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Memo

To:	Chris Hanks, Bill Patterson, Lea-Marie Bowles-Lyon	**Date:**	December 8, 2010
cc:	Deborah Muggli, Christine Kowbel	**From:**	Lois Boxill, Maritz Rykaart
Subject:	Reclamation and Security Brief for Proposed Amendment to Doris North Type A Water Licence No. 2AM-DOH0713	**Project #:**	1CH008.027

1 General

This memo describes changes in closure liability associated with site improvements included in the proposed Amendment to Type A Water Licence No. 2AM-DOH0713 for the Doris North Project. These improvements are related to the following:

- Construction of a new Roberts Bay Tank Farm and provision of secondary containment for this facility;
- Expansion of the existing Doris North Airstrip;
- Construction of an Airstrip Bypass Road; and
- Construction of the Cyanide and Reagent Storage facilities.

Where facilities are described in the 2007 Mine Closure and Reclamation Plan (hereafter 2007 RCP) that was submitted in support of the existing Water Licence, this brief summarizes the material changes impacting the associated estimate of closure liability.[1] It should be noted that there are no changes in proposed closure methodology included under the proposed Type A Water Licence amendment. Furthermore, proposed site specific reclamation criteria for the Doris North Project are consistent with the requirements specified in Table 1.1 of the 2007 RCP which is included as an attachment to the document. Where new facilities have been proposed, the applicable closure methodology is cited and an estimate of closure liability provided.

Detailed descriptions of changes in design criteria for the associated structures are provided in design briefs prepared for each facility and submitted in support of the proposed Type A Water Licence Amendment. Table 1 below summarizes changes in reclamation security for each infrastructure change or expansion included in the proposed Type A Water Licence Amendment. The following sections of this report describe these changes in greater detail.

[1] Miramar Hope Bay Ltd. 2007. Mine Closure and Reclamation Plan, Doris North Project, Nunavut.

Table 1: Summary of Reclamation Security Variances for Class A Water Licence Amendment

Area Description	Change from 2007 CRP	Change in Closure Methodology	Estimated Increase in Closure Liability Estimate (2010 CDN$)
Roberts Bay Tank Farm with Secondary Containment	Originally only Fuel Transfer Station at Roberts Bay was envisaged.	No	$275,000
Doris North Airstrip Extension & Airstrip Bypass Road	Width and length of airstrip have been increased. Airstrip Bypass Road is new.	No	$47,000
Cyanide and Reagent Storage Facilities	Additional facilities are proposed to house cyanide and chemical reagents stored on site.	No	$30,000

2 Roberts Bay Tank Farm and Secondary Containment Facility

The 2007 RCP that was submitted in support of the existing Type A Water Licence envisaged a Fuel Transfer Station at the Roberts Bay from which fuel would be transported via fuel trucks to a tank farm located at the Doris North mill site. Under the proposed Type A Water Licence Amendment, a new tank farm would be constructed at the Roberts Bay site to increase the on-site diesel storage capacity from 14 million litres (ML) to 36 ML.

The new tank farm would be located within the limits of a secondary containment facility to be constructed at Roberts Bay and would contain four 5.7 ML diesel fuel tanks and one 1.5 ML aviation fuel tank. Fuel will be pumped to these tanks from barges or ships moored in Roberts Bay via a dedicated fuel pipeline.

Descriptions of the design criteria for the new tank farm and secondary containment facility, in addition to the associated detail design drawings are provided in the design brief of the same name dated 22 September 2010 prepared by SRK.[2] Generally, the tank farm has been sized to allow for the required clearances and construction spacing between fuel tanks, and the secondary containment facility for the Tank Farm provides for containment of the capacity of the largest storage tank plus 10% of the aggregate capacity of the remaining storage tanks in the facility. It should also be noted that the footprint of the proposed expansion are entirely located within the existing Commercial Lease boundary.

The 2007 RCP provided an allowance of $6,000 (in 2007 CDN dollars) for removal of the existing Fuel Transfer Station and piping at Roberts Bay. However, using the cost basis provided in the 2007 RCP for removal of the new Roberts Bay Tank Farm which is akin to the facility being constructed at the Doris North mill site, tank decontamination, demolition, and disposal, liner removal, and earthworks required to breach and regrade the secondary containment facility are estimated to be on the order of approximately $275,000 (in 2010 CDN). The closure liability estimate for the new Roberts Bay Tank Farm and Secondary Containment includes the following:

- Tank Decontamination (5 tanks at 200 person hours/tank) - $90,000
- Demolition and disposal of fuel tanks (5 tanks at 300 person hours/tank) - $122,500
- Removal of new dedicated fuel lines – allowance of $10,000

[2] SRK Consulting. 2010a. Design Brief: Roberts Bay Fuel Tank Farm Expansion – Secondary Containment. September 22.

- Removal of containment liner at new Roberts Bay tank farm – allowance of $10,000
- Breaching and levelling secondary containment facility at Roberts Bay Tank Farm – allowance of $5,000
- Escalation of 2007 CDN dollars to 2010 CDN dollars at a rate of 5% to account for cost inflation.

3 Doris North Airstrip Expansion & Airstrip Bypass Road

The 2007 RCP included reclamation of the existing 746 m long by 23 m wide all-weather Airstrip that was initially designed to accommodate Dormier-228 and De Havilland Twin Otter and Dash 8 classes of light aircraft. Under the proposed amendment to the existing Water Licence, the expanded airstrip would facilitate landing of larger aircraft and have a total width of 46 m and extend to a total length of 1,795 m. The design aircraft for the Hope Bay airstrip expansion is a Lockheed L382G Hercules, with a maximum payload of 23 tonnes. As seen in the design drawings provided in the design brief prepared to describe this element of the proposed amendment (SRK 2010b), the new airstrip will envelop the existing facility and significantly improve the operational safety of the airstrip.[3] However, it should be noted that the length of the extended airstrip was selected to compensate for the less than optimal runway alignment relative to the prevailing winds that are key factors in aircraft take off and landing. The expanded airstrip resulted in 6.6 Ha of additional surface area to be reclaimed.

The proposed Airstrip Bypass Road is approximately 2.8 km long and would be constructed east of the expanded airstrip. The road would facilitate uninterrupted use of the airstrip which currently doubles as a segment of the all-weather Primary Access Road between Roberts Bay and the Doris Camp. The Airstrip Bypass Road will have a minimum crest width of 8 m which accommodates two-way operation of Super B-train trailer class vehicles. To facilitate use of this road by larger vehicles, a total of eight (8) turnouts, each 4 m wide and 30 m long have been strategically distributed along the length of the Bypass road alignment. The Airstrip Bypass Road was not included in the 2007 RCP and would require reclamation of an additional 2.4 Ha. It should also be noted that both the Airstrip Bypass road and the proposed expanded Airstrip fit within the limits of the Commercial Lease boundary.

The 2007 RCP included an allowance of $38, 586 (in 2007 CDN dollars) for reclamation of the existing airstrip. Consistent with the specified closure criteria, this allowance accounted for scarification of the airstrip surface, and removal of approximately 15 culverts. Using the same unit airstrip reclamation cost included in the 2007 RCP, closure and reclamation costs associated with the Airstrip expansion and Airstrip Bypass road are estimated to increase by $47,000. This increase accounts for scarification, culvert removal, and any other regrading required to reclaim the additional 9 Ha of Airstrip and Bypass Road that will be constructed. The estimated cost also provides for a 5% escalation of the 2007 unit rates that were used.

4 Cyanide & Reagent Storage Facilities

The 2007 RCP envisioned storage of cyanide and other mill reagents in approximately 20 Sea-cans that would be located single stacked on a pad area, and spaced at 2 m intervals, with capacity to meet the mill's cyanide and reagent demands for one year. Newmont Mining Company's (NMC) in-house 5-star standard exceeds best practice guidelines for cyanide and reagent storage at the Doris North mine site. As such, NMC's 5-star standard is based on the International Cyanide Code and calls for providing secondary containment for cyanide and reagent storage. As described and illustrated in the design brief developed for these facilities (SRK 2010c), both facilities have identical configurations and will be located on the Lower Reagent Pad that was constructed in 2010, and lie within the limits

[3] SRK Consulting. 2010b. Design Brief: Doris North Airstrip Expansion and Airstrip Bypass Road. September 24.

of the Commercial Lease Boundary.[4] Secondary containment for both storage facilities will be provided by a pre-fabricated steel containment berm covered in 60-mil chemical resistant HDPE liner that will be sandwiched between two 12-oz non-woven geotextiles. Ramped access will be provided to each containment facility which will cover a footprint of approximately 43 m by 43 m and be surrounded by a gated chain-link fence.

The 2007 RCP provided allowances for removal of the Sea-Cans used to store cyanide ($18,300 CDN in 2007 dollars), and reclamation of the footprint where the Sea-cans were stored (approximately $1,600 CDN in 2007 dollars). Reclamation of secondary containment provided for the cyanide and reagent storage areas will require removal and disposal of the steel containment berm and all geosynthetic liners placed above it, and removal of the chain link fences and gates. The cost to complete this work is estimated at $30,000 (2010 CDN dollars) and includes the following:

- Removal of secondary containment system - allowance of $25,000; and
- Removal of chain link fence – allowance of $5,000.

The cost of removing the secondary containment system is based the estimated level of effort required to complete this work relative to the effort required to remove other secondary containment systems at the site. The cost to remove the chain link fence is based on an hourly light-duty crew rate of $150/hr working for two shifts at 12 hours/shift to complete this work.

[4] SRK Consulting. 2010c. Design Brief: Doris North Project Cyanide and Reagent Storage. September 21.

Attachment: Proposed Site Specific Reclamation Criteria for the Doris North Project
(as excerpted from the 2007 Closure and Reclamation Plan)

Table 1.1: Proposed Site Specific Reclamation Criteria for the Doris North Project

Land Reclamation Unit	Proposed Site Specific Reclamation Criteria			
	Physical Stability Requirements	**Chemical Stability Requirements**	**Ecological Sustainability Requirements**	**Climatic and Geographic Stability Requirements**
Underground Mine Workings	1) Salvageable equipment removed. All other equipment cleaned of hydrocarbons and other hazardous contaminants. 2) All mine entries sealed to prevent any future inadvertent access by humans or large wildlife using a combination of engineered concrete caps and/or backfill for raises and a backfilled rock plug in the adit portal.	1) All potentially hazardous materials removed from the UG mine; prior to waste rock deposition. 2) All chemical/hydrocarbon spills and contaminants remediated or removed; prior to waste rock deposition. 3) Placement of all potentially acid generating waste rock into the underground mine where it will remain in a frozen state due to the presence of permafrost. 4) Should future global warming trends cause permanent thawing of the permafrost, allow subsequent natural flooding of the closed mine workings to minimize ARD generation.	1) Wildlife unable to enter or come into contact with UG mine workings to protect wildlife health and safety.	1) Permafrost is not required to be sustained within the closed out underground mine workings. 2) Dry underground mine conditions are not required in the event of global warming.

Table 1.1: Continued

	Proposed Site Specific Reclamation Criteria			
Land Reclamation Unit	**Physical Stability Requirements**	**Chemical Stability Requirements**	**Ecological Sustainability Requirements**	**Climatic and Geographic Stability Requirements**
Tail Lake tailings containment area and site water management facilities	1) Stable dam side slopes with adequate geotechnical factor of safety for closure. 2) No significant wind or water erosion. 3) Dams in the water management pond breached to re-establish hydrologic flow. 4) Site drainage systems on the reclaimed site set to direct precipitation into the surrounding water courses under all precipitation events including extreme events without causing significant erosion or damage to the drainage structures left behind. 5) All non-required catch basins, sedimentation ponds and drainage structures removed or in filled so that no significant erosion occurs under all precipitation events including extreme events.	1) No significant level of contaminants in outflow from the reclaimed Tail Lake. 2) Water license discharge requirements are being met without ongoing active water treatment of seepage and drainage. 3) Site drainage consistently meets water discharge criteria and results in no significant adverse impact on water quality in the surrounding water courses and water bodies	1) Separation of wildlife and humans from contact with the underlying tailings deposited within Tail Lake. 2) No opportunity for significant transfer of contaminants to wildlife through water. 3) Water quality draining from the reclaimed site remains protective of aquatic life in the surrounding water bodies and presents no significant adverse risk to the health of wildlife.	1) Ability to shed all precipitation including extreme events without causing significant erosion or pickup of contaminants. 2) Hydrologic flow re-established under all precipitation conditions including extreme events without resulting in significant erosion.

Table 1.1: Continued

	Proposed Site Specific Reclamation Criteria			
Land Reclamation Unit	**Physical Stability Requirements**	**Chemical Stability Requirements**	**Ecological Sustainability Requirements**	**Climatic and Geographic Stability Requirements**
Buildings and Equipment	1) All potentially hazardous materials removed from the mine site and shipped south for re-cycling or proper disposal. 2) Buildings and equipment cleaned prior to demolition and all hazardous materials recovered, packaged and removed prior to demolition. 3) All equipment and buildings demolished and the demolition debris encapsulated within an appropriate landfill within Quarry 2. 4) Site clean of all equipment, steel, containers, debris and concrete. All removed and buried within the landfill. 5) All concrete foundations and slabs broken up and buried within the landfill or used as UG backfill. 6) All fuel storage facilities cleaned of hydrocarbons then demolished and removed for encapsulation within the landfill. 7) No significant erosion of rockfill building pads after removal of buildings.	1) All hazardous materials removed. 2) All chemical/hydrocarbon spills remediated or removed. 3) No significant adverse water quality in drainage across former building pads and areas. 4) All liners and berms from within fuel tank farms removed and buried within landfill. 5) All identified contaminated soils will be excavated and dependant on their level of contamination they will be either remediated on site, removed from site for off-site disposal in a licensed facility or disposed of in the underground mine or landfill so that no significant contaminant release occurs with future site drainage from these sources.	1) No contact of wildlife or humans with contaminated soils due to removal and/or placement of separation barriers. 2) No significant health risks to wildlife or humans from the reclaimed building areas. It may be desirable to leave the residual building pads in an un-vegetated state so that they do not attract wildlife for browsing for many years even centuries.	1) Site drainage restored across the remaining building pads through creation of permanent no maintenance swales or drainage channels to meet all precipitation events including extreme events without causing ponding or significant erosion in these areas.

Table 1.1: Continued

	Proposed Site Specific Reclamation Criteria			
Land Reclamation Unit	**Physical Stability Requirements**	**Chemical Stability Requirements**	**Ecological Sustainability Requirements**	**Climatic and Geographic Stability Requirements**
Infrastructure (airstrip, roads and laydown areas)	1) All culverts and bridges removed and new drainage swales or channels created that are maintenance free and will not result in significant erosion. 2) All side berms removed and shoulder slopes regraded to prevent erosion and allow safe wildlife passage.	1) No ARD or significant contaminant release from the rock fill left in place within the roads, airstrip and laydown areas. 2) All chemical spills and contaminants remediated or removed.	1) No contact of wildlife or humans with contaminated soils due to removal and/or placement of separation barriers. 2) No significant health risks to wildlife or humans from the reclaimed roads, airstrip and laydown areas.	1) Site drainage restored across the remaining roads, airstrip and laydown rock fill areas through creation of permanent no maintenance swales or drainage channels to meet all precipitation events including extreme events without causing ponding or significant erosion in these areas
Non-Hazardous Landfill Area and Quarries	1) Non-hazardous landfill site fully buried within Quarry 2. A separation barrier of quarried rock placed on top of the landfill to separate contact with the surrounding environment. 2) No significant wind or water erosion of the reclaimed landfill area. 3) Stable wall slopes within the reclaimed quarries.	1) No adverse drainage from the landfill area and quarries into the surrounding water courses.	1) No contact of wildlife or humans with the contents of the reclaimed landfill area due to the placement of a suitable stable separation barrier (cover). 2) No significant health or safety risks to wildlife or humans from the reclaimed landfill area and quarries.	1) Permafrost development and maintenance within the reclaimed landfill. 2) Ability to shed all precipitation including extreme events without causing significant erosion or pickup of contaminants.