0.51%** *or* **Pb ≥ 5000 ppm** *or* **Zn ≥ 5000 ppm**	**S% ≥ 0.25%** *and* **Fizz Rating < 3** *or* **Pb ≥ 5000 ppm** *or* **Zn ≥ 5000 ppm**
Total # Samples		47	9	12	12	17	**20**	**22**
Leachate pH	< 5	6	6	6	0	0	**6**	**6**
Zn Loading (mg/kg)	> 10	13	9	10	4	7	**12**	**12**
Pb Loading (mg/kg)	> 3	8	2	3	8	7	**8**	**8**
# of Samples Meeting any one Criteria		17	9	10	8	10	**16**	**16**
# of Samples Not Meeting any of Above Criteria		30	0	2	4	7	**4**	**6**
% of Low Leachate pH samples isolated			100%	100%	0%	0%	**100%**	**100%**
% of anomalous Zn load samples isolated			69%	77%	31%	54%	**92%**	**92%**
% of anomalous Pb samples isolated			25%	38%	100%	88%	**100%**	**100%**
% of Reactive Samples Isolated			53%	59%	47%	59%	**94%**	**94%**
% of Non-Reactive Samples Included			0%	7%	13%	23%	**13%**	**20%**

4. *Key Conclusions*

- In the 47-sample leachate extraction database examined, net acidic samples are defined as those yielding a leachate pH ≤5.5. Metal leaching samples are defined as those with Zn loading ≥10 mg/kg, and/or Pb loading ≥3 mg/kg. Any sample meeting at least one of these three conditions is defined as "reactive".

- As observed in section 7 of the 1996 Characterization Study, it is important to note that most samples were taken from adit dump waste rock pile samples, and thus tend to be comprised of material in close proximity to mineralization. Samples from open pit waste piles, comprised of a greater amount of rock further from the vein systems, are less sulphidic and show less evidence of acidity and metal solubilization.

- Of the 47 samples, 17 (36%) meet one or more of the "reactive" criteria, with 6 of the 17 being net acidic, 13 zinc-leaching, and 8 lead-leaching. The quartzite units sampled showed the highest proportion of reactive samples (46%), followed by mixed quartzite and schist (40%), and vein (25%). Pit wall samples appear to store less soluble products, (none of the pit wall samples were reactive), likely a function of the more exposed environment relative to a waste rock dump with limited infiltration and transport of solutes.

- An average of 40% of sulphur is in the soluble form of sulphate, as indicated by an average SO4:Total S ratio of 0.4 for the 47 samples. Other elements with elevated soluble fraction are Ca, Co, Cd, Mn, and Zn (averaging 11%, 11%, 9%, 6% and 5% respectively).

- The following controls are noted for acidity and metal leaching:

    - Net Acidity: The two key aspects of samples demonstrating leachate pH ≤ 5.5, are either a calcium level in the rock of ≤0.51% or a CO_2 level of ≤0.6% , coupled with a sulphur level of ≥0.25%. Production of net acidity thus appears to be directly related to insufficient levels of available calcium (as calcium carbonate) to compensate for ongoing oxidation of sulphide minerals.

    - Zinc Leaching: leaching of zinc to levels ≥ 10 mg/kg appears to occur under two differing conditions: i) solubilization of zinc under net acidic conditions – independent of zinc concentration in rock, and ii) solubilization of zinc under overall neutral to alkaline conditions where Zn concentrations in rock exceed 5000 ppm.

    - Lead Leaching: leaching of lead to levels ≥ 3 mg/kg occurs only under neutral pH conditions, where Pb concentrations in rock exceed 5000 ppm.

- Various geochemical parameters were evaluated to identify a simple filter to best isolate the reactive samples from the non-reactive samples, using information normally available in an exploration database (eg. lithology, ICP analyses, simple field tests). While priority was given to ensuring complete isolation of the net acidic samples, it was considered that minor under-filtering of metal-leaching would not be detrimental to overall drainage quality of a waste rock storage area. After several trials, the following filter criteria were identified to discriminate reactive samples in the 47-sample database:

    1. $S_{via\ ICP} \geq 0.25\%$ and $Ca \leq 0.51\%$; *or*
    2. $Pb \geq 5000$ ppm; or
    3. $Zn \geq 5000$ ppm.

- When these criteria are applied to the 47-sample database, 16 of the 17 reactive samples are isolated, along with 4 non-reactive samples. 100% of the net acidic samples, 92% of the zinc-leaching samples, and 100% of the lead-leaching samples are isolated. On the other hand, 13% of the samples isolated using these criteria were actually non-reactive in the leachate extraction test, indicating that some potential 'dilution' by non- ARD/ML waste rock is possible if using this filter for waste rock classification.

- Similar results are obtained when substituting a Fizz Rating of <3 in place of ICP Calcium ≤ 0.51% – the reactive samples are filtered identically, however 'dilution' by non-reactive samples increases to 20%. Nonetheless, these results indicate Fizz Rating to be a potential screening parameter, which is of interest as a field screening tool for segregating rock during active mining.

Prepared By:

ALTURA ENVIRONMENTAL CONSULTING

Diane Lister, P.Eng.

<u>Attachments:</u>

Appendices A1 through A6

APPENDIX A1-1

Rock Codes

00		**Miscellaneous**
01		Unspecified
02		Mixed Quartzite and Schist
	OVB	Overburden
10	**SCH**	**Schists, undifferentiated**
11	CHSCH	Chloritic Schist
12	GSCH	Graphitic Schist
13	SSCH	Sericitic Schist
14	CSCH	Calcareous Schist
20		**Quartzite, Undifferentiated**
21	CQTZT	Calcareous Quartzite
22	QTZT	Quartzite
30	**GNST**	**Greenstone, Undifferentiated**
40	**VN**	**Vein, undifferentiated**
50	**PHY**	**Phyllite**

Zones:

	Unspecified	0
Dixie		10
	DixieAdit	11
Bermingham		20
	BermhamPit	21
Ruby		30
	RubyAdit	31
Calumet		40
	Calu_1_15_pit	41
Husky		50
	HuskySW	51
Hector		60
	HectorPit	61
	HectorAdit	62
Millier		70
	MillerPit	71
SIME		80
	SIME6pit	81
	SIME4pit	82
	SIME35pit	83
	SIME4&6pit	84
ONEK		90
	ONEKpit	91
Keno		100
	Keno700_Adit	101
UN		110
	UNAdit	111
Townsite		120
	TownsiteAdit	121
Bellekeno		130
	BelleKenoAdit	131
Silver King		140
	SlvrKing_Pit	141
Galkeno		150
	Galkeno900	151

Waste Rock Dump Sample Descriptions - May 2007

Mine/dump location	No. of 20 L Pails	Sample ID	Sample Description
DIXIE Adit dump			
	1	95UKHDD01	grey fine gr. mat'l, minor >3", 3" rusty bands every 12"
	1	95UKHDD02	brownish & grey fine gr. mat'l (broken schist, some fragments, grey qtzite)
	1	95UKHDD03	grey fine gr. mat'l, rusty bands (6") every 14", sample from 8' depth
BERMINGHAM pit wall			
	1	95UKHBP01	thin bedded qtzite, rusty weathering; North wall of pit
	2	95UKHBP02	thick bedded blocky, rusty weathering qtzite; manganese staining (?); above old brim. Shaft; N. wall pit
	2	95UKHBP03	thick bedded, blocky qtzite, buff weathering, some minor graphitic schist talus; N. wall pit
	2	95UKHBP04	rusty weathering, blocky qtzite, minor schist; 70%>4", 10%>8"
	2	95UKHBP06	graphitic schist, platy talus on South pit wall, 1/2" x 8" pieces
	2	95UKHBP07	sericitic schist, platy to blocky talus on S. pit bench
BERMINGHAM pit dump			
	2	95UKHBD01	fine grained ore stockpile (1/2">x<3"), rusty weathering, 70% "soil" fraction mat'l
	2	95UKHBD02	fine grained ore stockpile (1/2">x<3"), rusty weathering, 70% "soil" fraction mat'l
	1	95UKHBD03	ore and colluvium (?) scraped from floor of ore stockpile area
	1	95UKHBD04	graphitic schist
	1	95UKHBD05	ore and colluvium (?) scraped from floor of ore stockpile area
	1	95UKHBD06	buff weathering, blocky qyzite
RUBY adit dump			
	2	95UKHRD01	grey - black fine grained qtzite rubble, iron stain banding (on only, 6" thick, dipping 45')
	2	95UKHRD02	grey - black fine grained qtzite rubble, weak iron stain banding (on only, 6" thick, dipping 45')
	2	95UKHRD03	grey - black fine grained qtzite rubble, iron stain banding (on only, 6" thick, dipping 45')
HUSKY SW			
	1	95UKHWD01	very pyritic grey qtzite
CALUMET 1-15 pit dump			
	2	95UKHCD01	buff weathering, altered (?) qtzite, rusty fractures
	2	95UKHCD02	buff weathering, blocky qtzite, rusty fracturing, possible some vein mat'l (15%)
	2	95UKHCD03	ore stockpile scrapings mixed and some colluvium, minor buff weathering qtzite w/ rusty fractures
CALUMET 1-15 pit wall			
	1	95UKHCP01	graphitic schist, platy talus (1/2" thick x 6-10" long)
	2	95UKHCP02	grey blocky qtzite, maroon fractures, >60%+4"
HECTOR pit dump			
	2	95UKHCD04	grey blocky qtzite, maroon weathering on fractures
MILLER pit dump			
	2	95UKHMD01	greenish-grey fine grained qtzite, rusty weathering on fracture surfaces, some pyrite casts
HECTOR adit dump			
	1	95UKHHD01	grey qtzite rubble, mixed with debris; top of dump
	2	95UKHHD02	grey qtzite rubble, mixed with debris; top of dump
	1	95UKHHD03	green sercite schist rubble, woody debris & fines; toe of dump
SIME 6 pit wall			
	2	95UKHSP01	grey, platy graphitic schist; 1/4" thick x 4-10" long
	2	95UKHSP02	buff weathering , blocky qtzite, some rusty fracture surfaces
SIME 4 pit wall			
	1	95UKHSP03	thick bedded, grey massive qtzite, some pyrite casts, all surfaces iron stained
SIME 35 pit wall			
	2	95UKHSP04	very fine grained schist, some Fe stain
	2	95UKHSP05	
SIME 4 & 6 pits wall			
	1	95UKHSD01	clean buff qtzite, 4" blocks, minor oxidation on 50% of fracture surfaces
ONEK pit			
	2	95UKHOP01	grey, clean qtzite mixed with schist - Fe staining laminar in schist
ONEK pit dump			
	1	95UKHOD01	greenstone, blocky 3" x 7" pieces and chips
	1	95UKHOD02	buff weathered qtzite, rusty fractures
	2	95UKHOD03	grey platy graphitic schist, 1/2" x 7"
KENO 700 adit dump			
	1	95UKHKD01	grey qtzite, qtz bands
	1	95UKHKD02	green seritic schist
UN adit dump			
	2	95UKHUD01	mixture grey graphitic schist and buff weath. qtzite, 30" + 3" 70" <3"
TOWNSITE adit dump			
	2	95UKHTD01	buff weathering qtzite, 10% >3", mostly fine fraction, some oxidation
	2	95UKHTD02	grey qtzite with serecite schist, 10% > 3", mostly fine fraction
BELLEKENO adit dump			
	2	95UKHLD01	dark grey pyritic qtzite, qtz stringers abundant
SILVER KING pit dump			
	1	95UKHVD01	mixed grey and buff qtzite, minor schist, some sandsize particles
GALKENO 900			
	1	95UKGK901	grey, fine gr. Schist
TOTAL # of SAMPLE SITES:	47		
TOTAL # of 20 L PAILS	74		

APPENDIX A2-2
Shakeflask Extraction Results

ALS Environmental
11-May-07

RESULTS OF ANALYSIS

Mine/Dump Location		Dixie Adit Dump			Bermingham Pit Wall						Bemingham Pit Dump						
Sample ID		95UKHDD01	95UKHDD02	95UKHDD03	95UKHBP01	95UKHBP02	95UKHBP03	95UKHBP04	95UKHBP06	95UKHBP07	95UKHBD01	95UKHBD02	95UKHBD03	95UKHBD04	95UKHBD05	95UKHBD06	95UKHRD01
Date of Analysis	11-May-07																
ALS Sample ID		L481965-1	L481965-2	L481965-3	L481965-4	L481965-5	L481965-6	L481965-7	L481965-8	L481965-9	L481965-10	L481965-11	L481965-12	L481965-13	L481965-14	L481965-15	L481965-16
Matrix		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Leachable Anions & Nutrients	**Units**																
pH	pH	3.43	2.61	4.99	6.17	6.94	6.67	6.69	7.45	7.56	7.14	7.07	6.07	7.20	7.27	6.95	7.38
Leachable Metals																	
Aluminum (Al)-Leachable	mg/L	38.6	98.2	2.68	0.0111	0.0197	0.0204	0.0263	0.0198	0.840	<0.0030	0.203	<0.10	0.0054	<0.0030	0.0146	0.295
Antimony (Sb)-Leachable	mg/L	<0.0020	0.011	<0.0010	0.00289	0.00420	0.00205	0.00359	0.00558	0.00561	0.00051	0.00118	<0.010	0.00072	0.00208	0.00530	0.0031
Arsenic (As)-Leachable	mg/L	0.0049	0.130	<0.0010	0.00102	0.00729	0.00177	0.00082	0.00051	0.00101	0.00029	0.00681	<0.010	0.00023	0.00036	0.00081	0.0068
Barium (Ba)-Leachable	mg/L	0.109	<0.0050	0.0439	0.00935	0.00244	0.00683	0.00151	0.0232	0.00853	0.00224	0.0114	0.0569	0.00649	0.00267	0.00586	0.0263
Beryllium (Be)-Leachable	mg/L	<0.010	<0.050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.00050	<0.050	<0.0010	<0.00050	<0.00050	<0.0050
Bismuth (Bi)-Leachable	mg/L	<0.010	<0.050	<0.0050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050	<0.00050	<0.00050	<0.050	<0.0010	<0.00050	<0.00050	<0.0050
Boron (B)-Leachable	mg/L	<0.20	<1.0	<0.10	0.013	<0.010	0.013	<0.010	<0.020	0.011	<0.010	<0.010	<1.0	<0.020	0.011	<0.010	<0.10
Cadmium (Cd)-Leachable	mg/L	0.173	2.41	0.500	0.00604	0.000448	0.000716	0.000264	0.00111	0.000218	0.0120	0.0122	35.7	0.0446	0.00194	0.137	0.0156
Calcium (Ca)-Leachable	mg/L	268	148	511	5.22	11.3	3.31	1.87	142	5.01	47.0	86.5	136	45.8	4.52	6.15	548
Chromium (Cr)-Leachable	mg/L	0.023	0.210	<0.0050	0.00094	0.00156	0.00084	0.00240	<0.0010	<0.00050	<0.00050	0.00081	<0.050	<0.0010	<0.00050	<0.00050	<0.0050
Cobalt (Co)-Leachable	mg/L	0.0478	0.210	0.108	0.00013	<0.00010	<0.00010	<0.00010	0.00178	0.00022	<0.00010	0.00066	0.064	<0.00020	0.00012	0.00025	0.0044
Copper (Cu)-Leachable	mg/L	0.125	1.14	0.0732	0.00168	<0.00060	<0.00050	0.00170	0.00515	0.00434	<0.00050	0.00323	0.016	<0.0011	<0.0010	0.00091	0.0028
Iron (Fe)-Leachable	mg/L	15.2	188	2.03	<0.030	0.036	<0.030	<0.030	<0.030	0.409	<0.030	0.215	<0.030	<0.030	<0.030	<0.030	0.316
Lead (Pb)-Leachable	mg/L	0.407	0.0697	0.0251	0.00168	<0.00050	<0.00090	0.000973	0.00238	0.00204	0.00226	0.0353	1.45	0.0187	<0.00070	0.0108	0.0383
Lithium (Li)-Leachable	mg/L	<0.10	<0.50	0.066	0.0067	0.0097	0.0088	<0.0050	0.016	0.0085	0.0125	0.0111	<0.50	0.019	<0.0050	<0.0050	<0.050
Magnesium (Mg)-Leachable	mg/L	48.1	30.4	62.1	1.10	2.13	0.92	0.47	30.4	1.59	26.1	28.2	51.0	19.9	1.24	1.66	205
Manganese (Mn)-Leachable	mg/L	90.6	207	15.9	0.142	0.00428	0.0237	0.0162	1.26	0.0443	0.0311	0.282	122	0.276	1.94	0.461	3.48
Mercury (Hg)-Leachable	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Molybdenum (Mo)-Leachable	mg/L	<0.0010	<0.0050	<0.00050	<0.000050	0.000216	0.000062	0.000068	0.00625	0.00495	<0.000050	0.000066	<0.0050	<0.00010	0.000189	0.000083	<0.00050
Nickel (Ni)-Leachable	mg/L	0.234	0.981	0.417	0.00317	<0.00050	0.00067	0.00051	0.0039	0.00075	0.00072	0.00183	0.166	0.0014	0.00068	0.00088	0.0238
Phosphorus (P)-Leachable	mg/L	<0.30	1.59	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Leachable	mg/L	3.4	<2.0	4.5	4.2	<2.0	2.7	<2.0	6.3	3.5	2.6	3.5	6.4	3.4	<2.0	<2.0	6.0
Selenium (Se)-Leachable	mg/L	<0.020	<0.10	<0.010	<0.0010	<0.0010	<0.0010	<0.0010	0.0079	0.0013	0.0049	0.0075	<0.10	0.0073	0.0015	<0.0010	<0.010
Silicon (Si)-Leachable	mg/L	5.84	4.35	3.77	3.99	3.04	3.85	2.48	2.41	5.79	2.00	2.29	1.85	1.81	2.44	2.54	1.30
Silver (Ag)-Leachable	mg/L	0.00452	0.0011	<0.00010	0.000077	0.000208	0.000375	0.000045	0.000065	0.000080	0.000216	0.00105	<0.0010	0.000080	0.000026	0.000141	0.00099
Sodium (Na)-Leachable	mg/L	<2.0	<2.0	<2.0	<2.0	4.2	<2.0	<2.0	<2.0	2.6	4.8	6.2	5.9	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Leachable	mg/L	0.168	0.097	0.175	0.0243	0.0255	0.0173	0.00802	0.378	0.0110	0.0696	0.100	0.221	0.0561	0.0234	0.0296	0.784
Thallium (Tl)-Leachable	mg/L	0.0026	<0.010	0.0013	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.010	<0.00020	<0.00010	<0.00010	<0.0010
Tin (Sn)-Leachable	mg/L	<0.0020	<0.010	<0.0010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	<0.010	<0.00020	<0.00010	<0.00010	<0.0010
Titanium (Ti)-Leachable	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Leachable	mg/L	0.00947	0.0503	0.00043	<0.000010	0.000013	<0.000010	<0.000010	0.00155	0.000079	<0.000010	0.000075	<0.0010	<0.000020	<0.000010	<0.000010	0.00059
Vanadium (V)-Leachable	mg/L	<0.020	<0.10	<0.010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	<0.0010	<0.0010	<0.0010	<0.10	<0.0020	<0.0010	<0.0010	<0.010
Zinc (Zn)-Leachable	mg/L	7.42	143	29.0	0.0790	<0.0060	0.0107	<0.0080	0.0080	<0.0070	0.0437	0.0988	266	0.351	0.0178	1.05	0.105

APPENDIX A2-2
Shakeflask Extraction Results

ALS Environmental
11-May-07

RESULTS OF ANALYSIS

Mine/Dump Location		Ruby Adit Dump		Calumet 1-15 Pit Dump			Calumet 1-15 Pit Wall		Husky SW	Hector Pit Dump	Miller Pit Dump	Hector Adit Dump			SIME 6 Pit Wall	
Sample ID		95UKHRD02	95UKHRD03	95UKHCD01	95UKHCD02	95UKHCD03	95UKHCP01	95UKHCP02	95UKHWD01	95UKHCD04	95UKHMD01	95UKHHD01	95UKHHD02	95UKHHD03	95UKHSP01	95UKHSP02
Date of Analysis	11-May-07															
ALS Sample ID		L481965-17	L481965-18	L481962-1	L481962-2	L481962-7	L481962-4	L481962-5	L481962-3	L481962-6	L481962-8	L481962-9	L481962-10	L481962-11	L481962-12	L481962-13
Matrix		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Leachable Anions & Nutrients	**Units**															
pH	pH	6.59	7.07	6.25	5.74	6.49	5.76	6.17	2.38	6.34	6.71	6.42	7.04	7.41	7.08	6.53
Leachable Metals																
Aluminum (Al)-Leachable	mg/L	<0.0050	0.0468	<0.0030	0.0217	<0.0010	0.142	0.0041	158	0.0037	0.0245	<0.80	<0.080	0.0221	0.0286	0.0055
Antimony (Sb)-Leachable	mg/L	0.00136	0.00277	0.00077	<0.00050	0.00170	0.00134	0.00299	0.0090	0.00069	0.00175	<0.010	0.0045	0.00454	0.00098	0.00101
Arsenic (As)-Leachable	mg/L	<0.00050	0.00051	0.00014	0.00070	0.00031	0.00055	0.00080	1.40	0.00022	0.00083	0.012	0.0048	0.00127	0.00028	0.00051
Barium (Ba)-Leachable	mg/L	0.0422	0.0392	0.0213	0.306	0.0418	0.00609	0.00765	0.0133	0.259	0.0255	0.0202	0.0860	0.0620	0.0226	0.00448
Beryllium (Be)-Leachable	mg/L	<0.0025	<0.0025	<0.00050	<0.0025	<0.00050	<0.00050	<0.00050	<0.010	<0.00050	<0.00050	<0.050	<0.0050	<0.0025	<0.00050	<0.00050
Bismuth (Bi)-Leachable	mg/L	<0.0025	<0.0025	<0.00050	<0.0025	<0.00050	<0.00050	<0.00050	<0.010	<0.00050	<0.00050	<0.050	<0.0050	<0.0025	<0.00050	<0.00050
Boron (B)-Leachable	mg/L	<0.050	<0.050	0.013	<0.050	0.012	0.021	0.012	<0.20	<0.010	0.012	<1.0	<0.10	<0.050	0.022	0.020
Cadmium (Cd)-Leachable	mg/L	1.25	0.0610	0.00208	0.0771	0.0107	0.000993	0.0169	0.0648	0.190	0.000435	5.03	1.10	0.350	0.0169	0.00230
Calcium (Ca)-Leachable	mg/L	351	439	1.22	32.3	2.75	0.723	3.73	129	6.86	3.39	418	483	458	1.12	1.16
Chromium (Cr)-Leachable	mg/L	<0.0025	<0.0025	<0.00050	<0.0025	<0.00050	<0.00050	<0.00050	0.450	<0.00050	0.00271	<0.050	<0.0050	<0.0025	<0.00050	<0.00050
Cobalt (Co)-Leachable	mg/L	0.0237	0.0403	0.00024	0.00124	0.00014	0.00012	0.00138	0.356	0.00357	<0.00010	0.315	0.0218	0.00522	0.00038	0.00026
Copper (Cu)-Leachable	mg/L	0.0460	0.00157	0.00052	0.0106	0.00130	0.00391	0.00486	1.04	0.00500	0.00283	0.017	0.0113	0.00756	0.00232	0.00395
Iron (Fe)-Leachable	mg/L	<0.030	0.054	<0.030	<0.030	<0.030	<0.030	<0.030	618	<0.030	0.036	<0.090	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Leachable	mg/L	1.17	0.00482	1.56	16.3	1.08	0.0410	0.0786	0.144	1.75	0.0317	1.78	0.148	0.0878	0.319	0.0440
Lithium (Li)-Leachable	mg/L	<0.025	0.036	<0.0050	<0.025	<0.0050	<0.0050	0.0054	0.27	<0.0050	<0.0050	<0.50	<0.050	<0.025	0.0050	0.0060
Magnesium (Mg)-Leachable	mg/L	49.3	46.2	0.17	3.70	0.51	0.16	0.54	95.3	1.63	0.25	75.9	85.0	48.3	0.20	0.29
Manganese (Mn)-Leachable	mg/L	14.2	16.6	0.0303	0.345	0.0462	0.0434	0.615	19.7	0.448	0.0251	515	17.1	5.41	0.230	0.182
Mercury (Hg)-Leachable	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Molybdenum (Mo)-Leachable	mg/L	<0.00025	<0.00025	<0.000050	<0.00025	<0.000050	<0.000050	<0.000050	0.0024	0.000547	<0.000050	0.0052	0.00053	0.00041	0.000230	<0.000050
Nickel (Ni)-Leachable	mg/L	0.144	0.136	0.00176	0.0067	0.00090	<0.00050	0.00441	0.909	0.00863	<0.00050	0.663	0.0735	0.0260	0.00176	0.00118
Phosphorus (P)-Leachable	mg/L	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	2.27	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Leachable	mg/L	4.6	4.8	2.3	12.1	3.1	6.2	3.5	<2.0	2.4	<2.0	5.6	5.0	6.8	6.4	4.1
Selenium (Se)-Leachable	mg/L	0.0050	<0.0050	<0.0010	<0.0050	<0.0010	0.0022	0.0015	<0.020	<0.0010	<0.0010	<0.10	<0.010	<0.0050	<0.0010	<0.0010
Silicon (Si)-Leachable	mg/L	2.45	2.19	2.06	3.52	2.87	3.17	2.65	6.77	3.45	2.72	2.32	2.06	2.03	3.99	3.58
Silver (Ag)-Leachable	mg/L	0.000187	<0.000050	0.00156	0.00465	0.000618	0.000213	0.000061	0.00132	0.000023	0.000047	<0.0010	0.00016	0.000160	0.000883	0.000062
Sodium (Na)-Leachable	mg/L	<2.0	<2.0	<2.0	6.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Leachable	mg/L	0.232	0.324	0.00670	0.156	0.0208	0.00563	0.0168	0.263	0.0582	0.00645	0.432	0.764	0.463	0.00678	0.00641
Thallium (Tl)-Leachable	mg/L	<0.00050	<0.00050	0.00017	<0.00050	<0.00010	0.00014	<0.00010	<0.0020	<0.00010	<0.00010	<0.010	<0.0010	<0.00050	<0.00010	<0.00010
Tin (Sn)-Leachable	mg/L	<0.00050	<0.00050	<0.00010	<0.00050	<0.00010	<0.00010	<0.00010	<0.0020	<0.00010	<0.00010	<0.010	<0.0010	<0.00050	<0.00010	<0.00010
Titanium (Ti)-Leachable	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.019	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Leachable	mg/L	<0.000050	0.000276	<0.000010	<0.000050	<0.000010	<0.000010	<0.000010	0.0109	0.000046	<0.000010	<0.0010	0.00022	0.000435	0.000011	<0.000010
Vanadium (V)-Leachable	mg/L	<0.0050	<0.0050	<0.0010	<0.0050	<0.0010	<0.0010	<0.0010	0.235	<0.0010	<0.0010	<0.10	<0.010	<0.0050	<0.0010	<0.0010
Zinc (Zn)-Leachable	mg/L	16.2	0.590	0.0318	0.660	0.0518	0.0194	0.192	4.36	1.03	0.0418	277	32.9	3.69	0.199	0.0342

APPENDIX A2-2
Shakeflask Extraction Results

ALS Environmental
11-May-07

RESULTS OF ANALYSIS

Mine/Dump Location		SIME 4 Pit Wall	SIME 35 Pit Wall		SIME 4 & 6 Pit Walls	Onek Pit	Onke Pit Dump			Keno 700 Adit Dump		UN Adit Dump	Townsite Adit Dump		Bellekeno Adit Dump
Sample ID		95UKHSP03	95UKHSP04	95UKHSP05	95UKHSD01	95UKHOP01	95UKHOD01	95UKHOD02	95UKHOD03	95UKHKD01	95UKHKD02	95UKHUD01	95UKHTD01	95UKHTD02	95UKHLD01
Date of Analysis	11-May-07														
ALS Sample ID		L481962-14	L481962-15	L481962-16	L481962-17	L481962-18	L481962-19	L481962-20	L481962-21	L481962-22	L481962-23	L481962-24	L481962-25	L481962-26	L481962-27
Matrix		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Leachable Anions & Nutrients	**Units**														
pH	pH	6.81	6.66	6.71	7.32	7.87	7.61	6.67	7.45	7.15	7.46	6.78	5.99	6.37	7.37
Leachable Metals															
Aluminum (Al)-Leachable	mg/L	0.0084	0.0120	0.119	0.0408	0.156	0.270	0.0857	0.0486	0.0099	0.0101	0.0444	0.48	0.0448	0.0289
Antimony (Sb)-Leachable	mg/L	0.0156	0.00148	0.00361	0.00291	0.00232	0.0125	0.00337	0.00100	0.00938	0.00815	0.00558	<0.020	0.00628	0.00877
Arsenic (As)-Leachable	mg/L	0.00508	0.00073	0.00274	0.00219	0.00091	0.0118	0.00463	0.00124	0.00121	0.00591	0.00063	<0.020	0.00106	0.00525
Barium (Ba)-Leachable	mg/L	0.00275	0.00327	0.00424	0.000447	0.00260	0.00118	0.00852	0.0133	0.0396	0.0386	0.0411	0.027	0.0359	0.0413
Beryllium (Be)-Leachable	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.0010	<0.00050	<0.10	<0.0025	<0.0025
Bismuth (Bi)-Leachable	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.0010	<0.00050	<0.10	<0.0025	<0.0025
Boron (B)-Leachable	mg/L	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	0.027	0.012	<0.020	<0.020	0.014	<2.0	<0.050	<0.050
Cadmium (Cd)-Leachable	mg/L	0.00247	0.00137	0.00298	0.00144	0.000071	<0.000050	0.00196	0.000301	0.174	0.0204	0.0132	5.58	1.29	0.00930
Calcium (Ca)-Leachable	mg/L	2.33	5.42	1.91	9.57	18.7	9.93	1.80	39.6	134	155	3.76	91.7	61.8	214
Chromium (Cr)-Leachable	mg/L	<0.00050	<0.00050	<0.00050	0.00133	<0.00050	<0.00050	0.00118	0.00075	<0.0010	<0.0010	<0.00050	<0.10	<0.0025	<0.0025
Cobalt (Co)-Leachable	mg/L	0.00014	0.00010	0.00014	<0.00010	<0.00010	0.00015	<0.00010	<0.00010	0.00198	<0.00020	0.00043	0.361	0.00736	<0.00050
Copper (Cu)-Leachable	mg/L	0.00144	0.00168	0.00158	0.00047	<0.0012	0.00272	0.00383	0.00348	0.00842	0.00527	0.00427	0.038	0.00893	0.00456
Iron (Fe)-Leachable	mg/L	<0.030	<0.030	0.081	<0.030	<0.030	0.098	0.081	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Leachable	mg/L	0.0331	0.00965	0.0265	0.00161	0.00155	<0.00040	0.0175	0.00895	0.105	0.0199	0.156	0.881	3.03	0.0464
Lithium (Li)-Leachable	mg/L	<0.0050	0.0126	0.0059	<0.0050	0.0057	<0.0050	<0.0050	0.0067	<0.010	<0.010	0.0066	<1.0	<0.025	<0.025
Magnesium (Mg)-Leachable	mg/L	0.26	0.56	0.17	0.56	1.74	0.65	0.31	4.40	6.09	19.3	0.70	47.3	64.6	13.0
Manganese (Mn)-Leachable	mg/L	0.0577	0.0642	0.0874	0.0728	0.00686	0.00381	0.0847	0.00540	0.701	0.201	0.170	455	5.06	0.319
Mercury (Hg)-Leachable	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Molybdenum (Mo)-Leachable	mg/L	0.000104	0.000570	0.000206	0.000265	0.00201	0.00197	0.000269	0.00143	0.00086	0.0187	<0.000050	<0.010	<0.00025	0.00971
Nickel (Ni)-Leachable	mg/L	<0.00050	0.00079	0.00086	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.0054	<0.0010	0.00148	0.62	0.0293	<0.0025
Phosphorus (P)-Leachable	mg/L	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Leachable	mg/L	<2.0	<2.0	2.3	<2.0	4.2	<2.0	<2.0	4.1	3.2	4.7	3.1	5.0	4.1	6.7
Selenium (Se)-Leachable	mg/L	<0.0010	0.0030	<0.0010	<0.0010	0.0029	<0.0010	<0.0010	0.0068	<0.0020	<0.0020	<0.0010	<0.20	<0.0050	<0.0050
Silicon (Si)-Leachable	mg/L	1.69	3.71	2.11	1.67	1.79	4.03	2.52	2.04	2.24	2.09	3.59	2.24	4.02	2.16
Silver (Ag)-Leachable	mg/L	0.000078	0.000012	0.000328	0.000018	<0.000010	<0.000010	0.000229	0.000016	0.000171	0.000053	0.000172	<0.0020	0.000143	0.000096
Sodium (Na)-Leachable	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	4.5	<2.0	<2.0	<2.0	<2.0	<2.0	9.0
Strontium (Sr)-Leachable	mg/L	0.0101	0.0140	0.00621	0.00937	0.0557	0.0204	0.0126	0.103	0.205	0.335	0.0154	0.140	0.0225	0.332
Thallium (Tl)-Leachable	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00020	<0.00010	<0.020	<0.00050	<0.00050
Tin (Sn)-Leachable	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00016	<0.00010	<0.00020	<0.00020	<0.00010	<0.020	<0.00050	<0.00050
Titanium (Ti)-Leachable	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Leachable	mg/L	<0.000010	<0.000010	0.000016	0.000021	0.000223	0.000033	0.000015	0.000240	0.000076	0.000545	<0.000010	<0.0020	<0.000050	0.00237
Vanadium (V)-Leachable	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0047	<0.0010	<0.0010	<0.0020	<0.0020	<0.0010	<0.20	<0.0050	<0.0050
Zinc (Zn)-Leachable	mg/L	0.0131	0.0317	0.0878	0.0473	<0.0040	<0.0050	0.0278	<0.0050	1.76	0.221	0.118	289	17.0	0.0829

Keno Hill Waste Rock Chemistry Data				**DIXIE Adit dump**			**BERMINGHAM pit wall**						**BERMINGHAM pit dump**					
	Method		**Units**	**95UKHDD01**	**95UKHDD02**	**95UKHDD03**	**95UKHBP01**	**95UKHBP02**	**95UKHBP03**	**95UKHBP04**	**95UKHBP06**	**95UKHBP07**	**95UKHBD01**	**95UKHBD02**	**95UKHBD03**	**95UKHBD04**	**95UKHBD05**	**95UKHBD06**
MPA	OA-VOL08	*Basic Acid Base Accounting*	tCaCO3/1000t ore	10	11.6	9.1	0.9	0.6	0.9	0.3	21.6	0.6	5.3	6.3	23.4	6.6	0.9	0.9
FIZZ RATING	OA-VOL08	*Basic Acid Base Accounting*	Unity	1	1	2	1	1	1	1	3	1	1	2	3	2	1	1
NNP	OA-VOL08	*Basic Acid Base Accounting*	tCaCO3/1000t ore	-6	-15	2	4	4	6	5	46	6	15	11	285	24	6	1
NP	OA-VOL08	*Basic Acid Base Accounting*	tCaCO3/1000t ore	4	-3	11	5	5	7	5	68	7	20	17	308	31	7	2
pH	OA-ELE07	*Paste pH*	Unity	4.3	3.5	5.2	6.6	7	7.1	7.4	7.7	8.2	7.4	7.4	7	7.5	7.6	7.6
Ratio (NP:MPA)	OA-VOL08	*Basic Acid Base Accounting*	Unity	0.4	-0.26	1.21	5.33	8	7.47	16	3.15	11.2	3.76	2.72	13.14	4.72	7.47	2.13
S	S-IR08	*Total Sulphur (Leco)*	%	0.32	0.37	0.29	0.03	0.02	0.03	0.01	0.69	0.02	0.17	0.2	0.75	0.21	0.03	0.03
S	S-GRA06	*Sulfate Sulfur-carbonate leach*	%	0.22	0.3	0.23	0.01	0.01	<0.01	<0.01	0.05	0.01	0.03	0.05	0.18	0.02	0.01	0.02
S	S-GRA06a	*Sulfate Sulfur (HCl leachable)*	%	0.21	0.3	0.22	<0.01	<0.01	<0.01	<0.01	0.03	<0.01	0.16	0.17	0.21	0.08	0.01	0.01
S	S-CAL06	*Sulfide Sulpher (calculated)*	%	0.1	0.07	0.06	0.02	0.01	0.03	0.01	0.64	0.01	0.14	0.15	0.57	0.19	0.02	0.01
C	C-GAS05	*Inorganic Carbon (CO2)*	%	0.08	<0.05	0.15	<0.05	<0.05	<0.05	<0.05	0.8	<0.05	0.18	0.15	3.64	0.37	0.11	<0.05
CO2	C-GAS05	*Inorganic Carbon (CO2)*	%	0.3	<0.2	0.6	<0.2	<0.2	<0.2	<0.2	2.9	<0.2	0.7	0.6	13.4	1.4	0.4	<0.2
Au	Au-ICP21	*Au 30g FA ICP-AES Finish*	ppm	0.013	0.015	0.003	0.005	0.008	0.019	0.004	0.001	<0.001	0.056	0.046	0.085	0.039	0.009	0.016
Ag (Silver)	ME-ICP61	*27 element four acid ICP-AES*	ppm	1.7	14.7	1.6	11.5	6.1	15.1	3.4	0.5	<0.5	**>100**	**>100**	**>100**	95.4	5.3	10.7
Al (Aluminum)	ME-ICP61	*27 element four acid ICP-AES*	%	2.08	1.3	3.42	1.87	4.16	5.69	1.02	4.49	8.68	2.39	2.94	1.72	3.19	0.46	0.99
As (Arsenic)	ME-ICP61	*27 element four acid ICP-AES*	ppm	66	49	22	69	304	331	43	38	<5	620	433	944	424	39	89
Ba (Barium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	300	210	430	350	600	1110	130	770	860	530	880	330	630	140	260
Be (Beryllium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	0.6	<0.5	1	0.5	1.3	1.4	<0.5	1.1	2.3	0.7	0.8	0.6	0.8	<0.5	<0.5
Bi (Bismuth)	ME-ICP61	*27 element four acid ICP-AES*	ppm	<2	<2	<2	2	<2	3	<2	<2	3	5	7	7	3	<2	2
Ca (Calcium)	ME-ICP61	*27 element four acid ICP-AES*	%	0.25	0.1	0.51	0.06	0.18	0.08	0.02	1.98	0.15	0.22	0.18	0.57	0.15	0.03	0.02
Cd (Cadmium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	<0.5	5.9	3.7	15.8	24.6	15.8	5.2	1.2	1	211	151	691	110	12.9	9
Co (Cobalt)	ME-ICP61	*27 element four acid ICP-AES*	ppm	<1	<1	2	3	2	6	1	8	14	5	3	<1	3	<1	<1
Cr (Chromium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	46	34	60	38	77	78	45	47	61	36	42	32	56	32	34
Cu (Copper)	ME-ICP61	*27 element four acid ICP-AES*	ppm	9	15	11	39	25	39	14	24	22	119	86	137	76	10	16
Fe (Iron)	ME-ICP61	*27 element four acid ICP-AES*	%	2.1	1.2	1.81	1.45	2.95	4.14	1.15	2.24	3.95	10.9	8.54	14.05	6.01	1.21	1.09
Ga (Gallium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	10	<10	10	10	10	10	<10	10	20	<10	10	<10	10	<10	<10
K (Potassium)	ME-ICP61	*27 element four acid ICP-AES*	%	0.36	0.36	0.66	0.5	0.88	1.69	0.21	1.27	2.56	0.62	0.87	0.49	0.85	0.13	0.27
La (Lanthanum)	ME-ICP61	*27 element four acid ICP-AES*	ppm	10	10	20	10	20	20	<10	20	40	10	10	10	20	<10	10
Mg (Magnesium)	ME-ICP61	*27 element four acid ICP-AES*	%	0.16	0.06	0.24	0.14	0.54	0.34	0.12	0.95	0.93	0.24	0.24	0.38	0.25	0.02	0.05
Mn (Manganese)	ME-ICP61	*27 element four acid ICP-AES*	ppm	1040	691	179	1690	1985	4430	1615	707	441	46400	29300	82800	18700	3420	1615
Mo (Molybdenum)	ME-ICP61	*27 element four acid ICP-AES*	ppm	1	<1	1	<1	1	1	<1	4	<1	1	2	1	<1	<1	<1
Na (Sodium)	ME-ICP61	*27 element four acid ICP-AES*	%	0.08	0.02	0.14	----	0.15	0.17	0.04	0.39	0.97	0.08	0.08	0.04	0.1	0.01	0.03
Ni (Nickel)	ME-ICP61	*27 element four acid ICP-AES*	ppm	8	6	15	15	26	25	10	24	34	19	17	11	17	3	2
P (Phosphorous)	ME-ICP61	*27 element four acid ICP-AES*	ppm	280	390	470	440	600	560	150	1320	340	630	650	750	540	190	140
Pb (Lead)	ME-ICP61	*27 element four acid ICP-AES*	ppm	81	896	122	897	75	576	101	38	18	**>10000**	8660	**>10000**	6010	489	864
S (Sulphur)	ME-ICP61	*27 element four acid ICP-AES*	%	0.29	0.36	0.28	0.02	0.02	0.03	0.01	0.71	0.03	0.17	0.21	0.78	0.21	0.02	0.02
Sb (Antimony)	ME-ICP61	*27 element four acid ICP-AES*	ppm	21	35	9	18	27	24	12	5	9	222	153	247	131	11	31
Sc (Scandium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	3	3	5	4	10	12	4	7	13	7	7	7	7	1	2
Sr (Strontium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	35	20	59	28	71	91	24	126	92	86	82	37	76	10	27
Th	ME-ICP61	*27 element four acid ICP-AES*	ppm	<20	<20	<20	<20	<20	<20	<20	<20	20	<20	<20	<20	<20	<20	<20
Ti (Titanium)	ME-ICP61	*27 element four acid ICP-AES*	%	0.13	0.12	0.18	0.11	0.25	0.23	0.11	0.22	0.24	0.1	0.1	0.08	0.18	0.05	0.08
Tl (Thallium)#	ME-ICP61	*27 element four acid ICP-AES*	ppm	<10	<10	<10	<10	<10	<10	<10	<10	<10	10	<10	10	<10	<10	<10
U (Uranium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	10	<10	<10	<10
V (Vanadium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	41	30	63	37	92	130	31	66	77	52	63	36	66	10	21
W (Tungsten)	ME-ICP61	*27 element four acid ICP-AES*	ppm	<10	<10	<10	<10	<10	10	<10	<10	<10	<10	<10	<10	<10	<10	10
Zn (Zinc)	ME-ICP61	*27 element four acid ICP-AES*	ppm	93	489	214	646	621	659	276	120	112	3800	2860	**>10000**	3070	337	281
Fire Assay Results for samples triggered due to concentration indicated during ICP testing																		
Ag (Silver)	Ag-OG62	*Ore Grade Ag - Four Acid*	**ppm**										**230**	**191**	**190**			
Ag (Silver)		*Calculated*	**oz. (troy) / Tonne**										**7.39**	**6.14**	**6.11**			
Pb (Lead)	Pb-OG62	*Ore Grade Pb - Four Acid*	**%**										**1.17**		**1.14**			
Zn (Zinc)	Zn-OG62	*Ore Grade Zn - Four Acid*	**%**												**1.18**			

Red = fire assay testing triggered

APPENDIX A2-3

UKHM Haulage Route Sampling

Keno Hill Waste Rock Chemistry Data				RUBY adit dump			HUSKY SW	CALUMET 1-14 pit dump		HUSKY SW	CALUMET 1-15 pit wall		CALUMET 1-15 pit dump		MILLER pit dump
	Method		Units	95UKHRD01	95UKHRD02	95UKHRD03	95UKHWD01	95UKHCD01	95UKHCD02	95UKHWD01	95UKHCP01	95UKHCP02	95UKHCD04	95UKHCD03	95UKHMD01
MPA	OA-VOL08	*Basic Acid Base Accounting*	tCaCO3/1000t ore	38.1	12.8	15.6	37.5	0.6	5.3	37.5	0.9	0.9	2.2	4.4	0.3
FIZZ RATING	OA-VOL08	*Basic Acid Base Accounting*	Unity	2	2	2	1	1	1	1	1	1	1	1	1
NNP	OA-VOL08	*Basic Acid Base Accounting*	tCaCO3/1000t ore	14	5	2	-43	0	-3	-43	-1	1	3	-4	4
NP	OA-VOL08	*Basic Acid Base Accounting*	tCaCO3/1000t ore	52	18	18	-5	1	2	-5	0	2	5	0	4
pH	OA-ELE07	*Paste pH*	Unity	7.5	7.1	7.6	3.2	6.6	6.1	3.2	6.9	7.1	6.9	6.7	7.3
Ratio (NP:MPA)	OA-VOL08	*Basic Acid Base Accounting*	Unity	1.36	1.4	1.15	-0.13	1.6	0.38	-0.13	0	2.13	2.29	0	12.8
S	S-IR08	*Total Sulphur (Leco)*	%	1.22	0.41	0.5	1.2	0.02	0.17	1.2	0.03	0.03	0.07	0.14	0.01
S	S-GRA06	*Sulfate Sulfur-carbonate leach*	%	0.44	0.12	0.26	0.42	0.01	0.07	0.42	0.01	0.02	0.02	0.11	<0.01
S	S-GRA06a	*Sulfate Sulfur (HCl leachable)*	%	0.46	0.14	0.25	0.37	<0.01	0.13	0.37	0.02	0.02	0.04	0.11	<0.01
S	S-CAL06	*Sulfide Sulpher (calculated)*	%	0.78	0.29	0.24	0.78	0.01	0.1	0.78	0.02	0.01	0.05	0.03	0.01
C	C-GAS05	*Inorganic Carbon (CO2)*	%	0.78	0.34	0.12	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
CO2	C-GAS05	*Inorganic Carbon (CO2)*	%	2.9	1.3	0.5	<0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2	<0.2
Au	Au-ICP21	*Au 30g FA ICP-AES Finish*	ppm	0.024	0.177	0.011	0.029	0.018	0.175	0.029	0.011	0.001	0.066	0.106	0.005
Ag (Silver)	ME-ICP61	*27 element four acid ICP-AES*	ppm	19	**>100**	23	8.2	**>100**	**>100**	8.2	21.5	34.3	**>100**	**>100**	6.4
Al (Aluminum)	ME-ICP61	*27 element four acid ICP-AES*	%	4.73	3.02	4.85	2.62	1.15	2.59	2.62	6.8	2.21	2.14	1.87	0.6
As (Arsenic)	ME-ICP61	*27 element four acid ICP-AES*	ppm	172	178	53	82	117	800	82	56	70	295	829	53
Ba (Barium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	610	420	310	420	100	480	420	1180	410	150	230	100
Be (Beryllium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	1.2	0.8	0.8	0.5	<0.5	0.6	0.5	1.5	0.7	<0.5	<0.5	<0.5
Bi (Bismuth)	ME-ICP61	*27 element four acid ICP-AES*	ppm	<2	<2	<2	<2	<2	2	<2	2	<2	3	<2	3
Ca (Calcium)	ME-ICP61	*27 element four acid ICP-AES*	%	1.47	0.3	3.09	0.08	0.02	0.03	0.08	0.02	0.05	0.04	0.02	0.03
Cd (Cadmium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	17.4	47.3	7.9	0.5	1	22.9	0.5	2	3.4	27.8	16.6	12.2
Co (Cobalt)	ME-ICP61	*27 element four acid ICP-AES*	ppm	6	1	21	1	1	<1	1	<1	<1	5	<1	1
Cr (Chromium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	71	53	42	52	25	53	52	110	56	51	46	30
Cu (Copper)	ME-ICP61	*27 element four acid ICP-AES*	ppm	21	128	100	14	73	242	14	27	11	295	211	8
Fe (Iron)	ME-ICP61	*27 element four acid ICP-AES*	%	3.71	3.06	5.41	1.83	1.28	6.51	1.83	2.51	1.71	3.17	3.67	1.21
Ga (Gallium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	10	10	10									
K (Potassium)	ME-ICP61	*27 element four acid ICP-AES*	%	1.16	0.73	0.46	0.51	0.27	0.81	0.51	2.12	0.62	0.27	0.52	0.19
La (Lanthanum)	ME-ICP61	*27 element four acid ICP-AES*	ppm	20	20	10									
Mg (Magnesium)	ME-ICP61	*27 element four acid ICP-AES*	%	0.42	0.22	1.52	0.17	0.04	0.07	0.17	0.14	0.11	0.44	0.04	0.02
Mn (Manganese)	ME-ICP61	*27 element four acid ICP-AES*	ppm	8680	5920	1865	176	182	6630	176	94	155	2950	3590	4970
Mo (Molybdenum)	ME-ICP61	*27 element four acid ICP-AES*	ppm	2	1	<1	<1	<1	1	<1	1	<1	<1	1	<1
Na (Sodium)	ME-ICP61	*27 element four acid ICP-AES*	%	0.15	0.09	0.49	0.09	0.02	0.06	0.09	0.14	0.05	0.19	0.04	0.02
Ni (Nickel)	ME-ICP61	*27 element four acid ICP-AES*	ppm	40	14	41	10	6	5	10	9	8	20	5	3
P (Phosphorous)	ME-ICP61	*27 element four acid ICP-AES*	ppm	650	430	730	70	80	440	70	370	500	270	320	250
Pb (Lead)	ME-ICP61	*27 element four acid ICP-AES*	ppm	992	5520	915	447	9330	**>10000**	447	668	681	7890	**>10000**	620
S (Sulphur)	ME-ICP61	*27 element four acid ICP-AES*	%	1.28	0.42	0.56	1.25	0.02	0.17	1.25	0.04	0.03	0.07	0.14	0.01
Sb (Antimony)	ME-ICP61	*27 element four acid ICP-AES*	ppm	24	161	27	22	54	282	22	17	20	136	258	13
Sc (Scandium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	8	6	18									
Sr (Strontium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	99	47	128	27	8	29	27	94	30	41	18	12
Th	ME-ICP61	*27 element four acid ICP-AES*	ppm	<20	<20	<20									
Ti (Titanium)	ME-ICP61	*27 element four acid ICP-AES*	%	0.24	0.15	0.69	0.24	0.08	0.11	0.24	0.36	0.14	0.23	0.1	0.06
Tl (Thallium)#	ME-ICP61	*27 element four acid ICP-AES*	ppm	<10	<10	<10									
U (Uranium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	<10	<10	<10									
V (Vanadium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	77	57	197	65	16	48	65	108	42	72	32	13
W (Tungsten)	ME-ICP61	*27 element four acid ICP-AES*	ppm	<10	<10	<10	10	<10	<10	10	<10	<10	<10	<10	<10
Zn (Zinc)	ME-ICP61	*27 element four acid ICP-AES*	ppm	1430	1860	578	57	276	2050	57	306	357	1155	1040	950
Fire Assay Results for samples triggered due to concentration indicated during ICP testing															
Ag (Silver)	Ag-OG62	*Ore Grade Ag - Four Acid*	**ppm**		**241**			**126**	**290**				**265**	**219**	
Ag (Silver)		*Calculated*	**oz. (troy) / Tonne**		**7.75**			**4.05**	**9.32**				**8.52**	**7.04**	
Pb (Lead)	Pb-OG62	*Ore Grade Pb - Four Acid*	**%**						**1.51**					**1.46**	
Zn (Zinc)	Zn-OG62	*Ore Grade Zn - Four Acid*	**%**												

Red = fire assay testing triggered

APPENDIX A2-3
UKHM Haulage Route Sampling

Keno Hill Waste Rock Chemistry Data				HECTOR adit dump			SIME 6 pit wall		SIME 4 pit wall	SIME 35 pit wall		SIME 4 & 6 pits wall	ONEK pit	ONEK pit dump			KENO 700
	Method		Units	95UKHHD01	95UKHHD02	95UKHHD03	95UKHSP01	95UKHSP02	95UKHSP03	95UKHSP04	95UKHSP05	95UKHSD01	95UKHOP01	95UKHOD01	95UKHOD02	95UKHOD03	95UKHKD01
MPA	OA-VOL08	*Basic Acid Base Accounting*	tCaCO3/1000t ore	60.3	53.8	21.9	1.9	1.3	0.3	1.3	0.9	0.6	9.4	0.3	0.3	1.9	17.8
FIZZ RATING	OA-VOL08	*Basic Acid Base Accounting*	Unity	2	3	3	1	1	1	1	1	1	3	2	1	3	3
NNP	OA-VOL08	*Basic Acid Base Accounting*	tCaCO3/1000t ore	1	49	19	2	1	1	3	2	3	55	17	1	36	17
NP	OA-VOL08	*Basic Acid Base Accounting*	tCaCO3/1000t ore	61	103	41	4	2	1	4	3	4	64	17	1	38	35
pH	OA-ELE07	*Paste pH*	Unity	6	7.2	7.4	7.1	7.1	7.5	7.4	7.6	8	8.4	8.7	8.1	7.7	7.8
Ratio (NP:MPA)	OA-VOL08	*Basic Acid Base Accounting*	Unity	1.01	1.92	1.87	2.13	1.6	3.2	3.2	3.2	6.4	6.83	54.4	3.2	20.27	1.96
S	S-IR08	*Total Sulphur (Leco)*	%	1.93	1.72	0.7	0.06	0.04	0.01	0.04	0.03	0.02	0.3	0.01	0.01	0.06	0.57
S	S-GRA06	*Sulfate Sulfur-carbonate leach*	%	0.45	0.26	0.18	0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04
S	S-GRA06a	*Sulfate Sulfur (HCl leachable)*	%	0.42	0.24	0.16	0.03	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04
S	S-CAL06	*Sulfide Sulpher (calculated)*	%	1.48	1.46	0.52	0.04	0.03	0.01	0.04	0.03	0.02	0.3	0.01	0.01	0.06	0.53
C	C-GAS05	*Inorganic Carbon (CO2)*	%	0.91	1.82	0.63	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.89	0.11	<0.05	0.51	0.47
CO2	C-GAS05	*Inorganic Carbon (CO2)*	%	3.3	6.7	2.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	3.3	0.4	<0.2	1.9	1.7
Au	Au-ICP21	*Au 30g FA ICP-AES Finish*	ppm	0.058	0.039	0.022	0.179	0.009	0.011	0.006	0.003	0.004	<0.001	<0.001	0.004	0.001	0.116
Ag (Silver)	ME-ICP61	*27 element four acid ICP-AES*	ppm	**>100**	60.1	54.8	51.4	8.9	2.5	0.7	1.5	1.2	<0.5	<0.5	4.9	<0.5	90.5
Al (Aluminum)	ME-ICP61	*27 element four acid ICP-AES*	%	3.15	2.44	3.46	7.04	2.97	0.43	5.52	3.59	0.58	3.92	8.55	0.58	9.26	1.72
As (Arsenic)	ME-ICP61	*27 element four acid ICP-AES*	ppm	352	733	188	59	36	84	18	37	29	9	7	85	25	423
Ba (Barium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	500	510	680	1070	480	70	940	440	80	500	20	50	1160	310
Be (Beryllium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	0.8	0.6	0.8	1.9	0.7	<0.5	1.4	0.9	<0.5	1	0.7	<0.5	2.3	<0.5
Bi (Bismuth)	ME-ICP61	*27 element four acid ICP-AES*	ppm	2	2	2	2	3	<2	<2	2	<2	<2	<2	<2	<2	3
Ca (Calcium)	ME-ICP61	*27 element four acid ICP-AES*	%	0.57	0.95	0.67	0.09	0.02	0.02	0.2	0.1	0.05	2.65	8.32	0.05	1.69	0.67
Cd (Cadmium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	203	211	61.4	9.6	2.1	4.5	2.3	10.3	7.8	2.9	0.9	6.2	1.4	85.2
Co (Cobalt)	ME-ICP61	*27 element four acid ICP-AES*	ppm	1	5	4	1	1	<1	<1	2	2	6	41	<1	12	3
Cr (Chromium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	50	48	63	87	60	27	95	79	34	58	109	42	112	48
Cu (Copper)	ME-ICP61	*27 element four acid ICP-AES*	ppm	109	58	51	59	16	7	28	7	2	11	144	55	28	68
Fe (Iron)	ME-ICP61	*27 element four acid ICP-AES*	%	4.8	5.35	2.91	2.84	1.59	0.46	3.12	2.09	0.45	2.17	8.5	1	4.52	2.19
Ga (Gallium)	ME-ICP61	*27 element four acid ICP-AES*	ppm														
K (Potassium)	ME-ICP61	*27 element four acid ICP-AES*	%	0.92	0.74	1.05	2.36	0.93	0.12	1.16	0.79	0.16	0.76	0.02	0.17	1.78	0.49
La (Lanthanum)	ME-ICP61	*27 element four acid ICP-AES*	ppm														
Mg (Magnesium)	ME-ICP61	*27 element four acid ICP-AES*	%	0.27	0.46	0.3	0.16	0.1	0.02	0.37	0.12	0.02	0.26	4.15	0.04	0.36	0.18
Mn (Manganese)	ME-ICP61	*27 element four acid ICP-AES*	ppm	13550	23900	8300	952	174	73	229	752	732	275	1440	163	277	3870
Mo (Molybdenum)	ME-ICP61	*27 element four acid ICP-AES*	ppm	<1	<1	1	1	<1	<1	2	<1	<1	<1	<1	1	1	1
Na (Sodium)	ME-ICP61	*27 element four acid ICP-AES*	%	0.08	0.06	0.1	0.17	0.05	0.01	0.26	0.1	0.02	0.16	1.08	0.02	0.31	0.07
Ni (Nickel)	ME-ICP61	*27 element four acid ICP-AES*	ppm	16	21	15	10	5	2	21	16	4	21	93	2	54	13
P (Phosphorous)	ME-ICP61	*27 element four acid ICP-AES*	ppm	440	350	390	740	440	120	1210	450	110	450	610	170	1030	260
Pb (Lead)	ME-ICP61	*27 element four acid ICP-AES*	ppm	5170	3020	2530	2250	1230	292	48	103	68	43	19	224	79	7170
S (Sulphur)	ME-ICP61	*27 element four acid ICP-AES*	%	2	1.78	0.73	0.06	0.04	0.01	0.04	0.03	0.02	0.32	0.01	0.01	0.07	0.59
Sb (Antimony)	ME-ICP61	*27 element four acid ICP-AES*	ppm	130	76	59	46	17	19	<5	9	<5	5	11	6	<5	96
Sc (Scandium)	ME-ICP61	*27 element four acid ICP-AES*	ppm														
Sr (Strontium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	37	42	55	103	30	8	108	43	10	207	253	6	226	42
Th	ME-ICP61	*27 element four acid ICP-AES*	ppm														
Ti (Titanium)	ME-ICP61	*27 element four acid ICP-AES*	%	0.16	0.13	0.17	0.38	0.19	0.05	0.27	0.2	0.06	0.2	0.97	0.07	0.27	0.13
Tl (Thallium)#	ME-ICP61	*27 element four acid ICP-AES*	ppm														
U (Uranium)	ME-ICP61	*27 element four acid ICP-AES*	ppm														
V (Vanadium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	54	47	58	117	49	8	108	60	9	59	341	12	145	31
W (Tungsten)	ME-ICP61	*27 element four acid ICP-AES*	ppm	<10	<10	<10	<10	<10	10	<10	<10	<10	<10	<10	<10	<10	<10
Zn (Zinc)	ME-ICP61	*27 element four acid ICP-AES*	ppm	**>10000**	**>10000**	4640	778	224	108	161	414	309	421	181	172	168	5920
Fire Assay Results for samples triggered due to concentration indicated during ICP testing																	
Ag (Silver)	Ag-OG62	*Ore Grade Ag - Four Acid*	**ppm**	**123**													
Ag (Silver)		*Calculated*	**oz. (troy) / Tonne**	**3.95**													
Pb (Lead)	Pb-OG62	*Ore Grade Pb - Four Acid*	**%**														
Zn (Zinc)	Zn-OG62	*Ore Grade Zn - Four Acid*	**%**	**1.62**	**1.66**												

Red = fire assay testing triggered

APPENDIX A2-3

UKHM Haulage Route Sampling

Keno Hill Waste Rock Chemistry Data				adit dump	UN adit dump	TOWNSITE adit dump		BELLEKENO adit dump	SILVER KING pit dump	GALKENO 900
	Method		Units	95UKHKD02	95UKHUD01	95UKHTD01	95UKHTD02	95UKHLD01	95UKHVD01	95UKGK901
MPA	OA-VOL08	*Basic Acid Base Accounting*	tCaCO3/1000t ore	12.8	1.3	39.7	10.9	24.4	14.7	17.8
FIZZ RATING	OA-VOL08	*Basic Acid Base Accounting*	Unity	3	1	2	2	3	1	2
NNP	OA-VOL08	*Basic Acid Base Accounting*	tCaCO3/1000t ore	28	3	-24	-1	49	-14	-11
NP	OA-VOL08	*Basic Acid Base Accounting*	tCaCO3/1000t ore	41	4	16	10	73	1	7
pH	OA-ELE07	*Paste pH*	Unity	7.9	7.8	5.7	6.7	7.1	4.2	4.6
Ratio (NP:MPA)	OA-VOL08	*Basic Acid Base Accounting*	Unity	3.2	3.2	0.4	0.91	2.99	0.07	0.39
S	S-IR08	*Total Sulphur (Leco)*	%	0.41	0.04	1.27	0.35	0.78	0.47	0.57
S	S-GRA06	*Sulfate Sulfur-carbonate leach*	%	0.08	0.01	0.24	0.23	0.04	0.42	0.37
S	S-GRA06a	*Sulfate Sulfur (HCl leachable)*	%	0.07	0.01	0.23	0.22	0.02	0.4	0.37
S	S-CAL06	*Sulfide Sulpher (calculated)*	%	0.33	0.03	1.03	0.12	0.74	0.05	0.2
C	C-GAS05	*Inorganic Carbon (CO2)*	%	0.49	<0.05	0.36	0.23	1.03	<0.05	0.13
CO2	C-GAS05	*Inorganic Carbon (CO2)*	%	1.8	<0.2	1.3	0.9	3.8	0.2	0.5
Au	Au-ICP21	*Au 30g FA ICP-AES Finish*	ppm	0.112	0.019	0.076	0.339	0.016	0.121	0.021
Ag (Silver)	ME-ICP61	*27 element four acid ICP-AES*	ppm	21.2	49.3	61.5	**>100**	28.5	19.7	25.3
Al (Aluminum)	ME-ICP61	*27 element four acid ICP-AES*	%	3.93	5.57	2.07	2.08	2.24	4.37	3.47
As (Arsenic)	ME-ICP61	*27 element four acid ICP-AES*	ppm	367	78	125	696	348	290	101
Ba (Barium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	2870	1010	320	260	330	1050	1030
Be (Beryllium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	1.2	1.4	0.5	0.7	0.6	0.9	0.9
Bi (Bismuth)	ME-ICP61	*27 element four acid ICP-AES*	ppm	4	<2	<2	<2	<2	<2	<2
Ca (Calcium)	ME-ICP61	*27 element four acid ICP-AES*	%	0.68	0.11	0.16	0.08	2.65	0.3	0.41
Cd (Cadmium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	34.9	5.7	90.8	56.5	12.9	1.4	1.1
Co (Cobalt)	ME-ICP61	*27 element four acid ICP-AES*	ppm	11	3	4	<1	3	1	2
Cr (Chromium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	56	90	58	46	61	54	61
Cu (Copper)	ME-ICP61	*27 element four acid ICP-AES*	ppm	105	31	33	285	24	25	19
Fe (Iron)	ME-ICP61	*27 element four acid ICP-AES*	%	3.33	2.81	2.99	4.17	2.03	2.33	2.11
Ga (Gallium)	ME-ICP61	*27 element four acid ICP-AES*	ppm							
K (Potassium)	ME-ICP61	*27 element four acid ICP-AES*	%	1.02	1.31	0.59	0.4	0.5	1.28	0.92
La (Lanthanum)	ME-ICP61	*27 element four acid ICP-AES*	ppm							
Mg (Magnesium)	ME-ICP61	*27 element four acid ICP-AES*	%	0.79	0.32	0.13	0.1	0.26	0.25	0.27
Mn (Manganese)	ME-ICP61	*27 element four acid ICP-AES*	ppm	4900	371	7300	4260	2210	235	593
Mo (Molybdenum)	ME-ICP61	*27 element four acid ICP-AES*	ppm	2	1	<1	<1	1	<1	1
Na (Sodium)	ME-ICP61	*27 element four acid ICP-AES*	%	0.24	0.21	0.04	0.05	0.06	0.15	0.12
Ni (Nickel)	ME-ICP61	*27 element four acid ICP-AES*	ppm	35	19	9	12	16	11	18
P (Phosphorous)	ME-ICP61	*27 element four acid ICP-AES*	ppm	300	720	340	430	490	360	430
Pb (Lead)	ME-ICP61	*27 element four acid ICP-AES*	ppm	1460	1960	941	**>10000**	1370	333	477
S (Sulphur)	ME-ICP61	*27 element four acid ICP-AES*	%	0.38	0.04	1.29	0.36	0.85	0.46	0.56
Sb (Antimony)	ME-ICP61	*27 element four acid ICP-AES*	ppm	27	53	39	707	27	28	27
Sc (Scandium)	ME-ICP61	*27 element four acid ICP-AES*	ppm							
Sr (Strontium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	100	89	21	20	107	78	78
Th	ME-ICP61	*27 element four acid ICP-AES*	ppm							
Ti (Titanium)	ME-ICP61	*27 element four acid ICP-AES*	%	0.15	0.3	0.12	0.08	0.14	0.5	0.18
Tl (Thallium)#	ME-ICP61	*27 element four acid ICP-AES*	ppm							
U (Uranium)	ME-ICP61	*27 element four acid ICP-AES*	ppm							
V (Vanadium)	ME-ICP61	*27 element four acid ICP-AES*	ppm	81	95	35	30	42	157	70
W (Tungsten)	ME-ICP61	*27 element four acid ICP-AES*	ppm	<10	<10	<10	<10	<10	10	<10
Zn (Zinc)	ME-ICP61	*27 element four acid ICP-AES*	ppm	2920	240	7070	2630	1150	105	127
Fire Assay Results for samples triggered due to concentration indicated during ICP testing										
Ag (Silver)	Ag-OG62	*Ore Grade Ag - Four Acid*	**ppm**				**679**			
Ag (Silver)		*Calculated*	**oz. (troy) / Tonne**				**21.83**			
Pb (Lead)	Pb-OG62	*Ore Grade Pb - Four Acid*	**%**				**3.95**			
Zn (Zinc)	Zn-OG62	*Ore Grade Zn - Four Acid*	**%**							

Red = fire assay testing triggered

Samp_ID	LCH_Al_mg/kg	LCH_Sb_mg/kg	LCH_As_mg/kg	LCH_Ba_mg/kg	LCH_Be_mg/kg	LCH_Bi_mg/kg	LCH_B_mg/kg	LCH_Cd_mg/kg	LCH_Ca_mg/kg	LCH_Cr_mg/kg	LCH_Co_mg/kg	LCH_Cu_mg/kg	LCH_Fe_mg/kg	LCH_Pb_mg/kg	LCH_Li_mg/kg	LCH_Mg_mg/kg	LCH_Mn_mg/kg
95UKHDD01	115.800	0.006	0.015	0.327	0.030	0.030	0.600	0.519	804.000	0.069	0.143	0.375	45.600	1.221	0.300	144.300	271.800
95UKHDD02	294.600	0.033	0.390	0.015	0.150	0.150	3.000	7.230	444.000	0.630	0.630	3.420	564.000	0.209	1.500	91.200	621.000
95UKHDD03	8.040	0.003	0.003	0.132	0.015	0.015	0.300	1.500	1533.000	0.015	0.324	0.220	6.090	0.075	0.198	186.300	47.700
95UKHBP01	0.033	0.009	0.003	0.028	0.002	0.002	0.039	0.018	15.660	0.003	0.000	0.005	0.090	0.005	0.020	3.300	0.426
95UKHBP02	0.059	0.013	0.022	0.007	0.002	0.002	0.030	0.001	33.900	0.005	0.000	0.002	0.108	0.002	0.029	6.390	0.013
95UKHBP03	0.061	0.006	0.005	0.020	0.002	0.002	0.039	0.002	9.930	0.003	0.000	0.002	0.090	0.003	0.026	2.760	0.071
95UKHBP04	0.079	0.011	0.002	0.005	0.002	0.002	0.030	0.001	5.610	0.007	0.000	0.005	0.090	0.003	0.015	1.410	0.049
95UKHBP06	0.059	0.017	0.002	0.070	0.003	0.003	0.060	0.003	426.000	0.003	0.005	0.015	0.090	0.007	0.048	91.200	3.780
95UKHBP07	2.520	0.017	0.003	0.026	0.002	0.002	0.033	0.001	15.030	0.002	0.001	0.013	1.227	0.006	0.026	4.770	0.133
95UKHBD01	0.009	0.002	0.001	0.007	0.002	0.002	0.030	0.036	141.000	0.002	0.000	0.002	0.090	0.007	0.038	78.300	0.093
95UKHBD02	0.609	0.004	0.020	0.034	0.002	0.002	0.030	0.037	259.500	0.002	0.002	0.010	0.645	0.106	0.033	84.600	0.846
95UKHBD03	0.300	0.030	0.030	0.171	0.150	0.150	3.000	107.100	408.000	0.150	0.192	0.048	0.090	4.350	1.500	153.000	366.000
95UKHBD04	0.016	0.002	0.001	0.019	0.003	0.003	0.060	0.134	137.400	0.003	0.001	0.003	0.090	0.056	0.057	59.700	0.828
95UKHBD05	0.009	0.006	0.001	0.008	0.002	0.002	0.033	0.006	13.560	0.002	0.000	0.003	0.090	0.002	0.015	3.720	5.820
95UKHBD06	0.044	0.016	0.002	0.018	0.002	0.002	0.030	0.411	18.450	0.002	0.001	0.003	0.090	0.032	0.015	4.980	1.383
95UKHRD01	0.885	0.009	0.020	0.079	0.015	0.015	0.300	0.047	1644.000	0.015	0.013	0.008	0.948	0.115	0.150	615.000	10.440
95UKHRD02	0.015	0.004	0.002	0.127	0.008	0.008	0.150	3.750	1053.000	0.008	0.071	0.138	0.090	3.510	0.075	147.900	42.600
95UKHRD03	0.140	0.008	0.002	0.118	0.008	0.008	0.150	0.183	1317.000	0.008	0.121	0.005	0.162	0.014	0.108	138.600	49.800
95UKHCD01	0.009	0.002	0.000	0.064	0.002	0.002	0.039	0.006	3.660	0.002	0.001	0.002	0.090	4.680	0.015	0.510	0.091
95UKHCD02	0.065	0.002	0.002	0.918	0.008	0.008	0.150	0.231	96.900	0.008	0.004	0.032	0.090	48.900	0.075	11.100	1.035
95UKHCD03	0.003	0.005	0.001	0.125	0.002	0.002	0.036	0.032	8.250	0.002	0.000	0.004	0.090	3.240	0.015	1.530	0.139
95UKHCP01	0.426	0.004	0.002	0.018	0.002	0.002	0.063	0.003	2.169	0.002	0.000	0.012	0.090	0.123	0.015	0.480	0.130
95UKHCP02	0.012	0.009	0.002	0.023	0.002	0.002	0.036	0.051	11.190	0.002	0.004	0.015	0.090	0.236	0.016	1.620	1.845
95UKHWD01	474.000	0.027	4.200	0.040	0.030	0.030	0.600	0.194	387.000	1.350	1.068	3.120	1854.000	0.432	0.810	285.900	59.100
95UKHCD04	0.011	0.002	0.001	0.777	0.002	0.002	0.030	0.570	20.580	0.002	0.011	0.015	0.090	5.250	0.015	4.890	1.344
95UKHMD01	0.074	0.005	0.002	0.077	0.002	0.002	0.036	0.001	10.170	0.008	0.000	0.008	0.108	0.095	0.015	0.750	0.075
95UKHHD01	2.400	0.030	0.036	0.061	0.150	0.150	3.000	15.090	1254.000	0.150	0.945	0.051	0.270	5.340	1.500	227.700	1545.000
95UKHHD02	0.240	0.014	0.014	0.258	0.015	0.015	0.300	3.300	1449.000	0.015	0.065	0.034	0.090	0.444	0.150	255.000	51.300
95UKHHD03	0.066	0.014	0.004	0.186	0.008	0.008	0.150	1.050	1374.000	0.008	0.016	0.023	0.090	0.263	0.075	144.900	16.230
95UKHSP01	0.086	0.003	0.001	0.068	0.002	0.002	0.066	0.051	3.360	0.002	0.001	0.007	0.090	0.957	0.015	0.600	0.690
95UKHSP02	0.017	0.003	0.002	0.013	0.002	0.002	0.060	0.007	3.480	0.002	0.001	0.012	0.090	0.132	0.018	0.870	0.546
95UKHSP03	0.025	0.047	0.015	0.008	0.002	0.002	0.030	0.007	6.990	0.002	0.000	0.004	0.090	0.099	0.015	0.780	0.173
95UKHSP04	0.036	0.004	0.002	0.010	0.002	0.002	0.030	0.004	16.260	0.002	0.000	0.005	0.090	0.029	0.038	1.680	0.193
95UKHSP05	0.357	0.011	0.008	0.013	0.002	0.002	0.030	0.009	5.730	0.002	0.000	0.005	0.243	0.080	0.018	0.510	0.262
95UKHSD01	0.122	0.009	0.007	0.001	0.002	0.002	0.030	0.004	28.710	0.004	0.000	0.001	0.090	0.005	0.015	1.680	0.218
95UKHOP01	0.468	0.007	0.003	0.008	0.002	0.002	0.033	0.000	56.100	0.002	0.000	0.004	0.090	0.005	0.017	5.220	0.021
95UKHOD01	0.810	0.038	0.035	0.004	0.002	0.002	0.030	0.000	29.790	0.002	0.000	0.008	0.294	0.001	0.015	1.950	0.011
95UKHOD02	0.257	0.010	0.014	0.026	0.002	0.002	0.081	0.006	5.400	0.004	0.000	0.011	0.243	0.053	0.015	0.930	0.254
95UKHOD03	0.146	0.003	0.004	0.040	0.002	0.002	0.036	0.001	118.800	0.002	0.000	0.010	0.090	0.027	0.020	13.200	0.016
95UKHKD01	0.030	0.028	0.004	0.119	0.003	0.003	0.060	0.522	402.000	0.003	0.006	0.025	0.090	0.315	0.030	18.270	2.103
95UKHKD02	0.030	0.024	0.018	0.116	0.003	0.003	0.060	0.061	465.000	0.003	0.001	0.016	0.090	0.060	0.030	57.900	0.603
95UKHUD01	0.133	0.017	0.002	0.123	0.002	0.002	0.042	0.040	11.280	0.002	0.001	0.013	0.090	0.468	0.020	2.100	0.510
95UKHTD01	1.440	0.060	0.060	0.081	0.300	0.300	6.000	16.740	275.100	0.300	1.083	0.114	0.090	2.643	3.000	141.900	1365.000
95UKHTD02	0.134	0.019	0.003	0.108	0.008	0.008	0.150	3.870	185.400	0.008	0.022	0.027	0.090	9.090	0.075	193.800	15.180
95UKHLD01	0.087	0.026	0.016	0.124	0.008	0.008	0.150	0.028	642.000	0.008	0.002	0.014	0.090	0.139	0.075	39.000	0.957
95UKHVD01	263.100	0.003	0.525	0.024	0.018	0.015	0.300	0.345	1518.000	0.702	0.921	3.390	342.000	0.134	0.465	219.900	63.000
95UKGK901	135.600	0.015	0.015	0.151	0.075	0.075	1.500	0.299	1206.000	0.075	1.107	1.146	43.800	0.687	0.750	375.000	292.500

Samp_ID	LCH_Hg_mg/kg	LCH_Mo_mg/kg	LCH_Ni_mg/kg	LCH_P_mg/kg	LCH_K_mg/kg	LCH_Se_mg/kg	LCH_Si_mg/kg	LCH_Ag_mg/kg	LCH_Na_mg/kg	LCH_Sr_mg/kg	LCH_Tl_mg/kg	LCH_Sn_mg/kg	LCH_Ti_mg/kg	LCH_U_mg/kg	LCH_V_mg/kg	LCH_Zn_mg/kg
95UKHDD01	0.003	0.003	0.702	0.900	10.200	0.060	17.520	0.014	6.000	0.504	0.008	0.006	0.030	0.028	0.060	22.260
95UKHDD02	0.003	0.015	2.943	4.770	6.000	0.300	13.050	0.003	6.000	0.291	0.030	0.030	0.030	0.151	0.300	429.000
95UKHDD03	0.003	0.002	1.251	0.900	13.500	0.030	11.310	0.000	6.000	0.525	0.004	0.003	0.030	0.001	0.030	87.000
95UKHBP01	0.003	0.000	0.010	0.900	12.600	0.003	11.970	0.000	6.000	0.073	0.000	0.000	0.030	0.000	0.003	0.237
95UKHBP02	0.003	0.001	0.002	0.900	6.000	0.003	9.120	0.001	12.600	0.077	0.000	0.000	0.030	0.000	0.003	0.018
95UKHBP03	0.003	0.000	0.002	0.900	8.100	0.003	11.550	0.001	6.000	0.052	0.000	0.000	0.030	0.000	0.003	0.032
95UKHBP04	0.003	0.000	0.002	0.900	6.000	0.003	7.440	0.000	6.000	0.024	0.000	0.000	0.030	0.000	0.003	0.024
95UKHBP06	0.003	0.019	0.012	0.900	18.900	0.024	7.230	0.000	6.000	1.134	0.001	0.001	0.030	0.005	0.006	0.024
95UKHBP07	0.003	0.015	0.002	0.900	10.500	0.004	17.370	0.000	7.800	0.033	0.000	0.000	0.030	0.000	0.003	0.021
95UKHBD01	0.003	0.000	0.002	0.900	7.800	0.015	6.000	0.001	14.400	0.209	0.000	0.000	0.030	0.000	0.003	0.131
95UKHBD02	0.003	0.000	0.005	0.900	10.500	0.023	6.870	0.003	18.600	0.300	0.000	0.000	0.033	0.000	0.003	0.296
95UKHBD03	0.003	0.015	0.498	0.900	19.200	0.300	5.550	0.003	17.700	0.663	0.030	0.030	0.030	0.003	0.300	798.000
95UKHBD04	0.003	0.000	0.004	0.900	10.200	0.022	5.430	0.000	6.000	0.168	0.001	0.001	0.030	0.000	0.006	1.053
95UKHBD05	0.003	0.001	0.002	0.900	6.000	0.005	7.320	0.000	6.000	0.070	0.000	0.000	0.030	0.000	0.003	0.053
95UKHBD06	0.003	0.000	0.003	0.900	6.000	0.003	7.620	0.000	6.000	0.089	0.000	0.000	0.030	0.000	0.003	3.150
95UKHRD01	0.003	0.002	0.071	0.900	18.000	0.030	3.900	0.003	6.000	2.352	0.003	0.003	0.030	0.002	0.030	0.315
95UKHRD02	0.003	0.001	0.432	0.900	13.800	0.015	7.350	0.001	6.000	0.696	0.002	0.002	0.030	0.000	0.015	48.600
95UKHRD03	0.003	0.001	0.408	0.900	14.400	0.015	6.570	0.000	6.000	0.972	0.002	0.002	0.030	0.001	0.015	1.770
95UKHCD01	0.003	0.000	0.005	0.900	6.900	0.003	6.180	0.005	6.000	0.020	0.001	0.000	0.030	0.000	0.003	0.095
95UKHCD02	0.003	0.001	0.020	0.900	36.300	0.015	10.560	0.014	18.600	0.468	0.002	0.002	0.030	0.000	0.015	1.980
95UKHCD03	0.003	0.000	0.003	0.900	9.300	0.003	8.610	0.002	6.000	0.062	0.000	0.000	0.030	0.000	0.003	0.155
95UKHCP01	0.003	0.000	0.002	0.900	18.600	0.007	9.510	0.001	6.000	0.017	0.000	0.000	0.030	0.000	0.003	0.058
95UKHCP02	0.003	0.000	0.013	0.900	10.500	0.005	7.950	0.000	6.000	0.050	0.000	0.000	0.030	0.000	0.003	0.576
95UKHWD01	0.003	0.007	2.727	6.810	6.000	0.060	20.310	0.004	6.000	0.789	0.006	0.006	0.057	0.033	0.705	13.080
95UKHCD04	0.003	0.002	0.026	0.900	7.200	0.003	10.350	0.000	6.000	0.175	0.000	0.000	0.030	0.000	0.003	3.090
95UKHMD01	0.003	0.000	0.002	0.900	6.000	0.003	8.160	0.000	6.000	0.019	0.000	0.000	0.030	0.000	0.003	0.125
95UKHHD01	0.003	0.016	1.989	0.900	16.800	0.300	6.960	0.003	6.000	1.296	0.030	0.030	0.030	0.003	0.300	831.000
95UKHHD02	0.003	0.002	0.221	0.900	15.000	0.030	6.180	0.000	6.000	2.292	0.003	0.003	0.030	0.001	0.030	98.700
95UKHHD03	0.003	0.001	0.078	0.900	20.400	0.015	6.090	0.000	6.000	1.389	0.002	0.002	0.030	0.001	0.015	11.070
95UKHSP01	0.003	0.001	0.005	0.900	19.200	0.003	11.970	0.003	6.000	0.020	0.000	0.000	0.030	0.000	0.003	0.597
95UKHSP02	0.003	0.000	0.004	0.900	12.300	0.003	10.740	0.000	6.000	0.019	0.000	0.000	0.030	0.000	0.003	0.103
95UKHSP03	0.003	0.000	0.002	0.900	6.000	0.003	5.070	0.000	6.000	0.030	0.000	0.000	0.030	0.000	0.003	0.039
95UKHSP04	0.003	0.002	0.002	0.900	6.000	0.009	11.130	0.000	6.000	0.042	0.000	0.000	0.030	0.000	0.003	0.095
95UKHSP05	0.003	0.001	0.003	0.900	6.900	0.003	6.330	0.001	6.000	0.019	0.000	0.000	0.030	0.000	0.003	0.263
95UKHSD01	0.003	0.001	0.002	0.900	6.000	0.003	5.010	0.000	6.000	0.028	0.000	0.000	0.030	0.000	0.003	0.142
95UKHOP01	0.003	0.006	0.002	0.900	12.600	0.009	5.370	0.000	6.000	0.167	0.000	0.000	0.030	0.001	0.003	0.012
95UKHOD01	0.003	0.006	0.002	0.900	6.000	0.003	12.090	0.000	6.000	0.061	0.000	0.000	0.030	0.000	0.014	0.015
95UKHOD02	0.003	0.001	0.002	0.900	6.000	0.003	7.560	0.001	6.000	0.038	0.000	0.000	0.030	0.000	0.003	0.083
95UKHOD03	0.003	0.004	0.002	0.900	12.300	0.020	6.120	0.000	13.500	0.309	0.000	0.000	0.030	0.001	0.003	0.015
95UKHKD01	0.003	0.003	0.016	0.900	9.600	0.006	6.720	0.001	6.000	0.615	0.001	0.001	0.030	0.000	0.006	5.280
95UKHKD02	0.003	0.056	0.003	0.900	14.100	0.006	6.270	0.000	6.000	1.005	0.001	0.001	0.030	0.002	0.006	0.663
95UKHUD01	0.003	0.000	0.004	0.900	9.300	0.003	10.770	0.001	6.000	0.046	0.000	0.000	0.030	0.000	0.003	0.354
95UKHTD01	0.003	0.030	1.860	0.900	15.000	0.600	6.720	0.006	6.000	0.420	0.060	0.060	0.030	0.006	0.600	867.000
95UKHTD02	0.003	0.001	0.088	0.900	12.300	0.015	12.060	0.000	6.000	0.068	0.002	0.002	0.030	0.000	0.015	51.000
95UKHLD01	0.003	0.029	0.008	0.900	20.100	0.015	6.480	0.000	27.000	0.996	0.002	0.002	0.030	0.007	0.015	0.249
95UKHVD01	0.003	0.002	1.335	1.980	6.000	0.030	23.580	0.003	6.000	1.158	0.003	0.003	0.042	0.093	0.030	13.680
95UKGK901	0.003	0.008	3.780	0.900	13.500	0.150	17.460	0.002	6.000	1.329	0.015	0.015	0.030	0.022	0.150	25.290

APPENDIX A3-1

Samp_ID	%Extr_Ag	%Extr_Al	%Extr_As	%Extr_Ba	%Extr_Be	%Extr_Bi	%Extr_Ca	%Extr_Cd	%Extr_Co	%Extr_Cr	%Extr_Cu	%Extr_Fe	%Extr_K	%Extr_Mg	%Extr_Mn	%Extr_Na	%Extr_Ni
95UKHDD01	0.8%	0.6%	0.02%	0.1%	5.0%	1.5%	32.2%	104%	14.3%	0.2%	4.2%	0.2%	0.3%	9.0%	26.1%	0.8%	8.8%
95UKHDD02	0.0%	2.3%	0.80%	0.0%	30.0%	7.5%	44.4%	123%	63.0%	1.9%	22.8%	4.7%	0.2%	15.2%	89.9%	3.0%	49.1%
95UKHDD03	0.0%	0.0%	0.01%	0.0%	1.5%	0.8%	30.1%	41%	16.2%	0.0%	2.0%	0.0%	0.2%	7.8%	26.6%	0.4%	8.3%
95UKHBP01	0.0%	0.0%	0.00%	0.0%	0.3%	0.1%	2.6%	0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.2%	0.0%		0.1%
95UKHBP02	0.0%	0.0%	0.01%	0.0%	0.1%	0.1%	1.9%	0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.8%	0.0%
95UKHBP03	0.0%	0.0%	0.00%	0.0%	0.1%	0.1%	1.2%	0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.4%	0.0%
95UKHBP04	0.0%	0.0%	0.01%	0.0%	0.3%	0.1%	2.8%	0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.1%	0.0%	1.5%	0.0%
95UKHBP06	0.0%	0.0%	0.00%	0.0%	0.3%	0.2%	2.2%	0%	0.1%	0.0%	0.1%	0.0%	0.1%	1.0%	0.5%	0.2%	0.0%
95UKHBP07	0.0%	0.0%	0.06%	0.0%	0.1%	0.1%	1.0%	0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%
95UKHBD01	0.0%	0.0%	0.00%	0.0%	0.2%	0.0%	6.4%	0%	0.0%	0.0%	0.0%	0.0%	0.1%	3.3%	0.0%	1.8%	0.0%
95UKHBD02	0.0%	0.0%	0.00%	0.0%	0.2%	0.0%	14.4%	0%	0.1%	0.0%	0.0%	0.0%	0.1%	3.5%	0.0%	2.3%	0.0%
95UKHBD03	0.0%	0.0%	0.00%	0.1%	25.0%	2.1%	7.2%	15%	19.2%	0.5%	0.0%	0.0%	0.4%	4.0%	0.4%	4.4%	4.5%
95UKHBD04	0.0%	0.0%	0.00%	0.0%	0.4%	0.1%	9.2%	0%	0.0%	0.0%	0.0%	0.0%	0.1%	2.4%	0.0%	0.6%	0.0%
95UKHBD05	0.0%	0.0%	0.00%	0.0%	0.3%	0.1%	4.5%	0%	0.0%	0.0%	0.0%	0.0%	0.5%	1.9%	0.2%	6.0%	0.1%
95UKHBD06	0.0%	0.0%	0.00%	0.0%	0.3%	0.1%	9.2%	5%	0.1%	0.0%	0.0%	0.0%	0.2%	1.0%	0.1%	2.0%	0.1%
95UKHRD01	0.0%	0.0%	0.01%	0.0%	1.3%	0.8%	11.2%	0%	0.2%	0.0%	0.0%	0.0%	0.2%	14.6%	0.1%	0.4%	0.2%
95UKHRD02	0.0%	0.0%	0.00%	0.0%	0.9%	0.4%	35.1%	8%	7.1%	0.0%	0.1%	0.0%	0.2%	6.7%	0.7%	0.7%	3.1%
95UKHRD03	0.0%	0.0%	0.00%	0.0%	0.9%	0.4%	4.3%	2%	0.6%	0.0%	0.0%	0.0%	0.3%	0.9%	2.7%	0.1%	1.0%
95UKHCD01	0.0%	0.0%	0.00%	0.1%	0.3%	0.1%	1.8%	1%	0.1%	0.0%	0.0%	0.0%	0.3%	0.1%	0.0%	3.0%	0.1%
95UKHCD02	0.0%	0.0%	0.00%	0.2%	1.3%	0.4%	32.3%	1%	0.4%	0.0%	0.0%	0.0%	0.4%	1.6%	0.0%	3.1%	0.4%
95UKHCD03	0.0%	0.0%	0.00%	0.1%	0.3%	0.1%	4.1%	0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.4%	0.0%	1.5%	0.1%
95UKHCP01	0.0%	0.0%	0.00%	0.0%	0.1%	0.1%	1.1%	0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.4%	0.0%
95UKHCP02	0.0%	0.0%	0.00%	0.0%	0.2%	0.1%	2.2%	1%	0.4%	0.0%	0.1%	0.0%	0.2%	0.1%	1.2%	1.2%	0.2%
95UKHWD01	0.0%	1.8%	5.12%	0.0%	6.0%	1.5%	48.4%	39%	106.8%	2.6%	22.3%	10.1%	0.1%	16.8%	33.6%	0.7%	27.3%
95UKHCD04	0.0%	0.0%	0.00%	0.5%	0.3%	0.1%	5.1%	2%	0.2%	0.0%	0.0%	0.0%	0.3%	0.1%	0.0%	0.3%	0.1%
95UKHMD01	0.0%	0.0%	0.00%	0.1%	0.3%	0.1%	3.4%	0%	0.0%	0.0%	0.1%	0.0%	0.3%	0.4%	0.0%	3.0%	0.1%
95UKHHD01	0.0%	0.0%	0.01%	0.0%	18.8%	7.5%	22.0%	7%	94.5%	0.3%	0.0%	0.0%	0.2%	8.4%	11.4%	0.8%	12.4%
95UKHHD02	0.0%	0.0%	0.00%	0.1%	2.5%	0.8%	15.3%	2%	1.3%	0.0%	0.1%	0.0%	0.2%	5.5%	0.2%	1.0%	1.1%
95UKHHD03	0.0%	0.0%	0.00%	0.0%	0.9%	0.4%	20.5%	2%	0.4%	0.0%	0.0%	0.0%	0.2%	4.8%	0.2%	0.6%	0.5%
95UKHSP01	0.0%	0.0%	0.00%	0.0%	0.1%	0.1%	0.4%	1%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.4%	0.1%
95UKHSP02	0.0%	0.0%	0.00%	0.0%	0.2%	0.1%	1.7%	0%	0.1%	0.0%	0.1%	0.0%	0.1%	0.1%	0.3%	1.2%	0.1%
95UKHSP03	0.0%	0.0%	0.02%	0.0%	0.3%	0.1%	3.5%	0%	0.0%	0.0%	0.1%	0.0%	0.5%	0.4%	0.2%	6.0%	0.1%
95UKHSP04	0.0%	0.0%	0.01%	0.0%	0.1%	0.1%	0.8%	0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.2%	0.0%
95UKHSP05	0.1%	0.0%	0.02%	0.0%	0.2%	0.1%	0.6%	0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.6%	0.0%
95UKHSD01	0.0%	0.0%	0.02%	0.0%	0.3%	0.1%	5.7%	0%	0.0%	0.0%	0.1%	0.0%	0.4%	0.8%	0.0%	3.0%	0.0%
95UKHOP01	0.0%	0.0%	0.03%	0.0%	0.2%	0.1%	0.2%	0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%	0.0%	0.4%	0.0%
95UKHOD01	0.0%	0.0%	0.51%	0.0%	0.2%	0.1%	0.0%	0%	0.0%	0.0%	0.0%	0.0%	3.0%	0.0%	0.0%	0.1%	0.0%
95UKHOD02	0.0%	0.0%	0.02%	0.1%	0.3%	0.1%	1.1%	0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.2%	0.2%	3.0%	0.1%
95UKHOD03	0.0%	0.0%	0.01%	0.0%	0.1%	0.1%	0.7%	0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.4%	0.0%	0.4%	0.0%
95UKHKD01	0.0%	0.0%	0.00%	0.0%	0.6%	0.1%	6.0%	1%	0.2%	0.0%	0.0%	0.0%	0.2%	1.0%	0.1%	0.9%	0.1%
95UKHKD02	0.0%	0.0%	0.00%	0.0%	0.3%	0.1%	6.8%	0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.7%	0.0%	0.3%	0.0%
95UKHUD01	0.0%	0.0%	0.00%	0.0%	0.1%	0.1%	1.0%	1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.3%	0.0%
95UKHTD01	0.0%	0.0%	0.05%	0.0%	60.0%	15.0%	17.2%	18%	27.1%	0.5%	0.3%	0.0%	0.3%	10.9%	18.7%	1.5%	20.7%
95UKHTD02	0.0%	0.0%	0.00%	0.0%	1.1%	0.4%	23.2%	7%	2.2%	0.0%	0.0%	0.0%	0.3%	19.4%	0.4%	1.2%	0.7%
95UKHLD01	0.0%	0.0%	0.00%	0.0%	1.3%	0.4%	2.4%	0%	0.1%	0.0%	0.1%	0.0%	0.4%	1.5%	0.0%	4.5%	0.0%
95UKHVD01	0.0%	0.6%	0.18%	0.0%	2.0%	0.8%	50.6%	25%	92.1%	1.3%	13.6%	1.5%	0.0%	8.8%	26.8%	0.4%	12.1%
95UKGK901	0.0%	0.4%	0.01%	0.0%	8.3%	3.8%	29.4%	27%	55.4%	0.1%	6.0%	0.2%	0.1%	13.9%	49.3%	0.5%	21.0%

Samp_ID	%Extr_P	%Extr_Pb	%Extr_Sb	%Extr_Sr	%Extr_V	%Extr_Zn	%Extr_Ag_ore	%Extr_Pb_ore	%Extr_Zn_ore
95UKHDD01	0.3%	1.5%	0.0%	1.4%	0.1%	23.9%			
95UKHDD02	1.2%	0.0%	0.1%	1.5%	1.0%	87.7%			
95UKHDD03	0.2%	0.1%	0.0%	0.9%	0.0%	40.7%			
95UKHBP01	0.2%	0.0%	0.0%	0.3%	0.0%	0.0%			
95UKHBP02	0.2%	0.0%	0.0%	0.1%	0.0%	0.0%			
95UKHBP03	0.2%	0.0%	0.0%	0.1%	0.0%	0.0%			
95UKHBP04	0.6%	0.0%	0.1%	0.1%	0.0%	0.0%			
95UKHBP06	0.1%	0.0%	0.3%	0.9%	0.0%	0.0%			
95UKHBP07	0.3%	0.0%	0.2%	0.0%	0.0%	0.0%			
95UKHBD01	0.1%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	
95UKHBD02	0.1%	0.0%	0.0%	0.4%	0.0%	0.0%	0.0%		
95UKHBD03	0.1%	0.0%	0.0%	1.8%	0.8%	8.0%	0.0%	0.0%	6.8%
95UKHBD04	0.2%	0.0%	0.0%	0.2%	0.0%	0.0%			
95UKHBD05	0.5%	0.0%	0.1%	0.7%	0.0%	0.0%			
95UKHBD06	0.6%	0.0%	0.1%	0.3%	0.0%	1.1%			
95UKHRD01	0.1%	0.0%	0.0%	2.4%	0.0%	0.0%			
95UKHRD02	0.2%	0.1%	0.0%	1.5%	0.0%	2.6%	0.0%		
95UKHRD03	0.1%	0.0%	0.0%	0.8%	0.0%	0.3%			
95UKHCD01	1.1%	0.1%	0.0%	0.3%	0.0%	0.0%	0.0%		
95UKHCD02	0.2%	0.5%	0.0%	1.6%	0.0%	0.1%	0.0%	0.3%	
95UKHCD03	0.3%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	
95UKHCP01	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%			
95UKHCP02	0.2%	0.0%	0.0%	0.2%	0.0%	0.2%			
95UKHWD01	9.7%	0.1%	0.1%	2.9%	1.1%	22.9%			
95UKHCD04	0.3%	0.1%	0.0%	0.4%	0.0%	0.3%	0.0%		
95UKHMD01	0.4%	0.0%	0.0%	0.2%	0.0%	0.0%			
95UKHHD01	0.2%	0.1%	0.0%	3.5%	0.6%	8.3%	0.0%		5.1%
95UKHHD02	0.3%	0.0%	0.0%	5.5%	0.1%	1.0%			0.6%
95UKHHD03	0.2%	0.0%	0.0%	2.5%	0.0%	0.2%			
95UKHSP01	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%			
95UKHSP02	0.2%	0.0%	0.0%	0.1%	0.0%	0.0%			
95UKHSP03	0.8%	0.0%	0.2%	0.4%	0.0%	0.0%			
95UKHSP04	0.1%	0.1%	0.1%	0.0%	0.0%	0.1%			
95UKHSP05	0.2%	0.1%	0.1%	0.0%	0.0%	0.1%			
95UKHSD01	0.8%	0.0%	0.2%	0.3%	0.0%	0.0%			
95UKHOP01	0.2%	0.0%	0.1%	0.1%	0.0%	0.0%			
95UKHOD01	0.1%	0.0%	0.3%	0.0%	0.0%	0.0%			
95UKHOD02	0.5%	0.0%	0.2%	0.6%	0.0%	0.0%			
95UKHOD03	0.1%	0.0%	0.1%	0.1%	0.0%	0.0%			
95UKHKD01	0.3%	0.0%	0.0%	1.5%	0.0%	0.1%			
95UKHKD02	0.3%	0.0%	0.1%	1.0%	0.0%	0.0%			
95UKHUD01	0.1%	0.0%	0.0%	0.1%	0.0%	0.1%			
95UKHTD01	0.3%	0.3%	0.2%	2.0%	1.7%	12.3%			
95UKHTD02	0.2%	0.1%	0.0%	0.3%	0.1%	1.9%	0.0%	0.0%	
95UKHLD01	0.2%	0.0%	0.1%	0.9%	0.0%	0.0%			
95UKHVD01	0.6%	0.0%	0.0%	1.5%	0.0%	13.0%			
95UKGK901	0.2%	0.1%	0.1%	1.7%	0.2%	19.9%			

APPENDIX A4-1
Statistical Summary

Acid Base Accounting Parameters

Statistic	paste_pH	FIZZ RATING	St_%	SO4_CbLch%	SO4_HCl%	S2-_%	MPA_kgCaCO3/t	NP_kgCaCO3/t	NNP_kgCaCO3/t	NP:MPA	Cinorg_%	CO2_%
No. of observations	47	47	47	47	47	47	47	47	47	47	47	47
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	3.200	1.000	0.010	0.010	0.010	0.010	0.300	-5.000	-43.000	-0.260	0.050	0.200
Maximum	8.700	3.000	1.930	0.450	0.460	1.480	60.300	308.000	285.000	54.400	3.640	13.400
1st Quartile	6.700	1.000	0.030	0.010	0.010	0.020	0.900	2.500	1.000	1.180	0.050	0.200
Median	7.200	1.000	0.170	0.020	0.030	0.060	5.300	7.000	3.000	2.290	0.060	0.200
3rd Quartile	7.600	2.000	0.485	0.200	0.210	0.295	15.150	25.500	14.500	5.025	0.365	1.350
Mean	6.904	1.617	0.348	0.108	0.113	0.242	10.877	23.851	12.957	4.931	0.330	1.228
Standard deviation (n)	1.213	0.787	0.458	0.138	0.132	0.363	14.308	48.104	43.931	8.512	0.604	2.217
Variation coefficient	0.176	0.487	1.315	1.273	1.164	1.498	1.316	2.017	3.390	1.726	1.829	1.806
Skewness (Pearson)	-1.520	0.789	1.801	1.262	1.119	1.999	1.801	4.497	5.026	4.339	3.862	3.876
Kurtosis (Pearson)	1.799	-0.943	2.799	0.267	0.089	3.454	2.797	23.142	28.411	21.629	17.138	17.253
Geometric mean	6.767	1.452	0.121	0.041	0.046	0.076	3.742				0.135	0.520
Geometric standard deviation	1.242	1.580	5.155	4.289	4.312	5.044	5.229				3.418	3.315

Leachate Extraction Parameters

Statistic	LCH_pH	LCH_Al_mg/L	LCH_Sb_mg/L	LCH_As_mg/L	LCH_Ba_mg/L	LCH_Be_mg/L	LCH_Bi_mg/L	LCH_B_mg/L	LCH_Cd_mg/L	LCH_Ca_mg/L	LCH_Cr_mg/L	LCH_Co_mg/L	LCH_Cu_mg/L	LCH_Fe_mg/L	LCH_Pb_mg/L	LCH_Li_mg/L	LCH_Mg_mg/L	LCH_Mn_mg/L	LCH_Hg_mg/L	LCH_Mo_mg/L
No. of observations	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	2.380	0.001	0.001	0.000	0.000	0.001	0.001	0.010	0.000	0.723	0.001	0.000	0.000	0.030	0.000	0.005	0.160	0.004	0.001	0.000
Maximum	7.870	158.000	0.020	1.400	0.306	0.100	0.100	2.000	35.700	548.000	0.450	0.369	1.140	618.000	16.300	1.000	205.000	515.000	0.001	0.019
1st Quartile	6.210	0.011	0.001	0.001	0.005	0.001	0.001	0.011	0.002	3.745	0.001	0.000	0.002	0.030	0.007	0.005	0.560	0.052	0.001	0.000
Median	6.710	0.029	0.003	0.001	0.013	0.001	0.001	0.020	0.013	32.300	0.001	0.000	0.004	0.030	0.038	0.010	3.700	0.282	0.001	0.000
3rd Quartile	7.175	0.180	0.006	0.005	0.040	0.003	0.003	0.050	0.155	151.500	0.003	0.015	0.010	0.081	0.193	0.031	47.700	9.805	0.001	0.002
Mean	6.388	9.244	0.005	0.039	0.034	0.007	0.007	0.149	1.160	126.776	0.025	0.048	0.088	20.302	0.664	0.081	27.143	34.336	0.001	0.002
Standard deviation (n)	1.314	29.831	0.004	0.203	0.057	0.018	0.018	0.367	5.216	173.925	0.078	0.108	0.272	93.552	2.391	0.186	40.449	102.544	0.000	0.003
Variation coefficient	0.206	3.227	0.940	5.184	1.691	2.485	2.492	2.462	4.498	1.372	3.069	2.240	3.087	4.608	3.600	2.282	1.490	2.987	0.000	1.937
Skewness (Pearson)	-1.862	3.622	1.625	6.414	3.539	3.489	3.491	3.496	6.194	1.268	4.088	2.228	3.358	5.684	5.965	3.293	2.244	3.756		3.090
Kurtosis (Pearson)	2.703	12.930	2.599	39.984	12.806	12.520	12.528	12.564	37.946	0.089	17.277	3.316	9.655	32.693	35.950	11.391	6.156	13.494		10.648
Geometric mean	6.191	0.072	0.003	0.002	0.014	0.001	0.001	0.033	0.017	25.726	0.002	0.001	0.006	0.098	0.040	0.018	4.703	0.603	0.001	0.000
Geometric standard deviation	1.325	18.945	2.613	6.272	4.077	4.676	4.662	4.368	24.140	8.564	6.565	18.294	7.399	12.481	13.729	4.632	9.857	25.351	1.000	5.782

Elemental Composition of Solids

Statistic	As_ppm	Ba_ppm	Be_ppm	Bi_ppm	Ca_%	Cd_ppm	Co_ppm	Cr_ppm	Cu_ppm	Fe_%	Ga_ppm	K_%	La_ppm	Mg_%	Mn_ppm	Mo_ppm	Na_%	Ni_ppm	P_ppm	Pb_ppm
No. of observations	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
No. of missing values	0	0	0	0	0	0	0	0	0	0	29	0	29	0	0	0	1	0	0	0
Minimum	5	20	1	2	0	1	1	25	2	0	10	0	10	0	73	1	0	2	70	18
Maximum	944	2870	2	7	8	691	41	112	295	14	20	3	40	4	82800	4	1	93	1320	10000
1st Quartile	46	260	1	2	0	3	1	42	16	2	10	0	10	0	324	1	0	8	290	173
Median	85	430	1	2	0	10	2	53	28	3	10	1	10	0	1615	1	0	15	430	896
3rd Quartile	340	725	1	2	1	31	5	61	81	4	10	1	20	0	4935	1	0	21	580	4095
Mean	219	545	1	2	1	47	4	56	62	3	11	1	16	0	6485	1	0	17	455	2653
Standard deviation (n)	248	475	0	1	1	110	7	21	71	3	2	1	8	1	14168	1	0	16	263	3500
Variation coefficient	1	1	1	0	2	2	2	0	1	1	0	1	0	2	2	0	1	1	1	1
Skewness (Pearson)	1	3	2	3	4	4	4	1	2	2	4	1	2	5	4	4	3	3	1	1
Kurtosis (Pearson)	1	10	2	9	19	22	17	1	3	5	13	2	3	26	16	19	10	10	2	0
Geometric mean	107	379	1	2	0	10	2	53	35	3	10	1	14	0	1549	1	0	12	381	753
Geometric standard deviation	4	3	2	1	5	6	3	1	3	2	1	2	2	3	6	1	3	2	2	7

APPENDIX A4-1
Statistical Summary

Acid Base Accounting Parameters

Statistic
No. of observations
No. of missing values
Minimum
Maximum
1st Quartile
Median
3rd Quartile
Mean
Standard deviation (n)
Variation coefficient
Skewness (Pearson)
Kurtosis (Pearson)
Geometric mean
Geometric standard deviation

Leachate Extraction Parameters

Statistic	LCH_Ni_mg/L	LCH_P_mg/L	LCH_K_mg/L	LCH_Se_mg/L	LCH_Si_mg/L	LCH_Ag_mg/L	LCH_Na_mg/L	LCH_Sr_mg/L	LCH_Tl_mg/L	LCH_Sn_mg/L	LCH_Ti_mg/L	LCH_U_mg/L	LCH_V_mg/L	LCH_Zn_mg/L
No. of observations	47	47	47	47	47	47	47	47	47	47	47	47	47	47
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	0.001	0.300	2.000	0.001	1.300	0.000	2.000	0.006	0.000	0.000	0.010	0.000	0.001	0.004
Maximum	1.260	2.270	12.100	0.200	7.860	0.005	9.000	0.784	0.020	0.020	0.019	0.050	0.235	289.000
1st Quartile	0.001	0.300	2.000	0.001	2.100	0.000	2.000	0.015	0.000	0.000	0.010	0.000	0.001	0.030
Median	0.002	0.300	3.500	0.003	2.520	0.000	2.000	0.056	0.000	0.000	0.010	0.000	0.001	0.105
3rd Quartile	0.051	0.300	4.750	0.008	3.740	0.001	2.000	0.227	0.001	0.001	0.010	0.000	0.005	4.025
Mean	0.132	0.377	3.857	0.015	3.089	0.001	2.583	0.150	0.001	0.001	0.010	0.003	0.019	23.523
Standard deviation (n)	0.288	0.339	1.956	0.037	1.402	0.001	1.479	0.191	0.004	0.004	0.001	0.009	0.049	69.666
Variation coefficient	2.186	0.899	0.507	2.362	0.454	1.759	0.573	1.274	2.457	2.490	0.137	3.342	2.503	2.962
Skewness (Pearson)	2.475	4.688	1.679	3.501	1.509	3.086	2.695	1.670	3.470	3.491	5.347	4.449	3.207	3.178
Kurtosis (Pearson)	5.302	21.236	4.439	12.630	2.028	9.792	6.819	2.450	12.424	12.531	28.620	19.939	9.792	8.532
Geometric mean	0.006	0.330	3.458	0.004	2.837	0.000	2.348	0.056	0.000	0.000	0.010	0.000	0.003	0.301
Geometric standard deviation	14.457	1.480	1.588	4.381	1.494	4.923	1.470	4.758	4.671	4.636	1.111	12.175	5.139	26.160

Elemental Composition of Solids

Statistic	S_%	Sb_ppm	Sc_ppm	Sr_ppm	Th_ppm	Ti_%	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn_ppm	Ag_ore_ppm	Ag_ore_Oz/T	Pb_ore_%	Zn_ore_%
No. of observations	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
No. of missing values	0	0	29	0	29	0	29	29	0	0	0	37	37	42	44
Minimum	0	5	1	6	20	0	10	10	8	10	57	123	4	1	1
Maximum	2	707	18	253	20	1	10	10	341	10	10000	679	22	4	2
1st Quartile	0	13	4	27	20	0	10	10	34	10	219	190	6	1	1
Median	0	27	7	43	20	0	10	10	57	10	489	225	7	1	2
3rd Quartile	1	68	8	92	20	0	10	10	77	10	1955	259	8	2	2
Mean	0	72	7	65	20	0	10	10	67	10	1731	255	8	2	1
Standard deviation (n)	0	118	4	55	0	0	0	0	57	0	2655	150	5	1	0
Variation coefficient	1	2	1	1	0	1	0	0	1	0	2	1	1	1	0
Skewness (Pearson)	2	4	1	2		3			3		2	2	2	1	-1
Kurtosis (Pearson)	3	15	1	3		10			10		4	3	3	0	-2
Geometric mean	0	31	6	45	20	0	10	10	50	10	642	227	7	2	1
Geometric standard deviation	5	3	2	2	1	2	1	1	2	1	4	2	2	2	1

APPENDIX A4-1
Statistical Summary

Soluble Product Loading

Statistic	LCH_Al_mg/kg	LCH_Sb_mg/kg	LCH_As_mg/kg	LCH_Ba_mg/kg	LCH_Be_mg/kg	LCH_Bi_mg/kg	LCH_B_mg/kg	LCH_Cd_mg/kg	LCH_Ca_mg/kg	LCH_Cr_mg/kg	LCH_Co_mg/kg	LCH_Cu_mg/kg	LCH_Fe_mg/kg	LCH_Pb_mg/kg	LCH_Li_mg/kg	LCH_Mg_mg/kg	LCH_Mn_mg/kg	LCH_Hg_mg/kg	LCH_Mo_mg/kg	LCH_Ni_mg/kg
No. of observations	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	0.003	0.002	0.000	0.001	0.002	0.002	0.030	0.000	2.169	0.002	0.000	0.001	0.090	0.001	0.015	0.480	0.011	0.003	0.000	0.002
Maximum	474.000	0.060	4.200	0.918	0.300	0.300	6.000	107.100	1644.000	1.350	1.107	3.420	1854.000	48.900	3.000	615.000	1545.000	0.003	0.056	3.780
1st Quartile	0.032	0.004	0.002	0.016	0.002	0.002	0.033	0.005	11.235	0.002	0.000	0.005	0.090	0.021	0.015	1.680	0.156	0.003	0.000	0.002
Median	0.087	0.009	0.003	0.040	0.002	0.002	0.060	0.040	96.900	0.003	0.001	0.012	0.090	0.115	0.030	11.100	0.846	0.003	0.001	0.005
3rd Quartile	0.539	0.017	0.015	0.121	0.008	0.008	0.150	0.465	454.500	0.008	0.044	0.029	0.243	0.578	0.092	143.100	29.415	0.003	0.005	0.154
Mean	27.733	0.014	0.117	0.102	0.022	0.022	0.448	3.479	380.327	0.076	0.144	0.264	60.905	1.993	0.244	81.428	103.007	0.003	0.005	0.395
Standard deviation (n)	89.492	0.013	0.609	0.172	0.055	0.055	1.102	15.647	521.775	0.234	0.323	0.815	280.655	7.172	0.558	121.348	307.631	0.000	0.010	0.863
Variation coefficient	3.227	0.940	5.184	1.691	2.485	2.492	2.462	4.498	1.372	3.069	2.240	3.087	4.608	3.600	2.282	1.490	2.987	0.000	1.937	2.186
Skewness (Pearson)	3.622	1.625	6.414	3.539	3.489	3.491	3.496	6.194	1.268	4.088	2.228	3.358	5.684	5.965	3.293	2.244	3.756		3.090	2.475
Kurtosis (Pearson)	12.930	2.599	39.984	12.806	12.520	12.528	12.564	37.946	0.089	17.277	3.316	9.655	32.693	35.950	11.391	6.156	13.494		10.648	5.302
Geometric mean	0.217	0.009	0.006	0.042	0.004	0.004	0.099	0.052	77.179	0.006	0.004	0.017	0.294	0.119	0.054	14.108	1.810	0.003	0.001	0.018
Geometric standard deviation	18.945	2.613	6.272	4.077	4.676	4.662	4.368	24.140	8.564	6.565	18.294	7.399	12.481	13.729	4.632	9.857	25.351	1.000	5.782	14.457

% Solubilized (or % Extraction)

Statistic	%Extr_Ag	%Extr_Al	%Extr_As	%Extr_Ba	%Extr_Be	%Extr_Bi	%Extr_Ca	%Extr_Cd	%Extr_Co	%Extr_Cr	%Extr_Cu	%Extr_Fe	%Extr_K	%Extr_Mg	%Extr_Mn	%Extr_Na	%Extr_Ni	%Extr_P	%Extr_Pb	%Extr_Sb
No. of observations	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Minimum	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000
Maximum	0.008	0.023	0.051	0.005	0.600	0.150	0.506	1.225	1.068	0.026	0.228	0.101	0.030	0.194	0.899	0.060	0.491	0.097	0.015	0.003
1st Quartile	0.000	0.000	0.000	0.000	0.002	0.001	0.018	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.004	0.000	0.002	0.000	0.000
Median	0.000	0.000	0.000	0.000	0.003	0.001	0.045	0.003	0.001	0.000	0.000	0.000	0.002	0.009	0.001	0.008	0.001	0.002	0.000	0.000
3rd Quartile	0.000	0.000	0.000	0.000	0.013	0.004	0.162	0.034	0.009	0.000	0.001	0.000	0.003	0.052	0.005	0.020	0.009	0.003	0.001	0.001
Mean	0.000	0.001	0.001	0.000	0.037	0.010	0.112	0.092	0.107	0.002	0.015	0.004	0.003	0.036	0.062	0.014	0.037	0.005	0.001	0.001
Standard deviation (n)	0.001	0.004	0.007	0.001	0.103	0.026	0.137	0.240	0.261	0.005	0.049	0.016	0.004	0.052	0.163	0.015	0.091	0.014	0.002	0.001
Variation coefficient	4.410	3.522	5.007	2.300	2.789	2.642	1.224	2.602	2.444	3.011	3.195	4.493	1.593	1.440	2.631	1.050	2.469	2.729	2.939	1.178
Skewness (Pearson)	6.488	4.068	6.325	5.047	4.057	3.989	1.449	3.607	2.634	3.755	3.574	5.230	5.858	1.564	3.487	1.562	3.325	6.311	5.525	1.839
Kurtosis (Pearson)	40.713	15.920	39.134	27.308	17.383	16.605	1.019	12.835	5.689	13.720	11.694	27.455	35.302	1.330	13.295	1.775	11.916	39.136	31.415	3.132
Geometric mean	0.000	0.000	0.000	0.000	0.006	0.002	0.045	0.005	0.002	0.000	0.000	0.000	0.002	0.008	0.001	0.008	0.001	0.003	0.000	0.000
Geometric standard deviation	5.440	18.112	8.920	4.384	5.391	4.859	4.853	14.878	24.079	7.194	10.332	15.020	2.166	8.306	26.138	3.080	15.489	2.341	7.009	5.210

APPENDIX A4-1
Statistical Summary

Soluble Product Loading

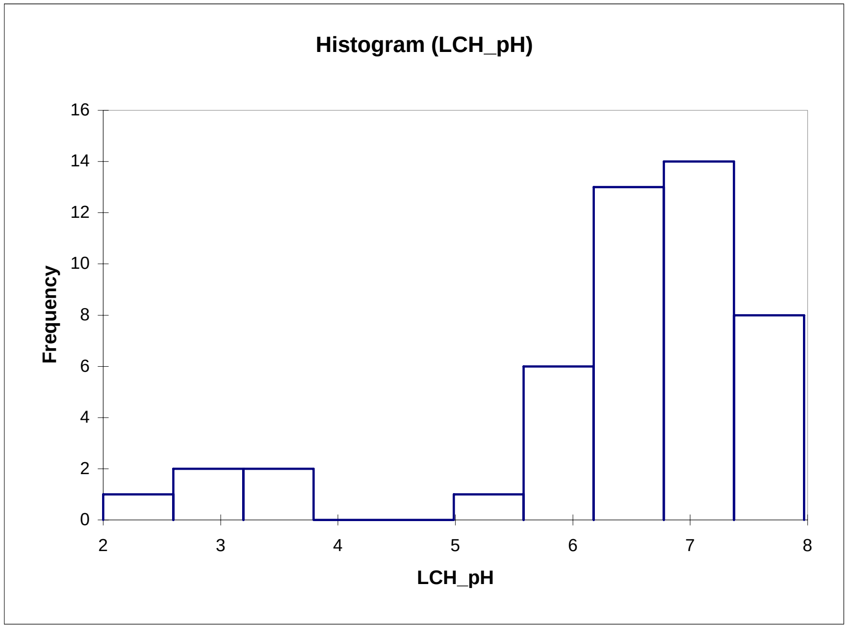
Statistic	LCH_P_mg/kg	LCH_K_mg/kg	LCH_Se_mg/kg	LCH_Si_mg/kg	LCH_Ag_mg/kg	LCH_Na_mg/kg	LCH_Sr_mg/kg	LCH_Tl_mg/kg	LCH_Sn_mg/kg	LCH_Ti_mg/kg	LCH_U_mg/kg	LCH_V_mg/kg	LCH_Zn_mg/kg
No. of observations	47	47	47	47	47	47	47	47	47	47	47	47	47
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	0.900	6.000	0.003	3.900	0.000	6.000	0.017	0.000	0.000	0.030	0.000	0.003	0.012
Maximum	6.810	36.300	0.600	23.580	0.014	27.000	2.352	0.060	0.060	0.057	0.151	0.705	867.000
1st Quartile	0.900	6.000	0.003	6.300	0.000	6.000	0.044	0.000	0.000	0.030	0.000	0.003	0.089
Median	0.900	10.500	0.009	7.560	0.000	6.000	0.168	0.000	0.000	0.030	0.000	0.003	0.315
3rd Quartile	0.900	14.250	0.023	11.220	0.002	6.000	0.680	0.002	0.002	0.030	0.001	0.015	12.075
Mean	1.131	11.572	0.046	9.266	0.002	7.749	0.451	0.004	0.004	0.031	0.008	0.058	70.570
Standard deviation (n)	1.016	5.868	0.110	4.206	0.003	4.437	0.574	0.011	0.011	0.004	0.026	0.146	208.998
Variation coefficient	0.899	0.507	2.362	0.454	1.759	0.573	1.274	2.457	2.490	0.137	3.342	2.503	2.962
Skewness (Pearson)	4.688	1.679	3.501	1.509	3.086	2.695	1.670	3.470	3.491	5.347	4.449	3.207	3.178
Kurtosis (Pearson)	21.236	4.439	12.630	2.028	9.792	6.819	2.450	12.424	12.531	28.620	19.939	9.792	8.532
Geometric mean	0.990	10.373	0.011	8.512	0.001	7.044	0.167	0.001	0.001	0.031	0.000	0.010	0.903
Geometric standard deviation	1.480	1.588	4.381	1.494	4.923	1.470	4.758	4.671	4.636	1.111	12.175	5.139	26.160

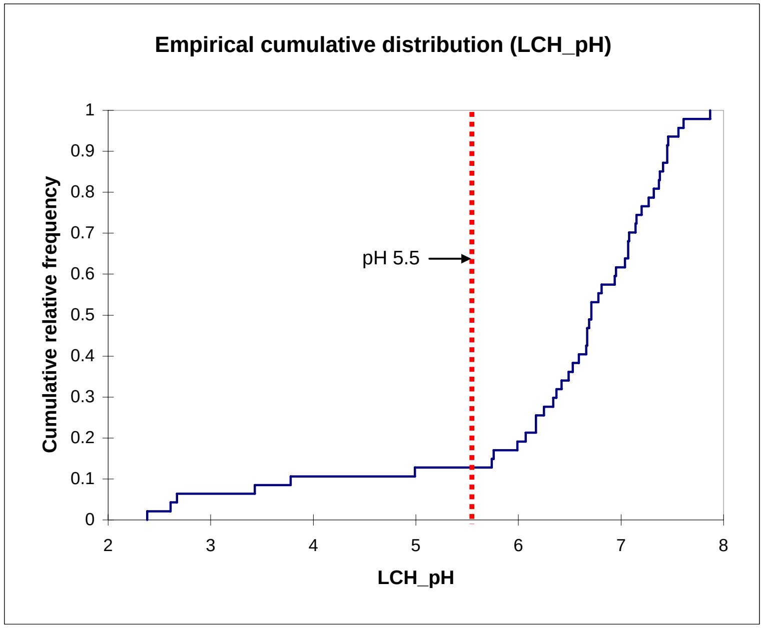
% Solubilized (or % Extraction)

Statistic	%Extr_Sr	%Extr_V	%Extr_Zn
No. of observations	47	47	47
No. of missing values	0	0	0
Minimum	0.000	0.000	0.000
Maximum	0.055	0.017	0.877
1st Quartile	0.001	0.000	0.000
Median	0.004	0.000	0.000
3rd Quartile	0.015	0.000	0.011
Mean	0.009	0.001	0.052
Standard deviation (n)	0.011	0.003	0.146
Variation coefficient	1.228	2.560	2.797
Skewness (Pearson)	2.051	3.201	4.214
Kurtosis (Pearson)	5.023	9.864	19.529
Geometric mean	0.004	0.000	0.001
Geometric standard deviation	4.597	5.783	18.050

APPENDIX A5-1
Leachate Criteria

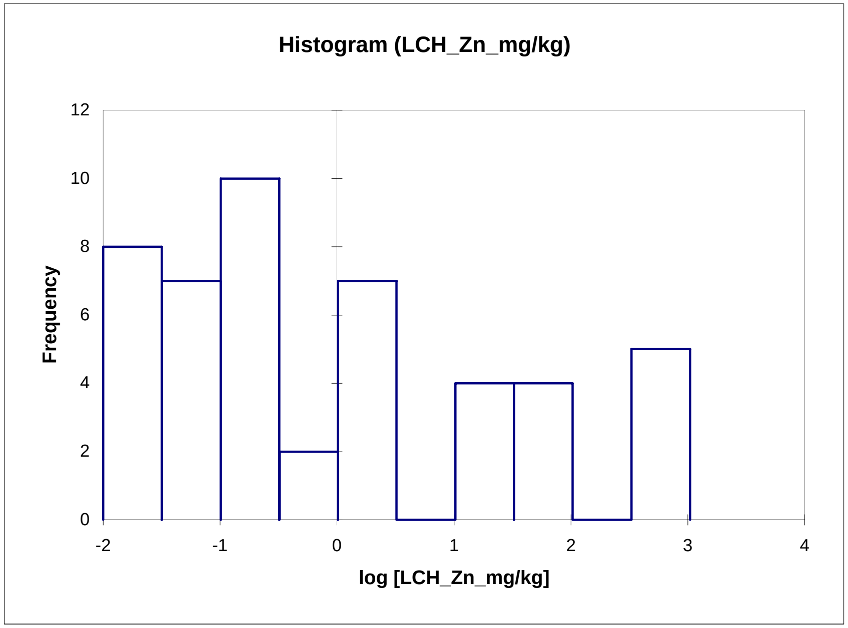
Variable	Observations	Obs. with missing data	Obs. without missing data	Minimum	Maximum	Mean	Std. deviation
LCH_pH	47	0	47	2.380	7.870	6.388	1.328
LCH_Zn_mg/kg	47	0	47	-1.745	2.920	-0.038	1.478
LCH_Pb_mg/kg	47	0	47	-2.824	1.689	-1.109	1.189



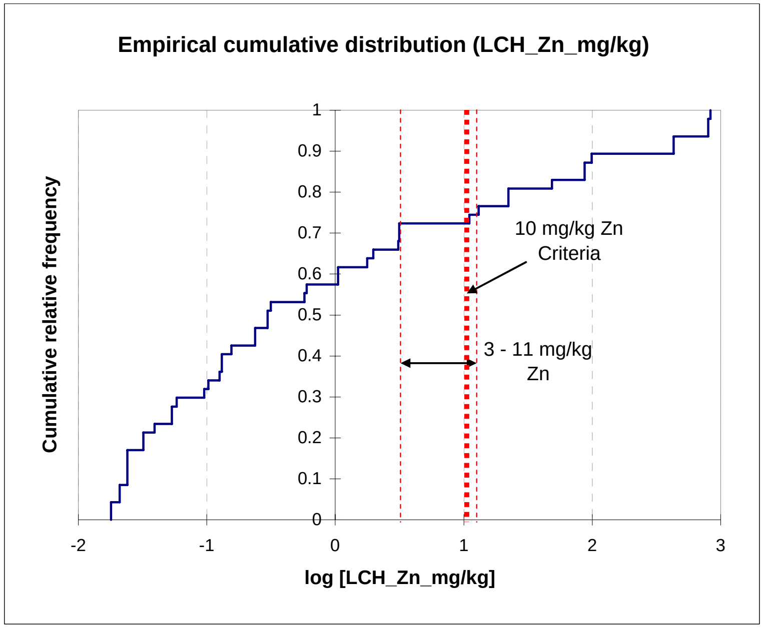


Descriptive statistics for the intervals (LCH_pH):

Lower bound [	Upper bound [	Frequency	Relative frequency	Density
2	2.597	1	0.021	0.036
2.597	3.194	2	0.043	0.071
3.194	3.791	2	0.043	0.071
3.791	4.388	0	0.000	0.000
4.388	4.985	0	0.000	0.000
4.985	5.582	1	0.021	0.036
5.582	6.179	6	0.128	0.214
6.179	6.776	13	0.277	0.463
6.776	7.373	14	0.298	0.499
7.373	7.97	8	0.170	0.285



Histogram (LCH_Zn_mg/kg)

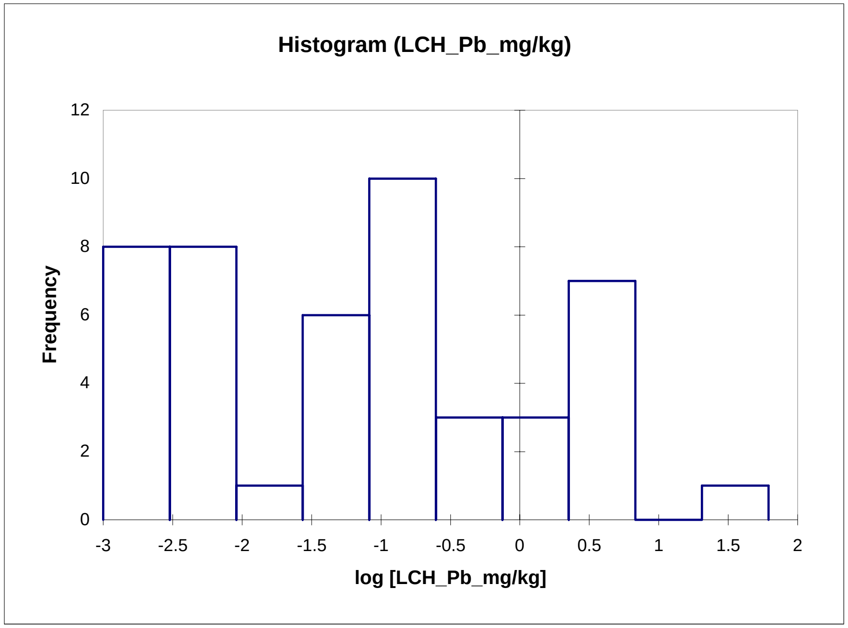


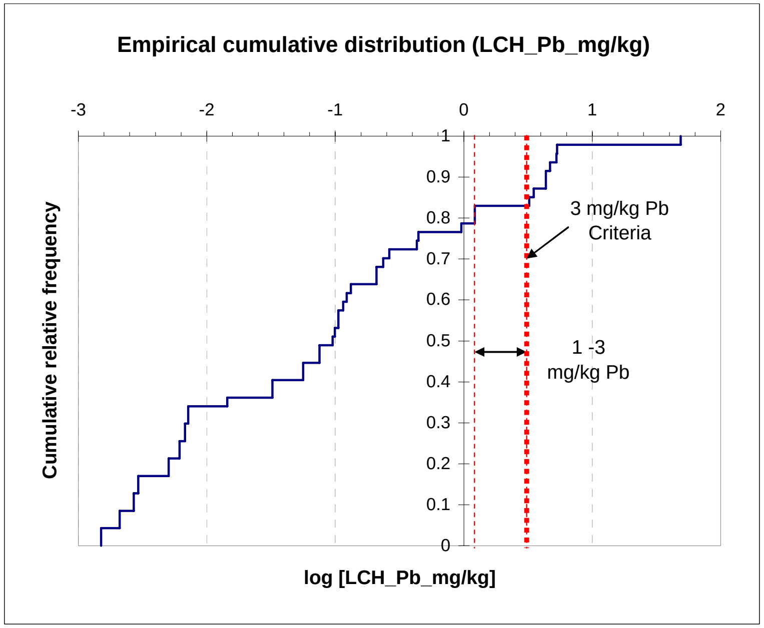
Empirical cumulative distribution (LCH_Zn_mg/kg)

Descriptive statistics for the intervals (LCH_Zn_mg/kg):

Lower bound [	Upper bound [	Frequency	Relative frequency	Density
-2	-1.498039898	8	0.170	0.339
-1.498039898	-0.996079795	7	0.149	0.297
-0.996079795	-0.494119693	10	0.213	0.424
-0.494119693	0.00784041	2	0.043	0.085
0.00784041	0.509800512	7	0.149	0.297
0.509800512	1.011760614	0	0.000	0.000
1.011760614	1.513720717	4	0.085	0.170
1.513720717	2.015680819	4	0.085	0.170
2.015680819	2.517640921	0	0.000	0.000
2.517640921	3.019601024	5	0.106	0.212

APPENDIX A5-1
Leachate Criteria





Descriptive statistics for the intervals (LCH_Pb_mg/kg):

Lower bound [	Upper bound [	Frequency	Relative frequency	Density
-3	-2.521069114	8	0.170	0.355
-2.521069114	-2.042138228	8	0.170	0.355
-2.042138228	-1.563207342	1	0.021	0.044
-1.563207342	-1.084276456	6	0.128	0.267
-1.084276456	-0.60534557	10	0.213	0.444
-0.60534557	-0.126414685	3	0.064	0.133
-0.126414685	0.352516201	3	0.064	0.133
0.352516201	0.831447087	7	0.149	0.311
0.831447087	1.310377973	0	0.000	0.000
1.310377973	1.789308859	1	0.021	0.044

APPENDIX A6-1
Box Plots by Lithography

XLSTAT 2007.8.03 - Univariate plots - on 1/8/2008 at 7:22:49 PM
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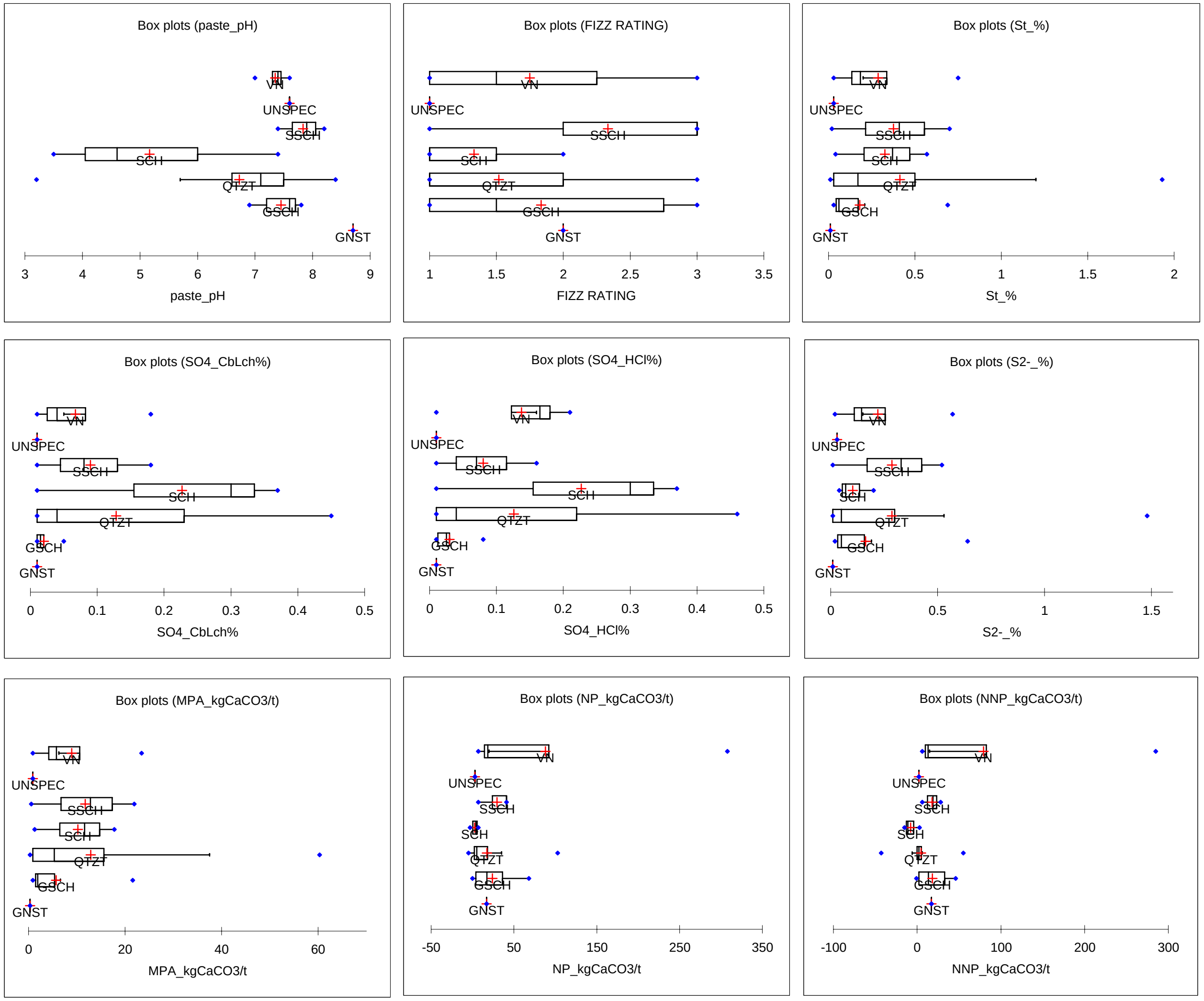
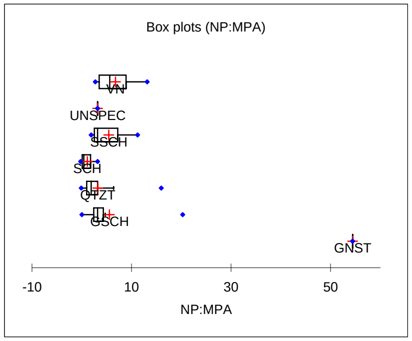
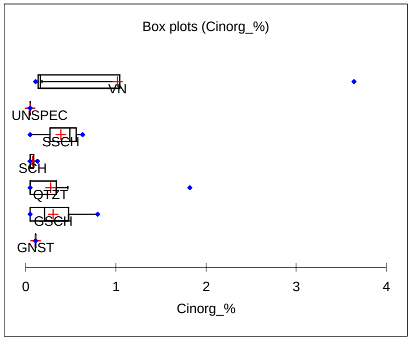
Subsamples: Workbook = Compilation 1995 and 2007 ABAs.xls / Sheet = 1995 Rock Char / Range = '1995 Rock Char'!$C$1:$C$48 / 47 rows and 1 column
Box plots ▼

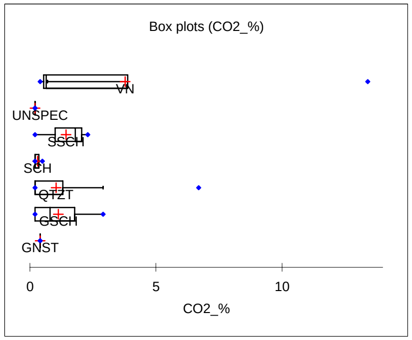
Box plots:

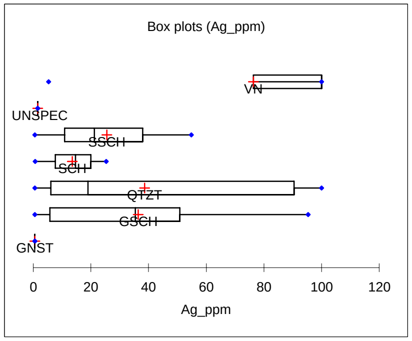


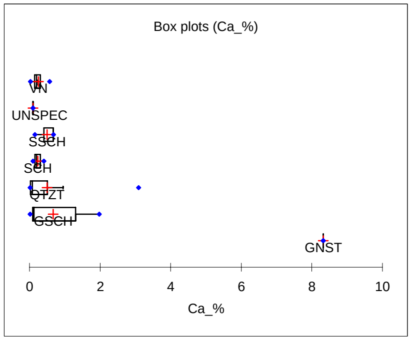
APPENDIX A6-1
Box Plots by Lithography

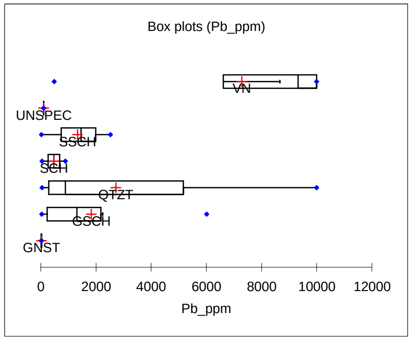


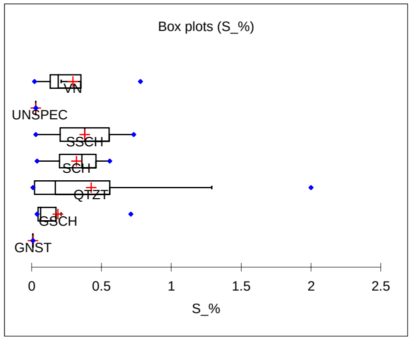


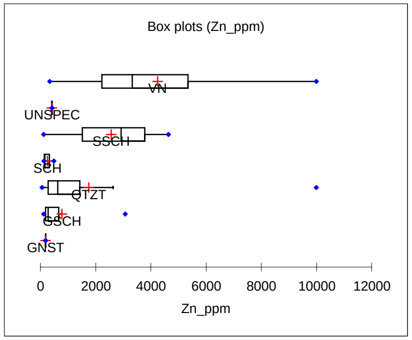


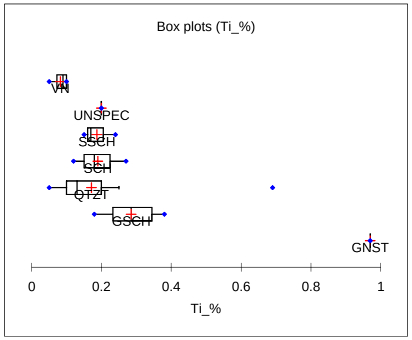












WASTE ROCK MANAGEMENT PLAN

FOR

WATER LICENCE APPLICATION &
MINING LAND USE APPROVAL AMENDMENT REQUEST

BELLEKENO ADVANCED UNDERGROUND

EXPLORATION & DEVELOPMENT

KENO HILL SILVER DISTRICT

YUKON

APPENDIX 2

GEOENVIRONMENTAL CHARACTERIZATION, BELLEKENO

To: Dan Cornett, Rob McIntyre, Access Consulting Group
From: Diane Lister
Date: January 8, 2008
RE: **Geoenvironmental Rock Characterization, Bellekeno Zone**

1.0 Purpose and Scope

This report summarizes results of geoenvironmental rock characterization focussed on the Bellekeno zone at Keno Hill, Yukon.

The purpose of this evaluation is to review general characteristics of Bellekeno rock with respect to its potential for generation of net acidity and/or metal leaching ("AML"). The objective is to provide a technical basis to support management for rock to be excavated in the zone, by deriving: 1) AML geochemical screening criteria, 2) estimated proportions AML and Non-AML material by rock type for Bellekeno, and 3) potential field criteria for differentiating AML and Non-AML rock during excavation activities.

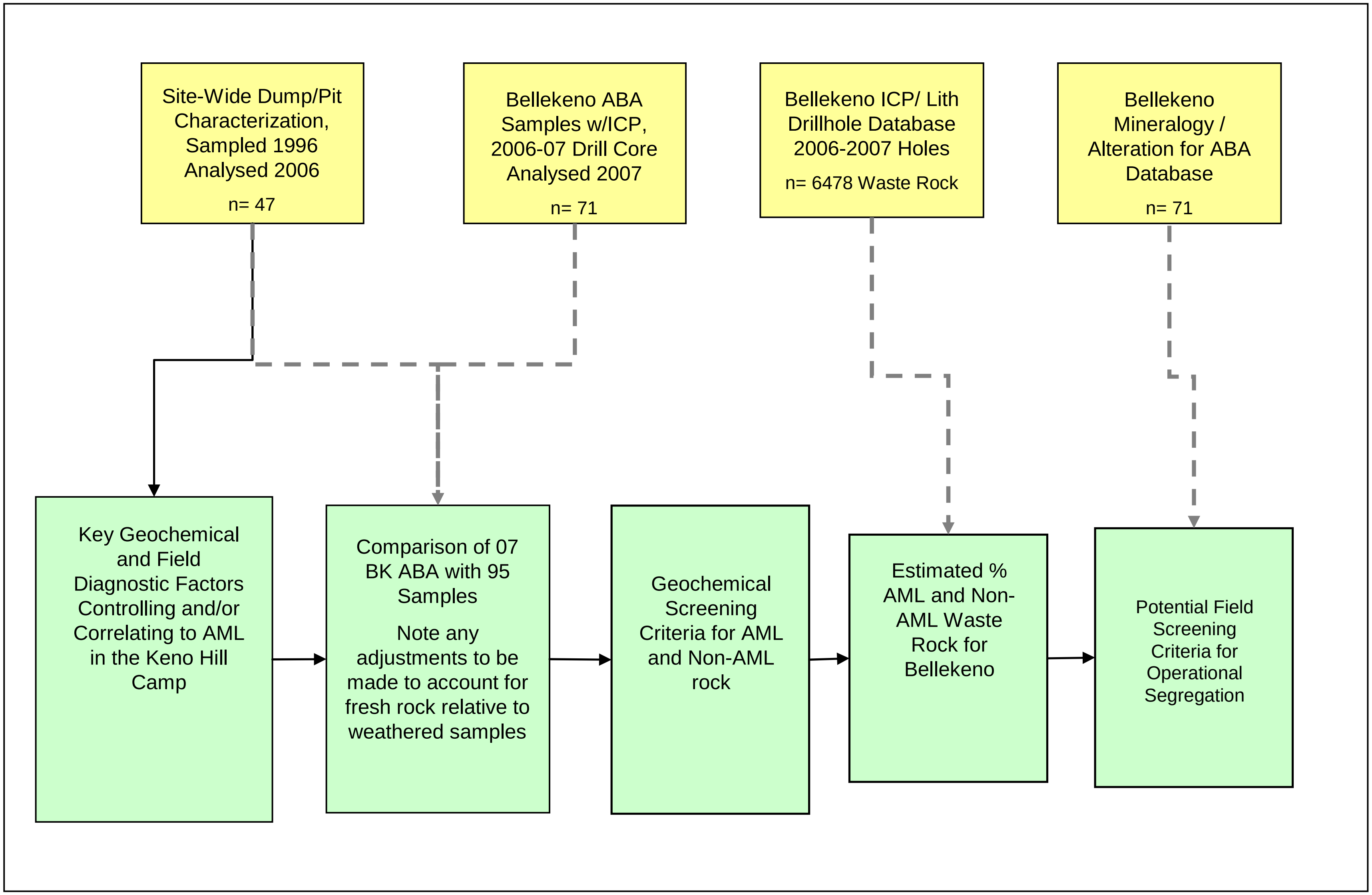
1.1 Study Approach

This geoenvironmental evaluation consisted of data analysis and integration of four specific data components: 1) site-wide studies on weathered rock (47 samples), 2) acid base accounting of 2006-2007 Bellekeno drill core (71samples), 3) Bellekeno drillhole multi-element and lithology database (6478 samples), and 4) mineralogy and alteration logging data on acid base accounting samples.

An overall flowchart of data review and synthesis is presented in Figure 1.

The evaluation utilized a previous review of site-wide geoenvironmental sampling conducted during 1995 to 1996 on weathered rock dump and pit samples; this study identified key geochemical and field diagnostic factors that appear to either control or correlate to the generation of net acidity and/or metal leaching in the Keno Hill rock suite (Altura, 2008a). These factors were then integrated into the review of the recent acid base accounting characterization analyses on the unweathered Bellekeno drill core samples, in order to determine any adjustments to be made to account for fresh rock relative to weathered samples. The adjusted factors served as geochemical screening criteria and were applied to the 6400-sample waste rock geochemical database for estimation of proportions of potential AML rock and Non-AML rock for each of the major Bellekeno rock types. Lastly, the acid base accounting and mineralogical/alteration information were reviewed to identify any potential correlations; potential field screening criteria were then identified for further development by site geologists.

Figure 1. Bellekeno Rock Characterization Study – Components and Study Synthesis



2.0 Methodology

All data were provided to the consultant by Alexco Resource Corp. Data were compiled and for statistical analysis purposes, results beyond minimum or maximum limits of detection were assigned a value equal to the respective detection limit. Analysis was carried out using Excel™ and XLStat™ software.

Samples in the 6478-sample waste rock drillhole database were analysed via 27-element ICP-AES with aqua regia digestion (including sulphur). The 71 acid base accounting samples were tested via the modified acid-base accounting methods including sulphate via both sodium carbonate leach and HCl digestion, total inorganic carbon via coulometer, and paste pH at a 1:1 solids to water ratio. All samples were analysed at ALS Chemex Labs in North Vancouver.

The sample's lithological, mineralogical and alteration information was determined by Alexco geologists at the time of logging and sampling. Of importance to note is the difference in lithological designation in the waste rock drillhole database versus the acid base accounting database. Due to the nature of the local geology, a specific lithology is typically intercalated with secondary lithologies over the scale of a few metres. Thus, when logging the core for deposit model purposes, over a given interval in the 10's of metres, the primary lithology is noted along with its percent proportion. Secondary lithologies are also designated along with their percent proportion. Thus, in the waste rock drillhole database a given lithology designation, for example quartzite (QTZT), should be interpreted as "predominantly quartzite". In contrast, the lithology designations in the acid base accounting database are specific to the given interval sampled.

3.0 Characterization Overview of Bellekeno Rock

3.1 Geology and Major rock types

The Keno Silver District is underlain by Yukon Group metasedimentary rocks, described in detail in the United Keno Hill Mines Limited Site Characterization Study (Access Mining Consultants, 1996).

The metasedimentary rocks have been divided locally into three formations; Upper Schist, Central Quartzite and Lower Schist. The Upper Schist (Hyland Group, pre-Cambrian to Cambrian age) consists of quartz-mica schist, quartzite, graphitic schist and minor limestone. The Central Quartzite (Keno Hill Quartzite, Mississippian age) contains thick-and thin-bedded quartzite, massive quartzite, graphitic phyllite, graphitic schist and calcareous schist. This unit is approximately 700 m (2300 ft) thick and hosts most of the major silver deposits in the area. The Lower Schist includes graphitic schist, argillite, thin-bedded quartzite, calcareous schist, phyllite, slate, sericite schist and minor thick-bedded quartzite. Conformable greenstone (altered diorite/gabbro) lenses and sills occur in places and narrow lamprophyre and quartz-feldspar porphyry dykes occur locally. Granite bodies have intruded the metasedimentary – greenstone package at several places to the north and south of the Keno Hill – Galena Hill area.

The Bellekeno zone is located approximately 1.5 km west of Keno City at Sourdough Hill, an area predominantly underlain by the Upper Schist above, and the mineralization-bearing Central Quartzite beneath. Near the schist-quartzite contact greenstone sills have been emplaced.

Principal rock units in approximate order of predominance at Bellekeno thus include quartzite, schist, and greenstone. Key aspects of these units and their respective sub-units are described in further detail below, as extracted from descriptions by Boyle (1962) in the 1996 Site Characterization Study.

Quartzite (QTZT): by far the most predominant unit at Bellekeno, quartzite may occur as either thinly bedded (inches to one foot or more thick) or thickly bedded (3 to 25 feet thick) sequences interbedded with assemblages of schist, argillite, and phyllite. Thin sections show that the quartzites consist essentially of quartz, with minor amounts of white mica (sericite) and, locally, carbonate minerals. Calcareous varieties contain up to 30 percent carbonate minerals (unit CQTZT). The black quartzites contain much carbonaceous material. Accessory minerals in all varieties include irregular patches and specks of leucoxene, tourmaline, zircon, apatite, and pyrite. The pyrite occurs mainly as cubes, distorted cubes, and crystal groups.

Schist (SCH): The predominant varieties of schist found in the area include graphitic schists (GSCH), quartz sericite schist (SSCH), and chlorite schist (CHSCH).

The graphitic schists are black or greyish black, weather easily to a crumbly mass of small black schistose fragments, and occur in beds ranging from a fraction of an inch to a few feet in thickness and are everywhere intercalated with phyllites, slates, or thin- and thick-bedded quartzites. Under the microscope the principal mineral constituents are dense opaque carbonaceous matter (graphite), quartz, sericite, carbonate minerals, feldspar, chlorite, isotropic colloidal material, and numerous metacrysts of pyrite. In some sections microcrystalline pyrite is strung out along the graphitic laminae.

The quartz-sericite and chlorite schists are greenish or mottled greenish yellow, and like the graphitic schist, weather easily and form few prominent outcrops. In thin sections the quartz-sericite schists are seen to consist essentially of quartz and sericite with subordinate amounts of carbonate minerals and leucoxene. The main accessories are apatite, zircon, and tourmaline, and a few pyrite metacrysts are also present in most sections.

Greenstone (GNST): The greenstones are schistose, greyish green to dark green rocks that occur in conformable elongated lenses and sills, principally in the schistose formations and to a lesser extent in the quartzite formations. The greenstones weather differentially compared with the schists and quartzites and form prominent precipices and knobs. In most occurrences they are jointed and present a slabby appearance. In some bodies narrow shear zones, joints, and irregular fractures contain small lenses and masses of quartz, epidote, and calcite. In thin sections the greenstones present considerable variety both in mineral composition and texture. All are highly altered, and it is rare to find bodies with any original minerals. The principal minerals now present in the greenstones are hornblende, actinolite, saussurite (zoisite, epidote, albite, sericite, carbonate), plagioclase (oligoclase to andesine), chlorite, stilpnomelane, biotite, white mica (sericite), leucoxene, and carbonate minerals. Quartz, potash feldspar, illuminate, magnetite, limonite, and apatite are common minor constituents, and pyrite is present in some bodies. All these minerals are not necessarily found in any one greenstone mass. Chlorite is generally present, commonly in considerable amounts, and biotite, sericite, quartz, and carbonate minerals are found in some bodies.

Vein (VN): Although strictly not a lithological unit, the economic mineralization in the Keno Silver District occurs in irregular shoots within vein systems developed along the vein faults, typically within the more brittle quartzite or greenstone units. Where the fault passes into soft phyllites or schists, the vein becomes less well defined and eventually dissipates. Two stages of vein mineralization are distinguished in the area. The first stage deposited quartz, pyrite, some arsenopyrite, trace gold and some sulphosalts in the vein faults. Following movement on the vein faults, a second stage of mineralization deposited siderite, galena, sphalerite, pyrite, freibergite, and pyrargyrite. Most of the economically mineable ore deposits to date have been stage two types. Supergene enrichment has occurred but is not believed to have been an important ore forming process. The oxidation zone extends from a few meters to 150 meters (10 - 500 feet) below surface. Within this zone, minerals such as limonite, pyrolusite, cerussite, and anglesite are common. Native silver, argentite and jarosite may occur locally. The principal gangue mineral is siderite.

3.2 *Elemental characterization*

Elemental characteristics of the Bellekeno waste rock were determined through analysis of an extensive multi-element exploration drillhole database and associated sample lithology. Table 1 shows the distribution of samples in the Bellekeno waste rock drillhole database.

Table 1. Distribution of Samples in the Bellekeno Waste Rock Drillhole Database

Lithology		
Description	**Code**	**Number of Samples**
Chloritic Schist	CHSCH	222
Calcareous Quartzite	CQTZT	505
Calcareous Schist	CSCH	36
Greenstone	GNST	567
Graphitic Schist	GSCH	870
Phyllite	PHY	5
Quartzite	QTZT	3293
Schist, Undifferentiated	SCH	775
Sericitic Schist	SSCH	205
	Total	**6478**

3.2.1 Results

Key statistical measures of the geochemistry are tabulated in Appendix C1, in accordance with major lithology.

Analysis of the results delineated certain elements of interest in the Bellekeno waste rock, and highlights are presented in the following text. Appendix C2 shows box plots of these selected elements in waste rock lithologies.

Aluminum (Al)

The more siliceous quartzite units show a tendency for relatively low aluminum values relative to the schist and greenstone units.

Arsenic (As)

A database-wide median value for arsenic of 9 ppm versus a mean of 45 ppm demonstrates the potential for significantly elevated values in a small subset of samples. As shown in the box plot for As in Appendix C2, elevated As in the several hundred to thousands ppm levels occur in most lithologies, however the quartzite units tend to show the most anomalous As occurrences.

Calcium (Ca)

Calcium content is relatively consistent across most units, tending to be below the 5 percent level. Greenstone is the exception, demonstrating a Ca tendency in the 5 to 10 percent range, likely due to the predominance of hornblende and actinolite.

Copper (Cu)

Median copper levels for most units are in the order of 50 ppm, with the exception of greenstone which shows a distinct tendency for slightly elevated copper in the 100 to 200 ppm range. Anomalous values above 400 ppm only occur within the greenstone and quartzite units.

Iron (Fe)

Most units show low iron content (less than 5%), with chloritic schist and greenstone slightly elevated, likely due to the presence of iron-bearing silicates such as chlorite and biotite.

Manganese (Mn)

Manganese occurs in a wide range of concentrations across all units, from a few hundred up to the hundreds of thousand ppm level. Greenstone units show a tendency for slightly higher manganese relative to other units.

Lead (Pb)

The median lead value for most units is relatively low in the 30 ppm range, however anomalously high values to the thousands ppm level also occur across all units. The quartzite unit demonstrates the greatest variation and most anomalous values. Greenstone shows the lowest median value for lead (5 ppm), however some anomalous outliers of several thousand ppm do occur even in this unit.

Sulphur (S)

Overall median sulphur value for the 6478 sample dataset is 0.32%, with a mean of 0.45%. Schist units tended to have medians above this value, including calcareous schist (0.46%), graphitic schist (0.72%), and undifferentiated schist (0.53%). Greenstone and phyllite units show a distinct tendency for low sulphur (medians of 0.03%), however it should be noted that the phyllite, with only 5 samples, is not sufficiently represented in the dataset, nor is this unit abundant in the Bellekeno zone.

Antimony (Sb)

Waste rock samples show an overall very low tendency for antimony, with the majority of median values at or close to the 5 ppm detection limit. Greenstone demonstrates the occurrence of some slightly elevated samples (albeit in the 10 ppm range). Rare anomalous values in the order of 100 to 200 ppm occur in the quartzite and calcareous quartzite units only.

Zinc (Zn)

Median zinc levels tend to slightly elevated, in the order 80 to 100 ppm for all units. Quartzite and calcareous quartzite show a wide range between upper and lower limits, potentially indicating sub-populations of distinctly lower and higher zinc contents. Most units have occasional occurrences of highly anomalous values over 5000 ppm.

3.2.2 Discussion of Results

Analysis of data from the 6,478 waste rock samples of the major Bellekeno units of quartzite, schist, and greenstone show that these units tend have overall low sulphur (less than 0.5%). The schist units demonstrate slightly higher values relative to the quartzite units, with the greenstone significantly lower in sulphur.

Most rock units, despite having overall low metals and sulphur, nonetheless demonstrate potential for occasional anomalous levels. All units demonstrate a weak zinc overprint in the order of 80 to 100 ppm.

3.3 Acid base accounting

A total of 71 Bellekeno waste rock and mineralized samples of varying lithology were submitted for acid base accounting analysis. The primary objective of this testing is to provide a quantitative determination of the balance between acid-producing (sulphide) and acid consuming minerals (namely carbonates) of materials in the Bellekeno zone. Samples were selected by Alexco geologists to provide both spatial and lithological representation of the entire Bellekeno zone. Table 2 shows the distribution of samples by lithology.

Table 2. Distribution of Acid Base Accounting Samples for Bellekeno

Lithology		**Number of Samples**		
Description	**Code**	**Waste Rock**	**Mineralized Rock**	**Total**
Calcareous Quartzite	CQTZT	12	0	12
Greenstone	GNST	12	0	12
Graphitic Schist	GSCH	13	0	13
Quartzite	QTZT	12	0	12
Sericitic Schist	SSCH	12	0	12
Vein	VN	4	6	10
	Total	**65**	**6**	**71**

3.3.1 Results

Acid base accounting results are tabulated in Appendix B1, and summary statistics in Appendix B3. Various relationships of the database with respect to lithology, zone, mineralized and non-mineralized samples are given in Appendix B4.

Paste pH

The 65 waste rock samples ranged in paste pH from 6.4 to 8.9 with a median of 8.3, and the majority in the range of 7.5 to 8.9, indicating that no samples were producing net acidity at the time of analysis. The six mineralized samples were distinctly lower slightly lower in pH (see Appendix B4-1c for box plot), ranging from 5.8 to 7.6.

Sulphur Species

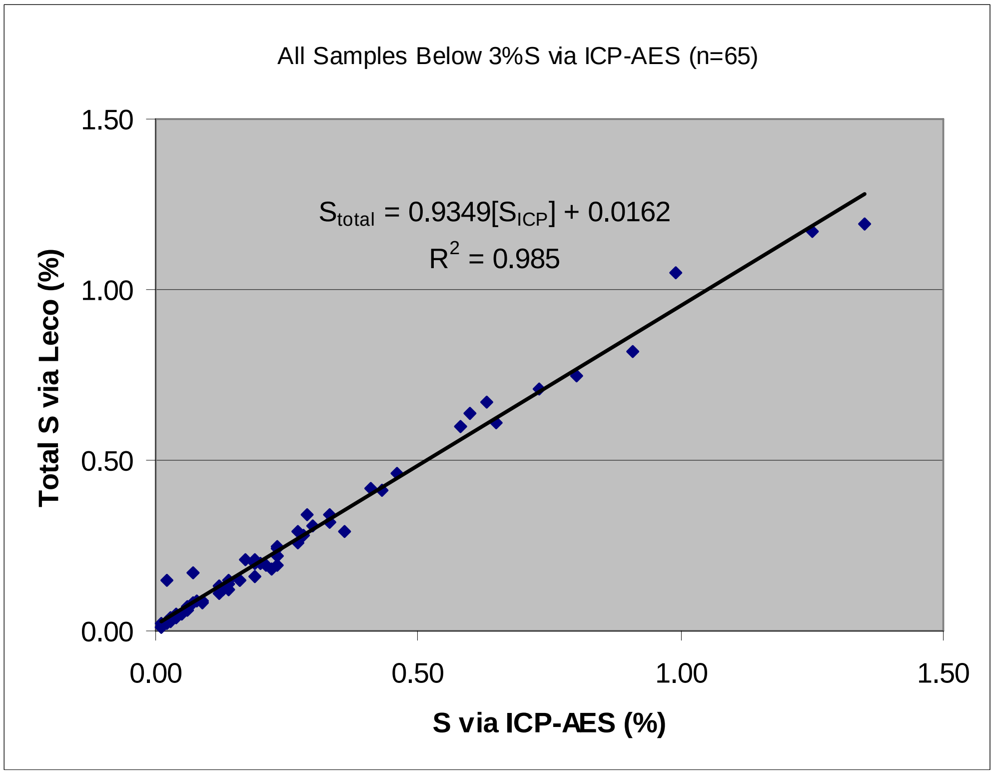
Total sulphur content of waste rock samples ranged from the 0.01 minimum detection limit to 1.19%, with a median value of 0.18%. As expected, the mineralized samples were significantly higher, ranging from 5.66 to 18.75%.

Sulphate were analysed using both carbonate leach and hydrochloric acid leach; aggregate results were very similar between the two methods, however upon reviewing sample-by sample results, there appears to be a greater sensitivity of the carbonate leach at near detection limit levels of sulphate. For future campaigns, Alexco may wish to consider deleting the hydrochloric acid leach method from the ABA suite.

Carbonate leach sulphate levels were low in the waste rock samples, ranging from the 0.01 minimum detection limit to 0.14%, indicating that on average 12% of the total sulphur is in the form of sulphate. While the mineralized samples show sulphate values up to 0.77%, sulphate accounts on average for just over 1% of the total contained sulphur. The relatively low proportion of sulphate may in part be due to the sulphides in the mineralized samples being mainly comprised of less-oxidizable galena and sphalerite.

Of interest for future analyses is the very good correlation between total sulphur via Leco and sulphur via ICP-AES, particularly at sulphur levels below 3% (eg. for typical waste rock). This indicates that sulphur values obtained as part of a multi-element ICP-AES scan, for example in the Bellekeno drillhole database, can be considered a reasonable estimate of total sulphur in a waste rock sample.

Figure 2.Correlation of Sulphur via ICP-AES and Sulphur via Leco, for samples below 3%S



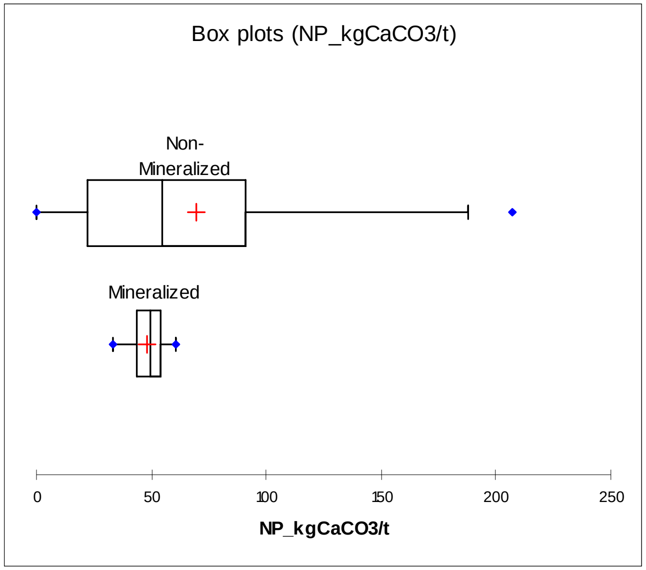
In order to assess ratios of sulphide to neutralizing potential, in acid base accounting analyses the sulphide value (calculated as the difference between total sulphur and sulphate) is multiplied by a factor of 31.25 for conversion to units of kg $CaCO_3$/t. This value is typically termed "maximum potential acidity", or MPA. Use of the MPA value allows direct comparison to the samples neutralizing potential, expressed in these same units, and also allows for calculation of the ratio of neutralizing potential to maximum potential acidity. MPA values for the Bellekeno samples are included in Appendix B1.

Neutralizing Potential

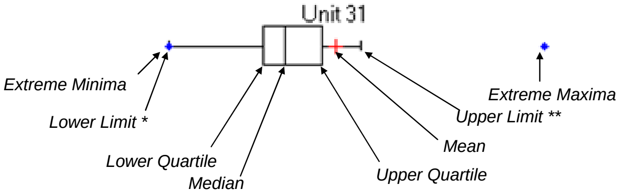
The 65 sample waste rock dataset returned a median NP of 55 kg $CaCO_3$/t, only slightly above the 49.5 kg $CaCO_3$/t median for mineralized samples. While mineralized samples show a very tight distribution around its respective median (Figure 3), waste rock samples show a much greater range of NP values, from 0 to 207 kg $CaCO_3$/t (the minimum value was from a sample of GSCH, the maximum from a calcareous GNST sample).

The similarity in median NP in the mineralized samples is attributed to the significant quantities of siderite ($FeCO_3$) in the veins. Siderite is capable of buffering net acidity only up to a slightly acidic pH range of 5 to 6, therefore would be measured in a neutralization potential analysis, but is a less efficient neutralizer than calcite ($CaCO_3$).

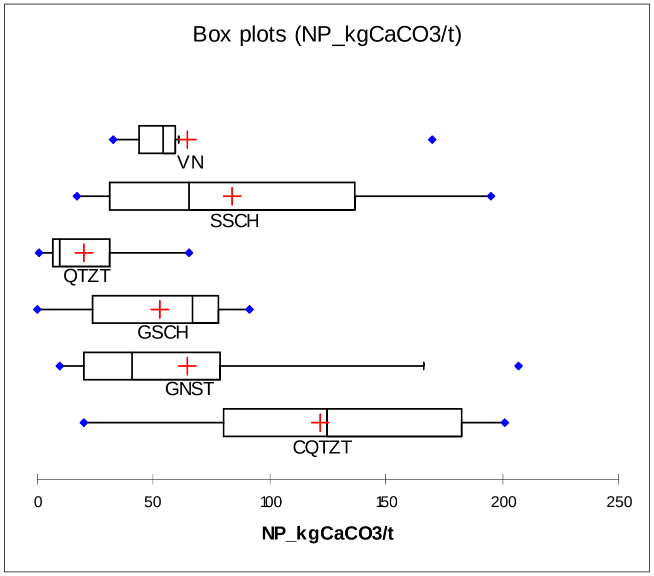
Figure 3. Box Plots for Neutralizing Potential and NP : MPA



LEGEND FOR BOX PLOTS:



**Lower limit: Linf = X(i) such that {X(i) – [Q1 – 1.5 (Q3 – Q1)]} is minimum*
and X(i) = Q1 – 1.5 (Q3 – Q1).
***Upper limit: Lsup = X(i) such that {X(i) - [Q3 + 1.5 (Q3 – Q1)]} is minimum*
and X(i) = Q3 + 1.5 (Q3 – Q1)



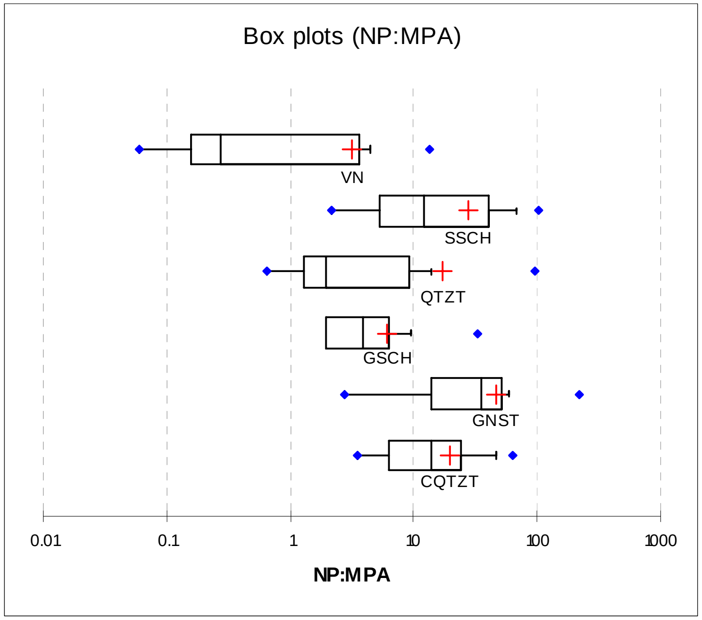
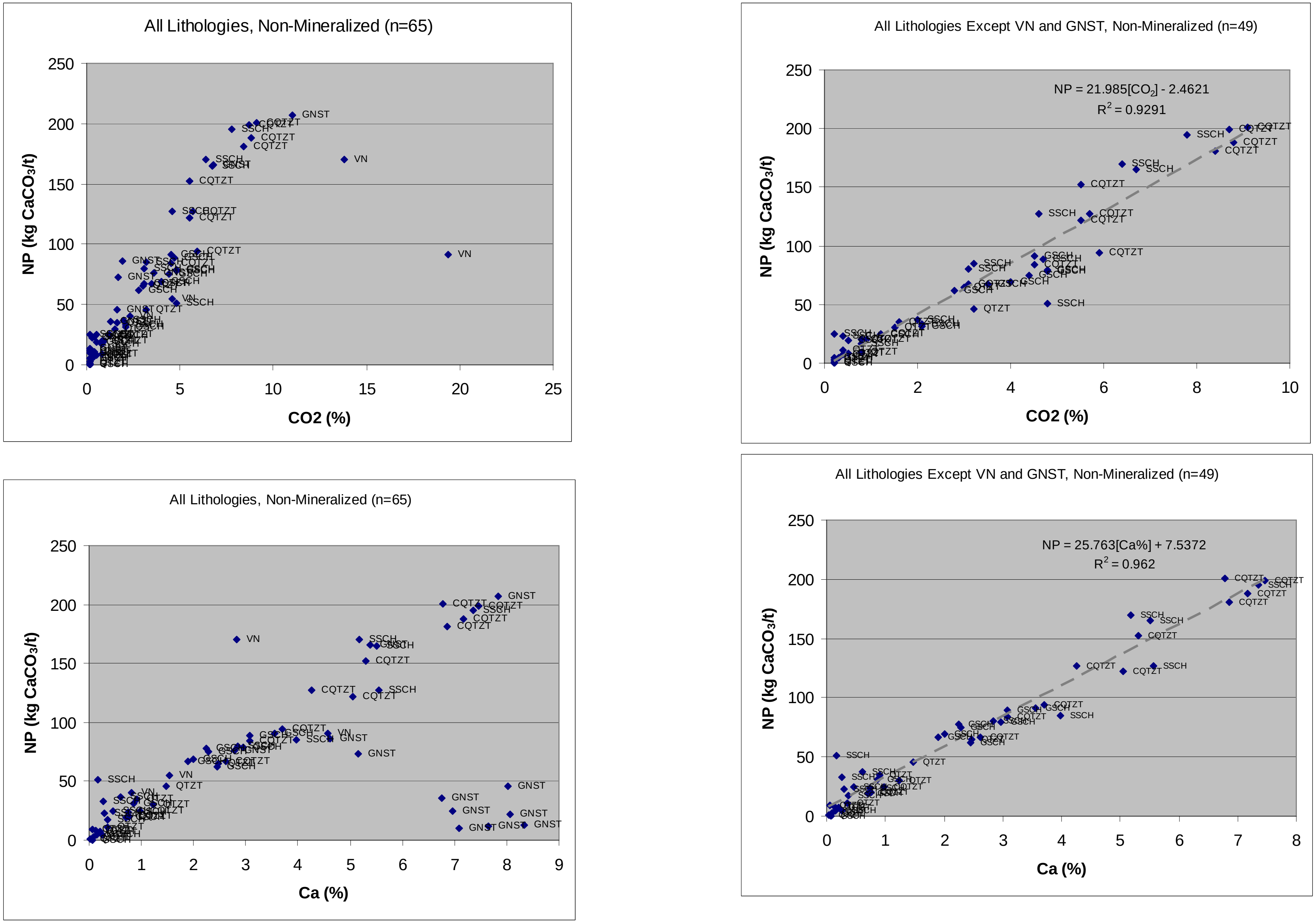


Figure 4. Relationships of Calcium and Carbonate with NP



By lithology, the calcareous quartzite unit has the tendency for the highest NP, with a median in the order of 125 kg $CaCO_3$/t (Figure 3). Quartzite, one of the more predominant units at Bellekeno, tends to have a relatively low NP, and appears to have a sub-population of very marginal NP samples in the 1 to 11 kg $CaCO_3$/t range, with the remaining samples between 20 and 65 kg $CaCO_3$/t.

The relationships between neutralizing potential and other geochemical parameters are important in: i) determining potential controls to buffering of net acidity, ii) evaluating the potential for correlation of the smaller acid base accounting database with the larger exploration drillhole database, and iii) determining potential correlations of NP to simple field screening parameters. Some key relationships are discussed in the following paragraphs, and shown in Figure 4.

Neutralizing potential of the Bellekeno ABA sample suite demonstrates a direct proportional relationship with both carbonate (as CO_2) and calcium (Figure 4). Of note in the left graphs of Figure 4 is that the VN and GNST units tend to be outliers in an otherwise linear trend. When samples of these units are filtered from the dataset, a very good correlation is derived ($r^2 > 0.9$), as shown in the right hand graphs. Moreover, the slopes of the NP:CO_2% and NP:Ca% trendlines correspond closely with the stoichiometric ratio of $CaCO_3$ to each of these constituents (22.7 and 25 respectively). These close relationships indicate that for the various quartzite and schist units at Bellekeno, that carbonate as calcite is the primary source of available neutralization. The vein units, on the other hand, have elevated carbonate attributable to its siderite gangue, and demonstrate the less effective neutralization by this mineral. Many of the greenstone units occur as a discrete group of outliers in the Ca versus NP graph, likely attributable to the occurrence of Ca in a non-neutralizing form such as hornblende, actinolite, and other amphibole minerals.

NP:MPA

As previously mentioned, the neutralizing to maximum potential acidity ratio, or NP:MPA is calculated by dividing the sample's neutralizing potential by its acid production potential expressed in kg CaCO3/t (% sulfide content x 31.25).

A common industry practice is to infer that samples with NP:MPA of greater than 3:1 are unlikely to produce net acidity, with no further testwork or study. British Columbia guidelines (BC Ministry of Energy and Mines, 1997) consider a 4:1 NP:MPA ratio. For samples with lower ratios, additional information (such as data from field and lab weathering studies) are indicated, in order to confirm any site-specific controls on net acid generation.

Distribution of the Bellekeno results across the NP:MPA ratio range are given in Table 3, and shown in the lower right-hand graph of Figure 3. A total of 49 of the 71 samples have NP:MPA ratios greater than 3, indicating minimal potential for net acidity. Removing the mineralized samples from the dataset (six vein samples all with NP:MPA of less than 1) and considering only the 65 waste rock samples, 75 percent of these show minimal potential for net acidity.

Greenstone, calcareous quartzite, and sericitic schist demonstrate a large proportion of samples with NP:MPA ratio greater than 3, indicating overall minimal concern for net acidity from these units. Quartzite and graphitic schist units show the have a larger proportion of samples in the “uncertain” range between 1 and 3, with one quartzite sample with NP:MPA of less than one, indicating that focus of site specific assessment and field screening should be directed to these units.

Table 3. Distribution of NP:MPA in Bellekeno Samples

Lithology		**NP : MPA**					
Description	**Code**	**≤ 1**	**>1 to 2**	**>2 to 3**	**>3 to 4**	**>4**	**Total**
Calcareous Quartzite	CQTZT	0	0	0	1	11	12
Greenstone	GNST	0	0	1	0	11	12
Graphitic Schist	GSCH	1	3	2	2	5	13
Quartzite	QTZT	1	6	0	0	5	12
Sericitic Schist	SSCH	0	0	1	0	11	12
Vein	VN	6	1	0	0	3	10
	Total	**8**	**10**	**4**	**3**	**46**	**71**

Fizz Rating

The 'fizz rating', a ranking from 1 to 4 of effervescence to 25% HCl, is assessed by the laboratory in order to determine the strength of acid to utilize for the neutralization potential titration. Fizz rating of the Bellekeno sample set ranged from 1 to 3, with a median of 2 (slight effervescence), and mean slightly over 2. When correlated with NP, it can be seen that samples with a fizz rating of 3 (moderate effervescence, continuous bubbling) demonstrate a neutralizing potential of at least 62 kg $CaCO_3$/t, and an NP:MPA of at least 4.76, with minimal potential for net acidity (Figures 5 and 6). This indicates that the fizz rating parameter could serve as a potential screening tool for field classification of rock – for example, a sample with a fizz rating of at least 3 may be classified as having minimal potential for net acidity.

Figure 5. Relationships of Fizz Rating and Neutralization Potential

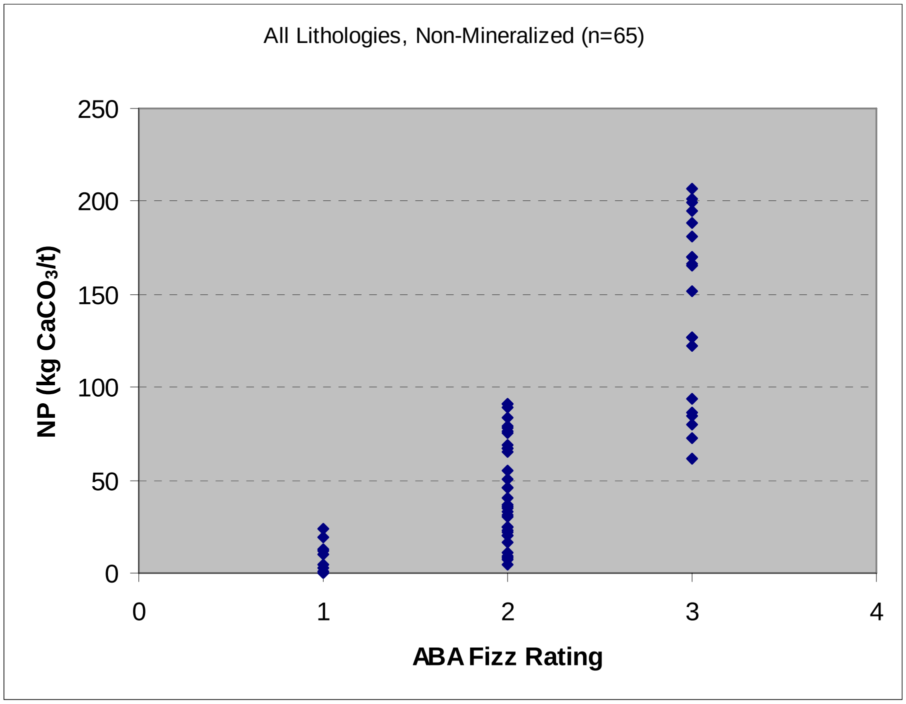
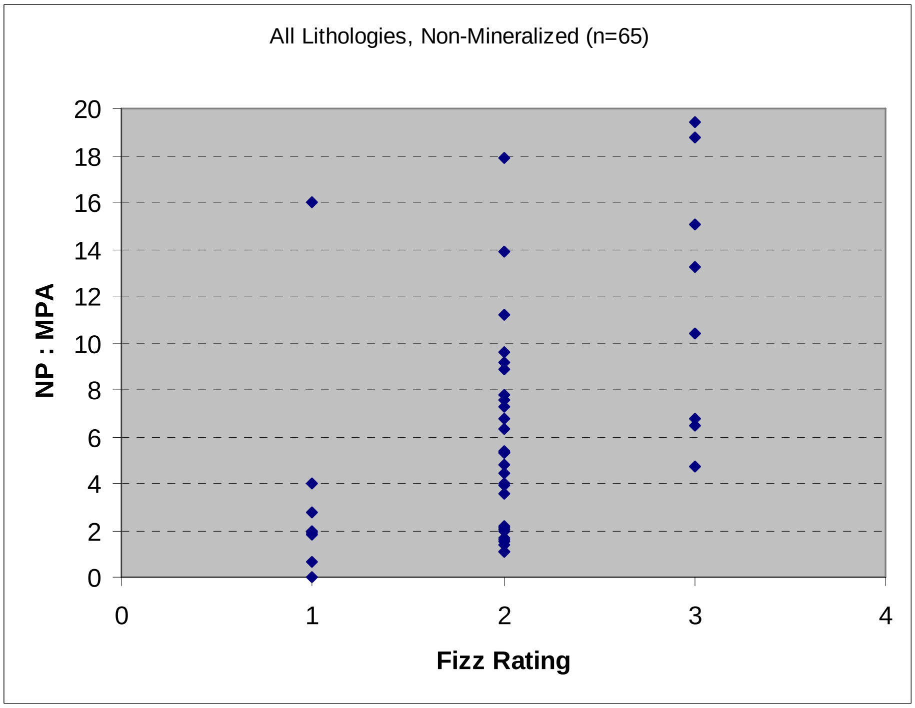


Figure 6. Relationships of Fizz Rating and NP : MPA



4.0 Analysis of Results

4.1 AML Geochemical Screening Criteria

An evaluation of testwork conducted on 47 1995-96 rock dump and pit wall samples in the Keno Silver District, rock excavated and left exposed for up to 80 years, concluded that samples showing net acidity and/or Pb and Zn metal leaching (AML) had the following geochemical characteristics (Altura Environmental Consulting, 2008a):

- Net Acidity: The two key aspects of samples demonstrating leachate pH ≤ 5.5, are either a calcium level in the rock of ≤0.51% or a CO_2 level of ≤0.6% , coupled with an ICP-sulphur level of ≥0.25%.
- Zinc Leaching: leaching of zinc to levels ≥ 10 mg/kg appears to occur under two differing conditions: i) solubilization of zinc under net acidic conditions – independent of zinc concentration in rock, and ii) solubilization of zinc under overall neutral to alkaline conditions where Zn concentrations in rock exceed 5000 ppm.
- Lead Leaching: leaching of lead to levels ≥ 3 mg/kg occurs only under neutral pH conditions, where Pb concentrations in rock exceed 5000 ppm.

The samples tested were taken from adit dump and pit samples at areas of previous mining activity in the Keno Hill area; and although occurring within the same geological units, most of the samples were comprised of material within or very close to the ore grade mineralization, and as such tend to demonstrate higher sulphur and sulphide content than the Bellekeno ABA sample suite. This relationship and other comparative graphs of the two datasets are presented in Appendix B4-4. Overall, the historic sample dataset also demonstrate lower paste pH, neutralization potential, carbonate and calcium. While this is no doubt in large part attributable to the weathered nature of the waste dump and pit wall samples versus the fresh rock of the Bellekeno dataset, due to the proximity of many of the samples to the main vein structure, differences in original sample lithology are also a likely factor.

The geochemical factors identified in the previous district-wide study provide valuable information with respect threshold criteria for determining, based on geochemical and visual characteristics, the potential for a fresh sample to generate AML.

Directly applying the above factors of ≤0.51% Ca, and ≥ 0.25% S (via ICP) to the Bellekeno dataset results in a few samples with NP:MPA marginally above 1 being classified into the category of having low potential for net acidity. This indicates that this threshold for calcium is too low for a “fresh sample” dataset. The lower calcium threshold in the weathered samples is likely attributable to the waste dump and pit wall samples experiencing solubilization and flushing of calcium under ambient site conditions. Thus an adjustment factor for fresh rock samples of 1.5 was applied to the calcium criteria, increasing the threshold to 0.75% Ca. Sulphur criteria is conservatively maintained at 0.25%; in addition, a 1.50% upper threshold is recommended, to ensure that any high sulphur samples, regardless of calcium content, are assigned as potential net acidity producers. The 5000 ppm Pb and Zn criteria from the district-wide study are maintained.

In summary, based on the review of the Bellekeno ABA dataset coupled with the AML evaluation district-wide, the following geochemical screening criteria are recommended to identify potentially AML rock:

a) Ca% ≤ 0.75% and $S_{\text{via ICP}} \geq 0.25$ %

b) or $S_{\text{via ICP}} \geq 1.50$ %

c) or Pb ≥ 5000 ppm

d) or Zn ≥ 5000 ppm

4.2 *Estimated Proportions of AML and Non-AML Rock for Bellekeno*

Utilizing the screening criteria presented above in section 4.1, the 6478-sample Bellekeno waste rock database was filtered to identify potentially AML samples.

Results are shown in Table 4. The graphitic schist unit is indicated to contain the highest proportion of potentially AML samples, while the greenstone samples show the least potential for AML.

Table 4. Results of % AML Samples Identified Using AML Geochemical Screening Criteria against Bellekeno Waste Rock Drillhole Database

Lithology		**Number of Samples in Database**	**# of Samples Screened as Potentially AML**	**% of Samples Screened as Potentially AML**
Description	**Code**			
Chloritic Schist	CHSCH	222	27	**12%**
Calcareous Quartzite	CQTZT	505	54	**11%**
Greenstone	GNST	567	10	**2%**
Graphitic Schist	GSCH	870	562	**65%**
Quartzite	QTZT	3293	719	**22%**
Schist, Undifferentiated	SCH	775	299	**39%**
Sericitic Schist	SSCH	205	37	**18%**

Note: Lithology units with less than 40 samples not included in calculation (units CSCH and PHY)

4.3 *Potential Field Screening Criteria*

Based on the geochemical screening criteria identified in section 4.1 and the results of the acid base accounting, a series of potential criteria may be used in field screening of Bellekeno waste rock, in order to permit reliable identification of potentially AML rock during routine mining or other rock excavation activities. A possible "field filter" for identifying potentially AML rock is as follows:

a) Slight or no effervescence of pulverized sample with 25% HCl (eg. presence of none or only a few bubbles), and visual estimated pyrite >0.5%, or;

b) Any sample with one or more of the following:

   i. visual estimated sphalerite >0.75%

   ii. visual estimated galena >0.5%

   iii. visual estimated pyrite >2%

   iv. any Vein material not deemed to be in "Mineralized" category

   v. paste pH ≤ 6.0 (to be measured on any highly altered/oxidized samples)

The above evaluations may be readily and rapidly conducted at a site in a basic field office facility, using simple instruments and materials such as a hand lens or binocular microscope, hydrochloric acid, distilled water, and pH meter.

As part of the development of a field program, the above criteria will require additional site testing, and should be modified as required to ensure and good correlation with geochemistry across all lithological units, and consistency in application between personnel.

5.0 Conclusions and Recommendations

This review of the Bellekeno geochemical and acid base accounting data, coupled with integration with studies and testwork done site-wide on exposed waste rock and pit walls, indicates that while much of the rock is geochemically benign, there is potential for a proportion of Bellekeno waste rock to produce net acidity and/or metal leaching.

To support waste rock management during future excavation activities, criteria have been derived to permit: i) estimation of expected quantities of potentially AML material for planning purposes, and ii) potential field screening criteria applicable to operation segregation of AML rock.

As part of the development of a field screening program for active rock excavation, field criteria will require additional site testing, and be modified as required to ensure and good correlation with geochemistry across all lithological units, and consistency in application between personnel.

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References:

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BC Ministry of Energy and Mines, 1997. Draft Guidelines for and Recommended Methods for the Prediction of Metal Leaching and Acid Rock Drainage at Mine Sites in British Columbia.

<u>Attachments:</u>

Appendices B1 to B4, and C1 to C2

APPENDIX B1-1 Acid Base Accounting Data

Certificate #	Sample #	Hole ID	BK Area	From (m)	To (m)	Lith Unit	Description
VA07091928	C212117	K-06-0011	SW Zone	36.3	37.5	SSCT	Light green-grey, fine grained mica schist with intermitted boudinized vein quartz.
TR07092775	E600288	K-07-0081	East Zone	45.7	47.7	SSCT	Yellow-green fine grained mica-schist. Slightly oxidized
VA07091920	C212566	K-06-0016	SW Zone	207.3	208.4	SSCT	Yellow-green fine grained mica schist.
VA07091804	C462066	K-06-0023	SW Zone	356.8	358.5	SSCT	Sericite/Chloritic Schist Unit: Medium grey/green fine grained micaseous schist preceding a greenstone unit.
TR07093011	E600079	K-07-0078	East Zone	52.51	54.1	SSCT	Yellow-green fine grained mica-schist. Moderately friable.
TR07093907	E467959	K-07-0065	East Zone	180.96	182.08	SSCT	Yellow/green/grey fine grained mica-schist. Slightly calcareous. Quartz sweats and boudins are interbedded with the schist.
TR07093920	E599704	K-07-0066	East Zone	139.38	139.77	SSCT	Yellow/green/grey fine grained mica-schist. Slightly calcareous.
TR07093369	E775513	K-07-0067	East Zone	135.63	136.25	SSCT	Light yellow-grey, fine-grained mica schist. Slightly calcareous.
TR07092771	E600542	K-07-0086	East Zone	229.1	229.9	CHSCH	Medium gray-green chlorite-rich schist with local thin quartzite beds.
VA07091806	C462793	K-06-0035	SW Zone	65.1	67.45	SSCT	Medium Grey/Green Chlorite-rich fine grained mica-schist.
VA07091923	C212729	K-06-0020	SW Zone	44.2	45.7	SSCT	Medium Grey/Green Chlorite-rich fine grained mica-schist.
VA07091226	E776315	K-07-0091a	East Zone	286.9	288	SSCT	Light-medium grey-green chlorite rich fine grained mica-schist.
TR07085899	E768248	K-07-0094	Middle East Zone	142.63	144.51	GNST	Dark grey-green greenstone
VA07091804	C462069	K-06-0023	SW Zone	359.9	361.9	GNST	Medium-dark green greenstone with abundant beige phenocrysts. Moderately calcareous.
TR07092775	E600290	K-07-0081	East Zone	51.05	51.9	GNST	Small unit of greenstone with cross-cutting quartz/siderite veins and sweats. Moderately foliated.
TR07093364	E775819	K-07-0079	East Zone	86.87	89.03	GNST	Dark green, well-foliated, moderately calcareous greenstone.
VA07091921	C212639	K-06-0016	SW Zone	300.3	301.8	GNST	Medium-dark green, slightly calcareous greenstone. Slightly foliated with tiny, beige/white phenocrysts elongated approximately folitaion parallel.
VA07091225	E600631	K-07-0092	Middle East Zone	116.25	118.26	GNST	Light grey-green, weakly foliated with porphyroblasts of quartz and carbonate.
TR07093906	E599612	K-07-0066	East Zone	1.34	3.35	GNST	Dark green-grey calcareous greenstone.
TR07092773	E752010	K-07-0083	East Zone	88.74	90.74	GNST	Medium grey-green calcareous greenstone
TR07092957	E775866	K-07-0082	East Zone	1.44	3.4	GNST	Medium grey-green calcareous greenstone
VA07091927	C212917	K-06-0020	SW Zone	289.6	291.05	GNST	Medium Grey-green calcareous greenstone.
TR07086383	E600841	K-07-0093	Middle East Zone	182.27	185.32	GNST	Light to medium grey-green, calcareous greenstone with trace qtz/calcite veining and elongated porphyroblasts. Moderately foliated.
VA07091226	E776319	K-07-0091a	East Zone	290.7	291.8	GNST	Light grey-green calareous greenstone with undulating, boudinized qtz/calcite veins.
TR07092774	E600319	K-07-0081	East Zone	98.25	100.28	QTZT	Medium grey, moderately foliated quartzite.
VA07091804	C462078	K-06-0023	SW Zone	369.5	370.7	QTZT	Well foliated med-dark grey quartzite unit that has been cross cut by siderite stringers.
TR07093010	E600086	K-07-0078	East Zone	64.1	66.1	QTZT	Medium-grey, brittle quartzite with several cross-cutting qtz/siderite stringers.
TR07086383	E600846	K-07-0093	Middle East Zone	190.1	191.21	QTZT	Medium grey quartzite with slightly oxidized fractured surfaces and thin cross-cutting qtz stringers.
TR07087698	E768283	K-07-0094	Middle East Zone	196.84	197.8	QTZT	Light - Medium grey quartzite with iron/manganese oxide staining. Minor siderite and quartz stringers
TR07093363	E775833	K-07-0079	East Zone	111.56	113.56	QTZT	Medium grey, brittle quartzite. Cross-cutting quartz veins/veinlets.
TR07093908	C467832	K-07-0065	East Zone	28.34	29.34	QTZT	Bleached quartzite with maganese staining surrounding fractures and quartz stringers.
TR07093902	E599725	K-07-0066	East Zone	155.95	156.95	QTZT	Brittle, light grey quartzite. Moderately foliated with stringers of quartz x-cutting foliation.
VA07091229	E600593	K-07-0092	Middle East Zone	51.55	53.52	QTZT	Medium grey, foliated with cross-cutting oxidized quartz stringers with slightly oxidized fracture surfaces.
TR07092952	E751981	K-07-0083	East Zone	43	45	QTZT	Bleached, brittle quartzite with manganese staining surrounding fractures and limonite staining on fracture surfaces.
VA07091806	C462785	K-06-0035	SW Zone	53	55	QTZT	Dark grey, well foliated
VA07091926	C212949	K-06-0020	SW Zone	332.2	333.7	QTZT	Medium-dark grey brittle quartzite with qtz stringers cross-cutting foliation. Iron Oxide staining on fractured surfaces.
TR07093900	C466994	K-07-0067	East Zone	111.1	113.1	CQTZT	Medium-dark grey calcareous quartzite.
VA07091809	C462038	K-06-0023	SW Zone	323.1	324.6	CQTZT	Medium-dark grey calcareous quartzite unit with cross-cutting quartz and calcite stringers.
VA07091227	E600744	K-07-0092	Middle East Zone	258	260.03	CQTZT	Medium-dark grey calcaerous quarzite with minor x-cutting quartz and calcite stringers.
TR07092959	E751851	K-07-0076	East Zone	78.73	81.55	CQTZT	Medium grey calcareous quartzite with foliation parallel sweats of calcite as well as cross-cutting quartz/calcite stringers.
TR07093366	E775774	K-07-0079	East Zone	29.39	31.39	CQTZT	Medium-dark grey calcareous quartzite with a well developed foliation. Cross-cutting quartz and calcite stringers are present thru-out.
TR07093907	C467957	K-07-0065	East Zone	178.72	180.23	CQTZT	Well foliated, medium to dark grey calcareous quartzite.
TR07093904	E599687	K-07-0066	East Zone	110.75	112.75	CQTZT	Medium grey calcareous quartzite with cross-cutting quartz/calcite stringers. Slightly oxidized fractured surfaces.
TR07092951	E752037	K-07-0083	East Zone	131.41	133.5	CQTZT	Well foliated, medium to dark grey calcareous quartzite with several foliation parallel bands of extreme calcification. Stringers of qtz and calcite are present x-cutting throughout
TR07092954	E775965	K-07-0082	East Zone	154.92	157.12	CQTZT	Well foliated, medium to dark grey calcareous quartzite with several foliation parallel bands of extreme calcification. Stringers of qtz and calcite are present x-cutting throughout
VA07091805	C462958	K-06-0035	SW Zone	337	339	CQTZT	Dark grey, slightly porous calcareous quartzite with bands of more intense calcification parallel to foliation.
VA07091926	C212942	K-06-0020	SW Zone	323.1	324.6	CQTZT	Dark grey, well foliated, calcareous quartzite with stringers of qtz and calicite cross-cutting foliation. Limonite oxide stains fractured surfaces and some stringers.
TR07086384	E600885	K-07-0093	Middle East Zone	225	227	CQTZT	Medium to dark grey, banded calcareous schist. Some bands (cm scale) are more intensly calcareous than othres.
VA07091924	C215828	K-06-0023	SW Zone	45.7	47.3	GSCH	Med-dark grey moderately graphitic schistose unit with intermittent, thin beds of quartzite.
TR07093011	E600070	K-07-0078	East Zone	39.62	41.62	GSCH	Graphitic Schist unit with intermittent thin beds of quartzite. Slightly gougy at times. Slightly vuggy sweats of quartz.
TR07087698	E768289	K-07-0094	Middle East Zone	207.9	209.91	GSCH	Dark grey, slightly gougy, friable graphitic schist with intermittent qtz sweats. Slightly oxidized - limonite staining on fractured surfaces.
TR07092956	E751924	K-07-0076	East Zone	154.04	155.91	GSCH	Dark grey slightly graphitic schist with intermittent, thin beds of quartzite. Qtz sweats. Moderately oxidized.
TR07092957	E775865	K-07-0079	East Zone	160.83	163.37	GSCH	Dark grey, moderatley graphitic schist unit with intermittent, thin bedded quartzite.
TR07093905	C467893	K-07-0065	East Zone	102.41	103.89	GSCH	Dark grey, graphitic schist. Sweats of calcite and vein quartz intermittent throughout.
TR07093367	E775645	K-07-0066	East Zone	60.58	62.66	GSCH	Dark grey to black graphitic schist with sweats and intermittent layers of vein quartz.
TR07093901	E466965	K-07-0067	East Zone	64.91	66.98	GSCH	Dark grey to black graphitic schist with sweats of calcite and quartz. Trace limonite on fracture surfaced.
TR07092955	E775947	K-07-0082	East Zone	130.47	132.27	GSCH	Dark grey to black graphitic schist with sweats of calcite and quartz.
VA07091807	C462772	K-06-0035	SW Zone	31	33	GSCH	Dark grey to black graphitic schist with sweats of quartz.
VA07091930	C212705	K-06-0020	SW Zone	13.5	15.2	GSCH	Dark grey to black graphitic schist with sweats of vein quartz throughout. Slightly oxidized.

APPENDIX B1-1 Acid Base Accounting Data

Certificate #	Sample #	Hole ID	BK Area	From (m)	To (m)	Lith Unit	Description
TR07092772	E600774	K-07-0092	Middle East Zone	297.77	299.8	GSCH	Dark grey to black graphitic schist with sweats of vein quartz/calcite throughout.
VA07091228	E776285	K-07-0091a	East Zone	247.45	249.45	GSCH	Dark grey to black graphitic schist with sweats of vein quartz/calcite throughout.
TR07093903	C467919	K-07-0065	East Zone	129.84	130.12	VN	Mineralized Siderite vein (sphalerite + galena veinlets) - clay alteration.
TR07093920	E599708	K-07-0066	East Zone	142.46	143.1	VN	Mineralized Siderite vein (sphalerite and galena veinlets)
TR07093368	E775550	K-07-0067	East Zone	164.24	164.94	VN	Brecciated Quartzite with siderite matrix. Main mineralized lens contains sphalerite, galena, arsenopyrite.
TR07092958	E751883	K-07-0076	East Zone	114.5	115.21	VN	Fine grained galena and sphalerite within quartz and siderite stringers that cross-cut the quartzite unit.
TR07092953	E775989	K-07-0082	East Zone	195.96	196.4	VN	Trace Galena within fractures of a siderite vein.
VA07091240	E600657	K-07-0092	Middle East Zone	158.37	158.72	VN	Trace Galena within greenstone and siderite stringers.
VA07091931	C212406	K-06-0011	SW Zone	401.3	402	VN	Tetrahedrite, siderite, galena and sphalerite - breccia.
VA07091925	C462087	K-06-0023	SW Zone	377.45	378	VN	Massive sphalerite with minor abours of galena, pyrite and chalcopyrite within a siderite vein.
VA07091241	C463235	K-06-0038	SW Zone	310.6	311.05	VN	Fractured broken quartzite with trace siderite veining. Trace pyrite/sphalerite and possibly galena
TR07093365	E775799	K-07-0079	East Zone	61.82	61.96	VN	Massive sphalerite within a siderite vein. Massive pyrite and trace galena also present.

APPENDIX B1-1 Acid Base Accounting Data

Sample #	Hole ID	BK Area	From (m)	To (m)	Lith Unit	OA-VOL08	OA-VOL08	OA-VOL08	OA-VOL08	OA-ELE07	OA-VOL08	S-IR08	S-GRA06	S-GRA06a	S-CAL06	C-GAS05	C-GAS05
						MPA	**FIZZ RATING**	**NNP**	**NP**	**pH**	**Ratio NP:MPA**	**Total S**	**SO4** (Cb Lch)	**SO4** (HCl Lch)	**S2-** (calc)	**C**	**CO2**
						tCaCO3/1000t ore	**Unity**	**tCaCO3/1000t ore**	**tCaCO3/1000t ore**	**Unity**	**Unity**	**%**	**%S**	**%S**	**%S**	**%**	**%**
C212117	K-06-0011	SW Zone	36.3	37.5	SSCT	10.6	2	12	23	8.5	2.16	0.34	<0.01	<0.01	0.34	0.11	0.4
E600288	K-07-0081	East Zone	45.7	47.7	SSCT	2.5	2	15	17	8.5	6.8	0.08	0.01	<0.01	0.07	0.2	0.8
C212566	K-06-0016	SW Zone	207.3	208.4	SSCT	5.3	3	75	80	7.8	15.06	0.17	0.05	0.04	0.12	0.83	3.1
C462066	K-06-0023	SW Zone	356.8	358.5	SSCT	1.3	3	84	85	8.9	68	0.04	0.01	<0.01	0.03	0.86	3.2
E600079	K-07-0078	East Zone	52.51	54.1	SSCT	6.3	2	27	33	7.6	5.28	0.2	0.01	0.01	0.19	0.57	2.1
E467959	K-07-0065	East Zone	180.96	182.08	SSCT	1.3	3	126	127	8.6	101.6	0.04	<0.01	0.02	0.04	1.25	4.6
E599704	K-07-0066	East Zone	139.38	139.77	SSCT	8.8	3	161	170	8.3	19.43	0.28	0.01	<0.01	0.27	1.75	6.4
E775513	K-07-0067	East Zone	135.63	136.25	SSCT	2.5	3	163	165	8.4	66	0.08	<0.01	<0.01	0.08	1.83	6.7
E600542	K-07-0086	East Zone	229.1	229.9	CHSCH	10.6	2	40	51	8	4.8	0.34	<0.01	<0.01	0.34	1.31	4.8
C462793	K-06-0035	SW Zone	65.1	67.45	SSCT	6.9	2	30	37	8.6	5.38	0.22	0.03	0.06	0.19	0.54	2
C212729	K-06-0020	SW Zone	44.2	45.7	SSCT	2.8	2	22	25	8.3	8.89	0.09	0.03	0.03	0.06	0.06	0.2
E776315	K-07-0091a	East Zone	286.9	288	SSCT	5.9	3	189	195	8.4	32.84	0.19	0.01	0.03	0.18	2.13	7.8
E768248	K-07-0094	Middle East Zone	142.63	144.51	GNST	4.7	1	8	13	8.6	2.77	0.15	0.01	0.01	0.14	0.05	0.2
C462069	K-06-0023	SW Zone	359.9	361.9	GNST	2.2	3	84	86	8.8	39.31	0.07	<0.01	0.01	0.07	0.53	1.9
E600290	K-07-0081	East Zone	51.05	51.9	GNST	5	3	161	166	8.1	33.2	0.16	<0.01	<0.01	0.16	1.86	6.8
E775819	K-07-0079	East Zone	86.87	89.03	GNST	0.9	2	45	46	8	49.07	0.03	0.01	<0.01	0.02	0.44	1.6
C212639	K-06-0016	SW Zone	300.3	301.8	GNST	3.4	2	22	25	8.6	7.27	0.11	0.01	0.02	0.1	0.13	0.5
E600631	K-07-0092	Middle East Zone	116.25	118.26	GNST	0.6	2	35	36	8.3	57.6	0.02	<0.01	0.01	0.02	0.36	1.3
E599612	K-07-0066	East Zone	1.34	3.35	GNST	0.6	1	9	10	8.8	16	0.02	0.01	<0.01	0.01	<0.05	0.2
E752010	K-07-0083	East Zone	88.74	90.74	GNST	0.9	3	206	207	8.3	220.8	0.03	<0.01	<0.01	0.03	3.01	11
E775866	K-07-0082	East Zone	1.44	3.4	GNST	0.3	1	12	12	8.6	38.4	0.01	0.01	<0.01	<0.01	<0.05	<0.2
C212917	K-06-0020	SW Zone	289.6	291.05	GNST	0.9	2	21	22	8.4	23.47	0.03	0.01	<0.01	0.02	0.08	0.3
E600841	K-07-0093	Middle East Zone	182.27	185.32	GNST	10	2	66	76	8.2	7.6	0.32	0.03	0.01	0.29	0.99	3.6
E776319	K-07-0091a	East Zone	290.7	291.8	GNST	1.3	3	72	73	8.3	58.4	0.04	<0.01	0.02	0.04	0.47	1.7
E600319	K-07-0081	East Zone	98.25	100.28	QTZT	5.9	2	40	46	8.9	7.75	0.19	0.01	<0.01	0.18	0.86	3.2
C462078	K-06-0023	SW Zone	369.5	370.7	QTZT	20.9	2	14	35	8.2	1.67	0.67	0.01	<0.01	0.66	0.42	1.6
E600086	K-07-0078	East Zone	64.1	66.1	QTZT	4.1	2	4	8	8	1.97	0.13	0.01	0.01	0.12	0.14	0.5
E600846	K-07-0093	Middle East Zone	190.1	191.21	QTZT	0.3	2	30	30	8.6	96	0.01	<0.01	0.02	0.01	0.4	1.5
E768283	K-07-0094	Middle East Zone	196.84	197.8	QTZT	4.7	2	60	65	7.9	13.87	0.15	<0.01	0.01	0.15	0.83	3
E775833	K-07-0079	East Zone	111.56	113.56	QTZT	4.7	2	0	5	7.9	1.07	0.15	0.02	<0.01	0.13	0.08	0.3
C467832	K-07-0065	East Zone	28.34	29.34	QTZT	1.6	1	-1	1	6.4	0.64	0.05	0.02	0.03	0.03	<0.05	<0.2
E599725	K-07-0066	East Zone	155.95	156.95	QTZT	6.6	2	2	9	7.6	1.37	0.21	0.01	0.01	0.2	0.21	0.8
E600593	K-07-0092	Middle East Zone	51.55	53.52	QTZT	1.6	1	1	3	7.7	1.92	0.05	0.02	0.02	0.03	<0.05	<0.2
E751981	K-07-0083	East Zone	43	45	QTZT	<0.3	2	11	11	8.6	70.4	<0.01	0.01	<0.01	<0.01	0.11	0.4
C462785	K-06-0035	SW Zone	53	55	QTZT	6.3	2	1	7	8	1.12	0.2	0.02	<0.01	0.18	0.1	0.4
C212949	K-06-0020	SW Zone	332.2	333.7	QTZT	3.8	2	16	20	8.3	5.33	0.12	0.01	0.02	0.11	0.2	0.8
C466994	K-07-0067	East Zone	111.1	113.1	CQTZT	6.9	3	192	199	8.5	28.95	0.22	0.02	<0.01	0.2	2.38	8.7
C462038	K-06-0023	SW Zone	323.1	324.6	CQTZT	25.6	3	96	122	8.1	4.76	0.82	0.04	0.01	0.78	1.5	5.5
E600744	K-07-0092	Middle East Zone	258	260.03	CQTZT	9.1	3	85	94	8.2	10.37	0.29	0.01	<0.01	0.28	1.61	5.9
E751851	K-07-0076	East Zone	78.73	81.55	CQTZT	23.4	3	129	152	8.3	6.49	0.75	0.03	<0.01	0.72	1.49	5.5
E775774	K-07-0079	East Zone	29.39	31.39	CQTZT	2.8	3	178	181	8.5	64.36	0.09	<0.01	<0.01	0.09	2.29	8.4
C467957	K-07-0065	East Zone	178.72	180.23	CQTZT	4.4	3	197	201	8.7	45.94	0.14	0.01	0.01	0.13	2.49	9.1
E599687	K-07-0066	East Zone	110.75	112.75	CQTZT	10	3	178	188	8.3	18.8	0.32	0.01	<0.01	0.31	2.4	8.8
E752037	K-07-0083	East Zone	131.41	133.5	CQTZT	5.6	2	14	20	8.3	3.56	0.18	0.02	0.01	0.16	0.25	0.9
E775965	K-07-0082	East Zone	154.92	157.12	CQTZT	4.7	2	20	25	8.3	5.33	0.15	0.01	<0.01	0.14	0.32	1.2
C462958	K-06-0035	SW Zone	337	339	CQTZT	18.8	3	108	127	8.4	6.77	0.6	0.02	0.01	0.58	1.56	5.7
C212942	K-06-0020	SW Zone	323.1	324.6	CQTZT	3.8	2	80	84	8.3	22.4	0.12	0.01	0.01	0.11	1.23	4.5
E600885	K-07-0093	Middle East Zone	225	227	CQTZT	3.8	2	63	67	8.4	17.87	0.12	0.02	0.01	0.1	0.83	3.1
C215828	K-06-0023	SW Zone	45.7	47.3	GSCH	6.6	1	-7	0	7.8	0	0.21	0.01	0.01	0.2	<0.05	<0.2
E600070	K-07-0078	East Zone	39.62	41.62	GSCH	1.3	1	4	5	7.9	4	0.04	<0.01	<0.01	0.04	<0.05	<0.2
E768289	K-07-0094	Middle East Zone	207.9	209.91	GSCH	7.5	2	62	69	8.3	9.2	0.24	0.01	0.01	0.23	1.09	4
E751924	K-07-0076	East Zone	154.04	155.91	GSCH	20	2	58	78	8.4	3.9	0.64	0.03	<0.01	0.61	1.32	4.8
E775865	K-07-0079	East Zone	160.83	163.37	GSCH	32.8	2	34	67	8.4	2.04	1.05	0.04	<0.01	1.01	0.94	3.5
C467893	K-07-0065	East Zone	102.41	103.89	GSCH	14.4	2	77	91	8.3	6.33	0.46	0.02	<0.01	0.44	1.24	4.5
E775645	K-07-0066	East Zone	60.58	62.66	GSCH	1.9	3	60	62	8.4	33.07	0.06	0.01	<0.01	0.05	0.77	2.8
E466965	K-07-0067	East Zone	64.91	66.98	GSCH	7.8	2	67	75	8.8	9.6	0.25	0.01	0.01	0.24	1.19	4.4
E775947	K-07-0082	East Zone	130.47	132.27	GSCH	22.2	2	67	89	8.4	4.01	0.71	0.03	<0.01	0.68	1.28	4.7
C462772	K-06-0035	SW Zone	31	33	GSCH	19.1	2	12	31	7.9	1.63	0.61	0.02	0.01	0.59	0.57	2.1
C212705	K-06-0020	SW Zone	13.5	15.2	GSCH	9.7	1	9	19	8	1.96	0.31	0.14	0.16	0.17	0.13	0.5

APPENDIX B1-1 Acid Base Accounting Data

Sample #	Hole ID	BK Area	From (m)	To (m)	Lith Unit	OA-VOL08	OA-VOL08	OA-VOL08	OA-VOL08	OA-ELE07	OA-VOL08	S-IR08	S-GRA06	S-GRA06a	S-CAL06	C-GAS05	C-GAS05
						MPA	FIZZ RATING	NNP	NP	pH	Ratio NP:MPA	Total S	SO4 (Cb Lch)	SO4 (HCl Lch)	S2- (calc)	C	CO2
						tCaCO3/1000t ore	Unity	tCaCO3/1000t ore	tCaCO3/1000t ore	Unity	Unity	%	%S	%S	%S	%	%
E600774	K-07-0092	Middle East Zone	297.77	299.8	GSCH	13.1	1	11	24	8.3	1.83	0.42	0.01	<0.01	0.41	0.31	1.2
E776285	K-07-0091a	East Zone	247.45	249.45	GSCH	37.2	2	42	79	6.9	2.12	1.19	0.02	<0.01	1.17	1.32	4.8
C467919	K-07-0065	East Zone	129.84	130.12	VN	335.9	2	-282	54	6.7	0.16	10.75	0.04	0.03	10.7	6.23	22.8
E599708	K-07-0066	East Zone	142.46	143.1	VN	196.6	2	-152	45	6.7	0.23	6.29	0.05	0.04	6.24	6.83	25
E775550	K-07-0067	East Zone	164.24	164.94	VN	176.9	2	-123	54	6.9	0.31	5.66	0.02	<0.01	5.64	3.46	12.9
E751883	K-07-0076	East Zone	114.5	115.21	VN	9.1	2	31	40	8.2	4.41	0.29	<0.01	<0.01	0.29	0.62	2.3
E775989	K-07-0082	East Zone	195.96	196.4	VN	12.8	3	157	170	8.4	13.27	0.41	0.01	<0.01	0.4	3.78	13.8
E600657	K-07-0092	Middle East Zone	158.37	158.72	VN	8.1	2	83	91	8.3	11.2	0.26	0.02	<0.01	0.24	5.29	19.4
C212406	K-06-0011	SW Zone	401.3	402	VN	378.1	2	-317	61	7.6	0.16	12.1	0.07	0.03	12.05	6.86	25.1
C462087	K-06-0023	SW Zone	377.45	378	VN	557.8	2	-515	43	6.6	0.08	17.85	0.21	0.25	17.65	1.78	6.5
C463235	K-06-0038	SW Zone	310.6	311.05	VN	36.6	2	18	55	7.7	1.5	1.17	0.01	0.01	1.16	1.26	4.6
E775799	K-07-0079	East Zone	61.82	61.96	VN	582.8	2	-550	33	5.8	0.06	18.65	0.77	0.78	17.9	3.88	14.2

APPENDIX B1-2 ICP Metals for ABA Database

	Certificate #	Sample #	Hole ID	BK Area	From (m)	To (m)	Lith Unit	Au_ppm	Ag_ppm	Al_%	As_ppm	Ba_ppm	Be_ppm	Bi_ppm	Ca_%	Cd_ppm	Co_ppm	Cr_ppm
1	VA07091928	C212117	K-06-0011	SW Zone	36.3	37.5	SSCH	0.01	0.50	3.53	5	3130	0.9	2	0.3	0.5	10	33
2	TR07092775	E600288	K-07-0081	East Zone	45.7	47.7	SSCH	0.01	2.00	5.31	37	2290	1.6	2	0.36	4.1	13	47
3	VA07091920	C212566	K-06-0016	SW Zone	207.3	208.4	SSCH	0.01	0.50	5.6	6	920	1.3	2	2.84	0.5	9	38
4	VA07091804	C462066	K-06-0023	SW Zone	356.8	358.5	SSCH	0.01	0.50	8.49	5	3200	1.9	2	3.98	0.5	10	99
5	TR07093011	E600079	K-07-0078	East Zone	52.51	54.1	SSCH	0.01	2.90	4.32	46	1880	1.3	2	0.26	16.3	8	38
6	TR07093907	C467959	K-07-0065	East Zone	180.96	182.08	SSCH	0.01	0.50	7.5	5	360	0.6	2	5.56	0.5	31	131
7	TR07093920	E599704	K-07-0066	East Zone	139.38	139.77	SSCH	0.01	11.80	7.25	30	310	0.8	2	5.18	19.7	35	168
8	TR07093369	E775513	K-07-0067	East Zone	135.63	136.25	SSCH	0.01	1.00	4.66	5	260	0.5	2	5.51	0.5	26	129
9	TR07092771	E600542	K-07-0086	East Zone	229.1	229.9	SSCH	0.02	0.80	1.55	262	210	0.5	2	0.17	47.3	3	37
10	VA07091806	C462793	K-06-0035	SW Zone	65.1	67.45	SSCH	0.01	0.50	5.58	5	7620	1.8	2	0.61	0.5	16	48
11	VA07091923	C212729	K-06-0020	SW Zone	44.2	45.7	SSCH	0.01	0.50	5.32	5	6800	1.9	2	0.46	0.5	14	50
12	VA07091226	E776315	K-07-0091a	East Zone	286.9	288	SSCH	0.01	1.40	6.53	20	410	0.7	2	7.35	0.5	29	112
13	TR07085899	E768248	K-07-0094	Middle East Zone	142.63	144.51	GNST	0.01	0.50	8.65	7	40	0.5	2	8.34	0.5	41	98
14	VA07091804	C462069	K-06-0023	SW Zone	359.9	361.9	GNST	0.02	0.50	7.13	13	1150	1.2	2	4.61	0.5	19	10
15	TR07092775	E600290	K-07-0081	East Zone	51.05	51.9	GNST	0.01	3.00	7.94	47	170	1.2	2	5.38	10.8	35	112
16	TR07093364	E775819	K-07-0079	East Zone	86.87	89.03	GNST	0.01	0.50	7.98	13	10	0.5	2	8.02	0.5	38	94
17	VA07091921	C212639	K-06-0016	SW Zone	300.3	301.8	GNST	0.01	0.50	8.45	18	30	0.6	2	6.97	0.5	43	46
18	VA07091225	E600631	K-07-0092	Middle East Zone	116.25	118.26	GNST	0.01	0.50	6.94	5	220	0.7	2	6.75	0.5	48	13
19	TR07093906	E599612	K-07-0066	East Zone	1.34	3.35	GNST	0.01	0.50	7.41	5	170	0.5	4	7.09	0.7	38	136
20	TR07092773	E752010	K-07-0083	East Zone	88.74	90.74	GNST	0.01	0.70	6.84	8	140	0.5	3	7.83	0.5	36	74
21	TR07092957	E775866	K-07-0082	East Zone	1.44	3.4	GNST	0.01	0.50	8.21	11	60	0.5	2	7.64	0.5	42	190
22	VA07091927	C212917	K-06-0020	SW Zone	289.6	291.05	GNST	0.02	0.50	8.18	8	250	0.5	2	8.06	0.5	41	455
23	TR07086383	E600841	K-07-0093	Middle East Zone	182.27	185.32	GNST	0.02	0.60	4	10	570	1	2	2.78	0.5	5	82
24	VA07091226	E776319	K-07-0091a	East Zone	290.7	291.8	GNST	0.02	0.50	8.53	5	380	0.6	2	5.15	0.5	46	166
25	TR07092774	E600319	K-07-0081	East Zone	98.25	100.28	QTZT	0.01	0.50	1.48	5	190	0.5	2	1.48	0.5	1	45
26	VA07091804	C462078	K-06-0023	SW Zone	369.5	370.7	QTZT	0.02	2.60	1.62	35	710	0.5	2	0.91	39.8	2	38
27	TR07093010	E600086	K-07-0078	East Zone	64.1	66.1	QTZT	0.01	0.80	1.12	13	180	0.5	2	0.12	1.1	2	42
28	TR07086383	E600846	K-07-0093	Middle East Zone	190.1	191.21	QTZT	0.01	1.30	1.43	5	70	0.5	2	1.23	0.5	2	58
29	TR07087698	E768283	K-07-0094	Middle East Zone	196.84	197.8	QTZT	0.02	1.60	0.43	37	50	0.5	2	2.47	3.0	1	26
30	TR07093363	E775833	K-07-0079	East Zone	111.56	113.56	QTZT	0.01	0.70	0.37	52	100	0.5	2	0.15	0.5	1	40
31	TR07093908	C467832	K-07-0065	East Zone	28.34	29.34	QTZT	0.01	1.80	0.29	121	40	0.5	2	0.03	1.4	1	42
32	TR07093902	E599725	K-07-0066	East Zone	155.95	156.95	QTZT	0.01	2.20	0.88	28	210	0.5	2	0.06	6.3	2	54
33	VA07091229	E600593	K-07-0092	Middle East Zone	51.55	53.52	QTZT	0.01	0.50	0.39	5	60	0.5	2	0.09	0.5	1	63
34	TR07092952	E751981	K-07-0083	East Zone	43	45	QTZT	0.01	0.50	1.32	13	190	0.5	2	0.35	1.5	2	44
35	VA07091806	C462785	K-06-0035	SW Zone	53	55	QTZT	0.01	0.50	0.75	5	150	0.5	2	0.21	0.5	1	24
36	VA07091926	C212949	K-06-0020	SW Zone	332.2	333.7	QTZT	0.01	0.50	0.31	38	50	0.5	2	0.76	0.5	1	41
37	TR07093900	C466994	K-07-0067	East Zone	111.1	113.1	CQTZT	0.01	0.50	1.36	6	310	0.5	2	7.47	0.5	3	35
38	VA07091809	C462038	K-06-0023	SW Zone	323.1	324.6	CQTZT	0.01	1.20	1.37	12	420	0.5	2	5.05	0.7	3	36
39	VA07091227	E600744	K-07-0092	Middle East Zone	258	260.03	CQTZT	0.01	0.50	0.51	5	230	0.5	2	3.71	0.5	1	30
40	TR07092959	E751851	K-07-0076	East Zone	78.73	81.55	CQTZT	0.01	2.30	2.2	15	340	0.6	2	5.3	6.5	2	48
41	TR07093366	E775774	K-07-0079	East Zone	29.39	31.39	CQTZT	0.01	0.50	0.8	5	200	0.5	2	6.85	0.5	4	33
42	TR07093907	C467957	K-07-0065	East Zone	178.72	180.23	CQTZT	0.01	0.50	1.31	5	390	0.5	2	6.78	0.5	1	29
43	TR07093904	E599687	K-07-0066	East Zone	110.75	112.75	CQTZT	0.01	0.70	1.83	12	340	0.5	2	7.17	0.8	3	38
44	TR07092951	E752037	K-07-0083	East Zone	131.41	133.5	CQTZT	0.01	0.50	0.5	5	140	0.5	2	0.74	0.5	1	44
45	TR07092954	E775965	K-07-0082	East Zone	154.92	157.12	CQTZT	0.01	0.50	0.41	7	90	0.5	2	0.98	0.5	1	29
46	VA07091805	C462958	K-06-0035	SW Zone	337	339	CQTZT	0.01	0.70	1.05	9	270	0.5	2	4.26	0.5	3	47
47	VA07091926	C212942	K-06-0020	SW Zone	323.1	324.6	CQTZT	0.01	0.50	2.03	21	210	0.5	2	3.07	0.6	11	56
48	TR07086384	E600885	K-07-0093	Middle East Zone	225	227	CQTZT	0.01	0.50	0.47	5	240	0.5	2	2.61	0.5	1	24
49	VA07091924	C215828	K-06-0023	SW Zone	45.7	47.3	GSCH	0.01	2.50	5.42	7	1420	1.3	2	0.07	0.6	5	60
50	TR07093011	E600070	K-07-0078	East Zone	39.62	41.62	GSCH	0.01	0.50	7.13	24	790	1.8	2	0.25	0.5	9	96
51	TR07087698	E768289	K-07-0094	Middle East Zone	207.9	209.91	GSCH	0.01	0.50	9.01	10	1360	2.5	2	2	0.5	14	117
52	TR07092956	E751924	K-07-0076	East Zone	154.04	155.91	GSCH	0.01	0.50	6.51	16	880	1.8	2	2.25	0.5	9	88
53	TR07092957	E775865	K-07-0079	East Zone	160.83	163.37	GSCH	0.10	0.60	7.51	16	1000	1.9	2	1.9	0.5	10	112

APPENDIX B1-2 ICP Metals for ABA Database

	Certificate #	Sample #	Hole ID	BK Area	From (m)	To (m)	Lith Unit	Au_ppm	Ag_ppm	Al_%	As_ppm	Ba_ppm	Be_ppm	Bi_ppm	Ca_%	Cd_ppm	Co_ppm	Cr_ppm
54	TR07093905	C467893	K-07-0065	East Zone	102.41	103.89	GSCH	0.01	0.50	5.16	7	870	1.3	2	3.56	0.5	6	81
55	TR07093367	E775645	K-07-0066	East Zone	60.58	62.66	GSCH	0.01	0.70	0.56	7	140	0.5	2	2.45	0.5	2	36
56	TR07093901	C466965	K-07-0067	East Zone	64.91	66.98	GSCH	0.01	0.70	9.16	13	1410	2.4	2	2.28	0.7	13	123
57	TR07092955	E775947	K-07-0082	East Zone	130.47	132.27	GSCH	0.01	0.50	8.25	5	1370	2	2	3.07	0.6	8	113
58	VA07091807	C462772	K-06-0035	SW Zone	31	33	GSCH	0.01	6.10	6.94	11	2240	1.8	2	0.86	0.5	9	90
59	VA07091930	C212705	K-06-0020	SW Zone	13.5	15.2	GSCH	0.01	0.50	10.35	10	3490	2.6	2	0.7	0.5	13	141
60	TR07092772	E600774	K-07-0092	Middle East Zone	297.77	299.8	GSCH	0.01	0.50	11.25	18	1360	2.9	2	0.74	0.5	15	125
61	VA07091228	E776285	K-07-0091a	East Zone	247.45	249.45	GSCH	0.01	0.60	9.21	64	1090	2.2	2	2.96	0.8	13	133
65	TR07092958	E751883	K-07-0076	East Zone	114.5	115.21	VN	0.01	2.10	2.23	34	350	0.7	2	0.81	8.3	4	46
66	TR07092953	E775989	K-07-0082	East Zone	195.96	196.4	VN	0.01	8.80	1.32	13	330	0.5	2	2.83	47.4	4	30
67	VA07091240	E600657	K-07-0092	Middle East Zone	158.37	158.72	VN	0.01	30.50	4.77	42	60	1.5	4	4.57	30.6	25	7
70	VA07091241	C463235	K-06-0038	SW Zone	310.6	311.05	VN	0.13	9.40	0.84	1810	100	0.5	2	1.53	36.5	7	27
62	TR07093903	C467919	K-07-0065	East Zone	129.84	130.12	VN	4.28	42.40	0.06	10000	10	0.5	18	0.25	1000.0	77	1
63	TR07093920	E599708	K-07-0066	East Zone	142.46	143.1	VN	0.73	1340.00	0.16	842	10	0.5	69	0.52	806.0	7	1
64	TR07093368	E775550	K-07-0067	East Zone	164.24	164.94	VN	0.12	175.00	0.62	10000	30	0.5	2	0.29	795.0	81	17
68	VA07091931	C212406	K-06-0011	SW Zone	401.3	402	VN	1.13	79.80	0.01	1710	10	0.5	38	0.2	1000.0	24	1
69	VA07091925	C462087	K-06-0023	SW Zone	377.45	378	VN	2.23	735.00	0.32	6550	10	0.5	86	0.15	1000.0	29	3
71	TR07093365	E775799	K-07-0079	East Zone	61.82	61.96	VN	0.60	1770.00	0.01	698	10	0.5	22	0.18	1000.0	5	1

APPENDIX B1-2 ICP Metals for ABA Database

	Certificate #	Sample #	Cu_ppm	Fe_%	Ga_ppm	K_%	La_ppm	Mg_%	Mn_ppm	Mo_ppm	Na_%	Ni_ppm	P_ppm	Pb_ppm	S_%	Sb_ppm	Sc_ppm	Sr_ppm	Th_ppm	Ti_%
1	VA07091928	C212117	96	2.43		0.89		0.84	1845	1	0.05	36	290	9	0.29	5		60		0.16
2	TR07092775	E600288	93	3.36	10	1.55	20	0.99	1810	1	0.07	45	350	62	0.09	8	12	46	20	0.22
3	VA07091920	C212566	18	2.37		1.99		0.67	635	1	0.84	13	240	17	0.07	5		122		0.21
4	VA07091804	C462066	27	4.26		2.47		2.02	844	1	2.96	41	1160	2	0.03	5		253		0.58
5	TR07093011	E600079	47	3.65	10	1.67	20	0.27	9170	2	0.04	21	320	217	0.19	5	9	30	20	0.18
6	TR07093907	C467959	145	7.16	20	0.39	20	3.11	989	1	0.25	79	670	9	0.04	6	28	379	20	0.78
7	TR07093920	E599704	142	6.77	20	0.61	10	1.99	3430	2	0.23	80	680	172	0.28	15	31	292	20	0.63
8	TR07093369	E775513	106	5.21	10	0.26	10	1.91	819	1	0.09	53	450	3	0.07	5	22	315	20	0.55
9	TR07092771	E600542	14	5.14	10	0.46	10	0.21	16050	1	0.07	7	290	65	0.33	5	5	17	20	0.11
10	VA07091806	C462793	62	3.29		1.8		1.24	3980	1	0.09	59	420	12	0.23	6		131		0.18
11	VA07091923	C212729	77	2.85		1.78		1.21	2550	1	0.03	48	400	6	0.08	5		103		0.21
12	VA07091226	E776315	178	7.17	20	0.33	10	2.87	934	1	0.15	67	750	7	0.23	5	24	281	20	0.56
13	TR07085899	E768248	233	8.14	20	0.08	10	3.67	1350	1	1.6	87	590	3	0.02	7	35	239	20	0.9
14	VA07091804	C462069	230	8.25		0.76		1.68	1545	1	2.69	11	1370	4	0.06	5		361		0.96
15	TR07092775	E600290	163	8.84	20	1.22	10	3.36	4670	1	0.02	86	650	594	0.19	10	34	64	20	0.93
16	TR07093364	E775819	180	8.37	20	0.01	10	3.61	1400	1	0.76	71	630	7	0.02	5	34	323	20	0.87
17	VA07091921	C212639	158	8.14		0.01		4.15	1330	1	1.46	89	680	2	0.12	9		293		0.96
18	VA07091225	E600631	306	10.75	20	0.05	10	3.07	1710	1	1.41	39	970	2	0.02	5	39	221	20	1.44
19	TR07093906	E599612	178	8.38	20	0.1	10	3.61	1305	1	1.58	80	590	3	0.01	5	35	219	20	0.9
20	TR07092773	E752010	140	7.53	20	0.11	10	3.77	1215	1	0.21	76	570	4	0.02	5	33	555	20	0.7
21	TR07092957	E775866	136	7.79	20	0.07	10	4	1410	1	1.32	100	510	7	0.01	7	36	242	20	0.78
22	VA07091927	C212917	120	7.07		0.29		5.17	1140	1	1.36	173	510	2	0.03	10		346		0.6
23	TR07086383	E600841	11	2.02	10	0.69	20	0.33	182	1	0.15	20	490	16	0.33	5	7	168	20	0.23
24	VA07091226	E776319	177	10.05	20	0.18	10	4.02	1500	1	0.02	99	970	4	0.03	5	36	361	20	1.4
25	TR07092774	E600319	7	1.29	10	0.31	10	0.39	111	1	0.06	10	370	3	0.21	5	3	40	20	0.11
26	VA07091804	C462078	12	2.27		0.47		0.25	3770	1	0.05	12	280	418	0.63	5		32		0.1
27	TR07093010	E600086	6	1.06	10	0.39	10	0.06	2300	1	0.03	8	240	131	0.12	5	2	23	20	0.1
28	TR07086383	E600846	6	0.93	10	0.18	10	0.22	241	1	0.15	7	190	5	0.01	5	2	52	20	0.1
29	TR07087698	E768283	10	0.84	10	0.14	10	0.1	763	2	0.01	4	390	39	0.16	12	1	48	20	0.04
30	TR07093363	E775833	4	0.54	10	0.11	10	0.04	221	1	0.01	5	80	13	0.14	5	1	8	20	0.07
31	TR07093908	C467832	11	0.55	10	0.09	10	0.01	568	1	0.01	4	60	71	0.04	5	1	5	20	0.04
32	TR07093902	E599725	6	1.06	10	0.32	10	0.04	2030	1	0.01	7	180	119	0.19	5	1	11	20	0.11
33	VA07091229	E600593	2	0.63	10	0.06	10	0.04	40	1	0.01	4	70	3	0.05	5	1	6	20	0.03
34	TR07092952	E751981	6	0.72	10	0.3	10	0.09	556	1	0.03	8	160	53	0.01	5	2	23	20	0.1
35	VA07091806	C462785	4	0.69		0.09		0.09	75	1	0.05	6	140	4	0.2	5		33		0.08
36	VA07091926	C212949	4	0.62		0.06		0.09	113	1	0.01	5	180	4	0.14	5		11		0.04
37	TR07093900	C466994	8	1.09	10	0.38	20	0.4	164	1	0.05	9	470	3	0.23	5	3	187	20	0.1
38	VA07091809	C462038	8	1.1		0.43		0.24	170	1	0.07	9	550	77	0.91	5		110		0.09
39	VA07091227	E600744	3	0.82	10	0.11	10	0.17	194	1	0.01	3	520	7	0.36	5	1	146	20	0.04
40	TR07092959	E751851	11	1.8	10	0.65	10	0.37	3030	1	0.06	16	560	327	0.8	6	4	150	20	0.1
41	TR07093366	E775774	5	0.81	10	0.22	10	0.41	127	1	0.05	9	560	10	0.09	5	2	156	20	0.05
42	TR07093907	C467957	9	1.28	10	0.36	10	0.66	161	1	0.05	9	540	9	0.14	5	3	137	20	0.06
43	TR07093904	E599687	8	1.28	10	0.61	10	0.38	333	1	0.06	14	540	19	0.33	5	4	172	20	0.11
44	TR07092951	E752037	3	0.55	10	0.14	10	0.08	63	1	0.02	5	250	4	0.22	5	1	31	20	0.06
45	TR07092954	E775965	6	0.44	10	0.12	10	0.06	181	1	0.01	5	230	12	0.16	5	1	31	20	0.05
46	VA07091805	C462958	9	0.97		0.35		0.39	202	1	0.04	13	470	28	0.58	5		81		0.08
47	VA07091926	C212942	30	2.2		0.25		0.49	334	1	0.04	24	380	6	0.13	5		82		0.21
48	TR07086384	E600885	1	0.41	10	0.13	10	0.12	83	1	0.01	1	250	3	0.12	5	1	144	20	0.05
49	VA07091924	C215828	47	1.96		0.76		0.25	155	1	0.36	24	320	18	0.17	13		162		0.27
50	TR07093011	E600070	19	3.37	10	1.21	30	0.28	152	1	0.27	40	720	14	0.03	5	12	145	20	0.3
51	TR07087698	E768289	26	5.03	20	1.69	40	0.75	289	2	0.34	56	1250	9	0.23	7	16	288	20	0.24
52	TR07092956	E751924	24	3.47	10	1.44	30	0.66	388	3	0.2	37	700	18	0.6	5	11	206	20	0.24
53	TR07092957	E775865	27	3.77	20	1.43	30	0.68	253	2	0.37	40	1050	27	0.99	6	13	269	20	0.32

APPENDIX B1-2 ICP Metals for ABA Database

	Certificate #	Sample #	Cu_ppm	Fe_%	Ga_ppm	K_%	La_ppm	Mg_%	Mn_ppm	Mo_ppm	Na_%	Ni_ppm	P_ppm	Pb_ppm	S_%	Sb_ppm	Sc_ppm	Sr_ppm	Th_ppm	Ti_%
54	TR07093905	C467893	19	2.41	20	1.18	30	0.52	213	1	0.21	29	710	17	0.46	5	9	220	20	0.28
55	TR07093367	E775645	6	0.77	10	0.13	10	0.16	552	1	0.04	4	280	49	0.06	5	2	60	20	0.07
56	TR07093901	C466965	28	5.11	20	1.65	30	0.83	372	1	0.36	53	1310	24	0.23	6	16	268	20	0.42
57	TR07092955	E775947	27	3.7	20	1.73	30	0.75	196	1	0.28	42	850	17	0.73	5	14	249	20	0.38
58	VA07091807	C462772	112	3.41		1.27		0.72	343	2	0.4	59	520	23	0.65	15		218		0.33
59	VA07091930	C212705	38	4.95		1.93		0.62	252	1	0.46	67	910	12	0.3	8		235		0.4
60	TR07092772	E600774	29	5.36	30	1.84	40	0.81	226	1	0.35	65	1210	24	0.41	7	19	256	20	0.31
61	VA07091228	E776285	26	5.04	20	1.58	30	0.91	358	1	0.47	53	1550	30	1.35	13	15	268	20	0.45
65	TR07092958	E751883	10	2.86	10	0.57	10	0.51	3510	1	0.05	16	320	394	0.27	5	5	30	20	0.14
66	TR07092953	E775989	3	5.07	10	0.44	10	0.96	18800	1	0.03	6	510	2680	0.43	10	3	36	20	0.05
67	VA07091240	E600657	165	13.5	10	1.47	10	1.43	40900	1	0.02	27	450	3540	0.27	51	25	43	20	0.67
70	VA07091241	C463235	15	4.15		0.26		0.11	10950	1	0.03	12	180	1600	1.25	22		10		0.04
62	TR07093903	C467919	620	24.5	10	0.01	10	0.42	69800	1	0.01	83	10	974	8.28	202	1	3	20	0.01
63	TR07093920	E599708	3340	22.6	10	0.05	10	0.27	80000	1	0.01	3	40	10000	5.59	1520	1	11	20	0.01
64	TR07093368	E775550	248	14.7	10	0.18	10	0.32	39300	1	0.01	43	70	6710	5.98	176	1	4	20	0.02
68	VA07091931	C212406	962	27.8		0.01		0.24	84300	1	0.01	11	10	6060	9.52	64		1		0.01
69	VA07091925	C462087	1760	16.2		0.07		0.15	36000	1	0.01	11	20	10000	10	661		2		0.01
71	TR07093365	E775799	4090	18.65	10	0.01	10	0.3	54300	1	0.01	1	10	1460	10	1730	1	1	20	0.01

APPENDIX B1-2 ICP Metals for ABA Database

	Certificate #	Sample #	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn_ppm
1	VA07091928	C212117			63	10	85
2	TR07092775	E600288	10	10	98	10	483
3	VA07091920	C212566			45	10	47
4	VA07091804	C462066			88	10	54
5	TR07093011	E600079	10	10	94	10	1250
6	TR07093907	C467959	10	10	261	10	86
7	TR07093920	E599704	10	10	254	10	1500
8	TR07093369	E775513	10	10	192	10	67
9	TR07092771	E600542	10	10	29	10	3320
10	VA07091806	C462793			91	10	110
11	VA07091923	C212729			105	10	100
12	VA07091226	E776315	10	10	269	10	105
13	TR07085899	E768248	10	10	308	10	96
14	VA07091804	C462069			184	10	101
15	TR07092775	E600290	10	10	316	10	1095
16	TR07093364	E775819	10	10	296	10	93
17	VA07091921	C212639			355	10	87
18	VA07091225	E600631	10	10	411	10	127
19	TR07093906	E599612	10	10	318	10	90
20	TR07092773	E752010	10	10	269	10	79
21	TR07092957	E775866	10	10	311	10	99
22	VA07091927	C212917			289	10	78
23	TR07086383	E600841	10	10	66	10	61
24	VA07091226	E776319	10	10	414	10	139
25	TR07092774	E600319	10	10	29	10	28
26	VA07091804	C462078			34	10	2960
27	TR07093010	E600086	10	10	22	10	223
28	TR07086383	E600846	10	10	25	10	26
29	TR07087698	E768283	10	10	8	10	246
30	TR07093363	E775833	10	10	5	10	96
31	TR07093908	C467832	10	10	4	10	250
32	TR07093902	E599725	10	10	14	10	620
33	VA07091229	E600593	10	10	10	10	34
34	TR07092952	E751981	10	10	22	10	181
35	VA07091806	C462785			13	10	14
36	VA07091926	C212949			5	10	49
37	TR07093900	C466994	10	20	27	10	30
38	VA07091809	C462038			32	10	70
39	VA07091227	E600744	10	10	10	10	25
40	TR07092959	E751851	10	10	44	10	709
41	TR07093366	E775774	10	10	20	10	31
42	TR07093907	C467957	10	10	28	10	38
43	TR07093904	E599687	10	10	38	10	61
44	TR07092951	E752037	10	10	8	10	8
45	TR07092954	E775965	10	10	7	10	35
46	VA07091805	C462958			26	10	79
47	VA07091926	C212942			67	10	104
48	TR07086384	E600885	10	10	8	10	12
49	VA07091924	C215828			95	10	64
50	TR07093011	E600070	10	10	103	10	74
51	TR07087698	E768289	10	10	161	10	119
52	TR07092956	E751924	10	10	107	10	83
53	TR07092957	E775865	10	10	133	10	93

APPENDIX B1-2 ICP Metals for ABA Database

	Certificate #	Sample #	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn_ppm
54	TR07093905	C467893	10	10	93	10	74
55	TR07093367	E775645	10	10	15	10	54
56	TR07093901	C466965	10	10	167	10	144
57	TR07092955	E775947	10	10	137	10	105
58	VA07091807	C462772			170	10	125
59	VA07091930	C212705			181	10	161
60	TR07092772	E600774	10	10	179	10	126
61	VA07091228	E776285	10	10	166	10	145
65	TR07092958	E751883	10	10	42	10	764
66	TR07092953	E775989	10	10	27	10	5810
67	VA07091240	E600657	20	10	250	10	3500
70	VA07091241	C463235			19	10	3620
62	TR07093903	C467919	40	10	1	10	10000
63	TR07093920	E599708	10	10	2	50	10000
64	TR07093368	E775550	20	10	10	10	10000
68	VA07091931	C212406			1	20	10000
69	VA07091925	C462087			3	50	10000
71	TR07093365	E775799	10	10	1	50	10000

APPENDIX B2-1 Mineralogy / Alteration Data for ABA Database

	Certificate #	Sample #	Hole ID	BK Area	From (m)	To (m)	Lith Unit	Lith Unit Minl'gy Log	Description	Assay Notes	Mineralogy Comments
1	VA07091928	C212117	K-06-0011	SW Zone	36.3	37.5	SSCH	SSCH	Light green-grey, fine grained mica schist with intermitted boudinized vein quartz.		tetrahedrite/siderite/galena/sphalerite
2	TR07092775	E600288	K-07-0081	East Zone	45.7	47.7	SSCH	SSCH	Yellow-green fine grained mica-schist. Slightly oxidized		
3	VA07091920	C212566	K-06-0016	SW Zone	207.3	208.4	SSCH	SSCH	Yellow-green fine grained mica schist.		208.25 - 208.4 Quartz veinlet with chlorite-rich stringers cutting perp. To CA.
4	VA07091804	C462066	K-06-0023	SW Zone	356.8	358.5	SSCH	SSCH	Sericite/Chloritic Schist Unit: Medium grey/green fine grained micaseous schist preceding a greenstone unit.		
5	TR07093011	E600079	K-07-0078	East Zone	52.51	54.1	SSCH	SSCH	Yellow-green fine grained mica-schist. Moderately friable.		trace clay @ 53.95
6	TR07093907	C467959	K-07-0065	East Zone	180.96	182.08	SSCH	SSCH	Yellow/green/grey fine grained mica-schist. Slightly calcareous. Quartz sweats and boudins are interbedded with the schist.		180.96-182.08: sericite schist with increased amount of clay on fractures. Clay is green-grey
7	TR07093920	E599704	K-07-0066	East Zone	139.38	139.77	SSCH	SSCH	Yellow/green/grey fine grained mica-schist. Slightly calcareous.	Sample adjacent to vein zone	
8	TR07093369	E775513	K-07-0067	East Zone	135.63	136.25	SSCH	SSCH	Light yellow-grey, fine-grained mica schist. Slightly calcareous.		
9	TR07092771	E600542	K-07-0086	East Zone	229.1	229.9	SSCH	CHSCH	Medium gray-green chlorite-rich schist with local thin quartzite beds.		
10	VA07091806	C462793	K-06-0035	SW Zone	65.1	67.45	SSCH	SSCH	Medium Grey/Green Chlorite-rich fine grained mica-schist.		
11	VA07091923	C212729	K-06-0020	SW Zone	44.2	45.7	SSCH	SSCH	Medium Grey/Green Chlorite-rich fine grained mica-schist.		
12	VA07091226	E776315	K-07-0091a	East Zone	286.9	288	SSCH	SSCH	Light-medium grey-green chlorite rich fine grained mica-schist.		
13	TR07085899	E768248	K-07-0094	Middle East Zone	142.63	144.51	GNST	GNST	Dark grey-green greenstone		Large amount of massive pyrite on a fracture surface at 144.21m.
14	VA07091804	C462069	K-06-0023	SW Zone	359.9	361.9	GNST	GNST	Medium-dark green greenstone with abundant beige phenocrysts. Moderately calcareous.		Primary qtz and secondary calcite stringer zone in mafic tuff like greenstone w/interbedded clays-silts Min in tuff.
15	TR07092775	E600290	K-07-0081	East Zone	51.05	51.9	GNST	GNST	Small unit of greenstone with cross-cutting quartz/siderite veins and sweats. Moderately foliated.		51.05-51.90: Quartz, calcite and siderite stringers are present throughout greenstone. Calcite and siderite seem secondary to quartz. Spalerite, pyrite and trace galena are present within siderite stringers.
16	TR07093364	E775819	K-07-0079	East Zone	86.87	89.03	GNST	GNST	Dark green, well-foliated, moderately calcareous greenstone.		
17	VA07091921	C212639	K-06-0016	SW Zone	300.3	301.8	GNST	GNST	Medium-dark green, slightly calcareous greenstone. Slightly foliated with tiny, beige/white phenocrysts elongated approximately folitaion parallel.		
18	VA07091225	E600631	K-07-0092	Middle East Zone	116.25	118.26	GNST	GNST	Light grey-green, weakly foliated with porphyroblasts of quartz and carbonate.		
19	TR07093906	E599612	K-07-0066	East Zone	1.34	3.35	GNST	GNST	Dark green-grey calcareous greenstone.		trace carb on fractures
20	TR07092773	E752010	K-07-0083	East Zone	88.74	90.74	GNST	GNST	Medium grey-green calcareous greenstone		
21	TR07092957	E775866	K-07-0082	East Zone	1.44	3.4	GNST	GNST	Medium grey-green calcareous greenstone		
22	VA07091927	C212917	K-06-0020	SW Zone	289.6	291.05	GNST	GNST	Medium Grey-green calcareous greenstone.		
23	TR07086383	E600841	K-07-0093	Middle East Zone	182.27	185.32	GNST	GNST	Light to medium grey-green, calcareous greenstone with trace qtz/calcite veining and elongated porphyroblasts. Moderately foliated.		
24	VA07091226	E776319	K-07-0091a	East Zone	290.7	291.8	GNST	GNST	Light grey-green calareous greenstone with undulating, boudinized qtz/calcite veins.		carb stringer // to foliation
25	TR07092774	E600319	K-07-0081	East Zone	98.25	100.28	QTZT	QTZT	Medium grey, moderately foliated quartzite.		
26	VA07091804	C462078	K-06-0023	SW Zone	369.5	370.7	QTZT	QTZT	Well foliated med-dark grey quartzite unit that has been cross cut by siderite stringers.	Sample adjacent to vein zone	
27	TR07093010	E600086	K-07-0078	East Zone	64.1	66.1	QTZT	QTZT	Medium-grey, brittle quartzite with several cross-cutting qtz/siderite stringers.		qtz and siderite veinlet, trace sphalerite @ 65.9
28	TR07086383	E600846	K-07-0093	Middle East Zone	190.1	191.21	QTZT	QTZT	Medium grey quartzite with slightly oxidized fractured surfaces and thin cross-cutting qtz stringers.		
29	TR07087698	E768283	K-07-0094	Middle East Zone	196.84	197.8	QTZT	QTZT	Light - Medium grey quartzite with iron/manganese oxide staining. Minor siderite and quartz stringers	Possible minor contamination. Sample occurs after high silver standard	
30	TR07093363	E775833	K-07-0079	East Zone	111.56	113.56	QTZT	QTZT	Medium grey, brittle quartzite. Cross-cutting quartz veins/veinlets.		Large amount of disseminated pyrite within QTZT.
31	TR07093908	C467832	K-07-0065	East Zone	28.34	29.34	QTZT	QTZT	Bleached quartzite with maganese staining surrounding fractures and quartz stringers.		28.34-29.34: manganese oxide in quartz veinlets
32	TR07093902	E599725	K-07-0066	East Zone	155.95	156.95	QTZT	QTZT	Brittle, light grey quartzite. Moderately foliated with stringers of quartz x-cutting foliation.		greenish clay on fractures
33	VA07091229	E600593	K-07-0092	Middle East Zone	51.55	53.52	QTZT	QTZT	Medium grey, foliated with cross-cutting oxidized quartz stringers with slightly oxidized fracture surfaces.		

APPENDIX B2-1 Mineralogy / Alteration Data for ABA Database

	Certificate #	Sample #	Hole ID	BK Area	From (m)	To (m)	Lith Unit	Lith Unit Minl'gy Log	Description	Assay Notes	Mineralogy Comments
34	TR07092952	E751981	K-07-0083	East Zone	43	45	QTZT	QTZT	Bleached, brittle quartzite with manganese staining surrounding fractures and limonite staining on fracture surfaces.		
35	VA07091806	C462785	K-06-0035	SW Zone	53	55	QTZT	QTZT	Dark grey, well foliated		
36	VA07091926	C212949	K-06-0020	SW Zone	332.2	333.7	QTZT	QTZT	Medium-dark grey brittle quartzite with qtz stringers cross-cutting foliation. Iron Oxide staining on fractured surfaces.		
37	TR07093900	C466994	K-07-0067	East Zone	111.1	113.1	CQTZT	CQTZT	Medium-dark grey calcareous quartzite.		111.10-115.10m: Pervasive CaCO3 throughout section. Perhaps some of QTZT is CaCO3 rich from origin and has been put into sweats/veinlets through metamorphism.
38	VA07091809	C462038	K-06-0023	SW Zone	323.1	324.6	CQTZT	CQTZT	Medium-dark grey calcareous quartzite unit with cross-cutting quartz and calcite stringers.		
39	VA07091227	E600744	K-07-0092	Middle East Zone	258	260.03	CQTZT	CQTZT	Medium-dark grey calcaerous quarzite with minor x-cutting quartz and calcite stringers.		
40	TR07092959	E751851	K-07-0076	East Zone	78.73	81.55	CQTZT	CQTZT	Medium grey calcareous quartzite with foliation parallel sweats of calcite as well as cross-cutting quartz/calcite stringers.	Possible minor contamination. Sample occurs after high silver standard	
41	TR07093366	E775774	K-07-0079	East Zone	29.39	31.39	CQTZT	CQTZT	Medium-dark grey calcareous quartzite with a well developed foliation. Cross-cutting quartz and calcite stringers are present thru-out.		No qtz veining, all carbonate veinlets and sweats, only limonite mineralization.
42	TR07093907	C467957	K-07-0065	East Zone	178.72	180.23	CQTZT	CQTZT	Well foliated, medium to dark grey calcareous quartzite.		178.72-180.23: calcite-bearing quartz veinlets
43	TR07093904	E599687	K-07-0066	East Zone	110.75	112.75	CQTZT	CQTZT	Medium grey calcareous quartzite with cross-cutting quartz/calcite stringers. Slightly oxidized fractured surfaces.		
44	TR07092951	E752037	K-07-0083	East Zone	131.41	133.5	CQTZT	CQTZT	Well foliated, medium to dark grey calcareous quartzite with several foliation parallel bands of extreme calcification. Stringers of qtz and calcite are present x-cutting throughout		
45	TR07092954	E775965	K-07-0082	East Zone	154.92	157.12	CQTZT	CQTZT	Well foliated, medium to dark grey calcareous quartzite with several foliation parallel bands of extreme calcification. Stringers of qtz and calcite are present x-cutting throughout		Large qtz veins crosscut by several smaller qtz veinlets.
46	VA07091805	C462958	K-06-0035	SW Zone	337	339	CQTZT	CQTZT	Dark grey, slightly porous calcareous quartzite with bands of more intense calcification parallel to foliation.		335.0-339.0 - Calcareous, white, vuggy stringers that cross cut perpindicular to foliation (~40 degrees TCA) and are often fractured, showing limonite staining +/- pyrite on fractured surfaces.
47	VA07091926	C212942	K-06-0020	SW Zone	323.1	324.6	CQTZT	CQTZT	Dark grey, well foliated, calcareous quartzite with stringers of qtz and calicite cross-cutting foliation. Limonite oxide stains fractured surfaces and some stringers.		
48	TR07086384	E600885	K-07-0093	Middle East Zone	225	227	CQTZT	CQTZT	Medium to dark grey, banded calcareous schist. Some bands (cm scale) are more intensly calcareous than othres.		225.00-_____m:chlorite along fractures.
49	VA07091924	C215828	K-06-0023	SW Zone	45.7	47.3	GSCH	GSCH	Med-dark grey moderately graphitic schistose unit with intermittent, thin beds of quartzite.	Possible minor contamination. Sample occurs after high silver standard	
50	TR07093011	E600070	K-07-0078	East Zone	39.62	41.62	GSCH	GSCH	Graphitic Schist unit with intermittent thin beds of quartzite. Slightly gougy at times. Slightly vuggy sweats of quartz.		qtz slightly vuggy
51	TR07087698	E768289	K-07-0094	Middle East Zone	207.9	209.91	GSCH	GSCH	Dark grey, slightly gougy, friable graphitic schist with intermittent qtz sweats. Slightly oxidized - limonite staining on fractured surfaces.		
52	TR07092956	E751924	K-07-0076	East Zone	154.04	155.91	GSCH	GSCH	Dark grey slightly graphitic schist with intermittent, thin beds of quartzite. Qtz sweats. Moderately oxidized.		154.04-155.91m: schist with broken siderite in a small fault zone. Increased disseminated pyrite.
53	TR07092957	E775865	K-07-0079	East Zone	160.83	163.37	GSCH	GSCH	Dark grey, moderatley graphitic schist unit with intermittent, thin bedded quartzite.		
54	TR07093905	C467893	K-07-0065	East Zone	102.41	103.89	GSCH	GSCH	Dark grey, graphitic schist. Sweats of calcite and vein quartz intermittent throughout.		
55	TR07093367	E775645	K-07-0066	East Zone	60.58	62.66	GSCH	GSCH	Dark grey to black graphitic schist with sweats and intermittent layers of vein quartz.		
56	TR07093901	C466965	K-07-0067	East Zone	64.91	66.98	GSCH	GSCH	Dark grey to black graphitic schist with sweats of calcite and quartz. Trace limonite on fracture surfaced.		
57	TR07092955	E775947	K-07-0082	East Zone	130.47	132.27	GSCH	GSCH	Dark grey to black graphitic schist with sweats of calcite and quartz.		

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	Certificate #	Sample #	Hole ID	BK Area	From (m)	To (m)	Lith Unit	Lith Unit Minl'gy Log	Description	Assay Notes	Mineralogy Comments
58	VA07091807	C462772	K-06-0035	SW Zone	31	33	GSCH	GSCH	Dark grey to black graphitic schist with sweats of quartz.	Possible minor contamination. Sample occurs after high silver standard	
59	VA07091930	C212705	K-06-0020	SW Zone	13.5	15.2	GSCH	GSCH	Dark grey to black graphitic schist with sweats of vein quartz throughout. Slightly oxidized.	Sample adjacent to vein zone	
60	TR07092772	E600774	K-07-0092	Middle East Zone	297.77	299.8	GSCH	GSCH	Dark grey to black graphitic schist with sweats of vein quartz/calcite throughout.		
61	VA07091228	E776285	K-07-0091a	East Zone	247.45	249.45	GSCH	GSCH	Dark grey to black graphitic schist with sweats of vein quartz/calcite throughout.		
65	TR07092958	E751883	K-07-0076	East Zone	114.5	115.21	VN	VN	Fine grained galena and sphalerite within quartz and siderite stringers that cross-cut the quartzite unit.		
66	TR07092953	E775989	K-07-0082	East Zone	195.96	196.4	VN	VN	Trace Galena within fractures of a siderite vein.		Galena within a fracture in a siderite vein, coating parts of the fracture.
67	VA07091240	E600657	K-07-0092	Middle East Zone	158.37	158.72	VN	VN	Trace Galena within greenstone and siderite stringers.		158.37-158.72: siderite vein about 4cm in width with galena. Galena within quartz veinlet and within greenstone.
70	VA07091241	C463235	K-06-0038	SW Zone	310.6	311.05	VN	VN	Fractured broken quartzite with trace siderite veining. Trace pyrite/sphalerite and possibly galena		311.05-311.9 - fractutred/broken qtzt and qtz with limonite on fractured surfaces possibly siderite? Tr py/sphalerite
62	TR07093903	C467919	K-07-0065	East Zone	129.84	130.12	VN	VN	Mineralized Siderite vein (sphalerite + galena veinlets) - clay alteration.		129.84-130.12: strongly altered siderite vein that crumbles to a fine grained breccia. Sphalerite and galena veinlets. White clay alteration. sphalerite vein in siderite. Less alteration and more intact rock. Pyrite throughout
63	TR07093920	E599708	K-07-0066	East Zone	142.46	143.1	VN	VN	Mineralized Siderite vein (sphalerite and galena veinlets)		142.46-146.9: ORE ZONE. Ore zone can be divided into 4 sections. 1. 142.46-143.9 - massive siderite vein with 2 smaller 15-20 cm spalerite and gn vns (mostly spahlerite) 143.58-143.63- sphalerite vein is brecciated by siderite. Siderite also has minor am
64	TR07093368	E775550	K-07-0067	East Zone	164.24	164.94	VN	VN	Brecciated Quartzite with siderite matrix. Main mineralized lens contains sphalerite, galena, arsenopyrite.		
68	VA07091931	C212406	K-06-0011	SW Zone	401.3	402	VN	VN	Tetrahedrite, siderite, galena and sphalerite - breccia.		
69	VA07091925	C462087	K-06-0023	SW Zone	377.45	378	VN	VN	Massive sphalerite with minor abours of galena, pyrite and chalcopyrite within a siderite vein.		
71	TR07093365	E775799	K-07-0079	East Zone	61.82	61.96	VN	VN	Massive sphalerite within a siderite vein. Massive pyrite and trace galena also present.		Massive sphalerite body begins here, within a siderite vein. Small amounts of massive pyrite also present.

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				Vein - Gangue Minerals			Vein-Sulphide Minerals						Disseminated Sulphide Minerals					Oxide Minerals	
	Certificate #	Sample #	Alteration Comments	VG_Quartz1	VG_Siderite	VG_Carbonate	VS_Pyrite	VS_Galena	VS_Sphalerite	VS_Sulphosalts	VS_Arsenopyrite	VS_Pyrite_Syn	DS_Pyrite	DS_Galena	DS_Sphalerite	DS_Arsenopyrite	DS_Pyrite_Syn	OT_Limonite	OT_Gypsum
1	VA07091928	C212117		5	0.01	0	0	0	0	0	0	0			0			0.01	0
2	TR07092775	E600288	35.34-86.15: Minor oxidiztion that is mainly present on fracture surfaces.	1														0.5	
3	VA07091920	C212566		20	0	0	0	0	0	0	0							0	0
4	VA07091804	C462066		5	0	1	0.1	0	0	0	0							0	0
5	TR07093011	E600079	minor clay on fractures	5														0.5	
6	TR07093907	C467959	180.96-182.02: moderate greenish-white clay alteration of fractures. Weak calcification in white calcite bands	15		0.1													
7	TR07093920	E599704	section of clay gouge 8cm 137.57-137.65	3		1		0	0.3										
8	TR07093369	E775513		3		8											0.01		
9	TR07092771	E600542	229.38-233.45: slightly bleached quartzite (at times chloritic).	20	10		0.5		0.5										
10	VA07091806	C462793		10	0	0	0.1	0	0	0	0							0	0
11	VA07091923	C212729		5	0	0	0.01	0	0	0	0							0	0
12	VA07091226	E776315	no alteration notes, however carbonate minerals denoted in intervals before and after sample	20		0.5													
13	TR07085899	E768248				0.1	0.2												
14	VA07091804	C462069		5	0	5	1	0.1	0.1	0	0							0	0
15	TR07092775	E600290	35.34-86.15: Minor oxidiztion that is mainly present on fracture surfaces.	0.5	5	1	0.5	0.1	1									0.5	
16	TR07093364	E775819				5												0.1	
17	VA07091921	C212639		1	0	0	0.1	0	0	0	0							0	0
18	VA07091225	E600631	114.39-120.41m: carbonate along fractures that has been oxidized and is an orangey colour	0.5		0.5													
19	TR07093906	E599612				0.01												0.01	
20	TR07092773	E752010	calcareous greenstone. Porphyroblasts are calcareous as are qtz veins. Iron oxide staining on fractures and weak clay alteration.	6		0.5												0.01	
21	TR07092957	E775866																	
22	VA07091927	C212917		1	0	1	0.01	0	0	0	0							0	0
23	TR07086383	E600841		0.01		0.01												0.01	
24	VA07091226	E776319		3		0.1													
25	TR07092774	E600319	92.28-121.30: Bands of Calcareous Quartzite	1		0.01													
26	VA07091804	C462078		5	1	0.1	1	0	0	0	0							0	0
27	TR07093010	E600086		1	0.1				0.01									0.01	
28	TR07086383	E600846		0.01	0.1	0.01												0.01	
29	TR07087698	E768283	QTZT here is a milky white colour because of calcitic alteration. Reacts to acid.	2	0.1	0.5	0.2											0.01	
30	TR07093363	E775833		6			0.01						0.1					0.05	
31	TR07093908	C467832		3			0.01												
32	TR07093902	E599725			0.3	0.1			0.01								0.1		
33	VA07091229	E600593	3.61-109.74m: iron, probably some limonite oxidation along fractures and within some qtz veins	2		0.01	0.01										0.01	0.01	

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				Vein - Gangue Minerals			Vein-Sulphide Minerals						Disseminated Sulphide Minerals					Oxide Minerals	
	Certificate #	Sample #	Alteration Comments	VG_Quartz1	VG_Siderite	VG_Carbonate	VS_Pyrite	VS_Galena	VS_Sphalerite	VS_Sulphosalts	VS_Arsenopyrite	VS_Pyrite_Syn	DS_Pyrite	DS_Galena	DS_Sphalerite	DS_Arsenopyrite	DS_Pyrite_Syn	OT_Limonite	OT_Gypsum
34	TR07092952	E751981	hematite and limonite on fractures. Suspected Mn oxides as stringers.															0.01	
35	VA07091806	C462785		10	0	0	0.01	0	0	0	0							0.1	0
36	VA07091926	C212949		2	0	2	2	0	0	0	0							0	0
37	TR07093900	C466994	109.00-160.00m: section has abundant carbonate veining. Veins (stringers) are often very small and abundant giving QTZT a pervasive CaCO3 alteration appearance. In other areas however it is clearly visible that CaCO3 is confined to stringers and QTZT i	0.5		3											0.01		
38	VA07091809	C462038		5	0	5	0.1	0	0.1	0	0							0	0
39	VA07091227	E600744		1		0.1							0.01						
40	TR07092959	E751851				0.01							0.01						
41	TR07093366	E775774	Strong carbonate mineralization/alteration as sweats from QTZT, gives homogenous look although foliation oriented at 45 degrees TCA.			2												0.1	
42	TR07093907	C467957	176.53-180.96: light to medium grey with white calcareous speckles. No reaction in schist beds	1		0.1							0.1						
43	TR07093904	E599687	weakly calcareous quartzite. CaCO3 alteration varies within unit. Sometimes seen in coarse grain bands (lighter grey) rangin from 1cm-30cm. Calcareous bands stronger reaction to HCL than rest of rock. Some section do not appear calcareous 75.15- 77.15 is	0.1		0.1											0.01		
44	TR07092951	E752037	calcareous zones in the QTZT appear as speckled areas 1-20cm wide or as qtz-carbonate stringers. Weak oxidation on some fractures.	1		0.05													
45	TR07092954	E775965		10		1	0.05						0.01					0.01	
46	VA07091805	C462958		1	0	5	0.1	0	0	0	0							0.1	0
47	VA07091926	C212942		5	0	1	0.01	0	0	0	0							0	0
48	TR07086384	E600885											0.01						
49	VA07091924	C215828		30	0	0	0	0	0	0	0							0	0
50	TR07093011	E600070		15															
51	TR07087698	E768289		3			0.1						0.01				0.1		
52	TR07092956	E751924	154.04-179.43m: calcareous QTZT. CQTZT has a lighter, speckled appearance. CaCO3 is also found in stringers parallel to foliation. Weak grey to grey-green clay is found on some fractures.		1	0.1							0.05						
53	TR07092957	E775865	Clay is fairly prominent throughout most of this interval, particularly on fracture surfaces.	7		2							0.01			0	0.1		
54	TR07093905	C467893	101.02-103.89: weak calcification occuring in 1-5 mm bands throughout interval. White to yellow-grey clay	5			0.01						0.01						
55	TR07093367	E775645		5	0	0.5											0.1		
56	TR07093901	C466965		6			0.01										0.01		
57	TR07092955	E775947		2		0.2							0.01				0.05	0.01	

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				Vein - Gangue Minerals			Vein-Sulphide Minerals						Disseminated Sulphide Minerals					Oxide Minerals	
	Certificate #	Sample #	Alteration Comments	VG_Quartz1	VG_Siderite	VG_Carbonate	VS_Pyrite	VS_Galena	VS_Sphalerite	VS_Sulphosalts	VS_Arsenopyrite	VS_Pyrite_Syn	DS_Pyrite	DS_Galena	DS_Sphalerite	DS_Arsenopyrite	DS_Pyrite_Syn	OT_Limonite	OT_Gypsum
58	VA07091807	C462772		20	0	0	0.01	0	0	0	0							1	0
59	VA07091930	C212705		5	0	0	0	0	0	0	0							0	0
60	TR07092772	E600774		4		0.01											0.1		
61	VA07091228	E776285		1		0.1	0.01										0.3		
65	TR07092958	E751883	108.57-119.98m: minor clay alteration (white, grey-green) on some fractures. Minor oxidation in localized blebs throughout unit.		0.5			0.05											
66	TR07092953	E775989		0	0.4			0.5	0.01				0.01						
67	VA07091240	E600657		14	10	5	0.01							0.01					
70	VA07091241	C463235		25	0.1	1	0.1	0	0.01	0	0							0.1	0
62	TR07093903	C467919			65	0	1		30										
63	TR07093920	E599708			50	0.1	2	3	15										
64	TR07093368	E775550		2	20			1	8		4								
68	VA07091931	C212406			35	0	10	10	35	0	0							0	0
69	VA07091925	C462087		10	20	0	10	15	30	0	0							0	0
71	TR07093365	E775799	Strong oxidation present with a lot of pervasive hematite, along with what might be some MnO, a dark grey to black metallic mineral that is present on fractures.		45				50								2		

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			Total Sulphides						Carbonate Alteration
	Certificate #	Sample #	Total_Pyrite	Total_Galena	Total_Sphalerite	Total_Arsenopyrite	Total_Pyrite_Syn	Calc_Total_Sx	CaCO3_Int
1	VA07091928	C212117	0	0	0	0	0	*0*	
2	TR07092775	E600288	0	0	0	0	0	*0*	
3	VA07091920	C212566	0	0	0	0	0	*0*	
4	VA07091804	C462066	0.1	0	0	0	0	*0.1*	
5	TR07093011	E600079	0	0	0	0	0	*0*	
6	TR07093907	C467959	0	0	0	0	0	*0*	1
7	TR07093920	E599704	0	0	0.3	0	0	*0.3*	
8	TR07093369	E775513	0	0	0	0	0.01	*0.01*	
9	TR07092771	E600542	0.5	0	0.5	0	0	*1*	
10	VA07091806	C462793	0.1	0	0	0	0	*0.1*	
11	VA07091923	C212729	0.01	0	0	0	0	*0.01*	
12	VA07091226	E776315	0	0	0	0	0	*0*	
13	TR07085899	E768248	0.2	0	0	0	0	*0.2*	
14	VA07091804	C462069	1	0.1	0.1	0	0	*1.2*	
15	TR07092775	E600290	0.5	0.1	1	0	0	*1.6*	
16	TR07093364	E775819	0	0	0	0	0	*0*	
17	VA07091921	C212639	0.1	0	0	0	0	*0.1*	
18	VA07091225	E600631	0	0	0	0	0	*0*	1
19	TR07093906	E599612	0	0	0	0	0	*0*	
20	TR07092773	E752010	0	0	0	0	0	*0*	2
21	TR07092957	E775866	0	0	0	0	0	*0*	
22	VA07091927	C212917	0.01	0	0	0	0	*0.01*	
23	TR07086383	E600841	0	0	0	0	0	*0*	
24	VA07091226	E776319	0	0	0	0	0	*0*	
25	TR07092774	E600319	0	0	0	0	0	*0*	3
26	VA07091804	C462078	1	0	0	0	0	*1*	
27	TR07093010	E600086	0	0	0.01	0	0	*0.01*	
28	TR07086383	E600846	0	0	0	0	0	*0*	
29	TR07087698	E768283	0.2	0	0	0	0	*0.2*	2
30	TR07093363	E775833	0.11	0	0	0	0	*0.11*	
31	TR07093908	C467832	0.01	0	0	0	0	*0.01*	
32	TR07093902	E599725	0	0	0.01	0	0.1	*0.11*	
33	VA07091229	E600593	0.01	0	0	0	0.01	*0.02*	

			Total Sulphides						Carbonate Alteration
	Certificate #	Sample #	Total_Pyrite	Total_Galena	Total_Sphalerite	Total_Arsenopyrite	Total_Pyrite_Syn	Calc_Total_Sx	CaCO3_Int
34	TR07092952	E751981	0	0	0	0	0	*0*	
35	VA07091806	C462785	0.01	0	0	0	0	*0.01*	
36	VA07091926	C212949	2	0	0	0	0	*2*	
37	TR07093900	C466994	0	0	0	0	0.01	*0.01*	2
38	VA07091809	C462038	0.1	0	0.1	0	0	*0.2*	
39	VA07091227	E600744	0.01	0	0	0	0	*0.01*	1
40	TR07092959	E751851	0.01	0	0	0	0	*0.01*	2
41	TR07093366	E775774	0	0	0	0	0	*0*	3
42	TR07093907	C467957	0.1	0	0	0	0	*0.1*	3
43	TR07093904	E599687	0	0	0	0	0.01	*0.01*	1
44	TR07092951	E752037	0	0	0	0	0	*0*	1
45	TR07092954	E775965	0.06	0	0	0	0	*0.06*	
46	VA07091805	C462958	0.1	0	0	0	0	*0.1*	
47	VA07091926	C212942	0.01	0	0	0	0	*0.01*	
48	TR07086384	E600885	0.01	0	0	0	0	*0.01*	2
49	VA07091924	C215828	0	0	0	0	0	*0*	
50	TR07093011	E600070	0	0	0	0	0	*0*	
51	TR07087698	E768289	0.11	0	0	0	0.1	*0.21*	
52	TR07092956	E751924	0.05	0	0	0	0	*0.05*	2
53	TR07092957	E775865	0.01	0	0	0	0.1	*0.11*	
54	TR07093905	C467893	0.02	0	0	0	0	*0.02*	1
55	TR07093367	E775645	0	0	0	0	0.1	*0.1*	
56	TR07093901	C466965	0.01	0	0	0	0.01	*0.02*	
57	TR07092955	E775947	0.01	0	0	0	0.05	*0.06*	

APPENDIX B2-1 Mineralogy / Alteration Data for ABA Database

			Total Sulphides						Carbonate Alteration
	Certificate #	Sample #	Total_Pyrite	Total_Galena	Total_Sphalerite	Total_Arsenopyrite	Total_Pyrite_Syn	Calc_Total_Sx	CaCO3_Int
58	VA07091807	C462772	0.01	0	0	0	0	*0.01*	
59	VA07091930	C212705	0	0	0	0	0	*0*	
60	TR07092772	E600774	0	0	0	0	0.1	*0.1*	
61	VA07091228	E776285	0.01	0	0	0	0.3	*0.31*	
65	TR07092958	E751883	0	0.05	0	0	0	*0.05*	
66	TR07092953	E775989	0.01	0.5	0.01	0	0	*0.52*	
67	VA07091240	E600657	0.01	0.01	0	0	0	*0.02*	1
70	VA07091241	C463235	0.1	0	0.01	0	0	*0.11*	
62	TR07093903	C467919	1	0	30	0	0	*31*	
63	TR07093920	E599708	2	3	15	0	0	*20*	
64	TR07093368	E775550	0	1	8	4	0	*13*	
68	VA07091931	C212406	10	10	35	0	0	*55*	
69	VA07091925	C462087	10	15	30	0	0	*55*	
71	TR07093365	E775799	0	0	50	0	2	*52*	

APPENDIX B3-1 Summary Statistics for ABA Database

All Samples

Sample	FIZZ RATING	paste_pH	NP_kgCaCO3/t	MPA_kgCaCO3/t	NNP_kgCaCO3/t	NP:MPA	St_%	SO4_CbLch %	SO4_HCl%	S2-_%	Cinorg_%	CO2_%	Au_ppm	Ag_ppm
No. of observations	71	71	71	71	71	71	71	71	71	71	71	71	71	71
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1.000	5.800	0.000	0.300	-550.000	0.000	0.010	0.010	0.010	0.010	0.050	0.200	0.010	0.500
Maximum	3.000	8.900	207.000	582.800	206.000	220.800	18.650	0.770	0.780	17.900	6.860	25.100	4.280	1770.000
1st Quartile	2.000	7.950	23.500	2.650	11.000	2.005	0.085	0.010	0.010	0.075	0.205	0.800	0.010	0.500
Median	2.000	8.300	54.000	6.300	34.000	6.770	0.200	0.010	0.010	0.180	0.830	3.100	0.010	0.600
3rd Quartile	3.000	8.400	87.500	12.950	81.500	22.935	0.415	0.020	0.010	0.405	1.585	5.800	0.010	2.050
Mean	2.155	8.113	67.817	38.924	28.859	20.280	1.245	0.032	0.030	1.216	1.289	4.731	0.141	60.025
Standard deviation (n)	0.620	0.602	57.659	111.213	130.028	33.488	3.559	0.093	0.096	3.493	1.536	5.621	0.583	272.005
Variation coefficient	0.288	0.074	0.850	2.857	4.506	1.651	2.858	2.893	3.177	2.872	1.192	1.188	4.128	4.531
Skewness (Pearson)	-0.115	-1.756	1.008	3.790	-2.545	3.525	3.790	7.167	6.961	3.752	2.105	2.105	5.780	5.174
Kurtosis (Pearson)	-0.500	3.135	-0.030	13.762	8.366	16.289	13.762	53.234	50.393	13.411	4.403	4.394	35.349	26.441
Geometric mean	2.053	8.088		6.762			0.216	0.016	0.014	0.196	0.606	2.253	0.017	1.467
Geometric standard deviation	1.389	1.084		5.195			5.175	2.252	2.220	5.460	4.051	3.973	3.822	6.801

Non-Mineralized Samples

Sample	FIZZ RATING	paste_pH	NP_kgCaCO3/t	MPA_kgCaCO3/t	NNP_kgCaCO3/t	NP:MPA	St_%	SO4_CbLch %	SO4_HCl%	S2-_%	Cinorg_%	CO2_%	Au_ppm	Ag_ppm
No. of observations	65	65	65	65	65	65	65	65	65	65	65	65	65	65
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	1.000	6.400	0.000	0.300	-7.000	0.000	0.010	0.010	0.010	0.010	0.050	0.200	0.010	0.500
Maximum	3.000	8.900	207.000	37.200	206.000	220.800	1.190	0.140	0.160	1.170	5.290	19.400	0.130	30.500
1st Quartile	2.000	8.000	22.000	2.500	14.000	3.560	0.080	0.010	0.010	0.070	0.200	0.800	0.010	0.500
Median	2.000	8.300	55.000	5.600	40.000	7.600	0.180	0.010	0.010	0.160	0.770	2.800	0.010	0.500
3rd Quartile	3.000	8.500	91.000	10.000	84.000	28.950	0.320	0.020	0.010	0.290	1.320	4.800	0.010	1.300
Mean	2.169	8.242	69.615	8.238	61.354	22.137	0.263	0.017	0.015	0.249	0.961	3.529	0.014	1.840
Standard deviation (n)	0.646	0.417	59.879	8.569	59.343	34.412	0.274	0.018	0.020	0.269	0.982	3.590	0.018	4.165
Variation coefficient	0.298	0.051	0.860	1.040	0.967	1.554	1.041	1.031	1.295	1.083	1.022	1.017	1.286	2.263
Skewness (Pearson)	-0.176	-1.765	0.899	1.772	1.021	3.405	1.772	5.234	6.084	1.816	1.853	1.860	5.375	5.384
Kurtosis (Pearson)	-0.672	5.305	-0.326	2.765	-0.096	15.134	2.759	32.436	40.100	2.940	4.683	4.740	28.322	32.322
Geometric mean	2.058	8.230		4.715			0.151	0.014	0.012	0.136	0.505	1.880	0.012	0.893
Geometric standard deviation	1.410	1.055		3.248			3.229	1.725	1.663	3.405	3.710	3.635	1.591	2.541

APPENDIX B3-1 Summary Statistics for ABA Database

All Samples

Sample	Al_%	As_ppm	Ba_ppm	Be_ppm	Bi_ppm	Ca_%	Cd_ppm	Co_ppm	Cr_ppm	Cu_ppm	Fe_%	Ga_ppm	K_%	La_ppm
No. of observations	71	71	71	71	71	71	71	71	71	71	71	71	71	71
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	20	0	20
Minimum	0.010	5.000	10.000	0.500	2.000	0.030	0.500	1.000	1.000	1.000	0.410	10.000	0.010	10.000
Maximum	11.250	10000.000	7620.000	2.900	86.000	8.340	1000.000	81.000	455.000	4090.000	27.800	30.000	2.470	40.000
1st Quartile	0.820	5.000	100.000	0.500	2.000	0.410	0.500	2.000	33.000	8.000	1.095	10.000	0.115	10.000
Median	3.530	12.000	250.000	0.500	2.000	2.280	0.500	9.000	46.000	27.000	3.410	10.000	0.350	10.000
3rd Quartile	7.190	34.500	875.000	1.300	2.000	5.165	3.550	24.500	97.000	141.000	7.165	20.000	1.195	20.000
Mean	4.041	464.113	761.972	0.921	5.211	2.922	83.206	15.155	67.901	209.254	5.230	13.725	0.633	14.902
Standard deviation (n)	3.364	1819.749	1344.129	0.643	13.413	2.685	259.995	17.546	64.303	647.976	5.712	5.225	0.651	8.716
Variation coefficient	0.832	3.921	1.764	0.698	2.574	0.919	3.125	1.158	0.947	3.097	1.092	0.381	1.028	0.585
Skewness (Pearson)	0.315	4.577	3.416	1.383	4.826	0.607	3.035	1.702	3.228	4.815	2.069	0.935	1.005	1.540
Kurtosis (Pearson)	-1.413	20.013	12.894	0.716	23.293	-1.041	7.351	2.889	16.101	23.291	4.400	-0.293	-0.316	1.016
Geometric mean	2.033	20.825	253.186	0.762	2.528	1.385	1.892	7.223	42.606	33.521	3.048	12.874	0.301	13.140
Geometric standard deviation	4.683	6.488	5.019	1.786	2.193	4.460	10.199	3.771	3.376	6.034	2.979	1.419	4.265	1.595

Non-Mineralized Samples

Sample	Al_%	As_ppm	Ba_ppm	Be_ppm	Bi_ppm	Ca_%	Cd_ppm	Co_ppm	Cr_ppm	Cu_ppm	Fe_%	Ga_ppm	K_%	La_ppm
No. of observations	65	65	65	65	65	65	65	65	65	65	65	65	65	65
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	18	0	18
Minimum	0.290	5.000	10.000	0.500	2.000	0.030	0.500	1.000	7.000	1.000	0.410	10.000	0.010	10.000
Maximum	11.250	1810.000	7620.000	2.900	4.000	8.340	47.400	48.000	455.000	306.000	13.500	30.000	2.470	40.000
1st Quartile	1.310	5.000	150.000	0.500	2.000	0.740	0.500	2.000	37.000	8.000	1.060	10.000	0.140	10.000
Median	4.660	11.000	310.000	0.500	2.000	2.610	0.500	8.000	48.000	24.000	3.290	10.000	0.390	10.000
3rd Quartile	7.410	21.000	920.000	1.300	2.000	5.300	0.800	16.000	99.000	106.000	5.210	20.000	1.220	20.000
Mean	4.396	48.492	831.077	0.960	2.077	3.167	4.717	13.123	73.800	59.031	3.798	14.043	0.686	15.319
Standard deviation (n)	3.297	223.032	1384.536	0.659	0.364	2.676	10.994	14.136	64.044	72.397	3.066	5.323	0.654	8.956
Variation coefficient	0.750	4.599	1.666	0.686	0.175	0.845	2.331	1.077	0.868	1.226	0.807	0.379	0.953	0.585
Skewness (Pearson)	0.190	7.589	3.279	1.253	4.777	0.485	2.883	1.137	3.386	1.360	0.916	0.810	0.899	1.414
Kurtosis (Pearson)	-1.445	56.876	11.744	0.356	21.592	-1.151	7.189	-0.105	16.809	0.966	0.153	-0.510	-0.529	0.624
Geometric mean	2.753	13.183	335.465	0.792	2.056	1.626	1.068	6.488	56.704	24.028	2.559	13.153	0.374	13.449
Geometric standard deviation	3.074	2.982	3.939	1.807	1.138	4.288	4.064	3.658	2.075	4.278	2.626	1.428	3.575	1.615

APPENDIX B3-1 Summary Statistics for ABA Database

All Samples

Sample	Mg_%	Mn_ppm	Mo_ppm	Na_%	Ni_ppm	P_ppm	Pb_ppm	S_%	Sb_ppm	Sc_ppm	Sr_ppm	Th_ppm	Ti_%	Tl_ppm
No. of observations	71	71	71	71	71	71	71	71	71	71	71	71	71	71
No. of missing values	0	0	0	0	0	0	0	0	0	20	0	20	0	20
Minimum	0.010	40.000	1.000	0.010	1.000	10.000	2.000	0.010	5.000	1.000	1.000	20.000	0.010	10.000
Maximum	5.170	84300.000	3.000	2.960	173.000	1550.000	10000.000	10.000	1730.000	39.000	555.000	20.000	1.440	40.000
1st Quartile	0.230	217.000	1.000	0.020	8.000	245.000	5.500	0.070	5.000	1.500	31.000	20.000	0.065	10.000
Median	0.490	819.000	1.000	0.060	21.000	470.000	17.000	0.200	5.000	5.000	131.000	20.000	0.180	10.000
3rd Quartile	1.225	2425.000	1.000	0.310	54.500	660.000	74.000	0.420	8.000	20.500	240.500	20.000	0.435	10.000
Mean	1.065	7313.408	1.113	0.319	34.634	495.915	652.070	0.937	67.915	12.118	142.606	20.000	0.309	10.980
Standard deviation (n)	1.295	17995.246	0.358	0.588	33.389	349.441	1978.207	2.295	278.188	12.633	123.622	0.000	0.337	4.540
Variation coefficient	1.216	2.461	0.322	1.845	0.964	0.705	3.034	2.448	4.096	1.043	0.867	0.000	1.090	0.413
Skewness (Pearson)	1.512	3.065	3.323	2.763	1.361	0.933	3.700	3.168	5.136	0.862	0.735		1.477	5.420
Kurtosis (Pearson)	1.034	8.590	11.081	7.709	2.347	0.575	13.160	8.664	25.697	-0.757	0.027		1.603	30.358
Geometric mean	0.486	986.764	1.077	0.083	19.555	336.640	29.957	0.197	8.896	5.694	70.353	20.000	0.156	10.559
Geometric standard deviation	3.958	6.657	1.258	5.347	3.300	3.064	10.098	5.271	3.612	3.906	4.644	1.000	3.691	1.263

Non-Mineralized Samples

Sample	Mg_%	Mn_ppm	Mo_ppm	Na_%	Ni_ppm	P_ppm	Pb_ppm	S_%	Sb_ppm	Sc_ppm	Sr_ppm	Th_ppm	Ti_%	Tl_ppm
No. of observations	65	65	65	65	65	65	65	65	65	65	65	65	65	65
No. of missing values	0	0	0	0	0	0	0	0	0	18	0	18	0	18
Minimum	0.010	40.000	1.000	0.010	1.000	60.000	2.000	0.010	5.000	1.000	5.000	20.000	0.030	10.000
Maximum	5.170	40900.000	3.000	2.960	173.000	1550.000	3540.000	1.350	51.000	39.000	555.000	20.000	1.440	20.000
1st Quartile	0.220	202.000	1.000	0.030	8.000	290.000	4.000	0.060	5.000	2.000	40.000	20.000	0.090	10.000
Median	0.620	568.000	1.000	0.070	24.000	510.000	13.000	0.190	5.000	9.000	145.000	20.000	0.210	10.000
3rd Quartile	1.430	1710.000	1.000	0.350	56.000	680.000	49.000	0.330	7.000	23.000	249.000	20.000	0.550	10.000
Mean	1.137	2393.108	1.123	0.348	35.492	539.231	170.662	0.264	7.215	13.064	155.431	20.000	0.336	10.213
Standard deviation (n)	1.330	5882.948	0.372	0.607	33.614	333.367	572.609	0.291	6.316	12.719	121.431	0.000	0.339	1.443
Variation coefficient	1.169	2.458	0.332	1.747	0.947	0.618	3.355	1.101	0.875	0.974	0.781	0.000	1.008	0.141
Skewness (Pearson)	1.380	4.885	3.142	2.619	1.373	1.042	4.660	1.904	5.386	0.750	0.668		1.399	6.635
Kurtosis (Pearson)	0.629	26.724	9.773	6.811	2.440	0.704	21.725	3.508	33.102	-0.937	0.043		1.346	42.022
Geometric mean	0.513	678.023	1.084	0.101	20.721	437.764	18.966	0.140	6.264	6.602	95.620	20.000	0.199	10.149
Geometric standard deviation	4.150	4.449	1.270	5.042	3.141	2.010	6.078	3.558	1.546	3.729	3.240	1.000	2.921	1.106

APPENDIX B3-1 Summary Statistics for ABA Database

All Samples

Sample	U_ppm	V_ppm	W_ppm	Zn_ppm
No. of observations	71	71	71	71
No. of missing values	20	0	0	0
Minimum	10.000	1.000	10.000	8.000
Maximum	20.000	414.000	50.000	10000.000
1st Quartile	10.000	17.000	10.000	65.500
Median	10.000	63.000	10.000	100.000
3rd Quartile	10.000	174.500	10.000	366.500
Mean	10.196	108.380	11.831	1272.423
Standard deviation (n)	1.386	114.677	8.103	2836.453
Variation coefficient	0.136	1.058	0.685	2.229
Skewness (Pearson)	6.930	1.036	4.420	2.487
Kurtosis (Pearson)	46.020	-0.093	17.818	4.708
Geometric mean	10.137	45.790	10.809	184.078
Geometric standard deviation	1.102	4.931	1.397	6.191

Non-Mineralized Samples

Sample	U_ppm	V_ppm	W_ppm	Zn_ppm
No. of observations	65	65	65	65
No. of missing values	18	0	0	0
Minimum	10.000	4.000	10.000	8.000
Maximum	20.000	414.000	10.000	5810.000
1st Quartile	10.000	25.000	10.000	61.000
Median	10.000	88.000	10.000	96.000
3rd Quartile	10.000	181.000	10.000	161.000
Mean	10.213	118.108	10.000	466.800
Standard deviation (n)	1.443	115.083	0.000	1052.599
Variation coefficient	0.141	0.974	0.000	2.255
Skewness (Pearson)	6.635	0.936		3.290
Kurtosis (Pearson)	42.022	-0.294		10.866
Geometric mean	10.149	61.195	10.000	127.306
Geometric standard deviation	1.106	3.695	1.000	4.115

APPENDIX B3-1 Summary Statistics for ABA Database

Mineralized Samples

Sample	FIZZ RATING	paste_pH	NP_kgCaCO3/t	MPA_kgCaCO3/t	NNP_kgCaCO3/t	NP:MPA	St_%	SO4_CbLch%	SO4_HCl%	S2-_%	Cinorg_%	CO2_%	Au_ppm	Ag_ppm
No. of observations	6	6	6	6	6	6	6	6	6	6	6	6	6	6
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	2.000	5.800	33.000	176.900	-550.000	0.060	5.660	0.020	0.010	5.640	1.780	6.500	0.120	42.400
Maximum	2.000	7.600	61.000	582.800	-123.000	0.310	18.650	0.770	0.780	17.900	6.860	25.100	4.280	1770.000
1st Quartile	2.000	6.625	43.500	231.425	-465.500	0.100	7.405	0.043	0.030	7.355	3.565	13.225	0.633	103.600
Median	2.000	6.700	49.500	357.000	-299.500	0.160	11.425	0.060	0.035	11.375	5.055	18.500	0.930	455.000
3rd Quartile	2.000	6.850	54.000	512.875	-184.500	0.213	16.413	0.175	0.198	16.250	6.680	24.450	1.955	1188.750
Mean	2.000	6.717	48.333	371.350	-323.167	0.167	11.883	0.193	0.190	11.697	4.840	17.750	1.515	690.367
Standard deviation (n)	0.000	0.527	9.123	157.652	162.968	0.085	5.045	0.265	0.276	4.856	1.922	7.009	1.397	664.314
Variation coefficient	0.000	0.079	0.189	0.425	-0.504	0.511	0.425	1.372	1.454	0.415	0.397	0.395	0.922	0.962
Skewness (Pearson)		-0.087	-0.307	0.136	-0.217	0.360	0.136	1.591	1.488	0.093	-0.314	-0.327	1.070	0.509
Kurtosis (Pearson)		-0.163	-0.978	-1.497	-1.472	-1.024	-1.497	0.795	0.551	-1.511	-1.434	-1.408	-0.214	-1.355
Geometric mean	2.000	6.696	47.412	335.883		0.144	10.748	0.088	0.064	10.619	4.371	16.041	0.910	317.904
Geometric standard deviation	1.000	1.091	1.245	1.656		1.865	1.656	3.726	4.991	1.642	1.699	1.697	3.424	4.722

APPENDIX B3-1 Summary Statistics for ABA Database

Mineralized Samples

Sample	Al_%	As_ppm	Ba_ppm	Be_ppm	Bi_ppm	Ca_%	Cd_ppm	Co_ppm	Cr_ppm	Cu_ppm	Fe_%	Ga_ppm	K_%	La_ppm
No. of observations	6	6	6	6	6	6	6	6	6	6	6	6	6	6
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Minimum	0.010	698.000	10.000	0.500	2.000	0.150	795.000	5.000	1.000	248.000	14.700	10.000	0.010	10.000
Maximum	0.620	10000.000	30.000	0.500	86.000	0.520	1000.000	81.000	17.000	4090.000	27.800	10.000	0.180	10.000
1st Quartile	0.023	1059.000	10.000	0.500	19.000	0.185	854.500	11.250	1.000	705.500	16.813	10.000	0.010	10.000
Median	0.110	4130.000	10.000	0.500	30.000	0.225	1000.000	26.500	1.000	1361.000	20.625	10.000	0.030	10.000
3rd Quartile	0.280	9137.500	10.000	0.500	61.250	0.280	1000.000	65.000	2.500	2945.000	24.025	10.000	0.065	10.000
Mean	0.197	4966.667	13.333	0.500	39.167	0.265	933.500	37.167	4.000	1836.667	20.742	10.000	0.055	10.000
Standard deviation (n)	0.218	4062.350	7.454	0.000	29.464	0.123	94.099	30.803	5.859	1420.832	4.635	0.000	0.060	0.000
Variation coefficient	1.107	0.818	0.559	0.000	0.752	0.464	0.101	0.829	1.465	0.774	0.223	0.000	1.100	0.000
Skewness (Pearson)	1.005	0.190	1.789		0.413	1.275	-0.711	0.478	1.730	0.486	0.147		1.268	
Kurtosis (Pearson)	-0.389	-1.761	1.200		-1.275	0.274	-1.490	-1.493	1.084	-1.363	-1.386		0.194	
Geometric mean	0.076	2949.403	12.009	0.500	23.731	0.243	928.504	23.100	1.926	1235.474	20.221	10.000	0.029	10.000
Geometric standard deviation	5.754	3.421	1.566	1.000	3.888	1.554	1.122	3.222	3.171	2.899	1.282	1.000	3.489	1.000

APPENDIX B3-1 Summary Statistics for ABA Database

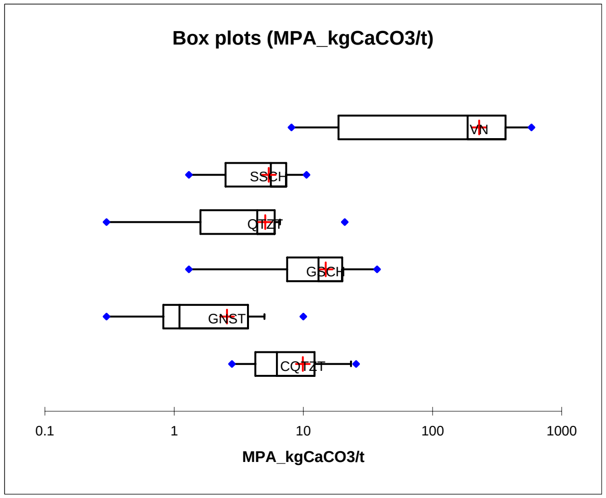
Mineralized Samples

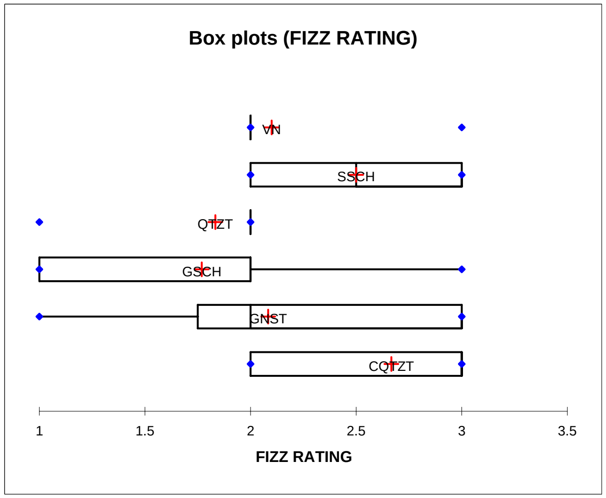
Sample	Mg_%	Mn_ppm	Mo_ppm	Na_%	Ni_ppm	P_ppm	Pb_ppm	S_%	Sb_ppm	Sc_ppm	Sr_ppm	Th_ppm	Ti_%	Tl_ppm
No. of observations	6	6	6	6	6	6	6	6	6	6	6	6	6	6
No. of missing values	0	0	0	0	0	0	0	0	0	2	0	2	0	2
Minimum	0.150	36000.000	1.000	0.010	1.000	10.000	974.000	5.590	64.000	1.000	1.000	20.000	0.010	10.000
Maximum	0.420	84300.000	1.000	0.010	83.000	70.000	10000.000	10.000	1730.000	1.000	11.000	20.000	0.020	40.000
1st Quartile	0.248	43050.000	1.000	0.010	5.000	10.000	2610.000	6.555	182.500	1.000	1.250	20.000	0.010	10.000
Median	0.285	62050.000	1.000	0.010	11.000	15.000	6385.000	8.900	431.500	1.000	2.500	20.000	0.010	15.000
3rd Quartile	0.315	77450.000	1.000	0.010	35.000	35.000	9177.500	9.880	1305.250	1.000	3.750	20.000	0.010	25.000
Mean	0.283	60616.667	1.000	0.010	25.333	26.667	5867.333	8.228	725.500	1.000	3.667	20.000	0.012	20.000
Standard deviation (n)	0.082	18802.608	0.000	0.000	29.267	22.111	3611.887	1.824	665.582	0.000	3.448	0.000	0.004	12.247
Variation coefficient	0.289	0.310	0.000	0.000	1.155	0.829	0.616	0.222	0.917	0.000	0.940	0.000	0.319	0.612
Skewness (Pearson)	0.046	-0.088			1.103	1.072	-0.216	-0.452	0.518		1.429		1.789	0.816
Kurtosis (Pearson)	-0.503	-1.616			-0.310	-0.356	-1.497	-1.547	-1.493		0.539		1.200	-1.000
Geometric mean	0.271	57505.755	1.000	0.010	10.441	19.560	4236.604	8.007	397.670	1.000	2.533	20.000	0.011	16.818
Geometric standard deviation	1.412	1.438	1.000	1.000	5.129	2.305	2.748	1.300	3.734	1.000	2.494	1.000	1.327	1.942

Mineralized Samples

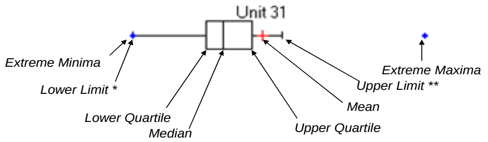
Sample	U_ppm	V_ppm	W_ppm	Zn_ppm
No. of observations	6	6	6	6
No. of missing values	2	0	0	0
Minimum	10.000	1.000	10.000	10000.000
Maximum	10.000	10.000	50.000	10000.000
1st Quartile	10.000	1.000	12.500	10000.000
Median	10.000	1.500	35.000	10000.000
3rd Quartile	10.000	2.750	50.000	10000.000
Mean	10.000	3.000	31.667	10000.000
Standard deviation (n)	0.000	3.215	18.634	0.000
Variation coefficient	0.000	1.072	0.588	0.000
Skewness (Pearson)		1.596	-0.089	
Kurtosis (Pearson)		0.824	-1.897	
Geometric mean	10.000	1.979	25.099	10000.000
Geometric standard deviation	1.000	2.499	2.217	1.000

APPENDIX B4-1a Acid Base Accounting Parameters by Lithology -- All Samples



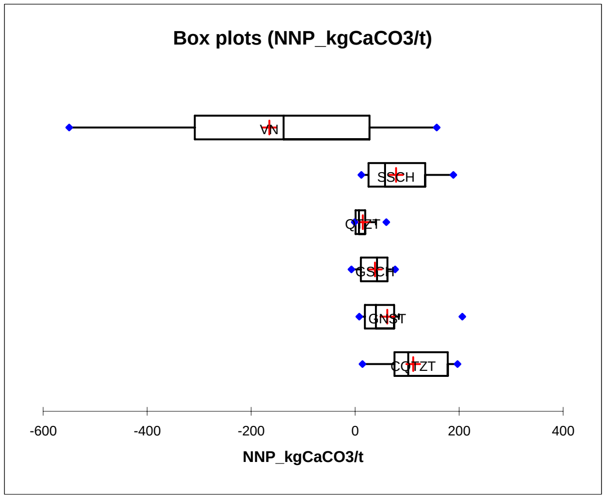


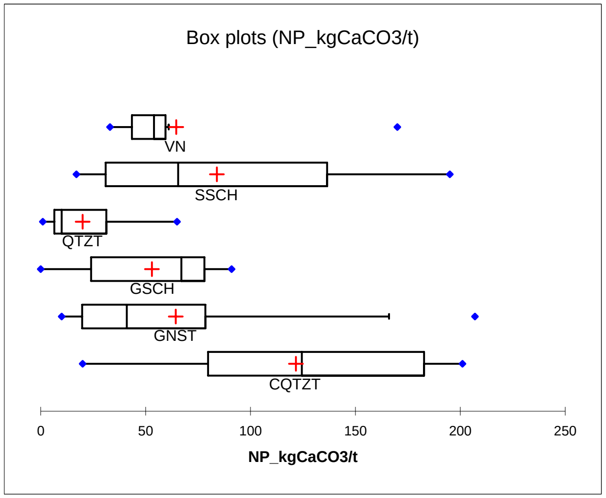
LEGEND FOR BOX PLOTS:

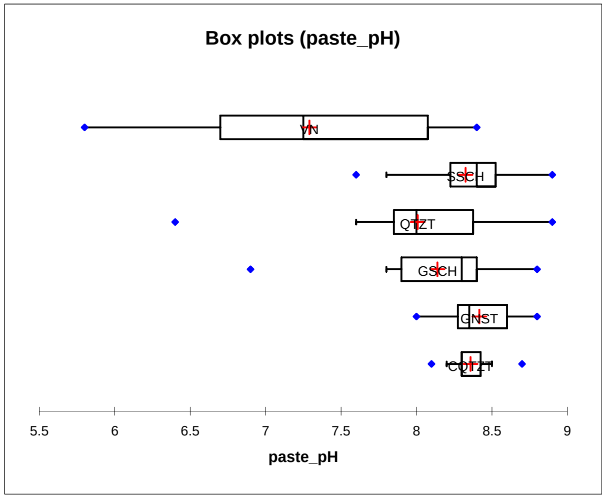


***<u>Lower limit:</u> Linf = X(i) such that {X(i) – [Q1 – 1.5 (Q3 – Q1)]} is minimum and X(i) = Q1 – 1.5 (Q3 – Q1).*

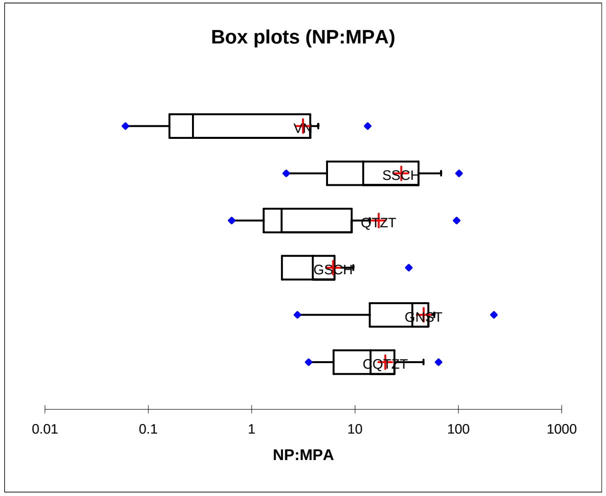
***<u>Upper limit:</u> Lsup = X(i) such that {X(i) - [Q3 + 1.5 (Q3 – Q1)]} is minimum and X(i) = Q3 + 1.5 (Q3 – Q1)*

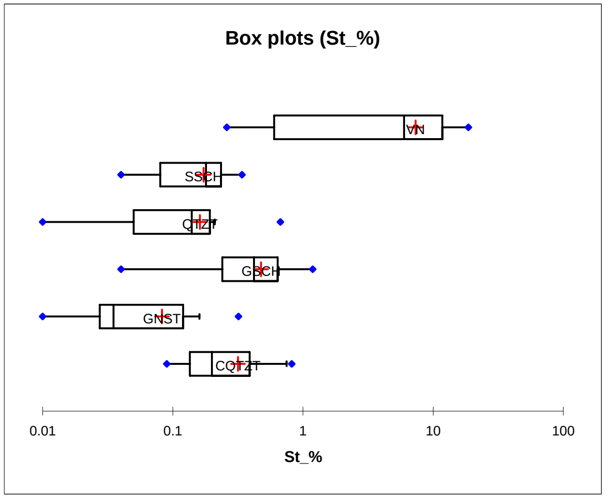


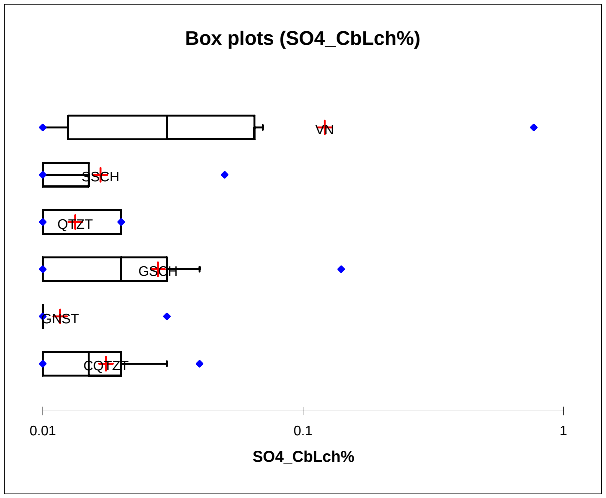


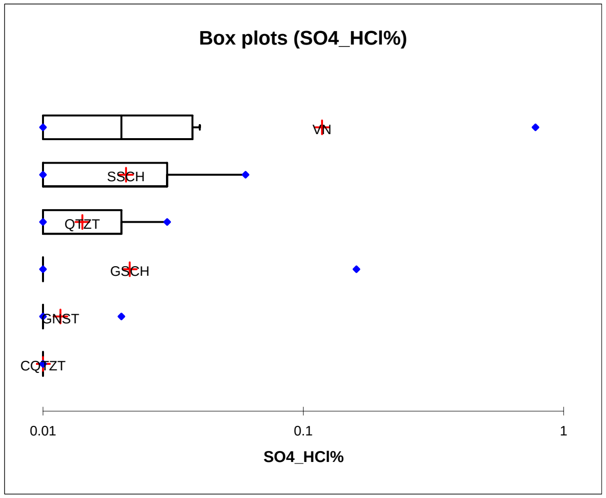


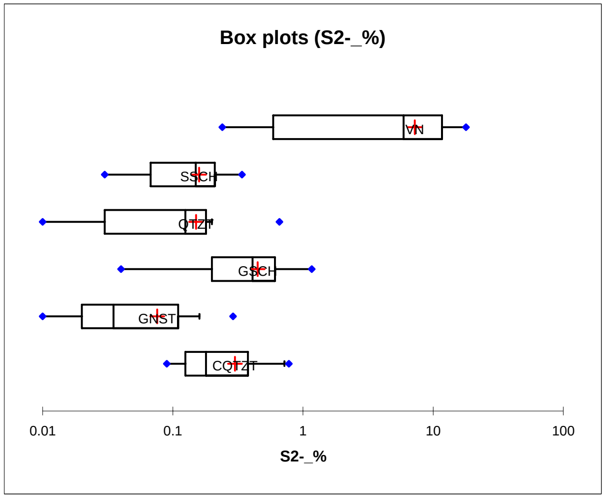
APPENDIX B4-1a   Acid Base Accounting Parameters by Lithology -- All Samples

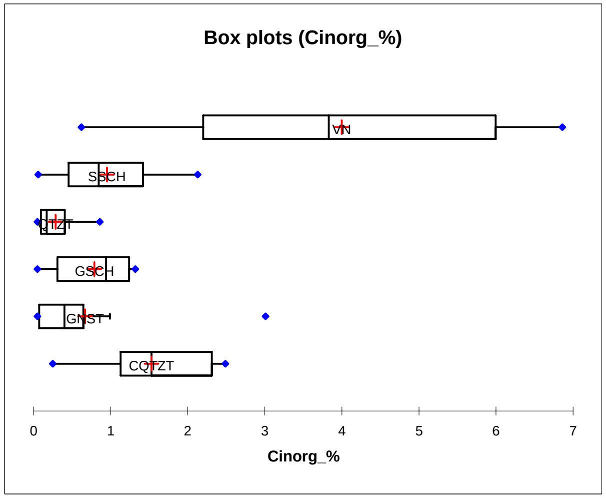

Box plots (NP:MPA)

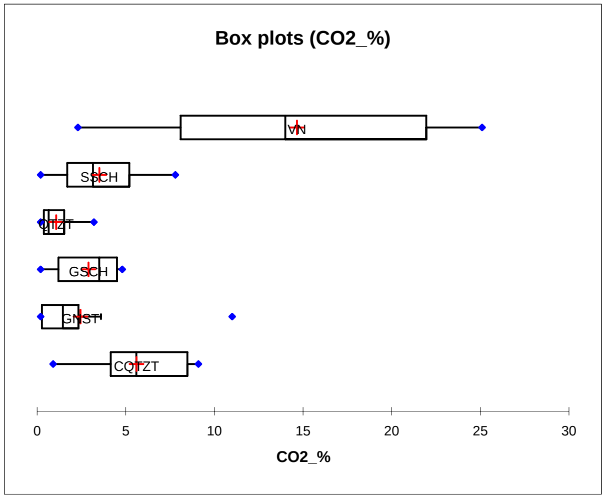

Box plots (St_%)


Box plots (SO4_CbLch%)

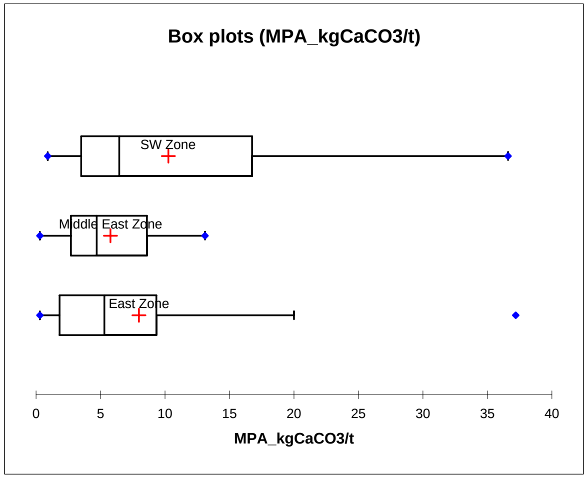

Box plots (SO4_HCl%)

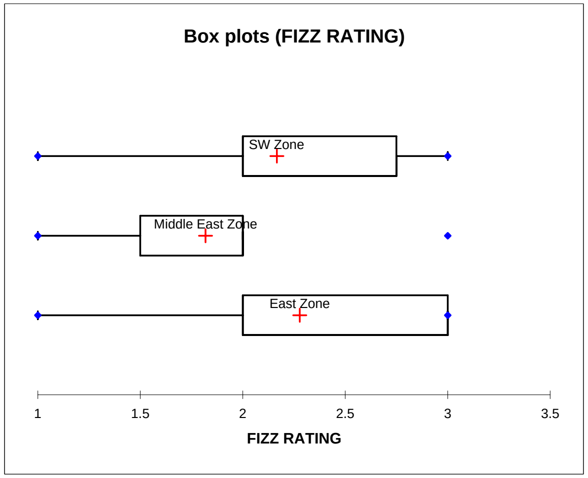

Box plots (S2-_%)


Box plots (Cinorg_%)

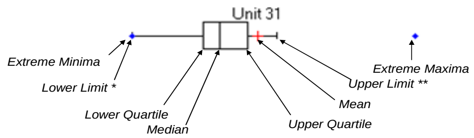

Box plots (CO2_%)
VN
SSCH
QTZT
GSCH
GNST
CQTZT
0
5
10
15
20
25
30
CO2_%

APPENDIX B4-1a Acid Base Accounting Parameters by Bellekeno Zone -- Waste Rock Samples



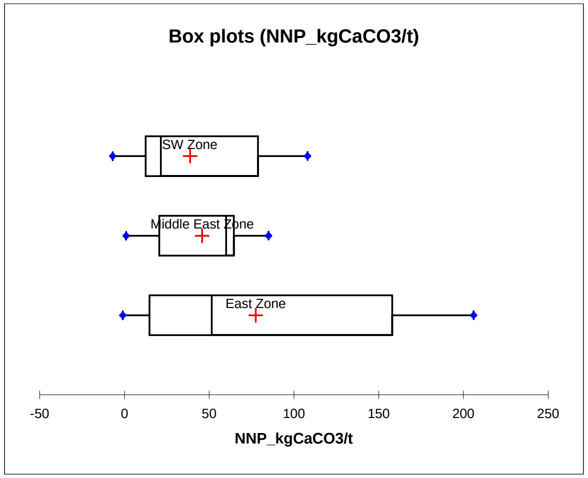


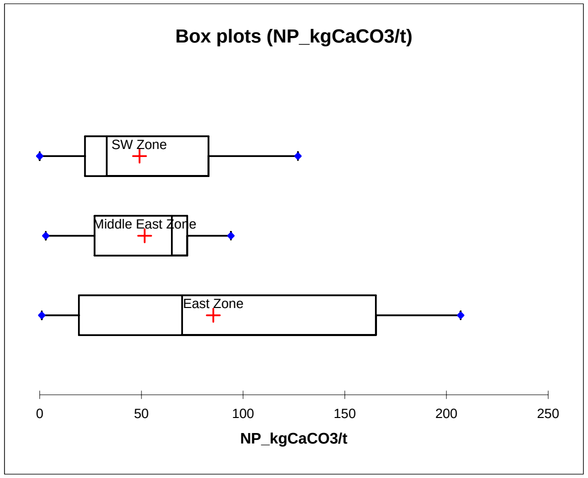
LEGEND FOR BOX PLOTS:

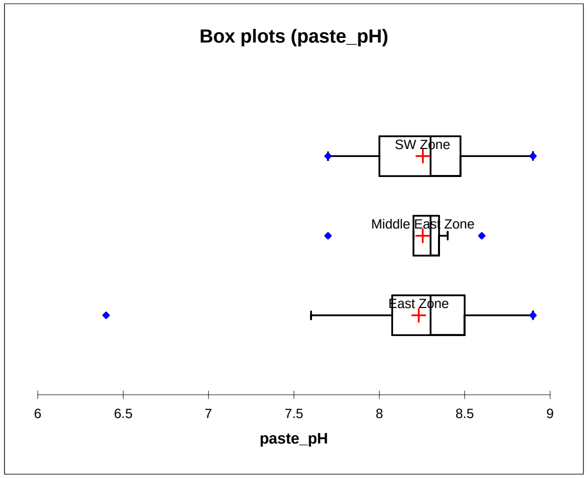


*<u>Lower limit:</u> *Linf = X(i) such that {X(i) – [Q1 – 1.5 (Q3 – Q1)]} is minimum and X(i) = Q1 – 1.5 (Q3 – Q1).*

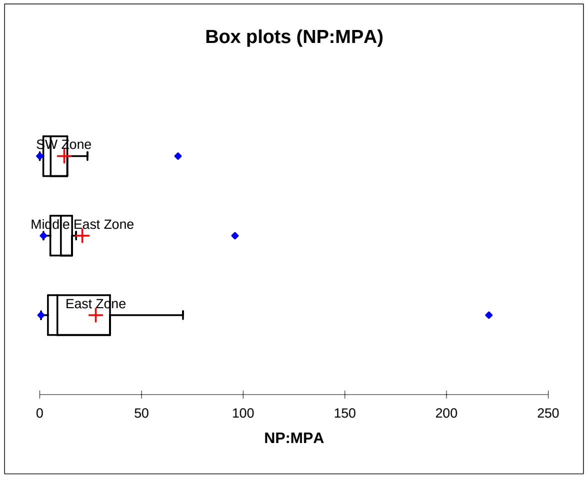
**<u>Upper limit:</u> *Lsup = X(i) such that {X(i) - [Q3 + 1.5 (Q3 – Q1)]} is minimum and X(i) = Q3 + 1.5 (Q3 – Q1)*

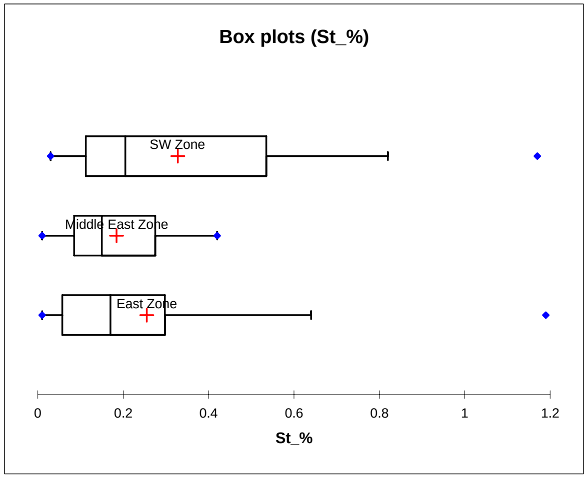


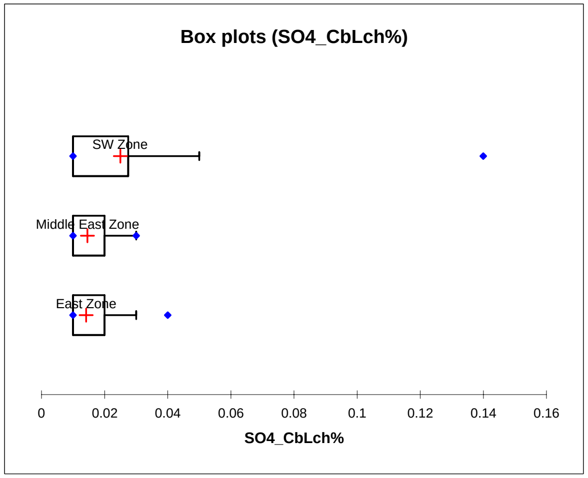


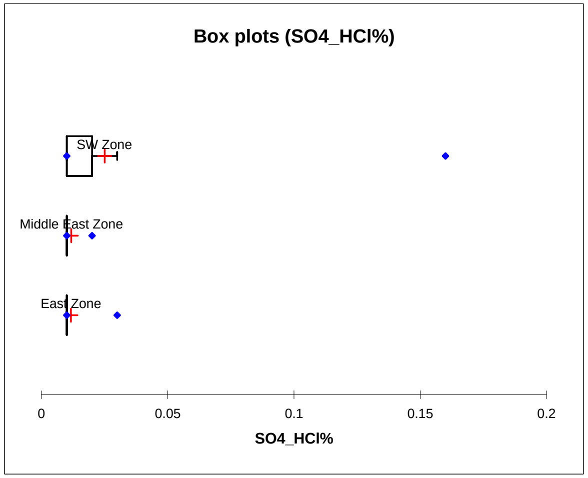


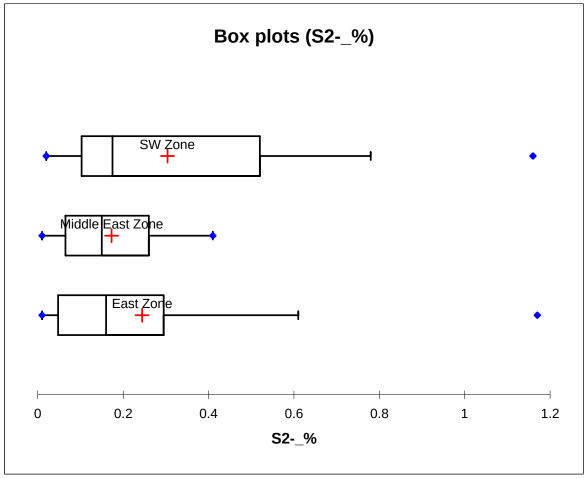
APPENDIX B4-1a Acid Base Accounting Parameters by Bellekeno Zone -- Waste Rock Samples

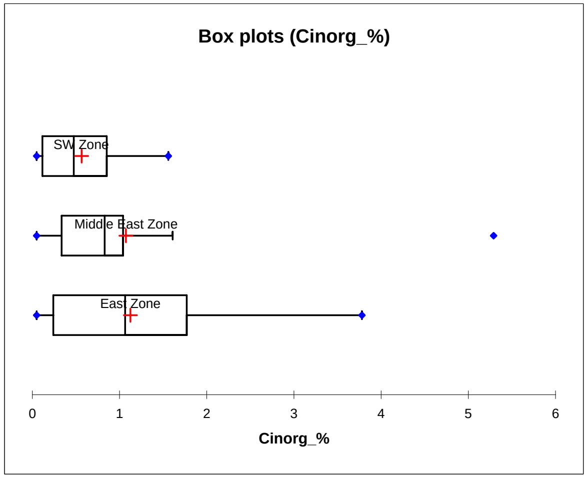




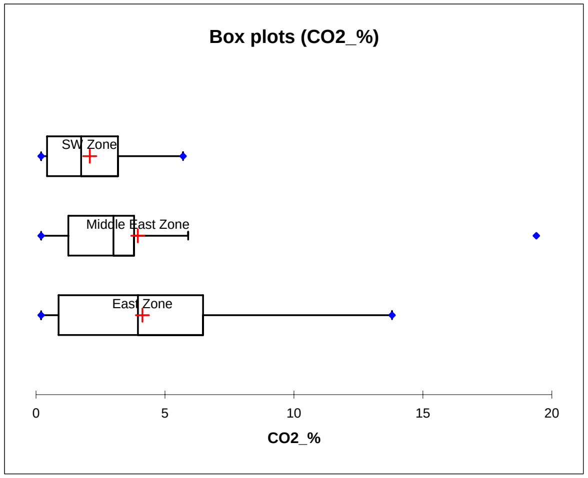




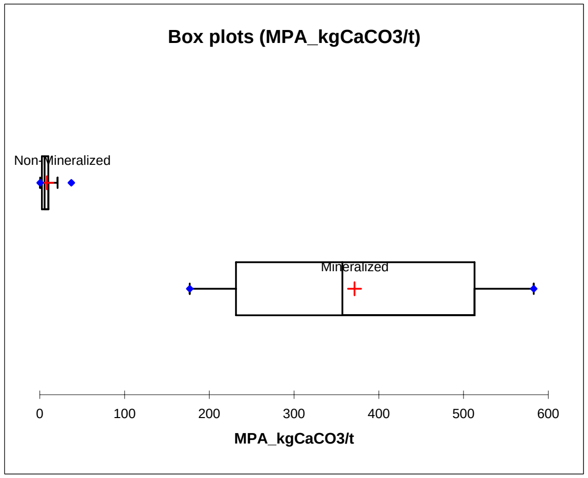


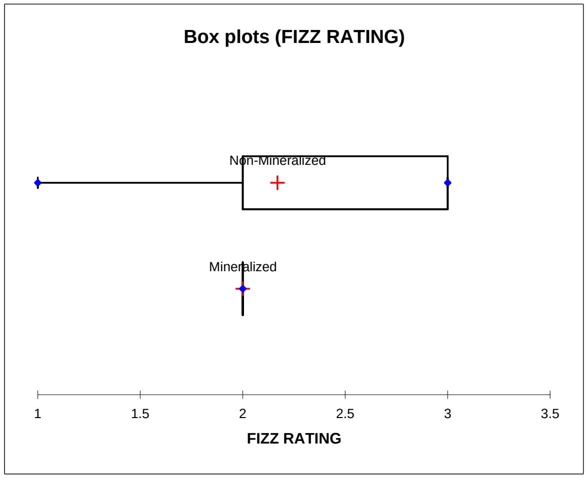


APPENDIX B4-1a Acid Base Accounting Parameters by Bellekeno Zone -- Waste Rock Samples

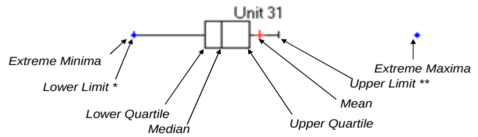


APPENDIX B4-1c Acid Base Accounting Parameters, Mineralized versus Waste Rock

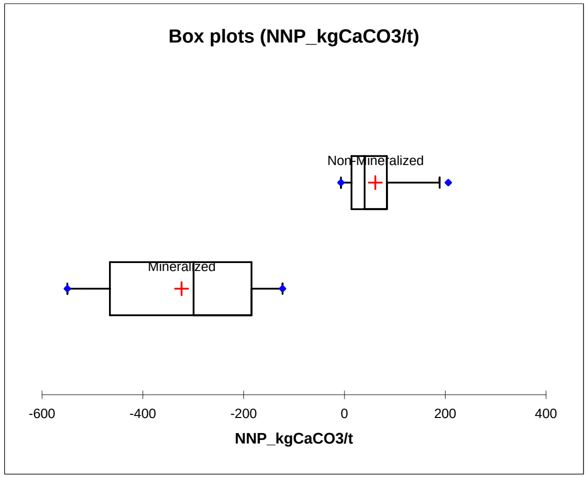


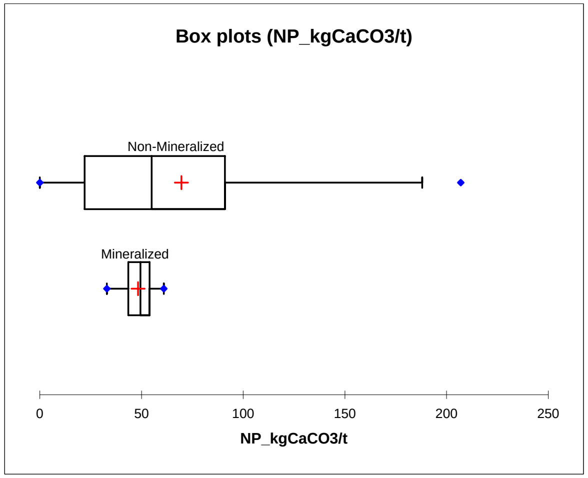


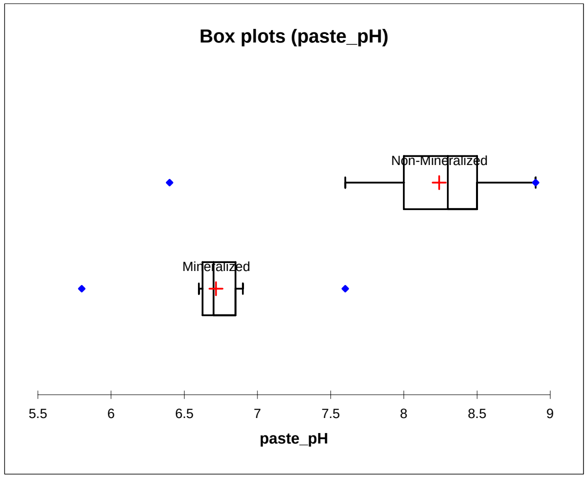
LEGEND FOR BOX PLOTS:



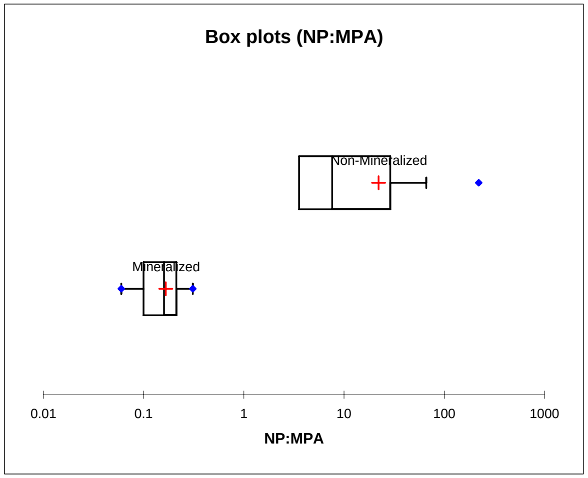
**Lower limit: Linf = X(i) such that {X(i) – [Q1 – 1.5 (Q3 – Q1)]} is minimum and X(i) = Q1 – 1.5 (Q3 – Q1).*
***Upper limit: Lsup = X(i) such that {X(i) - [Q3 + 1.5 (Q3 – Q1)]} is minimum and X(i) = Q3 + 1.5 (Q3 – Q1)*

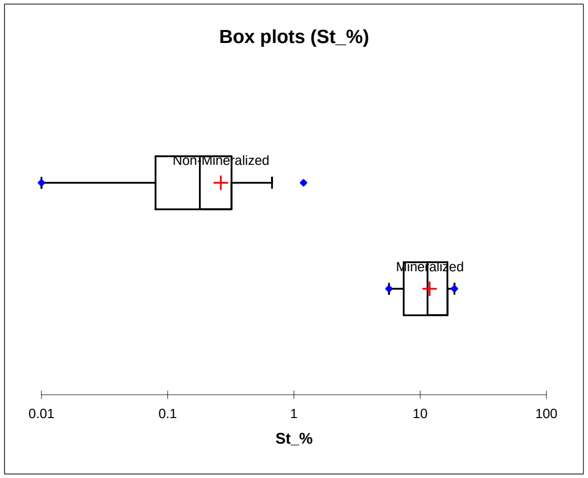


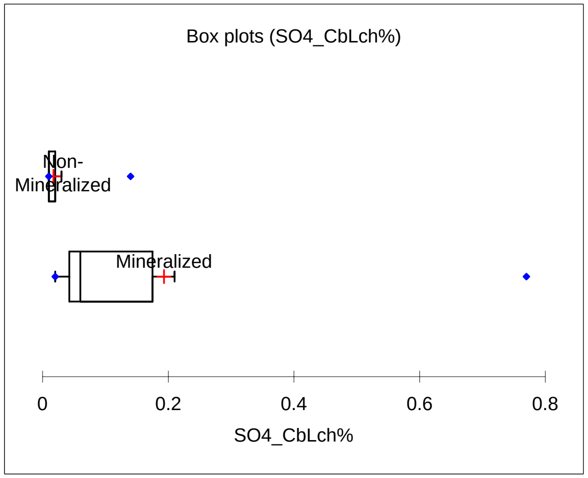


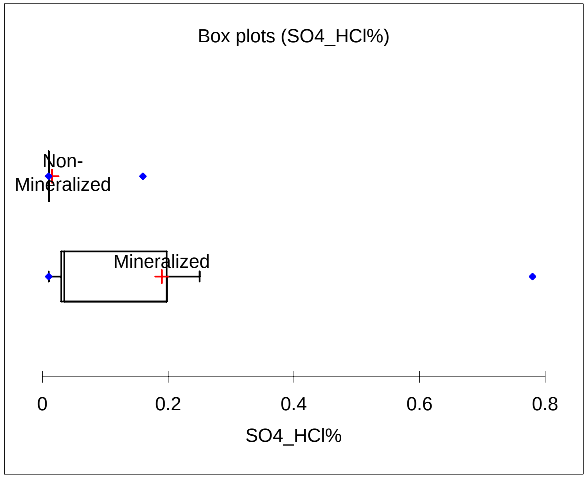


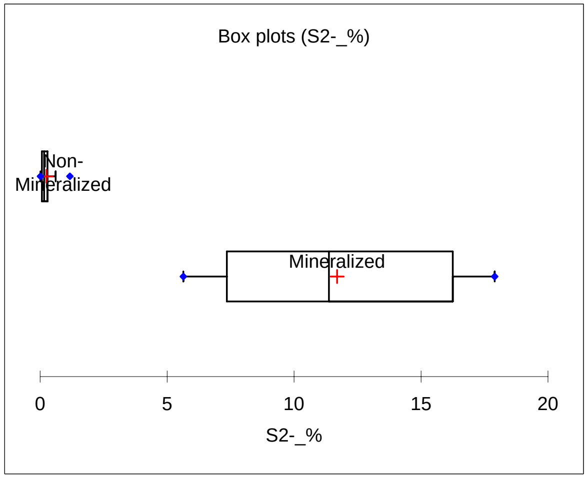
APPENDIX B4-1c Acid Base Accounting Parameters, Mineralized versus Waste Rock

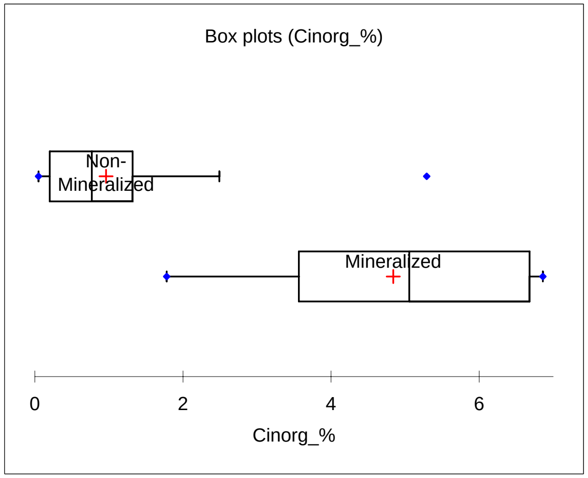




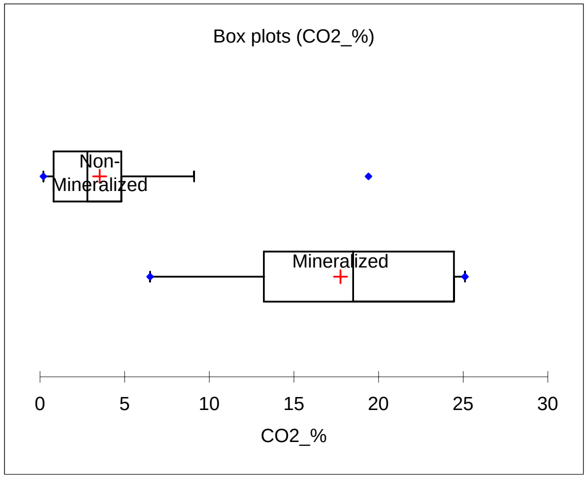




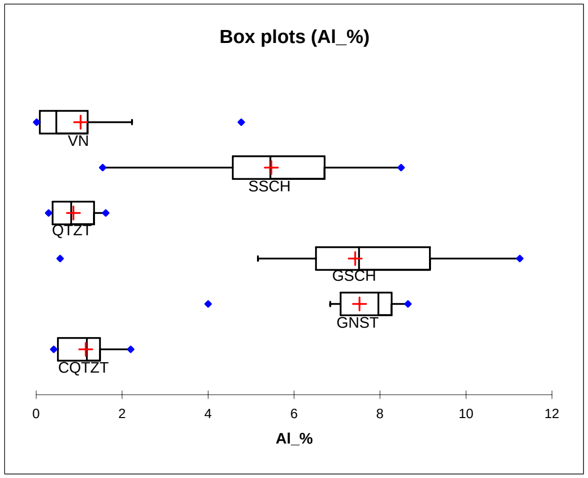


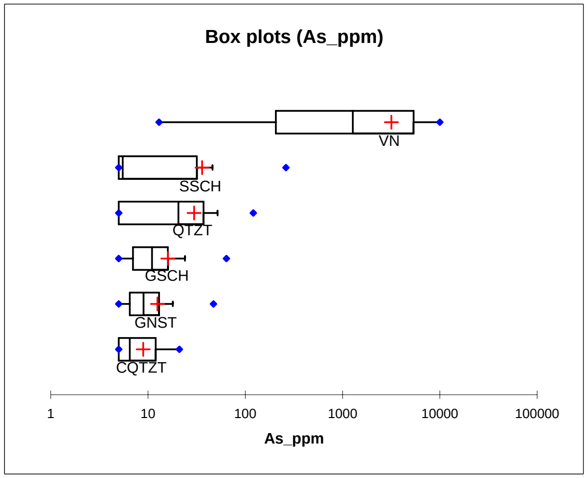


APPENDIX B4-1c Acid Base Accounting Parameters, Mineralized versus Waste Rock

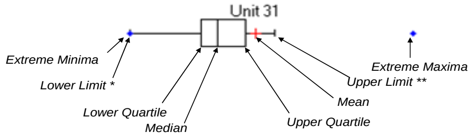


APPENDIX B4-2a Selected ICP Metals, Acid Base Accounting Database



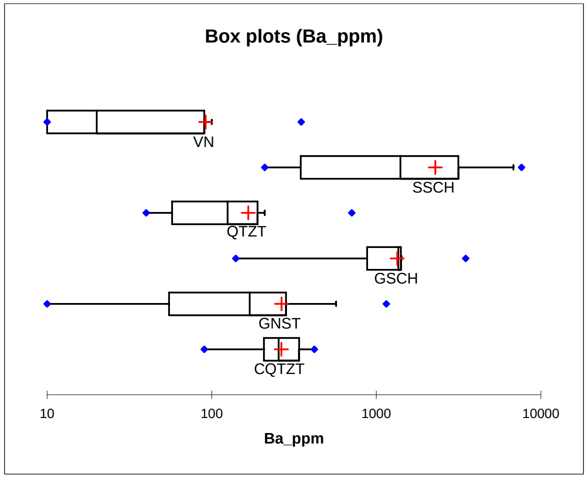


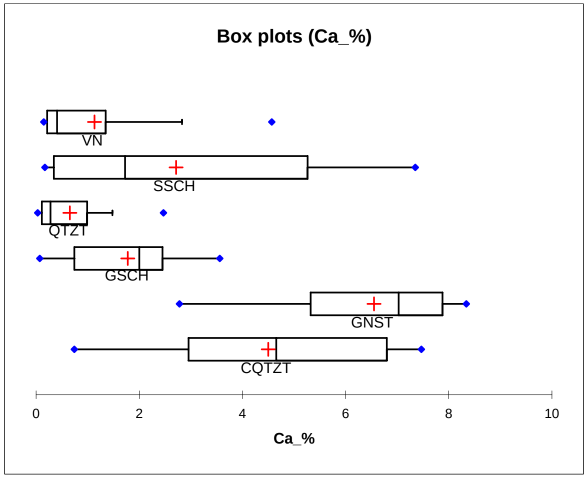
LEGEND FOR BOX PLOTS:

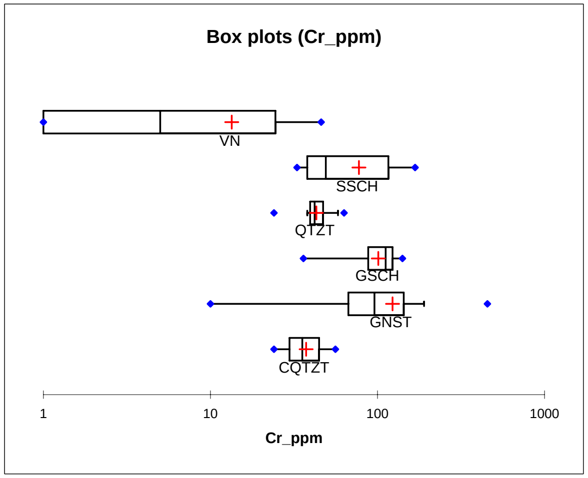


**Lower limit:* Linf = X(i) such that {X(i) – [Q1 – 1.5 (Q3 – Q1)]} is minimum and X(i) = Q1 – 1.5 (Q3 – Q1).*

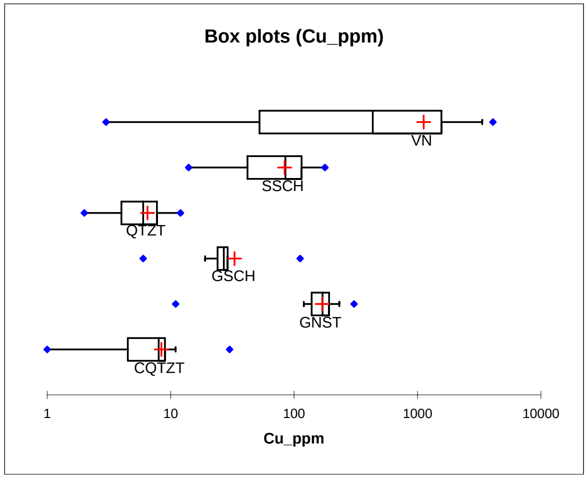
***Upper limit:* Lsup = X(i) such that {X(i) - [Q3 + 1.5 (Q3 – Q1)]} is minimum and X(i) = Q3 + 1.5 (Q3 – Q1)*

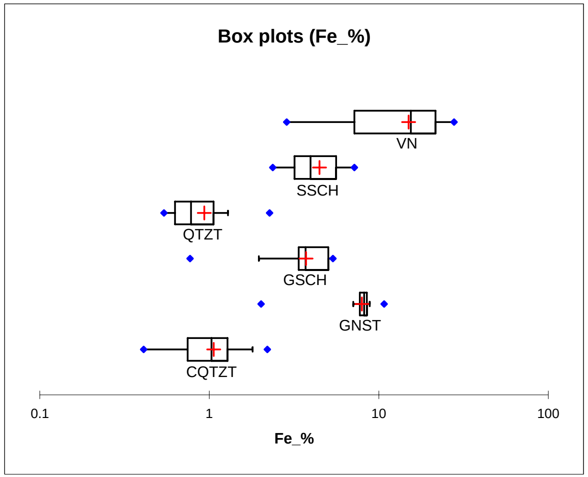


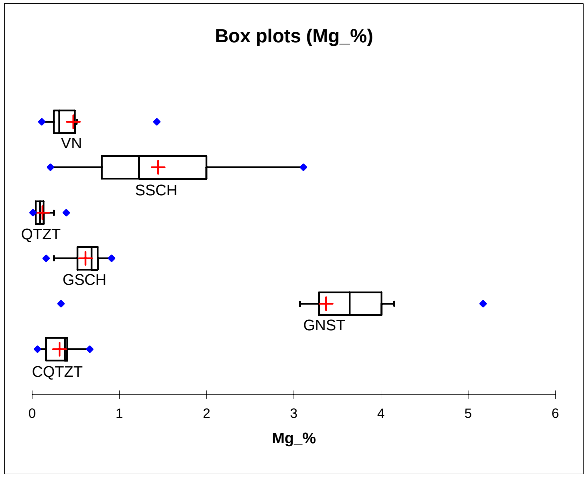


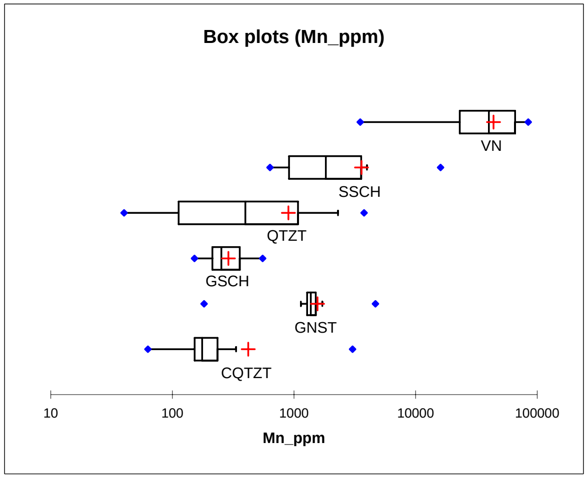


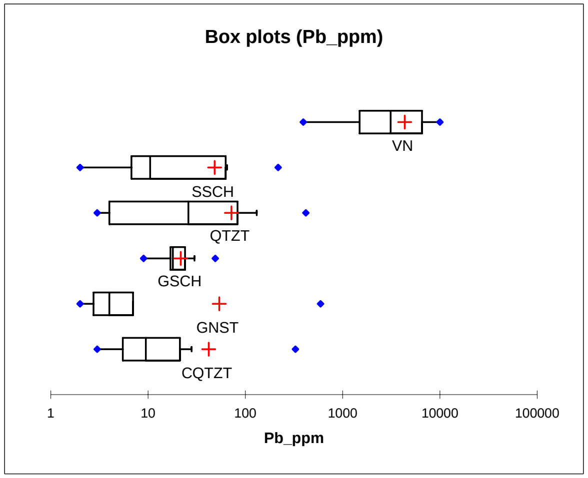
APPENDIX B4-2a Selected ICP Metals, Acid Base Accounting Database

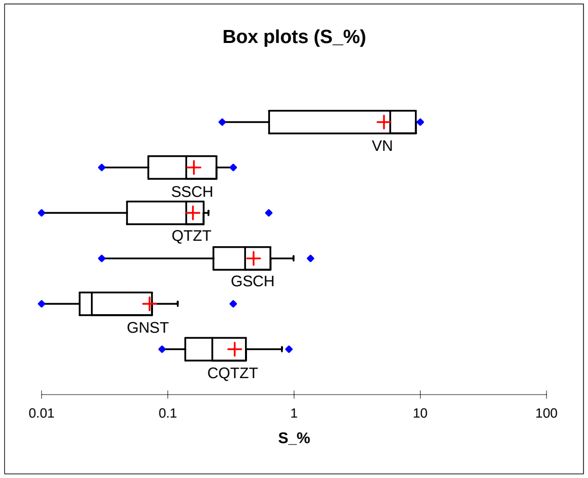

Box plots (Cu_ppm)


Box plots (Fe_%)

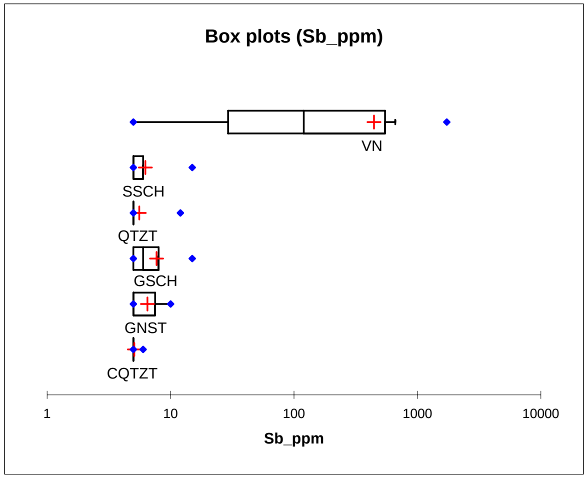

Box plots (Mg_%)

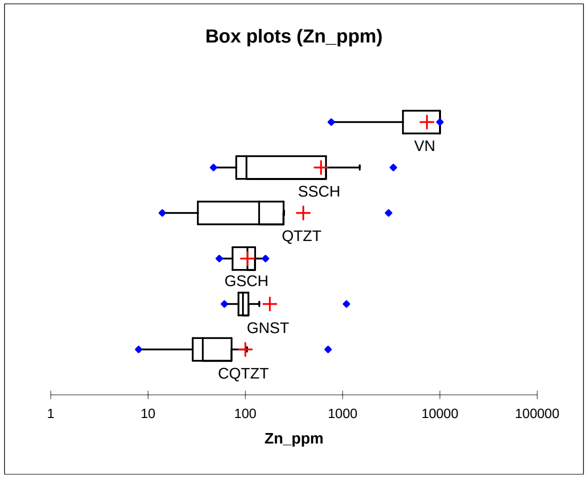

Box plots (Mn_ppm)


Box plots (Pb_ppm)

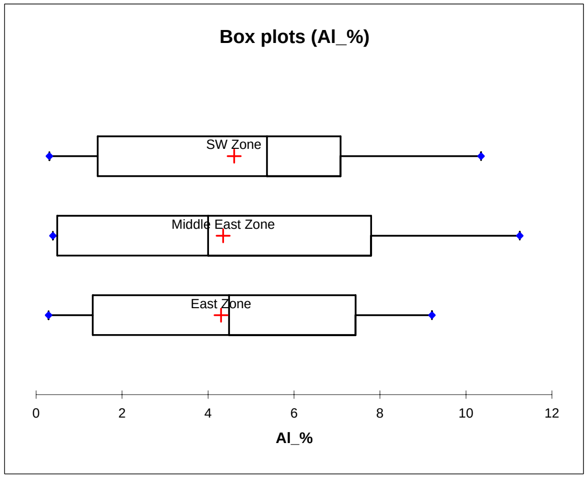

Box plots (S_%)

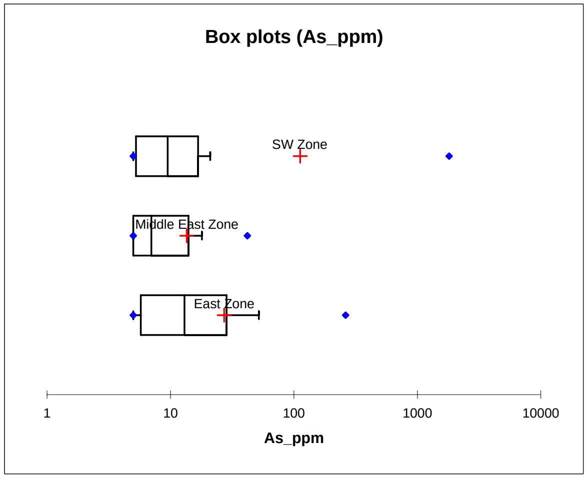
APPENDIX B4-2a Selected ICP Metals, Acid Base Accounting Database



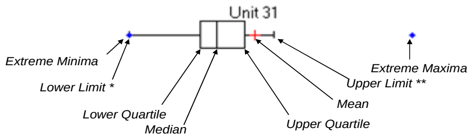


APPENDIX B4-2b ICP Metals by Bellekeno Zone, ABA Database



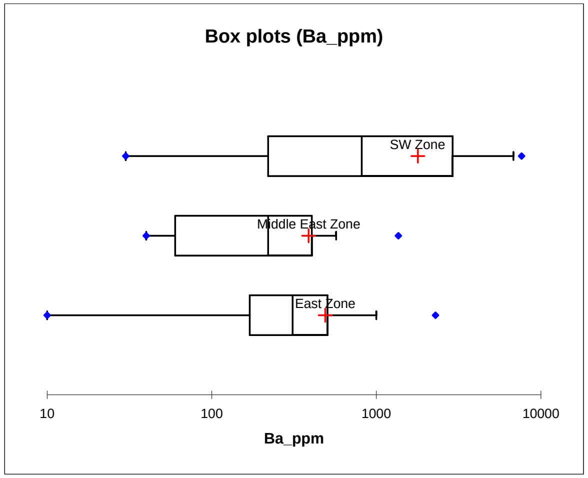


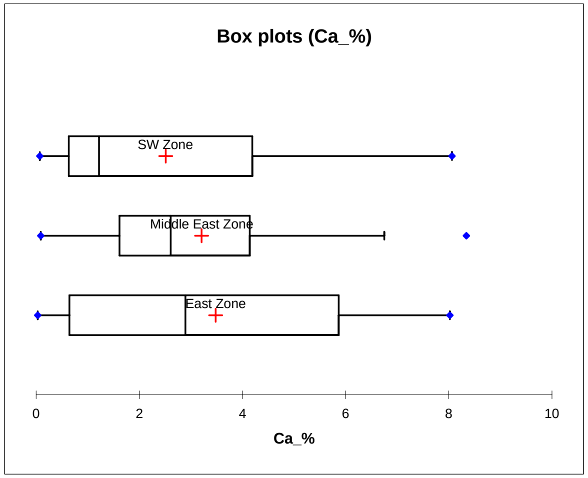
LEGEND FOR BOX PLOTS:

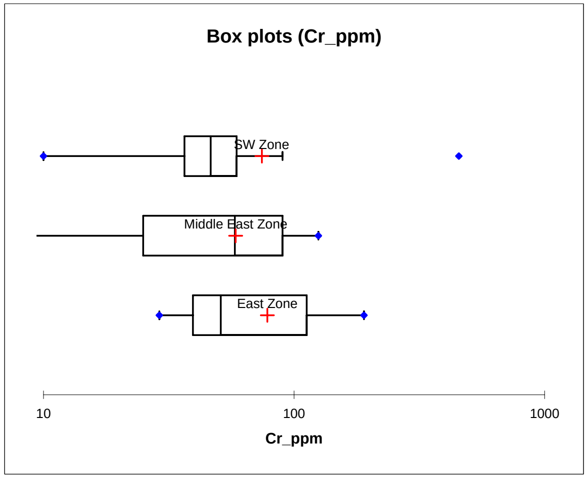


*<u>Lower limit:</u> *Linf = X(i) such that {X(i) – [Q1 – 1.5 (Q3 – Q1)]} is minimum and X(i) = Q1 – 1.5 (Q3 – Q1).*

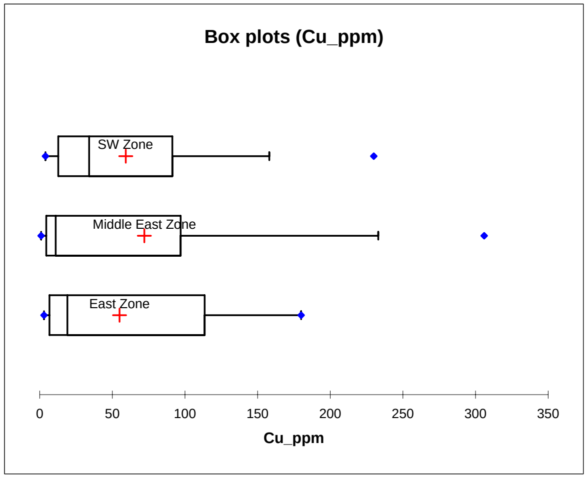
***<u>Upper limit:</u> *Lsup = X(i) such that {X(i) - [Q3 + 1.5 (Q3 – Q1)]} is minimum and X(i) = Q3 + 1.5 (Q3 – Q1)*

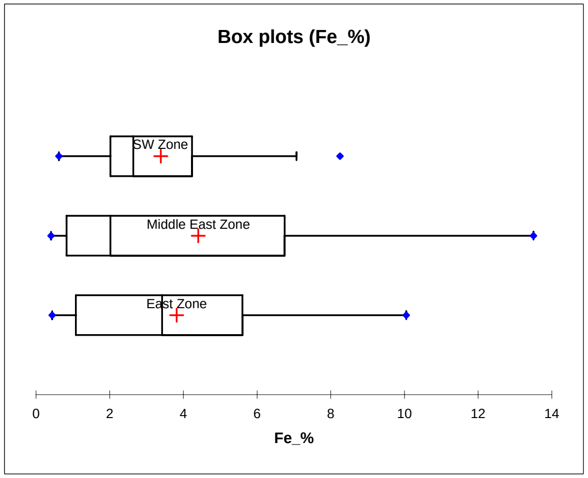


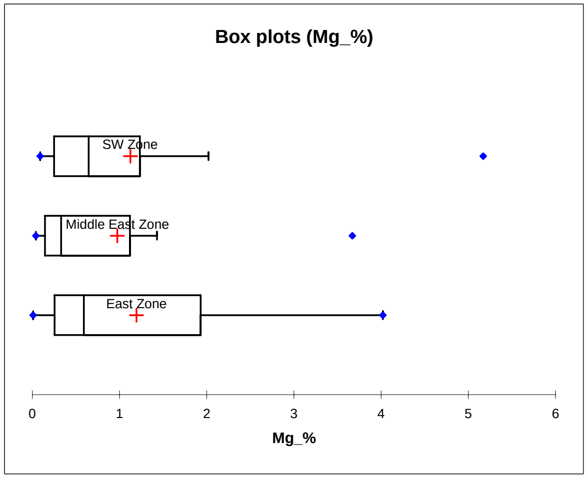


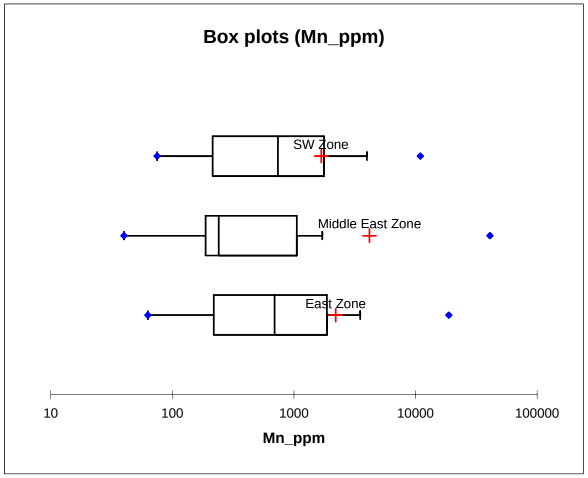


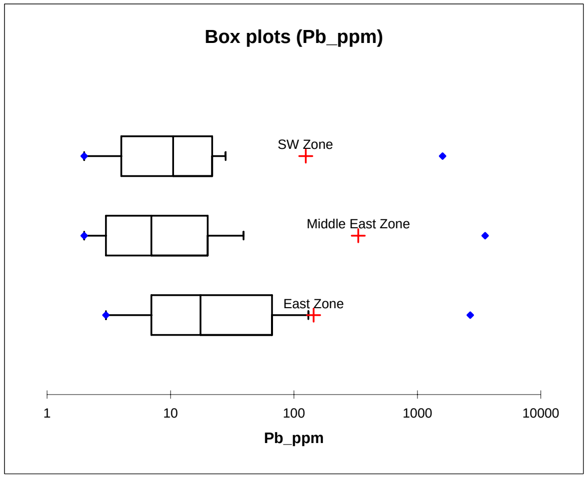
APPENDIX B4-2b ICP Metals by Bellekeno Zone, ABA Database

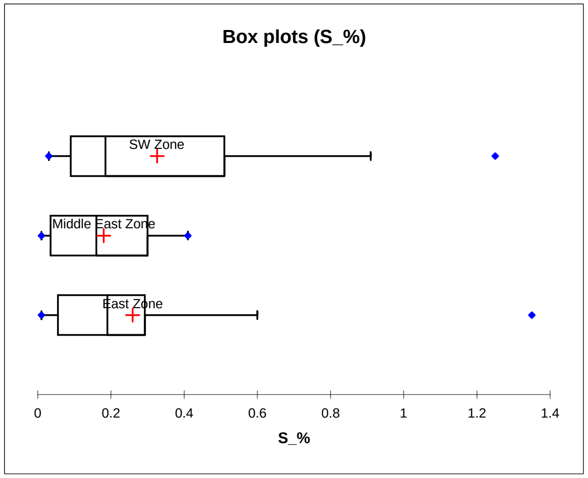




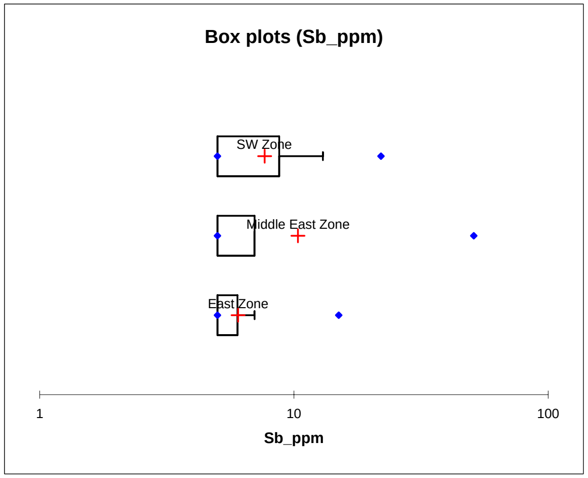


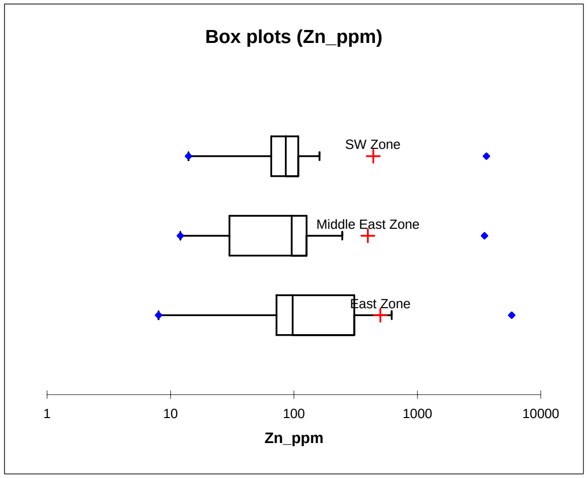




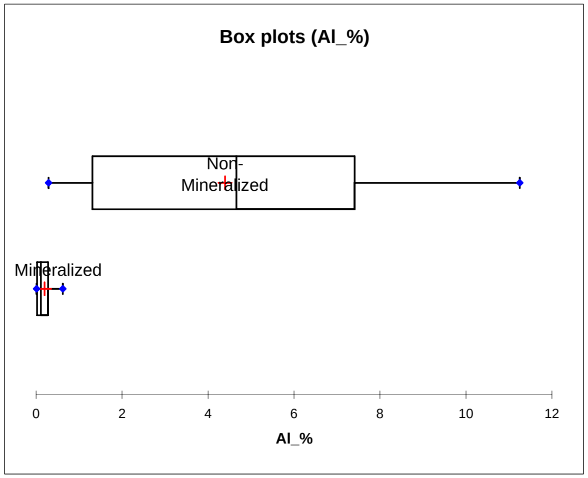


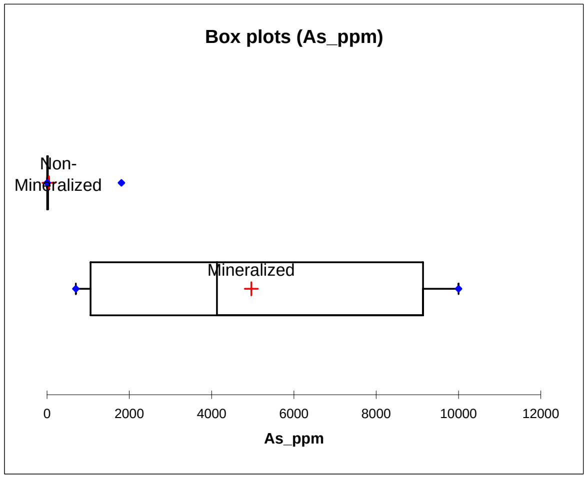
APPENDIX B4-2b ICP Metals by Bellekeno Zone, ABA Database



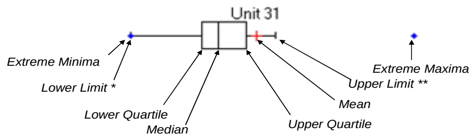


APPENDIX B4-2c

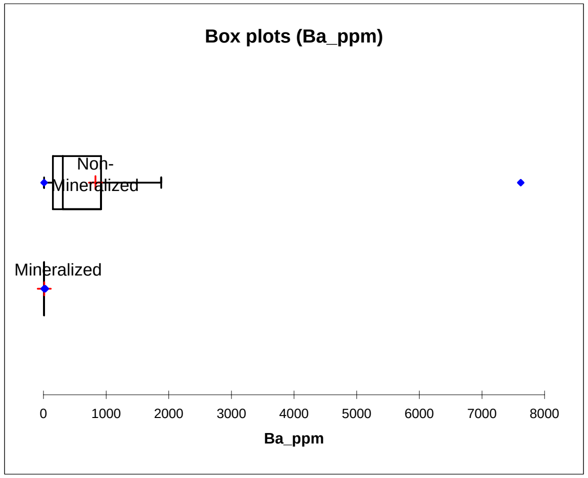


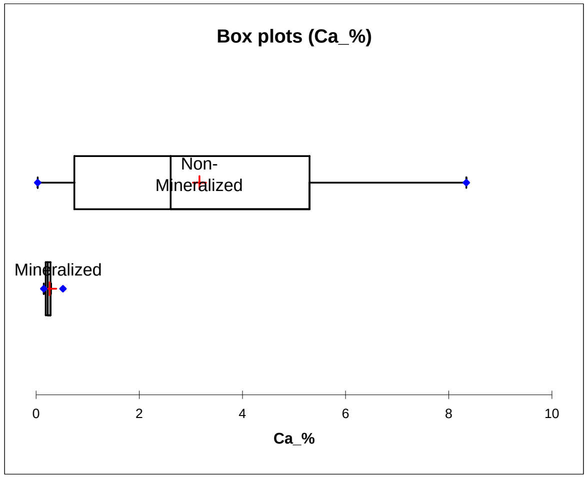


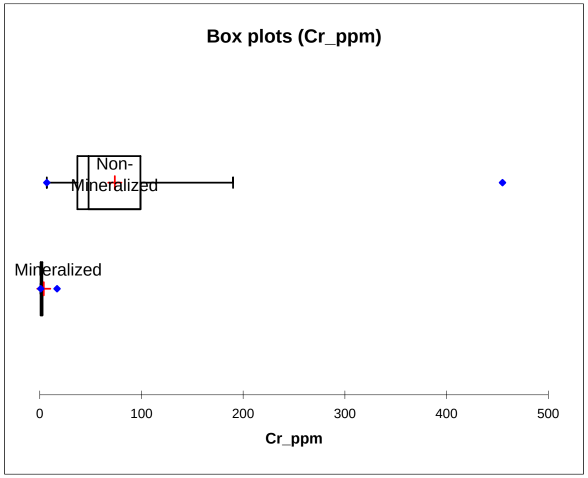
LEGEND FOR BOX PLOTS:



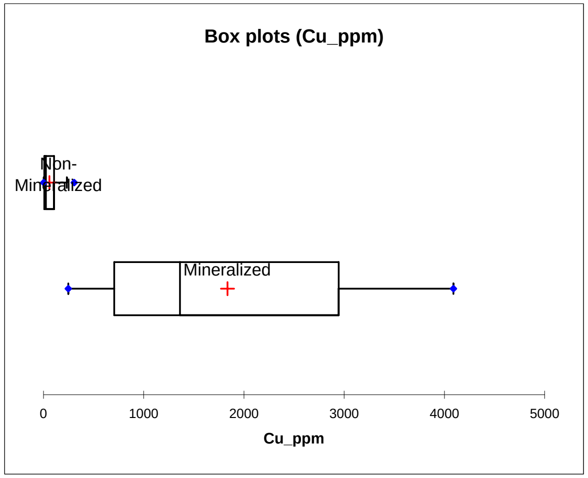
**Lower limit:* *Linf = X(i) such that {X(i) – [Q1 – 1.5 (Q3 – Q1)]} is minimum and X(i) = Q1 – 1.5 (Q3 – Q1).*
***Upper limit:* *Lsup = X(i) such that {X(i) - [Q3 + 1.5 (Q3 – Q1)]} is minimum and X(i) = Q3 + 1.5 (Q3 – Q1)*

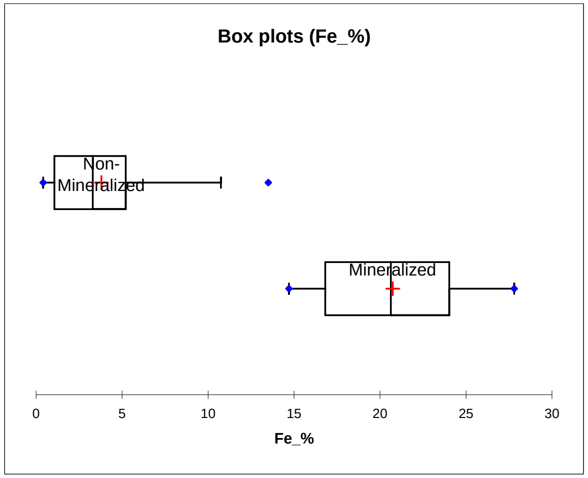


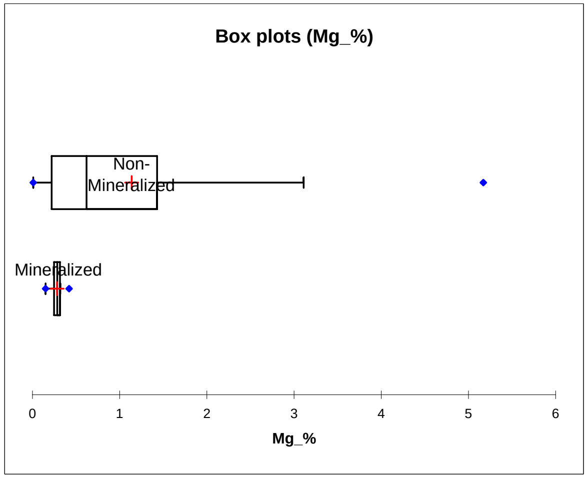


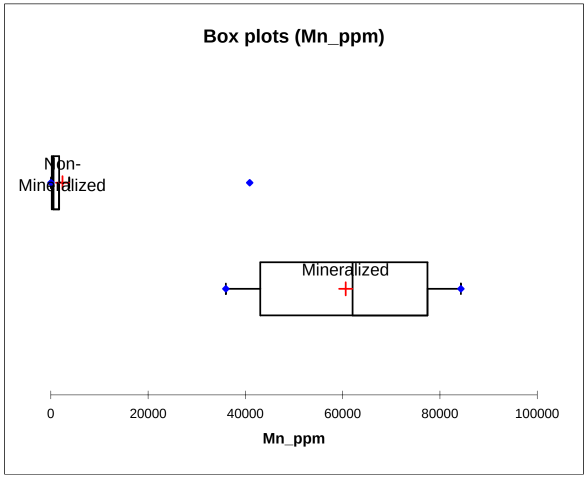


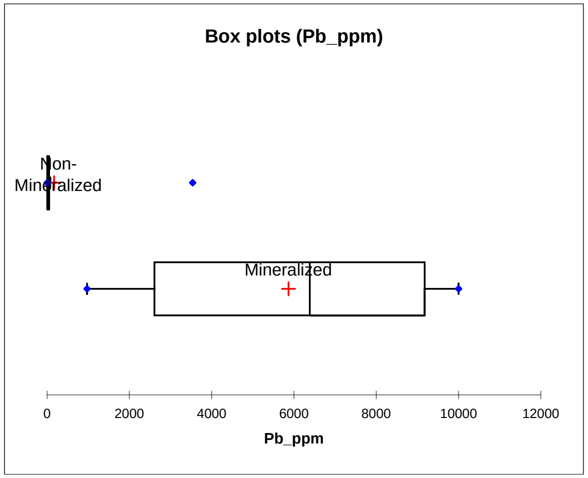
APPENDIX B4-2c

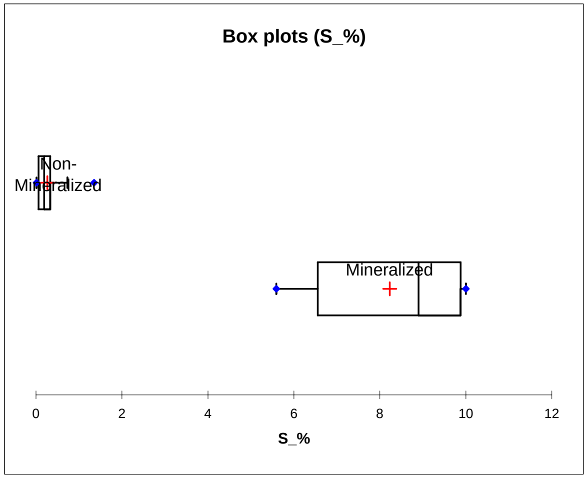




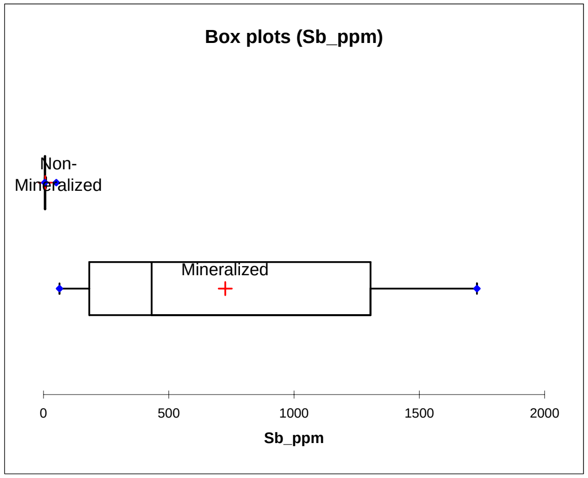


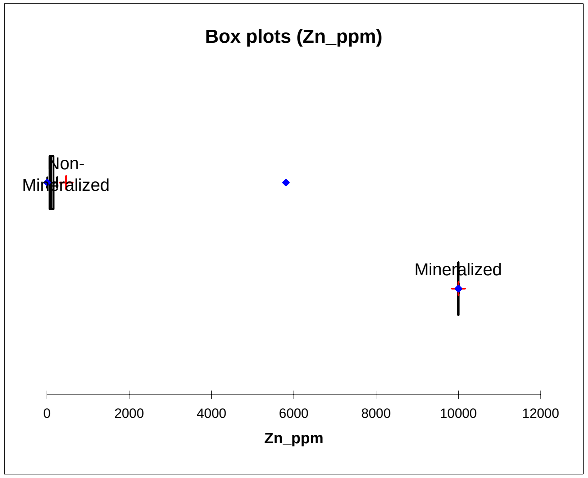




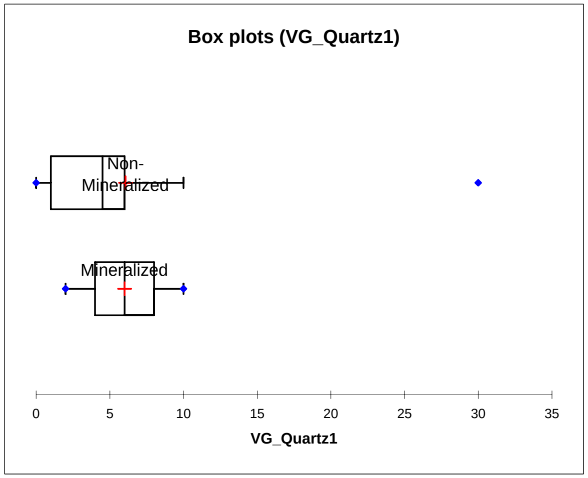


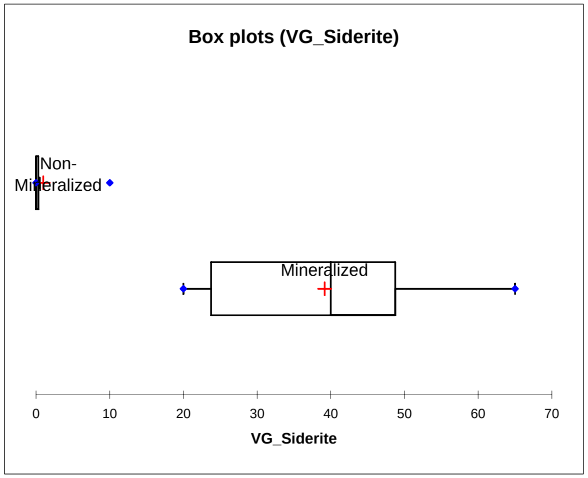
APPENDIX B4-2c



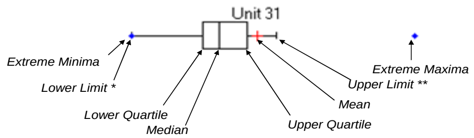


APPENDIX B4-3a Mineralogy and Alteration, ABA Datbase



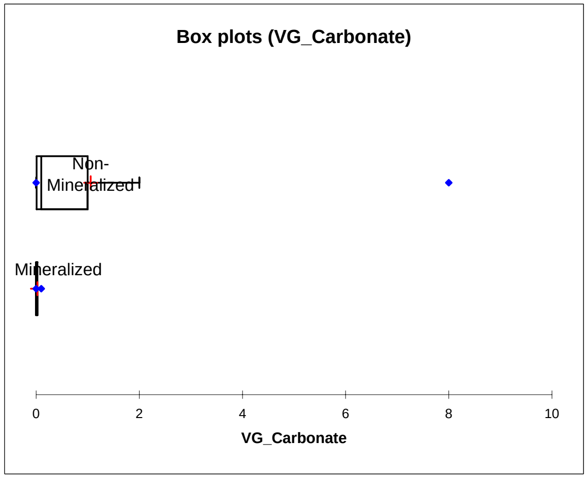


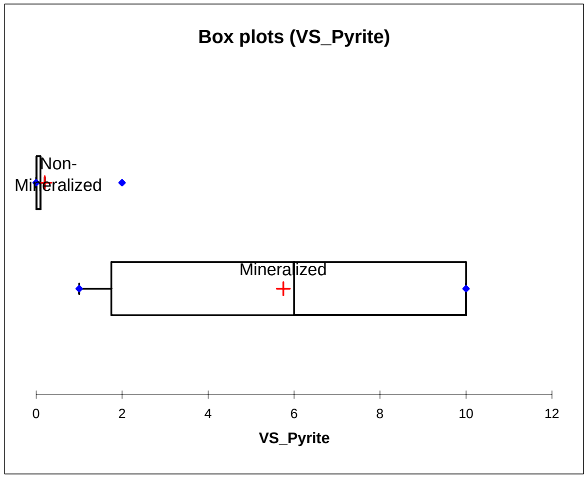
LEGEND FOR BOX PLOTS:

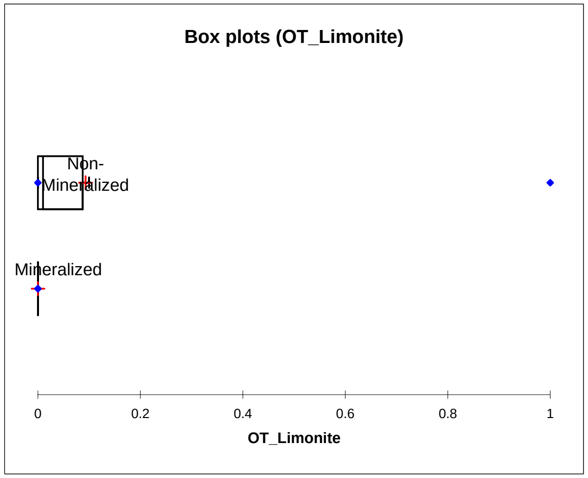


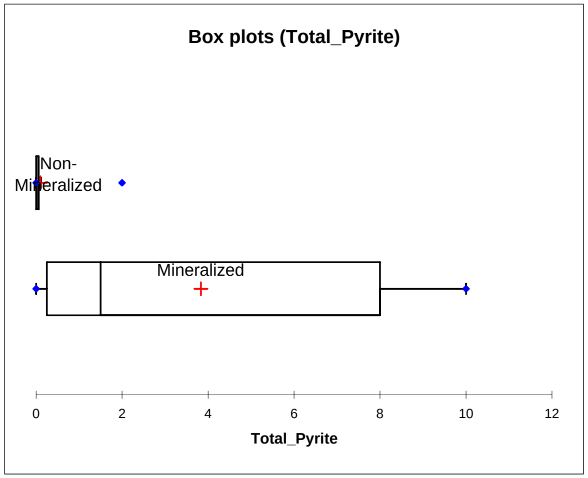
**Lower limit: Linf = X(i) such that {X(i) – [Q1 – 1.5 (Q3 – Q1)]} is minimum and X(i) = Q1 – 1.5 (Q3 – Q1).*

***Upper limit: Lsup = X(i) such that {X(i) - [Q3 + 1.5 (Q3 – Q1)]} is minimum and X(i) = Q3 + 1.5 (Q3 – Q1)*

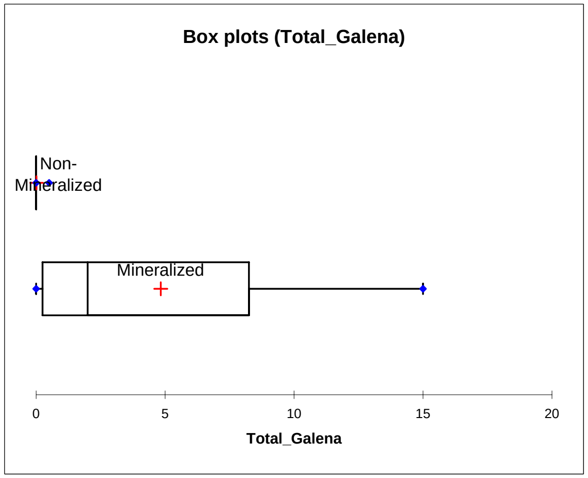




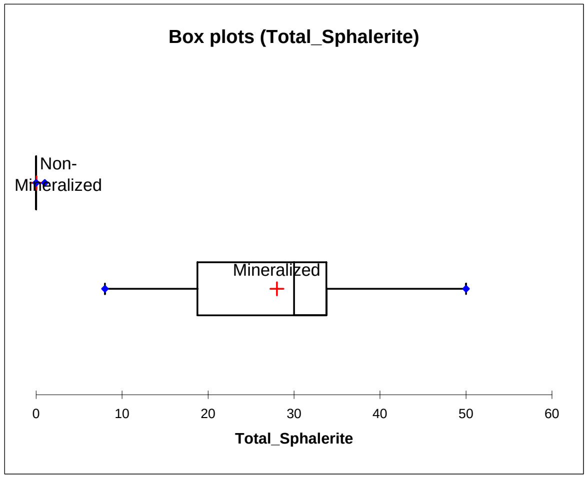




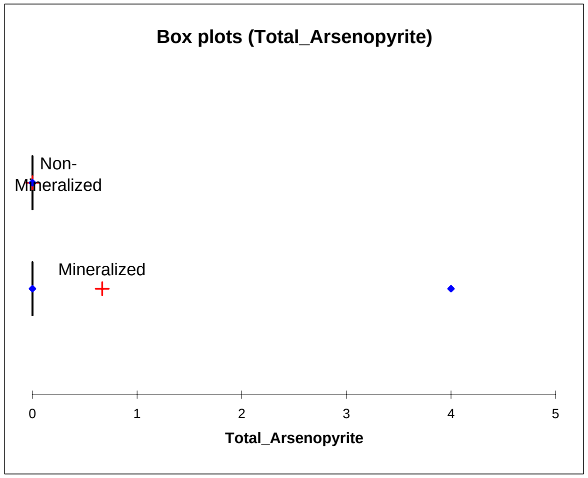
Box plots (Total_Pyrite)



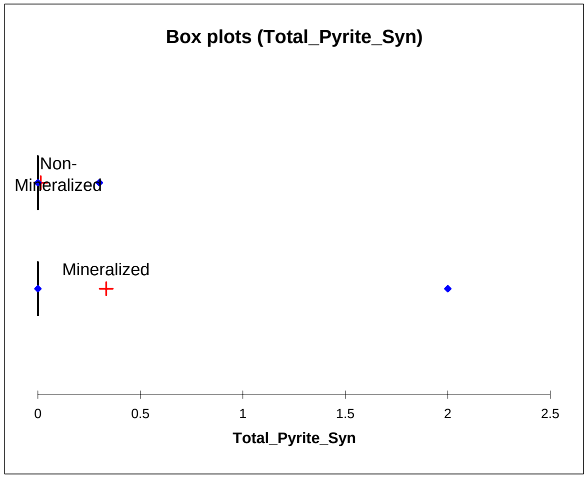
Box plots (Total_Galena)



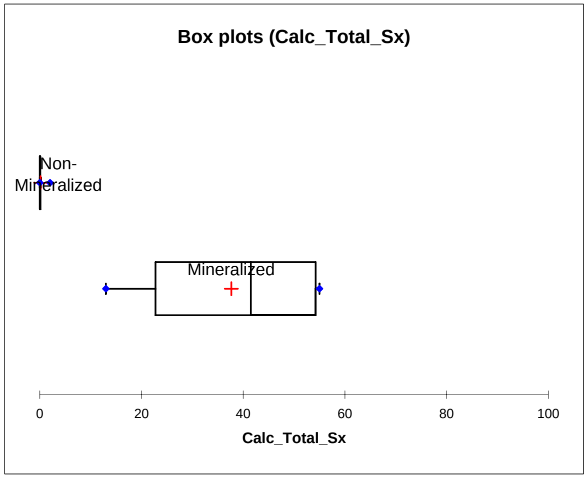
Box plots (Total_Sphalerite)



Box plots (Total_Arsenopyrite)

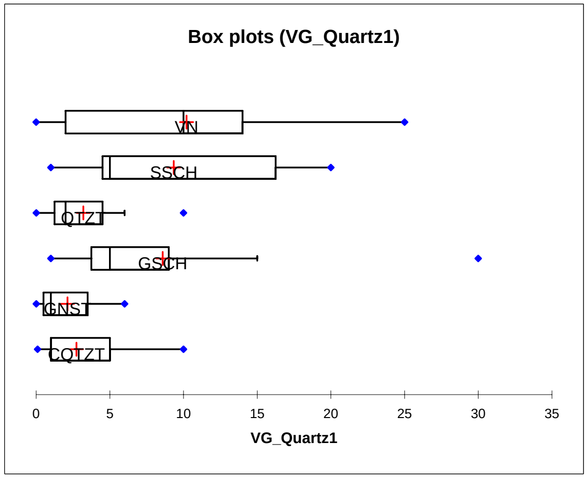


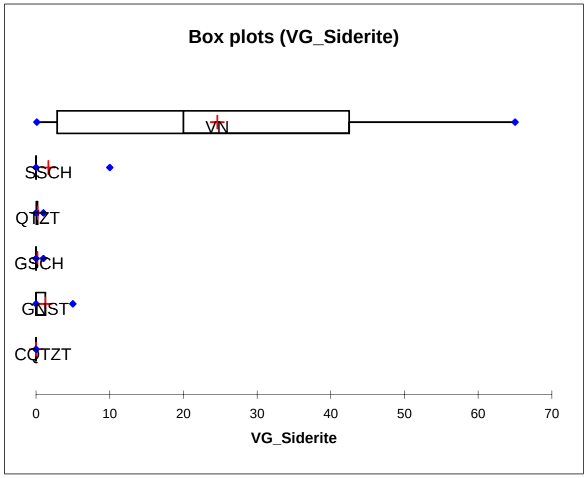
Box plots (Total_Pyrite_Syn)



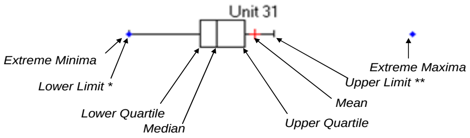
Box plots (Calc_Total_Sx)

APPENDIX B4-3c Mineralogy and Alteration by Lithology, ABA Database





LEGEND FOR BOX PLOTS:



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and X(i) = Q1 – 1.5 (Q3 – Q1).
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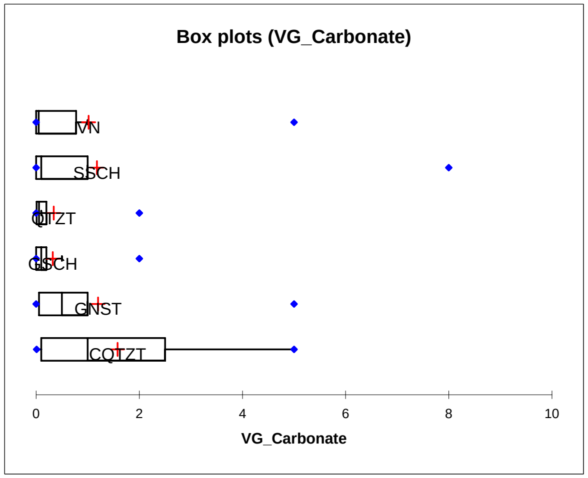
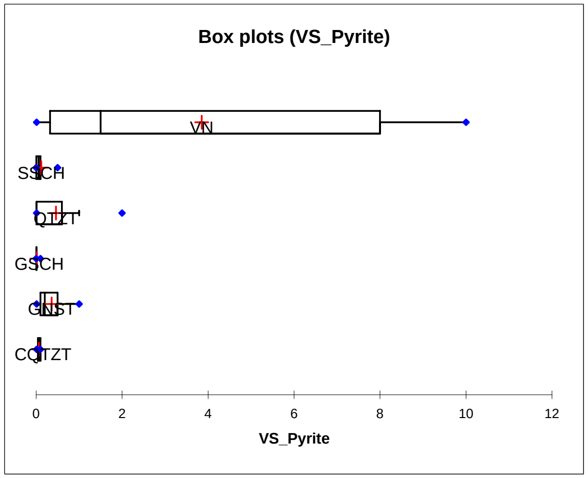
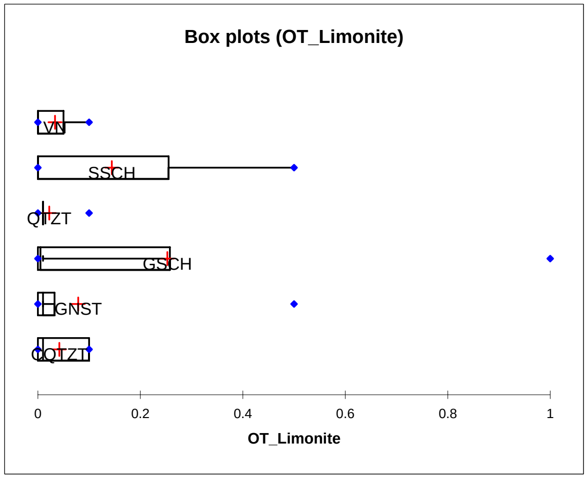
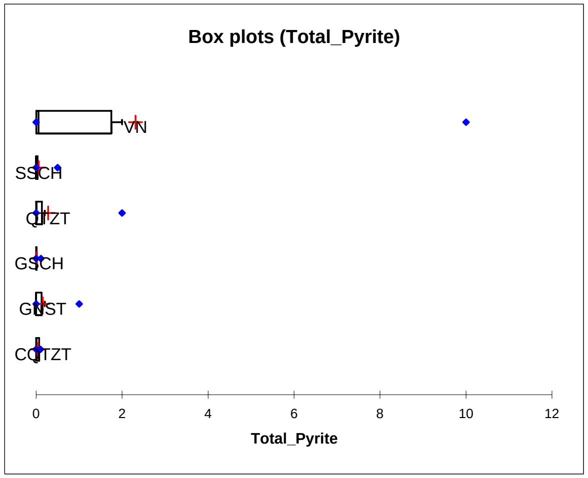
and X(i) = Q3 + 1.5 (Q3 – Q1)

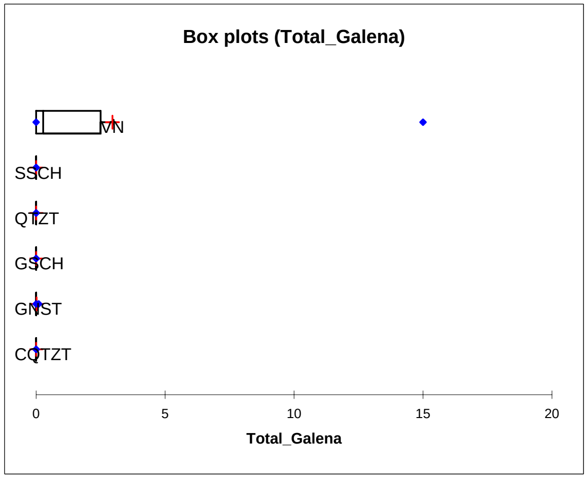


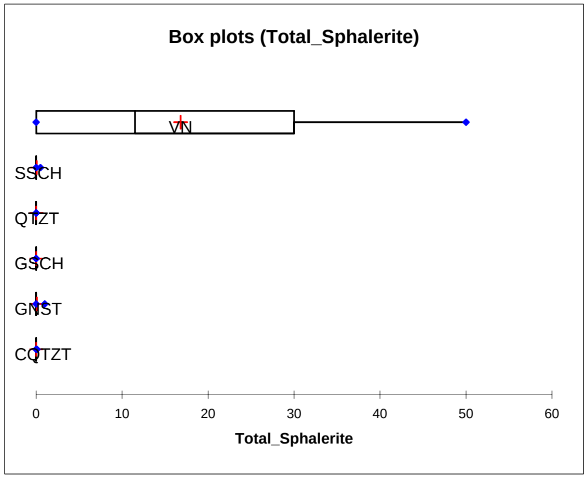


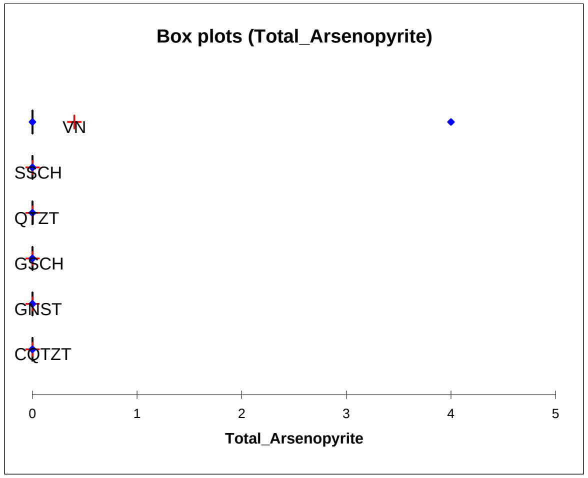


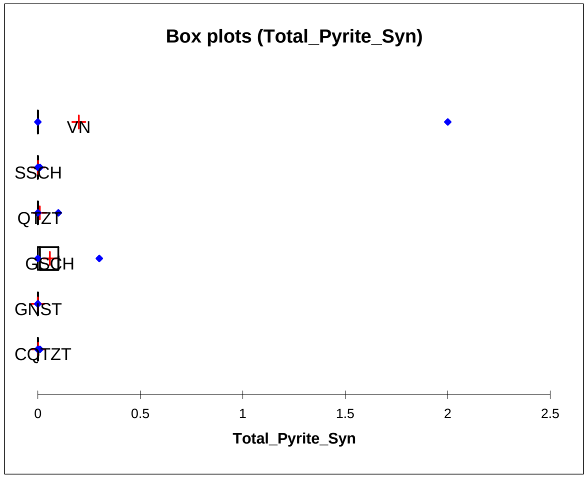
APPENDIX B4-3c Mineralogy and Alteration by Lithology, ABA Database

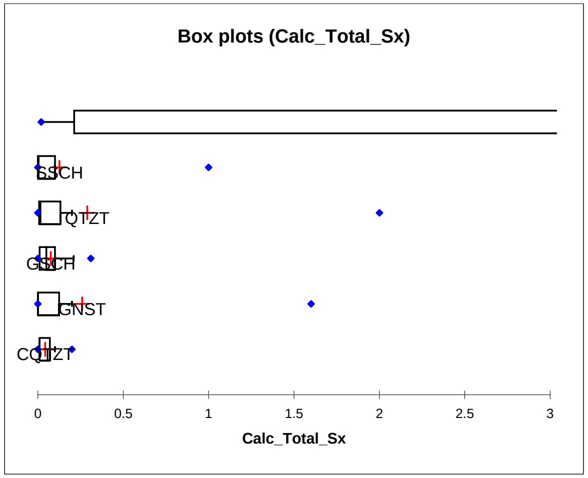




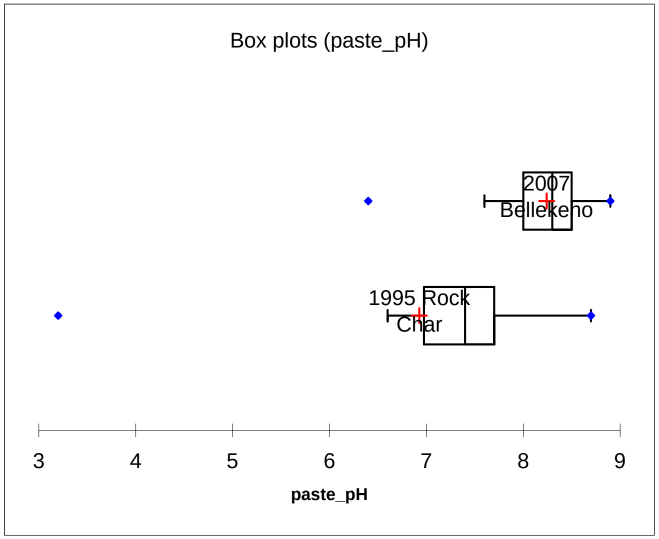


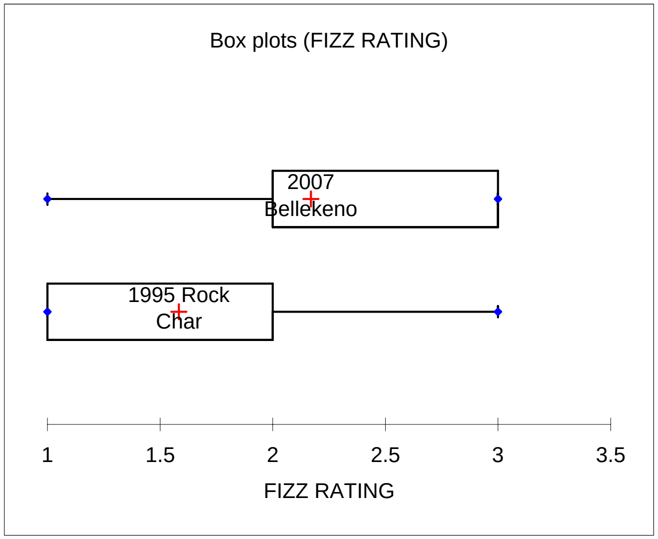


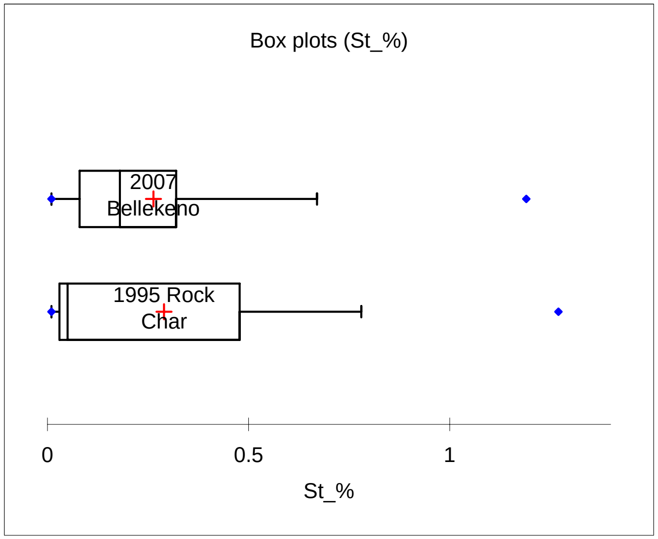


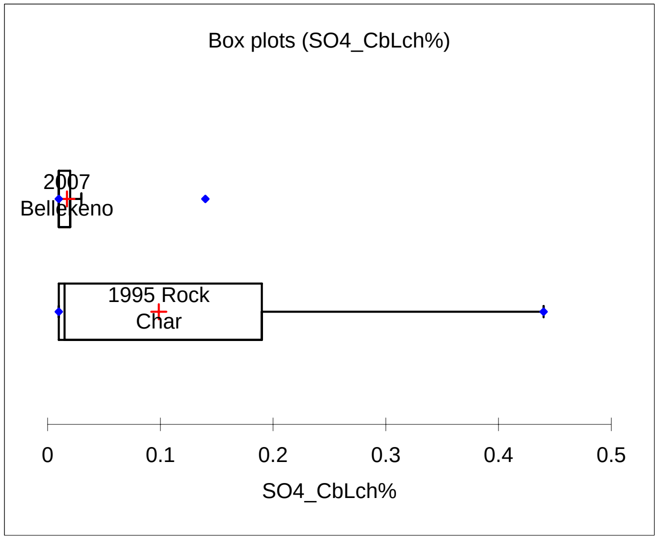


APPENDIX B4-4 Comparison of ABA Parameters Between 2007 Bellekeno and 1995-96 Keno Site-Wide Samples

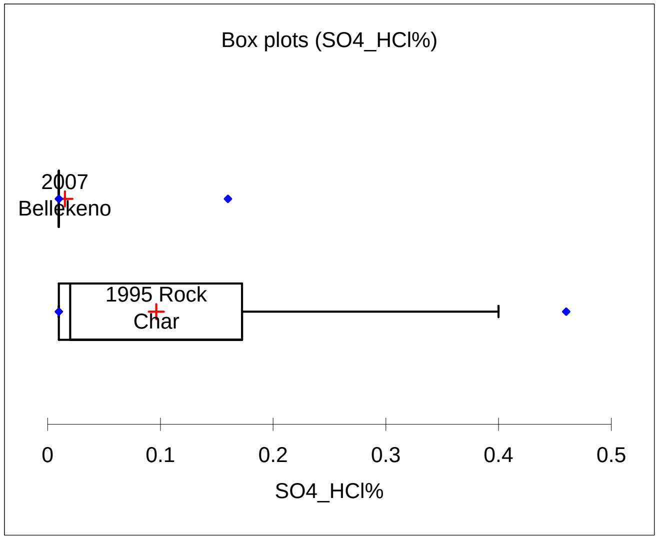


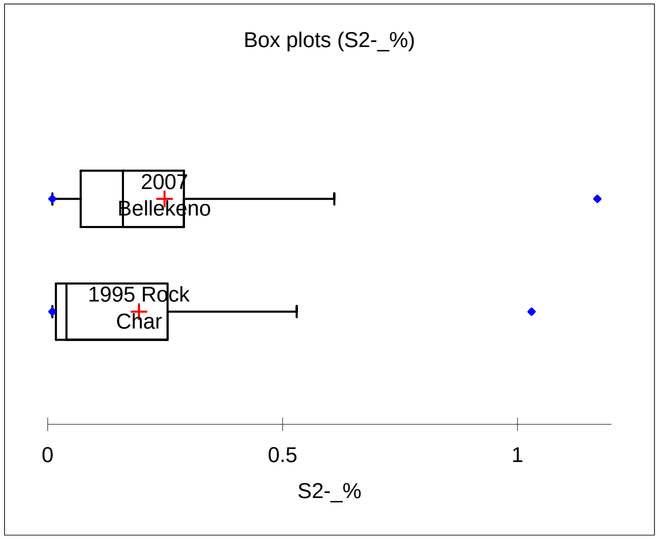


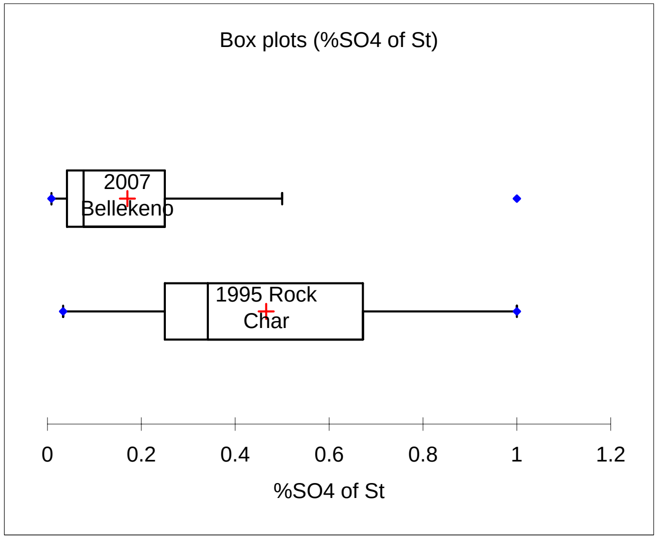


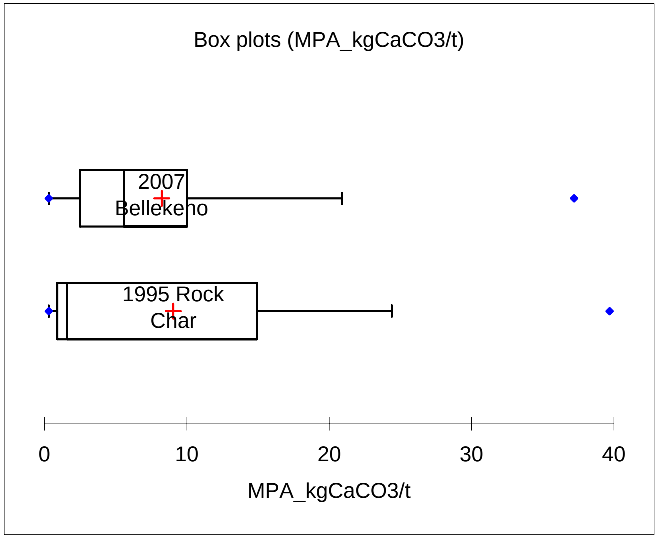


APPENDIX B4-4 Comparison of ABA Parameters Between 2007 Bellekeno and 1995-96 Keno Site-Wide Samples

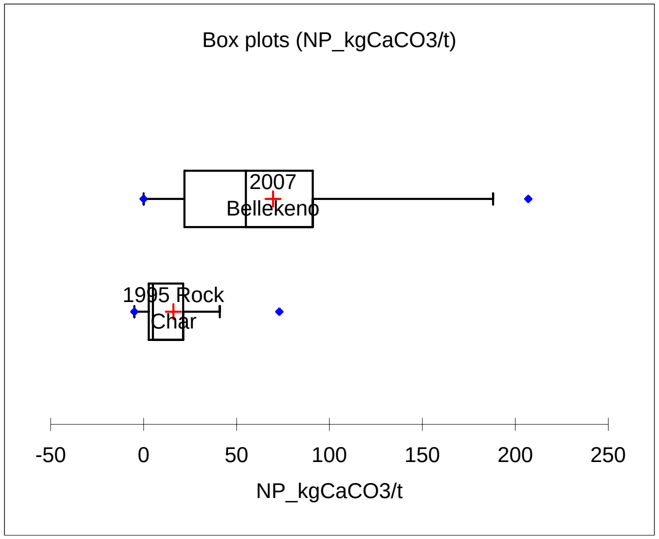


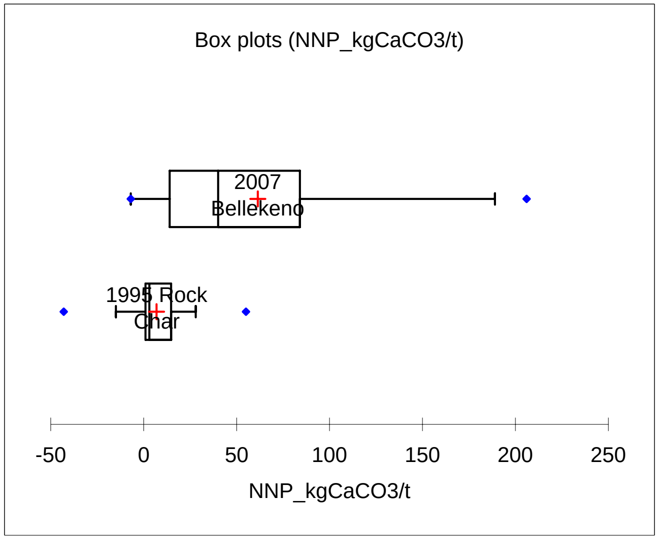


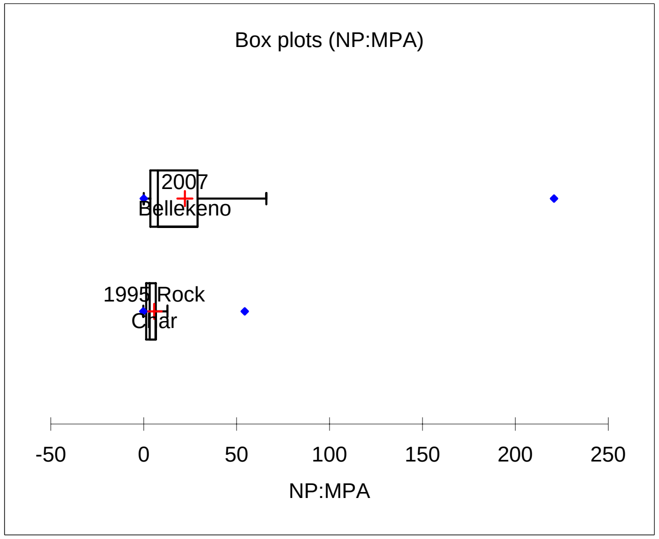


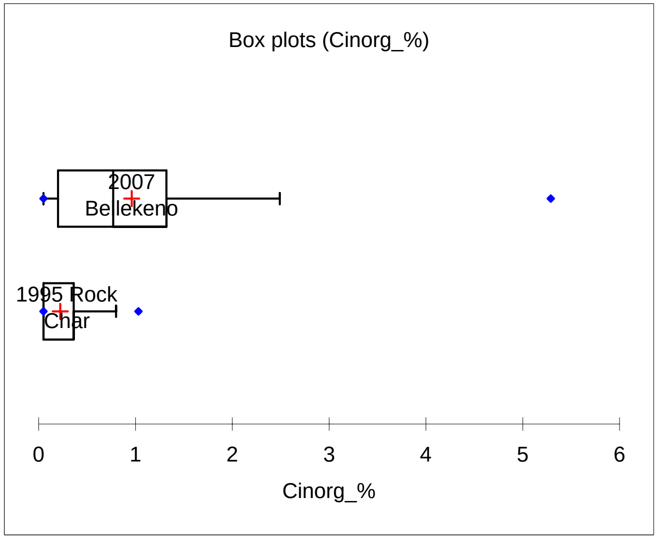


APPENDIX B4-4 Comparison of ABA Parameters Between 2007 Bellekeno and 1995-96 Keno Site-Wide Samples

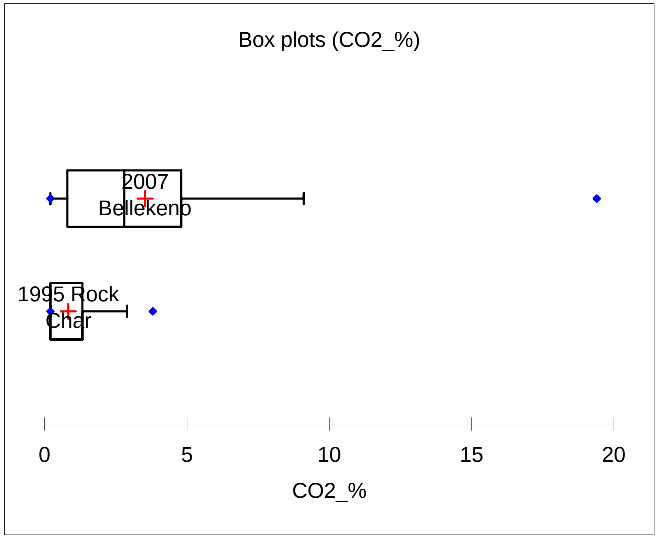


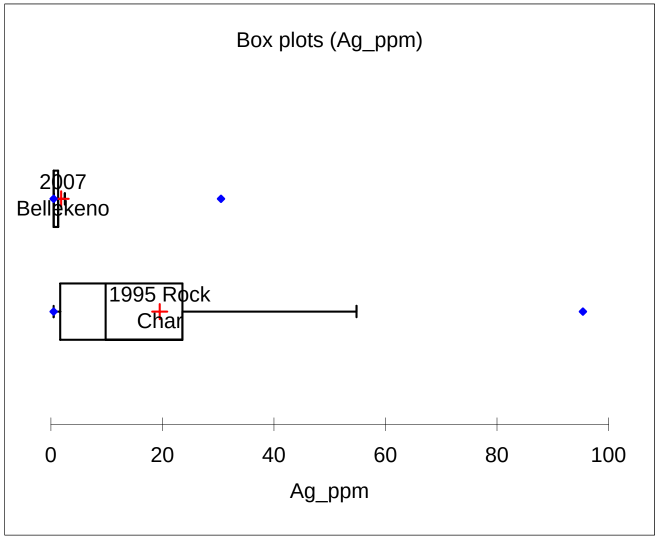


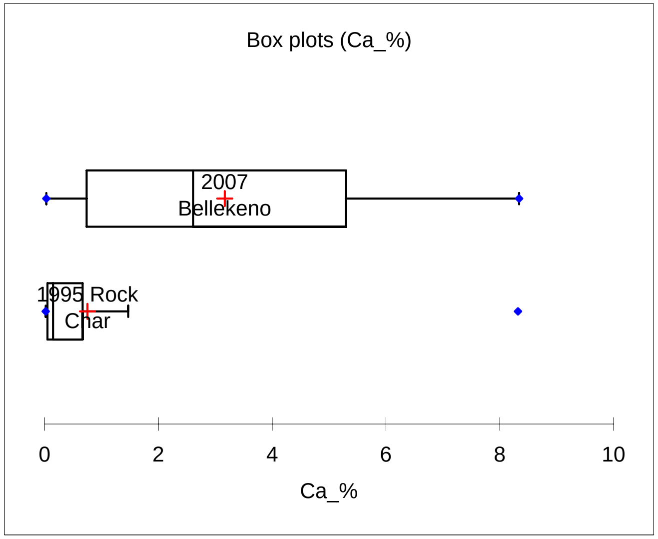


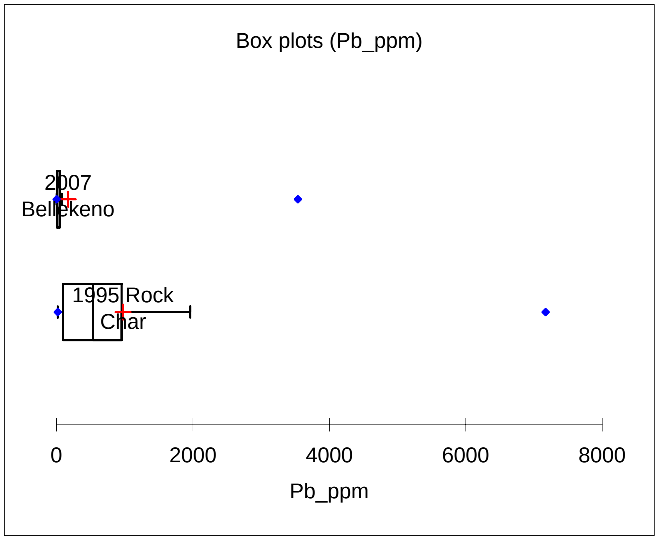


APPENDIX B4-4 Comparison of ABA Parameters Between 2007 Bellekeno and 1995-96 Keno Site-Wide Samples

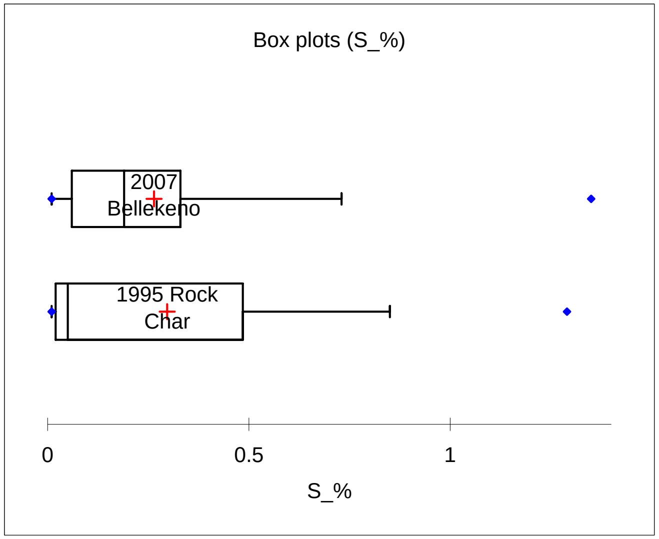


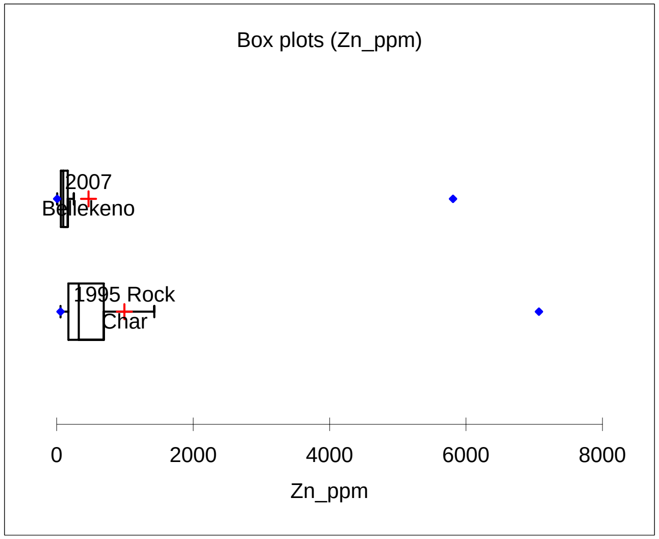


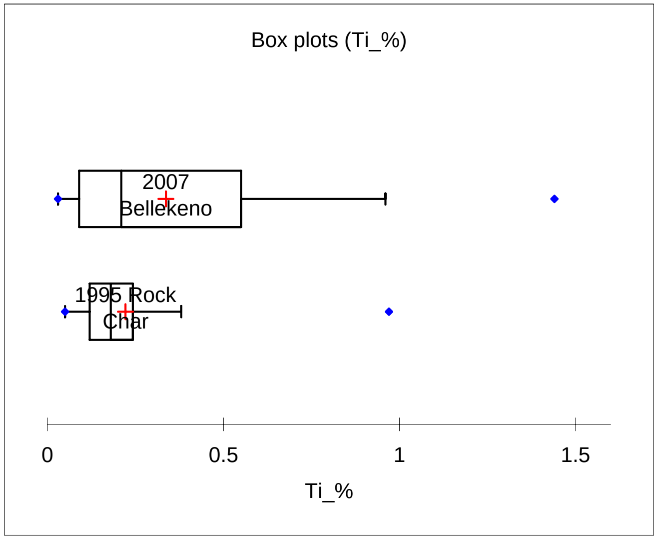




APPENDIX B4-4 Comparison of ABA Parameters Between 2007 Bellekeno and 1995-96 Keno Site-Wide Samples







APPENDIX C1-1 Bellekeno Waste Rock Drillhole Database
Summary Statistics

Bellekeno Non-Mineralized Rock

(<100 ppm Ag, <10000 ppm Pb, <10000 ppm Zn)

All Lithologies:

Statistic	Au_ppm	Ag_ppm	Al_%	As_ppm	Ba_ppm	Be_ppm	Bi_ppm	Ca_%	Cd_ppm	Co_ppm	Cr_ppm	Cu_ppm	Fe_%	Ga_ppm	K_%	La_ppm	Mg_%
No. of observations	6478	6478	6478	6478	6478	6478	6478	6478	6478	6478	6478	6478	6478	6478	6478	6478	6478
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0	2188	0	2188	0
Minimum	0.010	0.500	0.130	5.000	10.000	0.500	2.000	0.010	0.500	1.000	1.000	1.000	0.120	10.000	0.010	10.000	0.010
Maximum	3.160	90.700	13.900	10000.000	7620.000	4.100	27.000	23.400	144.000	75.000	1240.000	933.000	39.600	40.000	6.360	60.000	12.550
1st Quartile	0.010	0.500	0.900	5.000	140.000	0.500	2.000	0.390	0.500	2.000	37.000	7.000	1.023	10.000	0.190	10.000	0.140
Median	0.010	0.500	2.720	9.000	380.000	0.600	2.000	1.205	0.500	4.000	50.000	18.000	2.020	10.000	0.470	10.000	0.320
3rd Quartile	0.010	0.700	5.730	17.000	860.000	1.200	2.000	2.908	1.000	9.000	72.000	37.000	3.288	10.000	0.980	20.000	0.670
Mean	0.016	1.344	3.461	45.032	573.989	0.871	2.125	2.083	3.907	8.192	60.297	37.609	2.746	11.956	0.705	14.093	0.662
Standard deviation (n)	0.059	3.980	2.759	349.773	600.296	0.511	0.820	2.327	11.723	10.482	42.837	61.496	2.586	4.178	0.687	7.687	0.991
Variation coefficient	3.716	2.961	0.797	7.767	1.046	0.586	0.386	1.117	3.001	1.280	0.710	1.635	0.942	0.349	0.975	0.545	1.498
Skewness (Pearson)	35.697	11.417	0.570	20.616	2.697	1.448	15.943	1.874	5.358	2.217	6.480	4.444	2.840	1.903	1.671	2.000	3.281
Kurtosis (Pearson)	1602.047	175.187	-0.938	506.887	14.941	1.764	370.783	5.642	34.082	4.327	114.868	30.692	16.748	2.729	3.248	3.710	16.468
Geometric mean	0.012	0.728	2.216	11.567	331.031	0.759	2.075	1.013	0.974	4.305	50.639	18.201	1.950	11.424	0.435	12.712	0.314
Geometric standard deviation	1.608	2.148	2.865	2.764	3.173	1.649	1.190	3.936	3.489	3.104	1.884	3.190	2.284	1.323	2.850	1.515	3.474

CHSCH: Chloritic Schist

Statistic	Au_ppm	Ag_ppm	Al_%	As_ppm	Ba_ppm	Be_ppm	Bi_ppm	Ca_%	Cd_ppm	Co_ppm	Cr_ppm	Cu_ppm	Fe_%	Ga_ppm	K_%	La_ppm	Mg_%
No. of observations	222	222	222	222	222	222	222	222	222	222	222	222	222	222	222	222	222
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0	168	0	168	0
Minimum	0.010	0.500	0.150	5.000	20.000	0.500	2.000	0.100	0.500	3.000	3.000	1.000	0.150	10.000	0.020	10.000	0.050
Maximum	0.840	9.200	10.450	341.000	4220.000	2.700	7.000	21.000	120.500	47.000	764.000	282.000	12.400	30.000	4.250	60.000	12.550
1st Quartile	0.010	0.500	5.743	5.000	602.500	1.025	2.000	1.065	0.500	9.000	41.250	22.000	2.740	10.000	1.420	10.000	0.760
Median	0.010	0.500	6.940	6.000	850.000	1.400	2.000	2.560	0.500	12.000	54.000	31.000	3.455	20.000	2.025	20.000	0.960
3rd Quartile	0.010	0.500	7.900	12.000	1187.500	1.775	2.000	4.545	0.500	19.750	81.000	54.000	5.135	20.000	2.695	30.000	1.760
Mean	0.016	0.677	6.681	15.014	1020.405	1.423	2.054	3.252	2.527	15.878	74.495	49.459	4.181	16.111	1.967	24.444	1.428
Standard deviation (n)	0.056	0.759	1.742	33.525	719.501	0.532	0.421	2.887	12.052	9.910	76.812	50.544	2.219	5.241	0.940	14.229	1.254
Variation coefficient	3.541	1.121	0.261	2.233	0.705	0.374	0.205	0.888	4.768	0.624	1.031	1.022	0.531	0.325	0.478	0.582	0.878
Skewness (Pearson)	14.269	7.523	-0.822	7.032	1.778	0.073	9.391	2.078	8.008	1.301	5.007	2.490	1.442	-0.067	-0.307	0.614	3.908
Kurtosis (Pearson)	206.062	72.303	1.145	55.909	3.747	-0.556	95.872	7.502	68.062	0.966	34.174	6.548	2.102	-1.160	-0.519	-0.513	26.922
Geometric mean	0.011	0.574	6.317	8.839	780.674	1.309	2.033	2.154	0.666	13.335	57.030	34.423	3.680	15.193	1.519	20.367	1.109
Geometric standard deviation	1.542	1.537	1.513	2.176	2.356	1.543	1.127	2.711	2.512	1.807	2.039	2.328	1.684	1.425	2.661	1.866	2.022

APPENDIX C1-1 Bellekeno Waste Rock Drillhole Database
Summary Statistics

Bellekeno Non-Mineralized Rock

(<100 ppm Ag, <10000 ppm Pb, <1000

All Lithologies:

Statistic	Mn_ppm	Mo_ppm	Na_%	Ni_ppm	P_ppm	Pb_ppm	S_%	Sb_ppm	Sc_ppm	Sr_ppm	Th_ppm	Ti_%	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn_ppm
No. of observations	6478	6478	6478	6478	6478	6478	6478	6478	6478	6478	6478	6478	6478	6478	6478	6478	6478
No. of missing values	0	0	0	0	0	0	0	0	2188	0	2188	0	2188	2188	0	0	0
Minimum	17.000	1.000	0.010	1.000	20.000	2.000	0.010	5.000	1.000	1.000	20.000	0.010	10.000	10.000	2.000	10.000	2.000
Maximum	100000	28.000	4.250	1560.000	4670.000	8970.000	10.000	208.000	45.000	852.000	20.000	2.380	50.000	20.000	1620.000	290.000	9950.000
1st Quartile	153.000	1.000	0.030	7.000	260.000	7.000	0.120	5.000	1.000	45.000	20.000	0.070	10.000	10.000	18.000	10.000	45.000
Median	306.000	1.000	0.090	19.000	400.000	14.000	0.320	5.000	3.000	89.000	20.000	0.160	10.000	10.000	50.000	10.000	86.000
3rd Quartile	1093.750	1.000	0.240	40.000	580.000	30.000	0.620	5.000	10.000	152.000	20.000	0.270	10.000	10.000	115.000	10.000	166.000
Mean	1482.709	1.324	0.248	27.524	466.334	94.935	0.447	6.351	8.198	108.309	20.000	0.240	10.042	10.019	89.554	10.105	360.394
Standard deviation (n)	4550.571	1.337	0.427	33.959	355.395	367.142	0.474	7.165	10.594	88.880	0.000	0.286	0.889	0.431	109.457	3.880	974.496
Variation coefficient	3.069	1.010	1.725	1.234	0.762	3.867	1.060	1.128	1.292	0.821	0.000	1.188	0.089	0.043	1.222	0.384	2.704
Skewness (Pearson)	10.001	8.511	3.040	16.089	3.629	10.654	3.634	15.391	1.806	1.771		3.005	29.692	23.092	3.072	61.316	5.153
Kurtosis (Pearson)	149.067	99.660	10.346	655.053	23.610	160.712	37.729	324.700	2.080	6.598		11.097	1102.212	531.252	18.807	4243.224	31.128
Geometric mean	429.926	1.153	0.088	16.171	373.466	18.367	0.243	5.670	3.977	70.595	20.000	0.153	10.025	10.013	46.069	10.032	104.106
Geometric standard deviation	3.944	1.496	4.334	3.086	1.989	4.475	3.689	1.416	3.303	2.976	1.000	2.510	1.049	1.030	3.414	1.076	3.785

CHSCH: Chloritic Schist

Statistic	Mn_ppm	Mo_ppm	Na_%	Ni_ppm	P_ppm	Pb_ppm	S_%	Sb_ppm	Sc_ppm	Sr_ppm	Th_ppm	Ti_%	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn_ppm
No. of observations	222	222	222	222	222	222	222	222	222	222	222	222	222	222	222	222	222
No. of missing values	0	0	0	0	0	0	0	0	168	0	168	0	168	168	0	0	0
Minimum	98.000	1.000	0.010	1.000	130.000	2.000	0.010	5.000	1.000	6.000	20.000	0.010	10.000	10.000	3.000	10.000	11.000
Maximum	37600.0	11.000	3.510	310.000	3760.000	958.000	1.550	22.000	40.000	608.000	20.000	1.660	10.000	10.000	464.000	10.000	9310.000
1st Quartile	442.250	1.000	0.190	21.000	300.000	13.000	0.120	5.000	9.000	90.250	20.000	0.190	10.000	10.000	51.000	10.000	66.000
Median	608.500	1.000	0.420	28.500	460.000	19.000	0.245	5.000	13.000	135.000	20.000	0.290	10.000	10.000	76.500	10.000	81.500
3rd Quartile	1098.750	1.000	0.920	47.000	757.500	25.000	0.430	5.000	26.000	222.500	20.000	0.458	10.000	10.000	181.000	10.000	106.750
Mean	1112.356	1.293	0.644	39.595	667.162	31.338	0.336	5.649	17.667	169.590	20.000	0.406	10.000	10.000	121.640	10.000	236.640
Standard deviation (n)	2798.484	1.219	0.632	35.079	637.557	83.559	0.309	2.402	10.490	113.809	0.000	0.327	0.000	0.000	96.623	0.000	910.228
Variation coefficient	2.516	0.943	0.981	0.886	0.956	2.666	0.921	0.425	0.594	0.671	0.000	0.807	0.000	0.000	0.794	0.000	3.846
Skewness (Pearson)	10.772	5.796	1.670	3.483	2.593	8.835	1.546	4.870	0.571	1.440		1.762			1.221		7.980
Kurtosis (Pearson)	131.027	36.594	3.068	18.273	7.133	85.679	2.249	25.147	-0.806	2.335		2.511			0.545		68.081
Geometric mean	693.775	1.129	0.372	30.574	499.257	17.040	0.210	5.406	14.181	135.363	20.000	0.315	10.000	10.000	90.610	10.000	95.880
Geometric standard deviation	2.157	1.486	3.300	2.049	2.035	2.567	2.951	1.284	2.114	2.057	1.000	2.007	1.000	1.000	2.178	1.000	2.334

APPENDIX C1-1 Bellekeno Waste Rock Drillhole Database
Summary Statistics

Bellekeno Non-Mineralized Rock

CQTZT: Calcareous Quartzite

Statistic	Au_ppm	Ag_ppm	Al_%	As_ppm	Ba_ppm	Be_ppm	Bi_ppm	Ca_%	Cd_ppm	Co_ppm	Cr_ppm	Cu_ppm	Fe_%	Ga_ppm	K_%	La_ppm	Mg_%
No. of observations	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	0.010	0.500	0.140	5.000	10.000	0.500	2.000	0.030	0.500	1.000	1.000	1.000	0.340	10.000	0.030	10.000	0.020
Maximum	0.330	34.000	8.780	7480.000	1440.000	2.300	18.000	23.400	118.000	25.000	123.000	157.000	39.600	20.000	2.310	40.000	1.170
1st Quartile	0.010	0.500	0.560	5.000	120.000	0.500	2.000	1.120	0.500	1.000	30.000	4.000	0.670	10.000	0.150	10.000	0.100
Median	0.010	0.500	0.840	8.000	190.000	0.500	2.000	2.340	0.500	1.000	37.000	7.000	0.940	10.000	0.230	10.000	0.170
3rd Quartile	0.010	0.700	1.670	14.000	330.000	0.500	2.000	3.690	1.400	3.000	48.000	12.000	1.600	10.000	0.430	10.000	0.280
Mean	0.015	1.174	1.381	55.457	270.416	0.572	2.149	2.803	5.130	2.420	41.091	11.865	1.543	10.079	0.342	11.604	0.221
Standard deviation (n)	0.020	2.625	1.325	426.054	235.243	0.216	1.095	2.428	15.171	2.801	16.590	15.687	2.736	0.886	0.310	4.494	0.185
Variation coefficient	1.364	2.235	0.960	7.683	0.870	0.377	0.510	0.866	2.957	1.157	0.404	1.322	1.772	0.088	0.906	0.387	0.838
Skewness (Pearson)	9.827	7.763	2.225	14.165	2.073	3.935	10.879	2.100	4.675	4.050	1.573	4.066	10.005	11.102	2.363	3.137	1.990
Kurtosis (Pearson)	127.521	77.007	5.532	219.762	4.827	17.846	132.661	10.402	24.053	22.297	3.527	23.386	120.600	121.258	7.143	10.717	4.874
Geometric mean	0.012	0.702	0.995	10.420	200.740	0.550	2.072	1.707	1.066	1.739	38.060	7.518	1.094	10.055	0.254	11.076	0.165
Geometric standard deviation	1.616	2.070	2.156	2.834	2.156	1.286	1.222	3.349	3.918	2.051	1.523	2.422	1.978	1.063	2.110	1.313	2.175

CSCH: Carcareous Schist

Statistic	Au_ppm	Ag_ppm	Al_%	As_ppm	Ba_ppm	Be_ppm	Bi_ppm	Ca_%	Cd_ppm	Co_ppm	Cr_ppm	Cu_ppm	Fe_%	Ga_ppm	K_%	La_ppm	Mg_%
No. of observations	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	0.010	0.500	1.690	5.000	70.000	0.500	2.000	1.670	0.500	1.000	30.000	5.000	1.080	10.000	0.330	10.000	0.230
Maximum	0.040	5.200	9.470	43.000	1560.000	2.300	2.000	9.560	1.700	32.000	129.000	170.000	7.110	20.000	2.120	40.000	0.950
1st Quartile	0.010	0.500	5.370	8.750	635.000	1.300	2.000	2.510	0.500	6.000	84.500	18.750	2.753	10.000	1.188	20.000	0.518
Median	0.010	0.500	6.955	12.500	910.000	1.700	2.000	3.270	0.500	9.000	101.000	22.000	3.525	15.000	1.365	30.000	0.670
3rd Quartile	0.010	0.800	8.158	18.000	1145.000	2.025	2.000	5.153	0.500	11.000	113.250	26.000	4.758	20.000	1.570	30.000	0.730
Mean	0.011	0.892	6.701	13.889	872.778	1.642	2.000	3.877	0.581	9.056	97.306	25.611	3.732	15.000	1.318	28.889	0.630
Standard deviation (n)	0.005	0.946	1.888	8.144	341.041	0.465	0.000	1.833	0.273	5.060	21.038	25.000	1.265	5.000	0.347	8.089	0.145
Variation coefficient	0.464	1.061	0.282	0.586	0.391	0.283	0.000	0.473	0.470	0.559	0.216	0.976	0.339	0.333	0.264	0.280	0.230
Skewness (Pearson)	5.031	3.332	-0.475	1.589	-0.452	-0.501		1.040	3.452	2.339	-0.854	5.315	0.342	0.000	-0.763	-0.425	-0.561
Kurtosis (Pearson)	24.709	10.952	-0.348	3.446	-0.424	-0.553		0.728	10.483	9.203	0.882	27.929	-0.205	-2.000	1.229	-0.233	0.329
Geometric mean	0.011	0.696	6.365	11.856	769.205	1.560	2.000	3.495	0.547	7.811	94.376	21.752	3.503	14.142	1.254	27.495	0.610
Geometric standard deviation	1.291	1.797	1.425	1.783	1.835	1.416	1.000	1.581	1.345	1.810	1.314	1.633	1.455	1.421	1.430	1.409	1.317

APPENDIX C1-1 Bellekeno Waste Rock Drillhole Database
Summary Statistics

Bellekeno Non-Mineralized Rock

CQTZT: Calcareous Quartzite

Statistic	Mn_ppm	Mo_ppm	Na_%	Ni_ppm	P_ppm	Pb_ppm	S_%	Sb_ppm	Sc_ppm	Sr_ppm	Th_ppm	Ti_%	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn_ppm
No. of observations	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505	505
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	35.000	1.000	0.010	1.000	20.000	2.000	0.010	5.000	1.000	2.000	20.000	0.010	10.000	10.000	5.000	10.000	7.000
Maximum	100000.0	5.000	0.920	61.000	2560.000	5430.000	10.000	158.000	21.000	833.000	20.000	0.410	50.000	20.000	281.000	20.000	9920.000
1st Quartile	117.000	1.000	0.010	4.000	260.000	6.000	0.110	5.000	1.000	40.000	20.000	0.050	10.000	10.000	10.000	10.000	25.000
Median	190.000	1.000	0.020	7.000	320.000	11.000	0.200	5.000	2.000	73.000	20.000	0.070	10.000	10.000	17.000	10.000	49.000
3rd Quartile	588.000	1.000	0.060	12.000	480.000	40.000	0.390	5.000	3.000	118.000	20.000	0.110	10.000	10.000	32.000	10.000	174.000
Mean	1870.836	1.071	0.051	9.754	385.723	87.727	0.322	6.083	2.721	88.693	20.000	0.091	10.119	10.040	27.323	10.020	471.089
Standard deviation (n)	7831.206	0.392	0.075	8.722	232.342	347.706	0.540	7.805	2.713	74.702	0.000	0.066	1.987	0.628	28.799	0.445	1333.664
Variation coefficient	4.186	0.366	1.476	0.894	0.602	3.964	1.675	1.283	0.997	0.842	0.000	0.729	0.196	0.063	1.054	0.044	2.831
Skewness (Pearson)	9.784	6.769	5.503	2.186	3.892	10.583	12.159	15.574	2.531	2.771		2.144	18.007	15.796	3.182	22.405	4.486
Kurtosis (Pearson)	109.803	52.174	46.785	6.110	29.707	138.119	204.227	285.899	7.934	19.350		5.209	338.532	247.504	15.908	500.002	22.145
Geometric mean	322.932	1.040	0.030	7.003	335.889	16.960	0.205	5.439	1.968	59.764	20.000	0.075	10.054	10.027	19.128	10.014	81.499
Geometric standard deviation	4.555	1.221	2.608	2.303	1.713	4.671	2.534	1.375	2.104	2.791	1.000	1.809	1.090	1.045	2.224	1.031	5.057

CSCH: Carcareous Schist

Statistic	Mn_ppm	Mo_ppm	Na_%	Ni_ppm	P_ppm	Pb_ppm	S_%	Sb_ppm	Sc_ppm	Sr_ppm	Th_ppm	Ti_%	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn_ppm
No. of observations	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	96.000	1.000	0.020	11.000	410.000	8.000	0.180	5.000	3.000	76.000	20.000	0.080	10.000	10.000	28.000	10.000	54.000
Maximum	1620.000	2.000	0.390	58.000	1340.000	335.000	2.590	8.000	33.000	420.000	20.000	0.500	10.000	10.000	312.000	10.000	224.000
1st Quartile	172.000	1.000	0.158	31.000	797.500	16.000	0.278	5.000	9.000	224.750	20.000	0.278	10.000	10.000	100.250	10.000	95.250
Median	254.500	1.000	0.270	42.500	975.000	19.000	0.460	5.000	12.000	263.500	20.000	0.325	10.000	10.000	128.000	10.000	110.500
3rd Quartile	302.000	1.000	0.350	51.000	1142.500	25.250	1.163	5.000	15.250	310.750	20.000	0.393	10.000	10.000	148.750	10.000	133.000
Mean	293.333	1.083	0.250	40.583	961.111	31.278	0.773	5.389	12.611	269.472	20.000	0.325	10.000	10.000	124.111	10.000	115.944
Standard deviation (n)	250.705	0.276	0.101	11.762	219.959	54.226	0.700	0.859	4.957	71.828	0.000	0.092	0.000	0.000	45.671	0.000	33.184
Variation coefficient	0.855	0.255	0.403	0.290	0.229	1.734	0.905	0.159	0.393	0.267	0.000	0.284	0.000	0.000	0.368	0.000	0.286
Skewness (Pearson)	4.154	3.015	-0.456	-0.508	-0.183	4.982	1.273	2.056	1.638	-0.016		-0.156			1.545		1.262
Kurtosis (Pearson)	18.979	7.091	-0.943	-0.560	-0.628	24.534	0.257	2.826	5.687	0.144		-0.057			5.868		2.331
Geometric mean	246.708	1.059	0.219	38.445	933.471	21.334	0.544	5.332	11.708	258.381	20.000	0.309	10.000	10.000	115.922	10.000	111.692
Geometric standard deviation	1.695	1.214	1.855	1.435	1.289	1.927	2.266	1.152	1.499	1.369	1.000	1.416	1.000	1.000	1.483	1.000	1.316

APPENDIX C1-1 Bellekeno Waste Rock Drillhole Database
Summary Statistics

Bellekeno Non-Mineralized Rock

GNST: Greenstone

Statistic	Au_ppm	Ag_ppm	Al_%	As_ppm	Ba_ppm	Be_ppm	Bi_ppm	Ca_%	Cd_ppm	Co_ppm	Cr_ppm	Cu_ppm	Fe_%	Ga_ppm	K_%	La_ppm	Mg_%
No. of observations	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0	86	0	86	0
Minimum	0.010	0.500	1.910	5.000	10.000	0.500	2.000	0.220	0.500	1.000	1.000	1.000	1.190	10.000	0.010	10.000	0.290
Maximum	0.460	79.400	13.900	518.000	6790.000	4.100	9.000	10.800	64.200	59.000	511.000	753.000	17.150	40.000	6.360	60.000	5.430
1st Quartile	0.010	0.500	7.105	5.000	80.000	0.500	2.000	5.360	0.500	33.000	26.500	142.000	7.450	20.000	0.120	10.000	2.395
Median	0.010	0.500	7.930	6.000	140.000	0.500	2.000	7.080	0.500	39.000	98.000	173.000	8.220	20.000	0.180	10.000	3.300
3rd Quartile	0.010	0.700	8.405	13.000	355.000	0.800	2.000	7.745	0.500	41.000	163.500	209.500	9.380	20.000	0.430	10.000	3.935
Mean	0.015	1.838	7.659	14.062	426.420	0.756	2.235	6.378	2.822	35.880	101.637	184.501	8.565	18.420	0.505	10.769	3.104
Standard deviation (n)	0.029	6.608	1.147	30.185	780.456	0.506	0.902	1.934	8.333	8.936	80.624	104.769	2.289	4.373	0.800	4.329	1.034
Variation coefficient	1.949	3.595	0.150	2.147	1.830	0.669	0.404	0.303	2.952	0.249	0.793	0.568	0.267	0.237	1.584	0.402	0.333
Skewness (Pearson)	11.703	8.003	-0.888	11.082	3.616	3.094	4.733	-1.236	4.512	-1.382	0.913	1.884	0.490	-0.609	2.881	7.481	-0.561
Kurtosis (Pearson)	157.542	74.100	3.672	159.431	15.616	11.719	24.501	1.033	21.022	2.111	1.853	6.167	1.199	1.913	9.756	63.752	-0.395
Geometric mean	0.012	0.728	7.556	8.837	179.005	0.666	2.144	5.828	0.805	34.020	52.273	152.271	8.239	17.782	0.226	10.425	2.862
Geometric standard deviation	1.580	2.371	1.192	2.151	3.365	1.561	1.276	1.702	3.027	1.479	4.751	2.128	1.340	1.327	3.404	1.229	1.578

GSCH: Graphitic Schist

Statistic	Au_ppm	Ag_ppm	Al_%	As_ppm	Ba_ppm	Be_ppm	Bi_ppm	Ca_%	Cd_ppm	Co_ppm	Cr_ppm	Cu_ppm	Fe_%	Ga_ppm	K_%	La_ppm	Mg_%
No. of observations	870	870	870	870	870	870	870	870	870	870	870	870	870	870	870	870	870
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0	747	0	747	0
Minimum	0.010	0.500	0.150	5.000	20.000	0.500	2.000	0.030	0.500	1.000	5.000	2.000	0.120	10.000	0.010	10.000	0.030
Maximum	0.470	13.900	11.250	812.000	6400.000	2.900	6.000	22.400	62.600	75.000	1240.000	246.000	10.300	30.000	3.730	40.000	12.450
1st Quartile	0.010	0.500	3.625	6.000	680.000	0.900	2.000	0.290	0.500	6.000	56.000	24.000	2.190	10.000	0.670	20.000	0.380
Median	0.010	0.500	5.115	11.000	1020.000	1.300	2.000	0.480	0.500	8.000	73.000	34.000	2.840	20.000	1.055	20.000	0.520
3rd Quartile	0.010	0.600	6.448	18.000	1330.000	1.600	2.000	1.018	0.800	11.000	91.000	45.000	3.460	20.000	1.490	30.000	0.710
Mean	0.013	0.719	5.110	16.957	1059.103	1.302	2.103	0.928	0.913	8.761	78.548	36.929	2.930	15.610	1.133	24.797	0.647
Standard deviation (n)	0.024	0.877	2.039	35.156	573.826	0.493	0.413	1.481	2.639	4.775	54.600	20.041	1.122	6.001	0.593	9.401	0.785
Variation coefficient	1.771	1.220	0.399	2.073	0.542	0.378	0.197	1.596	2.892	0.545	0.695	0.543	0.383	0.384	0.523	0.379	1.213
Skewness (Pearson)	14.461	8.267	0.172	15.427	2.103	0.410	4.895	7.740	17.150	4.078	12.623	2.431	1.185	0.555	0.767	0.147	9.697
Kurtosis (Pearson)	230.865	89.899	-0.090	313.348	11.633	-0.086	27.688	92.360	359.523	45.057	243.700	15.907	4.355	-0.611	0.560	-0.880	122.155
Geometric mean	0.011	0.601	4.603	11.662	913.060	1.204	2.077	0.562	0.655	7.694	71.260	32.220	2.714	14.513	0.967	22.829	0.517
Geometric standard deviation	1.456	1.565	1.670	2.062	1.806	1.509	1.154	2.522	1.690	1.713	1.514	1.727	1.514	1.465	1.856	1.534	1.838

APPENDIX C1-1 Bellekeno Waste Rock Drillhole Database
Summary Statistics

Bellekeno Non-Mineralized Rock

GNST: Greenstone

Statistic	Mn_ppm	Mo_ppm	Na_%	Ni_ppm	P_ppm	Pb_ppm	S_%	Sb_ppm	Sc_ppm	Sr_ppm	Th_ppm	Ti_%	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn_ppm
No. of observations	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567	567
No. of missing values	0	0	0	0	0	0	0	0	86	0	86	0	86	86	0	0	0
Minimum	144.000	1.000	0.010	1.000	320.000	2.000	0.010	5.000	7.000	2.000	20.000	0.130	10.000	10.000	25.000	10.000	45.000
Maximum	50400.000	6.000	4.250	190.000	4270.000	3540.000	1.830	83.000	45.000	823.000	20.000	2.380	30.000	20.000	1070.000	60.000	7110.000
1st Quartile	1257.500	1.000	0.875	42.000	530.000	2.000	0.010	5.000	32.000	187.500	20.000	0.760	10.000	10.000	272.000	10.000	90.000
Median	1440.000	1.000	1.430	74.000	630.000	5.000	0.030	5.000	35.000	215.000	20.000	0.890	10.000	10.000	300.000	10.000	111.000
3rd Quartile	1842.500	1.000	1.620	100.000	790.000	15.500	0.070	8.000	37.000	246.000	20.000	1.075	10.000	10.000	339.000	10.000	158.000
Mean	2952.674	1.131	1.259	70.783	822.011	94.605	0.082	8.187	33.994	220.056	20.000	0.975	10.187	10.125	312.614	10.141	357.774
Standard deviation (n)	5798.270	0.542	0.637	35.924	573.017	352.846	0.174	8.126	5.160	98.212	0.000	0.372	1.501	1.110	135.399	2.296	864.728
Variation coefficient	1.964	0.479	0.506	0.508	0.697	3.730	2.133	0.993	0.152	0.446	0.000	0.381	0.147	0.110	0.433	0.226	2.417
Skewness (Pearson)	5.059	5.878	-0.178	-0.038	3.002	6.210	5.235	5.646	-2.009	1.839		1.199	8.852	8.785	2.120	19.344	4.514
Kurtosis (Pearson)	27.728	41.556	0.869	-0.551	10.055	45.682	35.203	40.557	6.264	9.131		1.645	86.786	75.179	8.383	399.743	21.568
Geometric mean	1771.247	1.075	0.892	55.405	716.882	9.080	0.033	6.825	33.429	190.137	20.000	0.910	10.124	10.087	284.544	10.063	154.935
Geometric standard deviation	2.129	1.299	3.249	2.471	1.587	5.724	3.232	1.645	1.228	2.019	1.000	1.461	1.102	1.080	1.606	1.097	2.581

GSCH: Graphitic Schist

Statistic	Mn_ppm	Mo_ppm	Na_%	Ni_ppm	P_ppm	Pb_ppm	S_%	Sb_ppm	Sc_ppm	Sr_ppm	Th_ppm	Ti_%	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn_ppm
No. of observations	870	870	870	870	870	870	870	870	870	870	870	870	870	870	870	870	870
No. of missing values	0	0	0	0	0	0	0	0	747	0	747	0	747	747	0	0	0
Minimum	53.000	1.000	0.010	1.000	20.000	2.000	0.010	5.000	2.000	11.000	20.000	0.010	10.000	10.000	3.000	10.000	6.000
Maximum	15600.000	28.000	2.510	1560.000	3810.000	1310.000	3.370	33.000	33.000	485.000	20.000	0.760	10.000	10.000	552.000	20.000	4880.000
1st Quartile	151.000	1.000	0.140	30.000	370.000	11.000	0.400	5.000	8.000	80.000	20.000	0.190	10.000	10.000	75.000	10.000	67.000
Median	244.000	1.000	0.220	42.000	535.000	15.000	0.720	5.000	11.000	102.000	20.000	0.260	10.000	10.000	123.500	10.000	101.000
3rd Quartile	399.750	2.000	0.290	52.000	670.000	20.000	1.038	5.000	15.000	145.000	20.000	0.330	10.000	10.000	205.000	10.000	152.750
Mean	418.795	1.676	0.236	46.423	555.460	22.275	0.754	5.669	11.553	120.784	20.000	0.262	10.000	10.000	143.371	10.011	130.859
Standard deviation (n)	996.016	1.842	0.177	60.768	272.789	67.275	0.490	2.151	5.009	62.998	0.000	0.103	0.000	0.000	84.742	0.339	213.051
Variation coefficient	2.378	1.099	0.752	1.309	0.491	3.020	0.649	0.379	0.434	0.522	0.000	0.392	0.000	0.000	0.591	0.034	1.628
Skewness (Pearson)	11.116	6.952	5.977	18.999	2.839	13.184	1.158	5.465	0.654	1.719		0.697			0.809	29.445	15.240
Kurtosis (Pearson)	145.124	69.671	64.630	448.608	24.065	201.916	2.915	42.552	1.273	4.138		1.667			0.485	865.001	300.393
Geometric mean	266.091	1.364	0.195	38.955	499.526	14.695	0.568	5.460	10.384	107.480	20.000	0.240	10.000	10.000	117.620	10.008	100.874
Geometric standard deviation	2.134	1.699	1.908	1.733	1.606	1.910	2.433	1.267	1.638	1.619	1.000	1.579	1.000	1.000	1.964	1.024	1.900

APPENDIX C1-1 Bellekeno Waste Rock Drillhole Database
Summary Statistics

Bellekeno Non-Mineralized Rock

PHY: Phyllite

Statistic	Au_ppm	Ag_ppm	Al_%	As_ppm	Ba_ppm	Be_ppm	Bi_ppm	Ca_%	Cd_ppm	Co_ppm	Cr_ppm	Cu_ppm	Fe_%	Ga_ppm	K_%	La_ppm	Mg_%
No. of observations	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	0.010	0.500	3.920	5.000	400.000	0.800	2.000	0.040	0.500	1.000	56.000	6.000	1.720	10.000	0.620	20.000	0.160
Maximum	0.030	0.700	7.840	15.000	1630.000	1.800	2.000	2.990	4.800	8.000	95.000	36.000	3.240	20.000	1.440	30.000	0.610
1st Quartile	0.010	0.500	4.060	5.000	860.000	1.000	2.000	0.050	0.500	2.000	58.000	13.000	2.060	10.000	0.760	20.000	0.260
Median	0.020	0.500	4.270	7.000	1060.000	1.400	2.000	0.050	0.500	4.000	67.000	14.000	2.180	10.000	0.800	20.000	0.320
3rd Quartile	0.030	0.500	6.050	8.000	1280.000	1.500	2.000	0.580	0.600	5.000	74.000	15.000	2.670	20.000	1.030	20.000	0.540
Mean	0.020	0.540	5.228	8.000	1046.000	1.300	2.000	0.742	1.380	4.000	70.000	16.800	2.374	14.000	0.930	22.000	0.378
Standard deviation (n)	0.009	0.080	1.516	3.688	411.806	0.358	0.000	1.143	1.710	2.449	14.071	10.107	0.529	4.899	0.287	4.000	0.170
Variation coefficient	0.447	0.148	0.290	0.461	0.394	0.275	0.000	1.540	1.239	0.612	0.201	0.602	0.223	0.350	0.309	0.182	0.450
Skewness (Pearson)	0.000	1.500	0.784	1.148	-0.183	-0.079		1.386	1.498	0.408	0.803	1.111	0.482	0.408	0.818	1.500	0.184
Kurtosis (Pearson)	-1.750	0.250	-1.007	-0.228	-0.951	-1.354		0.077	0.247	-1.033	-0.704	-0.130	-1.055	-1.833	-0.699	0.250	-1.559
Geometric mean	0.018	0.535	5.031	7.319	946.787	1.248	2.000	0.177	0.815	3.170	68.696	14.260	2.317	13.195	0.890	21.689	0.338
Geometric standard deviation	1.739	1.162	1.353	1.571	1.710	1.387	1.000	6.849	2.703	2.261	1.238	1.889	1.277	1.462	1.383	1.199	1.729

QTZT: Quartzite

Statistic	Au_ppm	Ag_ppm	Al_%	As_ppm	Ba_ppm	Be_ppm	Bi_ppm	Ca_%	Cd_ppm	Co_ppm	Cr_ppm	Cu_ppm	Fe_%	Ga_ppm	K_%	La_ppm	Mg_%
No. of observations	3293	3293	3293	3293	3293	3293	3293	3293	3293	3293	3293	3293	3293	3293	3293	3293	3293
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0	890	0	890	0
Minimum	0.010	0.500	0.130	5.000	10.000	0.500	2.000	0.010	0.500	1.000	3.000	1.000	0.230	10.000	0.010	10.000	0.010
Maximum	3.160	90.700	10.350	10000.000	3650.000	2.500	27.000	12.550	120.000	42.000	223.000	933.000	30.800	30.000	3.690	40.000	3.440
1st Quartile	0.010	0.500	0.560	5.000	100.000	0.500	2.000	0.300	0.500	1.000	35.000	6.000	0.780	10.000	0.150	10.000	0.090
Median	0.010	0.500	1.210	9.000	230.000	0.500	2.000	0.990	0.500	2.000	42.000	9.000	1.270	10.000	0.310	10.000	0.180
3rd Quartile	0.010	1.000	2.530	20.000	490.000	0.700	2.000	2.260	2.900	4.000	54.000	18.000	2.070	10.000	0.590	10.000	0.320
Mean	0.018	1.664	1.812	64.542	357.965	0.644	2.115	1.530	5.618	3.257	46.896	15.972	1.669	10.183	0.427	11.973	0.242
Standard deviation (n)	0.079	4.595	1.659	454.399	365.606	0.295	0.933	1.604	13.906	3.457	18.223	25.754	1.573	1.371	0.374	4.804	0.252
Variation coefficient	4.468	2.761	0.916	7.040	1.021	0.457	0.441	1.048	2.475	1.061	0.389	1.612	0.943	0.135	0.875	0.401	1.041
Skewness (Pearson)	28.757	9.729	1.547	16.451	2.196	2.531	17.485	1.667	4.085	3.798	1.942	16.465	5.965	7.664	1.907	2.641	4.223
Kurtosis (Pearson)	978.856	130.082	2.162	319.028	7.894	6.823	392.334	3.490	18.925	24.449	8.973	509.926	69.479	61.036	5.421	7.378	34.123
Geometric mean	0.012	0.826	1.224	12.715	217.393	0.601	2.063	0.753	1.291	2.277	43.965	10.300	1.299	10.127	0.301	11.354	0.157
Geometric standard deviation	1.680	2.392	2.457	3.185	2.910	1.399	1.185	4.072	4.277	2.231	1.425	2.397	1.967	1.098	2.369	1.342	2.713

APPENDIX C1-1 Bellekeno Waste Rock Drillhole Database
Summary Statistics

Bellekeno Non-Mineralized Rock

PHY: Phyllite

Statistic	Mn_ppm	Mo_ppm	Na_%	Ni_ppm	P_ppm	Pb_ppm	S_%	Sb_ppm	Sc_ppm	Sr_ppm	Th_ppm	Ti_%	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn_ppm
No. of observations	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	110.000	1.000	0.220	14.000	300.000	5.000	0.020	5.000	6.000	55.000	20.000	0.150	10.000	10.000	65.000	10.000	40.000
Maximum	509.000	13.000	1.020	66.000	520.000	18.000	0.840	8.000	12.000	216.000	20.000	0.350	10.000	10.000	613.000	10.000	463.000
1st Quartile	159.000	1.000	0.260	22.000	380.000	9.000	0.020	5.000	7.000	90.000	20.000	0.210	10.000	10.000	83.000	10.000	53.000
Median	194.000	2.000	0.340	23.000	460.000	15.000	0.030	6.000	7.000	125.000	20.000	0.260	10.000	10.000	112.000	10.000	66.000
3rd Quartile	210.000	2.000	0.460	23.000	470.000	16.000	0.090	8.000	10.000	164.000	20.000	0.280	10.000	10.000	156.000	10.000	97.000
Mean	236.400	3.800	0.460	29.600	426.000	12.600	0.200	6.400	8.400	130.000	20.000	0.250	10.000	10.000	205.800	10.000	143.800
Standard deviation (n)	140.551	4.622	0.292	18.511	77.356	4.841	0.321	1.356	2.245	56.217	0.000	0.067	0.000	0.000	205.910	0.000	160.718
Variation coefficient	0.595	1.216	0.634	0.625	0.182	0.384	1.605	0.212	0.267	0.432	0.000	0.269	0.000	0.000	1.001	0.000	1.118
Skewness (Pearson)	1.273	1.465	1.225	1.369	-0.494	-0.485	1.476	0.212	0.556	0.213		-0.024			1.419		1.449
Kurtosis (Pearson)	-0.019	0.203	-0.144	0.104	-1.103	-1.354	0.216	-1.770	-1.304	-1.193		-1.009			0.137		0.180
Geometric mean	205.072	2.204	0.391	25.486	418.363	11.422	0.062	6.258	8.119	116.994	20.000	0.240	10.000	10.000	142.023	10.000	91.127
Geometric standard deviation	1.762	2.860	1.831	1.771	1.243	1.703	4.868	1.266	1.334	1.703	1.000	1.378	1.000	1.000	2.413	1.000	2.624

QTZT: Quartzite

Statistic	Mn_ppm	Mo_ppm	Na_%	Ni_ppm	P_ppm	Pb_ppm	S_%	Sb_ppm	Sc_ppm	Sr_ppm	Th_ppm	Ti_%	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn_ppm
No. of observations	3293	3293	3293	3293	3293	3293	3293	3293	3293	3293	3293	3293	3293	3293	3293	3293	3293
No. of missing values	0	0	0	0	0	0	0	0	890	0	890	0	890	890	0	0	0
Minimum	17.000	1.000	0.010	1.000	20.000	2.000	0.010	5.000	1.000	1.000	20.000	0.010	10.000	10.000	2.000	10.000	2.000
Maximum	86200.000	24.000	2.120	101.000	3170.000	8970.000	5.820	208.000	36.000	428.000	20.000	1.040	20.000	10.000	663.000	290.000	9950.000
1st Quartile	128.000	1.000	0.010	5.000	200.000	7.000	0.140	5.000	1.000	20.000	20.000	0.060	10.000	10.000	11.000	10.000	33.000
Median	242.000	1.000	0.040	9.000	310.000	13.000	0.310	5.000	2.000	57.000	20.000	0.090	10.000	10.000	24.000	10.000	68.000
3rd Quartile	1105.000	1.000	0.100	18.000	450.000	81.000	0.550	5.000	4.000	102.000	20.000	0.150	10.000	10.000	49.000	10.000	305.000
Mean	1739.010	1.220	0.072	13.777	345.333	138.784	0.410	6.470	3.074	69.702	20.000	0.116	10.012	10.000	37.105	10.173	479.543
Standard deviation (n)	4816.526	1.081	0.099	13.068	225.845	455.294	0.419	8.727	3.269	59.704	0.000	0.086	0.353	0.000	39.992	5.349	1138.569
Variation coefficient	2.770	0.886	1.377	0.949	0.654	3.281	1.021	1.349	1.063	0.857	0.000	0.742	0.035	0.000	1.078	0.526	2.374
Skewness (Pearson)	7.937	9.942	6.474	1.906	2.831	8.932	3.447	14.091	3.607	1.276		2.717	28.249		3.317	45.745	4.009
Kurtosis (Pearson)	96.369	136.359	89.170	4.556	21.927	113.042	24.473	254.601	21.444	2.185		15.402	796.001		25.434	2305.978	18.385
Geometric mean	404.231	1.102	0.040	9.028	281.801	23.424	0.243	5.631	2.160	43.056	20.000	0.093	10.009	10.000	23.253	10.045	106.123
Geometric standard deviation	4.694	1.405	2.965	2.638	1.965	5.633	3.323	1.442	2.201	3.088	1.000	1.918	1.025	1.000	2.687	1.098	4.985

APPENDIX C1-1 Bellekeno Waste Rock Drillhole Database
Summary Statistics

Bellekeno Non-Mineralized Rock

SCH: Schist

Statistic	Au_ppm	Ag_ppm	Al_%	As_ppm	Ba_ppm	Be_ppm	Bi_ppm	Ca_%	Cd_ppm	Co_ppm	Cr_ppm	Cu_ppm	Fe_%	Ga_ppm	K_%	La_ppm	Mg_%
No. of observations	775	775	775	775	775	775	775	775	775	775	775	775	775	775	775	775	775
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0	147	0	147	0
Minimum	0.010	0.500	0.170	5.000	10.000	0.500	2.000	0.020	0.500	1.000	3.000	2.000	0.130	10.000	0.010	10.000	0.050
Maximum	0.300	23.400	11.150	3150.000	3400.000	3.700	6.000	21.100	24.500	41.000	247.000	256.000	10.350	30.000	3.850	50.000	11.750
1st Quartile	0.010	0.500	3.375	6.000	570.000	0.900	2.000	0.440	0.500	5.000	53.000	19.000	2.150	10.000	0.630	10.000	0.350
Median	0.010	0.500	5.030	10.000	900.000	1.200	2.000	0.900	0.500	8.000	70.000	28.000	2.770	10.000	0.950	20.000	0.510
3rd Quartile	0.010	0.600	6.625	16.000	1225.000	1.600	2.000	1.980	0.500	11.000	88.000	40.000	3.645	20.000	1.450	30.000	0.720
Mean	0.014	0.750	5.104	26.644	948.194	1.287	2.065	1.516	0.968	8.467	72.916	33.837	2.994	13.854	1.078	22.325	0.621
Standard deviation (n)	0.016	1.159	2.241	141.371	523.324	0.550	0.306	1.758	2.321	5.044	27.137	25.205	1.325	5.275	0.586	9.544	0.620
Variation coefficient	1.105	1.546	0.439	5.306	0.552	0.428	0.148	1.159	2.396	0.596	0.372	0.745	0.443	0.381	0.544	0.428	0.999
Skewness (Pearson)	10.440	12.214	0.194	16.491	1.090	0.559	6.175	3.508	7.092	2.595	1.042	3.095	1.361	0.890	0.842	0.357	9.184
Kurtosis (Pearson)	155.092	202.576	-0.591	326.764	2.292	0.031	50.066	23.237	54.451	12.634	3.098	15.696	3.723	-0.368	0.609	-0.610	139.164
Geometric mean	0.012	0.609	4.515	11.341	790.979	1.167	2.049	0.913	0.621	7.225	67.999	27.656	2.722	12.984	0.908	20.175	0.505
Geometric standard deviation	1.543	1.591	1.723	2.285	1.976	1.579	1.116	2.827	1.821	1.808	1.474	1.882	1.570	1.419	1.930	1.594	1.820

SSCH: Sericitic Schist

Statistic	Au_ppm	Ag_ppm	Al_%	As_ppm	Ba_ppm	Be_ppm	Bi_ppm	Ca_%	Cd_ppm	Co_ppm	Cr_ppm	Cu_ppm	Fe_%	Ga_ppm	K_%	La_ppm	Mg_%
No. of observations	205	205	205	205	205	205	205	205	205	205	205	205	205	205	205	205	205
No. of missing values	0	0	0	0	0	0	0	0	0	0	0	0	0	150	0	150	0
Minimum	0.010	0.500	0.390	5.000	30.000	0.500	2.000	0.150	0.500	3.000	12.000	5.000	0.920	10.000	0.130	10.000	0.130
Maximum	0.080	38.800	10.300	390.000	7620.000	3.200	6.000	20.500	144.000	40.000	203.000	276.000	9.300	30.000	4.570	40.000	4.530
1st Quartile	0.010	0.500	5.140	5.000	630.000	1.100	2.000	0.730	0.500	9.000	40.000	22.000	2.510	10.000	1.300	10.000	0.770
Median	0.010	0.500	6.310	6.000	860.000	1.400	2.000	1.720	0.500	12.000	51.000	35.000	3.150	10.000	2.020	20.000	0.890
3rd Quartile	0.010	0.500	7.280	15.000	1240.000	1.700	2.000	4.150	0.500	15.000	68.000	63.000	3.950	20.000	2.460	30.000	1.190
Mean	0.012	0.970	6.133	19.166	1179.171	1.421	2.337	2.814	2.349	13.273	61.249	49.249	3.476	14.000	1.911	20.182	1.133
Standard deviation (n)	0.008	2.894	1.597	44.867	1110.368	0.487	0.843	2.769	11.776	7.068	33.008	41.080	1.384	5.257	0.827	9.998	0.722
Variation coefficient	0.662	2.983	0.260	2.341	0.942	0.343	0.361	0.984	5.013	0.532	0.539	0.834	0.398	0.376	0.433	0.495	0.637
Skewness (Pearson)	6.031	11.323	-0.323	6.119	3.057	0.390	2.912	2.090	10.087	1.500	1.876	2.206	1.330	0.781	-0.101	0.509	2.253
Kurtosis (Pearson)	41.772	140.897	0.408	42.234	11.645	0.561	8.280	7.633	109.756	2.139	3.839	6.423	1.829	-0.616	-0.259	-0.947	5.499
Geometric mean	0.011	0.619	5.861	9.666	887.065	1.331	2.240	1.739	0.700	11.747	54.644	37.634	3.240	13.126	1.656	17.767	0.979
Geometric standard deviation	1.378	1.819	1.408	2.473	2.097	1.462	1.300	2.834	2.497	1.633	1.590	2.057	1.449	1.424	1.866	1.674	1.686

APPENDIX C1-1 Bellekeno Waste Rock Drillhole Database
Summary Statistics

Bellekeno Non-Mineralized Rock

SCH: Schist

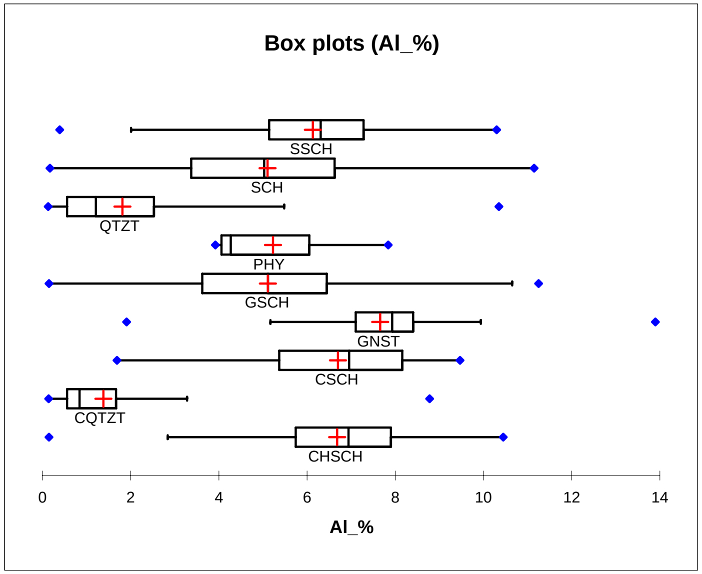
Statistic	Mn_ppm	Mo_ppm	Na_%	Ni_ppm	P_ppm	Pb_ppm	S_%	Sb_ppm	Sc_ppm	Sr_ppm	Th_ppm	Ti_%	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn_ppm
No. of observations	775	775	775	775	775	775	775	775	775	775	775	775	775	775	775	775	775
No. of missing values	0	0	0	0	0	0	0	0	147	0	147	0	147	147	0	0	0
Minimum	47.000	1.000	0.010	1.000	80.000	2.000	0.010	5.000	1.000	9.000	20.000	0.010	10.000	10.000	2.000	10.000	10.000
Maximum	20600.000	18.000	2.800	194.000	4670.000	2040.000	6.160	30.000	36.000	734.000	20.000	1.390	10.000	10.000	1620.000	20.000	2030.000
1st Quartile	192.000	1.000	0.120	26.000	360.000	10.000	0.260	5.000	7.000	88.000	20.000	0.170	10.000	10.000	66.000	10.000	62.500
Median	278.000	1.000	0.200	36.000	510.000	15.000	0.530	5.000	10.000	133.000	20.000	0.230	10.000	10.000	100.000	10.000	89.000
3rd Quartile	469.000	1.000	0.290	49.000	740.000	20.000	0.860	5.000	13.000	193.000	20.000	0.300	10.000	10.000	141.000	10.000	121.000
Mean	547.116	1.578	0.237	38.418	595.548	28.414	0.643	5.845	10.167	149.275	20.000	0.246	10.000	10.000	112.997	10.013	126.310
Standard deviation (n)	1334.902	1.668	0.202	17.679	362.697	95.595	0.549	2.286	5.048	83.232	0.000	0.117	0.000	0.000	92.314	0.359	192.656
Variation coefficient	2.440	1.057	0.851	0.460	0.609	3.364	0.854	0.391	0.496	0.558	0.000	0.476	0.000	0.000	0.817	0.036	1.525
Skewness (Pearson)	9.591	5.086	4.566	1.316	3.257	14.281	2.580	4.502	1.383	1.650		2.845			8.819	27.785	6.429
Kurtosis (Pearson)	110.925	32.525	40.361	7.531	24.796	264.957	14.955	28.329	4.624	5.503		19.405			127.369	770.001	46.655
Geometric mean	321.727	1.285	0.185	34.065	515.980	15.259	0.439	5.598	8.904	129.021	20.000	0.223	10.000	10.000	94.002	10.009	91.737
Geometric standard deviation	2.250	1.680	2.049	1.718	1.698	2.253	2.709	1.295	1.743	1.742	1.000	1.585	1.000	1.000	1.852	1.025	1.935

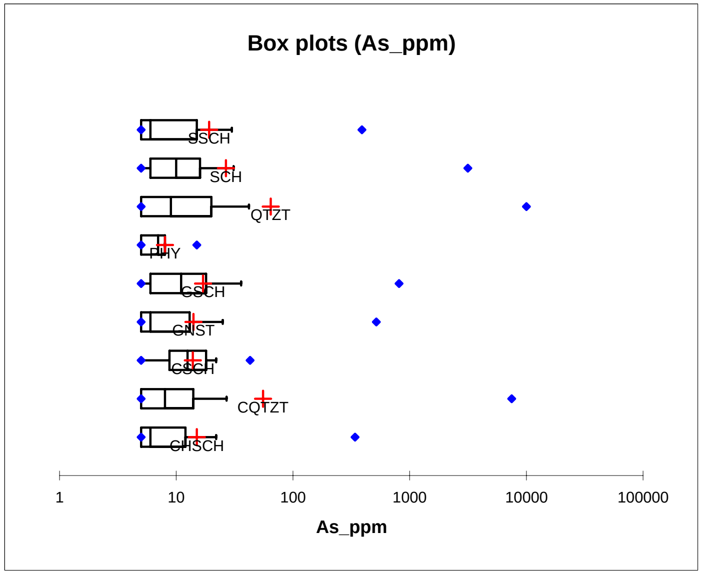
SSCH: Sericitic Schist

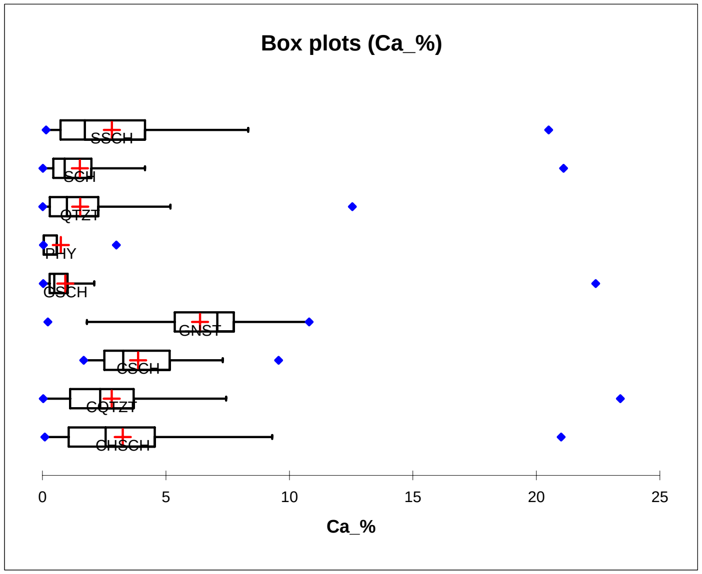
Statistic	Mn_ppm	Mo_ppm	Na_%	Ni_ppm	P_ppm	Pb_ppm	S_%	Sb_ppm	Sc_ppm	Sr_ppm	Th_ppm	Ti_%	Tl_ppm	U_ppm	V_ppm	W_ppm	Zn_ppm
No. of observations	205	205	205	205	205	205	205	205	205	205	205	205	205	205	205	205	205
No. of missing values	0	0	0	0	0	0	0	0	150	0	150	0	150	150	0	0	0
Minimum	50.000	1.000	0.010	4.000	70.000	2.000	0.040	5.000	1.000	4.000	20.000	0.040	10.000	10.000	8.000	10.000	15.000
Maximum	12500.000	22.000	2.090	189.000	1770.000	5530.000	2.220	29.000	31.000	852.000	20.000	0.890	10.000	10.000	1185.000	10.000	9920.000
1st Quartile	447.000	1.000	0.130	20.000	280.000	12.000	0.170	5.000	9.000	80.000	20.000	0.180	10.000	10.000	50.000	10.000	63.000
Median	673.000	1.000	0.330	29.000	360.000	17.000	0.280	5.000	12.000	122.000	20.000	0.220	10.000	10.000	70.000	10.000	80.000
3rd Quartile	958.000	1.000	0.650	47.000	530.000	23.000	0.490	5.000	21.000	218.000	20.000	0.300	10.000	10.000	106.000	10.000	105.000
Mean	1036.268	1.707	0.424	35.673	454.732	51.127	0.394	5.756	14.582	164.707	20.000	0.268	10.000	10.000	107.756	10.000	222.317
Standard deviation (n)	1434.008	2.815	0.361	22.706	289.938	385.087	0.357	2.594	7.852	125.104	0.000	0.146	0.000	0.000	135.084	0.000	876.379
Variation coefficient	1.384	1.649	0.852	0.636	0.638	7.532	0.905	0.451	0.539	0.760	0.000	0.543	0.000	0.000	1.254	0.000	3.942
Skewness (Pearson)	5.039	5.308	1.389	2.191	2.210	14.050	2.255	5.530	0.777	2.130		1.978			4.730		9.057
Kurtosis (Pearson)	29.977	29.547	2.585	9.525	5.786	196.885	5.960	37.561	-0.603	6.748		4.374			28.044		88.025
Geometric mean	714.813	1.228	0.277	30.007	391.532	17.511	0.286	5.489	12.459	129.108	20.000	0.239	10.000	10.000	77.174	10.000	92.981
Geometric standard deviation	2.158	1.780	2.777	1.810	1.692	2.314	2.238	1.298	1.842	2.052	1.000	1.602	1.000	1.000	2.069	1.000	2.346

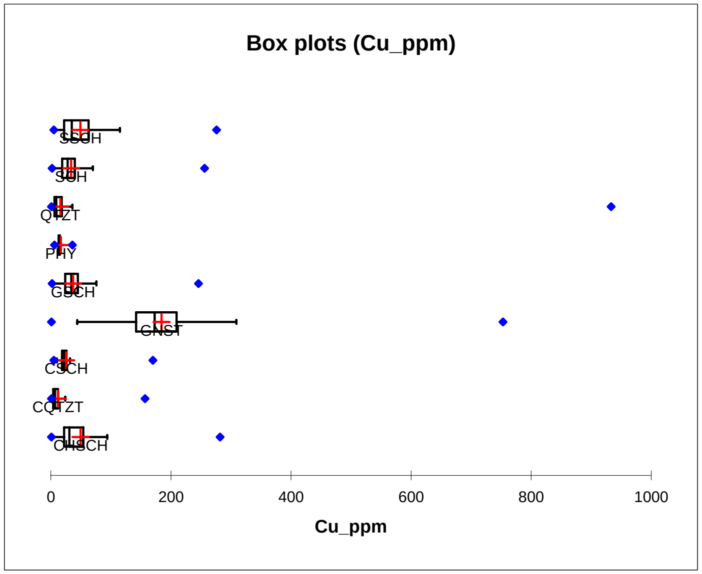
APPENDIX C2-1 Bellekeno Waste Rock Drillhole Database
ICP Metals by Lithology

Bellekeno Non-Mineralized Rock

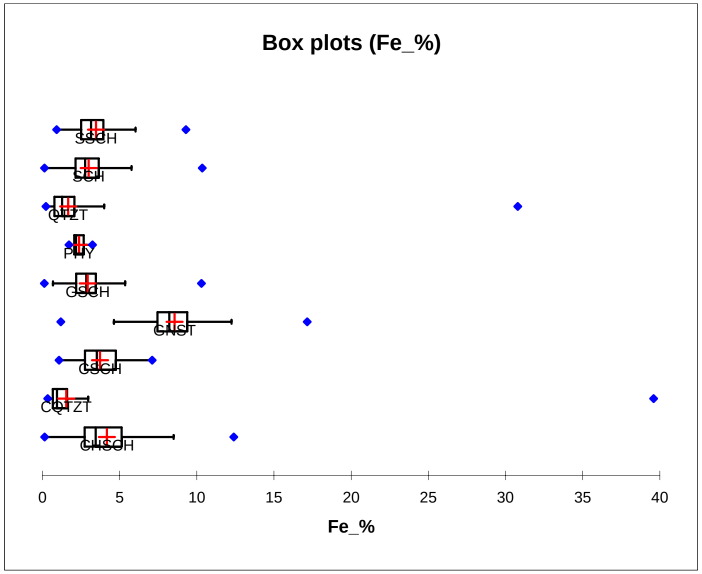


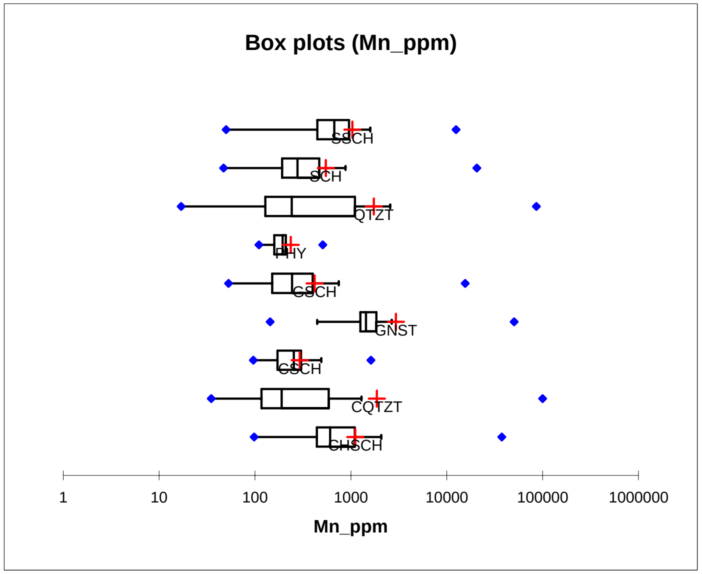


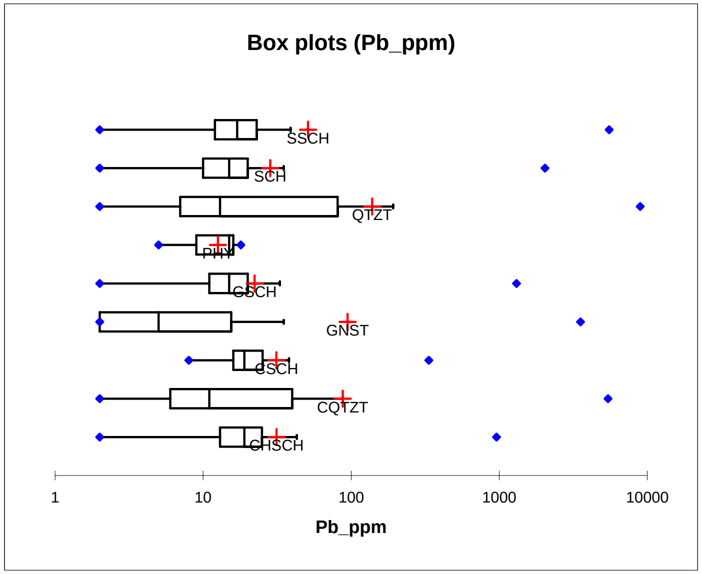


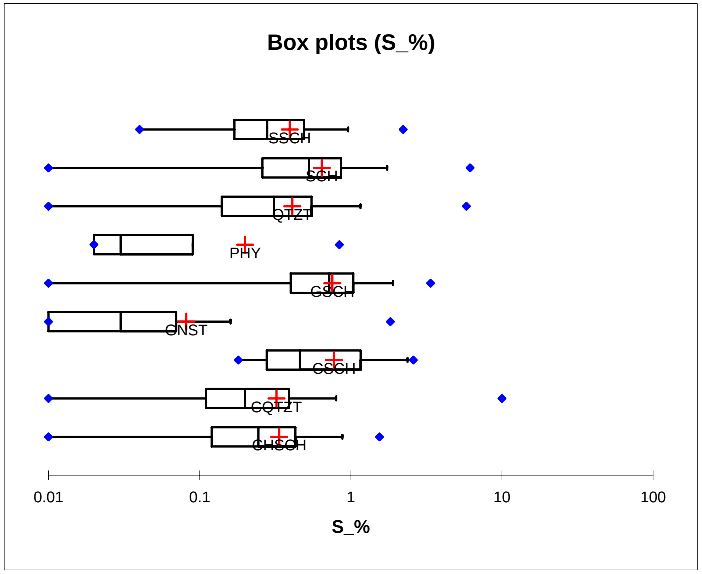


APPENDIX C2-1 Bellekeno Waste Rock Drillhole Database
ICP Metals by Lithology

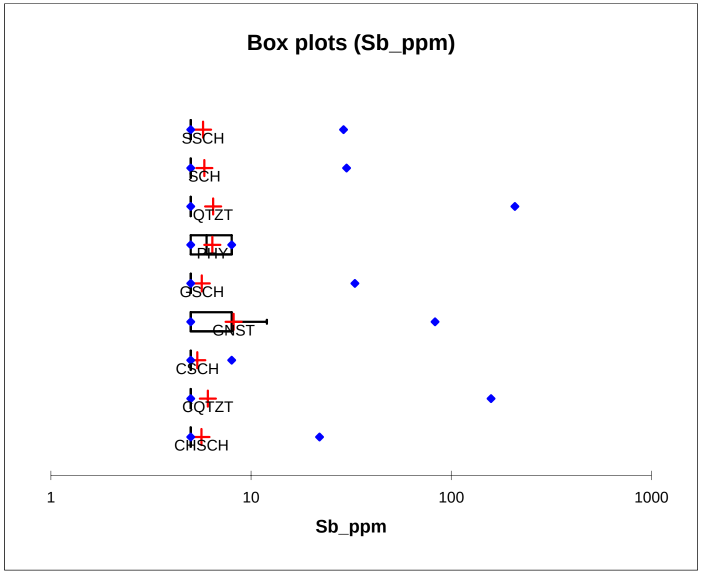


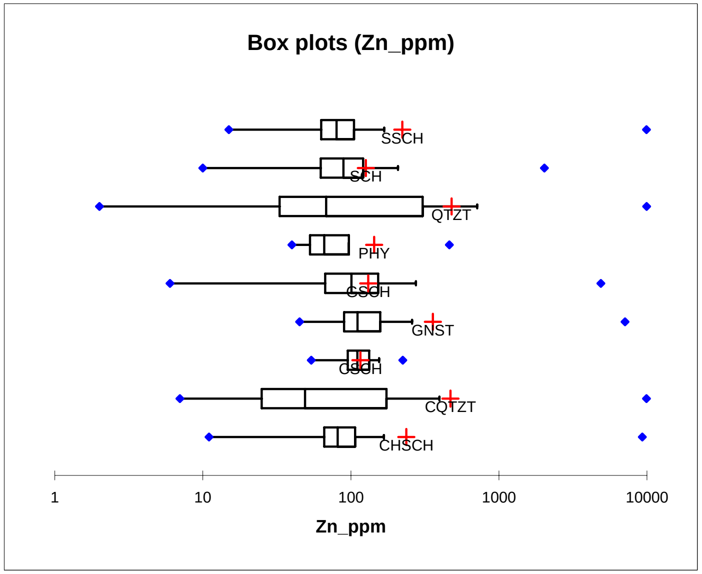






APPENDIX C2-1 Bellekeno Waste Rock Drillhole Database
ICP Metals by Lithology





ALEXCO KENO HILL MINING CORP.

QUARTZ MINING LICENCE QML-0009

2010 ANNUAL REPORT - RESUBMISSION

BELLEKENO MINE SITE

KENO HILL SILVER DISTRICT

YUKON

APPENDIX I

2010 REPORTABLE SPILL NOTICE

ALEXCO

December 16, 2010

Yukon Water Board
Suite 106, 419 Range Road
Whitehorse, YT Y1A 3V1

Attention: Ms. Carola Scheu, Water Board Manager

Dear Ms. Scheu:

Re: Alexco Keno Hill Mining Corporation – December 6, 2010 Spill Report

In accordance with the Alexco Keno Hill Mining Corporations (AHKM's) Water Use License QZ09-092 the following provides a summary of a spill of ferric chloride at the Bellekeno 625 water treatment location in the Keno Hill Silver District.

On the morning of Monday December 6th, the water treatment operator discovered that an accidental spillage of approximately 200L of ferric chloride had occurred at the Bellekeno 625 water treatment facility. The spill occurred within the reagent shed at this location as a result of corrosion of a brass fitting used to dispense the ferric chloride. The spilled ferric flowed onto the frozen ground within the shed and then underneath the edges of the building. The spilled material that exited the building mixed with snow and the resulting mixture froze in place. The approximate area covered by the spilled ferric chloride was estimated at approximately 4 m x 9 m with the volume of contaminated snow estimated at from 2 m^3 to 3 m^3. Pictures showing the spilled material are attached to this report.

Immediately following the discovery of the spill the area was flagged off to prevent personnel from spreading any of the contaminated snow. The effected fitting was replaced with a nylon fitting suitable for dispensing corrosive fluids such as ferric chloride. All other fittings and equipment in the system where inspected for suitability. The spilled material was all contained immediately adjacent to the reagent shed and there was no migration of ferric chloride or contaminated snow from this area.

Clean-up of the contaminated snow involved excavation of the snow to the ground surface with storage of the snow in a lined area adjacent to the treatment ponds. Future gradual disposal of the snow into Pond 1 of the treatment system is planned since the ferric chloride mixed with the snow is still useful for water treatment. Granular material is in the process of being placed into the reagent shed to minimize the potential for personnel to track any remaining ferric chloride on the ground within the building. The area outside the shed where the ferric chloride pooled will be assessed during the spring to determine if there is a need for the removal of any additional materials.

This event was verbally reported to Mr. Troy Searson, YG Water Resources on December 6, 2010 and to the Spill Report Line. Mr. William Leary of Energy Mines and Resources in Mayo attended the site on December 13, 2010 along with Mr. Rob Schneider (Care and Maintenance Supervisor).

If you have any questions concerning this matter, please contact me in our Whitehorse office at (867) 668-6463.

Sincerely,

ALEXCO KENO HILL MINING CORPORATION

DEC 16/10

Scott Davidson, M.Sc., P.Geo.
Senior Project Manager – Keno Hill Environmental Operations

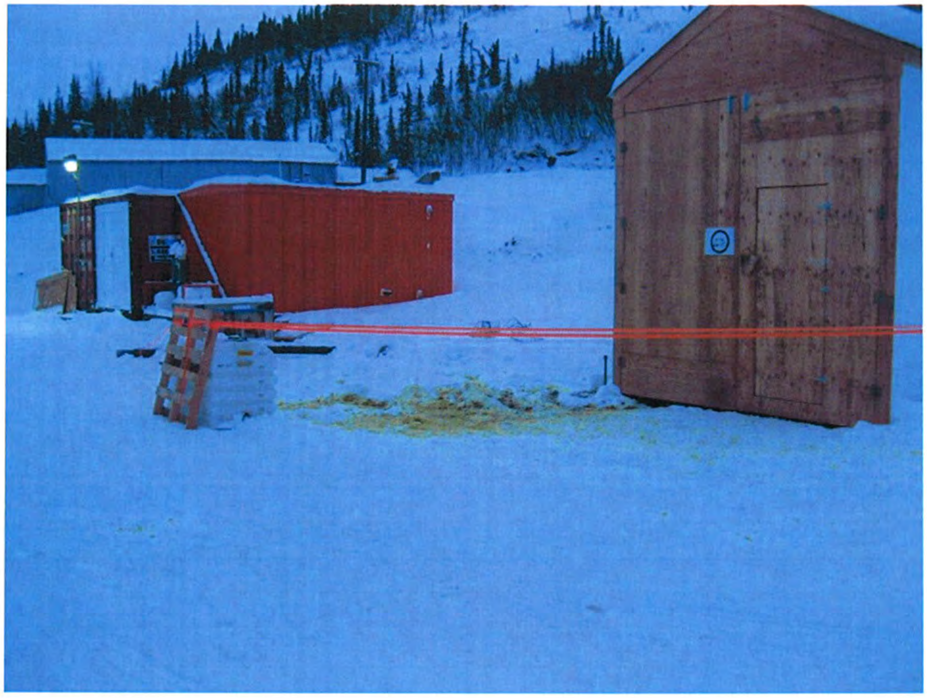
cc: Dennis Buyck, First Nation Na-cho N'yak Dun
Troy Searson, YG Water Resources
William Leary, YG EMR
Wade Comin, Environment Canada
Brad Thrall, Alexco Resources
Jim Harrington, Alexco Environmental Group
Tim Hall, Alexco Keno Hill Mining Corporation

BK625 Corroded Brass Fitting on Ferric Chloride Tank

BK 625 Ferric Chloride on Floor of Reagent Shed

BK625 Ferric Chloride Spillage Inside Reagent Shed

BK625 Ferric Chloride Mixed with Snow Outside of Reagent Shed



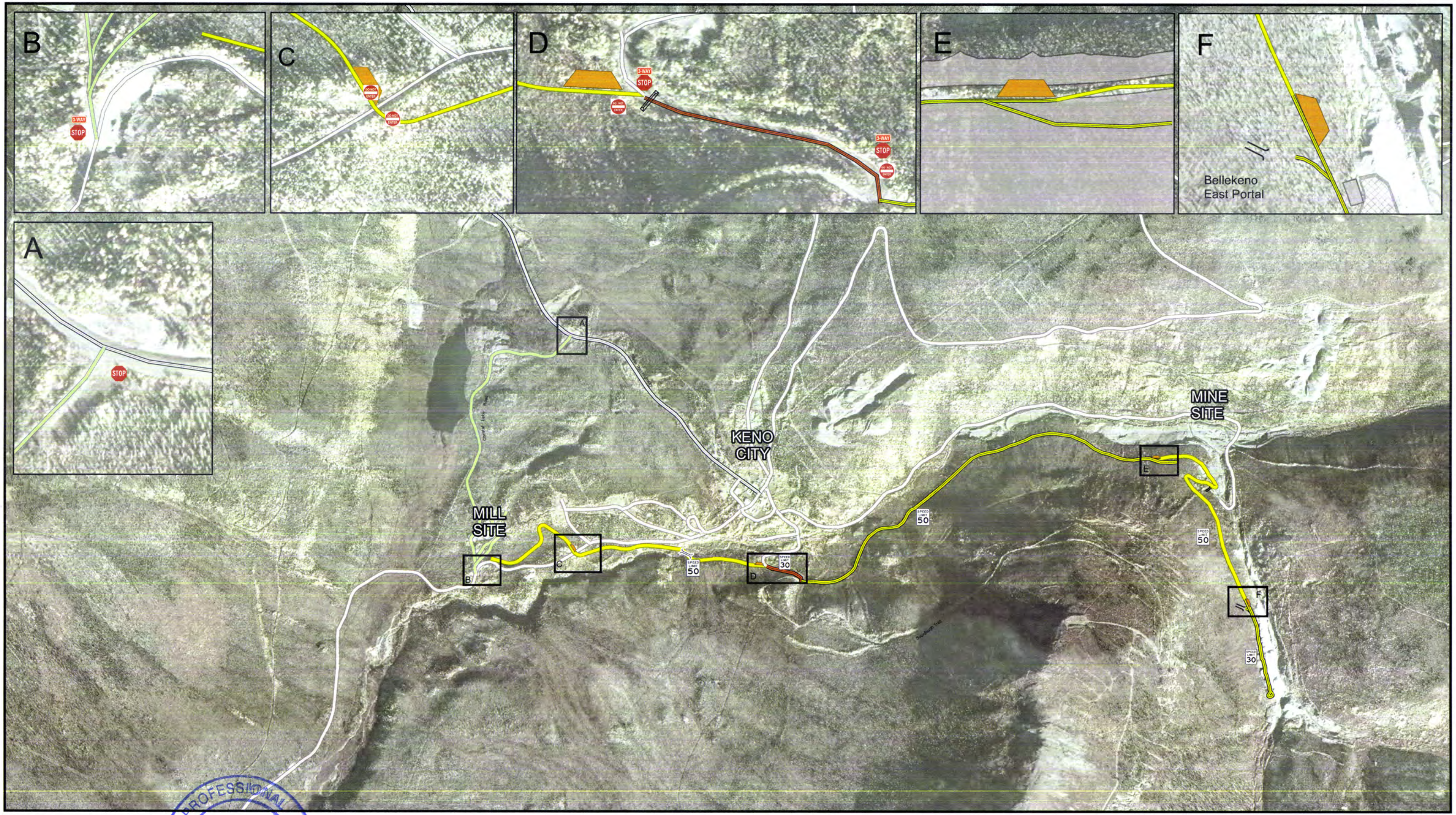
BK625 Ferric Chloride Mixed with Snow Outside of Reagent Shed

ALEXCO KENO HILL MINING CORP.
QUARTZ MINING LICENCE QML-0009
2010 ANNUAL REPORT - RESUBMISSION

BELLEKENO MINE SITE
KENO HILL SILVER DISTRICT
YUKON

APPENDIX J

BELLEKENO HAUL ROAD



Aerial photograph obtained from Geodesy Remote Sensing Inc., Calgary Alberta. Imagery acquired September 13 and 14 2006. Site hydrography and contours provided by Aero Geometrics LTD, derived from aerial photograph.

Datum: NAD 83; Map Projection: UTM Zone 8N

Main Map: 1:17,000

All Inset Maps: 1:2,500 (when printed on 11 x17 inch paper)

0 250 500 750 1,000 Meters

N E S W

SCOTT A. SMITH

Haul Roads

- 🟥 Haul Road, Two Way
- 🟨 Haul Road, One Way
- 🟩 Haul Road, Two Way

Other Roads

- ═ Highway
- ═ Local Road
- ═ Mill Access, No Haul Trafic

Traffic Management and Access Control

- ⏢ Haul Truck Pullout
- ⛔ Private Haul Road Do Not Enter Authorized Traffic Only
- ═ Gate

ALEXCO

ACCESS

2010 ANNUAL QUARTZ MINING LICENCE REPORT, QML-0009

APPENDIX J

BELLEKENO HAUL ROAD

DRAWN BY MD	JUNE 2011	VERIFIED BY VB

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(Last edited by: mduchame; 10/06/2011/15:08 PM)

ALEXCO KENO HILL MINING CORP.

QUARTZ MINING LICENCE QML-0009

2010 ANNUAL REPORT - RESUBMISSION

BELLEKENO MINE SITE

KENO HILL SILVER DISTRICT

YUKON

APPENDIX K

BELLEKENO PRODUCTION SCHEDULE (NI 43-101)

Table 1.4 Bellekeno Production Schedule

Bellekeno Production Schedule
Cut off $230

	Mineable	**NSR**	**2010**				**2011**				**2012**				**2013**				
SW Zone	**Tonnes**	**diluted**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**TOTAL**
A	29,454	$560		1600	4446	5000	3002	3000	3000	2000	3000	3000	1406						29454
B	71,223	$560		1900	5700	5330	5700	5700	5700	5700	5000	5000	5178	5700	4247	3844	3516	3008	71223
C_Upper	44,139	$618		1900	6700	6700	6700	6000	6700	6700	2739								44139
C_Lower	32,475	$396									4000	4000	4000	4100	4100	4100	4100	4075	32475
D	32,226	$388					1400	2800	2800	2800	2826	2800	2800	2800	2800	2800	2800	2800	32226
E	7,996	$475													1999	1999	1999	1999	7996
Sub-total SW	**217,512**	**$519**	0	5400	16846	17030	16802	17500	18200	17200	17564	14800	13384	12600	13146	12743	12415	11882	**217,512**
99 Zone																			
B	5,683	$377										1300	1300	1300	800	983			5683
C	4,627	$508			2776	1851													4627
D	1,364	$578									1364								1364
E	2,971	$466							1486	1486									2971
F	5,396	$854					2698	2698											5396
G	27,247	$675		2100	2878	3619	3000	2302	2815	2616	2373	2137	1200	2207					27247
H	6,128	$364										3064	3064						6128
J	4,795	$295								1199	1199	1199	1199						4795
Sub-total 99	**58,211**	**$572**	0	2100	5654	5470	5698	5000	4300	5300	4936	7700	6763	3507	800	983	0	0	**58,211**
East Zone																			
Upper 48	14,121	$454											2354	2354	2354	2354	2354	2354	14121
East_Mid_U	20,086	$345												4039	3,500	3,586	4,500	4,461	20086
East Mid_L	12,010	$271													2700	2834	3232	3245	12010
Sub-total East	**46,218**	**$359**	0	0	0	0	0	0	0	0	0	0	2354	6393	8554	8774	10085	10059	**46,218**
TOTAL PRODUCTION		**tonnes**	**0**	**7,500**	**22,500**	**22,500**	**22,500**	**22,500**	**22,500**	**22,500**	**22,500**	**22,500**	**22,500**	**22,500**	**22,500**	**22,500**	**22,500**	**21,941**	**321,941**
	Plant Feed:	**TPD**		250	250	250	250	250	250	250	250	250	250	250	250	250	250	244	
	Au	gpt	0	0.44	0.44	0.44	0.46	0.45	0.44	0.43	0.44	0.41	0.42	0.43	0.38	0.38	0.36	0.36	0.42
	Ag	gpt	0	1037	1002	1009	1060	1029	955	931	873	805	789	814	728	722	712	706	871
	Pb	%	0	11.97	11.57	11.81	11.90	11.65	11.53	11.09	10.10	8.63	7.74	7.51	7.15	7.04	7.02	6.95	9.47
	Zn	%	0	5.54	5.14	5.29	5.52	5.57	5.38	5.27	5.62	5.08	5.39	5.85	5.99	5.96	6.18	6.19	5.60
	NSR	$/t		**$607**	**$586**	**$592**	**$617**	**$601**	**$564**	**$549**	**$516**	**$469**	**$453**	**$460**	**$416**	**$412**	**$406**	**$402**	**$506**