Environment Plan Summary
Mereenie Field Development
2014 Fracture Stimulation, Completion, Workover and Recompletion

Santos

Facility: Mereenie Oil Field
Oil Lease 4 and 5, Northern Territory

Revision 1
May 2014

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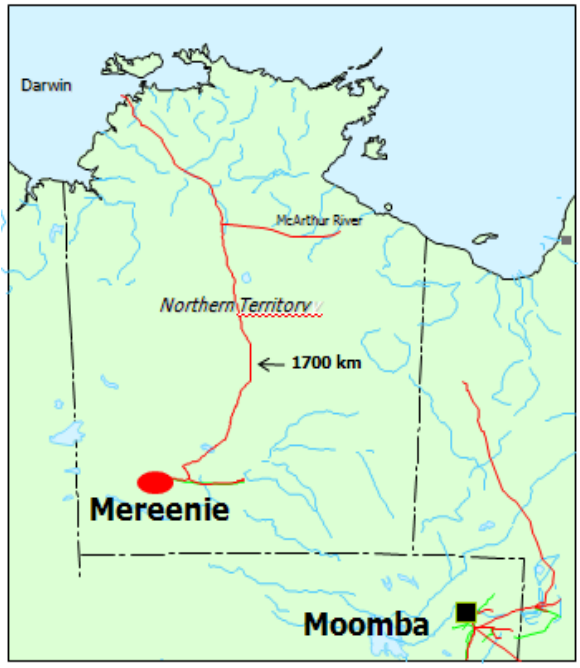
1 INTRODUCTION

The Mereenie Oil and Gas field is located approximately 250 km south-west of Alice Springs in the western-central Amadeus Basin area of Central Australia. Santos proposes to undertake fracture stimulation, completion, workover and recompletion activities on new and existing wells, to further development the Mereenie field. The wells will target conventional oil in the Stairway Sandstone, Horn Valley Siltstone and Pacoota Sandstone formations. A location map and coordinates of the activity are provided in Appendix 1.



The Mereenie Field was discovered in 1963 and commenced production in 1984, delivering hydrocarbon liquids for sale in South Australia and processed gas for sale in NT. Santos first acquired equity, and assumed Operatorship of the field, in 1993. The field is located on Aboriginal land and contained within NT Petroleum Leases OL4 (Western Mereenie) and OL5 (Eastern Mereenie), both first granted in November 1981 and reissued in 2002.

The nominated liaison personal for the project is Mr Mark Buckland, Manger Victoria and Mereenie, Santos Limited (mark.buckland@santos.com).

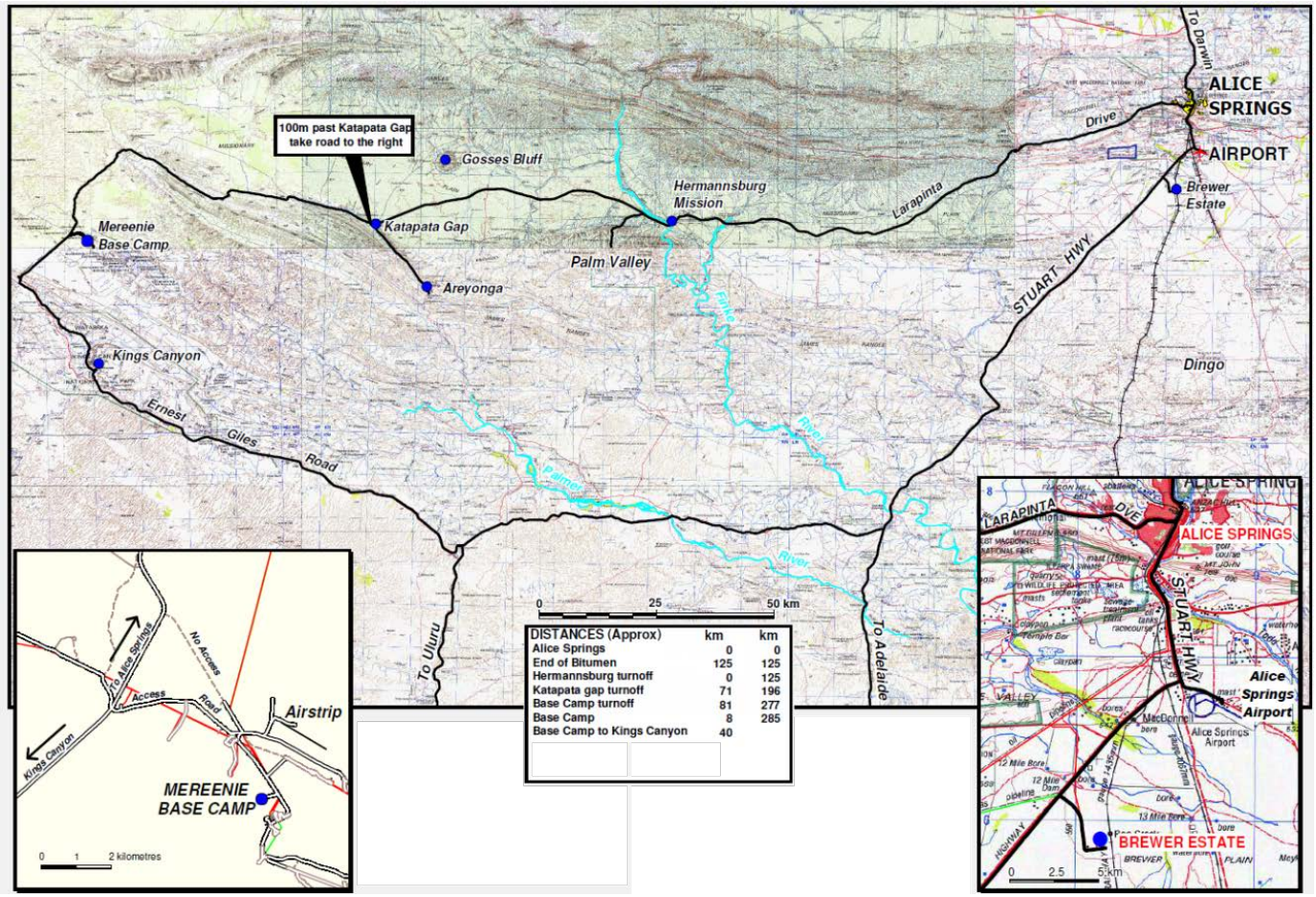


Figure 1: Mereenie Locality Map

2 PROJECT DESCRIPTION

The Project will be undertaken within the bounds of Northern Territory (NT) Onshore Production Leases (OLs) 4 and 5 and comprises:

- Fracture Stimulation and completion of eight new oil wells as part of the Mereenie Appraisal and Development Drilling (MADD) Project – West Mereenie 19, East Mereenie 44, East Mereenie 45, West Mereenie 20, West Mereenie 21, West Mereenie 22, West Mereenie 23 and West Mereenie 24;
- Workover and recompletion of West Mereenie 9;
- Workover, fracture stimulation and recompletion of East Mereenie 35, East Mereenie 12 ; and
- Workover and fracture stimulation of East Mereenie 26 and West Mereenie 8.

Fracture stimulation of a well may be undertaken as a final step prior to well completion. Fracture stimulation enhances the productivity of a well through increasing the rate at which product flows into the well from the target formation. The increase in flow resulting from fracture stimulation is achieved through opening or enlarging fractures. This is completed by the injection of fracture fluid (under pressure) into effectively isolated target formations. The fracture fluid includes proppants (such as sand) which keep the fractures open once pressure is released. Upon completion of the fracture stimulation, fluid is recovered from the wells, leaving the proppants in place within the target formation and facilitating increased well productivity.

Initial injection volumes of fracture fluid will be based on the specific fracture stimulation design for each well. Of the total volume injected, approximately 40% is typically retrieved during flowback pumping. The flowback fluid will be collected in pre-existing High Density Polyethylene (HDPE) lined pits (used for drilling muds / fluids during drilling activities) and allowed to evaporate. After evaporation, the remaining sludge will be removed via vac truck and disposed of at an appropriately licensed facility. Should it be required, flowback fluid will be transferred via vac truck to the Mereenie Central Treatment Plant interceptor pond for processing.

3 EXISTING ENVIRONMENT

The Mereenie Project area is located in the arid zone and experiences low and variable rainfall and high diurnal and seasonal temperature fluctuation. The Haasts Bluff Aboriginal Land Trust are the traditional owners of the Mereenie Field. Santos holds an agreement with the Land Trust and the Central Land Council (the Mereenie Agreement 2003). A Flora and Fauna Assessment of the Mereenie Oil and Gas Field was completed by Desert Wildlife Services in December 2000 (DWS 2000a&b). Survey results indicated that the flora of the Project area is particularly rich, containing many significant species and unique faunal habitats. Surface water in the Project area is ephemeral and subject to short flow duration and high turbidity. No perennial surface water features occur in the Mereenie area.

Geologically, the Mereenie Field comprises a large anticlinal structure within the Amadeus Basin. The lease area consists primarily of sandstones which form resistant strike ridges, and less resistant siltstones commonly covered by superficial soils. Hydrocarbons occur in the sandstones at depths ranging between 1 200 and 1 500 m. Groundwater is present within a number of formations within the Amadeus Basin. The main regional aquifer of the Amadeus Basin is hosted in the Mereenie Sandstone which underlies the Project area. The Mereenie aquifer is used regionally for domestic water supply, stock watering and irrigation, and supplies up to 80% of the Alice Springs town water supply. Other water for town supply is also drawn from the Upper and Lower Pacoota Sandstone and the limestone and calcarenite of the Upper Shannon Formation. The Upper and Lower Pacoota Sandstone from which Alice Springs draws town water supply (some 350 km to the east) is in a very different geological setting than the Pacoota Sandstone formation present in the Mereenie Project area. A Water Bore Baseline Assessment has recently been undertaken and this Assessment will form the basis of ongoing monitoring of the Mereenie aquifer in the Project area.

4 ENVIRONMENTAL RISKS OF PROPOSED ACTIVITY

4.1 Potential for Leakage to Aquifer from Loss of Well Integrity

A loss of well integrity has the potential to result in either fracture fluid or hydrocarbons leaking into the aquifer, or the production of aquifer water when the well is flowed. The risk of leakage in either direction is reduced to ALARP as

part of the well design process and managed through continual operational monitoring throughout the production process. In particular:

- Well design and construction provide a mechanical integrity to reduce the risk to ALARP.
- Pressure testing confirms that the production casing exceeds the maximum allowable operational pressure.
- Cement bond logs confirm the integrity of the cement that fills the area between the casing and the well bore and prevents the migration of fracture fluid, hydrocarbons or aquifer water.
- Pressure safety trip-out systems utilised during fracture stimulation activities prevent the exceedence of the pressure limits of surface pipework and down-hole casing equipment.
- Pressure monitoring provides confirmation that well integrity has not been impacted by fracture stimulation activities.
- Installation of a tubing string post-fracture will provide further isolation of production fluids from aquifers.

4.2 Potential for Fracture Propagation into Overlying Aquifer

Fracture propagation into the overlying Mereenie aquifer, if it were to occur, has the potential to result in contamination of this aquifer or establish a conduit from the aquifer to the wellbore such that, during production operations, water would be recovered to surface. In this case, the overlying Mereenie aquifer is separated from the target formations by over 500 m. Santos have modelled maximum fracture propagation for Mereenie to be in the order of 70 m. Given the separation and modelling scenario, fracture propagation into the aquifer is considered unlikely to occur.

4.3 Potential for Groundwater Impacts from Water Use

Santos currently access Mereenie aquifer water for operational use on site. Water demand for fracturing will vary per fracture stimulation, but is anticipated to be in the order of approximately 50m3 per fracture stimulation. The impact on the aquifer of once-off extraction for fracturing expected to be relatively short term and localised. Water use and the anticipated volumes of water will be assessed in order to ensure that their use does not adversely impact existing groundwater users.

4.4 Soil and Shallow Groundwater

Improper storage and handling of fuel, chemicals and flowback fluid may result in localised contamination of soil and shallow groundwater. Flowback fluid will be managed in a closed loop fluid handling system on site to minimise environmental risk of storage of flowback fluid. This system keeps hydraulic fracturing fluids within a series of pipes and tanks throughout the entire fluid storage process. Waste fluid is stored in on-site tanks for eventual transport via vac truck to the Mereenie Central Treatment Plant interceptor pond for processing. Any sludge will be removed via vac truck and disposed of at an appropriately licensed facility.

Measures to ensure safe handling and storage of fuel, chemicals and flowback fluids will be implemented on site, including secondary containment, lining, spill response and cleanup. Similarly, the secure storage and handling of waste will be implemented.

4.5 Stock, Wildlife and Vegetation

Activities outside defined / approved areas have the potential to impact vegetation and fauna. As such, all activities will be confined to the cleared well lease, with signage and appropriate fencing installed where required to delineate approved areas and any restricted areas. If flora of conservation significance is present in the vicinity of the well lease, it will be flagged and/or fenced off where necessary to prevent disturbance.

4.6 Radioactivity

The potential for radioactivity resulting from Naturally Occurring Radioactive Materials (NORM) that are brought to the surface is perceived as a potential issue for fracture stimulation activities. However, the level of radioactivity associated with NORM in the flowback fluid is not expected to be significant. NORM are usually only present a

potential issue when they are concentrated (e.g. by the formation of mineral scales or sludges over time in tanks, piping and facilities). In the unlikely situation that NORM above the natural background levels were to occur, appropriate measures for handling and disposal of pit liners and contents remaining after evaporation would be implemented.

4.7 Seismicity

The induction of seismic events (i.e. micro-earthquakes) as a result of fracture stimulation is sometimes perceived as a potential issue. Given the very low population density and little infrastructure in the surrounding area, it is not considered that a credible risk is presented by fracture stimulation of conventional oil targets in the Amadeus Basin.

4.8 Waste Management

Storage of waste and transport to licensed disposal facilities will be undertaken in accordance with relevant legislation and guidelines. Waste generation will be minimised to ALARP, waste will be transported offsite to an appropriately licensed facility by a licensed contractor. A range of wastes are generated during fracture stimulation operations.

5 CONSULTATION

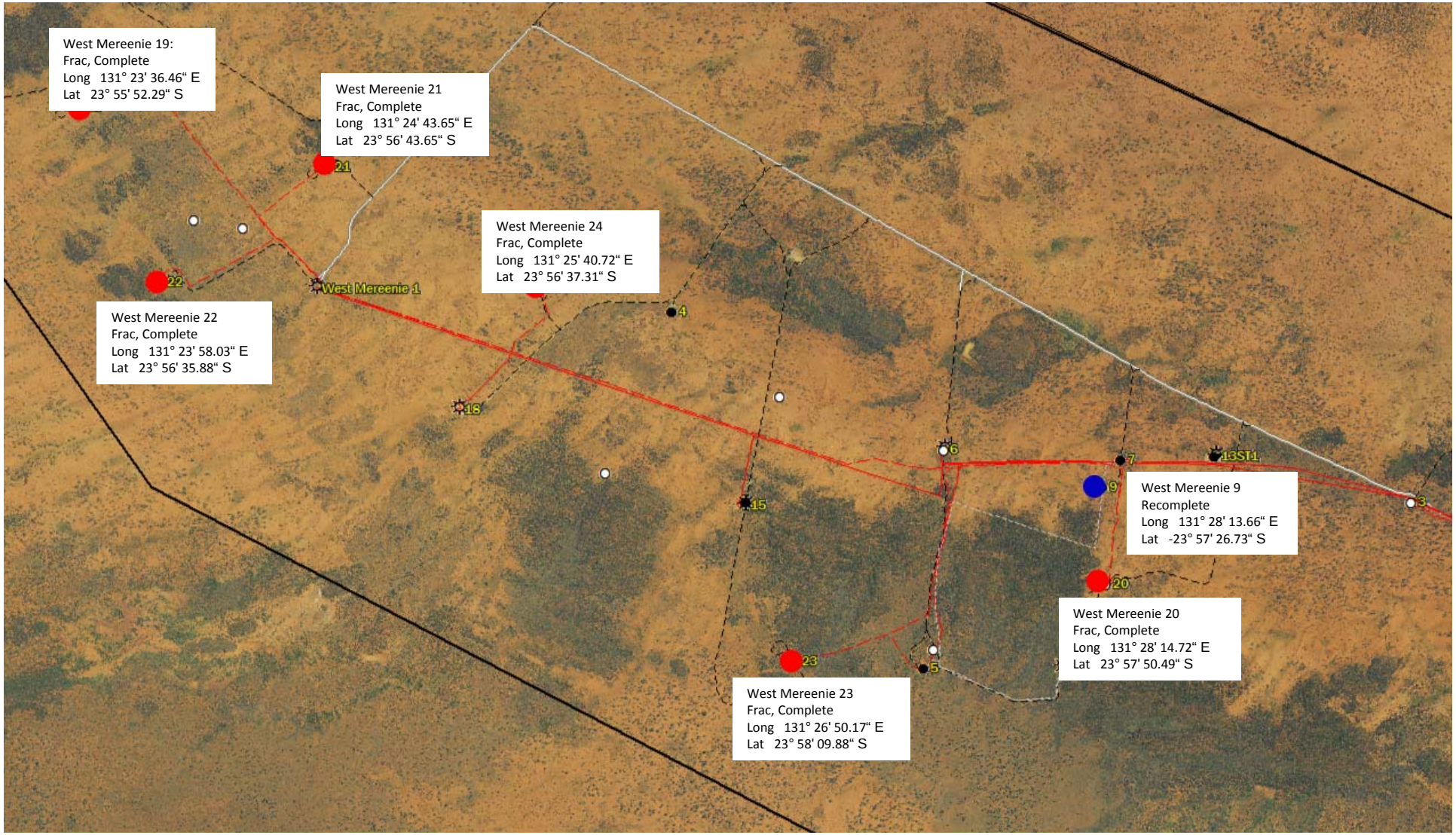
To date, consultation has included discussions with the CLC and the Department of Mines and Energy in relation to the project. Additional consultation will be undertaken through discussion with the CLC at future Advisory Body meetings and specific strategies detailed in the Stakeholder Management Plan.

Santos has engaged in stakeholder liaison over the past several months, intended to increase support for activities, identify community issues and find ways to address any issues or concerns. Santos will continue to engage with stakeholders on an ongoing basis throughout the life of the project as a way of keeping key stakeholders informed about our activities, educating the community, landowners, traditional owners and government about the project, and building and maintaining stakeholder confidence through long-term relationships.

A detailed cultural heritage assessment and clearance process has been undertaken involving representatives of the Traditional Owners including field assessment and development of effective protection measures.

APPENDIX 1

West Mereenie



East Mereenie