8.16 Rehabilitation and Decommissioning

8.16.1 Introduction

The LNG facility has a nominal project life of 20 years but may continue operations for a longer period. Nevertheless, planning is required for its eventual closure. This section outlines the rehabilitation and decommissioning stages which will be required for the LNG facility.

Rehabilitation and decommissioning plans will be developed in conjunction with regulatory agencies at least five years prior to closure. At that time there will be a greater understanding of the relevant decommissioning standards and alternative land uses available for the site.

Prior to site closure and the removal of any buildings or other infrastructure from the site, a series of stakeholder discussions will be held to determine the agreed end land use and fate of the LNG facility site and associated infrastructure. This will guide decisions about whether any buildings, equipment or facilities should remain on-site for future use, or if they should be decommissioned and removed. Once it has been determined which components of the facility will be decommissioned, a site decommissioning and closure plan will be developed in conjunction with the regulatory authorities. All decommissioning works will be conducted in accordance with standard practices applicable at the time including the requirements of the *Petroleum and Gas (Production and Safety) Act 2004* (Qld) as amended or superseded from time to time and any requirements as stipulated under the site's environmental authority.

It is likely that the LNG facility and its associated infrastructure will be valuable either as a package or as individual elements to other industrial or commercial users. Proximity to an industrial harbour in an area with developed social and physical infrastructure and considerable energy and raw material resources suggests that the most probable decommissioning activity will be preparation of the site for alternative industrial uses.

8.16.2 Regulatory Framework

The rehabilitation and decommissioning of the LNG facility will be undertaken in accordance with the following:

- *Petroleum and Gas (Production and Safety) Act 2004 (Qld);*
- *Environmental Protection Act 1994 (Qld);*
- *Environmental Protection (Waste Management) Policy 2000 (Qld); and*
- *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland (1998).*

Refer to Section 6.16.2 for details on the above legislation.

8.16.3 Rehabilitation

Progressive rehabilitation (where practicable) of the LNG facility and associated infrastructure will occur for areas that have been disturbed.

8.16.3.1 Goals

The specific goals for rehabilitating the LNG facility site are as follows:

- **Achievement of acceptable land use suitability** - Rehabilitation will aim to create a stable landform with a post-project land use capability and/or suitability similar to that prior to disturbance, unless other beneficial land uses are pre-determined and agreed;

- **Creation of stable landform** - The site will be rehabilitated to a safe condition that is self-sustaining or to a safe condition where maintenance requirements are consistent with an agreed post-project land use; and
- **Preservation of downstream water quality** - Surface and ground waters that leave the site will meet accepted closure criteria. Current and future water quality will be maintained at levels that are acceptable for users downstream of the site.

Objectives, indicators and closure criteria will be developed for each of these goals in a closure plan that will be prepared in consultation with the appropriate stakeholders prior to the site closure.

8.16.3.2 Land Suitability

Prior to the establishment of the LNG facility, land use was predominantly grazing land and disturbed areas of native habitat. Descriptions of soil types and agricultural land suitability classes are provided in Section 8.3.

Although detailed closure options are not currently available, should no future land uses be determined prior to closure, it is assumed that the site would be returned to a low intensity grazing use with minor areas of native habitat.

A more detailed description and definitions of the land suitability classes is presented in Section 8.3. It is intended that the same or similar percentage composition of land use suitability will be present on the facility site once rehabilitation is complete. This assumes that none of the infrastructure will be retained for alternative use.

8.16.3.3 Rehabilitation Strategy

The rehabilitation strategy will be flexible and will be amended as new rehabilitation techniques are developed. Where possible progressive or temporary rehabilitation of site areas will be undertaken, it is however expected that the majority of the site rehabilitation will be undertaken at site closure.

To achieve the rehabilitation objectives, rehabilitation of the site will be conducted so that:

- Suitable species of vegetation are planted and established to achieve the nominated post-facility land uses;
- The potential for water and wind induced erosion is minimised, including likelihood of environmental impacts being caused by the release of dust;
- The quality of surface water released from the site is such that releases are not likely to cause environmental harm;
- The water quality of any residual water bodies meets criteria for subsequent uses and does not have the potential to cause environmental harm; and
- The final landform is stable and not subject to slumping or erosion that would result in the agreed post-facility landform not being achieved.

8.16.3.4 Success Criteria

During the development of the decommissioning plan preliminary success criteria (or closure criteria) for the rehabilitation areas will be developed. The success criteria are performance objectives or standards against which rehabilitation success in achieving a sustainable system for the proposed land use is demonstrated. Satisfaction and maintenance of the success criteria (as indicated by monitoring results) will demonstrate that the rehabilitated landscape is ready to be relinquished and handed back to stakeholders in a productive and sustainable condition.

The success criteria are likely to include indicators for vegetation, fauna, soil, stability, land use and safety on a domain basis that reflects the nominated post-facility land use.

8.16.3.5 Monitoring

Monitoring of the rehabilitated areas will be undertaken during the initial vegetation establishment period and beyond to determine whether the objectives of the rehabilitation strategy are being achieved and whether a sustainable, stable landform has been obtained. Monitoring will include inspections for the following key aspects:

- Soil erosion;
- Revegetation success;
- Weed infestation; and
- Integrity of water diversion drains, waterways and sediment control structures.

Monitoring will be conducted by suitably skilled and qualified persons at locations which will be representative of the range of conditions on the rehabilitating areas. Annual reviews will be conducted of monitoring data to assess trends and monitoring program effectiveness. The outcome of these reviews will be included in reporting to the relevant government authorities.

Maintenance works will be undertaken to address any deficiencies or areas of concern identified from the monitoring. This may include the re-application of topsoil, re-seeding, re-planting, weed control, additional fertiliser applications, de-silting or repair of drainage works and sedimentation dams and infill and re-grading of eroded areas.

8.16.4 Decommissioning

If the LNG facility and associated infrastructure are no longer required for other uses, the PLF and the MOF will be decommissioned in consultation with the Gladstone Ports Corporation (GPC).

Should project-related infrastructure require decommissioning, negotiations will be conducted with relevant stakeholders as to the benefits of retaining some of the infrastructure for future use (e.g. roads, hardstand, etc.). Infrastructure will only be left after decommissioning where formal written agreements have been obtained from the relevant stakeholders for its use and maintenance/management.

8.16.4.1 Site Services

All services including power, water and telecommunications on the site will be isolated, disconnected and rendered safe. The inspection pits and junction boxes for underground services will be sealed. Generally, all underground services will be rendered safe and left buried in the ground. Overhead project-specific power lines will be removed and the equipment (i.e. poles and wires) recovered for potential re-sale or recycling as applicable.

8.16.4.2 Equipment and Buildings

All items of equipment to be decommissioned will be isolated, de-oiled, degassed, depressurised and decontaminated. This may involve flushing all process equipment and associated pipe work with water. This water will be disposed of as per the decommissioning plan developed in conjunction with the regulatory authorities. All hazardous materials will removed from the site in accordance with the handling and transportation requirements applicable at the time.

All buildings and infrastructure will be demolished and removed from the site. Where possible, assets will be re-used or sold.

The remaining items will be demolished, and removed/transported from the site as required. All recoverable scrap steel will be sold and recycled, with the remaining non-recyclable wastes being taken to a licensed landfill.

Prior to disposal, all wastes will be assessed and classified in accordance with the *Environmental Protection (Waste Management) Policy 2000* and the *Environmental Protection (Waste Management)*

Regulation 2000 (or requirements applicable at that time) and appropriate management procedures will be developed.

All concrete footings and pads will be broken up to at least 1.5 metres below the surface. The waste concrete will be crushed to produce an aggregate that can either be used on the site or sold for some other beneficial reuse.

If sediment ponds and sumps are to be removed, they will be drained, decontaminated, filled with backfill, topsoiled and revegetated. Any stormwater management ponds present at the time of decommissioning will be used to assist with the provision of water for rehabilitation, where necessary.

8.16.4.3 Bridge, Roadways, Car Parks and Hardstands

If not required for alternative uses, all paved roadways, car parks and hardstand areas will be removed with the inert waste material being transported to a licensed landfill or sold as fill. If the bridge is constructed, all infrastructure will be demolished and removed from the site. Where possible, assets will be re-used or sold. These areas will then be recontoured and revegetated. Stormwater drainage facilities will be installed as necessary.

8.16.4.4 Contaminated Land

Potential exists for land to become contaminated by sewage, hydrocarbons or other chemicals or general and regulated waste.

Sites contaminated by operational activities will be identified in the site management plan (including register and survey plan) which will be maintained for the life of the project. Identified contaminated areas will be included on the EPA's Environmental Management Register and Contaminated Land Register as appropriate.

Upon decommissioning, contaminated land assessments will be conducted in potentially contaminated areas to standards applicable under legislation at that time, which currently are those prescribed by the *Environmental Protection Act 1994*. Contaminated areas will be assessed for the type and amount of contaminants. Areas that have elevated levels of contaminants will be remediated using suitable methods as they become available during the life of the project. Any hazardous materials and wastes will be removed from site or remediated. Remediation measures will be discussed with the relevant regulatory authority prior to commencement of remediation works. Such measures could include bio-remediation on-site or disposal off-site at a licensed facility. Refer to Section 8.3.2 for further details.

8.16.4.5 Bulk Earthworks and Site Rehabilitation

Contaminated or unsuitable material (e.g. gravel, etc.) will be removed from the hardstand surfaces and disposed of as appropriate.

The entire facility will be dozer trimmed to facilitate the appropriate drainage of surface runoff from the site and any proposed future land use. Appropriate surface water management structures (contour banks, drains and settlement ponds) will also be constructed. The site will be rock raked to remove all surface rocks to a size of less than 500 mm and ripped to a depth of at least 1 metre. Fertiliser and pasture/tree seed will be applied to stabilise the surface.

8.16.4.6 Post Closure Monitoring and Management

Following closure of the facility the existing environmental monitoring program will be maintained until all decommissioning and rehabilitation works have been completed. Notwithstanding this, there may be the need to establish some additional monitoring sites depending on the nature of the decommissioning works.

The type and location of this monitoring will be determined during the decommissioning phase of the site.