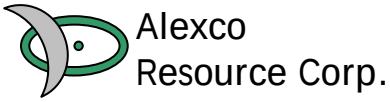


***Brewery Creek Mine***

# Blue Zone Monitoring and Assessment Program

*Date:*

*August 2005*

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# 1 Background

Viceroy Minerals Corporation's (Viceroy) Brewery Creek Mine was issued an amendment to the company's Quartz Mining Licence (QML) in April 2004. The Brewery Creek Mine was subsequently sold to Alexco Resource Corp. (Alexco) in March 2005. Amendment 04-001 to QML A99-001 outlines terms and conditions associated with the Brewery Creek Mine Decommissioning and Reclamation Plan. QML section 17.5.2 states:

> *"A detailed program designed to monitor and report on the geochemical stability of the Blue Pit and the Blue Waste Rock Storage Area (collectively the 'Blue Zone') must be submitted to the Chief for review and approval within 120 days of the effective date, and be implemented within 30 days of the Licensee receiving notice of the Chief's approval, unless otherwise agreed, in writing, by the Chief. The program must evaluate the effectiveness of the remediation measures implemented by the Licensee to decommission and abandon the Blue Zone."*

# 2 Purpose

This detailed monitoring and assessment program fulfills the requirements of Section 17.5.2 of QML A99-001 Amendment 04-001. The purpose of the monitoring program is to adequately gather data on geotechnical and physical stability of the engineered cover including infiltration, geochemical stability of metals, performance of the vegetated cover and metals update, and surrounding environmental quality of local ground and surface waters. Pertinent data will be assessed (key trend indicators) to determine if adverse water quality trends are developing in the Blue Pit or Blue Waste Rock Storage Area (WRSA) (Blue Zone) that may adversely impact downstream surface waters. This assessment will review the effectiveness of the closure remedial measures undertaken by the company. Results of the monitoring program will be routinely reported to the Government of Yukon.

The QML contains a further requirement for the submission and implementation of an adaptive management plan (AMP) if the Chief determines that the remedial measures are not performing as required and adverse effects to downstream water quality are, or will, occur. Therefore, triggers and response actions or remedial contingency measures associated with the monitoring program are not provided in this document. These details are left to the AMP if it is required in the future.

# 3 Monitoring Points

The Blue Zone and surrounding environment have a number of existing monitoring points and features already established to adequately assess the geochemical stability and physical stability of the facility, and to monitor down gradient environmental effects.

Most of these existing stations have a history of monitoring over the past 8-10 years and have well established baseline conditions that can be used to determine negative effects on the receiving environment as a result of any impacts from the Blue Zone. The monitoring stations are divided into several categories including:

1. Physical monitoring:
    a. Pit and WRSA Physical Stability;
    b. Erosion;
    c. Test cover lysimeter infiltration.
2. Groundwater:
    a. BC-67;
    b. BC-68;
    c. BC-69;
    d. BC-11 (seep below WRSA);
    e. Test cover lysimeter pore water quality.
3. Pit water:
    a. BC-12.
4. Surface water:
    a. WQ at BC-01;
    b. WQ at BC-02;
    c. WQ at BC-03;
    d. WQ at BC-06;
    e. WQ at BC-32;
    f. WQ at BC-38;
    g. WQ at BC-39;
    h. Sediments at BC-01, BC-02, BC-03, BC-06, BC-38 and BC-39;
    i. Benthos at BC-01, BC-06 and BC-38.
5. Terrestrial monitoring:
    a. Revegetation success;
    b. Metals uptake.
6. Climatic monitoring:
    a. Precipitation;
    b. Snowpack;
    c. Evaporation.

Each of these monitoring categories is further discussed and a schedule and frequency for monitoring various stations within these categories is provided for Viceroy's 15 year monitoring program. Table 1 summarizes the frequency of the monitoring stations. Table 2 contains the parameters of analysis for the various stations, and Figure 1 shows the location of each of these stations.

## 3.1 Physical Monitoring

A 0.5 meter storage and release cover was constructed over the Blue WRSA in 2003. The purpose of the cover is to reduce the infiltration rate of precipitation through the

WRSA and ultimately minimize the potential for transport of any contaminants in the Blue WRSA. With respect to physical monitoring, the following programs will be conducted:

1. Annual geotechnical inspections of the Blue WRSA and Pit for Years 1-5. Further geotechnical inspections conducted in years 10 and 15. Stability of the Blue Zone will be assessed by a qualified professional for physical stability, erosion, and public safety;
2. Inspection of the test cover lysimeter by a qualified professional for signs of erosion and general instability. The inspections will be conducted on an annual basis for Years 1-5 and on a biannual basis for Years 6-10;
3. The effectiveness of the Blue Zone remedial measures will be assessed for physical stability; and
4. A report on the findings of the geotechnical report will be included in the company's annual report.

### *3.1.1 Blue WRSA Infiltration Rate*

The infiltration rate through the test cover lysimeter can be correlated into the amount of precipitation passing through the actual Blue WRSA. Material placed in the Blue WRSA had been in place for over 4 years at the time the lysimeter test cover was constructed and material in the lysimeter itself has been in place for 1 ½ years since construction. Upon construction of the lysimeter, material was excavated and replaced back into the lined lysimeter, all within a period of 2-3 weeks. Since the test cover has undergone one spring freshet and an entire year of precipitation it can be reasonably assumed that the material in the lysimeter and the Blue WRSA is at steady state conditions and future solution passing through the lysimeter is not being held up due to drier than normal conditions caused by lysimeter construction. The test cover contains a 1,000 liter collection tank located downgradient from the lysimeter location. Monitoring of the infiltration rate through the test cover will consist of the following:

1. The volume of lysimeter effluent will be measured and recorded on a monthly basis during years 1-3 and on a quarterly basis during Years 4-5. The effluent volume will be measured on a semiannual basis during Years 6-10. The infiltration rate will be updated and calculated on a monthly basis during years 1-3 and on a quarterly basis during years 4-5 and reported in the company's monthly report to the Yukon Water Board (YWB). Monitoring during the spring freshet will be increased to several times per week during the critical spring freshet period. Based on operating experience at site over the past 10 years, the majority of the local freshet occurs during a 4-6 week period from early April until late May. The critical spring inspection schedule is based on the area of the lysimeter of 100 $m^2$, an above average snowpack of 150 mm water equivalent, 30% of the snowpack infiltrating through the cover during a 4 week period. With these parameters, a total of 1,000 – 1,500 liters per week may be reporting to the

storage tank. Based on this calculation, site inspections of at least 3 times per week during the critical spring freshet period will be conducted.
2. Adequate volume will be maintained in the storage tank to ensure no overtopping of the tank occurs prior to the next measuring period. This is most critical in the spring freshet period. After each site inspection, the volume in the tank will be recorded and drained to maximize the holding capacity until the next site inspection. In the future, the holding tank may be replaced by a flow totalizer;
3. The holding tank will be drained at the end of each season (September); and
4. The cover infiltration rate will be graphed and compared with historical data, reviewed and assessed to ensure cover effectiveness.

## 3.2 Groundwater

Three deep groundwater monitoring piezometers were installed in the Blue WRSA in 2002. The piezometers are located above, within and downgradient of the Blue WRSA to allow comparison of potential groundwater impact below the Blue WRSA with baseline conditions (see Figure 1). The three piezometers (BC-67, 68, 69) will be monitored for the parameters listed in Table 2 on the following frequency:

1. Quarterly for Years 1-5;
2. Annually for Years 6-15.

Stations BC-67, 68 and 69 have been monitored on a quarterly basis over the past 2 years and have established a baseline condition for water quality below the dump. Ongoing monitoring on a quarterly basis during the first 5 years is consistent with baseline schedules.

A seep designated as BC-11 intermittently flows at <0.1 liter per second at the toe of the Blue WRSA. Although the actual source and representativeness of BC-11 with the Blue WRSA material is not totally understood, this seep has historically and voluntarily been sampled to provide additional information that can be used in assessments for the Blue WRSA. Seepage water at BC-11 will be monitored as follows:

1. Quarterly when flowing during the open water season for Years 1-5;
2. Semi-annually when flowing during the open water season for Years 6-10; and
3. Annually when flowing for Years 11-15.

The frequency of monitoring BC-11 is consistent with the water license requirement for this station. Additional attention to flow conditions at BC-11 will be made during the spring freshet period to ensure sampling occurs during the potential short term duration of flow at BC-11. Visual inspection for any flow at BC-11 will be conducted during the same frequency as the spring freshet frequency for the lysimeter (3 times per week). Analytical parameters for all surface groundwater and seepage stations are summarized in Table 2.

Ground water monitoring will be carried out in accordance with the procedures and standards described in *Guidance Document for the Sampling and Analysis of Metal Mining Effluents, 2001, Minerals and Metals Division, Environment Canada* and the *Standard Guide for Sampling Ground-Water Monitoring Wells, ASTM D4448-01*.

The groundwater quality data will be reported in the company's monthly report to the YWB and part of the QML Annual report. Key trend indicators as outlined in Table 3 will graphed and presented with historically data and used to assess the geochemical stability of the Blue Zone.

### *3.2.1 Pore Water/Geochemical Status*

Pore water infiltrating through the Blue WRSA will be measured by collecting effluent from the test cover lysimeter. The large scale lysimeter was designed by the company's expert in this field. The lysimeter is a condition under the Comprehensive Study Report as a mechanism to assess overall cover performance. A series of column sequential leach tests was conducted by SRK Consulting (SRK) during October 2003 – February 2004. The findings and conclusions of the sequential leach tests have been previously reported and form the basis of the geochemical status of the Blue WRSA. The waste rock backfilled within the test cover lysimeter is the same rock tested in two of the columns from the sequential leach tests conducted by SRK. This material was logged and characterized by a professional geologist at the time of excavation of the lysimeter. The details of the material characterization have been previously reported to YWB and EMR. This allows for a direct comparison of the results of the sequential leach tests with actual field chemistry from the same material.

Water quality monitoring from the test cover lysimeter effluent will be conducted as follows:

1. On a monthly basis for Years 1-3;
2. Quarterly basis for Years 4-5;
3. Semi-annual basis during Years 6-10; and
4. Annual basis during Years 11-15.

In addition, during the critical spring freshet period additional water quality monitoring samples will be collected at a frequency of 2 samples per month.

Analytical parameters for the lysimeter effluent are summarized in Table 2.

The infiltration gallery pore water quality data will be reported in the company's monthly report to the YWB and part of the QML annual report.

Results from the infiltration gallery pore water quality will be reviewed and compared with the SRK sequential test work and geochemical assessment to verify model predictions and effects assessment and therefore demonstrate geochemical stability of the

Blue WRSA. Key trend indicators as outlined in Table 3 will graphed and presented with historically data and used to assess the geochemical stability of the Blue WRSA.

## 4 Pit Water

Blue Pit pond water is designated as BC-12. Water in the bottom of the pit is a combination of surface runoff during freshet and precipitation events as well as a seep emanating from the highwall of the Blue Pit. Samples from different depths of the Blue Pit pond water will be taken and composited into a single sample. Three depths including surface, midway and at the bottom of the pit pond will be targeted. This approach will provide a representative sample of the entire water body.

Pit water at BC-12 will be monitored as follows:

1. Quarterly during the open water season for Years 1-5;
2. Semi-annually during the open water season for Years 6-10; and
3. Annually during the open water season for Years 11-15.

In addition to water quality, static water elevation will be recorded on the same frequency basis as proposed above. Similar to the increased frequency for the lysimeter, weekly monitoring and recording of static water elevation in the Blue Pit will be conducted during the spring freshet. In the event water from the Blue Pit overflows the pit, sampling frequency will be increased to a weekly basis until the overflow ceases. Analytical parameters for BC-12 are summarized in Table 2. Key trend indicators as outlined in Table 3 will graphed and presented with historically data and used to assess the geochemical stability of the Blue pit.

## 5 Surface Water

There are seven surface water stations of significance below the Blue WRSA and Pit. These stations include BC-01, BC-02, BC-03, BC-06, BC-38, BC-32 and BC-39. These stations include upstream and downstream receiving waters in Laura Creek and the South Klondike River. The stations will be monitored as follows:

1. Monthly at stations BC-01, BC-02 and BC-03 during years 1-3 and Quarterly during year 4-5. Quarterly for water quality during Years 1-5 at Stations BC-06, BC-32, BC-38 and BC-39;
2. Semi-annual for water quality during Years 6-10; and
3. Annual for water quality during Years 11-15.
4. Annually for sediments during Years 1-5;
5. Benthos monitoring at BC-01 (B3 benthos), BC-06 (B5 benthos), BC-38 (B4 Benthos) during Years 1, 3 and 5;

This schedule is consistent with the requirements under the company's water license Amendment #7. Analytical parameters for the surface water quality stations are summarized in Table 2. Toxicity monitoring will not be conducted and is not a requirement for surface water in the water license monitoring program.

For sediment monitoring, the following protocols will be used:

- Environment Canada. December 1994. *Environmental Protection Series – Guidance Document on the Collection and Preparation of Sediments for Physico Chemical Characterization and Biological Testing*, Report EPS 1/RM/29.

- *Metal Mining Guidance Document for Aquatic Environmental Effects Monitoring*. Environment Canada. June 2002.

For benthos monitoring, the following protocols will be used:

- *Guideline for Monitoring Benthos in Freshwater Environments*. Environment Canada, 1993.
- *Metal Mining Guidance Document for Aquatic Environmental Effects Monitoring*. Environment Canada. June 2002.

The surface water quality data will be reported in the company's monthly report to the YWB and part of the QML annual report.

Results from the surface water quality will be reviewed and compared with the existing downstream receiving water Canadian Council of Ministers of the Environment (CCME) Guidelines to ensure effectiveness of closure remedial measures and environmental effects assessment. Key trend indicators as outlined in Table 3 will graphed and presented with historically data and used to assess the geochemical stability of the Blue Zone and effects to local receiving waters.

## 6 Terrestrial Monitoring

The following section outlines the monitoring program as it relates to vegetation in the Blue WRSA.

Terrestrial monitoring related to the Blue WRSA includes revegetation success and stability and metals uptake. These areas will be assessed by the following measures:

1. Annual inspections by a qualified revegetation specialist during Years 1-5;
2. Based on the recommendation of the specialist and the findings of the assessment during Years 1-5, additional annual monitoring during Years 6-15, with no less than 3 more annual assessments;
3. Metals uptake assessment for baseline conditions conducted during Year 1; and

4. Metals uptake assessment during Year 5 and 10.

Vegetation Test Plots

Three separate test plots will be established over the Blue WRSA. These 5m x 5m plots will be identified and marked off and used for subsequent monitoring. Monitoring at these test plots will include, species composition, vegetation cover estimation, metals uptake, soil erosion, moisture content and photographic record. The components of this program are presented below.

Species Composition

A qualified professional will catalogue and confirm species present within each test plot. Natural species and shrub invasion will be documented.

Vegetation Cover Estimation

The total vegetation cover will be monitored using a five graded scale:

- areas without vegetation cover 0-1 %;
- areas with sparse vegetation cover ranging from 1-12.5 %, 12,5 - 25 %, and 25 - 50 %; and,
- areas with sustaining covering 50 - 100 %.

Depth of plant root depth penetration will be recorded.

Vegetation and Soil Sampling for Metal Concentrations

Samples of plant tissue will be collected from established test plots at three locations for metal analysis. At each site, tissue samples from each species will be composited from the three test plots. Approximately 20 grams of each plant species (stem and leaves) were collected and analyzed for total metals.

Soil samples will also collected from a small hand dug pit at each of the test plots.

Vegetation and soil samples will be collected with latex gloves, placed in Ziploc bags, and shipped to an accredited laboratory for metals analysis. The moisture content of soils in the bottom of the test pit will also be determined.

Documentation of soil erosion

In each test plot soil erosion will be registered. Vegetation cover performance will be measured as noted earlier. With a ruler the depth and occurrence/non occurrence of

erosion gullies deeper than 5 cm, created by water erosion, will be documented. Significant erosion gullies will be photographed and assessed for further maintenance.

Vegetation Plot Photographs

Each test plot will be photographed from a standardized survey hub. Vegetation cover performance, species composition and erosion can be documented over time.

## 7 Climate Monitoring

Monitoring of climate data is necessary to determine overall infiltration rates through the Blue WRSA cover. A manual station is already established near the administration complex and is used for recording climate data used in both assessments for the Blue WRSA and the heap. An automatic station has historically been used at the mine site but as there is no longer any ongoing power supply, the recording of climate data has moved to a manual system. Battery and solar powered systems will be investigated and the automatic station may be used as an alternative to the manual system.

Precipitation will be collected and measured using a manual graduated precipitation gauge. An automatic station may be used in the future. Precipitation will be monitored on the following schedule:

1. On a monthly basis during Years 1-3 and;
2. On a quarterly basis during Years 4-15.

In addition, snowpack surveys will be conducted prior to the onset of the spring freshet and at a minimum will include surveys at the end of March during Years 1-15.

At least two snow survey stations will be established in the Blue WRSA: one on top of the test cover and lysimeter, and one outside but within the Blue WRSA. The snow survey locations will be surveyed and marked to ensure the continuity of the data from one survey to the next. The snow survey procedures consist of cutting a vertical face in the snow, measurement and description of the layering, and coring of the snow for density analysis. Coring of the snow is completed using a 5.1 cm ID x 110 cm long aluminum tube. Five samples are taken from each location and the average of the samples is used to determine the snowpack for each location. After a sample is taken, it is put into a zip lock bag and sealed. Water equivalent is determined by weighing the melted snow and calculating water equivalence based on weight and volume of snow collected.

Evaporation will be measured using a galvanized pan conforming to Evaporation Pan Class ‘A’ dimensions (1219mm diameter by 254mm high). This equipment and approach is the same as used over the past 8 years as required in the company’s water

license. Evaporation will be measured during the months of May – September. Evaporation measurements will be taken on the following schedule:

1. On a monthly basis for Years 1-3;
2. Quarterly basis for Years 4-5.

The climate data will be compiled and used to assist with the assessment of the cover effectiveness. Results will be reported in the annual report.

## 8 Blue Zone Assessment

On an annual basis as part of the Annual report, an assessment will be undertaken of the monitoring program data. This assessment will review the performance and effectiveness of the Blue Zone remedial measures and need for maintenance activities or additional monitoring. Key trend indicators as outlined in Table 3 will graphed and presented with historically data and used to assess the geochemical stability of the Blue Zone. The assessment will also review effects to the downstream receiving environment to ensure that performance receiving water criteria are being adhered too.

A detailed follow-up geochemical assessment will be conducted by a third party specialist after 5 years of monitoring. The assessment will incorporate the data collected for the prior 5 years.

## 9 Reporting

Results of the Blue WRSA and Pit monitoring program will be reported in Alexco's monthly and annual reports. Discussion of trends will be provided as well as an assessment of the performance of the systems.

Table 3 summarizes key indicator parameters that will be used to assess the overall effectiveness of the remedial measures. It is the company's view that assessing the overall performance of the remedial measures in the Blue Zone cannot be effectively done with a snapshot in time and percentage basis above baseline type approach. Water quality analysis over the past nearly 10 years shows significant fluctuations in total metals as a function of TSS. These fluctuations are expected to continue into the future and may be even more evident due to the significant forest fire activity throughout the Laura Creek basin in 2004.

In the case of the Blue WRSA, the water quality trends and parameters will be compared against the assessment made by SRK Consulting in August 2003. The SRK analysis predicted water quality in downstream water quality stations, most notably BC-1 and BC-6. The company will be compare the key parameters highlighted in the SRK report including Al, Sb, As, Cd, Cu, Fe, Mn, Hg, Se, Zn and SO4. The SRK assessment

provided spring and summer flow predictions for water quality at BC-1. The company will compare monthly and quarterly trends and individual parameters during the same periods to determine if the conditions at BC-1 are consistent with the long-term assessment made by SRK.

This approach will allow both the company and regulators to assess the overall effectiveness of the remedial measures and determine if additional measures (i.e. AMP) need to be implemented.

Alexco Resources Corp.
Brewery Creek Mine

# Table 1
## Blue WRSA and Pit Monitoring Program

| Frequency | Description |
|---|---|
| Q | Quarterly |
| SA | Semi-annual |
| A | Annual |
| QWA | Quarterly when active |
| AWA | Annual when active |
| BA | Bi annual |
| NLA | No longer active |

| | | UTM LOCATION (m) ZONE 7 | | TYPE/STATION ID | | | | | YEAR 1-5 FREQUENCY | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE | DESCRIPTION | Northing | Easting | Surface Water | Groundwater | Effluent | Sediment | Benthos | Surface Water | Groundwater | Effluent | Sediment | Benthos | Other |
| BC-01 | Laura Ck., 50 m u/s from Ditch Road | 7,099,870 | 634,405 | BC-01 | | | W5 | B3 | Q | | | A | BA | |
| BC-02 | Carolyn Ck. u/s from Laura Ck. | 7,102,410 | 632,240 | BC-02 | | | W15 | | Q | | | A | | |
| BC-03 | Laura Ck. above Carolyn Ck. | 7,102,500 | 632,295 | BC-03 | | | W4B | | Q | | | A | | |
| BC-06 | South Klondike d/s from confl. with Lee Ck. | 7,097,200 | 627,345 | BC-06 | | | W9 | B5 | Q | | | A | BA | |
| BC-11 | Blue Waste Dump | 7,105,140 | 633,780 | | | BC-11 | | | | | Q | | | |
| BC-12 | Blue Pit | 7,105,570 | 634,050 | | | BC-12 | | | | | Q | | | |
| BC-32 | Laura Ck. below exploration camp | 7,105,100 | 634,130 | BC-32 | | | W3 | | A | | | A | | |
| BC-38 | South Klondike u/s from confl. with Golden Ck. | 7,102,600 | 642,200 | BC-38 | | | W8 | B4 | | | | A | BA | |
| BC-39 | Laura Ck., u/s South Klondike River | 7,098,290 | 631,425 | BC-39 | | | BC-39 | | Q | | | A | | |
| BC-67 | Blue WRSA Piezometer | 7,105,300 | 633,570 | | | | | | | Q | | | | |
| BC-68 | Blue WRSA Piezometer | 7,105,180 | 633,600 | | | | | | | Q | | | | |
| BC-69 | Blue WRSA Piezometer | 7,105,160 | 633,790 | | | | | | | Q | | | | |
| | Blue Lysimeter Infiltration Volume | | | | | | | | | | | | | Q |
| | Blue Lysimeter Infiltration Chemistry | | | | | | | | | | | | | Q |
| | Blue Geotechnical Inspections | | | | | | | | | | | | | A |
| | Blue Revegetation Monitoring | | | | | | | | | | | | | A |
| | Blue Cover Monitoring | | | | | | | | | | | | | A |

Alexco Resources Corp.
Brewery Creek Mine

# Table 1
## Blue WRSA and Pit Monitoring Program

| Frequency | Description |
|---|---|
| Q | Quarterly |
| SA | Semi-annual |
| A | Annual |
| QWA | Quarterly when active |
| AWA | Annual when active |
| BA | Bi annual |
| NLA | No longer active |

| | | YEAR 6-10 FREQUENCY | | | | | | YEAR 11-15 FREQUENCY | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SITE** | **DESCRIPTION** | **Surface Water** | **Groundwater** | **Effluent** | **Sediment** | **Benthos** | **Other** | **Surface Water** | **Groundwater** | **Effluent** | **Sediment** | **Benthos** | **Other** |
| BC-01 | Laura Ck., 50 m u/s from Ditch Road | SA | | | | | | A | | | | | |
| BC-02 | Carolyn Ck. u/s from Laura Ck. | SA | | | | | | A | | | | | |
| BC-03 | Laura Ck. above Carolyn Ck. | SA | | | | | | A | | | | | |
| BC-06 | South Klondike d/s from confl. with Lee Ck. | SA | | | | | | A | | | | | |
| BC-11 | Blue Waste Dump | | | SA | | | | | | A | | | |
| BC-12 | Blue Pit | | | SA | | | | | | A | | | |
| BC-32 | Laura Ck. below exploration camp | | | | | | | | | | | | |
| BC-38 | South Klondike u/s from confl. with Golden Ck. | SA | | | | | | A | | | | | |
| BC-39 | Laura Ck., u/s South Klondike River | SA | | | | | | A | | | | | |
| BC-67 | Blue WRSA Piezometer | | A | | | | | | A | | | | |
| BC-68 | Blue WRSA Piezometer | | A | | | | | | A | | | | |
| BC-69 | Blue WRSA Piezometer | | A | | | | | | A | | | | |
| | Blue Lysimeter Infiltration Volume | | | | | | SA | | | | | | |
| | Blue Lysimeter Infiltration Chemistry | | | | | | SA | A | | | | | |
| | Blue Geotechnical Inspections | | | | | | | | | | | | |
| | Blue Revegetation Monitoring | | | | | | A | | | | | | |
| | Blue Cover Monitoring | | | | | | A | | | | | | |

Alexco Resources Corp.
Brewery Creek Mine

Table 2
Water Sample Analysis Parameters

| | | | | | | | | | 33-Element | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Monitoring Type** | pH | Flow/Depth | TSS | SO4- | NH3 | NO4 | T CN | WAD CN | ICP T Metals | ICP D Metals | TOC | LOI | Sieve Analysis |
| **Surface Water** | x | x | x | x | x | x | x | x | x | | | | |
| **Groundwater** | x | x[1] | x | x | x | x | x | x | | x | | | |
| **Pit Water** | x | x[1] | x | x | x | x | | | | x | | | |
| **Sediments** | | | | | | | | | x | | x | x | x |
| **Benthos** | | | | | | | | | x | | | | |

**Notes** 1 - water elevation

Alexco Resource Corp.
Brewery Creek Mine

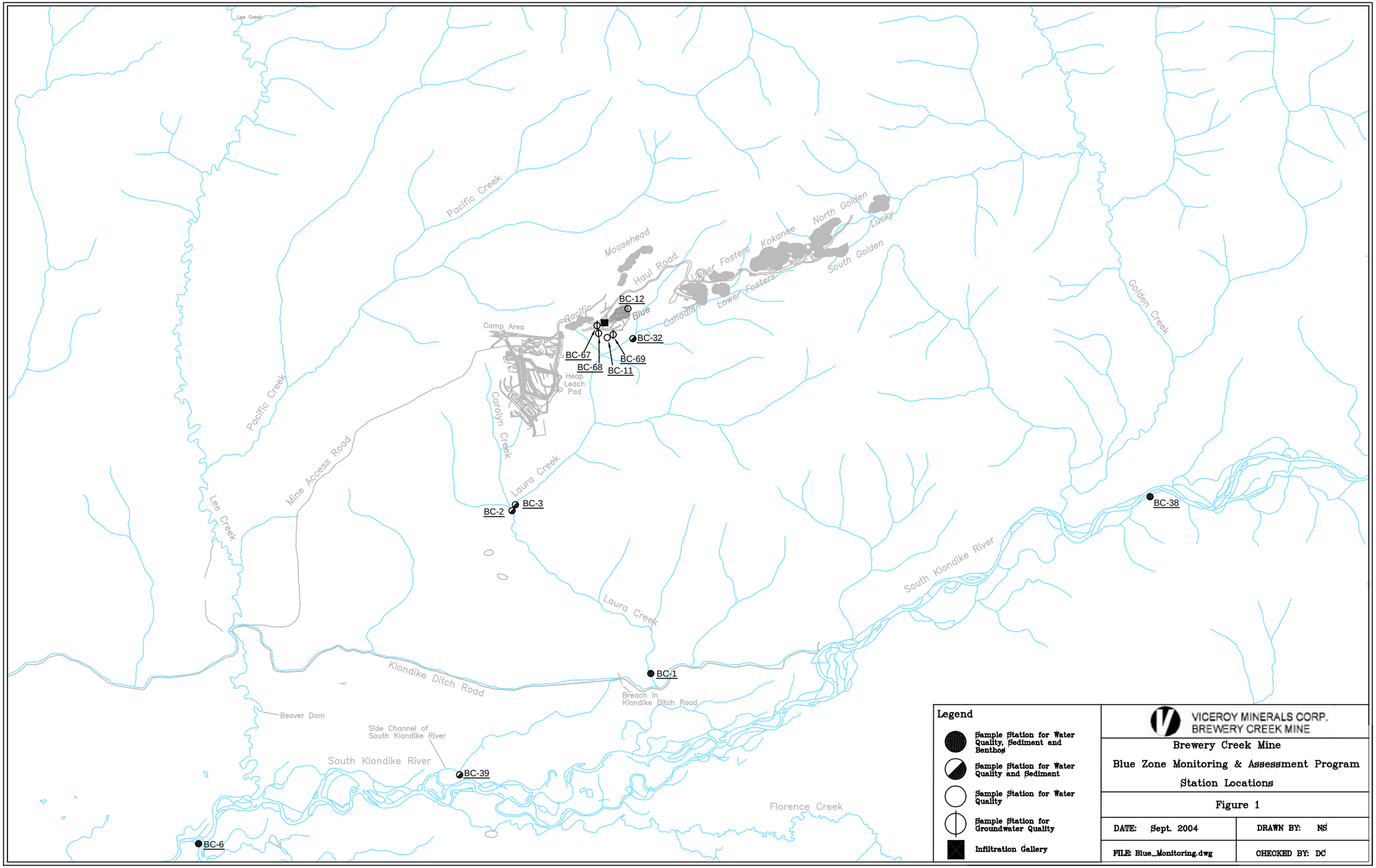
# Table 3
## Blue WRSA and Pit Monitoring Program

### Key Trend Indicators

| | | Key Parameter and Frequency - Year 1-5 | | | | | |
|---|---|---|---|---|---|---|---|
| **SITE** | **DESCRIPTION** | **pH** | **Flow/Depth** | **SO4-** | **ICP T Metals (Al,Sb,As,Cd,Cu,Fe,Mn,Hg,Se,Zn)** | **Sediment (T. Metals As, Sb, Se)** | **Inspection** |
| BC-01 | Laura Ck., 50 m u/s from Ditch Road | MWA | MWA | MWA | MWA | A | |
| BC-02 | Carolyn Ck. u/s from Laura Ck. | MWA | MWA | MWA | MWA | A | |
| BC-03 | Laura Ck. above Carolyn Ck. | M/Q | M/Q | M/Q | M/Q | A | |
| BC-06 | South Klondike d/s from confl. with Lee Ck. | Q | Q | Q | Q | A | |
| BC-11 | Blue Waste Dump | Q | Q | Q | Q | | |
| BC-12 | Blue Pit | Q | Q | Q | Q | | |
| BC-39 | Laura Ck., u/s South Klondike River | Q | Q | Q | Q | | |
| BC-67 | Blue WRSA Piezometer | Q | Q | Q | Q | | |
| BC-68 | Blue WRSA Piezometer | Q | Q | Q | Q | | |
| BC-69 | Blue WRSA Piezometer | Q | Q | Q | Q | | |
| | Blue Geotechnical Inspections | | | | | | A |
| | Blue Revegetation Monitoring | | | | | | A |
| | Blue Cover Monitoring | | | | | | A |

| **Frequency** | **Description** |
|---|---|
| M/Q | Monthly Years 1-3, Quarterly Years 4-5 |
| MWA | Monthy When Active Years 1-3, Quarterly When Active Years 4-5 |
| Q | Quarterly |
| QWA | Quarterly while flowing |
| A | Annual |

**Analyses** Annual report to provide individual graphs for the key parameters noted above and trends identified. Historic trends from previous years to be compared.
Monitoring for pH, SO4, Metals (Al, Sb, As, Cd, Fe, Mn, Hg, Se, Zn) at BC-11 and BC-12 and groundwater stations BC-67, BC-68, and BC-69 provides early warning of changes in Blue pit and waste rock geochemistry with key indicators and flag for furhter action. Monitoring stations BC-01; BC-02; BC-06; and BC-39 monitoring key trends in receiving waters and flagged for further action.
Geotechnical and revegetation monitoing annual assessment of structural stability and vegetation growth.


Lee Creek
Pacific Creek
Moosehead
Haul Road
Upper Fosters
Kokanee
North Golden
Lucky
South Golden
Lower Fosters
Canadian
Blue
Pacific
Camp Area
BC-12
BC-32
BC-67
BC-68
BC-11
BC-69
Heap Leach Pad
Carolyn Creek
Golden Creek
Pacific Creek
Mine Access Road
Laura Creek
BC-2
BC-3
BC-38
Lee Creek
South Klondike River
Laura Creek
Klondike Ditch Road
BC-1
Breach In Klondike Ditch Road
Beaver Dam
Side Channel of South Klondike River
South Klondike River
BC-39
Florence Creek
BC-6
Legend
Sample Station for Water Quality, Sediment and Benthos
Sample Station for Water Quality and Sediment
Sample Station for Water Quality
Sample Station for Groundwater Quality
Infiltration Gallery
VICEROY MINERALS CORP.
BREWERY CREEK MINE
Brewery Creek Mine
Blue Zone Monitoring & Assessment Program
Station Locations
Figure 1
DATE: Sept. 2004
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FILE: Blue_Monitoring.dwg
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