As Submitted for Approval

April 11, 2003

POLARIS MINE – LANDFILL OPERATING PROTOCOLS

1. LANDFILL OPERATING PROTOCOLS

The purpose of this document is to define the protocols being used during the placement of non-hazardous demolition debris and domestic wastes during the decommissioning and reclamation of the site. The intent of this document is not to provide details of final closure cap designs or long term monitoring plans for the landfills. These will be submitted under separate submissions.

1.1. LANDFILLS - LRD QUARRY

LRD Quarry ("LRD") is being used for the placement of all building / plant / equipment debris (with the exception of equipment placed into the u/g mine workings).

1.1.1. Acceptable and Prohibited Waste Types

LRD Quarry ('LRD') has been designated for disposal of demolition debris, site services debris, equipment, and other non-hazardous materials. Demolition debris consists of building materials, plant equipment and fixtures. Buildings have been inspected and confirmed to be free of asbestos. All equipment will be drained of motor oils, hydraulic oils, and transmission oils which will be disposed in the on site incinerator. All transformers have been inspected and confirmed to be free of PCB's. Transformers will also be drained prior to placing in LRD Quarry. Building materials and equipment shall be cleaned to remove any significant build up of concentrates and tailings ('process fines') prior to placement in LRD. The cleaning process for 'process fines' refers to manually shoveling/sweeping up accumulations, physically impacting structural members during handling to shake off build up of caked process fines, and finally a visual inspection to ensure there are no significant accumulations of materials remaining. During the operating days of the mill, reagent tanks were drawn down to minimum levels and thoroughly washed out. Associated transfer pumps, mixing equipment, and distribution piping were also thoroughly washed before the systems were isolated in readiness for demolition.

No hazardous wastes or special wastes will be disposed of in the landfills. Processing reagents remaining at the time of closure were repackaged as required, and shipped off site for resale in September, 2002. Any incidental hazardous materials encountered during the remainder of the demolition process are to be packaged, stored and shipped off site for use elsewhere, re-cycling or disposal at an approved and appropriate facility.

1.1.2. Requirement to Limit Void Space

Materials from buildings/equipment shall be cut into pieces small enough for efficient haulage by truck to LRD. Once in LRD, the material is either direct dumped into its final location or placed into temporary storage locations for sorting and temporary storage, prior to secondary cutting (if required). In order to minimize long term settlement of the debris placed in LRD, the debris will be cut into pieces small enough to minimize void spaces. Particular attention shall be made to minimize placing large flat shapes into the landfill that could result in substantial void spaces underneath such pieces. Building siding will be processed through a bailer where ever possible to minimize void paces between individual pieces. Individual items that contain substantial void spaces (tanks/shipping containers)

must be crushed by heavy equipment and cut into smaller pieces prior to being buried. The demolition contractor shall appoint a supervisor to be in charge of LRD activities and will be responsible to conduct daily inspections of the landfill operations to monitor what is being placed in the pit and to ensure compliance with these landfill protocols. The supervisor in charge of the LRD landfill shall ensure that demolition workers and debris handling workers are familiar with the requirements of this protocol. Debris shall be mixed with rock and/or overburden as it is placed into its final disposal location. The debris shall be placed in lifts not exceeding 4 metres high starting in the bottom bench of LRD and sequentially filling LRD one lift at a time. Sufficient rock and/or overburden is to be mixed with the debris or added to the top of each lift to fill void spaces in the debris and to provide a uniform, safe working surface for heavy equipment operating on top of the lift. Operation of the heavy equipment over top of each lift will also provide compaction to reduce void space within the lift.

During the most of the year, when the weather is constantly below freezing, there is no water to contend with. During the spring and summer, it is normal to have water in the pit bottom. To avoid having equipment operate in water, filling the quarry in lifts ensures that equipment working on top of a lift is operating in dry conditions. This also has the advantage of the water seeping into some of the void spaces in the fill. Once the water freezes (as it is below the active layer), it will assist in reducing the potential for future settlement. The temperature of the materials placed in the quarry will be monitored with thermistors (see Section 1.1.6) once the landfill has been completed.

1.1.3. Safe Working Practices

Operational issues to be considered when placing fill are:

- When placing debris near the pit walls, that it is being done in the prescribed manner to ensure the safety of the workers, and
- To ensure equipment is working from a dry location, and
- To ensure any water within the pit is saturating the fill but not flowing through the fill (which could potentially create void spaces within the debris).

It is a violation of Mine's Act Regulations to work against the pit face in areas where the bench berms are filled with loose rock (as is the case in several areas of LRD). This is to protect the equipment operators (or other personnel in the quarry) from rock falling/rolling down the face of the pit impacting the equipment and/or personnel working in the pit. The safety of operators and equipment can be assured by:

- Only allowing trucks to back up and dump near to pit walls so the box of the truck is between the operator and any potential loose rock, this protects the operator. Alternately, dump the load a safe distance from the pit wall and use a dozer to push the fill up against the pit wall.
- Placing debris in the bottom of LRD in lifts that do not extend completely to the pit face. Around the perimeter of LRD leave at least a 2 metre gap between each lift being constructed and the pit wall. Fill this gap in from the next lift.
- If a lift is less than 3 metres high, a truck may dump over the edge of the lift if there is a dump berm in place.
- If a lift is 3 or more metres high, there must be a dump berm in place, and if the truck is dumping within 3 metres of the dump crest, it must be under the direction of a dump person.

1.1.4. Documentation of Waste Types and Volumes

It is important to record what goes into LRD pit, where it came from and generally where it is placed within the pit. The following documentation or equivalent will be completed (Appendix 1) for materials being placed in the pit:

1.1.4.1. Plant Equipment Verification Form

The 'Stationary Equipment Lubricant Evacuation Check List' is to be used to document that plant equipment has been drained of hydrocarbons and/or any other hazardous wastes, inspected and approved for disposal in the landfill. Once the sheet has been signed by the inspector(s), the equipment is released for removal to the landfill.

1.1.4.2. LRD Placement Form

This form ('Daily Activity Log and Disposal Record – Structural Steel/Concrete/Building Components') records the location that debris originates from and where it has been placed in LRD. The form also indicates the approximate volume of debris that has been placed in the landfill. An AutoCad drawing is being maintained on a lift by lift basis with LRD to record the locations of the materials being placed.

1.1.4.3. Mobile Equipment Verification Form

This form ('Daily Activity Log and Disposal Record – Mobile Equipment') will be used to identify the equipment number being disposed and the items removed in preparation for its disposal. The sheet confirms that all fuels, oils, batteries and any other special waste materials have been removed from the piece of equipment prior to disposal. The forms are to be signed by the contractor who prepared the equipment for disposal and by Teck Cominco personnel verifying that they have inspected the equipment.

1.1.5. Permanent Closure of LRD Quarry

Once the placement of building debris has been completed, construction of an engineered cap will occur. It is not intended to document the final landfill cap design in this protocol but rather to identify that a cap is necessary and some considerations to be kept in mind while operating the landfill.

It is not possible to identify the final elevation of this cap until placement of the building debris has been completed. The construction of the engineered cap will be done in accordance with the approved engineered cap design. In general, the main features of the engineered cap is that it will be a minimum of 1.8 metres thick and be sloped sufficiently to ensure that water will drain off the cap and to prevent pools from forming on the cap. The water from the cap must drain through the notch in LRD. If landfill levels in LRD are not high enough to do this, then the notch in LRD may need to be deepened once the final cap elevation has been defined. To ensure the material requirements for the cap are kept to a minimum, the final lifts in LRD should be uniform and slopes similar to the final cap design.

1.1.6. Monitoring of Landfill Temperatures

Thermister pipes that extend through the full extent of the fill being placed in LRD are required to monitor and confirm that the debris in the quarry is adequately frozen. The thermister pipes have been pre-installed in the landfill prior to completion of the first lift so that the bases of the thermistors are at the bottom of the quarry. As fill is placed in the pit, it will gradually bury the thermistors pipe stands. It is necessary to do it in this sequence as it is not practical to install the thermister pipes after fill has been placed. This would

require drilling through lifts containing steel debris which is not practical. The thermistors will be vertically spaced no more that 0.5 metres apart through the 1.8 m cover cap so that temperatures in the cover cap can be adequately monitored. Through the remainder of the fill, thermistors can be spaced up to 1.5 m apart. Monitoring of the thermistors can not be conducted until the landfill operation is near completion as the top of the thermister pipes extend high above the areas being filled.

1.2. LANDFILLS – OPERATIONAL LANDFILL

This historic landfill has been used for disposal of domestic waste and other industrial debris throughout the operating life of the mine. Contents of this historic landfill have been reported in the environmental assessments included in the Polaris Mine Decommissioning and Reclamation Plan ("Closure Plan"). Since closure of the mine, use of the Operational Landfill has been restricted to the placement of domestic garbage. Domestic garbage is burned prior to placement in the landfill to minimize the volumes of waste being created and to minimize the attraction for wildlife. Shale from the New Quarry or gravel excavated from areas adjacent to the landfill is used as fill in the Operational Landfill. No building debris is being placed into this landfill during closure. Upon closure of the landfill, an engineered cap will be placed to encapsulate the landfill in accordance with the Closure Plan approvals.

1.2.1. Acceptable and Prohibited Waste Types

During decommissioning and reclamation activities at the site, use of the Operational Landfill is restricted to placement of domestic waste only. No building/plant/equipment debris will be placed in this landfill.

1.2.2. Requirement to Limit Void Space

As the use of this landfill is being restricted to domestic wastes, incineration of the wastes is being done to reduce attraction by wildlife and to minimize the space required to landfill the wastes. The incinerated wastes are mixed with fill by end dumping the wastes at the end of the landfill lift and then placing fill over top so they mix together. Heavy equipment operates on top of the landfill surface to assist in compacting the fill. No large objects that have the potential to create significant void spaces will be placed into the landfill.

1.2.3. Documentation of Debris

Since closure of the mine, only domestic debris is being placed in this landfill. This material is being generated at the Accommodations complex, where all meals are prepared and eaten. The associated domestic waste is accumulated and moved independent of the industrial and demolition wastes which are taken to the LRD quarry for appropriate disposal. Once collected, domestic waste is taken to the fenced area of the Operational Landfill and burned within the burn pit prior to placement and ultimate burial. No regular logs are required for the domestic debris.

1.2.4. Permanent Closure of the Operational Landfill

Once the placement of domestic waste has been completed, construction of an engineered cap will occur. The construction of the engineered cap will be done in accordance with the approved design. In general, the main features of the engineered cap are that it will be a minimum of 1.8 metres thick, sloped sufficiently to ensure that water will drain off the cap preventing the formation of pools on the cap, and the slopes on the face of the dump will be no steeper than 4:1 (H:V).

1.2.5. Monitoring of Landfill Temperatures

The Operational Landfill currently has operational thermistors installed which are being monitored on a monthly basis. During placement of the final landfill cap, monitoring may be temporarily (but briefly) suspended for operational reasons. Monitoring of landfill temperatures are included in the long term site monitoring plans.

1.3. LANDFILLS – RECLAMATION LANDFILL

While the mine was in operation, an area known as the Reclamation Landfill (aka the 'Subsidence Landfill'), was developed over a localized section of the mine workings that were subsiding. The settlement of the ground surface was active and on-going causing a depression that was unsafe and required filling. It was decided as part of our progressive reclamation activities (prior to mine closure), to place old vehicles, scrap shipping containers and other non-hazardous materials into this depression. Since mine closure, no further debris has been or will be placed into this area. Substantial quantities of fill have already been pushed over top of the debris to contour the depression for safety and landscaping reasons. Ground movement in this area has essentially concluded and future subsidence is expected to be minimal. Further material will be placed over this area to reduce the chances of water forming a pond due to minor settling of underlying materials.

1.3.1. Acceptable and Prohibited Waste Types

No hazardous or special wastes were placed in this landfill.

1.3.2. Requirement to Limit Void Space

As work on this landfill was concluded prior to the mine ceasing operations, the demolition contractor was not on site yet so there was no shearing apparatus to cut up the landfill debris. However, items such as shipping containers were crushed with the D9 dozer to minimize void space within debris. The same was true for any other items that had significant void spaces.

1.3.3. Required Documentation of Waste Types and Volumes

No wastes are or will be placed in this landfill during the decommissioning and reclamation of the site.

As discussed above, prior to mine closure, this area was used to receive non-hazardous material as part of progressive reclamation of the site. Any equipment placed into the landfill was prepared for disposal in the maintenance facilities by draining fuels, oils and removing batteries. Shipping containers were crushed to minimize void space by driving a large dozer over them. A form was filled out for each piece of mobile equipment to document that the fuels, oils and batteries had been removed, the equipment number of the equipment recorded and the mechanic who prepared it for disposal signed off that the work had been completed. In addition, regular photographs were taken of the landfill as material was placed. The debris was then covered with surrounding fill material. A binder complete with this information was stored in the Mill Superintendent's office for safe keeping as the

Mill Superintendent was in charge of the crews managing the landfill. A spare set of photographs were also retained in the same office. During mine closure in October 2002, while the Mill Superintendent was off site, his office was stripped as part of the demolition activities and these records have been lost. The Mill Superintendent remains employed at the site on the reclamation project (by the demolition contractor), and we will obtain a signed statement from him as to the general contents of the landfill, the preparation that was done for burial and the record keeping process that was rigidly followed. He will also verify that there were no materials classed as either hazardous waste or special waste placed into this landfill.

1.3.4. Permanent Closure of the Reclamation Landfill

A significant cover has already been placed over this landfill as part of filling the subsidence area and likely already exceeds the 1.8 metre cover thickness required for closure. However, measurements of the fill thickness were not done by operations as this was completed prior to approval of the Closure Plans. Further contouring of this area is required to restore the area to a more natural state this summer. To document that the minimum 1.8 metres of fill is in place, we will survey the current top of this landfill, and add an additional 1.8 metre cover overtop of the existing surface of the landfill. As this area is a hole rather than a high feature on the landscape, erosion of the cap is not a concern. Contouring of the area will be done to ensure that this area is not a low spot (i.e. prevent pooling of water).

APPENDIX 1

LANDFILL DOCUMENTATION FORMS

POLARIS MINESITE DECOMMISSIONING AND RECLAMATION PROJECT

STATIONARY EQUIPMENT FLUID EVACUATION CHECKLIST

Date	Origin Location	Equipment Description	Lubricant / Fluid Type	Disposal Location	Sub-Contractor	SLEC	Teck Cominco
date	CRF Plant	Lightning Mixer No.1	oil	Collected in drums for incineration	signed by sub doing the work	approved by contractor	approved by owner

Scope of Work Appendix - SW 1					SNC·LAVALIN Engineers & Constructors		Page
Cominco Polaris Minesite Demolition and Reclamation Project							
Daily Activity Log and Disposal Record							
Structural Steel/Concrete/Building Components					**Signatures**		
Date	**Origin Location**	**Disposal Location**	**Disposal Location Details**	**Quantity (m^3)**	**Sub-Contractor**	**SLEC**	**Owner/Rep**
			totals				

Scope of Work Appendix - SW 1

SNC·LAVALIN Engineers & Constructors

Cominco Polaris Minesite Demolition and Reclamation Project

Daily Activity Log and Disposal Record

Mobile Equipment

					Signatures		
Date	**Equip Description**	**Decontamination**	**Disposal Location**	**Disposal Location Details**	**Sub-Contractor**	**SLEC**	**Owner/Rep**