APPENDIX A

ASSESSMENT OF ACIDIFICATION POTENTIAL KENNECOTT TAILINGS IMPOUNDMENT (January 2006)

1.0 MONITORING OBJECTIVES

The objectives of this monitoring plan are as follows:

1. To characterize any potential water quality impacts resulting from potential future acidification of tailings material.

2. To accurately predict the acidification potential that will occur on the impoundment.

3. To present an adequate characterization of acidification potential for the different units of both the existing and expansion portion of the Tailings Impoundment.

2.0 MONITORING PLAN

2.1 Acidification Monitoring

The primary objective of this portion of the monitoring program is to determine the acidification potential of both the existing and expansion portions of the tailings impoundment, using acid/base accounting (ABA) and Net Acid Generation (NAG) testing.

2.1.1 Sampling Locations

The Tailings North Expansion embankment is constructed of coarse underflow material from two cyclone stations (designated East and West Cyclones). The fine-grained overflow material is placed in the interior of the impoundment. The East Cyclone station currently receives material only from the Copperton Concentrator. The West Cyclone Station currently receives Copperton tailings, Power Plant fly ash and inputs from the Smelter slag and hydrometallurgical tailings. In the future, Smelter process waters may be directed to the West Cyclone station as well.

Both slag tailings and the power plant ash contain abundant neutralizing capacity and little or no sulfide minerals, so there is little to no risk of acid generation from these materials. Hydrometallurgical tailings comprise <.5% of the flow entering the impoundment from the West Cyclone Station. The West Cyclone Station material is sampled after all of the

tailings streams have been mixed and cycloned in the overflow and underflow samples.

The exterior of the existing impoundment has been adequately characterized by previous sampling efforts. Sampling locations to characterize the active North Impoundment include the following sites, to be sampled at the frequencies indicated in section 2.1.2.

I. Embankment of the North Impoundment (cycloned tailings underflow)

II. Interior of North Impoundment (cycloned tailings overflow)

2.1.2 Sampling and Analysis for ABA Values

Samples will routinely be collected from a depth interval of 0 to 12 inches for tailings that are in place. However, additional samples may be taken from other depths for evaluation of areas of incipient acidification.

SOP #3 describes the standard protocol for sampling, preservation, chain of custody and archiving of samples. All samples will be archived for at least two years. The locations of the samples from the existing impoundment will be marked in the field with a stake and will be indicated on a reference map.

2.1.2.1 Whole Tailings

A. Copperton Tailings (BCP1483) – A quarterly grab sample will be collected from this tailings stream.

B. Hydromet/Slag Tailings (TLP2596) – A semi-annual grab sample will be collected from this tailings stream

2.1.2.2 Underflow Material in North Embankment

Grab samples of underflow tailings (TLP1485 and TLP1487) will be collected quarterly from each cyclone station (two samples per quarter). The samples will be collected as the underflow is discharged from the cyclone.

2.1.2.3 Overflow Material in the North Impoundment

Grab samples of overflow tailings (TLP1486 and TLP1488) will be collected semi-annually from each cyclone station (two samples every six months). The samples will be collected as the overflow material is discharged from the cyclone.

2.1.3 Testing Methods and Parameters

Samples of tailings solids will be analyzed using methods described in detail in the attached Standard Operating Procedures listed in section 4.0 (SOP's 1, 2, 3 and 4).

2.1.3.1 Static Testing

Samples of tailings solids will be analyzed for acid/base accounting using the protocol for ABA potential in SOP #1.

2.1.3.2 Kinetic Testing

The humidity cell kinetic testing protocol is listed in SOP #2. Routine humidity cell testing has been discontinued but the SOP has been retained in case the test is used on a discretionary basis in the future. The humidity cell test results are of limited usefulness because the kinetics of the sulfide oxidation and acid/base reactions in the test cells are very slow, and no tailings materials ever acidified (even those tested for over a year.) The test results could not be used to predict if a tailings sample would generate acid rock drainage in the future. To overcome this problem, kinetic Net Acid Generation (NAG) testing has been substituted for the humidity cells.

The protocol for the NAG test is listed in SOP #4. The kinetic NAG test involves the addition of a strong oxidizing agent, hydrogen peroxide, to the tailings sample. The hydrogen peroxide oxidizes the available sulfide in the sample at a rapid rate, mimicking years or decades of surface weathering in a matter of hours.

A minimum of six kinetic NAG tests will be completed each year. The tests will be run on samples that have been analyzed by acid/base accounting techniques (SOP #1). The samples will be selected to provide a data set with a broad range of ABA potentials and neutralization potential ratios.

2.1.4 Quality Assurance

Replicate Samples: Split replicate samples will be included to evaluate the precision of the analyses. At least one replicate sample will be analyzed for every 20 samples (5%). Results will be acceptable if the Relative Percent Differences (RPD) of the ABA values differ by less than 35%.

Reference Samples: A large quantity of Kennecott underflow tailings sample has been collected, dried, homogenized, and archived as a reference material. The reference sample is a composite sample of tailings underflow material that has been thoroughly mixed and split into

individual samples. (This is the same material as was used in the previous evaluation of the acidification potential of the tailings). Samples of the reference tailings material will be submitted to the analytical laboratory, together with the unknown samples, to determine the precision and consistency of the laboratory analyses. One reference sample will be submitted per 20 unknown samples. The results will be compared to those obtained for the same reference material in the previous evaluation of potential acidification (Shepherd Miller, Inc. and Schafer and Associates, 1995). If the RPD is within ± 1.5 standard deviations about the mean relative to past results for the same reference materials, the results will be accepted.

2.1.5 Inspection of Tailings North Impoundment Embankment

Annual inspection of the North Embankment will be conducted to visually identify potential "hot-spots." If acidification appears to be developing based upon changes in color or lack of vegetation, the approximate outlines of the site will be marked on a map and a sample collected for soil paste pH and paste conductivity.

2.2 Operational Monitoring

The operational monitoring will be conducted as outlined in Kennecott's Operational Monitoring Plan (see Appendix B)

3.0 REPORTING

An annual report will be submitted by March 31 addressing the previous years monitoring as described in this plan and Appendix B.

The report will include:

- summary tables of the results of the ABA analyses and the analyses of the final kinetic NAG test leachate,
- graphs showing the pH and temperature variation during the kinetic NAG tests,
- a comparison of the past year's geochemical data with the preceding years,
- a comparison between the ABA and kinetic test results (In particular, at what ABA potential and neutralization potential ratio the tailings will acidify),
- a summary of the results of the North Embankment inspection including a map of any areas that have acidified.
- a summary of all surface water, seep, lysimeter and groundwater data collected in accordance with Appendix B.

4.0 STANDARD OPERATING PROCEDURES (SOP's)

The following SOP's are attached to this plan:

1. Standard Operating Procedure #1 – The Complete Modified Sobek Acid Base Accounting.

2. Standard Operating Procedure #2 – Kinetic Testing by the Humidity Cell Procedure.

3. Standard Operating Procedure #3 – Sample Collection, Preservation, Chain of Custody, Archiving, and Quality Assurance.

4. Standard Operating Procedure #4 – Kinetic Testing by the Net Acid Generation (NAG) Procedure.