6 LAND CONTAMINATION

The Gas Field Component of the Queensland Curtis LNG (QCLNG) Project occurs across a large area of southern Queensland. Potentially, well sites or associated infrastructure may be developed over land that has previously been contaminated. Development in these instances may require a number of mitigation measures. In addition, potential exists for works throughout the various phases of development for the Gas Field to contaminate land.

Chapter 6 considers the potential for land contamination through development of the Gas Field Component. It also outlines impacts and an overall approach, including mitigation measures, to address land contamination.

6.1 PROJECT ENVIRONMENTAL OBJECTIVE

The Project's environmental objective for land contamination is to protect land from contamination arising from Project activities and ensure that any existing contaminated land is not disturbed, or if disturbed is appropriately managed and/or rehabilitated.

6.2 RELEVANT LEGISLATION

Environmental values for land and the prevention of contamination are defined in Queensland's *Environmental Protection Act 1994* (Qld) (*EP Act*) and associated legislation and policies.

Land contamination is regulated under the *EP Act*, which applies the following definition:

Contaminated land is land contaminated by a hazardous contaminant.

Hazardous contaminant means a contaminant, other than an item of explosive ordinance, that if improperly treated, stored, disposed of or otherwise managed, is likely to cause serious or material environmental harm because of:

(a) its quantity, concentration, acute or chronic toxic effects, carcinogenicity, teratogenicity, mutagenicity, corrosiveness, explosiveness, radioactivity or flammability; or

(b) its physical, chemical or infectious characteristics.

Notifiable activities are activities that have been identified as likely to cause land contamination; and are listed in Schedule 2 of the *EP Act*.

6.3 DESCRIPTION OF EXISTING ENVIRONMENT

The Gas Field Component is located on rural land that has been predominantly used for grazing and comprises several hundred individual land parcels. A risk-based approach has been adopted for the identification of potential existing land contamination at a proposed petroleum works site within the Gas Field. This process considers the most likely contaminants to be encountered and their likely locations. This process will continue during the field development activities.

The approach to identification of potential contaminated lands has been to:

- review the area to determine whether there were any known major activities being carried out that would be likely to be listed on the Environmental Management Register (EMR) or Contaminated Land Register (CLR)
- where necessary verify these land parcels with the Department of Environment and Resource Management (DERM)
- utilise observation and experience during the well field lay-out and landholder negotiation process.

Due to the rural location and the absence of any historical industrial activities with the potential to create land contamination, it has not yet been considered necessary to carry out any searches of the EMR or CLR.

Also taken into account were observations and experience that many rural properties do not have access to waste collection services and waste may in the past have been disposed of on site. Wastes may include not only domestic waste, but also animal carcasses (and possibly associated pathogens), chemical containers and scrap (including asbestos sheeting).

Burning of waste, particularly treated or painted timber, can also release heavy metals into the soil. No such contaminated areas have been identified to date, but such tips may be encountered over time. Rural pastoral properties may also have operational or abandoned animal dips, which contain pesticide residues and heavy metals. Land access enquiries can identify historical tip or dip locations prior to land entry for upstream activities.

Rail tracks and major roadways may have hydrocarbon contamination along the edges of their reserves. These areas may also have herbicide residues associated with weed control. Where asbestos brake linings have been used on trains, dust and fibres from these can accumulate in the soil adjacent to tracks.

To date, no other sources of existing contamination have been observed either during previous well development work or by soils specialists or Land Officers working in the field. The likelihood of significant sites of contamination occurring within the Gas Field is considered low. Land Officers conducting negotiations with landholders on infrastructure placement (i.e. wells, Field Compression Stations (FCS), Central Processing Plants (CPP) and gathering pipelines) will continue efforts to identify any known areas of

potentially contaminated land.

Should any areas of existing contamination be identified during field development works and cannot be avoided, management strategies, as set out in the draft Environmental Management Plan (Draft EMP) (refer *Volume 9*), will be implemented.

6.4 POTENTIAL IMPACTS

6.4.1 Existing Contaminated Land

If contaminated land is disturbed during field development work there may be a risk to the health and safety of construction personnel and the wider public through exposure to unknown contaminants. Also, the area of land contamination may further increase through surface water runoff, soil stockpiling or backfilling operations.

6.4.2 Potential to Cause Localised Land Contamination

The potential exists for localised contamination from the following Project related activities:

- Associated Water management
- saline brine processing, storage and transport
- drilling of wells (e.g. mud management)
- oily water from compressors
- oil, fuel and chemical storage, handling, and transport
- waste management.

6.4.2.1 Associated Water management

The management of Associated Water is addressed as a separate activity and is described in *Chapter 11* of this volume. Associated Water has elevated salt levels and therefore any loss of Associated Water could lead to salt contamination and scalding of the land.

Management of Associated Water also includes the use of ponds or treatment facilities that result in saline residues. Saline residue can cause saline or sodic scalds to the soil surface.

6.4.2.2 Saline brine processing, storage and transport

Disposal of the saline residues will be through:

- in-situ encapsulation by materials of an appropriately low permeability
- infiltration reduction by capping and topsoil/rehabilitation.

Surface saline residue and liners, such as natural base and high density polyethylene (HDPE), from decommissioned low and medium hazard evaporation ponds are likely to be wholly removed off site to an appropriately licensed disposal facility. The location of a brine disposal cell and/or concentrated brine disposal landfill will be registered on the CLR.

6.4.2.3 Drilling of wells

Drilling activities include the use of bentonite muds as a lubricant (refer *Volume 2, Chapters 7 and 11*). The bentonite is an inert clay. However, it is suspended in saline water which has salinity almost equivalent to seawater. Loss or disposal of excess water to ground may also cause salt contamination and scalding of the land. Muds are contained within a drill sump at each well lease area. Upon well completion the water and sediment will be left to dry out in the sump, which will then be filled and the area rehabilitated.

6.4.2.4 Oily water from compressors

Oily water generated at FCS and CPP facilities will be sent to an oily water storage tank, then to evaporation ponds via an interceptor pit. The oily water storage tank and interceptor pit will trap most of the oil, with only trace amounts of oil in the water disposed of in the HDPE-lined evaporation ponds. Seepage from these ponds or loss during transfer may result in land contamination. Oil will be collected by a licensed waste contractor on a regular basis.

6.4.2.5 Oil, fuel and chemical storage, handling, and transport

Development works will involve quantities of chemicals such as water pre-treatment and treatment chemicals at centralised locations in storage facilities compliant with Australian Standards according to their dangerous goods classification.

Construction equipment may be refuelled in the field from a mobile fuel truck holding up to 16,000 litres of fuel. Diesel may be stored at the CPPs in either 5,000 L or 10,000 L tanks.

6.4.2.6 Waste Management

Sites where waste is managed and stored can potentially cause land contamination. A waste transfer station is being developed on QGC land at Windibri. This station will be used for the management of all waste materials

associated with the Gas Field (refer *Volume 3, Chapter 16*).

6.4.3 *Potential to Cause Land Contamination through Notifiable Activities*

The Gas Field is likely to cause the following notifiable activities, as listed in the *Environmental Protection Regulations 2008*:

- No 7 Chemical storage (other than petroleum products or oil under item 29) —storing more than 10 T of chemicals (other than compressed or liquefied gases) that are dangerous goods under the dangerous goods code.
- No.28 Metal treatment or coating—treating or coating metal including, for example, anodising, galvanising, pickling, electroplating, heat treatment using cyanide compounds and spray painting using more than 5 L of paint per week (other than spray painting within a fully enclosed booth).
- No. 29 Petroleum product or oil storage - storing petroleum products or oil
  - (a) in underground tanks with more than 200 L capacity; or
  - (b) in above ground tanks with -
    - (i) for petroleum products or oil in class 3 in packaging groups 1 and 2 of the dangerous goods code - more than 2,500 L capacity; or
    - (ii) for petroleum products or oil in class 3 in packaging groups 3 of the dangerous goods code - more than 5,000 L capacity; or
    - (iii) for petroleum products that are combustible liquids in class C1 or C2 in Australian Standard AS 1940, ''The storage and handling of flammable and combustible liquids'' published by Standards Australia - more than 25,000 L capacity.

6.5 *MITIGATION MEASURES*

The following mitigation methods will be implemented (refer to the Gas Field Draft EMP, *Volume 9* for full details):

- continued consultation with all landholders will occur prior to construction activities to determine whether tips or dips are likely to occur within the area of construction or gathering line easement
- areas of known or potential contamination will be avoided where possible. If areas cannot be avoided or trenchless techniques are inappropriate, site specific management practices will be developed. Contaminated material will only be removed from the work area with the approval of DERM
- all Superintendents will be made aware of potential contamination issues through the induction training process. If suspected contamination is found during earthworks, work will stop in that area until a suitably qualified person has inspected the site, assessed the hazard and developed appropriate management measures

- regular monitoring of surface water, groundwater and Associated Water, will occur, particularly after rainfall
- a refuelling procedure will be developed for all mobile equipment and Job Safety and Environmental Analysis (JSEA) completed for selection of on-site refuelling locations. The site selection will include assurance that refuelling will be carried out away from watercourses to avoid surface water contamination and the provision of spill management materials will be provided at any refuelling location
- small volumes of chemicals and fuels will be stored in either lined bunds or on self-bunded pallets
- dangerous goods will be stored in accordance with the requirements of the *Dangerous Goods Safety Management Regulation* (DGSMR), AS 3780 – the Storage and Handling of Corrosive Substances, and the Australian Dangerous Goods (ADG) Code
- fuel farms (large storages) will be designed in accordance with AS 1940 to minimise the likelihood of land contamination through bunding and storage vessel capacity
- drill sumps will be filled and rehabilitated
- oils will be stored in bunded areas and removed by a licensed waste contractor
- areas surrounding oily water ponds will be monitored on a regular basis for evidence of contamination
- loading and unloading procedure will be required for the handling of water treatment and other chemicals including emergency response procedures for spill recovery.

Rehabilitation activities associated with the disposal of saline residues and evaporation ponds will involve a physical and chemical investigation of soils and ground waters to determine:

- area extent of saline contamination
- undisturbed land form characteristics
- landholder requirements (e.g. preferred vegetation type).

6.6 *CONCLUSION*

Land contamination is avoidable in developing the Gas Field Component of the Queensland Curtis LNG Project. However, land may have been contaminated by previous activities. Where wells are required in such locations, a risk-based approach to land contamination will be adopted that considers the most likely contaminants and their likely locations. Management plans will be developed to address these contaminated areas safely from a health, safety and environmental standpoint. A summary of the impacts outlined in this chapter is provided in *Table 4.6.1* below.

Table 4.6.1 Summary of Impacts for Land Contamination

Impact assessment criteria	Assessment outcome
Impact assessment	Negative
Impact type	Direct
Impact duration	Short term
Impact extent	Local
Impact likelihood	Unlikely

Overall assessment of impact significance: negligible.