

# Department of Environment and Heritage Protection

## Permit<sup>1</sup>

### Environmental Protection Act 1994

This environmental authority is issued by the administering authority under Chapter 5 of the *Environmental Protection Act 1994*.

**Permit<sup>1</sup> number:** EPPG00653513

**Santos Reference:** PEN100084007

**Project Name:** Nockatunga Joint Venture

**Environmental authority takes effect:** 28 August 2015

The anniversary date of this environmental authority is **31 August**.

An annual return and the payment of the annual fee will be due each year on this day.

The environmental authority is subject to the attached schedules of conditions.

| Environmental authority holder(s)      | Registered address                                                    |
|----------------------------------------|-----------------------------------------------------------------------|
| Santos QNT Pty Ltd<br>ACN: 083 077 196 | Ground Floor, Santos Centre<br>60 Flinders Street<br>ADELAIDE SA 5000 |
| Vamgas Pty Ltd<br>ACN: 006 245 110     | Ground Floor, Santos Centre<br>60 Flinders Street<br>ADELAIDE SA 5000 |

| Environmentally Relevant Activity              | Relevant Tenure          |
|------------------------------------------------|--------------------------|
| Resource activity that is a petroleum activity | Petroleum Lease (PL) 245 |



Signature

28.08.15

Date

**Kylie Breaker**

Delegate of the administering authority  
*Environmental Protection Act 1994*

**Enquiries:**

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<sup>1</sup> Permit includes licences, approvals, permits, authorisations, certificates, sanctions or equivalent/similar as required by legislation

## **Additional information for applicants**

### **Environmentally relevant activities**

The description of any environmentally relevant activity (ERA) for which an environmental authority is issued is a restatement of the ERA as defined by legislation at the time the approval is issued. Where there is any inconsistency between that description of an ERA and the conditions stated by an environmental authority as to the scale, intensity or manner of carrying out an ERA, then the conditions prevail to the extent of the inconsistency.

An environmental authority authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the authority specifically authorises environmental harm.

A person carrying out an ERA must also be a registered suitable operator under the *Environmental Protection Act 1994* (EP Act).

### **Contaminated land and notifiable activities**

It is a requirement of the EP Act that if an owner or occupier of land becomes aware a notifiable activity (as defined in Schedule 3 and Schedule 4) is being carried out on the land, or that the land has been, or is being, contaminated by a hazardous contaminant, the owner or occupier must, within 22 business days after becoming so aware, give written notice to the chief executive.

### **Responsibilities under the *Environmental Protection Act 1994***

Separate to the requirements of standard conditions, the holder of the environmental authority must also meet their obligations under the *Environmental Protection Act 1994*, and the regulations made under that Act. For example, the holder must be aware of the following provisions of the *Environmental Protection Act 1994*.

#### **General environmental duty**

Section 319 of the *Environmental Protection Act 1994* states that we all have a general environmental duty. This means that we are all responsible for the actions we take that affect the environment. We must not carry out any activity that causes or is likely to cause environmental harm unless we take all reasonable and practicable measures to prevent or minimise the harm. To decide what meets your general environmental duty, you need to think about these issues:

- the nature of the harm or potential harm
- the sensitivity of the receiving environment
- the current state of technical knowledge for the activity
- the likelihood of the successful application of the different measures to prevent or minimise environmental harm that might be taken
- the financial implications of the different measures as they would relate to the type of activity.

It is not an offence not to comply with the general environmental duty, however maintaining your general environmental duty is a defence against the following acts:

- (a) an act that causes serious or material environmental harm or an environmental nuisance
- (b) an act that contravenes a noise standard
- (c) a deposit of a contaminant, or release of stormwater run-off, mentioned in section 440ZG.

More information is available on the Department of Environment and Heritage Protection website [www.ehp.qld.gov.au](http://www.ehp.qld.gov.au).

#### **Duty to notify**

Section 320 of the *Environmental Protection Act 1994* explains the duty to notify. The duty to notify applies to all persons and requires a person or company to give notice where serious or material environmental harm is caused or threatened. Notice must be given of the event, its nature and the circumstances in which the event happened. Notification can be verbal, written or by public notice depending on who is notifying and being notified.

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The duty to notify arises where:

- a person carries out activities or becomes aware of an act of another person arising from or connected to those activities which causes or threatens serious or material environmental harm
- while carrying out activities a person becomes aware of the happening of one or both of the following events:
  - the activity negatively affects (or is reasonably likely to negatively affect) the water quality of an aquifer
  - the activity has caused the unauthorised connection of 2 or more aquifers.

For more information on the duty to notify requirements refer to the guideline *Duty to notify of environmental harm (EM467)*.

### **Some relevant offences under the *Environmental Protection Act 1994***

#### **Non-compliance with a condition of an environmental authority (section 430)**

Section 430 of the *Environmental Protection Act 1994* requires that a person who is the holder of, or is acting under, an environmental authority must not wilfully contravene, or contravene a condition of the authority.

#### **Environmental authority holder responsible for ensuring conditions complied with (section 431)**

Section 431 of the *Environmental Protection Act 1994* requires that the holder of an environmental authority must ensure everyone acting under the authority complies with the conditions of the authority. If another person acting under the authority commits an offence against section 430, the holder also commits an offence, namely, the offence of failing to ensure the other person complies with the conditions.

#### **Causing serious or material environmental harm (sections 437–39)**

Material environmental harm is environmental harm that is not trivial or negligible in nature. It may be great in extent or context or it may cause actual or potential loss or damage to property. The difference between material and serious harm relates to the costs of damages or the costs required to either prevent or minimise the harm or to rehabilitate the environment. Serious environmental harm may have irreversible or widespread effects or it may be caused in an area of high conservation significance. Serious or material environmental harm excludes environmental nuisance.

#### **Causing environmental nuisance (section 440)**

Environmental nuisance is unreasonable interference with an environmental value caused by aerosols, fumes, light, noise, odour, particles or smoke. It may also include an unhealthy, offensive or unsightly condition because of contamination.

#### **Depositing a prescribed water contaminant in waters (section 440ZG)**

Prescribed contaminants include a wide variety of contaminants listed in Schedule 9 of the *Environmental Protection Act 1994*.

It is your responsibility to ensure that prescribed contaminants are not left in a place where they may or do enter a waterway, the ocean or a stormwater drain. This includes making sure that stormwater falling on or running across your site does not leave the site contaminated. Where stormwater contamination occurs you must ensure that it is treated to remove contaminants. You should also consider where and how you store material used in your processes onsite to reduce the chance of water contamination.

#### **Placing a contaminant where environmental harm or nuisance may be caused (section 443)**

A person must not cause or allow a contaminant to be placed in a position where it could reasonably be expected to cause serious or material environmental harm or environmental nuisance.

### **Some relevant offences under the *Waste Reduction and Recycling Act 2011***

#### **Littering (section 103)**

Litter is any domestic or commercial waste and any material a person might reasonably believe is refuse, debris or rubbish. Litter can be almost any material that is disposed of incorrectly. Litter

includes cigarette butts and drink bottles dropped on the ground, fast food wrappers thrown out of the car window, poorly secured material from a trailer or grass clippings swept into the gutter. However, litter does not include any gas, dust, smoke or material emitted or produced during, or because of, the normal operations of a building, manufacturing, mining or primary industry.

#### **Illegal dumping of waste (section 104)**

Illegal dumping is the dumping of large volumes of litter (200L or more) at a place. Illegal dumping can also include abandoned vehicles.

#### **Responsibilities under other legislation**

An environmental authority pursuant to the *Environmental Protection Act 1994* does not remove the need to obtain any additional approval for the activity that might be required by other State and/or Commonwealth legislation. Other legislation for which a permit may be required includes but is not limited to the:

- *Aboriginal Cultural Heritage Act 2003*
- contaminated land provisions of the *Environmental Protection Act 1994*
- *Fisheries Act 1994*
- *Forestry Act 1959*
- *Nature Conservation Act 1992*
- *Petroleum and Gas (Production and Safety) Act 2004 / Petroleum Act 1923*
- *Queensland Heritage Act 1992*
- *Sustainable Planning Act 2009*
- *Water Supply (Safety and Reliability) Act 2008*
- *Water Act 2000*

Applicants are advised to check with all relevant statutory authorities and comply with all relevant legislation.

An environmental authority for petroleum activities is not an authority to impact on water levels or pressure heads in groundwater aquifers in or surrounding formations. There are obligations to minimise or mitigate any such impact under other Queensland Government and Commonwealth Government legislation.

**Environmental Authority Conditions**

This environmental authority consists of the following Schedules:

**Schedule A    General Conditions and Definitions**

**Appendix A    Criteria for dams and evaporation ponds**

## **SCHEDULE A                      GENERAL CONDITIONS**

### **Environmental Conditions**

#### **Condition 1 – Compliance with Environmental Health and Safety Management System**

The holder of the environmental authority must undertake petroleum activities in accordance with the Santos Environmental Health and Safety Management System (EHSMS). To the extent of any inconsistency between the conditions of this environmental authority and the EHSMS, the conditions of this environmental authority prevail.

#### **Condition 2 – Compliance with APPEA Code of Practice**

The holder of the environmental authority must undertake petroleum activities in accordance with the Australian Petroleum Production and Exploration Association Code of Environmental Practice (the Code) dated 1996 or subsequent versions thereof. To the extent of any inconsistency between the conditions of this environmental authority and the code, the conditions of this environmental authority prevail.

#### **Condition 3 – Compliance with APIA Code of Practice**

The holder of the environmental authority must undertake petroleum activities in accordance with the Australian Pipeline Industry Association (APIA) Code of Environmental Practice (Operations) dated 1996 or subsequent versions thereof. To the extent of any inconsistency between the conditions of this environmental authority and the Code, the conditions of this environmental authority prevail.

#### **Condition 4 – Pipeline activities**

The holder of the environmental authority must:

- (a) design, construct, operate and decommission petroleum pipelines on the relevant petroleum authorities in accordance with AS 2885; and
- (b) where they relate to pipeline construction, operation and abandonment using glass reinforced epoxy resin line pipe materials, as far as is reasonably practicable, be undertaken in accordance with sections of AS2885 referenced under Condition 4 (a).

#### **Condition 5 – Land management**

The holder of the environmental authority must:

- (a) minimise disturbance to land in order to prevent **land degradation**;
- (b) ensure that for land that is to be **significantly disturbed** by petroleum activities, (except in areas with highly erosive soils, e.g. gibber plains), the **top layer** of the soil profile is removed; and
  - i. stockpiled in a manner that will preserve its biological and chemical properties; and
  - ii. used for rehabilitation purposes (refer condition 17)

#### **Condition 6 – Vegetation management**

The holder of the environment authority must:

- (a) prevent or minimise disturbance to vegetation by petroleum activities; and
- (b) manage the effects of clearing to prevent the loss of biodiversity, maintain ecological processes and prevent land degradation.

### Condition 7 – Protection of riverine areas

The holder of the environmental authority must:

- (a) ensure that there is no significant disturbance in riverine areas containing permanent water, except for the necessary construction and/or maintenance of roads, tracks and pipelines that are essential for carrying out the authorised petroleum activities and no reasonable alternative location is feasible; and
- (b) minimise disturbance of all other riverine areas.

### Condition 8 – Erosion and sedimentation control

The holder of the environmental authority must prevent or minimise:

- (a) erosion of areas disturbed by petroleum activities; and
- (b) sedimentation of any waters as a result of petroleum activities.

### Condition 9 – Dust management

The holder of the environmental authority must ensure that:

- (a) Dust or particulate matter or both resulting from a petroleum activity must not cause an environmental nuisance at any sensitive place or commercial place.
- (b) When requested by the administering authority, dust and particulate monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of environmental nuisance at any sensitive place or commercial place, and the results must be notified within 14 days to the administering authority following completion of monitoring, analysis and interpretation of results.

### Condition 10 – Noise management

- (a) Noise emitted from any aspect of petroleum activities must not exceed the noise levels, specified in the table below, at any sensitive place or commercial place.

| Time period | Noise level at a sensitive place measured as the Adjusted Maximum Sound Pressure Level $L_{A, max adj T}$  |
|-------------|------------------------------------------------------------------------------------------------------------|
| 7am – 6pm   | Background noise level plus 5 dB(A)                                                                        |
| 6pm – 10pm  | Background noise level plus 5 dB(A)                                                                        |
| 10pm – 7am  | Background noise level plus 3 dB(A)                                                                        |
| Time period | Noise level at a commercial place measured as the Adjusted Maximum Sound Pressure Level $L_{A, max adj T}$ |
| 7am – 6pm   | Background noise level plus 10 dB(A)                                                                       |
| 6pm – 10pm  | Background noise level plus 10 dB(A)                                                                       |
| 10pm – 7am  | Background noise level plus 8 dB(A)                                                                        |

General note: In no case is the background noise level,  $LA_{90}$ , 15 mins to be less than 25 dB(A). In the event that measured background noise level is less than 25 dB(A), then 25 dB(A) is to be used.

- (b) When requested by the administering authority, noise monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of environmental nuisance at any sensitive place or commercial place, and the results must be notified within 14 days to the administering authority following completion of monitoring, analysis and interpretation of results.

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- (c) The method of measurement and reporting of noise levels must be in accordance with most recent edition of the Environmental Protection Agency (EPA) Noise Measurement Manual.

**Condition 11 – Contaminant releases to land**

Contaminants must not be directly or indirectly released to land.

**Condition 12 – Waste management**

Waste, including waste fluids, but excluding waste used in **closed-loop systems**, must be transported off-site for lawful reuse, remediation, recycling or disposal.

**Condition 13 – Chemical Storage**

Chemicals and fuels stored, must be effectively contained and where relevant, meet Australian Standards, where such a standard is applicable.

**Condition 14 – Spills and clean up action**

Notwithstanding the other conditions of this environmental authority, if a hazardous contaminant is released to waters or land, the holder of the environmental authority must:

- (a) take immediate action to stop any further release;
- (b) take immediate action to contain the hazardous contaminant to the affected area, taking particular care to protect environmentally sensitive areas;
- (c) restore or rehabilitate the environment to its condition before the release occurred; and
- (d) take necessary action to prevent a recurrence of the release.

**Condition 15 – New containment facilities**

Containment facilities that have not begun construction on 28 August 2015 are not authorised.

**Condition 16 – Containment facilities**

The holder of the environmental authority must ensure that all existing containment facilities:

- (a) must be operated, maintained and decommissioned in accordance with the criteria outlined in Appendix A; and
- (b) that exist within 100 m of any natural drainage feature (i.e. watercourse, waterway, wetland or lake) are maintained to prevent material or serious environmental harm.

**Condition 17 – Rehabilitation**

As soon as practicable but no later than 6 months (or longer period agreed in writing by the administering authority) after the end of petroleum activities causing significant disturbance to land, the holder of the environmental authority must:

- (a) remediate contaminated land in accordance with Environmental Protection Act 1994 requirements;
- (b) reshape all significantly disturbed land to a stable landform similar to that of surrounding undisturbed areas;
- (c) ensure that significantly disturbed land is reinstated to a condition that enables the land to rehabilitate to the pre-disturbance state, or a state otherwise agreed with the administering authority;

- (c) ensure that significantly disturbed land is reinstated to a condition that enables the land to rehabilitate to the pre-disturbance state, or a state otherwise agreed with the administering authority;
- (d) on all significantly disturbed land, take all reasonable and practicable measures to:
  - i. re-establish surface drainage lines;
  - ii. reinstate the top layer of the soil profile; and
  - iii. promote establishment of vegetation of the same species and density of cover to that of the surrounding undisturbed areas.
- (e) ensure that the maintenance requirements for rehabilitated land is no greater than that required for the land prior to its disturbance by petroleum activities;
- (f) ensure that the water quality of any residual water bodies constructed by petroleum activities meets criteria for subsequent uses and does not have potential to cause environmental harm; and
- (g) decommission any inactive buried pipelines by in-situ decommissioning (i.e. abandonment in place) consistent with the requirements of AS 2885.

**Condition 18 – Infrastructure**

- (a) All infrastructure constructed by or for the holder of the environmental authority must be removed by the holder from the site and the site rehabilitated according to condition 18 prior to surrender of the environmental authority.
- (b) Despite condition 19 (a), where infrastructure is to remain after the surrender of the environmental authority, the holder must obtain the written agreement of the administering authority and the current landowner or holder.

**Condition 19 – Monitoring and complaints**

The holder of the environmental authority must:

- (a) develop and implement a monitoring program that will demonstrate compliance with this environmental authority;
- (b) document the monitoring and inspections carried out under the program and any actions taken;
- (c) when the administering authority advises the holder of a complaint alleging nuisance (e.g. caused by dust or noise), investigate the complaint and advise the administering authority of the action proposed or undertaken in relation to the complaint;
- (d) if the administering authority is not satisfied with the proposed or completed action, undertake monitoring or other action requested by the administering authority;
- (e) maintain a record of complaints and incidents causing environmental harm, and actions taken in response to the complaint or incident; and
- (f) retain the record of complaints required by this condition for 5 years.

**Condition 20 – Notification**

The holder of the environmental authority must record and initially notify the administering authority as soon as practicable of any emergency or incident that causes non-compliance with the conditions of the authority.

**Condition 21 – Wild Rivers Area**

If the petroleum authority is in or partly within a declared Wild Rivers Area or an area covered by a moratorium under the Wild Rivers Act 2005, the holder of the environmental authority must ensure that petroleum activities within the (proposed) Wild Rivers Area are conducted in accordance with the conditions in the wild river declaration for the area that state they are for petroleum activities.

**Condition 22 – Work program for all petroleum activities**

- (a) The holder of the authority must submit to the administering authority a copy of the original or any amended work program for the relevant for the petroleum project 8 business days before commencing activities or additional or varied activities covered by the program.
- (b) The work program must:
  - i. describe all petroleum activities that will take place in the Nockatunga Project Area during the term of the program; and
  - ii. be used to calculate the maximum amount of financial assurance for the petroleum project during the term of the work program.

**Condition 23 – Financial assurance**

- (a) The holder of this authority must provide a financial assurance in the amount and form required by the administering authority at the time of submission of the original or any amended work program. The calculation of financial assurance must be in accordance with the guideline "Financial assurance for petroleum activities".
- (b) The financial assurance is to remain in force until the administering authority is satisfied that no claim is likely to be made on the assurance.

## Definitions

### AS 2885 Australian Standard Pipelines – Gas and Liquid Petroleum

**Associated water** for this environmental authority is underground water produced from a petroleum well during the course of or resulting from carrying out petroleum activities. Associated water may be potable, suitable for stock purposes, saline, high in fluoride, contaminated by hydrocarbons, and/or otherwise contaminated by a hazardous contaminant. It may be classified as a **hazardous waste** (See Appendix B).

**Commercial place** means a place used as an office or for business or commercial purposes.

**Development plan** - Under the P & G Act holders of petroleum authorities must submit a development plan for a petroleum lease or proposed petroleum lease. The plan gives detailed information about the nature and extent of activities to be carried out under the relevant lease.

**Discharge area** is:

- (a) that part of the land surface where groundwater discharge produces a net movement of water out of the groundwater; and
- (b) identified by an assessment process consistent with the document: Salinity Management Handbook, Queensland Department of Natural Resources, 1997; or
- (c) identified by an approved salinity hazard map held by the Department of Natural Resources and Mines.

**Dissects corridors** of vegetation means clearing vegetation that results in a break more than 50 metres wide across a corridor.

**Dispersible soils** are soils in which clay material disintegrates into particles less than 2 microns across. This can be observed within 24 hours when soil crumbs are submerged in distilled water.

**End** means the stopping of the particular activity that has caused a significant disturbance in a particular area. It refers to, among other things, the end of a seismic survey or the end of a drilling operation. It does not refer to the end of all related *activities such as rehabilitation*. In other words, it does not refer to: the "completion" of the particular activity, the time at which the petroleum authority ends or the time that the land in question ceases to be part of an authority. Under the *APPEA Code* "completion" refers to the point at which the particular survey, program or operation has been rehabilitated and abandoned.

**Environmental nuisance** is unreasonable interference or likely interference with an environmental value caused by:

- (a) noise, dust, odour, light; or
- (b) an unhealthy, offensive or unsightly condition because of contamination; or
- (c) another way prescribed by regulation.

**Essential habitat** means an area identified as essential habitat for a species of wildlife listed as endangered, vulnerable, rare, or near threatened under the Nature Conservation Act 1992 on a map prepared by the chief executive officer of the Environmental Protection Agency and certified by the chief executive officer of the Department of Natural Resources and Mines for the purposes of the *Vegetation Management Act 1999*.

**Evaporation pond** means a dam or interceptor pond constructed outside a watercourse, wetland or waterway by excavating a pit and constructing a wall around the pit with the excavated material. Natural surface flow is excluded from the pond.

**Environmentally sensitive area** (as determined from the EPA GIS data base) means a location, however large or small, that has environmental values that contribute to maintaining biological diversity and integrity, have intrinsic or attributed scientific, historical or cultural heritage value, or are important in providing amenity, harmony or sense of community.

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**Financial assurance** means a security deposit, either cash or a bank guarantee, held by the administering authority to cover the potential costs of rehabilitating areas significantly disturbed by the petroleum activities.

**Flow line** is a small diameter pipeline through which fluids move on a petroleum lease before being sold.

**Gathering line** is a pipeline to convey crude oil or gas from a production facility to a processing plant, compressor station, flow line or transmission pipeline.

**Closed-loop systems** means using waste on site in a way that does not release waste or contaminants in the waste to the environment

**Hazardous contaminant** means a contaminant 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.

**High bank** - The defining bank is the terrace or bank or, if no bank is present, the point on the active floodplain, which confines the average annual peak flows.

**Land degradation** includes the following:

- (a) soil erosion;
- (b) rising water tables;
- (c) the expression of salinity;
- (d) mass movement by gravity of soil or rock;
- (e) stream bank instability; and
- (f) a process that results in declining water quality.

**$L_{A\max, adj, T}$**  is the adjusted average maximum A-weighted sound pressure level measured over a time period T. The maxima must be measured on a sound level meter with a frequency-weighting that corresponds to perceived loudness ("A" weighting) and the meter must be set to the "fast" response time-weighting. The measured values are to be adjusted upwards by 2 dB(A) to 5 dB(A) if the noise source has tonal characteristics. The measuring period must be in excess of five minutes. The arithmetic average of the adjusted maxima, after eliminating any extraneous noise peaks, is the measure used to characterise the noise environment. (This measure will generally be similar to a percent exceedance of 10% or less. Refer to Australian Standard AS1055.)

**Licensed waste disposal facility** is a facility approved under a development approval and operated by a holder of a registration certificate for environmentally relevant activity item number 60 under Schedule 2 of the *Environmental Protection Regulation 1998*.

**Permanent infrastructure** includes any infrastructure (roads, tracks, bridges, culverts, dams, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads, pipelines etc.), which is to be left by agreement with the landowner.

**Petroleum activity** is defined in the EP Act as an activity:

- (a) authorised on a petroleum tenure granted under the *Petroleum Act 1923*; or
- (b) authorised on a petroleum authority granted under the *Petroleum and Gas (Production and Safety) Act 2004*; or
- (c) exploring for or mining minerals under a licence, permit, pipeline licence, primary licence, secondary licence or special prospecting authority granted under the *Petroleum (Submerged Lands) Act 1982*; or
- (d) rehabilitating or remediating environmental harm because of an activity mentioned in paragraphs (a) to (c); or
- (e) action taken to prevent environmental harm because of an activity mentioned in paragraphs (a) to (d); or
- (f) required under a condition of an environmental authority (petroleum activities); or

- (g) required under a condition of an environmental authority (petroleum activities) that has ended or ceased to have effect, if the condition:
- continues to apply after the authority has ended or ceased to have effect; and
  - has not been complied with.

**Petroleum authority** includes Authority to Prospect, Petroleum Lease, Data Acquisition Authority, Water Monitoring Authority, Petroleum Facility Licence, Survey Licence and Pipeline Licence issued or granted under the *Petroleum Act 1923* or *Petroleum and Gas (Production and Safety) Act 2004*.

**Petroleum project** is all petroleum activities conducted on one or more petroleum authorities as a single integrated operation. To be a single integrated operation, the activities must be:

- carried out under the day to day management of a single responsible person, for example, a site or operations manager;
- operationally interrelated;
- operated in a way that leads to a lower risk of environmental harm being caused by the activities; and
- carried out at two or more places at or about the same time, and the places where they are carried out are separated by distances short enough to make feasible the integrated day to day management of the activities.

**Petroleum works site** is a separate location on the area subject to a petroleum authority where certain petroleum activities are undertaken; including a well site, production facilities, evaporation pond, compressor site and campsite. The following petroleum activities are excluded from the definition of *petroleum works site*: roads and tracks, seismic survey lines, and non-licensed gathering systems.

**Potential discharge area** - Low lying parts of the landscape (relative to adjacent terrain) where groundwater movements are within 2-5m of the land surface and the landscape may be subject to upward movement of groundwater in the future.

**Release** of a contaminant into the environment, includes –

- to deposit, discharge, emit or disturb the contaminant; and
- to cause or allow the contaminant to be deposited, discharged, emitted or disturbed; and
- to fail to prevent the contaminant from being deposited, discharged, emitted or disturbed; and
- to allow the contaminant to escape; and
- to fail to prevent the contaminant from escaping.

**Riverine area** refers to the land confined to the flood flow channel of a watercourse.

**Sediment pond** means a bunded or excavated structure used to contain and settle waterborne sediment running off significantly disturbed areas.

**Sediment trap** means a device used to filter waterborne sediment running off significantly disturbed areas. This may include silt fences, hay bales or grassed strips.

**Sensitive place** means

- a dwelling, mobile home or caravan park, residential marina or other residential place;
- a motel, hotel or hostel;
- a kindergarten, school, university or other educational institution;
- a medical centre or hospital;
- a protected area;
- a park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organized entertainment.

**Significantly disturbed land and significant disturbance** means land that is:

- contaminated land; or
- disturbed and human intervention is needed to rehabilitate it:
  - to a state required under the relevant environmental authority; or
  - if the environmental authority does not require the land to be rehabilitated to a particular state – to its state immediately before the disturbance.

Examples of a disturbance to land:

- (a) areas where soil has been compacted, removed, covered, exposed or stockpiled;
- (b) areas where vegetation has been removed or destroyed to an extent where the land has been made susceptible to erosion;
- (c) areas where land use suitability or capability has been diminished;
- (d) areas within a watercourse, waterway, wetland or lake where petroleum activities occur and human intervention is necessary to restore or stabilise the disturbed area;
- (e) areas submerged by hazardous waste storage and dam walls in all cases;
- (f) areas under temporary infrastructure. Temporary infrastructure includes any infrastructure (roads, tracks, bridges, culverts, dams, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc.) which is to be removed after petroleum activities have ceased; or
- (g) areas where land has become contaminated land and a suitability statement has not been issued.

However, for the purpose of this environmental authority the following areas **are not** significantly disturbed:

- (a) areas off the petroleum authority (e.g. roads or tracks which provide access to the petroleum authority).
- (b) areas previously significantly disturbed which have been rehabilitated to the administering authority's satisfaction.
- (c) areas under permanent infrastructure.
- (d) areas that were significantly disturbed prior to the grant of the environmental authority, unless those areas are re-disturbed by the holder of the environmental authority during the term of the authority.
- (e) minor disturbances such as drill sumps and minor respreading of soil on GPS located seismic lines.

**Stable** means geo-technical stability of the rehabilitated landform where instability related to the excessive settlement and subsidence caused by consolidation / settlement of the wastes deposited, and sliding / slumping instability has ceased.

**State wildlife corridor** means an area identified as State wildlife corridor on a map prepared by the chief executive officer of the Environmental Protection Agency and certified by the chief executive officer of the Department of Natural Resources and Mines for the purposes of the *Vegetation Management Act 1999*. The map showing areas of State wildlife corridor is available in digital form from NR&M. Areas of State wildlife corridor are also depicted on regional ecosystem maps available from NR&M or the EPA's website at <http://www.epa.qld.gov.au/REMAPS>.

**Static high water mark** means the settled ordinary water level that occurs under average meteorological conditions. It is less than extreme levels that can be caused by storm surges.

**Top soil** means the top layer of soil, alluvium or weathered rock that forms a suitable plant growth medium. Top soil should be non-crusting and low in salinity.

**Turkey's nest dam** - A dam constructed outside a watercourse, wetland or waterway by excavating a pit and constructing a wall around the pit with the excavated material. Natural surface flow is excluded from the dam.

**Waters** includes river, stream, lake, wetland, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater and any part thereof.

**Waterlogging** is the saturation of soil by soil water.

**Work program** - Under the P & G Act holders of petroleum authorities are required to submit a work program for an authority to prospect. The program gives detailed information about the nature and extent of activities to be carried out under the authority.

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## APPENDIX A Criteria for dams and evaporation ponds

Containments built on land subject to a Petroleum Authority as level 2 petroleum activities can be used for raw water storage, storage and evaporation of contaminated waters, containment of **associated water** that is saline or contains hydrocarbons, storage of process waters, or the containment of contaminated solids formed from such waters.

They are classified as:

- Hazardous dams containing hazardous waste; or
- Low hazard dams.

Hazardous dams containing hazardous waste are those, which cannot comply with the assessment criteria presented in Tables 1 and 2. High hazard dams containing hazardous waste, or dams which could impact on life or property on collapse or failure, are not permitted under this code and will require either site-specific conditions or will be conditioned under a level 1 environmental authority.

### Determination if dam contains hazardous waste.

The assessment process for the determination if a dam contains a hazardous waste is dependent on whether the dam contents, including liquor and total solids can comply with the hazardous contaminant limits listed in Table 1 below. If the content of the dam cannot comply with the limits in Table 1, then the dam contains a hazardous waste.

**Table 1 – Determination if content of dam is hazardous waste**

| Contaminant <sup>1</sup>         | Liquor <sup>2</sup>          | Total solids <sup>3,4</sup>  |
|----------------------------------|------------------------------|------------------------------|
| Arsenic                          | 0.5 mg/l                     | 250 mg/kg                    |
| Boron                            | 5.0 mg/l                     | 15,000 mg/kg                 |
| Cadmium                          | 10µg/l                       | 100mg/kg                     |
| Cobalt                           | 1.0 mg/l                     | 500 mg/kg                    |
| Copper                           | 1.0 mg/l                     | 5,000 mg/kg                  |
| Lead                             | 0.1 mg/l                     | 300 mg/kg                    |
| Mercury                          | 2µg/l                        | 75 mg/kg                     |
| Nickel                           | 1.0 mg/l                     | 3,000 mg/kg                  |
| Zinc                             | 20 mg/l                      | 35,000 mg/kg                 |
| Chloride                         | 2,500 mg/l                   | -                            |
| Fluoride                         | 2.0 mg/l                     | -                            |
| Selenium                         | 0.02 mg/l                    | -                            |
| Sulphate                         | 1,000 mg/l                   | -                            |
| Cyanide                          | 10 mg/l                      | 2,500 mg/kg                  |
| pH                               | Between 5.5 and 9.0          | Net acid generation of pH <4 |
| Nitrite                          | 30 mg/l                      | -                            |
| Nitrate                          | 400 mg/l                     | -                            |
| TDS                              | 4000 mg/l                    | -                            |
| Aromatic Hydrocarbons            | 600 µg/l                     | -                            |
| Polycyclic Aromatic Hydrocarbons |                              | -                            |
| Naphthalene                      | 16µg/l                       |                              |
| Benzo (a) pyrene                 | 0.2 µg/l                     |                              |
| Phenol                           | 320 µg/l                     | -                            |
| Polychlorinated Biphenyls        |                              | -                            |
| Aroclor 1242                     | 0.3 µg /l                    |                              |
| Aro 1254                         | 0.1 µg /l                    |                              |
| TPH                              | 10 mg/l (or no visible film) |                              |
| Blue green Algae (Microcystis)   | 11,000 cells/ml              | -                            |

1. Metals should be analysed in accordance with recognised test methods by a NATA certified laboratory.
2. Applies to the liquid contents in a dam generally available to the environment (for example, water available to birds and animals)
3. Total solids include suspended and colloidal solids.
4. Applies to the solids in the dam.

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### Determining the hazard category of dam containing hazardous waste

If any proposed dam containing a hazardous waste cannot comply with the acceptance criteria listed in Table 1 but can comply with the size and location criteria listed in Table 2, then the dam will be a hazardous dam containing hazardous waste. Similarly if the dam contains hazardous waste and exceeds the criteria in Table 2 then the dam will be a high hazard dam containing hazardous waste.

**Table 2 – Determination if dam containing hazardous waste is high hazard**

|             | Hazardous dam activity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criterion 1 | In the event of dam collapse, failure or overflow, flow from the dam would have one or more of the following actions; it would or could <ul style="list-style-type: none"> <li>• impact on occupied premises to a depth of more than 300 mm; or</li> <li>• flow to a sensitive or commercial place; or</li> <li>• flow to a riverine area containing permanent water; or</li> <li>• contaminate a water supply for human consumption; or</li> <li>• contaminate a water supply used for livestock.</li> </ul> |
| Criterion 2 | The dam is located within a: <ul style="list-style-type: none"> <li>• declared catchment or sub-artesian area; or</li> <li>• watercourse and the dam's surface area of water exceeds 1ha.</li> </ul>                                                                                                                                                                                                                                                                                                          |
| Criterion 3 | The dam has a surface area of water greater than 4 ha; or the dam has a volume of water greater than 20 mega litres.                                                                                                                                                                                                                                                                                                                                                                                          |

Table 3 summarises the process for the determination of what is the hazard category of dams on a site.

**Table 3 – Determination of dam hazard category**

| Dam liquor and total solid hazardous contaminant concentration | Dam location and size                                          | Type of dam                                                                               |
|----------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Dam contents do not exceed limits in Table 1                   | -                                                              | The dam is a low hazardous dam if collapse or failure cannot impact on occupied premises. |
| Dam contents exceed limits in Table 1                          | Dam location and size are below the criteria listed in table 2 | The dam is a hazardous.                                                                   |
| Dam contents exceed limits in Table 1                          | Dam location and size are above the criteria listed in table 2 | The dam is a high hazardous dam containing hazardous waste.                               |

### Design, construction, operation, maintenance and decommissioning criteria

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Dams are engineering structures and must be designed by professional engineer(s) who would normally apply the criteria defined below. A professional engineer should also be consulted in the development of the decommissioning plan.

In order to comply with the conditions of this Code design, construction, operation, maintenance and decommissioning of dams containing hazardous waste must be in accordance with the following criteria and other requirements, as applicable, of the Queensland Small Dams Guideline 2005.

**Criteria for the design, construction, operation, maintenance and decommissioning of dams containing hazardous waste**

**Design:**

- (a) Dams with a capacity up to 3000m<sup>3</sup> are best constructed as **Turkey's Nest** dams;
- (b) Dams should be located to have the smallest practical catchment area;
- (c) Dams must have a spillway capable of passing a design flood, defined as the peak discharge from a critical duration storm with an annual exceedence probability of 1% (i.e. 1 in 100 yr event) or lower;
- (d) The spillway should be located where practicable in the abutment of the dam or in the minimum height section of the dam;
- (e) Any spillway discharge should be contained within stable defined channels until it enters any natural watercourse or waterway;
- (f) For embankments built on stable foundations, not subject to draw down and out of uniform soil material, the batters shall be no steeper than those shown in the table below, unless otherwise shown to be stable:

| Embankment Soil Classification<br>(Universal soil classification) | Upstream Batter | Downstream Batter |
|-------------------------------------------------------------------|-----------------|-------------------|
| GC, SC                                                            | 2.5:1           | 2.0:1             |
| CL, ML                                                            | 3.5:1           | 2.5:1             |
| CH, MH                                                            | 3.5:1           | 2.5:1             |
| GW, GP, GM, SW, SP, SM                                            | Not suitable    | Not suitable      |

**Note:** The codes for the Universal Soil Classification (e.g. GC) are detailed in the Australian Standard AS 1726 1993 Geotechnical Site Investigation, Appendix A.

- (g) Where foundation material differs from the embankment fill material, the batters shall be chosen conservatively to be consistent with the weaker material classification.

**Construction:**

- (a) Embankments must be constructed in accordance with an engineering design and specification, which has considered the internal seepage pressures, flow velocities, material strength, stability and durability.
- (b) Fine grained soils used in embankment construction should be mechanically compacted when they are near or at the optimum moisture content (i.e. slightly plastic) to improve soil strength, minimise seepage and reduce the risk of piping failure
- (c) Where geo-membranes are used, ensure that they are placed, anchored and joined in accordance with the manufacturer's specification.
- (d) Where geo-membranes are used ensure that they are suitable to prevent leakage of the hazardous contaminants, which are contained within the dam.
- (e) Where geo-membranes are used for liners, filters or drains, ensure that the geo-membrane is in contact only with fine-grained soils to prevent punching or tearing of the membrane.

- (f) Embankments built out of pervious material must be constructed in accordance with an engineering design and specification, which has considered the internal seepage pressures and flow velocities.
- (g) Where foundation material differs from embankment fill material, the embankment should be constructed out of the material, which gives the flatter batter.
- (h) Prior to construction of an embankment, the foundation should be cleared of all:
  - vegetation (grass, shrubs and trees);
  - soils containing organic matter (roots);
  - cracked soils (stiff plastic soils);
  - pervious soils (sand, gravel)
  - pervious material in rock faults, joints or the rock foundation itself.
- (i) Prior to construction of an embankment, all transverse trenches, holes and other irregularities should be plugged or backfilled to create a generally undulating foundation for placement of the embankment.
- (j) Fine-grained soils used in embankment construction should have a consistent texture and be free from foreign matter such as branches, logs, gravels or boulders etc.
- (k) Fine-grained soils including dispersive soils should be placed in the centre of or towards the upstream faces of embankment dams.
- (l) Coarser grained soils and rock materials are to be placed to wards and on the outer faces of embankment dams to minimise erosion and breaching potential.
- (m) Dispersive and easily erodible soils should not be used on the outer faces of embankment dams.
- (n) Provide adequate measures to control seepage through the dam wall and the transmission of contaminants through underlying soil layers or rock stratum.
- (o) Embankment dams should be constructed with stable earth materials that will not decay or generate leachate or hazardous contaminants.

**Operation:**

- (a) The dam should be operated to maintain a minimum freeboard of 0.5m below the spillway level.
- (b) To ensure that there is no leakage of hazardous wastes from any dam or evaporation pond associated with the petroleum activity a field based groundwater monitoring program must be established to ensure there is no contamination of any unsaturated perched systems or existing groundwater aquifers in the vicinity of the works. Three or more monitoring bores specifically designed for this purpose should be located in a cluster between the contaminant source and any environmentally sensitive place. The monitoring program should regularly record:
  - i. water levels;
  - ii. water quality;
  - iii. flow rates; and
  - iv. direction of flow.
- (c) As far as practicable minimise seepage and return any contaminated seepage to the dam.

**Maintenance:**

- (a) Maintain the erosion resistance of the downstream face of the dam to avoid surface scour, which may lead to failure of the wall;
- (b) Maintain the erosion resistance of the spillway to avoid scouring during the design flood;
- (c) Prevent the establishment of trees or shrubs on water containing embankments (roots initiate seepage paths);
- (d) Control of burrowing insects and animals (initiation of piping paths);

- (e) Repair active erosion and piping processes; and
- (f) During initial filling or commissioning, the dam should be monitored for leaks, seepages, embankment deformation or other signs of embankment distress.

**Decommissioning:**

- (a) Removing (where possible) all remaining liquids in the dam (e.g. it is generally acceptable to evaporate the liquid if the dam is not to be left to the land owner / holder).
- (b) Remove (where possible) all contaminated solids from the dam and encapsulate in a purpose built storage facility, or
- (c) Encapsulate any residual contaminated solids in situ by capping with an appropriate capillary break and with one metre of clay or similar impermeable material;
- (d) Design, install and maintain adequate diversion drains or similar structures to protect or minimise the erosion of any exposed surfaces by stormwater runoff;
- (e) Design, install and maintain adequate surface drainage to prevent water ponding and infiltration into any contaminated materials;
- (f) Address contaminated site issues by referring to Condition 17 of this code;
- (g) Establish a monitoring program to determine the success of the decommissioning plan.
- (h) If required, remove the wall and rehabilitate the disturbed area in accordance with the rehabilitation conditions of this code; and
- (i) Rehabilitate the disturbed areas in accordance with the rehabilitation conditions of this authority.

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