SENES Comment:

2.1.1 Windblown Tailings

Relevant Review Document/Reference: AANDC Inspections, Care and Maintenance Plan (Sections 4.3), Compliance Plan

Observation:
Windblown tailings have been an issue at the site for many years. In the 2009 review of the Water Licence Renewal, the Nunavut Impact Review Board indicated ongoing concern over windblown tailings but assessed this could be addressed in the renewal of the Water Licence. The concerns remain and air-borne arsenic and metal contamination continues to spread into the environment. This has resulted in unnecessary contamination of the land and exposure of plants and animals to tailings contaminants.

LMI in the Care and Maintenance Plan (Section 4.3) has indicated they would remediate the land and apply a temporary stabilizer to the tailings surface to control future dusting, although to our knowledge this has not been completed to date (5 years since licence renewal). While this has the potential to be effective on an interim basis, more proactive remedial measures such as the placement of a shallow surface cover of esker sands and vegetation as required by the licence (Part I. Item 9) would be much more effective and could last indefinitely. Surface stabilizers are costly and are likely to require repeated additions to be effective over several years. The costs of repeated application may well be less economic and less effective than shallow soil cover. In the response to AANDC Comments on the Licence Application, LMI indicated they would complete and submit an evaluation and action plan by the end of August, 2014.

Recommendation:
It is recommended that LMI be required to provide details of the windblown tailings monitoring plan, cleanup methodology, tailings surface stabilization plan and schedule for implementation. Furthermore, implementation of this plan should be a requirement of the licence.

LMI Response:

The potential for windblown deposition of tailings outside of the tailings facility has been controlled by the placement of esker sand on the exposed tailings in 2004 and 2005. The area of exposed tailings remaining in Cell 3 (Figure 14 of AANDC's 15 July 2014 Inspection Report) is saturated and/or covered with shallow water and ice throughout the year. LMI has observed no ongoing issue of dust blowing outside of the facility. Observations made in 2014 continue to support this.

The deposition noted in Figure 16 of AANDC's 15 July 2014 Inspection Report originates from the perimeter dam, DAM 4. DAM 4 separates Cell 4 from Ferguson Lake. Cell 4, was never used for tailings storage and acts as a polishing pond for the decant water received from Cell 3. Anomalous arsenic concentrations at the toe of DAM 4 are the result of natural background mineralization in this area as documented during extensive historical grid soil geochemistry sampling at this location.

The deposition as seen in Figure 15 of AANDC's 15 July 2014 Inspection Report predominately originates from the perimeter dam, DAM 6 and from the esker cover on Cell 3. LMI will provide further information

in the form of physical and soil chemical characterization data (sieve analysis and analytical test results) to support this statement. Characterization samples will be collected in a 25 m grid pattern at the downstream base of DAM 6. Should LMI utilize on site equipment to conduct the grain size analysis (ro-tap test sieve shaker) and/or metals analysis (Niton Elemental Analyzer) duplicates of a minimum of 10% of the samples tested will be sent off site for testing at an accredited laboratory.

Based on the results of further study of the windblown tailings below DAM 6 a monitoring plan and the cleanup methodology and schedule will be finalized and submitted to the NWB for review and approval. Options to address the presence of windblown tailings outside of the facility include but are not limited to: excavation and relocation areas with exposed tailings within Cell 3 or Cell 5; cover in place; and development of site specific remedial objectives for the metals of concern based on CCME guidelines.

Upon restarting the milling operation at Lupin tailings the current plan is to deposit tails into Cell 5. There is approximately 155,000 m^2 of Cell 5 available for the deposition of additional tails as of 2014. The 86,000 m^2 area of exposed saturated tails in Cell 3 represents a contingency location for the deposition of tails at the restart of operations, in addition to being a suitable location for the deposition of any tails recovered from outside of the facility during cleanup.

Should the monitoring results show that windblown tails are currently being deposited outside of the facility (which is unlikely) as a result of the exposed saturated tails in Cell 3 additional measures will be implemented to control this source.

Prior to restarting operations LMI will update their operating procedures to incorporate measures to be implemented to control windblown tails from other areas of the tailings facility. The spill contingency plan will also be updated to provide contingency measures that are to be implements should deposition of tails outside the facility be detected during operations.

SENES Comment:

2.1.2 Acid Control in Closed Out and Reclaimed Tailings Basin

Relevant Review Document/Reference: LMI IARP, March 2013

Observation:
The primary concern with the decommissioning and closeout of acid generating tailings is the prevention and control of acid drainage. The Abandonment and Restoration plan provides for the application of an esker sand cover (1-m depth) to cause saturation of the tailings surface and control acid generation. Information to date suggests this plan has been effective, however, we are not aware of recent monitoring data to indicate that the plan is functioning as designed. It appears that no data have been collected on porewater quality within the saturated tailings cells since about 2005 or internal pond water quality (e.g., all ponds upstream of Pond 2).

Furthermore, we could find no data on variability of water level or depth of saturation in the cover material since 2005. As such, it is difficult to assess whether the system is performing as projected as no monitoring appears to have been undertaken for 9 years. This greatly increases the uncertainty and risk that the plan remains valid.

Recommendation:
It is recommended that LMI be required to provide a monitoring program that is included in the Licence to:

- Monitor variability of the active permafrost zone within the tailings;
- Monitor water levels in the esker sands over the covered tailings; and,
- Monitor porewater quality in the covered tailings and internal pond water quality to assess the progression of water quality in the tailings porewater and ponds to verify conditions are improving.

LMI Responses:

- Monitor variability of the active permafrost zone within the tailings;

  LMI Response:

  Readings from the thermistors installed in the exterior dams are to be included in the annual geotechnical monitoring report; this was completed on those functional units up until 2012 and to that date there was no evidence of permafrost degradation. This was also stated by the SRK professional geotechnical engineer who took readings and analyzed the data. Raphs of all data have been included in the reports. No readings were capable of being recorded in 2013 as the meter for reading the thermistors could not be located. Thermistor readings were completed in 2014 and data will be included in the 2014 annual geotechnical monitoring report, which is due for submission to the NWB by on October 31, 2014. LMI will present the thermistor graphs for the parameter dams at the technical meeting.

LMI is prepared to provide monitoring data being gathered from the many functional/reliable thermistors installed in the covered tailings to monitor the variability of the active permafrost zone. LMI's geotechnical engineer at SRK is of the opinion that the existing functional thermistors provide enough general information of the permafrost zone in the tailings.

- Monitor water levels in the esker sands over the covered tailings; and,

  LMI Response:

  LMI's geotechnical engineer at SRK agrees with the recommendation to install piezometers within the esker sands.

- Monitor porewater quality in the covered tailings and internal pond water quality to assess the progression of water quality in the tailings porewater and ponds to verify conditions are improving.

  LMI Response:

  LMI agree with the recommendation to provide the NWB with surface water quality data from the internal ponds in the tailings containment area. See *response to 2.2.5 Water Quality Monitoring Plan Quality Assurance/Quality Control Plan (2013).*

SENES Comment

2.1.3 Inventory and Management of Hydrocarbon Contaminated Soils

Relevant Review Document/Reference: LMI Waste Management Plan, LMI Response to Information Requests

Observation:
The site contains a large inventory of hydrocarbon contaminated soils although no updated site assessment has been completed to determine the likely quantities. The site has no approval for management of this waste on-site and as such, until an approved facility is in place, it would be appropriate to have the material removed from the site. To date, it is understood no application has been submitted for an on-site land farm for management of this contaminated soil.

The current waste management plan provides no information on the quantities or characteristics of the inventories of hydrocarbon materials and provides no information with regard to how this material will be managed. Given the site is more than 30 years old, there is a high potential that tanks may have leaked and contributed to the inventories of contaminated soils which could be substantially greater than the quantities identified to date. The plan simply states the contaminated material will be remediated.

In the response to AANDC Comments on the Licence Application, LMI indicated the Waste Management Plan (2013) was submitted but provided no commitment to address the extent of hydrocarbon contaminated soils. LMI also suggested they preferred to back-haul hydrocarbon contaminated soils as on-site treatment would be difficult.

Recommendation:
It is recommended that LMI submit a revised Waste Management Plan. Specific requirements for the management of hydrocarbon soils should include:

- A site assessment and monitoring program to define the extent and characterization of hydrocarbon contaminated soils;
- Program and schedule for management of the hydrocarbon contaminated soil (including a schedule for annual back-hauling even during C&M);
- A Landfarm Management Plan, including siting and design of a landfarm (should on-site management of hydrocarbon contaminated soils be selected

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LMI Response:

The site has not been on care and maintenance since 2005; as such the site assessment conducted by Morrow remains valid. The contaminated soil identified in the 2005 environmental site assessment is to be addressed fully upon final closure.

As discussed in the response to the first bullet under Comment 2.2.1, LMI considers the contamination resulting from the spill that occurred sometime between 2005 and 2011 at the satellite tank farm to be an exception. Inspections of the integrity of the tanks and liner of the satellite tank farm have been completed by outside consultants (see responses to SENES comments 2.2.2 and 2.4 item 4) and the

results support observations made by LMI that the source of the petroleum hydrocarbons spill was a result of a localized spillage outside of the containment berm, not seepage through the berm.

LMI will prepare a revised waste management plan that describes how the contamination outside the satellite tank farm will be characterized and remediated. It appears that the soil adjacent to the satellite tank farm has been predominately impacted by diesel with a minor contribution of more volatile gasoline. It is anticipated that this quality of the contaminated soil will allow for efficient treatment utilizing landfarm techniques. A conceptual landfarm management plan will be provided that outlines the approach to be taken based on the assumption that it will respond well to landfarm treatment.

Small quantities of hydrocarbon impacted soil that is recovered from inside the fuel containment areas during facility maintenance will continue to be back-hauled until such time as the landfarm facility is available to receive and treat the soil.

SENES Comment

2.1.4 Management of Hazardous Materials

Relevant Review Document/Reference: AANDC Inspections; LMI Waste Management Plan

Observation:
The site has amassed a large inventory of hazardous materials. During the last formal inspection of the storage site by AANDC in 2012, the inspector noted that the waste had been centralized but the site was poorly managed with uncovered and leaking barrels. The waste management plan is silent on quantities, storage location and design of the storage facility. Management practices as outlined in the plan are generally adequate. The plan indicates all material will be removed off site to a hazardous waste facility as is required in the Licence, however hazardous material remains in storage at the site.

In the response to AANDC Comments on the Licence Application, LMI indicated they would revise the plan to keep hazardous material in secure storage until removed from the site but provided no inventory or schedule for removal.

Recommendation:
It is recommended that LMI update the management plans for hazardous waste to include the location and design of the storage facility and provide a schedule for removing the inventory of waste from the site.

LMI Response:

Hazardous waste is placed in a lined and bermed facility pending backhaul. LMI has backhauled considerable hazardous waste and continues to do so on available flights when safety and proper protocols so allow. Below is a current photo of the facility and attached is the manifest list from KBL from 2010-2014.

Hazardous Waste Storage Facility

SENES Comment

2.2.1 Interim Abandonment and Restoration Plan (2013)

Observation:
The closure plan for the Lupin Mine is generally well prepared and supported by technical documentation. The last material update of the plan was submitted by Kinross in 2005. Minor additions and updates have occurred and are included in the plan submitted in 2013. The plan in 2005 was reviewed in detail and many issues were identified. These were addressed in responses to the NWB and overall we are supportive of the plan concepts but believe a thorough update is required to remove inconsistencies and old information and provide data on recent site monitoring. Specific requirements include:

- *A Site Assessment* – The last site assessment was conducted in 2005 (Morrow, 2006). As stated previously, given this was 9 years ago, the assessment needs to be updated so that more accurate estimates of contaminated soils can be determined and included in the cleanup costs for the reclamation estimate.
- *Clarification on Soil Cover requirements (area to be covered)* – On page 33, the updated plan states there are 650,000 m2 of tailings that remain to be covered. The RECLAIM estimate provides for only 375,000 m2 to be covered.
- *Natural Revegetation* – The report states that no revegetation is proposed and that the site will be allowed to naturally recolonize. In responses to various questions, LMI continues to defend this position indicating it is difficult to revegetate in Arctic environments and costs would be prohibitive. The licence (Part I, Item 9) requires the tailings be covered and vegetated. *Water Quality Table 9, pg.39* – The updated plan shows the water quality in the cells and ponds. The date of sampling is not stated but appears to be from 2005.
- *Additional Sand to perimeter dams and dykes* – On page 43 it states that a peripheral strip of esker was added to the upstream edge of Dam 3D and additional strips would be added to all other unlined periphery cell dykes and dams in 2005. Clarification is required on whether this has been completed.
- *Ecological Risk Assessment* – An ecological risk assessment was prepared for the covered tailings pond by Golder (2004) and concluded there is minimal risk to the ecosystem. It is not clear if the report addressed any effects from historical windblown tailings on the ecosystem outside of the tailings pond. Given there has been no cleanup of this material it would be prudent to assess the ecological risks.
- *Rip Rap Quarry Rock* – The report on page 47 states that approximately 100,000 m3 of rock will be quarried for resloping dams and miscellaneous uses. The RECLAIM estimate has no allowance for quarry development or placement of any of this material. Other deficiencies include no allowances for spillways, dam resloping, removal of hydraulic structures, etc. (see section on the Financial Assurance estimate for further detail).
- *Cycle 4 EEM Study* – Page 49 of the updated report says the cycle 4 EEM study would be completed in 2013. *Was this done?*
- *Cover to Cell 2 and Levelling Cell 1* – Page 51 states Cell 2 will be covered in the near future and Cell 1 levelled. *Was this completed?*
- *Cover Application* – Page 52 suggests that the last cover application was in September 2005, increasing the total area covered to 383,001 m2. *How much area remains to be covered?*
- *Cover Application - Response to Comments on the 2005 A&R Plan (Environment Canada, pg. 15)* – The report states there are 250,000 m2 that remain to be covered and this will be completed

in 2007. This work does not appear to have been completed and is a different number than quoted elsewhere.

Recommendation:
It is recommended that LMI fully update the closure plan, eliminate outdated information and provide accurate information on current site conditions. This may not be achievable during the licence review process and as such may need to be included as a licence condition.

LMI Responses:

LMI will prepare an erratum to correct errors identified during this review process and subsequent revisions of the Interim Abandonment and Reclamation Plan will incorporate these corrections. The studies included as appendices will continue to include outdated information and an additional appendix will be provided with the updated Plan to identify those statements. Responses to some of the key items raised in SENES comment 2.2.1 are provided here.

- A Site Assessment – The last site assessment was conducted in 2005 (Morrow, 2006). As stated previously, given this was 9 years ago, the assessment needs to be updated so that more accurate estimates of contaminated soils can be determined and included in the cleanup costs for the reclamation estimate.

  LMI Response:

  The site has not been on care and maintenance since 2005, as such the results obtained by Morrow remain valid.

  The character and quantity of metal contaminated soil has remained static since the Morrow study was conducted.

  The natural attenuation of petroleum hydrocarbon contaminated soils is considered to have been offset by the generation of minor quantities during care and maintenance. LMI considers the contamination resulting from the spill that occurred sometime between 2005 and 2011 at the satellite tank farm to be an exception. LMI recognizes that the soil quality remediation objectives for petroleum hydrocarbons have been updated since the Morrow report was prepared and that more stringent generic objectives exist. The current generic Canada Wide Standards for Petroleum Hydrocarbons came into effect in 2008. The soil samples analyzed by Morrow are either well below the previous standards or exceeded them by a significant factor. The application of the current objectives does not increase the quantity of petroleum hydrocarbon contaminated soil identified.

- Clarification on Soil Cover requirements (area to be covered) – On page 33, the updated plan states there are 650,000 m2 of tailings that remain to be covered. The RECLAIM estimate provides for only 375,000 m2 to be covered.

LMI Response:

The area of tailings to be covered reported on page 33 of the plan is an outdated number. LMI will prepare an erratum to correct this error and subsequent revisions of the Interim Abandonment and Reclamation Plan will incorporate these corrections. There is currently an estimated 241,000 m^3 of tailings not covered by esker sand. This includes 155,000 m^2 in Cell 5 and 86,000 m^2 in Cell 3. These areas are either saturated for most of the year or underwater.

The RECLAIM estimate has conservatively increased the areal extent to 250,000 m^2 and instead of a 1 m cover 1.5 m has been used to generate 375,000 m^3 to allow for additional contingency in the amount stated. In future updates of the RECLAIM estimate LMI proposes to continue to use the 250,000 m^2 estimate, but to allocate contingency under the subheading contingency and apply a 1 m cover.

- Natural Revegetation – The report states that no revegetation is proposed and that the site will be allowed to naturally recolonize. In responses to various questions, LMI continues to defend this position indicating it is difficult to revegetate in Arctic environments and costs would be prohibitive. The licence (Part I, Item 9) requires the tailings be covered and vegetated.

LMI Response:

LMI requests that the provision for revegetation of the tailings cover be removed from the licence. The cover has been designed to allow for natural revegetation, therefore long-term maintenance to remove vegetation is not required.

- Water Quality Table 9, pg.39 – The updated plan shows the water quality in the cells and ponds. The date of sampling is not stated but appears to be from 2005.

LMI Response:

LMI agree with the recommendation to provide the NWB with surface water quality data from the internal ponds in the tailings containment area. See *response to 2.2.5 Water Quality Monitoring Plan Quality Assurance/Quality Control Plan (2013).*

- Additional Sand to perimeter dams and dykes – On page 43 it states that a peripheral strip of esker was added to the upstream edge of Dam 3D and additional strips would be added to all other unlined periphery cell dykes and dams in 2005. Clarification is required on whether this has been completed.

LMI Response:

Additional esker sand has been added to periphery cell dykes and dams. The locations of the unlined periphery cell dykes and dams will be identified in the updated plan.

- Ecological Risk Assessment – An ecological risk assessment was prepared for the covered tailings pond by Golder (2004) and concluded there is minimal risk to the ecosystem. It is not clear if the report addressed any effects from historical windblown tailings on the ecosystem outside of the tailings pond. Given there has been no cleanup of this material it would be prudent to assess the ecological risks.

  LMI Response:

  See response to SENES comment 2.1.1

- Rip Rap Quarry Rock – The report on page 47 states that approximately 100,000 m3 of rock will be quarried for resloping dams and miscellaneous uses. The RECLAIM estimate has no allowance for quarry development or placement of any of this material. Other deficiencies include no allowances for spillways, dam resloping, removal of hydraulic structures, etc. (see section on the Financial Assurance estimate for further detail).

  LMI Response:

  Allowances for the items listed above have been clearly identified in the updated RECLAIM estimate. See response to SENES comment 2.4

- Cycle 4 EEM Study – Page 49 of the updated report says the cycle 4 EEM study would be completed in 2013. Was this done?

  LMI Response:

  The Cycle 4 EEM Study was not completed. LMI advised Environment Canada in August 2013 that the study was not completed and LMI formally requested an extension to June 2015. LMI will seek advice from Environment Canada on whether the study should be carried out in 2015 and path forward from there.

- Cover to Cell 2 and Levelling Cell 1 – Page 51 states Cell 2 will be covered in the near future and Cell 1 levelled. Was this completed?

  LMI Response:

  The statement on page 51 is an error. Cell 2 has been covered. LMI will prepare an erratum to correct this error and subsequent revisions of the Interim Abandonment and Reclamation Plan will incorporate these corrections.

- Cover Application – Page 52 suggests that the last cover application was in September 2005, increasing the total area covered to 383,001 m2. How much area remains to be covered?

  LMI Response:

The statement on page 52 is an error. The areas remaining to be covered are stated in the response to bullet 2 above.

- Cover Application - Response to Comments on the 2005 A&R Plan (Environment Canada, pg. 15) – The report states there are 250,000 m2 that remain to be covered and this will be completed in 2007. This work does not appear to have been completed and is a different number than quoted elsewhere.

  LMI Response:

  The statement on page 52 is an error. The areas remaining to be covered are stated in the response to bullet 2 above.

SENES Comment

2.2.2 Fuel Containment Management Strategy (2013)

Observation:
An updated Fuel Containment Management Strategy was submitted as Appendix 4 of the Care and Maintenance Plan. As a general comment, the plan is reasonable. The following comments, clarifications and recommendations are offered for consideration.

- *Inventories and Characteristics* – The Fuel Containment Strategy report includes data on the total capacity and reported contents of all tanks and whether they are in active service. Given most of the fuels have been on-site for more than 10 years, many of these fuels are contaminated, deficient in volatiles or contain excess water. It is likely most of these fuels cannot be used to support future operations and as such are likely waste materials that require disposal.
- *Status of Diesel tanks* – The report on page 3 states the sixth tank (M16) contains residual fuel and water and will be drained in 2013. Was this work completed?
- *Tank Inspection Schedule* – Page 9 states that weekly and monthly inspections will be conducted with inventories monitored on a weekly basis. This appears to be inconsistent with the inspection log presented in the annual reports. During 2012 tanks were only monitored during 3 months of the year (total inspections reported were 9) and in 2013 in 7 months (total inspections were 11). Weekly inspections were only conducted during December 2012.

Recommendation:
It is recommended that LMI include an updated inventory of the quantity and quality of all fuels in each tank on site. The total quantities will be required to assess disposal costs for the IARP. AANDC also recommends that LMI inspect fuel facilities in accordance with the plan and sand the water licence.

LMI Response:

There is currently a total of 2.3 million litres of fuel left on site stored in proper fuel storage tanks. The last shipment to site was in the winter of 2007. It was tested recently and results show it to be of excellent quality. It was used to supply power generators and vehicles this summer with no issues. Furthermore, quantities were sold to a third party contractor.

Contents of Tank M16 in the Main Tank Farm were transferred to Tank M17. The fuel will be analyzed to determine best method of disposal.

During care and maintenance the tanks are generally inspected once per month during the open water season. According to the Environment Canada Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations there is no specific requirement to inspect tanks that are within secondary containment. However, there is a requirement to regularly inspect piping that is outside of containment as per Regulation 23.1. All tanks valves are kept locked in a closed position when fuel is not being consumed.

LMI recently facilitated inspection by Environment Canada on all work completed in 2014 to bring the storage and distribution systems up to the latest code and although LMI have not seen the final report LMI believes that based on comments from the Inspector on site that all changes are acceptable. LMI has completed a third part inspection on tanks, piping and associated facilities by a registered third party inspector and the system was deemed to be in good condition.

When in operations, weekly and monthly inspections and inventories of tanks are done for operational reasons and as an added precaution. LMI's practice is to regularly account for the fuel that is being consumed as it is a precious commodity and contributes significantly to the site operating costs.

SENES Comment

2.2.3 Spill Contingency Plan (2013)

Observation:
The spill contingency plan is reasonable and only minor comments are provided. The primary issue is that the site is often without staff and as such spills could go undetected for extended periods of time. Furthermore, when staff is on site, it is unknown if they are qualified to operate the heavy equipment required to contain or clean up a spill. The following clarifications are required:

- *Update Fuel Quantities* – The report on page 5 states as of December 31, 2012 there were approximately 2,762,519 L of diesel fuel on site. This should be updated to 2014.
- *Lime Bags* – The report on page 5 says there are 850 bags of lime at the site. The size of the bags or total weight should be stated.

LMI Response:

The key point is that the facilities are inspected by an engineer every year and remain in good condition with repairs being made as necessary based on the engineer's recommendations. The facilities are lined and bermed to meet the storage capacity requirements in the event of a spill. When care and maintenance crews are mobilized to site, the crew always includes a qualified heavy equipment operator and mechanic if fuel is being used and work is being carried out.

The SCP should note the maximum volumes of materials that may be stored on site so that spill prevention and response are planned accordingly. Real time fuel or material quantities can be provided upon request at any point but the SCP should not be updated on this basis.

SENES Comment:

2.2.5 Water Quality Monitoring Plan Quality Assurance/Quality Control Plan (2013)

Observation:
The plan is directed at monitoring water quality in the discharge and the receiving environment. As previously discussed, it is recommended the plan be expanded to include internal monitoring of the ponds and tailings porewaters so that it is possible to confirm the system is functioning as expected.

Recommendation:
It is recommended that the plan be expanded to include internal monitoring of the ponds and tailings porewaters.

LMI Response:

Under Water Licence 2AM-LUP0914 LMI has only been required to report results to the NWB from Pond 2 on years when discharge is planned. LMI has periodically monitored water quality in the interior ponds in order to characterization the system in addition to the final treatment pond, Pond 2. LMI collects surface water quality data from Pond 1, Cell 4 and Cell 5. Samples are collected in the top meter of water and while it is possible that water quality at depth may differ from surface water quality, as there is some evidence of a thermocline in Pond 2 while under ice, the thermocline dissipates quickly once it becomes ice free and exposed to wind. LMI sample the interior ponds in August or September, after any thermocline would have been dissipated. The recent suit of analyses obtained by LMI have included the following: pH, alkalinity, acidity, total ammonia, chloride, total cyanide, hardness, nitrate, nitrite, sulphate, total suspended solids, total metals and dissolved metals. LMI proposes to collect samples annual from the ponds Pond 1, Pond 2, Cell 4 and Cell 5 and to provide the NWB with these results in the annual report going forward.

LMI does not consider additional monitoring to be warranted at this time.

SENES Comment:

2.2.6 Lupin Mine Waste Management Plan (Solid and Hazardous-2013)

Observation:
The Waste Management Plan is reasonable. The following clarifications are required:

- *Landfill* – On page 5, LMI proposes to operate a landfill for non-hazardous solid waste. Currently the licence does not include an approved landfill. In the response to AANDC Comments on the Licence Application, LMI indicated they proposed to submit a Landfill Management Plan by the end of July 2014.
- *Burn Pit* – On page 5, LMI proposes to operate a burn pit for combustible non-domestic solid waste.
- *On-site Remediation of hydrocarbon contaminated soils* – The plan assumes hydrocarbon contaminated soils will be remediated on site, however no bioremediation site has been approved and no application for bioremediation of hydrocarbon contaminated soils has been received. In the response to AANDC Comments on the Licence Application, LMI suggested they preferred to back-haul hydrocarbon contaminated soils as on-site treatment would be difficult.

Recommendation:
It is recommended that the unknowns identified above be clarified.

LMI Response:

This Landfarm Management Plan was submitted, via email, on July 31, 2014 to the NWB.

SENES Comment

2.3 Licence Requirements and Commitments

Observation:
There are a number of areas where the company has not lived up to its commitments. In this regard, a compliance plan (2013) was submitted which identifies these areas. The plan is now more than 1 year out of date and it appears that many of the items remain unaddressed in 2014.

Key areas of concern include:

- *Weekly Inspections* – LMI is not compliant with the licence condition stating, "The Licensee shall carry out weekly inspections of all water management structures during periods of flow and maintain records of the inspections and findings, for review upon the request of the Board" and "Weekly inspections of the dam(s), Tailings line(s), and catchment basin(s) shall be carried out and records of these inspections shall be kept for review upon the request of an Inspector, or as otherwise approved by the Board" (Part E, Item 6f) and "The Licensee shall perform, at a minimum, weekly inspections of fuel containment facilities for leaks and settlement and shall keep a written log of inspections to be made available to an Inspector upon request, or as otherwise approved by the Board in writing" (Part H, Item 6).
- *Minimum Freeboards of 1-m* – LMI has had periods when minimum freeboards have not been maintained, contrary to the licence condition stating, "freeboard limit of 1.0 metre shall be maintained at all times or as recommended by a Geotechnical Engineer and as approved by the Board in writing" (Part E, Item 6e). In 2013, LMI was compliant.
- *Dam and Tailings Area Maintenance* – LMI has annual geotechnical inspections of the dams as required but has not been diligent in responding to all recommendations arising from the inspections. This is in contravention of the licence requirement that states, "Erosion of constructed facilities is addressed immediately..." (Part E, Item 6d).
- *Removal of Hazardous Material* – LMI has not removed all hazardous material from the site in accordance with the licence condition stating, "The Licensee shall remove from the project site, all hazardous wastes generated through the course of the Operation, for disposal at an approved hazardous waste disposal facility" (Part E, Item 14).
- *Progressive Reclamation*- LMI has not met the condition (Part I, Item 9) to cover and vegetate exposed tailings in the tailings pond as soon a realistically possible.

Recommendation:
LMI should operate the Lupin Mine in compliance with licence conditions.

LMI Responses:

- Weekly Inspections – LMI is not compliant with the licence condition stating, "The Licensee shall carry out weekly inspections of all water management structures during periods of flow and maintain records of the inspections and findings, for review upon the request of the Board" and "Weekly inspections of the dam(s), Tailings line(s), and catchment basin(s) shall be carried out and records of these inspections shall be kept for review upon the request of an Inspector, or as otherwise approved by the Board" (Part E, Item 6f) and "The Licensee shall perform, at a minimum, weekly inspections of fuel containment facilities for leaks and settlement and shall keep a written

log of inspections to be made available to an Inspector upon request, or as otherwise approved by the Board in writing" (Part H, Item 6).

LMI Response:

In regards to the weekly inspections of the water management facilities there is only flow when LMI pumps from internal dams to other internal dams as part of the water level management strategy and site have constant inspection at that time. The other times are when LMI pump treated water from dam #2 to the environment and at that time there is full presence on site for a period of approximately 6 weeks as site personnel treat water, sample water and then perform discharge. In regards to tailings line inspection, no tailings lines are used and have not been in use for 8 years. They were fully flushed and blown out at that time. It has been clearly stated by all the independent geotechnical engineers on site that weekly inspections should not be required from a safety or technical viewpoint and LMI have submitted a request to reduce these several times. Furthermore, LMI keep all external dam levels at or below 1.5m freeboard at all times and again this has been noted in the geotechnical reports and LMI have been very stringent about this issue.

In regards to the fuel facilities these are inspected at a minimum three times every year- even if there is no activity at site. LMI pump out any collected spring runoff after receiving a clear sample analysis and LMI performs inspections again at that time. If LMI are using fuel they do carry out all mandated weekly inspections, but in periods where LMI have no presence on site and there is no fuel being pumped or moved LMI does not see the need to fly someone in once per week to look at tanks and valves that have been properly closed, locked and sealed with no fluid moving. LMI would also like to stress that they had a full comprehensive inspection of all tanks pipelines and fuel systems by an independent engineer in 2013 and no flaws, issues or potential problems were noted. Furthermore LMI completed all necessary work in 2014 as mandated by Environment Canada to bring all fuel system up to current standards and this was recently checked on site by an inspector from Environment Canada.

- Minimum Freeboards of 1-m – LMI has had periods when minimum freeboards have not been maintained, contrary to the licence condition stating, "freeboard limit of 1.0 metre shall be maintained at all times or as recommended by a Geotechnical Engineer and as approved by the Board in writing" (Part E, Item 6e). In 2013, LMI was compliant.

LMI Response:

LMI has a strict policy to keep the free board at a minimum of 1m. In fact all external tailings dams are kept at between 1.5m to 5m and this is reported in the annual geotechnical reports.

- Dam and Tailings Area Maintenance – LMI has annual geotechnical inspections of the dams as required but has not been diligent in responding to all recommendations arising from the inspections. This is in contravention of the licence requirement that states, "Erosion of constructed facilities is addressed immediately..." (Part E, Item 6d).

LMI Response:

LMI would state that they are diligent in carrying out the critical work as recommended in the reports. It may be a matter of timing of the AANDC inspections as the work is normally completed the year following the geotechnical inspection which are normally performed just before closing the site for winter as that is when the inspector wants to come to site in order to see dam levels and inspect the annual work completed from the previous year. Our procedures are as follows:

- *Review all areas of damage erosion as documented by the previous year's report*
- *Prioritise work in terms of location- usually this is any work required on external dams.*
- *Complete work and inspect. This will include the taking of photographs for record purposes.*
- *It should also be noted that LMI are pro-active in repairing cracks in roads or wash-outs during any year prior to an inspection as this is clearly a safety issue. Please see attached Geotechnical Reports that show LMI have continuously completed all critical work that was recommended in the reports.*

- Removal of Hazardous Material – LMI has not removed all hazardous material from the site in accordance with the licence condition stating, "The Licensee shall remove from the project site, all hazardous wastes generated through the course of the Operation, for disposal at an approved hazardous waste disposal facility" (Part E, Item 14).

LMI Response:

LMI has removed more Hazardous Material than any other company that has owned the site since 2005. Please see attached KBL manifest list. Every effort is made to remove hazardous materials when safe and feasible.

- Progressive Reclamation- LMI has not met the condition (Part I, Item 9) to cover and vegetate exposed tailings in the tailings pond as soon a realistically possible.

LMI Response:

See response to SENES comment 2.1.1

SENES Comment

2.4 Financial Security

Relevant Review Document/Reference: 2012 Reclamation Liability Estimate (Appendix 6 of the Abandonment and Restoration Plan, April 2013)

Observation:
LMI has posted an irrevocable letter of credit in the amount of $25,500,000 as financial security for the Abandonment and Reclamation of the Lupin Mine site. This was issued by HSBC Bank in 2011 and is understood to have been renewed. LMI has prepared a RECLAIM excel spreadsheet estimate as support for the estimate. We have reviewed the estimate and believe the financial security appears to be insufficient to cover the total outstanding reclamation liability of the mine site (Mine Site Reclamation Policy for Nunavut, INAC, 2002).

Items that do not appear to have been included in the costs are addressed below and differences in costs are shown in Table 2.1. The SENES estimate is approximately $47,800,000. We would like to stress that our review is based on partial access to data and does not include any engineering design or updated quantity estimates. There is also substantial confusion over which quantities are valid (e.g., area of exposed tailings, quantity of contaminated soils, fuel inventory, etc.).

The following are the key differences in the cost estimates:

1) Underground Mine – LMI did not allow for any costs to backfill the portal, address crown pillar or remove hazardous material from the mine.

2) Tailings – There are material deficiencies in this estimate for tailings closure. These include:

- No allowance for quarrying of 100,000 m3 of rock for resloping dams and lining ditches and spillways.
- No allowance for additional cover or repair to historic cover where depths are inadequate.
- No allowance for any vegetation even though the licence calls for revegetation of the tailings. As a minimum, one should assume islands of vegetation are applied to assist in natural recolonization.
- No provision for grading and ditching.
- No allowance for removal of tailings pipelines.
- No provisions for removal of hydraulic structures or construction of spillways.
- No provisions for dam improvements and resloping.
- No provisions for monitoring instrumentation.
- No provisions for water treatment and draining of the ponds.
- Unit costs appear to be based upon NWT costs rather than Nunavut costs

3) Buildings – LMI used a low unit rate for building removal (the model says remove mothball). No allowance for vegetation. Require at least islands of vegetation to enhance natural regeneration. No other material deficiencies were noted.

4) Chemicals and Soil Contamination

- No allowance for disposal of 2,762,519 L of fuel that were reported to be on site in 2012. Assume this fuel will be flared on-site.
- No allowance for disposal of heavy fuels/waste oil.

5) Mobilization
- Costs for mobilizing equipment and ice road costs appear low.
- There are no allowances to mobilize workers to the site.
- No allowances for accommodation.
- No allowance for monitoring or geotechnical inspection.
- Fuel costs of $1.15/L are far too low.

6) Post Closure Monitoring and Maintenance
- There are no provisions for care, maintenance or repair of the site post-closure.
- There are no provisions for long term inspection of the site.
- No allowance for regulatory oversight/inspection.
- Monitoring is limited to 5 years while dams impounding hazardous tailings will need to function in perpetuity.

Regarding item 6), there will be a need for long term inspection and care and maintenance of the site. The Lupin Water Licence was approved with a surface tailings disposal facility. These tailings are acid generating and contain elevated levels of heavy metals. The tailings are stored behind engineered dams and the acid generation is controlled by either a saturated sand cover or a flooded pond. These engineered facilities will require perpetual care and monitoring. For planning purposes we have suggested that provisions be included for care and maintenance for 100 years. Costs will reduce over time and 100 years is a reasonable planning timeframe.

Potential future issues that may develop include:
- Erosion of cover materials and dams.
- Glaciation/plugging of spillways leading to overtopping or rapid failure of the plug, and erosion of cover/spillway.
- Potential failure of saturated cover due to loss of cover by erosion, extended drought, inadequate cover depth, seepage resulting from climate change, cover removal by other factors, other factors.
- Potential need for treatment (likelihood uncertain given the lack of monitoring since 2005, however given the data available to 2005, long term treatment is unlikely to be required).

7) Other Costs
- The costs for project management and engineering were assumed to be 4% of the direct cost. This appears low and we suggest 5% be included.
- Contingencies were included at 10%. This is far too low for a conceptual plan and should be increased to at least 25%.
- No provisions for insurance/bonding were included.

In the response to AANDC Comments on the Licence Application, LMI indicated they provided an updated reclamation cost estimate to the NWB in April 2013, included with the 2012 Annual Report. They stated that in June and July 2014, LMI is undertaking a re-evaluation of the reclamation cost

estimate and will provide additional information to address AANDC's technical issues on closure costing by the end of August 2014.

Recommendation:
It is recommended that LMI update the RECLAIM (version 7) estimate taking into account the items addressed in this section. The update should be submitted for review prior to the Public Hearing. An updated financial assurance should also be issued to reflect increased costs for the IARP.

Reclamation Cost	Elgin	Senes
Underground Mine	$413,921	$460,019
Tailings	$2,625,345	$7,060,206
Buildings and Equipment	$6,046,303	$7,862,228
Chemicals and Soil Management	$2,417,469	$4,255,876
Post Closure Monitoring C&M	$1,395,753	$7,640,000
Subtotal	$12,898,791	$27,278,328
Mob and DeMob	$6,018,646	$9,756,865
Project Management	$515,952	$1,363,916
Site Assessment/ Permitting	$0	$909,800
Insurance	$0	$272,783
Engineering	$515,952	$1,363,916
Contingency	$1,289,879	$6,819,582
Subtotal	$8,340,429	$20,486,863
Total Estimated Cost	**$21,239,220**	**$47,765,191**

LMI Response:

LMI is committed to further discussion with AANDC on the security estimate. LMI will provide an updated detailed estimate to facilitate the discussion and requests that AANDC provide their RECLAIM estimate details as well.

SENES Comment

2.5.1 Unattended Site

Relevant Review Document/Reference: AANDC Inspections

Observation:
During much of the year there is no presence at the site. This greatly increases the risk that unplanned events could lead to contamination of the environment. The site contains millions of dollars of infrastructure (buildings, fuel farms, sewage ponds, hazardous waste storage, tailings dams and ponds), all of which require care and maintenance. With no presence on site, spills could go undetected for weeks and during the winter period, months could pass without inspection during which period a material failure would go undetected. LMI cannot meet its own commitments in its management plans, water licence monitoring requirements or the 2007 Mine Site Reclamation Guidelines (AANDC, 2007) with an unattended site.

In the response to AANDC Comments on the Licence Application, LMI did not specifically respond to the comments and concerns raised by AANDC. LMI indicated they consider the unattended site adequate and had concerns for the safety and risks associated with having a small crew at a remote site.

Recommendation:
It would be prudent to retain a permanent presence at the site. This could be in the form of a caretaker/security guards who would complete daily inspections of key facilities to ensure the site is functioning as designed.

LMI Response:

LMI has provided a care and maintenance plan detailing the frequency of site visits during periods of care and maintenance or temporary closure. This plan and the frequency of site visits must be considered in addition to the geotechnical engineering inspections that are carried out every year. The annual geotechnical inspections are able to track emerging issues before they become problematic, and LMI has carried out care and maintenance work each year to ensure the site is secure. Unless the geotechnical inspection identifies an issue that would warrant a permanent site presence, which is not the case to date, placing a crew at the remote site is unwarranted and poses an unacceptable health and safety risk for LMI.

SENES Comment

2.5.2 Progressive Reclamation

Relevant Review Document/Reference: AANDC Inspections

Observation:
It has now been 9 years since any material reclamation activity appears to have occurred at the tailings pond. During this period, tailings have remained exposed and wind erosion continues. In the response to AANDC Comments on the Licence Application, LMI indicated that all tailings are covered yet the Abandonment and Restoration Plan report indicates either 660,000 m2, 375000 m2 or 250,000 m2 remain to be covered. The Care and Maintenance Plan says 241,000 m2 (pg. 5) remain to be covered. As discussed, the licence requires all tailings be covered and revegetated. Furthermore, many of the facilities have likely degraded to the point where they are no longer useable and should be demolished and reclaimed.

Recommendation:
It is recommended that LMI submit an updated progressive reclamation plan as part the update to the IARP. This plan should detail what facilities are no longer useable and provide a schedule for the progressive decommissioning and reclamation of these areas.

LMI Response:

LMI will submit an updated progressive reclamation plan. This plan will incorporate statements made in the responses to SENES comments 2.1.1, 2.1.3 and 2.5.1 (bullet 2).

LMI strongly disagrees with the statement that "many of the facilities have likely degraded to the point where they are no longer useable and should be demolished and reclaimed." Which facilities have likely "degraded"? LMI know of no such facilities and in fact the work completed in 2012 and 2013 showed that with little work, facilities and equipment were brought to normal working conditions. One must remember that there were significant dollars and time spent by the previous owners in decommissioning this facility so that it could recommence operations within a reasonable timeframe and at reasonable cost. LMI plan to show photos at the presentation of such facilities.

SENES Comment:

2.5.3 Current Status for Reopening

Relevant Review Document/Reference: G.A. Harron and Associates Inc. Technical Report (2012)

Observation:
The current prospects for reopening the mine are unknown. To our knowledge, the last technical report by G.A. Harron and Associates Inc. (2012) recommended a program for underground exploration to upgrade information on inferred reserves. The status of this additional work is unknown.

In June 2014, Elgin announced in a press release that they were being acquired by Mandalay Resources. The status of this transaction, or its bearing on the activities at the site are unknown.

Recommendation:
It is recommended that LMI clarify the anticipated future use for the mine.

LMI Response:

Elgin acquired LMI in late 2011. LMI then proceeded to hire technical staff with relevant northern experience to evaluate the underground ore resource and test the potential for these resources to continue closer to surface thereby increasing the potential for re-start and decreasing the development timeline. Drilling proceeded through 2012 and continued through the winter season at great expense in order to expedite the program.

Hiring of technical staff with suitable northern experience continued in 2012, all of whom were based at site. LMI also purchased several pieces of underground mining mobile equipment as part of the plan to facilitate re-start of operations. Drilling also continued during this period. Technical work was completed on the process plant and power house with detailed equipment inspections with reports on requirements for re-start, timelines and estimated costs.

LMI also obtained quotes to permit and extend the ice road in the 2013 shipping season from Yellowknife through Ekati to the Lupin site in order to move in bulk materials, with plans also made to backhaul hazardous waste stored at site. Supplies were ordered for shipping on the 2013 ice road transportation window.

Discussions were completed on term sheets with two lending institutions to secure funds for a planned re-start of operations in 2015. These funds needed to be secured at that time in order to complete technical work, hire staff, buy mining equipment and also order and purchase sufficient supplies for the 2015 ice road season.

However, the gold price began to decline from +$1,700/oz in December 2012 to below $1,400/oz in April 2013 and then below $1,200/oz in June 2013. At this time Elgin's board of directors determined to postpone continue the schedule for re-start of operations and the facility was returned to low level care and maintenance.

However, a significant amount of work was completed to advance the project and once the gold price returns to a level that can sustain operations LMI would plan to continue to advance the project towards re-start of operations.