





2020-2021 NEERABUP STACK EMISSIONS MANAGEMENT PLAN (SEMP) ANNUAL COMPLIANCE REPORT NewGen Neerabup Pty Ltd

Shell Energy Power Generation Pty Ltd ABN 44 117 443 035

3/11/2021

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1. Executive Summary

This annual audit and Stack Emissions Management Plan (SEMP) Compliance Report is produced internally by NewGen Neerabup and covers the period from 1st July 2020 to 30th June 2021.

The following is a summary of the key points in this report;

- This report is an internal audit of the SEMP for the period 1 July 2020 to 30 June 2021.
- This annual report identifies compliance with the SEMP.
- Strategen Environmental Consultants Pty Ltd are currently investigating Section 46 revisions to streamline some of the duplicated reporting requirements that exist within other DWER reporting requirements (DWER Annual reporting and SEMP reporting requirements).
- As required by the environmental licence, annual stack emissions testing was conducted by NATA accredited Ektimo Pty Ltd on the following dates;
 - o Unit 12 27th October 2020
 - o Unit 11 29th October 2020

The results of these tests were within the defined limits.

- An external compliance audit of the SEMP was conducted 18th November 2020 by Strategen-JBS&G, Environmental Consultants, report dated 4th January 2021, for the audit period 1st July 2019 to 30th June 2020 for the Ministerial Statement and also for the Bankers Audit. This external audit included a review of the SEMP and found compliance with the SEMP.
- The next external compliance audit of the SEMP is currently scheduled for November 2021, for the audit period 1st July 2020 to 30th June 2021 for the Ministerial Statement and also for the Bankers Audit. Strategen-JBS&G Environmental Consultants will again be engaged to undertake this external compliance audit.
- Complaints procedures and register have been developed; no complaints have been received to date. NewGen Neerabup also regularly completes (annually) pipeline landowner and other relevant third parties that are located within 500meters of the pipeline easement and power station (eg; all close neighbouring residences and business), no complaints have been received via this consultation process.

2. Introduction

The NewGen Neerabup Power Station (NewGen Neerabup Pty Ltd) was commissioned in October 2009 and is operated by Shell Energy Power Generation (Shell acquired ERM Power and all its subsidiaries in November 2019).

The power station is owned by NewGen Neerabup Partnership (ABN: 63 218 761 290), a 50%/50% partnership, Comprising;

- EIT NEERABUP POWER PTY LTD (ACN: 128 916 478), [Infrastructure Capital Group]
- SHELL ENERGY NEERABUP PTY LTD (ACN: 126 964 583)

NewGen Neerabup Partnership has appointed the Operator under an Operations and Maintenance Service Agreement, SHELL ENERGY POWER GENERATION PTY LTD (ACN: 117 443 035).

The Power Station's environmental licence is issued to NEWGEN NEERABUP PTY LTD (ACN: 126 965 722), that contains the following members under the NEWGEN NEERABUP PTY LTD ASIC registration;

- SHELL ENERGY NEERABUP PTY LTD (ACN: 126 964 583)
- EIT NEERABUP POWER PTY LTD (ACN: 128 916 478)

The power station is listed as a Prescribed Premises, category 52 under Part IV of the Environmental Protection Act 1986 (EP Act). The power station is covered by an EP Act licence (L8356/2009/2). This report documents the licence compliance of the operation for the period 1 July 2020 to 30 June 2021.

This document satisfies reporting conditions of the licence as defined by Sections 5.2 and 5.3 of the licence and presents results and discussion of licence requirements for the 2020/2021 financial and annual reporting year.

3. Key Recommendations / Future Work

• Complete the next external audit for the 2020-2021 period. This external audit is currently scheduled to be conducted by Strategen-JBS&G in November 2021. Currently scheduled in MEX Work Order #12017 and will be subsequently reported within the 2021-2022 SEMP reporting period.

4. SEMP Conditions

As defined by the section 13.0 of the stack emissions management plan, this report evaluates compliance with the requirements of the Stack Emissions Management Plan, December 2019 Rev 3.0 (SEMP) as agreed with by the Office of Environmental Protection Authority (OEPA) and NewGen Neerabup.

The SEMP was revised 12th July 2021 to Rev 4 as part of the Shell Energy transition, with only minor amendments made to formatting and also a change to the public facing generation regulatory hyperlink.

Section 13/table 5 of the stack emissions management plant defines the key management actions/compliance requirements of the SEMP annual compliance report and comments on the status of these requirements are summarised in table 1.

Ref #	Timing / Phase	Key Management Action	DWER	Reviewed comments/status
			Reporting/Evidence	
SEMP1	Post- commissioning	Monitor emissions from the exhaust stack as specified in Section 7.1 Table 4	Results submitted to DWER	As per • Section 4.1 • Section 4.2 • Section 4.4 • Section 4.5 • Section 5.0 / This annual compliance report
SEMP2	Ongoing	Monitor NOx emissions from the exhaust stack as specified in Section 7.1 Table 4	Notification letter sent to DWER in the event of an exceedance, summarise performance in annual report, logged data available on request.	As per Section 4.1 Section 4.2 Section 4.4 Section 4.5 Nil Incident reports / Appendix 2 Section 5.0 / This annual compliance report
SEMP3	Ongoing	Monitor and respond to community complaints, record actions as specified in Section 7.2	Summarise performance in annual report, logged data available on request.	As per • Section 4.5 • Nil external complaints / Appendix 3 • Section 5.0 / This annual compliance report
SEMP4	Annual	Monitor carbon monoxide, and other stack parameters as specified in Section 7.1 Table 4	Summarise performance in annual report, logged data available on request.	As per Section 4.1 Section 4.2 Section 4.4 Section 4.5 Annual stack test reports / Appendix 1 Section 5.0 / This annual compliance report
SEMP5	Annual	Prepare annual compliance report	Analyse monitoring results, submit to DWER with annual report	As per Section 4.4 Section 4.5 Section 4.6 Section 4.7 Section 4.7 Section 4.8 Section 4.9 Section 5.0 / This annual compliance report
SEMP6	Ongoing	Preventative maintenance	Complete maintenance log, logged data available on request	As per Section 4.1 Section 4.2 Section 4.3 Section 4.4 Section 4.5 Section 4.6 Section 4.7 Section 4.7 Section 4.8 Maintenance management system database Inspection Plan Schedule/ Appendix 4 This annual compliance report

Table 1 - Key management actions

4.1 SEMP Conditions

As defined by the section 6.1 of the stack emissions management plan, the power station shall be designed and constructed to comply with the emission concentration targets specified in section 5.1 of the stack emissions management plan. The power station will utilise low NOx burners to ensure that emissions of oxides of nitrogen are minimised as far as is practicable.

4.1.1 Evidence

Emission concentration targets are specified in section 5.1 of the SEMP and as summarised in table 2 below;

Table 2 – SEMP atmospheric emission concentration tar	gets.
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	•		•	
Gas-turbine	Air pollutant	Operational Condition ⁻¹	Emission concentration Target ^{-2, 3}	Averaging period
Unit 1 and 2	Oxides of nitrogen	All	25 ppmv or 51 mg/Nm ³	1-hour
Unit 1 and 2	Carbon monoxide	All	10 ppmv or 12.6 mg/Nm ³	1-hour

Table notes;

Excluding start-up, shutdown, initial commissioning and other times when the units are operating below 60% maximum load.

²Corrected to 15% O₂ basis.

³ mg/Nm³, corrected to 101.3 KPa, 273 K.

The design criteria in "General Turnkey Specifications, NEERABUP POWER STATION, March 2007, Commercial-In-Confidence, ERM Power", which was supplied to prospective plant providers, includes NOx emission target of 25ppmv. Note: the design specifications precede the SEMP by over two years.

- Low NOx burners were included in the design and have been installed on the commissioned units in 2009.
- Refer to section 4.2 Operations and section 4.4 Atmospheric Emissions
- Refer to Annual stack test reports / Appendix 1
- All emissions testing performed to date has verified that emissions measured are below the targets in table 2 of section 5.1 of the SEMP.

4.1.2 Comments

Remains compliant.

4.2 Operations & Maintenance

As defined by the section 6.2 of the stack emissions management plan, the power station shall be maintained and operated in a proper and efficient manner and in accordance with the manufacturer's operation and maintenance manual to ensure compliance is achieved with the emission concentration targets specified within section 5.1 of the stack emissions management plan

4.2.1 Evidence - Maintenance

Maintenance planning schedules are in accordance with the manufacturer's requirements (refer to attached Inspection Plan Schedule in Appendix 4).

Maintenance on the Neerabup gas turbines are triggered by the number of starts rather than the equivalent operating hours (EOH) due to the peaking nature of Neerabup Operations. (Short runs with frequent starts).

The Siemens OEM schedules peaking power station's minor inspections at 250 starts (+/- 10starts) or 8,000EOH whichever is earlier. Table 3 indicates all the required outages have been undertaken. Table 4 indicating status at the end of the financial/reporting year.

1st Minor inspection (Starts Based) 2nd Minor inspection (Starts Based)			s Based)	3rd Minor inspection (Starts Based)			4th Minor inspection (Starts Based)								
	1st minor inspection	Starts count @ 1st minor	EOH @ 1st minor	2nd minor inspection	Starts count @2nd minor	EOH @ 2nd minor	Total Starts from 1st to 2nd minor	3rd Minor inspection (Starts Based)	Starts count @3rd minor	EOH @ 3rd minor	Total Starts from 2nd to 3rd minor	4th minor inspection	Starts count @4th minor	EOH @ 4th minor	Total Starts from 3rd to 4th minor
Unit 11	19-Nov-14	273	6,159	10-Nov-17	523	10,991	250	26-Feb-20	785	16,356.70	262	1-Oct-21	1,027	20,804	242
Unit 12	21-Nov-14	272	5,851	7-Nov-17	523	10,623	251	29-Feb-20	788	16,555.90	265	16-Oct-21	1,032	21,170	244

Table 3 - Outage History.

As at the 30th June 2021 the units were within the OEM maintenance triggers. The fourth Minor inspection was completed in October 2021.

Table 4 - Outage History (reporting year).

	Total Starts @EOM	Total EOH @EOM	Total Starts Since Last Minor inspection	Total Starts Remaining till Next Minor	Total EOH Since Last Minor Inspection	Total EOH Remaining till Next Minor
Unit 11	980	19,973	195	55	3,616	4,384
Unit 12	982	20,407	194	56	3,851	4,149

The hardware component affecting gas emission i.e. fuel gas burners and combustion chamber hot gas path items are inspected during every minor inspection at 250 starts (+/- 10starts) or 8,000EOH whichever is earlier. The first and second minor inspections were performed by Siemens Nov 2014 and Nov 2017, the third minor inspections (Feb 2020) were completed by Sulzer, the fourth minor inspections were performed by Siemens in Oct 2021 with no issues detected. The burners and the turbine in good working condition fit for service until the next minor inspection. Based on current operating regime of Neerabup Power Station the fifth minor inspections are likely to occur August 2022 on GT12 & September 2023 on GT11.

A more extensive inspection involving repair / replacement of some components of fuel gas burners and hot gas path items will be performed during a major inspection which is scheduled at every 1250 starts (+/- 10 starts) or 41,000EOH or 12 year time period whichever is earlier. Based on current operating regime of Neerabup Power Station the first major inspection will be due in 2022. Due to the good condition of the units and that Neerabup is a peaking power station with low operational hours, negotiations are continuing with Siemens (OEM) regarding extending the major outage inspections to occur beyond the 12-calendar year trigger and align to a 1500 starts trigger. If successful in extending this interval, then the first major inspections are likely to occur in September 2023 on GT12 & November 2024 on GT11.

A yearly maintenance programme is in place for checking and testing flame monitoring and protection circuitry.

Running parameters of fuel gas combustion performance e.g. combustion chamber differential pressure, combustion chamber noise level, combustion flame intensity and gas turbine fuel gas inlet temperature are being regularly monitored online during gas turbine operation. These all provide normal operating parameters and deviation from these normal parameters are alarmed by the Turbine control SCADA system.

A bi-annual performance check is scheduled within MEX (PM#336) to check both units Compressor and Gas Turbine efficiency.

4.2.2 Evidence - Operations

The power station has conducted operations in compliance with the SEMP emission targets. Results from annual exhaust stack monitoring/sampling and analysis of air pollutants, undertaken by Ektimo Pty Ltd (NATA Accreditation No 14601) as per summary of stack emissions test results in table 5.

Table 5 – Summary of stack emissions test results

Neerabup Unit 11											
Parameter Nitrogen Oxides (as NO ₂) Corrected to 15% Oxygen Carbon Monoxide											
D. (Time of Emissions Testing	Machine output	Concentration	1 hr avg Criteria	Compliance	Concentration	1 hr avg Criteria	Compliance			
Date of Emissions resting	Time of Emissions Testing	MW	ppmv @ 15% O ₂	ppmv @ 15% O ₂	Yes / No	ppmv	ppmv @ 15% O ₂	Yes / No			
29-Oct-20	15:51 -16:51	157 1,2	15	< 25	Yes	<5	< 10	Yes			
290-0220 15:51 16:51 157 ¹² 15 <25 Yes <5 <10 Yes Note 1 - Unit 11 water Injection (or Power Augmentation (PAG)) mode WAS NOT operating at the time of the stack test. [Future emissions tests will be performed with this worse case emission scenario where possible] Note 2 - Unit 11 turbine operated @>100MW (95.15%) of nominal Maximum rated capacity of 165MWe, and was operating no more than +/-5% variation											

	Neerabup Unit 12											
	Parameter			Nitrogen Oxide	es (as NO ₂) Corrected	to 15% Oxygen		Carbon Monoxide				
Data of Entiring Testing	Time of Emissions Testing	Machine out		Concentration	1 hr avg Criteria	Compliance	Concentration	1 hr avg Criteria	Compliance			
Date of Emissions resting	Time of Emissions resulty	M	N	ppmv @ 15% O ₂	ppmv @ 15% O ₂	Yes / No	ppmv	ppmv @ 15% O ₂	Yes / No			
27-Oct-20	16:34-17:34	157	1,2	15	< 25	Yes	<5	< 10	Yes			
Note 1 - Unit 12 water Injection (or Power Augmentation (PAG)) mode WAS NOT operating at the time of the stack test. [Future emissions tests will be performed with this worse case emission scenario where possible]												
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The full results of the monitoring are included Appendix 1.

- Appendix 2 Nil notifiable incidents detected or reported to Department of Environment Regulation
 - o Annual stack test results refer SEMP4 and
 - o Section 4.1
 - o Section 4.2
 - o Section 4.4
 - o Section 4.5
- Monitoring results for emissions are below specified concentration targets. Annual stack test reports / Appendix 1.
- All scheduled minor inspections have been completed, some under and some briefly over the 250 (+/- 10 starts overrun trigger). The very slight overruns were due to timing of the booked outages relative to the incurred starts as the outage date approached. Subsequent inspections reveal turbine in very good condition.

The OEM Schedule for a peaking power station has the minor inspections to be completed every 250 starts (+/- 10 starts) or 8,000EOH (whichever is earlier). The first minor inspection this was misinterpreted as 10% overrun, rather than 10 starts overrun.

- Refer to section 4.4 atmospheric emissions
- Refer to Annual stack test reports / Appendix 1
- Available on request "2020-2021 NewGen Neerabup DWER AMR-AER-AACR Report"

Bi-annual performance & Efficiency reviews on both units were completed, with no deterioration detected, as per Mex work orders as below;

- WO11498 : Unit 11, Dec 2020
- WO11499 : Unit 12, Dec 2020
- WO12138 : Unit 11, June 2021
- WO12139 : Unit 12, June 2021

4.2.3 Comments

Remains compliant.

4.3 Roles and Responsibilities

Roles, or responsibilities have not changed within the last 12 months.

4.3.1 Evidence

Remains compliant.

4.3.2 Comments

Remains compliant.

4.4 Atmospheric Emissions

As defined by the section 7.1 of the stack emissions management plan, Sampling and analysis of air pollutants shall be undertaken and reported as specified in section 7 of the SEMP and as summarised in table 6 below;

TABLE 6 – Emission monitoring parameters, Units 1 and 2

Pollutant/parameter	Units of measure	Method	Frequency
Oxides of nitrogen	ppmvd@15% O2 or mg/Nm ³	USEPA Method 7E	Annually
Carbon monoxide	ppmvd@15% O2 or mg/Nm³	USEPA Method 10	Annually
Stack Gas Velocity	m/s	USEPA Method 2 or 2C	Annually
Stack Gas Temperature	°C	USEPA Method 2 or 2C	Annually
Stack volumetric flow rate	m ³ /s	USEPA Method 2 or 2C	Annually
Moisture content	%	USEPA Method 4	Annually
Dry gas density or molecular weight	Kkg/m³ g/gmol	USEPA Method 3	Annually
Oxygen	%	USEPA Method 3A	Annually

4.4.1 Evidence

Sampling and analysis of Ektimo Pty Ltd (NATA Accreditation Number 14601) on the following dates and the report provided by Ektimo have been attached to this report in Appendix 1;

- Unit 12 27th October 2020 (16:34 17: 34)
- Unit 11 29th October 2020 (15:51 16:51)
- Refer to section 4.4 & 4.5
- Refer to Annual stack test reports / Appendix 1
- Please also refer to "2020-2021 NewGen Neerabup DWER AMR-AER-AACR Report" for the AR1 forms and also copies of the external consultant stack testing reports submitted to DWER. Report is available on request.

4.4.2 Comments

Remains compliant.

4.5 Complaints

As defined by the section 7.2 of the stack emissions management plan, A complaints procedure shall be established to receive complaints from the community associated with air emissions from the power station.

The power station operator shall investigate all complaints and, where the power station is found to be the cause of the incident, the operator shall take actions to ensure that the cause is rectified and implement measures to ensure that there is minimal risk of the incident recurring.

4.5.1 Evidence

NewGen Neerabup has a complaints procedure and complaints register to meet the requirements of the SEMP-External Complaints Procedure [NPS-OPS-EXT-COMP]; External Complaints Register [NPS-REG-EXT-COMP].

NewGen Neerabup also performs annual Stakeholder consultations to meet the requirements of the Pipeline Licence (PL75) for the Department of Minerals and Petroleum as per Stakeholder Management Guidelines procedure [NPS-PL-ROW-14]. This procedure regularly (annually) prompts pipeline landowner and other relevant third party consultations that are located within 500 meters of the power station and pipeline easement (eg; all close neighbouring residences and business). The previous annual stakeholder consultations were conducted in October 2020 (WO 10864), currently undertaking the 2021 Consultations.

During the reporting period no complaints have been received by the above processes as both require the complaints to be entered into the complaints register.

Refer to appendix 3 for the complaints register for the reporting period (Nil or blank).

Procedure and register established. No complaints or investigations recorded. No complaints or investigations recorded via the Pipeline easement stakeholder management procedures.

4.5.2 Comments

Remains compliant.

4.6 Contingencies

As defined by the section 8.0 of the stack emissions management plan, the following mechanisms will be established to identify actual and apparent non-conformance with the SEMP:

- a) Routine preventative maintenance will be undertaken in accordance with the manufacturer's operation and maintenance manual.
- b) Sampling and analysis of carbon monoxide, oxides of nitrogen (and other exhaust parameters) on an annual campaign basis in accordance with the requirements specified in Section 7.1 of the SEMP to support the SEMP and provide a secondary check on operations and maintenance.
- c) Implementation and ongoing maintenance of complaints reporting, management system and investigation system.
- d) Biannual performance and efficiency reviews on both units as per section 4.2.2.

4.6.1 Evidence

a) All scheduled minor inspections have been completed, some under and some briefly over the 250 (+/- 10 starts overrun trigger), subsequent inspections reveal turbine in very good condition.

The OEM Schedule for a peaking power station has the minor inspections to be completed every 250 starts (+/- 10 starts) or 8,000EOH (whichever is earlier). The first minor inspection this was misinterpreted as 10% overrun, rather than 10 **starts** overrun. Please refer to appendix 4.

- b) Annual stack testing program as defined in section 4.4.
- c) Complaints reporting, investigation and management system as defined by section 4.5.
- d) Biannual performance and efficiency reviews on both units as per section 4.2.2.

4.6.2 Comments

Remains compliant.

4.7 Stakeholder Consultation

As defined by the section 9.0 of the stack emissions management plan, In accordance with OEPA correspondence dated 15 February 2011 (Ref: OEPA2010/001038-1) Shell Energy will:

- 1) Post a copy of the revised SEMP on the Shell Energy website for the life of the project: https://shellenergy.com.au/regulatory/
- 2) Make all historical documents required to be made publicly available obtainable upon request to Shell Energy.
- 3) Within fourteen days from the date of making documents publicly available, provide evidence to the Proposal Implementation Monitoring Branch (PIMB) to confirm that the document has been posted on the Shell Energy website.

4.7.1 Evidence

- NewGen Neerabup submitted revision 3 of the SEMP to DWER on 12th December 2019. DWER accepted revision 3 on 12th May 2020. Revision 3 of the SEMP was made publicly available on the Shell Energy's internet site on 10th December 2019. As at 22nd September 2020 Revision 3 of the SEMP was still publicly available on the Shell Energy website (https://shellenergy.com.au/regulatory/).
- 2) As at 22nd September 2020 a check on last year's 2019-2020 SEMP Annual Compliance report that was submitted to the OEPA & DWER, is currently still available on the Shell Energy website (https://shellenergy.com.au/regulatory/)
- 3) This current report replaced this previous year's report prior to submission to the OEPA and can be confirmed by accessing it via the following link. (https://shellenergy.com.au/regulatory/).
- 4) The SEMP was revised 12th July 2021 to Rev 4 as part of the Shell Energy transition, with only minor amendments made to formatting and also a change to the public facing generation regulatory hyperlink. The SEMP was made publicly available shortly after via the following link. (https://shellenergy.com.au/regulatory/).
- 5) Historical documents are available upon request.

4.7.2 Comments

Remains compliant.

4.8 Auditing

As defined by the section 10.0 of the stack emissions management plan, Annual internal audits and annual external audits will be conducted as specified in the Operational Environmental Management Plan. These audits will assess compliance with the SEMP.

4.8.1 Evidence

Operational Environmental Management Plan states auditing is to be done in accordance with requirements of MS759 and other approvals. Internal and external audits conducted found compliance with the SEMP;

- Internal Compliance audit of the SEMP by the Operator Shell Energy for period 1 July 2019 to 30 June 2020 has been completed by the review and the issue of the 2019-2020 SEMP annual compliance report dated 3rd November 2020.
- This report is also an internal audit for the 2020-2021 SEMP Annual Compliance report period.
- An external compliance audit of the SEMP was conducted 18th November 2020 by Strategen-JBS&G, Environmental Consultants, report dated 4th January 2021, for the audit period 1st July 2019 to 30th June 2020 for the Ministerial Statement and also for the Bankers Audit. This external audit included a review of the SEMP and found compliance with the SEMP.

Filename reference: 59988 Neerabup Environmental CAR (RevO).pdf, Strategen JBS&G document number (59988-134,591).

- The next external compliance audit of the SEMP is currently scheduled for November 2021, for the audit period 1st July 2020 to 30th June 2021 for the Ministerial Statement and also for the Bankers Audit. Strategen-JBS&G Environmental Consultants will again be engaged to undertake this external compliance audit.
- Internal / External Audit reports available on request.
- Internal / External compliance audits found compliance with SEMP.

4.8.2 Comments

Remains compliant.

4.9 Review & Revision

As defined by the section 11.0 of the stack emissions management plan, This SEMP will be reviewed on an annual basis to ensure that all aspects of operation management and maintenance comply with Government requirements and current best practice.

4.9.1 Evidence

NewGen Neerabup submitted revision 3 of the SEMP to DWER on 12th December 2019. DWER accepted revision 3 on 12th May 2020, Following the Shell Energy transition the SEMP was subsequently revised 12th July 2021 and shortly after made publicly available via (https://shellenergy.com.au/regulatory/).

The SEMP was revised 12th July 2021 to Rev 4 as part of the Shell Energy transition, with only minor amendments made to formatting and also a change to the public facing generation regulatory hyperlink. And was made publicly available shortly after via the following link. (https://shellenergy.com.au/regulatory/).

Strategen Environmental Consultants Pty Ltd are currently investigating Section 46 revisions and this may cancel out the SEMP and streamline some of the duplicated reporting requirements that exist within other DWER reporting requirements (DWER Annual reporting and SEMP reporting requirements).

4.9.2 Comments

Remains compliant.

4.10 Annual Report

As defined by the section 12.1 of the stack emissions management plan, an annual report will be submitted within three months of completion of the financial year (30th Sept annually), that:

- Summarises compliance with SEMP conditions
- Provides details of any incidents of non-compliance with SEMP conditions
- Summarises air pollution monitoring data collected as part of this SEMP
- Summarises complaints
- Summarises outcomes of auditing.

This report was prepared in accordance with DWER guidelines for performance and compliance reporting. The annual report will be made publicly available through posting on the Shell Energy website prior lodgement to OEPA.

4.10.1 Evidence

- This SEMP annual compliance report summarises compliance with SEMP conditions and other items indicated in Section 4.0.
- This SEMP annual compliance report was slightly overdue as it was approved internally on the 3rd November 2020 and was submitted to OEPA on the 4th November 2020.

• This SEMP annual compliance report was made publicly available on the Shell Energy website 3rd November 2020.

4.10.2 Comments

Remains compliant.

4.11 Record keeping

As defined by the section 12.2 of the stack emissions management plan, the following records are to be kept on site and made available to any DWER, EPA or OEPA representative on request.

- Emissions monitoring reports and data
- All environmental complaints maintain complaints register
- External reporting to OEPA, including annual reports.

4.11.1 Evidence

• All available upon request.

4.11.2 Comments

Remains compliant.

5. Certification of Results

The annual auditing and annual monitoring results supplied in this report are a correct representation of the plant as required by the SEMP.

Signed:

Name:Bruno LancianoPosition:Power Station ManagerDate:03/11/2021

APPENDIX LISTING

APPENDIX 1 - Stack Emissions Sampling Report (Both Units - Oct 2020)

- APPENDIX 2 Incident Reports
- APPENDIX 3 External Complaints Register
- APPENDIX 4 Inspection Plan Schedule

APPENDIX 1 - Stack Emissions Sampling Report (Both Units – Oct 2020)



REPORT NUMBER R009868

2020 Emission Testing Gas Turbine Units 11 & 12 NewGen Neerabup Partnership, WA

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Document Information

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Attention:	Bruno Lanciano	
Address:	Trandos Road Lot 507 Old Yanchep Rd NEERABUP WA 6031	
Testing Laboratory:	Ektimo Pty Ltd, ABN 86 600 381 413	

Report Authorisation



Paul Cimbaly Client Manager No. 14601

Greg Sceneay Ektimo Signatory

Accredited for compliance with ISO/IEC 17025 - Testing. NATA is a signatory to the ILAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

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Please note that only numerical results pertaining to measurements conducted directly by Ektimo are covered by Ektimo's terms of NATA accreditation. This does not include comments, conclusions or recommendations based upon the results. Refer to 'Test Methods' for full details of testing covered by NATA accreditation.





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1 EXECUTIVE SUMMARY

1.1 Background

Ektimo was engaged by NewGen Neerabup Partnership to perform emission testing at the Neerabup Power Station. Testing was carried out in accordance with Department of Water and Environmental Regulation (DWER) Licence L8356/2009/2.

Flow rate and velocity were calculated by stoichiometric algorithm to determine mass rate emission of target compounds. Algorithm inputs were supplied by NewGen Neerabup.

1.2 Project Objectives

The objectives of the project were to conduct a monitoring programme to quantify emissions from two discharge points to determine compliance with NewGen Neerabup Partnership's Environmental Licence.

Monitoring was performed as follows:

Location	Test Date	Test Parameters*
A1 – Unit 11	29 October 2020	Nitrogen evides earbon menovide earbon disvide and evvgen
A2 – Unit 12	27 October 2020	Nitrogen oxides, carbon monoxide, carbon dioxide and oxygen

* Flow rate, velocity, temperature and moisture were also determined.

All results are reported on a dry basis at STP.

Plant operating conditions have been noted in the report.

1.3 Licence Comparison

The following licence comparison table shows that all analytes highlighted in green are within the licence limit and all analytes highlighted in red are outside the licence limit set by the WA Department of Water and Environmental Regulation (DWER) as per licence L8356/2009/2.

Location Description	Parameter	Units	Licence Limit	Detected Values	Detected Values (corrected to $15\% O_2$)
	Nitrogon ovidos	mg/m ³	51	31	31
	Nill Ogen Oxides	ppm	25	15	15
A2 Init 12	Nitrogon ovidos	mg/m ³	51	31	31
A2 - 01111 12	Niti ogen oxides	ppm	25	15	15

Please note that the measurement uncertainty associated with the test results was not considered when determining whether the results were compliant or non-compliant.

Refer to the Test Methods table for the measurement uncertainties.

1.4 Results Summary

Location	cation Date Time		Load	NO _x *	CO*	O ₂	Stack Gas Velocity	Stack Gas Volumetric Flowrate	Comments
			MW	ppm	ppm	% v/v dry	m/s	m³/s	Augmentation
				<25 ppm	No Limits	N/A	No Limits	No Limits	(water injection)
Unit 11	29/10/20	1551-1651	157	15	<5	14.9	39	370	No PAG
Unit 12	27/10/20	1634-1734	157	15	<5	14.9	38	360	No PAG

* corrected to 15% oxygen



2 RESULTS

2.1 A1 – Unit 11

Data	20/10/2020		Client	NewCentle	Do stars and		
Date	29/10/2020		Client	NewGen Neerat	oup Partnership		
Report	RU09868		Stack ID	A1 - Unit 11			
Licence No.	L8356/2009/2		Location	Neerabup			
Ektimo Staff	Paul Cimbaly		State	WA			
Sampling Plane Details							
Sampling plane dimensions		6200 mm					
Sampling plane area		30.2 m ²					
Sampling port size number		6" Flange (x4)					
Access & height of norts		Stairs & fixed ladder 35 m					
Duct orientation & shape		Vertical Circular					
Downstream disturbance		Fxit 0 3 D					
Unstream disturbance		Change in diameter 1 2 D					
No traverses & points samp	ed						
Sample plane compliance to	Δ\$4323 1	Compliant but non-idea	1				
sumple plane compliance to	A34323.1	compliant but non luca	•				
Comments							
Power Output 157MW							
No PAG							
Turbine operating in Peak Fir	ing mode						
·							
The sampling plane is deem	ed to be non-ideal due to t	he following reasons:					
The downstream disturbance	is <1D from the sampling p	lane					
The upstream disturbance is	<2D from the sampling plan	e					
	I I I I I I I I I I I I I I I I I I I						
Stack Parameters							
Moisture content, %v/v		6.8					
Gas molecular weight, g/g m	ole	28.5 (wet)				29.3 (dry)	
Gas density at STP, kg/m ³		1.27 (wet)				1.31 (dry)	
% Oxygen correction & Facto	r	15 %				0.98	
Gas Flow Parameters							
Flow measurement time(s) (h	ıhmm)	1550					
Temperature, °C		529					
Velocity at sampling plane, m	n/s	39					
Volumetric flow rate, actual,	m³/s	1200					
Volumetric flow rate (wet ST	P), m³/s	390					
Volumetric flow rate (dry ST	P), m³/s	370					
Mass flow rate (wet basis), k	g/hour	1800000					
Gas Analyser Results				Average			
	Sampling time			1551 - 1651			
		-			4500 0.0		
Combustion Costs		Co	mg/m ³	Corrected t	0 15% U2 mg/m ³	Mass Rate	
Nitrie evide (ee NO		ppin	₆ /	14	20	5/3	
Nitrogon diavida (as NO ₂)		14	28	14	28	10	
Nitrogen uloxide (as NO ₂)		1.5	3	1.4	3	1.1	
Nitrogen oxides (as NO ₂)		- 15	31	15	31	12	
carbon monoxide		<5	<6	<5	<6	<2	
		Co	% v/v			viass kate	
Carbon diavida			2.4			5/3	
			3.4 1/ 0			25000	





2.2 A2 – Unit 12

Date	27/10/2020		Client	NewGen Neera	abup Partnershij		
Report	R009868		Stack ID	A2 - Unit 12			
Licence No.	L8356/2009/2		Location				
Ektimo Staff	Paul Cimbaly		State	WA			
Sampling Plane Details							
Sampling plane dimensions		6200 mm					
Sampling plane area		30.2 m²					
Sampling port size, number		6" Flange (x4)					
Access & height of ports		Stairs & fixed ladder 35 m					
Duct orientation & shape		Vertical Circular					
Downstream disturbance		Exit 0.3 D					
Opstream disturbance	لمم	Change in diameter 1.2 D					
Sample plane compliance to	eu 454222 1	I I Compliant but non ideal					
sample plane compliance to	A34323.1	compliant but non-ideal					
Comments							
Power Output 157MW							
No PAG							
Turbine operating in Peak Fir	ng mode						
	0						
The sampling plane is deem	ed to be non-ideal due t	o the following reasons:					
The downstream disturbance	is <1D from the samplin	g plane					
The upstream disturbance is	<2D from the sampling p	ane					
Stack Parameters							
Moisture content, %v/v		6.4					
Gas molecular weight, g/g mo	ole	28.5 (wet)				29.3 (dry)	
Gas density at STP, kg/m ³		1.27 (wet)				1.31 (dry)	
% Oxygen correction & Facto	r	15 %				0.98	
Gas Flow Parameters							
Flow measurement time(s) (h	hmm)	1635					
Temperature, °C		532					
Velocity at sampling plane, m	/s	38					
Volumetric flow rate, actual,	m³/s	1200					
Volumetric flow rate (wet ST	P), m³/s	390					
Volumetric flow rate (dry ST	'), m'/s	360					
iviass flow rate (wet basis), k	g/nour	1800000					
Gas Analyser Results				Average			
aus Anaryser Results	Sampling time			163/ - 172/			
	Sampling time			1054 1754			
		Con	centration	Corrected	to 15% 02	Mass Rate	
Combustion Gases		ppm	mg/m ³	ppm	mg/m ³	g/s	
Nitric oxide (as NO ₂)		13	27	13	26	9.8	
Nitrogen dioxide (as NO ₂)		2.2	4.6	2.2	4.5	1.7	
Nitrogen oxides (as NO ₂)		15	31	15	31	11	
Carbon monoxide		<5	<6	<5	<6	<2	
		Con	centration	-	-	Mass Rate	
			% v/v			g/s	
Carbon dioxide			3.4			25000	
Oxygen			14.9			77000	





3 PLANT OPERATING CONDITIONS

See NewGen Neerabup Partnership records for complete process conditions.

4 TEST METHODS

All sampling and analysis performed by Ektimo unless otherwise specified. Specific details of the methods are available upon request.

Parameter	Sampling Method	Analysis Method	Uncertainty*	NATA Ac	credited
				Sampling	Analysis
Sample plane criteria	AS 4323.1	NA	NA	~	NA
Moisture	USEPA Alt-008	USEPA Alt-008	19%	✓	✓
Molecular weight	NA	USEPA 3	not specified	NA	✓
Carbon dioxide and oxygen	NA	USEPA 3A	13%	NA	✓
Carbon monoxide	USEPA 10	USEPA 10	12%	~	✓
Nitrogen oxides	USEPA 7E	USEPA 7E	12%	~	✓
Flow rate, temperature and velocity	USEPA 2	USEPA 2**	8%, 2%, 7%	NA	✓
					201106

* Uncertainty values cited in this table are calculated at the 95% confidence level (coverage factor = 2)

5 DEVIATIONS FROM TEST METHODS

** Flows calculated stoichiometrically. Ektimo is NATA accredited for USEPA 2 which allows the use of an alternative procedure such as stoichiometric calculations of total volumetric flow subject to the approval of the Administrator. DWER has allowed the use of these calculations at the NewGen Neerabup facility.

6 QUALITY ASSURANCE/QUALITY CONTROL INFORMATION

Ektimo is accredited by the National Association of Testing Authorities (NATA) for the sampling and analysis of air pollutants from industrial sources. Unless otherwise stated test methods used are accredited with the National Association of Testing Authorities. For full details, search for Ektimo at NATA's website <u>www.nata.com.au</u>.

Ektimo is accredited by NATA (National Association of Testing Authorities) to ISO/IEC 17025 - Testing. ISO/IEC 17025 - Testing requires that a laboratory have adequate equipment to perform the testing, as well as laboratory personnel with the competence to perform the testing. This quality assurance system is administered and maintained by the Quality Director.

NATA is a member of APLAC (Asia Pacific Laboratory Accreditation Co-operation) and of ILAC (International Laboratory Accreditation Co-operation). Through the mutual recognition arrangements with both of these organisations, NATA accreditation is recognised worldwide.





7 DEFINITIONS

The following symbols and abbreviations may be used in this test report:

% v/v	Volume to volume ratio, dry or wet basis
~	Approximately
<	Less than
>	Greater than
2	Greater than or equal to
АРНА	American public health association, Standard Methods for the Examination of Water and Waste Water
AS	Australian Standard
BSP	British standard pipe
CARB	Californian Air Resources Board
CEM	Continuous Emission Monitoring
CEMS	Continuous Emission Monitoring System
CTM	Conditional test method
D	Duct diameter or equivalent duct diameter for rectangular ducts
D ₅₀	'Cut size' of a cyclone defined as the particle diameter at which the cyclone achieves a 50% collection efficiency ie. half of the particles are retained by the cyclone and half are not and pass through it to the next stage. The D_{50} method simplifies the capture efficiency distribution by assuming that a given cyclone stage captures all of the particles with a diameter equal to or greater than the D_{50} of that cyclone and less than the D_{50} of the preceding cyclone.
DECC	Department of Environment & Climate Change (NSW)
Disturbance	A flow obstruction or instability in the direction of the flow which may impede accurate flow determination. This
	includes centrifugal fans, axial fans, partially closed or closed dampers, louvres, bends, connections, junctions,
	direction changes or changes in pipe diameter.
DWER	Department of Water and Environmental Regulation (WA)
DEHP	Department of Environment and Heritage Protection (QLD)
EPA	Environment Protection Authority
FTIR	Fourier Transform Infra-red
ISC	Intersociety committee, Methods of Air Sampling and Analysis
ISO	International Organisation for Standardisation
Lower Bound	Defines values reported below detection as equal to zero.
Medium Bound	Defines values reported below detection are equal to half the detection limit.
NA	Not applicable
NATA	National Association of Testing Authorities
NIOSH	National Institute of Occupational Safety and Health
NT	Not tested or results not required
OM	Other approved method
OU	The number of odour units per unit of volume. The numerical value of the odour concentration is equal to the
	number of dilutions to arrive at the odour threshold (50% panel response).
PM ₁₀	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately
	10 microns (μm).
PM _{2.5}	Atmospheric suspended particulate matter having an equivalent aerodynamic diameter of less than approximately 2.5 microse (um)
Ρςα	Particle size analysis
RATA	Relative Accuracy Test Audit
Semi-quantified VOCs	Inknown VOCs (those not matching a standard compound) are identified by matching the mass spectrum of the
	chromatographic peak to the NIST Standard Reference Database (version 14.0), with a match quality exceeding 70%. An estimated concentration will be determined by matching the integrated area of the peak with the nearest suitable compound in the analytical calibration standard mixture.
STP	Standard temperature and pressure. Gas volumes and concentrations are expressed on a dry basis at 0°C, at discharge express expression and an absolute pressure of 101.225 kBa unless otherwise specified.
тм	Test Method
	The sum of all compounds of carbon which contain at least one carbon to carbon hand, plus mothane and its
	derivatives
LISEDA	United States Environmental Protection Agency
VDI	Verein Deutscher Ingenieure (Association of German Engineers)
Velocity Difference	The percentage difference between the average of initial figures and afterflows
Vic FPA	Victorian Environment Protection Authority
VOC	Any chamical compound based on carbon with a vanour pressure of at least 0.010 kPa at 25°C or having a
	corresponding volatility under the particular conditions of use. These compounds may contain oxygen, nitrogen and other elements, but specifically excluded are carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonate salts.
XRD	X-ray Diffractometry
Upper Bound	Defines values reported below detection are equal to the detection limit.
95% confidence interval	Range of values that contains the true result with 95% certainty. This means there is a 5% risk that the true result
	is outside this range.





8 APPENDIX 1: PROCESS TRENDS

8.1 Unit 11

SPPA-T3000

					Analog	Interval	Report				
Name	э:										
Comr	ment:										
Creat	Created at: 2020/10/30 13:03:15.592										
Time: From 2020/10/			2020/10/29 15:5	51:00.000		То	2020/10/2	9 16:51:00.0	000		
Time Interval : 1:00:00											
	averade value			time period							
Agare	egate: a	average v	values per time p	period							
Aggr∉ Note:	egate: a	average v	values per time p	period							
Aggre Vote:	egate: a Name	average 1	values per time p Desi	period ignation		En	jUnit Time			Avg	QF
Aggre Note: Tag1	egate: a	average ۱ ۱	values per time Desi FG C	period ignation :orr FLOW AT I	METERI	En	gUnit Time 374			Avg 47395.355	QF 1.0
Aggre Note: Tag1 Tag2	egate: a Name 11EKG60FF001 XC 11MBP13FQ101 XC	average ۱ ۱ ۱ ۱ ۱ ۱ ۱	values per time Desi FG C NG H	period ignation :ORR FLOW AT I IEAT VALUE	METERI	En Sm' MJ/	gUnit Time 3/H ո ^s			Avg 47395.355 33.9599	QF 1.0 1.0
Aggre Note: Tag1 Tag2 Tag3	egate: a <u>Name</u> 11EKG60FF001 XC 11MBP13FQ101 XC 11MBU33CF101 XC	average י גי גי גי גי גי גי גי	values per time Desi FG C NG H FLOV	period ignation CORR FLOW AT I IEAT VALUE W DENOX WATE	METERI	En: Sm MJ/ kg/s	gUnit Time 3/H m³			Avg 47395.355 33.9599 2.160891E-2	QF 1.0 1.0 1.0
Aggre Note: Tag1 Tag2 Tag3 Tag4	Name 11EKG60FF001 XC 11MBP13F0101 XC 11MBU33CF101 XC 11MBU310CE901 XC	201 201 201 201 201 201 201	values per time Desi FG C NG H FLOW ACTI	period ignation corr FLOW AT I IEAT VALUE W DENOX WATE VE POWER	METERI ER	En Sm MJ/ kg/s MW	jUnit Time 3/H ™			Avg 47395.355 33.9599 2.160891E-2 156.92665	QF 1.0 1.0 1.0 1.0
Aggre Note: Tag1 Tag2 Tag3 Tag4 Tag5	egate: a Name 11EKG66F001 XC 11MBP13FQ101 XI 11MBV33CF101 XI 11MBY10CE901 XC 11MBY10F1010 ZC	201 201 202 201 201 201 201 201	values per time Desi FG C NG H FLOW ACTI CALC	ignation CORR FLOW AT I IEAT VALUE W DENOX WATE VE POWER C TURB OT	METERI ER	En Sm MJ/ kg/s MW °C	gUnit Time 3/H π⁵			Avg 47395.355 33.9599 2.160991E-2 156.92665 526.20349	QF 1.0 1.0 1.0 1.0 1.0
Aggre Note: Tag1 Tag2 Tag3 Tag4 Tag5 Fime	egate: a Name 11EKG60FF001 XC 11MBP13FQ101 X 11MBV03CF101 X 11MBV03CF101 X 11MBV10EE901 XC 11MBY10FT010 ZC 11MBY10FT010 ZC	201 201 202 202 201 201 201	values per time Desi FG C NG H FLOW ACTI CALC	period ignation ORR FLOW AT I IEAT VALUE W DENOX WATE VE POWER C TURB OT	METERI ER Tag1	Env Sm MJ/ kg/s MW °C Tag2	gUnit Time 3/H m ^a Tag3	Tag4	Tag5	Avg 47395.355 33.9599 2.160891E-2 156.92665 526.20349	QF 1.0 1.0 1.0 1.0 1.0







8.2 Unit 12

SPPA-T3000

					Analog	Interval I	Report				
Name	ə:										
Com	ment:										
Creat	ted at:	2020/10	0/30 13:50:09	.036							
Time: From 2020/10/27 1			16:34:00.000		То	2020/10/2	7 17:34:00.0	000			
Time	Interval :	1:00:00									
Aaare	eaate:	average	e values per t	ime period							
Note:		J	•								
	Name			Designation		Eng	jUnit Time			Avg	QF
Tag1	12EKG60FF001	XQ01		FG CORR FLOW	AT METERI	Sm	3/H			47252.762	1.0
Tag2	12MBP13FQ10	1 XQ02		NG HEAT VALUE		MJ/i	m ³			34.04644	1.0
Tag3	12MBU33CF10	1 XQ01		FLOW DENOX WA	TER	kg/s				1.736355E-2	1.0
Tag4	12MBY10CE901	1 XQ01		ACTIVE POWER		MW				157.14233	1.0
Tag5	12MBY10FT010	0 ZQ01		CALC TURB OT		°C				527.65149	1.0
Time					Tag1	Tag2	Tag3	Tag4	Tag5		
2020/10/	27 16:34:00.000 - 20	020/10/27 17:3	4:00.000		47252.762	34.04644	1.736355E-2	157.14233	527.65149		

Page 1 of 1





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APPENDIX 2 - Incident Reports

No DWER notifiable incidents oncurred, No incidents were reported to DWER during this period.

APPENDIX 3 - External Complaints Register

			STAND	ARD OPERATING PR	NPS-RE	NPS-REG-EXT-COMP					
Shell ENE	RGY	E	xternal I	Complaints Power Stati	s Regist on	er -					
		REV NO:	2		REV DATE :	17/08/2021	LIVE DOCUMENT L	AST UPDATED	23/08/2021		
Complaint No	Date Received			Description (abbreviate	ed)		Actions Closed Date	Date Notification Completed	MEX WO#		
		No complaints rec	eived to date.				23/12/2010				
		No complaints rec	eived to date.				16/12/2011				
		No complaints rec	eived to date.				14/01/2012				
		No complaints rec	eived to date.				9/11/2012				
		No complaints rec	eived to date.				25/07/2013				
		No complaints rec	eived to date.				18/08/2014]		
		No complaints rec	eived to date.				22/09/2014				
		No complaints rec	eived to date.				5/08/2015				
		No complaints rec	eived to date.				22/08/2016				
		No complaints rec	eived to date.				29/08/2017				
		No complaints rec	eived to date.				9/07/2018				
		No complaints rec	eived to date.				19/07/2019				
		No complaints rec	eived to date.				22/08/2020				
		No complaints rec	eived to date.				23/08/2021				

She	
EN	ERGY

STANDARD OPERATING PROCEDURE

NPS-REG-EXT-COMP

External Complaints Register -Pipeline PL75



		REV NO:	2		REV DATE:	17/08/2021	LI	/E DOCUMENT L/	AST UPDATED	23/08/2021
Complaint No	Date Received			Description (abbreviated)				Actions Closed Date	Date Notification Completed	MEX WO#
		No complaints rec	ceived to date.					23/12/2010		
		No complaints rec	ceived to date.					16/12/2011		
		No complaints rec	ceived to date.					14/01/2012		
		No complaints rec	ceived to date.					9/11/2012		
		No complaints rec	ceived to date.					25/07/2013		
		No complaints rec	ceived to date.					18/08/2014		
		No complaints rec	ceived to date.					22/09/2014		
		No complaints rec	ceived to date.					5/08/2015		
		No complaints rec	ceived to date.					22/08/2016		
		No complaints rec	ceived to date.					29/08/2017		
		No complaints rec	ceived to date.					9/07/2018		
		No complaints rec	ceived to date.					19/07/2019		
		No complaints rec	ceived to date.					22/08/2020		
		No complaints rec	ceived to date.					23/08/2021		

I	J		

APPENDIX 4 - Inspection Plan Schedule

NEEARBUP Forecasted Inspection Plan 2009 - 2032

	1st Minor Insp	2nd Minor Insp.	3rd Minor Inp.	4th Minor Inp.	5th Minor Inp.
GT11 - Date	19/11/2014	10/11/2017	26/02/2020	1/10/2021	Sept 2023 (forecast)
Dynamic Hours	371	404	404	404	N/A
Baseload OH	937	1631	2303	2,677	N/A
Peakload OH	2032	3626	5700	7,229	N/A
Normal Start	273	523	785	1027	1,272
Emergency Start	9	10	10	10	N/A
EOH	6159	10991	16356	20,805	24,603
GT12 - Date	28/11/2014	7/11/2017	29/02/2020	16/10/2021	Oct 2022 (forecast)
Dynamic Hours	441	441	441	441	N/A
Baseload OH	676	1321	2025	2,484	N/A
Peakload OH	2007	3602	6180	7,896	N/A
Normal Start	272	523	788	1032	1,253
Emergency Start	3	3	3	3	N/A
EOH	5851	10623	16555	20,758	24,528
Note: if the starts spi	read between units is equ	alised, both 4th minor ir	nspections could be so	21170	

GT Inspection Interval

EOH	Start	Years	Description
8000	250	n/a	Minor inspection (3 days)
41000	1250	upto 12	Major inspection (25 days)
123000	3000	n/a	Life Extention inspection (35 days)

Inspection scope

Minor -	entry to accessible regions for visual inspection on followings:- compressor inlet including air intake burners and flame cylinder end plate
	ceramic tile lining of flame cylinders, hot gas path of mixing and inner casings turbine stage 1 and 4 exhaust casing and diffuser liner
Major -	extensive dismantling, detail visual inspection and non-destructive evaluation;

refurbishment of coated airfoils in turbine and compressor sections; scheduled and condition-based repair measures

implementation of LTE measures

GT Generator Inspection Interval

EOH		Years	Description	GT11/12 3rd Minor
Min	Max			Unit 11 - 29/02/2020
10000	20000	n/a	Initial Inspection (4 weeks)	
8000	10000	upto 3	Short Inspection (3 days)	2nd Minor Inspections Complet
16000	20000	upto 6	Intermediate Inspection (2 weeks)	Unit $12 - 07/11/2017$ (@ 523 starts
40000	60000	upto 12	Main Inspection (4 weeks)	
Initial - Short -	maximal as Main inspe checks and measures r during operation and c	ction, removal of rotor equired based on observa hecks;	ation	Ist Minor Inspections Completed Unit 11 - 19/11/2014 (@273 starts, 6,15) Unit 12 - 21/11/2014 (@272 starts, 5,85) GT11/12 End of Warranty 19 Oct 2011
Intermediate -	similar to Short Inspect disassembly but witho	ion including partial ut rotor removal	GT11 End 1-2 Sept 2 GT12 End of Wa	d of Warranty Inspection 2011 arranty Inspection
Main -	similar to Intermediate	Inspection but with roto	or removal GT11/12 Commercial C 19 Oct 2009	Operation

	io-gu	50-da	ct-09	ug-1.
Forecast EOH (accumulative)	31-A	30-S(31-0	31-A
Scenario a)				
Operating Regime No.5a - 135 station starts / unit / year				
Operating Regime No.5b - 150 station starts / unit / year				
Operating Regime No.5c - 165 station starts / unit / year				
Operating Regime No.5d - 200 starts / unit / year				
Operating Regime No.5e - 215 start / unit / year				
Operating Regime No.5f - 85 start / unit / year				
Operating Regime No.5g - 100 start / unit / year	3	23	37	98
Starts no. GT11	40	572	975	2373
EOH GT11	40	572	975	2373
EOH Generator GT11				
Operating Regime No.5a - 135 station starts / unit / year				
Operating Regime No.5b - 150 station starts / unit / year				
Operating Regime No.5c - 165 station starts / unit / year				
Operating Regime No.5d - 200 starts / unit / year				
Operating Regime No.5e - 215 start / unit / year				
Operating Regime No.5f - 85 start / unit / year				
Operating Regime No.5g - 100 start / unit / year	5	25	33	94
Starts no. GT12	59	404	539	2058
EOH GT12	59	404	539	2058



	X	X		2		A
30-Sep-23	30-Jun-24	30-Sep-25	31-May-27	28-Feb-29	31-Oct-30	31-May-32
	5a					
			5b	5b	5b	5b
5c						
		5f				
1272	1376	1499	1744	2006	2256	2494
24603	26204	28123	31892	35934	39784	43442
25812	27870	30624	35386	40463	45298	49891
5a						
			5b	5b	5b	5b
	5c					
		5e				
1377	1498	1750	2006	2268	2518	2756
26439	28303	31059	34891	38933	42783	46441
27495	29789	33297	38115	43192	48027	52620



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