



## **Supplementary Management Plan**

### **Gunnedah Basin Operations PEL 456**

### **Rouchel Rouchel 1 Corehole**

#### **Document Approvals**

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## **1 Introduction**

In November 2008, Santos QNT Pty Ltd (“Santos”) received approval from the Department of Industry and Investment (DII) for their Review of Environmental Factors (REF) for Petroleum Exploration Licence (PEL) 456.

Santos has entered into a Farmin Agreement with the holder of PEL 456, Macquarie Energy Pty Ltd, to explore for petroleum (in accordance with the *Petroleum (Onshore) Act 1991*). Santos has been appointed and is the authorised under a Farmin Agreement as the Operator of PEL 456. Santos is continuing the exploration programme outlined in the 2008 REF within the Gunnedah Basin. The exploration programme being undertaken in PEL 456 is primarily corehole drilling.

To achieve the exploration objectives, Santos is seeking through this Supplementary Management Plan, to change the location of the Rouchel Rouchel 1 corehole location by 20 km (refer Figure 1).

### **1.1 Purpose**

The purpose of this Supplementary Management Plan is to outline the potential new impacts associated with changing the location of the Rouchel Rouchel 1 corehole, assess the likely risk and where required provide appropriate mitigation strategies to minimise any impacts.

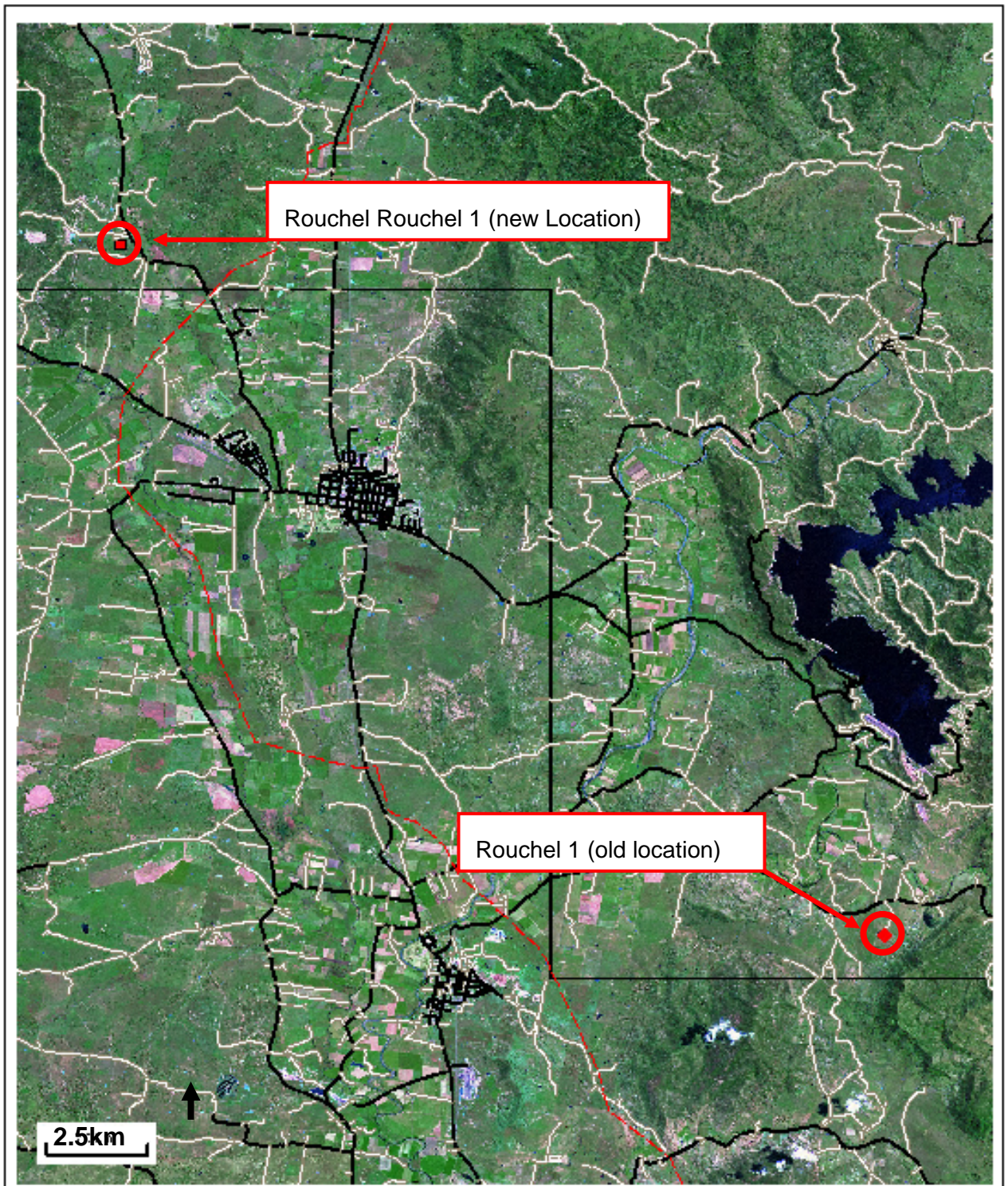


Figure 1: Location change from Rouchel 1 to Rouchel Rouchel 1

## **2 Proposed Activity**

Activities to be undertaken include drilling coreholes, running casing and cementing, core analysis and geophysical logging.

All activities apart from access to the site are confined to the drill pad.

Initial site preparation and rehabilitation of the drill pad will be undertaken during daylight hours as per normal drilling operations.

### ***Drill Rig***

Santos has contracted McDermott Rig 33 to undertake the work programme for this phase of the Gunnedah Basin exploration project. Rig 33 is a truck mounted UDR 1200-21 hydraulic rig.

McD Rig 33 is considered a smaller, quieter rig than those used in other petroleum operations and has very similar noise emission levels to Santos' other NSW rigs (McD 29 and MDC Rig 105) (Heggies 2009b).

Coring activity is conducted using only the FMC Bean pump, which has low frequency noise characteristics.

## **3 Landholder Consultation**

The landholders for Rouchel Rouchel 1 have been contacted and a signed Access and Compensation Agreement will be prepared prior to any activities commencing.

Santos encourages open dialogue between the landholder, neighbours and the Santos Drilling Rig Representative during operations on site to address any issues that might arise.

## **4 Potential Impacts and Management Controls**

The potential environmental impacts associated with the Project, the management controls and the performance management indicators are discussed below. The focus of environmental management will be to firstly avoid where possible, then minimise and mitigate any impacts. All activities will be planned in consultation with landholders so that potential impacts (e.g. lighting, noise, weeds) are avoided and/or controlled.

### ***4.1 Risk Assessment***

The Santos Risk Matrix was used to determine the risk rating for each of the environmental elements identified as potentially being impacted. The risk ratings were determined prior to applying mitigation strategies and safeguards and then after considering measures to reduced risk. The unmitigated risk rating and residual risk ratings are both provided and ranged from a 1-3, which means that the risk identified can be managed through routine monitoring and procedures.

Table 1: Aspect, Potential Impacts, Unmitigated Risk Rating (UMRR), Management Controls, Residual Risk Rating (RRR), Performance Indicator and Records

Aspect	Potential Impacts	UMRR	Management Controls	RRR	Performance Indicator	Records
<b>Air Quality</b>	<p>Expected air emissions / air quality issues associated with the short term activities may include:</p> <ul style="list-style-type: none"> <li>▪ Combustion exhausts from the flare stack (during testing);</li> <li>▪ Fugitive emissions from (vehicles); and</li> <li>▪ Dust emissions from earthworks and vehicular activity.</li> </ul> <p>Dust levels should not be significant enough to present a health hazard, but may in some circumstances cause a decrease in visual amenity.</p> <p>Fugitive emissions from vehicles used during appraisal activities are anticipated to be minor due to the small scale of activities planned.</p> <p>Other minor sources of air emissions include exhaust fumes from earthmoving and transport equipment. These sources are likely to be negligible in the context of existing activities including grazing and transport within the area. No measurable</p>	<b>1</b>	<p>The following standards related to air quality are part of the Santos EHSMS:</p> <ul style="list-style-type: none"> <li>▪ EHS05 – Air Emissions; and</li> <li>▪ EHS06 – Greenhouse Gas Management.</li> </ul> <p>These standards outline Company requirements for the management of air emissions and the accounting, reporting and reduction of greenhouse gas emissions from Santos operated facilities.</p> <p>In accordance with these Standards and the Santos Greenhouse Policy, Santos annually reports all air pollutant and greenhouse gas emissions to the National Pollutant Inventory (NPI) and the Commonwealth Government Greenhouse Challenge Program.</p> <p>Santos may apply one or more of the following dust suppression methods depending on the severity of the situation:</p> <ul style="list-style-type: none"> <li>▪ Reducing the speed of vehicles on field roads.</li> <li>▪ Watering of roads when appropriate or when agreed.</li> <li>▪ Investigating dust complaints and responding appropriately.</li> </ul>	<b>1</b>	<p>Minimal complaints from Landholders regarding dust impacts.</p> <p>Amicable resolution of complaints.</p>	<p>All complaints made by the Landholder and any subsequent actions are to be recorded in the Complaints Register.</p>

Aspect	Potential Impacts	UMRR	Management Controls	RRR	Performance Indicator	Records
	impact is likely.		Planning the location of activities in consultation with landholders should control impacts.			
<b>Water-Surface and Groundwater</b>	<p>Potential impacts associated with further development of the area are:</p> <ul style="list-style-type: none"> <li>▪ Release of oils or other chemicals / maintenance fluids; and</li> <li>▪ Transport of sediments disturbed by erosion of soils during construction activities.</li> <li>▪ Movement of Associated water into surface or ground water.</li> </ul>	<b>2</b>	<p>The following management strategies will be implemented.</p> <ul style="list-style-type: none"> <li>▪ Bunding of all areas storing or handling fuel, fuel using equipment, and chemicals, in line with Australian Standard 1940 – 1993; The Storage and Handling of Flammable and Combustible Liquids</li> <li>▪ Where applicable maintenance of roads, drains, bund walls, contour and diversion banks, will occur. All drainage structures are to be maintained for the life of the development.</li> <li>▪ Maintenance is carried out on an as needed basis - based on field observations of the Field Operations personnel.</li> </ul> <p>During rehabilitation, diversion banks and ripping along the contour will be completed to prevent the concentration and momentum of water flow as required.</p>	<b>1</b>	<p>No surface or ground water contamination.</p> <p>Diversion mechanisms in place, regularly checked and maintained to redirect natural stormwater movement where required.</p> <p>Controlled erosion</p>	<p>Records of spills, leaks and associated clean ups are to be managed using the Incident Management System.</p> <p>Maintenance carried out to remedy any erosion and water channelling is to be recorded using the Incident Management System.</p> <p>Records of water storage inspections to be maintained.</p>
<b>Noise</b>	Activities to be undertaken include drilling, running casing and cementing, core analysis and geophysical logging.	<b>2</b>	<p>To manage noise and minimise impacts the following management strategies/controls will be implemented:</p> <p>Landholder notification will be given prior to commencement of drilling. Equipment will be maintained so that noise levels remain constant. Complaints will be responded to in a timely manner.</p>	<b>1</b>	<p>All noise complaints will be recorded in the Complaints Register.</p> <p>Amicable resolution of complaints</p> <p>Where noise disturbance cannot be avoided, Santos will investigate alternative arrangements to suit the landholder.</p>	<p>Maintenance carried out on equipment is to be recorded.</p> <p>All complaints made and any subsequent action is to be recorded within the Complaints Register.</p>

Aspect	Potential Impacts	UMRR	Management Controls	RRR	Performance Indicator	Records
<b>Light Disturbance</b>	<p>Temporary lighting is required at the well sites for night-time drilling activities to ensure visibility is maintained to allow safe operations.</p> <p>Light spillage is minimal due to the focused nature of the lighting arrangements, with the illumination reducing outside of lighting tower range. Santos considers the offsite impacts to be minimal as drilling operations are of a temporary nature and short term.</p> <p>Potential impacts related to light disturbance are:</p> <ul style="list-style-type: none"> <li>▪ Disturbance to landholder at night</li> <li>▪ Visual impact on nearby sensitive receptors.</li> </ul>	<b>2</b>	<ul style="list-style-type: none"> <li>▪ The placement of lease sites is conducted in consultation with the landholder and the potential for light disturbance is addressed in the scouting process. If light disturbance is considered to be a potential impact site specific mitigation controls are adopted for the lease site. These mitigation controls could include, but is not limited to: <ul style="list-style-type: none"> <li>○ Redirection of light towers</li> <li>○ Angling of lights to be more directed at the ground</li> </ul> </li> <li>▪ Due to the small number of sensitive receptors and the opportunity to plan appraisal activities with landowners, it is anticipated that minimal impact will occur.</li> <li>▪ Complaints will be responded to in a timely manner.</li> </ul>	<b>1</b>	<p>All light disturbance complaints will be recorded in the Complaints Register.</p> <p>Where Light disturbance cannot be avoided, Santos will investigate alternative arrangements to suit the landholder.</p>	<p>All complaints made and any subsequent action is to be recorded within the Complaints Register.</p>
<b>Waste</b>	No waste will be stored on site.	<b>1</b>	<p>The Santos EHSMS Standard related to waste management is EHS04 – Waste Management. This standard covers the requirements for the management of waste within Santos operated facilities.</p> <p>The following mitigation measures shall be used in waste management:</p> <ul style="list-style-type: none"> <li>▪ The EHS04 – Waste Management Standard shall be followed to ensure</li> </ul>	<b>1</b>	<p>Quantity of waste disposed.</p> <p>Waste is disposed of at appropriate end point.</p> <p>Post construction checks to ensure all waste has been appropriately removed and disposed of.</p>	<p>All waste that is generated and moved off-site will be recorded.</p> <p>All waste management non-compliances are managed in the Incident Management System.</p> <p>Any complaints from the landholders regarding waste management are recorded in the Complaints Register.</p>



Aspect	Potential Impacts	UMRR	Management Controls	RRR	Performance Indicator	Records
			<p>appropriate mitigation measures are implemented in the management of waste.</p> <ul style="list-style-type: none"> <li>▪ General and recyclable wastes (including glass, paper and plastic) generated during construction will be transported to landfill and recycling facilities on a routine basis.</li> <li>▪ Any regulated waste will be collected by licensed contractors for off-site disposal.</li> <li>▪ Complaints are addressed in a timely manner.</li> </ul>		Operational checks to establish that all waste has been appropriately removed from the operational areas, or correctly stored and waiting for removal.	
<b>Land, Soils and Terrain</b>	It is considered that the only potential environmental impact associated with the activities is soil erosion.	<b>2</b>	<p>All activities associated with land disturbance will be discussed with the Landholder prior to commencement.</p> <ul style="list-style-type: none"> <li>▪ An environmental assessment will be carried out prior to the acceptance of a site for a new activity. This assessment determines landholder values, habitats, vegetation, and areas of significant environmental/cultural value to be avoided. The assessment also outlines areas or issues requiring particular environmental management.</li> </ul>	<b>1</b>	<p>The site will be rehabilitated for operational purposes and upon closure of the field.</p> <p>The area of all disturbances will be determined and placed within Santos' Geographic Information System (GIS).</p>	Records of disturbance are maintained within Santos' GIS.
<b>Flora, Fauna and Environmental Sensitive Areas</b>	The proposed location has previously been disturbed by agricultural activities.	<b>1</b>	<ul style="list-style-type: none"> <li>▪ Use of areas already disturbed</li> <li>▪ It is intended that petroleum activities will be confined where possible to existing cleared lands.</li> <li>▪ No unplanned or unapproved damage to flora and fauna.</li> <li>▪ Restoration of disturbed areas to</li> </ul>	<b>1</b>	Ongoing monitoring will be undertaken to assess the success and integrity of construction and rehabilitation measure and ensure appropriate follow-up rehabilitation	Santos will maintain records during construction and operation of all monitoring and assessment activities. Recommendations and corrective actions arising from audits and reviews will be

Aspect	Potential Impacts	UMRR	Management Controls	RRR	Performance Indicator	Records
			commence as soon as practical.		measures are implemented.	implemented. Routine work reports will be recorded and reviewed by each supervisor or manager.
<b>Weed Management</b>	There is a potential for transmission of weeds through earthworks equipment and general traffic.	<b>3</b>	<p>Santos has in place EHS09 Weeds and Pest Animal Control that outlines the requirements for weed management.</p> <p>The following are key items from the weed management plan:</p> <ul style="list-style-type: none"> <li>▪ All vehicles coming from declared weed infested to non-declared weed areas are required to utilise vehicle washing facilities or any temporary washing facilities established for this purpose.</li> <li>▪ All equipment entering an area not already infested with declared weeds shall follow the Environment Hazard Standard EHS09: Weed and Pest Control and the Field Weed Management Plan.</li> <li>▪ All vehicle movements are restricted to defined areas agreed upon with the Landholder/s.</li> <li>▪ Soil and gravel from known declared weed infested areas is not to be used in weed free areas.</li> <li>▪ Land disturbance is to be minimised to prevent the germination of weed seeds that may already exist in the soil.</li> <li>▪ If a declared weed or weed of concern is discovered, it shall be collected in</li> </ul>	<b>2</b>	All land disturbed by Santos is to be returned to a condition consistent with the adjacent area at the end of the rehabilitation process. Identify and document areas of new weed infestations in the Incident Management System.	The earthworks contractor is aware of local weed issues and washes vehicles where a serious risk occurs for weed spread. Vehicle Records are to be inspected at the time of site entry to verify that vehicles and equipment from a weed infested area have been appropriately washed down.

Aspect	Potential Impacts	UMRR	Management Controls	RRR	Performance Indicator	Records
			<p>accordance with the Environment Hazard Standard EHS09: Weed and Pest Control and EHS09 Appendix A: Weed and Pest Animal Identification Procedure.</p> <p>Field staff will monitor new and pre-existing infestations in.</p>			
<b>Community</b>	<p>The primary contact during planning and development will be with the Landholder. The activities have the potential to impact upon landholders. In general, land access will be addressed in compensation/access agreements prior to the commencement of petroleum activities.</p>	<b>2</b>	<p>The management strategies will include:</p> <ul style="list-style-type: none"> <li>▪ Access will be discussed with the Landholder during the field scouting period and compensation finalised.</li> <li>▪ Land requirements and locations for infrastructure will be discussed during the pilot design period with the Landholder. Where practical infrastructure will be located within previously disturbed areas. Land requirements will be minimised to that required for safe operations.</li> <li>▪ Land no longer required for normal operations will be rehabilitated and where practical returned to its previous use in consultation with the Landholder.</li> </ul>	<b>1</b>	All land disturbed by Santos is to be returned to a condition consistent with the adjacent area and in consultation with the landholder.	Santos records contract with landholders.
<b>Indigenous and Non-Indigenous Cultural Heritage</b>	<p>Indigenous heritage. Site or artefact of indigenous culture may be inadvertently damaged.</p> <p>Non-Indigenous Heritage: Sites or artefacts of non-indigenous settlement may be inadvertently damaged.</p>	<b>1</b>	<ul style="list-style-type: none"> <li>▪ Development will occur in cleared/disturbed areas.</li> </ul>	<b>1</b>		Records of any cultural heritage site are maintained.

## 5 Clause 228 Checklist

Clause 228 of the EP&A Regulation states that for the purpose of Part 5 of the EP&A Act the following factors are required to be taken into account concerning the impact of an activity on the environment. These factors are considered below.

Factor	Positive/Negative Impact
<p><i>Any environmental impact on the community</i></p> <p>Minor short term impacts such as noise would be experienced. Safeguards proposed in Section 4 and the PEL 456 REF would minimise these impacts.</p>	Short term negative.
<p><i>Any transformation of a locality</i></p> <p>There would be localised and non-permanent impact on the immediate vicinity of the hole for the duration of the programme. Safeguards proposed in Section 4 and the PEL 456 REF would minimise these impacts.</p>	Short term negative
<p><i>Any environmental impact on the ecosystems of the locality</i></p> <p>The area of proposed activities is disturbed, no environmental impacts of the ecosystems of the locality would occur as a result of the project.</p>	Nil
<p><i>Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality</i></p> <p>During construction there may be a reduction in these values due to affecting visual amenity. Given the short term nature of activities and the safeguards/mitigation in Section 4 and the PEL 456 REF the reduction is considered negligible.</p>	Nil
<p><i>Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations</i></p> <p>No locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations occur near the proposal area.</p>	Nil
<p><i>Any impact on the habitat of protected fauna (within the meaning of the National Parks and Wildlife Act 1974 )</i></p> <p>The proposal would not impact on the habitat of protected fauna.</p>	Nil
<p><i>Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air</i></p> <p>The proposal would not endanger any species of animal, plant or other</p>	Nil

Factor	Positive/Negative Impact
form of life, whether living on land, in water or in the air.	
<p><i>Any long-term effects on the environment</i></p> <p>The proposal would have no long-term effects on the environment</p>	Nil
<p><i>Any degradation of the quality of the environment</i></p> <p>There is potential for minor short term environmental degradation due to noise impacts. Safeguards proposed in Section 4 and the PEL 456 REF would minimise these impacts.</p>	Minor short term negative
<p><i>Any risk to the safety of the environment</i></p> <p>The proposal may result in short term potential risks to the safety of the environment due to potential accidents and spills. The likelihood of incidents occurring would be reduced through the application of Santos' EHSMS Standards and mitigation proposed in Section 4 and the PEL 456 REF.</p>	Minor short term negative
<p><i>Any reduction in the range of beneficial uses of the environment</i></p> <p>The footprint of activities for the proposal would not result in any reduction in the range of beneficial use of the environment.</p>	Nil
<p><i>Any pollution of the environment</i></p> <p>There is minor potential for short term negative impacts during activities. However mitigation documented in Section 4 and the PEL 456 REF would minimise the potential for impacts.</p> <p>CSG is seen as a transitional fuel in the aim for a carbon neutral energy source. The potential to secure CSG reserves has long term positives.</p>	Short term negatives  Long term positives
<p><i>Any environmental problems associated with the disposal of waste</i></p> <p>Drill cuttings would be essentially inert and any drilling fluid conditions would be biodegradable or similarly inert and would be allowed to dry onsite and disposed of in drilling sumps. Any other waste generated by the activities will be collected and removed from site for disposal at approved landfill sites. Given the short term of the propose activity waste production will be minimal.</p> <p>Water produced will be temporarily stored in onsite pits and transported to an appropriate licensed facility.</p>	Nil
<p><i>Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply</i></p> <p>Resources required for the proposal are not in limited supply in the area.</p>	Nil

## **6 Conclusion**

To support the change in location of the Rouchel Rouchel 1 corehole operational activity Santos has assessed the potential new risks that may occur and developed strategies to mitigate potential impacts.

The impacts associated with the change in location have not significantly changed from those described in the DPI approved November 2008 REF for PEL 456.

Santos will continue to engage all possible best practices to ensure reasonable comfort to landholders in the area.

## **7 References**

Heggies 2009a, *Santos Drill Rig Lighting Assessment*. A report prepared by Heggies Pty Ltd for URS and Santos.

Heggies 2009b, *Santos Drill Rig Noise Assessment*. A report prepared by Heggies Pty Ltd for URS and Santos.