

Table of Contents

1 Introduction	1
2 The Gas Storage Project.....	3
2.1 Background - historical	3
2.2 Background – future application	5
2.3 Planned Project Activities	5
2.4 Project Facilities	6
3 Other Oil and Gas Fields.....	12
3.1 Taylor Field	12
3.2 Remaining Fields	13
4 Provision of Information to meet Legislative Requirements.....	13
4.1 Legislative Requirement Section 53A	13

Figures within text

Figure 1	Permit Location Map.....	20
Figure 2a	Current Infrastructure / Diagrammatic	20
Figure 2b	Current Infrastructure / Satellite Image	20
Figure 3	Well and Seismic Location Map	20

Figures at the back of the Plan

Figure 1: Permit Location Map	21
Figure 2: Current Infrastructure / Diagrammatic	22
Figure 2b: Current Infrastructure / Satellite Image	23
Figure 3: Well and Seismic Location Map.....	24
Figure 4: Top Showgrounds Formation Depth Map.....	25



Document Revision History

Date	Version	Author	Comment
26 th November 2010	1	M. Lucas	

1 Introduction

This submission comprises the Later Development Plan (LDP) for Petroleum Lease 16 (PL16), which was granted under the *Petroleum Act 1923*. The PL is located approximately 60 km south of Surat Township. PL16 contains the Silver Springs/Renlim, Sirrah, Tinker, Taylor, Boggo Creek and Beechwood Fields. Sections of the Taylor Field that fall outside PL16 (in PL48 and PL49) have been submitted separately within LDP's for PL48 and 49.

The structure of this Plan is as follows:

- The Introduction outlines the planned conversion of the Silver Springs/Renlim gas field to gas storage and the currently planned future activities at the other producing assets in the lease
- Section 2 discusses the Gas Storage Project – conversion of the depleted Silver Springs/Renlim gas field to a gas storage facility
- Section 3 discusses the other fields – Taylor, Sirrah, Tinker, Boggo Creek & Beechwood
- Section 4 provides the items of available information specified in Table 4 of the "*Guidelines for preparing initial and later development plans under the Petroleum and Gas (Production and Safety) Act 2004 and the Petroleum Act 1923*" provided by the Queensland Government (Natural Resources and Mines). The information provided is generally in the form of updates, where relevant, to previously submitted LDP's since the initial lease award in 1977

Petroleum Lease 16 (Fig 1: Permit Location – situated in the Figures Section at the back of the Plan) was owned 100% and is operated by Mosaic Oil Qld Pty Ltd. In October 2010 the Mosaic group of companies was acquired by AGL Gas Storage Pty Ltd, a wholly owned subsidiary company of AGL Energy Limited (AGL) by means of AGL's acquisition of the entire share capital of Mosaic Oil N.L. The subject lease was awarded on 30th April 1977 for a 21-year period. The renewal commenced on the 30th of April 1998, and was approved on the 4th of February 2000, the lease expires on the 29th April 2019.

PL16 contains several fields that are addressed individually in this Later Development Plan. Well locations and PL16 infrastructure are shown diagrammatically in Fig2a and superimposed on a satellite picture in Fig 2b. Seismic operations previously conducted in the area are summarised in Fig 3.

Silver Springs/Renlim; Conversion to Gas Storage

The principal focus of this LDP is the Silver Springs/Renlim complex, and the planned change of use. The asset comprises two adjacent gas accumulations: Silver Springs, first discovered in 1970, and Renlim discovered in 1982. The two accumulations are in pressure communication through a "joining area", and are, therefore, treated as a single gas field. The Silver Springs/Renlim field is situated in the southern region of PL16. All production from this field has been directed to the Silver Springs Plant processing facility, which is located near the Silver Springs-2 well. From 1978 until the present time this asset has produced gas and condensate resulting in the cumulative recovery of over 90Bscf gas, 0.4MMbbls condensate. The field complex had produced almost all of its remaining reserves of gas by the year 2000, 90.2 Bscf, and reservoir pressure in the Showgrounds Sandstone reservoir had declined to 1,550 psi from an initial reservoir pressure of 2,785 psi measured prior to any production, and furthermore all producing wells had experienced



water breakthrough from the active underlying aquifer, and had developed high water cut. Only two wells remain (sporadically) active on the Silver Springs and Renlim structures: Silver Springs-2 and Renlim-5A. Gas production from these wells is negligible and each well's production is dominated by water. The remaining wells have been shut in, and a total of five Silver Springs wells have been permanently plugged and abandoned (P&A). Three other wells in the Silver Springs/Renlim area have also been P&A'd: Glenmore-1, Noona-1 and Lacombe-1.

The current development plan is to convert this depleted gas field into a gas storage facility, and this LDP, covering the period to end-2015, deals chiefly with the first phase of this Gas Storage Project Plan.

Other PL16 Oil and Gas Fields

There are a number of other fields within the lease that, in general terms, are now mature and into their decline phase. The following briefly describes the salient features of these assets:

Sirrah Field

The Sirrah Field is situated in the southern region of PL16 approximately 5km southeast of the Silver Springs Plant. As with the Silver Springs/Renlim Fields, Sirrah production has been from the Showgrounds Sandstone reservoir, and a common aquifer has been shown to underlie the gas columns in both fields, as well as in the Taylor Field (to the east) and the Boxleigh Field (in the neighbouring PL15, to the west). There are four wells on the structure, and just two wells have demonstrated any ability to flow this year; the last time Sirrah 4 and Sirrah 5 produced any gas was in May 2010, for just a few days at low rates. Almost all expected reserves have been recovered.

Taylor Field

The Taylor Field lies approximately 15km east of the Silver Springs Plant. The field produces both gas and oil/condensate. This field also produces from the Showgrounds reservoir. Initial field pressures were observed to be somewhat pressure depleted through earlier Silver Springs gas production causing the drop in Silver Springs reservoir pressure to be hydraulically communicated to the Taylor Field by means of the aquifer. Taylor has been developed with twelve wells within PL16, and is currently producing 1 -2MMscfd through just two wells. Recent studies have indicated potential further opportunities to drill infill wells and improve recovery of both oil and gas. The planning intentions for the Taylor Field have been provided in Section 3.

Tinker Field

The Tinker area lies in the northern region of PL16. Production from the Tinker Area includes contributions from the Tinker, East Glen, Link and Lark Fields.

Boggo Creek

Boggo Creek is approximately 10km north of the Silver Springs facility. Low levels of production are expected to continue through just one well, Boggo Creek-2 on beam pump.

2 The Gas Storage Project

2.1 Background - historical

Silver Springs started commercial gas production in late 1978, and was followed by Renlim in 1989. Field performance monitoring subsequently provided evidence that the two fields were in communication. A number of studies, including material balance calculations, volumetric assessments and reservoir simulation defined a “joining area” between the Silver Springs and Renlim accumulations through which gas and water within the Showgrounds Sandstone reservoir can move according to the imposed pressure gradient resulting from gas offtake/pressure drawdown at the producing wells. In the early years of gas production the offtake from the Silver Springs/Renlim complex (the field) was low, limited by restrained market demand. In the later years of the field’s history, demand increased and higher field rates were, unusually, experienced very late in the life of the field. See Fig 2.1 below.

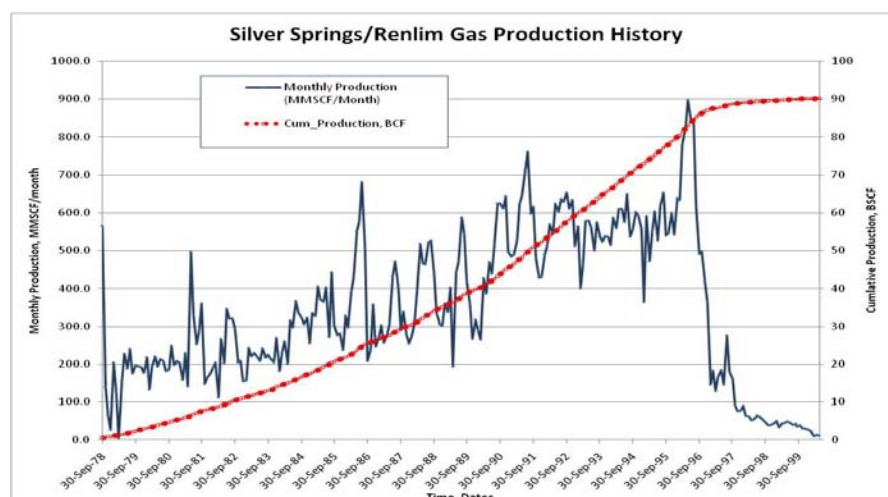


Figure 2.1: Gas Production History – Silver Springs/Renlim Field

The field’s offtake of gas is supported by an active aquifer underlying the gas column within the Showgrounds reservoir. This was initially evidenced by water breakthrough and increasing water cut at a number of the production wells, particularly those situated close to flank water in the field. Bottom water drive/breakthrough has not been a particular feature of the production performance in this field. Further evidence of the partial water drive has been observed through pressure measurements in the field. The lowest reservoir pressure recorded (11 February 1997) at Silver Springs-11 after total field production of some 88Bscf gas, and with the field gas rate rapidly declining at this time, was 1,550 psia. A number of further surveys were performed in subsequent years in several of the wells and on 3 February 2009, Silver Springs 3 indicated a degree of reservoir pressure recovery of some 191 psi to 1,741psia through the influx of water, although an additional 2 Bscf gas (approximately) had been produced late in the field’s life(at very low rates).

The current field status is approaching abandonment. Ten wells are now shut in, and eight wells have been Plugged & Abandoned (P&A). Only two wells are currently capable of intermittent and low levels of production: Silver Springs-2 and Renlim-5A. These wells are currently put on production when the wellhead pressure has built up adequately, and that is around once per month for a short period of time, during which the wellhead pressure

then reduces to zero. The very limited production is dominated by water. These two wells are scheduled to be shut in before year-end.

Figures 2.2 and 2.3 below illustrate the associated production history of condensate and water from Silver Springs/Renlim.

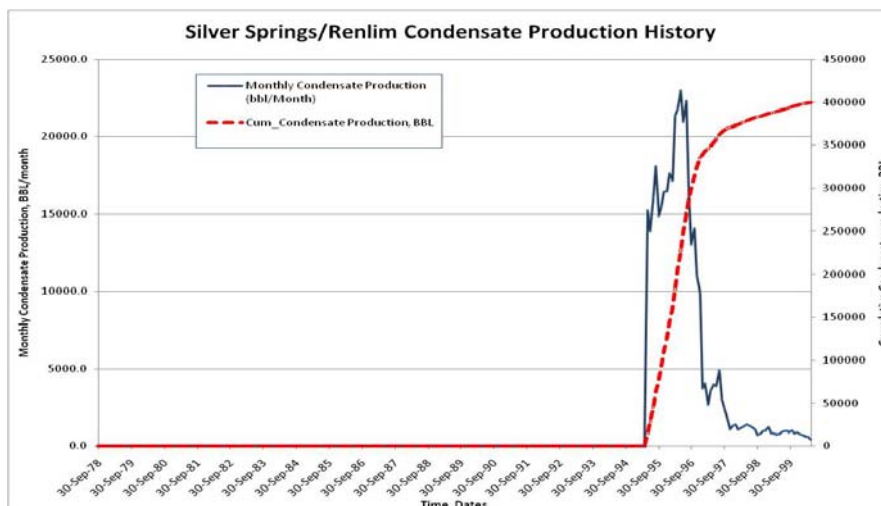


Figure 2.2: Condensate Production History – Silver Springs/Renlim Field

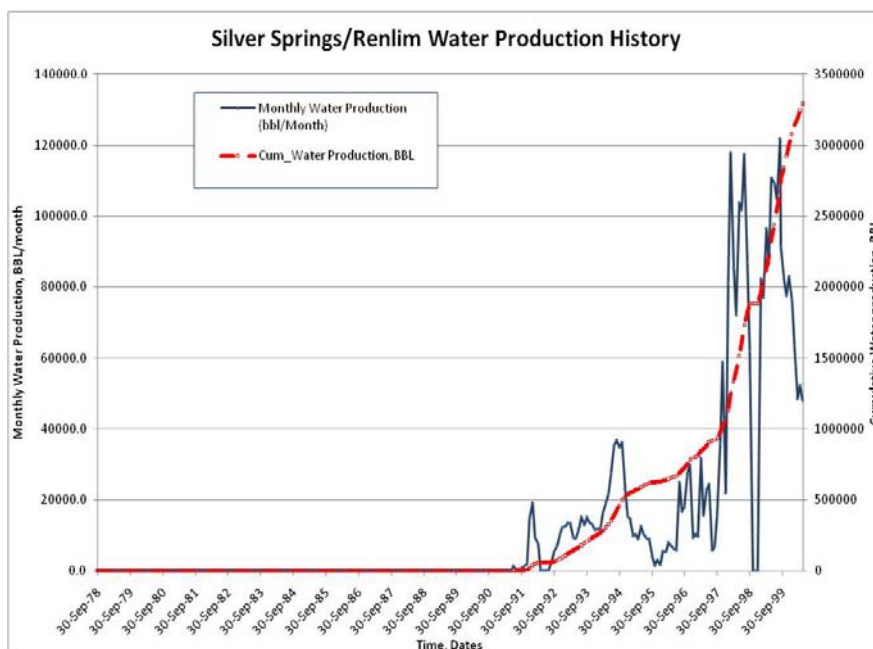


Figure 2.3: Water Production History – Silver Springs/Renlim Field

2.2 Background – future application

The opportunity for extending the life of the Silver Springs/Renlim asset through conversion to gas storage has been presented principally by the recent high level of activity concerned with finding, producing and converting coal seam gas (CSG) in the Surat-Bowen Basin and other areas in proximity to the coast of East Australia to Liquefied Natural Gas (LNG), at Gladstone, north of Brisbane. British Gas, following its acquisition of OGC, has advanced its plans to convert CSG to LNG and has committed to a Final Investment Decision (FID) for capital expenditure of \$15 billion to provide two LNG trains converting gas (produced from hundreds of wells drilled into the Queensland Surat Basin coal measures, and transported to the coast by means of a new 540 km underground pipeline) into 8.5 million tonnes per year of LNG for export into the international energy market from Curtis Island near Gladstone.

AGL Energy has contracted with British Gas to provide gas storage services at mutually agreed flow rates and stored volumes both for the initial three years of gas injection and for the subsequent three years of gas withdrawal. These services are to be provided by the Silver Springs/Renlim depleted gas field together with the existing gas pipelines network connecting Berwyndale to Wallumbilla to Silver Springs.

The specific opportunity for the Silver Springs/Renlim Field is to enhance management of the early ramp gas being brought on stream from the many new wells being drilled, completed and dewatered prior to the completion of the construction and commissioning of the complex LNG facilities. This comprises CSG transportation by existing pipelines, including the existing Berwyndale to Wallumbilla Pipeline (BWP) and the Silver Springs pipeline (SSP), to the Silver Springs/Renlim compression and process facilities where the gas will be injected and stored within the depleted Showgrounds reservoir through dedicated gas injection wells. Once the LNG plant in Gladstone is fully commissioned and operational, the gas will be produced via the same injection wells and transported by reversing the flow of the SSP and BWP in order to be transferred into the Eastern Australian network at the Wallumbilla hub.

2.3 Planned Project Activities

The planned conversion to gas storage operations comprises a number of key activities:

- Perform existing Silver Springs/Renlim well integrity checks
- Work over selected existing wells that are to be used as monitoring wells
- Work over selected existing wells that are to be used as injection/withdrawal wells
- Abandon (P&A) selected wells judged to be of no further use
- Perform surveys in all monitoring wells for pressure and fluid level data
- Drill a new gas injection/production well adjacent to the Silver Springs-2 well (Silver Springs 12)
- Construct necessary field facilities, including new compression for gas storage and gas withdrawal operations

The target date for the commencement of gas injection is 1 May 2011. The planned duration of the injection phase is three years. At the end of this 3-year period, operations are to be switched to gas withdrawal utilising the same wells. Gas production operations are then planned to extend for the next three years.

The rate schedule for the first phase of gas storage operations is: injection at rates up to 40 MMscfd (42 TJ/D) for three years followed by gas withdrawal at the same rate over a similar withdrawal period of three years. The first phase of the gas storage project, therefore, comprises an injection cycle (3 years) and a withdrawal cycle (3 years) and extends from approximately mid-2011 to mid-2017.

2.4 Project Facilities

This section provides a brief discussion of the field facilities currently planned for the project. A project schedule and cost breakdown is also provided.

Silver Springs Processing Plant (PL16)

The Silver Springs Processing Facility will be adapted to enable injection in May 2011 into the Silver Springs/Renlim depleted reservoir. Refer to the summary schedule in Table 2.4.1.

Table 2.4.1: Project Schedule

The current plant configuration

The central processing facility at the Silver Springs Plant (SSP) has a current processing capacity of up to twelve million cubic feet of gas per day, 12 MMscfd. The Silver

Time Period	Actions at Silver Springs Plant
Time Period	
Present – December 2011	<ul style="list-style-type: none"> Plant in current configuration and operating as normal until May 2011 while work is being performed around the plant such as that below: <ul style="list-style-type: none"> Workovers on injection/withdrawal wells (Silver Springs-3, Renlim-4) and monitoring wells (Silver Springs-1 and -6, Renlim-1, -2 and -3) December 2010 Drill new well Silver Springs-12 Early 2011 New compressor and coalescer installed and commissioned May 2011 Flowlines, pig launcher and receivers and other supporting infrastructure installed and commissioned May 2011 Ultrasonic pipeline testing of the Wallumbilla to Silver Springs pipeline Early 2011 Plant setup changed to enable Taylor / Waggamba gas to be injected into the Silver Springs/Renlim reservoir May 2011 Plant and pipeline blowdown May 2011 Injection of (up to 40 MMscf/d) gas via Wallumbilla (major volume) into Silver Springs/Renlim reservoir May 2011
December 2011-2012	Injection of gas (up to 40 MMscf/d) into Silver Springs/Renlim reservoir
December 2012-2013	Injection of gas (up to 40 MMscf/d) into Silver Springs/Renlim reservoir
December 2013-2014	Injection of gas (up to 40 MMscf/d) into Silver Springs/Renlim reservoir
December 2014-2015	Withdrawal of gas (up to 40 MMscf/d) from Silver Springs/Renlim reservoir – also planned for the next 2 years until 2017

Springs/Renlim field and the surrounding fields, which include the Tinker complex, Taylor, Waggamba, Sirrah, and Boxleigh all feed into the Silver Springs processing facility.

The total well streams are transported via pipelines into the Silver Springs Plant. These comprise gas, oil/condensate and produced water. The fluids are separated in two closed pressure vessels (separators) into water, oil and gas. Separated gas is compressed using three compressors (plus one back-up compressor). Water is further removed within a triethylene glycol (TEG) dehydrator in a closed system where water-saturated TEG is passed through a gas-fired reboiler that separates the TEG and water, and the TEG is recycled. The produced gas is transported through an 8" pipeline to the Wallumbilla LPG plant, operated by Santos, which is located approximately 100 km to the north.

There are two water-bath heaters for heating gas entering the plant during winter. Power to drive pumps, lighting and the camp is generated on site using one generator (two gas backup generators and one diesel backup generator) fuelled by natural gas. Other pieces of equipment that require power (such as compressors and heaters) use fuel gas taken from the dehydrator outlet gas stream.

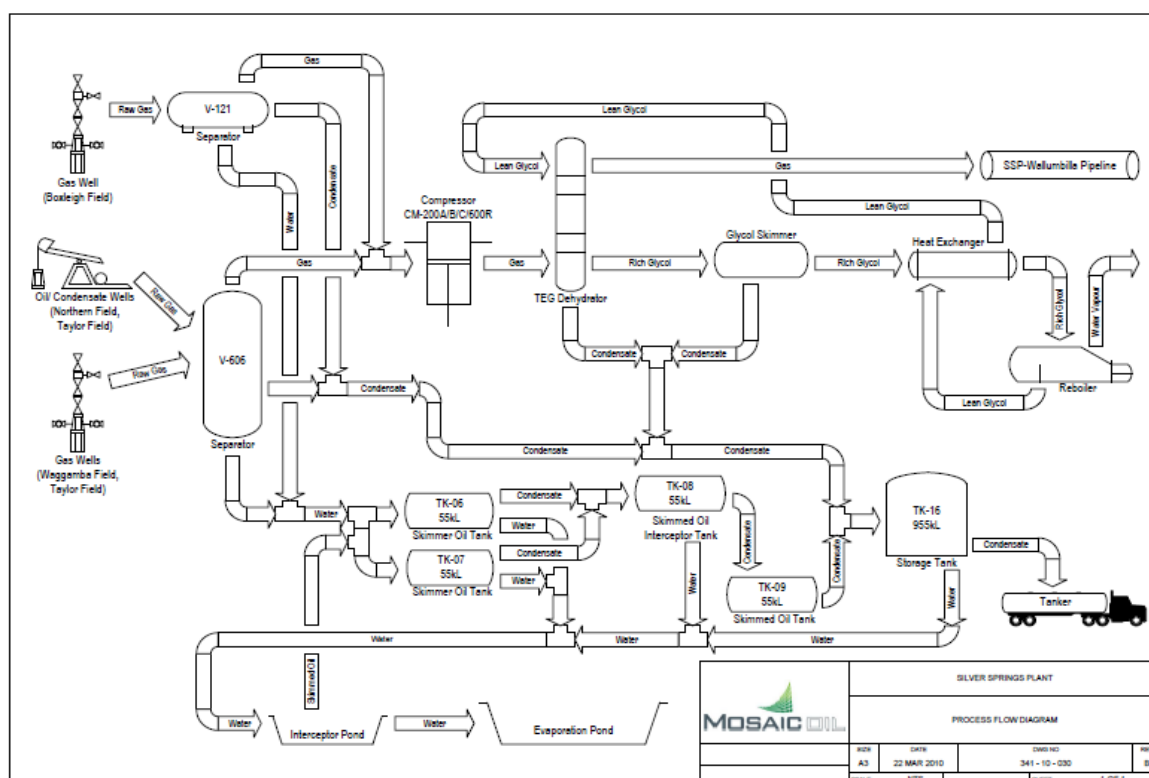


Figure 2.4.1: Current Silver Springs Plant Configuration



Plant Modifications for Injection/Withdrawal

New equipment/investment at SSP:

- New high pressure compressor for gas injection into the reservoir
- Coalescer after high pressure compressor within the plant to extract any carried-over compressor lube oil to minimise damage to the reservoir
- New inlet separator
- New liquids handling at Silver Springs for Silver Springs-Wallumbilla pipeline
- New glycol dehydration system
- Other piping modifications to allow individual testing of wells

Plant Process during Injection Phase (2011-2014)

Injection of gas into the Silver Springs/Renlim depleted reservoir is initially intended to run for three years (2011-2014) at rates up to 40 MMscf/d. Dry gas (coal seam gas) from other fields is to be transported via the Wallumbilla pipeline to the Silver Springs/Renlim reservoir via the Silver Springs Plant, and possibly combined with local gas from nearby fields that is also pipelined into the plant. Gas and oil from the Taylor/Waggamba fields will continue to be processed at the Silver Springs plant and the oil transferred to the storage tanks; the gas then being combined with the coal seam gas for injection into the Silver Springs/Renlim reservoir.

From the Wallumbilla pipeline dry gas enters the Silver Springs plant separator where any oil or water in the stream is removed and transported to the respective processing areas. The gas is compressed (to 19MPa) using a new high pressure compressor (CM-400A), and lube oil and other impurities are removed using a coalescer. This gas is injected via flowlines into three injection wells Silver Springs-3, -12 and Renlim-4. Renlim-5A is to be a backup injection/withdrawal well. There are five monitoring wells Silver Springs-1 and -6, and Renlim-1, -2 and -3. The water is separated from the oil within the tank separation system and then disposed of into the existing evaporation ponds. See the diagram below for the plant configuration:

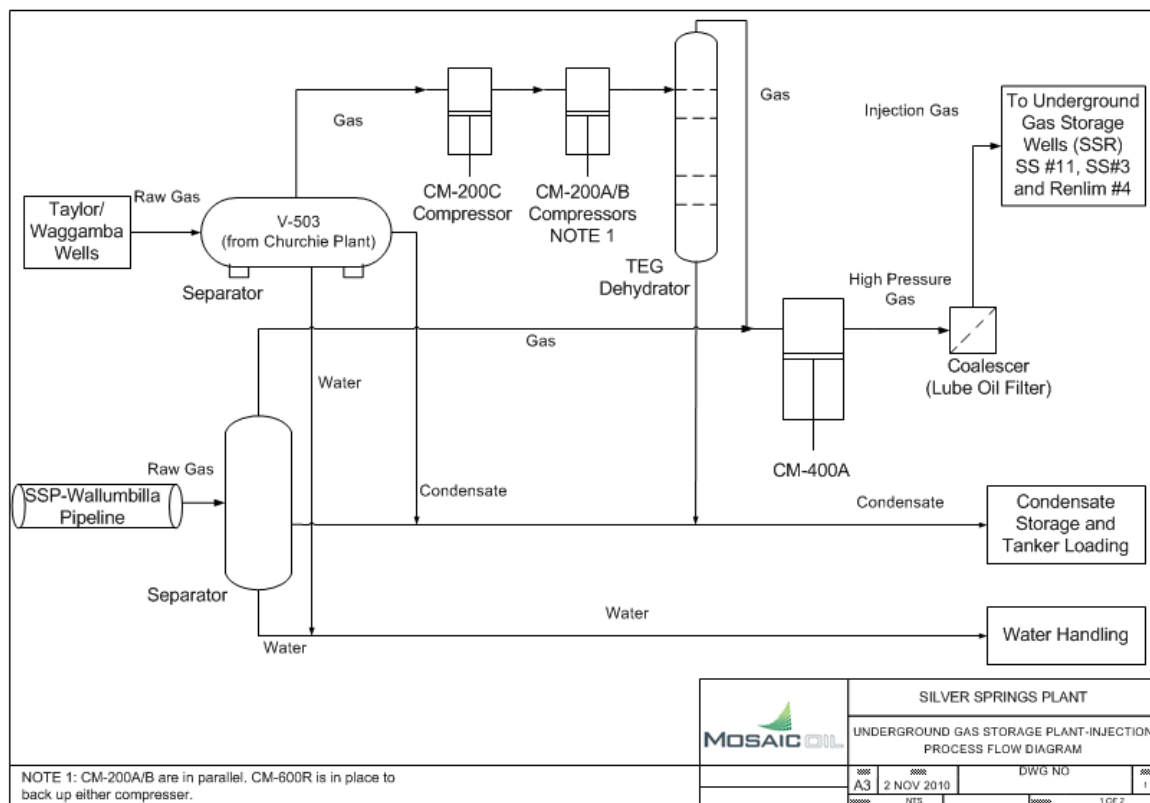


Figure 2.4.2: Silver Springs Plant configuration during injection stage

Plant Process during withdrawal phase (2014-2017)

After the initial three years of gas injection, the plant configuration will be changed to enable withdrawal of the gas from the Silver Springs/Renlim reservoir via the Silver Springs-3, -12 and Renlim-4 wells (Renlim-5A as backup). The Taylor/Waggamba fields will remain on production during this period. The condensate will be stored onsite and the water produced will have oil removed via the existing oil water separation units for the Taylor/Waggamba fields then transferred to existing evaporation and storage ponds. Any water generated during the withdrawal operations will be handled through a separate oil-water separation plant to enable appropriate disposal either through re-injection or storage in aggregation ponds on site prior to disposal. See the diagram below for the plant configuration: (shows Figure 2.4.3)

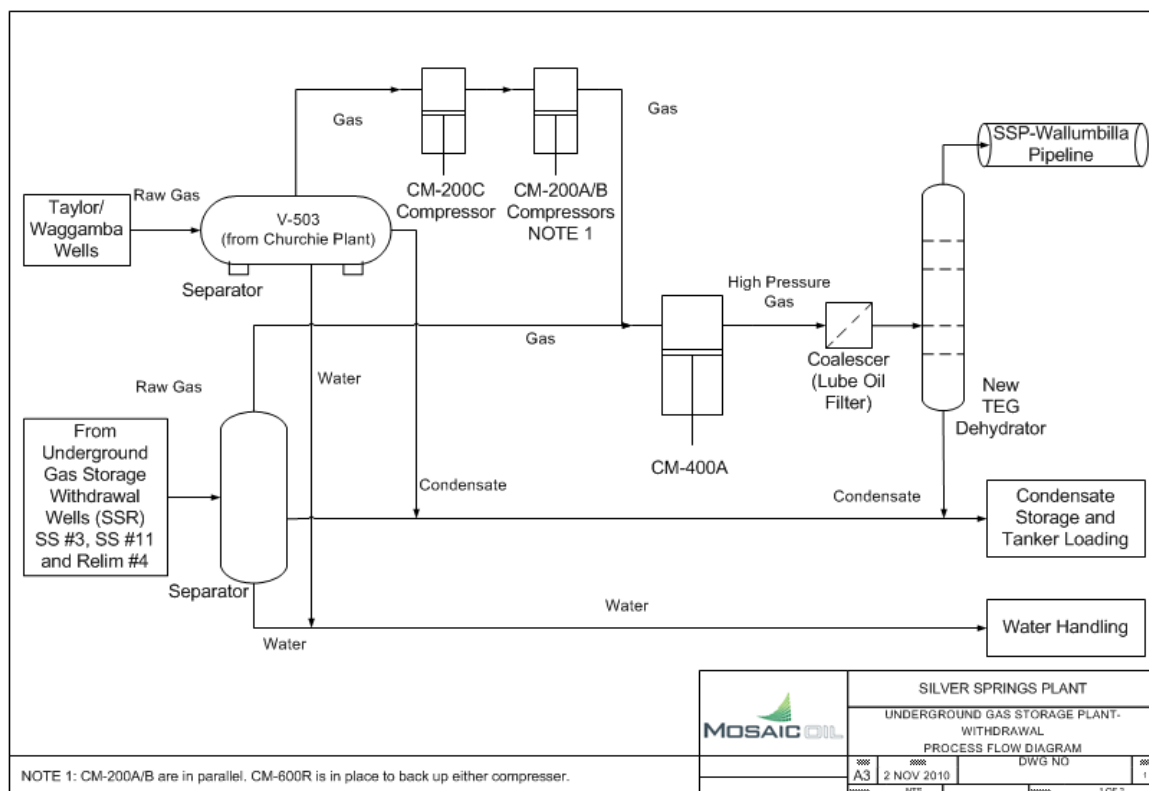


Figure 2.4.3: Silver Springs configuration during withdrawal stage

Processing support systems permanently in place

Condensate treatment

The oil/condensate flows to condensate storage tank TK-16, holding 955kL (Note twin tank TK-15 has been decommissioned) and periodically loaded into road tankers for transport to Brisbane. Any water present in the oil storage tank is drained to the interceptor pond.

Water treatment

Produced water from the production separators enters twin oil-water wash tanks (TK-06 and TK-07, 57kL and 50kL respectively) that skim off free oil into skimmed oil tank TK-08 (55kL). Oil is then transferred from TK-08 to oil storage tank TK-09 (55kL). The water is drained to an interceptor pond where any further oil is regularly skimmed off. The water then flows to a series of evaporation ponds.

Protective Systems

To minimise any safety or environmental risks, protective systems are installed at the plant, and on the pipelines. These systems include;

- Bunding of tanks,
- Overpressure protection,
- High pressure switches to shut off the inlet flow,



- Emergency shutdown on inlet and outlets,
- Pressure relief valves,
- Fusible loop systems which alarm or cause an emergency shutdown of the plant,
- And a permanent flare operates at the plant for emergency vapour releases.

Site Support

A camp and office are located at Silver Springs with a 20 person capacity. The usual occupancy is approximately 8 people onsite, 1 field supervisor, 3 operators, 1 mechanic, 2 handymen (required for general maintenance and repairs for facilities) and 1 cook. The camp also includes several sheds for maintenance of equipment and vehicles and storage of equipment and spare parts.

A landfarm, used to treat hydrocarbon contaminated soils, is also located at Silver Springs. It has an area of approximately 10,000 m² and is fully bunded to contain runoff.

Taylor Satellite Processing Plant (PL16)

The Taylor Satellite is currently shut-in as non-commercial. The facility will be modified for centralised well production testing using a separator at the plant from which the oil and water is sent to the tanks onsite.

The oil and water mixture is sent to a processing tank where water is manually conveyed to Evaporation Pond No.3 and the oil is pumped into an oil storage tank, from where it is periodically removed using tankers. The Taylor Satellite also contains a decommissioned compressor, power generators, compressed air facilities and one production separator.

The Taylor evaporation pond system consists of three ponds. Pond No.1 is being remediated, Pond No.2 is decommissioned, and Pond No.3 is intact and will occasionally be used as stated above.

To minimise any safety or environmental risks, protective systems are installed at the plant, and on the pipelines. These systems include;

- Bunding of tanks,
- Overpressure protection; high pressure switches to shut off the inlet flow,
- Emergency shutdown on inlet and outlets, pressure relief valves,
- Fusible loop systems which alarm or cause an emergency shutdown of the plant.

Beechwood Satellite Plant (PL16)

The Beechwood Satellite plant has been decommissioned and bypassed.

Sirrah Satellite Plant (PL16)

The Sirrah Satellite plant has been decommissioned and bypassed.



Production Operations Activities (PL16)

- Decommissioning of Beechwood Satellite Plant (removal of compressor and separator),
- Shut-in of Taylor Satellite plant (gas lift operations),
- Installation of beam pump units on Taylor-9, Taylor-16, Link-1 & Boggo Creek-2,
- Tie-in of Waggamba pipeline (PPL 93) into Taylor Satellite,
- Pipeline and surface facilities leak test survey,
- Microbiological introduced corrosion (MIC) aversion testing and treatment,
- Ultrasonic thickness testing on surface pipework,
- Update of piping & instrumentation diagrams (P & IDs),
- Preparation of hazardous area dossiers to comply with AS2430,
- Silver Springs Processing Plant: Simplification of instrumentation to reduce risk of instrumentation failure, and
- General audits of processing plants, wells, evaporation ponds, workshops and camp facilities (offices and lodgings).

The later development plan for this permit deals primarily with the further planned development of the Silver Springs/Renlim and Taylor fields, however, other activity may be carried out on the remainder of the permit. Other fields in the permit have no substantial incremental investment or activities planned for them at this time. Due to some of these fields extending into adjacent permits, Later Development Plans for PL48 and PL 49 are related to the Later Development Plan for PL 16, and will be submitted under separate cover.

3 Other Oil and Gas Fields

3.1 Taylor Field

There are a number of other fields within the lease that, in general terms, are now mature and into their decline phase. The Taylor Field lies approximately 15km east of the Silver Springs Plant. The field produces both gas and oil/condensate. This field also produces from the Showgrounds reservoir. Initial field pressures were observed to be somewhat pressure depleted through earlier Silver Springs gas production causing the drop in Silver Springs reservoir pressure to be hydraulically communicated to the Taylor Field by means of the aquifer. Taylor has been developed with twelve wells within PL16, and is currently producing around 1 - 2MMscfd through two wells.

Further activity is planned for the Taylor field after an integrated field study was performed earlier in 2010 to identify additional oil and gas recovery opportunities. The study comprised a full petrophysical review and construction of a detailed geological model, which then was exported into dynamic reservoir simulation. The entire history of pressures and production (gas, oil and water) was then history matched within the simulation model, and this model used to determine future field development options. A number of promising potential infill well opportunities have resulted from the model work, and it is possible these will involve the drilling of up to a further five Taylor wells in order to improve both gas and oil recoveries and production levels from the field.

3.2 Remaining Fields

PL16 also contains the Sirrah, Tinker, Boggo Creek and Beechwood fields. There is no significant further activity currently planned for these mature fields.

The Sirrah Field is situated in the southern region of PL16 approximately 5km southeast of the Silver Springs Plant. As with the Silver Springs/Renlim fields, Sirrah production has been from the Showgrounds Sandstone reservoir, and a common aquifer has been shown to underlie the gas columns in both fields, as well as in the Taylor field (to the east) and the Boxleigh field (in the neighbouring PL15 lease) to the west. There are four wells on the structure, and just two wells have demonstrated any ability to flow this year; the last time Sirrah 4 and Sirrah 5 produced any gas was in May 2010, for just a few days at low rates. Almost all expected reserves have been recovered.

The Tinker area lies in the northern region of PL16. Production from the Tinker Area includes contributions from the Tinker, East Glen, Link and Lark Fields.

Boggo Creek is approximately 10 km north of the Silver Springs facility. Low levels of production are expected to continue through just one well, Boggo Creek-2 on beam pump.

4 Provision of Information to meet Legislative Requirements

4.1 Legislative Requirement Section 53A

(1)(a) Overview of the activities proposed to be carried out under the lease or proposed lease during all of its term:

- Potential 3D seismic acquisition over the Silver Springs/Renlim and Taylor field and Tinker areas
- Drilling of up to 5 wells in the Silver Springs/Renlim area – one well planned in detail at this time
- Drilling of up to 5 wells in the Taylor field
- Potential drilling programme of up to 5 exploration wells within the PL16 area
- Continued production from existing, mature reservoirs with optimisation efforts to include pump installations at selected wells, particularly in the Taylor field

(1)(b)(i) Nature and extent of activities proposed to be carried out under the lease or proposed lease during the duration of the plan

Silver Springs-Renlim will continue to intermittently produce from free flowing gas wells (Silver Springs-2 and Renlim-5A) until the end of the year, when they will be shut in.

The conversion of the Silver Springs/Renlim field to gas storage is planned to commence as soon as possible in order to achieve first gas injection by 1 May 2011. **Please refer to Section 2 for the full details of the Gas Storage Project.**

Sirrah will continue to intermittently produce from free flowing gas wells (Sirrah-4 & Sirrah-5). Taylor (PL16 component) will continue to produce from Taylor-1 (free flowing

gas well), the two 2009 gas producers Taylor-20, Taylor-22 and from the beam pump well Taylor-18). A number of other wells are under active consideration for the installation of down-hole electric submersible pumps (ESPs) which is expected to increase and prolong oil (and gas) production. These include Taylor-8, -16 and Taylor-19. 3D seismic may be used to identify additional targets for development around the existing Taylor field reservoir. There is the potential for further infill drilling in the Taylor field, and the potential scope is for up to five additional wells targeting both oil and gas.

The Tinker complex will continue to produce from the current wells on the Tinker complex including Link, Tinker and East Glen fields. Production from the Boggo Creek Field is expected to continue, but from just one well, Boggo Creek-2 (beam pump) and just intermittently.

The Beechwood field last produced gas and condensate in 2002, and there are no current plans for any further development activity

Seismic may also be carried out over the Tinker complex to identify suitable drilling targets.

Up to 5 exploration wells may be drilled on the Tinker complex or elsewhere in the permit.

(1)(b)(ii) Where the activities are proposed to be carried out

A new 3D seismic survey over the Silver Springs/Renlim and Taylor fields is currently in the conceptual planning stage. The gas storage project will require refined geological and dynamic simulation model upgrades and the Taylor field, which has also been subjected to recent reservoir simulation, will also be a focus of improved understanding, to mitigate risk in further development drilling, therefore, it is likely that additional improved seismic data will be acquired over these areas in the next few years.

Continued production from mature assets, as described in **Section (1)(b)(i)** above, will be conducted using existing infrastructure.

(1)(b)(iii) Estimated cost of the activities

The estimated cost of a 3D seismic survey is in the order of \$2,000,000.

The average well cost in the PL16 area is around \$1,500,000 to \$2,500,000 depending on the details of well completion (eg artificial lift installation etc).

The cost of the Gas Storage Project is estimated to total \$32 million. Below is a breakdown of the different budget area costs in summary form:

<u>Cost Area:</u>	<u>Cost Break down:</u>
Project Management:	\$1.13 million
Construction:	\$10.16 million
Wells/Subsurface:	\$6.50 million
EPCM	\$14.10 million
Total:	<u>\$31.89M</u>

The wells/subsurface category includes the drilling and completion of one new, high injectivity/deliverability Silver Springs well, Silver Springs-12.

(1)(c)(i) Location and a verifiable estimate of the amount of petroleum in the reservoir

PL16 reserves estimated are summarised in Table 4.1 and Table 4.2 below.

Table 4.1: Gas Reserves for PL16

RESERVES	GAS RESERVES (BSCF)					
	Silver Springs - Renlim	Sirrah	Taylor Field (PL16)	Tinker Complex	Boggo Creek	TOTAL
2P	-	0.10	2.38	1.50	0	3.98

Table 4.2: Oil / Condensate Reserves for PL16

RESERVES	OIL / CONDENSATE RESERVES (MMBBL)					
	Silver Springs - Renlim	Sirrah	Taylor Field (PL16)	Tinker Complex	Boggo Creek	TOTAL
2P	-	0.00(2)	0.22	0.10	0.01	0.33

(1)(c)(ii) Standards and procedures used to make the estimate

- Silver Springs/Renlim

This field is the subject of planned conversion to gas storage. The field is now depleted and has experienced water breakthrough, and predominant water production at all existing production wells. There are no remaining reserves in the field. Following the first 3-year injection phase portion of the gas storage cycle (2011 – 2014), there will be approximately 44 Bscf of recoverable gas in the reservoir, assuming an average rate of gas injection over 3 years of 40 MMscfd.

- Taylor

In 2010 Mosaic undertook the construction of a detailed Petrel geological model, and its subsequent export to a dynamic reservoir simulator, used to history match the field's oil, gas and water production data, on an individual well basis, and the field's pressure data. This approach provides a deterministic hydrocarbons in-place (HIIP) volume at an expected, or most likely, level of confidence. This level of OIIP and GIIP is taken as the equivalent of the 2P (Proved + Probable) in-place volumes. Forecast future volumes of oil/condensate and gas production, derived from model input development activities (continued production from existing wells; production optimisation and additional drilling and completion of producing wells) then represent the expected, 2P, level of field reserves. These reserves have been tabulated in the foregoing Table 1. The Taylor model study is reported in the July 2010 'Dynamic Reservoir Modelling of the Taylor Field' by RPS

Energy Pty Ltd. Further to this study, RPS performed a Taylor Field Reserves Audit, October 2010, which documents the verifiable Taylor remaining recoverable reserves.

- Sirrah, Tinker, Boggo Creek

For the other fields in the lease (with indicated 2P remaining recoverable reserves summarised in Table 1) the range of 1P, 2P and 3P reserves have previously been estimated using both volumetric and decline analysis methods. Decline Analysis methods have been used to determine 1P reserves whilst Volumetric Analysis has been used to estimate 2P & 3P reserves in accordance with SPE Guidelines for reserve estimation. No updates to previous work defining recoverable reserves have been performed since the submission of the last LDP. The reserves summarised in Table 1 have been obtained by subtracting the recorded production from each field from the previous reserves number as reported in the last LDP: 'Petroleum Lease 16 Later Development Plan (13th April 2007 – 12th April 2012)'

(1)(c)(iii) Rate and amount of production proposed from the reservoir

The anticipated production for PL16 is summarised in Table 4.3 (Sales Gas) and Table 4.4 (Oil/Condensate) below.

Table 4.3: Gas Production Profile for PL16

YEAR	SALES GAS (BSCF)					
	Silver Springs/ Renlim	Sirrah	Taylor Field (PL16)	Tinker Complex	Boggo Creek	TOTAL
2011	-	0.02	1.19	0.03	0	1.24
2012	-	0.02	0.31	0.02	0	0.35
2013	-	0.02	0.15	0.02	0	0.19
2014	-	0.01	0.10	0.01	0	0.12
2015	-	0.01	0.08	0.01	0	0.10
TOTAL	-	0.08	1.83	0.09	0	2.00

Note: Ignores the withdrawal of newly injected gas planned in Silver Springs/Renlim

Table 4.4: Oil / Condensate Production Profile for PL16

YEAR	OIL / CONDENSATE (BBL)					
	Silver Springs - Renlim	Sirrah	Taylor Field (PL16)	Tinker Complex	Boggo Creek	TOTAL
2011	-	350	27,184	700	1,000	29,234
2012	-	300	23,416	600	900	25,216
2013	-	225	17,345	500	800	18,870
2014	-	175	15,442	400	750	16,767
2015	-	100	15,321	300	700	16,421
TOTAL	-	1,150	98,708	2,500	4,150	106,508

Note: Ignores the withdrawal of newly injected gas planned in Silver Springs/Renlim

(1)(c)(iv) Proposed production start

Production has been continuous from 1977 onwards from the Silver Springs/Renlim field (Sirrah, Taylor, Tinker Complex and Boggo Creek following). Regarding the Gas Storage Project, following the first 3-year injection phase portion of the gas storage cycle (2011 – 2014) in the Silver Springs/Renlim field, the current plan is to start withdrawing gas around mid-2014.

The provisionally planned new well drilling in Taylor could see new production come on stream in 2011, however, it is more likely that a new 3D seismic shoot would first be acquired, processed and interpreted over the Silver Springs/Renlim and Taylor areas prior to any well locations being finalised, and well drilling plans concluded.

(1)(c)(v) Schedule for the proposed production during the plan period

Refer to Tables 4.3 and 4.4 (**Section (1)(c)(iii)** above) for a possible schedule of production. Note this is the most optimistic scenario for the Taylor field, and assumes additional drilling and incremental production goes ahead without the benefit of any additional seismic acquisition.

(1)(f) Reasons why the plan is considered appropriate

The Gas Storage Project has been subject to detailed planning for over one year, but it is only since the recent acquisition of Mosaic Oil by AGL Energy that a commercial way forward has been defined, and the planning has been tuned to the specific requirements of the new British Gas – AGL contract for managing the coal seam ramp gas within the

greater LNG gas conversion scheme. Technically, studies have shown the potential to store some 70 - 80 Bscf gas within the Showgrounds reservoir at Silver Springs/Renlim. The current plan to store up to 44 Bscf is very conservative in comparison, however, this reflects the initial contract and the further planning carried out by AGL.

The proposed additional well drilling in Taylor is designed to maximize recovery from the Showgrounds reservoir using appropriate well completions and artificial lift, as has been the practice up to now. 3D seismic may assist in the identification and optimisation of robust infill well locations.

(1)(g) Regulation 7: Provide for the area limit of the natural underground reservoir

- Silver Springs/Renlim

Fig 4 (Top Showgrounds Formation Depth Structure Map) included within the Figures Section at the rear of the Plan illustrates the extent of the reservoir of interest for the Gas Storage Project. This map has been gridded, digitised and used within the simulation model during the detailed technical planning of the storage project.

- Taylor

Fig 4 also shows the extent of the productive reservoir, which is again the Showgrounds Sandstone, at Taylor. This map has been gridded, digitised and used within the simulation model during the further development planning of the field.

- Sirrah, Tinker, Boggo Creek

These fields are also included on Fig 4, and provide information on the areal extent of the reservoir. There has been no recent technical work performed addressing hydrocarbons in-place or reserves within these very mature producing fields, which would update any previous LDP submissions.

Regulation 7: Details, including the location, type and size, of any planned infrastructure intended to be located within the area of the proposed lease

Proposed work to achieve the conversion of the Silver Springs/Renlim depleted gas field to a gas storage utility is covered in **Section (1)(b)(i)** "Nature and extent of activities proposed to be carried out under the lease or proposed lease during the year" above. Details of the project's planned infrastructure for PL16 are provided in the foregoing sections of this LDP.

No additional infrastructure is planned for the remainder of PL16 for the duration of the plan, other than pump equipment and facilities and connecting flowlines for successful Taylor infill wells and possibly for successful exploration wells. Refer to Figs 2a, 2b for infrastructure location within PL16.

(2)(a) Highlight any significant changes from the current development plan for the lease

The Gas Storage Project plan represents a significant change from the current development plan for the Silver Springs/Renlim asset within the PL16 lease. The Silver Springs/Renlim field is now fully depleted, with no remaining recoverable reserves. This LDP presents details, timing, scheduling and costs of the intended field conversion, and covers the period from 4Q 2010 to 4Q 2015. This conversion extends the economic life of the asset.



There are no planned significant changes from the current development plan for the remainder of PL16, other than ongoing optimisation of Taylor production, additional drilling of Taylor infill wells and potentially further exploration drilling of prospects and leads within the lease. It is likely further 3D seismic will be acquired to improve the understanding of the structuring of certain areas of the lease and to reduce drilling risk.

(2)(b) Has the current development plan not been complied with? –and any details of, and the reasons for, each non-compliance

The current plan has been complied with and in some cases lease activities have exceeded requirements.

(3) Does the proposed plan significantly change an activity provided for under the current development plan for the lease? –and the reasons for the change

As discussed above in **Section (1)(b)(i)**, “Nature and extent of activities proposed to be carried out under the lease or proposed lease during the year”, and in **Regulation 7 Section (2)(a)**, “Highlight any significant changes from the current development plan for the lease”.

Significant change is planned for the Silver Springs/Renlim asset within the PL16 lease. The principal reasons for the change are as follows:

- The Silver Springs/Renlim field is fully depleted with zero remaining reserves
- There is a commercial opportunity to extend the life of the asset by converting it to a gas storage facility

(4) Possible cessation or reduction of petroleum production -

(a) petroleum production potential in the area of the lease

The Silver Springs/Renlim field is now fully depleted, and is scheduled to be fully shut in at the end of 2010 with the closure of the final two, intermittently produced wells Silver Springs-2 and Renlim-5A, which currently produce very little gas, and a lot of water for an extremely limited period about once per month or less.

There has otherwise been no outstanding cessation or reduction of petroleum production in the remainder of PL16 other than for planned maintenance of production, process and export facilities. However, all other fields are very mature and have exhibited continuing levels of decline reflecting this stage of their life, particularly Sirrah, Tinker, Boggo Creek and a number of individual wells in the Taylor Field.

(b) Market opportunities for petroleum production in the area of the lease

Not applicable.



PL 16 LATER DEVELOPMENT PLAN

Figures

Figure 1	Permit Location Map
Figure 2a	Current Infrastructure / Diagrammatic
Figure 2b	Current Infrastructure / Satellite Image
Figure 3	Well and Seismic Location Map
Figure 4	Top Showgrounds Formation Depth Structure Map

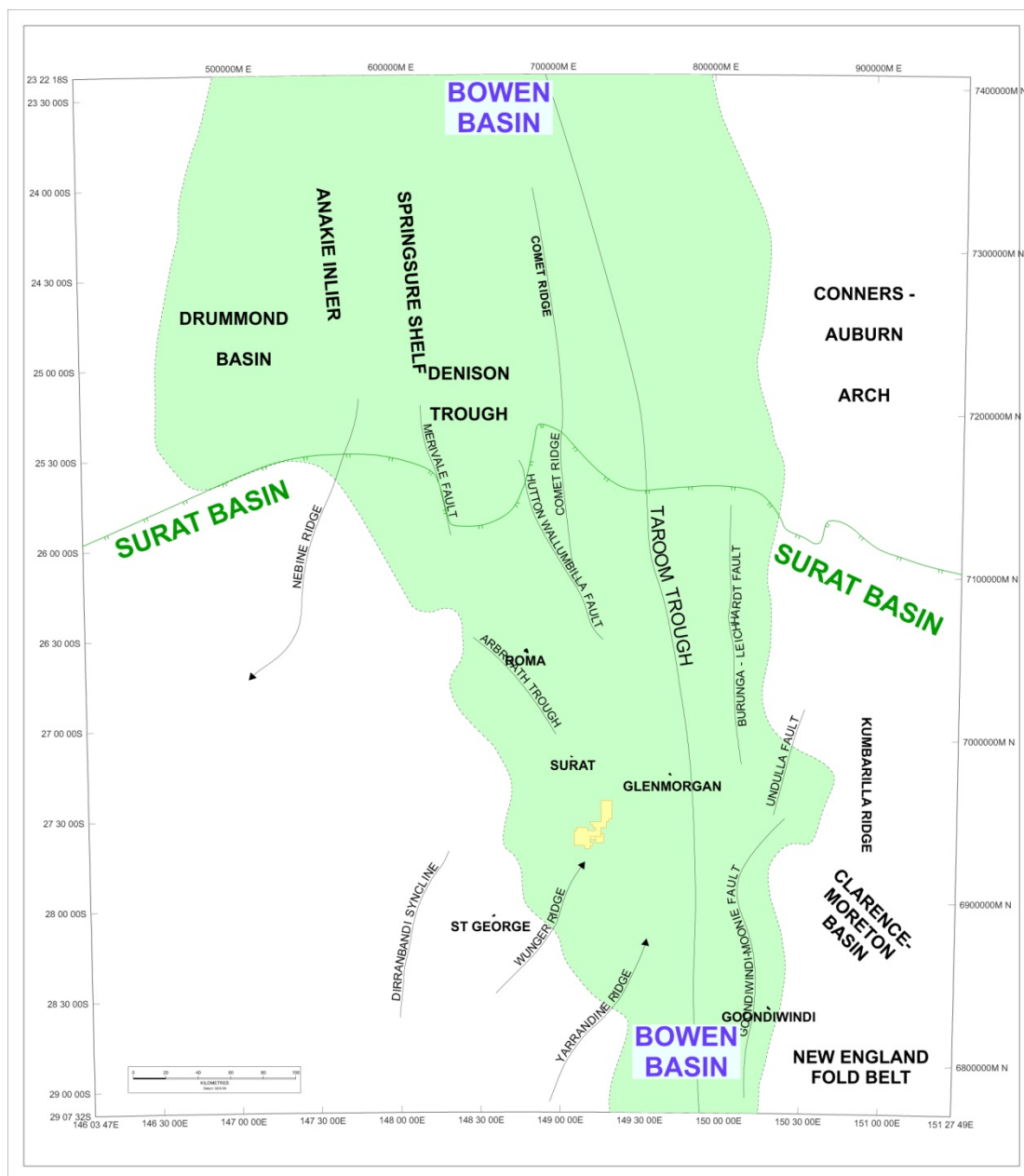


Figure 1: Permit Location Map

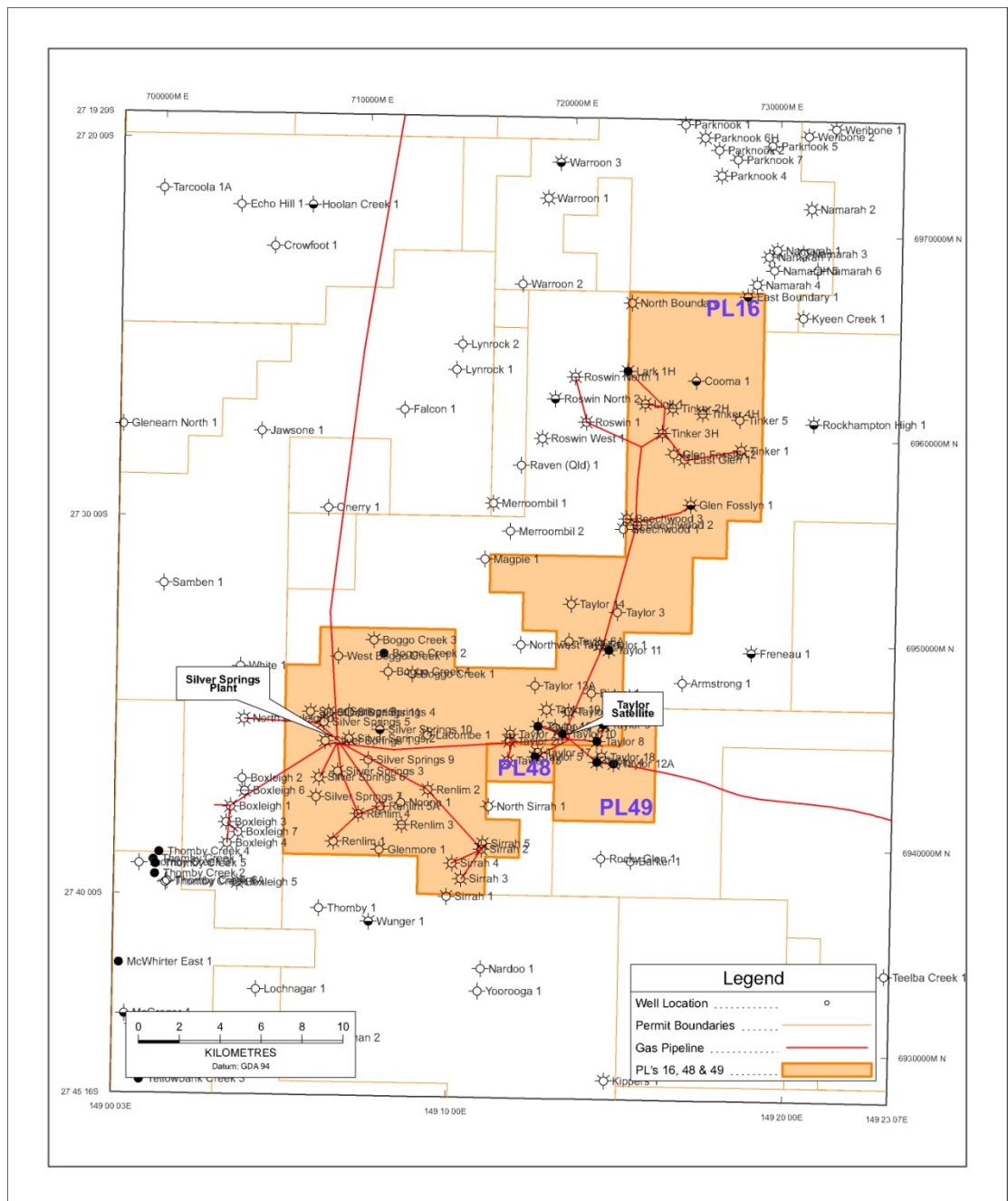


Figure 2: Current Infrastructure / Diagrammatic

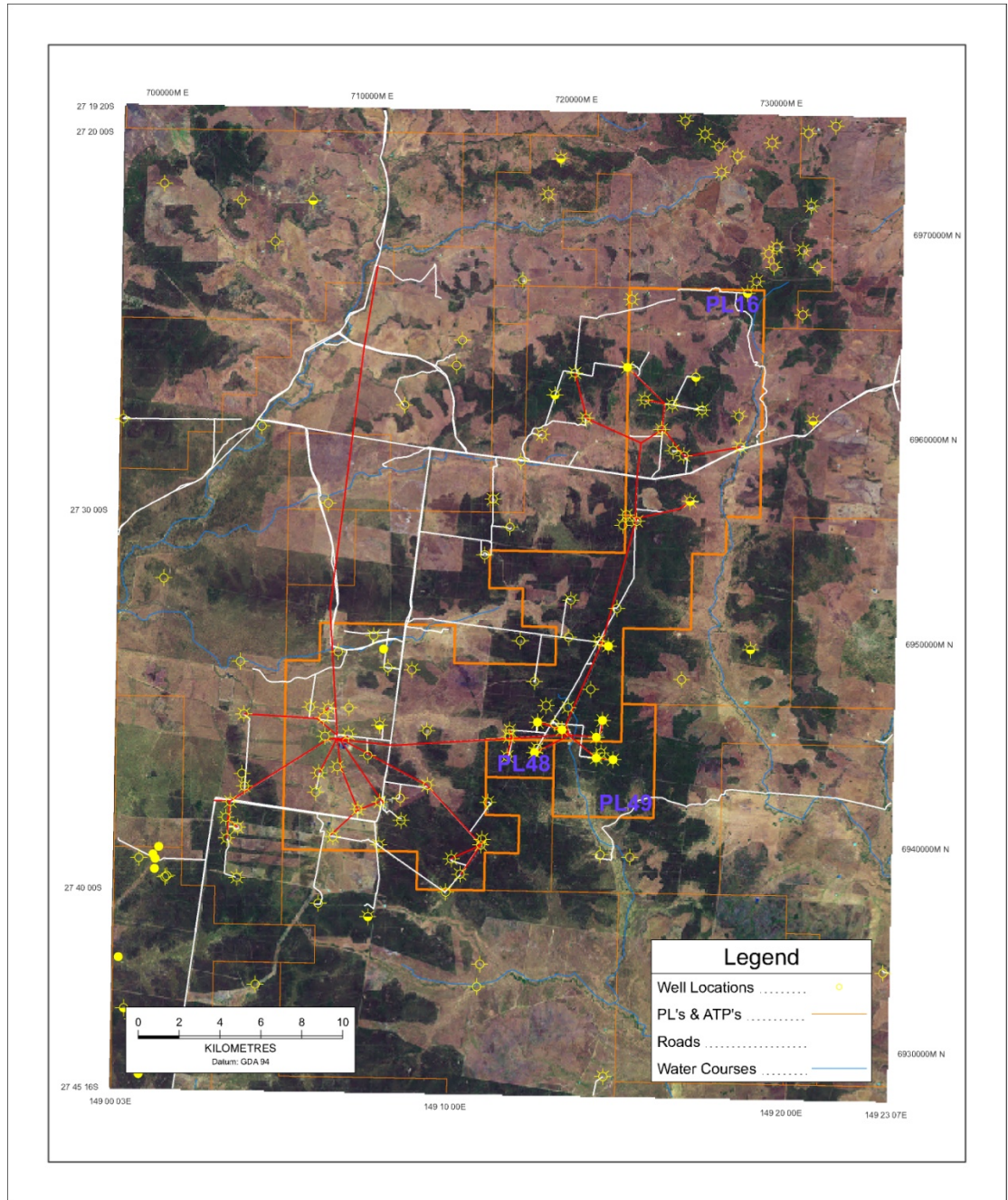


Figure 2b: Current Infrastructure / Satellite Image

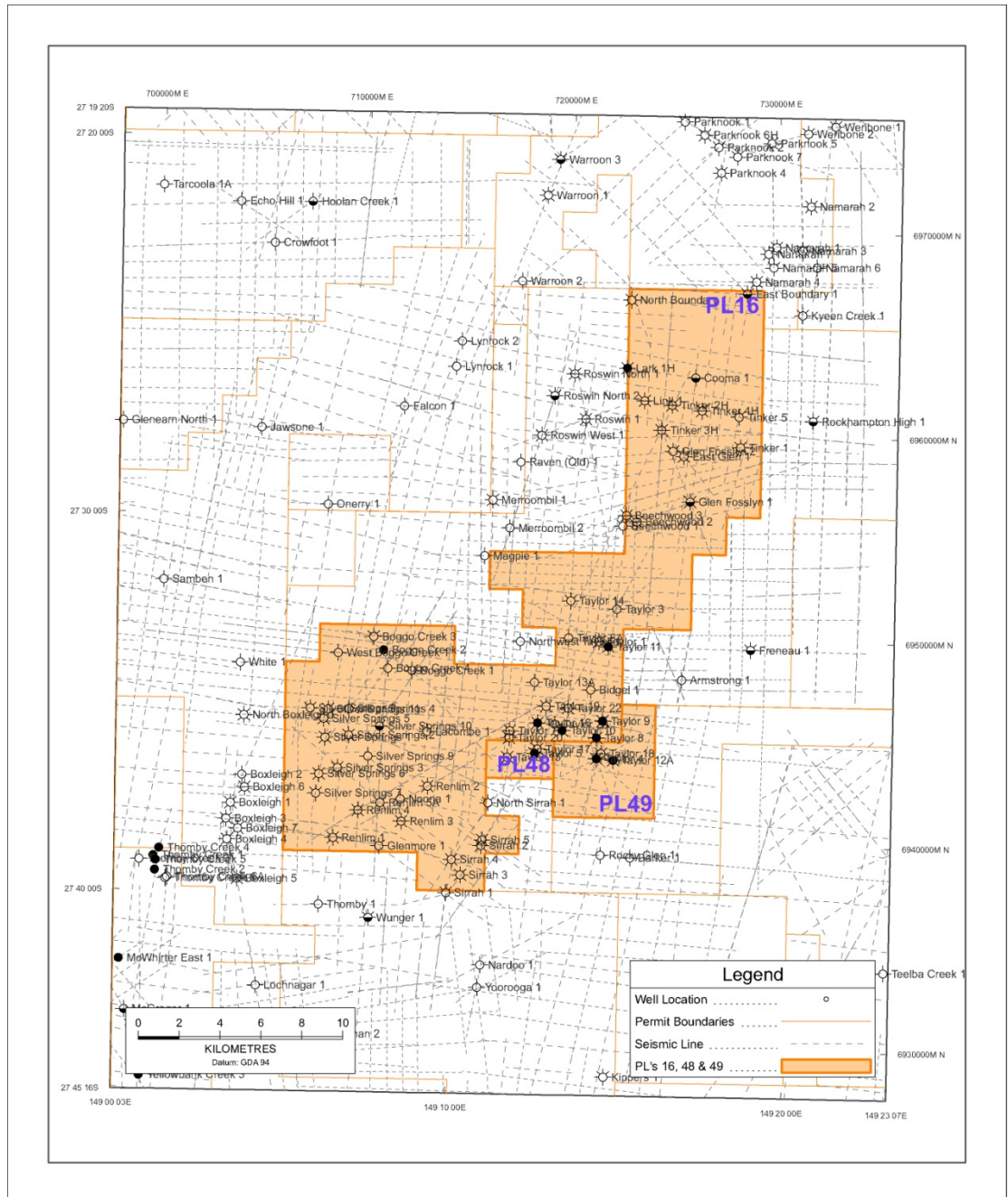


Figure 3: Well and Seismic Location Map

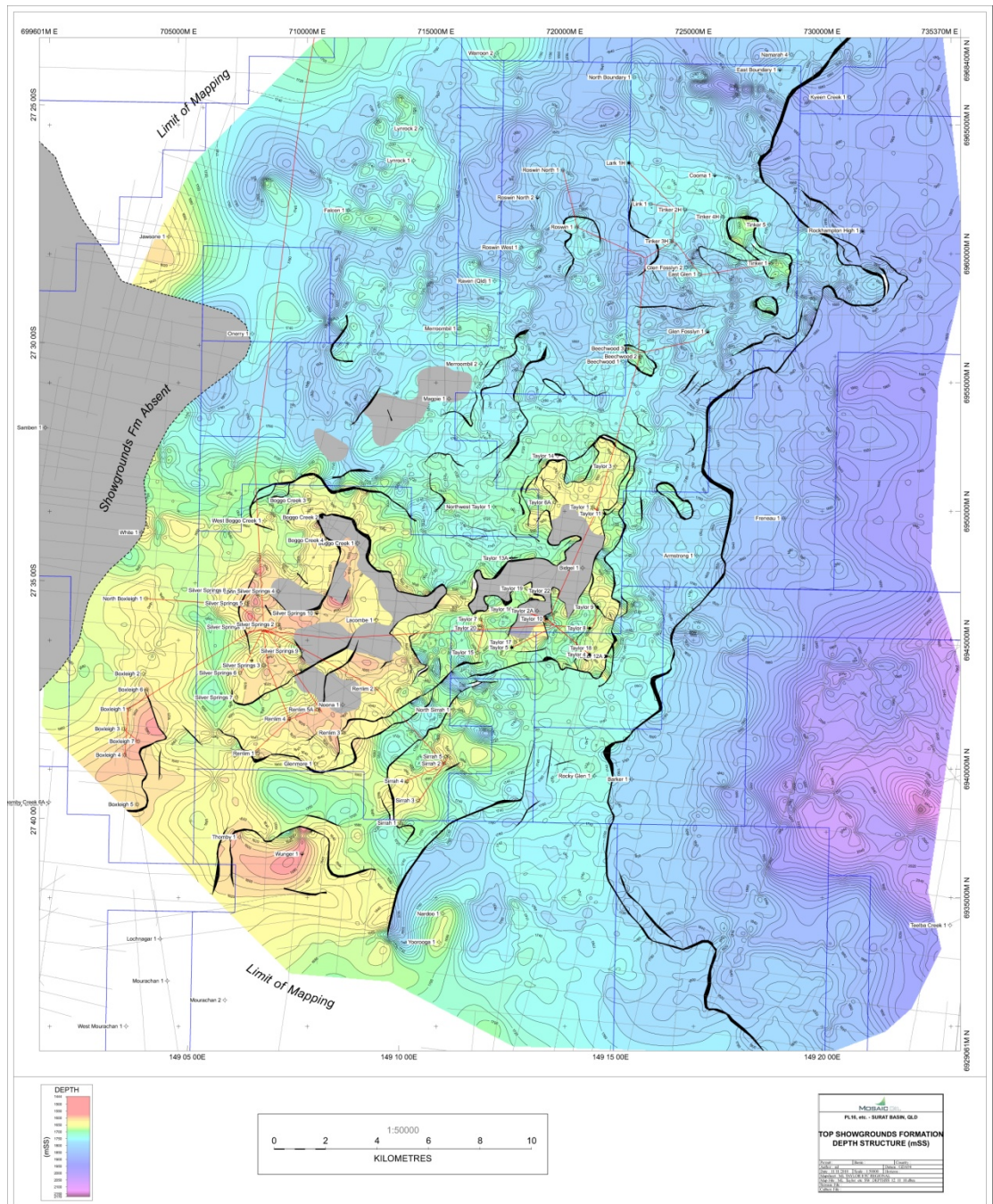


Figure 4: Top Showgrounds Formation Depth Map