NSW Resources
Resources Regulator

Compliance audit program

PEL1 and PEL12 – Gunnedah Basin exploration

Australian Coalbed Methane Pty Ltd and Santos QNT Pty Ltd

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1. Introduction

1.1. Background

Petroleum exploration licence 1 (1991) was granted to Australian Coal Bed Methane Pty Ltd on 11 February 1993. The title was transferred to Australian Coal Bed Methane Pty Ltd and Santos QNT Pty Ltd (Santos) on 16 March 2011. PEL1 is about 14 kilometres south-east of Gunnedah in northern NSW.

Petroleum exploration licence 12 (1991) was granted to Australian Coal Bed Methane Pty Ltd on 27 September 1995. The title was transferred to Australian Coal Bed Methane Pty Ltd and Santos on 16 March 2011. PEL12 is about 51 kilometres south-west of Gunnedah in northern NSW.

Santos is the operator of both PEL1 and PEL12.

As part of the compliance audit program, an audit of the exploration activities associated with the Gunnedah area exploration project within PEL1 and PEL12 was undertaken on 2 and 3 December 2024 by the Resources Regulator within the Department of Primary Industries and Regional Development, and NSW Environment Protection Agency (EPA) as the lead regulator for petroleum.

1.2. Audit objectives

The objectives of the audit were to:

- undertake a compliance audit of the Australian Coal Bed Methane Pty Ltd and Santos petroleum exploration activities against the requirements of the Petroleum (Onshore) Act 1991 and the conditions of the exploration licences and activity approvals issued pursuant to that Act.
- assess the operational performance of the exploration activities and the ability of the licence holder and/or its operator to implement management systems and controls to provide for sustainable management of the operations.

1.3. Audit scope

The scope of the audit included:

- the exploration activities associated with PEL1 and PEL12 including:
  - the Kahlua wells project
  - PEL1 seismic survey
  - rehabilitation of plugged and abandoned holes/wells on PEL 1 and PEL12.
- a review of documents and records pertaining to the exploration operations for the period commencing 2 December 2022 and ending 3 December 2024.

1.4. Audit criteria

The audit criteria against which compliance was assessed included:

- *Petroleum (Onshore) Act 1991*

- Petroleum (Onshore) Regulation 2016
- conditions attached to PEL1 (granted 11 February 1993, last renewed 12 April 2022)
- conditions attached to PEL12 (granted 27 September 1995 and last renewed 12 April 2022)
- assessable prospecting operations application dated 12 January 2023 for the continuation of existing exploration and appraisal activities on PEL 1 utilising the existing coal seam gas exploration infrastructure (Kahlua 2, Kahlua 3, Kahlua 4 and Kahlua 5), and associated approval dated 15 March 2023 (MAAG0015433)
- Kahlua Pilot Reactivation Project Produced Water Management Plan, Revision 0, dated 27 September 2023
- Kahlua Pilot Well Reactivation Rehabilitation Management Plan, Revision 0, dated 30 May 2023
- Exploration code of practice: Environmental management (version 3, September 2017, version 4, June 2021, and/or version 5, March 2022)
- Exploration code of practice: Rehabilitation (version 3, September 2017, version 4, June 2021 and/or version 5, March 2022)
- Exploration code of practice: Community consultation (version 1.1, May 2016, version 2.0, October 2022, and/or version 2.1, May 2023)
- Exploration code of practice: Produced water management, storage and transfer (version 3, September 2017, version 4, June 2021, and/or version 5, March 2022)
- Code of practice for construction, operation and decommissioning of petroleum wells (February 2023)
- Exploration reporting: A guide for reporting on exploration and prospecting in New South Wales (version 3, October 2021 and version 4, January 2022)
- Exploration guideline: Annual activity reporting for prospecting titles (version 3.0, December 2020 and version 4, October 2022)

1.5. Publishing and disclosure of information

This audit report was published on the Regulator's website consistent with:

- Section 113M of the *Petroleum (Onshore) Act 1991*
- Resources Regulator's *Compliance Publication Policy*
- *Government Information (Public Access) Act 2009*.

2. Audit methods

The audit process involved interviewing site personnel, reviewing documentation and samples of records provided by the licence holder and/or operator to determine the level of compliance of the operations and assess the status of the operational performance. The audit process and methodology are described in more detail in the sections below.

2.1. Opening meeting

An opening meeting was held onsite on 2 December 2024. The audit team, which included representatives from the Resources Regulator and the EPA, was introduced, and the scope of their responsibilities was conveyed to the auditees. The objectives and scope of the audit were outlined. The methods to be used by the team to conduct the audit were explained, including the interview of personnel, review of documentation, examination of records and a site inspection to assess specific compliance requirements.

2.2. Site interviews and inspections

2.2.1. Data collection and verification

Where possible, documents and data provided during the audit process were reviewed electronically on the day. Where documents were unable to be reviewed on the day, they were provided following the audit.

All information obtained during the audit process was verified by the audit team where possible. For example, statements made by site personnel were verified by viewing documentation and records, including site photographs, where possible. Where suitable verification could not be provided, this has been identified in the audit findings as not determined.

2.2.2. Site inspections

A site inspection was undertaken of the following exploration activities on PEL1 and PEL12:

PEL1

- Kahlua 2 well – operational exploration appraisal well
- Kahlua 3 well - operational exploration appraisal well
- Kahlua 4 well - operational exploration appraisal well
- Kahlua 5 well - operational exploration appraisal well
- power generation and diesel storage facility adjacent to Kahlua 2 well
- gas flare adjacent to Kahlua 2 well
- produced water storage tanks.

PEL12

- Longlea 1 well – suspended well.

2.3. Closing meeting

A closing meeting was held on site on 3 December 2024. The objectives of this meeting were to discuss any outstanding matters, present preliminary findings and outline the process for finalising the audit report.

2.4. Compliance assessment definitions

The reporting of results from the compliance audit was determined based on the definitions presented below in Table 1.

Table 1: Compliance assessment definitions

Assessment	Criteria
Compliance	Sufficient and appropriate evidence is available to demonstrate the particular requirement has been complied with.
Non-compliance	Clear evidence has been collected to demonstrate the particular requirement has not been complied with. There are three subcategories of non-compliance reflecting the severity and level of risk associated with the non-compliance: NC1 – the absence of planning or implementation of a required operational element which has the potential to result in a significant risk. NC2 – an isolated lapse or absence of control in the implementation of an operational element which is unlikely to result in a significant risk. NC3 – an administrative or reporting non-compliance which does not have a direct environmental or safety significance. Note: The identification of a non-compliance in this audit may or may not constitute a breach of, or offence under, the *Mining Act 1992*. Non-compliances identified in this audit report may be further investigated by the Regulator and regulatory actions may be undertaken.
Observation of concern	Where an auditee may be compliant at the time of the audit but there are issues that exist that could result in the potential for future non-compliance if not addressed. Observation of concern was also used where an issue may not have particular compliance requirements, but which was not conducive to good management or best practice.

Assessment	Criteria
Suggestion for improvement	Where changes in processes or activities inspected or evaluated at the time of the audit could deliver improvement in relation to risk minimisation, sustainable outcomes and management practices.
Not determined	The necessary evidence has not been collected to enable an assessment of compliance to be made within the scope of the audit. Reasons why the audit team could not collect the required information include: • insufficient information on the file relating to the period covered by the audit or insufficient evidence collected to reach a conclusion • the wording on the criteria (approval condition) meant that no evidence could be gathered, or it was too difficult to gather the evidence. A 'not determined' assessment was also made where the condition was outside the scope of the audit.
Not applicable	The circumstances of the authorisation or licence holder have changed and are no longer relevant (e.g. no longer mining, mining equipment and plant has been removed). An invoking element in the criteria was not activated within the scope of the audit.

2.5. Reporting

Following completion of the audit, the audit checklists were completed, and audit notes were reviewed to compile a list of outstanding matters to be noted in the audit report. This report was prepared to provide an overview of the operational performance of the site in relation to the exploration activities and identify any non-compliances or observations of concern noted by the auditors during the documentation review and interviews.

The draft audit findings were forwarded to Santos for comment. Consideration was given to the representations made during the finalisation of the audit report as discussed in the audit findings.

3. Audit findings

3.1. Work program

Section 14 (1) of the *Petroleum (Onshore) Act 1991* required an application for a petroleum title to be accompanied by a proposed work program that:

- indicates the nature and extent of operations to be carried out
- sets out commitments relating to the conduct of those operations (such as the timing of the operations)
- provides for carrying out activities (such as community consultation and environmental management and rehabilitation) in connection with those operations.

Clause 9 of the Petroleum (Onshore) Regulation 2016 required operations to be carried out as described in the approved work program and in compliance with any commitments in relation to the conduct of operations specified in the work program.

Approved work programs were in place for both PEL1 and PEL12 based on the work programs submitted with the renewals in April 2022. These work programs were varied by an endorsement schedule dated 3 May 2024. Evidence was available to confirm the work programs were progressing. A review of the annual exploration reports for 2023 and 2024 showed the following works were progressed:

PEL1

- Bando 2D seismic survey
- processing of newly acquired seismic data and reprocessing of existing data
- Kahlua multi-well pilot reactivation and operation
- geological and geophysical desktop studies.

PEL12

- geological and geophysical studies and review of existing data
- interpretation of available 2D seismic data.

Exploration data was noted to be maintained by the Santos geologists and petroleum engineers and submitted to NSW Resources with the annual activity reports as required.

3.2. Access arrangements

Section 69C of the *Petroleum (Onshore) Act 1991* stated, 'the holder of a prospecting title must not carry out prospecting operations on any particular area of land except in accordance with an access arrangement or arrangements applying to that area of land'. The access arrangement was required to be agreed in writing between the holder of the prospecting title and each landholder of that area of land.

Written land access agreements were in place for both PEL1 and PEL12. The Santos internal disturbance planning process included a check to ensure access agreements were in place before any activities took place. A land access agreement for the Kahlua property on PEL1 was sighted by the audit team as an example of the land access agreements in place.

In addition to the land access agreements, Santos implemented a notice of intention to visit process, which notified landholders about 2 weeks in advance of planned activities.

3.3. Native title and exempted areas

Condition 1 of PEL1 and PEL12 required the licence holder to obtain the prior written consent of the Minister before carrying out any activities on land on which native title had not been extinguished. Similarly, Section 70 of the *Petroleum (Onshore) Act 1991* required the consent of the Minister before a licence holder undertook any activities within an exempted area.

Santos staff said exploration activities were not being conducted within any exempted areas within PEL1 and PEL12. Mapping confirmed the Kahlua wells in PEL1 and the Longlea well in PEL12 were within privately owned lands. No further approvals under Section 70 of the *Petroleum (Onshore) Act 1991* were required.

Santos staff said most of the licence areas were under freehold title where native title had generally been extinguished. No new wells or exploration coreholes were drilled on either PEL1 or PEL12 during the audit scope period. No further approvals under condition one of the licence were required for PEL1 or PEL12.

It was observed Santos maintained a geographic information system (GIS) that included information of Crown lands and other areas where native title may apply. This was used for planning purposes and checks for exempted areas and native title were included in the internal disturbance planning process.

3.4. Community consultation

Condition 2 of PEL1 and PEL12 required the licence holder to carry out community consultation in relation to the planning and conduct of exploration activities. Community consultation was required to be carried out in accordance with the requirements of Exploration code of practice: Community consultation.

An assessment against the mandatory requirements of the code of practice was undertaken as documented in the following sections. Generally, community consultation and engagement was very well managed.

3.4.1. Risk assessment

Mandatory requirement 1 of the code of practice required the licence holder to conduct a risk assessment to identify and consider the range of opportunities and potential threats associated with community consultation and engagement.

Santos undertook a community consultation risk assessment for the broader Narrabri gas project, which was documented as part of the community consultation strategy. The risk assessment was primarily focussed on the risks associated with each stakeholder group, rather than threats and opportunities for consultation and engagement overall. As suggestion for improvement one, it was recommended that Santos reviews the community consultation risk assessment against the objectives for consultation such that the risk assessment can focus on the risks and opportunities that need to be identified and managed to facilitate an inclusive and effective consultation program.

3.4.2. Community consultation strategy

Mandatory requirement 2 required the preparation of a community consultation strategy to manage the risks identified in the risk assessment. Mandatory requirement 3 set out the requirements for preparation of the community consultation strategy.

Santos prepared a consultation strategy for the broader Narrabri Gas project, which included PEL1, PEL12, PEL238, PEL427, PAL2 and PPL3. The NSW Community Consultation Plan 1 January 2024 to 31 December 2024 generally followed the guidance material in the code of practice and included:

- objectives for consultation
- a description and analysis of community stakeholders and impacts
- a description of how consultation would be undertaken
- a process for review and amendment of the strategy when required.

The strategy title included the 6 petroleum titles that made up the wider Narrabri gas project. Records confirmed the strategy was generally implemented on all 6 titles. However, it was noted the strategy was heavily focused on PEL238, particularly in the background section. This was raised as observation of concern one. It was recommended Santos updates the strategy to make it clear it applied to all 6 titles and included information specific to each title.

3.4.3. Implementation and reporting

Mandatory requirement 4 required the licence holder to implement, monitor and report annually on the community consultation strategy.

Santos used a variety of consultation tools as described in the consultation strategy. Monthly activity updates were prepared and distributed to key stakeholders, community organisations and interested subscribers. These were also available on the Santos Narrabri gas project website that included fact sheets and links to community consultation reports and other information.

A Santos shopfront was established in Narrabri. Interested members of the public and any other stakeholders could obtain information from the shopfront where Santos staff were available to answer queries and receive feedback.

Santos established a community consultative committee (CCC) for the Narrabri gas project in accordance with its development consent. Exploration activities in the wider Narrabri gas project area, including exploration activities in PEL1 and PEL12 were noted to be discussed at the CCC meetings. For example, the CCC minutes showed the Kahlua wells reactivation project was discussed at the meeting held on 24 September 2024.

Comprehensive annual community consultation reports were prepared and published on the Santos Narrabri gas project website for both PEL1 and PEL12. Reports were also submitted to the Regulator with the annual activity reports, although this was not required after October 2022.

The reports included a discussion of the outcomes of consultation activities, and an evaluation of the effectiveness of the consultation activities. Both the outcomes and effectiveness of the consultation activities was related back to the objectives for consultation as described in the community consultation strategy.

Santos maintained detailed records of all consultation activities in its SRM database. This included:

- a comprehensive listing of stakeholders and their contact details
- copies of correspondence sent to stakeholders
- details of complaints and enquiries.

3.5. Exploration activity approvals

Section 31A of the *Petroleum (Onshore) Act 1991* required the holder of an exploration licence to obtain an activity approval prior to carrying out assessable prospecting operations.

Evidence was available to confirm that exploration activity approvals were sought and granted for exploration activities. Exploration activity approvals granted included:

- assessable prospecting operations application dated 12 September 2022 for the Bando 2D seismic survey in PEL1, and associated approval dated 31 October 2022 (MAAG0014844).
- assessable prospecting operations application dated 12 January 2023 for the continuation of existing exploration and appraisal activities on PEL 1 utilising the existing coal seam gas exploration infrastructure (Kahlua 2, Kahlua 3, Kahlua 4 and Kahlua 5), and associated approval dated 15 March 2023 (MAAG0015433).

There were no exploration activity approvals current for PEL12.

Records reviewed, and observations made by the audit team on site confirmed the exploration activities were generally carried out in accordance with the description provided in the applications and in accordance with the approvals given.

3.6. Environmental management

Condition 3 of PEL1 and PEL12 required the licence holder to prevent or minimise so far as is reasonably practicable, any harm to the environment arising from the activities carried out under the licence. Condition 2 of the exploration activity approval required the licence holder to carry out the activity in compliance with Part B of the Exploration code of practice: Environmental management.

No evidence of environmental harm was observed at the sites visited during the site inspection. The Kahlua wells reactivation project was the main activity in operation on PEL1. Construction of this project was completed, and the wells were in operation as a multi-well appraisal pilot. An assessment against the Exploration code of practice: Environmental management was completed for the operational phase of the exploration activities in progress on PEL1 as documented in the following sections.

There was one suspended well on PEL12 (Longlea 1) with this well suspended for about 15 years. Routine inspection activities were carried out on Longlea 1 during the audit scope period. No other on-site activities were undertaken on PEL12. The requirements of the environmental management code of practice were not applicable to PEL12 because there were no exploration activity approvals in force which required compliance with the code.

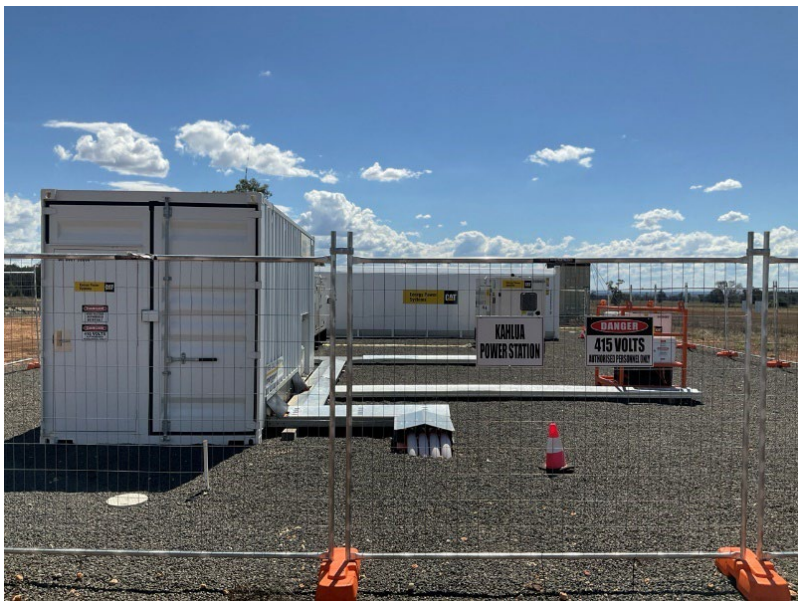
3.6.1. Use of chemicals, fuels and lubricants

Mandatory requirements 1.1 to 1.4 identified the requirements for the management of chemicals, fuels and lubricants used during exploration activities.

Commitments H1 to H4 of the statement of commitments included in the review of environmental factors (REF) for the Kahlua wells reactivation project outlined the measures to be implemented for hazardous materials.

The power generation facility adjacent to Kahlua 2 well included a self-bunded double skinned diesel tank to power the generators required to run pumps and equipment for the multi-well pilot. Appropriate signage, fencing and bollards were observed as required by commitment H1 (Figure 1). Santos staff said all Santos vehicles accessing the site had spill kits on board and staff were trained in spill management. It was observed there was no spill kit permanently stored at the diesel storage facility. This was raised as observation of concern 2. It was recommended Santos installs a suitable spill kit at the diesel storage facility.

Figure 1: Power generation facility including diesel storage tank



3.6.2. Water management

Mandatory requirements 2.1 and 2.2 required the licence holder to implement all measures to prevent, so far as reasonably practicable, causing adverse impacts on water quality and quantity, including groundwater levels and pressure.

Commitments W1 to W7 of the statement of commitments included in the REF for the Kahlua wells reactivation project outlined the measures to be implemented for water management. These commitments included:

- implementing a groundwater monitoring program
- carrying out the activity in accordance with relevant codes of practice (e.g. Exploration code of practice: Produced water management, storage and transfer)
- implementing erosion and sediment controls as required
- managing hazardous substances.

In accordance with mandatory requirement 2.2, Santos prepared a groundwater monitoring and modelling plan that was submitted to and approved by DPI-Water. Telemetry viewed during the audit for the 4 Kahlua wells provided information on extraction rates and groundwater levels in the wells.

Santos prepared a produced water management plan for the Kahlua pilot that was submitted to the Regulator and reviewed by EPA before the wells became operational. The produced water management plan is discussed in detail in section 3.7.

3.6.3. Noise and vibration

Mandatory requirement 3.1 required the licence holder to implement all practicable noise management measures to ensure that noise levels meet acceptable noise criteria for sensitive receivers.

Commitments N1 to N7 of the statement of commitments included in the REF for the Kahlua wells reactivation project outlined the measures to be implemented for noise and vibration. Most of these measures related to impacts associated with construction and workover activities which were completed. Implementation of the controls was not verified during the audit.

The noise assessment provided in the REF modelled the noise impacts of appraisal operations including the use of the diesel power generation unit, the well head drive motors and the use of the pilot flare. Operational noise was expected to comply with noise criteria and the potential for noise impacts in the operational phase was low.

No noise issues were observed during the audit site inspection. The wells were operational, and noise levels were very low.

3.6.4. Air quality

Mandatory requirement 4.1 required the licence holder to implement all measures to prevent, so far as practicable, pollution caused by dust and other air pollutants.

Commitments A1 to A5 of the statement of commitments included in the REF for the Kahlua wells reactivation project outlined the measures to be implemented for air quality. Most of these measures related to impacts associated with construction and workover activities which were completed. Implementation of the controls was not verified during the audit.

In terms of greenhouse gas emissions, Santos implemented a gas leak detection and repair program for the Kahlua pilot (REF commitment G2). Examples of leak detection and repair reports prepared by a specialist consultant were reviewed by the audit team (for example, February 2024 and May 2024).

No air quality issues were observed during the audit site inspection.

3.6.5. Waste management

Mandatory requirement 5.1 required the licence holder to manage all waste in a manner which did not, as far as practicable, cause harm to the environment.

Commitments WA1 to WA3 of the statement of commitments included in the REF for the Kahlua wells reactivation project outlined the measures to be implemented for waste management.

Commitments WA1 and WA2 primarily related to the construction and workover phase of the Kahlua project which was completed. Implementation of these controls was not verified during the audit.

For the operational phase, produced water was the key waste stream. This was managed in accordance with the produced water management plan which is discussed in section 3.7.

3.6.6. Vegetation clearance and surface disturbance

Mandatory requirements 6.1 to 6.4 required the licence holder to:

- minimise the extent of any vegetation clearing and surface disturbance to as low as practicable
- implement all measures to prevent, so far as practicable:
  - adverse impacts to fauna caused by vegetation clearing or surface disturbance
  - causing any land degradation or pollution of land and water
  - harm to the environment when disturbing land in areas of potential or actual acid sulfate soils.

Commitments B1 to B8 of the statement of commitments included in the REF for the Kahlua wells reactivation project outlined the measures to be implemented for biodiversity and biosecurity. The REF for the Kahlua project stated potential impacts on biodiversity would be avoided through the avoidance of mature native trees, including hollow bearing trees and koala food trees.

The Kahlua pilot project was in a mostly cleared agricultural area (Figure 2). Vegetation clearance during the construction of the Kahlua pilot civil works included some cropped areas and predominantly exotic groundcover. Santos staff said there was no clearance of trees during the construction of the civil works. This was confirmed during the audit site inspection with no evidence of tree clearing observed.

Figure 2: Kahlua 2 well with flare and power generation facility in a cleared agricultural area

The Santos GIS included vegetation layers and disturbance layers. The construction disturbance zone for the Kahlua pilot reactivation project was mapped and included in the GIS. The internal disturbance permitting process was used to assess and monitor vegetation clearance and surface disturbance for the project.

3.6.7. Roads and tracks

Mandatory requirements 7.1 to 7.5 required the licence holder to:

- consult with relevant landholders before establishing any new roads or tracks
- plan, design, construct and use roads and tracks in a manner which minimises the area and duration of disturbance
- construct any crossing of rivers, permanent and intermittent water lands and wetlands to prevent impacts on fish habitats
- refrain from using any unsealed road or track during wet conditions to prevent damage to that road or track
- repair all damage to existing roads and tracks resulting from exploration activities.

There was an existing access road for the Kahlua wells that was constructed in 2010 when the wells were drilled. Use of the access road was included in the land access agreement for the Kahlua property.

Santos upgraded this access road for the Kahlua pilot reactivation project to a standard suitable to provide all weather gravel access for heavy vehicles. The road was observed to be maintained in good condition.

Santos staff said operations were generally paused during wet weather, except for safety-critical operations. Track mats were available for use if vehicle access was required for safety critical access.

3.6.8. Weeds, pest animals and disease

Mandatory requirement 8.1 required the licence holder to implement all practicable measures to prevent the introduction and spread of weeds, pest animals and animal and plant diseases.

Commitments B7 and B8 of the statement of commitments included in the REF for the Kahlua wells reactivation project outlined the measures to be implemented for biosecurity. This included implementing weed hygiene protocols to prevent introduction and/or spread of weeds.

In accordance with commitment B7, Santos said pest hygiene inspection forms were completed for each vehicle accessing the site. Records of pest hygiene inspections were reviewed by the audit team to confirm implementation of the process.

In accordance with commitment B8, regular inspections were undertaken to monitor for the presence of weeds. For example, an inspection on 28 November 2024 identified some weed areas which were referred to a contractor for treatment.

3.6.9. Livestock protection

Mandatory requirement 9.1 required the licence holder to implement all measures to prevent, as far as practicable, causing adverse impacts to livestock.

It was observed each well site, and the low point drains or high point vents, were fenced with stock proof fencing (Figure 3 and Figure 4). There was no livestock observed during the audit site inspection. Santos said livestock in the paddocks was typically at the discretion of the landholder. Santos maintained liaison with the landholder during the project.

Figure 3: Stock fencing around the Kahlua 4 well site

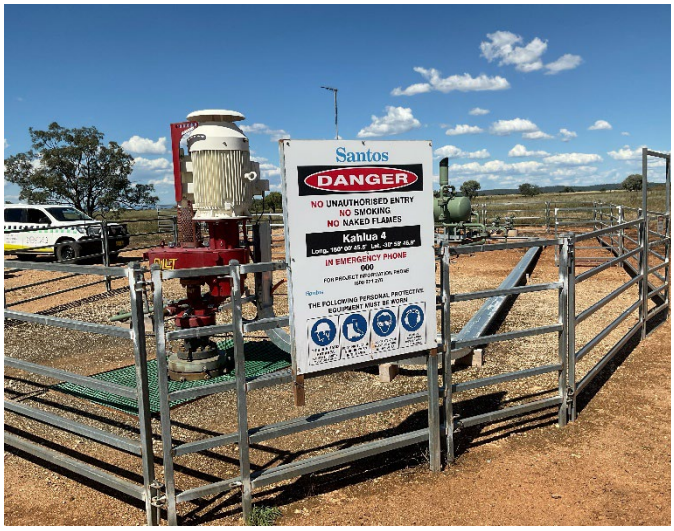


Figure 4: Stock fencing around a low point drain

3.6.10. Cultural heritage

Mandatory requirement 10.1 required the licence holder to implement all measures to prevent, so far as practicable, harm to Aboriginal cultural heritage and non-indigenous cultural heritage. Condition 17 of PEL1 and PEL12 required the licence holder not to knowingly destroy, deface or damage any Aboriginal object or place, and to take every precaution against any such destruction, defacement or damage.

Commitments CH1 and CH2 of the statement of commitments included in the REF for the Kahlua wells reactivation project outlined the measures to be implemented to minimise impacts to cultural heritage.

Santos undertook a search of the Aboriginal Heritage Information Management System (AHIMS) over a broad search area of about 30 km by 40 km as part of the cultural heritage assessment for the REF. The search returned 65 records of Aboriginal sites within this area, mainly artefact scatters and culturally modified trees and a relatively smaller number of grinding grooves and isolated finds. The sites were mapped as a layer in the Santos GIS. None of these Aboriginal sites were in or near the site of the Kahlua pilot reactivation project.

The REF assessments found no known items of non-indigenous heritage within the project area. Santos concluded no indigenous sites, or non-indigenous heritage items, would be harmed by the Kahlua pilot project.

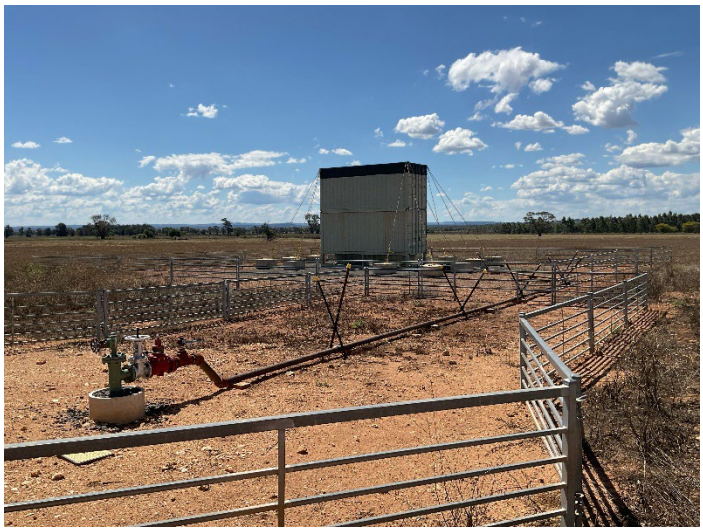
As a management strategy, Santos developed an unanticipated finds protocol which was included in the Kahlua project site inductions in accordance with commitment CH1. No unexpected finds were recorded during the construction activities.

3.6.11. Fire prevention

Mandatory requirement 11.1 required the licence holder to implement all measures to prevent, as far as practicable, the ignition and spread of fire.

Santos developed an emergency response procedure for the Kahlua project that included fire management. Engineering controls included sterile and exclusions zones around the flare site. It was observed the flare was of a boxed design with shielding surrounding the flare (Figure 5).

Figure 5: Kahlua gas flare adjacent to Kahlua 2 well



3.6.12. Risk assessment

Mandatory requirement 12.1 required the licence holder to monitor the risks associated with activities and, if the risk associated with an activity changes, implement revised environmental management controls.

Santos prepared an environmental management plan (EMP) for the Kahlua pilot reactivation project. A qualitative environmental risk assessment was documented as part of the EMP based on the impact assessment undertaken for the REF. The management and mitigation measures outlined in the EMP generally mirrored the mandatory requirements of the code of practice.

Santos said the risk assessment was reviewed if there was any change to the activity or if an incident occurred. There were no changes or incidents that triggered a revision of the risk assessment.

3.7. Produced water management

Condition 3 of the activity approval for assessable prospecting operations for the Kahlua pilot reactivation project in PEL1 required the licence holder to comply with the mandatory requirements of the Exploration code of practice: Produced water management, storage and transfer.

An assessment against the Exploration code of practice: Produced water management, storage and transfer was completed for the operational phase of the exploration activities in progress on PEL1 as documented in the following sections.

3.7.1. Produced water management plan

Mandatory requirement 1 required the licence holder prepare and implement a produced water management plan (PWMP) before commencing petroleum exploration that requires managing produced water. Mandatory requirements 1.1, 1.3 and 1.4 required the PWMP to include:

- a description of the activities associated with produced water
- how identified risks would be managed and mitigated, including the characterisation, consideration of beneficial reuse, and the fate of the produced water
- a site-specific water balance which was to be maintained during the activities.

Mandatory requirement 1.5 required the PWMP to be submitted to the Regulator. There was no approval requirement for the PWMP.

The Kahlua produced water management system was an existing facility before the code of practice for produced water management came into force. The Kahlua pilot reactivation project triggered the requirement for preparing a produced water management plan before starting the reactivation project.

Santos prepared a PWMP for the Kahlua pilot reactivation project. The PWMP was reviewed by the Regulator and the EPA. This review confirmed:

- characterisation of the produced water, including quantity and quality of water produced, was documented in section 2
- a brief overview of the Kahlua pilot reactivation activities was documented in section 1.3, with details of the produced water management system outlined in section 3
- a site water balance was included in section 3.2
- risk assessment and mitigation measures were documented in section 4.

Santos provided the PWMP to the Regulator in October 2023.

3.7.2. Produced water storage

Mandatory requirements 2.1 to 2.4 set out the requirements for the storage of produced water. These included:

- evaporation ponds must not be used to manage produced water
- produced water storage facilities must:
  - not be operated beyond its intended design life
  - have a secondary containment if the facility has the capacity to store more than 5 cubic metres of water
  - have the capability to detect leaks of produced water through the primary containment.

The produced water management system described in section 3 of the PWMP for the Kahlua pilot reactivation project included the use of 2 existing 5 megalitre lined panel tanks to temporarily store produced water from the project. Santos was not using evaporation ponds to manage produced water from the Kahlua pilot project.

The tanks and the produced water management system were inspected during the audit. Observations made during the inspection confirmed produced water management activities, including:

- both tanks were 5 megalitre capacity lined metal tanks in good condition (see Figure 6)
- the tanks were sitting on concrete pads within an earthen bund (see Figure 7)
- telemetry was installed to continuously monitor the tank levels.

Figure 6: Kahlua produced water storage tank

Figure 7: Earthen bund around water storage tanks

3.7.3. Trigger action response plan

Mandatory requirement 3 required the licence holder to include a trigger action response plan (TARP) in the produced water management plan. The TARP was required to set out specific procedures to be followed and actions to be taken for a series of defined events, including any detection of leakage through a primary containment, or the detection of leakage from a pipeline.

Santos prepared and documented a TARP in Table 6.1 of the Kahlua PWMP. The TARP included actions and notification requirements for a range of possible non-routine operating scenarios including:

- unexpected reduction of water level
- high high-level alarm
- unacceptable operation.

If the high high-level alarm was triggered, the field would be shut-in, which would cease the flow of water into the tank. Following any shut-in from a high high-level alarm, remedial measures were to be developed to reduce the water level in the storage tank.

Santos staff said there were no TARP triggers reached during the operation of the Kahlua pilot project. There was no loss of containment from the storage and water volumes were as expected or below. The audit team viewed the SCADA system screens for the Kahlua storage tanks and the water flowlines to confirm monitoring of the produced water management system.

3.7.4. Review of the plan

Mandatory requirement 4 required the licence holder to review and update the produced water management plan if any of the triggers were met. These triggers included:

- a direction by the Minister or the EPA
- if there were any changes to the way produced water was managed which required additional assessment under the *Environmental Planning & Assessment Act 1979*
- before making any significant changes to the design or operation of the produced water management system
- in the event a TARP is activated
- otherwise at intervals of no longer than one year.

If the PWMP was revised because of the review, an updated PWMP was required to be submitted to the Regulator.

There were no significant changes to the way produced water was stored or managed, and no TARP triggers were activated. Santos reviewed the PWMP after 12 months of operation to confirm it was appropriate and effective for the management of produced water from the Kahlua project. No changes were required to the PWMP. An updated PWMP was not required to be prepared or submitted.

3.8. Rehabilitation

Condition 5 of PEL1 and PEL12 required the licence holder to carry out rehabilitation of all disturbance caused by activities carried out under the licence in accordance with the requirements of the Exploration code of practice: Rehabilitation.

An assessment against the mandatory requirements of the code of practice was undertaken for the exploration activities in PEL1 as documented in the following sections. There were no surface disturbing exploration activities in PEL12 since the imposition of condition 5. The mandatory requirements of the code of practice were generally not applicable to PEL12.

3.8.1. Risk assessment

Mandatory requirement 1 required the licence holder to conduct a risk assessment to evaluate the range of potential threats and opportunities associated with rehabilitating disturbed areas to a condition that could support the intended final land use.

Santos undertook an assessment of the risks associated with rehabilitation of the petroleum exploration appraisal activities for the Kahlua pilot reactivation project. This risk assessment was documented in Table 3.5 of the rehabilitation management plan prepared for the Kahlua pilot reactivation project.

Risks assessed included:

- weed infestation and introduction of plant disease
- erosion due to site characteristics
- damage from livestock or fauna
- adoption of inadequate topsoil management practices
- groundwater impacts due to failure of borehole sealing.

Controls were outlined for each risk. Controls included:

- grouting any bores to the surface by a suitably qualified individual
- implementing erosion and sediment controls and ongoing monitoring of those controls
- ongoing monitoring to identify any proliferation of weeds, and implementation of weed control where required.

3.8.2. Rehabilitation objectives and completion criteria

Mandatory requirement 2 required the licence holder, not later than 14 days before the start of surface disturbing activities, to provide to the Secretary a copy of clear, specific, achievable and measurable rehabilitation objectives and completion criteria (ROCC). For higher risk prospecting operations, a rehabilitation management plan was required to be prepared and submitted with the rehabilitation objectives and completion criteria.

The definitions in Appendix 4 of the code of practice defined a higher risk prospecting activity to include the construction and use of petroleum wells, including associated water management, gas gathering and pipeline infrastructure.

The Kahlua pilot reactivation project was classified as a higher risk prospecting activity. A rehabilitation management plan was required to be prepared and submitted.

Santos prepared and submitted the Kahlua pilot well reactivation rehabilitation management plan in May 2023 before the commencement of the project. The plan included:

- a rehabilitation risk assessment (section 3)
- rehabilitation objectives and completion criteria (section 4)
- a description of the rehabilitation program to be implemented for the project (section 5)
- an outline of the rehabilitation monitoring program (section 5.6).

3.8.3. Rehabilitation program

Mandatory requirement 3 required the licence holder to develop, implement and complete a rehabilitation program (which includes a monitoring program) to rehabilitate disturbed areas to a condition that could support the intended final land use. Mandatory requirement 5 required the licence holder to commence rehabilitation of a site as soon as reasonably practicable following the completion of activities on that site.

Section 5 of the rehabilitation management plan prepared for the Kahlua project described the rehabilitation planning process and rehabilitation methods to be used for rehabilitation of the project. Final rehabilitation will not be completed until the decommissioning of the wells. Partial rehabilitation of the construction areas back to a minimal well pad area was completed at each well site.

The trenches dug during the construction phase for the laying of water, gas, and electrical infrastructure to connect the wells were rehabilitated. This area was cropped by the landholder during 2024 with no issues.

3.9. Security deposit

Condition 4 of PEL1 and PEL12 required the licence holder to provide a security deposit to secure funding for the fulfilment of obligations under the licence.

The security amount required for PEL1 was $2,177,000, which department records confirmed was held. This amount included rehabilitation associated with the 2023 seismic survey and the Kahlua pilot reactivation project.

The security amount required for PEL12 was $275,000, which department records confirmed was held. Further review of department records for PEL12 indicated a security review was not recorded against PEL12 for several years.

In 2024, Santos prepared and submitted revised rehabilitation cost estimates (RCEs) for both PAL2 and PPL3. It was noted the rate used for formal well abandonment in those RCEs was $337,500 per well (although the notes in the RCE schedule indicated this could be as high as $450,000 per well for a Category 2 well that may require additional effort such as remediation of primary cement, remediation of casing integrity issues or fishing operations). These rates were higher than the security held for PEL12 and indicated a potential shortfall in the security deposit required.

Longlea 1 well was drilled in 2006 and was suspended for about 15 years or more, therefore the integrity of the well may require additional effort to plug and decommission as has been the case with some of the recent plugging and decommissionings for older wells in PAL2. This was raised as observation of concern 3. It was recommended Santos update the rehabilitation cost estimate for PEL12 and resubmit it to the Regulator. It was noted Santos submitted a revised rehabilitation cost estimate to the Regulator for assessment.

3.10. Overlapping coal titles

Condition 8 of PEL1 and PEL12 required the licence holder to make reasonable attempts to enter into a co-operation agreement with the holder(s) of any overlapping coal titles. Condition 14 of PEL1 and PEL12 required the licence holder to undertake operations with regard to identifying, managing and minimising the impact of activities on the potential mineability of coal seams.

A search of the department's Minview system identified several overlapping coal titles including:

- Curlewis Coal & Coke Pty Ltd - CCL711
- Namoi Mining Pty Ltd – CCL701, ML1624, EL5183, EL8278

- Whitehaven Coal Mining Limited – CL316, ML1471, ML1579, ML1620, ML1662, ML1685, ML1693, ML1718, EL4699, EL5831, EL5967, EL8224
- Coalworks (Vickery South) Pty Ltd – EL7407
- Vickery Coal Pty Ltd – ML1838
- Boggabri Coal Pty Ltd – CL368,
- Goonbri Coal Company Pty Ltd – EL7435
- Aston Coal 2 Pty Ltd – CL375, ML1701, ML1719, EL8072.

Santos staff said verbal contact was made with the overlapping coal companies, but no formal co-operation agreements were in place. Overlapping coal titleholders were notified of the exploration activities in PEL1 by letter.

3.11. Construction, operation and decommissioning of wells

The licence conditions for PEL1 and PEL12 were amended by an instrument of variation dated 29 August 2023 which replaced conditions 9 to 13 and 15 to 16 with one condition requiring the lease holder to design, construct, operate, maintain and decommission all petroleum wells in accordance with the Code of practice for construction, operation and decommissioning of petroleum wells published by Department of Regional NSW in February 2023.

There were 4 operational wells producing gas within PEL1. There were no operational wells in PEL12. All gas produced from the Kahlua wells was flared at the flare near Kahlua 2 well. There were no drilling or workover activities in progress.

Given the stage of activities within the Kahlua project, the assessment against the code of practice: Construction, operation and decommissioning of petroleum wells (2023) focussed on the sections related to well integrity management during the operational phase.

Well integrity ensured well fluids and gases were contained within the well infrastructure. Under the provisions of the code, licence or lease holders were required to have a management system in place to describe how well integrity was to be maintained for the well life cycle. It was noted there was also a requirement under the Work Health and Safety (Mines and Petroleum Sites) Regulation 2022 to have a well integrity control plan.

3.11.1. Well integrity management

Section 2.9 of the code of practice set out the mandatory requirements for well integrity management that included:

- being able to demonstrate well integrity through the establishment of a well integrity management system
- documenting and maintaining integrity records including the current operational status and completion status of all wells
- completing risk assessments if a well integrity issue was discovered, including the implementation of control measures for the well to continue operating.

Santos developed a well integrity management procedure that it applied to its New South Wales assets.

Verification of well integrity and barriers was documented in section 5.2 of the Santos well integrity procedure. A review of completed work orders confirmed the procedure was implemented. Santos completed a risk assessment to classify the wells into 'concern levels', with the concern level dictating the monitoring requirements and frequency for the wells.

The Santos well integrity management procedure was reviewed during the audit. The review confirmed:

- a regular wellhead maintenance program was documented in section 5.2
- procedures for inspections for identification of leaks was included in sections 1.1, 2.2 & 5.2.3
- a program for routine operational visits to wells was documented in section 5.2.2
- procedures for monitoring and management of annuli pressures were included in appendix D
- barrier maintenance and verification were described in section 5.2.3
- a program for assessment during the well life cycles of the wellhead, tubing and casing, for any wear due to erosion or corrosion, and its impact on well integrity was documented in section 5.2 and appendix E
- risk assessment and response levels for impaired barriers were described in appendix F
- well integrity records to be maintained were documented in section 6.2, and Table 11
- flowcharts describing what do to in the event a well integrity issue was discovered were included in the well integrity management procedure
- the requirement to notify the EPA as soon as reasonably practical but no later than 5 days, where a well integrity issue was identified, was included in Table 1 of section 1.1 of the procedure.

Records were documented and maintained to verify implementation of the procedure. For example, work orders were generated at scheduled intervals as determined by the well integrity management procedure. These work orders were completed by the maintenance crews and outcomes recorded in the Santos OEC task history dashboard. Santos maintained a register of all wells that detailed the concern level and operational and completion status of each well.

The well integrity management procedure provided for review by the audit team was revised in November 2022. The code of practice: Construction, operation and decommissioning of petroleum wells was issued in 2023. As demonstrated above, the 2022 Santos procedure satisfied the requirements of the 2023 code, but it was noted it contained references to the previous well integrity code. As suggestion for improvement 2, Santos should review its well integrity management procedure to confirm it aligns with the 2023 code. This review should include updating the procedure to reference the 2023 code of practice.

3.11.2. Well suspension

Section 2.11.2 of the code of practice set out the mandatory requirements for well suspension which included:

- 2 tested well barriers must be used for well suspension

- suspended wells must be classified and addressed in the well integrity management system
- appropriate suspension fluids must be used
- the suspended well site must:
  - display appropriate safety signs
  - be secured with a locked fence around the well
  - be maintained clear of vegetation around the well
  - have wellhead valves securely chained and locked for have their handles removed.
- A program must be in place for regular inspections to check for gas leaks and well integrity monitoring and maintenance matters.
- A record of all inspections must be kept.

An example of a suspended well on PEL12 was inspection during the audit. Longlea 1 well was drilled in 2006 and was suspended for about 15 years. As shown in Figure 8 and Figure 9, the well site displayed safety signs, and the area around the well was maintained clear of vegetation. The well site was fenced, and the wellhead valves were securely chained and locked.

Figure 8: Signage at suspended well Longlea 1

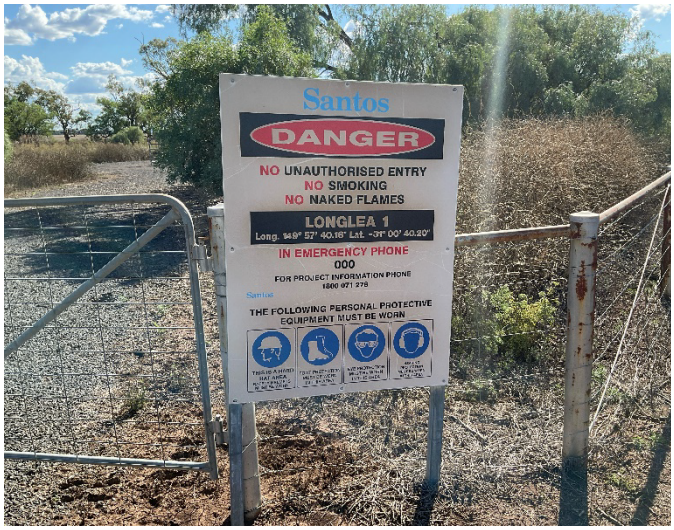
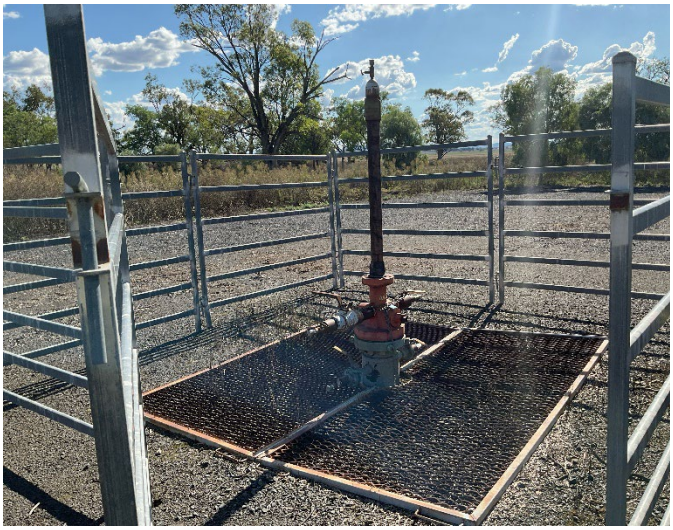


Figure 9: Wellhead valves chained and locked at Longlea 1



3.12. Beneficial use of gas

Section 28B of the *Petroleum (Onshore) Act 1991* and clause 16 of the Petroleum (Onshore) Regulation 1991 allowed the licence holder to beneficially use gas recovered from the exploration operations, if that gas would otherwise have been flared or released into the atmosphere as part of the exploration activities.

For the Kahlua pilot reactivation project, gas produced from the exploration appraisal pilot was not being beneficially used. The requirements of section 28B and clause 16 were not applicable. Gas produced from the pilot was flared using the flare adjacent to Kahlua 2 well.

3.13. Reporting

3.13.1. Annual reporting

Section 97C of the *Petroleum (Onshore) Act 1991* and clause 21 of the Petroleum (Onshore) Regulation 2016 required the lease holder to submit an annual report within one calendar month following grant anniversary date. Condition 6 of PEL1 and PEL12 required the licence holder to submit an activity report annually within one calendar month following grant anniversary date. Annual activity reports were required to be prepared in accordance with the Exploration guideline: Annual activity reporting for prospecting titles.

During the audit scope period, Santos prepared and submitted annual activity reports comprising:

- annual geological report
  - PEL1 annual report for reporting period 11 February 2022 to 10 February 2023 – submitted 9 March 2023
  - PEL1 annual report for reporting period 11 February 2023 to 10 February 2024 – submitted 12 March 2024
  - PEL12 annual report for reporting period 27 September 2022 to 26 September 2023 – submitted 27 October 2023
  - PEL12 annual report for reporting period 27 September 2023 to 26 September 2024 – submitted 27 October 2024.
- environmental and rehabilitation compliance report
  - PEL1 environmental and rehabilitation report for reporting period 11 February 2022 to 10 February 2023 – submitted 14 March 2023
  - PEL1 environmental and rehabilitation report for reporting period 11 February 2023 to 10 February 2024 – submitted 11 March 2024
  - PEL12 annual report for reporting period 27 September 2022 to 26 September 2023 – submitted 26 October 2023
  - PEL12 annual report for reporting period 27 September 2023 to 26 September 2024 – submitted 25 October 2024.

Community consultation reports were not required to be submitted to the Regulator after October 2022. Although not required, Santos submitted annual community consultation reports with its annual activity reports for 2023 and 2024. The reports were also published on the Santos Narrabri gas project website.

The annual geological reports generally followed the NSW Resources guideline Onshore petroleum reporting and data submission - A guide to geoscientific reporting and data submission of onshore petroleum exploration and production in New South Wales.

Santos used the Regulator template for the preparation of the environmental and rehabilitation compliance reports.

3.13.2. Drilling and seismic activity reporting

Section 97C of the *Petroleum (Onshore) Act 1991* and clause 22 of the Petroleum (Onshore) Regulation 2016 required the licence holder to prepare and submit a report in relation to each seismic program, and the drilling of each borehole.

The Kahlua wells were drilled in 2010. Well completion reports were prepared and submitted at the time of drilling. Workover activities were conducted as part of the Kahlua wells reactivation project, but these were not subject to a reporting requirement under clause 22.

There was no drilling in PEL1 or PEL12 during the audit scope period and no requirement for drilling reports to be submitted.

In 2022, Santos applied for and were granted exploration activity approval for the Bando 2D seismic survey (MAAG0014844). The survey was conducted in January 2023 with 59 kilometres of seismic acquisition recorded.

Existing seismic data from PEL1 and PEL12 was reprocessed along with the newly acquired data from the Bando 2D survey. The results from the seismic survey and the reprocessed data were documented in the Bando 2D seismic survey interpretation report, prepared by Santos and submitted to NSW Resources in January 2024.

3.13.3. Partial relinquishment reporting

Section 97C of the *Petroleum (Onshore) Act 1991* and clause 23 of the Petroleum (Onshore) Regulation 2016 required the licence holder to prepare and submit a partial relinquishment report where the licence holder's title was partially cancelled. Reports were required to be submitted within one calendar month of notification of the part cancellation.

PEL1 and PEL12 were renewed on 12 April 2022. Relinquishment of some areas of each title was a requirement of renewal. For PEL1, 25% of the title was relinquished. For PEL12, 28% of the title was relinquished. These partial relinquishments triggered the requirement for a partial relinquishment report for PEL1 and PEL12 in accordance with clause 23 of the Regulation.

Santos prepared and submitted partial relinquishment reports within one calendar month of the renewal as follows:

- Partial relinquishment report – Petroleum exploration licence (PEL) 1 – submitted 11 May 2022
- Partial relinquishment report – Petroleum exploration licence (PEL) 12 – submitted 11 May 2022.

3.14. Core and sample storage

Section 97G of the *Petroleum (Onshore) Act 1991* and Clause 29 of the Petroleum (Onshore) Regulation 2016 required the holder of an authority to, so far as is reasonably practicable, collect, retain and preserve:

- all drill cores remaining after sampling
- characteristic samples of the rock or strata encountered in any drill holes.

All core and samples collected were required to be labelled, stored and managed in a manner that preserved the integrity of the core or samples.

No new drilling was undertaken on PEL1 or PEL12 during the audit scope period. Drilling was last undertaken in 2014. Core and samples were collected during previous drilling operations and several samples were sent to the department's Londonderry Core Library.

Santos said core and samples were stored at the Santos Narrabri Operations Centre which was not inspected during the audit.

3.15. Record keeping

Sections 97D and 97E of the *Petroleum (Onshore) Act 1991* related to the creation and maintenance of records required under the Act, the Regulations, or a condition of title. Records must be kept in a legible form for production to any inspector and must be maintained for a period of 4 years after the expiry or cancellation of the title. Specific requirements for the types of records to be maintained for exploration activities were detailed in the mandatory requirements of the exploration codes of practice as follows:

- mandatory requirement 5 of the community consultation code of practice
- mandatory requirement 13.1 of the environmental management code of practice
- mandatory requirement 5 of the produced water code of practice
- mandatory requirement 6 of the rehabilitation code of practice.

Records reviewed during the audit demonstrated that Santos was generally maintaining records as required by the licence conditions and the exploration codes of practice. Examples of records reviewed included:

- land access agreements
- notice of intention to visit process and records
- Santos GIS system including environmental layers
- internal disturbance planning process records
- annual activity reports
- partial relinquishment reports
- seismic survey report
- correspondence with overlapping coal mine operators
- exploration activity approvals, including REFs
- environmental management plan, including environmental risk assessment
- rehabilitation management plan, including rehabilitation risk assessment
- groundwater modelling and monitoring plan
- produced water management plan
- photographic record of baseline condition, disturbance area and rehabilitation
- Santos SCADA and SAP systems
- Well integrity management procedure

- well integrity management system work orders
- well records and well barrier schematics
- well integrity risk assessments
- leak detection program records
- pest hygiene inspection records
- site inspection records
- community consultation strategy
- community consultation records in the SRM database
- community consultation reports
- contractor scope of works and construction package.

4. Compliance management

4.1. Identifying and managing compliance obligations

Identifying compliance obligations is a critical step in the development of an effective compliance management system. Compliance obligations for an exploration project can include:

- regulatory requirements (for example, the *Petroleum (Onshore) Act 1991*)
- conditions imposed on the grant, renewal, or transfer of exploration licences
- exploration activity approvals
- exploration codes of practice
- specific commitments made by the organisation (for example, commitments made in the approved exploration activity applications).

Once identified, compliance obligations should be reviewed periodically to identify any changes in those obligations (for example, changes in legislation).

Santos identified its compliance requirements and developed comprehensive and robust systems to manage those obligations. Examples of compliance management systems and processes included:

- the Landfolio software system - used to action and track compliance requirements. For example:
  - reporting dates were entered into the system and reminders generated as dates approached.
  - assessable prospecting operation approval requirements were tracked for each exploration activity.
  - work program requirements were entered in the system and were tracked and actioned as required.
- the internal disturbance planning process – required for any surface disturbing activity. This process used a gateway process to ensure compliance requirements were identified and actioned throughout the planning and implementation of exploration activities.
- the well integrity management system which included surveillance, verification and maintenance activities scheduled in the SAP system – SAP automatically generated work orders for scheduled preventative maintenance tasks. Any follow-up action required was actioned through a corrective maintenance request generated in SAP.

Records were generally available to confirm compliance with documents and records able to be linked through the Landfolio system.

4.2. Contractor management

Contractors are often used to undertake specialist tasks, for example, exploration drilling. While the responsibility for compliance or the implementation of environmental controls is often passed to the contractor, the licence holder will retain accountability for compliance with its licence conditions and other compliance obligations.

It is important that the licence holder exercises management control of its contractors by specifying contract requirements, providing oversight of contracted works, and evaluating the performance of the contractor during the contracted works.

Santos used contractors for the civil construction works and the workovers for the Kahlua pilot reactivation project. The civil construction works were reviewed during the audit as an example of the Santos contractor management process.

Santos prepared a detailed scope of works as part of a contractor construction pack. The scope of works set out the works required and included relevant compliance, environmental and safety requirements. All contractor personnel working on-site were required to complete both a Santos corporate induction and a site-specific Kahlua project induction. Induction records were reviewed during the audit to confirm implementation of the process.

The planned construction disturbance zones were mapped by Santos, who provided a spatial layer to the contractor to confirm the disturbance footprint. A Santos construction manager was always onsite during the construction works to oversee the contracted works.

4.3. Inspections, monitoring and evaluation

An effective inspection, monitoring and evaluation process is required to:

- monitor the implementation of the risk controls
- evaluate the effectiveness of those controls based on an assessment of inspection and monitoring data
- implement an adaptive management approach if monitoring shows that controls may be ineffective.

Santos developed a series of programs for inspection and monitoring to confirm the implementation and effectiveness of the management strategies to address compliance requirements, and controls to address risks. These programs included:

- environmental inspections
- rehabilitation inspections
- routine well inspections
- leak detection and repair program
- telemetry for monitoring wells and pipelines.

Evaluation of the outcomes of the inspection and monitoring programs was undertaken. For example, for the Kahlua pilot reactivation project, Santos held an after-action review to evaluate the implementation of the program of construction works. This review identified key lessons learnt which could be applied to future projects.

5. Audit conclusions

From the evidence reviewed during the audit, it was concluded the exploration operations undertaken by Santos on PEL1 and PEL12 were well managed. Evidence was available to demonstrate comprehensive and robust systems and processes were developed to identify and manage compliance requirements. Records were maintained as required to demonstrate compliance.

Santos was compliant with the requirements of the exploration licences, exploration activity approvals, and the codes of practice, for the elements reviewed during the audit. No non-compliances were identified during the audit. Three observations of concern were identified as summarised in Table 2.

Two suggestions for improvement were identified as summarised in Table 3.

Table 2: Summary of observations of concern

Observation of concern No.	Description of Issue	Recommendation
1	The community consultation strategy title included the 6 petroleum titles that made up the wider Narrabri gas project. Records confirmed that the strategy was generally implemented on all 6 titles. However, it was noted the strategy was heavily focused on PEL238, particularly in the background section.	It was recommended Santos update the strategy to make it clear it applied to all 6 titles and included information specific to each title.
2	Santos staff said all Santos vehicles accessing the site had spill kits on board and staff were trained in spill management. It was observed there was no spill kit permanently stored at the diesel storage facility.	It was recommended Santos install a suitable spill kit at the diesel storage facility.
3	Longlea 1 well was drilled in 2006 and has been suspended for about 15 years or more, therefore the integrity of the well may require additional effort to plug and decommission as has been the case with some of the recent plugging and decommissionings for older wells in PAL2.	It was recommended Santos update the rehabilitation cost estimate for PEL12 and resubmit it to the Regulator. It was noted Santos submitted a revised RCE to the Regulator for assessment.

Table 3 Summary of suggestions for improvement

Suggestion for Improvement No.	Description of Issue
1	It was recommended that Santos review the community consultation risk assessment against the objectives for consultation such that the risk assessment can focus on the

Suggestion for Improvement No.	Description of Issue
	risks and opportunities that need to be identified and managed to facilitate an inclusive and effective consultation program.
2	Santos should review its well integrity management procedure to confirm it aligns with the 2023 code of practice. This review should include updating the procedure to reference the 2023 code.