KINROSS

LUPIN NU

Lupin Operation
9818 Edmonton International Airport
Edmonton, AB T5J 2T2 Canada

October 20, 2006

Executive Director
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU
X0B 1J0

Dear Sir:

RE: Kinross Gold Corporation, Lupin Mine, Contwoyto Lake, NU.
Water License NWB1LUP0008
2006 Annual Geotechnical Report

As per Part D, Item 6(g) of Lupin Water Licence NWB1LUP0008, please find enclosed a hard copy and cd of the report "2006 Geotechnical Inspection, Perimeter Tailings Dams" completed in August 2006 by BGC Engineering.

Should you have any questions or comments regarding this report, please contact:
Mike Tansey, Reclamation Manager mike.tansey@kinross.com.

Respectfully submitted,

Mike Tansey

cc: Mark Ioli
Shawn Healey

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

KINROSS GOLD CORPORATION
LUPIN OPERATION

2006 GEOTECHNICAL INSPECTION
PERIMETER TAILINGS DAMS

LUPIN MINE
NUNAVUT

FINAL

PROJECT NO.: 0256-012-01
DATE: OCTOBER 10, 2006

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Project No. 0256-012-01
October 10, 2006

Mr. Mike Tansey, P.Eng. – Reclamation Manager
Kinross Gold Corporation
Lupin Operation
9818 International Airport
Edmonton, Alberta
T5J 2T2

RE: 2006 REPORT ON ANNUAL GEOTECHNICAL INSPECTION
PERIMETER TAILINGS DAMS, LUPIN MINE, NUNAVUT

Dear Mike:

Please find attached our report on the Annual Geotechnical Inspection of the Perimeter Tailings Dams, which was carried out on August 17 and 18, 2006. A site inspection memo was left with Mr. John Oliver outlining items requiring maintenance following the inspection visit.

Thank you for the hospitality shown during the site visit. If there are any questions regarding this report, please contact the undersigned at your convenience.

Yours truly,
BGC ENGINEERING INC.
per:

James W. Cassie, M.Sc., P.Eng.
Specialist Geotechnical Engineer
(direct line 403/250-5185 ext. 103)

encl.: Final Report

JWC/sf

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LIMITATIONS OF REPORT

This report was prepared by BGC Engineering Inc. (BGC) for Kinross Gold Corporation. The material in it reflects the judgment of BGC staff in light of the information available to BGC at the time of report preparation. Any use which a Third Party makes of this report, or any reliance on decisions to be based on it are the responsibility of such Third Parties. BGC Engineering Inc. accepts no responsibility for damages, if any, suffered by any Third Party as a result of decisions made or actions based on this report.

As a mutual protection to our client, the public, and ourselves, all reports and drawings are submitted for the confidential information of our client for a specific project and authorization for use and/or publication of data, statements, conclusions or abstracts from or regarding our reports and drawings is reserved pending our written approval.

1.0 INTRODUCTION

Lupin Mine, owned and operated by Kinross Gold Corporation, is located 285 km south-east of Kugluktuk and 400 km north-east of Yellowknife on Contwoyto Lake, as illustrated on Figure 1. Kinross's Nunavut Water Board License (NWB1LUP0008) requires that the tailings containment area (TCA) be inspected annually by a qualified Geotechnical Engineer. As such, Mr. Mike Tansey, P.Eng., Reclamation Manager for Lupin Mine, requested that BGC Engineering Inc. (BGC) conduct an inspection of the tailings facility perimeter embankments.

This inspection and the preparation of a report are required in partial satisfaction of the Lupin Mine Water License obligations. Conditions in the Water License that apply to the annual inspection are as follows:

- a freeboard limit of 1.0 m should be maintained at all times;
- seepage from the TCA be minimised;
- any seepage that occurs should be collected and returned immediately;
- any erosion of the facilities should be addressed immediately; and
- the annual inspection report should be forwarded to the Water Board within 60 days of the inspection date.

Based on the visual inspection and a review of monitoring data, the geotechnical performance of the perimeter dams is assessed. Any deficiencies and points of concern are brought to the attention of Kinross.

Previous design, as-built and annual inspection reports by Geocon Inc., Golder Associates Ltd. and BGC Engineering Inc. should be reviewed for information, observations and recommendations prior to 2006.

Geocon (1982) provides as-built information for Dams 1A, 1B, 1C, 2 and 4A (later a portion of the much larger Dam 4) that were all built up to elevation 485 m during the 1981 construction period. The dam embankments were constructed of silty sand till with a liner on the upstream side. The liner is keyed into the underlying permafrost.

Golder Associates (1992) provides dam design information for Dams 4, 5 and 6 and the End Lake Dam (which was never constructed). For these dams, a geosynthetic liner is installed within the upstream portion of the embankment and then anchored into the frozen foundation, except for Dam 4. On Dam 4, the liner extends 15 m upstream from the upstream toe. For each of these dams, the top of the liner was situated 0.5 m below the physical crest of the dams. Dam 4 has a rockfill toe drain to collect embankment seepage, should it occur.

Golder Associates (2004) provides a Dam Safety Review of the perimeter tailings dams. Within that work, a failure consequence classification for each perimeter dam was provided, as follows:

- Low consequence – Dams 1A, 2 and 4.
- Very low consequence – Dams 1B, 1C, 3, 5 and 6.

Slope stability analyses were also undertaken for Dams 1A, 2 and 4. Factors of safety for static conditions were greater than 1.6 and greater than 1.3 for conservative seismic loadings. As a result, Golder concluded that all three noted dams satisfy dam safety stability requirements. A brief Operations, Maintenance and Surveillance (OMS) Manual was also prepared as an appendix to their report.

2.0 TAILINGS CONTAINMENT AREA OPERATION DESCRIPTION

As illustrated on Figure 2, tailings storage at Lupin Mine utilises a number of low embankments which are arranged to provide five cells for solids accumulation, some supernatant water storage within these cells, supernatant runoff storage accumulation (Pond 1) and an adjacent area (Pond 2) for transport water conditioning and staged release. In that none of the tailings water is recycled to the mill, aged water is typically transferred from Pond 2 to the environment once every second year (usually beginning mid-July). Following this discharge, tailings water is transferred from Pond 1 to Pond 2 for subsequent ageing. During the transfer, water treatment chemicals are added, if required. In a typical year, compliant water within Pond 2 is discharged to the environment via the siphons over Dam 1A. When storage capacity is created in Pond 2, Pond 1 water is transferred in using the siphons over J-Dam.

Processing and tailings deposition was completed in February 2005 as Lupin Mine went into closure. In 2006, the following water transfers took place:

- No discharge from Pond 2 m^3 in the summer of 2006.
- Discharge from Pond 1 – 171,656 m^3 between August 12 and August 27, 2006.
- Pond 2 water levels rose 0.17 m as a result of the transfer of water between Pond 1 to Pond 2.

Dams 1A and 2 retain Pond 2 and these dam are built to approximately elevation 486.3 m. The high water level during the time of the inspection was approximately 3.5 m below the crest of the two noted retention dam as shown in Figure 5.

3.0 CLIMATIC CONDITIONS

Figures 3 and 4 provide a graphical representation of the 2005 and 2006 (to-date) monthly temperature and precipitation values versus the long-term mean values (which have been recorded since 1982). Figure 3 indicates that the 2005 temperature values were warmer than typical for the year (MAAT of –10.1°C versus –11.0°C long term), while values for 2006 (to July) were significantly warmer until June. Figure 3 also provides a plot of mean annual air temperature (MAAT) values recorded at Lupin Mine since 1982. The plot provides some context with regards to potential climate change that may be occurring. A relatively strong warming trend was indicated between 1983 and 1999 but MAAT values have been relatively consistent since then.

Figure 4 illustrates that precipitation in 2005 was normal on an annual basis, but June was wetter than normal while July was drier. Data from June and July 2006 also appear to be matching the pattern from 2005. Figure 4 also provides a long term plot for the total annual precipitation (TAP) values since 1983 and no discernable pattern is apparent.

4.0 INSPECTION CONDITIONS AND APPROACH

4.1 General

Mr. Jim Cassie, P. Eng., conducted the inspection on August 17 and 18, 2006. The temperature during the inspection was approximately 10° to 15°C under partly cloudy conditions with a trace of rain in the evening of the 17th. Since August 6th, approximately 21 mm of rain had fallen with no precipitation falling between Aug. 12th and 17th.

As noted, tailings placement was completed in February 2005. Tailings covering were undertaken in 2005 and a significant amount of the tailings in Cell 3, Cell 5 and behind N-Dam had been covered with a 1 m thick cover of esker sand and gravel. No water transfers over Dam 1A or J-Dam were occurring during the inspection visit.

Each of the embankments was inspected on foot. A camera and Dictaphone were used to record pertinent observations concerning both the physical conditions and seepage. In general, the crest and upstream slope of a given embankment were inspected first, followed by inspection of the downstream slope by walking along the toe of the slope. The transcribed Dictaphone notes and photographs constitute the field record (the Field Memo which remains in the office of BGC) and provides the basis for this formal report. Before leaving the site, a summary memo regarding tailings area maintenance items was prepared and reviewed with Mr. John Oliver from Lupin Mine; this memo is attached in Appendix 1.

4.2 Instrumentation

Seacor Environmental Engineering Inc. installed four thermistor strings in Dam #4 in October 1995, along with several other cables in the reclaimed tailings area. In addition, BGC (2000) outlines the installation details of an additional four thermistor cables in Dams 1A and 2. Some thermistors were installed in Dam 6 in May 2003 as reported in BGC (2003). Lupin Mine staff also installed some thermistors in Dams 1A and 2 in May 2003. Most of these recently installed thermistors were destroyed by a bear shortly after installation. Long term plots of the instrumentation data still being monitored by site staff are provided in Appendix 2. An interpretation of this data is provided on the individual dam inspection sheets.

5.0 FINDINGS AND CONCLUSIONS

The inspection results for each of the structures are presented on the following pages in standardised format, complemented by a selection of site photographs. Refer to Figure 2 for the location of each structure. Specific maintenance requirements are documented on each of the individual sheets and again, in the summary memo provided in Appendix 1.

In general, the inspection confirms that the perimeter embankments are in satisfactory condition. Some erosional gullies were noted and these should be repaired.

Instrumentation installed in selected dams show subzero temperatures at depth. No signs of permafrost warming are indicated and some temperatures at depth are cooling due to on-going permafrost aggradation.

Clause D.6.f of the Water Licence notes that weekly inspections of tailings dams (and associated infrastructure) are to be undertaken by site staff and records kept on these inspections. As the water levels rise behind the various dams, inspections must be undertaken to assess potential seepage and dam performance.

Continued vigilance with regards to thermistor monitoring should be undertaken, especially when summer pond levels are high. Hence, all thermistors within tailings dams should be read according to the following frequency:

- November to April – monthly.
- May to June – weekly.
- July to October – every two weeks.

The objective of collecting this data is to provide proactive assessment of potentially deteriorating performance of the dams. Instrumentation data from the various dams should be forwarded to BGC immediately after collection for review and interpretation.

In addition to thermistor readings, all pond levels should be recorded at least monthly and perhaps bi-weekly as water transfer events occur. Staff gauges or pore pressure transducers should be considered to record water levels.

DAM 1A

LOCATION:	West side of Pond 2.
FUNCTION:	Major perimeter closure for water retention; carries siphon pipes for water decant system.
LENGTH:	250 +/- m
MAX HEIGHT:	8 m +/- above d/s tundra.
AS-BUILT ELEVATION:	486.27 m
CREST WIDTH AND CONDITION:	7 to 8 m; surfaced with esker material, but not travelled because of the siphons. No significant cracking evident; condition is good.
RIPRAP:	Run of Mine rockfill; broadly graded; good condition. Previously noted disturbed area (due to construction traffic possibly) in rip rap at the crest edge.
BACKSLOPE:	Approx. 1.5H:1V; variably armoured with cobbles and boulders; no evidence of cracking.
TOE BERM:	No significant cracking evident; condition is good.
SEEPAGE:	No evidence of seepage.
INSTRUMENTATION:	Thermistor D1A-00-1 is located in the crest, just south of the mid-point of the dam. Approximately 2.5 m of active layer depth recorded on Aug. 15, 2006. Thermistor nodes below depth of 9 m (situated approximately below the embankment fill) are equal to, or colder than –4°C with no signs of any permafrost warming. Thermistor D1A-00-02 is located in the crest towards the north end of the dam. No data in upper portion of thermistor to accurately measure the active layer depth. Nodes below a depth of 10.3 m are also equal to or colder than –4.0°C with no signs of permafrost warming. The node at 5.3 m depth appeared to indicate a cooling trend over the last few years but that node appears to have warmed slightly this year, likely in response to the warm temperatures over the past year.

DAM 1A CONTINUED

MAINTENANCE RECOMMENDATIONS: No maintenance required.

CONCLUSIONS: The dam is in good condition with no evidence of seepage passing through or beneath the dam. Monitor instrumentation regularly and visually inspect downstream toe as Pond 2 level increases.

DAM 1B

LOCATION:	West side of Pond 2.
FUNCTION:	Minor perimeter closure for water retention; pond level is below dam base elevation thus currently functioning only as a road embankment.
LENGTH:	200 +/- m
MAX HEIGHT:	2.5 +/- m above d/s tundra.
AS-BUILT ELEVATION:	485.83 m
CREST WIDTH AND CONDITION:	5 to 6 m wide; surfaced with esker material so that this dam may also function as a roadway for access around the perimeter of the area. Crest condition is good.
RIPRAP:	Run of Mine rockfill; variable sizes; undulating; disturbed in areas but in good condition overall.
BACKSLOPE:	Approx. 1.5H:1V with minor runoff erosion rills and a toe-of-slope roadway berm. No cracking observed.
SEEPAGE:	No seepage observed but no water head being retained by the structure.
MAINTENANCE RECOMMENDATIONS:	None currently required.
CONCLUSIONS:	The structure is in good condition; it should be monitored for seepage if Pond 2 rises sufficiently to place a water head against the dam.

DAM 1C

LOCATION:	West side of Pond 2.
FUNCTION:	Minor perimeter closure for water retention: currently retaining no water other than small puddles. Currently functioning only as a road embankment.
LENGTH:	230 +/- m
MAX HEIGHT:	2.0 +/- m above d/s tundra.
AS-BUILT ELEVATION:	485.88 m
CREST WIDTH AND CONDITION:	9 +/- m wide; surfaced with esker material, so that this dam may also function as a roadway, although the downstream toe roadway appears more commonly used. Crest condition is good.
RIPRAP:	Run of Mine rockfill; some minor disturbances noted; some minor longitudinal cracking noted, overall condition satisfactory.
BACKSLOPE:	Approx. 3H:1V, smooth slope. Access road berm appears in good condition.
SEEPAGE:	No seepage observed but no water currently being retained by the structure.
MAINTENANCE RECOMMENDATIONS:	None currently required.
CONCLUSIONS:	The structure is in good condition; it should be monitored for seepage if Pond 2 rises sufficiently to place a water head against the dam.

DAM 2

LOCATION:	North end of Pond 2.
FUNCTION:	Major perimeter closure for water retention; natural pond downstream of the dam.
LENGTH:	350 +/- m
MAX HEIGHT:	5.5 +/- m above d/s tundra.
AS-BUILT ELEVATION:	486.30 m
CREST WIDTH AND CONDITION:	Approx. 6 m; surfaced with esker material and used as the primary traffic route. Crest condition is good; no cracking is evident.
RIPRAP:	Run of Mine rock forms convex-upward, gently sloped upstream face; minor erosional scarps formed at previous higher water levels; good condition.
BACKSLOPE:	Variable materials but comprised mostly of esker granular material with minor rills; good condition.
SEEPAGE:	Seepage (likely resulting from active layer drainage rather than seepage through the dam) observed discharging at the toe of the northeast abutment where it is typically observed.
INSTRUMENTATION:	Thermistor D2-00-02 is located at the north end of the crest. Approximately 2.5 m active layer depth measured on Aug. 15, 2006. Temperatures at depth are subzero. Below 5 m depth (approximate bottom of embankment fill), temperatures are colder than –2°C. Temperatures below that depth are colder with no signs of permafrost warming. Thermistor D2-00-03 is situated near the mid-point of the dam. Readings were only available until March 2006 but approximately 2.3 m of active layer depth measured on Sept. 14, 2005. All readings below 5 m depth are colder than –2°C. The 5 m depth readings appear to be cooling over time. Temperatures below 15 m depth are colder than –3.5°C with no indications of warming.

DAM 2 CONTINUED

MAINTENANCE RECOMMENDATIONS: None required.

CONCLUSIONS: The dam is in satisfactory condition. Continue with vigilant monitoring of instrumentation and visual condition assessment.

DAM 3

LOCATION:	East end of now-covered tailings storage area, east of Cells 1 and 2.
FUNCTION:	Minor perimeter closure for tailings retention; Boomerang Lake downstream of the dam. The dam retains tailings covered with an esker material cap, thickened in 1995 by one metre using esker material.
LENGTH:	600 +/- m
MAX HEIGHT:	2.5 +/- m above d/s tundra.
AS-BUILT ELEVATION:	488.4 m
CREST WIDTH AND CONDITION:	Approx. 8 m; surfaced with esker material. Crest condition is good and no cracking is evident. Discharge swale on the east arm appears in satisfactory condition.
RIPRAP:	Inside slope buried with tailings cover sand and gravel.
BACKSLOPE:	Variable in inclination; locally meets the shoreline of Boomerang Lake. Minor toe cracking continues to be observed.
SEEPAGE:	None observed near the toe of the east arm of the dam.
MAINTENANCE RECOMMENDATIONS:	None required.
CONCLUSIONS:	The dam is in satisfactory condition. Continue to conduct visual monitoring of small cracks at downstream toe.

DAM 4

LOCATION:	South end of Cell 4 for K Dam sub-pond.
FUNCTION:	Perimeter closure for water retention at present; natural pond downstream of the dam at its west end.
LENGTH:	900 +/- m
MAX HEIGHT:	6 +/- m above u/s native ground elevation.
AS-BUILT ELEVATION:	489.59 m
CREST WIDTH AND CONDITION:	Approximately 12 m wide crest width in generally good condition. Minor crest grading required at west abutment to prevent channelization of run-off.
RIPRAP:	Run of Mine rockfill in generally good condition on upstream slope.
BACKSLOPE:	Esker sand; slope steeper in upper portion and flattens in the lower portion, approximately 2H:1V. Several small to mid-sized erosional gullies noted on the crest edge should be backfilled.
SEEPAGE:	Water is seeping into the "cofferdam area" from the downstream lake, rather than from the upstream pond. This circumstance has been previously observed.
INSTRUMENTATION:	Three of the original four thermistors are currently monitored in Dam 4. From east to west across the crest, the four cables are numbered TD4-1 to –4. Thermistor TD4-1 recorded an active layer depth of 2.5 m on Sept. 14, 2005 and 2.8 m on Aug. 15, 2006. The cable has only subzero temperatures below 4 m depth. Below a depth of 6 m (approximately embankment fill thickness), the subsurface temperatures are colder than –3°C with no signs of significant warming.

DAM 4 CONTINUED

INSTRUMENTATION:

Thermistor TD4-2 was destroyed in summer 2003.

Thermistor TD4-3 also recorded an active layer depth of 2.5 m on Sept. 14, 2005 and 2.8 m on Aug. 15, 2006. The cable displayed only subzero temperatures below 4 m depth. Below a depth of 6 m, the temperatures are colder than –2.5°C with no signs of significant warming.

Thermistor TD4-4 recorded 2 m of active layer thaw on Sept. 14, 2005 and 2.5 m on Aug. 15, 2006. Only subzero temperatures were measured below 4 m depth. Below a depth of 6 m (approximately embankment fill thickness), the subsurface temperatures are colder than –3.2°C with no signs of significant warming.

MAINTENANCE RECOMMENDATIONS:

The crest at the west abutment should be graded and the erosional gullies on the downstream slope should be backfilled to prevent additional erosion.

CONCLUSIONS:

The dam is in good condition and is functioning without apparent seepage. If the "cofferdam area" is to be backfilled (as suggested by site staff), consideration should be given to the metals content in the sediments in the pond bottom. If tailings are located in these sediments, then the backfill thickness should be appropriate to ensure these sediments remain frozen.

DAM 5

LOCATION:	Southeast corner of Cell 3, just northwest of Dam 4.
FUNCTION:	Minor perimeter closure intended for future tails and water retention; currently functioning as a road embankment.
LENGTH:	250 +/- m
MAX HEIGHT:	1.5 +/- m above d/s tundra.
AS-BUILT ELEVATION:	491.54 m
CREST WIDTH AND CONDITION:	Approximately 8 m wide and esker surfaced so that the dam may also function as roadway. Crest is in generally good condition with one significant erosional gulley located in the mid-point on the downstream face.
RIPRAP:	Angular rockfill, maximum particle size from 20 to 30 cm, has been placed on the upstream face. Approximate slope of 3H:1V and in good condition.
BACKSLOPE:	About 1.5 to 2H:1V with till and esker sand. No cracking observed.
SEEPAGE:	No seepage observed. No water head being retained by the structure.
MAINTENANCE RECOMMENDATIONS:	Grade crest to prevent surface water channelization and repair one erosional gulley.
CONCLUSIONS:	The dam is in good condition and should be inspected for seepage when pond levels place a water head against it (unlikely occurrence).

DAM 6

LOCATION:	West side of Cell 3 retaining tailings placed behind K-dam.
FUNCTION:	Minor perimeter closure. Retaining some tailings beach and ponded water on the northern portion of the dam.
LENGTH:	300 +/- m
MAX HEIGHT:	2.5 +/- m above d/s tundra.
AS-BUILT ELEVATION:	490.25 m previously but some minor fill placement may have occurred.
CREST WIDTH AND CONDITION:	Approximately 10 m wide and esker surfaced so that dam also function as a roadway. Crest in good condition.
RIPRAP:	Upstream side tailings been covered with sand and gravel so not possible to observe the upstream side of this dam. No pond located behind the dam now.
BACKSLOPE:	About 2H:1V with till and esker sand; some minor longitudinal cracks were noted at the toe; three minor erosional gullies observed on the downstream toe.
SEEPAGE:	No seepage observed.
INSTRUMENTATION:	None.
MAINTENANCE RECOMMENDATIONS:	A small pond has formed on the upstream side of this dam, at the south abutment, due to proximal cover placement trapping runoff against the natural topography. The placement of additional esker material over an area of 80 to 100 m^2 would prevent the formation of this pond, reducing the risk of overtopping.
CONCLUSIONS:	The dam is in good condition.

6.0 CLOSURE

We trust the enclosed meets your present requirements and we thank Kinross Gold Corporation, Echo Bay Division, for the opportunity to be of service at Lupin Mine. If you have any questions or require additional information, please contact the undersigned.

Respectfully submitted,
BGC ENGINEERING INC.
per:

REGISTERED PROFESSIONAL ENGINEER
J. W. CASSIE
LICENSEE
N.W.T.

James W. Cassie, M.Sc., P.Eng.
Specialist Geotechnical Engineer

Reviewed by:

Holger Hartmaier, M.Eng., P.Eng.
Senior Geotechnical Engineer.

PERMIT TO PRACTICE
BGC ENGINEERING INC.
Signature _____
Date 10-OCT-06
PERMIT NUMBER: P 285
The Association of Professional Engineers, Geologists and Geophysicists of the Northwest Territories