Gold Hydrogen

Natural Hydrogen Exploration Drilling and Well Testing

PEL 687 - Yorke Peninsula

Statement of Environmental Objectives

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Table of Contents

List of Tables

List of Figures

1. Introduction

1.1. Purpose

This Statement of Environmental Objectives (SEO) has been prepared to meet the requirements of Sections 99 and 100 of the *Petroleum and Geothermal Energy Act 2000* (PGE Act) and Regulations 12 and 13 of the *Petroleum and Geothermal Energy Regulations 2013* (PGE Regulations).

The intent of the SEO is to outline the environmental objectives to which exploration well drilling and testing for natural hydrogen in PEL 687 on Yorke Peninsula will conform, and the criteria upon which the achievement of these objectives will be assessed.

The objectives of this SEO have been developed on the basis of the information provided in the Environmental Impact Report (EIR) (Gold Hydrogen 2023), and are in keeping with the objectives of the PGE Act, which include:

- to minimise the environmental damage from exploration for, or recovery or commercial utilisation of, resources to which the Act applies
- to establish appropriate consultative processes involving people directly affected by regulated activities and the public generally
- to protect the public from risks inherent in regulated activities.

'Environment' is broadly defined in the PGE Act to include natural, social, cultural and economic aspects. The environmental objectives outlined in this SEO incorporate these aspects.

1.2. Scope

This SEO applies the activities that would be involved with exploration drilling for natural hydrogen and testing of any occurrences of hydrogen that are detected, within PEL 687 on Yorke Peninsula (refer Figure 1-1). These activities are described in the EIR (Gold Hydrogen 2023).

The following are excluded from the scope of this EIR and the accompanying SEO:

- the portion of PEL 687 located on Kangaroo Island
- activities in reserves established under the *National Parks and Wildlife Act 1972* or exploration activities immediately adjacent to a Marine Park established under the *Marine Parks Act 2007*
- activities in mining production tenement regulation areas identified in Schedule 14 of the *Planning, Development and Infrastructure (General) Regulations 2017*[1].

A number of other areas that would specifically be avoided by exploration drilling activities have also been identified in the EIR. These are:

- Wardang Island Indigenous Protected Area
- Native Vegetation Heritage Agreement areas (established under the *Native Vegetation Act 1991*)

[1] Mining production tenement regulation areas (MPTRA) incorporate the coastline and several other areas on Yorke Peninsula. The *Planning Development and Infrastructure Act 2016* requires referral of new SEOs (and mining production tenement applications) for activities in MPTRAs to the Planning Minister for advice. These areas have not been identified by Gold Hydrogen for exploration drilling and testing under this EIR and SEO and have been excluded from the scope to simplify the SEO approval process.

- land where access has not been agreed with the landowner
- land in close proximity to towns or sensitive receptors
- areas of high-quality native vegetation and significant wetland areas
- areas of identified cultural heritage significance.

Figure 1-1: Location of PEL 687 on Yorke Peninsula

2. Environmental Objectives and Assessment Criteria

2.1. Objectives

Potential environmental hazards and consequences associated with exploration well drilling and testing for natural hydrogen in PEL 687 on Yorke Peninsula have been identified in the Environmental Impact Report (Gold Hydrogen 2023). Gold Hydrogen is committed to achieving a range of environmental objectives in regard to these potential hazards.

The environmental objectives for exploration well drilling and testing for natural hydrogen are:

1. Minimise disturbance to land use and the local community
2. Avoid disturbance to sites of cultural and heritage significance
3. Minimise risks to the health and safety of the public
4. Avoid the introduction and spread of weeds, exotic pest fauna and pathogens
5. Minimise disturbance and avoid contamination of soil
6. Minimise loss of reservoir and aquifer pressures and avoid aquifer contamination
7. Minimise disturbance to drainage patterns and avoid contamination of surface waters and shallow groundwater resources
8. Minimise disturbance to native vegetation and native fauna
9. Minimise atmospheric emissions
10. Minimise the visual impact of operations
11. Minimise the impact on the environment of waste storage, handling and disposal
12. Remediate and rehabilitate operational areas to agreed standards

2.2. Assessment Criteria

The environmental objectives identified above are subject to an assessment to measure the level of achievement. The assessment criteria for each objective are set out in Table 2-1 and include:

- Defined conditions – In many cases the achievement of an objective can be assessed through ensuring defined conditions are met or carried out. Such conditions include:
  - Prohibitions that achieve the objective through the prevention of unacceptable actions
  - Requirements to carry out certain actions in accordance with approved procedures or industry accepted standards.
- Scientific studies / monitoring - In some cases assessment of the environmental objectives may not be possible in the shorter term and may require longer term monitoring and scientific evaluation. In such cases, the assessment criteria may be in the form of longer-term data and information gathering.

Table 2-1 also outlines the controls that are planned to be implemented to ensure that environmental objectives are achieved, in the ‘Guide to How Objectives Can be Achieved’ column.

Table 2-1: Environmental Objectives and Assessment Criteria

Environmental Objective	Assessment Criteria	Guide to How Objective Can Be Achieved
1. Minimise disturbance to land use and the local community	No adverse impact (outside agreed disturbance / compensation areas) on land use as a result of activities Adverse impacts of accidental or unforeseen disturbance to infrastructure or land use resolved to the reasonable satisfaction of the landowner Timely consultation and notification of proposed activities with relevant landowners and stakeholders can be demonstrated Landowner / stakeholder complaints are documented and reasonable steps taken to resolve them can be demonstrated No uncontrolled fires initiated as a result of drilling or well testing activities	• Landowner is consulted regarding the location, management and timing of proposed activities. Ongoing landowner liaison during and following operations. • Compliance with Part 10 of the PGE Act (Notice of Entry requirements). • Activities are restricted to agreed / defined areas. • Well sites not located in close proximity to towns or sensitive receptors. • Adequate buffer maintained between well site and residences. • All gates left in the condition in which they were found (open / closed). • Well site and access track construction restricted to daylight hours. • If necessary, unsealed roads and tracks are sprayed with water as required to minimise dust generation. • Any lighting required is positioned to minimise light emanating from the well site. • Any flaring during well testing kept to minimum length of time necessary. • Equipment operated and maintained in accordance with manufacturer specifications. • Transport trucks to be restricted to daylight hours as far as possible. • Heavy truck drivers to be instructed not to use engine brake near dwellings. • Assessments of potential noise impacts undertaken as appropriate during design and planning stages. • Noise limitation (particularly at night) to be included as part of induction procedures (e.g. noisy tubular / pipe handing, unnecessary use of horns, reversing of forklifts). • Locations where energy sources are used (near the well) are not in close proximity to residences or other built infrastructure. • Systems in place for logging stakeholder complaints to ensure that issues are addressed as appropriate. • During well site and access track rehabilitation, imported materials are removed from site and soil profiles and contours restored unless otherwise agreed with the landowner. • Decommissioned sites restored to original land surface topography with no irregularities, unless otherwise agreed with the landowner. • Refer to Objective 12 for further criteria for remediation and restoration.

Environmental Objective	Assessment Criteria	Guide to How Objective Can Be Achieved
		Fire Prevention • Confinement of flammable sources, restrictions on certain procedures and ready access to suitable fire-fighting equipment (e.g. fire unit consisting of trailer with water tank, pump and hoses in high fire danger season). • Liaise with CFS regarding operations to ensure fire concerns are addressed and any Fire and Emergency Services Act requirements are met (e.g. permits for 'hot work' on fire ban days if required). • Where necessary (e.g. in fire danger season), fire break constructed around well pad. • Any well tests designed and managed to ensure that hydrogen gas is safely managed (e.g. combusted or dispersed) so that it does not pose a fire or explosion risk. • Response to fire included in Emergency Response Plan. • Emergency response procedures included in staff training. • Ensure fire risk is included in the induction and all personnel are fully informed on the fire danger season and associated restrictions. Weed, Pest and Pathogen Management • Refer to Objective 4. Vehicle Movement • Refer to Objective 3.
2. Avoid disturbance to sites of cultural and heritage significance	In the event the conditions[2] of a cultural heritage clearance are not complied with, the incident is appropriately reported[3] , investigated and remediated in consultation with the relevant Aboriginal heritage organisations, including Native Title groups, Recognised Aboriginal Representative Bodies (RARBs), Aboriginal heritage associations, Traditional Owners and AAR	• Any sites identified in searches of the Central Archive and the Register of Aboriginal Sites and Objects are avoided. • Consultation carried out with the Narungga Nation Aboriginal Corporation regarding the risk of damage to Aboriginal heritage, and a cultural heritage survey carried out where required. Any identified sites are avoided. • Known sites identified and protected from operations where required (e.g. using temporary flagging if present in the vicinity of operations).

[2] Note that cultural heritage clearances are not defined under or referenced by the *Aboriginal Heritage Act 1988* and cannot ever authorise impacts to Aboriginal heritage.

[3] This may include compliance with reporting obligations pursuant to s.20 of the *Aboriginal Heritage Act 1988*

Environmental Objective	Assessment Criteria	Guide to How Objective Can Be Achieved
	Damage, disturbance or interference to any Aboriginal sites, objects and remains (all as defined under the *Aboriginal Heritage Act 1988*) is avoided unless authorisation has been obtained under the *Aboriginal Heritage Act 1988* Any Aboriginal heritage sites, objects and remains discovered during operations have been appropriately reported and responded to, consistent with the *Aboriginal Heritage Act 1988* Non-Aboriginal heritage sites identified and avoided No impact to non-Aboriginal heritage places and related objects protected under the *Heritage Places Act 1993* unless approval has been obtained under the *Heritage Places Act 1993*	• Cultural heritage issues covered in inductions. Key personnel (e.g. supervisors, machinery operators) receive appropriate cultural heritage training. • Procedures consistent with the relevant obligations under the Aboriginal Heritage Act are in place to appropriately report and respond to any sites discovered during activities • If Aboriginal sites, objects and remains are discovered during activities: - works halt in the vicinity of the discovery - advice sought from the Narungga Nation Aboriginal Corporation, a qualified heritage consultant or AAR - mitigation measures implemented to ensure the discovery is avoided. (If the works cannot be relocated to avoid the Aboriginal site, object or remains, authorisation would be obtained under the Aboriginal Heritage Act). • Aboriginal heritage discoveries reported to AAR on behalf of the Minister in accordance with section 20 of the *Aboriginal Heritage Act 1988*. • Records relating to management/avoidance of any identified sites of cultural heritage significance kept and available for audit. • Where damage, disturbance or interference to Aboriginal sites, objects or remains discovered during activities is unavoidable, then an application for authorisation pursuant to section 23 of the *Aboriginal Heritage Act 1988* (the Act) will be sought from the Minister for Aboriginal Affairs. Appropriate consultation with Aboriginal organisations, traditional owners or Aboriginal persons with interests in the matter, as well as the State Aboriginal Heritage Committee, will be conducted by AAR in relation to the application (as per section 13 of the Act). • Heritage site registers (and Heritage Branch, DEW, where appropriate) consulted regarding the location of non-Aboriginal heritage sites and any identified sites are avoided.
3. Minimise risks to the health and safety of the public	Reasonable measures implemented to ensure no injuries or health risks to the public No injuries, incidents or adverse health impacts involving the public from drilling or well testing activities that could have been reasonably prevented by the operator	<u>Unauthorised Access by Third Parties</u> • "No Entry" signs warning of dangers associated with drilling operations placed at the entry to the site access track. • Site area to be fenced with a gate on the access track. • Access gate to well site will be closed during testing and appropriate signage will be in place to restrict entry. • Drilling Supervisor and Drilling Contractor Manager given authority to refuse entry of unauthorised third parties.

Environmental Objective	Assessment Criteria	Guide to How Objective Can Be Achieved
		• All minor excavations (e.g. for septic tank) to be backfilled soon after rig release. • Wellhead (if installed) and sump (if used) to be individually fenced if delay in clean-up operations to occur. • Sump (if used) to be backfilled as soon as practicable after waste materials have been appropriately removed. • Necessary measures (e.g. fencing, signage) taken to prevent the public accessing the wellhead equipment or waste relating to the well. <u>Drilling and Well Testing</u> • Wells designed, constructed, operated and maintained in accordance with regulatory requirements and approved well construction standards. • Drill rig, ancillary and any testing equipment to comply with Regulations, meet relevant industry standards and be 'Fit for Purpose'. • Periodic review of management systems as required based on learnings and changes to Australian and international leading practice. • Blow out prevention precautions in place in accordance with defined procedures and appropriate to the expected downhole conditions. • Competent site personnel and contractors on site at all times during drilling operations. • Well control equipment, tested and verified in accordance with international standards, used during coiled tubing, wireline and workover activities. • Satisfactory kick tolerance in casing program design. • Work is performed as set out in the Drilling Program. • Well testing activities monitored at all times with personnel on site where required, subject to testing requirements and risk assessment. • Engineering design of well testing program considers the interface with hydrogen gas, to ensure that appropriate equipment and materials are utilised to safely conduct the test. • Design and operation of well testing and selection of equipment in accordance with relevant standards. • Measures (e.g. routine inspection, gas detection) implemented to detect any loss of containment of hydrogen through pipework and separators. • Emergency response procedures in place. • Emergency response procedures included in staff training.

Environmental Objective	Assessment Criteria	Guide to How Objective Can Be Achieved
		• Personnel are trained in the use of spill response equipment. <u>Storage handling and use of explosives (if required) for vertical seismic profiling</u> • Explosives use, storage, handling and disposal undertaken in accordance with relevant industry codes, standards and guidelines (e.g. Australian Dangerous Goods Code), and the requirements of the South Australian Explosives Act. • Explosives handled and utilised by appropriately trained and licensed personnel (i.e. holders of a SafeWork SA Blaster's Licence) in accordance with applicable legislative requirements. • Explosives stored in an approved receptacle, store or magazine. • Adequate buffer distances maintained between activities and residences. • Activities are restricted to daylight hours and agreed / defined areas and times. • Risks and requirements associated with explosive storage, handling and use are included in the induction and all personnel are fully informed of risks and associated restrictions. <u>Well Decommissioning Activities</u> • Refer to Objective 6. <u>Vehicle Movement</u> • Compliance with relevant speed restrictions on access roads and tracks. • Warning signage and traffic management measures installed where appropriate in the vicinity of well sites. • Driver behaviour and vehicle speed limits to be included in compulsory induction. • Landowners, local councils, potentially affected residents and emergency services will be informed of significant activities such as rig mobilisation and demobilisation. • Any required authorisations (e.g. local council, DIT, police) obtained where required for movement of rig along public roads, including joint inspections of roads before and after transport moves if necessary. • Rig mobilisation and demobilisation to detour around town centres where possible. • Consultation undertaken with DIT if site access required off DIT roads, regarding location details, signage, asset condition and visibility for other drivers. • Any deterioration of property tracks or infrastructure as a result of drilling-related traffic is rectified. <u>Fire Prevention</u> • Refer to Objective 1.

Environmental Objective	Assessment Criteria	Guide to How Objective Can Be Achieved
		Well Site Restoration Activities • Effective rehabilitation of the well site so that potentially dangerous variations in ground level do not remain. • Refer to Objective 12.
4. Avoid the introduction and spread of weeds, exotic pest fauna and pathogens	The presence of weeds, pest animals or pathogens is consistent with or better than pre-disturbance conditions and adjacent land or where this is not the case, a management plan is implemented promptly Declared plants occurring as a result of regulated activities are reported and managed in accordance with the *Landscape South Australia Act 2019* and applicable Landscape plans	• All reasonable and practical endeavours taken to minimise the risks of introducing weeds, exotic pest fauna and pathogens into the area of the activity. • Appropriate consultation regarding weeds or pathogens carried out with landowners (and Landscape Board officers where appropriate). • Vehicles and equipment arriving at the site must be clean and free of soil and plant material. • Vehicles and equipment entering the region or moving between sites (especially from weed or pathogen infested areas into non-infested areas) will be assessed for the risk of transporting weeds and pathogens and cleaned down where appropriate. • Local earthworks contractors used where possible rather than bringing in equipment from outside the region. • All records of vehicle or equipment inspections and cleaning will be kept for auditing. • Biosecurity procedures implemented as agreed with landowners. • Paving materials will be sourced from licensed quarries that are free of weeds. • Sites and access tracks will be monitored on a regular basis for new weed species / infestations and treated as necessary in accordance with requirements of the landowner, and if appropriate the Landscape Board. • Records of detection, monitoring or eradication of weeds or pathogens introduced by activities are kept and available for review.
5. Minimise disturbance and avoid contamination of soil	No disturbance to soil profiles resulting from activities remains after restoration Local erosion rates are not significantly accelerated above those of surrounding land No adverse impact to land use or native vegetation and native fauna outside drilling sites due to an escape of a regulated substance, processed substance, chemical or fuel	Site and Access Track Construction and Restoration • Landowner to be consulted about earthworks required, location of access tracks and general information to minimise surface damage and to facilitate rehabilitation. • Locate and orientate well pad and access to minimise soil removal and area of cut and fill. • Soil removed in construction to be stored on site and returned to its original stratigraphic level upon restoration of the drill site. Separate storage of topsoil, subsoil and clays will be undertaken to assist in regeneration of pasture or crops.

Environmental Objective	Assessment Criteria	Guide to How Objective Can Be Achieved
	Any escape of a regulated substance, processed substance, chemical or fuel to land is either immediately contained and removed or assessed in accordance with NEPM[4] guidelines and remediated in a timely manner Waste Management Refer to Assessment Criteria for Objective 10.	• Well sites are rehabilitated following drilling or the well pad area reduced to the minimum size necessary well testing is likely to extend over a longer period. • Restoration of the well site to be approved by the landowner or in accordance with landowner's wishes should retention of specific parts of the site be requested (e.g. pad or access track). • During rehabilitation the soil beneath the tracks, laydown, camp and pad will be ripped (after removal of any imported fill) and before the returning of any stockpiled topsoil. • Soil profile and contours will be reinstated following completion of operations. Drilling and Testing Activities • Drilling sump (if used) to have sufficient capacity. • Flooding risk is considered in well pad location and construction and additional measures implemented if required (e.g. a small berm around the sump (if a sump is used) to prevent floodwater entering the sump). • Camp and drill rig generators to be appropriately located to contain any spills (e.g. in polyethylene lined bunded areas or with suitable alternative spill containment). • Flare tank and / or vent is used for emergency well control situations while drilling. • The sump will be lined with a suitable impermeable liner. • If required the sump may be pumped and excess fluid disposed of as appropriate. Fuel and Chemical Storage and Handling • All fuel and chemical storage areas will be in accordance with relevant standards and guidelines (e.g. AS 1940, EPA guideline 080/16 Bunding and Spill Management and the Australian Dangerous Goods Code). • Safety Data Sheet information readily available at the well site. • Hazardous materials stored, used and disposed of in accordance with relevant legislation on dangerous substances. • All hazardous materials including fuels, oils and chemicals are to be stored in approved containers in polythene lined bunded areas or on bunded pallets. • No refuelling outside designated refuelling or servicing areas.

[4] *National Environment Protection (Assessment of Site Contamination) Measure (1999) amended in 2013*

Environmental Objective	Assessment Criteria	Guide to How Objective Can Be Achieved
		• Appropriate drip capture / spill capture methods implemented in refuelling areas (e.g. use of drip trays or liners). • Appropriate spill response equipment is available on site. • Personnel have received training in the use of spill response equipment. • Spills or leaks are immediately reported and clean up actions initiated. • All contaminated soil will either be treated in-situ or removed for treatment / disposal at an EPA approved facility. • Assessment and remediation of uncontained spills with larger scale impact is consistent with the National Environment Protection (Assessment of Site Contamination) Measure and relevant guidelines (e.g. SA EPA guidelines). • Records of any spill events and corrective actions are maintained. <u>Well Testing</u> • Tanks to be located in lined bunded areas. • Piping and tanks to be inspected prior to use. • Well testing activities monitored at all times with personnel on site where required, subject to testing requirements and risk assessment. • Separator tank used during well testing to separate any produced liquids from gas before gas is sent to vent / flare. • Engineering design of well testing program considers the interface with hydrogen gas, to ensure that appropriate equipment and materials are utilised to safely conduct the test. • Groundwater monitoring wells installed on a site-specific basis (e.g. if an exploration well is located in an area where a significant shallow groundwater resource has been identified). <u>Waste Management</u> • Refer to Objective 11.
6. Minimise loss of reservoir and aquifer pressures and avoid aquifer contamination	No aquifer contamination as a result of drilling or well testing activities No uncontrolled flow to surface (e.g. blow out) Appropriate barriers exist to protect separate aquifer systems and / or hydrogen reservoirs that are typically in natural hydraulic isolation from each other	<u>Drilling and Completion Activities</u> • Fluid losses will be controlled during drilling. • Wells designed (including the casing and cementing design) to ensure aquifer systems are isolated. • Water-based drilling muds used. • Information on muds and chemicals to be readily available on the rig. • Surface casing installed and cemented back to surface before drilling of deeper hole sections.

Environmental Objective	Assessment Criteria	Guide to How Objective Can Be Achieved
		• Drilling fluid selection provided to DEM as part of the activity notification process. • Non-toxic to low toxicity additives used. • Mud properties allow for build-up of filter cake on the borehole wall, creating a barrier and minimising potential loss of fluids to permeable formations. Volume of mud filtrate is insignificant relative to the volume of the aquifer. • Relevant landowners/stakeholders consulted regarding water bore locations and water use prior to drilling activity. • Activities performed in accordance with applicable industry and regulatory standards. • Wells designed to meet pressure, temperature, operational stresses and loads. • Drilling operation and the design of the well and well test consider the interface with hydrogen gas, to ensure that appropriate equipment and materials are utilised to safely conduct the operations. • Specialist metallurgical advice sought to ensure that equipment and materials are not at risk of failure due to exposure to a potential hydrogen environment during drilling and testing. • Specialist technical engineers design the cementing program in accordance with international standards. • Effective verified barriers exist to maintain well control and prevent crossflow between aquifer systems or hydrogen reservoirs. • Aquifers isolated behind casing strings, cemented in place. Surface casing to be cemented to surface with visible return. • Cement bond logs run on suspension casing to confirm quality of cement. • Operational verification reports in wells being suspended or tested demonstrate that barriers have been set and/or remedial cement work carried out in accordance with the work program submitted to and agreed with DEM. • Monitoring programs implemented (e.g. through well logs or pressure measurements / testing) to aid in the assessment of wellbore barrier conditions during drilling, completion and well testing activities where appropriate. • Where monitoring identifies potential issues during drilling activities, risk assessment undertaken to identify hazards / scenarios and propose recommendations and mitigation controls where appropriate to reduce or monitor risk. • Service providers using radiation sources appropriately licensed under the South Australian *Radiation Protection and Control Act 2022*, with a radiation management program and contingency

Environmental Objective	Assessment Criteria	Guide to How Objective Can Be Achieved
		plans for management and reporting of incidents such as stuck logging tools containing radiation sources. • Immediate retrieval of any radioactive source lost downhole. If retrieval is not possible, tool is cemented in hole to isolate it from adjacent formations. EPA notified as soon as reasonably practicable of loss of radioactive source. Approval sought from EPA to cement any radioactive tools in hole pursuant to the *Radiation Protection and Control Regulations 2022*. <u>Well Decommissioning Activities</u> • Well decommissioning program submitted to DEM prior to implementation. • Downhole decommissioning carried out to meet worst case expected loads and downhole environmental conditions. • Aquifers logged during drilling and logging data used in decommissioning design to ensure appropriate isolation. • Appropriate verified barriers are put in place to prevent crossflow, contamination or further pressure reduction occurring. • Pressure testing and / or negative inflow testing performed on barrier envelopes / components where feasible. • Inhibited fluid placed between barriers where applicable. • Operational verification reports for barrier installation and testing submitted and retained. <u>Water Bore Use</u> • Any proposed water supply bores reviewed to ensure that their use does not impact adversely on existing users of groundwater or nearby groundwater dependent ecosystems.

Environmental Objective	Assessment Criteria	Guide to How Objective Can Be Achieved
7. Minimise disturbance to drainage patterns and avoid contamination of surface waters and shallow groundwater resources	Well leases and access tracks are located and constructed to maintain pre-existing water flows as far as practicable No new 'water affecting activities' (as defined under the NRM Act and regional NRM Plan) are undertaken unless relevant permits have been obtained No unauthorised discharge or escape of a regulated substance, processed substance, chemical, fuel or solid wastes to surface water and/or groundwater No uncontrolled flow to the surface (i.e. no free-flowing bores) Waste Management Refer to Assessment Criteria for Objective 10	Site and Access Track Construction and Restoration • Well sites, access tracks, laydowns and camp sites are located to avoid surface water features such as saline lakes or significant wetland areas and to maintain pre-existing water flows. • Temporary drainage depressions / culverts installed where required to maintain surface runoff. • Sediment and erosion control measures (e.g. sediment fences) installed where necessary (e.g. if in close proximity to surface water features). • Any area artificially elevated via pad or access track construction will be lowered to original ground level by removal of paving material unless otherwise instructed by the landowner. • Original drainage patterns restored. Drilling and Well Testing • Refer to measures under Objectives 5 and 6. Fuel and Chemical Storage and Handling • Refer to Objective 5 Waste Management • Refer to Objective 11.
8. Minimise disturbance to native vegetation and native fauna	No unauthorised clearing of native vegetation Any sites of rare, vulnerable or endangered species or threatened communities have been identified, flagged and subsequently avoided No rare, vulnerable or endangered flora removed without appropriate permits High quality or significant[5] remnant vegetation has not been cleared Activities are not carried out in parks or reserves established under the *National Parks and Wildlife Act 1972*	• Appropriately trained and experienced personnel have assessed or scouted proposed well site, access track, laydown and camp locations to identify and flag significant (or rare, vulnerable or endangered) species and communities. • Native vegetation clearance avoided or minimised by locating well sites and access tracks appropriately. • Vegetation is trimmed rather than removed where possible. • Areas of low-quality native vegetation are avoided unless there are no viable alternatives (e.g. use of adjacent cleared areas). • Areas of high quality or significant[4] remnant vegetation or Heritage Agreement Areas are avoided. • Activities are not carried out in parks or reserves established under the National Parks and Wildlife Act.

[5] Significant in this context includes listed plant species, listed communities or important fauna habitat. Site specific assessment by an appropriately qualified specialist would be used to determine whether any native vegetation proposed to be cleared constitutes large trees, high quality vegetation or significant vegetation

Environmental Objective	Assessment Criteria	Guide to How Objective Can Be Achieved
	No significant adverse impacts on native fauna through any stage of construction, drilling or well testing No native fauna casualties that could have reasonably been prevented through the management measures described in the guide No uncontrolled fires initiated as a result of drilling or well testing activities <u>Fuel and Chemical Storage and Handling</u> Refer to Assessment Criteria for Objective 4 <u>Waste Management</u> Refer to Assessment Criteria for Objective 10	• If well sites are in close proximity to a park or reserve established under the National Parks and Wildlife Act and indirect impacts are likely, consultation is undertaken with DEW to determine appropriate mitigation measures. • Excavations (e.g. sump if used) checked regularly for trapped fauna. • Sumps and well site are appropriately fenced to minimise fauna access. • Fauna mortality (if it occurs) to be captured by incident reporting system with advice from an ecologist if required. • Well sites with native vegetation are rehabilitated in consultation with DEM, DEW and other relevant stakeholders. <u>Fire Prevention</u> • Refer to Objective 1.
9. Minimise atmospheric emissions	Emissions minimised by implementation of reasonable practical measures during design and operation as outlined in the guide to how objectives can be achieved column	• Equipment operated and maintained in accordance with manufacturer specifications. • If necessary, unsealed roads and tracks are sprayed with water as required to minimise dust generation. *Note: Greenhouse gas emissions recorded and reported in accordance with NGER requirements where required*.
10. Minimise the visual impact of operations	Well site maintained in a clean and tidy condition Restored well site contours and colour blend with the surroundings	• Landowners and relevant stakeholders (e.g. local council) consulted regarding location of proposed activities. • Activities are restricted to agreed / defined areas. • High standard of 'housekeeping' is maintained to minimise visual impact. • Drill rigs and camps removed from site promptly following completion of activities, particularly in visible locations. • Refer to Objectives 1, 5 and 12 for further details on site management and restoration measures.
11. Minimise the impact on the environment of waste storage, handling and disposal	Wastes are segregated and transported to an EPA licensed facility for recycling or disposal Reasonable steps are taken to securely contain waste prior to removal from site. All wastewater disposed of in accordance with the *South Australian Public and Environmental Health (Wastewater) Regulations 2013*	• EPA's Waste Hierarchy model (avoid, reduce, reuse, recycle, recover, treat, dispose) should be complied with and waste management undertaken with regard to the *Environment Protection (Waste to Resources) Policy 2010*. • Covered bins are provided for the collection and storage of wastes. All loads of rubbish are covered during transport to an approved waste facility.

Environmental Objective	Assessment Criteria	Guide to How Objective Can Be Achieved
		• Waste streams are segregated on site and transported to appropriate facilities to maximise waste recovery, reuse and recycling. • Production of waste is minimised by purchasing reusable, biodegradable or recyclable materials where practical. • All waste disposal is at an EPA licensed facility. • Hazardous wastes handled in accordance with relevant legislation and standards. • Licensed contractors used for waste transport. • All wastewater is disposed in accordance with the *South Australian Public Health (Wastewater) Regulations 2013* and in compliance with the South Australian Health On-site Wastewater Systems Code. • Sewage treatment units and septic tanks used at camp and drill rig ablutions. Septic tanks pumped out on an 'as required' basis by a licensed septic waste removal contractor and disposed of at a licensed facility. • Any necessary approvals (e.g. local council) are obtained for use of wastewater disposal system. • On completion of drilling the drill cuttings and sump water will be tested to analyse their suitability for reuse, industrial recycle, fill or waste and will be disposed of accordingly, along with the sump liner. Sump contents to be disposed as waste will be removed by a licensed contractor to an EPA licensed waste disposal facility. • Excess water from the sump or tanks will not be reused on land unless it has landowner agreement and water quality meets applicable criteria (e.g. *Environment Protection (Water Quality) Policy 2015* requirements, ANZECC/ARMCANZ 2000 and ANZG 2018 criteria) and any relevant approvals (e.g. DEM / EPA) have been obtained. • Investigations undertaken prior to drilling to confirm that lithologies containing high concentrations of naturally occurring radioactive materials are not likely to be encountered. Cuttings (and sump water where relevant) will be screened for radioactivity during drilling operations. If investigations indicate that wells may drill into or through a lithology that could contain high concentrations of naturally occurring radioactive materials, detailed assessment carried out to identify likelihood for elevated radioactivity in cuttings. Where required, SA EPA Radiation Protection Branch would be consulted and appropriate management implemented consistent with relevant guidelines (e.g. SA EPA *Radiation protection guidelines on mining in South Australia: Mineral exploration*). • Wastewater is not allowed to drain to surface water drainage features • Well site is kept free of litter and rubbish.

Environmental Objective	Assessment Criteria	Guide to How Objective Can Be Achieved
12. Remediate and rehabilitate operational areas to agreed standards	Surface structures are removed and the ground surface re-contoured consistent with pre-existing contours unless alternative agreement is reached with the regulator and stakeholders No reasonable stakeholder complaints left unresolved No rubbish or litter remains on restored sites Refer to Assessment Criteria for Objectives 4, 5 and 8	Refer to Objectives 1, 3, 5, 6, 7, 8, 10, 11. • Rehabilitation plans for surface activities will be developed in consultation with relevant stakeholders. • Imported materials are removed from site and soil profiles and contours restored unless otherwise agreed with the landowner. See Objectives 4 and 9 for details. • Well sites with native vegetation are rehabilitated in consultation with DEM, DEW and other relevant stakeholders.

3. Reporting

It is a requirement under Section 85 of the PGE Act that 'serious' and 'reportable' incidents must be reported to the Minister.

Serious Incidents must be reported to the Minister as soon as practicable after the occurrence, as per Section 85 of the PGE Act and Regulation 32 of the PGE Regulations.

Reportable Incidents must be reported to the Department for Energy and Mining (DEM) on a quarterly basis within 1 month of the end of the quarter, as per Regulation 32.

3.1. Incident Definitions

Regulation 12 (2) requires an SEO to identify events that could, if not properly managed or avoided, cause a serious incident or a reportable incident within the meaning of Section 85 of the Act.

Table 3-1 identifies the potential serious and reportable incidents relevant to exploration well drilling and testing activities. These definitions are based on standard definitions developed by DEM, which are intended to expand on definitions provided in Section 85(1) of the Act and Regulation 32(1), and provide consistency for Licensee reporting.

In accordance with Section 85 of the Act and Regulation 32(1):

Serious Incident means an incident arising from activities conducted under the licence in which:

a. a person is seriously injured or killed; or

b. an imminent risk to public health or safety arises; or

c. serious environmental damage occurs or an imminent risk of serious environmental damage arises; or

d. security of natural gas supply is prejudiced or an imminent risk of prejudice to security of natural gas supply arises; or

e. some other event or circumstance occurs or arises that results in the incident falling within a classification of serious incidents under the regulations or a relevant statement of environmental objectives.

Reportable Incident is defined in Section 85(1) of the PGE Act as incidents (other than a serious incident) arising from activities conducted under a licence that are classified under the PGE Regulations as a reportable incident. Regulation 32(1) classifies the following as reportable incidents:

a. an escape of petroleum, a processed substance, a chemical or a fuel that affects an area that has not been specifically designed to contain such an escape; and

b. an incident identified as a reportable incident under the relevant statement of environmental objectives.

Table 3-1: Potential Serious and Reportable Incidents

Serious Incidents	Reportable Incidents
1. A person is seriously injured[1] or killed. 2. An imminent risk to public health or safety arises. 3. Serious environmental damage occurs or an imminent risk of serious environmental damage arises. For example: a. Damage, disturbance or interference to sites of cultural and / or heritage significance without appropriate authorisations[2]. b. An escape of a regulated substance, processed substance, a chemical or a fuel to a water body, or to land in a place where it is reasonably likely to enter a water body by seepage or infiltration, or onto land that affects the health of native flora and fauna species[3]. c. Identification of cross flows between aquifers in natural hydraulic isolation, or uncontrolled flows to the surface. d. Any well incident or failure that threatens or poses an imminent risk to safety or a risk of serious damage to environmental values whether or not those values are referred to in State or Commonwealth legislation. e. Detection of a declared weed, animal / plant pathogen or plant pest species that has been introduced or spread as a direct result of activities. f. Any removal of rare, vulnerable or endangered flora and fauna or threatened ecological community without appropriate permits and approvals[4]. g. Any significant alteration of hydrology that affects a significant wetland area. 4. A regulated activity[5] being undertaken in manner that involved or will involve a serious risk to the health or safety of a person emanating from an immediate or imminent exposure to a hazard[6]. 5. An uncontrolled release resulting in the activation of emergency response and / or evacuation procedures of an area in or adjacent to the release, and / or fire or explosion.	1. An escape of a regulated substance[7], processed substance, a chemical or a fuel that affects an area that has not been specifically designed to contain such an escape[8] (other than a serious incident). 2. An event that has the potential to compromise the physical integrity of an asset or facility. For example: - An unapproved excursion outside of critical design or operating conditions / parameters. - Identification of a critical barrier failure that could lead to the potential for cross flows between aquifers in natural hydraulic isolation, or uncontrolled flows to the surface. - Failure of a critical procedural control in place to reduce a credible threat to low or as low as reasonably practicable (ALARP)[9]. 3. Malfunction or failure of critical plant or equipment that had (or still has) potential to cause a serious incident. 4. Unresolved reasonable complaints from stakeholders regarding operations. 5. Any event where an incursion outside a culturally cleared area has occurred or the conditions[10] of a cultural heritage clearance have not been complied with (other than a serious incident).

[1] As per the definition in Section 36 of the *Work Health and Safety Act 2012.*

[2] Pursuant to *Aboriginal Heritage Act 1988* and *Heritage Places Act 1993*.

[3] For reporting purposes, the assessment of 'reasonably likely to enter a water body by seepage or infiltration' may require further intrusive assessment. Should delineation of the extent of the release not be achieved within one week of becoming aware of the incident, DEM will be notified of the incident and the proposed site investigation methodology, including timeframes.

[4] Pursuant to *Native Vegetation Act 1991* (flora) and *National Parks and Wildlife Act 1972* (fauna).

[5] Regulated activity as defined in Section 10 of the *Petroleum and Geothermal Energy Act 2000*.

[6] Resulting in the issuing of a prohibition notice by SafeWork SA pursuant to Section 195 of the *Work Health and Safety Act 2012*.

[7] As per Petroleum and Geothermal Energy Act definition.

[8] An area assigned during a Hazard and Operability Process (HAZOP) study as a hazardous area for the purpose of gas venting, and designed as such, is considered to be an area specifically designed to contain a gas escape.

[9] As per the Safety Management System process articulated in AS 2885.1-2012, or similar risk assessment process.

[10] Note: Cultural heritage clearances are not defined under or referenced by the *Aboriginal Heritage Act 1988* and cannot ever authorise impacts to Aboriginal heritage.

3.2. Reporting to the EPA

Where applicable, incidents causing or threatening serious or material environmental harm under the *Environment Protection Act 1993* (EP Act) must be reported to the Environmental Protection Authority (EPA) in accordance with section 83 of the EP Act.

The EP Act and its reporting obligations do not apply to:

- petroleum exploration activity undertaken under the PGE Act; or
- wastes produced in the course of an activity (not being a prescribed activity of environmental significance) authorised by a licence under the PGE Act when produced and disposed of to land within the area of the licence.

3.3. Reporting to SafeWork SA

Notifiable incidents (i.e. death, serious injury or illness, or dangerous incidents) must be reported to SafeWork SA in accordance with Part 3 of the South Australian *Work Health and Safety Act 2012*.

4. List of Abbreviations

Abbreviation	Definition
AAR	Aboriginal Affairs and Reconciliation, Attorney General's Department (South Australia)
ALARP	as low as reasonably practicable
CFS	Country Fire Service
contamination	As defined by the *Environment Protection Act 1993* and the *National Environment Protection (Assessment of Site Contamination) Measure (1999) amended in 2013*
DEW	Department for Environment and Water
DEM	Department for Energy and Mining (DEM) (regulator of the Petroleum and Geothermal Energy Act)
DIT	Department for Infrastructure and Transport
EIR	Environmental Impact Report prepared in accordance with Section 97 of the *Petroleum and Geothermal Energy Act 2000* and Regulation 10.
EPA	Environment Protection Authority (South Australia)
minimise	To reduce as far as reasonably practical, considering all other factors e.g. requirements for safe operations and accessibility
NEPM	*National Environment Protection (Assessment of Site Contamination) Measure (1999) amended in 2013*
SEO	Statement of Environmental Objectives prepared in accordance with Section 99 and 100 of the *Petroleum and Geothermal Energy Act 2000* and Regulations 12 and 13.

5. References

AAR (2023). Managing Aboriginal heritage in South Australia. Fact sheet. Accessed June 2023 at https://www.agd.sa.gov.au/__data/assets/pdf_file/0011/908417/Managing-Aboriginal-heritage-in-South-Australia.pdf. Aboriginal Affairs and Reconciliation, Attorney General's Department.

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