Amendment Report

Application for Licence Amendment

Part V Division 3 of the *Environmental Protection Act 1986*

Licence Number	L8731/2013/1
Licence Holder	Santos WA Energy Limited
ACN	009 301 964
File Number	DER2016/001677-1
Premises	Devil Creek Gas Plant Fourty Mile Beach Road MARDIE WA 6714 Legal description - Lots 5001 and 5002 on Deposited Plan 53412, Lot 5008 on Deposited Plan 53413 Certificate of Title Volume 3154 Folios 221, 222 and 228 As defined by the premises map in Schedule 1 of the Revised Licence
Date of Report	10 February 2023
Decision	Revised licence granted

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1. Decision summary

Licence L8731/2013/1 is held by Santos WA Energy Limited (licence holder) for the Devil Creek Gas Plant (the premises), located at Lots 5001, 5002 and 5008, Forty Mile Beach Road, Mardie, Western Australia.

This Amendment Report documents the assessment of potential risks to the environment and public health from a proposed extension to the timeframe for operating the premises Evaporation Ponds at a reduced freeboard of 500 mm, requested by the licence holder. As a result of this assessment, Revised Licence L8731/2013/1 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this amendment report, the Department of Water and Environmental Regulation (the department; DWER) has considered and given due regard to its regulatory framework and relevant policy documents which are available at https://dwer.wa.gov.au/regulatory-documents.

2.2 Application summary

On 4 January 2023, the licence holder submitted an application to the department to amend the Devil Creek Gas Plant licence L8731/2013/1 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The licence holder applied to temporarily reduce the freeboard requirement specified on the licence for the premises evaporation ponds from 800 mm to 500 mm for the period 9 January to 10 February 2023.

The temporary freeboard reduction was requested due to the evaporation ponds receiving an increased volume of production water as a result of production from the premises needing to be increased from December 2022 and the gas supply (Reindeer Reservoir) nearing end of life resulting in increased produced water volumes. The production increase was required to ensure State gas supply continuity in response to a series of broader gas supply incidents and events as outlined in the State Government media statements on 7 January 2023 and 8 January 2023 (available at https://www.mediastatements.wa.gov.au). The licence was amended to authorize the temporary freeboard reduction subject to controls on 11 February 2023.

On 3 February 2023 the licence holder submitted an amendment application for L8731/2013/1 to extend the period which the evaporation ponds can operate with a reduced freeboard of 500 mm to 14 August 2023. The application stated the amendment is required due to:

- the ponds being at 95-100% of capacity (based on 500 mm freeboard) at the time of the application;
- well intervention activities undertaken in January 2023 to reduce produced water volumes being unsuccessful with volumes continuing to increase;
- continued increased gas production from the Devil Creek Plant being required for domestic gas supply in Western Australia due to the start-up of the Spartan field (additional gas supply to Varanus Island) being delayed until later in the year; and
- the plant being required to shut down on 10 February 2023, and operated via batch operation, to manage increasing the freeboard back to 800mm as per licence condition 1.3, which would impact on the ability of the plant to continue to meet domestic gas demands.

The application also stated the licence holder is investigating other options to manage increased water volumes and is intending to submit a further amendment application seeking a permanent reduction of the evaporation pond freeboard to 500 mm.

2.3 Background

2.3.1 Premises details

The premises is located approximately 65 km southwest of Karratha. The gas plant processes gas and liquids from the Reindeer gas field which are transported onshore from an offshore platform to produce natural gas for the domestic market and condensate. The premises has four high density polyethylene (HDPE) lined evaporation ponds for disposal of wastewater produced on the premises and from the adjacent Devil Creek Accommodation Village also operated by the licence holder.

The evaporation ponds primarily receive treated produced water recovered from the gas during processing which has undergone treatment via hydrocyclones and a stripping column designed to reduce hydrocarbon content to 30 mg/L. The maximum production rate of produced water is facility limited at 76 m^3/hr. The ponds also receive treated wastewater from the accommodation village (average of 1.69 m^3/hr), the premises sewage treatment system (<0.5 m^3/day) and the Contaminated Stormwater Pond (estimated to occur 1-2 times per year if the ponds reach capacity with a total inflow based on the pond capacity approximately 3,660 m^3).

The ponds are approximately 150 m by 150 m, have been excavated to a depth of approximately 1.6 m and have constructed embankments of approximately 0.8 m (total depth of 2.4 m). The ponds were designed and constructed with a freeboard of 0.8 m (equivalent to the embankments) which includes an allowance of 300 mm to account for a 1 in 100 year, 24 hour rain event and an additional 500 mm.

2.3.2 Climate

The premises is located in the Pilbara region of Western Australia which is characterised by very hot summers, mild winters and low and variable rainfall. From late spring to early autumn (November–April) is the region's wet season which is characterised by hot temperatures (daily maximum temperatures averaging 36–37 °C) and the majority of the annual rainfall occurring. Wet season rains are associated with the Australian monsoon and occasional tropical cyclones. Tropical cyclones cause the most extreme rainfall events and generate 25–34% of the total annual rainfall near the Pilbara coast. Hot, dry and sunny conditions mean the Pilbara is also subject to very high evaporative demand (Sudmeyer 2016).

A summary of historical rainfall and evaporation data from the Bureau of Meteorology (BOM) Mardie weather station (05008) is provided in Table 1 with data most relevant to the assessment highlighted.

Table 1. BOM Mardie weather station 05008 monthly climate statistics (all years of data 1885-2022)

Month	Average monthly rainfall (mm)	Highest monthly rainfall (mm)	Decile 9 monthly rainfall (mm)	Highest daily rainfall (mm)	Monthly evaporation[1] (mm)
January	37.6	259.6	110.2	211	275
February	62.4	675.2	162.3	364	225
March	48.5	330.4	167	241.3	225
April	19.4	222	77.6	183	225
May	38.7	257.2	112.3	130.6	200
June	36.8	274.9	100.9	131.3	175
July	13.6	150.6	39.2	89.8	175
August	7.0	117.1	18.4	39.9	200
September	1.3	63.5	2.7	63.5	250
October	0.8	24.4	1.2	16.3	375
November	1.5	32.2	2.6	21.4	400
December	9.1	171.3	32.6	168.6	300

NOTE 1: Monthly average pan evaporation based on BOM pan evaporation maps for the period1975-2005 (http://www.bom.gov.au/climate/maps/averages/evaporation)

3. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guideline: Risk assessments* (DWER 2020).

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission. The key emissions and associated actual or likely pathway during premises operation which have been considered in this Amendment Report are detailed in Table 2 below. Table 2 also details the control measures the licence holder has proposed to assist in controlling these emissions, where necessary, and the potential human and environmental receptors that may be impacted as a result of these emissions *(Guideline: Environmental siting* (DWER 2020)).

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for those emission sources which are proposed to change and take into account potential source-pathway and receptor linkages identified in Table 2.

Where the licence holder has proposed mitigation measures/controls these have been considered when determining the final risk rating. Where the Delegated Officer considers the licence holder's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the licence as regulatory controls.

Additional regulatory controls may be imposed where the licence holder's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 2.

The conditions in the Revised Licence have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

Table 2. Risk assessment of potential emissions and discharges from the premises during operation

Risk Event					Risk rating[1] C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions[2] of amended licence	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Controls**				
Storage and disposal of treated produced formation water, treated hydrocarbon contaminated water from the Contaminated Water Pond and treated sewage from the Devil Creek Accommodation Village in four HDPE lined evaporation ponds, with a reduced freeboard (500 mm) for approximately 7 months.	Contaminated wastewater (hydrocarbons, nutrients and elevated salinity)	Direct discharge to ground due to overtopping of the ponds which may result in soil contamination, flooding and vegetation smothering in surrounding area and runoff toward surrounding seasonal drainage watercourses potentially impacting the health of the watercourse and vegetation.	– Minor seasonal watercourses ~300-800 m north and west of the ponds – Devil Creek ~600 m east of the ponds (gas plant in between) – Vegetation within the Priority 3 Horseflat Land System of the Roebourne Plains Ecological Community (located within the extent) – Groundwater is approximately 10 mbgl.	Condition 1.3.2 of the licence requires evaporation ponds E1-E4 to be operated with a minimum freeboard of 500 mm subject to: – maintaining visible freeboard markers; – daily visual inspection and recording of water levels; – review of BOM 7-day forecasts; and – restricted inflow to ponds with a freeboard of less than 600 mm in the event a significant rainfall event is forecast. Other controls the licence holder will implement include (ref Santos 2023a): – Rate of discharge into the ponds to be reduced to match evaporation rates (or less) if three ponds are full to the 500 mm freeboard level and the fourth pond exceeds the 800 mm freeboard level – Production to be shut-in if all ponds achieve maximum operation level of 500mm freeboard. – Production not to be restarted until freeboard for at least one pond has reduced to below 800 mm. – The maximum produced water production rate is facility limited at 76m^3/hour which is approximately equivalent to 130mm/day on a single pond. – BOM weather forecast to be discussed in morning operational meetings. – The maximum rain event (1 in 100 year) is designed for as 300mm over 24-hour period.	C = Moderate, low level offsite impacts at a local scale L = Rare, risk event may only occur in exceptional circumstances **Medium Risk**	N	**Condition 1.3.2** **Condition 4.3.1**	The evaporation ponds are proposed to operate with a reduced freeboard of 500 mm during the Pilbara wet season, when the region is subject to higher rainfall and potentially to cyclonic activity and tropical lows with associated heavy rainfall and flooding which presents an increased risk of overtopping. The delegated officer noted that this risk was assessed and conditions included in the licence (1.3.2) to mitigate this risk on the basis the freeboard reduction would be for a little over a month, with conditions providing for a transition period where water levels would reduce to a freeboard of 800 mm. It was also noted that the freeboard includes a 300 mm allowance to contain a 1 in 100 year 24 hour storm event with an additional 200 mm. The delegated officer referred to relevant climate data (Table 1) and found that the maximum recorded daily rainfall exceeds this (364 mm in February 1995 when the highest monthly rainfall also occurred) but is still within the 500 mm freeboard allowance. Additionally, the 90% percentile monthly rainfall for the months where there will be a reduced freeboard is less than 200 mm which is less than the monthly evaporation rates. It also significantly decreases from April indicating a period of lower risk. Given the above the delegated officer considered the proposed temporary freeboard reduction (including the extension until 14 August 2023) does not present an unacceptable risk for the finite period proposed, subject to the controls specified in condition 1.3.2 to mitigate the risk of overtopping. The delegated officer considered it necessary to extend visual inspections to include the pond embankments to ensure the operational change does not impact the structure. Noting that what was originally a very short-term operational change has been extended to a period of approximately seven months, the delegated officer also included monthly reporting requirements to ensure the department is informed of the performance of the ponds for the duration of the change. Any breach of the specified 500 mm freeboard would be considered a limit exceedance and therefore as per condition 4.3.1 must be reported to the department no later than 5 pm of the next working day.

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: Risk assessments* (DWER 2020).

Note 2: Proposed licence holder's controls are depicted by standard text. **Bold and underline text** depicts additional regulatory controls imposed by department.

4. Consultation

The licence holder was provided with the draft decision on 9 February 2023. The licence holder responded on 10 February 2023 advising they agreed with the changes and waived the remainder of the consultation period.

5. Decision

The delegated officer has determined the proposal to extend the timeframe for the evaporation ponds to operate at the reduced freeboard of 500 mm, does not pose an unacceptable risk of impacts to public health or the environment. The determination is based on the following:

- the ponds having adequate capacity to contain a 1 in 100 year 24 hour storm event when operated with a reduced freeboard;
- the freeboard reduction being authorised only for a restricted period until 14 August 2023 which will allow the Devil Creek Plant to continue to supplement the State's domestic gas supplies as required during this period; and
- existing licence controls to manage the risk of overtopping when operating at a reduced freeboard being applied to the extended period.

The delegated officer has specified a time frame of 14 January to 14 August 2023 in which the evaporation ponds can be operated with a reduced freeboard of 500 mm. The normal operating freeboard of 800 mm will apply from 15 August 2023. Noting the licence holder's intention to submit a licence amendment application seeking to permanently reduce the freeboard of the ponds to 500 mm, the grant of this amendment should not be interpreted as any assessment or implied acceptance that ponds can be permanently operated at a reduced freeboard of 500 mm. Any assessment of a permanent change to the evaporation pond freeboard will be assessed on its own merits.

Based on the assessment in this Amendment Report, the Delegated Officer has determined that a Revised Licence will be granted, subject to conditions commensurate with the determined controls.

5.1 Summary of amendments

Table 3 provides a summary of the proposed amendments and will act as record of implemented changes. All proposed changes have been incorporated into the Revised Licence as part of the amendment process. Changes made as a result of consolidating the licence are also details in the table but do not change any existing obligations on the licence holder.

Table 3: Summary of licence amendments

Condition no.	Proposed amendments
1.3.2 (Table 1.3.2)	Table 1.3.2 has been amended to increase the duration the evaporation ponds can be operated at a reduced freeboard to 14 August 2023. Visual inspection of the pond integrity has been added as a requirement due to the operational change being in place for a longer period than initially assessed. Conditions restricting inflow to manage water levels back to a freeboard of 800 mm have been removed as they are no relevant to the operational change.
4.3.1	Monthly notification/reporting of pond water levels and inspection outcomes has been included due to the operational change in place for a longer period than initially assessed.

References

1. Apache Energy 2011, *Devil Creek Licence application including attachments*, Perth WA
2. Bureau of Meteorology (BOM) 2023a, *Climate Data Online – Climate statistics Mardie site number 05008*. Accessed January 2023 at http://www.bom.gov.au/climate/data/.
3. BOM 2023b, *Australian Bureau of Meteorology Climate outlooks—weeks, months and seasons (Weekly rainfall outlook scenario)*. Accessed January 2023 at http://www.bom.gov.au/climate/outlooks/#/rainfall/total/75/weekly/0
4. Department of Environment and Conservation 2012, *Devil Creek Gas Plant W4560/2009/1 Environmental Assessment Report (issued 2009, updated 2012)*, Perth, Western Australia.
5. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
6. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
7. DWER 2020a, *Guideline: Risk Assessments*, Perth, Western Australia.
8. Santos WA Energy Limited (Santos) 2023a, *Application for a Licence amendment for L8731/2013/1 under the Environmental Protection Act 1986 (including application form and attachments)* (A2148301 and A2148302).
9. Santos WA Energy Limited (Santos) 2023b, *Application for a Licence amendment for L8731/2013/1 under the Environmental Protection Act 1986 (including application form)* (DWERDT721892).
10. Sudmeyer, R 2016, *Climate in the Pilbara, Bulletin 4873, Department of Agriculture and Food*, Perth, Western Australia.