

## 2.7 Decommissioning and Abandonment

The decommissioning and abandonment plan has its focus on protecting public health and safety, improving or eliminating environmental damage and liabilities, and allowing the land use to be similar to its original use or an acceptable alternative.

The following will occur prior to decommissioning of the site:

- Any new plant and marine facilities will be designed to mitigate environmental impacts;
- The plant and marine facilities will be operated to mitigate environmental impacts;
- A preliminary site contamination/facility inventory will be developed;
- Site inspections and hazard characterization will take place and concerns will be identified;
- Communication with local communities, in particular Arnold's Cove, to obtain relevant community input to the final decommissioning plan to determine which facilities should remain in place and transfer to community ownership; and
- Negotiation with relevant government authorities on the final decommissioning plan, included schedules and on going monitoring requirements.

The proposed Grassy Point LNG Transshipment Facility has an anticipated life expectancy of a minimum of 50 years, during which time this facility will be maintained to operate safely and efficiently. At some point in the future upon completion of its operating life, the facility will be decommissioned and abandoned. A decommissioning and abandonment plan will be developed to reduce and remediate environmental impacts associated with project infrastructure and operations. All NLNG decommissioning procedures developed for the decommissioning and abandonment of the Grassy Point Transshipment Facility shall be in accordance with all applicable legislation and regulations.

The decommissioning plan shall be executable at anytime throughout the lifetime of the facility. This plan shall also take into account environmental rehabilitation. Environmental rehabilitation shall include the removal of all surface facilities and excess hydrocarbon waste, as well as re-vegetation of localized natural flora. Government approved hazardous material disposal sites shall be used if any hazardous materials are collected.

Associated decommissioning activities in accordance with Environmental Protection Measures and Standards of Good Practice are listed below:

- removal of site infrastructure and waste:
- all civil structures and associated infrastructure will be removed;
- all remaining materials and hydrocarbons and hazardous waste will be removed;
- all jetties, pilings, and trestles will be removed;
- all waste will be disposed of in an appropriate manner; and
- reusable materials will be resold or recycled.

Hazardous Waste Clean Up and Transport:

- when decommissioned, all products within piping and storage infrastructure shall be removed from said system along with all associated infrastructure and possible contaminated soils; and
- all hazardous wastes shall be transported to approved hazardous waste storage facilities or disposal sites.

#### Site Rehabilitation:

- all disturbed areas due to ROWs, transmission lines, etc. shall be rehabilitated and re-vegetated;
- native flora shall be used to re-vegetate the rehabilitated sites;
- Roadways will be scarified; and
- Natural drainage patterns will be reinstated where practical.

#### Employment and Business Opportunities:

- trained personnel from facility operations will be used where possible; and
- additional rehabilitation crews shall be hired to assist with decommissioning.

The management strategy for decommissioning activities is outlined in the following sections.

### **2.7.1 Facilities Removal**

#### **2.7.1.1 LNG Storage Tank Decommissioning**

Before the storage tanks can be dismantled, they must be vacated of any excess hydrocarbons. The procedures for vacating (purging) LNG or natural gas vapor are very similar to that of storage tank maintenance or repairs.

##### Removing Liquid from the LNG Storage Tank

LNG pumps will be used to pump as much LNG out of the storage tanks as possible. The net positive suction head required (NPSHR) for the LNG pumps will determine the lowest level the tanks can be pumped down to. It is estimated that this level would be about 1 m of liquid level left remaining in the tank. During this process, the pumps would be carefully monitored for cavitation. Once the LNG can no longer be pumped out, the remaining LNG must be vaporized by adding heat into the tank. This is usually done by heated fuel gas or nitrogen.

##### Isolating the LNG Storage Tank

The objective of isolating a storage tank is the prevention of any re-entry of LNG or hydrocarbons. This is usually accomplished by providing a physical gap (air gap) between the tank and any piping containing hazardous fluid or gas. If the purpose of isolating the LNG tank is for personnel inspection, maintenance, or entry, the storage tank isolation shall comply with all applicable facility and regulatory safety procedures.

##### Sampling

Before purging can begin, the initial tank pressure and temperature are recorded. After the purging has begun, the following data is collected:

- storage tank pressure;
- purge gas flow rate;
- percentage of combustible gases in the vent gas; and
- quantity of purge gas used.

### Purging of Tanks

After the LNG has been removed, the tank warm-up and inert gas purge is initiated. The tanks will then be heated to temperatures above that of the atmospheric dew point. Raising the storage tank temperature above this level prevents moisture in the air from forming condensation in the insulation and on the tank surfaces.

During the inert gas purge, additional heat may be required to reach the desired warm-up in a reasonable time. The vent gas will be monitored during the purge for combustible gases. The end-point for the inert gas purge will be when the combustible gas readings on the gases venting is below the combustible threshold.

Vapor from the LNG storage tank will be vented to the atmosphere. The inner tank, dome and annular space between the inner and outer tanks will be purged of combustible gases with an inert gas. If personnel entry is required, after the combustible gases are purged out of the tank, a purge process will begin to purge the inert gases out using air. Detailed procedures will be developed for this process.

#### **2.7.1.2 System Decommissioning**

The decommissioning of facility systems is necessary whenever inspection, maintenance, or dismantling is to occur. System decommissioning procedures will be written specifically for each system and piece of equipment. Each procedure will address necessary safety and environmental activities, such as, purging (similar to tanks), electrical isolation (lock out/tag out), air gap isolation, piping valves to be locked and tagged out, safety and environmental monitoring, among others.

#### **2.7.1.3 Facility Abandonment**

Prior to abandonment, a review of the site infrastructure will be carried out to address items to be decommissioned and abandoned and items to remain for use by the community. The following items will be addressed during abandonment process:

- Hazardous chemicals, reagents and materials will be removed for re-sale or proper disposal.

- Equipment will be disconnected, drained and cleaned, disassembled and sold for reuse or to a licensed scrap dealer. This includes tanks, mechanical equipment, electrical switchgear, pipes, pumps, vehicles, laboratory equipment and office furniture.
- Any equipment deemed potentially hazardous will be removed from the site and disposed of in accordance with government regulations.
- Buildings, surface structures, and other infrastructure, which will no longer be required by the authorities or the community will be properly dismantled, demolished and removed.
- Concrete foundations will be demolished to or near surface grade and the concrete debris disposed of in an appropriate landfill. Buildings or foundations to be retained will be examined and passed as fit for occupation, failing which they shall be dismantled and removed as described above.
- An assessment of soil contamination in the location or vicinity of the buildings and other facilities will be completed and appropriate remediation measures will be implemented to treat or excavate and remove contaminated soil as required.
- Where possible, any sheer slopes or sharp elevation changes will be graded or fenced in consultation with the authorities and the local community. Fencing will remain in place to protect the public where sheer slopes exist or there are sharp elevation changes, if not the fences will be removed and the posts excavated.
- Access and site roads deemed no longer required will be reclaimed by removing the wear or asphalt surface and scarifying the surface. Where erosion and sedimentation is a potential concern, suitable plant species will be established along the prepared roadway surface. For areas where erosion and sedimentation are not a concern the scarified surface will be left to re-vegetate naturally. Culverts will be removed and natural drainage patterns will be restored wherever practical.
- Re-vegetation will be systematically assessed and implemented where practical, including seeding and reforestation through the introduction of indigenous vegetation and organic material.
- Removal and disposal of all insulation from tanks.
- Removal and disposal of tank superstructures.
- Removal and disposal of tank foundations.
- Power to the site will be terminated and the service disconnected at the source. The electrical lines along with the poles will be removed.
- The equipment associated with the water supply will be removed and any drilled well holes will be plugged with concrete. The underground water line will also be removed and the area graded.
- The sewage holding tank and associated underground piping will be removed from the site.
- Site lighting will be removed along with all lighting hardware and poles. Underground pipes, conduits and cables will be terminated a minimum depth below the surface grade and allowed to remain unless there is a regulatory stipulation to remove them, in which case they will be removed and the areas graded and rehabilitated.
- The jetties structures will be removed from site.
- The tug basin will likely remain in place after abandonment.

### **2.7.2 Air Emissions**

There will be minor air emissions from construction equipment associated with decommissioning and abandonment operations. Since LNG itself is a clean, non-corrosive fluid it is not anticipated that it will create any hazardous polluting emissions.

### **2.7.3 Wastes**

Wastes include all solid building materials and equipment. All waste material will be sorted and material not deemed acceptable for reuse or recycling will be disposed of in an approved landfill site. Government agencies will be consulted on waste disposal matters during facility decommissioning and abandonment.