Colongra Power Station

2021 - 2022

Annual Environmental Management Report

March 2022

Reporting period 31 January 2021 to 30 January 2022

Revision	Details	Date	Drafted	Reviewed
01	Original - Updated to new template	February 2019	R Williams Snr. Env Advisor	A Weston
02	31 Jan 2019 to 30 Jan 2020	February 2020	R Williams Snr. Env Advisor	S Allam
03	31 Jan 2020 to 30 Jan 2021	February 2021	R Williams Snr. Env Advisor	C Litchfield Manager Environmental Services
04	Updated to Address DPIE comments	July 2021	R Williams Snr. Env Advisor	C Litchfield Manager Environmental Services
05	31 Jan 2021 to 30 Jan 2022	March 2022	R Williams Snr. Env Advisor	C Litchfield Manager Environmental Services

Contents

Executive summary

The Project Approval for the Munmorah Gas Turbine Facility Application No. 05_0195 (**the Project Approval**) was granted in July 2006, and Delta Electricity (**Delta**) completed the construction and commissioning of the Munmorah Gas Turbine Facility in 2009. The gas turbine power station is now commonly known as the Colongra Power Station (**Colongra**) and is owned by Snowy Hydro Limited (**Snowy Hydro**). Snowy Hydro completed the purchase of Colongra on 30 January 2015.

The Project Approval requires submission of an Annual Environmental Management Report (**AEMR**). This report has been prepared to satisfy that requirement.

Project Description

Colongra is an open-cycle electricity generation plant, consisting of four 167 megawatt (**MW**) dual-fuel turbines primarily powered by natural gas fed from a trunk pipeline from the main Sydney to Newcastle gas pipeline. The plant also has the capability to be fuelled with diesel oil (as back-up fuel) and to perform in-service fuel changeovers between the two fuel types. The power station supplies electricity during peak demand periods meaning the operating hours of the power station across the year are fundamentally intermittent and very low.

The operational objectives of Colongra are to:

- Provide electricity at relatively short notice during periods of peak demand;
- Provide 'black start' capability (it is possible to start the gas turbines when there is no grid supplied electricity available) to improve system security, stabilisation and emergency response;
- Provide electricity using best available technology and low greenhouse gas emissions;
- Establish an electricity supply that is market-competitive and consistent with current trends and future energy demands; and
- Produce socially acceptable environmental outcomes.

Colongra Operational Activity

Colongra comprises four GT13E2 gas turbines with a nominal combined output of approximately 660 MW and a licensed annual generation capacity of 1,000 gigawatt hours (**GWh**) to 4,000 GWh, as identified in the Environmental Protection Licence (**EPL**) No. 13036 Administrative Condition A1.

Due to the peaking nature of the power station Colongra generated 61 GWh of electrical power during this reporting period. This is compared to approximately 48 GWh during the previous reporting period. The increase in generation can be attributed to the failure of Callide Power Station in May/June of 2021, as well as a large number of Transmission line outages. The line outages reduced the amount of energy that can flow between Vic-NSW-Qld causing potential / actual periods of energy shortfall in NSW.

Colongra operated the turbines for approximately 71 hours on diesel fuel during this period which is below the 75 hour total limit for any 12 month period imposed by clause 2.2 of the Project Approval.

Of the 71 diesel run hours, it is noted that approximately 52 hours were production runs which aligned with the exemption conditions of Clause 2.3 of the Project Approval listed below:

- *a) to manage network constraints;* and
- *e) if cessation of operation would otherwise lead to a loss or reduction in electricity necessary to maintain the required network supply security and reliability'*

The remaining balance (approximately 19 hours) related to maintenance and testing of the plant and diesel fuel system.

Annual Environmental Management Report scope

Condition 6.3 of the Project Approval states that this AEMR is required to review the performance of Colongra against the Operational Environmental Management Plan (OEMP) developed under condition 5.3 of the Project Approval, as well as the conditions of the Concept Approval, the Project Approval, and other licences and approvals relating to the project as identified in the OEMP.

The AEMR scope covers the Colongra facilities within the site boundary fence (refer **Figure 1**) for the period 31 January 2021 to 30 January 2022. The study does not include the Colongra trunk pipeline from the Sydney to Newcastle gas pipeline, which is operated by Jemena. The details of Condition 6.3 of the Project Approval are provided in the following table along with the sections of the report where each detail is addressed.

Condition of Project Approval addressed by AEMR

Condition No.	Condition Requirement	AEMR Section
Condition 6.3	***Annual Performance Reporting*** *The Proponent shall, throughout the life of the project, prepare and submit for the approval of the Director-General, an Annual Environmental Management Report (AEMR). The AEMR shall review the performance of the project against the Operation Environmental Management Plan (refer to condition 5.3 of this approval), the conditions of this approval and other licences and approvals relating to the project. The AEMR shall include, but not necessarily be limited to:*	
Condition 6.3a)	*- details of compliance with the conditions of this approval;*	Section 2
Condition 6.3b)	*- a copy of the Complaints Register (refer to condition 4.3 of this approval) for the preceding twelve-month period (exclusive of personal details), and details of how these complaints were addressed and resolved;*	Section 2
Condition 6.3c)	*- identification of any circumstances in which the environmental impacts and performance of the project during the year have not been generally consistent with the environmental impacts and performance predicted in the documents listed under condition 1.1 of this approval, with details of additional mitigation measures applied to the project to address recurrence of these circumstances;*	Section 3 & 4
Condition 6.3d)	*- results of all environmental monitoring required under this approval and other approvals, including interpretations and discussion by a suitably qualified person; and*	Section 3
Condition 6.3e)	*- a list of all occasions in the preceding twelve-month period when environmental performance goals for the project have not been achieved, indicating the reason for failure to meet the goals and the action taken to prevent recurrence of that type of incident.*	Section 3 & 4

Snowy Hydro ISO 14001 Environmental Management System

Snowy Hydro maintains an Environmental Management System (**EMS**) for its operations that is certified to ISO 14001 and externally audited annually. Snowy Hydro was recertified to the ISO14001 standard following the most recent recertification audit in September 2020.

Colongras' participation in the audit is determined during the scheduling of that year's audit. A site visit to Colongra was included within the scope of the ISO 14001 surveillance audit that was undertaken for Snowy Hydro during 2019 but not in the recertification audit in 2020 or the most recent surveillance audit in 2021.

Consistency with Predicted Performance & Environmental Goals

A review of the data collected during the reporting period identified no significant changes in circumstances to the previous reporting period, and that the environmental performance of Colongra was generally consistent with the original predictions made and conclusions drawn in the documents listed under Condition 1.1.

Using environmental monitoring and complaints management as the key assessment mechanisms, the environmental performance of Colongra was able to be assessed against the performance goals established through the various approvals, licences and permits for the project. No physical environmental impacts were found in excess of those predicted by the environmental assessment studies or in excess of environmental licence, planning or legislative limits during this reporting period. As such, it's considered that the environmental goals of the project have been achieved during the reporting period.

There are a number of conditions in the project approval related to the construction and commissioning phases of the project. As such they are no longer relevant to current site operations.

Of the remaining conditions there were no environmental non-conformances against the Approval conditions, similarly there were no non-compliances with the site EPL conditions.

1. Introduction

1.1 Background

The Project Approval for the Munmorah Gas Turbine Facility Application No. 05_0195 (**the Project Approval**) was granted in July 2006. Delta Electricity (**Delta**) completed the construction and commissioning of the Munmorah Gas Turbine Facility, now commonly known as the Colongra Power Station (**Colongra**), in 2009. Colongra is now owned by Snowy Hydro Limited (**Snowy Hydro**). Snowy Hydro completed the purchase of Colongra on 30 January 2015.

Condition 6.3 of the Project Approval requires completion of an Annual Environmental Management Report (**AEMR**) on an annual basis. The previous AEMR covered the period from 31 January 2020 to 30 January 2021 . The reporting year with respect to this AEMR is from 31 January 2021 to 30 January 2022.

1.2 AEMR Scope

The AEMR covers the Colongra facility within the site boundary shown in **Figure 1** for the period 31 January 2021 to 30 January 2022, addressing condition 6.3 of the Project Approval as outlined in **Table 1.**

Table 1 Condition of Project Approval addressed by AEMR

Condition No.	Condition Requirement	AEMR Section
Condition 6.3	***Annual Performance Reporting*** *The Proponent shall, throughout the life of the project, prepare and submit for the approval of the Director-General, an Annual Environmental Management Report (AEMR). The AEMR shall review the performance of the project against the Operation Environmental Management Plan (refer to condition 5.3 of this approval), the conditions of this approval and other licences and approvals relating to the project. The AEMR shall include, but not necessarily be limited to:*	
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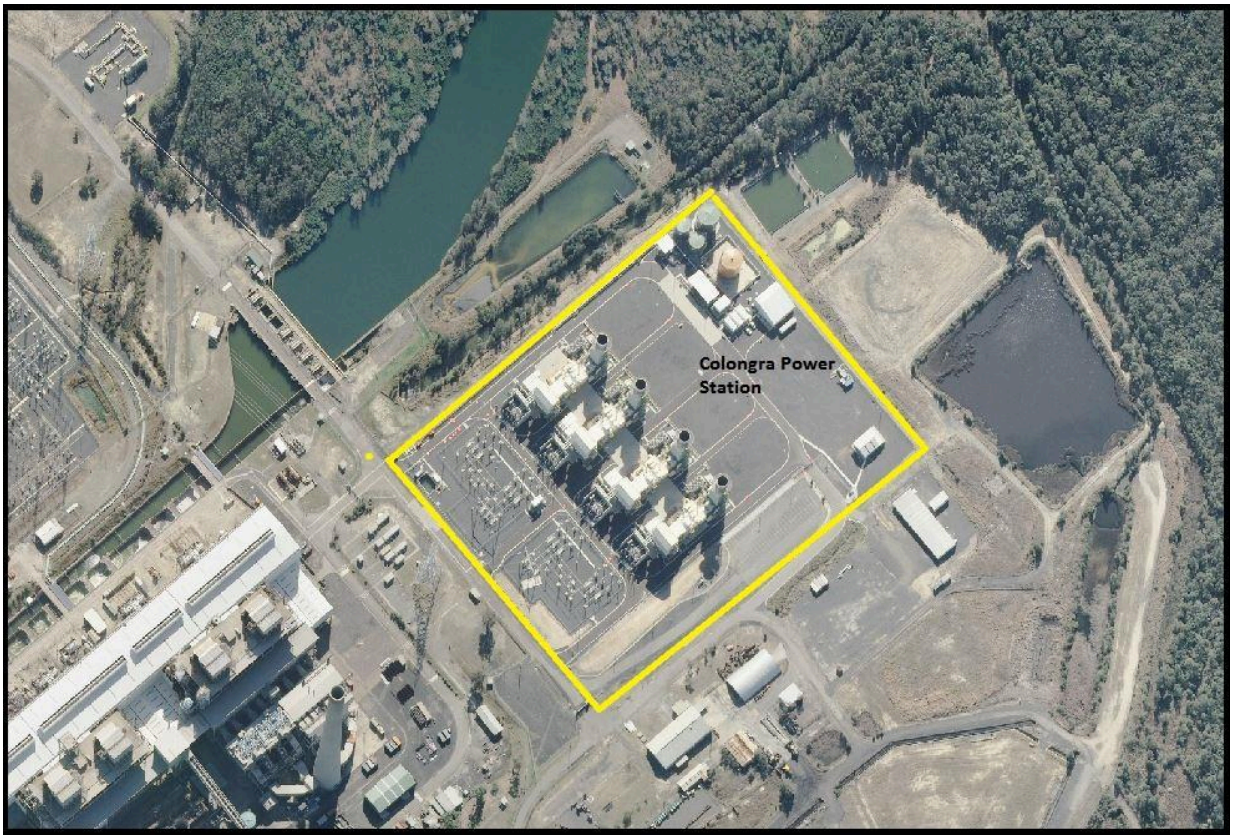
Condition 6.3e)	- *a list of all occasions in the preceding twelve-month period when environmental performance goals for the project have not been achieved,*	Section 3 & 4

	indicating the reason for failure to meet the goals and the action taken to prevent recurrence of that type of incident.	

Figure 1 Colongra Power Station premises boundary for this AEMR

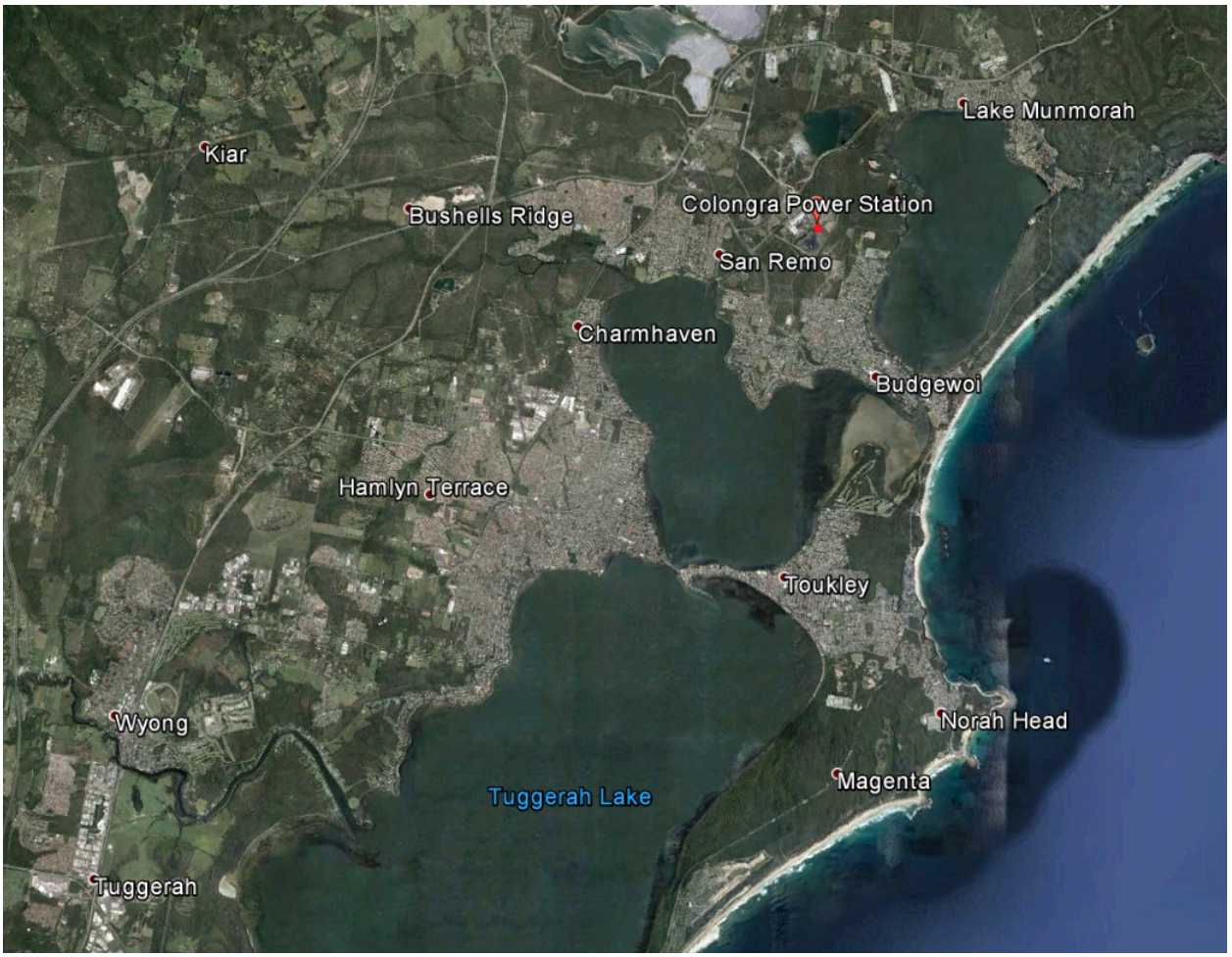


1.3 Overview of Colongra Power Station

1.3.1 Location

Colongra is located adjacent to the decommissioned Munmorah Power Station (about 110 kilometres (**km**) north of Sydney, NSW) on the shore of Lake Munmorah and is located within the Central Coast Council Local Government Area . The location of Colongra in the regional context is shown in **Figure 2**.

Figure 2 Regional location of the Colongra Power Station



1.3.2 Facility Description

The Colongra facility is an open-cycle 'peaking' generation plant, consisting of four GT 13E2 167 megawatt (**MW**) dual-fuel gas turbines primarily powered by natural gas fed from a trunk pipeline from the main Sydney to Newcastle gas pipeline and supplies electricity during peak demand periods. The nominal combined output is approximately 660 MW dependent upon ambient conditions. The gas turbines are capable of running on natural gas (as the primary fuel) and distillate fuel (as the back-up fuel for use during a major interruption to the natural gas supply), with a marginally higher potential power output whilst running on distillate fuel.

The basic components and structures of the Colongra facility include:

- Four gas turbine buildings and exhaust stacks;
- Electrical generating equipment and power supply cables;
- Facilities building;
- Distillate fuel delivery area, a 1.6 million litres (**ML**) fuel storage tank and delivery system;
- Demineralised water storage (2 ML) and delivery system;
- Lube oil supply systems (tanks, pumps and pipe work);

- Fire detection, protection and fire-fighting systems (detectors, fire main, fire water pumps and fire water storage tanks);
- Oil / water separator system;
- Three back-up diesel generators (black start); and
- Demineralised water plant.

Natural gas is supplied to Colongra via an underground "lateral" pipeline connecting the facility to the Sydney–Newcastle pipeline, which is located approximately seven kilometres west of the facility, and adjacent to the F3 Freeway. The lateral pipeline is owned and operated by Jemena Colongra Pty Ltd (**Jemena**).

1.3.3 Operations

The operational objectives of Colongra are to:

- Provide electricity at relatively short notice during periods of peak demand;
- Provide 'black start' capability (it is possible to start the gas turbines when there is no grid supplied electricity available) to improve system security, stabilisation and emergency response;
- Provide electricity using best available technology and low greenhouse gas emissions;
- Establish an electricity supply that is market-competitive and consistent with current trends and future energy demands; and
- Produce socially acceptable environmental outcomes.

Due to the peaking nature of the power station Colongra generated 61 GWh of electrical power during this reporting period. This is compared to approximately 48 GWh during the previous reporting period. The increase in generation can be attributed to the failure of Callide Power Station in May/June of 2021, as well as a large number of Transmission line outages. The line outages reduced the amount of energy that can flow between Vic-NSW-Qld causing potential / actual periods of energy shortfall in NSW.

Colongra operated the turbines for approximately 71 hours on diesel fuel during this period which is below the 75 hour total limit for any 12 month period imposed by clause 2.2 of the Project Approval.

Of the 71 hours, it is noted that approximately 52 hours were production runs which aligned with the exemption conditions of Clause 2.3 of the Project Approval listed below:

- *a) to manage network constraints;* and
- *e) if cessation of operation would otherwise lead to a loss or reduction in electricity necessary to maintain the required network supply security and reliability'*

The remaining balance (approximately 19 hours) related to maintenance and testing of the plant and diesel fuel system.

2.0 Details of Compliance

2.1 Project Approval

Condition 6.3 of the Project Approval states that the AEMR is required to review the performance of the Project against the Operational Environmental Management Plan (**OEMP**), which is required by Condition 5.3 of the Project Approval), as well as the conditions of the Concept Approval, the Project Approval, and other licences and approvals relating to the project as identified in the OEMP.

2.1.1 Operational Environmental Management Plan

Condition 5.3 of the Project Approval requires preparation and implementation of an OEMP. The OEMP addresses the applicable requirements of:

- the Conditions of Concept Approval (05_0195) issued by the Minister for Planning;
- the Conditions of Project Approval (05_0195) issued by the Minister for Planning;
- the Statement of Commitments contained within the Project's Environmental Assessment (**EA**);
- the Submissions Report prepared by Parsons Brinckerhoff Australia Pty Ltd; and
- Applicable New South Wales and Australian environmental legislation.

The OEMP has been developed to be consistent with:

- the (former) Department of Infrastructure, Planning and Natural Resources document: Guideline for the Preparation of Environmental Management Plans (2004); and
- Snowy Hydro's ISO14001 accredited Environmental Management System.

The OEMP is a "living" document controlled electronically within the Snowy Hydro EMS. The Environmental Services Group is responsible for ensuring that the OEMP is current and that it reflects underpinning legislation and supporting documentation, by updating the OEMP in response to:

- specific review of the OEMP;
- regulatory changes;
- internal audit recommendations;
- external audit recommendations;
- issues identified in Annual Environmental Management Reports;
- staff training changes;
- implementation of corrective actions;
- the inclusion of new initiatives in environmental management; and
- revision of any environmental documentation listed in the OEMP.

The OEMP is reviewed annually and updated as required. Details of performance against the OEMP during the reporting period are provided in **Table 3** of this AEMR.

Table 3: Compliance with OEMP during this Reporting period

Reference	Summary of OEMP Section	Details of Compliance
Section 3.0	**Compliance Requirements Overview** This section contains the key compliance requirements for the Colongra project.	Compliance requirements within the OEMP and contained within this AEMR are up to date and consistent.
Section 3.5	**Tracking compliance** Processes used to track compliance against external approvals.	Compliance registers exist for gas operations in NSW including the Colongra Power Station, and regular updates are received through an external update service. The Asset Change Management System has been adopted by the Colongra site and is used to identify any new compliance risks from changes to plant and equipment. Emissions to air results are reviewed monthly and published on the Snowy Hydro Internet site. Non-compliances are tracked inSnowy Hydro's Event Management System.
Section 4.1	**Environmental Aspects** Section identifies that environmental aspects associated with Colongra operation will be updated.	Environmental aspects relating to Colongra are included in the Snowy Hydro aspects and impacts register which is reviewed annually.
Section 4.2	**Environmental Management Responsibilities** Environmental responsibilities for employees are detailed in the OEMP.	Environmental responsibilities for Snowy Hydro staff are reviewed and updated as part of the OEMP update.
Section 4.3	**Reporting & notification** Statutory requirements for incident reporting, statutory reports, notification to regulators, and reporting within the Snowy Hydro internal incident management system.	Incident reporting and corrective action management systems are in place. Internal and external reviews of these systems are regularly carried out. Statutory environmental reporting requirements have been met for this 2021-2022 reporting period for the Project Approval and EPL 13036 annual return which is based on a financial year (**FY**).
Section 4.4	**Training** The training program for Colongra is summarised in this section of the OEMP.	Colongra employees are progressively receiving training outlined in the OEMP including training in pollution incident response and training supporting operational risk and incident management, as well as site inductions for projects conducted at site. Site specific environmental awareness training is conducted as part of the site specific induction.
Section 4.5	**Environmental Management Plans**	Environmental Management Plans for air quality, water, noise and waste have been prepared and are detailed in the OEMP.

Reference	Summary of OEMP Section	Details of Compliance
Section 4.5.1	**Air Quality Management Plan** The OEMP Air Quality Management Plan identifies the air quality impacts, risks, control measures and management procedures for Colongra.	Compliance with the Air Quality Management Plan is discussed in Section 3.2 of this AEMR.
Section 4.5.2	**Water Management Plan** The Water Management Plan comprises this section of the OEMP and identifies the water impacts, risks, control measures and management procedures for Colongra.	Compliance with the Water Management Plan is discussed in Section 3.2 of this AEMR.
Section 4.5.3	**Noise Management Plan** The Noise Management Plan comprises this section of the OEMP and identifies the noise impacts, risks, control measures and management procedures for Colongra.	Compliance with the Noise Management Plan is discussed in section 3.2 of this AEMR.
Section 4.5.4	**Waste Management Plan** The Waste Management Plan comprises this section of the OEMP and identifies the waste impacts, risks, control measures and management procedures for Colongra.	Compliance with the Waste Management Plan is discussed in section 3.2 of this AEMR.
Section 4.5.5	**Fuel Use Management Plan** The Fuel Use Management Plan comprises this section of the OEMP and identifies the risks and control measures for Colongra.	The Fuel Use Management Plan has been complied with, with diesel hours and market conditions are reviewed as part of the Gen Ops operations and the monthly EPL emissions process. Diesel fuel analysis is undertaken in accordance with NGER requirements, while Jemena provide the required gas analysis data.
Section 4.5.6	**Complaints Management Plan** The Complaints Management Plan comprises this section of the OEMP and identifies the risks, control measures and management procedures for Colongra.	No complaints were received during the reporting period. Snowy Hydro uses its internal event management system as the site Complaints Register for the Colongra. All complaints are treated as incidents, and the use of the system enables tracking and investigation of complaints, the recording of preventative actions that may be outcomes of an investigation and tracking of those actions to closure.
Section 5.1	**Internet Site** This section requires the Snowy Hydro Internet site is maintained to provide regular, up to date information regarding Colongra.	The Snowy Hydro internet site is maintained and regularly reviewed to ensure compliance with the Concept Approval and this section of the OEMP. The Colongra internet site and key information can be accessed at: https://www.snowyhydro.com.au/about/reports/
Section 5.2	**Telephone Complaints Line** This section lists the complaints line number and reiterates	The 24 hour contact telephone number for Colongra inquiries is included in the Snowy Hydro Pollution Incident Response Management Plan (**PIRMP**)

Reference	Summary of OEMP Section	Details of Compliance
	requirements of the Project Approval and EPL13036.	required under EPL13036. An external version of the PIRMP is provided on the Snowy Hydro Internet site. https://www.snowyhydro.com.au/about/reports/ A free call 24 hour contact line for Safety and Environmental Incidents and Complaints is also provided on the Internet site contact page. http://www.snowyhydro.com.au/contact-us/
Section 6	**Audits and Inspections** This section describes audits and inspections undertaken at Colongra.	Weekly site inspections which include key environmental controls (bunding, spill kits, equipment condition and site amenity are undertaken and documented through the Ellipse maintenance system. Maintenance inspections and calibration of environmental equipment/controls are also scheduled through the Ellipse system as required by the manufacturer. External audits of our EMS against the ISO 14001 standard are undertaken annually with recertification audits occuring every 3 years. Site visits to Colongra are determined based on the agreed schedule. A 3 yearly environmental external audit was undertaken in October 2019 as required by the Project Approval. The scope of this audit is set out by Condition 3.8 of the Approval and covered the period of September 2016 to September 2019. The audit found Snowy Hydro demonstrated an overall high level of compliance with the Approval and EPL conditions that were applicable to the operation of Colongra.
Section 7	**Documentation** The document control system and key environmental documentation is specified in this section of the OEMP.	Environmental documentation is stored within Snowy Hydro's document management system. Hard copies of inspection documents and waste certificates are also kept on-site as required.
Section 4.2.5	**OEMP Review** This section describes the triggers for updating the OEMP.	The OEMP has been reviewed annually and updated as required, refer Section 2.1.1 of this AEMR.

Implementation of Mitigation and Maintenance Measures

Mitigation measures have been installed and are maintained across the site. Critical environmental controls (mitigation measures) include the following: 24 hr monitored alarming on critical systems (ie equipment status alarms, level and concentration alarms), bunding, an OWW separator, isolated drainage systems for potentially contaminated and clean water, emergency shutoff valves, regular training in emergency management and spill response, and environmental awareness. Daily visual inspections of these critical controls in addition to scheduled maintenance activities is also undertaken.

Maintenance requirements are scheduled in Snowy Hydro's maintenance system and required work activities which is used to schedule and track progress and completion of maintenance activities.

Environmental Incidents and Corrective/Preventative actions

In summary, four environmental incidents were recorded at Colongra during this period relating to minor hydrocarbon spills onsite and spills in bunded areas.

There were no notifiable environmental incidents and therefore no notifications to regulators occurred during this period.

Details of corrective/preventative actions will be provided in relation to notifiable incidents, noting that this is therefore not required during the current reporting period.

2.1.2 Independent Environmental Audit

Condition 3.8 of the Project Approval requires an Independent Environmental Audit (**IEA**) is commissioned 12 months after the commencement of operation of the project, and every three years thereafter. The purpose of the IEA is to assess, among other things, compliance with the requirements of the Project Approval and other licences and approvals that apply to the project, along with the environmental performance of the project against the predictions made and conclusions drawn in the documents referred to under Condition 1.1 of the Project Approval.

In October 2019 GHD Pty Limited (**GHD**) was commissioned by Snowy Hydro to conduct an audit of compliance with the requirements of the Project Approval for the construction and operation of a gas turbine power station at Colongra. The audit also included a review of compliance against the sites EPL 13036.

Snowy Hydro demonstrated an overall high level of compliance with the Approval and EPL conditions that were applicable to the operation of the Colongra Power Station.

The next IEA is due in October 2022 for the period September 2019 to September 2022.

2.2 Colongra Environment Protection Licence No. 13036

In addition to the Project Approval, the other primary regulatory requirement considered in the OEMP is the Colongra EPL 13036 issued under the Protection of the Environment Operations Act 1997 (POEO Act) and the Protection of the Environment Operations (General) Regulations 2009 (POEO Regulation). A link to the latest version of the Colongra EPL 13036 is provided on the Snowy Hydro website and can be found on the EPA Public Register.

The following are conducted for oversight of licence compliance on a monthly basis:

- reviews of compliance with discharge limits identified in the Project Approval and EPL 13036;

- summary tables of emissions to air from each of the turbine units are published on the Snowy Hydro Internet site; and
- reports of non-compliances and issues relating to risk and compliance for review by the Snowy Hydro Executive Safety, Operations, Environment, Risk Committee.

Variations to EPL13036

A variation to the site EPL13036 was finalised during the reporting period. The variation was issued on 24 November 2021 and included new conditions allowing the use of a predictive emissions modelling system (**PEMS**) and the use of Bureau of Meteorology data as backup systems in the event of a failure of the site CEMs or weather station during operations.

Colongra EPL13036 Annual Return

In accordance with Condition R1 of EPL 13036, Snowy Hydro was required to complete and submit to the NSW Environment Protection Authority (**EPA**) Annual Return within 60 days of the end the reporting period, comprising:

- a Statement of Compliance; and
- a Monitoring and Complaints Summary.

Summary copies of the Colongra Annual Returns are publicly available on the EPA Public Register. The Annual Return for the period 01 July 2012 to 30 July 2021 was submitted on time.

Non-compliances

There were no non-compliances with Colongra EPL13036 during this reporting period.

Stack Emissions Monitoring Results Summary

Please refer to the Air Quality section in this report for detail regarding stack emissions, including information reported to the EPA, stack emissions test results, and continuous emissions reporting summaries. All emission results during the period have been within the Project Approval and EPL13036 limits.

Publication of Pollution Monitoring Data

In accordance with section 66(6) of the POEO Act, all licensees who maintain a website are required to make any pollution monitoring data collected in compliance with monitoring conditions attached to their licence publicly available on the website.

To access this data please use the following link.

https://www.snowyhydro.com.au/about/reports/reports-colongra-monthly/

Pollution Incident Response Management Plan (PIRMP)

In accordance with section 153A of the POEO Act, Snowy Hydro is required to prepare and maintain a Pollution Incident Response Management Plan (**PIRMP**). Compliance

with the requirements to prepare and maintain PIRMP is certified in the Annual Return. The external version of the PIRMP is accessible through the following link.

https://www.snowyhydro.com.au/about/reports/

2.3 Snowy Hydro Environmental Management System

Snowy Hydro has implemented and maintains a business wide Environmental Management System certified to ISO 14001. The EMS undergoes a mandatory Recertification Audit every three years and mandatory Surveillance Audits in the intervening years on an annual basis.

Snowy Hydro was recertified to the ISO14001 standard following the most recent EMS recertification audit in September 2020. Colongras' participation in the audit is determined during the scheduling of that year's audit. A site visit to Colongra was included within the scope of the ISO 14001 surveillance audit that was undertaken for Snowy Hydro during 2019 but not in the recertification audit in 2020 or the surveillance audit in 2021.

3.0 OEMP Implementation & Monitoring

Specific environmental management and monitoring actions are required for Colongra under the Project Approval, EPL 13036 and the Statement of Commitments. Implementation of environmental management practices and monitoring results for this reporting period is presented in this section.

3.1 Environmental Aspects, Impacts and Risk

Colongra Aspects & Impacts have been included in the Snowy Hydro Aspects & Impacts Register. A review of the register was undertaken with key stakeholders in January 2020 and any additional aspects specific to Colongra were included in the Register. An annual review was undertaken by the Environment team in 2021.

As operational activity remained relatively low during the reporting period, and environmental controls have been maintained to the same standard as during the previous reporting period, environmental impacts associated with Colongra operations were negligible.

A baseline contamination study was completed following ownership transfer from the State government to Snowy Hydro. This study identified a number of pre-existing contaminants. Snowy Hydro is working with the previous owner and the NSW EPA to ensure that pre-existing contamination is managed appropriately.

3.2 Environmental Management Plans & Monitoring

The OEMP has identified environmental management plans for air quality, water, noise, waste, fuel use, and complaints, to manage the environmental risks associated with these activities. Performance against these aspects is summarised below.

Due to the nature of Colongra operation the primary aspect for which data is available is emissions to air, for which comprehensive monitoring data is provided below.

3.2.1 Air Quality

Colongra emits products of combustion into the surrounding atmosphere via four exhaust stacks. Conditions 3.1 of the Project Approval and Conditions P1 and M2 of the Colongra EPL require that air emissions from the stacks are monitored continuously for oxides of nitrogen (**NOx**), as well as annually for carbon dioxide, dry gas density, moisture content, molecular weight of stack gases and oxygen.

The stack emission monitoring consists of continuous monitoring using in-stack continuous emission monitors (**CEMs**) and verification testing on an annual basis. Stack emissions verification testing (on gas and diesel fuel) was undertaken on the 22, 23 and 24th of February for GT 1, 2, 3 and 4 (gas only). Diesel testing was undertaken on GT Unit 4 on the 7th of May 2021. The results of the annual verification testing are summarised in **Tables 4** to **7**.

Annual stack emissions testing is undertaken by Ektimo Pty Ltd an external NATA accredited contractor who specialise in industrial air emission monitoring.

The CEMS collects continuous emissions data for NOx for each of the emissions stacks as required by EPL 13036 and Project Approval Condition 3.1. Monthly summaries of CEMS monitoring results are published on the Snowy Hydro Internet site at:

https://www.snowyhydro.com.au/about/reports/reports-colongra-monthly/

With regards to emissions limits the Project Approval and EPL13036 specify;

- while operating on gas, the concentration limit for NOx for all discharge points is 60 milligrams per cubic metre **(mg/m^3)**, measured as an hourly average NO_2 equivalent and in "one hour blocks" as specified in Schedule 5 of POEO (Clean Air) Regulation;
- while operating on distillate fuels only, the concentration limit for NOx for all discharge points is 90 mg/m^3; and
- the concentration limits do not apply during a period of start-up or shutdown, where start-up and shutdown have the same meaning as defined in the POEO (Clean Air) Regulation.

For determination of compliance with nitrogen oxides emission limits, emissions data have been collected in accordance with the EPA method CEM-2. In accordance with the requirements of the Project Approval, EPL13036, and POEO (Clean Air) Regulation, Schedule 5, data have been analysed on the basis of:

- a one hour averaging period, where the hour is a 1 hour block, as opposed to a rolling average. For the purposes of this report, the NOx emissions levels reported are the average of all emission concentrations taken from a turbine whilst in normal operation for one hour. Where the turbines were operating for less than one hour, the emissions level is not reported as it would lead to a misrepresentation of emissions from the power station;
- reference conditions of dry gas, 273 K, 101.3 kPa and 15 % O2; and
- excluding emissions during periods of start-up or shutdown, as specified by the Project Approval and EPL13036 conditions.

In summary, the CEMs NOx levels measured in this reporting period complied with the EPL and Project Approval NOx limits.

The maximum hourly NOx averages during gas-fired operation ranged between 27 mg/m^3 recorded in November and 58 mg/m^3 recorded in July. The mean hourly average each month on gas ranged from a minimum of 27 mg/m^3 during November to a maximum of 55 mg/m^3 in July.

The maximum and average hourly NOx averages during diesel fuel operation ranged between 62 mg/m^3 recorded in May and 83 mg/m^3 recorded in February (on GT4).

Variation in performance is expected as emissions control effectiveness will differ between fuel types and units. Variation in results will also be seen due to the ambient weather conditions throughout the year and the peaking nature of operations where prolonged steady state operations are a rare occurrence, resulting in more variation in emissions levels and consistency of components within the exhaust gas stream.

Stack Emissions Monitoring Results Summary

The gas fuel emissions monitoring results shown in **Tables 4** to **7** overleaf are provided for the 2021 financial year as this is the period reported in the Annual Return to the EPA, and as such the same data is provided to both Departments.

The emissions results for the remaining reporting period are available through the Snowy Hydro website which is linked below to the 'Continuous Emissions Monitoring Results Summary' section in this report.

During the AEMR reporting period the annual stack emissions tests were conducted, the results of which are also provided in **Tables 4** to **7**.

Table 4: Stack emissions test results and continuous monitoring results for turbine Unit 1

Pollutant	Unit of Measure	No. of samples required by licence (this is hourly average excluding start/stop)	No. of samples collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Carbon dioxide	percent	1	1	3.0	3.1	3.2
Dry gas density	kilograms per cubic metre	1	1	1.3	1.3	1.3
Moisture content	percent	1	1	6.1	6.1	6.1
Molecular weight of stack gases	grams per gram mole	1	1	29.2	29.2	29.2
Nitrogen oxides	milligrams per cubic metre	Continuous	100.0%	30	42	57
Oxygen (O2)	precent	1	1	14.9	15.1	15.2
Temperature	Celcius	1	1	497	497	497
Velocity	metres per second	1	1	33	33	33
Volumetric flowrate	cubic metres per second	1	1	400	400	400
*Nitrogen Oxides	milligrams per cubic metre	1	1	-	43	-

*Annual Stack Emission Test Results

Table 5: Stack emissions test results and continuous monitoring results for turbine Unit 2

Pollutant	Unit of Measure	No. of samples required by licence (this is hourly average excluding start/stop)	No. of samples collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Carbon dioxide	percent	1	1	3.0	3.0	3.1
Dry gas density	kilograms per cubic metre	1	1	1.3	1.3	1.3
Moisture content	percent	1	1	7.2	7.2	7.2
Molecular weight of stack gases	grams per gram mole	1	1	29.2	29.2	29.2
Nitrogen oxides (Nox)	milligrams per cubic metre	Continuous	100.0%	29	41	54
Oxygen (O2)	precent	1	1	15.2	15.3	15.4
Temperature	Celcius	1	1	502	502	502
Velocity	metres per second	1	1	30	30	30
Volumetric flowrate	cubic metres per second	1	1	350	350	350
*Nitrogen Oxides	milligrams per cubic metre	1	1	-	22	-

*Annual Stack Emission Test Results

Table 6: Stack emissions test results and continuous monitoring results for turbine Unit 3

Pollutant	Unit of Measure	No. of samples required by licence (this is hourly average excluding start/stop)	No. of samples collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Carbon dioxide	percent	1	1	3.1	3.1	3.3
Dry gas density	kilograms per cubic metre	1	1	1.3	1.3	1.3
Moisture content	percent	1	1	6.3	6.3	6.3
Molecular weight of stack gases	grams per gram mole	1	1	29.2	29.2	29.2
Nitrogen oxides (Nox)	milligrams per cubic metre	Continuous	100%	20	33	50
Oxygen (O2)	precent	1	1	14.9	15.2	15.2
Temperature	Celcius	1	1	504	504	504
Velocity	metres per second	1	1	33	33	33
Volumetric flowrate	cubic metres per second	1	1	400	400	400
*Nitrogen Oxides	milligrams per cubic metre	1	1	-	27	-

*Annual Stack Emission Test Results

Table 7: Stack emissions test results and continuous monitoring results for turbine Unit 4

Pollutant	Unit of Measure	No. of samples required by licence (this is hourly average excluding start/stop)	No. of samples collected and analysed	Lowest sample value	Mean of samples	Highest sample value
Carbon dioxide	percent	1	1	3.0	3.1	3.2
Dry gas density	kilograms per cubic metre	1	1	1.30	1.30	1.30
Moisture content	percent	1	1	7.7	7.7	7.7
Molecular weight of stack gases	grams per gram mole	1	1	29.2	29.2	29.2
Nitrogen oxides (Nox)	milligrams per cubic metre	Continuous	100%	25	37	47
Oxygen (O2)	precent	1	1	15.1	15.2	15.2
Temperature	Celcius	1	1	499	499	499
Velocity	metres per second	1	1	33	33	33
Volumetric flowrate	cubic metres per second	1	1	400	400	400
*Nitrogen Oxides	milligrams per cubic metre	1	1	-	40	-

*Annual Stack Emission Test Results

Continuous Emissions Monitoring Results Summary

Continuous emissions monitoring for Nitrogen Oxides (**NOx**) is required for all operations of the power station. These are summarised monthly and published on the Snowy Hydro Internet site as required by EPL13036. The summaries are not reproduced in this AEMR, and are available through the following link:

https://www.snowyhydro.com.au/about/reports/reports-colongra-monthly/

3.2.2 Water

Water monitoring is not required under the approvals, licences and permits applicable to Colongra. However, as outlined in the OEMP, in the event of any uncontrolled surface water discharge from the site, the discharge may be monitored should there be concerns in relation to water quality. In this event a number of physical parameters are identified for monitoring including pH, Total Dissolved Solids, Suspended Solids, Dissolved Oxygen, Heavy Metals, Trace Elements, and Oil and Grease.

As there were no uncontrolled discharges recorded during this reporting period water monitoring for the above parameters was not undertaken.

Six monthly monitoring of discharge from the oily water separator pit was undertaken for physical parameters and oil and greases as required by the OEMP. Oil and grease was detected in a sample collected on 19 February 2021. An inspection of the OWW system and discharge area was undertaken and no indications of sheen or hydrocarbons were observed; additional sampling was undertaken on 4 March and the results were below detection levels.

3.2.3 Noise

Project Approval condition 2.12 and EPL 13036 condition L5 require Colongra to operate and maintain the premises and plant to ensure that the noise contributions from the power station to the background acoustic environment do not exceed the maximum allowable noise contributions specified in Table 3 of the Project Approval. The noise emissions from the power station were verified and reported to NSW Planning by Delta Electricity following construction and commissioning.

Effective noise mitigation results from design and construction of the power station, and in addition Colongra operates under procedures to manage any unexpected noise emissions from the site. These procedures include operating checklists, and ensuring all doors, vents and louvers are closed as required during operation to limit noise from the generator/turbine enclosures.

During operation, noise monitoring is undertaken after any community complaint at the receiver in order to verify noise levels from the power station, as per the corrective actions section of the OEMP. Where this occurs, results would be submitted to the Department of Industry and Environment (**DPIE**) in the AEMR and to the EPA in the Colongra EPL Annual Return. This process was not required to be implemented as there were no noise complaints related to site operation during this reporting period.

3.2.4 Waste

Waste types commonly generated onsite include waste oil, general waste, recyclables (paper and plastics). All liquid and non-liquid waste generated onsite is classified in accordance with EPA environmental Guidelines prior to offsite disposal at a licenced

facility. No waste material generated outside the site is accepted onto the site for storage/processing or treatment.

Overall waste generation from day to day operations at Colongra is considered to be minimal. Licenced contractors (such as Cleanaway) are engaged to dispose of the general waste, co mingled recyclables (paper and plastics), metal recyclables and oily waste to a licenced facility. Prescribed waste is recorded and tracked in accordance with EPA requirements.

Individual Contractors, in consultation with the site personnel and their contract qualification requirements, are responsible for monitoring housekeeping, waste collection, storage, and disposal procedures and facilities.

Additionally, contractors are required to prepare an EMP prior to the commencement of any special projects. All EMP's are reviewed and approved by Snowy Hydro to ensure environmental risks and appropriate management measures have been identified and are adopted by the contractor.

Surveillance of site waste minimisation and disposal guidelines has been conducted as part of the routine inspections by Colongra site Production Technicians, and by Project Managers associated with site related project activities. No significant waste management issues were identified during the routine inspections.

3.2.5 Fuel Use

The Fuel Use Management Plan has been complied with, with diesel hours and market conditions recorded and tracked by Generation Operations (**Gen Ops**) following each diesel run.

Colongra generated 61 GWh of electrical power during this reporting period with the turbines operating for approximately 71 hours on diesel fuel. Of the total 71 hours approximately 52 hours were commercial production runs all of which met one or more of the stated exemption conditions listed in Clause 2.3 of the Project Approval. The remaining balance of 19 hours related to testing of the plant and diesel fuel system (as detailed in Section 1.3.3 of this report).

3.2.6 Meteorological Data

As required by the site EPL, meteorological data was collected during site generation activities. The data is available within Snowy Hydro's SCADA system and a direct download of the equipment is also undertaken on a regular basis. Monitoring and maintenance of the weatherstation is undertaken in accordance with the operating manual and scheduled in the site maintenance planning system to ensure the equipment is operating reliably.

4.0 Predicted Performance & Achievement of Environmental Goals

Condition 6.3(c) of the Project Approval states that the AEMR shall include:

"identification of any circumstances in which the environmental impacts and performance of the project during the year have not been generally consistent with the environmental impacts and performance predicted in the documents listed under condition 1.1 of this approval, with details of additional mitigation measures applied to the project to address recurrence of these circumstances."

A review of the data collected during the reporting period identified no significant changes in circumstances to the previous reporting period, and that the environmental performance of Colongra was generally consistent with the original predictions made and conclusions drawn in the documents listed under Condition 1.1.

It should be noted that Colongra power station has four gas turbines with a nominal output of 660 MW total and a licensed annual generation capacity of 1,000 GWh to 4,000 GWh, as identified in EPL 13036 Administrative Condition A1. However, as a result of market conditions, Colongra generated approximately 61 GWh during the reporting period.

Using environmental monitoring to air and complaints management as the key assessment mechanisms, the environmental performance of Colongra power station was able to be assessed against the performance goals established through the various approvals, licences and permits for the project.

No physical environmental impacts were found in excess of those predicted by the environmental assessment studies or in excess of environmental licence, planning or legislative limits during this reporting period. As such, it's considered that the environmental goals of the project have been achieved during the reporting period.

5.0 Overall Performance Against Licences and Approvals

There are a number of conditions in the project approval related to the construction and commissioning phases of the project. As such they are no longer relevant to current site operations.

Of the remaining conditions there were no non-conformances against the Approval conditions, similarly there were no non-compliances with the site EPL conditions.