SNC·LAVALIN
Morrow Environmental

MORROW ENVIRONMENTAL
CONSULTANTS INC.
#112, 1212 1st Street SE
Calgary, Alberta
Canada T2G 2H8

Telephone: (403) 253-4333
Fax: (403) 253-1975

PHASE 1 AND 2
ENVIRONMENTAL SITE ASSESSMENT

Lupin Mine Site
Nunavut Territory

Volume 1 of 2

Prepared for: Kinross Gold Corp.

Attention: Mr. Michael Tansey
Reclamation Manager

A053017
January 11, 2006

EXECUTIVE SUMMARY

Morrow Environmental Consultants Inc. (Morrow), a member of the SNC-Lavalin Group, was retained by Kinross Gold Corporation (Kinross) to carry out a Phase 1 and Phase 2 Environmental Site Assessment (ESA) for the Lupin Gold Mine, Nunavut. The work was undertaken to evaluate the environmental quality of the site such that the mine closure plan can be finalized.

The Lupin Gold Mine is located on the western shore of Contwoyto Lake in the tundra zone of the Canadian Shield. Contwoyto Lake is the primary aquatic receiving environment in the area however, numerous secondary water bodies exist in close proximity to the mine. The average site temperature is greater than freezing for four months of the year. Since the study area is situated on top of a slight hill whose height is augmented by the development rock pad, groundwater flow is radial to the edges of the pad. Exploration studies have confirmed that metal concentrations are naturally elevated in the area of the site.

The self-contained mining facility has been in operation since 1982. Diesel is used to generate electricity and heat for the 300-man camp and is used to power heavy equipment. Accordingly, hydrocarbons and metals are the primary contaminant groups. Secondary contaminants associated with mill reagents, glycols, and salts have also been considered by the ESA.

Abandonment and reclamation of mine sites in Nunavut is regulated under the Indian and Northern Affairs Canada (INAC) land lease. INAC references the *Canadian Environmental Quality Guidelines for Soil and Water* (CEQG), and the *Canada Wide Standards for Petroleum Hydrocarbons (PHC) in Soil (PHC CWS)*. Given the site setting, criteria protective of groundwater flow to aquatic life (AW), residential/park land (RL), industrial land use (IL) have been referenced. Since it is likely that the site may continue to be used for industrial or commercial purposes, the RL criteria may be overly conservative. Since groundwater is not used for drinking water at the site, criteria protective of potable water have not been referenced. Since the CCME criteria for AW are intended as receiving water criteria, the British Columbia (BC), provincial groundwater standards have been referenced as they allow a tenfold dilution prior to the receiving environment. In addition, since there are no CCME guidelines for Petroleum Hydrocarbon Fractions (PHC) F1 and F2 in groundwater, the F1 and F2 results have

been compared to the BC Standards for light and heavy extractable petroleum hydrocarbons. Similarly, the CCME CEQG do not have criteria for sulphate in water so the *British Columbia Approved Water Quality Guidelines (BCAWQG)* have been referenced.

The site has a Water Licence from the Nunavut Water Board (NWB). Criteria contained in the Water Licence have been referenced for surface water. The Metal Mining Effluent Regulations produced under the *Fisheries Act*, also list 'authorized limits of deleterious substances', which have been referenced during this study.

For Acid Rock Drainage/Metal Leaching (ARD/ML) parameters, the Department of Indian and Northern Development (DIAND) guidelines and the BC Ministry of Energy and Mines (MEM) guidelines have been referenced.

The Phase 1 ESA portion of the work identified sixty-one areas that had the potential for metals, hydrocarbon, glycol, cyanide, nitrogen, and/or salt based contamination. These areas were assessed between July 13 and July 27, 2005 by drilling nine boreholes, excavating fifty-nine test pits, and installing nineteen monitoring wells. Numerous soil and groundwater samples were submitted for a variety of analysis to characterize the potential contamination. The Phase 2 ESA determined:

- the primary contaminants of concern are arsenic and hydrocarbons that are characterized by total metals and PHC F1 and F2 analysis respectively;
- secondary contaminants do exist, however, they are localized and coincide with the primary contaminants (the exception to this is lead nitrate and/or cyanide in soil at Cold Storage #3);
- localized areas of ARD exist, however additional monitoring is necessary to evaluate the significance of the drainage;
- neutral pH leaching of arsenic is widespread with the greatest concentrations existing at or downgradient of areas with hydrocarbon contamination, potentially as a result of changes in the soil geochemistry;
- although neutral leaching and localized ARD is indicated, the metal loading is low because the site is located on a low hill (i.e., groundwater recharge from precipitation only);

- due to the low arsenic loading, it is unlikely that a measurable effect would exist in Contwoyto Lake;

- arsenic concentrations in the development rock pad beneath the site are elevated in relation to federal reference criteria and background concentrations; and

- 40,000 m^3 (bank) of hydrocarbon impacted soil is estimated to exist in twelve locations plus an additional 800 m^3 of nitrate and/or cyanide containing soil and 2,000 m^3 of soil with traces of ore fines.

The hydrocarbon-impacted soil can be disposed of in the mine workings (i.e., as proposed in the mine closure plan). Removal of the hydrocarbon-contaminated soil may also result in a reduction of dissolved arsenic concentrations due to changes in the soil geochemistry. Continued monitoring and sampling of the site wells and seeps should allow trends in metal concentrations to be established. Direct measurement of water quality discharging from the site will provide the best indication of whether there are significant ARD/ML concerns at the site. A Human Health and Ecological Risk Assessment is necessary to establish site-specific remediation criteria for metals and to identify an appropriate site closure strategy.

TABLE OF CONTENTS

TABLE OF CONTENTS cont'd

TABLE OF CONTENTS cont'd

TABLE OF CONTENTS cont'd

TABLE OF CONTENTS cont'd

Page

EMBEDDED TABLES

TABLE OF CONTENTS cont'd

Page

EMBEDDED TABLES cont'd

EMBEDDED FIGURES

ATTACHED TABLES

TABLE OF CONTENTS cont'd

Page

ATTACHED TABLES cont'd

ATTACHED DRAWINGS

APPENDICES

T:\2005\A053017\2006\REPORTS\R111MTA.DOC

1. INTRODUCTION

Morrow Environmental Consultants Inc. (Morrow), a member of the SNC-Lavalin Group, was retained by Kinross Gold Corporation (Kinross) to carry out a Phase 1 and Phase 2 Environmental Site Assessment (ESA) for the Lupin Gold Mine, Nunavut. The work was commissioned in 2005 to allow Kinross to plan for mine closure activities in 2006. The Lupin mine was operated by Echo Bay Mines, Ltd. (Echo Bay), which was recently acquired by Kinross. As such, the terms Kinross and Echo Bay are used interchangeably within this report.

1.1. Definition of Site

The Lupin Gold Mine is located on the western shore of Contwoyto Lake, approximately 285 km southeast of the community of Kugluktuk and approximately 400 km northeast of Yellowknife, at 65° 46' Latitude and 111° 14' Longitude. The location is shown on Drawing A053017-001, attached.

The mine has been in operation since 1982 and is a self-contained facility that includes an airstrip, underground mine workings, an ore processing mill and refinery, a tailings containment area (TCA), electric power generation through the use of diesel-fired generators, accommodations for over 300 people, and numerous maintenance shops. A more detailed description of the site facilities is provided in Section 4.

For the purposes of this ESA, the 'Site' is defined as the surface parcel/lease for land occupied by the mine and mill site only, along with the associated roads and water supply facilities at Contwoyto lake. The TCA and associated #1 dump pond are part of an existing separate reclamation plan and is not the subject of this assessment. Similarly, the airstrip will remain in place under a separate lease and is not part of this subject assessment.

1.2. Objective and Scope of Work

The Phase 1 ESA was conducted to identify areas of potential environmental concern (APECs) and associated potential contaminants of concern (PCOCs) at the Site. The Phase 1 ESA included a combination of desktop information review (including background information and previous reports), interviews, and a site inspection.

The Phase 2 ESA was completed to assess PCOCs in each APEC identified during the Phase 1 ESA. The scope of work for the Phase 2 ESA included:

- surface soil sampling;
- soil sampling from test pits;
- groundwater sampling from monitoring wells;
- surface water seep sampling;
- hydraulic conductivity testing; and
- evaluation of laboratory data.

The ESA fieldwork was completed between July 2005 and September 2005 in general accordance with the scope of work prepared by Morrow for Kinross, dated March 10, 2005.

The 2005 site work also included a regulated building material assessment. This information has been presented under separate cover and is not discussed further here.

All work was conducted in accordance with the following standards, within the limitations noted in Section 1.4:

- *Canadian Standards Association Z768-01, A Standard for Phase 1 Environmental Site Assessments.*
- *Canadian Standards Association Z769, A Standard for Phase 2 Environmental Site Assessments.*

1.3. Report Structure

The report structure and information contained within each section are summarized on the following pages:

- 1. Introduction - Introduces the project with study objectives and scope of work, and briefly describes the site.

- 2. Phase 1 ESA Methodology - Describes the methodology for the background review and historical records searches.
- 3. Background Information - Presents background information on the geology, hydrogeology, climate, and vegetation in the area of the site.
- 4. Detailed Site Description and History of Operations - Presents detailed information on the site facilities and history of operations based on the Phase 1 ESA research and site inspection.
- 5. Regulatory Framework - Summarizes the regulatory context for the investigation.
- 6. Previous Assessment Data - Summarizes the findings of previous studies that are relevant to the Phase 2 ESA.
- 7. Phase 1 ESA Results and Rationale for Phase 2 ESA - Summarizes the findings from the Phase 1 ESA, and presents the rationale for the Phase 2 ESA.
- 8. Phase 2 ESA Methodology - Presents the methodology for the Phase 2 ESA.
- 9. Phase 2 ESA Results - Presents the results for the Phase 2 ESA.
- 10. Discussion of Phase 2 ESA - Discussion for the Phase 2 ESA results.
- 11. Conclusions - Provides a summary of the project findings.
- 12. General Limitations and Confidentiality - Standard closure statement.

1.4. Limiting Factors

The findings contained in this report are based, in part, upon information provided by others. Where possible, information obtained through interviews was corroborated through other sources. If any of the information is inaccurate, modifications to the findings, conclusions, and recommendations may be necessary. Given the unique nature of the site (large size, far north location), professional judgment was utilized to design some aspects of the assessment. The General Limitations are provided in Section 12 of this report.

2. PHASE 1 ESA METHODOLOGY

A review of available background and historical information, interviews, and site inspections were completed for the Phase 1 ESA to compile a history of site usage on the subject property and the surrounding areas and to identify APECs and the corresponding PCOCs.

Given the relatively recent development of the mine (1982), reports or drawings were available that provided a detailed history of the mine design and development. On-site staff who had been involved with the mine since early operation and were knowledgeable about historical activities were interviewed during the on-site inspections. These sources of information provided complete and detailed information and provided the bulk of the information gathered for the Phase 1 ESA. Historical aerial photographs and government reports were also consulted for relavent information. The sources of information consulted for the Phase 1 ESA are detailed in the following sections.

2.1. Interviews

Kinross staff who had been involved with the mine since early operation and were knowledgeable about historical activities were interviewed by phone, or in person during the on-site inspections. Information obtained during the interviews is provided in Appendix I.

2.2. Previous Reports

The following previous reports were available and were reviewed for information relevant to the subject ESA:

- Kinross Gold Corp. - Lupin Mine 2004 Final Abandonment and Restoration Plan, February, 2005 (FARP).
- Vizon Scitec, *Results of Meteoric Water Mobility Procedure (MWMP)*, June 07, 2005.
- URS Canada Inc., *ARD/ML Assessment of Waste Rock at Lupin Mine*, February 7, 2005.
- Indian and Northern Affairs Canada, *August 19, 2002 Water Licence Inspection - Report,* dated March 25, 2003.

- Indian and Northern Affairs Canada, *Lupin Mine Water Licence Inspection July 7, 2004 and July 13, 2004,* dated November 17, 2004.

- Klohn Leonoff, *Column Leaching Study, Evaluation of ARD Control Measures,* dated December 1993.

- Klohn Leonoff, *Acid Rock Drainage Study, Lupin Mine, Northwest Territories,* March 1992a.

- Geocon (1975) Ltd, Geotechnical Report on Proposed Plant and Residential Sites, Lupin Project, Contwoyto Lake, July 12, 1980.

It is noted that the 2005 FARP contains a detailed summary/compilation of the mine operation history and the results of previous studies. Relevant information from the FARP has been included in this report.

The following reports are also referenced in the FARP, however since the reports are specific to the TCA area, they were not reviewed for purposes of this ESA. However, information in some of the risk assessment reports may be relevant to the development of a management plan for the Site:

- Golder Associates Ltd., *Lupin Gold Mine Environmental Effects Monitoring Study Design*, December 2004.

- Golder Associates Ltd., *Studies Related to Water Licence Requirements and in Support of Reclamation Planning (Lupin Mine),* December 2004a.

- Golder Associates Ltd., *Ecological Risk Assessment for Lupin Mine Tailings Containment Area,* December 2004b.

- Golder Associates, *2004 Dam Safety Review, Perimeter Tailings Dams*, December 2004c.

- Holubec, I. and Hohnstein, D., *Partially Saturated Granular Cover for Reactive Tailings in Permafrost,* paper presented at 7th International Symposium of Mining in the Arctic, Iqaluit, NU, April 2003.

- Holubec Consulting, *Covers for Reactive Tailings Located in Permafrost Regions Review (Draft),* prepared for Mine Environment Neutral Drainage (MEND) Program, May 2004.

- Holubec Consulting, *Lupin Operation – Closure Plan for Tailings Containment Area*, January 2005.

- Klohn Leonoff, *Assessment of Water Chemistry and Remedial Measures for the Lupin Tailings Effluent System*, July 1992b.

- Klohn-Crippen, *Tailings Reclamation Test Cover Program, 1994 Report of Activities*, August 1995.

- Reid, Crowther & Partners: RL&L Environmental, *Report on Aquatic Studies Program for EchoBay Mines Ltd*, February 1985.

2.3. Historical Drawings and Maps

A large collection of historical design drawings were available in the drafting department at the mine. Morrow staff reviewed the drawings and obtained copies of drawings that provided relevant information. Specifically, the following historical drawings provided information that was utilized in the Phase 1 ESA:

- drawing entitled *Fuel Oil Storage & Distribution P&I Diagram*, Drawing 20D-A-401, dated November 30, 1981 (by Bechtel Canada Limited for Echo Bay Mines Ltd.);

- drawing entitled *Fuel Oil Supply & Storage P&I Diagram*, Drawing 20D-A-402, dated December 22, 1987 (by Echo Bay Mines Ltd.);

- drawing entitled *Plant Complex Arrangement Lower Floor Plan*, Drawing 41E-A-405 dated October 21, 1981 (by Bechtel Canada Limited for Echo Bay Mines Ltd.);

- drawing entitled *Echo Bay Mines Ltd., Lupin Project,* drawing 33D-A-003 (Index 93203.90) dated August 11, 1999, by Factory Mutual Engineering Association;

- untitled digital drawing showing all current and former fuel tanks provided by Kinross; and

- untitled digital drawing showing sketch lines of underground utility locations provided by Kinross

Kinross also provided geologic maps, which are described in Section 3.3.

2.4. Historical Aerial Photographs

The following historical aerial photographs of the property were reviewed:

- Orthographic Aerial Photo G018040-7-077 August 2001; and
- an undated Air Photo, approximately 1995.

Copies of the photographs are provided in Appendix II.

3. BACKGROUND INFORMATION

The following sections provide information on the environmental setting of the site.

3.1. Topography

The site is in the tundra zone of the Canadian Shield, an area of continuous permafrost. Terrain in the vicinity of the site is generally low and undulating, ranging between 470 m and 505 m elevation. The study area is situated on top of a slight hill whose height is augmented by the development rock used to form the footprint of the mine site development. Contours for the topography are shown on the Site Plan, Drawing A05-3017-002.

3.2. Surface Water and Hydrology

Contwoyto Lake is the major water body in the region, with a surface area of approximately 95,900 ha and a drainage area of 8,000 km^2. Contwoyto Lake has two outlets: the Burnside River, which flows from the northwest end of the lake towards Bathurst Inlet; and Back River at the southeast end of the lake, which flows into Pellatt Lake. The main body of Contwoyto Lake exists approximately 1.5 km to the east and south of the mine site.

Numerous shallow lakes and streams occur in depressions around the area of the site. To the southwest of the mill area, two sewage lagoons/ponds are present. Up to thirteen seeps were identified around the perimeter of the mine site, at the locations shown on Drawing A053017-002.

All of the small lakes and ponds freeze to the bottom in winter, and a 1 m to 3 m thick layer of ice forms on Contwoyto Lake. More details on seasonal/climate effects are described in Section 3.4.

3.3. Geology

An understanding of the area geology is important as natural background metals concentrations may be elevated in relation to environmental assessment criteria.

Copies of select geology maps for the area of the Lupin mine are provided in Appendix III. The map *Contwoyto Project Geology*, prepared by Echo Bay Mines Ltd., January 1996, shows the setting of the mine site in the region. A second map, entitled *Lupin Geology (date unknown)*

shows the detailed geology and mineralization at and immediately surrounding the Lupin site. It is notable that there are mineralized (i.e., iron sulphide) veins that extend beyond the area that was mined and naturally elevated metals concentrations would be expected to be associated with those veins.

The Lupin deposit is situated in an Archean metaturbidite sequence of the Contwoyto Formation, part of the Yellowknife Supergroup of supracrustal metasedimentary and metavolcanic rocks of the Slave Geologic Province. The rocks have been subjected to both regional and contact metamorphism and to several phases of deformation and intrusion.

The Lupin ore unit is composed of the Centre Zone, East Zone, West Zone, and L19 Zone all of which are contained within a continuous, isoclinally folded, steeply dipping unit of amphibolitic iron formation within the Contwoyto Formation. This unit has been followed for a strike length of 3,000 m and a dip length of 1,500 m. Several phases of deformation have resulted in steeply plunging fold noses and steeply dipping fold limbs. The resulting pattern is 'M' shaped, consisting of a northerly-plunging syncline and adjacent anticlines to the west and east. The West Zone forms the west limb of the west anticline, the Centre Zone the west limb of the syncline, and the East Zone the east limb of the syncline. Most of the gold occurred in the West Zone and Centre Zone. A lesser amount was found in the East Zone. The L-19 Zone did not contain economic concentrations of gold and was not mined.

The iron formation is a well laminated unit and consists of both silicate facies and sulphide facies metamorphosed to an amphibolite + quartz rich rock. The gold is found primarily within the sulphide rich iron formation. The ore at Lupin consists of amphibole, quartz, garnet, pyrrhotite, arsenopyrite, minor pyrite, and traces of chalcopyrite. The gold is fine-grained (generally less than 100 microns in diameter) and is associated mainly with the pyrrhotite and arsenopyrite. Although not common, visible gold is sometimes found and is usually in close proximity to quartz veining. Also found in trace amounts are scheelite, apatite, epidote, calcite, tourmaline, and some arsenides (notably loellingite). Arsenopyrite occurs as metacrysts, up to 2 cm in diameter, which often have loellingite cores. Much of the gold associated with these arsenides occurs at the arsenopyrite - loellingite boundaries within these metacrysts. Gold is also finely disseminated within pyrrhotite and silicates, and is rarely visible to the naked eye.

The McPherson Zones (M1 and M2) are in iron formation lenses separate from the main Lupin ore unit, contain economic quantities of gold, and were mined. They trend parallel to the West

Zone at approximately 60 m and 80 m east of it near the latitude of the shaft. The M1 and M2 Zones contain a higher proportion of pelitic beds than the main Lupin ore unit. Gold is locally present in the pelitic beds, and visible gold is more common in the M1 and M2 Zones than in mineralized zones of the main ore body.

Also provided in Appendix III is a Drawing entitled *Background Arsenic in Sediment* (Kinross Dwg.1607-11 Geochemical Lake Sediment Survey Arsenic). The map shows arsenic concentrations in lake sediment samples collected before January 1982 (i.e., prior to the development of the Lupin mine). The concentrations are natural and reflect the distribution of arsenic in lake sediments as a result of 2.5 billion years of weathering. The Kinross geologist who compiled the data noted that there were anomalously high concentrations of arsenic in many places on the Lupin Leases. The highest concentration of arsenic on the property (100 mg/kg to 200 mg/kg range) was found in lake sediment from a z-shaped lake that lies on the Lupin Shear approximately 1 km southeast of the site. The elevated concentration is likely the consequence of fluids migrating along the shear during and after gold emplacement about 2.5 billion years ago.

At the time of writing this report, no information was available on the concentrations of metals in surface soils at the mine site prior to development of the mine.

3.4. Climate

Table A shows the monthly precipitation from snow and rain, as measured at the Lupin weather station, between 1982 and 2004.

TABLE A: Monthly Precipitation at Lupin, Nunavut

Total Monthly Precipitation (mm water equivalent; 1 cm snow = 1 mm water)													
	Jan.	**Feb.**	**March**	**April**	**May**	**June**	**July**	**Aug.**	**Sept.**	**Oct.**	**Nov.**	**Dec.**	**Year**
1982	no readings taken			13.2	12.8	43.9	35.0	62.6	36.6	21.6	14.1	15.0	
1983	24.3	5.5	16.8	16.5	18.0	10.4	77.8	75.4	77.0	41.8	10.4	6.0	379.9
1984	6.8	19.4	16.2	19.3	17.8	60.0	69.6	53.7	19.8	25.5	13.2	9.2	330.5
1985	9.2	11.6	10.4	25.8	10.2	19.4	89.0	46.6	44.5	24.0	9.4	6.6	306.7
1986	20.0	9.2	4.6	19.7	29.2	17.5	18.0	100.8	30.0	28.0	13.6	12.8	303.4
1987	11.6	6.6	5.6	6.6	8.7	67.8	41.8	47.0	35.0	34.1	45.0	25.4	335.2
1988	1.6	3.6	4.4	6.0	10.8	50.3	32.0	18.7	43.4	32.2	22.2	8.2	233.4
1989	20.0	4.0	10.2	3.3	36.1	6.3	35.0	27.5	33.7	12.0	14.4	16.6	219.1
1990	11.8	6.0	12.0	8.3	2.4	23.5	23.3	54.0	48.5	20.1	9.2	14.7	233.8
1991	7.9	13.2	12.4	26.1	14.0	12.4	49.8	76.2	46.5	26.4	18.0	19.4	322.3
1992	11.8	8.6	9.8	20.4	21.5	22.2	14.8	47.0	31.2	43.8	15.4	4.2	250.7
1993	3.3	14.2	13.2	6.2	28.4	27.8	87.0	28.8	29.9	19.4	14.8	12.0	285.0
1994	3.4	2.2	22.0	8.2	15.4	39.2	13.8	47.2	43.4	29.2	11.0	14.8	249.8
1995	5.2	3.4	38.8	6.6	8.4	20.8	40.2	79.0	49.4	36.0	7.4	23.8	319.0
1996	5.8	18.4	4.4	8.0	24.8	54.0	57.5	130.8	68.8	13.0	13.6	6.6	405.7
1997	6.0	6.6	6.8	12.8	27.2	21.2	18.2	58.7	25.6	46.2	12.6	18.6	260.5
1998	5.2	8.2	5.6	17.8	19.2	38.4	57.4	55.2	62.6	52.2	17.0	21.6	360.4
1999	9.8	6.6	14.4	25.0	25.6	19.6	62.4	57.2	84.2	23.8	13.4	30.8	372.8
2000	3.8	5.4	8.0	12.4	18.6	4.6	27.2	49.2	58.6	44.2	14.0	7.8	253.8
2001	6.4	7.6	26.4	30.2	48.2	6.4	45.0	46.4	9.4	20.0	27.6	12.0	285.6
2002	7.6	2.2	6.2	15.8	4.4	43.6	67.0	93.8	52.2	15.2	20.2	11.4	339.6
2003	3.8	0.4	19.8	3.4	23.4	18.6	43.8	68.6	36.0	28.4	31.3	15.6	293.1
2004	10.8	12.4	9.2	19.6	6.0	21.2	12.2	111.0	61.2	30.0	30.2	3.4	327.2
Avg	8.9	8.0	12.6	14.4	18.7	28.2	44.3	62.4	44.7	29.0	17.3	13.8	303.1

Climate in this region is classed as semi-arid subarctic, with an average annual precipitation of just over 300 mm and a mean daily temperature of -11.0^{O}C. Average temperature for the months of May through September is 4.6^{O}C (Canadian Climate Normals 1961 - 2000). Table B summarizes the monthly mean temperatures at the site. Precipitation is heaviest in the months June through September. Snowfall can occur during any month, although heaviest snowfalls generally occur in October. The average annual snowfall is 138.1 cm. The prevailing winds in the Lupin area are from the northwest.

Snowmelt is generally complete by the end of June. Break-up on Contwoyto Lake begins in mid-July, although in some years the lake is not ice free until early August. Small lakes in the region are ice free by early July. Ice starts to reform on small lakes of the surrounded area in late August or early September. Complete freeze-over of Contwoyto Lake occurs in October.

TABLE B: Monthly Temperature at Lupin, Nunavut

Mean Monthly Temperatures (°C) at Lupin, NU													
	Jan.	**Feb.**	**March**	**April**	**May**	**June**	**July**	**Aug.**	**Sept.**	**Oct.**	**Nov.**	**Dec.**	**Avg.**
1982	-36.0	-28.5	-27.5	-19.8	-5.6	4.9	11.5	7.3	0.9	-7.2	-26.0	-29.8	-13.0
1983	-28.8	-33.4	-28.8	-17.1	-14.0	5.3	10.3	9.3	2.4	-9.4	-13.9	-27.1	-12.1
1984	-32.2	-25.8	-25.2	-12.0	-3.9	8.1	12.7	9.7	-0.1	-9.2	-21.8	-32.4	-11.0
1985	-27.7	-34.7	-26.5	-19.6	-1.6	6.6	7.7	6.3	0.8	-10.0	-23.3	-25.1	-12.3
1986	-31.8	-26.9	-27.6	-19.0	-5.7	3.0	10.4	7.0	1.5	-9.6	-24.1	-24.9	-12.3
1987	-24.7	-25.5	-26.1	-15.4	-7.4	5.4	10.1	5.4	4.1	-8.1	-21.1	-19.5	-10.2
1988	-31.6	-31.7	-22.7	-15.4	-10.1	7.1	11.5	10.4	3.7	-8.3	-25.5	-27.5	-11.7
1989	-33.4	-22.5	-29.7	-15.3	-8.2	7.8	12.3	12.7	1.8	-8.0	-26.0	-29.1	-11.5
1990	-32.9	-34.6	-21.3	-14.6	-7.3	4.3	11.0	6.1	1.2	-9.3	-25.0	-31.2	-12.8
1991	-31.5	-30.6	-28.1	-13.9	-1.8	7.4	11.4	10.1	0.0	-10.6	-22.7	-27.8	-11.5
1992	-29.4	-29.0	-22.9	-17.5	-5.8	4.3	11.0	8.2	-1.2	-8.4	-18.5	-25.9	-11.3
1993	-25.6	-28.3	-21.4	-17.0	-5.7	4.7	10.4	9.2	0.3	-8.9	-21.9	-29.0	-11.1
1994	-34.5	-33.6	-21.7	-17.5	-2.5	8.1	13.9	10.5	2.2	-5.0	-18.5	-28.6	-10.6
1995	-24.9	-28.3	-25.6	-15.3	-7.2	8.5	8.9	8.7	0.8	-9.3	-20.6	-29.9	-11.2
1996	-31.7	-26.3	-25.8	-16.3	-7.1	9.8	14.2	7.5	5.2	-9.6	-20.4	-26.9	-10.6
1997	-30.3	-27.5	-27.6	-16.2	-6.5	6.0	13.4	9.9	4.8	-10.6	-15.1	-23.0	-10.2
1998	-33.5	-25.6	-22.0	-10.2	-0.4	8.3	13.8	11.4	3.5	-4.0	-12.9	-22.2	-7.8
1999	-28.6	-23.2	-19.6	-13.5	-5.0	6.8	8.4	8.7	2.3	-8.9	-16.9	-24.9	-9.5
2000	-26.2	-24.9	-22.4	-15.5	-3.9	7.4	15.0	9.0	1.1	-8.5	-18.8	-29.6	-9.8
2001	-25.5	-27.0	-23.8	-15.9	-4.6	3.9	12.3	8.5	5.9	-9.6	-20.5	-23.2	-10.0
2002	-28.3	-31.3	-25.5	-19.9	-8.3	7.3	12.1	8.1	2.5	-9.0	-17.4	-20.2	-10.8
2003	-27.3	-32.1	-26.1	-13.5	-5.2	5.6	13.5	10.3	3.7	-4.3	-18.9	-25.0	-9.9
2004	-32.3	-28.5	-28.4	-18.9	-11.1	5.2	11.6	6.2	0.8	-10.4	-21.7	-29.7	-13.1
Avg.	-29.9	-28.7	-25.1	-16.1	-6.0	6.3	11.6	8.7	2.1	-8.5	-20.5	-26.6	-11.1

The winter climate at this latitude is severe in intensity and duration and is followed by a short, warm summer. In winter, between 1 m and 3 m of ice develop on the surface of the lakes and it is the rate of melting of this ice that greatly influences summer conditions. The interaction between climate and morphology of the individual lakes gives rise to great differences in the thermal regime of the lakes.

3.5. Vegetation

The Lupin mine is located in the barren land tundra of Nunavut. It is typified as having a generous amount of low-lying vegetation extremely tolerant and well adapted to the climatic conditions. Some of the more prevalent types of habitat that can be found throughout the area include upland and lowland tundra, wet meadows, and gentle slopes.

Plentiful and diverse amounts of vegetation can be found everywhere consisting of grasses and sedges; ground cover such as mosses, labrador tea, cranberry, bilberry, bearberry, arctic white heather; in wet areas predominant species include cotton grass, bog rush, and other aquatic grasses; dwarf birch and willows populate trenches and colourful flowering plant species include fireweed, lapland rosebay, azalea, and saxifrage.

4. DETAILED SITE DESCRIPTON AND HISTORY OF OPERATIONS

The following sections provide a detailed description of the history of the mine operation and the facilities on the site that are relevant to this ESA. The bulk of the information in the following sections has been based on or copied from the FARP, supplemented with information gathered from the sources described in the previous sections. Photographs of the site are provided in Appendix II.

4.1. Site Location and Access

The Lupin Mine is located on the west shore of Contwoyto Lake, approximately 285 km southeast of Kugluktuk, Nunavut and approximately 400 km northeast of Yellowknife, N.W.T. The coordinates are $65^0$46' Latitude and $111^0$15' Longitude, and the mine lies approximately 80 km south of the Arctic Circle. The location is shown on Drawing A053017-001, attached.

Access to the mine site for personnel and small freight is by flights from Edmonton, AB, using commercial carrier to Yellowknife and chartered aircraft to Lupin mine site. Bulk supplies and large freight, including mobile heavy equipment, are transported to the site each winter by a 580 km long winter ice road that runs from Yellowknife, N.W.T., to the Lupin mine. Travel on the road is limited to a 6 week to 8 week period between February and March each year.

4.2. Exploration

The Lupin gold deposit was discovered in 1960 as a result of reconnaissance sampling and mapping programs conducted by the Canadian Nickel Company Ltd., a subsidiary of Inco Limited. Between 1961 and 1964 the Canadian Nickel Company Ltd. conducted exploration in the Lupin area, which included geological mapping, geophysical surveying, trenching, stripping, and channel sampling.

In February 1979, Echo Bay obtained an option on the Lupin property from Inco and proceeded with an underground exploration program. The geological information indicated the potential to develop in excess of two million tons of ore.

4.3. Construction and Operation

In 1980, development and construction of the Lupin Mine proceeded. A 5,000 foot gravel landing strip was prepared to bring construction equipment and materials to the site. Mill construction was completed on schedule in March 1982, with some expansions of the capacity in 1983 to increase the nominal capacity of 1,200 tons per day. From 1983 to 1993, the Lupin Mine underwent a number of other expansions and operational changes (e.g., power plant expansion, new hoist house) to increase milling capacity to a nominal 2,300 tons per day. In December 1994, a paste backfill plant was completed which allowed tailings to be deposited underground, thus reducing the amount of tailings reporting to the tailings containment area. A more detailed description of the site facilities is provided in Section 4.5. Drawing A053017-002, attached, shows the current configuration of the site.

Operations were temporarily suspended at Lupin between January 1998 and April 2000, and again from August 2003 to March 2004. Final operation of mining and milling was ceased in the spring of 2005, and the mill is currently in care and maintenance until final reclamation activities are confirmed.

4.4. Underground Mining Facilities

The FARP details the shaft and decline mining method used at the site. Only mining activities that intercepted the surface are discussed below.

During the last few years of mining, the crown pillars of the Lupin orebody were recovered. The crown pillars were the portions of the East, Centre, and West zones between surface and 27 m level that were left behind when the initial mining was carried out. The East Zone crown pillar was recovered in 1997 and was completely backfilled with waste rock and non-hazardous waste material in 1998. Mining of most of the Centre Zone crown was completed in 2003 and it was backfilled with pastefill that same year. A small portion of the Centre Zone crown pillar was mined during 2004 and remains open for the deposition of non-hazardous waste material. The West Zone crown pillar was mined between 1996 and 2004, and has been left open for the future disposal of hydrocarbon and metals impacted soils. It is estimated that 36,000 m^3 to 65,000 m^3 volume[1] is available for disposal in these open stopes. A photograph of the open stopes is provided as Photograph 7, Appendix II.

[1] Discrepancy between verbal reports from Kinross personnel, and that presented in the FARP.

It is planned for the crown pillar openings to be completely filled in and the surface capping material contoured during reclamation activities.

4.5. Surface Facilities

Other than the transportation requirement for materials and supplies necessary to sustain the workforce and industrial operations, the Lupin site is completely self-contained and relatively compact.

A site plan is provided as Drawing A053017-002, attached. The main features of the site include:

1) An airstrip for delivery of material and personnel by air. A former (original) airstrip is located to the southwest of the site.

2) A main diesel fuel tank farm (Photographs 4, 13, and 19), satellite fuel tank farm, and diesel generator powerhouse (including "day" fuel tanks) (Photograph 5), along with an emergency powerhouse (Photograph 20) which provides power for the facility.

3) An industrial complex comprised of milling and maintenance areas, as detailed on Drawing A053017-003, attached, and including the following:

   - powerhouse/power plant (as referenced in point 2);
   - shaft house;
   - hoist house;
   - crushing plant;
   - screen house;
   - grinding building;
   - fine ore building;
   - recovery plant/complex;
   - underground equipment storage area; and
   - rebuild shop (for repairing underground equipment).

4) A residential complex consisting of accommodations, kitchen, and recreation centre.

5) Support areas which include:

- The freshwater pump house is situated approximately 1.6 km northwest of the camp, on the shore of Contwoyto Lake (Photograph 8);
- shops and yards (warehouse, surface shops, paste backfill plant, carpentry, etc.);
- storage/lay down areas and buildings;
- camp sewerage facilities, mill tailings line; and
- a weather/aircraft control office with exploration shack.

The TCA is located 3.5 km to the west of the mill area, however is not considered part of "the Site" for the purposes of this assessment. Because of the physical separation of the 2 sites, the TCA is being managed independently.

The following sections provide more detailed information on the facilities which are of particular interest due to their potential for to release contaminants into soil and groundwater:

- metallurgical processing facilities;
- hydrocarbon storage tanks and facilities;
- regulated materials storage facilities; and
- waste management facilities.

4.6. Metallurgical Processing Facilities

The Lupin milling process remained basically consistent since commissioning. Lupin utilizes the Merrill-Crowe process for gold recovery whereby a powdered zinc mixture was added to a gold bearing cyanide solution to precipitate out the gold. Lead nitrate was used in low doses to activate the zinc. The gold precipitate was then dried and melted in a furnace and poured into dore bars. The management and storage of the reagents is described in Section 4.7.

The crushing, grinding, pre-aeration, leaching, filtration, and recovery stages are detailed in the following sections. The location of the described facilities within the Mill is shown in Drawing A053017-003, attached.

4.6.1. Crushing

The ore was crushed underground to 5.5 inches by a primary jaw crusher. It was then skipped to a 600 ton coarse-ore bin on surface. A vibrating feeder and conveyor belt transported the ore to a secondary cone crusher. After being reduced to -1.5 inch, the ore passed over a double-deck vibrating screen. The material larger than 5/8 inch was fed into the tertiary cone crusher and re-circulated over the vibrating screen until passed through the 5/8-inch openings. The ore passing this screen was conveyed to two 1, 000 ton fine ore bins, which fed the grinding circuit. The crushing circuit could operate at a rate of 240 tons per hour.

4.6.2. Grinding

Liberation of the gold from the host rock was done by further reduction of the ore size. This was accomplished with a 9.5 ft. diameter x 12 ft. long rod mill feeding two 8 ft. x 24 ft. long ball mills in parallel. The ore was fed into the rod mill from the fine ore bins via belt feeders and conveyors. The ball mill discharge slurry was pumped to a common ball mill discharge or cyclone feed pump box, then to a cluster of cyclones which classified the material. Cyclone underflow (+200 mesh material) was fed back into the ball mills. The cyclone overflow slurry (-200 mesh material) was pumped to the pre-aeration circuit at about 30% solids. The grinding circuit operated at a maximum rate of 2,300 tons per day, with the target-grind being 57% passing -400 mesh.

4.6.3. Pre-Aeration

The cyclone overflow was fed to the center well of the pre-aeration thickener, a 50 ft. diameter shallow settling tank. The thickener overflow solution flowed by gravity to the recycle water tank and was recycled back to the grinding circuit. The thickener underflow slurry (60% solids) was pumped to the first of three 82,000 USG pre-aeration tanks. These tanks provided air to oxidize sulfide minerals, which would otherwise consume large amounts of cyanide and oxygen, thus hindering the leaching reaction. The circuit was tuned for efficient mechanical and chemical performance by operating under alkaline conditions (pH 10), adding lead nitrate reagent, and by using primary filtrate to dilute the thickener underflow density to 45% solids.

4.6.4. Leaching

The liberated gold particles were leached into solution through the reaction of cyanide, oxygen, and water. Slurry from the pre-aeration circuit was leached in six consecutive agitated and aerated tanks. Lime was added to the circuit to maintain a constant pH of about 10. These six tanks in series gave the circuit 30 hours of retention time. The overflow from Leach Tank No. 6 fed the cyanidation thickener. Thickener overflow solution was loaded with gold and flowed to the pregnant solution tank. The underflow, also containing some gold in solution, was pumped to the filtration circuit.

4.6.5. Filtration

A two-stage filtration system separated dissolved gold from the waste solids of the cyanide thickener underflow. Each stage consisted of four vacuum drum filters 8 ft. in diameter and 14 ft. long. In the first stage, the cyanidation thickener underflow slurry contacted the outside of the filter unit and the solution was drawn through the filter while the filter cake was washed with barren solution. The solution was returned to the cyanidation thickener or pumped to pre-aeration as dilution water. The filter cake passed through a repulper to a second stage. The second stage filter cake was washed with either barren or raw water and the solution was again returned to the cyanidation thickener. The filter cake was repulped with barren or raw water and flowed by gravity to the tailings disposal pump box.

4.6.6. Recovery

The pregnant solution from the cyanidation thickener overflow was clarified and de-aerated, precipitated, and refined to obtain dore bullion in a conventional Merrill-Crowe system. Three pressure clarifiers removed suspended solids from the solution, and then the oxygen was removed prior to precipitation in a de-aeration or Crowe tower. Zinc dust was added to the clarified de-aerated solution and the precipitated gold was collected in precipitation presses. The barren solution was bled to tailings and recirculated throughout the plant. Once the filter press became loaded with precipitate, the feed was transferred to the other presses and the loaded press is emptied. After being mixed with suitable fluxes, the precipitate was smelted in the bullion furnace to produce dore bullion and slag. The slag is returned to the mill to be reprocessed. The bullion contains approximately 85% gold and 12% silver, the balance being base metals.

4.7. Regulated Materials Storage

Regulated materials that were used in mine operations were stored as follows:

- lime (1 tonne and 25 kg bags) and zinc dust were stored in Cold Storage Building #2 (Photograph 28);
- lead nitrate (1 tonne bags) and cyanide (cubes) were stored in former Cold Storage Building #3 (now removed) (Photograph 28);
- battery acid was stored in a storage building on the south side of the warehouse;
- cement mix was stored in the cement storage (paste backfill) building; and
- salt was stored in an area at the north side of the site, and then used in the brine mixing area to mix a 3% to 6% (by weight) brine solution for use in drill water delivered to the upper levels of the workings which are in permafrost (Photograph 21).

4.8. Hydrocarbon Storage Tanks and Facilities

Diesel-type fuel and/or fuel oil (either P-40 or P-50, herein referred to as “diesel”) was used at the site to power the generators and to fuel equipment at the site. The diesel was trucked to the site in tankers using the winter haul road and stored in the main tank farm located to the northwest of the mill. An above ground pipeline (Photograph 15) was used to convey diesel from the main tank farm to a satellite tank farm and then underground to pump dispensers and powerhouse day tanks. The pipelines operated by pressure (not suction). A fuel line used to pump diesel fuel to underground storage was located on the west of the mill, adjacent the brine mixing area. Jet-A fuel was also stored in one tank in the main tank farm for aviation use. Gasoline was stored in two tanks within the satellite tank farm for automobile and small engine use. A number of diesel tanks were located throughout the mine site to fuel various backup generators in the event of a powerhouse failure. These storage tank locations are shown on the Site Plan, and also summarized in Table C. Fuel facilities were also present at the following areas off-site from the area shown on the Site Plan: 1) at the water intake pump (for emergency use); 2) former fuelling area for boats, near dock at Contwoyto lake; and 3) former fuelling area for airstrip (Photograph 16). Drums of diesel and Jet-A fuel are/were stored by third parties near the winter haul road.

All storage tanks were above ground and had a secondary containment (lined berm or steel pan). No underground (buried) storage tanks were identified or reported at the site.

An inventory of all hydrocarbon storage tanks at the site is provided in Table C. Included in the table is glycols (glycols used in radiators to cool the generators in the powerhouse, as well as to heat the remainder of the mill buildings) and used oil (refer to Section 4.9.7).

Total capacities were approximately:

- 4,800,000 Gallons Diesel;
- 360,000 Gallons Jet-A;
- 20,000 Gallons Used Oil; and
- 500 Gallons Glycols.

TABLE C: Inventory of Hydrocarbon Storage Tanks

Location	Tank Number	Size (Gallons)	Fuel Type	Status
Main Tank Farm	1	187,000	Diesel	Active
	2	187,000	Diesel	Active
	3	350,000	Diesel	Active
	4	350,000	Diesel	Empty
	5	350,000	Diesel	Empty
	6	350,000	Diesel	Active
	7	350,000	Diesel	Active
	8	350,000	Diesel	Active
	9	350,000	Diesel	Active
	10	350,000	Diesel	Active
	11	350,000	Diesel	Active
	12	350,000	Diesel	Active
	13	360,000	Diesel	Active
	14	360,000	Diesel	Active
	15	360,000	Jet A	Active
	16	108,000	Used	Partially Filled
	17	108,000	Used	Empty
	18	108,000	Used	Empty
	19	108,000	Used	Empty
	20	108,000	Used	Empty
	21	108,000	Used	Empty

TABLE C cont'd: Inventory of Hydrocarbon Storage Tanks

Location	Tank Number	Size (Gallons)	Fuel Type	Status
Satellite Tank Farm	1	20,000	Diesel	Active
	2	20,000	Diesel	Active
	3	20,000	Diesel	Active
	4	20,000	Diesel	Active
	5	5,000	Gasoline	Active
	6	5,000	Gasoline	Active
	7	20,000	Diesel	Active
	8	20,000	Diesel	Active
	9	20,000	Diesel	Active
	10	20,000	Diesel	Active
	11	20,000	Diesel	Active
	12	20,000	Diesel	Active
Powerhouse Day Tanks	1	500	Diesel	Active
	2	500	Diesel	Active
	3	500	Diesel	Active
	4	500	Diesel	Active
	5	500	Diesel	Active
	6	300	Diesel	Active
	7	300	Diesel	Active
	8	300	Diesel	Active
	9	300	Diesel	Active
	10	300	Diesel	Active
	11	790	Diesel	Active
	12	790	Diesel	Active
	13	500	Glycols	Active
Emergency Powerhouse	1	500	Diesel	Active
	2	500	Diesel	Active
Mill	1	2,000	Diesel	Active
	2	500	Diesel	Active
	3	500	Diesel	Active
South End Paste Backfill Building	1	1,000	Diesel	Former
Former Surface Shop#1	1	14,000	Diesel	Former
RTL surface Shop	1	500	Diesel	Active
Incinerator	1	1,000	Diesel	Active
Guest House	1	1,000	Diesel	Active
Offices	1	1,000	Diesel	Active
Water Intake Generator	1	500	Diesel	Active
Boat Fuelling Area	1	500	Gasoline	Former
Used Oil Storage	1	10,000	Used Oil	Active
	2	10,000	Used Oil	Active

4.9. Waste Management

4.9.1. Development/Waste Rock

During development of the mine, the generated waste rock was placed around the footprint of the mine/mill to form a 'pad' on which facilities could be built. While the mine was in operation, waste rock was used as roadbed material, in dams, in the airstrip, or as underground backfill.

Approximately 1,000,000 m^3 of development rock, some of which was potentially mineralized, was used as construction material on-site (laydowns, roads, dams, etc.) since 1982.

4.9.2. Solid Waste

A diesel fired incinerator was used to burn scrap food and the residual ash was placed into the landfill. Other burnable solid waste was collected into two burn pits – one near the north portal for underground solid wastes (Photograph 39) and one at the south side of the site for surface wastes (Photograph 6). The solid waste was burned in the burn pits (used oil or diesel used as a starter), and then the residual solids were placed in a landfill at the south side of the site (Photograph 6). The land filled materials were covered with lifts of soil or waste rock.

4.9.3. Sewage

Sewage and domestic grey water was pumped via a pipeline to a sewage lagoon/pond disposal system for treatment by 'natural degradation'. The system features two small unnamed ponds created by the construction of coffer dams in a depressed area to the southwest of the mill (formerly named Chaffee Lake). The lower pond discharges into empty an unnamed drainage area towards Contwoyto Lake. The discharge quality is monitored under the Water Licence.

4.9.4. Minewater

The underground workings has an average water inflow of between 45 L/min. and 95 L/min. Prior to the mid-1990s, the workings were dewatered into the upper sewage pond at the location shown on the Site Plan. An area of eroded soil was observed where the water had been discharged. Following the mid-1990s, the mine water was pumped to the TCA along with the tailings.

4.9.5. Tailings

Tailings are piped to the TCA. The TCA has been studied separately and is not the subject of this report.

4.9.6. Floor Drainage Sumps

The following floor drainage sumps were present in buildings on the site, and are shown on Drawings A053017-002 and A053017-003.

- All floor drains in the mill complex drain to two main sumps in the recovery complex; the sumps are pumped to the tailings line (Photograph 25).
- Floor drains in the surface shop drain to a main sump/separator, from which any oil accumulations are removed as necessary. The sump is pumped to the sewer line.
- Floor drains in the powerhouse drain to a sump located between the boilers, which are believed to be pumped to the sewage line (or else the tailings line).
- There is a groundwater sump located in the powerhouse, which pumps groundwater accumulated below the powerhouse to the tailings line. The sump pump is controlled by a float switch (Photograph 19).

4.9.7. Used Oil and Grease

All used oil and grease from underground operations was brought to surface for disposal. Some used oil from underground operations was used to bind the runway prior to the mid 1990s. Used oil from the surface and underground shops was placed in the two used oil above ground storage tanks (ASTs) located south of the Powerhouse (Photograph 5). The tanks are emptied into a tanker truck for off-site transport (via the winter ice road) and disposal as required. Otherwise, oil and grease wastes were consolidated in to cubes and drums and stored on the south side of the main tank farm for eventual off-site disposal.

5. REGULATORY FRAMEWORK

The territory of Nunavut was created on April 1, 1999 through the Nunavut Land Claim Agreement (NLCA). At present, the regulatory process in Nunavut is co-managed by the Government of Canada (GoC), Nunavut Tunngavik Incorporated (NTI), Regional Inuit Associations (RIAs), the Government of Nunavut (GN), and Institutions of Public Government (IPGs). Each has specific mandates and responsibilities; however, there is some overlap.

Nunavut is made up of three regions; Kitikmeot, Kivalliq, and Qikiqtani (or Baffin). Land in Nunavut can be classified as either: Crown land, Inuit Owned Land (IOL) surface land, IOL surface/subsurface lands, or Commissioners land. The subject site is situated on crown-owned land in the Kitikmeot region.

Abandonment and reclamation of mine sites in Nunavut is regulated under the following instruments[2] which are detailed in the following sections:

- Indian and Northern Affairs Canada (INAC) land lease; and
- Nunavut Water Board (NWB) water licence.

5.1. INAC Land Lease

INAC administers Crown land through the Territorial Lands Act (TLA) which provides for the disposition, use, and protection of territorial lands. The TLA and its regulations govern the administration and disposition of mineral rights and access to these rights.

A list of the surface and mining leases pertaining to the Lupin Mine is presented in Table D. Surface Lease 76 E 14-1-9 consists of ten separate parcels of land which constitute the mine site, the TCA, the powder magazine, and the tailings pipeline corridor between the mill and the TCA. A separate surface lease (76 E 14-2-10) applies to the airstrip.

It is noted that for purposes of this ESA, the "Site" is defined as only that part of Lease 76E/14-1-9 that is occupied by the mine site, as described in Section 1.

[2] Based on *"Exploration and Mining on Crown Lands in Nunavut Guidebook"* published under the authority of the Minister of Indian Affairs and Northern Development, Ottawa, 2005

TABLE D: Mineral and Surface Leases, Lupin

Name	Type	Desc.	Expiry	Area (ha)
76E/14-1-9	Surface Lease	Minesite (Site), TCA	31-Mar-2012	1,035.79
76E/14-2-10	Surface Lease	Airstrip	31-Mar-2012	53.16
76E/11-2-4	Surface Lease	Fingers Lake Quarry, access road	31-Mar-2012	137.80
76E/11-3-4	Surface Lease	Fingers Lake Waterlot – dock	31-Mar-2012	0.43
76E/14-10-3	Surface Lease	VOR Navigation aid site	31-Mar-2012	0.09
2428	Mining Lease	Lot 1, Group 1216 Quad 76E11/14	12-Jul-2013	2,831.59
3275	Mining Lease	Lot 1003 Quad 76E\11	27-Sep-2009	927.13
3276	Mining Lease	Lot 1002 Quad 76E\11	27-Sep-2009	891.92
3277	Mining Lease	Lot 1004 Quad 76E\11	27-Sep-2009	959.10
3278	Mining Lease	Lot 1001 Quad 76E\11	27-Sep-2009	1,148.09

5.2. Water License

Under Article 13 of the NLCA and Nunavut Waters and Nunavut Surface Right Tribunal Act (NW&NSRTA), the NWB is responsible for issuing water licences that allows the use of water and deposit of waste into water. Under the NW&NSRTA, INAC participates as an intervener in the licencing process and, once issued, enforcing the terms and conditions of the NWB water licences. The NWB, through the water licencing process, may identify additional legislation and regulations governing waters that may be applicable.

The Lupin operation is presently permitted by Water Licence NWB1LUP0008 for water use and waste disposal in a mining and milling undertaking. The current Licence was received from the Nunavut Water Board on July 1, 2000, and is set to expire on June 30, 2008. At the time of writing this report, Kinross had applied to have the Licence amended since the mill is no longer operating. INAC has the responsibility to inspect, monitor, assess compliance, and enforce legislation including the terms and conditions identified in a water licence issued by the NWB.

Water Licence NWB1LUP0008 specifies the following conditions with regard to abandonment and restoration:

- an abandonment and Restoration Plan is to be prepared in accordance with the *Guidelines for Abandonment and Restoration Planning in the Northwest Territories*; Northwest Territories Water Board September 1990;

- a restoration plan is to be developed to address specific components including surface structure, all petroleum and chemical storage areas, and any other areas potentially contaminated with hazardous material;

- contaminated soils are to be identified; and

- a summary of existing background metals data is to be compiled.

5.3. Nunavut Mine Reclamation Policy

The Department of Indian and Northern Development (DIAND) prepared and issued the *Mine Site Reclamation Policy for Nunavut* in 2002.

Given the relatively recent creation of Nunavut, the development of Nunavut-specific regulations are in transition. As such the Policy describes general principles for mine reclamation in the context of current legislation (Acts). The policy defines reclamation as "returning mine sites and affected areas to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment and with human activities".

Under the heading *Required Standard of Reclamation*, the policy states "*Site-specific criteria should be developed by regulators for assessing the adequacy of plans and their implementation, based on the 1994 Whitehorse Mining Initiative principle of "returning mine sites and affected areas to viable and, wherever practicable, self-sustaining ecosystems that are compatible with a healthy environment and with human activities. Where regulatory boards with jurisdiction for land and water management have developed specific guidelines and standards of environmental rehabilitation, these will be adopted for use in the applicable region".*

DIAND is also developing a complementary Policy on the Management of Contaminated Sites in Canada's North however, the Policy relates only to orphaned or abandoned sites and thus will not apply to this site.

The *Exploration and Mining on Crown Lands in Nunavut Guidebook* was published under the authority of the Minister of Indian Affairs and Northern Development, Ottawa 2005. The guide is intended to be a general overview of selected legislation and processes. It has no legislative sanction and is not intended to be comprehensive nor to provide legal advice.

The guidebook describes general restoration and closure requirements however, does not provide or reference specific numerical standards for the evaluation of contaminant concentrations.

5.4. INAC Contaminated Sites Management Policy

INAC's *Contaminated Sites Management Policy*, August 20, 2002 states that *"INAC will manage contaminated sites by following the Treasury Board Federal Contaminated Sites Management Policy, and by applying the Contaminated Sites Management Working Group's (CSMWG) "Federal Approach to Contaminated Sites" and its recommended guidelines and standards - including those from the Canadian Council of Ministers of the Environment (CCME) and the Canadian Standards Association (CSA)".*

The *Treasury Board Federal Contaminated Sites Management Policy* states:

"Where remediation of federal real property is undertaken, departments and agencies are to set remediation objectives in accordance with the most applicable of the three methods developed by the Canadian Council of Ministers of the Environment (CCME):

- *Method 1: Follow CCME Environmental Quality Guidelines, as amended from time to time, and, where applicable, the Canada-wide Standard for Petroleum Hydrocarbons in Soil. To the extent that such guidelines do not exist for a particular type of contamination, or are technically or economically inappropriate for a particular situation, departments and agencies may follow equivalent guidelines or standards (e.g. provincial).*

- *Method 2: Follow modified CCME Environmental Quality Guidelines where site conditions, land use, receptors, or exposure pathways differ only slightly from the protocols used in the development of the Guidelines.*

- *Method 3: Follow modified CCME Environmental Quality Guidelines based on a site-specific risk assessment, as outlined by the CCME, or equivalent, where site conditions are unique or particularly sensitive".*

5.5. Applicable Regulatory Criteria

5.5.1. CCME and Alternate Reference Criteria

Based on the policies discussed above, when selecting chemical analysis and evaluating the results of chemical analysis for soil and water quality, we have referenced the following CCME documents:

- *Canadian Environmental Quality Guidelines for Soil and Water* (CEQG), Winnipeg, MB, 1999, updated 2005.
- *Canada Wide Standards for Petroleum Hydrocarbons (PHC) in Soil (PHC CWS)*, CCME, Winnipeg, MB, May 1, 2001.

Based on the current and potential land use at the site, results were compared to criteria that are protective of the following:

- groundwater flow to aquatic life (AW);
- residential/park land (RL);
- industrial land use (IL); and
- Tier 1 Generic Soil Quality Levels listed in the PHC CWS.

Morrow understands that the likely future land use will remain commercial/industrial. Accordingly, the criteria for residential/parkland would be overly conservative.

When selecting reference criteria for benzene, toluene, ethylbenzene and xylene in soil, we have selected the most conservative criteria for coarse grained surface soils exclusive of criteria that is protective of groundwater use for drinking water (i.e., groundwater is not a potable resource).

Prior to undertaking remedial action, it may be beneficial to generate site-specific risk based standards for organic and metallic contaminants (i.e., follow Method 3/Tier 3 modified CCME Environmental Quality Guidelines based on a site-specific risk assessment, as outlined by the CCME). However the development of site-specific risk based standards is beyond the scope of this Phase 2 ESA, and are only discussed in general in Section 10.

Notes on Interpretation of PHC CWS

Under the PHC CWS, petroleum hydrocarbons are subdivided in "Fractions" according to the specified ranges of equivalent normal straight – chain hydrocarbon (nC) boiling point ranges, with Fraction #1 (F1) representing the range from nC6 to nC10, Fraction #2 (F2) from >nC10 to nC16, Fraction #3 (F3) from >nC16 to nC34, and Fraction #4 $\geq$ nC35. The applicable Tier 1 PHC CWS standards depend on soil texture and sample depth, as well as on land use. For the purposes of determining the applicable PHC CWS standards, all soil samples analyzed for petroleum hydrocarbon can be classified as either fine-grained or coarse-grained, depending on whether the median particle size for the soil is finer or coarser than 0.075 mm, respectively. The applicable Tier 1 PHC CWS standards also depend on groundwater and surface water uses in and around the subject property. When determining the applicable PHC CWS standards, groundwater flow to surface water supporting aquatic life has been considered a pathway that requires protection. Protection of groundwater for potable purposes is unnecessary as groundwater is unlikely to be used for such a purpose.

Notes on Interpretation of Groundwater Criteria

Groundwater is not used as a source of potable water in the study area and, as such, drinking water criteria/standards are not applicable to this investigation. Criteria/standards for the protection of freshwater aquatic life is applicable as groundwater in the study area discharges to Contwoyto Lake, a freshwater aquatic environment. Groundwater quality for the subject site is therefore compared to the CCME freshwater aquatic life (AW) criteria. However, it should be noted that the CCME criteria are intended as receiving water criteria and thus is not directly applicable for assessing groundwater quality. In British Columbia (BC), provincial groundwater standards in general assume a minimum 10 times dilution factor is available prior to discharge to aquatic environments and are thus directly applicable for assessing groundwater quality. We understand that Environment Canada has accepted the concept of 10 times dilution elsewhere for comparison of groundwater quality results with aquatic life criteria. Therefore we have also compared groundwater concentrations for dissolved metals and hydrocarbon in groundwater to the BC Contaminated Sites Regulations (CSR[3]) standards for protection of freshwater aquatic life (which account for a 10x dilution factor) in Tables 24 and 25.

[3] *Contaminated Sites Regulation (CSR),* B.C. Reg. 375/96, including amendments up to B.C. Reg. 76/2005.

There are no CCME guidelines for F1 (hydrocarbon C_6-C_{10}) and F2 (hydrocarbon C_{10}-C_{16}) in groundwater. Therefore, for comparison/screening purposes, the F1 and F2 results have been compared to standards in BC's CSR for protection of freshwater aquatic life for analytical parameters that have similar carbon ranges. Specifically, the CSR standards for volatile petroleum hydrocarbons ($VPHw_{6-10}$) and extractable petroleum hydrocarbons ($EPHw_{10-19}$) have been referenced.

Notes on Interpretation of Surface Water Criteria

The CCME CEQG do not have criteria for sulphate in water. As such, for screening purposes, sulphate results have been compared to the criteria protective of aquatic life in the *British Columbia Approved Water Quality Guidelines (BCAWQG)* 1998 Edition, September 11, 1998, Updated: August 24, 2001.

5.5.2. Evaluation of Potentially Acid Generating (PAG) Waste and Acid Rock Drainage-Metal Leaching (ARD-ML)

Guidelines developed by DIAND for ARD prediction the north is contained in the following document: Department of Indian and Northern Development (DIAND); *Guidelines for ARD Prediction in the North*; Sep 1992.

The guidelines recommend that the net neutralization potential (NNP) and NP/MPA values be used to determine the acid generation potential of a mine waste. More specifically, after the Neutralizing Potential (NP) and Acid Generation Potential (AP or MPA) have been determined for a sample it is necessary to combine these two values in a manner that allows comparison with set criteria based on experience or regulation. The two methods of combination commonly used are:

- the difference in value between NP and AP, or Net Neutralization Potential (NNP = NP - AP); and
- the ratio of NP value to AP value, or Neutralization Potential Ratio (NPR = NP/AP).

The screening criteria used to evaluate a need for further test work based on acid base accounting tests are:

- Materials with sulphide minerals whose net neutralizing potential (NNP = NP - AP) is negative are likely to be an acid drainage source. Exceptions are possible if the sulphide content is very low and/or there are significant slow release, non-carbonate sources of alkalinity.

- The acid drainage potential based on the ratio of neutralization potential to potential acidity (NP:AP) evaluated based on Table E. This method is preferred for metal mining sites in the west of Canada.

TABLE E: Neutralization Potential Ratio (NPR) Screening Criteria

POTENTIAL FOR ARD	INITIAL NPR SCREENING CRITERIA	COMMENTS
Likely (PAG)	< 1:1	Likely ARD generating.
Possibly (Limited)	1:1 - 2:1	Possible ARD generating if NP is insufficiently reactive or is depleted at a faster rate than sulphides.
Low (Uncertain)	2:1 - 4:1	Not potentially ARD generating unless significant preferential exposure of sulphides along fracture planes, or extremely reactive sulphides in combination with insufficiently reactive NP.
None (Non-Reactive)	> 4:1	No further ARD testing required unless materials are to be used as a source of alkalinity.

However, these classifications are often invalid when considering rock samples with low NP and low sulphide concentrations, such as most of the Lupin waste rock. Guidelines developed in British Columbia[4] recognize this characteristic and utilize screening criteria of 0.3% sulphide and paste pH of 5.5 to separate out materials which likely will not generate acid. Specifically, PAG waste rock can be considered present when sulphide concentrations exceed 0.3% and paste pH concentrations are less than 5.5. These criteria are widely employed in ARD/ML assessment worldwide, as well as Nunavut. It is noted however, that the BC Guidelines make exception that where elevated concentrations of arsenic (or zinc) are present in phyllic formations (which is the case at the Lupin site), additional ARD investigation may be required since arsenic is soluble in weakly acidic leachate.

Regardless of what these tests indicate, the direct measurement of the water quality discharging from the site provides the best indicator whether there are ARD/ML concerns after the development rock pad has weathered for twenty-five years.

[4] *Guideline for Metal Leaching and Acid rock Drainage at Mine Sites in British Columbia,* August 1998

5.5.3. Water Licence NWB1LUP0008 Criteria

Criteria in Water Licence NWB1LUP0008 are summarized in Table F, and were also referenced as comparison criteria during the ESA for evaluation of surface water concentrations.

TABLE F: Criteria in Water Licence NWB1LUP0008

Parameter	Maximum Average Concentration	Maximum Concentration of Any Grab
Total Arsenic	0.50 mg/L	1.00 mg/L
Total Copper	0.15 mg/L	0.30 mg/L
Total Cyanide	0.80 mg/L	1.60 mg/L
Total Lead	0.10 mg/L	0.20 mg/L
Total Nickel	0.20 mg/L	0.40 mg/L
Total Zinc	0.4 mg/L	0.80 mg/L
Total Suspended Solids	15 mg/L	30 mg/L
Oil and Grease		
The Waste discharged shall have a pH between 6.0 and 9.5		

5.5.4. Metal Mining Effluent Regulations

The *Metal Mining Effluent Regulations (MMER)* P.C. 2002-987 6 June, 2002, produced under the *Fisheries Act*, also list 'authorized limits of deleterious substances' at mine sites, as summarized in Table G. The limits in the MMER are often used as the basis for Licences and Permits issued for mine sites.

TABLE G: MMER Schedule 4 Authorized Limits Of Deleterious Substances

Column 1	Column 2	Column 3	Column 4
Deleterious Substance	**Maximum Authorized Monthly Mean Concentration**	**Maximum Authorized Concentration in a Composite Sample**	**Maximum Authorized Concentration in a Grab Sample**
Arsenic	0.50 mg/L	0.75 mg/L	1.00 mg/L
Copper	0.30 mg/L	0.45 mg/L	0.60 mg/L
Cyanide	1.00 mg/L	1.50 mg/L	2.00 mg/L
Lead	0.20 mg/L	0.30 mg/L	0.40 mg/L
Nickel	0.50 mg/L	0.75 mg/L	1.00 mg/L
Zinc	0.50 mg/L	0.75 mg/L	1.00 mg/L
Total Suspended Solids	15.00 mg/L	22.50 mg/L	30.00 mg/L

6. PREVIOUS ASSESSMENT DATA

Based on a review of the Previous Reports listed in Section 2.2, the following information which is relevant to the evaluation of the site quality has been included in this ESA report:

- Geotechnical Assessment by Geocon (1975) Ltd.;
- ARD assessment by Klohn Leonhoff;
- Acid Base Accounting (ABA) For Lupin Waste Rock by URS;
- Meteoric Water Mobility Procedure (MWMP) by Vizon Scientific;
- Kinross Drilling Samples for Total Metals Analysis (2004); and
- Information from Water Board Inspection Reports.

6.1. Geocon Geotechnical Report

The report prepared by Geocon (1975) Ltd., entitled *Geotechnical Report on Proposed Plant and Residential Sites, Lupin Project*, Contwoyto Lake, July 12, 1980 was reviewed. The report contained information on the geotechnical assessment of the mine site area for purposes of construction design. The report indicated that on average, the general native soil stratigraphy at the site prior to development of the mine consisted of:

- a 0.15 m thick layer of “TUNDRA ORGANICS”;
- a 1 m thick layer of SILTY SAND, with some gravel and occasional boulders. Frozen with traces of ice lenses less than 5 mm in size;
- a 1.4 m thick layer of FRACTURED BEDROCK BOULDERS, with some frozen soil matrix and trace of ice lenses less than 10 mm in size; and
- below 2.5 m, BEDROCK, phyllite.

6.2. Klohn Leonoff ARD Assessments

The following reports were available and reviewed for information relevant to this ESA:

- Klohn Leonoff, *Acid Rock Drainage Study, Lupin Mine, Northwest Territories*, March 1992a; and
- Klohn Leonoff, *Column Leaching Study, Evaluation of ARD Control Measures*, December 1993.

The potential for ARD within Lupin waste rock was assessed using a 30-week column leach test on a composite sample of fresh Lupin waste rock. Acid-base accounting (ABA) data from the composite waste sample is provided in Table H.

TABLE H: Summary of ABA Results for Waste Rock From 1992 ARD Study

Sample	% Total S	Paste pH	Neutralization Potential (NP)	Maximum Potential Acidity (MPA)	Net Neutralization Potential (NNP)
Waste	0.23	9.3	13.3	7.19	+6

The column leach test indicated that the waste contains low sulphide (i.e., less than 0.3%) and based on a NNP >0, had sufficient alkalinity in the form of silicate minerals to consume any acidity generated in drainage. Leachates collected from the waste rock column contained low levels of silicon (2 mg/L) but, other than alkaline earth metals, reported metal concentrations at lower than detection limits. The study conclusion stated that "*waste rock presents no ARD concerns for the Lupin Mine in abandonment*".

6.3. Acid Base Accounting (ABA) For Lupin Waste Rock by URS

The following information was obtained from the report prepared by URS Canada Inc. (URS) entitled *ARD/ML Assessment of Waste Rock at Lupin Mine*, February 7, 2005.

To supplement the 1992 ARD study for purposes of reclamation planning, in September 2004 Lupin personnel conducted a sampling program on all areas of the site where mine development waste rock was used for construction. In total, eighty-five samples were collected and analyzed for ABA parameters, which included paste pH, Sobek NP, and total sulphur.

The sample locations are shown on Drawing A053017-004. Results of the sampling are provided in Table I.

In December 2004, six additional sample locations were selected for study. These samples were analyzed for ABA parameters and their soluble metal contents were assessed using the shake flask method. The shake flask method is an ASTM procedure for the leaching of solid waste that consists of the shaking of a known weight of waste with water of specified composition and the separation of the aqueous phase for analysis. Results of the sampling are provided in Tables J and K. For purposes of simplifying this report, the interpretation of the ARD/PAG results is provided in Sections 9.3.7 and 10.2, along with comparison to the results Morrow obtained during the site assessment work.

Information was not available to Morrow to confirm that the laboratory methods URS used to measure the sulphur concentrations. It is suspected that sulphide sulphur was determined as the difference between total sulphur by Leco furnace and acid-soluble sulphate sulphur.

Definitions are summarized as follows:

- MPA = Maximum Potential Acidity. Maximum potential acidity (MPA) is a function of the total sulphur content, calculated as total sulphur x 31.25;
- NP = Neutralization Potential;
- NNP = Net Neutralization Potential = NP – MPA; and
- NP:MPA = Neutralization Potential Ratio.

TABLE I: 2004 ABA Sample Results

Sample ID	NNP	NP	pH	MPA	NP:MPA	%S	General Location
50043	11	13	8.7	1.6	8.32	0.05	Winter road, by lake
50044	6	9	8.8	3.1	2.88	0.10	Winter road, 1/2 way
50045	0	10	9.3	10.3	0.97	0.33	Winter road, top
50046	8	11	9.1	2.8	3.91	0.09	Airstrip
50047	-2	9	8.5	11.3	0.80	0.36	Weather stn
50048	-11	10	9.2	21.3	0.47	0.68	Mine lay down, west
50049	1	22	9.3	21.3	1.04	0.68	Mine lay down
50050	8	11	9.5	3.4	3.20	0.11	Mine lay down
50051	-9	10	8.6	19.4	0.52	0.62	North of portal

TABLE I cont'd: 2004 ABA Sample Results

Sample ID	NNP	NP	pH	MPA	NP:MPA	%S	General Location
50052	-34	11	8.6	45.0	0.24	1.44	Old surface crusher area
50053	9	11	8.8	2.2	5.03	0.07	Occurrence 8
50054	-23	12	9.1	35.3	0.34	1.13	Road to esker
50055	6	9	9.0	3.4	2.62	0.11	Road to esker
50056	0	11	8.8	10.6	1.04	0.34	Road to esker
50057	7	10	8.9	3.4	2.91	0.11	Perimeter road, east of culvert road
50058	2	12	8.6	9.7	1.24	0.31	Dam 4
50059	-2	14	8.6	15.9	0.88	0.51	Dam 5
50060	7	9	8.3	2.2	4.11	0.07	Dam 6
50061	10	11	9.4	0.9	11.73	0.03	Dam 1c
50062	4	9	9.5	5.3	1.69	0.17	Dam 1b
50063	9	10	9.5	0.9	10.67	0.03	Dam 1a
50064	0	10	8.6	9.7	1.03	0.31	Dam 2
50065	-2	10	9.5	11.6	0.86	0.37	Powder mag rd/dam 2 rd intersection
50066	6	12	9.7	5.6	2.13	0.18	Powder mag road
50067	7	10	9.8	2.8	3.56	0.09	Powder mag rd/quarry rd intersection
50068	9	10	9.6	0.6	16.00	0.02	Powder mag
50069	9	11	9.9	2.5	4.40	0.08	Powder mag road
50070	6	10	9.6	4.1	2.46	0.13	Tails line/powder mag rd intersection
50071	7	10	8.3	2.8	3.56	0.09	Perimeter road, by cell 5east
50072	2	10	9.2	8.4	1.19	0.27	Perimeter road, south of Dam 3C
50073	4	10	8.6	5.9	1.68	0.19	L Dam, south
50074	5	12	8.6	7.5	1.60	0.24	L Dam, north
50075	10	15	9.0	4.7	3.20	0.15	J Dam
50076	8	11	9.2	2.8	3.91	0.09	Lower sewage dam
50077	4	11	9.1	6.6	1.68	0.21	Sewage road, past landfill
50078	3	10	9.8	7.2	1.39	0.23	Road south of upper sewage pond
50079	9	11	10.0	1.6	7.04	0.05	Bone yard
50080	9	12	9.3	2.8	4.27	0.09	Bone yard
50081	-8	9	9.1	16.9	0.53	0.54	In front of burn pit
50082	7	11	9.6	3.8	2.93	0.12	Burn pit road, up from landfill
50084	4	11	9.8	6.6	1.68	0.21	Tails line, by kimberlite cmpd
50085	3	10	9.3	6.6	1.52	0.21	Mill lay down
50086	-1	10	8.8	10.9	0.91	0.35	Mill lay down, by CN cubes
50087	-4	12	9.1	16.3	0.74	0.52	Airstrip
50088	-2	11	9.3	13.1	0.84	0.42	Pad by guest house
50089	-3	11	9.3	14.4	0.77	0.46	By 1300 wing accommodation
50090	-6	11	9.1	16.6	0.66	0.53	Mill lay down
50091	-18	10	8.9	27.5	0.36	0.88	Lay down
50092	-18	13	9.2	30.6	0.42	0.98	Sewage line, end
50093	5	10	9.5	5.0	2.00	0.16	Sewage line, mid
50094	9	11	9.6	1.6	7.04	0.05	Tails line by #1 dump stn

TABLE I cont'd: 2004 ABA Sample Results

Sample ID	NNP	NP	pH	MPA	NP:MPA	%S	General Location
50095	8	12	9.6	4.4	2.74	0.14	Old airstrip
50096	0	10	9.5	10.3	0.97	0.33	Tails line, by #2 dump stn
50097	9	11	9.8	2.2	5.03	0.07	Tails line/road x'ing
50098	-3	13	8.8	15.6	0.83	0.50	Tails line
50099	-36	14	8.5	50.3	0.28	1.61	Tails line
50100	6	13	9.4	6.6	1.98	0.21	Main road, N of sat road access
50101	6	9	9.5	3.1	2.88	0.10	Main road
50102	9	12	9.7	2.8	4.27	0.09	Main road
50103	8	11	9.4	3.4	3.20	0.11	Main road, by upper sewage pond
50104	9	13	9.7	4.1	3.20	0.13	Airstrip, N apron
50105	2	8	8.4	5.9	1.35	0.19	Airstrip
50106	15	17	9.0	1.9	9.07	0.06	Airstrip
50107	4	10	8.4	5.6	1.78	0.18	Airstrip
50108	0	13	8.5	13.1	0.99	0.42	Airstrip
50109	9	12	8.7	3.1	3.84	0.10	Airstrip
50110	9	12	9.7	3.4	3.49	0.11	Airstrip
50111	5	11	9.8	5.9	1.85	0.19	Airstrip, south access road
50112	17	21	9.7	4.1	5.17	0.13	By 1100 wing accommodations
50113	12	15	9.2	3.4	4.36	0.11	Ball diamond
50114	-90	16	5.0	106.0	0.15	3.39	Ball diamond
50115	-73	10	8.3	82.5	0.12	2.64	Road north of ball diamond
50116	3	16	9.1	13.4	1.19	0.43	Water line, south of cap mag
50117	7	10	9.6	3.4	2.91	0.11	Cap mag
50118	-73	11	7.5	84.1	0.13	2.69	Road to L25
50119	3	11	8.6	8.4	1.30	0.27	Water line, north of cap mags
50120	9	11	9.5	2.2	5.03	0.07	Pump house berm
50121	-9	11	8.1	20.3	0.54	0.65	Road to lake
50122	0	12	9.2	12.2	0.98	0.39	Road to lake
50123	-29	8	8.8	37.2	0.22	1.19	Lay down, steelyard
50124	2	12	9.5	10.0	1.20	0.32	Lay down, steelyard
50125	0	13	9.3	12.8	1.01	0.41	Lay down, corner main road
50126	10	11	9.8	1.3	8.80	0.04	Fuel yard, truck parking
50127	8	10	9.9	2.5	4.00	0.08	Main tank farm, north end
50128	-14	12	9.6	25.6	0.47	0.82	Main tank farm, south end

Table J: Detailed Acid-Base Accounting Data For Waste Rock Leachate Samples

Sample	Paste pH	CO2 (Wt.%)	CaCO3 Equiv. (Kg CaCO3/ Tonne)	Total Sulphur (Wt.%)	Sulphate Sulphur (Wt.%)	Sulphide Sulphur* (Wt.%)	Maximum Potential Acidity** (Kg CaCO3/ Tonne)	Neutralization Potential (Kg CaCO3/ Tonne)	Net Neutralization Potential (Kg CaCO3/ Tonne)
Detection Limits	0.1	0.01		0.02	0.01			1.3	
50045A	8.3	0.1	2.3	0.86	<0.01	0.86	26.9	5.0	-21.9
50048A	8.9	0.02	0.5	1.32	<0.01	1.32	41.3	4.5	-36.8
50104A	8.2	0.09	2.0	0.67	<0.01	0.67	20.9	6.1	-14.8
50115A	8.9	0.1	2.3	0.92	<0.01	0.92	28.8	5.6	-23.2
50118A	7.8	0.05	1.1	0.77	0.01	0.76	23.8	4.0	-19.8
50128A	9.2	0.24	5.5	0.34	<0.01	0.34	10.6	7.1	-3.5

*Based on difference between total sulphur and sulphate-sulphur
**Based on sulphide-sulphur

TABLE K: Shake Flask Leachate Results

Parameter	Units	50045A	50048A	50104A	50115A	50118A	50128A	Blank
pH		8.76	8.88	8.95	8.86	8.54	9.09	5.9
Dissolved Metals								
Aluminum Al	mg/L	0.45	0.41	0.46	0.53	0.15	0.82	0.001
Antimony Sb	mg/L	0.0003	< 0.0002	0.0005	0.0008	< 0.0002	< 0.0002	< 0.0002
Arsenic As	mg/L	0.185	0.787	0.105	2.93	0.027	0.12	< 0.0002
Barium Ba	mg/L	0.0075	0.0092	0.022	0.0042	0.028	0.0088	< 0.0002
Beryllium Be	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Bismuth Bi	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Boron B	mg/L	< 0.01	< 0.01	0.02	0.02	0.01	< 0.01	< 0.01
Cadmium Cd	ug/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Calcium Ca	mg/L	8.89	3.2	26.2	7.79	25.3	5.71	< 0.01
Chromium Cr	mg/L	< 0.0002	0.0007	< 0.0002	0.0002	< 0.0002	0.0005	< 0.0002
Cobalt Co	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Copper Cu	mg/L	0.0006	0.0003	0.0002	0.0002	< 0.0002	0.0004	0.0058
Iron Fe	mg/L	0.04	0.37	< 0.01	0.12	< 0.01	0.17	< 0.01
Lead Pb	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Lithium Li	mg/L	0.025	0.037	0.033	0.0071	0.046	0.041	< 0.0002
Magnesium Mg	mg/L	0.83	0.72	2.33	1.21	3.07	0.84	< 0.01
Manganese Mn	mg/L	0.0008	0.0027	0.0018	0.0064	0.0068	0.0016	< 0.0002
Molybdenum Mo	mg/L	0.0005	0.0004	0.0009	0.0003	0.0005	0.0005	< 0.0001
Nickel Ni	mg/L	0.0002	0.0004	0.0005	0.0004	0.0004	0.0004	< 0.0002
Phosphorus PO4	mg/L	0.08	0.06	< 0.03	0.04	< 0.03	0.03	< 0.03

Legend:

	- Exceeds MMER monthly mean concentration
	- Exceeds MMER maximum grab sample concentration

TABLE K cont'd: Shake Flask Leachate Results

Parameter	Units	50045A	50048A	50104A	50115A	50118A	50128A	Blank
Potassium K	mg/L	18.1	12	23.3	11.4	19.2	18	0.03
Selenium Se	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Silicon SiO2	mg/L	3.96	6.62	3.43	4.77	4.04	4.86	< 0.05
Silver Ag	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Sodium Na	mg/L	5.03	5.25	4.1	4.62	4.52	3.88	< 0.01
Strontium Sr	mg/L	0.109	0.026	0.106	0.017	0.137	0.034	< 0.0002
Tellurium Te	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Thallium Tl	mg/L	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Thorium Th	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Tin Sn	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Titanium Ti	mg/L	0.0014	0.013	0.0002	0.0026	0.0003	0.0072	< 0.0002
Uranium U	mg/L	0.0003	0.0001	0.0002	0.0004	0.0003	0.0002	< 0.0001
Vanadium V	mg/L	0.0067	0.0055	0.0016	0.0033	0.0006	0.0064	< 0.0002
Zinc Zn	mg/L	0.002	0.004	< 0.001	0.002	0.002	0.001	< 0.001
Zirconium Zr	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002

Legend:

	- Exceeds MMER monthly mean concentration
	- Exceeds MMER maximum grab sample concentration

6.4. Meteoric Water Mobility Procedure (MWMP) by Vizon Scientific

To follow up the ABA work completed by URS, five of the samples (50104, 50097, 50065, 50045, 50057, labelled as Lupin 1 through Lupin 5, respectively) were sent by Kinross to Vizon Scitec for analysis of Meteoric Water Mobility Procedure (MWMP), on June 07, 2005. The purpose of the MWMP is to evaluate the potential for dissolution and mobility of certain constituents from a mine rock sample by meteoric water. The procedure consists of a single-pass column leach over a 24-hour period using a mine rock sample to extraction fluid (effluent) ratio of 1:1. The results of the assessment are provided in Table L, and discussed in Section 9.3.5.2.

TABLE L: Results of Meteoric Water Mobility Procedure (MWMP) Testing

Parameter	Units	Method	Lupin 1	Lupin 2	Lupin 3	Lupin 4	Lupin 5
Input	L		5.90	5.63	5.54	5.79	5.55
Output	L		5.00	5.00	5.00	5.00	5.00
pH		meter	7.07	6.43	7.15	7.32	6.84
EC	(umhos/cm)	meter	370	126	107	82	323
Sulphate	(mg/L)	turbidimetric	110	41	22	10	100
Dissolved Metals							
Aluminum Al	mg/L	ICP-MS	0.15	0.01	0.19	0.24	0.011
Antimony Sb	mg/L	ICP-MS	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Arsenic As	mg/L	ICP-MS	0.035	0.0086	0.056	0.067	0.027
Barium Ba	mg/L	ICP-MS	0.016	0.0045	0.0046	0.0039	0.0064
Beryllium Be	mg/L	ICP-MS	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Bismuth Bi	mg/L	ICP-MS	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Boron B	mg/L	ICP-MS	0.01	< 0.01	< 0.01	< 0.01	0.01
Cadmium Cd	ug/L	ICP-MS	0.02	0.02	< 0.01	< 0.01	0.02
Calcium Ca	mg/L	ICP-MS	48	13.3	12.4	8.44	37.8
Chromium Cr	mg/L	ICP-MS	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Cobalt Co	mg/L	ICP-MS	0.0007	0.002	< 0.0002	< 0.0002	0.0022
Copper Cu	mg/L	ICP-MS	0.0026	0.0011	0.0019	0.0027	0.0019
Iron Fe	mg/L	ICP-MS	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Lead Pb	mg/L	ICP-MS	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Lithium Li	mg/L	ICP-MS	0.038	0.036	0.011	0.019	0.034
Magnesium Mg	mg/L	ICP-MS	2.36	1.78	1.23	0.58	2.72
Manganese Mn	mg/L	ICP-MS	0.074	0.164	0.024	0.023	0.234
Molybdenum Mo	mg/L	ICP-MS	0.0017	< 0.0001	0.0007	0.0008	0.0004
Nickel Ni	mg/L	ICP-MS	0.0048	0.011	0.0019	0.0013	0.016
Phosphorus PO4	mg/L	ICP-MS	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Potassium K	mg/L	ICP-MS	12.5	8.66	8.2	8.84	10.3
Selenium Se	mg/L	ICP-MS	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Silicon SiO2	mg/L	ICP-MS	4.24	4.66	3.24	4.82	9.07
Silver Ag	mg/L	ICP-MS	0.0001	< 0.00005	0.00009	< 0.00005	0.00008
Sodium Na	mg/L	ICP-MS	2.58	2.58	2.23	2.66	2.74
Strontium Sr	mg/L	ICP-MS	0.277	0.038	0.038	0.037	0.079
Tellurium Te	mg/L	ICP-MS	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Thallium Tl	mg/L	ICP-MS	< 0.00002	0.00004	< 0.00002	< 0.00002	0.00004
Thorium Th	mg/L	ICP-MS	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Tin Sn	mg/L	ICP-MS	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Titanium Ti	mg/L	ICP-MS	< 0.0002	< 0.0002	< 0.0002	0.0004	0.0002
Uranium U	mg/L	ICP-MS	0.0014	< 0.0001	0.0002	0.0003	0.0002
Vanadium V	mg/L	ICP-MS	0.0004	< 0.0002	0.0003	0.0009	< 0.0002
Zinc Zn	mg/L	ICP-MS	0.004	0.004	< 0.001	0.001	0.005
Zirconium Zr	mg/L	ICP-MS	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002

Exceeds CCME Aquatic Life
Exceeds CCME Drinking Water

6.5. Kinross Drilling Samples, 2004

Lupin personnel drilled ten locations along the road and bone yard areas to the south of the mill, denoted as BPR1 through BPR7 and LD1 through LD3 in 2004. The purpose of the work was to initiate Phase 2 ESA type assessment activities however, the completion of the project was abandoned when the personnel responsible for the work left Lupin.

The Kinross drilling locations are shown on Drawing A053017-004. At each location, soil (rock) samples were collected from surface, 1 m and 2 m depths, and at some locations 3 m and/or 4 m depths. The samples were submitted to Norwest Labs Ltd. for total metals analysis. The analytical results were provided to Morrow and have been included in the Phase 2 ESA section of this report.

6.6. Water Board Licence Inspection Reports

As part of the Water Licence, yearly inspections of the Lupin Mine site and TCA are completed by INAC personnel. The following Water Licence Board Inspection reports were available and reviewed for information relevant to this ESA:

- *August 19, 2002 Water Licence Inspection – Report,* dated March 25, 2003; and
- *Lupin Mine Water Licence Inspection July 7, 2004 and July 13, 2004,* dated November 17, 2004.

An INAC inspection was in progress during Morrow's time on-site in July 2005, however, the results of that inspection were not available to Morrow at the time of completing this report.

The inspections include areas not relevant to this report including drinking water supply and treatment, sewage treatment ponds and discharge, and TCA discharge. Inspection topics relevant to this report include the inspection of fuel and waste storage areas; the following items were notable from review of the reports:

- The 2004 inspection noted that hydrocarbons had been released within the berm of the satellite and day storage tanks. This area has been assessed in the subject ESA.
- The 2004 inspection found that a groundwater seep at the southeast side of the landfill contained hydrocarbon and metals concentrations that exceeded Canadian Water Quality Guidelines. This seep has been assessed in the subject ESA (denoted as SEEP3), and further discussion of the results is provided in Section 9.3 of this report.

7. PHASE 1 ESA RESULTS AND RATIONALE FOR PHASE 2 ESA

Based on the information reviewed during the Phase 1 ESA, APECs were identified that required investigation during the Phase 2 ESA. The APECs and a discussion of the PCOCs is presented in Tables M through U. The Phase 2 ESA investigation and the acronyms for the laboratory analysis are discussed in Section 8. The location of each APEC is shown on Drawing A053017-004, attached. Photographs of selected APECs are provided in Appendix II.

TABLE M: Areas of Potential Environmental Concern Related to Bulk Materials

APEC	Description of Area	Potential Contaminants of Concern (PCOCs)	Discussion of Possible Contamination	Photos	Assessment Method	PCOCs in Soil Analytical Program	PCOCs in Groundwater Analytical Program	Surface Water Seep Analytical Program
1a[1]	Development rock used for entire footprint of Mill complex	Metals PAG/ARD-ML	Since the padded area of the site is comprised of waste/development rock, metals are considered a PCOC at all locations. Seeps (i.e., direct groundwater discharge) have been observed draining from all sides of the development rock.	All	Samples of development rock collected at all APECs analyzed for total metals, paste pH, and sulphide. Sampling groundwater and all seeps within and around the footprint also addresses the potential for leachate from the rock.	total metals, paste pH, and sulphide	Dissolved metals and sulphate, routine water quality	Total metals and sulphate, routine water quality
1b[1]	Site Roads	per 1a	Site roads are identified as an APEC in the RFP and Restoration Plan. The assessment of the areas described above may adequately assess the site roads since they are constructed of the same materials, with the exception of those specifically referenced below. It is noted that if the roads stay in place they may be considered beneficial use.	All	Kinross had collected samples from the roads during previous ABA assessments. Ten samples collected by Kinross personnel (51161 through 51170).	per 1a	per 1a	per 1a
1c	Former Surface Ore Stockpile	per 1a	Ore may have been left or leached at the former ore stockpile.	n/a	Test pit 05-34.	per 1a	per 1a	per 1a
1d	Ore Loading Ramp	per 1a	Ore or process fines may have been spilled.	9	Test pit 05-59.	per 1a	per 1a	per 1a

[1] APEC not indicated on drawing

TABLE M cont'd: Areas of Potential Environmental Concern Related to Bulk Materials

APEC	Description of Area	Potential Contaminants of Concern (PCOCs)	Discussion of Possible Contamination	Photos	Assessment Method	PCOCs in Soil Analytical Program	PCOCs in Groundwater Analytical Program	Surface Water Seep Analytical Program
1e	Screening Plant Ramp	per 1a	Mineralized ore or process fines may have been spilled.	n/a	Test pit 05-57.	per 1a	per 1a	per 1a
1f	Ball Field	per 1a	Specifically identified as potentially mineralized.	10	Test pit 05-54.	per 1a	per 1a	per 1a
1g	Road to Airport	per 1a	Specifically identified as potentially mineralized.	n/a	Test pit 05-52.	per 1a	per 1a	per 1a
1h	Overburden Stockpiles	per 1a	Piles of overburden removed to access near surface mineralization.	7	Two composite/ representative samples SS69 and SS70 to screen the metals content.	per 1a	per 1a	per 1a
1i	Former Surface Jaw Crusher	per 1a	Originally used to crush development rock. Fines and dust may have concentrated in the area. It is noted that Kimberlite reportedly distributed on the surface around the area due to more recent related activities by third parties, though this presents no concern for contamination.	11	Test pit 05-49.	per 1a	per 1a	per 1a

TABLE N: Areas of Potential Environmental Concern Related to Main Tank Farm Area

APEC	Description of Area	Potential Contaminants of Concern (PCOCs)	Discussion of Possible Contamination	Photos	Assessment Method	PCOCs in Soil Analytical Program	PCOCs in Groundwater Analytical Program	Surface Water Seep Analytical Program
2a	Main Tank Farm	Diesel fuel, Jet A Fuel	Approximately twenty-one ASTs containing diesel fuel are located at the main tank farm within three contained berms that are lined with impermeable membrane. The bedding sand on top of the liner has visible hydrocarbon staining. Jet fuel stored in the most southeastern AST. The pump shack is also located with the bermed area. In the spring, water in the berm is reportedly decanted to the west side of the tank farm, which may have resulted in a small areas of stained/stressed vegetation observed on the west side of the tank farm.	4, 12, 13, 14	One hand dug surface soil sample in each bermed area to confirm presence of liner and quality of bedding sand (SS73, SS74, SS75). Surface Soil samples SS71 and SS72 collected on west side of tank farm footprint. Test pit/monitoring well 05-37 on southwest (downgradient) side of footprint. Sampled SEEP9 on west side of footprint.	CCME metals, BETX, PHC F1 to F4, and PAHs	Insufficient water to collect samples	Total metals, sulphate, BETX, PHC F1 to F2, PAHs, and routine water quality
2b	Main Tank Farm Loaders	Diesel fuel	Tank farm loaders are uncontained and hydrocarbon staining observed on ground surface.	14	Test pit/monitoring well 05-07 and test pit 05-36.	per 2a	F2 Insufficient water available to complete other analyses.	per 2a

TABLE N cont'd: Areas of Potential Environmental Concern Related to Main Tank Farm Area

APEC	Description of Area	Potential Contaminants of Concern (PCOCs)	Discussion of Possible Contamination	Photos	Assessment Method	PCOCs in Soil Analytical Program	PCOCs in Groundwater Analytical Program	Surface Water Seep Analytical Program
2c	Jet Fuel Loader	Jet Fuel	Jet fuel is loaded/unloaded in an uncontained area on the berm to the south of the Jet Fuel tank.	4	Could not drill or test pit due to liner. Surface soil sample SS75 collected and presence of liner confirmed.	BETX, PHC F1 to F4, and PAHs	n/a	n/a
2d	Tank Farm Pipeline	Diesel fuel	Pipeline is above ground and is a pressure, not suction, line. No evidence of staining was observed.	15	Two hand dug surface soil samples SS67 and SS68.	BETX, PHC F1 to F4	n/a	n/a
2e[1]	Former Airport Fuelling Area	Diesel or Jet Fuel	A fuel line formerly ran to the west of the tank farm to a fuelling area located on the west side of the airstrip.	16	Test pit 05-53.	BETX, PHC F1 to F4, and PAHs	n/a	n/a
2f	Third Party Product Storage North	Diesel, fuel oil, varsol, lubrication oil, ATF etc.	New drums of diesel, fuel oil, varsol, ATF, etc. stored within bermed area.	n/a	Could not drill or test pit due to reported liner. Rock was too coarse for hand assessment.	n/a	n/a	n/a
2g	Third Party Wastes Storage South	Waste diesel, fuel oil, varsol, lubrication oil, ATF etc.	Waste drums and cubes of diesel, fuel oil, varsol, ATF, etc. stored within or on top of bermed area that is lined.	4	Could not drill or test pit due to liner. Surface soil sample SS75 collected in the vicinity.	BETX, PHC F1 to F4, and PAHs	n/a	n/a
2h	Tanker Truck Parking Area	Diesel Fuel	Tanker trucks are parked to the east of fuel load area and may release fuel from time to time.	n/a	Test pit 05-35.	CCME metals, sulphide, pH, BETX, PHC F1 to F4	n/a	n/a

[1] APEC not indicated on drawing

TABLE O: Areas of Potential Environmental Concern Related to Central Mill Area and Supporting Facilities

APEC	Description of Area	Potential Contaminants of Concern (PCOCs)	Discussion of Possible Contamination	Photos	Assessment Method	PCOCs in Soil Analytical Program	PCOCs in Groundwater Analytical Program	Surface Water Seep Analytical Program
3a	Satellite Tank Farm	Diesel and Gasoline	Eight ASTs containing diesel and two ASTs containing gasoline are located within a lined/bermed area. Bedding sand was visibly stained with hydrocarbons and there was sheen on the ponded water within the berm. The diesel is pumped to the tanks via a pipeline from the main tank farm. Gasoline is offloaded to the tanks at the tank farm. There was at least one report of an overfill that resulted in fuel being discharged into the berm. The fuel/ water mixture was pumped out and was stored in one of the small tanks at the main tank farm. On the south side of the area there is a pipe for decanting water from the berm. A hydrocarbon stain was observed below the pipe discharge.	5, 17	SS65 sample within berm. Borehole/monitoring well 05-08 and test pit/monitoring well 05-28 on downgradient side.	BETX, PHC F1 to F4, and PAHs	Dissolved metals, sulphate, BETX, PHC F1 to F2, PAHs, and routine water quality	PHC F2 to F4, PAHs, and glycols
3b	Fuel Pump House	Diesel and Gasoline	Fuel from the tank farm is pumped via above ground lines to the pump house. South of the pump house are two fuelling areas. The fuelling area is uncontained and staining of soil was prevalent in the area.	5	Test pit 05-29.	CCME metals, sulphide, pH, BETX, PHC F1 to F4, and PAHs	n/a	n/a

TABLE O cont'd: Areas of Potential Environmental Concern Related to Central Mill Area and Supporting Facilities

APEC	Description of Area	Potential Contaminants of Concern (PCOCs)	Discussion of Possible Contamination	Photos	Assessment Method	PCOCs in Soil Analytical Program	PCOCs in Groundwater Analytical Program	Surface Water Seep Analytical Program
3c	Powerhouse Day Tanks	Diesel	Several day tanks were present along the south wall of the powerhouse. There is secondary concrete containment below the tanks however, the concrete is known to have settled and cracked, compromising the integrity of the containment. The high level switches on some of the tanks have reportedly malfunctioned in the past and the tanks have been overfilled.	5, 18	Borehole/monitoring well 05-04. Borehole/ monitoring well 05-10. Test pit 05-31, Test pit 05-32.	CCME metals, sulphide, pH, BETX, PHC F1 to F4, PAHs, and glycols	Dissolved metals, sulphate, BETX, F1 to F2, PAHs, glycols, and routine water quality	n/a
3d	Powerhouse Radiators and Glycols Tank	Glycols	A glycols tank and several radiators are located outside the south side of the powerhouse. There is no secondary containment in this area. The north radiator is known to have released an undetermined amount of glycols in the past.	5	Borehole/monitoring well 05-04. Test pit 05-31, Test pit 05-32. North radiator could not be assessed due to under-ground power lines.	CCME metals, sulphide, pH, BETX, PHC F1 to F4, and glycols	n/a	n/a
3e	Powerhouse Compressor Spray	Compressor oil	As the compressors cycle, an oily condensate spray discharges at two locations. Oil staining was observed on the ground surface.	n/a	Test pit 05-31. North compressor area could not be assessed due to under-ground power lines.	CCME metals, BETX, PHC F1 to F4	n/a	n/a

TABLE O cont'd: Areas of Potential Environmental Concern Related to Central Mill Area and Supporting Facilities

APEC	Description of Area	Potential Contaminants of Concern (PCOCs)	Discussion of Possible Contamination	Photos	Assessment Method	PCOCs in Soil Analytical Program	PCOCs in Groundwater Analytical Program	Surface Water Seep Analytical Program
3f	Powerhouse Sumps	Diesel, glycols, compressor oil, lubricants	The powerhouse is underlain by a concrete floor with a surrounding concrete berm. The concrete floors are known to have settled and significant cracking was observed. Never the less, the most likely areas for contaminants to have migrated to the building sump that was confirmed to be connected to groundwater. Since the sump is emptied by a float valve controlled pump, there is essentially a groundwater and contaminant collection system in place.	19	Borehole/monitoring well 05-10, water sample (SUMP) collected directly from sump.	CCME metals, sulphide, pH, BETX, PHC F1 to F4, and PAHs	Dissolved metals, sulphate, BETX, F1 to F2, cyanide, and routine water quality	n/a
3g	Emergency Powerhouse	Diesel fuel	Two ASTs and one transformer associated with emergency powerhouse.	20	Test pit 05-58.	BETX, PHC F1 to F4, and PAHs	n/a	n/a
3h	Brine Mix Area, Underground Equipment Fuelling and Storage area	Salt, diesel fuel, lubricants	Brine was prepared for underground use in this area. The floor of the equipment storage area was unfinished, and evidence of spills were observed. An unloader for pumping fuel to underground workings was also present at this location.	21	Test pit/monitoring well 05-60	CCME metals, sulphide, pH, BETX, PHC F1 to F4, PAHs, cyanide, glycols, and salinity	Dissolved metals, sulphate, BETX, F1 to F2, cyanide, glycols, routine water quality, and salinity	n/a

TABLE O cont'd: Areas of Potential Environmental Concern Related to Central Mill Area and Supporting Facilities

APEC	Description of Area	Potential Contaminants of Concern (PCOCs)	Discussion of Possible Contamination	Photos	Assessment Method	PCOCs in Soil Analytical Program	PCOCs in Groundwater Analytical Program	Surface Water Seep Analytical Program
3i	Crusher and Rebuild Area	Metals	The crusher and underground equipment rebuild area is underlain by a concrete floor with a surrounding concrete berm. One of the crusher units showed evidence of leaking oil. Lubricants are stored in one area that has secondary containment. Floor drains are directed to the sumps in the Recovery Complex.	22	The inside of the crusher area could not be accessed with heavy equipment however, borehole 05-06 was advanced south of the crusher area and test pit 05-56 to the east of the crusher area.	CCME metals, sulphide, pH, BETX F1, PHC F2-F4 and PAHs	n/a	n/a
3j	Grinding Area	Metals	The grinding area is underlain by a concrete floor with a surrounding concrete berm. One sump was present; and there was evidence of a former pump that discharged to the sump in the Recovery Complex. Floor drains are directed to the sumps in the Recovery Complex.	23	Borehole/monitoring well 05-05.	CCME metals, sulphide, and pH	Dissolved metals, sulphate, and routine water quality	n/a
3k	Fine Ore Area	Metals	The fine ore area is underlain by a concrete floor with a surrounding concrete berm. Lubricants are stored in one area that has secondary containment. Floor drains are directed to the sumps in the Recovery Complex.	n/a	Could not be accessed however, the concrete floor appears intact and floor drains drain to Recovery Complex where there was a higher likelihood for contamination proximate the sumps.	n/a	n/a	n/a

TABLE O cont'd: Areas of Potential Environmental Concern Related to Central Mill Area and Supporting Facilities

APEC	Description of Area	Potential Contaminants of Concern (PCOCs)	Discussion of Possible Contamination	Photos	Assessment Method	PCOCs in Soil Analytical Program	PCOCs in Groundwater Analytical Program	Surface Water Seep Analytical Program
3l	Recovery Complex Sumps	Metals, Cyanide, Zinc, Lead	The mill is underlain by a concrete floor that is in good condition with a surrounding concrete berm. Liquid spillages are directed to two large sumps which discharge to the tailings line. There is also a sump for the tailings discharge pump. There are numerous chemical tanks and storage areas, however the most likely areas for contaminants to have potentially entered the subsurface were the three sumps.	24, 25	Borehole/monitoring well 05-02 and Borehole/monitoring well 05-03.	CCME metals, sulphide, pH, and cyanide	Dissolved metals, sulphate, glycols, cyanide, and routine water quality	n/a
3m	Paste Backfill Plant and Cement Storage	Metals, alkaline, pH	A sump was located below paste backfill plant which discharge to the tailings line. Cement and blotter acid was stored in the Cement Storage (Paste Backfill) Building.	n/a	Test pit 05-25 west of plant. Test pit 05-22 inside cement storage building.	CCME metals, sulphide, pH, BETX, PHC F1 to F4, PAHs, cyanide, and glycols	n/a	n/a
3n	Misc. Fuel ASTs	Diesel fuel	Three diesel fuel ASTs were located on the periphery of the mill building. All had secondary containment. Valves on the secondary containment allow water to be decanted from time to time. A fourth fuel AST was formerly located south of the cement storage area and was used to power diamond exploration related activities carried out by third parties in this area.	26	Test pits 05-19, 05-23, 05-24, 05-26	CCME metals, sulphide, pH, BETX, PHC F1 to F4, PAHs, cyanide, and glycols	n/a	n/a

TABLE O cont'd: Areas of Potential Environmental Concern Related to Central Mill Area and Supporting Facilities

APEC	Description of Area	Potential Contaminants of Concern (PCOCs)	Discussion of Possible Contamination	Photos	Assessment Method	PCOCs in Soil Analytical Program	PCOCs in Groundwater Analytical Program	Surface Water Seep Analytical Program
3p	Warehouse Hazardous Material Storage	Metals, pH	Hazardous materials (e.g., acids) were delivered to the warehouse and formerly stored in two small shacks to the west of the warehouse entrance.	n/a	Test pit 05-27.	CCME metals, sulphide, pH, and glycols	n/a	n/a
3o	Surface Shop	Diesel, glycols, compressor oil, lubricants	The surface shop is underlain by a concrete floor. Liquid spillages are directed to floor drains that enter a large concrete sump. The sump has a float switch that automatically pumps to the sewage discharge. Oil accumulations are pumped off from time to time for storage in the used oil storage tanks. Steam room has a concrete sump from which sludge is periodically removed and disposed to the landfill.	n/a	Borehole/monitoring well 05-01.	CCME metals, sulphide, pH, BETX, PHC F1 to F4, PAHs, and glycols	Dissolved metals, sulphate, BETX, F1 to F2, glycols, and routine water quality	n/a

TABLE P: Areas of Potential Environmental Concern Related to Periphery of Mill Area

APEC	Description of Area	Potential Contaminants	Discussion of Possible Contamination	Photos	Assessment Method	PCOCs in Soil Analytical Program	PCOCs in Groundwater Analytical Program	Surface Water Seep Analytical Program
4a	Cold Storage #1	Machine parts (oils, grease, metals)	Gravel floors, surface spillage observed.	27	Test pit 05-18, SEEP1.	CCME metals, sulphide, pH, BETX, PHC F1 to F4	n/a	Total metals, sulphate, BETX, F1 to F2, cyanide, and routine water quality
4b	Cold Storage #2	Lime, zinc dust storage Hydrochloric and Nitric Acid storage	Gravel floors, surface spillage observed.	28	Test pit 05-17, SEEP1.	CCME metals, sulphide, and pH	n/a	Total metals, sulphate, BETX, F1 to F2, cyanide, and routine water quality
4c	Cold Storage #3 (now removed)	Cyanide and lead nitrate storage	Gravel floors, surface spillage observed.	28	Borehole/monitoring well 05-16, SEEP1.	CCME metals, sulphide, pH, and cyanide	n/a	Total metals, sulphate, BETX, F1 to F2, cyanide, and routine water quality
4e	Tailings Line	Metals, hydrocarbons	Potential leaks, preferential pathway due to heat melting permafrost. Seep observed adjacent the line.	29	Test pit 05-20, sampled SEEP8.	CCME metals	n/a	Total metals, sulphate, BETX, F1 to F2, PAHs, and routine water quality
4f	Sewage Line	Metals, hydrocarbons	Potential leaks, preferential pathway due to heat melting permafrost, Seep observed adjacent the line.	30	Test pit/monitoring well 05-21 SEEP7 was low flow and not sampled.	CCME metals, sulphide, pH, BETX, PHC F1 to F4, PAHs, and glycols	Dissolved metals, sulphate, BETX, F1 to F2, cyanide, and routine water quality	n/a

TABLE P cont'd: Areas of Potential Environmental Concern Related to Periphery of Mill Area

APEC	Description of Area	Potential Contaminants	Discussion of Possible Contamination	Photos	Assessment Method	PCOCs in Soil Analytical Program	PCOCs in Groundwater Analytical Program	Surface Water Seep Analytical Program
4g	Remainder Steel Yard, Lumber Yard, East Mill Lay down	Various	Innocuous materials stored in this area. Stressed vegetation near SEEP1 to south may be associated with APECs 4a through 4c. Two areas of ponded water on east side of mine footprint.	6	Covered by the above, plus test pits 05-34, 05-77, 05-78, and 05-81. Surface soil sample SS63 at stressed area. SEEP1 as well as SEEP5 and SEEP6.	CCME metals, sulphide, pH, BETX, PHC F1 to F4, PAHs, and glycols	Dissolved metals, sulphate, BETX, F1 to F2, cyanide, and routine water quality	Total metals, sulphate, BETX, F1 to F2, cyanide, and routine water quality
4h	Former Mine Water Discharge Area	Metals	Underground mine water was discharged to this area prior to 2001. The surface soil has been scoured by the discharge.	n/a	Surface soil sample SS64.	CCME metals, sulphide, pH, and PHC F2 to F4	n/a	n/a

TABLE Q: Areas of Potential Environmental Concern Related to North Shops

APEC	Description of Area	Potential Contaminants	Discussion of Possible Contamination	Photos	Assessment Method	PCOCs in Soil Analytical Program	PCOCs in Groundwater Analytical Program	Surface Water Seep Analytical Program
5a	RTL Shop	Fuels, maintenance activities	Equipment parking and maintenance areas are at risk of hydrocarbon contamination due to leaks and spills. Metals concentrations may also be elevated due to parked underground equipment which may have released ore dust. A diesel fuel AST associated with the shop has been reported to have released fuel.	31, 32	Test pits 05-44 and 05-55. SEEP12.	CCME metals, sulphide, pH, BETX, PHC F1 to F4, and PAHs	n/a	Total metals, sulphate, BETX, F1 to F2, PAHs, glycols, and routine water quality
5b	Concrete Plant	Lime (concrete mix), metals in fire debris	Soil pH values may be altered proximate to the concrete plant. Concrete plant involved in a fire and the building was replaced.	31	Test pit 05-57, SEEP11.	CCME metals, sulphide, and pH	n/a	n/a
5c	Former Numa Logistics Winter Road Shop and Tank	Fuels, maintenance activities	Former shop had 14,000 Gallon Diesel Tank. Fold away building now removed. Apparently hydrocarbon contaminated soil was excavated from the ore and disposed to the tailings area.	33	Test pit 05-42 and test pit/monitoring well 05-43.	CCME metals, sulphide, pH, BETX, PHC F1 to F4, PAHs, and glycols	Dissolved metals, sulphate, BETX, F1 to F2, PAHs, glycols, and routine water quality	n/a

TABLE R: Areas of Potential Environmental Concern Related to North Storage Areas

APEC	Description of Area	Potential Contaminants	Discussion of Possible Contamination	Photos	Assessment Method	PCOCs in Soil Analytical Program	PCOCs in Groundwater Analytical Program	Surface Water Seep Analytical Program
6a	Third Party Drum Storage Area	Diesel, fuel oil, lubrication oil, jet fuel, ATF, etc.	Third party storage of drums of diesel, fuel oil, lubrication oil, jet fuel, ATF, etc. Most drums were new and stored on wooden skids however, potential exists for releases to have occurred.	34	Test pit 05-39.	CCME metals, sulphide, pH, BETX, PHC F1 to F4	n/a	n/a
6b	Third Party Salt Storage	Salt	Third party storage of bags of salt; some visible spillage observed.	35	Test pit 05-41.	CCME metals, sulphide, pH, and salinity	n/a	n/a
6c	Former Surface Shop #3, now used for storage	Misc. hydrocarbons, metals	Former surface Shop #3 now used for storage of insulation and polyester resin. A small diesel tank for a heater is located inside the building.	n/a	Test pit 05-38.	CCME metals, sulphide, pH, BETX, PHC F1 to F4, PAHs, and glycols	n/a	n/a
6d	Former Surface Shop #2, now used for storage	Misc hydrocarbons, metals from shotcrete	Former surface Shop #3 now used for storage of shotcrete.	n/a	Test pit 05-40.	CCME metals, sulphide, pH, BETX, PHC F1 to F4	n/a	n/a
6e	Portal Ramp	Spilled materials, development rock	Ore may have been tracked out of the portal and other materials may have been released in this high traffic area.	n/a	Test pit 05-48.	CCME metals, sulphide, and pH	n/a	n/a

TABLE S: Areas of Potential Environmental Concern Related to Residential Area

APEC	Description of Area	Potential Contaminants	Discussion of Possible Contamination	Photos	Assessment Method	PCOCs in Soil Analytical Program	PCOCs in Groundwater Analytical Program	Surface Water Seep Analytical Program
7a	Offices, accommoda-tion, recrea-tion and kitchen complex	Diesel fuel	One diesel AST for emergency boiler. Tank has secondary containment. Glycol circuit is above ground so leaks would be seen. Otherwise no obvious environmental concerns exist in this area.	36	Test pit/monitoring well 05-55.	CCME metals, BETX, PHC F1 to F4, and PAHs	CCME metals, BETX, PHC F1 to F2, and PAHs	n/a
7b[1]	Water intake and fuelling area at dock	Diesel fuel, metals, PAG	One fuel AST for emergency power. Development rock use to construct breakwater.	8	Test pit 05-51.	CCME metals, sulphide, pH, BETX, PHC F1 to F4	n/a	n/a
7c[1]	Sea Plane and Boat Fuelling	Fuel	Small volumes fuelled from drums or truck on occasion. Spills were unlikely or small, and no staining was visible during inspection. A former boat fuelling AST was located in a lined and bermed area west of the dock.	8	Test pit 05-50.	BETX, PHC F1 to F4	n/a	n/a
7d	Guesthouse Emergency Fuel Storage	Diesel fuel	An AST is located in the basement below the guesthouse.	37	Test pit 05-61.	BETX, PHC F1 to F4	n/a	n/a

[1] APEC not indicated on drawing

TABLE T: Areas of Potential Environmental Concern Related to Wastes Management and Disposal Areas

APEC	Description of Area	Potential Contaminants	Discussion of Possible Contamination	Photos	Assessment Method	PCOCs in Soil Analytical Program	PCOCs in Groundwater Analytical Program	Surface Water Seep Analytical Program
8a	Used Oil Storage	Used oil	Used oil was collected and pumped into two ASTs located within a lined berm. The bedding sand above the liner was visibly stained with hydrocarbons. The tanks are periodically emptied into tanker trucks for off-site disposal.	5	SS66 sample within berm. Test pit 05-30 on southwest (downgradient side).	CCME metals, PHC F2 to F4, PAHs, glycols, and cyanide	n/a	n/a
8b	Incinerator	Metals, diesel fuel	1,000 Gal diesel tank supplies fuel for the incinerator. Potential for contamination from released fuel or incinerator ash.	38	Test pit/monitoring well 05-15.	CCME metals, sulphide, pH, BETX, PHC F1 to F4, and PAHs	n/a	n/a
8c	South Surface Burn Pit	Various wastes burned	Burn pits are frequently contaminated due to the incomplete combustion of wastes and residue materials. There is an abandoned AST and some staining visible on the south side of the burn pit, which may be from fuel used to start the burning process. Some buried debris and orange precipitate-stained water and stressed vegetation observed on the east (downgradient) side of the burn pit.	6	Test pit 05-12, test pit/monitoring well 05-13, test pit 05-14. Surface soil sample SS62 at location of stressed vegetation. Surface water seep sample at SEEP2.	CCME metals, sulphide, pH, BETX, PHC F1 to F4, PAHs, glycols, and cyanide	Dissolved metals, sulphate, BETX, F1 to F2, glycols, cyanide, and routine water quality	Total metals, sulphate, BETX, F1 to F2, PAHs, glycols, cyanide, and routine water quality
8d	North Underground Burn Pit	Various wastes burned	Burn pits are frequently contaminated due to the incomplete combustion of wastes and residue materials. It was also reported the drums may have been cleaned in this area.	39	Test pit 05-47 to northeast on downgradient side. SEEP13.	CCME metals, sulphide, pH, BETX, PHC F1 to F4, PAHs, glycols, and cyanide	n/a	Total metals, sulphate, BETX, F1 to F2, and routine water quality Insufficient amount of water to analyze for cyanide

TABLE T cont'd: Areas of Potential Environmental Concern Related to Wastes Management and Disposal Areas

APEC	Description of Area	Potential Contaminants	Discussion of Possible Contamination	Photos	Assessment Method	PCOCs in Soil Analytical Program	PCOCs in Groundwater Analytical Program	Surface Water Seep Analytical Program
8e	Landfill	Various wastes	Landfill is unlined. Three seeps with some oxide staining identified discharging on the west and south side of the landfill. INAC inspector identified elevated contaminants in the seep at the south side of the landfill.	6, 40	Borehole/monitoring well 05-09 at southwest (downgradient). Surface water sample from SEEP3.	n/a	Dissolved metals, sulphate, BETX, F1 to F2, glycols, and routine water quality Insufficient amount of water to analyze for cyanide	Total metals, sulphate, BETX, F1 to F2, PAHs, glycols, cyanide, and routine water quality
8f	Bone Yard	Hydrocarbons, metals	Used for storage of derelict equipment. Reportedly there have been releases of hydrocarbons from some of the equipment.	41	Test pit/monitoring well 05-11, test pits 05-82 and 05-83.	CCME metals, sulphide, pH, BETX, PHC F1 to F4, PAHs, and glycols	Dissolved metals, sulphate, BETX, F1 to F2, glycols, and routine water quality	n/a

TABLE U: Areas of Potential Environmental Concern Related to Background Reference Areas

APEC	Description of Area	Potential Contaminants	Discussion	Photos	Assessment Method	PCOCs in Soil Analytical Program	PCOCs in Groundwater Analytical Program	Surface Water Seep Analytical Program
9a[1]	Soil Background	Natural background concentrations	Background reference for soil – mineralized areas described by geology map. Orange coloured oxides observed in some bedrock outcrops around the mill site.	n/a	Surface soil sample SS76. Kinross transect samples (51161 through 51190) collected to north, south, east, and west of the mill site.	CCME metals, sulphide, and pH	n/a	n/a
9b[1]	Water Background	Natural background concentrations	Background reference for water – creek to north of site. Orange staining on rocks.	n/a	Surface water sample CREEK.	n/a	n/a	Total metals, sulphate, and routine water quality

[1] APEC not indicated on drawing

8. PHASE 2 ESA METHODOLOGY

Fieldwork associated with the Phase 2 ESA was completed between July 13 and July 27, 2005. The Phase 2 ESA investigation included:

- drilling of nine boreholes (05-01 through 05-09) and hand augering of one borehole (05-10);
- excavation and soil sampling from fifty-nine test pits (05-11 through 05-61, and 05-77 through 05-84);
- installation of nine monitoring wells in boreholes (05-01 through 05-05, and 05-07 through 05-10);
- installation of ten monitoring wells in test pits (05-11, 05-13, 05-15, 05-16, 05-21, 05-28, 05-37, 05-43, 05-55, 05-60);
- collection of fifteen surface soil samples by Morrow (SS62 through SS75, plus one background soil sample, SS76);
- monitoring of water levels and water sampling of all the monitoring wells, as well as the groundwater sump present in the powerhouse;
- rising head conductivity tests in four of the monitoring wells (05-05, 05-04, 05-08, 05-09);
- collection of surface water samples from ten of the thirteen groundwater seeps (SEEP1 through SEEP13), plus one background sample (CREEK) from a creek located north of the site;
- collection of ten road surface soil samples (51161 through 51170) by Kinross personnel in September 2005; and
- collection of twenty background transect surface soil samples (51171 through 51190) by Kinross personnel in September, 2005.

The investigation locations are shown on Drawing A053017-005. A complete inventory of the investigation locations in relation to the NAD-83 coordinate system, is provided in Table V. The methodology for the fieldwork was generally in accordance with Morrow's Preferred Operating Procedures (POPs) which are based on industry standards or best practice techniques. The locations were placed to investigate each of the APECS identified by the Phase 1 ESA, as presented and discussed in Tables M through U.

TABLE V: Inventory of Investigation Locations

Location	Easting	Northing	General Location
Boreholes, Test pits, Monitoring Wells			
MW05-01	*inside building*	*inside building*	Inside surface shop
MW05-02	*inside building*	*inside building*	South recovery building
MW05-03	*inside building*	*inside building*	North recovery building
MW05-04	*inside building*	*inside building*	Adjacent southeast of powerhouse
MW05-05	*inside building*	*inside building*	Inside grinding room
BH05-06	*inside building*	*inside building*	Inside rebuild shop
MW05-07	489113	7293698	Tank farm loader south
MW05-08	489446	7293498	Southwest of sat tank farm
MW05-09	489750	7293326	Landfill
MW05-10	*inside building*	*inside building*	Inside powerhouse
MW05-11	489875	7293268	Bone yard
TP05-12	489862	7293382	South of main burn pit
MW05-13	489888	7293435	East of main burn pit
TP05-14	489844	7293417	Burn pit
MW05-15	489679	7293676	Incinerator
MW05-16	489616	7293663	Cold Storage #3
TP05-17	*inside building*	*inside building*	Inside Cold Storage #2
TP05-18	*inside building*	*inside building*	Inside Cold Storage #1
TP05-19	489604	7293503	South of cement storage building
TP05-20	489544	7293408	South of tailings line
MW05-21	489511	7293471	South of sewer line
TP05-22	*inside building*	*inside building*	Inside cement storage building
TP05-23	489555	7293635	East of mill
TP05-24	489493	7293689	North of mill
TP05-25	489516	7293628	West of cement pastefill plant
TP05-26	489535	7293592	West of mill
TP05-27	489492	7293605	South of acid storage
MW05-28	489472	7293505	South of satellite tank farm
TP05-29	489416	7293514	Fuel pumps
TP05-30	489384	7293547	Used oil tanks

TABLE V cont'd: Inventory of Investigation Locations

Location	Easting	Northing	General Location
Boreholes, Test pits, Monitoring Wells cont'd			
TP05-31	489364	7293547	Southeast powerhouse
TP05-32	489382	7293574	Glycol tank
TP05-33	489411	7293581	South of powerhouse
TP05-34	489279	7293564	Steelyard
TP05-35	489128	7293786	Tanker parking
TP05-36	489112	7293737	Tank farm loaders north
MW05-37	489057	7293521	Southwest of main tank farm
TP05-38	489157	7293930	Surface Shop #3
TP05-39	489189	7293987	North barrel storage
TP05-40	489267	7293986	Surface Shop #2
TP05-41	489253	7294032	North salt storage
TP05-42	489306	7293937	Former surface shop #1
MW05-43	489357	7293969	Former SS#1 tank, RTL parking
TP05-44	489427	7293915	South of RTL shop AST
TP05-45	*inside building*	*inside building*	Inside north RTL shop storage
TP05-46	489454	7293963	North of concrete batch plant
TP05-47	489465	7294115	Underground portal burn pit
TP05-48	489424	7294067	Portal
TP05-49	489577	7294144	Former crusher
TP05-50	489983	7294894	Former boat fuel AST
TP05-51	490087	7295131	Water intake pump
TP05-52	489011	7293930	Road to airstrip
TP05-53	488665	7293576	Former fuelling area at airstrip
TP05-54	489552	7293827	Ball field
MW05-55	489475	7293767	South of office boiler AST
TP05-56	489426	7293680	East of crusher
TP05-57	489408	7293714	Ramp to screener
TP05-58	489311	7293688	Emergency powerhouse
TP05-59	489362	7293655	Ramp to shaft house
MW05-60	489378	7293615	Brine mix area
TP05-61	489612	7293746	Guesthouse AST
TP05-77	489446	7293464	Southwest of satellite tank farm
TP05-78	489414	7293484	West of pumps
TP05-79	489319	7293713	Northeast of emergency power
TP05-80	489437	7293727	Between mill and offices
TP05-81	489598	7293627	Southeast of mill
TP05-82	489912	7293241	South end bone yard
TP05-83	489836	7293287	North end bone yard
TP05-84	489507	7293557	East of surface shop

TABLE V cont'd: Inventory of Investigation Locations

Location	Easting	Northing	General Location
Road Surface Soil Samples (collected by Lupin), located outside the main footprint and not shown on Drawings			
55161	489591	7294633	Road surface
55162	489792	7294440	Road surface
55163	488940	7291967	Road surface
55164	488222	7291708	Road surface
55165	485355	7291080	Road surface
55166	486205	7290294	Road surface
55167	486017	7289672	Road surface
55168	487201	7288387	Road surface
55169	488137	7288688	Road surface
55170	489982	7288321	Road surface
Surface Soil Samples			
SS62	489870	7293464	East of burn pit
SS63	489755	7293483	Southeast of mill lay down
SS64	489634	7293271	Mine water discharge
SS65	489452	7293501	South of TF ASTS
SS66	489386	7293553	Used oil ASTs
SS67	489328	7293483	South of pipeline
SS68	489243	7293512	Southwest of pipeline
SS69	489297	7293585	West overburden pile
SS70	489321	7293732	East overburden pile
SS71	489023	7293561	Southwest of main TF
SS72	489020	7293769	Northwest of main TF
SS73	489056	7293734	North main TF
SS74	489048	7293591	Middle main TF
SS75	489080	7293566	South main TF
SS76	490025	7294271	Background reference
Background Transect Surface Soil Samples (collected by Kinross)			
55171	489120	7294124	Transect to North
55172	489146	7294192	Transect to North
55173	489151	7294298	Transect to North
55174	489167	7294388	Transect to North
55175	489190	7294491	Transect to North
55176	489729	7293787	Transect to East
55177	489815	7293860	Transect to East
55178	489895	7293921	Transect to East
55179	489998	7293939	Transect to East
55180	490084	7294001	Transect to East

TABLE V cont'd: Inventory of Investigation Locations

Location	Easting	Northing	General Location
Background Transect Surface Soil Samples (collected by Kinross) cont'd			
55181	489481	7293246	Transect to South
55182	489131	7293131	Transect to South
55183	489482	7293029	Transect to South
55184	489439	7292942	Transect to South
55185	489462	7292840	Transect to South
55186	488924	7293811	Transect to West
55187	488823	7293771	Transect to West
55188	488700	7293721	Transect to West
55189	488601	7293705	Transect to West
55190	488513	7293670	Transect to West
Surface Water Seep Samples			
SEEP1	489724	7293456	South of mill lay down
SEEP2	489870	7293464	East of burn pit
SEEP3	489791	7293375	South of landfill
SEEP4	489707	7293348	Northwest of landfill (not sampled)
SEEP5	489737	7293612	Incinerator
SEEP6	489652	7293798	Northeast of guesthouse
SEEP7	489435	7293421	Adjacent sewer line (not sampled)
SEEP8	489493	7293372	North of tails line
SEEP9	489047	7293624	West of main tank farm
SEEP10	489408	7293895	South of RTL shop
SEEP11	489466	7293951	East of RTL shop (not sampled)
SEEP12	489439	7293986	North of RTL shop
SEEP13	489432	7294163	North of underground burn pit
CREEK	489769	7295051	Background reference; unnamed creek to north

8.1. Borehole Drilling, Test Pit Excavation, and Soil Sampling

At select locations within buildings, or where monitoring wells for conductivity tests were desired, boreholes were drilled using Kinross' Tamrock rotary percussion drill (Photograph 42). Soil cuttings were observed by withdrawing the drill bit every 1.2 m and sampling the soil in the bottom of the borehole with a hand auger. Boreholes 05-01 through 05-09 were drilled in this manner. Given the highly disturbed nature of the drilling method, soil samples were not analyzed from the boreholes. At borehole 05-10 within the powerhouse, the area was inaccessible to heavy equipment, and a borehole was manually excavated using a hand auger and sampled following the methodology discussed in the subsequent paragraph. The soil cuttings were logged as presented on the Borehole Logs, Appendix IV.

Soil samples were collected from test pits excavated to permafrost by Echo Bay's Case 580 backhoe (Photograph 43). The exposed soil was logged for type, moisture content, grain size, and visual indications of contamination (e.g., oxidation and/or staining), as presented on the Test Pit Logs, Appendix IV. At least two soil samples were collected from each test pit to characterize all stratigraphic zones and areas of interest. Soil samples were stored in laboratory supplied containers and a portion of the sample was retained in a sealable poly-ethylene bag for field screen purposes as discussed in Section 8.7. The test pits were backfilled with the displaced soil in the reverse order of excavation and left in a smooth and safe manner.

Surface soil samples collected from select areas of the site, logged, and sampled as discussed in the previous paragraph. In addition, in September 2005, Lupin personnel collected surface soil samples from: a) transects of natural background soil; and b) from roads outside the main footprint. These samples were sent directly to ALS for analysis. Surface soil sample logs are provided as Tables 1 and 3, attached.

8.2. Monitoring Well Installation

Monitoring wells were installed within boreholes and select test pits for groundwater elevation monitoring and groundwater sampling. A well could not be placed in borehole 05-06 as sloughing of soil prevented placement of the well pipe.

The well pipes consisted of 35 mm or 50 mm diameter PVC void of glues or primers, with a screened section (0.10 mm slots) that were installed across the water table and a solid section that protrudes above ground surface in areas with no traffic or flush with the ground surface in traveled areas.

A medium silica sand-pack was installed around the well screen. Since the bagged commercial sand was of unknown quality, a sample of the sand (SANDBLANK) was submitted for total metals analysis to confirm that it would not influence groundwater quality. The purpose of the monitoring well installations was to facilitate hydraulic conductivity testing and a comparison of water quality between samples collected from test pits and boreholes, since the test pit wells were installed by backfilling the test pit spoils around the pipe (i.e., no sand pack) (Photographs 44 and 45). The monitoring well installation details are shown on the Test Pit and Borehole Logs, Appendix IV.

8.3. Site Mapping and Surveying

The site features shown on Morrow drawings are based on several digital drawings provided to Morrow by Kinross. Surface soil and test pit locations were determined using a hand held GPS relative to the NAD-83 coordinate system and by measurements from features shown on the site drawing. The monitoring well locations and elevations were surveyed by Kinross' on-site surveyor.

It is noted that some features or corresponding investigation locations shown on the site drawings are not located exactly, as the drawings were combined from several Kinross drawings that had different coordinate systems, and for which the coordinate systems did correspond exactly.

8.4. Groundwater Monitoring and Sampling

Groundwater monitoring was completed a minimum of two days after the wells were installed to allow groundwater elevations to stabilize. Hydrocarbon vapour concentrations in the well were recorded prior to the depth to water, groundwater pH, temperature, and conductivity being recorded. The field equipment is shown in Photograph 46. The water levels and vapour measurements are provided in the Monitoring Report, Appendix V.

Groundwater samples were collected after monitoring using an ultra low flow method (i.e., Peristaltic pump) that minimizes the volume of water required for purging before sampling. The ultra low flow sampling method also reduces turbidity that is expected to exist in groundwater as a result of the wells being installed in test pits. Samples were collected directly into laboratory-supplied containers after field readings of temperature, conductivity, and pH were within 10% between subsequent readings, which indicated that representative groundwater was being displaced from the well. The final field readings are provided in Table 18, attached. Samples for dissolved metals were field filtered using a 45 µm in-line filter.

8.5. Surface Water Sampling

The surface water seeps were carefully collected using laboratory-supplied containers in a manner that minimized the entrainment of any sediment. Field measurements of pH, temperature, and conductivity were also recorded. The surface water sample log is provided as Table 2, attached, and field measurements are provided in Table 19, attached.

8.6. Hydraulic Conductivity Testing

Rising or falling head response tests were completed at monitoring wells 05-05, 05-04, 05-08, and 05-09. These wells were selected due to their location and geologic stratigraphy.

A slug consisting of a sand filled PVC pipe was rapidly introduced (falling head or slug test) into the monitoring well and rapidly removed (rising head or bail test) from the monitoring well in order to induce a near-instantaneous change in hydraulic head in the wells. Recovery of the hydraulic head was measured using a data logger/pressure transducer assemblage and several slug and bail tests were carried out to ensure accuracy of results.

Since non-aqueous phase liquid (NAPL) was present at monitoring well 05-04, the well was bailed dry to induce the water level response (a rising head test; NAPL bail down test). The water and NAPL level response was monitored manually.

Results of the response testing were analyzed using the Bouwer and Rice[6] method (appropriate for unconfined aquifer conditions) and AquiferTest[7] computer software in order to determine estimates for the in situ hydraulic conductivities of the screened geological materials. Appendix VI contains the results of hydraulic conductivity estimates.

8.7. Field Screening

8.7.1. Hydrocarbon Field Screening

For hydrocarbons in soil, all samples were field screened for hydrocarbon vapour using an Eagle RKI-Portable Gas Detector for headspace vapour sampling. However, since the main source of hydrocarbon contamination was diesel (i.e., less volatile and vapour screen potentially non-reliable), select samples were also field screened for hydrocarbons using a Petro-Flag™ Portable Field Test Kit, which is a reagent based test for non-volatile hydrocarbons.

[6] Bouwer, H. and R.C. Rice, 1976. A slug test method for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells, Water Resources Research, Vol. 12, no. 3 pp. 423-428.

[7] Rohrich, T. and Waterloo Hydrogeologic Inc. *AquiferTest* – Version 3.0 for Windows

8.7.2. Metals Field Screening

Select samples targeted for metals analysis were field screened using a Niton XL-702S Portable X-Ray Fluorescence Analyzer (referred to hereafter as XRF) for primary metals of concern identified by Echo Bay (the Restoration Plan indicated arsenic, lead, and/or zinc). As with hydrocarbon screening, the intent was to compile a data set that will allow more accurate decisions to be made during the potential remedial excavation work. In addition, it was found that the on-site screening results aided in the selection of samples for laboratory analysis.

8.8. Laboratory Analysis

Soil and ground water samples were analyzed at ALS Environmental (ALS) of Calgary, AB, for appropriate laboratory parameters associated with the PCOCs identified at the site associated with hydrocarbon fuels and lubricants, metals, and potential acid generation (PAG), and process reagents including cyanide, zinc power, and lead-nitrate. Potential contamination associated with salt and cement use was also evaluated.

In soil, selected analysis was completed for benzene, ethylbenzene, toluene, xylenes (BETX), polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbon (PHC) fractions F1 to F4, cyanide, and glycols. Total metals in soil was analyzed using the CCME digestion method on the -2 mm field screened fraction. Three soil samples were also submitted for grain size analysis, one from each of the primary statigraphic units at the site.

As required by the mine closure plan, the potential for acid rock drainage and metal leaching (ARD/ML) was evaluated by determining the paste pH and percent sulphide in soil samples and comparing the results to criteria established by the BC Ministry of Energy and Mines (MEM).

In water, selected analysis was completed for BETX, PAHs, PHC fractions F1 and F2, cyanide, and glycols. Dissolved metals (field filtered and preserved) were evaluated in groundwater and total metals in the surface water seeps. Routine water quality parameters including pH, sulphate, nitrogen compounds, and other anions were also analyzed.

The laboratory analysis completed for samples collected at each APEC are summarized in Tables M through U.

The detailed laboratory methodology is contained in the laboratory reports provided in Appendix VII. Because of their significance on the interpretation of results, the laboratory methodology for pH and sulphide analysis in soil is summarized as follows.

8.8.1. Laboratory Methodology for pH Analysis

“Standard” pH in soil analysis (i.e., for comparison to CCME criteria) was carried out in accordance with procedures described in *Soil Sampling and Methods of Analysis* (CSSS). The procedure involves mixing the air-dried sample with deionized/distilled water. The pH of the solution is then measured using a standard pH probe. A one to two ratio of sediment to water is used for mineral soils and a one to ten ratio is used for highly organic soils.

For "Saturated Paste Extract" (paste pH) 200 dry grams to 500 dry grams of sample was extracted for a minimum of 4 hours with an amount of deionized water required to create a saturated paste. The resulting extract is then filtered and analyzed for pH.

8.8.2. Laboratory Methodology for Sulphide Analysis

Sulphide in soil analysis was carried out on a leachable basis. The procedure involves mixing the sample with a sodium hydroxide solution in a one to ten ratio and leaching for several hours. The leachate is then centrifuged and analyzed colorimetrically.

8.9. Quality Assurance/Quality Control

Morrow uses standardized field protocols for sample collection and handling as well as chain-of-custody documentation to maintain sample integrity. Quality assurance and quality control (QA/QC) was also assessed by the analysis of blind duplicates sampled at a frequency of one in ten samples. As part of QA/QC measures undertaken to ensure unbiased and representative sample collection a total of sixteen blind field duplicate samples (thirteen soil/ three water) were submitted for analysis. Blind duplicate samples consisted of a second set of samples from a given location that are submitted blind to the laboratory. Additionally, laboratory internal quality control was monitored through assessment of blanks, spikes, and standard recovery.

Evaluation of the precision of the laboratory based on blind duplicate samples involves comparison of the results and calculation of the relative percent difference (RPD) between results. The RPD is the absolute value of the difference between the two results, divided by the average of the two and reported as a percentage; i.e.,

$$RPD = abs[(C_{sample}-C_{dup})/(C_{sample}+C_{dup})/2]*100$$

RPDs are only calculated from samples/parameters for which the measured concentration is greater than five times the method detection limit (MDL) (i.e., greater than the practical quantitation limit). For the purposes of evaluation, Morrow interprets that RPD values for soil and groundwater are large enough to require an investigation into the cause based on the following trigger values for inorganic and organic compounds.

TABLE W: RPD Objectives

Parameter Group	Soil RPD_{DUP} Trigger Criteria	Groundwater RPD_{DUP} Trigger Criteria
Organics	35%	40%
Inorganics	35%	25%

9. PHASE 2 ESA RESULTS

9.1. Stratigraphy

The stratigraphy observed is described in the Test Pit and Borehole Logs, Appendix IV. The typical stratigraphy is also shown on Photograph 43, Appendix II. The stratigraphy for the mine footprint generally consisted of the following stratigraphic units:

- UNIT 1: Approximately 0.5 m to 2.0 m (average approximately 1 m) of DEVELOPMENT ROCK consisting of angular sand, gravel, cobbles, and boulders, grey with orange oxidation near surface.
- UNIT 2: In many areas development rock is overlain or underlain by approximately 0.5 m of rounded granular OVERBURDEN FILL (i.e., natural materials that were moved to develop the mine).
- UNIT 3: Fill material is underlain by NATIVE SILT/FINE SAND TILL.
- UNIT 4: Undisturbed NATIVE SAND AND GRAVEL (rounded) at depth (based on geotechnical report). Finally
- UNIT 5: BEDROCK (based on geotechnical report).

Permafrost exists throughout the site at a depth of about 1.3 m below surface grade in July. Exceptions to this occur in the vicinity of buildings where the heat imprint allows a greater thickness of unfrozen soils.

9.1.1. Grain Size Analysis

Soil textures were classified based on visual and manual procedures completed in the field. A selected sample from each of the three main soil units were submitted for sieve analyses to confirm the median particle size, as presented in Table X.

TABLE X: Summary of Grain Size Analysis

Sample Identification	Depth (m)	Field Description	UNIT	<0.075 mm %	>0.075 mm %	Laboratory Description
TP05-77-01	0.25	SAND, GRAVEL, and COBBLES (DEVELOPMENT ROCK), angular, compact.	1	14.6	85.4	Coarse-grained soil, coarse textured soil having a median grain size of greater than 75 µm
TP05-77-02	0.75	SAND and GRAVEL (OVERBURDEN FILL), well graded, rounded.	2	7.3	92.7	Coarse-grained soil, coarse textured soil having a median grain size of greater than 75 µm
TP05-77-03	1.00	SAND (NATIVE), fine-grained, silty.	3	57.7	42.3	Fine-grained soil, fine textured soil having a median grain size of less than 75 µm

9.2. Hydrogeology

9.2.1. Water Levels and Flow Direction

The groundwater monitoring report is provided in Appendix V. Groundwater was observed at a depth of approximately 1 m to 1.2 m below surface grade on the surface of the permafrost. Since the study area is situated on top of a slight hill whose height is augmented by the development rock pad, the groundwater is 'mounded' in the same pattern as the topographic contours, with radial groundwater flow to the north, east, south, and west. Contours for the topography are shown on the Site Plan, Drawing A05-3017-001, and groundwater contours based on the July 2005 measurements are provided on Drawing A053017-008, attached.

Groundwater seeps exist at the edges of the development rock pad at the locations noted in Section 3.2. The seeps flowed at an approximate flow rate of 1 L/minute to 5 L/minute during the July site inspection, depending on the location. The seeps do not flow during the colder approximately eight months of the year.

9.2.2. Rising Head Hydraulic Conductivity Tests

Hydraulic conductivity estimates for each of the wells in which tests were conducted along with the nature of the geological material within the saturated screened interval are presented in the table below. The response test curves and test parameters as output from AquiferTest are provided in Appendix VI.

TABLE Y: Summary of Soil Characteristics and Response Test Results

MW ID	Saturated Screened Interval		Hydraulic Conductivity (m/s)
	Geologic Material	Unit	
05-05	SAND and GRAVEL (OVERBURDEN FILL)	2	6.60×10^{-5} to 8.15×10^{-5}
05-04	SAND and GRAVEL (OVERBURDEN FILL)	2	1.62×10^{-4}
05-08	SAND and GRAVEL and COBBLES (DEVELOPMENT ROCK), angular, grey, compact	1	6.6×10^{-6}
05-09	SAND (NATIVE), some silt, abundant cobbles and boulders, rounded, compact.	3	2.07×10^{-8}

The hydraulic conductivity tests confirm that when unfrozen, the development rock is highly permeable, the overburden fill moderately permeable, and the native silt till relatively impermeable. These measurements were taken during the peak summer season and the permeability of all site soils would be much reduced when during winter months when the active zone of the permafrost is frozen.

9.2.3. Non-Aqueous Phase Liquid

The only area where non-aqueous phase liquid (NAPL) was encountered was at monitoring well 05-04 in the area of the powerhouse day tanks where a NAPL thickness of 68 mm was observed in the monitoring well. The NAPL was removed in a bail down test and the NAPL recovery was monitored. Data from the NAPL bail down test at well 05-4 is provided in Table Z.

TABLE Z: NAPL Bail Down Test Data for Monitoring Well 05-04

Time	Elapsed Time (min)	Depth to NAPL (m)	Depth to Water (m)	NAPL Thickness (mm)
1:28	0	well bailed dry		
1:29	1	-	2.035	0
1:30	2	-	1.97	0
1:33	5	1.764	1.765	1
1:35	7	1.725	1.726	1
1:40	12	1.53	1.531	1
1:50	22	1.375	1.376	1
2:02	34	1.318	1.319	1
2:14	46	1.301	1.302	1
2:30	62	1.299	1.3	1

The bail down test indicates that the volume of NAPL was relatively small since the NAPL thickness did not recover. As such, a NAPL recovery system does not appear warranted.

9.3. Analytical Results

Analytical results are presented along with comparison to the regulatory criteria in Tables 3 through 28, attached. The detailed analytical reports are provided in Appendix VII. The results of chemical analysis of soil and groundwater samples are also summarized on Drawings A053006-006 and 007, attached. The results for each PCOC and media are summarized in the following sections.

9.3.1. Metals in Soil

Analytical results for total metals in soil are provided in the following tables and summarized on Drawing A053006-006B:

- Table 7: Summary of Analytical Results for Metals in Surface Soil Samples;
- Table 10: Summary of Analytical Results for Metals in Borehole and Test Pit Soil Samples;
- Table 11: Summary of Analytical Results for Metals in Soil, Kinross Borehole Samples; and
- Table 12: Summary of Analytical Results for Metals in Soil, Kinross Samples, September 2005.

We have not included the analytical results for Kinross installed boreholes (BPR1 through BPR7 and LD1 through LD3) in the following interpretation because the geologic description of the materials analyzed was not available. However, for the sake of completeness, the data is included in Table 11.

Over one hundred forty two samples from the site were analyzed for total metals. The number of samples analyzed have allowed us to evaluate the analytical results for the metals in soil on a statistical basis for each type of material found at the site.

Arsenic concentrations in soil were elevated across the site, with concentrations in development rock being up to two orders of magnitude greater than the comparative CCME criteria. Since arsenic concentrations exceeded the reference criteria whenever any other metal parameters

exceeded criteria it is the primary metal of concern that is most likely to drive remediation or risk-based management practice. Secondary metals of concern include chromium, copper, molybdenum, and nickel. However, the concentrations of these metals are minor compared to the arsenic concentrations and on a statistical basis do not exceed the criteria across the site as a whole. A statistical summary of arsenic concentrations measured in the different geologic media at the site are summarized in Table AA. The significance of these results is discussed in Section 10.1.

TABLE AA: Statistical Summary of Arsenic Concentrations Based on Geologic Type

Geologic Type	# of Samples Analyzed	Sample Identification	Minimum	Maximum	Median	90th Percentile	CCME Criteria
Development Rock	52	TP05-11-01, TP05-11-02, TP05-15-01, TP05-15-02, TP05-16-01, TP05-16-02, TP05-17-01, TP05-18-01, TP05-19-01, TP05-19-02, TP05-21-01, TP05-21-02, TP05-22-01, TP05-22-02, TP05-23-01, TP05-24-01, TP05-24-02, TP05-25-01, TP05-26-01, TP05-26-02, TP05-27-01, TP05-29-01, TP05-32-01, TP05-32-03, TP05-34-01, TP05-34-02, TP05-35-01, TP05-39-01, TP05-39-02, TP05-40-01, TP05-41-01, TP05-42-01, TP05-45-01, TP05-45-02, TP05-46-01, TP05-47-01, TP05-49-01, TP05-49-02, TP05-52-01, TP05-54-01, TP05-54-02, TP05-56-01, TP05-56-02, TP05-56-03, TP05-57-01, TP05-57-02, TP05-59-01, TP05-77-01, TP05-78-01, TP05-79-03, TP05-81-01, TP05-82-01	122	11,700	1,140	3,988	12
Mixed Materials	6	TP05-12-01, TP05-43-01, TP05-48-01, TP05-60-01, TP05-79-01, TP05-83-01	61	1,370	361	977	12
Road Surface	10	51161, 51162, 51163, 51164, 51165, 51166, 51167, 51168, 51169, 51170	19	516	136	450	12
Overburden Fill Below Buildings	18	BH05-01-01, BH05-02-01, BH05-02-02, BH05-03-01, BH05-03-02, BH05-04-01, BH05-05-01, BH05-05-02, BH05-10-01	6	1,690	40	453	12
Overburden Fill	18	TP05-12-02, TP05-14-02, TP05-20-01, TP05-20-02, TP05-23-03, TP05-27-02, TP05-29-03, TP05-30-01, TP05-31-01, TP05-36-01, TP05-38-01, TP05-44-01, TP05-61-01, TP05-14-01, TP05-51-01, SS66, SS69, SS70	9	1,690	15	474	12
Native Sand and Silt Below Rock	9	TP05-17-02, TP05-18-02, TP05-40-02, TP05-55-01, TP05-42-02, TP05-43-02, TP05-44-02, TP05-46-02, TP05-34-03	8	30	11	27	12

TABLE AA cont'd: Statistical Summary of Arsenic Concentrations Based on Geologic Type

Geologic Type	# of Samples Analyzed	Sample Identification	Minimum	Maximum	Median	90th Percentile	CCME Criteria
Native Surface Silt at Edge of Footprint	8	SS62, TP05-13-01, TP05-13-02, SS63, SS64 , SS71, SS72, TP05-37-01	5	19	9	15	12
Background Soil	21	SS76, 51171, 51172, 51173, 51174, 51175, 51176, 51177, 51178, 51179, 51180, 51181, 51182, 51183, 51184, 51185, 51186, 51187, 51188, 51189, 51190	9	189	33	152	12

Locations where elevated metals concentrations were anomalous to those in the waste rock (i.e., associated with other activities) are summarized as follows:

- a lead concentration of 156 mg/kg was measured at test pit 05-79, located north of the emergency powerhouse at a location where ore fines are suspected to be present based on field observations;

- lead (3,410 mg/kg), copper (429 mg/kg), and zinc (1,570 mg/kg) concentrations located at test pit 05-14 in the burn pit were greater than CCME IL criteria (600 mg/kg, 91 mg/kg, and 360 mg/kg, respectively); and

- samples with a slightly elevated zinc (329 mg/kg compared to CCME RL and IL criteria of 200 mg/kg and 360 mg/kg, respectively) and copper (171 mg/kg compared to CCME RL and IL criteria of 63 mg/kg and 91 mg/kg, respectively) concentrations were collected in the Bone Yard at test pit 05-11.

9.3.2. Metals in Groundwater and Surface Water

Groundwater samples from fourteen monitoring wells (including the powerhouse sump) and nine surface water seep samples were analyzed for dissolved metals and total metals, respectively. Analytical results for metals in water are provided in the following tables and summarized on Drawing A053006-007B:

- Table 20: Summary of Analytical Results for Total Metals in Surface Water; and
- Table 25: Summary of Analytical Results for Dissolved Metals in Groundwater.

Groundwater and surface water quality for the subject site has been compared to the CCME freshwater aquatic life (AW) criteria. However, as noted in Section 5.5, context for the water analytical results is also gained by comparison of groundwater to BC CSR standards for protection of freshwater aquatic life (which account for a 10x dilution factor) and comparison of surface water quality to limits set out in Water License NWB1LUP0008.

Surface Water

The creek sample had total metal concentrations below both the water licence and CCME guidelines, with the exception of aluminum. Based on this result, the creek sample results are not discussed through the rest of this section.

When the results for the total metals in the ten groundwater seep samples were compared to the conservative CCME CEQG AW guidelines, the following observations were made:

- all of the sample locations had arsenic and copper concentrations greater than the guideline, ranging from 0.00526 mg/L to 0.526 mg/L and 0.0052 mg/L to 0.0948 mg/L, respectively;
- all of the sample locations with the exception of one had elevated iron concentrations, ranging from 0.434 mg/L to 16.2 mg/L; and
- six of the samples had elevated concentrations of zinc and/or cadmium, five samples with elevated nickel, eight samples with elevated aluminum (i.e., also greater than the creek sample), three samples with elevated chromium, and two samples had elevated concentrations of lead.

When the groundwater seep sample results are compared to the Water Licence limits, the exceedances were limited to the following:

- arsenic concentrations in samples SEEP3, SEEP9, SEEP12 ranging from 0.112 mg/L to 0.536 mg/L compared to water licence criteria (0.05 mg/L); and

- nickel concentrations in samples SEEP6, SEEP9, SEEP10, and SEEP13 (0.367 mg/L to 0.523 mg/L) compared to the water licence limit of 0.0.25 mg/L to 0.15 mg/L (dependant on hardness).

It is noted that a sample from SEEP3 , which was collected by the Water License inspector in 2004, contained a different distribution of metal concentrations in excess of the reference criteria. In particular, arsenic concentrations were less (0.223 mg/L) while lead and zinc concentrations were greater than (0.0161 mg/L and 1,360 mg/L, respectively) in 2005. The most significant difference was that zinc concentrations were much greater in the sample collected in 2004 than the 2005 sample (3,360 mg/L vs. < 0.025 mg/L).

Groundwater

When the dissolved metals results for groundwater were compared to the conservative CCME CEQG AW it was observed that there were also elevated levels of aluminum, chromium, copper, iron, molybdenum, nickel, and zinc in the majority of the samples. However, when compared to the BC CSR AW standards, the exceedences were limited to the following:

- arsenic in monitoring wells 05-01, 05-10, 05-21, 05-43, and SUMP with concentrations ranging from 0.0661 mg/L to 1.89 mg/L compared to BC CSR AW standard of 0.05 mg/L; and

- cadmium in monitoring wells 05-11, 05-28, 05-55, and 05-60 with a range of concentrations of 0.000467 mg/L to 0.0141 mg/L compared to BC CSR AW standard of 0.0003 mg/L to 0.0036 mg/L, dependent on hardness.

The sample obtained from monitoring well 05-10 also had elevated levels of chromium and iron when compared to the BC CSR AW standards.

9.3.3. Hydrocarbons in Soil

Approximately one hundred soil samples were analyzed for hydrocarbon parameters in soil. Analytical results for hydrocarbons in soil are provided in the following tables, and summarized on Drawing A053006-006A:

- Table 5: Summary of Analytical Results for Hydrocarbons in Surface Soil Samples;

- Table 6: Summary of Analytical Results for Polycyclic Aromatic Hydrocarbons in Surface Soil Samples;
- Table 9: Summary of Analytical Results for Hydrocarbons in Borehole and Test Pit Soil Samples; and
- Table 13: Summary of Analytical Results for Polycyclic Aromatic Hydrocarbons in Soil.

Since the future land use is unconfirmed and may involve abandonment (i.e., return to the Crown) or residential land use, hydrocarbon concentrations have been compared to the most conservative CCME RL (includes parkland) criteria. Also, since most locations impacted by hydrocarbons were located where coarse-grained fill was present, the CCME criteria based on coarse-grained soil texture was used for all samples. The analytical results indicated that hydrocarbon concentrations exceed the CCME RL criteria at the locations summarized in Table BB.

TABLE BB: Summary of Locations With Hydrocarbons in Soil Greater Than CCME RL Criteria

Investigation Location	APEC	General Location
SS73 and SS75	2a, 2c	Inside main tank farm berm
Test pit 05-35	2b	Main tank farm loaders
SS65, Test pits 05-28, 05-77, and 05-29	3a	Satellite tank farm
Test pits 05-32, 05-33, and Borehole 05-10	3c	Powerhouse day tanks
Test pit 05-28	3g	Emergency powerhouse
Test pits 05-12 and 05-14	8c	At the south burn pit
Test pits 05-23, 05-14, 05-25, and 05-26	3n	ASTs around the perimeter of the Recovery Plant
Test pit 05-47	8d	North burn pit
Test pit 05-45	5a	RTL shop
Borehole 05-55 and Test pit 05-80	7a	Office emergency fuel AST
Test pit 05-55	2e	Former airstrip fuelling area
Test pit05-18	4a	Cold storage #1
Borehole 05-60	3h	Underground fuel transfer station (brine mix area)
Test pit 05-15	8b	Incinerator

Hydrocarbon concentrations were less than the applied guidelines in the samples analyzed from the remainder of the investigation locations.

9.3.4. Hydrocarbons in Water

Groundwater samples from twelve monitoring wells (including the powerhouse sump), and nine surface water seep samples were analyzed for appropriate hydrocarbon parameters. Analytical results for hydrocarbons in soil are provided in the following tables, and summarized on Drawing A053006-007A:

- Table 19: Summary of Analytical Results for Hydrocarbons in Surface Water;
- Table 21: Summary of Analytical Results for Polycyclic Aromatic Hydrocarbons in Surface Water;
- Table 24: Summary of Analytical Results for Hydrocarbons in Groundwater; and
- Table 26: Summary of Analytical Results for Polycyclic Aromatic Hydrocarbons in Groundwater.

Groundwater and surface water quality for the subject site has been compared to the CCME freshwater aquatic life (AW) criteria. However, as noted in Section 5.5, context for the water analytical results is also gained by comparison to BC CSR standards for protection of freshwater aquatic life (which account for a 10x dilution factor) and also provide screening criteria for F1 and F2 hydrocarbon parameter results.

<u>Groundwater</u>

For groundwater, the analytical results indicated that the following locations had F2 concentrations greater than the BC reference standards for aquatic life (0.5 mg/L):

- monitoring well 5-01 (30.4 mg/L) located inside the surface shop (APEC 3o);
- monitoring well 05-07 (12.6 mg/L) located at the main tank farm loaders (APEC 2b);
- monitoring well 05-09 (0.99 mg/L) located on the downgradient side of the landfill (APEC 8e);
- monitoring well 05-10 (3.61 mg/L) groundwater SUMP (6.68 mg/L) in the Powerhouse (APEC 3c,3d);
- monitoring well 05-04 (NAPL) south of Powerhouse (APEC 3c, 3d);

- Monitoring well 05-11 (0.54 mg/L) in the bone yard (APEC 8f);
- monitoring well 05-13 (0.88 mg/L) on the east side of the south burn pit (APEC 8c);
- monitoring well 05-21 (0.8 mg/L) south of the satellite tank farm (APEC 3a) and adjacent the sewer line (APEC 4f);
- monitoring well 05-28 (30.9 mg/L) adjacent the satellite tank farm (APEC 3a);
- monitoring well 05-43 (14.6 mg/L) at the location of the former Surface Shop #1 fuel tank (APEC 5c);
- monitoring well 05-55 (8.26 mg/L) adjacent the office building emergency fuel tank (APEC 7a); and
- monitoring well 05-60 (1.23 mg/L) at the location of the underground fuel unloading area (APEC 3h).

In addition to the above, toluene concentrations in monitoring wells 05-11, 05-28, and 05-60 exceeded the CCME CEQG AW guideline, but not the BC CSR AW standard.

Surface Water Seeps

For the surface water seeps, the analytical results indicated that:

- SEEP3, located south of the landfill (APEC 8e) contained an F2 concentration (0.8 mg/L) greater than the BC CSR AW reference standard (0.5 mg/L);
- SEEP12, located north of the RTL shop (APEC 5a) contained toluene (0.0178 mg/L), F1 (1.64 mg/L) and F2 (4.43 mg/L) concentrations greater than the CCME and CSR AW reference criteria (0.002 mg/L, 1.5 mg/L, and 0.5 mg/L, respectively); and
- SEEP 13, located north of the north burn pit (APEC 8d) contained an F2 concentration (0.62 mg/L) greater than the BC CSR AW reference standard (0.5 mg/L).

It is noted that the sample from SEEP3 collected by the Water License inspector in 2004 reported a concentration of 26 mg/L “Oil and Grease”.

The remaining seep and groundwater samples contained hydrocarbon concentrations less than the reference criteria.

9.3.5. Glycols in Soil and Water

Glycols were analyzed in eighteen soil samples, eight groundwater samples, and two seeps. Analytical results for glycols in water are provided in the following tables and are summarized on Drawings A053017-006A and A053017-007A for soil and water, respectively:

- Table 8: Summary of Analytical Results for Glycols in Surface Soil Samples;
- Table 15: Summary of Analytical Results for Glycols in Soil;
- Table 23: Summary of Analytical Results for Glycols in Surface Water; and
- Table 28: Summary of Analytical Results for Glycols in Groundwater.

No glycol concentrations in soil exceeded the CCME criteria. However, elevated ethylene glycol concentrations greater than CCME CEWQ AW (697 mg/L compared to 192 mg/L) were identified in a groundwater sample obtained from monitoring well 05-43, located near the former Surface Shop #1 (APEC 5c). However if a 10x dilution factor for groundwater was considered, the glycols concentration would be less than the guideline.

Glycol concentrations were not elevated in the two sampled seeps.

9.3.6. Anions in Soil and Water

Groundwater samples from fifteen monitoring wells (including the sump in the powerhouse), and surface water from eleven locations were analyzed for anions, and two locations for salinity. Soil samples from two locations were analyzed for salinity. Analytical results for anions in soil and water are provided in the following tables:

- Table 16: Summary of Analytical Results for Soil Salinity and Inorganics in Soil;
- Table 22: Summary of Analytical Results for Inorganics in Surface Water; and
- Table 27: Summary of Analytical Results for Inorganics in Groundwater.

9.3.6.1. Nitrate and Nitrite

Analytical results for nitrate and nitrite in water are included on attached Drawing A053017-007B. The analytical result indicate that nitrate (and nitrite) concentrations in groundwater and surface water were greater than the CCME CEQG AW criteria of 13 mg/L at the following locations:

- Monitoring well 05-02 (below recovery plant, APEC 3l), 25.2 mg/L;
- Monitoring well 05-09 (downgradient from landfill, APEC 8e), 26.3 mg/L;
- Monitoring well 05-13 (downgradient from burn pit, APEC 8c), 666 mg/L;
- Monitoring well 05-16 (cold storage #3, where lead nitrate was stored, APEC 4c), 258 mg/L; and
- SEEP7, beside the sewage discharge line (APEC 4f), 53.6 mg/L.

Nitrite was also elevated at monitoring well 05-05, SEEP1, SEEP2, SEEP3, and SEEP8 (ranging from 0.071 mg/L to 0.722 mg/L compared to CCME CEQG AW guideline of 0.06 mg/L).

It is noted that the sample from SEEP3 collected by the Water License inspector in 2004 reported a concentration of 3.6 mg/L nitrate.

The nitrite and nitrate concentrations were less than CCME CEQG AW at the remaining sampled locations.

9.3.6.2. Sulphate

Analytical results for sulphate in water are included on attached Drawing A053017-007B. The CCME CEQG do not have criteria for sulphate in water. Accordingly, for screening purposes sulphate concentrations in surface water results have been compared to the criteria protective of aquatic life in the BC AWQG.

The analytical results indicate that sulphate concentrations were greater than the BC AWQG (100 mg/L) in all the seeps on-site (ranging from 202 mg/L to 740 mg/L) in all sampled monitoring wells except well 05-28 and the powerhouse SUMP. However, when the CSR AW standards are referenced, concentrations in groundwater were less than the standard of 1,000 mg/L with the exception of samples from monitoring wells 05-13 and 05-60.

It is noted that the sample from SEEP3 collected by the Water License inspector in 2004 reported a concentrations of 640 mg/L sulphate, which is similar to the 2005 result.

9.3.6.3. Cyanide

Of the seventeen soil samples analyzed, cyanide concentrations greater than CCME criteria were found in one soil sample, BH05-03-02 (21.9 mg/kg compared to CEQG RL guideline of 0.9 mg/kg, and 8 mg/kg for IL). The sample was collected from below the recovery area of the mill (APEC 3l).

Of the seven groundwater samples analyzed for cyanide, the following three monitoring wells contained concentrations greater than the comparable CCME CEQG AW guideline of 0.005 mg/L:

- Monitoring wells 5-02, 0.422 mg/L and 05-03, 3.97 mg/L located in the recovery plant (APEC 3l);
- Monitoring well 05-13, 0.017 mg/L, located east of the south burn pit (APEC 8c); and
- Monitoring well 05-21, 0.178 mg/L, located near the sewage line (APEC 4f).

With the exception of monitoring well 05-13, these results would remain a concern even if a 10x factor were applied to allow for dilution, as groundwater becomes surface water. It is noted that cyanide concentrations would degrade rapidly in the natural environment.

For the three sampled seeps (SEEP1, SEEP2, and SEEP3), which are downgradient from the recovery and cyanide storage areas (APECs 3i and 4c), samples SEEP1 and SEEP2 contained cyanide concentrations greater than CCME CEQG AW guidelines (0.657 mg/L and 0.048 mg/L, respectively, compared to 0.005 mg/L).

9.3.6.4. Salinity

In the two soil samples analyzed for salinity (one at the salt storage area, APEC 6b, and one at the brine mix area, APEC 3h), salinity levels were acceptable, as were the two water samples collected near these areas.

9.3.7. PAG Screening

Results and interpretation of the data obtained for PAG screening of waste rock is provided in the following sections. The significance of these results is discussed in Section 10.2.

9.3.7.1. Acid Base Accounting (ABA) For Lupin Waste Rock by URS

Data for the 2004 ABA sampling is presented in Section 6.3. Paste pH values for the samples were strongly alkaline, with a median paste pH of 9.2 and of the eighty-five samples, only two had paste pH values below 8.0. The majority of the samples reported neutralization potentials (NP) between 8 mg $CaCO_3$/kg and 13 mg $CaCO_3$/kg. Total sulphur concentrations ranged from 0.02% to 3.4%, and reported a median value of 0.2%, although seven of the samples reported total sulphur concentrations above 1%.

Calculated NP/MPA values ranged from 0.1 to 16, with a median value of 1.9. Compared to the screening criteria for NP/MPA presented in Section 5.5.2, twenty-seven samples are classified as PAG, thirty as uncertain, and twenty-eight as non-acid generating (eighty-five samples analyzed). These interpretations are illustrated spatially on attached Drawing A053017-006B.

As noted in Section 5.5.2, guidelines developed in BC (Price and Errington, 1997) recognize that classifications based on NP/MPA values are often invalid when considering rock samples with low NP and low sulphide concentrations, and utilize screening criteria of 0.3% sulphide and paste pH of 5.5 to separate out materials which likely will not generate acid. Utilizing these screening criteria, only 30% of the waste rock (thirty-four) samples have sulphide concentrations above the 0.3% sulphide level. Of these thirty-four samples, only one exhibits an acidic paste pH (<5.0) that suggests acid generation may be occurring.

For the six samples collected in December 2004, all reported NP/AP values <1.0 (i.e., PAG) and negative NNP values (Table J). The December 2004 analyses suggest that the ARD potential of the waste rock is higher than the samples collected earlier in2004. This may be a function of different laboratories and analytical methods used for the two sample sets, the smaller sample set for the 2004 sampling (i.e., coincidental), or potentially there were different proportions of coarse and fine materials in the collected samples. In any case, this data indicates there is some uncertainty and/or variability associated with the previous ABA testing.

Results from the shake flask test work were compared to MMER guidelines. Two of the samples reported leachable arsenic concentrations greater the MMER guidelines (Table K). No other metals concentrations in the shake flask leachate were greater than the MMER guidelines.

These results indicate that Lupin waste rock is characterised by relatively uniform, low NP values, and generally low sulphide concentrations (<0.3% S). Only a small proportion of the samples contain elevated sulphide contents (>1% S). The alkaline pH values of the waste rock indicate that acid generation has yet to occur in the samples, even those that are classified as PAG.

9.3.7.2. Results of Meteoric Water Mobility Procedure (MWMP) Testing

The results of the MWMP testing are provided in Table L. The results indicate that some of the samples may have a potential to leach aluminum, arsenic, cadmium, and copper at concentrations that exceeded the CCME aquatic life criteria.

9.3.7.3. Sulphide and pH in Soil

Analytical results for sulphide and "standard" pH (refer to Section 8.8) in soil are provided in the following tables:

- Table 4: Summary of Analytical Results for Physical Parameters in Surface Soil Samples; and
- Table 14: Summary of Analytical Results for Physical Parameters in Soil.

<u>Interpretation of Sulphide results</u>

As a screening exercise, paste pH and % sulphide were to be compared against the criteria of <5.5% and >0.3%, respectively, as laid out in BC MEM Guidelines. All sulphide results reported by ALS were less than 0.3%, and as such the analyzed samples would not be considered PAG under the BC Guidelines regardless of the paste pH.

This interpretation is confounded by the fact that the ALS reported sulphide concentrations are two orders of magnitude less than those reported by URS (Table J). The discrepancy may be due to the analytical method, as ALS measured sulphide in soil analysis on a leachable basis, whereas previous tests were based on total sulphur minus sulphate (or the assumption that all sulphur was present as sulphide). As discussed earlier, direct measurement of groundwater and surface is considered a better method of assessing the PAG nature of the site soils.

It was also noted that in general there was a correlation between sulphide and arsenic concentrations (i.e., samples with higher sulphide concentrations also had higher arsenic concentrations).

Interpretation of pH in Waste/Development Rock

Since the pH of the development/waste rock has an influence on the likelihood of leachate generation, the pH of was examined for distribution patterns. A histogram of pH results in the development rock presented in Figure 1. The histogram suggests there are two populations for pH in development rock – the measured pHs were either relatively alkaline (i.e., 8 to 10), or relatively acidic, (i.e., 4 to 6). The significance of this observation in comparison to the other analytical results is discussed in Section 10. It is noted that these results differ from previous ABA sampling which suggested that most of the waste rock was alkaline.

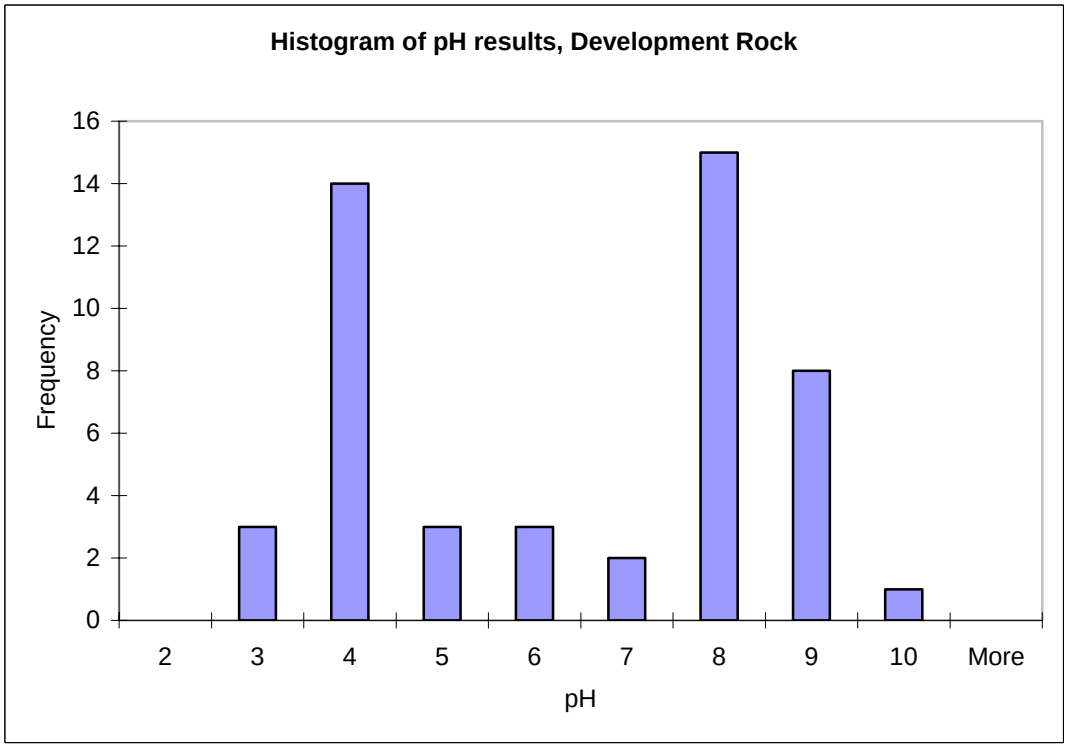


Figure 1: Histogram of pH Results, Development Rock

9.3.8. Field Screening

9.3.8.1. Gas Detector and Petroflag™ Hydrocarbon Screening

For hydrocarbons in soil, all samples were field screened for hydrocarbon headspace vapour using an Eagle RKI-Portable Gas Detector calibrated to a hexane standard. However, since the main source of hydrocarbon contamination was diesel (i.e., less volatile and vapour screen potentially non-reliable), select samples were also field screened for hydrocarbons using a Petro-Flag™ Portable Field Test Kit, which is a reagent-based test for non-volatile hydrocarbons. The correlation for the analytical and field screen results are compared in Figure 2. For Petro-Flag™, there is reasonable correlation up to the unit's detection limit of approximately 3,000 total petroleum hydrocarbon (TPH, approximately equal to PHC fractions F1 + F2 + F3 + F4). For the vapour analyzer, there was relatively poor correlation. This information suggests that the Petro-Flag™ is a more suitable field screening method than headspace hydrocarbon vapours.

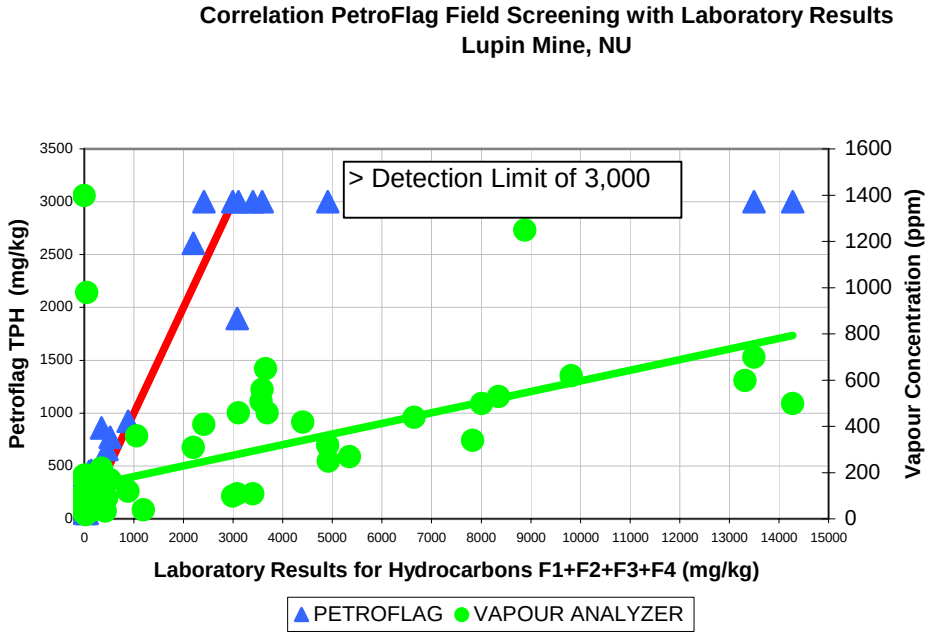


Figure 2: Correlation of Petroflag™ and Vapour Analyzer to Laboratory Results

9.3.8.2. XRF screening

Select samples were field screened for metal concentrations using a Niton XL-702S Portable XRF.

Most of the samples were dried, sieved, and placed in special Mylar film containers in an effort to increase the accuracy of the readings (a large oven drier was available on-site). However, since this method is not time effective, readings from un-prepared samples were also taken by placing the sample in a re-sealable polyethylene bag and measuring directly through the ziplock bag. The correlation for both screening methods are shown in Figure 3. As indicated, the correlation for both types of readings was very good indicating that XRF is a useful screening tool at the site.

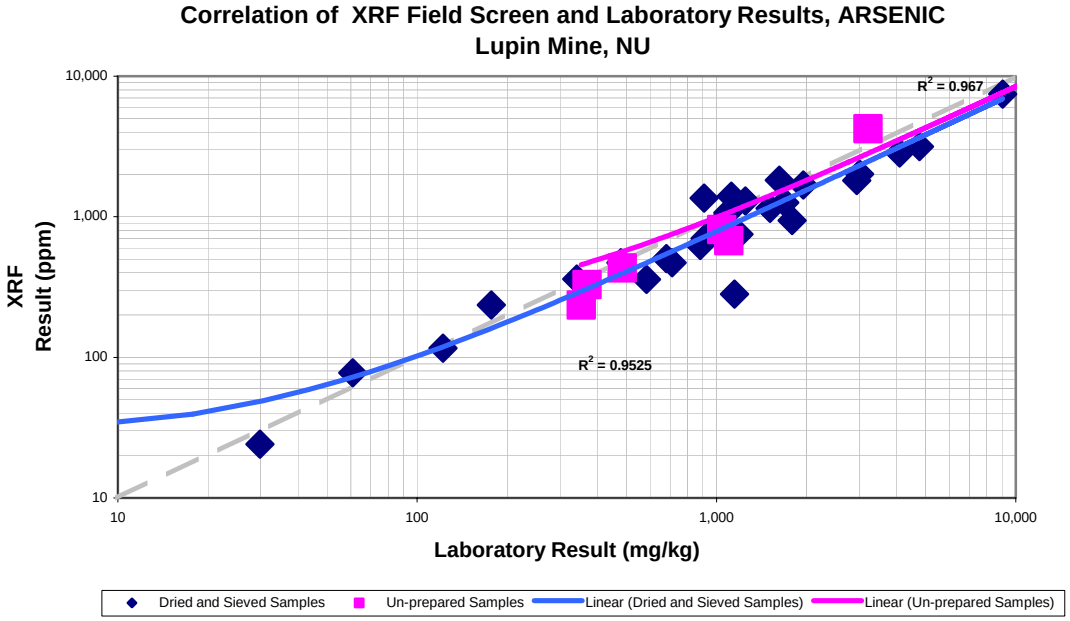


Figure 3: Correlation of XRF to Laboratory Results

9.3.9. Quality Assurance/Quality Control Results

The blind duplicate sample sets, and a summary of calculated RPD_{DUP} values is provided in Table CC.

TABLE CC: Analytical Parameters and Sample Sets with RPD Exceedences – Groundwater

Sample Set ID	Parameter	RPD value (%)
TP05-25-03/HCDUP1	No RPDs Exceeded	
TP05-28-03/HCDUP2	F1-BTEX, PHC F1-F3	55.4, 52.0, 42.1, 39.3
TP05-32-03/HCDUP3	PHC F2-F4	109.3, 90.1
TP05-36-03/HCDUP4	No RPDs Exceeded	
TP05-45-02/HCDUP5	F1-BTEX, PHC F1	60.2, 60.2
TP05-53-01/HCDUP6	PHC F2	43.8
TP05-55-02/HCDUP7	F1-BTEX, PHC F1	38.6, 38.5
TP05-58-01/HCDUP8	No RPDs Exceeded	
BH05-05-02/METDUP1	No RPDs Exceeded	
TP05-17-01/METDUP2	No RPDs Exceeded	
TP05-45-02/METDUP3	No RPDs Exceeded	
TP05-54-01/METDUP4	No RPDs Exceeded	
TP05-56-01/METDUP5	No RPDs Exceeded	
MW05-43/WDUP1	Acenaphthylene	44.1
SUMP/WDUP2	No RPDs Exceeded	
SEEP12/WDUP3	No RPDs Exceeded	

For the sample pairs TP05-28-03/HCDUP2 and TP05-53-01/HCDUP6 the elevated RPDs are likely due to the relatively high concentrations in the samples and are insignificant because all samples contained hydrocarbons significantly greater than the guidelines.

For the sample pairs TP05-32-03/HCDUP3, TP05-45-02/HCDUP5, and TP05-55-02/HCDUP7 the elevated RPDs may be due to sample heterogenetity however, both samples contained parameter concentrations greater than the guideline, and thus the interpretation of the results is not affected.

For the sample pair MW05-43/WDUP1 the source of elevated RPDs is not apparent however, the interpretation of the results is not affected since there is no criteria for acenaphthylene.

In summary, no laboratory quality assurance/quality control (QA/QC) problems were identified by the blind duplicate analysis.

The internal laboratory QA/QC program included testing for batch sample quality control and instrument quality control. The laboratory results were reviewed and proved acceptable (i.e., RPD values were within the limits referenced by the laboratory and percent of surrogate recovered was also within the range specified by the laboratory). The internal QA/QC results are appended to each laboratory report contained in Appendix VII.

10. DISCUSSION OF PHASE II ESA

A general discussion of the significance of the results is provided in the following sections.

10.1. Metals (Arsenic) in Soil

Arsenic concentrations in soil were elevated across the site including soil samples collected from locations considered to represent background conditions. Most sample concentrations were greater than the comparative CCME screening criteria. Since arsenic concentrations exceeded the reference criteria whenever any other metal parameters exceeded criteria, arsenic is the primary metal of concern at the site. Secondary metals of concern include chromium, copper, lead molybdenum, nickel, and zinc. However, when the data set is statistically evaluated, these secondary metals do not represent 'contamination'. Exceptions to this (i.e., locations where secondary metals exist without significant arsenic) are discussed below.

A statistical summary of the arsenic concentrations observed in geologic media present at the site is presented in Table DD.

TABLE DD: Statistical Summary of Arsenic Concentrations in Soil

GEOLOGIC TYPE	Minimum	Maximum	Median	90th Percentile	CCME Criteria
Development Rock	122	11,700	1,140	3,988	12
Mixed Materials	61	1,370	361	977	12
Road Surface	19	516	136	450	12
Overburden Fill Below Buildings	6	1,690	40	453	12
Overburden Fill	9	1,690	15	474	12
Native Sand and Silt Below Rock	8	30	11	27	12
Native Surface Silt at Edge of Footprint	5	19	9	15	12
Background Soil	9	189	33	152	12

Arsenic Concentrations in Background Soils and Associated Trigger Limit for Further Assessment

Native sand and silt sampled below the waste rock and from surface soil samples around the mine site pad have median arsenic concentrations that are less than the CCME screening criterion. However, maximum concentrations do exceed the CCME screening criterion. Overall, the results are consistent with pre-existing natural lake sediment concentrations measured in the region in 1981 (refer to Section 3.3).

In background surface soil samples collected from transects radiating from the mine pad in all four compass directions, arsenic concentrations ranged from 9 mg/kg to 189 mg/kg with a median concentration of 33 mg/kg which exceeds the CCME reference criterion. Since surface soil samples collected immediately beside the mine footprint did not have arsenic concentrations greater than the background samples, this indicates that the elevated arsenic concentrations are due to the site geology. Specifically, the concentrations are consistent with the locations of mineralized veins that extend to surface, as shown on the appended geology map and discussed in Section 3.3.

In many regulatory jurisdictions it is standard practice to utilize the 95th percentile of the data set to determine a 'background soil concentration limit' for comparison of analytical results for purposes of determining management/remediation triggers. The 95th percentile of arsenic concentration in the background soil data set is 179 mg/kg.

Arsenic Concentrations in Fill Materials

Sand and gravel that was present above the mineralized bedrock (i.e., overburden) was excavated during the development of the mine and used for fill at various locations. Most of the overburden fill was apparently used below the buildings as mine development rock was not available. The median arsenic concentration in the overburden fill beneath the buildings was 40 mg/kg whereas the median concentration elsewhere was 15 mg/kg. The difference in median overburden concentrations and background concentrations is associated with "outlier" results that likely represent cross-contamination with development rock (i.e., introduced during the sampling process or unavoidable due to the proximity of the two materials). Overall, the overburden fill does not contain arsenic concentrations that are significantly greater than background levels.

Arsenic Concentrations in Development/Waste Rock

Arsenic concentrations exceeded the CCME criteria of 12 mg/kg in all of the development rock samples with the median concentration being 1,140 mg/kg.

The positive correlation between sulphide and arsenic concentrations (i.e., samples with higher sulphide concentrations also had higher arsenic concentrations) indicates that arsenic is associated with natural mineralization (i.e., arsenopyrite in the development rock).

It is suspected that ore dust may have contributed to the most elevated arsenic concentrations (up to 11,700 mg/kg) in the surficial areas surrounding the crusher and screening plant ramps, as well as at the former surface crusher.

The median arsenic concentrations in the development rock also exceed the generally recognized value for acceptable risks for human exposure of 100 mg/kg for residential land use, and 300 mg/kg for commercial/industrial land use. The potential for phytotoxic effects on plants also exists at the observed concentrations. The median concentration also exceeds the background concentration trigger limit of 179 mg/kg. As such, the ultimate remedial/reclamation plan will likely have to include a risk-based mitigative action plan. Examination of the logs indicates that twenty-three out of sixty-three test pit locations had a cover of overburden fill (rounded and sand and gravel cover 0.15 m or thicker). The remaining forty test pit locations had development rock exposed at surface (in some cases crushed). In other words, approximately 35% of the footprint area already has a 'cap', and approximately 65% does not. It is presently unknown if the thickness of overburden cover is adequate to prevent exposure to the development rock as site-specific risk assessment calculations would be required to determine this.

Arsenic Concentrations in Roads

The site roads are largely constructed from development rock. However, since the roads were constructed early in the development of the mine, they may have been constructed from rock that was not as close to the mineralized ore body (i.e., less mineralized) as that rock used in the site pad. This interpretation is supported by the median arsenic concentration in the road samples (136 mg/kg) being less than the on-site development rock, and less than the background concentration trigger limit of 179 mg/kg.

Based on the preceding, the site roads could be reclaimed without a soil cover as long as the future pattern of use results in acceptable human health risks.

It is suspected that some of the upper percentile road concentrations may be the result of dusting of ore fines that may have been tracked onto the roads by vehicles. If so, scarifying the roads as proposed in the FARP would reduce the arsenic concentrations on the surface of the roads.

Specific APECs with Other Metals of Concern

Elevated concentrations of copper and zinc have been identified at the bone yard. In addition, elevated copper, lead, and zinc concentrations have been identified at the burn pit. These results are likely a result of anthropogenic activities carried out at those locations.

The lateral extent of these secondary metals of concern has not been determined as remedial/reclamation efforts undertaken to address arsenic will likely address the secondary metals of concern.

10.2. Potential Acid Generation (PAG) and Acid Rock Drainage/Metal Leaching (ARD-ML)

The development rock is composed mostly of quartzite and phyllite and has minor amounts of carbonate. Overall, the development rock has a very low sulphide content.

As required by the mine closure plan, the potential for acid rock drainage and metal leaching (ARD/ML) was evaluated during the Phase 2 ESA by determining the paste pH and percent sulphide in soil samples and comparing the results to criteria established by the BC Ministry of Energy and Mines (MEM). The results indicated that it was unlikely that ARD/ML would be generated at the site, since sulphide concentrations in all samples were less than 0.3 %. It is noted however that the BC Guidelines make exception where elevated concentrations of arsenic (or zinc) are present in phyllic formations (which is the case at the Lupin site). This exception is confirmed by the historic shake flask and meteoric tests which yielded mixed results about the ability of the waste rock to generate metal leaching. For these reasons it is concluded that the BC MEM screening protocol is not appropriate for use at this site.

The results of historic ARD/ML testing was discussed in Section 9.3.7. In summary, humidity cell testing indicated no potential for ARD however, the results of shake flask and meteoric water testing were mixed. These latter results are consistent with the results of surface and groundwater sampling undertaken by Morrow, which indicate depressed groundwater pH and elevated dissolved metal concentrations at various locations (discussed in the next two sections). As discussed in Section 10.4 metals concentrations in water also appear to be influenced by factors other than ARD processes. Based on the mixed results of the predictive ARD/ML testing, it is apparent that the techniques employed do not adequately approximate

actual site conditions. Given that the development rock pad has been in place for twenty-five years, direct measurement of seepage quality provides the best data to evaluate the potential for significant ARD. Accordingly, the direct measurement data set created by Morrow should be enlarged to allow trends in groundwater seepage chemistry to be evaluated over time. Incremental efforts should also be made to identify and incorporate any historic data that may exist in Kinross' files that was not identified during the Phase I ESA.

10.3. Metals in Groundwater and Seeps

10.3.1. Arsenic in Water

Similar to soil, arsenic was considered the primary contaminant in groundwater and surface water seepage as the measured arsenic concentration exceeded the CCME CEQG AW screening criteria in all of the seeps and most of the groundwater wells. The highest concentrations were orders of magnitude greater than the criteria.

The average arsenic concentration in the groundwater was 0.19 mg/L, whereas the average arsenic concentration in the seepage water was 0.01 mg/L - a dilution ratio of 19x – which validates the use of the BC CSR standards, which allow for a 10x dilution factor. Similarly, the current Water Licence limits, which are based to the MMER, recognize that metals are likely to be naturally elevated in water discharges from "Core Area" mine sites, and were used for interpretation of the seepage data.

Based on comparison to the BC CSR AW standards and the Water License, four 'hotspots' in arsenic concentrations are apparent:

1) in the area of the landfill and burn pit (Seep3);

2) in the area of the mill and powerhouse (monitoring well 05-10);

3) in the area of the RTL shop (Seep12); and

4) in the area of the tank farm (Seep 9).

The elevated arsenic concentrations appear to be associated with water with more alkaline pH (i.e., 7 to 9 pH units) which is consistent with the Eh-pH diagram for arsenic shown in Figure 4, and literature (e.g., MEM guidelines) which indicate that arsenic can be more soluble under slightly alkaline or weakly acidic conditions. If ARD was extensive at the site, arsenic concentrations would be reduced in relation to metals that are mobile under acidic conditions. This result supports the conclusion that enlarging the direct measurement data set (i.e., seep sampling) is the best method for evaluating ARD/ML.

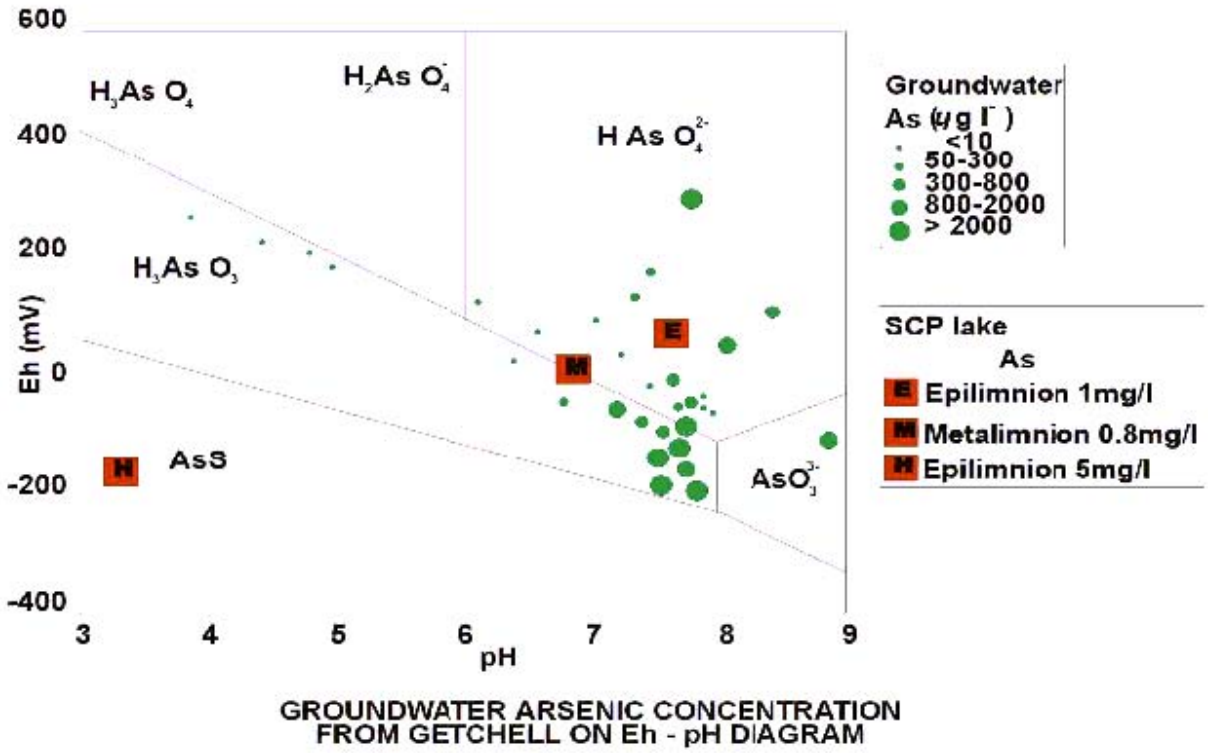


Figure 4: Eh-pH diagram for Arsenic[8]

10.3.2. Other metals in water

In contrast to arsenic, dissolved cadmium and nickel concentrations were generally most elevated at locations where arsenic concentrations and pH were lower. This is appropriate as nickel and cadmium are known to be more soluble in acidic environments.

[8] Source: *Arsenic Cycling in the Mining Environment*. Rob Bowell. SRK Consulting, from U.S. EPA Workshop on Managing Arsenic Risks to the Environment: Characterization of Waste, Chemistry, and Treatment and Disposal EPA/625/R-03/010 October 2003

On a statistical basis nickel and cadmium were not found to be elevated (i.e., less than CCME guidelines) in the waste/development rock. Accordingly, these elements remain secondary when evaluating metal leaching concerns at the site. However, since the secondary metals could be precursors to ARD, their concentrations should be tracked for a period of time to allow trends in concentrations to be determined.

10.4. Identification of Correlations/Patterns for Metal Leaching Source Areas

As presented in Section 9.3.7.3. there are two populations of pH in the development rock. Measured pHs were either relatively high (i.e., 8 to 10) or relatively low (i.e., 4 to 6) irrespective of the depth of the sample or the arsenic concentration. Although some of the distribution is likely the result of variability in the development rock composition, there are areas with higher pH which appear to be associated with hydrocarbon contamination (though there are samples with high pH that don't have hydrocarbons). Similarly in water, the most elevated arsenic concentrations in groundwater appear to coincide with seeps where hydrocarbon concentrations are elevated (refer to Section 10.6) and pH is slightly alkaline.

It is possible that the hydrocarbon contamination has mobilized certain metals due to changes in the geochemistry of site soils. If such is the case, removal or containment of the hydrocarbon contamination may cause dissolved metal concentrations to attenuate. Further data is needed to evaluate this eventuality including eH measurements and the speciation of arsenic in seep and groundwater samples from both the hydrocarbon and non-hydrocarbon contaminated areas.

10.5. Order of Magnitude Mass Loading Calculations

The site is located on a 'mound' in which groundwater and surface water discharges radially in all directions. As such, the site is not located within a catchment that has an ongoing groundwater flux – the only groundwater source on the site is precipitation.

Based on field observations, approximately half the groundwater generated within the site reports to the thirteen identified seeps around the edge of the development rock pad. The seeps were observed to flow at rates ranging from 1 L/min to 5 L/min. Therefore the total groundwater seepage was calculated to be on the order 100 L/min. This estimate was tested by multiplying the area of the footprint (approximately 250,000 m^2) by the average annual

precipitation (300 mm, Table A), which gives a flow rate of 142 L/min. This value appears reasonable given that blowing snow, surface run-off, and the building sumps will reduce the volume of groundwater available to discharge from the seeps.

Multiplying the average groundwater flow rate of 100 L/day by the average groundwater arsenic concentration (0.19 mg/L) provides a mass loading rate of approximately 27 grams/day, or 10 kg/year, which would be divided between the thirteen seeps. Although the significance of the discharge to the local receiving environment should be evaluated further, it is apparent that arsenic loading is unlikely to have a measurable effect on Contwoyto Lake which is the primary aquatic habitat in the area.

10.6. Hydrocarbons in Soil and Water

The most elevated dissolved/absorbed phase hydrocarbon contamination associated with historic releases of diesel was encountered in the following four areas that are relatively large, but shallow (due to permafrost):

1) landfill and burn pit;

2) much of the core area including the mill, powerhouse, and satellite tank farm;

3) the tanker unloaders at the main tank farm, and bedding sand within the main tank farm berm; and

4) the RTL shop and associated former Surface Shop #1.

Isolated areas where lesser hydrocarbon contamination was identified includes the north burn pit, fuelling area for underground equipment, emergency powerhouse, the incinerator, cold storage area #1, and the former fuelling area at the airstrip.

Only a small area with NAPL was encountered in the vicinity of the powerhouse day tanks. However, bail down tests indicated that the volume of NAPL is small and does not warrant a NAPL recovery system.

The primary indicator parameters for hydrocarbons were the F1 and F2 fractions which is typical for diesel fuel type contamination. The BTEX and few PAH exceedences invariably coincided with elevated F1 or F2 concentrations. Accordingly, BTEX and PAH are secondary contaminants at this site.

In source areas, the hydrocarbons were present at surface however, away from the source areas the hydrocarbons were prevalent at the water/permafrost interface. Sample analysis indicates that the maximum depth of hydrocarbon contamination is 1.8 m below grade, which coincides with the base of the active layer in the area of heated structures. Hydrocarbon contamination has not been identified below the active zone of the permafrost.

Hydrocarbons in soil are not fully delineated in most locations as the test pits were widely spaced and some locations were not accessible for further investigation due to buildings. However, there is enough information to provide order of magnitude volume estimates, which are summarized in Table EE.

TABLE EE: Order of Magnitude Estimated Volumes of Hydrocarbon Contaminated Soil

Area	General Area	Approximate Length (m)	Approximate Width (m)	Average Thickness (m)	Approximate Volume (m^3)
1	Satellite Tank Farm and Powerhouse	150	50	1.3	9,800
2	Mill and Office Emergency Tanks	200	75	1.3	19,500
3	Main Tank Farm Loaders	25	50	1.3	1,600
4	Main Tank Farm Bedding Sand	120	50	0.3	1,800
5	Emergency Powerhouse	25	25	1.3	800
6	South Burn Pit	50	25	1.3	1,600
7	Landfill	too large to excavate - to be managed in place			
8	RTL Shop	50	25	1.3	1,600
9	North Burn Pit	25	25	1.3	800
10	Incinerator	25	25	1.3	800
11	Cold Storage #1	25	25	1.3	800
12	Former Airstrip Fuelling Area	25	25	1.3	800
Estimated Bank Cubic Metres of Contaminated Soil					**40,000**

In the FARP, it has been proposed that the hydrocarbon contaminated materials be excavated and placed in the open stopes for encapsulation in frozen bedrock. Given the limited volume available in the stopes the areas with the most elevated concentrations would be targeted first. In areas where hydrocarbons remained or were present in groundwater, concentrations would be expected to decrease with time due to natural attenuation/degradation.

Groundwater has likely been impacted by hydrocarbons at the twelve locations listed in Table EE. However, the impacts are likely localized and will be addressed when the impacted soil is removed. This being said, elevated hydrocarbon concentrations have been identified in groundwater seeps downgradient of the:

- landfill;
- RTL Shop; and
- North burn area.

It is reasonable to expect dissolved hydrocarbon concentrations at these locations will attenuate once the hydrocarbon contaminated soil in the source areas is removed.

10.7. Other Contaminants of Concern

10.7.1. Glycols

No glycol concentrations in soil exceeded the CCME criteria. Elevated glycol concentrations were identified in a water sample obtained from monitoring well 05-43, located near the former Surface Shop #1 (northwest of current RTL shop). However, if the appropriate 10x dilution factor for groundwater was considered, the glycols concentration would be less than the guideline, and as such no further action was considered necessary for a risk-based/prioritized management strategy for the site.

10.7.2. Cyanide

Cyanide concentrations greater than CCME criteria were found in one soil sample, BH05-03-02, located below the recovery area of the mill where cyanide was used as a process reagent (refer to Photograph 24, Appendix II). Cyanide concentrations were greater than CCME CEQG criteria in groundwater samples MW05-02, MW05-03 (below recovery area of mill), MW05-13 (downgradient of the burn pit), MW05-21 (near the sewage discharge line), as well as in SEEP1 and SEEP2, which are downgradient from the recovery area and cyanide storage area.

The cyanide in water is suspected to be sourced from the soil contamination identified under the recovery plant, as well as at cold storage area #3: although not identified from the soil and groundwater analysis in the one test pit at this area, the appearance of white material on the ground surface (refer to photograph 28) suggests that sodium cyanide or lead-nitrate may be present. If the impacted soil at these areas were removed or contained, groundwater conditions would be expected to improve, especially since cyanide is known to undergo rapid aerobic biodegradation/attenuation in the natural environment.

10.7.3. Nitrate (and Nitrite)

Nitrate concentrations in groundwater were elevated at monitoring wells 05-02 (below recovery area in mill), 05-09 (downgradient from landfill), 05-13 (downgradient from burn pit), 05-16 (cold storage, where lead nitrate was stored), and also in SEEP7, beside the sewage discharge line. The nitrate is interpreted to be associated with the use of lead nitrate as a process reagent at the site. As these areas have already been identified as requiring management due to hydrocarbon and cyanide concerns, and nitrate concentrations can be expected to improve if these areas are remediated or contained, nitrate was not considered to be a primary driver for a risk-based/prioritized management strategy for the site.

10.7.4. Sulphate

The analytical results indicate that sulphate concentrations were greater than the BC AWQG (100 mg/L) in all the seeps on-site (ranging from 202 mg/L to 740 mg/L) and in all sampled monitoring wells except well 05-28 and the powerhouse SUMP. The sulphate is interpreted to be the result of degradation of sulphides in the development rock. Allowing for the dilution factors previously discussed, and considering that the higher concentration areas would be addressed during the management of the arsenic metal leaching concern, sulphate was not considered to be a primary driver for a risk-based/prioritized management strategy for the site.

10.7.5. Salinity

Salinity levels were not found to be elevated in the two areas where salt was handled, and as such no further action related to salinity was identified.

10.8. Total Volume of Soil Requiring Remedial Management

Based on the information presented in the previous sections, the following estimated in situ volumes of contaminated soil were identified at the site:

- approximately 40,000 m^3 of hydrocarbon contaminated soil – some also contaminated with cyanide, metals, and other contaminants (Section 10.6);
- approximately 800 m^3 of soil with lead nitrate and/or cyanide at Cold Storage #3 (Section 10.7.2); and
- approximately 2,000 m^3 of arsenic 'hotspots' where it is suspected that ore concentrate was spilled at the crusher/screen plant conveyor area, screening plant ramps, as well as at in surface materials at the former surface crusher.

At this time it is proposed that these materials be placed within the open stopes in keeping with the FARP. As discussed previously, a human health and ecological risk assessment is necessary to determine the best method for managing other metal containing soils at the site.

11. CONCLUSIONS

The following summarizes the findings of the ESA completed for the Lupin mine site in Nunavut:

- baseline conditions in the area of the mine are fairly well established due to mineral exploration data;
- Contwoyto Lake is the primary aquatic receiving environment in the area of the mine (i.e., contains fish) however, numerous secondary water bodies exist in the area of the mine, which freeze to the bottom each year (i.e., no fish);
- the area climate is semi-arid subarctic with four months of the year having average temperatures above freezing (i.e., considerations regarding groundwater movement and presence of permafrost);
- historic humidity cell testing determined that the development rock had no ARD potential, however this finding was offset by mixed results from historic shake flask and meteoric water testing;
- sixty-one areas of potential environmental concern were identified that had the potential for metals, hydrocarbon, glycol, cyanide, nitrogen, and/or salt based contamination;
- the areas of potential concern were assessed via ten boreholes, nineteen monitoring wells, fifty-nine test pits, forty-five surface sample locations, and eleven surface water sampling stations;
- numerous soil and groundwater samples were submitted for a variety of analysis intended to characterize the potential contaminants ;
- the Phase 2 ESA determined that the primary contaminants of concern are arsenic and hydrocarbons that are characterized by total metals and PHC F1 and F2 analysis respectively;
- secondary contaminants do exist, however, they are localized and coincide with the primary contaminants (the exception to this is cyanide and/or nitrate in soil at Cold Storage #3);
- localized areas of ARD exist however, the direct measurement data set (i.e. seep sampling) needs to be enlarged to facilitate trend analysis;

- neutral pH leaching of arsenic is widespread with the greatest concentrations existing at or downgradient of areas with hydrocarbon contamination, potentially as a result of changes in the soil geochemistry;
- although neutral leaching and localized ARD is indicated, the metal loading is low in relation to what is allowed under the current Water Board license;
- due to the low arsenic loading, it is unlikely that a measurable effect will exist in Contwoyto Lake;
- 40,000 m^3 (bank) of hydrocarbon impacted soil is estimated to exist in twelve locations plus an additional 800 m^3 of cyanide and/or nitrate containing soil and 2,000 m^3 of soil with traces of ore fines;
- arsenic concentrations in the development rock pad beneath the site are elevated in relation to federal reference criteria and background concentrations; and
- the general limitations of this report are presented in Section 12 and the specific limitations are described in Section 1.4.

12. GENERAL LIMITATIONS

This report has been prepared by Morrow, a member of the SNC-Lavalin Group, for the exclusive use of Kinross, who has been party to the development of the scope of work for this project and understands its limitations.

This report is intended to provide information to Kinross to assist it in making business decisions. Morrow is not a party to the various considerations underlying the business decisions, and does not make recommendations regarding such business decisions. In providing this report, Morrow accepts no liability or responsibility in respect of the site described in this report or for any business decisions relating to the site, including decisions in respect of the purchase, sale or investment in the site.

Any use, reliance on, or decision made by a third party based on this report is the sole responsibility of such third party. Morrow accepts no liability or responsibility for any damages that may be suffered or incurred by any third party as a result of the use of, reliance on, or any decision made based on this report.

The findings, conclusions and recommendations in this report have been developed in a manner consistent with the level of skill normally exercised by environmental professionals currently practising under similar conditions in the area. The findings contained in this report are based, in part, upon information provided by others. If any of the information is inaccurate, modifications to the findings, conclusions and recommendations may be necessary.

The findings, conclusions and recommendations presented by Morrow in this report reflect Morrow's best judgement based on the site conditions at the time of the site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. They have been prepared for specific application to this site and are based, in part, upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific materials as described in this report during a specific time interval. The findings cannot be extended to previous or future site conditions or to portions of the site which were unavailable for direct observation, subsurface locations which were not investigated directly, or materials or analysis which were not specified. Substances other than those described may exist within the site, reported substance parameters may exist in areas of the site not investigated, and concentrations of substances greater or less than those reported may exist between sample locations.

The findings and conclusions of this report are valid only as of the date of this report. If site conditions change, new information is discovered, or unexpected site conditions are encountered in future work, including excavations, borings, or other studies, Morrow should be requested to re-evaluate the findings, conclusions and/or recommendations of this report, and to provide amendments as required.

Prepared by:

Mark Tinholt
Senior Project Engineer

Reviewed by:

Neil L. Sandstrom
Project Manager

TABLES

TABLE 1: Soil Sample Log

Sample I.D.	Sample Date	Sample Type [1]	Description	Coordinates (m)		Depth (m)	Headspace (ppm)
				North	East		
SS62	2005 07 23	S	SAND, fine silty (TILL), light grey-brown, brown organics, wet.	7293464	489870	0.1	25
SS63	2005 07 23	S	SAND, fine silty (TILL), light grey-brown, some organics, wet.	7293483	489755	0.1	20
SS64	2005 07 23	S	SAND, fine to medium grained, some silt, grey brown, damp.	7293271	489634	0.1	10
SS65	2005 07 23	S	SAND, medium to coarse grained, grey, saturated, hydrocarbon odour.	7293501	489452	0.1	140
SS66	2005 07 23	S	SAND, medium to coarse grained, grey, saturated, oily odour.	7293553	489386	0.1	15
SS67	2005 07 23	S	SAND, fine silty (TILL), light grey-brown, wet.	7293483	489328	0.1	15
SS68	2005 07 23	S	SAND, fine silty (TILL), light grey-brown, wet.	7293512	489243	0.1	15
SS69	2005 07 23	S	SAND, silty, some gravel, rounded, grey-brown, damp.	7293585	489297	0.1	15
SS70	2005 07 23	S	SAND, silty, some gravel, rounded, grey-brown, damp.	7293732	489321	0.1	10
SS71	2005 07 23	S	SAND, fine silty (TILL), light grey-brown, wet.	7293561	489023	0.1	10
SS72	2005 07 23	S	SAND, fine silty (TILL), light grey-brown, wet.	7293769	489020	0.1	15
SS73	2005 07 23	S	SAND, medium to coarse grained, grey, saturated, hydrocarbon odour.	7293734	489056	0.1	120
SS74	2005 07 23	S	SAND, medium to coarse grained, grey, saturated, hydrocarbon odour.	7293591	489048	0.1	130
SS75	2005 07 23	S	SAND, medium to coarse grained, grey, saturated, oily odour.	7293566	489080	0.1	140
SS76	2005 07 24	S	SAND and GRAVEL, some silt, light brown with some orange, wet.	7294271	490025	0.1	10
SANDBLANK	2005 07 23	B	SAND, fine, black (Used for monitoring well screens).	0	0	-	-

Notes:
B = Blank
S = Surface Soil Sample

TABLE 2: Surface Water Sample Log

Sample I.D.	Sample Date	Description	Coordinates(m)	
			North	East
CREEK	2005 07 23	Bottom is cobbles, orange staining on rocks, clear sample	7295051.0	489769.0
SEEP1	2005 07 23	Orange/green biomat, sample is clear	7293456.0	489724.0
SEEP2	2005 07 23	Orange sediment, sample is clear	7293464.0	489870.0
SEEP3	2005 07 23	Grey sediment, hydrocarbon sheen, sample is clear	7293375.0	489791.0
SEEP4	2005 07 23	Flow is clear, too slow to sample	7293348.0	489707.0
SEEP5	2005 07 23	Ponded, surrounded by healthy green moss, clear	7293612.0	489737.0
SEEP6	2005 07 23	Ponded, surrounded by healthy green moss, clear	7293798.0	489652.0
SEEP7	2005 07 23	Flow is clear, too slow to sample	7293421.0	489435.0
SEEP8	2005 07 23	Flow is clear and clean	7293372.0	489493.0
SEEP9	2005 07 23	Orange staining on sediment, sample is clear	7293624.0	489047.0
SEEP10	2005 07 23	Clear, no colouration, good flow	7293895.0	489408.0
SEEP11	2005 07 23	Low flow not well defined, some orange stain	7293951.0	489466.0
SEEP12	2005 07 23	Orange staining on sediment, sample is clear	7293986.0	489439.0
SEEP13	2005 07 23	Low flow, orange/yellow staining in sediment and evaporated on nearby rocks, sample is clear	7294163.0	489432.0
WDUP3	2005 07 23	Duplicate of SEEP12	7293986.0	489439.0

TABLE 3: Soil Sample Log - Samples Collected by Kinross, September 2005

Sample I.D.	Sample Date	Sample Type[1]	Description	Coordinates(m)		Depth (m)
				North	East	
Road Surface						
51161	2005 09 19	R	Granular materials, frozen	7294633.0	489591.0	0.0 - 0.1
51162	2005 09 19	R	Granular materials, frozen	7294440.0	489792.0	0.0 - 0.1
51163	2005 09 19	R	Granular materials, frozen	7291967.0	488940.0	0.0 - 0.1
51164	2005 09 19	R	Granular materials, frozen	7291708.0	788222.0	0.0 - 0.1
51165	2005 09 19	R	Granular materials, frozen	7291080.0	485355.0	0.0 - 0.1
51166	2005 09 19	R	Granular materials, frozen	7290294.0	486205.0	0.0 - 0.1
51167	2005 09 19	R	Granular materials, frozen	7289672.0	486017.0	0.0 - 0.1
51168	2005 09 19	R	Granular materials, frozen	7288387.0	487201.0	0.0 - 0.1
51169	2005 09 19	R	Granular materials, frozen	7288688.0	488137.0	0.0 - 0.1
51170	2005 09 19	R	Granular materials, frozen	7288321.0	489982.0	0.0 - 0.1
Background Transect Surface						
51171	2005 09 21	S	SILT, sandy, trace to some gravel	7294124.0	489120.0	0.3
51172	2005 09 21	S	SILT, sandy, trace to some gravel	7294192.0	489146.0	0.3
51173	2005 09 21	S	PEAT	7294298.0	489151.0	0.4
51174	2005 09 21	S	PEAT, some silt to silty, trace to some sand, trace gravel	7294388.0	489167.0	0.4
51175	2005 09 21	S	PEAT, some silt to silty, trace to some sand, trace gravel	7294491.0	489190.0	0.4
51176	2005 09 21	S	PEAT, some sand to sandy	7293787.0	489729.0	0.4
51177	2005 09 21	S	PEAT, trace silt, trace sand	7293860.0	489815.0	0.3
51178	2005 09 21	S	PEAT, some coarse sand to sandy, trace silt	7293921.0	489895.0	0.4
51179	2005 09 21	S	SILT, sandy, some clay to clayey, trace peat	7293939.0	489998.0	0.4
51180	2005 09 21	S	PEAT, trace sand	7294001.0	490084.0	0.4
51181	2005 09 21	S	PEAT	7293246.0	489481.0	0.3
51182	2005 09 21	S	PEAT	7293131.0	489131.0	0.3
51183	2005 09 21	S	SAND, silty, some gravel	7293029.0	489482.0	0.3
51184	2005 09 21	S	PEAT, some sand to sandy, trace to some silt, trace to some gravel	7292942.0	489439.0	0.3
51185	2005 09 21	S	PEAT, sandy, some gravel to gravely	7292840.0	489462.0	0.3
51186	2005 09 21	S	SAND, some silt to silty, trace to some gravel	7293811.0	488924.0	0.3
51187	2005 09 21	S	SILT and SAND, some clay to clayey	7293771.0	488823.0	0.2
51188	2005 09 21	S	SAND, some peat to peaty	7293721.0	488700.0	0.3
51189	2005 09 21	S	PEAT, silty, trace gravel	7293705.0	488601.0	0.3
51190	2005 09 21	S	PEAT and SILT and SAND, trace gravel to some gravel	7293670.0	488513.0	0.3

Notes:

[1] R = Road Surface Sample
S = Surface Soil Sample

TABLE 4: Summary of Analytical Results for Physical Parameters in Surface Soil Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth (m)	Field Screen (ppm)	Physical Parameters				
					pH	Paste pH	Moisture	Sulphide	Sulphate
					pH	pH	%	mg/kg	mg/kg
SS62	SS62	2005 07 23	0.1	25	6.88	-	13.5	-	-
SS63	SS63	2005 07 23	0.1	20	6.7	-	10.4	-	-
SS64	SS64	2005 07 23	0.1	10	7.11	-	6	0.38	-
SS65	SS65	2005 07 23	0.1	140	-	-	13.3	-	-
SS66	SS66	2005 07 23	0.1	15	6.7	-	12.2	-	-
SS67	SS67	2005 07 23	0.1	15	-	-	9.59	-	-
SS68	SS68	2005 07 23	0.1	15	-	-	9.74	-	-
SS69	SS69	2005 07 23	0.1	15	7.68	-	7.07	0.39	-
SS70	SS70	2005 07 23	0.1	10	7.3	-	4.47	0.54	-
SS71	SS71	2005 07 23	0.1	10	5.7	-	8.36	-	-
SS72	SS72	2005 07 23	0.1	15	5.72	-	8.4	-	-
SS73	SS73	2005 07 23	0.1	120	-	-	4.09	-	-
SS74	SS74	2005 07 23	0.1	130	-	-	11.9	-	-
SS75	SS75	2005 07 23	0.1	140	-	-	10.1	-	-
SANDBLANK	SANDBLANK	2005 07 19	-	-	5.87	-	-	-	-
BC Guidelines									
Guidelines for Metal Leaching and Acid Rock Drainage at Mine Sites					n/a	< 5.5	n/a	> 0.3% (>3,000 mg/kg)	

Notes:
Associated ALS files: CC500004, R3056, R3057, R3058, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.

BOLD Concentration greater than or equal to *Guidelines for Metal Leaching and Acid Rock Drainage at Mine Sites in British Columbia*, August 1998.

TABLE 5: Summary of Analytical Results for Hydrocarbons in Surface Soil Samples

Sample Location		SS62	SS63	SS64	SS65	SS66	SS67	SS68	SS69	SS70	SS71	SS72	SS73	SS74	SS75	Guidelines			
Sample ID		SS62	SS63	SS64	SS65	SS66	SS67	SS68	SS69	SS70	SS71	SS72	SS73	SS74	SS75	CCME CEQG Industrial Land Use[a,b] (IL)	CCME CEQG Residential Land Use[a,b] (RL)	CCME CWS Residential CG Surface[a,c]	CCME CWS Industrial CG Surface[a,c]
Sample Date (yyyy mm dd)		2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 23				
Depth (m)		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1				
Field Screen (ppm)		25	20	10	140	15	15	15	15	10	10	15	120	130	140				
Parameter	**Units**	**Analytical Results**																	
Monocyclic Aromatic Hydrocarbons																			
Benzene	mg/kg	-	-	-	0.053	-	< 0.04	< 0.04	-	-	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	0.3	0.095	n/a	n/a
Toluene	mg/kg	-	-	-	1.17	-	< 0.1	< 0.1	-	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	250	75	n/a	n/a
Ethylbenzene	mg/kg	-	-	-	1.15	-	< 0.05	< 0.05	-	-	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	300	55	n/a	n/a
Xylenes	mg/kg	-	-	-	7.55	-	< 0.075	< 0.075	-	-	< 0.075	< 0.075	0.365	< 0.075	< 0.075	160	14	n/a	n/a
Petroleum Hydrocarbon Fractions																			
F1-BTEX (C_6-C_{10})[d]	mg/kg	-	-	-	***187***	-	< 10	< 10	-	-	< 10	< 10	< 10	< 10	< 10	n/a	n/a	30	230
F1 (C_6-C_{10})	mg/kg	-	-	-	197	-	< 10	< 10	-	-	< 10	< 10	< 10	< 10	< 10	n/a	n/a	n/a	n/a
F2 (>C_{10}-C_{16})	mg/kg	< 30	< 30	< 30	**3,990**	< 30	< 30	< 30	< 30	< 30	< 30	< 30	**4,050**	< 30	**249**	n/a	n/a	150	150
F3 (>C_{16}-C_{34})	mg/kg	< 50	< 50	< 50	**4,400**	305	< 50	< 50	80	65	< 50	< 50	**2,120**	57	265	n/a	n/a	400	1,700
F4 (>C_{34}-C_{50})	mg/kg	< 50	< 50	< 50	70	174	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50	90	n/a	n/a	2,800	3,300

Notes:
Associated ALS files: CC500004, R3056, R3057, R3058, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million.
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.

BOLD Concentration greater than or equal to CCME CEQG Industrial Land Use (IL) guideline or CCME CWS Residential CG Surface standard.

SHADOW Concentration greater than or equal to CCME CEQG Residential Land Use (RL) guideline or CCME CWS Industrial CG Surface standard.

[a] Standards for coarse grained surface soil.
[b] The exposure pathway(s) used for determining the standards for this site include: soil ingestion, vapour inhalation (indoor, slab-on-grade), vapour inhalation (indoor), protection of gw for aquatic life, and eco soil contact.
[c] The exposure pathway(s) used for determining the standards for this site include: soil ingestion, vapour inhalation (indoor, slab-on-grade), vapour inhalation (indoor), and eco soil contact.
[d] Excludes the target compounds benzene, toluene, ethylbenzene, and xylenes (BTEX).

TABLE 6: Summary of Analytical Results for Polycyclic Aromatic Hydrocarbons in Surface Soil Samples

Sample Location		SS66	SS73	SS74	SS75	Guidelines	
Sample ID		SS66	SS73	SS74	SS75	CCME CEQG Industrial Land Use (IL)	CCME CEQG Residential Land Use (RL)
Sample Date (yyyy mm dd)		2005 07 23	2005 07 23	2005 07 23	2005 07 23		
Depth Interval (m)		0.1	0.1	0.1	0.1		
Field Screen (ppm)		15	120	130	140		
Parameter	**Units**	**Analytical Results**					
Acenaphthene	mg/kg	< 0.04	< 0.4	< 0.04	< 0.04	n/a	n/a
Acenaphthylene	mg/kg	< 0.05	< 0.5	< 0.05	< 0.05	n/a	n/a
Anthracene	mg/kg	< 0.05	< 0.5	< 0.05	< 0.05	n/a	n/a
Benzo(a)anthracene	mg/kg	< 0.05	< 0.5	< 0.05	< 0.05	10	1
Benzo(a)pyrene	mg/kg	< 0.05	< 0.5	< 0.05	< 0.05	0.7	0.7
Benzo(b)fluoranthene	mg/kg	< 0.05	< 0.5	< 0.05	< 0.05	10	1
Benzo(g,h,i)perylene	mg/kg	< 0.05	< 0.5	< 0.05	< 0.05	n/a	n/a
Benzo(k)fluoranthene	mg/kg	< 0.05	< 0.5	< 0.05	< 0.05	10	1
Chrysene	mg/kg	< 0.05	< 0.5	< 0.05	< 0.05	n/a	n/a
Dibenz(a,h)anthracene	mg/kg	< 0.05	< 0.5	< 0.05	< 0.05	10	1
Fluoranthene	mg/kg	< 0.05	< 0.5	< 0.05	< 0.05	n/a	n/a
Fluorene	mg/kg	< 0.05	< 0.7	< 0.05	< 0.05	n/a	n/a
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.05	< 0.5	< 0.05	< 0.05	10	1
Naphthalene	mg/kg	< 0.05	< 0.6	< 0.05	< 0.05	22	0.6
Phenanthrene	mg/kg	< 0.05	< 0.5	< 0.05	< 0.05	50	5
Pyrene	mg/kg	< 0.05	< 0.5	< 0.05	< 0.05	100	10

Notes:
Associated ALS files: CC500004, R3056, R3057, R3058, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million.
< Denotes concentration less than indicated detection limit.
n/a Denotes no applicable standard.

BOLD Concentration greater than or equal to CCME CEQG Industrial Land Use (IL) guideline.

SHADOW Concentration greater than or equal to CCME CEQG Residential Land Use (RL) guideline.

TABLE 7: Summary of Analytical Results for Metals in Surface Soil Samples

Sample Location		SS62	SS63	SS64	SS66	SS69	SS70	SS71	SS72	SANDBLANK	Guidelines	
Sample ID		SS62	SS63	SS64	SS66	SS69	SS70	SS71	SS72	SANDBLANK	CCME CEQG Industrial Land Use (IL)	CCME CEQG Residential Land Use (RL)
Sample Date (yyyy mm dd)		2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 19		
Depth (m)		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	-		
Field Screen (ppm)		25	20	10	15	15	10	10	15	-		
Parameter	**Units**	**Analytical Results**										
Antimony	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 20	40	20
Arsenic	mg/kg	11.9	10.9	***18.6***	***14***	***97.3***	***124***	< 5	< 5	***30***	12	12
Barium	mg/kg	40.3	33.5	24.4	42.5	42.6	39.5	28.7	31.7	**505**	2,000	500
Beryllium	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	8	4
Cadmium	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 1	22	10
Chromium	mg/kg	27.7	23.5	16.8	30.5	26.6	26.8	20.3	23.1	**64.4**	87	64
Cobalt	mg/kg	5.3	4.2	3.2	5.1	4.8	4.9	3.5	3.8	46.5	300	50
Copper	mg/kg	13.3	11.5	8.8	14.8	13	13.6	8.8	9.8	***2,230***	91	63
Lead	mg/kg	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 30	< 60	600	140
Mercury	mg/kg	0.0051	0.0063	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0156	< 0.005	50	6.6
Molybdenum	mg/kg	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 8	40	10
Nickel	mg/kg	14.9	12.9	10.6	18.1	14.7	16.2	10.7	12.2	33	50	50
Selenium	mg/kg	< 2[a]	< 2[a]	< 2[a]	< 2[a]	< 2[a]	< 2[a]	< 2[a]	< 2[a]	< 4[a]	3.9	1
Silver	mg/kg	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 4	40	20
Thallium	mg/kg	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	1	1
Tin	mg/kg	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 10	300	50
Vanadium	mg/kg	25	20.7	12.2	20.8	24.2	23.3	19.5	21.3	***130***	130	130
Zinc	mg/kg	68.1	26.9	22.1	23.9	24.3	22.8	17.8	20.6	126	360	200

Notes:
Associated ALS files: CC500004, R3056, R3057, R3058, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
n/a Denotes no applicable standard.

BOLD Concentration greater than or equal to CCME CEQG Industrial Land Use (IL) guideline.

SHADOW Concentration greater than or equal to CCME CEQG Residential Land Use (RL) guideline.

TABLE 8: Summary of Analytical Results for Glycols in Surface Soil Samples

Sample Location		SS64	SS66	Guidelines	
Sample ID		SS64	SS66	CCME CEQG Industrial Land Use (IL)	CCME CEQG Residential Land Use (RL)
Sample Date (yyyy mm dd)		2005 07 23	2005 07 23		
Depth (m)		0.1	0.1		
Field Screen (ppm)		10	15		
Parameter	**Units**	**Analytical Results**			
Diethylene glycol	mg/kg	< 10	< 10	n/a	n/a
Ethylene glycol	mg/kg	< 10	< 10	960	960
Propylene glycol	mg/kg	< 10	< 10	n/a	n/a
Triethylene glycol	mg/kg	< 10	< 10	n/a	n/a

Notes:
Associated ALS files: CC500004, R3056, R3057, R3058, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
n/a Denotes no applicable standard.

BOLD Concentration greater than or equal to CCME CEQG Industrial Land Use (IL) guideline.

SHADOW Concentration greater than or equal to CCME CEQG Residential Land Use (RL) guideline.

TABLE 9: Summary of Analytical Results for Hydrocarbons in Borehole and Test Pit Soil Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Monocyclic Aromatic Hydrocarbons				Petroleum Hydrocarbon Fractions				
					Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	F1-BTEX[d] (C_6-C_{10}) (mg/kg)	F1 (C_6-C_{10}) (mg/kg)	F2 (>C_{10}-C_{16}) (mg/kg)	F3 (>C_{16}-C_{34}) (mg/kg)	F4 (>C_{34}-C_{50}) (mg/kg)
BH05-10	05-10-01	2005 07 16	0.4 - 0.7	30	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	67	241	< 50
TP05-11	05-11-01	2005 07 18	0.3 - 0.6	160	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	105	351	< 50
	05-11-02	2005 07 18	1.0 - 1.3	35	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	52	375	< 50
TP05-12	05-12-01	2005 07 18	0.1 - 0.4	100	< 0.04	< 0.1	< 0.05	< 0.075	***62***	62	***1,680***	***1,040***	213
	05-12-02	2005 07 18	0.9 - 1.2	50	< 0.04	< 0.1	< 0.05	< 0.075	***46***	46	< 30	< 50	< 50
TP05-13	05-13-01	2005 07 18	0.3 - 0.6	60	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	< 50	< 50
	05-13-02	2005 07 18	1.2 - 1.5	70	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	< 50	< 50
TP05-14	05-14-01	2005 07 18	0.3 - 0.6	620	***0.201***	0.89	0.341	3.65	***270***	275	***3,700***	***4,050***	1,790
	05-14-02	2005 07 18	1.0 - 1.3	420	***0.332***	1.03	0.093	2.04	***141***	144	***2,600***	***1,300***	363
TP05-15	05-15-01	2005 07 18	0.3 - 0.6	50	< 0.04	< 0.1	< 0.05	< 0.075	***35***	35	< 30	157	56
	05-15-02	2005 07 18	0.9 - 1.2	110	< 0.04	< 0.1	< 0.05	0.178	***39***	40	***2,560***	***798***	< 50
TP05-18	05-18-01	2005 07 18	0.1 - 0.4	60	< 0.04	< 0.1	< 0.05	< 0.075	***31***	31	< 30	117	< 50
	05-18-02	2005 07 18	0.9 - 1.0	60	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	< 50	< 50
Guidelines													
CCME CWS Residential CG Surface[a,b]					n/a	n/a	n/a	n/a	30	n/a	150	400	2,800
CCME CWS Industrial CG Surface[a,b]					n/a	n/a	n/a	n/a	230	n/a	150	1,700	3,300
CCME CEQG Industrial Land Use (IL) guideline[a, c]					0.3	250	300	160	n/a	n/a	n/a	n/a	n/a
CCME CEQG Residential Land Use (RL) guideline[a, c]					0.095	75	55	14	n/a	n/a	n/a	n/a	n/a

Notes:
Associated ALS files: CC500004, R3056, R3057, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the method detection limit.

BOLD Concentration greater than or equal to CCME CWS Residential CG Surface standard or CCME CEQG Residential Land Use (RL) guideline.

SHADOW Concentration greater than or equal to CCME CWS Industrial CG Surface standard or CCME CEQG Industrial Land Use (IL) guideline

[a] Standards for coarse grained surface soil.

[b] The exposure pathway(s) used for determining the standards for this site include: soil ingestion, vapour inhalation (indoor, slab-on-grade), vapour inhalation (indoor), protection of gw for aquatic life and eco soil contact.

[c] The exposure pathway(s) used for determining the standards for this site include: soil ingestion, vapour inhalation (indoor, slab-on-grade), vapour inhalation (indoor), and eco soil contact.

[d] Excludes the target compounds benzene, toluene, ethylbenzene, and xylenes (BTEX).

[e] Detection limit is greater than the CEQG RL guideline.

TABLE 9 cont'd: Summary of Analytical Results for Hydrocarbons in Borehole and Test Pit Soil Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Monocyclic Aromatic Hydrocarbons				Petroleum Hydrocarbon Fractions				
					Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	F1-BTEX[d] (C_6-C_{10}) (mg/kg)	F1 (C_6-C_{10}) (mg/kg)	F2 (>C_{10}-C_{16}) (mg/kg)	F3 (>C_{16}-C_{34}) (mg/kg)	F4 (>C_{34}-C_{50}) (mg/kg)
TP05-19	05-19-01	2005 07 19	0.1 - 0.3	60	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	81	< 50
	05-19-02	2005 07 19	1.0 - 1.3	65	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	57	< 50
TP05-21	05-21-01	2005 07 19	0.0 - 0.1	130	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	175	< 50
	05-21-02	2005 07 19	0.6 - 0.7	-	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	202	< 50
TP05-23	05-23-01	2005 07 19	0.3 - 0.4	40	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	120	< 50
	05-23-02	2005 07 19	1.0 - 1.3	360	< 0.04	< 0.1	< 0.05	1.23	***56***	57	***775***	224	< 50
	05-23-03	2005 07 19	1.7 - 2.0	410	< 0.04	0.12	< 0.05	5.58	***204***	210	***1,750***	***449***	< 50
TP05-24	05-24-01	2005 07 19	0.1 - 0.4	90	< 0.04	< 0.1	< 0.05	< 0.075	***73***	73	< 30	70	< 50
	05-24-02	2005 07 19	0.7 - 0.9	90	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	77	< 50
TP05-25	05-25-01	2005 07 19	0.1 - 0.3	70	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	72	70
	05-25-02	2005 07 19	0.6 - 0.7	75	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	< 50	< 50
	05-25-03	2005 07 19	1.2 - 1.3	160	< 0.04	< 0.1	< 0.05	0.141	19	19	***291***	213	< 50
	HCDUP1	2005 07 20	1.2 - 1.3	-	< 0.04	< 0.1	< 0.05	< 0.075	12	12	***281***	213	< 50
	QA/QC RPD %				*	*	*	*	*	*	3.5	0.0	*
Guidelines													
CCME CWS Residential CG Surface[a,b]					n/a	n/a	n/a	n/a	30	n/a	150	400	2,800
CCME CWS Industrial CG Surface[a,b]					n/a	n/a	n/a	n/a	230	n/a	150	1,700	3,300
CCME CEQG Industrial Land Use (IL) guideline[a, c]					0.3	250	300	160	n/a	n/a	n/a	n/a	n/a
CCME CEQG Residential Land Use (RL) guideline[a, c]					0.095	75	55	14	n/a	n/a	n/a	n/a	n/a

Notes:
Associated ALS files: CC500004, R3056, R3057, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the method detection limit.

BOLD Concentration greater than or equal to CCME CWS Residential CG Surface standard or CCME CEQG Residential Land Use (RL) guideline.

SHADOW Concentration greater than or equal to CCME CWS Industrial CG Surface standard or CCME CEQG Industrial Land Use (IL) guideline

[a] Standards for coarse grained surface soil.

[b] The exposure pathway(s) used for determining the standards for this site include: soil ingestion, vapour inhalation (indoor, slab-on-grade), vapour inhalation (indoor), protection of gw for aquatic life and eco soil contact.

[c] The exposure pathway(s) used for determining the standards for this site include: soil ingestion, vapour inhalation (indoor, slab-on-grade), vapour inhalation (indoor), and eco soil contact.

[d] Excludes the target compounds benzene, toluene, ethylbenzene, and xylenes (BTEX).

[e] Detection limit is greater than the CEQG RL guideline.

TABLE 9 cont'd: Summary of Analytical Results for Hydrocarbons in Borehole and Test Pit Soil Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Monocyclic Aromatic Hydrocarbons				Petroleum Hydrocarbon Fractions				
					Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	F1-BTEX[d] (C_6-C_{10}) (mg/kg)	F1 (C_6-C_{10}) (mg/kg)	F2 (>C_{10}-C_{16}) (mg/kg)	F3 (>C_{16}-C_{34}) (mg/kg)	F4 (>C_{34}-C_{50}) (mg/kg)
TP05-26	05-26-01	2005 07 19	0.1 - 0.3	40	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	123	< 50
	05-26-02	2005 07 19	0.4 - 0.6	35	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	101	< 50
	05-26-03	2005 07 19	1.2 - 1.3	40	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	***740***	***450***	< 50
TP05-28	05-28-01	2005 07 19	0.3 - 0.4	650	< 0.08	< 0.2	< 0.1	***14.9***	***1,030***	1,040	***5,440***	***1,530***	< 50
	05-28-02	2005 07 19	1.0 - 1.2	980	***0.49***	4.9	4.62	***46.9***	***1,670***	1,730	***8,610***	***2,980***	< 50
	05-28-03	2005 07 19	1.5 - 1.7	1,400	< 0.8	8.1	7.8	***78.4***	***2,650***	2,740	***9,130***	***2,410***	< 50
	HCDUP2	2005 07 20	1.5 - 1.7	-	***0.494***	8.33	7.44	***92.4***	***1,500***	1,610	***14,000***	***3,590***	< 50
	QA/QC RPD %				-	2.8	4.7	16.4	55.4	52.0	42.1	39.3	*
TP05-29	05-29-01	2005 07 19	0.1 - 0.3	500	< 0.04	< 0.1	< 0.05	***1.1***	***51***	52	***2,290***	***1,170***	142
	05-29-02	2005 07 19	0.7 - 0.9	600	< 0.04	< 0.1	< 0.05	0.08	< 10	< 10	52	< 50	< 50
	05-29-03	2005 07 19	1.2 - 1.3	500	< 0.04	0.26	0.12	0.861	< 10	< 10	< 30	< 50	< 50
TP05-30	05-30-01	2005 07 19	0.3 - 0.4	170	-	-	-	-	-	-	< 30	< 50	< 50
	05-30-02	2005 07 19	1.0 - 1.2	190	-	-	-	-	-	-	< 30	< 50	< 50
Guidelines													
CCME CWS Residential CG Surface[a,b]					n/a	n/a	n/a	n/a	30	n/a	150	400	2,800
CCME CWS Industrial CG Surface[a,b]					n/a	n/a	n/a	n/a	230	n/a	150	1,700	3,300
CCME CEQG Industrial Land Use (IL) guideline[a, c]					0.3	250	300	160	n/a	n/a	n/a	n/a	n/a
CCME CEQG Residential Land Use (RL) guideline[a, c]					0.095	75	55	14	n/a	n/a	n/a	n/a	n/a

Notes:
Associated ALS files: CC500004, R3056, R3057, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the method detection limit.

BOLD Concentration greater than or equal to CCME CWS Residential CG Surface standard or CCME CEQG Residential Land Use (RL) guideline.

SHADOW Concentration greater than or equal to CCME CWS Industrial CG Surface standard or CCME CEQG Industrial Land Use (IL) guideline

[a] Standards for coarse grained surface soil.

[b] The exposure pathway(s) used for determining the standards for this site include: soil ingestion, vapour inhalation (indoor, slab-on-grade), vapour inhalation (indoor), protection of gw for aquatic life and eco soil contact.

[c] The exposure pathway(s) used for determining the standards for this site include: soil ingestion, vapour inhalation (indoor, slab-on-grade), vapour inhalation (indoor), and eco soil contact.

[d] Excludes the target compounds benzene, toluene, ethylbenzene, and xylenes (BTEX).

[e] Detection limit is greater than the CEQG RL guideline.

TABLE 9 cont'd: Summary of Analytical Results for Hydrocarbons in Borehole and Test Pit Soil Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Monocyclic Aromatic Hydrocarbons				Petroleum Hydrocarbon Fractions				
					Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	F1-BTEX[d] (C_6-C_{10}) (mg/kg)	F1 (C_6-C_{10}) (mg/kg)	F2 (>C_{10}-C_{16}) (mg/kg)	F3 (>C_{16}-C_{34}) (mg/kg)	F4 (>C_{34}-C_{50}) (mg/kg)
TP05-31	05-31-01	2005 07 19	0.4 - 0.6	170	-	-	-	-	-	-	< 30	127	61
	05-31-02	2005 07 19	0.9 - 1.0	90	-	-	-	-	-	-	< 30	< 50	< 50
	05-31-03	2005 07 19	1.2 - 1.5	190	-	-	-	-	-	-	< 30	58	< 50
TP05-32	05-32-01	2005 07 19	0.3 - 0.6	180	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	31	84	< 50
	05-32-02	2005 07 19	1.0 - 1.2	170	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	33	< 50	< 50
	05-32-03	2005 07 19	1.8 - 2.0	320	< 0.04	< 0.1	< 0.05	0.482	11	11	***2,590***	***1,870***	437
	HCDUP3	2005 07 20	1.8 - 2.0	-	< 0.04	< 0.1	< 0.05	0.469	12	13	***759***	***708***	160
	QA/QC RPD %				*	*	*	2.7	8.7	16.7	109.3	90.1	92.8
TP05-33	05-33-01	2005 07 19	0.4 - 0.7	250	< 0.04	< 0.1	< 0.05	0.301	26	26	***2,590***	***1,870***	437
	05-33-02	2005 07 19	1.2 - 1.5	1,250	< 0.04	0.35	0.242	***24***	***445***	470	***7,030***	***1,380***	< 50
	05-33-03	2005 07 19	1.7 - 1.8	530	< 0.2[e]	2.66	3.86	***31.2***	***977***	1,010	***6,220***	***1,120***	< 50
Guidelines													
CCME CWS Residential CG Surface[a,b]					n/a	n/a	n/a	n/a	30	n/a	150	400	2,800
CCME CWS Industrial CG Surface[a,b]					n/a	n/a	n/a	n/a	230	n/a	150	1,700	3,300
CCME CEQG Industrial Land Use (IL) guideline[a, c]					0.3	250	300	160	n/a	n/a	n/a	n/a	n/a
CCME CEQG Residential Land Use (RL) guideline[a, c]					0.095	75	55	14	n/a	n/a	n/a	n/a	n/a

Notes:
Associated ALS files: CC500004, R3056, R3057, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the method detection limit.

BOLD Concentration greater than or equal to CCME CWS Residential CG Surface standard or CCME CEQG Residential Land Use (RL) guideline.

SHADOW Concentration greater than or equal to CCME CWS Industrial CG Surface standard or CCME CEQG Industrial Land Use (IL) guideline

[a] Standards for coarse grained surface soil.

[b] The exposure pathway(s) used for determining the standards for this site include: soil ingestion, vapour inhalation (indoor, slab-on-grade), vapour inhalation (indoor), protection of gw for aquatic life and eco soil contact.

[c] The exposure pathway(s) used for determining the standards for this site include: soil ingestion, vapour inhalation (indoor, slab-on-grade), vapour inhalation (indoor), and eco soil contact.

[d] Excludes the target compounds benzene, toluene, ethylbenzene, and xylenes (BTEX).

[e] Detection limit is greater than the CEQG RL guideline.

TABLE 9 cont'd: Summary of Analytical Results for Hydrocarbons in Borehole and Test Pit Soil Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Monocyclic Aromatic Hydrocarbons				Petroleum Hydrocarbon Fractions				
					Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	F1-BTEX[d] (C_6-C_{10}) (mg/kg)	F1 (C_6-C_{10}) (mg/kg)	F2 (>C_{10}-C_{16}) (mg/kg)	F3 (>C_{16}-C_{34}) (mg/kg)	F4 (>C_{34}-C_{50}) (mg/kg)
TP05-35	05-35-01	2005 07 19	0.1 - 0.4	40	-	-	-	-	-	-	< 30	87	< 50
	05-35-02	2005 07 19	0.7 - 1.0	40	-	-	-	-	-	-	< 30	< 50	< 50
	05-35-03	2005 07 19	1.2 - 1.5	100	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	< 50	< 50
TP05-36	05-36-01	2005 07 19	0.3 - 0.4	460	< 0.04	< 0.1	< 0.05	0.148	***272***	272	***2,780***	***638***	< 50
	05-36-02	2005 07 19	0.7 - 0.9	440	< 0.04	< 0.1	< 0.05	3.68	***398***	401	***4,770***	***1,480***	< 50
	05-36-03	2005 07 19	1.2 - 1.3	700	< 0.2[e]	1.63	2.46	***30.9***	***1,360***	1,390	***8,790***	***3,320***	< 50
	HCDUP4	2005 07 20	1.2 - 1.3	-	< 0.04	1.29	2.11	***28.6***	***1,030***	1,060	***9,740***	***3,490***	< 50
	QA/QC RPD %				*	23.3	15.3	7.7	27.6	26.9	10.3	5.0	*
TP05-37	05-37-01	2005 07 19	0.6 - 0.9	20	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	33	< 50	< 50
TP05-38	05-38-01	2005 07 19	0.3 - 0.4	70	-	-	-	-	-	-	34	160	< 50
	05-38-02	2005 07 19	1.0 - 1.2	120	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	< 50	< 50
TP05-39	05-39-01	2005 07 19	0.1 - 0.4	65	-	-	-	-	-	-	< 30	111	< 50
	05-39-02	2005 07 19	1.0 - 1.2	50	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	162	< 50
Guidelines													
CCME CWS Residential CG Surface[a,b]					n/a	n/a	n/a	n/a	30	n/a	150	400	2,800
CCME CWS Industrial CG Surface[a,b]					n/a	n/a	n/a	n/a	230	n/a	150	1,700	3,300
CCME CEQG Industrial Land Use (IL) guideline[a, c]					0.3	250	300	160	n/a	n/a	n/a	n/a	n/a
CCME CEQG Residential Land Use (RL) guideline[a, c]					0.095	75	55	14	n/a	n/a	n/a	n/a	n/a

Notes:
Associated ALS files: CC500004, R3056, R3057, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the method detection limit.

BOLD Concentration greater than or equal to CCME CWS Residential CG Surface standard or CCME CEQG Residential Land Use (RL) guideline.

SHADOW Concentration greater than or equal to CCME CWS Industrial CG Surface standard or CCME CEQG Industrial Land Use (IL) guideline

[a] Standards for coarse grained surface soil.

[b] The exposure pathway(s) used for determining the standards for this site include: soil ingestion, vapour inhalation (indoor, slab-on-grade), vapour inhalation (indoor), protection of gw for aquatic life and eco soil contact.

[c] The exposure pathway(s) used for determining the standards for this site include: soil ingestion, vapour inhalation (indoor, slab-on-grade), vapour inhalation (indoor), and eco soil contact.

[d] Excludes the target compounds benzene, toluene, ethylbenzene, and xylenes (BTEX).

[e] Detection limit is greater than the CEQG RL guideline.

TABLE 9 cont'd: Summary of Analytical Results for Hydrocarbons in Borehole and Test Pit Soil Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Monocyclic Aromatic Hydrocarbons				Petroleum Hydrocarbon Fractions				
					Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	F1-BTEX[d] (C_6-C_{10}) (mg/kg)	F1 (C_6-C_{10}) (mg/kg)	F2 (>C_{10}-C_{16}) (mg/kg)	F3 (>C_{16}-C_{34}) (mg/kg)	F4 (>C_{34}-C_{50}) (mg/kg)
TP05-40	05-40-01	2005 07 19	0.1 - 0.3	40	-	-	-	-	-	-	< 30	125	< 50
	05-40-02	2005 07 19	0.5 - 0.7	40	-	-	-	-	-	-	< 30	< 50	< 50
	05-40-03	2005 07 19	0.9 - 1.2	25	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	< 50	< 50
TP05-42	05-42-01	2005 07 21	0.3 - 0.4	70	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	65	137	< 50
	05-42-02	2005 07 21	0.7 - 0.9	70	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	< 50	< 50
TP05-43	05-43-01	2005 07 21	0.3 - 0.4	80	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	157	60
	05-43-02	2005 07 21	1.0 - 1.2	85	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	139	< 50
TP05-44	05-44-01	2005 07 21	0.4 - 0.6	75	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	< 50	< 50
	05-44-02	2005 07 21	0.9 - 1.0	75	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	30	< 50	< 50
TP05-45	05-45-01	2005 07 21	0.1 - 0.3	270	< 0.04	< 0.1	< 0.05	< 0.075	***161***	161	***4,070***	***1,060***	53
	05-45-02	2005 07 21	0.6 - 0.7	340	< 0.04	< 0.1	< 0.05	< 0.075	***173***	173	***5,310***	***2,180***	163
	HCDUP5	2005 07 20	0.6 - 0.7	-	< 0.04	< 0.1	< 0.05	< 0.075	***93***	93	***5,010***	***2,020***	160
	QA/QC RPD %				*	*	*	*	60.2	60.2	5.8	7.6	1.9
Guidelines													
CCME CWS Residential CG Surface[a,b]					n/a	n/a	n/a	n/a	30	n/a	150	400	2,800
CCME CWS Industrial CG Surface[a,b]					n/a	n/a	n/a	n/a	230	n/a	150	1,700	3,300
CCME CEQG Industrial Land Use (IL) guideline[a, c]					0.3	250	300	160	n/a	n/a	n/a	n/a	n/a
CCME CEQG Residential Land Use (RL) guideline[a, c]					0.095	75	55	14	n/a	n/a	n/a	n/a	n/a

Notes:
Associated ALS files: CC500004, R3056, R3057, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the method detection limit.

BOLD Concentration greater than or equal to CCME CWS Residential CG Surface standard or CCME CEQG Residential Land Use (RL) guideline.

SHADOW Concentration greater than or equal to CCME CWS Industrial CG Surface standard or CCME CEQG Industrial Land Use (IL) guideline

[a] Standards for coarse grained surface soil.

[b] The exposure pathway(s) used for determining the standards for this site include: soil ingestion, vapour inhalation (indoor, slab-on-grade), vapour inhalation (indoor), protection of gw for aquatic life and eco soil contact.

[c] The exposure pathway(s) used for determining the standards for this site include: soil ingestion, vapour inhalation (indoor, slab-on-grade), vapour inhalation (indoor), and eco soil contact.

[d] Excludes the target compounds benzene, toluene, ethylbenzene, and xylenes (BTEX).

[e] Detection limit is greater than the CEQG RL guideline.

TABLE 9 cont'd: Summary of Analytical Results for Hydrocarbons in Borehole and Test Pit Soil Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Monocyclic Aromatic Hydrocarbons				Petroleum Hydrocarbon Fractions				
					Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	F1-BTEX[d] (C_6-C_{10}) (mg/kg)	F1 (C_6-C_{10}) (mg/kg)	F2 (>C_{10}-C_{16}) (mg/kg)	F3 (>C_{16}-C_{34}) (mg/kg)	F4 (>C_{34}-C_{50}) (mg/kg)
TP05-46	05-46-01	2005 07 21	0.3 - 0.6	220	-	-	-	-	-	-	136	212	< 50
	05-46-02	2005 07 21	0.9 - 1.0	160	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	50	< 50	< 50
TP05-47	05-47-01	2005 07 21	0.7 - 0.9	120	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	139	***621***	121
TP05-50	05-50-01	2005 07 21	0.4 - 0.7	100	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	32	< 50	< 50
TP05-51	05-51-01	2005 07 21	0.1 - 0.3	90	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	61	233	159
TP05-53	05-53-01	2005 07 21	0.1 - 0.3	460	< 0.04	< 0.1	< 0.05	< 0.075	***133***	133	***2,480***	***497***	< 50
	HCDUP6	2005 07 20	0.1 - 0.3	-	< 0.04	< 0.1	< 0.05	< 0.075	***154***	154	***3,870***	***677***	< 50
	QA/QC RPD %				*	*	*	*	14.6	14.6	43.8	30.7	*
TP05-55	05-55-01	2005 07 21	0.3 - 0.6	810	< 0.04	< 0.1	< 0.05	0.207	***179***	180	***2,900***	***486***	< 50
	05-55-02	2005 07 21	1.0 - 1.3	560	< 0.04	< 0.1	< 0.05	0.177	***371***	372	***2,700***	***513***	< 50
	HCDUP7	2005 07 20	1.0 - 1.3	-	< 0.04	< 0.1	< 0.05	0.172	***251***	252	***2,770***	***450***	< 50
	QA/QC RPD %				*	*	*	2.9	38.6	38.5	2.6	13.1	*
TP05-56	05-56-03	2005 07 21	1.5 - 1.7	90	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	< 30	97	< 50
Guidelines													
CCME CWS Residential CG Surface[a,b]					n/a	n/a	n/a	n/a	30	n/a	150	400	2,800
CCME CWS Industrial CG Surface[a,b]					n/a	n/a	n/a	n/a	230	n/a	150	1,700	3,300
CCME CEQG Industrial Land Use (IL) guideline[a, c]					0.3	250	300	160	n/a	n/a	n/a	n/a	n/a
CCME CEQG Residential Land Use (RL) guideline[a, c]					0.095	75	55	14	n/a	n/a	n/a	n/a	n/a

Notes:
Associated ALS files: CC500004, R3056, R3057, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the method detection limit.

BOLD Concentration greater than or equal to CCME CWS Residential CG Surface standard or CCME CEQG Residential Land Use (RL) guideline.

SHADOW Concentration greater than or equal to CCME CWS Industrial CG Surface standard or CCME CEQG Industrial Land Use (IL) guideline

[a] Standards for coarse grained surface soil.

[b] The exposure pathway(s) used for determining the standards for this site include: soil ingestion, vapour inhalation (indoor, slab-on-grade), vapour inhalation (indoor), protection of gw for aquatic life and eco soil contact.

[c] The exposure pathway(s) used for determining the standards for this site include: soil ingestion, vapour inhalation (indoor, slab-on-grade), vapour inhalation (indoor), and eco soil contact.

[d] Excludes the target compounds benzene, toluene, ethylbenzene, and xylenes (BTEX).

[e] Detection limit is greater than the CEQG RL guideline.

TABLE 9 cont'd: Summary of Analytical Results for Hydrocarbons in Borehole and Test Pit Soil Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Monocyclic Aromatic Hydrocarbons				Petroleum Hydrocarbon Fractions				
					Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	F1-BTEX[d] (C_6-C_{10}) (mg/kg)	F1 (C_6-C_{10}) (mg/kg)	F2 (>C_{10}-C_{16}) (mg/kg)	F3 (>C_{16}-C_{34}) (mg/kg)	F4 (>C_{34}-C_{50}) (mg/kg)
TP05-58	05-58-01	2005 07 21	0.4 - 0.6	310	< 0.04	< 0.1	< 0.05	< 0.075	***79***	79	***1,710***	***409***	< 50
	HCDUP8	2005 07 20	0.4 - 0.6	-	< 0.04	< 0.1	< 0.05	< 0.075	***75***	75	-	-	-
	QA/QC RPD %				*	*	*	*	5.2	5.2	-	-	-
TP05-60	05-60-01	2005 07 21	0.3 - 0.6	110	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	***151***	***1,900***	1,030
TP05-61	05-61-01	2005 07 21	0.3 - 0.4	110	< 0.04	< 0.1	< 0.05	< 0.075	< 10	< 10	50	142	< 50
TP05-77	05-77-02	2005 07 25	0.7 - 1.0	750	-	-	-	-	-	-	***3,610***	***525***	< 50
TP05-78	05-78-02	2005 07 25	1.3 - 1.5	15	-	-	-	-	-	-	35	308	64
TP05-79	05-79-02	2005 07 25	1.0 - 1.3	10	-	-	-	-	-	-	< 30	52	< 50
TP05-80	05-80-02	2005 07 25	1.0 - 1.2	1,050	-	-	-	-	-	-	***2,580***	313	< 50
TP05-81	05-81-02	2005 07 25	0.7 - 0.9	10	-	-	-	-	-	-	< 30	< 50	< 50
TP05-82	05-82-01	2005 07 25	1.0 - 1.2	10	-	-	-	-	-	-	< 30	62	< 50
TP05-83	05-83-01	2005 07 25	0.5 - 0.7	10	-	-	-	-	-	-	< 30	148	< 50
TP05-84	05-84-02	2005 07 25	1.5 - 1.7	90	-	-	-	-	-	-	< 30	< 50	< 50
Guidelines													
CCME CWS Residential CG Surface[a,b]					n/a	n/a	n/a	n/a	30	n/a	150	400	2,800
CCME CWS Industrial CG Surface[a,b]					n/a	n/a	n/a	n/a	230	n/a	150	1,700	3,300
CCME CEQG Industrial Land Use (IL) guideline[a, c]					0.3	250	300	160	n/a	n/a	n/a	n/a	n/a
CCME CEQG Residential Land Use (RL) guideline[a, c]					0.095	75	55	14	n/a	n/a	n/a	n/a	n/a

Notes:
Associated ALS files: CC500004, R3056, R3057, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the method detection limit.

BOLD Concentration greater than or equal to CCME CWS Residential CG Surface standard or CCME CEQG Residential Land Use (RL) guideline.

SHADOW Concentration greater than or equal to CCME CWS Industrial CG Surface standard or CCME CEQG Industrial Land Use (IL) guideline

[a] Standards for coarse grained surface soil.

[b] The exposure pathway(s) used for determining the standards for this site include: soil ingestion, vapour inhalation (indoor, slab-on-grade), vapour inhalation (indoor), protection of gw for aquatic life and eco soil contact.

[c] The exposure pathway(s) used for determining the standards for this site include: soil ingestion, vapour inhalation (indoor, slab-on-grade), vapour inhalation (indoor), and eco soil contact.

[d] Excludes the target compounds benzene, toluene, ethylbenzene, and xylenes (BTEX).

[e] Detection limit is greater than the CEQG RL guideline.

TABLE 10: Summary of Analytical Results for Metals in Borehole and Test Pit Soil Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Total Metals																
					Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Thallium (mg/kg)	Tin (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
BH05-01	05-01-01	2005 07 16	1.1 - 1.4	-	< 10	***1,690***	144	< 0.5	< 0.5	**77.4**	10.2	32.2	< 30	< 0.005	**18**	41.6	< 2[a]	< 2	< 1	< 5	42.8	48.6
BH05-02	05-02-01	2005 07 16	1.0 - 1.3	-	< 10	***26.8***	63.5	< 0.5	< 0.5	60.2	8.3	26.2	< 30	< 0.005	7.3	32.7	< 2[a]	< 2	< 1	< 5	36.6	36.5
	05-02-02	2005 07 16	2.3 - 2.6	-	< 10	***13.4***	80.1	< 0.5	< 0.5	**76**	8.6	24.3	< 30	< 0.005	**22.8**	39	< 2[a]	< 2	< 1	< 5	38.3	35.5
BH05-03	05-03-01	2005 07 16	0.7 - 1.0	-	< 10	***39.9***	47.8	< 0.5	< 0.5	31.2	5.5	13.6	< 30	< 0.005	< 4	16.5	< 2[a]	< 2	< 1	< 5	25.1	34.7
	05-03-02	2005 07 16	1.7 - 2.0	-	< 10	5.9	35.2	< 0.5	< 0.5	29	4.2	11	< 30	< 0.005	< 4	15.5	< 2[a]	< 2	< 1	< 5	19.8	23.3
BH05-04	05-04-01	2005 07 16	0.7 - 1.0	-	< 10	***113***	123	< 0.5	< 0.5	57.4	9.8	31.7	< 30	< 0.005	6.2	33.7	< 2[a]	< 2	< 1	< 5	39.7	58.8
BH05-05	05-05-01	2005 07 16	0.7 - 0.9	-	< 10	***144***	142	< 0.5	< 0.5	56.8	7.6	24.7	< 30	< 0.005	**10**	29.8	< 2[a]	< 2	< 1	< 5	35.8	41.7
	05-05-02	2005 07 16	1.8 - 2.0	-	< 10	***50.2***	55.7	< 0.5	< 0.5	46.7	5.5	16.1	< 30	< 0.005	**11.2**	24.6	< 2[a]	< 2	< 1	< 5	23.8	26.4
	METDUP1	2005 07 19	1.8 - 2.0	-	< 10	***47.5***	55	< 0.5	< 0.5	46.4	5.4	16	< 30	< 0.005	**11.6**	25.4	< 2[a]	< 2	< 1	< 5	25.3	26.6
	QA/QC RPD %				*	5.7	1.3	*	*	0.6	1.9	0.6	*	*	3.4	3.1	*	*	*	*	6.1	0.8
BH05-10	05-10-01	2005 07 16	0.4 - 0.7	30	< 10	10	47.8	< 0.5	< 0.5	54.1	8.1	30.6	< 30	< 0.005	< 4	29.6	< 2[a]	< 2	< 1	< 5	28.4	33.9
TP05-11	05-11-01	2005 07 18	0.3 - 0.6	160	< 10	***1,510***	212	< 0.5	1.18	**77**	19.8	***157***	40	0.0064	< 4	***57.9***	< 2[a]	< 2	< 1	< 5	55.2	**329**
	05-11-02	2005 07 18	1.0 - 1.3	35	< 10	***2,420***	189	< 0.5	< 0.5	**75.5**	18.6	***171***	< 30	< 0.005	< 4	***51.5***	< 2[a]	< 2	< 1	< 5	48.5	163
TP05-12	05-12-01	2005 07 18	0.1 - 0.4	100	< 10	***72.8***	45.4	< 0.5	< 0.5	32.6	5.6	46	37	0.0054	4.6	31.9	< 2[a]	< 2	< 1	9.3	25	75.8
	05-12-02	2005 07 18	0.9 - 1.2	50	< 10	***20.8***	42.2	< 0.5	< 0.5	26.1	5.1	14.8	< 30	< 0.005	< 4	14.2	< 2[a]	< 2	< 1	< 5	23.6	25.3
TP05-13	05-13-01	2005 07 18	0.3 - 0.6	60	< 10	< 5	30.9	< 0.5	< 0.5	18.5	3.5	6.7	< 30	< 0.005	< 4	9.4	< 2[a]	< 2	< 1	< 5	18.6	19.5
	05-13-02	2005 07 18	1.2 - 1.5	70	< 10	< 5	42.6	< 0.5	< 0.5	25.7	4.2	11.9	< 30	< 0.005	< 4	13.4	< 2[a]	< 2	< 1	< 5	22.2	30.9
TP05-14	05-14-01	2005 07 18	0.3 - 0.6	620	***171***	***1,690***	249	< 0.5	6.38	**74.4**	12.9	***429***	***3,410***	0.0549	**10.6**	42.5	< 2[a]	< 2	< 1	7.2	40	***1,570***
	05-14-02	2005 07 18	1.0 - 1.3	420	14	***14.7***	61	< 0.5	0.6	30	4	33.5	***1,570***	< 0.005	< 4	14	< 2[a]	< 2	< 1	< 5	19.8	**257**
TP05-15	05-15-01	2005 07 18	0.3 - 0.6	50	< 10	***2,110***	189	< 0.5	< 0.5	**79.8**	7.8	42.4	< 30	< 0.005	< 4	33.6	< 2[a]	< 2	< 1	< 5	52.6	59.4
	05-15-02	2005 07 18	0.9 - 1.2	110	< 10	***619***	101	< 0.5	< 0.5	45.6	11	30.3	< 30	0.0076	< 4	35.4	< 2[a]	< 2	< 1	< 5	35.8	56.5
TP05-16	05-16-01	2005 07 18	0.1 - 0.4	25	< 10	***1,060***	189	< 0.5	< 0.5	***87.3***	20.5	44.6	88	< 0.005	< 4	***62.9***	< 2[a]	< 2	< 1	< 5	58.9	70.9
	05-16-02	2005 07 18	1.0 - 1.3	40	< 10	***556***	147	< 0.5	< 0.5	**66.4**	16.5	40.8	84	< 0.005	< 4	***51.1***	< 2[a]	< 2	< 1	< 5	44.9	70.3
TP05-17	05-17-01	2005 07 18	0.1 - 0.4	75	< 10	***122***	194	< 0.5	< 0.5	**84.7**	20.7	45.9	< 30	< 0.005	< 4	***64***	< 2[a]	< 2	< 1	< 5	58	75.6
	METDUP2	2005 07 19	1.0 - 1.2	-	< 10	***154***	185	< 0.5	< 0.5	**85.5**	21.6	53.1	< 30	< 0.005	< 4	***67.3***	< 2[a]	< 2	< 1	< 5	60.6	80
	QA/QC RPD %				*	23.2	4.7	*	*	0.9	4.3	14.5	*	*	*	5.0	*	*	*	*	4.4	5.7
	05-17-02	2005 07 18	1.0 - 1.2	30	< 10	8.9	37.8	< 0.5	< 0.5	29	5.5	12.8	< 30	< 0.005	< 4	17.6	< 2[a]	< 2	< 1	< 5	22.5	30.3
Guidelines																						
CCME CEQG Industrial Land Use (IL)					40	12	2,000	8	22	87	300	91	600	50	40	50	3.9	40	1	300	130	360
CCME CEQG Residential Land Use (RL)					20	12	500	4	10	64	50	63	140	6.6	10	50	1	20	1	50	130	200

Notes:
Associated ALS files: CC500004, R3056, R3057, R3058, R3059.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the MDL.

BOLD Concentration greater than or equal to CCME CEQG Industrial Land Use (IL) guideline.

SHADOW Concentration greater than or equal to CCME CEQG Residential Land Use (RL) guideline.

[a] Laboratory detection limit exceeds regulatory standard.
[b] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

TABLE 10 cont'd: Summary of Analytical Results for Metals in Borehole and Test Pit Soil Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Total Metals																
					Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Thallium (mg/kg)	Tin (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
TP05-18	05-18-01	2005 07 18	0.1 - 0.4	60	< 10	***511***	239	< 0.5	< 0.5	***91.5***	20.6	53.4	< 30	< 0.005	< 4	***59.7***	< 2[a]	< 2	< 1	< 5	63.7	80.2
	05-18-02	2005 07 18	0.9 - 1.0	60	< 10	***12***	47.3	< 0.5	< 0.5	32.7	5.5	15	< 30	< 0.005	< 4	18	< 2[a]	< 2	< 1	< 5	27.6	28.1
TP05-19	05-19-01	2005 07 19	0.1 - 0.3	60	< 10	***1,110***	177	< 0.5	< 0.5	**74.8**	11.6	33.5	< 30	< 0.005	< 4	40.9	< 2[a]	< 2	< 1	< 5	53.5	55.7
	05-19-02	2005 07 19	1.0 - 1.3	65	< 10	***1,340***	142	< 0.5	< 0.5	61.1	13.9	34.7	< 30	< 0.005	< 4	41.9	< 2[a]	< 2	< 1	< 5	41.3	53.9
TP05-20	05-20-01	2005 07 19	0.3 - 0.4	40	< 10	***479***	81.9	< 0.5	< 0.5	40.5	7.1	26.2	< 30	< 0.005	< 4	22.4	< 2[a]	< 2	< 1	< 5	34.9	35.5
	05-20-02	2005 07 19	1.0 - 1.3	75	< 10	10.4	35.2	< 0.5	< 0.5	25.6	5	16.4	< 30	< 0.005	< 4	15.6	< 2[a]	< 2	< 1	< 5	24	23.4
TP05-21	05-21-01	2005 07 19	0.0 - 0.1	130	< 10	***1,600***	75.4	< 0.5	< 0.5	50.6	5.8	20.6	< 30	< 0.005	< 4	22.7	< 2[a]	< 2	< 1	< 5	35.9	35.1
	05-21-02	2005 07 19	0.6 - 0.7	-	< 10	***3,660***	166	< 0.5	< 0.5	63.5	15	44	< 30	< 0.005	< 4	45.4	< 2[a]	< 2	< 1	< 5	45.8	55.7
TP05-22	05-22-01	2005 07 19	0.3 - 0.4	40	< 10	***1,190***	232	< 0.5	< 0.5	**83.5**	17.7	41.9	< 30	< 0.005	< 4	***60.5***	< 2[a]	< 2	< 1	< 5	65.6	70.4
	05-22-02	2005 07 19	1.0 - 1.3	70	< 10	***1,760***	239	< 0.5	< 0.5	**83.3**	18.8	48.8	< 30	< 0.005	< 4	***61.1***	< 2[a]	< 2	< 1	< 5	62.3	71.1
TP05-23	05-23-01	2005 07 19	0.3 - 0.4	40	< 10	***1,130***	236	< 0.5	< 0.5	**85**	18	42.7	< 30	< 0.005	< 4	***61.6***	< 2[a]	< 2	< 1	< 5	62.3	75.6
	05-23-03	2005 07 19	1.7 - 2.0	410	< 10	***15.7***	42.6	< 0.5	< 0.5	36.5	6.6	19.5	< 30	< 0.005	< 4	21.9	< 2[a]	< 2	< 1	< 5	25.9	30.8
TP05-24	05-24-01	2005 07 19	0.1 - 0.4	90	< 10	***341***	76.4	< 0.5	< 0.5	38.2	6.8	26.9	< 30	< 0.005	< 4	22.4	< 2[a]	< 2	< 1	< 5	27.3	39.2
	05-24-02	2005 07 19	0.7 - 0.9	90	< 10	***189***	73.3	< 0.5	< 0.5	51.4	11.2	47.3	< 30	< 0.005	< 4	35	< 2[a]	< 2	< 1	< 5	34.3	45.2
TP05-25	05-25-01	2005 07 19	0.1 - 0.3	70	< 10	***3,010***	150	< 0.5	< 0.5	61.6	12.6	51.5	49	< 0.005	< 4	44.5	< 2[a]	< 2	< 1	< 5	42	59.2
TP05-26	05-26-01	2005 07 19	0.1 - 0.3	40	< 10	***1,620***	206	< 0.5	< 0.5	**72.6**	9.7	46	***712***	0.0063	< 4	34	< 2[a]	< 2	< 1	< 5	51.4	61.4
	05-26-02	2005 07 19	0.4 - 0.6	35	< 10	***1,580***	207	< 0.5	< 0.5	***89.3***	20.4	47.1	< 30	< 0.005	< 4	***63.4***	< 2[a]	< 2	< 1	< 5	59.1	75.2
TP05-27	05-27-01	2005 07 19	0.1 - 0.3	55	< 10	***1,440***	152	< 0.5	< 0.5	62.8	13.2	33.5	< 30	0.0093	< 4	41.7	< 2[a]	< 2	< 1	< 5	44.2	64.8
	05-27-02	2005 07 19	1.2 - 1.3	170	< 10	***14.6***	41.4	< 0.5	< 0.5	25.3	5	14	< 30	< 0.005	< 4	13.7	< 2[a]	< 2	< 1	< 5	21.5	22.8
TP05-29	05-29-01	2005 07 19	0.1 - 0.3	500	< 10	***940***	159	< 0.5	< 0.5	**65.3**	13.7	34.2	< 30	< 0.005	< 4	43.4	< 2[a]	< 2	< 1	< 5	44.7	64.2
	05-29-03	2005 07 19	1.2 - 1.3	500	< 10	***14.7***	41	< 0.5	< 0.5	27.8	4.6	11.7	< 30	< 0.005	< 4	13.7	< 2[a]	< 2	< 1	< 5	27.3	23.8
TP05-30	05-30-01	2005 07 19	0.3 - 0.4	170	< 10	9.9	37.4	< 0.5	< 0.5	27.4	4.5	12.9	< 30	< 0.005	< 4	15.2	< 2[a]	< 2	< 1	< 5	19.9	20.9
TP05-31	05-31-01	2005 07 19	0.4 - 0.6	170	< 10	***81.3***	48	< 0.5	< 0.5	34.3	6.8	16.2	< 30	< 0.005	< 4	21.5	< 2[a]	< 2	< 1	< 5	23.8	28.8
TP05-32	05-32-01	2005 07 19	0.3 - 0.6	180	< 10	***3,700***	216	< 0.5	< 0.5	**70**	9.8	34.3	< 30	< 0.005	< 4	34.3	< 2[a]	< 2	< 1	< 5	46.7	49.3
	05-32-03	2005 07 19	1.8 - 2.0	320	< 10	***339***	71.4	< 0.5	< 0.5	42.8	8.8	20.3	< 30	< 0.005	< 4	29.5	< 2[a]	< 2	< 1	< 5	27.6	42.9
Guidelines																						
CCME CEQG Industrial Land Use (IL)					40	12	2,000	8	22	87	300	91	600	50	40	50	3.9	40	1	300	130	360
CCME CEQG Residential Land Use (RL)					20	12	500	4	10	64	50	63	140	6.6	10	50	1	20	1	50	130	200

Notes:
Associated ALS files: CC500004, R3056, R3057, R3058, R3059.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the MDL.

BOLD Concentration greater than or equal to CCME CEQG Industrial Land Use (IL) guideline.

SHADOW Concentration greater than or equal to CCME CEQG Residential Land Use (RL) guideline.

[a] Laboratory detection limit exceeds regulatory standard.
[b] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

TABLE 10 cont'd: Summary of Analytical Results for Metals in Borehole and Test Pit Soil Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Total Metals																
					Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Thallium (mg/kg)	Tin (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
TP05-34	05-34-01	2005 07 19	0.1 - 0.3	80	< 10	***1,120***	181	< 0.5	< 0.5	**82.6**	8.2	34.3	< 30	< 0.005	< 4	34.1	< 2[a]	< 2	< 1	< 5	49.9	54
	05-34-02	2005 07 19	0.6 - 0.9	95	< 10	***882***	214	< 0.5	< 0.5	**78**	23.5	40.5	92	< 0.005	< 4	***63.8***	< 2[a]	< 2	< 1	< 5	49.6	77.3
	05-34-03	2005 07 19	1.2 - 1.3	95	< 10	***29.8***	35.8	< 0.5	< 0.5	22.6	4.4	11	< 30	< 0.005	< 4	12.3	< 2[a]	< 2	< 1	< 5	19	19.9
TP05-35	05-35-01	2005 07 19	0.1 - 0.4	40	< 10	***359***	129	< 0.5	< 0.5	**80.7**	20.6	49.2	< 30	< 0.005	< 4	***58.8***	< 2[a]	< 2	< 1	< 5	47.2	76.4
TP05-36	05-36-01	2005 07 19	0.3 - 0.4	460	< 10	9	32.5	< 0.5	< 0.5	29.2	4.7	11.9	< 30	< 0.005	< 4	16.8	< 2[a]	< 2	< 1	< 5	20.6	22
TP05-37	05-37-01	2005 07 19	0.6 - 0.9	20	< 10	6.4	41.9	< 0.5	< 0.5	25.4	4.3	13.6	< 30	< 0.005	< 4	13.2	< 2[a]	< 2	< 1	< 5	22.1	22.7
TP05-38	05-38-01	2005 07 19	0.3 - 0.4	70	< 10	***12.5***	32.4	< 0.5	< 0.5	27.2	5.2	13.2	< 30	< 0.005	< 4	14.3	< 2[a]	< 2	< 1	< 5	21.1	20
TP05-39	05-39-01	2005 07 19	0.1 - 0.4	65	< 10	***1,250***	188	< 0.5	< 0.5	**71.6**	8.8	31.1	< 30	< 0.005	< 4	32.2	< 2[a]	< 2	< 1	< 5	48.3	50.6
	05-39-02	2005 07 19	1.0 - 1.2	50	< 10	***372***	**558**	< 0.5	< 0.5	***94.3***	24	49.2	< 30	< 0.005	< 4	***62.6***	< 2[a]	< 2	< 1	< 5	64.4	79.5
TP05-40	05-40-01	2005 07 19	0.1 - 0.3	40	< 10	***680***	141	< 0.5	< 0.5	**64.5**	12	27.7	< 30	< 0.005	< 4	39	< 2[a]	< 2	< 1	< 5	41.5	48.3
	05-40-02	2005 07 19	0.5 - 0.7	40	< 10	10.8	41.3	< 0.5	< 0.5	32.7	5.8	15.2	< 30	< 0.005	< 4	17.5	< 2[a]	< 2	< 1	< 5	24.5	27.1
TP05-41	05-41-01	2005 07 19	0.9 - 1.0	-	< 10	***915***	189	< 0.5	< 0.5	**76.7**	19	47.4	< 30	< 0.005	< 4	***61.4***	< 2[a]	< 2	< 1	< 5	55.8	53.9
TP05-42	05-42-01	2005 07 21	0.3 - 0.4	70	< 10	***1,150***	146	< 0.5	< 0.5	**67.8**	15.3	37.8	< 30	< 0.005	< 4	46.2	< 2[a]	< 2	< 1	< 5	45.5	57.1
	05-42-02	2005 07 21	0.7 - 0.9	70	< 10	9	34.2	< 0.5	< 0.5	24.9	4.3	13.5	< 30	< 0.005	< 4	13.7	< 2[a]	< 2	< 1	< 5	24.4	21.7
TP05-43	05-43-01	2005 07 21	0.3 - 0.4	80	< 10	***1,370***	217	< 0.5	< 0.5	**71.5**	16.7	36.8	< 30	< 0.005	< 4	49.8	< 2[a]	< 2	< 1	8.8	45.8	60.6
	05-43-02	2005 07 21	1.0 - 1.2	85	< 10	***26.2***	28.7	< 0.5	< 0.5	24.9	4.4	15.1	< 30	< 0.005	< 4	14.9	< 2[a]	< 2	< 1	< 5	18.7	22.6
TP05-44	05-44-01	2005 07 21	0.4 - 0.6	75	< 10	***17.2***	42.5	< 0.5	< 0.5	48.3	9.8	26.5	< 30	< 0.005	< 4	33.8	< 2[a]	< 2	< 1	< 5	28.3	36.5
	05-44-02	2005 07 21	0.9 - 1.0	75	< 10	7.8	32.1	< 0.5	< 0.5	27.4	5.1	18.3	< 30	0.0081	< 4	15.4	< 2[a]	< 2	< 1	< 5	25	22.4
TP05-45	05-45-01	2005 07 21	0.1 - 0.3	270	< 10	***1,150***	223	< 0.5	< 0.5	**80.3**	18.3	59.4	< 30	< 0.005	< 4	***56.8***	< 2[a]	< 2	< 1	< 5	58.6	67
	05-45-02	2005 07 21	0.6 - 0.7	340	< 10	***177***	174	< 0.5	< 0.5	**70.8**	16.7	53.7	< 30	< 0.005	< 4	***51.6***	< 2[a]	< 2	< 1	< 5	51.4	56.7
	METDUP3	2005 07 19	0.6 - 0.7	340	< 10	***302***	173	< 0.5	< 0.5	**70.6**	18.3	43.4	< 30	< 0.005	< 4	***55.7***	< 2[a]	< 2	< 1	< 5	52	61.5
	QA/QC RPD %				*	52.2	0.6	*	*	0.3	9.1	21.2	*	*	*	7.6	*	*	*	*	1.2	8.1
TP05-46	05-46-01	2005 07 21	0.3 - 0.6	220	< 10	***1,010***	112	< 0.5	< 0.5	36	5.1	36.4	< 30	0.0079	< 4	16.1	< 2[a]	< 2	< 1	< 5	23.8	36
	05-46-02	2005 07 21	0.9 - 1.0	160	< 10	***12.2***	38.7	< 0.5	< 0.5	27.5	4.7	14.1	< 30	< 0.005	< 4	14.7	< 2[a]	< 2	< 1	< 5	24.4	24.3
TP05-47	05-47-01	2005 07 21	0.7 - 0.9	120	< 10	***1,790***	115	< 0.5	< 0.5	**67.5**	16.2	62.9	< 30	< 0.005	< 4	***52.9***	< 2[a]	< 2	< 1	< 5	45.6	67.9
TP05-48	05-48-01	2005 07 21	0.1 - 0.3	140	< 10	***60.9***	44.1	< 0.5	< 0.5	27.1	5.5	14.2	< 30	< 0.005	< 4	16.5	< 2[a]	< 2	< 1	< 5	23.1	26.7
Guidelines																					
CCME CEQG Industrial Land Use (IL)					40	12	2,000	8	22	87	300	91	600	50	40	50	3.9	40	1	300	130	360
CCME CEQG Residential Land Use (RL)					20	12	500	4	10	64	50	63	140	6.6	10	50	1	20	1	50	130	200

Notes:
Associated ALS files: CC500004, R3056, R3057, R3058, R3059.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the MDL.

BOLD Concentration greater than or equal to CCME CEQG Industrial Land Use (IL) guideline.

SHADOW Concentration greater than or equal to CCME CEQG Residential Land Use (RL) guideline.

[a] Laboratory detection limit exceeds regulatory standard.
[b] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

TABLE 10 cont'd: Summary of Analytical Results for Metals in Borehole and Test Pit Soil Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Total Metals																
					Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Thallium (mg/kg)	Tin (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
TP05-49	05-49-01	2005 07 21	0.3 - 0.4	110	< 10	***4,770***	168	< 0.5	< 0.5	62.1	10.4	39.6	< 30	< 0.005	< 4	36.2	< 2[a]	< 2	< 1	< 5	45.8	47.9
	05-49-02	2005 07 21	0.7 - 0.9	110	< 10	***8,900***	50.5	< 0.5	< 0.5	30.8	8.3	44.9	< 30	< 0.005	< 4	25.7	< 2[a]	< 2	< 1	< 5	20.8	26.4
TP05-51	05-51-01	2005 07 21	0.1 - 0.3	90	< 10	8.8	38.2	< 0.5	< 0.5	28.5	4.3	15.3	< 30	0.0084	< 4	16.3	< 2[a]	< 2	< 1	< 5	24.7	22.4
TP05-52	05-52-01	2005 07 21	0.1 - 0.3	85	< 10	***1,090***	149	< 0.5	< 0.5	55.7	8.4	33.7	< 30	< 0.005	< 4	29.5	< 2[a]	< 2	< 1	< 5	41.5	44.6
TP05-54	05-54-01	2005 07 21	0.1 - 0.3	80	< 10	***1,950***	215	< 0.5	< 0.5	**73.6**	8.5	29.1	< 30	< 0.005	< 4	30.4	< 2[a]	< 2	< 1	< 5	53.7	49
	METDUP4	2005 07 19	0.1 - 0.3	80	< 10	***1,740***	204	< 0.5	< 0.5	**67.8**	7.4	26.1	< 30	< 0.005	< 4	28.6	< 2[a]	< 2	< 1	< 5	49.5	49
	QA/QC RPD %				*	11.4	5.3	*	*	8.2	13.8	10.9	*	*	*	6.1	*	*	*	*	8.1	0.0
	05-54-02	2005 07 21	0.6 - 0.7	80	< 10	***910***	130	< 0.5	< 0.5	60	7.8	35.1	< 30	< 0.005	< 4	27.9	< 2[a]	< 2	< 1	< 5	42.6	44.2
TP05-55	05-55-01	2005 07 21	0.3 - 0.6	810	< 10	< 5	38.2	< 0.5	< 0.5	28.1	4.3	13.4	< 30	< 0.005	< 4	15.8	< 2[a]	< 2	< 1	< 5	21.8	22
TP05-56	05-56-01	2005 07 21	0.1 - 0.3	65	< 10	***9,040***	109	< 0.5	< 0.5	47.1	4.7	***109***	< 30	0.0057	< 4	17.2	< 2[a]	< 2	< 1	< 5	31.6	32.8
	METDUP5	2005 07 19	0.1 - 0.3	65	< 10	***9,230***	94.8	< 0.5	< 0.5	36	5	**84.7**	< 30	0.0094	< 4	18.7	< 2[a]	2.5	< 1	< 5	27.5	31.1
	QA/QC RPD %				*	2.1	13.9	*	*	26.7	6.2	25.1	*	*	*	8.4	*	*	*	*	13.9	5.3
	05-56-02	2005 07 21	0.9 - 1.0	70	< 10	***850***	48	< 0.5	< 0.5	27.6	4.2	17.4	< 30	< 0.005	< 4	15.2	< 2[a]	< 2	< 1	< 5	22	22.7
	05-56-03	2005 07 21	1.5 - 1.7	90	< 10	***710***	199	< 0.5	< 0.5	**83.1**	16.8	55.4	< 30	< 0.005	< 4	***58.7***	< 2[a]	< 2	< 1	< 5	60.1	79.7
TP05-57	05-57-01	2005 07 21	0.1 - 0.3	70	< 10	***4,090***	193	< 0.5	< 0.5	**65.3**	9.5	42.9	< 30	< 0.005	< 4	33.1	< 2[a]	< 2	< 1	< 5	52.7	48.2
	05-57-02	2005 07 21	0.7 - 0.9	70	< 10	***2,940***	237	< 0.5	< 0.5	**74.2**	17.6	46.5	< 30	0.0141	< 4	***55.5***	< 2[a]	< 2	< 1	< 5	56.5	72.3
TP05-59	05-59-01	2005 07 21	0.1 - 0.3	65	< 10	***4,020***	173	< 0.5	< 0.5	**69.1**	10.1	34.6	< 30	< 0.005	< 4	36.9	< 2[a]	< 2	< 1	< 5	50.8	49.6
TP05-60	05-60-01	2005 07 21	0.3 - 0.6	110	< 10	***584***	73.7	< 0.5	< 0.5	42.7	34.9	24.7	< 30	< 0.005	< 4	31.1	< 2[a]	< 2	< 1	< 5	27	54.4
TP05-61	05-61-01	2005 07 21	0.3 - 0.4	110	< 10	***472***	95.6	< 0.5	< 0.5	47.8	6.1	20.5	< 30	0.0067	< 4	22.8	< 2[a]	< 2	< 1	< 5	35	35.7
TP05-77	05-77-01	2005 07 25	0.1 - 0.4	25	< 10	***3,210***	158	< 0.5	< 0.5	59.4	7.9	27.8	< 30	< 0.005	< 4	30	< 2[a]	< 2	< 1	< 5	49.3	43.7
TP05-78	05-78-01	2005 07 25	0.7 - 1.0	20	< 10	***484***	77.3	< 0.5	< 0.5	45.3	17.9	27.7	< 30	< 0.005	< 4	29.5	< 2[a]	< 2	< 1	< 5	30.7	44.4
TP05-79	05-79-01	2005 07 25	0.1 - 0.3	10	< 10	***369***	56.7	< 0.5	< 0.5	32.6	5.5	17.1	< 30	< 0.005	< 4	25.6	< 2[a]	< 2	< 1	< 5	23.3	25.6
	05-79-03	2005 07 25	1.7 - 1.8	10	< 10	***11,700***	104	< 0.5	< 0.5	35.2	7.4	46.1	**156**	< 0.005	< 4	23.9	< 2[a]	< 2	< 1	< 5	28.1	30
TP05-81	05-81-01	2005 07 25	0.3 - 0.6	10	< 10	***1,040***	103	< 0.5	< 0.5	44.3	6.5	26.4	31	0.0082	< 4	23.2	< 2[a]	< 2	< 1	< 5	31	49.5
TP05-82	05-82-01	2005 07 25	1.0 - 1.2	10	10	***1,100***	211	< 0.5	0.74	**76.2**	16.6	**76**	55	0.0263	4	***52***	< 2[a]	< 2	< 1	< 5	53	146
TP05-83	05-83-01	2005 07 25	0.5 - 0.7	10	< 10	***353***	60.1	< 0.5	< 0.5	40.5	6.2	21.9	< 30	< 0.005	< 4	20.6	< 2[a]	< 2	< 1	< 5	27.7	45.4
Guidelines																						
CCME CEQG Industrial Land Use (IL)					40	12	2,000	8	22	87	300	91	600	50	40	50	3.9	40	1	300	130	360
CCME CEQG Residential Land Use (RL)					20	12	500	4	10	64	50	63	140	6.6	10	50	1	20	1	50	130	200

Notes:
Associated ALS files: CC500004, R3056, R3057, R3058, R3059.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the MDL.

BOLD Concentration greater than or equal to CCME CEQG Industrial Land Use (IL) guideline.

SHADOW Concentration greater than or equal to CCME CEQG Residential Land Use (RL) guideline.

[a] Laboratory detection limit exceeds regulatory standard.
[b] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

TABLE 11: Summary of Analytical Results for Metals in Soil, Kinross Borehole Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Total Metals																												
				Aluminum (mg/kg)	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Bismuth (mg/kg)	Cadmium (mg/kg)	Calcium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Iron (mg/kg)	Lead (mg/kg)	Magnesium (mg/kg)	Manganese (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Phosphorus (mg/kg)	Selenium (mg/kg)	Silicon (mg/kg)	Silver (mg/kg)	Strontium (mg/kg)	Thallium (mg/kg)	Tin (mg/kg)	Titanium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
BPR #1	Surface	2004 05 25	0	21,500	2.0	***118***	300	0.29	0.6	0.16	1,830	***110***	21.0	33.3	39,600	2.7	11,900	239	< 0.01	1.6	***65.7***	311	< 0.2	412	< 0.05	9.97	< 0.3	1.4	**1,450**	68.6	56.2
	1 meter	2004 05 25	1	20,900	2.2	***772***	291	0.29	0.5	0.60	5,640	**74.3**	11.2	39.0	42,600	5.5	10,400	193	< 0.01	2.3	45.9	401	< 0.2	429	< 0.05	28.90	< 0.3	1.5	**1,430**	52.8	48.2
	2 meters	2004 05 25	2	20,600	1.7	***558***	267	0.23	0.7	0.48	7,780	**72.8**	12.0	42.6	41,700	6.2	10,300	178	< 0.01	2.5	45.6	433	< 0.2	302	< 0.05	32.70	< 0.3	1.6	**1,390**	51.6	48.7
BPR #2	Surface	2004 05 25	0	17,100	1.9	***4,320***	214	0.34	0.9	2.75	2,770	62.7	11.6	39.2	45,000	9.5	9,170	156	< 0.01	1.7	45.4	592	< 0.2	632	< 0.05	32.30	< 0.3	1.8	**1,140**	43.1	43.4
	1 meter	2004 05 25	1	15,600	2.2	***1,530***	247	0.22	1.0	1.18	2,420	59.7	10.2	31.5	4,250	4.2	7,760	151	< 0.01	3.0	35.2	462	< 0.2	588	0.07	51.90	< 0.3	1.8	**1,100**	42.2	35.4
	2 meters	2004 05 25	2	16,900	2.2	***1,140***	300	0.23	0.9	0.88	4,070	**69.5**	11.2	36.4	42,600	5.4	8,420	172	< 0.01	3.2	41.9	550	< 0.2	680	< 0.05	55.40	< 0.3	1.9	**1,220**	48.3	40.8
	3 meters	2004 05 25	3	18,000	1.9	***1,060***	269	0.28	0.5	0.82	3,330	**83.2**	11.8	53.2	41,400	5.3	9,270	178	< 0.01	5.1	***50.6***	489	< 0.2	592	< 0.05	52.10	< 0.3	1.7	**1,240**	50.8	442
BPR #3	Surface	2004 05 25	0	16,200	3.0	***21,200***	172	0.19	1.6	**13.20**	3,420	**65.4**	21.1	**66.3**	52,700	9.7	8,590	158	< 0.01	1.7	***65.6***	407	**1.0**	467	0.12	25.00	< 0.3	1.9	**1,050**	44.2	39.5
	1 meter	2004 05 25	1	18,000	1.6	***863***	252	0.21	< 0.5	0.66	2,750	**82.3**	15.2	24.3	40,100	10.1	10,200	216	< 0.01	1.8	46.3	342	< 0.2	499	< 0.05	17.20	< 0.3	2.3	**1,040**	48.2	44.6
	2 meters	2004 05 25	2	15,000	1.2	***307***	153	0.18	< 0.5	0.29	2,210	63.6	9.93	32.5	30,700	5.0	8,220	162	< 0.01	6.8	41.1	388	< 0.2	684	< 0.05	12.80	< 0.3	1.6	**891**	39.8	43.5
	3 meters	2004 05 25	3	12,200	1.1	***251***	109	0.18	< 0.5	0.24	1,890	45.4	8.90	23.6	30,000	3.8	7,200	166	< 0.01	2.6	30.8	497	< 0.2	691	< 0.05	10.80	< 0.3	1.5	**741**	33.5	35.0
	4 meters	2004 05 25	4	7,550	0.6	***73.3***	63.8	0.12	< 0.5	0.09	1,480	29.1	5.33	13.2	14,900	2.5	4,400	126	< 0.01	1.2	19.0	363	< 0.2	607	< 0.05	7.34	< 0.3	1.5	**565**	22.4	24.8
	5 meters	2004 05 25	5	7,190	0.6	***35.0***	46.9	0.13	< 0.5	0.05	2,100	28.8	5.57	32.4	15,900	1.9	4,460	124	< 0.01	1.9	18.8	417	< 0.2	619	< 0.05	7.66	< 0.3	1.5	**577**	29.1	23.6
BPR #4	Surface	2004 05 25	0	19,900	2.7	***1,150***	242	0.27	0.7	0.92	7,150	**66.3**	14.2	***108***	47,300	17.5	10,200	188	< 0.01	2.2	***51.9***	449	< 0.2	531	< 0.05	61.50	< 0.3	2.1	**1,090**	47.3	53.9
	1 meter	2004 05 25	1	12,000	1.1	***123***	134	0.12	< 0.5	0.16	1,620	47.0	7.45	17.4	28,000	4.2	6,900	182	< 0.01	1.0	26.4	460	< 0.2	613	< 0.05	8.23	< 0.3	1.6	**909**	36.3	36.6
	2 meters	2004 05 25	2	13,100	2.0	***101***	107	0.03	< 0.5	0.14	1,360	26.0	8.73	20.8	28,400	7.5	8,150	191	< 0.01	1.2	17.3	370	< 0.2	579	< 0.05	6.82	< 0.3	1.7	**1,380**	39.8	42.2
BPR #5	Surface	2004 05 25	0	11,600	1.2	***96.8***	131	0.07	< 0.5	0.14	6,010	45.1	6.51	21.4	27,500	26.1	9,310	160	< 0.01	0.6	24.4	359	< 0.2	450	< 0.05	5.70	< 0.3	1.4	**761**	31.2	34.4
	1 meter	2004 05 25	1	11,000	0.9	***131***	103	0.19	< 0.5	0.22	2,300	40.6	6.60	20.6	24,200	66	6,140	158	< 0.01	1.1	22.5	467	< 0.2	548	< 0.05	8.91	< 0.3	1.5	**703**	29.0	69.1
	2 meters	2004 05 25	2	8,120	1.0	***60.4***	68.4	0.08	< 0.5	0.17	7,500	31.5	6.32	17.5	20,500	17.6	4,640	157	< 0.01	0.9	17.9	400	< 0.2	573	< 0.05	71.20	< 0.3	1.5	**637**	24.1	90.3
	3 meters	2004 05 25	3	7,840	0.6	***12.8***	54.3	0.11	< 0.5	0.04	1,890	26.8	5.11	10.9	15,000	3.7	4,710	149	< 0.01	0.6	15.6	394	< 0.2	954	< 0.05	8.70	< 0.3	1.4	**706**	24.6	29.5
	4 meter	2004 05 25	4	7,820	0.8	***19.4***	54.8	0.11	< 0.5	0.08	1,780	28.5	5.29	10.7	15,500	3.5	4,890	148	< 0.01	0.7	16.7	391	< 0.2	898	< 0.05	8.02	< 0.3	1.6	**644**	24.8	29.2
BPR #6	Surface	2004 05 25	0	9,680	0.9	***58.4***	66.9	0.15	0.5	0.13	2,260	32.8	6.07	17.9	16,800	4.4	5,220	166	< 0.01	0.9	18.9	485	< 0.2	794	< 0.05	8.32	< 0.3	1.7	**578**	25.5	32.2
	1 meter	2004 05 25	1	7,740	0.9	***58.9***	46.1	0.11	< 0.5	0.10	1,690	27.9	4.86	18.0	13,100	3.4	4,110	143	< 0.01	1.5	18.2	402	< 0.2	644	0.07	7.24	< 0.3	1.8	**510**	20.6	30.9
	2 meters	2004 05 25	2	8,490	1.1	***20.9***	61.1	0.15	< 0.5	0.12	3,170	32.1	5.07	23.1	13,900	84	4,630	144	< 0.01	1.0	17.1	440	< 0.2	689	< 0.05	21.70	< 0.3	2.1	**658**	24.4	65.8
BPR #7	Surface	2004 05 25	0	11,100	1.2	***408***	75.9	0.27	< 0.5	0.39	1,750	39.0	5.24	25.2	21,000	13.4	5,820	132	< 0.01	1.1	21.0	318	< 0.2	599	< 0.05	14.50	< 0.3	2.0	**510**	25.0	32.8
	1 meter	2004 05 25	1	9,870	0.9	***71.1***	70.1	0.17	< 0.5	0.11	2,040	32.6	6.82	19.0	17,900	3.8	5,310	162	< 0.01	1.0	20.6	474	0.3	474	< 0.05	8.70	< 0.3	1.8	**693**	28.7	34.8
	2 meters	2004 05 25	2	18,000	1.8	***58.9***	182	0.36	0.9	0.13	2,880	45.7	6.51	22.7	40,900	4.1	7,050	187	< 0.01	1.1	24.1	750	0.4	637	0.10	16.20	< 0.3	3.4	**844**	34.2	32.9
LD #1	Surface	2004 05 25	0	9,640	0.5	***70.5***	69.6	0.24	< 0.5	0.12	1,860	42.1	7.58	35.5	18,300	4.2	5,500	150	< 0.01	1.3	26.3	452	< 0.2	402	< 0.05	7.80	< 0.3	1.5	**634**	27.2	30.5
	1 meter	2004 05 25	1	9,670	0.9	***22.0***	69.3	0.21	< 0.5	0.08	1,710	37.2	6.66	22.4	18,300	3.5	5,400	151	< 0.01	1.3	22.1	445	< 0.2	723	< 0.05	7.63	< 0.3	1.5	**676**	27.1	29.4
	2 meters	2004 05 25	2	7,210	0.6	6.5	49.1	0.11	< 0.5	0.04	1,520	26.7	5.17	9.6	12,900	2.1	4,040	121	< 0.01	0.6	15.6	415	< 0.2	410	< 0.05	6.30	< 0.3	1.4	**513**	22.2	22.6
	3 meters	2004 05 25	3	8,790	0.8	***55.4***	59.6	0.14	< 0.5	0.05	1,750	31.4	6.68	17.4	16,600	2.1	5,150	146	< 0.01	0.7	20.4	452	< 0.2	750	< 0.05	7.38	< 0.3	1.4	**612**	26.9	26.4
	4 meters	2004 05 25	4	9,220	0.6	***14.5***	39.1	0.14	< 0.5	0.06	1,560	32.9	7.25	17.8	19,100	2.5	5,440	139	< 0.01	1.1	25.0	447	< 0.2	686	< 0.05	7.02	< 0.3	1.3	**387**	22.0	27.2
LD #2	Surface	2004 05 25	0	13,700	1.7	***1,260***	140	0.16	0.5	1.03	1,590	57.0	10.6	33.3	28,600	4.4	7,850	157	< 0.01	1.6	35.2	449	< 0.2	442	0.05	13.70	< 0.3	1.4	**827**	37.1	41.3
	1 meter	2004 05 25	1	13,700	1.5	***699***	141	0.15	< 0.5	0.67	1,580	56.9	10.4	32.1	35,900	4.8	7,830	165	< 0.01	1.4	34.6	454	< 0.2	711	0.07	14.40	< 0.3	1.6	**857**	36.3	43.9
	2 meters	2004 05 25	2	9,780	1.0	***47.6***	76.6	0.12	< 0.5	0.09	1,940	36.0	7.06	15.3	20,100	3.5	5,920	157	< 0.01	1.0	24.1	498	< 0.2	793	< 0.05	10.30	< 0.3	1.6	**678**	27.2	30.7
	3 meters	2004 05 25	3	9,600	0.9	***28.2***	65.5	0.12	< 0.5	0.07	1,830	36.5	6.58	13.1	19,000	3.0	5,700	154	< 0.01	0.9	22.0	462	< 0.2	892	< 0.05	9.29	< 0.3	1.5	**695**	27.7	30.3
	4 meters	2004 05 25	4	17,200	1.6	***332***	118	0.41	0.6	0.30	1,590	56.0	13.6	8.44	31,900	2.0	10,800	238	< 0.01	1.7	45.7	530	< 0.2	610	< 0.05	7.58	< 0.3	3.1	**1,080**	39.9	41.1
LD #3	Surface	2004 05 25	0	20,400	2.1	***1,380***	216	0.24	1.4	1.62	2,900	***191***	**56.6**	***193***	45,800	48.2	10,500	277	< 0.01	**23.7**	***248.0***	538	0.3	715	0.11	23.00	< 0.3	4.0	**1,100**	50.2	133
	1 meter	2004 05 25	1	20,000	1.8	***777***	209	0.23	0.9	1.07	2,620	***148***	37.3	***118***	43,700	35.8	10,300	257	< 0.01	**14.8**	***170.0***	512	< 0.2	297	0.13	19.90	< 0.3	2.2	**1,060**	48.8	110
	3 meters	2004 05 25	3	7,200	1.0	4.6	32.3	0.10	0.5	0.09	2,070	20.7	5.10	15.6	13,000	2.7	3,910	149	< 0.01	0.9	15.2	489	< 0.2	522	< 0.05	9.09	< 0.3	2.0	**540**	21.2	29.7
Guidelines																																
CCME CEQG Industrial Land Use (IL)				40	12	2,000	8	n/a	22	n/a	87	300	91	n/a	600	n/a	n/a	50	40	50	n/a	3.9		40	n/a	1	300	130	130	360		
CCME CEQG Residential Land Use (RL)				20	12	500	4	n/a	10	n/a	64	50	63	n/a	140	n/a	n/a	6.6	10	50	n/a	1		20	n/a	1	50	130	130	200		

Notes:
Associated Northwest file: 310952
All terms defined within the body of Morrow's report.
< Denotes concentration less than indicated detection limit.
n/a Denotes no applicable standard.

BOLD Concentration greater than or equal to CCME CEQG Industrial Land Use (IL) guideline.

SHADOW Concentration greater than or equal to CCME CEQG Residential Land Use (RL) guideline.

TABLE 12: Summary of Analytical Results for Metals in Soil, Kinross Samples, September 2005

Sample Location	Sample Date yyyy mm dd	Depth Interval (m)	Physical	Total Metals																	
			pH (pH)	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Thallium (mg/kg)	Tin (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
51161	2005 09 19	0.0 - 0.1	***4.32***	< 10	***128***	61.1	< 0.5	< 0.5	35.3	6.0	17.5	< 30	< 0.005	< 4	20.9	< 2[a]	< 2	< 1	< 5	24.5	27.2
51162	2005 09 19	0.0 - 0.1	***3.89***	< 10	***443***	111	< 0.5	< 0.5	49.3	6.7	24.1	< 30	< 0.005	< 4	25.0	< 2[a]	< 2	< 1	< 5	33.3	36.4
51163	2005 09 19	0.0 - 0.1	6.30	< 10	***351***	61.4	< 0.5	< 0.5	33.9	5.8	15.1	< 30	< 0.005	< 4	24.3	< 2[a]	< 2	< 1	< 5	23.3	26.6
51164	2005 09 19	0.0 - 0.1	***5.43***	< 10	***27.2***	40.2	< 0.5	< 0.5	29.5	4.2	12.1	< 30	< 0.005	< 4	15.4	< 2[a]	< 2	< 1	< 5	22.1	21.3
51165	2005 09 19	0.0 - 0.1	***3.61***	< 10	***516***	113	< 0.5	< 0.5	62.8	9.0	23.9	< 30	< 0.005	< 4	33.0	< 2[a]	< 2	< 1	< 5	42.7	44.0
51166	2005 09 19	0.0 - 0.1	***3.62***	< 10	***426***	64.8	< 0.5	< 0.5	41.0	5.4	16.0	< 30	< 0.005	< 4	20.9	< 2[a]	< 2	< 1	< 5	27.4	29.5
51167	2005 09 19	0.0 - 0.1	***4.26***	< 10	***62.1***	39.7	< 0.5	< 0.5	31.8	5.1	12.9	< 30	< 0.005	< 4	16.4	< 2[a]	< 2	< 1	< 5	24.9	24.1
51168	2005 09 19	0.0 - 0.1	***3.93***	< 10	***144***	44.7	< 0.5	< 0.5	32.4	5.4	16.8	< 30	< 0.005	< 4	19.4	< 2[a]	< 2	< 1	< 5	25.1	25.8
51169	2005 09 19	0.0 - 0.1	***4.07***	< 10	***93.5***	42.4	< 0.5	< 0.5	29.9	3.8	12.7	< 30	< 0.005	< 4	14.2	< 2[a]	< 2	< 1	< 5	21.1	19.0
51170	2005 09 19	0.0 - 0.1	***5.57***	< 10	***18.8***	47.0	< 0.5	< 0.5	37.4	6.6	16.5	< 30	< 0.005	< 4	23.5	< 2[a]	< 2	< 1	< 5	25.9	28.2
51171	2005 09 21	0.3	***5.01***	< 10	***20.1***	37.1	< 0.5	< 0.5	25.9	5.2	13.7	< 30	0.0133	< 4	15.9	< 2[a]	< 2	< 1	< 5	25.3	23.5
51172	2005 09 21	0.3	***5.67***	< 10	***32.9***	43.1	< 0.5	< 0.5	28.6	5.7	14.9	< 30	0.0177	< 4	18.9	< 2[a]	< 2	< 1	< 5	29.1	27.2
51173	2005 09 21	0.4	***4.85***	< 10	***125***	37.6	< 0.5	< 0.5	12.7	11.7	59.6	< 30	0.1020	< 4	34.1	< 3[a]	< 2	< 1	< 5	7.6	20.0
51174	2005 09 21	0.4	***4.93***	< 10	***12.3***	33.5	< 0.5	< 0.5	34.4	5.1	14.3	< 30	0.0131	< 4	19.9	< 2[a]	< 2	< 1	< 5	20.8	18.5
51175	2005 09 21	0.4	***4.82***	< 10	10.4	24.3	< 0.5	< 0.5	18.3	3.7	11.5	< 30	0.0070	< 4	12.7	< 2[a]	< 2	< 1	< 5	19.2	18.6
51176	2005 09 21	0.4	***4.68***	< 10	***62.3***	54.6	< 0.5	< 0.5	29.7	5.9	18.7	< 30	0.0637	< 4	18.7	< 2[a]	< 2	< 1	< 5	28.6	29.9
51177	2005 09 21	0.3	***4.45***	< 10	***92.5***	45.4	< 0.5	< 0.5	22.8	5.9	15.7	< 30	0.0445	< 4	18.7	< 3[a]	< 2	< 1	< 5	24.8	24.7
51178	2005 09 21	0.4	***4.32***	< 10	***12.5***	23.3	< 0.5	< 0.5	17.6	2.8	5.0	< 30	0.0102	< 4	9.9	< 2[a]	< 2	< 1	< 5	19.2	15.0
51179	2005 09 21	0.4	***5.05***	< 10	9.4	31.2	< 0.5	< 0.5	21.0	4.0	9.4	< 30	< 0.005	< 4	12.2	< 2[a]	< 2	< 1	< 5	19.2	19.6
51180	2005 09 21	0.4	***4.13***	< 10	11.0	29.0	< 0.5	< 0.5	14.3	3.6	11.2	< 30	0.0374	< 4	11.3	< 2[a]	< 2	< 1	< 5	15.9	14.4
51181	2005 09 21	0.3	***4.59***	< 10	***152***	66.1	< 0.5	< 0.5	25.3	9.6	23.9	< 30	0.0692	< 4	26.6	< 2[a]	< 2	< 1	< 5	14.0	31.2
51182	2005 09 21	0.3	***4.86***	< 10	***179***	103	< 0.5	1.28	29.7	18.2	**77.8**	< 30	0.0613	< 4	34.9	< 2[a]	< 2	< 1	< 5	24.0	193.0
51183	2005 09 21	0.3	***5.07***	< 10	***36.8***	27.4	< 0.5	< 0.5	17.8	3.4	8.0	< 30	0.0081	< 4	10.5	< 2[a]	< 2	< 1	< 5	17.3	17.4
51184	2005 09 21	0.3	***4.48***	< 10	***36.7***	37.9	< 0.5	< 0.5	23.3	5.3	12.3	< 30	0.0147	< 4	14.3	< 2[a]	< 2	< 1	< 5	22.6	20.7
51185	2005 09 21	0.3	***4.87***	< 10	***189***	43.8	< 0.5	< 0.5	23.2	5.1	13.9	< 30	0.0193	< 4	15.0	< 2[a]	< 2	< 1	< 5	24.7	25.3
51186	2005 09 21	0.3	***5.14***	< 10	8.6	32.7	< 0.5	< 0.5	18.0	3.3	8.6	< 30	0.0076	< 4	10.5	< 2[a]	< 2	< 1	< 5	19.3	18.0
51187	2005 09 21	0.2	***5.00***	< 10	***20.8***	33.4	< 0.5	< 0.5	21.2	4.7	12.0	< 30	< 0.005	< 4	13.5	< 2[a]	< 2	< 1	< 5	22.9	18.8
51188	2005 09 21	0.3	***4.26***	< 10	***40.4***	36.0	< 0.5	< 0.5	15.5	2.8	7.1	< 30	0.0145	< 4	8.9	< 2[a]	< 2	< 1	< 5	14.8	15.2
51189	2005 09 21	0.3	***5.15***	< 10	***27.3***	25.6	< 0.5	< 0.5	21.3	6.0	19.9	< 30	0.0150	< 4	23.6	< 2[a]	< 2	< 1	< 5	19.2	27.0
51190	2005 09 21	0.3	***5.35***	< 10	10.6	21.2	< 0.5	< 0.5	14.6	3.0	10.2	< 30	< 0.005	< 4	11.7	< 2[a]	< 2	< 1	< 5	13.9	14.8
Guidelines																					
CCME CEQG Industrial Land Use		6 - 8		40	12	2,000	8	22	87	300	91	600	50	40	50	3.9	40	1	300	130	360
CCME CEQG Residential Land U		6 - 8		20	12	500	4	10	64	50	63	140	6.6	10	50	1	20	1	50	130	200

Notes:
Associated ALS files: CC500213, CC500304.
All terms defined within the body of Morrow's report.
< Denotes concentration less than indicated detection limit.

BOLD Concentration greater than or equal to CCME CEQG Industrial Land Use (IL) guideline.

SHADOW Concentration greater than or equal to CCME CEQG Residential Land Use (RL) guideline.

[a] Laboratory detection limit exceeds regulatory standard.
[b] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.

TABLE 13: Summary of Analytical Results for Polycyclic Aromatic Hydrocarbons in Soil

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Polycyclic Aromatic Hydrocarbons															
					Acenaphthene (mg/kg)	Acenaphthylene (mg/kg)	Anthracene (mg/kg)	Benzo(a)-anthracene (mg/kg)	Benzo(a)-pyrene (mg/kg)	Benzo(b)-fluoranthene (mg/kg)	Benzo(g,h,i)-perylene (mg/kg)	Benzo(k)-fluoranthene (mg/kg)	Chrysene (mg/kg)	Dibenz(a,h)-anthracene (mg/kg)	Fluoranthene (mg/kg)	Fluorene (mg/kg)	Indeno(1,2,3-cd)-pyrene (mg/kg)	Naphthalene (mg/kg)	Phenanthrene (mg/kg)	Pyrene (mg/kg)
BH05-10	05-10-01	2005 07 16	0.4 - 0.7	30	< 0.04	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
TP05-11	05-11-01	2005 07 18	0.3 - 0.6	160	< 0.04	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.37	< 0.05	< 0.05
TP05-12	05-12-01	2005 07 18	0.1 - 0.4	100	0.094	< 0.05	0.212	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.294	< 0.05	0.211	0.115	< 0.05
TP05-13	05-13-02	2005 07 18	1.2 - 1.5	70	< 0.04	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
TP05-15	05-15-02	2005 07 18	0.9 - 1.2	110	< 0.4	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	< 0.5	< 0.5	0.111
TP05-21	05-21-01	2005 07 19	0.0 - 0.1	130	< 0.04	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
TP05-23	05-23-03	2005 07 19	1.7 - 2.0	410	< 0.4	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	< 0.5	< 0.5	< 0.05
TP05-25	05-25-03	2005 07 19	1.2 - 1.3	160	< 0.04	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.1	< 0.05	< 0.05	< 0.05	< 0.05
	HCDUP1	2005 07 20	1.2 - 1.3	-	< 0.4	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	< 0.5	< 0.5	< 0.05
	QA/QC RPD %				*	*	-	*	*	*	*	*	*	*	*	-	*	-	-	*
TP05-28	05-28-03	2005 07 19	1.5 - 1.7	1,400	< 0.8	< 1	< 1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.096	< 1	< 0.05	**8.4**	< 1	0.258
	HCDUP2	2005 07 20	1.5 - 1.7	-	< 1.4	< 0.5	< 1.9	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.113	4.53	< 0.05	**10.1**	3.74	0.318
	QA/QC RPD %				*	*	-	*	*	*	*	*	*	*	16.3	-	*	18.4	-	20.8
TP05-29	05-29-03	2005 07 19	1.2 - 1.3	500	< 0.04	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
TP05-31	05-31-01	2005 07 19	0.4 - 0.6	170	< 0.04	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	05-31-02	2005 07 19	0.9 - 1.0	90	< 0.04	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	05-31-03	2005 07 19	1.2 - 1.5	190	< 0.04	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
TP05-32	05-32-03	2005 07 19	1.8 - 2.0	320	< 0.4	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	< 0.5	< 0.5	< 0.05
	HCDUP3	2005 07 20	1.8 - 2.0	-	< 0.4	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	< 0.5	< 0.5	< 0.05
	QA/QC RPD %				*	*	-	*	*	*	*	*	*	*	*	-	*	-	-	*
TP05-33	05-33-03	2005 07 19	1.7 - 1.8	530	< 0.75	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 1.9	< 0.05	**6.91**	1.36	< 0.05
TP05-36	05-36-03	2005 07 19	1.2 - 1.3	700	< 1.5	< 0.5	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	< 0.5	< 3.1	< 0.05	< 5.9[a]	1.54	< 0.5
	HCDUP4	2005 07 20	1.2 - 1.3	-	< 0.9	< 0.5	< 1.7	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	4.13	< 0.05	**3.94**	1.81	< 0.05
	QA/QC RPD %				*	*	-	*	*	*	*	*	*	*	*	-	*	-	16.1	*
TP05-38	05-38-02	2005 07 19	1.0 - 1.2	120	< 0.04	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
TP05-43	05-43-02	2005 07 21	1.0 - 1.2	85	< 0.04	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
TP05-45	05-45-02	2005 07 21	0.6 - 0.7	340	< 0.4	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	< 0.5	< 0.5	< 0.05
	HCDUP5	2005 07 20	0.6 - 0.7	-	< 0.4	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	< 0.5	< 0.5	< 0.05
	QA/QC RPD %				*	*	-	*	*	*	*	*	*	*	*	-	*	-	-	*
TP05-46	05-46-01	2005 07 21	0.3 - 0.6	220	< 0.04	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
TP05-47	05-47-01	2005 07 21	0.7 - 0.9	120	< 0.04	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
TP05-53	05-53-01	2005 07 21	0.1 - 0.3	460	< 0.4	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	< 0.5	< 0.5	< 0.05
	HCDUP6	2005 07 20	0.1 - 0.3	-	< 0.4	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	< 0.5	< 0.5	< 0.05
	QA/QC RPD %				*	*	-	*	*	*	*	*	*	*	*	-	-	-	-	*
TP05-55	05-55-02	2005 07 21	1.0 - 1.3	560	< 0.4	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.056	< 0.86	< 0.05	< 0.81[a]	0.84	< 0.05
	HCDUP7	2005 07 20	1.0 - 1.3	-	< 0.4	< 0.5	< 0.6	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06	1.03	< 0.05	< 0.8[a]	1.03	0.052
	QA/QC RPD %				*	*	-	*	*	*	*	*	*	*	6.9	-	*	-	20.3	*
TP05-56	05-56-03	2005 07 21	1.5 - 1.7	90	< 0.04	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
TP05-58	05-58-01	2005 07 21	0.4 - 0.6	310	< 0.4	< 0.5	< 0.5	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.5	< 0.05	< 0.5	< 0.5	< 0.05
TP05-60	05-60-01	2005 07 21	0.3 - 0.6	110	< 0.04	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.061	< 0.05	< 0.05
Guidelines																				
CCME CEQG Industrial Land Use (IL)					n/a	n/a	n/a	10	0.7	10	n/a	10	n/a	10	n/a	n/a	10	22	50	100
CCME CEQG Residential Land Use (RL)					n/a	n/a	n/a	1	0.7	1	n/a	1	n/a	1	n/a	n/a	1	0.6	5	10

Notes:
Associated ALS files: CC500004, R3057, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.

BOLD Concentration greater than or equal to CCME CEQG Industrial Land Use (IL) guideline.

SHADOW Concentration greater than or equal to CCME CEQG Residential Land Use (RL) guideline.

[a] Laboratory detection limit exceeds regulatory standard.

TABLE 14: Summary of Analytical Results for Physical Parameters in Borehole and Test Pit Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Physical Parameters				
					pH (pH)	Paste pH (pH)	Moisture (%)	Sulphate mg/kg	Sulphide mg/kg
BH05-01	05-01-01	2005 07 16	1.1 - 1.4	-	12.5	-	-	-	< 3.3
BH05-02	05-02-01	2005 07 16	1.0 - 1.3	-	10.6	-	1.65	-	< 0.2
	05-02-02	2005 07 16	2.3 - 2.6	-	8.67	-	< 0.1	-	< 0.33
BH05-03	05-03-01	2005 07 16	0.7 - 1.0	-	12.0	-	2.26	-	< 0.21
	05-03-02	2005 07 16	1.7 - 2.0	-	10.6	-	0.17	-	0.72
BH05-04	05-04-01	2005 07 16	0.7 - 1.0	-	12.5	-	-	-	< 0.51
BH05-05	05-05-01	2005 07 16	0.7 - 0.9	-	12.5	-	-	-	1
	05-05-02	2005 07 16	1.8 - 2.0	-	10.6	-	-	-	< 0.2
	METDUP1	2005 07 19	1.8 - 2.0	-	10.9	-	-	-	< 0.21
	QA/QC RPD %				2.8	-	-	-	*
BH05-10	05-10-01	2005 07 16	0.4 - 0.7	30	8.06	-	4.95	-	< 5
TP05-11	05-11-01	2005 07 18	0.3 - 0.6	160	8.14	7.61	4.88	-	< 1
	05-11-02	2005 07 18	1.0 - 1.3	35	7.75	5.73	5.47	-	1.2
TP05-12	05-12-01	2005 07 18	0.1 - 0.4	100	7.81	7.08	8.25	-	1.37
	05-12-02	2005 07 18	0.9 - 1.2	50	5.61	-	10.4	-	-
TP05-13	05-13-01	2005 07 18	0.3 - 0.6	60	6.72	-	9.93	-	-
	05-13-02	2005 07 18	1.2 - 1.5	70	7.14	-	7.84	-	-
TP05-14	05-14-01	2005 07 18	0.3 - 0.6	620	7.53	7.33	7.74	-	< 1
	05-14-02	2005 07 18	1.0 - 1.3	420	7.79	7.21	8.46	-	1.2
TP05-15	05-15-01	2005 07 18	0.3 - 0.6	50	3.47	3.47	6.77	-	21.9
	05-15-02	2005 07 18	0.9 - 1.2	110	7.63	7.47	10.3	-	< 3.3
TP05-16	05-16-01	2005 07 18	0.1 - 0.4	25	8.09	7.56	5.42	-	1.3
	05-16-02	2005 07 18	1.0 - 1.3	40	8.53	7.62	6.02	-	0.68
Guidelines									
Metal Leaching and Acid Rock Drainage at Mine Sites					n/a	< 5.5	n/a	n/a	> 0.3% (>3000 mg/kg)

Notes:
Associated ALS files: CC500004, R3056, R3057, R3058, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the MDL.

BOLD Materials with a sulphide-S content greater than or equal to 0.3% and a subsoil pH less than 5.5 require no further ARD testing in accordance with the Guideline for Metal Leaching and Acid Rock Drainage at Mine Sites in British Columbia, August 1998.

TABLE 14 cont'd: Summary of Analytical Results for Physical Parameters in Borehole and Test Pit Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Physical Parameters				
					pH (pH)	Paste pH (pH)	Moisture (%)	Sulphate mg/kg	Sulphide mg/kg
TP05-17	05-17-01	2005 07 18	0.1 - 0.4	75	9.36	7.84	8.19	-	< 1
	METDUP2	2005 07 19	0.1 - 0.4	-	11.4	7.25	-	-	0.29
	QA/QC RPD %				19.7	7.8	-	-	*
	05-17-02	2005 07 18	1.0 - 1.2	30	7.75	7.25	10.5	-	< 1
TP05-18	05-18-01	2005 07 18	0.1 - 0.4	60	8.38	7.74	6.66	-	1.2
	05-18-02	2005 07 18	0.9 - 1.0	60	7.61	-	9.8	-	-
TP05-19	05-19-01	2005 07 19	0.1 - 0.3	60	3.82	3.82	3.64	-	< 5
	05-19-02	2005 07 19	1.0 - 1.3	65	7.59	6.14	5.14	-	< 5
TP05-20	05-20-01	2005 07 19	0.3 - 0.4	40	3.89	-	-	-	-
	05-20-02	2005 07 19	1.0 - 1.3	75	5.58	-	-	-	-
TP05-21	05-21-01	2005 07 19	0.0 - 0.1	130	6	3.83	9.43	-	-
	05-21-02	2005 07 19	0.6 - 0.7	-	7.73	7.54	6.25	-	< 5
TP05-22	05-22-01	2005 07 19	0.3 - 0.4	40	7.59	6.94	0.14	-	< 5
	05-22-02	2005 07 19	1.0 - 1.3	70	7.7	7.25	15.4	-	2.2
TP05-23	05-23-01	2005 07 19	0.3 - 0.4	40	8.04	6.41	6.21	-	< 5
	05-23-02	2005 07 19	1.0 - 1.3	360	-	-	4.86	-	-
	05-23-03	2005 07 19	1.7 - 2.0	410	7.15	7.32	12.8	-	< 1
TP05-24	05-24-01	2005 07 19	0.1 - 0.4	90	4.05	3.75	6.24	-	< 5
	05-24-02	2005 07 19	0.7 - 0.9	90	7.99	7.73	5.09	-	< 0.2
TP05-25	05-25-01	2005 07 19	0.1 - 0.3	70	7.91	7.4	7.69	-	< 5
	05-25-02	2005 07 19	0.6 - 0.7	75	-	-	3.58	-	-
	05-25-03	2005 07 19	1.2 - 1.3	160	-	-	7.3	-	-
	HCDUP1	2005 07 20	1.2 - 1.3	-	-	-	7.8	-	-
	QA/QC RPD %				-	-	-	-	-
Guidelines									
Metal Leaching and Acid Rock Drainage at Mine Sites					n/a	< 5.5	n/a	n/a	> 0.3% (>3000 mg/kg)

Notes:
Associated ALS files: CC500004, R3056, R3057, R3058, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the MDL.

BOLD Materials with a sulphide-S content greater than or equal to 0.3% and a subsoil pH less than 5.5 require no further ARD testing in accordance with the Guideline for Metal Leaching and Acid Rock Drainage at Mine Sites in British Columbia, August 1998.

TABLE 14 cont'd: Summary of Analytical Results for Physical Parameters in Borehole and Test Pit Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Physical Parameters				
					pH (pH)	Paste pH (pH)	Moisture (%)	Sulphate mg/kg	Sulphide mg/kg
TP05-26	05-26-01	2005 07 19	0.1 - 0.3	40	4.26	3.83	9.43	530	4.3
	05-26-02	2005 07 19	0.4 - 0.6	35	7.94	7.16	5.14	-	< 1
	05-26-03	2005 07 19	1.2 - 1.3	40	-	-	8.24	-	-
TP05-27	05-27-01	2005 07 19	0.1 - 0.3	55	7.42	6.97	5.65	-	1.1
	05-27-02	2005 07 19	1.2 - 1.3	170	5.75	6.45	8.43	-	< 2
TP05-28	05-28-01	2005 07 19	0.3 - 0.4	650	-	-	6.9	-	-
	05-28-02	2005 07 19	1.0 - 1.2	980	-	-	13.1	-	-
	05-28-03	2005 07 19	1.5 - 1.7	1,400	-	-	8.36	-	-
	HCDUP2	2005 07 20	1.5 - 1.7	-	-	-	8.6	-	-
	QA/QC RPD %				-	-	-	-	-
TP05-29	05-29-01	2005 07 19	0.1 - 0.3	500	8.04	7.48	4.45	-	< 2
	05-29-02	2005 07 19	0.7 - 0.9	600	-	-	9.93	-	-
	05-29-03	2005 07 19	1.2 - 1.3	500	5.9	-	10.2	-	-
TP05-30	05-30-01	2005 07 19	0.3 - 0.4	170	5.61	-	4.58	-	-
	05-30-02	2005 07 19	1.0 - 1.2	190	-	-	7.49	-	-
TP05-31	05-31-01	2005 07 19	0.4 - 0.6	170	7.55	-	13.2	-	-
	05-31-02	2005 07 19	0.9 - 1.0	90	-	-	7.64	-	-
	05-31-03	2005 07 19	1.2 - 1.5	190	-	-	7.56	-	-
TP05-32	05-32-01	2005 07 19	0.3 - 0.6	180	3.35	3.29	6.07	-	< 2
	05-32-02	2005 07 19	1.0 - 1.2	170	-	-	2.51	-	-
	05-32-03	2005 07 19	1.8 - 2.0	320	6.92	6.85	6.76	-	< 2
	HCDUP3	2005 07 20	1.8 - 2.0	-	-	-	7.41	-	-
	QA/QC RPD %				-	*	-	-	-
Guidelines									
Metal Leaching and Acid Rock Drainage at Mine Sites					n/a	< 5.5	n/a	n/a	> 0.3% (>3000 mg/kg)

Notes:
Associated ALS files: CC500004, R3056, R3057, R3058, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the MDL.

BOLD Materials with a sulphide-S content greater than or equal to 0.3% and a subsoil pH less than 5.5 require no further ARD testing in accordance with the Guideline for Metal Leaching and Acid Rock Drainage at Mine Sites in British Columbia, August 1998.

TABLE 14 cont'd: Summary of Analytical Results for Physical Parameters in Borehole and Test Pit Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Physical Parameters				
					pH (pH)	Paste pH (pH)	Moisture (%)	Sulphate mg/kg	Sulphide mg/kg
TP05-33	05-33-01	2005 07 19	0.4 - 0.7	250	-	-	5.22	-	-
	05-33-02	2005 07 19	1.2 - 1.5	1,250	-	-	7.47	-	-
	05-33-03	2005 07 19	1.7 - 1.8	530	-	-	9.48	-	-
TP05-34	05-34-01	2005 07 19	0.1 - 0.3	80	3.31	-	6.33	-	< 5
	05-34-02	2005 07 19	0.6 - 0.9	95	6.66	3.26	6.26	-	< 2
	05-34-03	2005 07 19	1.2 - 1.3	95	5.01	5.44	-	-	-
TP05-35	05-35-01	2005 07 19	0.1 - 0.4	40	8.27	7.42	5.55	-	0.76
	05-35-02	2005 07 19	0.7 - 1.0	40	-	-	2.52	-	-
	05-35-03	2005 07 19	1.2 - 1.5	100	-	-	11.6	-	-
TP05-36	05-36-01	2005 07 19	0.3 - 0.4	460	6.13	-	2.93	-	-
	05-36-02	2005 07 19	0.7 - 0.9	440	-	-	12.6	-	-
	05-36-03	2005 07 19	1.2 - 1.3	700	-	-	9.99	-	-
	HCDUP4	2005 07 20	1.2 - 1.3	-	-	-	9.86	-	-
	QA/QC RPD %				-	-	1.3	-	-
TP05-37	05-37-01	2005 07 19	0.6 - 0.9	20	5.37	-	8.95	-	-
TP05-38	05-38-01	2005 07 19	0.3 - 0.4	70	5.84	-	6.06	-	-
	05-38-02	2005 07 19	1.0 - 1.2	120	-	-	3.19	-	-
TP05-39	05-39-01	2005 07 19	0.1 - 0.4	65	3.36	-	4.88	-	< 5
	05-39-02	2005 07 19	1.0 - 1.2	50	7.79	-	5.09	-	0.71
TP05-40	05-40-01	2005 07 19	0.1 - 0.3	40	5.93	-	3.84	-	< 2
	05-40-02	2005 07 19	0.5 - 0.7	40	7.04	-	3.03	-	-
	05-40-03	2005 07 19	0.9 - 1.2	25	-	-	10.7	-	-
TP05-41	05-41-01	2005 07 19	0.9 - 1.0	-	7.8	-	< 0.1	-	< 2
Guidelines									
Metal Leaching and Acid Rock Drainage at Mine Sites					n/a	< 5.5	n/a	n/a	> 0.3% (>3000 mg/kg)

Notes:
Associated ALS files: CC500004, R3056, R3057, R3058, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the MDL.

BOLD Materials with a sulphide-S content greater than or equal to 0.3% and a subsoil pH less than 5.5 require no further ARD testing in accordance with the Guideline for Metal Leaching and Acid Rock Drainage at Mine Sites in British Columbia, August 1998.

TABLE 14 cont'd: Summary of Analytical Results for Physical Parameters in Borehole and Test Pit Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Physical Parameters				
					pH (pH)	Paste pH (pH)	Moisture (%)	Sulphate mg/kg	Sulphide mg/kg
TP05-42	05-42-01	2005 07 21	0.3 - 0.4	70	5.93	-	7.95	-	< 5
	05-42-02	2005 07 21	0.7 - 0.9	70	4.81	-	5.36	-	-
TP05-43	05-43-01	2005 07 21	0.3 - 0.4	80	4.75	6.66	6.52	348	2.9
	05-43-02	2005 07 21	1.0 - 1.2	85	5.61	-	10.1	-	-
TP05-44	05-44-01	2005 07 21	0.4 - 0.6	75	6.6	-	9.08	-	-
	05-44-02	2005 07 21	0.9 - 1.0	75	5.75	-	10.2	-	-
TP05-45	05-45-01	2005 07 21	0.1 - 0.3	270	7.97	7.79	4.98	-	0.94
	05-45-02	2005 07 21	0.6 - 0.7	340	8.11	7.17	3.1	-	< 0.5
	METDUP3	2005 07 19	0.6 - 0.7	340	8.32	-	-	-	0.89
	QA/QC RPD %				2.6	*	-	-	*
	HCDUP5	2005 07 20	0.6 - 0.7	-	-	-	3.52	-	-
	QA/QC RPD %				-	-	12.7	-	-
TP05-46	05-46-01	2005 07 21	0.3 - 0.6	220	3.97	6.66	6.52	-	< 10
	05-46-02	2005 07 21	0.9 - 1.0	160	5.04	6.39	8.52	-	1.3
TP05-47	05-47-01	2005 07 21	0.7 - 0.9	120	7.14	5.73	7.99	-	< 2
TP05-48	05-48-01	2005 07 21	0.1 - 0.3	140	6.61	6.32	5.78	-	< 5
TP05-49	05-49-01	2005 07 21	0.3 - 0.4	110	4.90	4.66	7.52	-	< 10
	05-49-02	2005 07 21	0.7 - 0.9	110	7.28	4.66	7.52	821	4.3
TP05-50	05-50-01	2005 07 21	0.4 - 0.7	100	-	-	14.6	-	-
TP05-51	05-51-01	2005 07 21	0.1 - 0.3	90	4.58	5.38	7.92	-	< 10
TP05-52	05-52-01	2005 07 21	0.1 - 0.3	85	3.18	3.41	< 0.1	-	< 5
TP05-53	05-53-01	2005 07 21	0.1 - 0.3	460	-	-	6.46	-	-
	HCDUP6	2005 07 20	0.1 - 0.3	-	-	-	5.66	-	-
	QA/QC RPD %				-	-	13.2	-	-
Guidelines									
Metal Leaching and Acid Rock Drainage at Mine Sites					n/a	< 5.5	n/a	n/a	> 0.3% (>3000 mg/kg)

Notes:
Associated ALS files: CC500004, R3056, R3057, R3058, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the MDL.

BOLD Materials with a sulphide-S content greater than or equal to 0.3% and a subsoil pH less than 5.5 require no further ARD testing in accordance with the Guideline for Metal Leaching and Acid Rock Drainage at Mine Sites in British Columbia, August 1998.

TABLE 14 cont'd: Summary of Analytical Results for Physical Parameters in Borehole and Test Pit Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Physical Parameters				
					pH (pH)	Paste pH (pH)	Moisture (%)	Sulphate mg/kg	Sulphide mg/kg
TP05-54	05-54-01	2005 07 21	0.1 - 0.3	80	2.71	3.15	0.12	-	***10***
	METDUP4	2005 07 19	0.1 - 0.3	80	3.6	-	-	-	***5.4***
	QA/QC RPD %				28.2	*	-	-	*
	05-54-02	2005 07 21	0.6 - 0.7	80	3.05	3.16	< 0.1	-	< 10
TP05-55	05-55-01	2005 07 21	0.3 - 0.6	810	6.26	-	4.47	-	-
	05-55-02	2005 07 21	1.0 - 1.3	560	-	-	9.64	-	-
	HCDUP7	2005 07 20	1.0 - 1.3	-	-	-	12.9	-	-
	QA/QC RPD %				-	-	97.1	-	-
TP05-56	05-56-01	2005 07 21	0.1 - 0.3	65	2.7	2.53	0.38	-	< 10
	METDUP5	2005 07 19	0.1 - 0.3	65	3.56	-	-	-	***3.1***
	QA/QC RPD %				27.5	*	-	-	*
	05-56-02	2005 07 21	0.9 - 1.0	70	3.16	2.95	7.52	-	< 2
	05-56-03	2005 07 21	1.5 - 1.7	90	4.5	4.38	6.09	-	***0.54***
TP05-57	05-57-01	2005 07 21	0.1 - 0.3	70	2.7	3.2	0.18	-	< 2
	05-57-02	2005 07 21	0.7 - 0.9	70	5.09	3.33	0.11	-	***2***
TP05-58	05-58-01	2005 07 21	0.4 - 0.6	310	-	-	3.04	-	-
	HCDUP8	2005 07 20	0.4 - 0.6	-	-	-	3.78	-	-
	QA/QC RPD %				-	-	21.7	-	-
TP05-59	05-59-01	2005 07 21	0.1 - 0.3	65	3.11	3.4	6.84	-	< 2
TP05-60	05-60-01	2005 07 21	0.3 - 0.6	110	7.52	-	5	-	< 2
TP05-61	05-61-01	2005 07 21	0.3 - 0.4	110	3.9	4.23	6.23	-	< 2
TP05-77	05-77-01	2005 07 25	0.1 - 0.4	25	3.36	-	-	-	-
	05-77-02	2005 07 25	0.7 - 1.0	750	-	-	9.94	-	-
Guidelines									
Metal Leaching and Acid Rock Drainage at Mine Sites					n/a	< 5.5	n/a	n/a	> 0.3% (>3000 mg/kg)

Notes:
Associated ALS files: CC500004, R3056, R3057, R3058, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the MDL.

BOLD Materials with a sulphide-S content greater than or equal to 0.3% and a subsoil pH less than 5.5 require no further ARD testing in accordance with the Guideline for Metal Leaching and Acid Rock Drainage at Mine Sites in British Columbia, August 1998.

TABLE 14 cont'd: Summary of Analytical Results for Physical Parameters in Borehole and Test Pit Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Physical Parameters				
					pH (pH)	Paste pH (pH)	Moisture (%)	Sulphate mg/kg	Sulphide mg/kg
TP05-78	05-78-01	2005 07 25	0.7 - 1.0	20	4	-	-	-	-
	05-78-02	2005 07 25	1.3 - 1.5	15	-	-	6.33	-	-
TP05-79	05-79-01	2005 07 25	0.1 - 0.3	10	5.33	-	-	-	-
	05-79-02	2005 07 25	1.0 - 1.3	10	-	-	12.7	-	-
	05-79-03	2005 07 25	1.7 - 1.8	10	8.21	-	-	-	-
TP05-80	05-80-02	2005 07 25	1.0 - 1.2	1,050	-	-	12.2	-	-
TP05-81	05-81-01	2005 07 25	0.3 - 0.6	10	4.05	-	-	-	-
	05-81-02	2005 07 25	0.7 - 0.9	10	-	-	6.1	-	-
TP05-82	05-82-01	2005 07 25	1.0 - 1.2	10	7.66	-	7.54	-	-
TP05-83	05-83-01	2005 07 25	0.5 - 0.7	10	7.06	-	6.6	-	-
TP05-84	05-84-02	2005 07 25	1.5 - 1.7	90	-	-	9.76	-	-
Guidelines									
Metal Leaching and Acid Rock Drainage at Mine Sites					n/a	< 5.5	n/a	n/a	> 0.3% (>3000 mg/kg)

Notes:
Associated ALS files: CC500004, R3056, R3057, R3058, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the MDL.

BOLD	Materials with a sulphide-S content greater than or equal to 0.3% and a subsoil pH less than 5.5 require no further ARD testing in accordance with the Guideline for Metal Leaching and Acid Rock Drainage at Mine Sites in British Columbia, August 1998.

TABLE 15: Summary of Analytical Results for Glycols in Soil

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Glycols			
					Diethylene glycol (mg/kg)	Ethylene glycol (mg/kg)	Propylene glycol (mg/kg)	Triethylene glycol (mg/kg)
BH05-10	05-10-01	2005 07 16	0.4 - 0.7	30	< 10	< 10	< 10	< 10
TP05-11	05-11-02	2005 07 18	1.0 - 1.3	35	< 10	< 10	< 10	< 10
TP05-14	05-14-02	2005 07 18	1.0 - 1.3	420	< 10	< 10	< 10	< 10
TP05-21	05-21-02	2005 07 19	0.6 - 0.7	-	< 10	< 10	< 10	< 10
TP05-23	05-23-03	2005 07 19	1.7 - 2.0	410	< 10	< 10	< 10	< 10
TP05-25	05-25-03	2005 07 19	1.2 - 1.3	160	< 10	< 10	< 10	< 10
	HCDUP1	2005 07 20	1.2 - 1.3	-	< 10	< 10	< 10	-
	QA/QC RPD %				*	*	*	-
TP05-30	05-30-02	2005 07 19	1.0 - 1.2	190	< 10	< 10	< 10	< 10
TP05-32	05-32-01	2005 07 19	0.3 - 0.6	180	< 10	< 10	< 10	< 10
	05-32-03	2005 07 19	1.8 - 2.0	320	< 10	< 10	< 10	< 10
	HCDUP3	2005 07 20	1.8 - 2.0	-	< 10	11	< 10	-
	QA/QC RPD %				*	*	*	-
TP05-33	05-33-03	2005 07 19	1.7 - 1.8	530	< 10	< 10	< 10	< 10
TP05-38	05-38-02	2005 07 19	1.0 - 1.2	120	< 10	< 10	< 10	< 10
TP05-43	05-43-02	2005 07 21	1.0 - 1.2	85	< 10	< 10	< 10	< 10
TP05-45	05-45-02	2005 07 21	0.6 - 0.7	340	< 10	< 10	< 10	< 10
	HCDUP5	2005 07 20	0.6 - 0.7	-	< 10	< 10	< 10	-
	QA/QC RPD %				*	*	*	-
TP05-46	05-46-02	2005 07 21	0.9 - 1.0	160	< 10	< 10	< 10	< 10
TP05-47	05-47-01	2005 07 21	0.7 - 0.9	120	< 10	< 10	< 10	< 10
TP05-60	05-60-01	2005 07 21	0.3 - 0.6	110	< 10	< 10	< 10	< 10
Guidelines								
CCME CEQG Industrial Land Use (IL)					n/a	960	n/a	n/a
CCME CEQG Residential Land Use (RL)					n/a	960	n/a	n/a

Notes:
Associated ALS files: CC500004, R3057, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the MDL.

BOLD Concentration greater than or equal to CCME CEQG Industrial Land Use (IL) guideline.

SHADOW Concentration greater than or equal to CCME CEQG Residential Land Use (RL) guideline.

TABLE 16: Summary of Analytical Results for Soil Salinity and Inorganics in Soil

Sample Location	Sample ID	Sample Date yyyy mm dd	Depth Interval (m)	Field Screen (ppm)	Inorganics	Soil Salinity			
					Total Cyanide (mg/kg)	% Saturation (%)	Sodium Adsorption (None)	Conductivity (uS/cm)	Saturated Paste Chloride (mg/kg)
BH05-02	05-02-01	2005 07 16	1.0 - 1.3	-	< 3	-	-	-	-
	05-02-02	2005 07 16	2.3 - 2.6	-	< 3	-	-	-	-
BH05-03	05-03-01	2005 07 16	0.7 - 1.0	-	< 3	-	-	-	-
	05-03-02	2005 07 16	1.7 - 2.0	-	***21.9***	-	-	-	-
TP05-11	05-11-02	2005 07 18	1.0 - 1.3	35	< 3	-	-	-	-
TP05-12	05-12-02	2005 07 18	0.9 - 1.2	50	< 3	-	-	-	-
TP05-13	05-13-02	2005 07 18	1.2 - 1.5	70	< 3	-	-	-	-
TP05-14	05-14-02	2005 07 18	1.0 - 1.3	420	< 3	-	-	-	-
TP05-16	05-16-01	2005 07 18	0.1 - 0.4	25	< 3	-	-	-	-
	05-16-02	2005 07 18	1.0 - 1.3	40	< 3	-	-	-	-
TP05-23	05-23-03	2005 07 19	1.7 - 2.0	410	< 3	-	-	-	-
TP05-25	05-25-03	2005 07 19	1.2 - 1.3	160	< 3	-	-	-	-
	HCDUP1	2005 07 20	1.2 - 1.3	-	< 3	-	-	-	-
	QA/QC RPD %				*	-	-	-	-
TP05-26	05-26-03	2005 07 19	1.2 - 1.3	40	< 3	-	-	-	-
TP05-30	05-30-02	2005 07 19	1.0 - 1.2	190	< 3	-	-	-	-
TP05-33	05-33-03	2005 07 19	1.7 - 1.8	530	< 3	-	-	-	-
TP05-41	05-41-01	2005 07 19	0.9 - 1.0	-	-	99.6	1.25	-0.784	57.8
TP05-47	05-47-01	2005 07 21	0.7 - 0.9	120	< 3	-	-	-	-
TP05-60	05-60-01	2005 07 21	0.3 - 0.6	110	< 3	100	0.46	-1.27	36.4
Guidelines									
CCME CEQG Industrial Land Use (IL)					8	n/a	12	n/a	n/a
CCME CEQG Residential Land Use (RL)					0.9	n/a	5	n/a	n/a

Notes:
Associated ALS files: CC500004, R3056, R3057, R3058, R3059, R3064.
All terms defined within the body of Morrow's report.
ppm - parts per million
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the MDL.

BOLD Concentration greater than or equal to CCME CEQG Industrial Land Use (IL) guideline.

SHADOW Concentration greater than or equal to CCME CEQG Residential Land Use (RL) guideline.

TABLE 17: Summary of Field Measurement Results for Physical Parameters in Surface Water Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Physical Parameters		
			pH (field) (pH)	Conductivity (field) (µS/cm)	Temperature (field) (°C)
CREEK	CREEK	2005 07 23	5.8	24.4	6.4
SEEP1	SEEP1	2005 07 23	7.75	1,709	3.2
SEEP2	SEEP2	2005 07 23	7.93	1,460	6.1
SEEP3	SEEP3	2005 07 23	7.73	1,973	6.0
SEEP5	SEEP5	2005 07 23	3.59	582	5.3
SEEP6	SEEP6	2005 07 23	4	633	7.3
SEEP8	SEEP8	2005 07 23	7.1	1,116	5.8
SEEP9	SEEP9	2005 07 23	5.93	3,610	6.0
SEEP10	SEEP10	2005 07 23	6.5	678	5.4
SEEP12	SEEP12	2005 07 23	6.5	813	3.8
SEEP13	SEEP13	2005 07 23	3.6	1,957	2.6

Notes:
All terms defined within the body of Morrow's report.

TABLE 18: Summary of Field Measurement Results for Physical Parameters in Groundwater Samples

Sample Location	Sample ID	Sample Date yyyy mm dd	Physical Parameters		
			pH (field) (pH)	Conductivity (field) (µS/cm)	Temperature (field) (°C)
MW05-01	MW05-01	2005 07 22	6.9	950	4.2
MW05-02	MW05-02	2005 07 22	7.6	1,722	11.5
MW05-03	MW05-03	2005 07 22	6.7	1,166	12.5
MW05-05	MW05-05	2005 07 22	7	996	13.5
MW05-07	MW05-07	2005 07 24	6.5	1,898	2.1
MW05-09	MW05-09	2005 07 23	6.5	19,470	4.0
MW05-10	MW05-10	2005 07 22	6.8	1,645	14.0
MW05-11	MW05-11	2005 07 22	6.9	1,992	2.2
MW05-13	MW05-13	2005 07 23	6.8	11,560	1.6
MW05-16	MW05-16	2005 07 23	7.1	2,600	2.1
MW05-21	MW05-21	2005 07 23	6.8	1,429	4.0
MW05-28	MW05-28	2005 07 23	5.6	257	3.7
MW05-43	MW05-43	2005 07 24	6.4	1,418	1.2
MW05-55	MW05-55	2005 07 23	6	417	2.6
MW05-60	MW05-60	2005 07 23	5.5	3,170	5.2
SUMP	SUMP	2005 07 24	6.18	830	15.8

Notes:
All terms defined within the body of Morrow's report.

TABLE 19: Summary of Analytical Results for Hydrocarbons in Surface Water

Sample Location	Sample ID	Sample Date yyyy mm dd	Monocyclic Aromatic Hydrocarbons				Petroleum Hydrocarbon Fractions		
			Benzene (mg/L)	Toluene (mg/L)	Ethyl-benzene (mg/L)	Xylenes (mg/L)	F1-BTEX[b] (C_6-C_{10}) (mg/L)	F1 (C_6-C_{10}) (mg/L)	F2 (>C_{10}-C_{16}) (mg/L)
SEEP1	SEEP1	2005 07 23	< 0.0005	< 0.001	< 0.0005	< 0.00071	< 0.1	< 0.1	< 0.3
SEEP2	SEEP2	2005 07 23	< 0.0005	< 0.001	< 0.0005	< 0.00071	< 0.1	< 0.1	< 0.3
SEEP3	SEEP3	2005 07 23	< 0.0005	< 0.001	< 0.0005	< 0.00071	< 0.1	< 0.1	***0.8***
SEEP5	SEEP5	2005 07 23	< 0.0005	< 0.001	< 0.0005	< 0.00071	< 0.1	< 0.1	< 0.3
SEEP8	SEEP8	2005 07 23	< 0.0005	< 0.001	< 0.0005	< 0.00071	< 0.1	< 0.1	0.3
SEEP9	SEEP9	2005 07 23	< 0.0005	< 0.001	< 0.0005	< 0.00071	< 0.1	< 0.1	0.36
SEEP10	SEEP10	2005 07 24	< 0.0005	< 0.001	< 0.0005	< 0.00071	< 0.1	< 0.1	< 0.3
SEEP12	SEEP12	2005 07 24	< 0.0005	***0.0178***	0.0328	0.521	1.07	***1.64***	***4.43***
	WDup3	2005 07 24	< 0.0005	***0.018***	0.0328	0.522	1.09	***1.66***	***3.53***
	QA/QC RPD %		*	1.1	0	0.2	1.9	1.2	22.6
SEEP13	SEEP13	2005 07 24	< 0.0005	< 0.001	< 0.0005	0.00122	< 0.1	< 0.1	***0.62***
Guidelines									
CCME CEQG Aquatic Life (AW)[a]			0.37	0.002	0.09	n/a	n/a	n/a	n/a
CSR AW[c]			NA	NA	NA	NA	NA	1.5	0.5

Notes:
Associated ALS file: CC500001.
All terms defined within the body of Morrow's report.
< Denotes concentration less than indicated detection limit.
n/a Denotes no applicable standard.
NA Denotes guideline is not applicable.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the MDL.

BOLD Concentration greater than or equal to CCME CEQG Aquatic Life (AW) guideline. F1 and F2 criteria based on BC CSR Standards.

[a] Guidelines for the protection of freshwater aquatic life.
[b] Excludes the target compounds benzene, toluene, ethylbenzene, and xylenes (BTEX).
[c] CSR AW standards for VPHw and EPHw applied to surface water for general screening purposes.

TABLE 20: Summary of Analytical Results for Total Metals in Surface Water

Sample Location		CREEK	SEEP1	SEEP2	SEEP3	SEEP5	SEEP6	SEEP8	SEEP9	SEEP10	SEEP12			SEEP13	Guidelines	
Sample ID		CREEK	SEEP1	SEEP2	SEEP3	SEEP5	SEEP6	SEEP8	SEEP9	SEEP10	SEEP12	WDup3	QA/QC	SEEP13	CCME CEQG Aquatic Life[h] (AW)	Water Licence NWB1LUP008
Sample Date (yyyy mm dd)		2005 07 24	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 24	2005 07 24	2005 07 24	RPD %	2005 07 24		
Parameter	**Units**	**Analytical Results**														
Physical Parameters																
Field pH		***5.8***	7.75	7.93	7.73	***3.59***	***4***	7.1	***5.93***	6.5	6.5	-	n/a	***3.6***	6.5-9.0	6.0-9.5
Hardness	mg/L	7.99	684	516	872	144	252	326	859	290	317	365	14.1	570		
Total Metals																
Aluminum	mg/L	***0.0327***	***0.104***	0.037	***0.117***	***3.62***	***4.17***	0.069	***1.45***	***0.428***	***1.92***	***1.41***	*	***8.82***	0.005 pH <6.5, 0.1 pH>6.5[i]	n/a
Antimony	mg/L	< 0.0005	< 0.0025	0.0031	0.0081	< 0.0005	< 0.0005	< 0.001	< 0.0025	< 0.0005	<0.0010	< 0.001	*	<0.0010	n/a	n/a
Arsenic	mg/L	0.00112	***0.0479***	***0.0103***	***0.536***	***0.0302***	***0.013***	***0.0437***	***0.112***	***0.00526***	***0.184***	***0.186***	*	***0.0068***	0.005	0.05
Barium	mg/L	< 0.02	0.05	0.033	0.067	0.022	0.022	0.027	0.048	0.022	0.043	0.036	*	<0.020	n/a	n/a
Beryllium	mg/L	< 0.001	< 0.005	< 0.002	< 0.005	< 0.001	0.0015	< 0.002	< 0.005	< 0.001	<0.0020	< 0.002	*	0.0024	n/a	n/a
Boron	mg/L	< 0.1	0.46	0.36	0.42	< 0.1	< 0.1	0.51	< 0.1	< 0.1	<0.10	< 0.1	*	<0.10	n/a	n/a
Cadmium	mg/L	< 0.000017[a]				***0.0004***	***0.00101***	***0.000103***		***0.00142***	0.000049	0.000054	-	***0.00256***	3.76869E-06 4.53098E-05 7.3317E-05 8.27299E-05 9.14886E-05 0.000100826 0.000135793 0.000173041 0.000210491 0.000213228	n/a
			< 0.000085	0.000115	0.000171				***0.00205***				*			
Calcium	mg/L	1.55	226	166	294	42.1	75.2	110	276	92.5	119	120	*	184	n/a	n/a
Chromium	mg/L	< 0.001	< 0.005[a]	< 0.002[a]	< 0.005[a]	***0.0011***	< 0.001	< 0.002[a]	***0.0058***	< 0.001	***0.0092***	***0.0075***	*	<0.0020	0.001	n/a
Cobalt	mg/L	0.00051	0.358	0.0705	0.0097	0.0658	0.191	0.0937	0.209	0.158	0.0672	0.0735	*	0.32	n/a	n/a
Copper	mg/L	0.0016	***0.0052***	***0.0094***	***0.0162***	***0.0487***	***0.0948***	***0.0088***	***0.007***	***0.0194***	***0.0066***	***0.006***	*	***0.0455***	0.002 (H<120) 0.003 (H 120-<180) 0.004 (H>=180)	0.20
Iron	mg/L	0.164	***0.434***	***1.03***	***1.37***	***13.2***	***1.42***	0.24	***4.75***	0.262	***16.2***	***13.3***	*	***7.69***	0.3	n/a
Lead	mg/L	< 0.0005	< 0.0025	< 0.001	***0.0115***	0.00259	0.00156	< 0.001	0.0056	< 0.0005	0.0025	0.0024	*	***0.0127***	0.001 (H<60) 0.004 (H 120-<180) 0.007 (H>=180)	0.05
Lithium	mg/L	< 0.005	0.106	0.014	0.116	0.0147	0.0518	0.019	0.056	0.0375	0.021	0.022	*	0.086	n/a	n/a
Magnesium	mg/L	1	29	24.8	33.6	9.56	15.6	12.6	41.5	14.4	16.3	16	*	36.6	n/a	n/a
Manganese	mg/L	0.00754	0.462	0.119	0.329	0.363	1.11	0.527	2.36	0.91	1.07	1.04	*	2.91	n/a	n/a
Mercury	mg/L	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	*	<0.000050	0.000026	n/a
Molybdenum	mg/L	< 0.001	< 0.005	< 0.002	0.0368	< 0.001	< 0.001	0.0042	< 0.005	< 0.001	<0.0020	< 0.002	*	<0.0020	0.073	n/a
Nickel	mg/L	0.0033	0.0551	0.0252	0.0299	***0.146***	***0.367***	0.0832	***0.43***	***0.421***	0.136	0.143	-	***0.523***	0.025 (H<60) 0.11 (H 120-<180) 0.15 (H>=180)	0.30
Potassium	mg/L	< 2	17.6	6.4	24.2	2.4	2	14.9	31.6	9.9	12.1	9.7	*	11.6	n/a	n/a
Selenium	mg/L	< 0.001	< 0.005[a]	< 0.002[a]	< 0.005[a]	< 0.001	< 0.001	< 0.002[a]	< 0.005[a]	< 0.001	<0.0020	< 0.002[a]	*	<0.0040	0.001	n/a
Silver	mg/L	< 0.00002	< 0.0001	0.000041	< 0.0001	0.000023	< 0.00002	< 0.00004	< 0.0001	< 0.00002	<0.000040	< 0.00004	*	<0.000040	0.0001	n/a
Sodium	mg/L	< 2	83	95.4	89.7	9	6	95.6	385	12.3	15.4	15.3	*	142	n/a	n/a
Thallium	mg/L	< 0.0002	< 0.001[a]	< 0.0004	< 0.001[a]	< 0.0002	< 0.0002	< 0.0004	< 0.001[a]	< 0.0002	<0.00040	< 0.0004	*	<0.00040	0.0008	n/a
Tin	mg/L	< 0.0005	< 0.0025	< 0.001	< 0.0025	< 0.0005	< 0.0005	< 0.001	< 0.0025	< 0.0005	<0.0010	< 0.001	*	<0.0010	n/a	n/a
Titanium	mg/L	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.04	< 0.01	0.122	0.048	*	<0.010	n/a	n/a
Uranium	mg/L	< 0.0002	0.0372	0.00069	0.0114	0.00069	0.00125	0.00667	0.0023	0.00239	0.00224	0.00219	*	0.0143	n/a	n/a
Vanadium	mg/L	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	<0.030	< 0.03	*	<0.030	n/a	n/a
Zinc	mg/L	< 0.005	< 0.025	***0.177***	< 0.025	***0.0633***	***0.3***	0.018	***0.167***	***0.391***	0.018	0.019	*	***0.697***	0.03	0.50

Notes:
Associated ALS file: CC500001.
All terms defined within the body of Morrow's report.
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.

BOLD Concentration greater than or equal to CCME CEQG Aquatic Life (AW) guideline.

SHADOW Concentration greater than or equal to *Water Licence NWB1LUP008*.

[a] Laboratory detection limit exceeds regulatory standard.
[b] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[c] Standard for Cadmium and Zinc for H >= 500 calculated as per Protocol 10.
[d] Criterion for cadmium is determined using the following formula: 10 exp(0.86[log{hardness}] - 3.2) / 1000.
[e] Criterion for copper is determined using the following formula: [0.094 (hardness) + 2] / 1000.
[f] Criterion for lead is determined using the following formula: exp[1.273 ln (hardness) - 1.460] / 1000.
[g] If hardness is <= 8mg/L CaCO3, guideline for Total Pb = 0.003 mg/L, otherwise Total Pb = exp[1.273*ln(hardness)-1.460] / 1000.
[h] Guidelines for the protection of freshwater aquatic life.
[i] Guideline dependant on pH.

TABLE 21: Summary of Analytical Results for Polycyclic Aromatic Hydrocarbons in Surface Water

Sample Location		SEEP2	SEEP3	SEEP8	SEEP9	SEEP12	Guidelines
Sample ID		SEEP2	SEEP3	SEEP8	SEEP9	SEEP12	CCME CEQG
Sample Date (yyyy mm dd)		2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 24	Aquatic Life[b]
Parameter	**Units**	**Analytical Results**					**(AW)**
Acenaphthene	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.000188	0.0058
Acenaphthylene	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	n/a
Acridine	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.0044
Anthracene	mg/L	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	0.000012
Benzo(a)anthracene	mg/L	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	0.000018
Benzo(a)pyrene	mg/L	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	0.000015
Benzo(b)fluoranthene	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	n/a
Benzo(g,h,i)perylene	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	n/a
Benzo(k)fluoranthene	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	n/a
Chrysene	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	n/a
Dibenz(a,h)anthracene	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	n/a
Fluoranthene	mg/L	< 0.00005[a]	< 0.00006[a]	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	0.00004
Fluorene	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00133	0.003
Indeno(1,2,3-cd)pyrene	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	n/a
Naphthalene	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005	***0.0122***	0.0011
Phenanthrene	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00007	0.000061	0.0004
Pyrene	mg/L	< 0.00005[a]	***0.000199***	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	0.000025
Quinoline	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.0034

Notes:
Associated ALS file: CC500001.
All terms defined within the body of Morrow's report.
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.

BOLD Concentration greater than or equal to CCME CEQG Aquatic Life (AW) guideline.

[a] Laboratory detection limit exceeds regulatory standard.
[b] Guidelines for the protection of freshwater aquatic life.

TABLE 22: Summary of Analytical Results for Inorganics in Surface Water

Sample Location		CREEK	SEEP1	SEEP2	SEEP3	SEEP5	SEEP6	SEEP8	SEEP9	SEEP10	SEEP12			SEEP13	Guidelines
Sample ID		CREEK	SEEP1	SEEP2	SEEP3	SEEP5	SEEP6	SEEP8	SEEP9	SEEP10	SEEP12	WDup3	QA/QC	SEEP13	CCME CEQG
Sample Date (yyyy mm dd)		2005 07 24	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 24	2005 07 24	2005 07 24	RPD %	2005 07 24	Aquatic Life[a]
Parameter	**Units**	**Analytical Results**													**(AW)**
Physical Parameters															
Conductivity	µS/cm	24.5	1,560	1,310	1,830	496	551	932	3,070	612	616	725	16.3	1,850	n/a
Hardness	mg/L	7.99	684	516	872	144	252	326	859	290	317	365	14.1	570	n/a
Ion Balance %	%	18.2	-0.8	-0.6	-1.1	-1.7	1.1	1.1	-3.4	-2	-2.7	5.8	*	-7.2	n/a
Laboratory pH	pH	6.65	7.75	7.79	8.01	3.76	4.14	4	8.03	6.91	5.83	6.58	*	6.6	n/a
Field pH	pH	***5.8***	7.75	7.93	7.73	***3.59***	***4***	7.1	***5.93***	6.5	6.5	-	n/a	***3.6***	pH 6.5 - 9
Total Anions	meq/L	0.118	18.1	14.9	22.6	4.57	5.88	11	37.7	7	7.23	7.93	n/a	20.6	n/a
Total Cations	meq/L	0.171	17.8	14.7	22.1	4.42	6.01	11.2	35.2	6.72	6.86	8.91	n/a	17.8	n/a
Total Dissolved Solids	mg/L	8.3	1,170	947	1,420	295	386	697	2,360	458	472	538	13.1	1,240	n/a
Dissolved Inorganics															
Bicarbonate HCO_3	mg/L	< 5	92.5	67.4	191	< 5	< 5	112	113	34.1	< 5	34.2	*	35.6	n/a
Carbonate CO_3	mg/L	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	*	< 5	n/a
Chloride	mg/L	0.51	80.9	115	118	12.8	5.83	77.5	588	14.4	21.2	21.2	0	269	n/a
Hydroxide OH	mg/L	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	*	< 5	n/a
Nitrate	mg/L	0.0175	5.07	3.1	0.031	0.0571	< 0.005	3.85	***53.6***	4.52	< 0.005	0.0058	*	6.31	13
Nitrite	mg/L	< 0.005	***0.646***	***0.235***	***0.214***	< 0.005	< 0.005	***0.722***	***0.23***	< 0.05	< 0.005	< 0.005	*	0.03	0.06
Nitrate+Nitrite	mg/L	0.018	5.71	3.33	0.245	0.057	< 0.01	4.57	53.8	4.52	< 0.01	< 0.01	*	6.34	n/a
Salinity	SAL	-	-	-	-	-	-	-	-	-	-	-	-	< 1.0	n/a
Sulphate	mg/L	4.9	***652***	***483***	***740***	***202***	***274***	***298***	***721***	***278***	***319***	***319***	0	***568***	100[b]
Total Alkalinity	mg/L	< 5	92.5	67.4	191	< 5	< 5	112	113	24.1	< 5	34.2	*	35.6	n/a
Total Cyanide	mg/L	-	***0.657***	***0.048***	< 0.01	-	-	-	-	-	-	-	-	-	0.005

Notes:
Associated ALS file: CC500001.
All terms defined within the body of Morrow's report.
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the MDL.

BOLD Concentration greater than or equal to CCME CEQG Aquatic Life (AW) guideline.

[a] Guidelines for the protection of freshwater aquatic life.
[b] based on British Columbia Approved Water Quality Guidelines for the protection of freshwater aquatic life.

TABLE 23: Summary of Analytical Results for Glycols in Surface Water

Sample Location		SEEP3	SEEP12	Guidelines
Sample ID		SEEP3	SEEP12	CCME CEQG
Sample Date (yyyy mm dd)		2005 07 23	2005 07 24	Aquatic Life[a]
Parameter	**Units**	**Analytical Results**		**(AW)**
Diethylene Glycol	mg/L	< 5	< 5	n/a
Ethylene Glycol	mg/L	< 5	< 5	192
Propylene Glycol	mg/L	< 5	< 5	500
Triethylene Glycol	mg/L	< 10	-	n/a

Notes:
Associated ALS file: CC500001.
All terms defined within the body of Morrow's report.
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.

BOLD Concentration greater than or equal to CCME CEQG Aquatic Life (AW) guideline.

[a] Guidelines for the protection of freshwater aquatic life.

TABLE 24: Summary of Analytical Results for Hydrocarbons in Groundwater

Sample Location	Sample ID	Sample Date yyyy mm dd	Monocyclic Aromatic Hydrocarbons				Petroleum Hydrocarbon Fractions		
			Benzene (mg/L)	Toluene (mg/L)	Ethyl-benzene (mg/L)	Xylenes (mg/L)	F1-BTEX[b] (C_6-C_{10}) (mg/L)	F1 (C_6-C_{10}) (mg/L)	F2 (>C_{10}-C_{16}) (mg/L)
MW05-01	MW05-01	2005 07 22	0.00356	***0.08***	***0.0381***	***0.415***	0.77	1.3	**30.4**
MW05-07	MW05-07	2005 07 24	-	-	-	-	-	-	**12.6**
MW05-09	MW05-09	2005 07 23	< 0.0005	< 0.001	< 0.0005	< 0.00071	< 0.1	< 0.1	**0.99**
MW05-10	MW05-10	2005 07 22	< 0.001	< 0.002	< 0.001	< 0.0014	< 0.1	< 0.1	**3.61**
MW05-11	MW05-11	2005 07 22	< 0.0005	< 0.001	< 0.0005	0.00257	< 0.1	< 0.1	**0.54**
MW05-13	MW05-13	2005 07 23	0.00202	***0.0047***	0.00139	0.00737	< 0.1	< 0.1	**0.88**
MW05-21	MW05-21	2005 07 23	0.00604	< 0.001	< 0.0005	0.00145	< 0.1	< 0.1	**0.8**
MW05-28	MW05-28	2005 07 23	0.112	***0.161***	0.0374	0.451	1.57	**1.57**	**30.9**
MW05-43	MW05-43	2005 07 24	< 0.0005	< 0.001	< 0.0005	0.00694	< 0.1	< 0.1	**14.6**
	WDup1	2005 07 24	< 0.0005	< 0.001	< 0.0005	0.00704	< 0.1	< 0.1	**13.8**
	QA/QC RPD %		*	*	*	1.4	*	*	5.6
MW05-55	MW05-55	2005 07 23	< 0.0005	< 0.001	< 0.0005	0.0108	0.64	0.65	**8.26**
MW05-60	MW05-60	2005 07 23	0.00091	***0.0023***	0.00065	0.00786	< 0.1	< 0.1	**1.23**
SUMP	SUMP	2005 07 24	< 0.0005	< 0.001	< 0.0005	< 0.00071	< 0.1	< 0.1	**6.68**
	WDup2	2005 07 24	< 0.0005	< 0.001	< 0.0005	< 0.00071	< 0.1	< 0.1	**5.92**
	QA/QC RPD %		*	*	*	*	*	*	12.1
Guidelines									
CCME CEQG Aquatic Life (AW)[a]			0.37	0.002	0.09	n/a	n/a	n/a	n/a
BC CSR Aquatic Life (AW)[a]			4	0.39	2	n/a	n/a	1.5	0.5

Notes:
Associated ALS file: CC500001.
All terms defined within the body of Morrow's report.
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the MDL.

BOLD Concentration greater than or equal to CCME CEQG Aquatic Life (AW) guideline.

Shadow Concentration greater than or equal to BC CSR Aquatic Life (AW) guideline.

[a] Guidelines for the protection of freshwater aquatic life. For screening purposes results for F1 & F2 have been compared to BC CSR standards for VH_W & EPH_W.

[b] Excludes the target compounds benzene, toluene, ethylbenzene, and xylenes (BTEX).

TABLE 25: Summary of Analytical Results for Dissolved Metals in Groundwater

Sample Location		MW05-01	MW05-02	MW05-03	MW05-05	MW05-09	MW05-10	MW05-11	MW05-13	MW05-16	MW05-21	MW05-28	MW05-43			MW05-55	MW05-60	SUMP			Guidelines	
Sample ID		MW05-01	MW05-02	MW05-03	MW05-05	MW05-09	MW05-10	MW05-11	MW05-13	MW05-16	MW05-21	MW05-28	MW05-43	WDup1	QA/QC	MW05-55	MW05-60	SUMP	WDup2	QA/QC	CCME CEQG	CSR
Sample Date (yyyy mm dd)		2005 07 22	2005 07 22	2005 07 22	2005 07 22	2005 07 23	2005 07 22	2005 07 22	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 24	2005 07 24	RPD %	2005 07 23	2005 07 23	2005 07 24	2005 07 24	RPD %	Aquatic Life[b] (AW)	Aquatic Life[b] (AW)
Parameter	**Units**	**Analytical Results**																				
Physical Parameters																						
Field pH		6.9	7.6	6.7	7	6.5	6.8	6.9	6.8	7.1	6.8	**5.6**	6.4	-		6	***5.5***	6.18	-		6.5-9.0	n/a
Hardness	mg/L	423	337	369	336	1,120	895	810	1,580	991	412	89.2	716	723	1	193	938	269	272	1.1	n/a	n/a
Dissolved Metals																						
Aluminum	mg/L	***0.408***	< 0.05	***0.103***	***0.247***	< 0.1	***2.76***	< 0.05	< 0.05	< 0.05	< 0.02	***0.411***	***0.168***	***0.159***	*	***0.127***	***1.9***	0.029	0.026	*	0.005 pH <6.5, 0.1 pH>6.5[l]	n/a
Antimony	mg/L	0.0054	< 0.0025	< 0.001	< 0.001	< 0.005	< 0.0025	0.0031	0.0061	< 0.0025	< 0.001	< 0.0005	< 0.0025	< 0.0025	*	< 0.0005	< 0.0025	< 0.0005	< 0.0005	*	n/a	not applied
Arsenic	mg/L	***1.89***	***0.0106***	0.0024	***0.0279***	***0.011***	***0.244***	***0.0131***	***0.0172***	***0.012***	***0.0661***	***0.0398***	***0.0866***	***0.0842***	2.8	0.0032	***0.0156***	***0.386***	***0.385***	0.3	0.005	0.05
Barium	mg/L	0.051	0.07	0.058	0.039	0.187	0.106	0.026	0.139	0.055	0.061	0.073	0.036	0.037	*	0.03	0.033	0.085	0.086	*	n/a	10
Beryllium	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	*	< 0.005	< 0.005	< 0.005	< 0.005	*	n/a	not applied
Boron	mg/L	0.25	0.28	0.34	0.2	0.23	0.41	0.7	2.65	3.6	0.67	< 0.1	0.37	0.37	*	< 0.1	0.26	0.69	0.67	2.9	n/a	not applied
Cadmium	mg/L	***0.00023***	< 0.00025	***0.0001***	< 0.0001	***0.00109***	***0.00133***	***0.00325***	< 0.00025	***0.00104***	< 0.0001	***0.000467***	< 0.00025	< 0.00025	-	***0.000969***	***0.0141***	< 0.00005	< 0.00005	-	0.00003 - 0.00035[l]	0.0003 (H 30-<90) 0.0006 (H 150-<210) 0.0008 (H 210-<270) 0.0009 (H 270-<330) 0.0011 (H 330-<390) 0.0012 (H 390-<450) 0.0017 (H>=500) 0.0018 (H>=500) 0.0020 (H>=500) 0.0021 (H>=500) 0.0023(H>=500) 0.0024 (H>=500) 0.0026 (H>=500) 0.0036 (H>=500)
Calcium	mg/L	147	96.4	126	112	368	318	264	492	359	139	22.8	238	241	1.3	59.8	313	93	94	1.1	n/a	n/a
Chromium	mg/L	***0.005***	< 0.0025	***0.0034***	< 0.001	< 0.005	***0.032***	< 0.0025	< 0.0025	< 0.0025	***< 0.001***	***0.00215***	< 0.0025	< 0.0025	*	< 0.0005	< 0.0025	***0.00319***	***0.00291***	9.2	0.001	0.01
Cobalt	mg/L	0.105	0.106	0.0144	0.0292	0.114	0.0519	0.0746	0.005	0.0428	0.107	0.0611	0.0564	0.0503	11.4	0.058	3.28	0.041	0.0412	0.5	n/a	not applied
Copper	mg/L	0.0021	***0.0223***	***0.0076***	***0.004***	< 0.01	***0.235***	***0.0083***	***0.0092***	< 0.005	0.0037	***0.0052***	< 0.005	< 0.005	*	***0.0055***	***0.0723***	0.0037	0.0035	*	0.002-0.004[l]	0.04 (H 75-<100) 0.08 (H 175-<200) 0.09 (H>=200)
Iron	mg/L	***23.6***	0.277	***1.36***	0.216	***83.1***	***14.9***	***4.38***	***0.324***	0.04	***5.29***	***10.8***	***10.6***	***10.7***	0.9	0.208	0.042	***49.9***	***50.4***	1	0.3	n/a
Lead	mg/L	< 0.002	< 0.005	< 0.002	< 0.002	< 0.01	0.0376	< 0.005	< 0.005	< 0.005	< 0.002	0.0026	< 0.005	< 0.005	*	< 0.001	< 0.005	< 0.001	< 0.001	*	0.002-0.007[l]	0.05 (H 50-<100) 0.06 (H 100-<200) 0.11 (H 200-<300) 0.16 (H>=300)
Lithium	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	0.083	< 0.05	0.061	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	*	< 0.05	0.102	< 0.05	< 0.05	*	n/a	n/a
Magnesium	mg/L	13.6	23.5	13.3	14.1	49.1	24.5	36.8	85.3	23	15.5	7.84	29.2	29.6	1.4	10.6	37.7	8.97	9.17	2.2	n/a	n/a
Manganese	mg/L	1.65	1.79	0.126	0.639	4.11	1.89	2.78	1.98	3.09	2.7	1.23	1.72	1.73	0.6	0.766	3.89	1.26	1.26	0	n/a	n/a
Molybdenum	mg/L	0.009	***0.0815***	0.0046	0.028	***0.083***	0.0275	< 0.005	0.0116	< 0.005	0.0034	< 0.001	< 0.005	< 0.005	*	< 0.001	< 0.005	0.0048	0.0046	*	0.073	10
Nickel	mg/L	***0.171***	< 0.025	< 0.01	< 0.01	***0.209***	0.115	0.133	< 0.025	0.07	0.068	***0.0756***	0.067	0.061	*	0.128	***1.24***	0.0266	0.0265	0.4	0.65-0.150[l]	0.65 (H 60-<120) 1.5 (H>=180)
Potassium	mg/L	21.1	47.1	22.4	23.4	150	29.3	26.6	129	17.9	18.6	5.7	13.6	13.7	0.7	4.2	18.1	29.4	29.3	0.3	n/a	n/a
Selenium	mg/L	0.0024	< 0.005	< 0.002	< 0.002	< 0.03[a]	< 0.005	< 0.005	< 0.01	< 0.005	0.0039	< 0.001	< 0.005	< 0.005	*	< 0.001	< 0.005	< 0.001	< 0.001	*	0.001	0.01
Silver	mg/L	< 0.0001	< 0.00025	< 0.0001	< 0.0001	< 0.0005	< 0.00025	< 0.00025	< 0.00025	< 0.00025	< 0.0001	< 0.00005	< 0.00025	< 0.00025	*	< 0.00005	< 0.00025	< 0.00005	< 0.00005	*	0.0001	0.0005 (H<=100) 0.015 (H>100)
Sodium	mg/L	31.9	205	81.9	70.9	824	39.8	119	302	53.8	124	3.9	36.3	36.5	0.5	< 2	304	27.4	27.1	1.1	n/a	n/a
Thallium	mg/L	< 0.0004	< 0.001	< 0.0004	< 0.0004	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.0004	< 0.0002	< 0.001	< 0.001	*	< 0.0002	< 0.001	< 0.0002	< 0.0002	*	0.0008	0.003
Titanium	mg/L	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.121	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	*	< 0.05	< 0.05	< 0.05	< 0.05	*	n/a	not applied
Uranium	mg/L	0.00872	< 0.001	0.00191	0.00267	< 0.002	0.0378	0.0029	0.0085	0.0112	0.00434	0.00049	0.0031	0.003	*	< 0.0002	< 0.001	0.00097	0.00093	*	n/a	not applied
Vanadium	mg/L	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.05	< 0.03	0.036	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	*	< 0.03	< 0.03	< 0.03	< 0.03	*	n/a	n/a
Zinc	mg/L	***0.089***	0.01	< 0.005	< 0.005	***0.0531***	***5.78***	***1.5***	0.0276	***0.0793***	0.0129	***0.0486***	***0.0333***	***0.0331***	-	***0.0845***	***2.53***	***0.172***	***0.196***	13	0.03 -	0.075 (H<=90) 0.9 (H 100-<200) 1.65 (H 200-<300) 2.4 (H 300-<400) 3.15 (H 400-<500) 4.77 (H>=500) 4.8225 (H>=500) 5.475 (H>=500) 6.1125 (H>=500) 6.435 (H>=500) 6.8325 (H>=500) 7.8 (H>=500) 11.25 (H>=500)

Notes:
Associated ALS file: CC500001.
All terms defined within the body of Morrow's report.
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RPDs are not normally calculated where one or more concentrations are less than five times MDL.

BOLD Concentration greater than or equal to CCME CEQG Aquatic Life (AW) guideline.

SHADOW Concentration greater than CSR Aquatic Life (AW) standard.

[a] Laboratory detection limit exceeds regulatory standard.
[b] Standard/Guideline to protect freshwater aquatic life.
[c] Individual standards exist for Cr +3 and Cr +6. Reported value represents more stringent standard.
[d] Standard for Cadmium and Zinc for H >= 500 calculated as per Protocol 10.
[e] Criterion for cadmium is determined using the following formula: 10 exp{0.86[log{hardness}] - 3.2) / 1000.
[f] Criterion for copper is determined using the following formula: [0.094 (hardness) + 2] / 1000.
[g] Criterion for lead is determined using the following formula: exp[1.273 ln (hardness) - 1.460] / 1000.
[h] If hardness is <= 8mg/L CaCO3, guideline for Total Pb = 0.003 mg/L, otherwise Total Pb = exp[1.273*ln(hardness)-1.460] / 1000.
[i] Guideline dependant on pH.
[j] Guideline dependant on hardness.

TABLE 26: Summary of Analytical Results for Polycyclic Aromatic Hydrocarbons in Groundwater

Sample Location		MW05-10	MW05-11	MW05-28	MW05-43			Guidelines
Sample ID		MW05-10	MW05-11	MW05-28	MW05-43	WDup1	QA/QC	CCME CEQG
Sample Date (yyyy mm dd)		2005 07 22	2005 07 22	2005 07 23	2005 07 24	2005 07 24	RPD %	Aquatic Life[b]
Parameter	**Units**	**Analytical Results**						**(AW)**
Acenaphthene	mg/L	0.000157	< 0.00005	< 0.0005	< 0.00005	< 0.0007	*	0.0058
Acenaphthylene	mg/L	< 0.0003	< 0.00005	< 0.0005	0.00221	0.00346	44.1	n/a
Acridine	mg/L	< 0.0007	< 0.00005	< 0.0005	< 0.00005	< 0.0005	*	0.0044
Anthracene	mg/L	< 0.0004[a]	< 0.00005[a]	< 0.0005[a]	< 0.00005[a]	< 0.0005[a]	*	0.000012
Benzo(a)anthracene	mg/L	< 0.00005[a]	< 0.00005[a]	< 0.0005[a]	< 0.00005[a]	< 0.00005[a]	*	0.000018
Benzo(a)pyrene	mg/L	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	< 0.00005[a]	*	0.000015
Benzo(b)fluoranthene	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	*	n/a
Benzo(g,h,i)perylene	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	*	n/a
Benzo(k)fluoranthene	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	*	n/a
Chrysene	mg/L	< 0.00005	< 0.00005	< 0.0005	< 0.00005	< 0.00005	*	n/a
Dibenz(a,h)anthracene	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	*	n/a
Fluoranthene	mg/L	***0.000358***	< 0.00005[a]	< 0.0005[a]	< 0.00005[a]	< 0.00005[a]	*	0.00004
Fluorene	mg/L	< 0.0003	< 0.00005	< 0.0006	0.00221	< 0.004[a]	*	0.003
Indeno(1,2,3-cd)pyrene	mg/L	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	*	n/a
Naphthalene	mg/L	< 0.00005	< 0.00005	< 0.0007	< 0.00005	< 0.0005	*	0.0011
Phenanthrene	mg/L	< 0.0002	< 0.00005	< 0.0005[a]	< 0.00005	< 0.0005[a]	*	0.0004
Pyrene	mg/L	< 0.0004[a]	< 0.00005[a]	***0.00175***	< 0.00005[a]	< 0.00005[a]	*	0.000025
Quinoline	mg/L	< 0.00006	< 0.00005	< 0.011[a]	< 0.00005	< 0.0005	*	0.0034

Notes:
Associated ALS file: CC500001.
All terms defined within the body of Morrow's report.
< Denotes concentration less than indicated detection limit.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the MDL.

BOLD Concentration greater than or equal to CCME CEQG Aquatic Life (AW) guideline.

[a] Laboratory detection limit exceeds regulatory standard.
[b] Guidelines for the protection of freshwater aquatic life.

TABLE 27: Summary of Analytical Results for Inorganics in Groundwater

Sample Location		MW05-01	MW05-02	MW05-03	MW05-05	MW05-09	MW05-10	MW05-11	MW05-13	MW05-16	MW05-21	MW05-28	MW05-43			MW05-55	MW05-60	SUMP			Guidelines
Sample ID		MW05-01	MW05-02	MW05-03	MW05-05	MW05-09	MW05-10	MW05-11	MW05-13	MW05-16	MW05-21	MW05-28	MW05-43	WDup1	QA/QC	MW05-55	MW05-60	SUMP	WDup2	QA/QC	CCME CEQG
Sample Date (yyyy mm dd)		2005 07 22	2005 07 22	2005 07 22	2005 07 22	2005 07 23	2005 07 22	2005 07 22	2005 07 23	2005 07 23	2005 07 23	2005 07 23	2005 07 24	2005 07 24	RPD %	2005 07 23	2005 07 23	2005 07 24	2005 07 24	RPD %	Aquatic Life[a]
Parameter	**Units**	**Analytical Results**																			(AW)
Physical Parameters																					
Conductivity	µS/cm	871	1,600	1,050	880	6,500	3.6	1,770	10,400	2,250	1,240	212	1,260	1,280	1.6	373	2,840	691	719	4	n/a
Hardness	mg/L	423	337	369	336	1,120	895	810	1,580	991	412	89.2	716	723	1	193	938	269	272	1.1	n/a
Ion Balance %	%	3.8	-1.9	4.5	1.4	-3.3	-	-0.1	-38.5	-6	-0.8	13	5.2	5.5	5.6	-0.5	-0.8	13.1	10.9	18.3	n/a
Laboratory pH	pH	6.79	7.78	7.38	7.5	6.17	6.04	7.17	7.42	7.66	7.56	5.8	6.65	6.78	1.9	6.45	5.59	6.67	6.7	0.4	n/a
Field pH	pH	6.9	7.6	6.7	7	6.5	6.8	6.9	6.8	7.1	6.8	***5.6***	***6.4***	-	-	***6***	***5.5***	***6.18***	-	-	pH 6.5 - 9
Total Anions	meq/L	10.5	17.6	10.6	10.2	69.8	14.9	22.5	109	25.7	14.6	1.99	15.1	15.1	0	4.07	33.4	7.06	7.43	5.1	n/a
Total Cations	meq/L	11.4	17	11.6	10.5	65.3	21.5	22.4	48.2	22.8	14.4	2.59	16.8	16.9	0.6	4.04	32.9	9.19	9.26	0.8	n/a
Total Dissolved Solids	mg/L	665	1,030	659	654	4,200	1,140	1,440	3,560	1,910	909	140	998	1,000	0.2	265	2,160	464	478	3	n/a
Dissolved Inorganics																					
Bicarbonate HCO_3	mg/L	208	111	100	111	27	-	126	306	68.7	182	20.8	124	123	0.8	15.8	< 5	199	216	8.2	n/a
Carbonate CO_3	mg/L	< 5	< 5	< 5	< 5	< 5	-	< 5	< 5	< 5	< 5	< 5	< 5	< 5	*	< 5	< 5	< 5	< 5	*	n/a
Chloride	mg/L	14.1	171	165	54.2	1,870	41.8	142	792	32.5	94.3	2.3	36	36.4	1.1	1.3	373	36.8	36.8	0	n/a
Hydroxide OH	mg/L	< 5	< 5	< 5	< 5	< 5	-	< 5	< 5	< 5	< 5	< 5	< 5	< 5	*	< 5	< 5	< 5	< 5	*	n/a
Nitrate	mg/L	< 0.05	***25.2***	0.147	1.86	***36.3***	0.095	1.17	***666***	***258***	0.219	< 0.05	0.0273	< 0.005	*	0.015	2.33	0.0075	< 0.05	*	13
Nitrite	mg/L	0.056	***0.263***	0.019	***0.071***	***0.24***	< 0.025	0.045	***2.9***	***0.77***	***0.089***	< 0.05	< 0.005	< 0.005	*	0.029	< 0.05	< 0.005	< 0.05	*	0.06
Nitrate+Nitrite	mg/L	< 0.071	25.5	0.166	1.93	36.6	0.095	1.21	668	259	0.308	< 0.071	0.027	< 0.01	*	0.044	2.33	< 0.01	< 0.071	*	n/a
Salinity	SAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-1.8	-	-	-	n/a
Sulphate	mg/L	***287***	***421***	***189***	***303***	***669***	***658***	***761***	***1,560***	***234***	***399***	72.6	***557***	***560***	0.5	***178***	***1,090***	98.4	***100***	1.6	100[b]
Total Alkalinity	mg/L	208	111	100	111	27	-	126	305	68.7	182	20.8	124	123	0.8	15.8	< 5	199	216	8.2	n/a
Total Cyanide	mg/L	-	***0.422***	***3.97***	-	-	-	-	***0.017***	< 0.01	***0.178***	-	-	-	-	-	< 0.01	< 0.01	-	*	0.005

Notes:
Associated ALS file: CC500001.
All terms defined within the body of Morrow's report.
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDP are not normally calculated where one or more concentrations are less than five times the MDL.

BOLD Concentration greater than or equal to CCME CEQG Aquatic Life (AW) guideline.

[a] Guidelines for the protection of freshwater aquatic life.
[b] based on British Columbia Approved Water Quality Guidelines for the protection of freshwater aquatic life.

TABLE 28: Summary of Analytical Results for Glycols in Groundwater

Sample Location		MW05-03	MW05-09	MW05-10	MW05-11	MW05-13	MW05-28	MW05-43			MW05-60	Guidelines
Sample ID		MW05-03	MW05-09	MW05-10	MW05-11	MW05-13	MW05-28	MW05-43	WDup1	QA/QC	MW05-60	CCME CEQG
Sample Date (yyyy mm dd)		2005 07 22	2005 07 23	2005 07 22	2005 07 22	2005 07 23	2005 07 23	2005 07 24	2005 07 24	RPD %	2005 07 23	Aquatic Life[a]
Parameter	**Units**	**Analytical Results**										**(AW)**
Diethylene Glycol	mg/L	< 5	< 5	< 5	< 5	< 5	< 5	9.1	< 5	*	< 5	n/a
Ethylene Glycol	mg/L	< 5	< 5	< 5	< 5	< 5	< 5	***697***	***563***	21.3	< 5	192
Propylene Glycol	mg/L	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	*	< 5	500
Triethylene Glycol	mg/L	< 10	< 10	< 10	< 10	< 10	< 10	< 10	-	*	< 10	n/a

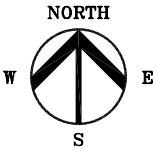
Notes:
Associated ALS file: CC500001.
All terms defined within the body of Morrow's report.
< Denotes concentration less than indicated detection limit.
- Denotes analysis not conducted.
n/a Denotes no applicable standard.
RPD Denotes relative percent difference.
* RDPs are not normally calculated where one or more concentrations are less than five times the MDL.

BOLD Concentration greater than or equal to CCME CEQG Aquatic Life (AW) guideline.

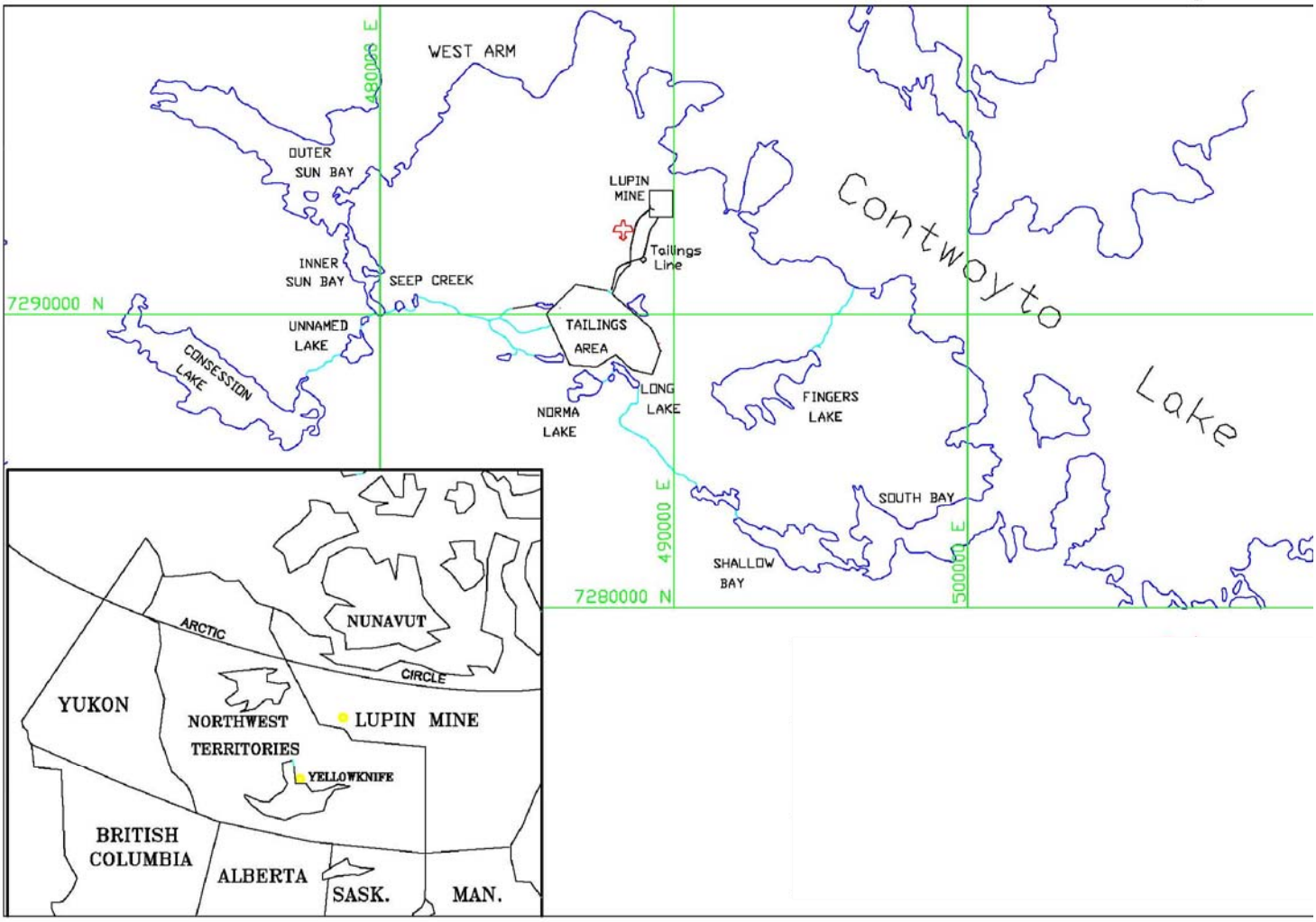
[a] Guidelines for the protection of freshwater aquatic life.

DRAWINGS

- A053017-001 – Location Plan
- A053017-002 – Site Plan
- A053017-003 – Detail Plan for Mill Building
- A053017-004 – Investigation Locations
- A053017-005 – Areas of Potential Environmental Concern
- A053017-006A – Detailed Soil Analytical Results - Hydrocarbons
- A053017-006B – Detailed Soil Analytical Results - Metals
- A053017-007A – Detailed Groundwater Analytical Results - Hydrocarbons
- A053017-007B – Detailed Groundwater Analytical Results - Metals
- A053017-008 – Groundwater Potentiometric Contours (July 2005)



Abandonment and Restoration Plan February, 2005



LEGEND

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED ON SITE. NOT ALL UTILITIES MAY BE SHOWN.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	–	–	–	–

MORROW

CLIENT NAME: KINROSS GOLD MINE

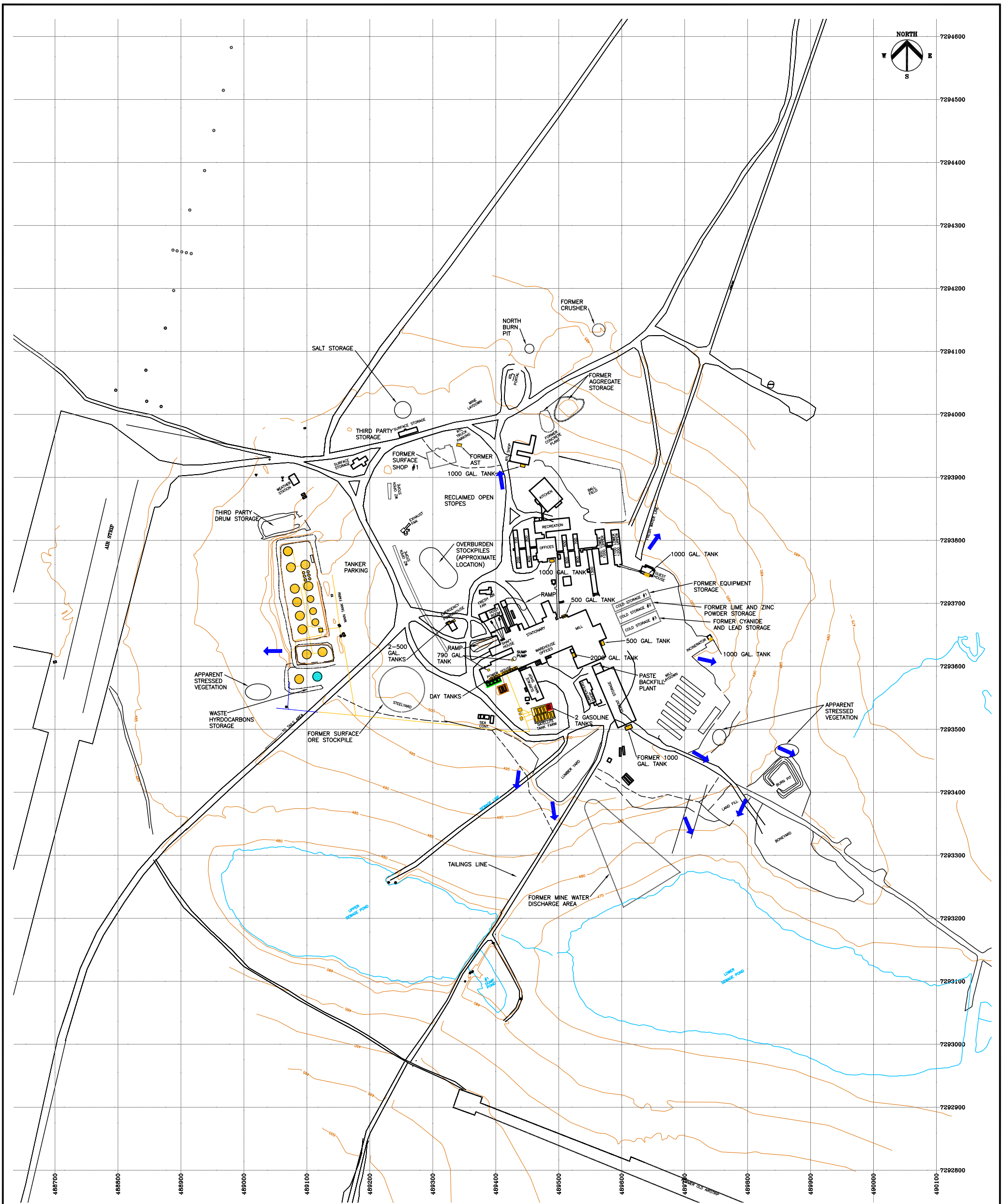
PROJECT LOCATION: LUPIN MINE NUNAVUT

TITLE: **LOCATION PLAN**

DWN BY: VAD | SCALE: N.T.S. | DATE: 2005 08 12 | DWG No: A053017-001 | REV.: 0

CHK'D: MT | CADFILE: K:\A05\A05-3017\A053017R02

PLOT DATE: 20060127.1029



LEGEND

0 50 100 200 METRES

- JET A FUEL
- USED OIL
- GLYCOLS
- GASOLINE FUEL
- DIESEL FUEL
- FORMER FACILITIES
- SURFACE WATER FEATURE
- TOPOGRAPHIC CONTOUR LINE
- GROUNDWATER SEEP DIRECTION

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED ON SITE. NOT ALL UTILITIES MAY BE SHOWN.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0				

MORROW

CLIENT NAME: KINROSS GOLD CORPORATION

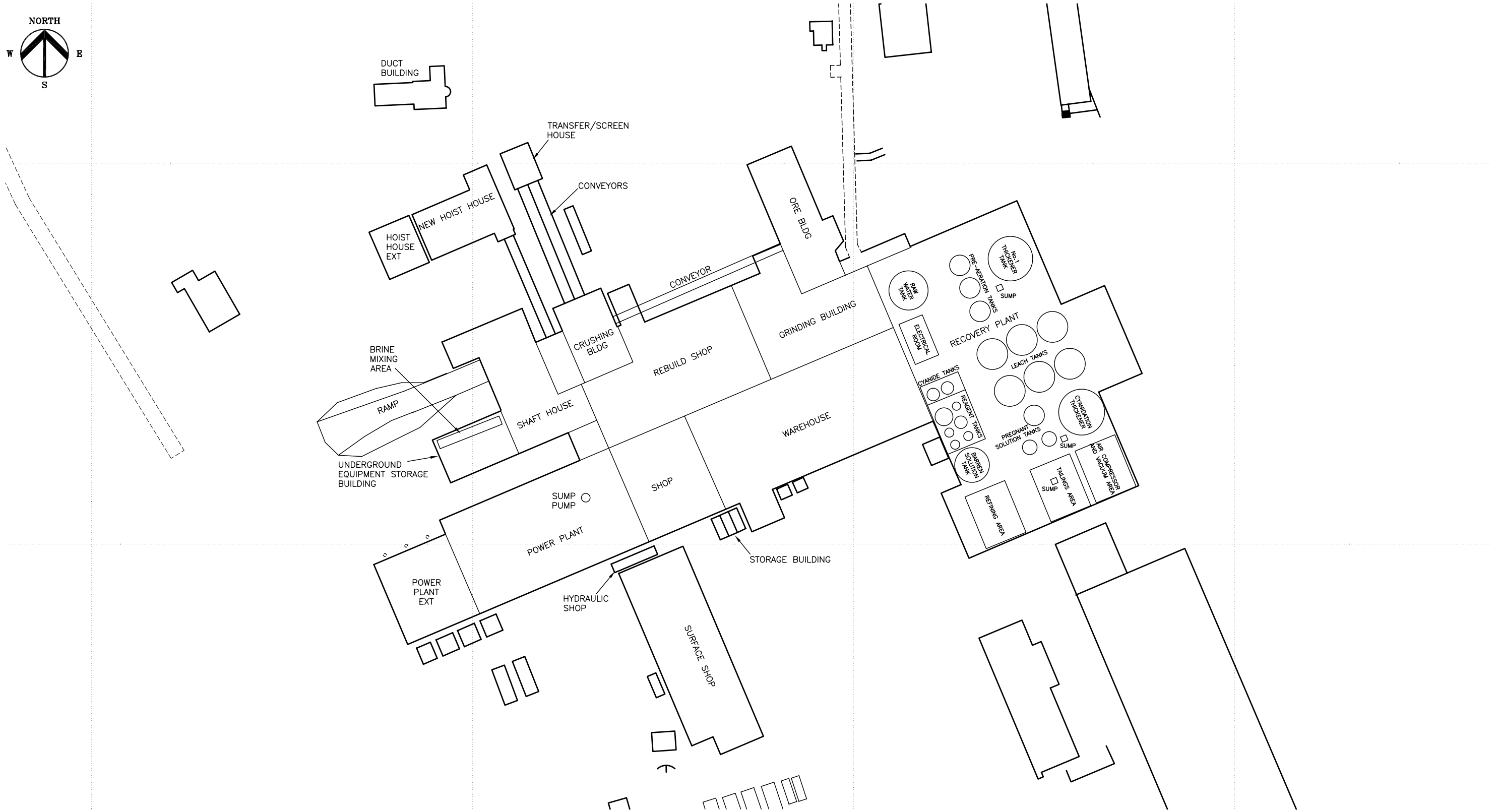
PROJECT LOCATION: LUPIN MINE NUNAVUT

TITLE:

SITE PLAN

DWN BY: CZ/CDC | SCALE: 1:4,000 | DATE: 2005-08-02 | DWG No: A053017-002 | REV.: 0

CHK'D: MT | PLOT: 20040305.1300 | CADFILE: A053017R00



LEGEND

0 10 20 30 40 50
METRES

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED ON SITE. NOT ALL UTILITIES MAY BE SHOWN.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0				

MORROW

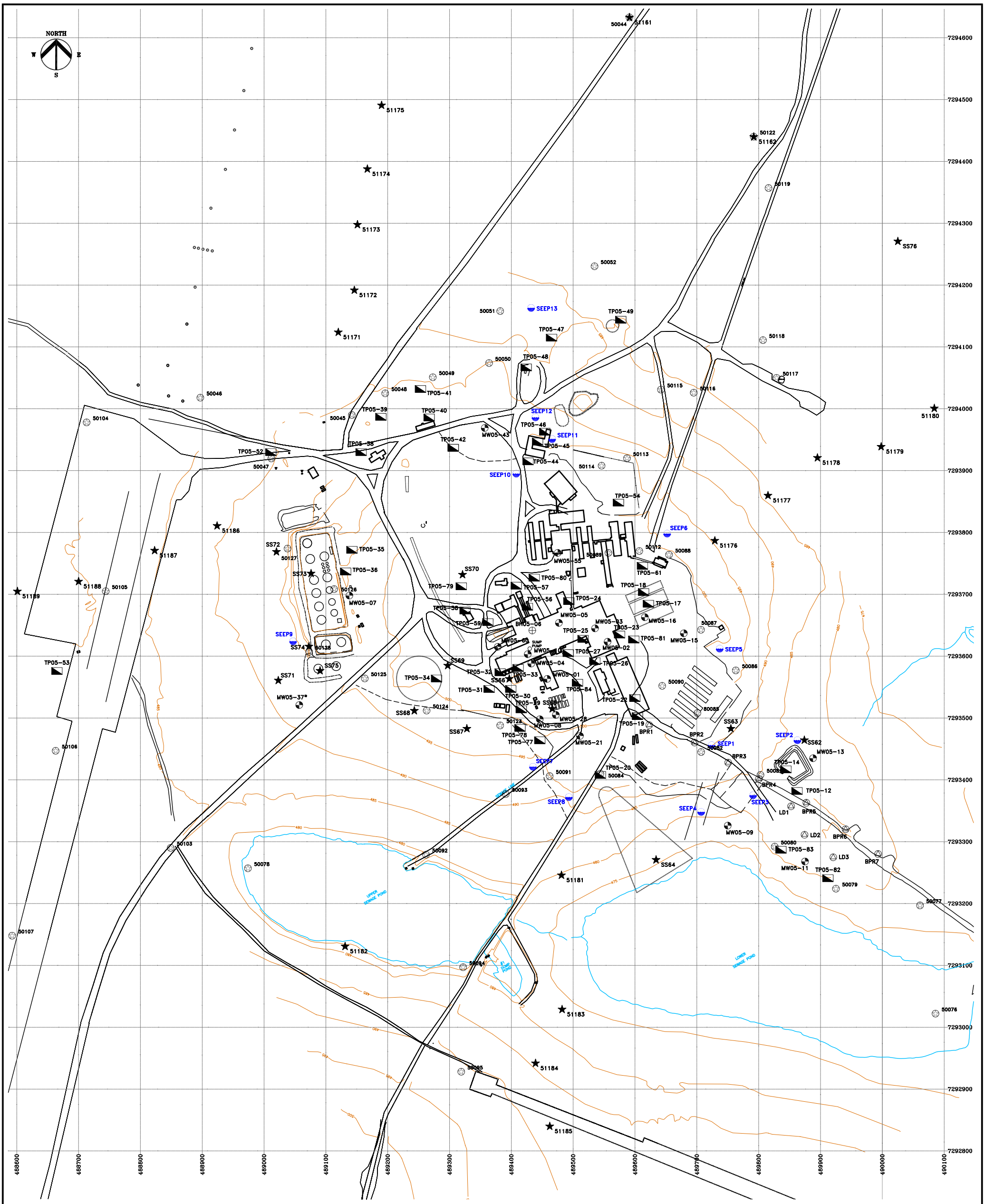
CLIENT NAME: KINROSS GOLD CORPORATION

PROJECT LOCATION: LUPIN MINE NUNAVUT

TITLE:

MILL BUILDING DETAIL PLAN

DWN BY: VAD/CDC	SCALE: 1:1,000	DATE: 2005-08-02	DWG No: A053017-003 REV.: 0
CHK'D: MT	PLOT: 20040305.1300	CADFILE: A053017R00	



LEGEND

0 50 100 200 METRES

- MONITORING WELL LOCATION (BY MORROW)
- BOREHOLE LOCATION (BY MORROW)
- TEST PIT LOCATION (BY MORROW)
- SURFACE SOIL SAMPLE LOCATION (BY MORROW)
- SURFACE WATER SAMPLE LOCATION (BY MORROW)
- 2004 ABA DRILL LOCATIONS (BY KINROSS)
- 2004 ABA SURFACE SOIL SAMPLE LOCATIONS (BY KINROSS)
- FORMER FACILITIES
- SURFACE WATER FEATURE
- TOPOGRAPHIC CONTOUR LINE

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED ON SITE. NOT ALL UTILITIES MAY BE SHOWN.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0				

MORROW

CLIENT NAME: KINROSS GOLD CORPORATION

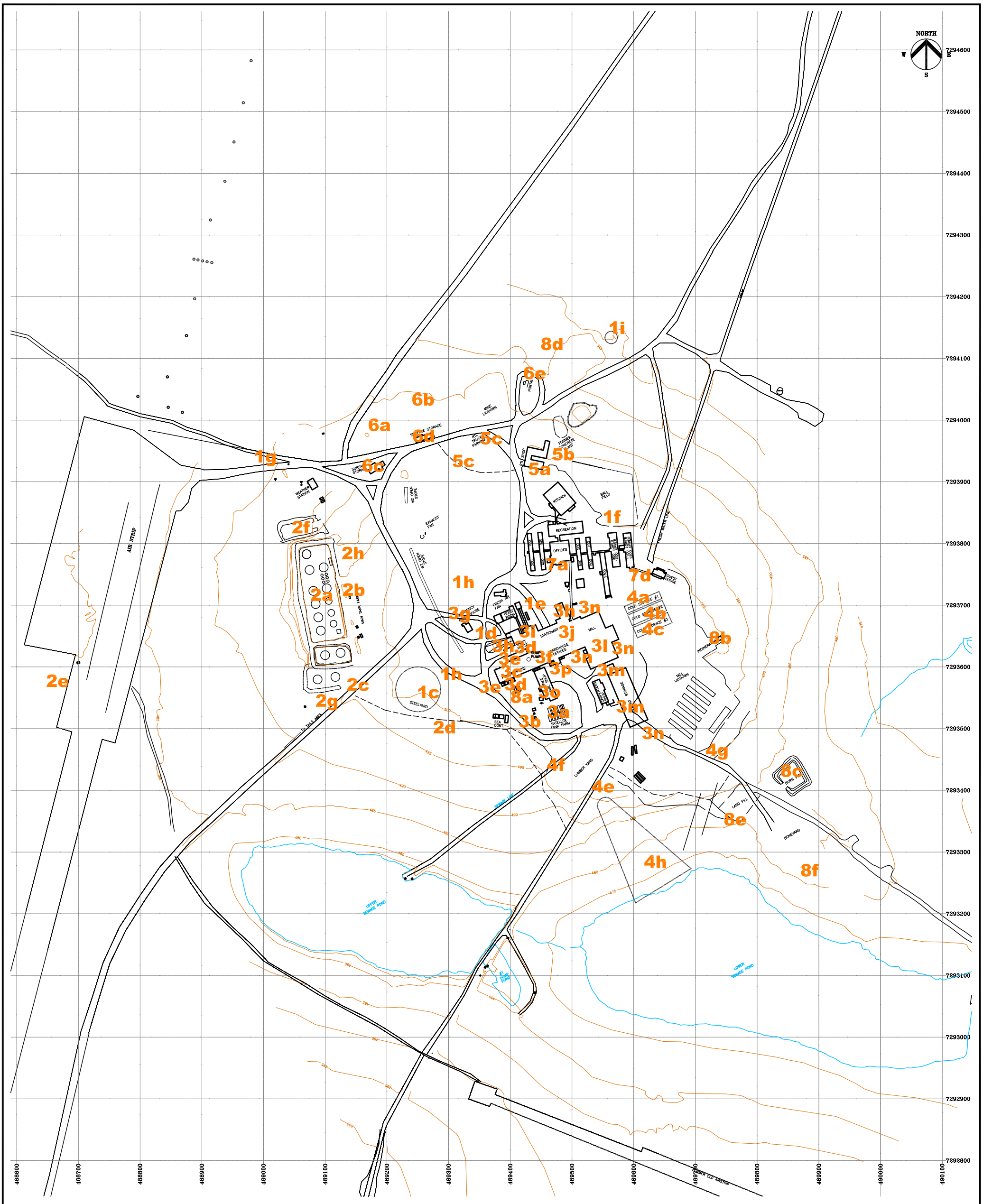
PROJECT LOCATION: LUPIN MINE NUNAVUT

TITLE:

INVESTIGATION LOCATIONS

DWN BY:	SCALE:	DATE:	DWG No:	REV.:
CZ/VAD	1:4,000	2005-08-02	A053017-004	0

CHK'D:	PLOT:	CADFILE:
MT	20040305.1300	A053017R00



LEGEND

0 50 100 200 METRES

3b AREA OF POTENTIAL ENVIRONMENTAL CONCERN

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED ON SITE. NOT ALL UTILITIES MAY BE SHOWN.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0				

MORROW

CLIENT NAME: KINROSS GOLD CORPORATION

PROJECT LOCATION: LUPIN MINE NUNAVUT

TITLE:

AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

DWN BY: VAD/CDC	SCALE: 1:4,000	DATE: 2005-08-02	DWG No: A053017-005 REV.: 0
CHK'D: MT	PLOT: 20040305.1300	CADFILE: A053017R00	

05-47	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs	Glycols
0.7 – 0.9	<0.04	<0.1	<0.05	<0.075	<10	139	881	131	<CCME RL	<CCME RL

05-46	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs	Glycols
0.3 – 0.6	–	–	–	–	–	136	212	<50	<CCME RL	–
0.9 – 1.0	<0.04	<0.1	<0.05	<0.075	<10	50	<50	<50	–	<CCME RL

05-45	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs	Glycols
0.1 – 0.3	<0.04	<0.1	<0.05	<0.075	161	4,970	1,585	53	–	–
0.6 – 0.7	<0.04	<0.1	<0.05	<0.075	170	5,310	2,100	183	<CCME RL	<CCME RL
DUPLICATE	<0.04	<0.1	<0.05	<0.075	98	5,010	2,050	193	<CCME RL	<CCME RL

05-44	B	T	E	X	F1-BTEX	F2	F3	F4
0.4 – 0.6	<0.04	<0.1	<0.05	<0.075	<10	<30	<50	<50
0.9 – 1.0	<0.04	<0.1	<0.05	<0.075	<10	35	<50	<50

05-43	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs	Glycols
0.3 – 0.4	<0.04	<0.1	<0.05	<0.075	<10	<30	157	60	–	–
1.0 – 1.2	<0.04	<0.1	<0.05	<0.075	<10	<30	139	<50	<CCME RL	<CCME RL

05-42	B	T	E	X	F1-BTEX	F2	F3	F4
0.3 – 0.4	<0.04	<0.1	<0.05	<0.075	<10	85	137	<50
0.7 – 0.9	<0.04	<0.1	<0.05	<0.075	<10	<30	<50	<50

05-39	B	T	E	X	F1-BTEX	F2	F3	F4
0.1 – 0.4	–	–	–	–	–	<30	111	<50
1.0 – 1.2	<0.04	<0.1	<0.05	<0.075	<10	<30	162	<50

05-38	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs	Glycols
0.3 – 0.4	–	–	–	–	–	34	160	<50	–	–
1.0 – 1.2	<0.04	<0.1	<0.05	<0.075	<10	<30	<50	<50	<CCME RL	<CCME RL

05-40	B	T	E	X	F1-BTEX	F2	F3	F4
0.1 – 0.3	–	–	–	–	–	<30	125	<50
0.5 – 0.7	–	–	–	–	–	<30	<50	<50
0.9 – 1.2	<0.04	<0.1	<0.05	<0.075	<10	<30	<50	<50

05-35	B	T	E	X	F1-BTEX	F2	F3	F4
0.1 – 0.4	–	–	–	–	–	<30	97	<50
0.7 – 1.0	–	–	–	–	–	<30	<50	<50
1.2 – 1.5	<0.04	<0.1	<0.05	<0.075	<10	<30	<50	<50

SS72	B	T	E	X	F1-BTEX	F2	F3	F4
0.1	<0.04	<0.1	<0.05	<0.075	<10	<30	<50	<50

SS73	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs
0.1	<0.04	<0.1	<0.05	0.350	<10	4,850	5,130	<50	<CCME RL

05-36	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs
0.3 – 0.4	<0.04	<0.1	<0.05	0.148	275	5,700	658	<50	–
0.7 – 0.9	<0.04	<0.1	<0.05	3.68	286	4,770	1,660	<50	–
1.2 – 1.3	<0.2*	1.83	2.46	98.9	1,580	9,700	9,230	<50	<CCME RL
DUPLICATE	<0.04	1.39	2.11	86.0	1,080	9,740	9,460	<50	<CCME RL

05-33	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs
0.1 – 0.3	<0.04	<0.1	<0.05	<0.075	186	5,480	497	<50	<CCME RL
DUPLICATE	<0.04	<0.1	<0.05	<0.075	164	5,870	577	<50	<CCME RL

SS71	B	T	E	X	F1-BTEX	F2	F3	F4
0.1	<0.04	<0.1	<0.05	<0.075	<10	<30	<50	<50

SS74	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs
0.1	<0.04	<0.1	<0.05	<0.075	<10	<30	57	<50	<CCME RL

05-37	B	T	E	X	F1-BTEX	F2	F3	F4
0.6 – 0.9	<0.04	<0.1	<0.05	<0.075	<10	33	<50	<50

SS75	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs
0.1	<0.04	<0.1	<0.05	<0.075	<10	849	285	90	<CCME RL

SS70	B	T	E	X	F1-BTEX	F2	F3	F4
0.1	–	–	–	–	–	<30	85	<50

05-79	B	T	E	X	F1-BTEX	F2	F3	F4
1.0 – 1.3	–	–	–	–	–	<30	92	<50

05-55	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs
0.4 – 0.6	<0.04	<0.1	<0.05	<0.075	76	1,710	609	<50	<CCME RL
DUPLICATE	<0.04	<0.1	<0.05	<0.075	76	–	–	–	–

SS68	B	T	E	X	F1-BTEX	F2	F3	F4
0.1	<0.04	<0.1	<0.05	<0.075	<10	<30	<50	<50

SS69	B	T	E	X	F1-BTEX	F2	F3	F4
0.1	–	–	–	–	–	<30	80	<50

05-50	B	T	E	X	F1-BTEX	F2	F3	F4	Naphth	Glycols
0.3 – 0.6	<0.04	<0.1	<0.05	<0.075	<10	181	1,000	1,030	0.091	<CCME RL

SS67	B	T	E	X	F1-BTEX	F2	F3	F4
0.1	<0.04	<0.1	<0.05	<0.075	<10	<30	<50	<50

05-31	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs
0.4 – 0.6	–	–	–	–	–	<30	127	61	<CCME RL
0.9 – 1.0	–	–	–	–	–	<30	<50	<50	<CCME RL
1.2 – 1.5	–	–	–	–	–	<30	58	<50	<CCME RL

05-32	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs	Glycols
0.3 – 0.6	<0.04	<0.1	<0.05	<0.075	<10	21	64	<50	–	<CCME RL
1.0 – 1.2	<0.04	<0.1	<0.05	<0.075	<10	55	<50	<50	–	–
1.6 – 2.0	<0.04	<0.1	<0.05	0.468	11	2,350	1,870	437	<CCME RL	<CCME RL
DUPLICATE	<0.04	<0.1	<0.05	0.468	13	799	708	186	<CCME RL	<CCME RL

05-30	B	T	E	X	F1-BTEX	F2	F3	F4	Glycols
0.3 – 0.4	–	–	–	–	–	<30	<50	<50	–
1.0 – 1.2	–	–	–	–	–	<30	<50	<50	<CCME RL

SS66	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs	Glycols
0.1	–	–	–	–	–	<30	200	174	<CCME RL	<CCME RL

05-33	B	T	E	X	F1-BTEX	F2	F3	F4	Naphth	Glycols
0.4 – 0.7	<0.04	<0.1	<0.05	0.301	28	2,990	1,870	427	–	–
1.2 – 1.5	<0.04	0.39	0.342	94	665	7,280	1,350	<50	–	–
1.7 – 1.8	<0.2*	2.66	3.56	81.2	977	9,580	1,150	<50	0.91	<CCME RL

SS75	B	T	E	X	F1-BTEX	F2	F3	F4
1.3 – 1.5	–	–	–	–	–	35	200	64

05-80	B	T	E	X	F1-BTEX	F2	F3	F4
1.0 – 1.2	–	–	–	–	–	2,200	513	<50

05-56	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs
1.5 – 1.7	<0.04	<0.1	<0.05	<0.075	<10	<30	97	<50	<CCME RL

05-55	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs
0.3 – 0.6	<0.04	<0.1	<0.05	0.207	170	5,000	600	<50	–
1.0 – 1.3	<0.04	<0.1	<0.05	0.177	971	5,700	513	<50	<CCME RL
DUPLICATE	<0.04	<0.1	<0.05	0.172	881	5,770	600	<50	<CCME RL

05-24	B	T	E	X	F1-BTEX	F2	F3	F4
0.1 – 0.4	<0.04	<0.1	<0.05	<0.075	76	<30	79	<50
0.7 – 0.9	<0.04	<0.1	<0.05	<0.075	<10	<30	77	<50

05-81	B	T	E	X	F1-BTEX	F2	F3	F4
0.3 – 0.4	<0.04	<0.1	<0.05	<0.075	<10	50	142	<50

05-18	B	T	E	X	F1-BTEX	F2	F3	F4
0.1 – 0.4	<0.04	<0.1	<0.05	<0.075	91	<30	117	<50
0.9 – 1.0	<0.04	<0.1	<0.05	<0.075	<10	<30	<50	<50

05-25	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs	Glycols
0.1 – 0.3	<0.04	<0.1	<0.05	<0.075	<10	<30	72	70	–	–
0.6 – 0.7	<0.04	<0.1	<0.05	<0.075	<10	<30	<50	<50	–	–
1.2 – 1.3	<0.04	<0.1	<0.05	0.141	10	591	213	<50	<CCME RL	<CCME RL
DUPLICATE	<0.04	<0.1	<0.05	<0.075	18	551	212	<50	<CCME RL	<CCME RL

05-23	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs	Glycols
0.3 – 0.4	<0.04	<0.1	<0.05	<0.075	<10	<30	<30	–	–	–
1.0 – 1.3	<0.04	<0.1	<0.05	1.23	55	770	224	<50	–	–
1.7 – 2.0	<0.04	0.12	<0.05	0.56	284	1,700	449	<50	<CCME RL	<CCME RL

05-81	B	T	E	X	F1-BTEX	F2	F3	F4
0.7 – 0.9	–	–	–	–	–	<30	<50	<50

05-15	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs
0.3 – 0.6	<0.04	<0.1	<0.05	<0.075	95	<30	157	90	–
0.9 – 1.2	<0.04	<0.1	<0.05	0.178	90	5,000	700	<50	<CCME RL

05-10	B	T	E	X	F1-BTEX	F2	F3	F4	Glycols
0.4 – 0.7	<0.04	<0.1	<0.05	<0.075	<10	67	241	<50	<CCME RL	<CCME RL

SS63	B	T	E	X	F1-BTEX	F2	F3	F4
0.1	–	–	–	–	–	<30	<50	<50

SS62	B	T	E	X	F1-BTEX	F2	F3	F4
0.1	–	–	–	–	–	<30	<50	<50

05-14	B	T	E	X	F1-BTEX	F2	F3	F4	Glycols
0.3 – 0.6	0.301	0.89	0.341	2.48	270	3,700	4,050	1,790	–
1.0 – 1.3	0.288	1.08	0.883	2.04	141	5,600	1,900	263	<CCME RL

05-13	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs
0.3 – 0.6	<0.04	<0.1	<0.05	<0.075	<10	<30	<50	<50	–
1.2 – 1.5	<0.04	<0.1	<0.05	<0.075	<10	<30	<50	<50	<CCME RL

05-12	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs
0.1 – 0.4	<0.04	<0.1	<0.05	<0.075	66	1,600	1,040	210	<CCME RL
0.9 – 1.2	<0.04	<0.1	<0.05	<0.075	45	<30	<50	<50	–

05-11	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs	Glycols
0.3 – 0.6	<0.04	<0.1	<0.05	<0.075	<10	105	201	<50	<CCME RL	–
1.0 – 1.3	<0.04	<0.1	<0.05	<0.075	<10	52	579	<50	–	<CCME RL

05-82	B	T	E	X	F1-BTEX	F2	F3	F4
1.0 – 1.2	–	–	–	–	–	<30	62	<50

05-83	B	T	E	X	F1-BTEX	F2	F3	F4
0.5 – 0.7	–	–	–	–	–	<30	148	<50

05-19	B	T	E	X	F1-BTEX	F2	F3	F4
0.1 – 0.3	<0.04	<0.1	<0.05	<0.075	<10	<30	91	<50
1.0 – 1.3	<0.04	<0.1	<0.05	<0.075	<10	<30	57	<50

05-26	B	T	E	X	F1-BTEX	F2	F3	F4
0.1 – 0.3	<0.04	<0.1	<0.05	<0.075	<10	<30	123	<50
0.4 – 0.6	<0.04	<0.1	<0.05	<0.075	<10	<30	101	<50
1.2 – 1.3	<0.04	<0.1	<0.05	<0.075	<10	749	402	<50

05-84	B	T	E	X	F1-BTEX	F2	F3	F4
1.5 – 1.7	–	–	–	–	–	<30	<50	<50

SS64	B	T	E	X	F1-BTEX	F2	F3	F4	Glycols
0.1	–	–	–	–	–	<30	<50	<50	<CCME RL

05-21	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs	Glycols
0.0 – 0.1	<0.04	<0.1	<0.05	<0.075	<10	<30	175	<50	<CCME RL	–
0.6 – 0.7	<0.04	<0.1	<0.05	<0.075	<10	<30	302	<50	–	<CCME RL

05-28	B	T	E	X	F1-BTEX	F2	F3	F4	Naphth
0.3 – 0.4	<0.09	<0.2	<0.1	16.9	1,200	5,040	2,020	<50	–
1.0 – 1.2	0.48	4.9	4.02	48.2	1,470	9,010	5,000	<50	–
1.5 – 1.7	<0.8*	8.1	7.8	78.4	2,050	9,190	5,410	<50	5.40
DUPLICATE	0.484	8.33	7.44	88.4	1,900	14,000	5,000	<50	–

SS65	B	T	E	X	F1-BTEX	F2	F3	F4
0.1	0.662	1.17	1.18	7.58	197	5,000	4,400	70

05-77	B	T	E	X	F1-BTEX	F2	F3	F4
0.7 – 1.0	–	–	–	–	5,010	905	<50	–

05-29	B	T	E	X	F1-BTEX	F2	F3	F4	PAHs
0.1 – 0.3	<0.04	<0.1	<0.05	1.1	51	5,200	2,170	143	–
0.7 – 0.9	<0.04	<0.1	<0.05	0.08	<10	52	<50	<50	–
1.2 – 1.3	<0.04	0.26	0.12	0.681	<10	<30	<50	<50	<CCME RL

LEGEND

- MONITORING WELL LOCATION (BY MORROW)
- BOREHOLE LOCATION (BY MORROW)
- TEST PIT LOCATION (BY MORROW)
- SURFACE SOIL SAMPLE LOCATION (BY MORROW)
- SURFACE WATER SAMPLE LOCATION (BY MORROW)
- 2004 ABA DRILL LOCATIONS (BY KINROSS)
- 2004 ABA SURFACE SOIL SAMPLE LOCATIONS (BY KINROSS)
- FORMER FACILITIES
- SURFACE WATER FEATURE
- TOPOGRAPHIC CONTOUR LINE
- CONCENTRATION(S) LESS THAN OR EQUAL TO THE CCME RL GUIDELINES
- CONCENTRATION(S) GREATER THAN THE CCME RL GUIDELINES

0 50 100 200 METRES

ANALYTICAL SOIL RESULTS

SAMPLE ID	02-13	B	T	E	X	F1	F2	Pb
DEPTH OF SAMPLE (m)	4.1-4.6	1.08	310	950	940	<0.1	<0.1	<0.01

RED – CONCENTRATION(S) GREATER THAN THE CCME RL GUIDELINES (mg/kg)

GREEN – CONCENTRATION(S) LESS THAN OR EQUAL TO THE CCME RL GUIDELINES (mg/kg)

* – LABORATORY DETECTION LIMIT EXCEEDS CCME RL GUIDELINE

Naphth – NAPTHENE

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED ON SITE. NOT ALL UTILITIES MAY BE SHOWN.

REFERENCE DRAWINGS

No.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	–	–	–	–

MORROW

CLIENT NAME: KINROSS GOLD CORPORATION

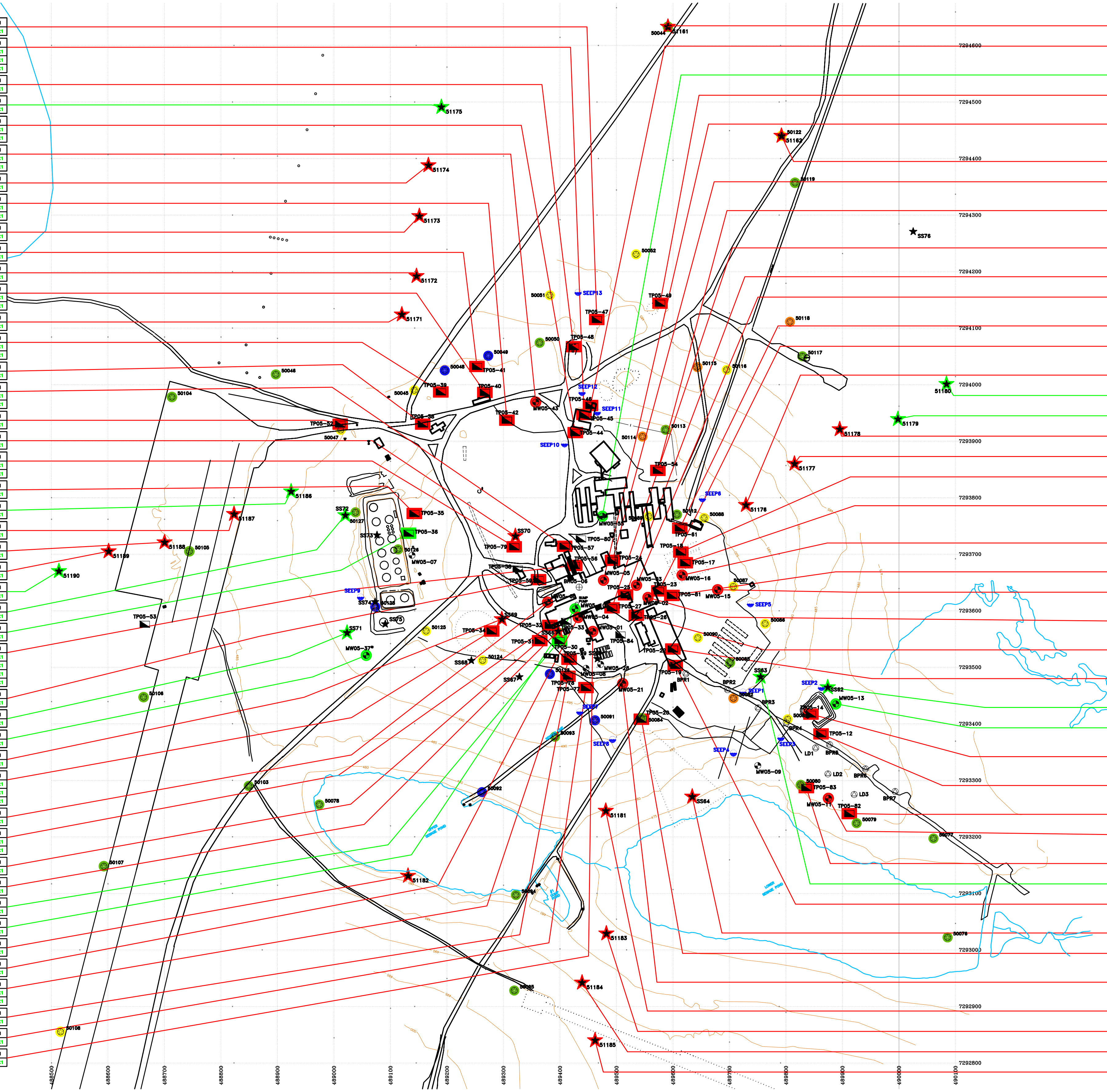
PROJECT LOCATION: LUPIN MINE NUNAVUT

TITLE: **DETAILED SOIL ANALYTICAL RESULTS - HYDROCARBONS**

DWN BY: CDC | SCALE: 1:4,000 | DATE: 2005-09-07 | DWG No: A053017-006A | REV.: 0

CHK'D: NS | CADFILE: K:\A05\A05-3017\A053017R02

PLOT DATE: 20060127:1032



Sample ID	Depth (m)	Sb	As	Ba	Be	Cd	Cr	Co	Cu	Pb	Hg	Mo	Ni	Se	Ag	Sn	V	Zn	Tl
05-47	0.7 – 0.9	<10	1,790	115	<0.5	<0.5	67.5	16.2	62.9	<30	<0.005	<4	58.9	<2*	<2	<5	45.6	67.9	<1
05-45	0.1 – 0.3	<10	1,150	223	<0.5	<0.5	80.3	18.3	59.4	<30	<0.005	<4	56.6	<2*	<2	<5	58.6	67	<1
	0.6 – 0.7	<10	177	174	<0.5	<0.5	70.8	16.7	53.7	<30	<0.005	<4	51.6	<2*	<2	<5	51.4	56.7	<1
	DUPLICATE	<10	308	173	<0.5	<0.5	70.6	18.3	43.4	<30	<0.005	<4	55.7	<2*	<2	<5	52	61.5	<1
05-48	0.1 – 0.3	<10	60.9	44.1	<0.5	<0.5	27.1	5.5	14.2	<30	<0.005	<4	18.5	<2*	<2	<5	23.1	26.7	<1
51175	0.4	<10	10.4	24.3	<0.5	<0.5	18.3	3.7	11.5	<30	0.007	<4	12.7	<2*	<2	<5	19.2	18.6	<1
05-44	0.4 – 0.6	<10	17.2	42.5	<0.5	<0.5	46.3	9.8	26.5	<30	<0.005	<4	33.8	<2*	<2	<5	28.3	34.5	<1
	0.9 – 1.0	<10	7.8	32.1	<0.5	<0.5	27.4	5.1	18.3	<30	0.0081	<4	15.4	<2*	<2	<5	25	22.4	<1
05-43	0.3 – 0.4	<10	1,270	217	<0.5	<0.5	71.5	16.7	38.8	<30	<0.005	<4	49.8	<2*	<2	8.8	45.8	60.6	<1
	1.0 – 1.2	<10	38.2	28.7	<0.5	<0.5	24.9	4.4	15.1	<30	<0.005	<4	14.9	<2*	<2	<5	18.7	22.8	<1
51174	0.4	<10	12.3	33.5	<0.5	<0.5	34.4	5.1	14.3	<30	0.0131	<4	19.9	<2*	<2	<5	20.8	18.5	<1
05-42	0.3 – 0.4	<10	1,150	146	<0.5	<0.5	67.8	15.3	37.8	<30	<0.005	<4	48.2	<2*	<2	<5	48.5	57.1	<1
	0.7 – 0.9	<10	9	34.2	<0.5	<0.5	24.9	4.3	13.5	<30	<0.005	<4	13.7	<2*	<2	<5	24.4	21.7	<1
51173	0.4	<10	185	37.6	<0.5	<0.5	12.7	11.7	59.6	<30	0.102	<4	34.1	<2*	<2	<5	7.8	20	<1
05-41	0.9 – 1.0	<10	915	189	<0.5	<0.5	76.7	19	47.4	<30	<0.005	<4	61.4	<2*	<2	<5	55.8	53.9	<1
51172	0.3	<10	38.9	43.1	<0.5	<0.5	28.6	5.7	14.9	<30	0.0177	<4	18.9	<2*	<2	<5	29.1	27.2	<1
05-40	0.1 – 0.3	<10	680	141	<0.5	<0.5	64.5	12	27.7	<30	<0.005	<4	39	<2*	<2	<5	41.5	48.3	<1
	0.5 – 0.7	<10	10.8	41.3	<0.5	<0.5	32.7	5.8	15.2	<30	<0.005	<4	17.5	<2*	<2	<5	24.5	27.1	<1
51171	0.3	<10	20.1	37.1	<0.5	<0.5	28.9	5.2	13.7	<30	0.0133	<4	18.9	<2*	<2	<5	25.3	23.5	<1
05-39	0.1 – 0.4	<10	1,250	188	<0.5	<0.5	71.6	8.8	31.1	<30	<0.005	<4	32.2	<2*	<2	<5	48.3	50.6	<1
	1.0 – 1.2	<10	372	558	<0.5	<0.5	94.3	24	49.2	<30	<0.005	<4	68.6	<2*	<2	<5	84.4	78.5	<1
05-38	0.3 – 0.4	<10	12.5	32.4	<0.5	<0.5	27.2	5.2	13.2	<30	<0.005	<4	14.3	<2*	<2	<5	21.1	20	<1
05-57	0.1 – 0.3	<10	4,090	193	<0.5	<0.5	65.3	9.5	42.9	<30	<0.005	<4	33.1	<2*	<2	<5	52.7	48.2	<1
	0.7 – 0.9	<10	2,940	237	<0.5	<0.5	74.2	17.6	46.5	<30	0.0141	<4	55.5	<2*	<2	<5	56.5	72.3	<1
05-52	0.1 – 0.3	<10	1,090	149	<0.5	<0.5	55.7	8.4	33.7	<30	<0.005	<4	29.5	<2*	<2	<5	41.5	44.6	<1
SS70	0.1	<10	124	39.5	<0.5	<0.5	26.8	4.9	13.6	<30	<0.005	<4	18.2	<2*	<2	<5	23.3	22.8	<1
05-79	0.1 – 0.3	<10	369	56.7	<0.5	<0.5	32.6	5.5	17.1	<30	<0.005	<4	25.6	<2*	<2	<5	23.3	25.6	<1
	1.7 – 1.8	<10	11,700	104	<0.5	<0.5	35.2	7.4	46.1	156	<0.005	<4	23.9	<2*	<2	<5	28.1	30	<1
05-35	0.1 – 0.4	<10	359	129	<0.5	<0.5	80.7	20.6	49.2	<30	<0.005	<4	58.8	<2*	<2	<5	47.2	76.4	<1
51186	0.3	<10	8.6	32.7	<0.5	<0.5	18	3.3	8.6	<30	0.0076	<4	10.5	<2*	<2	<5	19.3	18	<1
51187	0.2	<10	20.8	33.4	<0.5	<0.5	21.2	4.7	12	<30	<0.005	<4	13.5	<2*	<2	<5	22.9	18.8	<1
51188	0.3	<10	40.4	36	<0.5	<0.5	15.5	2.8	7.1	<30	0.0145	<4	8.9	<2*	<2	<5	14.8	15.2	<1
51189	0.3	<10	27.3	25.6	<0.5	<0.5	21.3	6	19.9	<30	0.015	<4	23.6	<2*	<2	<5	19.2	27	<1
51190	0.3	<10	10.6	21.2	<0.5	<0.5	14.6	3	10.2	<30	<0.005	<4	11.7	<2*	<2	<5	13.9	14.8	<1
SS72	0.1	<10	<5	31.7	<0.5	<0.5	23.1	3.8	9.8	<30	0.0156	<4	12.2	<2*	<2	<5	21.3	20.6	<1
05-36	0.3 – 0.4	<10	9	32.5	<0.5	<0.5	29.2	4.7	11.9	<30	<0.005	<4	16.8	<2*	<2	<5	20.6	22	<1
05-56	0.1 – 0.3	<10	9,040	109	<0.5	<0.5	47.1	4.7	109	<30	0.0057	<4	17.2	<2*	<2	<5	31.6	32.8	<1
	DUPLICATE	<10	9,230	94.8	<0.5	<0.5	36	5	84.7	<30	0.0094	<4	18.7	<2*	2.5	<5	27.5	31.1	<1
	0.9 – 1.0	<10	850	48	<0.5	<0.5	27.6	4.2	17.4	<30	<0.005	<4	15.2	<2*	<2	<5	22	22.7	<1
	1.5 – 1.7	<10	710	199	<0.5	<0.5	83.1	16.8	55.4	<30	<0.005	<4	58.7	<2*	<2	<5	60.1	79.7	<1
05-59	0.1 – 0.3	<10	4,020	173	<0.5	<0.5	69.1	10.1	34.6	<30	<0.005	<4	36.9	<2*	<2	<5	50.8	49.6	<1
SS71	0.1	<10	<5	28.7	<0.5	<0.5	20.3	3.5	8.8	<30	<0.005	<4	10.7	<2*	<2	<5	19.5	17.8	<1
05-37	0.6 – 0.9	<10	6.4	41.9	<0.5	<0.5	25.4	4.3	13.6	<30	<0.005	<4	13.2	<2*	<2	<5	22.1	22.7	<1
SS69	0.1	<10	97.3	42.6	<0.5	<0.5	26.6	4.8	13	<30	<0.005	<4	14.7	<2*	<2	<5	24.2	24.3	<1
05-34	0.1 – 0.3	<10	1,120	181	<0.5	<0.5	82.6	8.2	34.3	<30	<0.005	<4	34.1	<2*	<2	<5	49.9	54	<1
	0.6 – 0.9	<10	882	214	<0.5	<0.5	78	23.5	40.5	92	<0.005	<4	63.8	<2*	<2	<5	49.6	77.3	<1
	1.2 – 1.3	<10	29.8	35.8	<0.5	<0.5	22.6	4.4	11	<30	<0.005	<4	12.3	<2*	<2	<5	19	19.9	<1
05-60	0.3 – 0.6	<10	584	73.7	<0.5	<0.5	42.7	34.9	24.7	<30	<0.005	<4	31.1	<2*	<2	<5	27	54.4	<1
05-32	0.3 – 0.6	<10	3,700	216	<0.5	<0.5	70	9.8	34.3	<30	<0.005	<4	34.3	<2*	<2	<5	46.7	49.3	<1
	1.8 – 2.0	<10	339	71.4	<0.5	<0.5	42.8	8.8	20.3	<30	<0.005	<4	29.5	<2*	<2	<5	27.6	42.9	<1
05-31	0.4 – 0.6	<10	81.3	48	<0.5	<0.5	34.3	6.8	16.2	<30	<0.005	<4	21.5	<2*	<2	<5	23.8	28.8	<1
SS66	0.1	<10	14	42.5	<0.5	<0.5	30.5	5.1	14.8	<30	<0.005	<4	18.1	<2*	<2	<5	20.8	23.9	<1
05-30	0.3 – 0.4	<10	9.9	37.4	<0.5	<0.5	27.4	4.5	12.9	<30	<0.005	<4	15.2	<2*	<2	<5	19.9	20.9	<1
05-10	0.4 – 0.7	<10	10	47.8	<0.5	<0.5	54.1	8.1	30.6	<30	<0.005	<4	29.6	<2*	<2	<5	28.4	33.9	<1
51182	0.3	<10	179	103	<0.5	1.28	29.7	18.2	77.8	<30	0.0613	<4	34.9	<2*	<2	<5	24	193	<1
05-04	0.7 – 1.0	<10	113	123	<0.5	<0.5	57.4	9.8	31.7	<30	<0.005	6.2	33.7	<2*	<2	<5	39.7	58.8	<1
05-29	0.1 – 0.3	<10	940	159	<0.5	<0.5	65.3	13.7	34.2	<30	<0.005	<4	43.4	<2*	<2	<5	44.7	64.2	<1
	1.2 – 1.3	<10	14.7	41	<0.5	<0.5	27.8	4.6	11.7	<30	<0.005	<4	13.7	<2*	<2	<5	27.3	23.8	<1
05-78	0.7 – 1.0	<10	484	77.3	<0.5	<0.5	45.3	17.9	27.7	<30	<0.005	<4	29.5	<2*	<2	<5	30.7	44.4	<1
05-77	0.1 – 0.4	<10	3,210	158	<0.5	<0.5	59.4	7.9	27.8	<30	<0.005	<4	30	<2*	<2	<5	49.3	43.7	<1
05-01	1.1 – 1.4	<10	1,690	144	<0.5	<0.5	77.4	10.2	32.2	<30	<0.005	18	41.6	<2*	<2	<5	42.8	48.6	<1
51161	0.0 – 0.1	<10	128	61.1	<0.5	<0.5	35.3	6	17.5	<30	<0.005	<4	20.9	<2*	<2	<5	24.5	27.2	<1
05-46	0.3 – 0.6	<10	1,010	112	<0.5	<0.5	36	5.1	36.4	<30	0.0079	<4	16.1	<2*	<2	<5	23.8	36	<1
	0.9 – 1.0	<10	12.2	38.7	<0.5	<0.5	27.5	4.7	14.1	<30	<0.005	<4	14.7	<2*	<2	<5	24.4	24.3	<1
05-55	0.3 – 0.6	<10	<5	38.2	<0.5	<0.5	28.1	4.3	13.4	<30	<0.005	<4	15.8	<2*	<2	<5	21.6	22	<1
05-49	0.3 – 0.4	<10	4,770	198	<0.5	<0.5	62.1	10.4	39.8	<30	<0.005	<4	38.2	<2*	<2	<5	45.8	47.9	<1
	0.7 – 0.9	<10	8,900	50.5	<0.5	<0.5	30.8	8.3	44.9	<30	<0.005	<4	25.7	<2*	<2	<5	20.8	28.4	<1
05-05	0.7 – 0.9	<10	144	142	<0.5	<0.5	56.8	7.8	24.7	<30	<0.005	10	29.8	<2*	<2	<5	35.8	41.7	<1
	1.8 – 2.0	<10	50.2	55.7	<0.5	<0.5	40.7	5.5	16.1	<30	<0.005	11.2	24.6	<2*	<2	<5	23.8	26.4	<1
	DUPLICATE	<10	47.5	55	<0.5	<0.5	46.4	5.4	16	<30	<0.005	11.6	25.4	<2*	<2	<5	25.3	26.6	<1
51162	0.0 – 0.1	<10	443	111	<0.5	<0.5	48.3	6.7	24.1	<30	<0.005	<4	25	<2*	<2	<5	33.3	36.4	<1
05-24	0.1 – 0.4	<10	341	78.4	<0.5	<0.5	38.2	6.8	26.9	<30	<0.005	<4	22.4	<2*	<2	<5	27.5	39.2	<1
	0.7 – 0.9	<10	189	73.3	<0.5	<0.5	51.4	11.2	47.3	<30	<0.005	<4	35	<2*	<2	<5	34.3	45.2	<1
05-54	0.1 – 0.3	<10	1,860	215	<0.5	<0.5	73.8	8.5	29.1	<30	<0.005	<4	30.4	<2*	<2	<5	33.7	49	<1
	DUPLICATE	<10	1,740	204	<0.5	<0.5	67.8	7.4	26.1	<30	<0.005	<4	28.8	<2*	<2	<5	40.5	49	<1
	0.6 – 0.7	<10	910	130	<0.5	<0.5	90	7.8	35.1	<30	<0.005	<4	27.9	<2*	<2	<5	42.8	44.2	<1
05-27	0.1 – 0.3	<10	1,440	152	<0.5	<0.5	62.8	13.2	33.5	<30	0.0093	<4	41.7	<2*	<2	<5	44.2	64.8	<1
	1.2 – 1.3	<10	14.6	41.4	<0.5	<0.5	25.3	5	14	<30	<0.005	<4	13.7	<2*	<2	<5	21.5	22.8	<1
05-25	0.1 – 0.3	<10	3,010	150	<0.5	<0.5	61.6	12.8	51.5	49	<0.005	<4	44.5	<2*	<2	<5	42	59.2	<1
05-03	0.7 – 1.0	<10	39.9	47.8	<0.5	<0.5	31.2	5.5	13.6	<30	<0.005	<4	16.5	<2*	<2	<5	25.1	34.7	<1
	1.7 – 2.0	<10	5.9	35.2	<0.5	<0.5	29	4.2	11	<30	<0.005	<4	15.5	<2*	<2	<5	19.8	23.3	<1
05-61	0.3 – 0.4	<10	472	95.6	<0.5	<0.5	47.8	6.1	20.5	<30	0.0067	<4	22.8	<2*	<2	<5	35	35.7	<1
05-23	0.3 – 0.4	<10	1,130	236	<0.5	<0.5	85	18	42.7	<30	<0.005	<4	61.6	<2*	<2	<5	82.3	75.6	<1
	1.7 – 2.0	<10	15.7	42.6	<0.5	<0.5	36.5	6.6	19.5	<30	<0.005	<4	21.9	<2*	<2	<5	25.9	30.8	<1
51176	0.4	<10	62.3	54.6	<0.5	<0.5	20.7	5.9	18.7	<30	0.0637	<4	18.7	<2*	<2	<5	28.6	29.8	<1
51180	0.4	<10	11	29	<0.5	<0.5	14.3	3.6	11.2	<30	0.0374	<4	11.3	<2*	<2	<5	15.9	14.4	<1
51179	0.4	<10	9.4	31.2	<0.5	<0.5	21	4	9.4	<30	<0.005	<4	12.2	<2*	<2	<5	19.2	19.6	<1
51178	0.4	<10	12.5	23.3	<0.5	<0.5	17.6	2.8	5	<30	0.0102	<4	9.9	<2*	<2	<5	19.2	15	<1
51177	0.3	<10	92.5	45.4	<0.5	<0.5	22.8	5.9	15.7	<30	0.0445	<4	18.7	<2*	<2	<5	24.8	24.7	<1
05-18	0.1 – 0.4	<10	511	239	<0.5	<0.5	91.5	20.8	33.4	<30	<0.005	<4	59.7	<2*	<2	<5	63.7	80.2	<1
	0.9 – 1.0	<10	12	47.3	<0.5	<0.5	32.7	5.5	15	<30	<0.005	<4	18	<2*	<2	<5	27.6	28.1	<1
05-17	0.1 – 0.4	<10	122	184	<0.5	<0.5	84.7	20.7	45.9	<30	<0.005	<4	64	<2*	<2	<5	58	75.6	<1
	1.0 – 1.2	<10	8.9	37.8	<0.5	<0.5	29	5.5	12.8	<30	<0.005	<4	17.6	<2*	<2	<5	22.5	30.3	<1
	DUPLICATE	<10	154	185	<0.5	<0.5	88.5	21.6	53.1	<30	<0.005	<4	67.3	<2*	<2	<5	60.6	80	<1
05-16	0.1 – 0.4	<10	1,060	189	<0.5	<0.5	87.3	20.5	44.8	88	<0.005	<4	68.9	<2*	<2	<5	58.9	70.9	<1
	1.0 – 1.3	<10	556	147	<0.5	<0.5	66.4	18.5	40.8	84	<0.005	<4	51.1	<2*	<2	<5	44.9	70.3	<1
05-81	0.3 – 0.6	<10	1,040	103	<0.5	<0.5	44.3	6.5	26.4	31	0.0082	<4	23.2	<2*	<2	<5	31	40.5	<1
05-15	0.3 – 0.6	<10	2,110	189	<0.5	<0.5	79.8	7.8	42.4	<30	<0.005	<4	33.6	<2*	<2	<5	32.6	59.4	<1
	0.9 – 1.2	<10	619	101	<0.5	<0.5	45.6	11	30.3	<30	0.0076	<4	35.4	<2*	<2	<5	35.8	54.5	<1
05-02	1.0 – 1.3	<10	26.6	63.5	<0.5	<0.5	60.2	8.3	26.2	<30	<0.005	7.3	32.7	<2*	<2	<5	36.6	36.5	<1
	2.3 – 2.6	<10	13.4	80.1	<0.5	<0.5	76	8.8	24.3	<30	<0.005	22.8	39	<2*	<2	<5	38.3	35.5	<1
05-26	0.1 – 0.3	<10	1,620	206	<0.5	<0.5	72.8	9.7	46	712	0.0063	<4	34	<2*	<2	<5	51.4	61.4	<1
	0.4 – 0.6	<10	1,500	207	<0.5	<0.5	80.3	20.4	47.1	<30	<0.005	<4	63.4	<2*	<2	<5	59.1	75.2	<1
05-22	0.3 – 0.4	<10	1,100	232	<0.5	<0.5	88.5	17.7	41.9	<30	<0.005	<4	60.5	<2*	<2	<5	65.6	70.4	<1
	1.0 – 1.3	<10	1,700	239	<0.5	<0.5	88.3	18.8	48.8	<30	<0.005	<4	61.1	<2*	<2	<5	62.3	71.1	<1
SS62	0.1	<10	11.9	40.3	<0.5	<0.5	27.7	5.3	13.3	<30	0.0051	<4	14.9	<2*	<2	<5	25	68.1	<1
05-13	0.3 – 0.6	<10	<5	30.9	<0.5	<0.5	18.5	3.5	8.7	<30	<0.005	<4	9.4	<2*	<2	<5	18.6	19.5	<1
	1.2 – 1.5	<10	<5	42.6	<0.5	<0.5	25.7	4.2	11.9	<30	<0.005	<4	13.4	<2*	<2	<5	22.2	30.9	<1
05-14	0.3 – 0.6	171	1,690	249	<0.5	8.38	74.4	12.9	489	3,410	0.0549	10.6	42.5	<2*	7.2	<5	40	1,570	<1
	1.0 – 1.3	14	14.7	61	<0.5	0.6	30	4	33.5	1,570	<0.005	<4	14	<2*	<2	<5	19.8	257	<1
05-12	0.1 – 0.4	<10	79.8	45.4	<0.5	<0.5	32.8	5.6	46	37	0.0064	4.6	31.9	<2*	<2	9.3	25	75.8	<1
	0.9 – 1.2	<10	20.8	42.2	<0.5	<0.5	26.1	5.1	14.6	<30	<0.005	<4	14.2	<2*	<2	<5	23.6	25.3	<1
05-82	1.0 – 1.2	10	1,100	211	<0.5	0.74	78.2	18.6	76	85	0.0283	4	58	<2*	<2	<5	53	146	<1
05-11	0.3 – 0.6	<10	1,510	212	<0.5	1.18	77	19.8	187	40	0.0054	<4	57.9	<2*	<2	<5	55.2	389	<1
	1.0 – 1.3	<10	2,430	189	<0.5	<0.5	75.5	18.8	171	<30	<0.005	<4	51.5	<2*	<2	<5	48.5	183	<1
05-83	0.5 – 0.7	<10	358	80.1	<0.5	<0.5	40.5	8.2	21.9	<30	<0.005	<4	20.6	<2*	<2	<5	27.7	45.4	<1
SS63	0.1	<10	10.9	33.5	<0.5	<0.5	23.5	4.2	11.5	<30	0.0063	<4	12.9	<2*	<2	<5	20.7	26.9	<1
05-19	0.1 – 0.3	<10	1,110	177	<0.5	<0.5	74.8	11.6	33.6	<30	<0.005	<4	40.9	<2*	<2	<5	53.5	55.7	<1
	1.0 – 1.3	<10	1,340	142	<0.5	<0.5	61.1	13.9	34.7	<30	<0.005	<4	41.9	<2*	<2	<5	41.3	53.9	<1
SS64	0.1	<10	18.6	24.4	<0.5	<0.5	16.8	3.2	8.8	<30	<0.005	<4	10.6	<2*	<2	<5	12.2	22.1	<1
05-20	0.3 – 0.4	<10	479	81.9	<0.5	<0.5	40.5	7.1	28.2	<30	<0.005	<4	22.4	<2*	<2	<5	34.9	35.5	<1
	1.0 – 1.3	<10	10.4	35.2	<0.5	<0.5	25.6	5	16.4	<30	<0.005	<4	15.8	<2*	<2	<5	24	23.4	<1
05-21	0.0 – 0.1	<10	1,600	78.4	<0.5	<0.5	50.6	5.8	20.6	<30	<0.005	<4	22.7	<2*	<2	<5	35.9	35.1	<1
	0.6 – 0.7	<10	3,600	186	<0.5	<0.5	63.5	15	44	<30	<0.005	<4	45.4	<2*	<2	<5	45.8	55.7	<1
51181	0.3	<10	158	66.1	<0.5	<0.5	25.3	9.6	23.9	<30	0.0682	<4	26.6	<2*	<2	<5	14	31.2	<1
51183	0.3	<10	38.8	27.4	<0.5	<0.5	17.8	3.4	8	<30	0.0081	<4	10.5	<2*	<2	<5	17.3	17.4	<1
51184	0.3	<10	36.7	37.9	<0.5	<0.5	28.3	5.5	12.3	<30	0.0147	<4	14.3	<2*	<2	<5	22.6	20.7	<1
51185	0.3	<10	189	43.8	<0.5	<0.5	23.2	5.1	13.9	<30	0.0193	<4	15	<2*	<2	<5	24.7	28.3	<1

LEGEND

- MONITORING WELL LOCATION (BY MORROW)
- BOREHOLE LOCATION (BY MORROW)
- TEST PIT LOCATION (BY MORROW)
- SURFACE SOIL SAMPLE LOCATION (BY MORROW)
- SURFACE WATER SAMPLE LOCATION (BY MORROW)
- 2004 ABA DRILL LOCATIONS (BY KINROSS)
- 2004 ABA SURFACE SOIL SAMPLE LOCATIONS (BY KINROSS)
- FORMER FACILITIES
- SURFACE WATER FEATURE
- TOPOGRAPHIC CONTOUR LINE
- CONCENTRATION(S) LESS THAN OR EQUAL TO THE CCME RL GUIDELINES
- CONCENTRATION(S) GREATER THAN THE CCME RL GUIDELINES

ABA SAMPLE LOCATIONS BY KINROSS

- PAG
- LIMITED
- UNCERTAIN
- NON REACTIVE

0 50 100 200 METRES

ANALYTICAL SOIL RESULTS							
02-13	Sb	Ba	As	Cr	Co	Cu	Pb
4.1-4.6	<10	133	550	240	6.1	34.2	<30

SAMPLE ID# / DEPTH OF SAMPLE (m)

RED – CONCENTRATION(S) GREATER THAN THE CCME RL GUIDELINES (mg/kg)

GREEN – CONCENTRATION(S) LESS THAN OR EQUAL TO THE CCME RL GUIDELINES (mg/kg)

* – LABORATORY DETECTION LIMIT EXCEEDS CCME RL GUIDELINE

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED ON SITE. NOT ALL UTILITIES MAY BE SHOWN.

REFERENCE DRAWINGS

No.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	–	–	–	–

MORROW

CLIENT NAME: KINROSS GOLD CORPORATION

PROJECT LOCATION: LUPIN MINE NUNAVUT

TITLE: DETAILED SOIL ANALYTICAL RESULTS - METALS

DWN BY: CDC | SCALE: 1:4,000 | DATE: 2005-09-07 | DWG No: A053017-006B | REV.: 0

CHK'D: NS | CADFILE: K:\A05\A05-3017\A053017R02

PLOT DATE: 20060127.1034

NORTH

SEEP9 (SW)	B	T	E	X	F1-BTEX	F1	F2	PAHs
2005 07 23	<0.0005	<0.001	<0.0005	<0.0007	<0.1	<0.1	0.38	<COME AW

05-07 (GW)	F2
2005 07 24	18.9

05-43 (GW)	B	T	E	X	F1-BTEX	F1	F2	PAHs	Ethylene Glycol
2005 07 24	<0.0005	<0.001	<0.0005	0.00694	<0.1	<0.1	14.6	<COME AW	897
DUPLICATE	<0.0005	<0.001	<0.0005	0.00704	<0.1	<0.1	13.8	<COME AW	955

SEEP15 (SW)	B	T	E	X	F1-BTEX	F1	F2
2005 07 24	<0.0005	<0.001	<0.0005	0.00122	<0.1	<0.1	0.82

SEEP12 (SW)	B	T	E	X	F1-BTEX	F1	F2	NAP	Glycols
2005 07 24	<0.0005	0.1175	0.0035	0.521	1.07	1.84	6.46	0.0138	<COME AW
DUPLICATE	<0.0005	0.0130	0.0035	0.522	1.09	1.88	8.82	–	–

SEEP10 (SW)	B	T	E	X	F1-BTEX	F1	F2
2005 07 24	<0.0005	<0.001	<0.0005	<0.0007	<0.1	<0.1	<0.3

05-60 (GW)	B	T	E	X	F1-BTEX	F1	F2	Glycols
2005 07 23	0.0009	0.0003	0.0004	0.00786	<0.1	<0.1	1.28	<COME AW

05-55 (GW)	B	T	E	X	F1-BTEX	F1	F2
2005 07 23	<0.0005	<0.001	<0.0005	0.0108	0.64	0.85	8.59

SUMP (GW)	B	T	E	X	F1-BTEX	F1	F2
2005 07 24	<0.0005	<0.001	<0.0005	<0.0007	<0.1	<0.1	0.49
DUPLICATE	<0.0005	<0.001	<0.0005	<0.0007	<0.1	<0.1	0.66

05-10 (GW)	B	T	E	X	F1-BTEX	F1	F2	FLT	Glycols
2005 07 22	<0.001	<0.002	<0.001	<0.0014	<0.1	<0.1	0.61	0.000484	<COME AW

05-01 (GW)	B	T	E	X	F1-BTEX	F1	F2
2005 07 22	0.00356	0.65	0.0061	0.415	0.77	1.3	95.4

05-03 (GW)	Glycols
2005 07 22	<COME AW

SEEP5 (SW)	B	T	E	X	F1-BTEX	F1	F2
2005 07 23	<0.0005	<0.001	<0.0005	<0.0007	<0.1	<0.1	<0.3

SEEP1 (SW)	B	T	E	X	F1-BTEX	F1	F2
2005 07 23	<0.0005	<0.001	<0.0005	<0.0007	<0.1	<0.1	<0.3

SEEP2 (SW)	B	T	E	X	F1-BTEX	F1	F2	PAHs
2005 07 23	<0.0005	<0.001	<0.0005	<0.0007	<0.1	<0.1	<0.3	<COME AW

05-13 (GW)	B	T	E	X	F1-BTEX	F1	F2	Glycols
2005 07 23	1.00322	1.0047	1.00139	0.00737	<0.1	<0.1	0.88	<COME AW

SEEP3 (SW)	B	T	E	X	F1-BTEX	F1	F2	PYR	Glycols
2005 07 23	<0.0005	<0.001	<0.0005	<0.0007	<0.1	<0.1	0.6	0.000126	<COME AW

05-11 (GW)	B	T	E	X	F1-BTEX	F1	F2	PAHs	Glycols
2005 07 22	<0.0005	<0.001	<0.0005	0.00257	<0.1	<0.1	0.54	<COME AW	<COME AW

05-09 (GW)	B	T	E	X	F1-BTEX	F1	F2	Glycols
2005 07 23	<0.0005	<0.001	<0.0005	<0.0007	<0.1	<0.1	0.89	<COME AW

05-21 (GW)	B	T	E	X	F1-BTEX	F1	F2
2005 07 23	0.0004	<0.001	<0.0005	0.00145	<0.1	<0.1	0.8

05-28 (GW)	B	T	E	X	F1-BTEX	F1	F2	PYR	Glycols
2005 07 23	0.112	0.181	0.0274	0.451	1.57	1.27	89.0	0.00175	<COME AW

SEEP8 (SW)	B	T	E	X	F1-BTEX	F1	F2	PAHs
2005 07 23	<0.0005	<0.001	<0.0005	<0.0007	<0.1	<0.1	0.3	<COME AW

05-04 (GW)	NAPL
2005 07 22	88

LEGEND

- MONITORING WELL LOCATION (BY MORROW)
- BOREHOLE LOCATION (BY MORROW)
- TEST PIT LOCATION (BY MORROW)
- SURFACE SOIL SAMPLE LOCATION (BY MORROW)
- SURFACE WATER SAMPLE LOCATION (BY MORROW)
- 2004 ABA DRILL LOCATIONS (BY KINROSS)
- 2004 ABA SURFACE SOIL SAMPLE LOCATIONS (BY KINROSS)
- FORMER FACILITIES
- SURFACE WATER FEATURE
- TOPOGRAPHIC CONTOUR LINE
- CONCENTRATION(S) LESS THAN OR EQUAL TO THE APPLICABLE GUIDELINES
- CONCENTRATION(S) GREATER THAN THE APPLICABLE GUIDELINES
- NON AQUEOUS PHASE LIQUID HYDROCARBON ACCUMULATION (mm)

0 50 100 200 METRES

ANALYTICAL WATER RESULTS

WELL ID	02-13 (GW)	B	T	E	X	F1	F2	Pb	NAPL
DATE COLLECTED	2002 04 21	1.008	310	890	940	<0.1	<0.1	<0.001	8

BLUE – CONCENTRATION(S) GREATER THAN THE APPLICABLE GUIDELINES (mg/L)
GREEN – CONCENTRATION(S) LESS THAN OR EQUAL TO THE APPLICABLE GUIDELINES (mg/L)
BLACK – NO APPLICABLE GUIDELINES FOR CONCENTRATION(S) (mg/L)
PURPLE – NON AQUEOUS PHASE LIQUID HYDROCARBON ACCUMULATION (mm)

(SW) – SURFACE WATER SAMPLE
(GW) – GROUNDWATER SAMPLE
– SURFACE WATER RESULTS COMPARED TO COME CEQG AW GUIDELINES
– GROUNDWATER RESULTS FOR BTEX, F1 AND F2 COMPARED TO SCREENING CRITERIA BASED ON THE CSR STANDARDS

FLT – FLUORANTHENE
NAP – NAPTHALENE
PYR – PYRENE

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED ON SITE. NOT ALL UTILITIES MAY BE SHOWN.

REFERENCE DRAWINGS

No.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	–	–	–	–

MORROW

CLIENT NAME: KINROSS GOLD CORPORATION

PROJECT LOCATION: LUPIN MINE NUNAVUT

TITLE: **DETAILED WATER ANALYTICAL RESULTS - HYDROCARBONS**

DWN BY: CDC | SCALE: 1:4,000 | DATE: 2005-09-07 | DWG No: | REV.: 0

CHK'D: NS | CADFILE: K:\A05\A05-3017\A053017R02 | A053017-007A

PLOT DATE: 20060127.1035

SEEP9 (SW)	pH	NO3	NO2	SO4	Al	As	Cd	Cr	Cu	Fe	Pb	Hg	Mo	Ni	Se	Ag	Tl	Zn
2005 07 23	8.08	55.8	0.38	781	1.48	0.118	0.00050	0.0050	0.007	4.79	0.0066	<0.00005	<0.005	0.48	<0.005	<0.00001	<0.001	0.197

05-43 (GW)	pH	NO3	NO2	SO4	Al	As	Cd	Cr	Cu	Fe	Pb	Hg	Mo	Ni	Se	Ag	Tl	Zn
2005 07 24	8.4	0.0273	<0.005	307	0.148	0.0086	<0.00033	<0.0025	<0.005	15.8	<0.005	<0.005	0.007	<0.005	<0.00025	<0.001	0.0056	
DUPLICATE	--	<0.005	<0.005	309	0.159	0.0048	<0.00025	<0.0025	<0.005	16.7	<0.005	<0.005	0.061	<0.005	<0.00025	<0.001	0.0051	

SEEP10 (SW)	pH	NO3	NO2	SO4	Al	As	Cd	Cr	Cu	Fe	Pb	Hg	Mo	Ni	Se	Ag	Tl	Zn
2005 07 24	8.50	4.62	<0.05	878	0.488	0.00928	0.00148	<0.001	0.0104	0.262	<0.0005	<0.00005	<0.001	0.481	<0.001	<0.00002	<0.0002	0.001

SEEP13 (SW)	pH	NO3	NO2	SO4	Al	As	Cd	Cr	Cu	Fe	Pb	Hg	Mo	Ni	Se	Ag	Tl	Zn
2005 07 24	8.0	9.31	0.05	998	0.08	0.0060	0.00059	<0.0020	0.0456	7.89	0.0137	<0.00005	<0.002	0.889	<0.004	<0.00004	<0.0004	0.007

SEEP12 (SW)	pH	NO3	NO2	SO4	Al	As	Cd	Cr	Cu	Fe	Pb	Hg	Mo	Ni	Se	Ag	Tl	Zn
2005 07 24	8.5	<0.005	<0.005	519	1.59	0.194	0.000048	0.0050	0.0050	16.8	0.0025	<0.00005	<0.002	0.138	<0.002	<0.00004	<0.0004	0.018
DUPLICATE	--	0.0058	<0.005	519	1.61	0.189	0.000054	0.0070	0.0050	15.9	0.0024	<0.00005	<0.005	0.143	<0.002	<0.00004	<0.0004	0.018

05-60 (GW)	pH	NO3	NO2	SO4	CN	Al	As	Cd	Cr	Cu	Fe	Pb	Mo	Ni	Se	Ag	Tl	Zn
2005 07 23	8.0	8.33	<0.05	1,060	<0.01	1.8	0.0156	0.0141	<0.0025	0.0709	0.048	<0.005	<0.005	1.06	<0.005	<0.00025	<0.001	2.49

SUMP (SW)	pH	NO3	NO2	SO4	CN	Al	As	Cd	Cr	Cu	Fe	Pb	Mo	Ni	Se	Ag	Tl	Zn
2005 07 24	8.15	0.0075	<0.005	96.4	<0.01	0.029	0.005	<0.00005	0.00019	0.0007	58.8	<0.001	0.0048	0.0068	<0.001	<0.0001	<0.0002	0.178
DUPLICATE	--	<0.05	<0.05	100	--	0.026	0.006	<0.00009	0.00021	0.0033	59.4	<0.001	0.0046	0.0060	<0.001	<0.0001	<0.0002	0.192

05-58 (GW)	pH	NO3	NO2	SO4	Al	As	Cd	Cr	Cu	Fe	Pb	Mo	Ni	Se	Ag	Tl	Zn
2005 07 23	8.0	0.018	0.039	170	0.127	0.0032	0.000060	<0.0005	0.0008	0.308	<0.001	<0.001	0.128	<0.001	<0.00005	<0.0002	0.0048	

05-10 (GW)	pH	NO3	NO2	SO4	Al	As	Cd	Cr	Cu	Fe	Pb	Mo	Ni	Se	Ag	Tl	Zn
2005 07 22	8.0	0.066	<0.005	858	0.70	0.044	0.00188	0.008	0.028	14.0	0.0070	0.0279	0.118	<0.005	<0.00025	<0.001	0.70	

SEEP8 (SW)	pH	NO3	NO2	SO4	Al	As	Cd	Cr	Cu	Fe	Pb	Hg	Mo	Ni	Se	Ag	Tl	Zn
2005 07 23	8.08	<0.005	<0.005	976	4.17	0.013	0.00101	<0.001	0.0048	1.48	0.00156	<0.00005	<0.001	0.307	<0.001	<0.00002	<0.0002	0.3

05-05 (GW)	pH	NO3	NO2	SO4	Al	As	Cd	Cr	Cu	Fe	Pb	Mo	Ni	Se	Ag	Tl	Zn
2005 07 22	7.0	1.88	0.491	806	0.847	0.0079	<0.0001	<0.001	0.004	0.518	<0.002	0.023	<0.01	<0.002	<0.0001	<0.0004	<0.008	

05-16 (GW)	pH	NO3	NO2	SO4	CN	Al	As	Cd	Cr	Cu	Fe	Pb	Mo	Ni	Se	Ag	Tl	Zn
2005 07 23	7.1	868	0.77	894	<0.01	<0.05	0.012	0.00104	<0.0025	<0.005	8.04	<0.005	<0.005	0.07	<0.005	<0.00025	<0.001	0.0798

05-03 (GW)	pH	NO3	NO2	SO4	CN	Al	As	Cd	Cr	Cu	Fe	Pb	Mo	Ni	Se	Ag	Tl	Zn
2005 07 22	8.7	0.147	0.019	189	0.07	0.188	0.0024	0.0001	0.0004	0.0079	1.58	<0.002	0.0046	<0.01	<0.002	<0.0001	<0.0004	<0.008

SEEP5 (SW)	pH	NO3	NO2	SO4	CN	Al	As	Cd	Cr	Cu	Fe	Pb	Mo	Ni	Se	Ag	Tl	Zn
2005 07 23	8.09	0.0571	<0.005	806	0.06	0.0050	0.0004	0.0011	0.0007	15.3	0.00258	<0.00005	<0.001	0.149	<0.001	0.000023	<0.0002	0.0093

SEEP2 (SW)	pH	NO3	NO2	SO4	CN	Al	As	Cd	Cr	Cu	Fe	Pb	Hg	Mo	Ni	Se	Ag	Tl	Zn
2005 07 23	7.90	5.1	0.095	699	0.048	0.007	0.0109	0.000118	<0.002	0.0091	1.65	<0.001	<0.00005	<0.002	0.0252	<0.002	0.000041	<0.0004	0.177

05-13 (GW)	pH	NO3	NO2	SO4	CN	Al	As	Cd	Cr	Cu	Fe	Pb	Mo	Ni	Se	Ag	Tl	Zn
2005 07 23	8.8	965	5.0	1,260	0.017	<0.05	0.0178	<0.00025	<0.0025	0.0008	0.054	<0.005	0.0116	<0.005	<0.01	<0.00025	<0.001	0.0279

SEEP3 (SW)	pH	NO3	NO2	SO4	CN	Al	As	Cd	Cr	Cu	Fe	Pb	Mo	Ni	Se	Ag	Tl	Zn
2005 07 23	7.73	0.001	0.014	748	<0.01	0.117	0.008	0.000171	<0.005	0.0108	1.37	0.0118	<0.00005	0.0068	0.0259	<0.005	<0.00001	<0.001	0.005

05-11 (GW)	pH	NO3	NO2	SO4	Al	As	Cd	Cr	Cu	Fe	Pb	Mo	Ni	Se	Ag	Tl	Zn
2005 07 22	8.9	1.17	0.045	761	<0.05	0.0153	0.00085	<0.0025	0.0050	0.06	<0.005	<0.005	0.135	<0.005	<0.00025	<0.001	1.0	

05-09 (GW)	pH	NO3	NO2	SO4	Al	As	Cd	Cr	Cu	Fe	Pb	Mo	Ni	Se	Ag	Tl	Zn
2005 07 23	8.2	91.3	0.21	998	<0.1	0.011	0.00108	<0.005	<0.01	55.1	<0.01	0.088	0.089	<0.03	<0.0005	<0.002	0.0051	

SEEP1 (SW)	pH	NO3	NO2	SO4	CN	Al	As	Cd	Cr	Cu	Fe	Pb	Hg	Mo	Ni	Se	Ag	Tl	Zn
2005 07 23	7.75	5.07	0.040	998	0.057	0.184	0.0079	<0.000045	<0.005	0.0068	0.054	<0.0025	<0.00005	<0.005	0.0051	<0.005	<0.0001	<0.001	<0.025

05-02 (GW)	pH	NO3	NO2	SO4	CN	Al	As	Cd	Cr	Cu	Fe	Pb	Mo	Ni	Se	Ag	Tl	Zn
2005 07 22	7.9	95.3	0.383	681	0.488	<0.05	0.0159	<0.00025	<0.0025	0.0008	0.377	<0.005	0.0015	<0.025	<0.005	<0.00025	<0.001	0.01	

05-21 (GW)	pH	NO3	NO2	SO4	CN	Al	As	Cd	Cr	Cu	Fe	Pb	Mo	Ni	Se	Ag	Tl	Zn
2005 07 23	8.0	0.318	0.086	999	0.176	<0.02	0.0061	<0.0001	<0.001	0.0007	0.38	<0.002	0.0054	0.008	0.0039	<0.0001	<0.0004	0.0126

05-28 (GW)	pH	NO3	NO2	SO4	Al	As	Cd	Cr	Cu	Fe	Pb	Mo	Ni	Se	Ag	Tl	Zn
2005 07 23	8.0	<0.05	<0.05	72.6	0.411	0.0050	0.000497	0.00010	0.0050	15.0	0.0024	<0.001	0.0794	<0.001	<0.00005	<0.0002	0.0408	

SEEP6 (SW)	pH	NO3	NO2	SO4	Al	As	Cd	Cr	Cu	Fe	Pb	Mo	Ni	Se	Ag	Tl	Zn
2005 07 23	7.10	3.85	0.798	905	0.065	0.0477	0.000103	<0.002	0.0060	8.54	<0.001	<0.00005	0.0049	0.0832	<0.002	<0.00004	<0.0004	0.018

05-01 (GW)	pH	NO3	NO2	SO4	Al	As	Cd	Cr	Cu	Fe	Pb	Mo	Ni	Se	Ag	Tl	Zn
2005 07 22	8.9	<0.05	0.056	997	0.408	1.89	0.00089	0.0010	0.0021	85.8	<0.002	0.008	0.771	0.0024	<0.0001	<0.0004	0.088	

LEGEND

- MONITORING WELL LOCATION (BY MORROW)
- BOREHOLE LOCATION (BY MORROW)
- TEST PIT LOCATION (BY MORROW)
- SURFACE SOIL SAMPLE LOCATION (BY MORROW)
- SURFACE WATER SAMPLE LOCATION (BY MORROW)
- 2004 ABA DRILL LOCATIONS (BY KINROSS)
- 2004 ABA SURFACE SOIL SAMPLE LOCATIONS (BY KINROSS)
- FORMER FACILITIES
- SURFACE WATER FEATURE
- TOPOGRAPHIC CONTOUR LINE
- CONCENTRATION(S) LESS THAN OR EQUAL TO THE CCME CEQG AW GUIDELINES
- CONCENTRATION(S) GREATER THAN THE CCME CEQG AW GUIDELINES
- CONCENTRATION(S) GREATER THAN OR EQUAL TO THE WATER LICENCE LIMITS FOR SURFACE WATER
- CONCENTRATION(S) GREATER THAN OR EQUAL TO THE BC CSR AW GUIDELINES FOR GROUNDWATER

0 50 100 200 METRES

ANALYTICAL WATER RESULTS

WELL ID	02-13 (GW)	Al	As	Cd	Cr	Cu	Fe	Pb
DATE COLLECTED	2002 04 21	0.30	0.08	0.007	0.006	0.003	0.120	<0.005

BOLD = CONCENTRATION(S) GREATER THAN OR EQUAL TO THE BC CSR AW GUIDELINES FOR GROUNDWATER (mg/L)
UNDERLINED = CONCENTRATION(S) GREATER THAN OR EQUAL TO THE WATER LICENCE LIMITS FOR SURFACE WATER (mg/L)
BLUE = CONCENTRATION(S) GREATER THAN THE CCME CEQG AW GUIDELINES (mg/L)
GREEN = CONCENTRATION(S) LESS THAN OR EQUAL TO THE CCME CEQG AW GUIDELINES (mg/L)
"-" = LABORATORY DETECTION LIMIT EXCEEDS APPLICABLE GUIDELINE

(SW) - SURFACE WATER SAMPLE
(GW) - GROUNDWATER SAMPLE

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED ON SITE. NOT ALL UTILITIES MAY BE SHOWN.

REFERENCE DRAWINGS

No.	DATE	DESCRIPTION
--	--	--

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	--	--	--	--

MORROW

CLIENT NAME: KINROSS GOLD CORPORATION

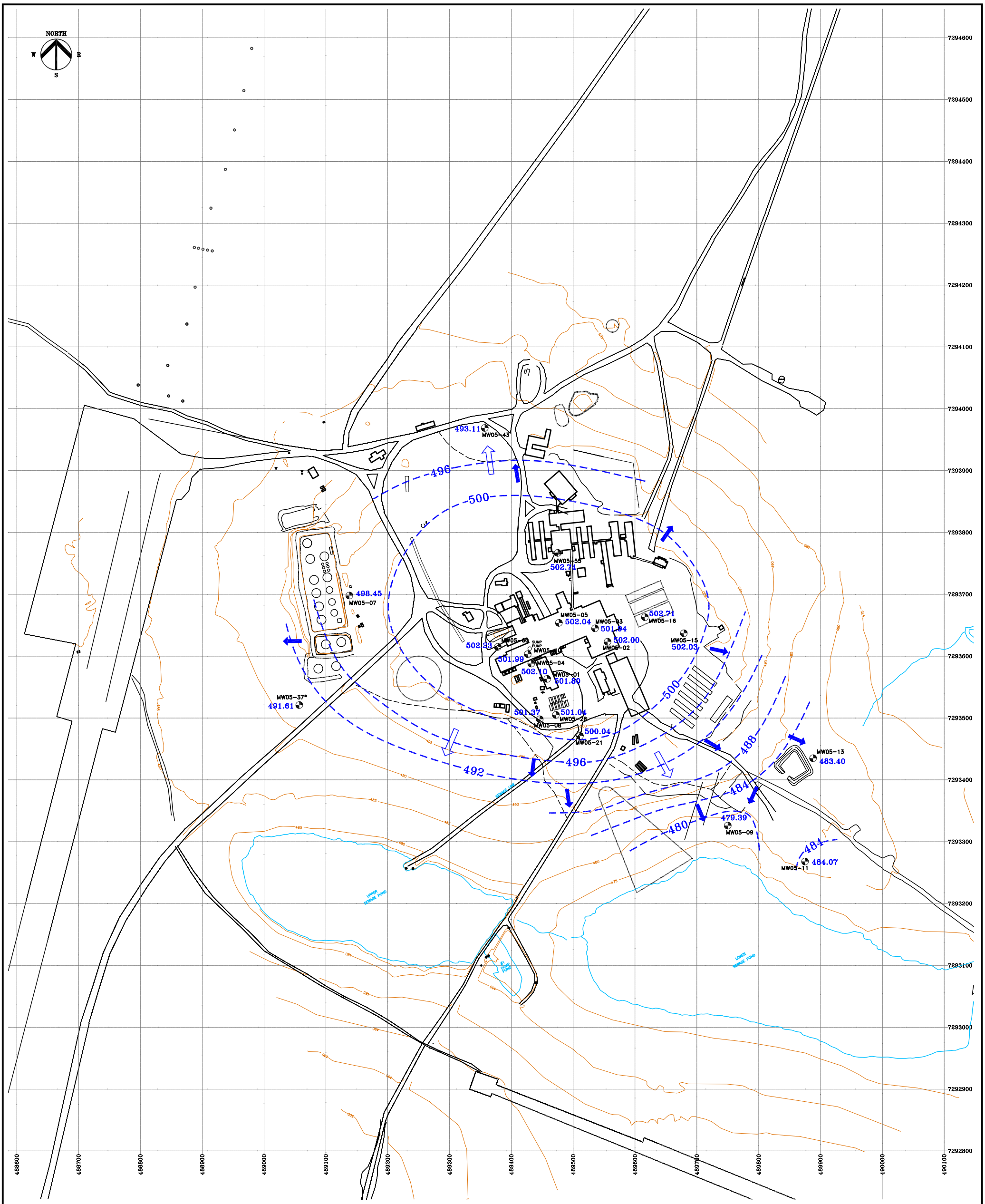
PROJECT LOCATION: LUPIN MINE NUNAVUT

TITLE: **DETAILED WATER ANALYTICAL RESULTS - METALS AND INORGANICS**

DWN BY: CDC | SCALE: 1:4,000 | DATE: 2005-09-07 | DWG No: A053017-007B | REV.: 0

CHK'D: NS | CADFILE: K:\A05\A05-3017\A053017R02

PLOT DATE: 20060127:1036



LEGEND

0 50 100 200 METRES

- MONITORING WELL LOCATION (BY MORROW)
- 98.60 GROUNDWATER ELEVATION (m)
- INFERRED GROUNDWATER FLOW DIRECTION
- GROUNDWATER SEEP DIRECTION
- FORMER FACILITIES
- SURFACE WATER FEATURE
- TOPOGRAPHIC CONTOUR LINE

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED ON SITE. NOT ALL UTILITIES MAY BE SHOWN.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	–

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0				

MORROW

CLIENT NAME: KINROSS GOLD CORPORATION

PROJECT LOCATION: LUPIN MINE NUNAVUT

TITLE: **INFERRED GROUNDWATER CONTOURS (July 22, 2005)**

DWN BY: CDC	SCALE: 1:4,000	DATE: 2005–11–14	DWG No: A053017-008 REV.: 0
CHK'D: MT	PLOT: 20040305.1300	CADFILE: A053017R00	

APPENDIX I

Interview Records

INTERVIEWS

Mr. Mike Tansey, Reclamation Manager

Mr. Mike Tansey was interviewed on May 9, 2005, and was also consulted during the on-site work completed in July, 2005. Mr. Tansey started working at the site in 1989 as a Mine Engineer. He was promoted to Chief Mine Engineer in 1992 and worked in that capacity until 2001 (with the exception of 1997 and 1998 when he was involved in the exploration of an adjacent property). In 2001, Mr. Tansey was reclassified as a Senior Project Engineer, a position whose responsibilities included surface reclamation. In 2003, Mr. Tansey was reclassified as the Reclamation Manager for the Lupin Mine.

The following information was recorded during the interview of Mr. Tansey.

- All used oil and grease from underground operations was brought to surface for off-site disposal.
- All underground shops and areas with hydrocarbon staining were sprayed with Oil Sponge® to immobilize and degrade residual hydrocarbons.
- All underground operations were decommissioned as described in the closure plan.
- Groundwater seepage in the mine reported to a central collection point where it was recovered and pumped to the tailing pond.
- Waste rock was reused underground with no surface disposal since the mid-1990's.
- Approximately 1,000,000 m^3 of development rock, some of which was mineralized, was used to build the pad beneath the core area of the site.
- The baseball diamond is suspected to be constructed from mineralized rock.
- The south end of the air strip is used to temporarily store drums of diesel and Jet-A that will be used off-site.
- Snow dumps do not exist at the site. Snow is simply pushed out of the way when necessary.

INTERVIEWS

- The Upper Sewage Pond receives raw seepage. Liquid is siphoned to the Lower Sewage Pond annually. The Lower Sewage Pond, which discharges to the environment, is sampled in compliance with the Water Board licence for the site.

- ANFO, which is imported to the site in 25 kg bags, is stored at a remote magazine which is located on a separate lease area from the study area.

- Site roads are not oiled but the airstrip is. The airstrip is not part of the study as it will remain in place.

- An aboveground diesel storage tank exists at the drinking water intake.

- The majority of the camp and mill was constructed between 1979 and 1981. The gym, paste backfill and cement plant was added in 1993/1994. The kitchen was added in 1994. The "1300" residential wing was added in 1996.

- Soil at the two fuel unloading area associated with the Main Tank Farm is suspected to be contaminated as a result of numerous leaks. Diesel and Jet A fuel is stored at the Main Tank Farm. The tank farm was expanded several times over the life of the mine. Drums of diesel and Jet-A are stored at the north end of the tank farm.

- The lay down area by the portal is used for benign materials. The exception to this are drums of diesel and Jet-A fuel that are stored by third parties near the winter haul road. Salt is stored east of the drums.

- Mining occurred to surface in the Crown Pillar area. The resulting pit was backfilled with surplus clean waste material (e.g., steel and wood) , paste backfill or clean soil.

- The RTL Shop and Truck Park has been used by Robinson Trucking Ltd. (RTL) since 2004. RTL is the contractor responsible for covering the tailings cells with soil from the esker borrow. RTL presently parks approximately ten tractor trailer units, three bulldozers, a water truck, and several loaders. The associated shop includes two work bays. The south bay is used for maintenance and the north bay is used for parking. Prior to 2004 the building was used as shop and for parking. In the early to mid 1990s, Nuna Logistics Inc. (Nuna) parked equipment

beneath a “fold away” building in the current parking area. The building footprint was scraped off using a bulldozer to remove surficial hydrocarbon staining when Nuna left the site. The recovered soil was placed in the tailing impoundment.

- The concrete plant was used until the early 1990s when a fire partly destroyed the foldaway building. After the fire, the area was periodically used for parking.
- The Mill Perimeter Yard was used to store mostly innocuous materials. Possible exceptions to this include:
  - the three cold storage buildings that were used to store lead nitrate (1 tonne bags), lime (1 tonne and 25 kg bags), cyanide (cubes), zinc dust, acids, and minor amounts of other chemicals;
  - a diesel fired incinerator that was used to burn scrap food; and
  - the buried pipelines used to convey diesel from the main tank farm to the satellite tank farm operate by pressure, not suction.
- The Mill Complex includes the following elements that may be of environmental concern:
  - the emergency powerhouse that is periodically started and consists of three diesel fired generators mounted on concrete slabs;
  - the pit beneath the cable drum in the hoist house;
  - the carpenters shop where small containers of paint and solvents are stored;
  - the main surface shop has been in service for sixteen years and contains a floor drain network, electric hoists and lubricating oils and greases;
  - the used oil storage trailer is stored on the west side of the maintenance shop;
  - hazardous goods containers are placed adjacent to the south wall of he mill;

- the main fuelling area for the mine is located near the southwest corner of the mill complex;
- the satellite fuel storage area for diesel and gasoline is located south of the surface maintenance shop;
- glycol storage tanks are located adjacent to the south wall of the powerhouse;
- soil beneath the Powerhouse is suspected to be contaminated as the concrete floor that underlies the interior storage tanks are cracked and spills are known to have occurred;
- sumps and floor drains exist within the mill complex however, the integrity of the drains, which report to the tailing pond, are not suspect (Kinross intends to clean all sumps and drains and the mill floor as part of the closure process to recover trace amounts of gold);
- the powerhouse contains two diesel fired boilers for back up heat;
- primary heat for the camp is obtained by recovering waste heat from the power plant using glycol, which is circulated throughout the camp; and
- one glycol loss is known to have occurred between the Power and Shaft House.

- The #1 Dump Pond is used as a surge pond for tailings that are occasionally drained from the tailings pipeline. The pond is cleaned out as necessary and will ultimately be capped and contoured. As such it is part of the site reclamation work and not the contaminated site assessment.
- The landfill is the ultimate repository of all site waste. The land filling procedure was: 1) assemble waste at the Burn Pit; 2) wet the waste with diesel or Jet A; 3) burn the waste; 4) transfer the residual waste to Landfill; 5) cap the landfill with clean soil. It is suspected that hydrocarbon contamination exists at the Burn Pit and Landfill. Surface runoff from the landfill was south-southeast to the Lower Sewage Lagoon.

INTERVIEWS

Mr. Dave Hohnstein, Environmental Coordinator

Mr. Dave Hohnstein was the Reclamation Manager for the Lupin site until Mr. Tansey assumed the role in 2003. Mr. Hohnstein was interviewed on June 6, 2005. The notes made during Mr. Tansey's interview were reviewed/ confirmed with Mr. Hohnstein, and he added the following comments:

- some used oil from underground operations was used to bind the runway prior to the mid 1990s;
- groundwater from underground reported to the #2 sewage lagoon until the mid 1990s after which it went to the tailing pond;
- construction done prior to the mid 1990s used potentially mineral containing rock (mentioned the road to the air strip);
- barrel storage occurred on the east side of the road to the pump house;
- drums were steam cleaned on the west side of the road to the pump house;
- underground equipment was fuelled adjacent to the portal;
- ASTs existed at several areas around the site including the emergency generator, near the refinery furnaces, and outside the "old" kitchen;
- fine-grained soil used to maintain grade at the cold storage area was mineralized;
- a separate helicopter pad exists east of the airstrip; and
- fuelling occurred at the boat dock (seaplanes).

Mr. John Oliver, Mill Supervisor

Mr Oliver has worked at the site since 1992, and provided a tour of the Mill and confirmed the information provided in Section 4.6 of this report.

INTERVIEWS

Mr. Jocki Fong, Maintenance Supervisor (Foreman), and Mr. Kent Wunsch, Surface Shop Lead Hand (Group Interview)

Mr. Fong has worked at the site since 1982; Mr. Wunsch has worked at the site since 1992. They provided a tour of the Surface Maintenance Shop, and provided the following information regarding maintenance operations:

- Floor drains in the shop enter a main sump, from which oil accumulations are removed as necessary. The sump underflow drains to a sewer line.
- An electric vehicle hoist is located in the shop, as well as larger overhead hydraulic cranes.
- Used oil is collected and stored in the two aboveground tanks located to the southwest of the Powerhouse. In the winter, the oil is trucked off-site for disposal.
- Two solvent washing booths are located in the shop; waste solvents are disposed of with the used oil.
- Hazardous material stored in the carpenters shop was limited to commercial quantities of paint, thinners and solvents.
- Solid waste management practices described by Mr. Tansey during his interview were confirmed.
- Solids collected in the wash bay sump are disposed of to the landfill.
- A former diesel fuel line that ran from the main tank farm to the airstrip has not been used since 1992, and in 1998 the tanks and pipeline at the airport were removed. Airstrip fuelling is now completed using a fuel truck.

Mr. Jim Siddle, Power Plant Operator

Mr. Siddle has worked at as the Power Plant Operator since 2000, and was previously on-site as a geologist. Mr. Siddle provided a tour of the Power Plant and provided the following information:

- Floor drains in the powerhouse enter a sump located between the boilers, which he believes is pumped to the sewage line.

- There is a groundwater sump located in the powerhouse, which pumps groundwater accumulated below the powerhouse to the tailings line. The sump pump is controlled by a float switch. The powerhouse is 'always heated' so it is anticipated that there is a heat imprint into the permafrost below the powerhouse.

- The concrete floor has settled considerably below some parts of the powerhouse, which has resulted in cracks. Most notably, the concrete secondary containment berm/floor below the day tanks has separated from the main outside berm, and it is suspected that any spills from the day tanks could enter the subsurface at that location.

- Recently the high level switch was not working on some of the day tanks, which resulted in overfills.

- Used oil generated in the powerhouse is disposed to the used oil storage tanks.

- Overfilling a tank into the containment at the satellite day tank area proximate to the mill occurred in 2004. Approximately 5,000 gallons of fuel was pumped out of the containment berm and placed in one of the storage tanks at the Main Tank Farm.

- Glycol is used to cool the generators using radiators. Glycol is also used to heat the remainder of the plant. A radiator on the north side of the plant is known to have leaked. No leaks have been reported at the glycols tanks or radiators located on the south side of the plant.

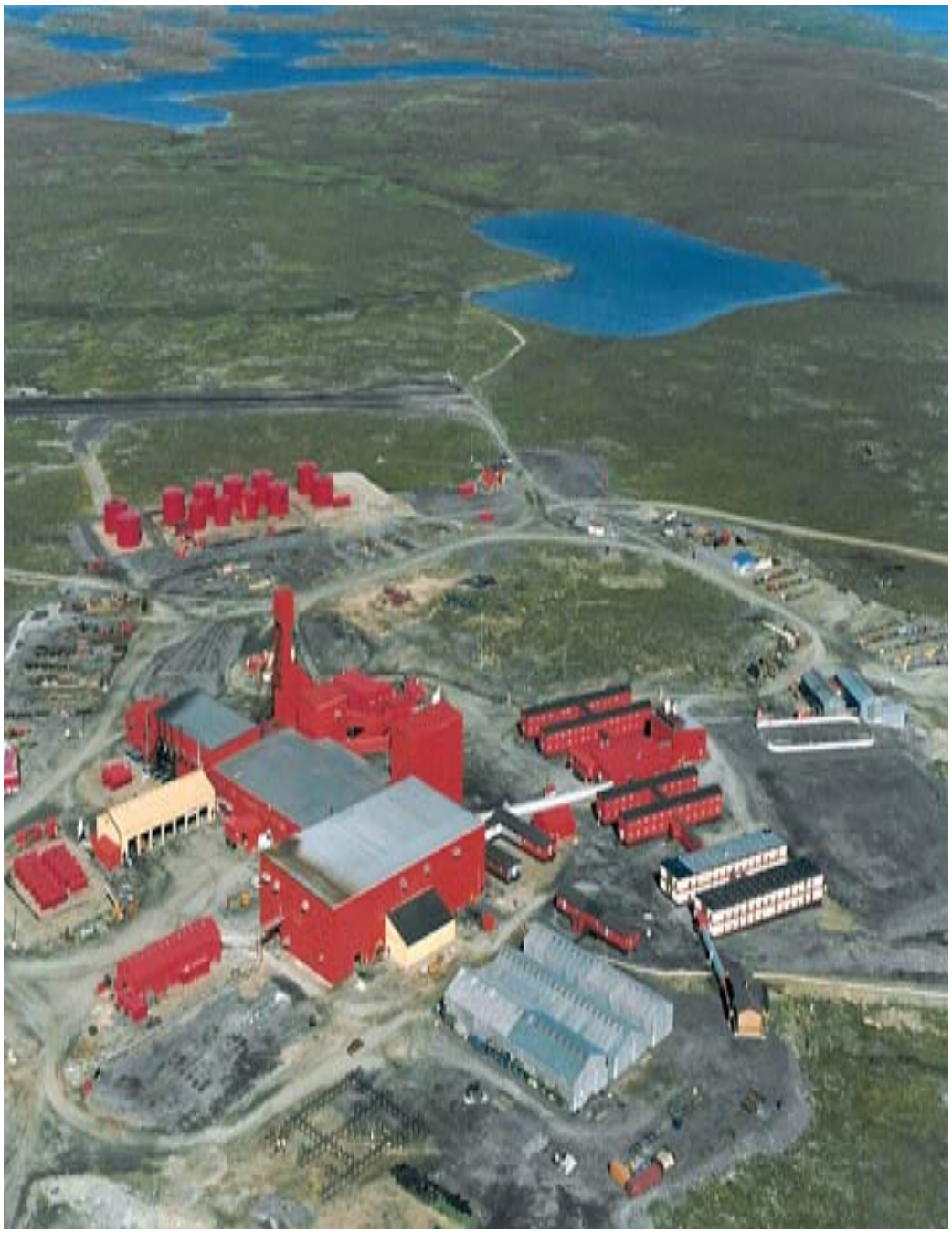
Mr. Jerry Warren, RTL Contracting Ltd., Foreman

Mr. Warren has supervised RTL Contracting Ltd.'s operations out of the "RTL Shop" for the past three years, and previously worked for Echo Bay Mines. Mr. Warren provided information on the historical "Winter Road Shop" as well as activities in the RTL shop (Surface Shop #1). A leak was reported in the past from the 500 Gallon AST used for emergency heating, located on the south side of the building.

APPENDIX II

Photographs

Photograph 1: Aerial Photograph G018040-7-077, August 2001.



Photograph 2: Aerial View of Site from Southeast, circa 1995.

Photograph 3: View of site from northeast, July 2005.

Photograph 4: Panoramic view to east of Main Tank Farm Area, July 2005.

Photograph 5: Panoramic view to east of Satellite Tank Farm area and Powerhouse, July 2005.

Photograph 6: Panoramic view to south of south burn pit and landfill area, July 2005.

Photograph 7: View to north of Open Stopes, July 2005.

Photograph 8: View to northeast of boat dock and freshwater intake area while excavating test pit 05-50, July 2005 (APECs 7b and 7c).

Photograph 9: View to north of screening plot to ramp where test pit 05-57 is being excavated, July 2005 (APEC 1e).

Photograph 10: View of test pit 05-54 being excavated in the ball field, July 2005 (APEC 1f).

Photograph 11: View of test pit 05-49 being excavated at former crusher, July 2005 (APEC 1i).

Photograph 12: View of Seep 9 on west side of Main Tank Farm, July 2005 (APEC 2a).

Photograph 13: View to north of test pit 05-37 being excavated below the Main Tank Farm, July 2005 (APEC 2a).

Photograph 14: View to south while sampling monitoring well 05-37 by Main Tank Farm loaders, July 2005 (APEC 2b).

Photograph 15: View to north showing location of the fuel pipeline, July 2005 (APEC 2d).

Photograph 16: View to west of former airport fuelling area (APEC 2e) while test pit 05-53 is being excavated, July 2005.

Photograph 17: View to west berm and test pit 05-28 located adjacent to Satellite Tank Farm, July 2005 (APEC 3a).

Photograph 18: View to north of test pit 05-32 being excavated south of Powerhouse, July 2005 (APEC 3d).

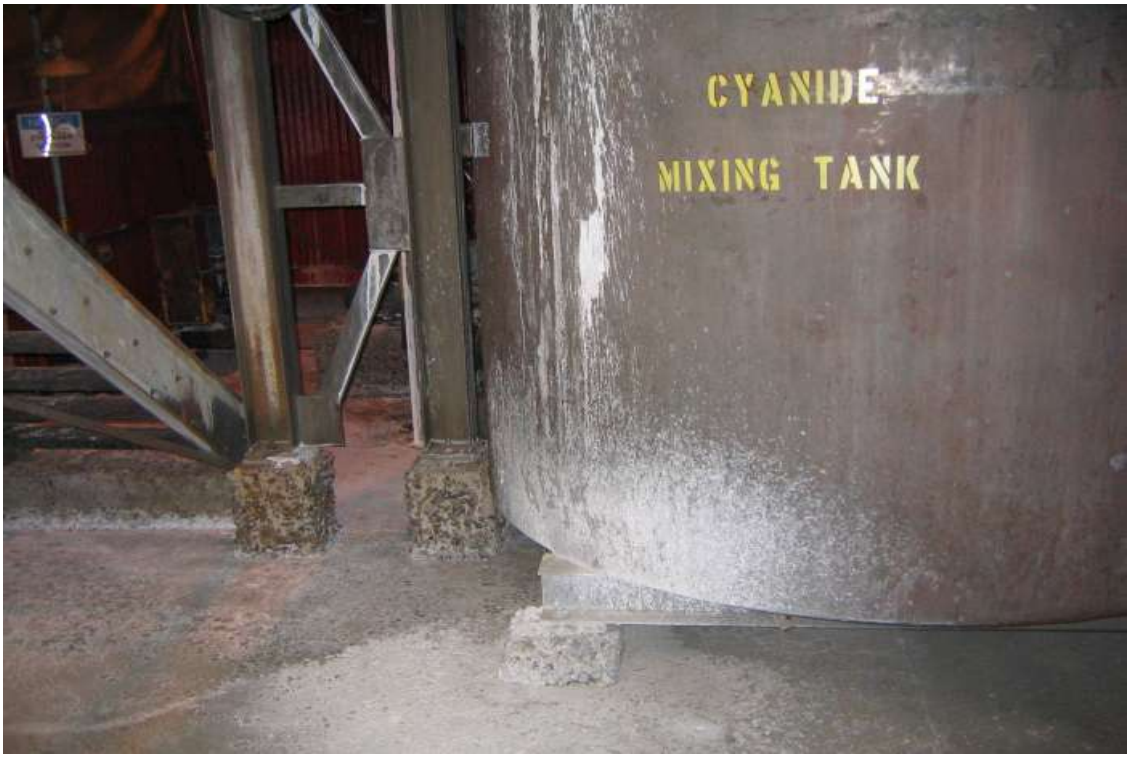
Photograph 19: Location of groundwater sump in the Powerhouse, July 2005 (APEC 3f).

Photograph 20: View to south of test pit 05-58 being excavated at Emergency Powerhouse, July 2005 (APEC 3g).

Photograph 21: View of water sampling behind the underground storage and brine mixing area, July 2005 (APEC 3h).

Photograph 22: View inside of the Rebuild Area, July 2005 (APEC 3i).

Photograph 23: View of the ball and rod grinders inside of the Grinding Building, July 2005 (APEC 3j).



Photograph 24: View inside of the Recovery Plant showing a typical reagent tank, July 2005 (APEC 3l).

Photograph 25: View inside of the Recovery Plant showing a typical sump, July 2005 (APEC 3l).

Photograph 26: View of a typical diesel tank adjacent to the Mill Building, July 2005 (APEC 3n).

Photograph 27: Excavating test pit 05-18 inside of the Cold Storage building, July 2005 (APEC 4b).

Photograph 28: North to folded down Cold Storage Building #3 with Cold Storage Building #2 in background, July 2005 (APEC 4c).

Photograph 29: View to northwest showing Seep 8 below the tailings line, July 2005 (APEC 4e).

Photograph 30: Showing excavation of test pit 05-21 adjacent the sewer line, July 2005 (APEC 4f).

Photograph 31: Looking northeast to the RTL Shop with Seep 12 being sampled in the foreground, July 2005 (APECs 5a and 5b).

Photograph 32: Test pit 05-44 being excavated south of the RTL Shop, July 2005 (APEC 5a).

Photograph 33: Test pit 05-43 being dug where the former Surface Shop #1 tank was located, July 2005 (APEC 5c).

Photograph 34: View of test pit 05-39 being excavated in the North Drum Storage Area, July 2005 (APEC 6a).

Photograph 35: View to south showing location of test pit 05-41 in the Salt Storage area, July 2005 (APEC 6b).

Photograph 36: View to north of test pit 05-55 being excavated beside the Office Building emergency fuel tank, July 2005 (APEC 7a).

Photograph 37: Location of test pit 05-61 being excavated beside the Guest House, July 2005 (APEC 7d).

Photograph 38: View to east showing water sampling at monitoring well 05-15 adjacent to the incinerator, July 2005 (APEC 8b).

Photograph 39: Looking north to test pit 05-47 by the former north/underground Burn Pit, July 2005 (APEC 8d).

Photograph 40: View to east of Seep 3 emerging below the Land Fill, July 2005 (APEC 8e).

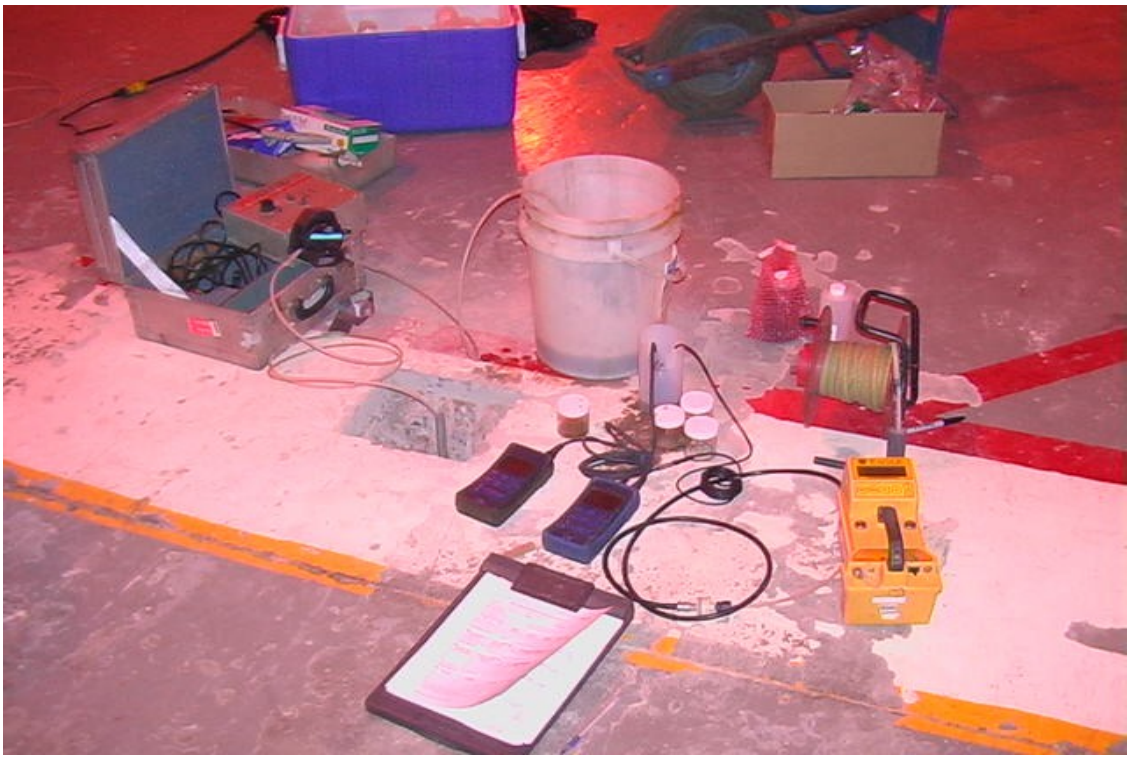
Photograph 41: View to south showing monitoring well 05-11 being sampled in the Bone Yard, July 2005 (APEC 8f).

Photograph 42: Drilling borehole 05-03 in the Recovery Building, July 2005 (APEC 3l).

Photograph 43: Test pit 05-28 adjacent to the Satellite Tank Farm illustrating a typical test pit, July 2005 (APEC 3a).

Photograph 44: Showing a typical installation of a monitoring well in a test pit, well 05-28, July 2005 (APEC 3a).

Photograph 45: Typical completed monitoring well (05-28), with “Quadra pod” placed for protection, July 2005 (APEC 3a).

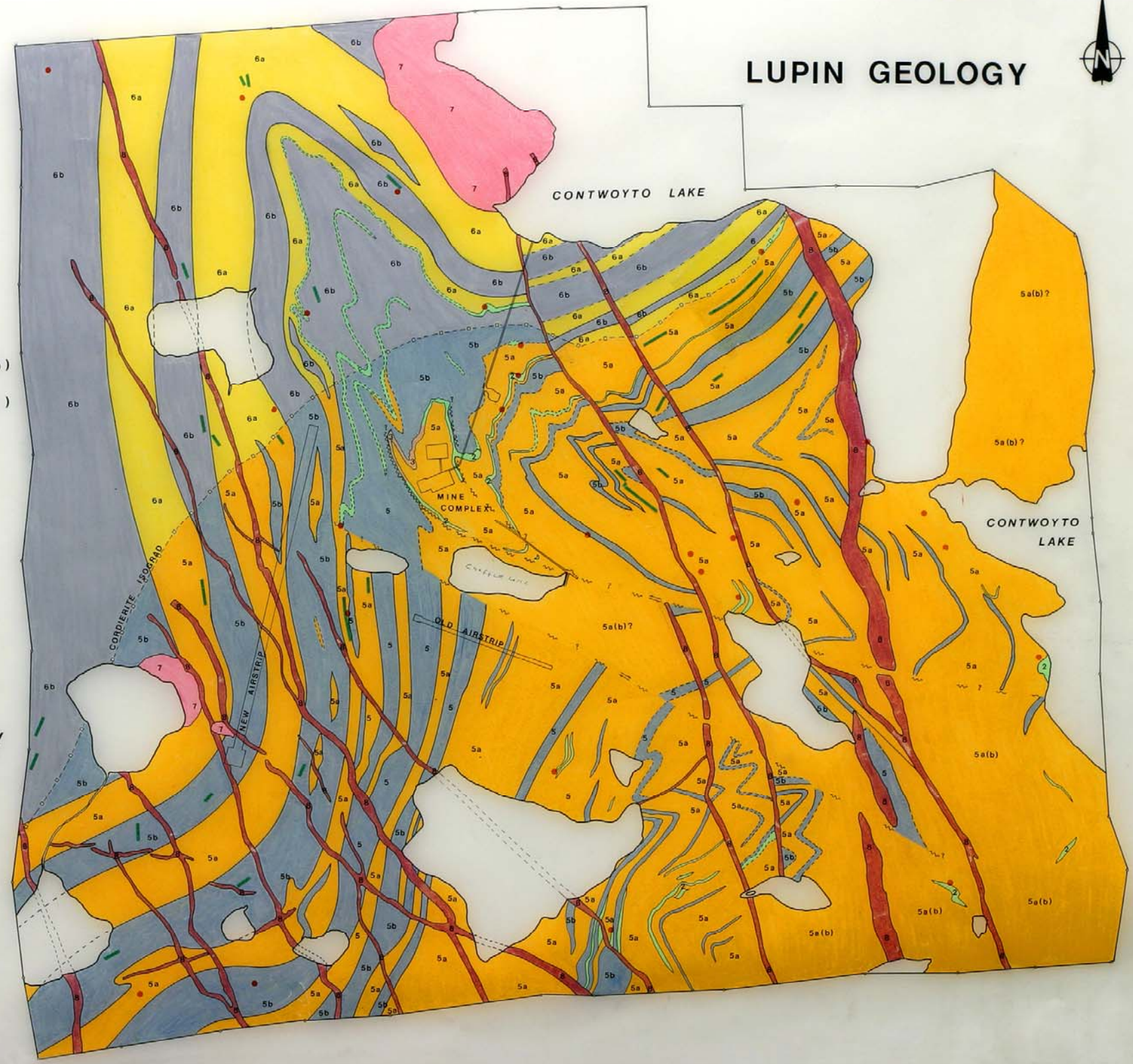


Photograph 46: Water sampling array using low flow system being used at monitoring well 05-10, July 2005 (APEC 3d).

APPENDIX III

Geology Maps

LUPIN GEOLOGY



LEGEND

- 8 DIABASE, GABBRO
- 7 INTRUSIVES

SEDIMENTS

- 6b QTZ. BIO. SCHIST (=5b)
- 6a METAGREYWACKE (=5a)
- 5b MUDSTONE
- 5a GREYWACKE

IRON FORMATION

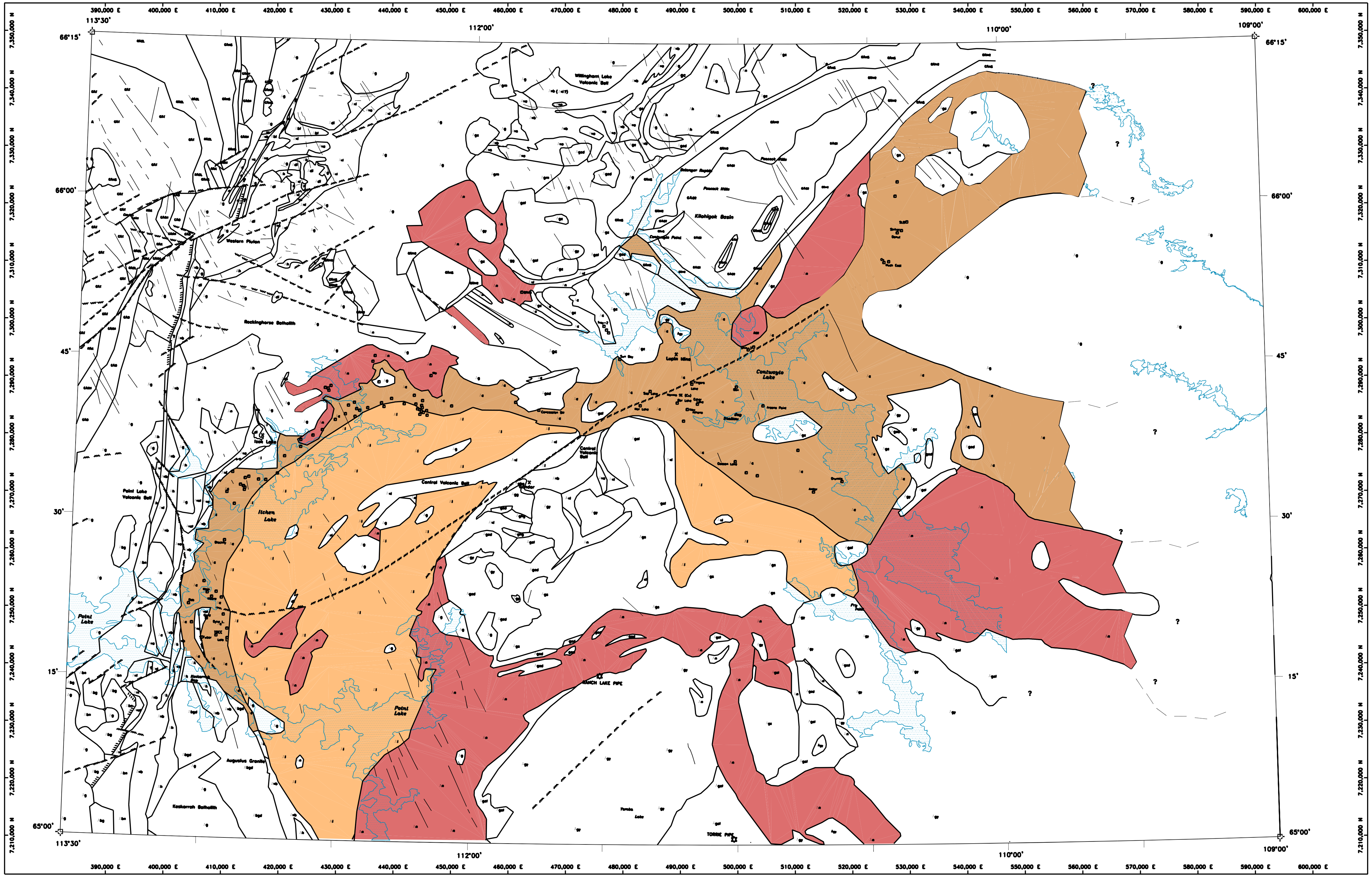
- 3 SULPHIDE RICH
- 2 SULPHIDE POOR

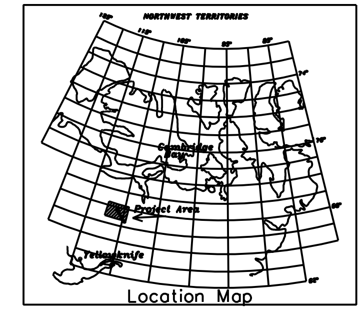
SYMBOLS

- FAULT
- GOLD OCCURRENCE
- GEOLOGIC BOUNDARY
  - assumed
  - inferred

0 500 1000
METERS

SCALE - 1:10,000





Legend

Archean

YELLOWKNIFE SUPERGROUP

ITCHEN FORMATION

CONTWOYTO FORMATION

PRE-YELLOWKNIFE SUPERGROUP ROCKS

Symbols

Geological boundary

Dyke

Fault

Shear Zone

Extrapolated

Gold (iron formation hosted)

Sources of Information
EGS 1995-03 Sheet 6 Preliminary compilation of the Point-Contwoyto to Napaktulik-Kathawachage Lakes Area (NTS 86H, 76E, 86I, 76L)
Author(s) not known.
Client Sources

1:250,000

0 20km

ECHO BAY MINES LTD

Contwoyto Project N.W.T.

Geology

Prepared By: JAT, RVL, EAR	January 1996
NTS:76F,76K,76E,76L,86H,86I	Revised by:
ACAD File:Echobay5.dwg	TS Project Code: EBR

TerraSat Geomatics Inc.

NORTH
W E
S

480000E
485000E
490000E
495000E

7295000N
7290000N
7285000N
7280000N

PXD 1 CLAIM
Tag F 10648

PXD 2 CLAIM
Tag F 10649

LUPIN LEASE
Lease 2428
LOT 1
GROUP 1216

LOT 1 CLAIM
Lease 3278
LOT 1001
PLAN 70272MC

BRI 1 CLAIM
Lease 3276
LOT 1002
PLAN 70272MC

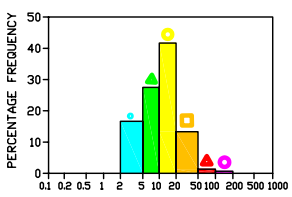
DER 1 CLAIM
Lease 3275
LOT 1003
PLAN 70272MC

PEN 1 CLAIM
Lease 3277
LOT 1004
PLAN 70272MC

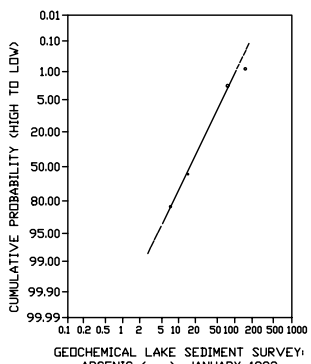
Contwoyto Lake
Contwoyto Lake
Contwoyto Lake
Shallow Bay
White Lake
Boot Lake
Tailings Pond
Chain Lakes
Long Lake
Block Lake
Fingers Lake
Pool Lake

LEGEND

0 0.5 1.0 1.5 2.0 2.5 KM



4 CYCLE LOGARHYTHMIC - PERCENTAGE FREQUENCY



4 CYCLE LOGARHYTHMIC - PROBABILITY PLOT

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED ON SITE. NOT ALL UTILITIES MAY BE SHOWN.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	–	LUPIN ARSENIC 1982

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0				

MORROW

CLIENT NAME: KINROSS GOLD CORPORATION

PROJECT LOCATION: LUPIN MINE NUNAVUT

TITLE:
BACKGROUND ARSENIC CONCENTRATIONS IN SEDIMENT

DWN BY: CDC	SCALE: 1:50,000	DATE: 2005-09-22	DWG No: A053017-APP REV.: 0
CHK'D: NS	PLOT: 20040305.1300	CADFILE: A053017R00	