



**Kerosene Vale Ash Repository Stage 2  
Annual Environment Management Report  
April 2013 – March 2014**



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### Annual Environmental Management Report (AEMR) Approval:

Signed:

\_\_\_\_\_  
PETER GRIFFITHS

NOMINATED ENVIRONMENTAL REPRESENTATIVE

Disclaimer: This document has been prepared by the EnergyAustralia NSW Environment Group, at the request of and exclusively for the benefit and reliance of EnergyAustralia NSW. All endeavours were made to ensure the best available information was utilised in the preparation of this report.

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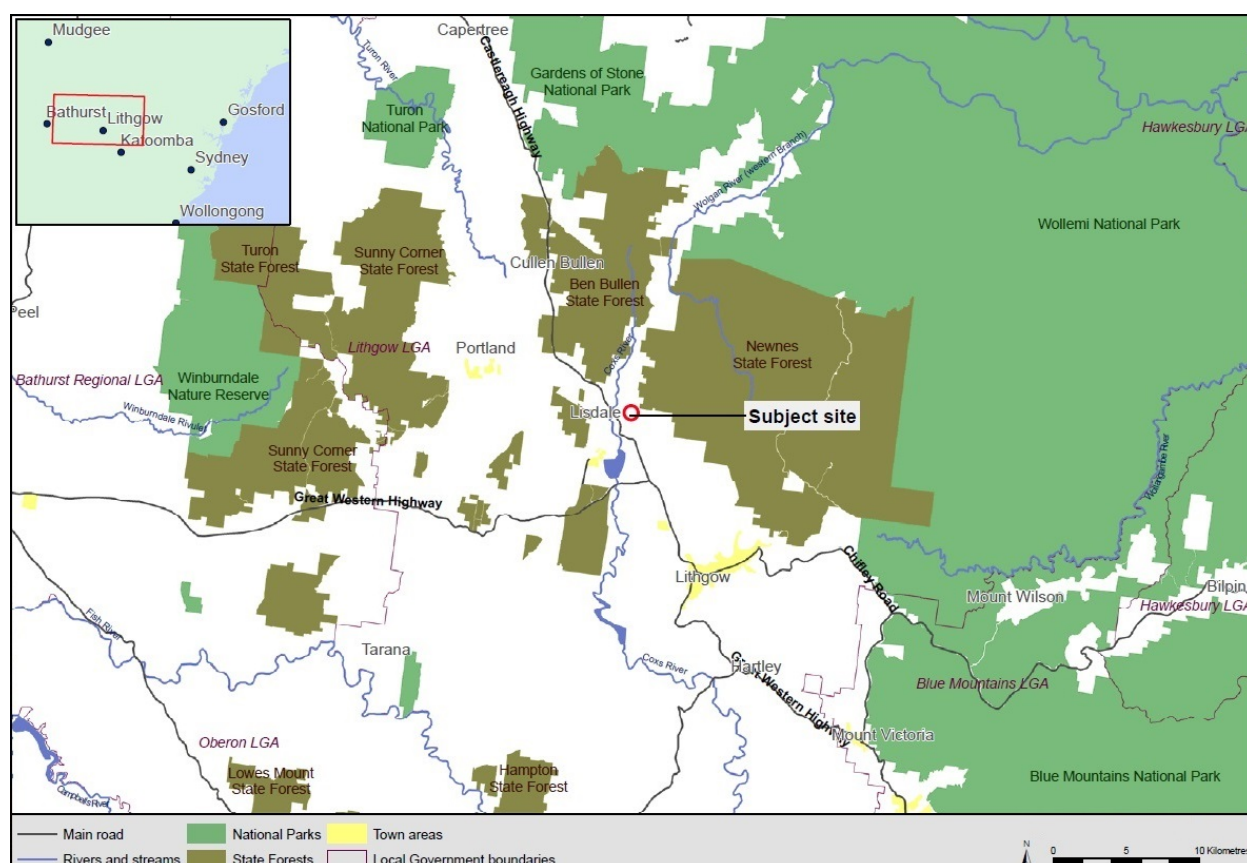
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# 1. Introduction

## 1.1 Background

The Kerosene Vale Ash Repository (KVAR) is owned and operated by EnergyAustralia NSW, formerly Delta Electricity, and is located approximately 2.5 kilometres north-east of Wallerawang Power Station and approximately 10 kilometres north-west of the city of Lithgow, which is 150 kilometres west of Sydney (Figure 1). KVAR is situated in the centre of the Sawyers Swamp Creek (SSC) catchment, and receives significant runoff from the surrounding areas.



**Figure 1: Regional context map**

The original ash placement operations were at the Kerosene Vale Ash Dam (KVAD). The void was filled with ash transported from the Wallerawang power station as slurry (i.e. wet ash placement). When the KVAD was full, it was capped with a clay capping and then ash placement operations began at the Sawyers Swamp Creek Ash Dam (SSCAD), which saw wet ash placement take place from 1980 to 2003.

The need to further develop the KVAR area in order to maintain power-generation operations at Wallerawang Power Station was identified by Delta Electricity (DE) in 2001. The existing wet ash storage area (i.e. the Sawyers Swamp Creek Ash Dam) was approaching its design capacity. The placement of dry ash at the KVAR was identified as a viable alternative. The extent of both stages is outlined in Figure 2.

Conversion from wet to dry ash placement aimed to minimise environmental and social impacts potentially resulting from heavy metal accumulation. Key benefits of a dry ash handling facility included:

- The potential for ash to be beneficially reused in its dry form;
- An approximate 80% decrease in the water required to transport ash;
- Discharges to the Cocks River are decreased in the long term;
- The SSCAD can be progressively rehabilitated; and
- There would be a decreased flood risk for Kerosene Vale, Lidsdale and surrounding areas (Hyder Consulting, 2001)

In 2002 DE was granted approval to change from wet to dry ash-producing activities and to use the Kerosene Vale Ash Repository (KVAR) area for dry ash storage. On 26 November 2008, DE received further Project Approval from the Minister of Planning for the extension of the existing KVAR area to permit the continued disposal of ash generated by the Wallerawang Power Station under Section 75J of the *Environmental Planning and Assessment Act 1979*. The KVAR Stage 1 placement works were completed and capped in February 2009. The KVAR Stage 2 placement works commenced soon after in April 2009 (Aurecon, 2011).

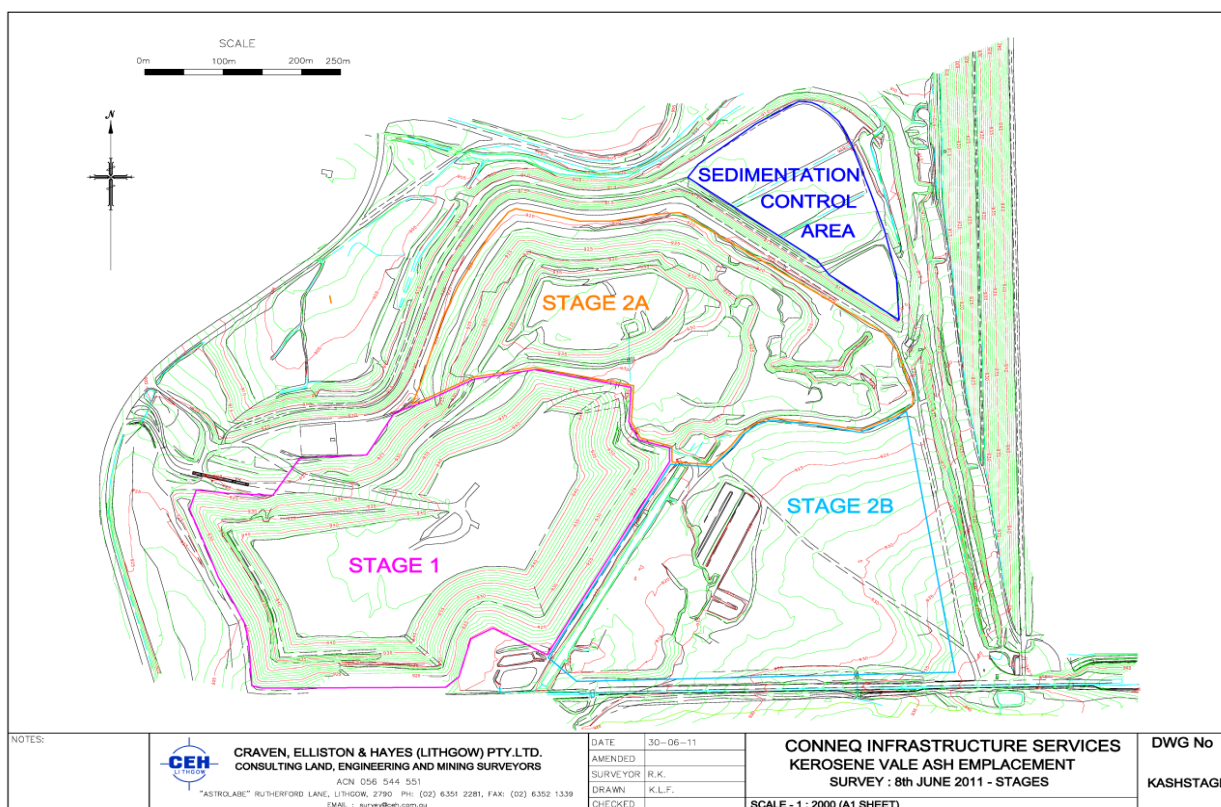
The original ash placement strategy, as outlined within the Operation Environmental Management Plan (OEMP) (Parsons Brinckerhoff, 2008b), was as follows:

- Stage 2A as an extension of Stage 1;
- Stage 2B to allow time for the re-alignment of Sawyer's Swamp Creek and for material to be obtained from the pine plantation area to reinforce the stabilisation berm to the north of KVAR Stage 1; and
- Stage 2C as a final ash placement area once reinforcements of a proposed stabilisation berm with creek realignment had been carried out.

Since the first AEMR was submitted in 2011, the ash placement strategy for Kerosene Vale Stage 2 Ash Repository has been updated to reflect changes from the three stage process outlined above, to a two-staged approach. This change in strategy was in response to Centennial Coal relinquishing their right to extract coal from the areas of mining interest within the KVAR Stage 2 proposal (Figure 2). However, the designated area for ash placement remained and subsequent earthworks and excavations were to be considered.

With ash placement commencing in Stage 2A, Delta Electricity's contract structural engineers reviewed the ash placement strategy and determined that moving the northern boundary of the repository at least 60m from the dam wall, at a depth of no more than 12 m removed the necessity for the stabilisation berm. Berm stabilisation was no longer required and it was deemed unnecessary to realign SSC. As a result, construction activities were not required to facilitate the placement of ash in the Stage 2A area within the context of coal extraction as the operation was within progression of ash placement from Stage 1 utilising existing facilities and infrastructure. The Construction Environmental Management Plan (CEMP) for KVAR Stage 2B, subsequently developed in consultation with Delta Electricity's Western Environment Section (Conneq, 2011), was approved by the Department of Planning and Infrastructure in August 2011 and reflects the planning associated with these changes particularly to address the need for excavated materials within the site. These site proposals are illustrated within Figure 2.





**Figure 2: Revised ash placement strategy for KVAR- Stages 1, 2A and 2B**

## 1.2 Purpose of the AEMR

The Project Approval contains a number of conditions that need to be complied with by EnergyAustralia NSW, as the proponent, at different stages of the Project (Section 2). Condition 7.3 of the Project Approval (DP&I, 2008) requires that EnergyAustralia NSW prepare and submit an Annual Environmental Management Report (AEMR) for the approval of the Director-General, Department of Planning (DP&I).

This Annual Environmental Management Report has been prepared in order to satisfy Condition 7.3 of the Project Approval (DP&I, 2008). This report covers the operations between April 2013 to March 2014.

The AEMR is to include, but not necessarily be limited to:

- The Proponent shall, throughout the life of the project, prepare and submit for the approval of the Director-General, an AEMR. The AEMR shall review the performance of the project against the Operation Environmental Management Plan (OEMP) (Conditions of Approval (CoA) 6.4) and the Conditions of this Approval;
- Details of compliance with CoAs;
- A copy of the Complaints Register (refer to CoA 5.4) for the preceding twelve-month period (exclusive of personal details), and details of how these complaints were addressed and resolved;
- 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 CoA 1.1, with details of additional mitigation measures applied to the project to address recurrence of these circumstances;

- Results of all environmental monitoring required under CoA 3.3 to 3.8, including interpretations and discussion by a suitably qualified person; and
- A list of all occasions in the preceding twelve-month period when environmental goals/objectives/impact assessment criteria for the project have not been achieved, indicating the reason for failure to meet the criteria and the action taken to prevent recurrence of that type of failure.

### 1.3 Current Project Setting

In January 2014, Wallerawang Power Station's Unit 7 was removed from service and deregistered from the market; whilst in March 2014, Unit 8 was placed in long term storage,

As a consequence, Wallerawang Power Station has not generated ash requiring disposal at KVAR since April 2014. However, environmental management within a caretaker operation will continue. Further, EnergyAustralia is currently negotiating with NSW Treasury to produce a plan for the decommission, deconstruction and rehabilitation of the entire operational facility at Wallerawang including the ash placement areas.

## 2. Consents, Leases and Licences

This AEMR has been prepared to address the relevant conditions of the project approval and the Statement of Commitments which have been triggered during the reporting period. The operation of the KVAR project must comply with the following statutory requirements (Table 1):

**Table 1: Key Consents, Leases, Licences and Permits**

Approval/Lease/Licence	Issue Date	Expiry Date	Details/Comments
Project Approval 07_0005	29 July 2005 (Renewed 26 November 2008)	26 November 2013	Detailed summary provided in Appendix A
Environment Protection Licence (EPL) No. 766	10 January 2014	10 January 2019 (Review Date)	Detailed summary provided in Appendix A
Kerosene Vale Stage 2 Ash Repository Area – Submissions Report	30 May 2008	-	-
Kerosene Vale Stage 2 Ash Repository Area – Environmental Assessment	1 April 2008	-	-
Other licences, permits and approvals	-	-	Detailed summary within Section 4.1.3 of the OEMP (Appendix B)
Other relevant legislation, guidelines and approvals	-	-	Detailed summary within Section 4.1.4 of the OEMP (Appendix C)

A summary of compliance against the applicable statutory requirements is provided in the sections below (Sections 2.1 - 2.3).

### 2.1 Assessment of compliance with conditions of approval

The Project Approval contains a number of conditions that need to be complied with by EnergyAustralia NSW, as the proponent, at different stages of the Project. A summary of the compliance assessment findings against the Conditions of Approval (CoAs) for the management period (April 2013 to March 2014) is provided in Table 2 and outlined below. A detailed review of compliance with the CoA is presented in Appendix A.

In assessing compliance with CoAs the following compliance categories were used:

- Compliance;
- Partial compliance;
- Non-compliance; and
- Not applicable.

**Table 2: Summary of compliance assessment findings for the management period**

Compliance Category	Number of Findings
Compliance findings	45
Non applicable findings	25
Partial compliance findings	0
Non-compliance findings	0
Total	70

There were no Non-Compliant findings in the reporting period.

### 2.1.1 Compliance with other licences, permits and approvals that apply to the project

#### Environment Protection Licence

The project area is located within the operating area of EnergyAustralia NSW's Wallerawang Power Station, which operates under Environment Protection Licence (EPL) No. 766.

The following sections of the EPL are relevant with respect to the operations of KVAR Stage 2 (See Table 3):

- **L1 Pollution of waters:** Except as may be expressly provided in any other condition of the Licence (EPL 766) the licensee must comply with Section 120 of the Protection of the Environment Operations Act 1997 (POEO Act): Prohibition of pollution of waters;
- **L5 Waste:** The licensee must not cause, permit or allow any waste generated outside the premises to be received at the premises for storage, treatment, processing, reprocessing or disposal or any waste generated at the premises to be disposed of at the premises, except as expressly permitted by the licence;
- **L6 Noise limits:** Operational noise from the KVAR area must not exceed 40dB(A)  $L_{Aeq}(15 \text{ minute})$ , at the nearest most affected noise sensitive location; and
- **L7 Hours of operation:** Operational activities associated with the KVAR must only be carried out between the hours of 0700 and 2200 Monday to Sunday.

**Table 3: EPL compliance assessment**

EPL requirements	Finding	Relevant Section of AEMR
L1 Pollution of waters	Compliant	Section 4.4 (Groundwater monitoring) and Section 4.5 (Surface Water Quality Monitoring)
L5 Waste	Compliant	Section 4.11 Waste management
L6 Noise limits	Compliant	Detailed review checklist for CoA (Appendix A), Section 4.2 (ongoing operational noise monitoring), Section 4.3 (construction noise monitoring) and Section 6 (complaints register)
L7 Hours of operation	Compliant	Detailed review checklists for CoA 2.8 and CoA 2.10 (Appendix A)

## 2.2 Operations Environmental Management Plan

The Operations Environmental Management Plant (OEMP) provides the framework to manage the environmental aspects associated with the operation of the KVAR. The OEMP outlines the requirements associated with the project as stipulated in the relevant provisions of the Project Approval 07\_0005 issued by the NSW Department of

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Planning (DoP), the Environment Protection Licence 766 (EPL) issued by the NSW Department of Environment and Climate Change (DECC), and the Statement of Commitments (SoC) presented in the Submissions Report (Parsons Brinckerhoff, 2008b).

The scope of the OEMP covers all operations involving the movement and placement of ash from Wallerawang Power Station (WWPS) to the Stage 2 area of the Kerosene Vale Ash Repository.

## 2.3 Construction Environmental Management Plan

A Construction Environmental Management Plan (CEMP) for KVAR Stage 2B was developed in consultation with EnergyAustralia NSW's Western Environment Section and approved by the DP&I in August 2011. The CEMP meets the requirements of CoA's 6.2 and 6.3, providing the framework to manage the environmental aspects associated with construction works during KVAR Stage 2B operations. The CEMP has been written to address the requirements associated with the project as stipulated in the relevant provisions of the Project Approval 07\_0005 issued by the NSW Department of Planning (DoP).

## 2.4 Actions required from previous AEMR review

In a letter dated 23 June 2014, the DP&I stated that with regards to the 2012-2013 AEMR, the Department is generally satisfied that it adequately addresses the relevant requirements of the approval. Four comments were made, which are detailed in Table 4. The status of these actions is discussed in the relevant sections of this AEMR.

**Table 4 Actions required from last AEMR**

Actions Required	Response
A partial non-compliance was found regarding condition of Approval (CoA) 2.9 such that a review of the feasibility of reducing the hours of operation in the logistical arrangement was conducted, but not submitted to the Director-General (page 7). This should be amended as required by the condition.	The Ash Management contractors for KVAR (LLI) performed a logistical review (Lend Lease, 2012a), which was submitted to the DP&I on the 26 <sup>th</sup> April 2012. This report concluded that it was not feasible to permanently reduce the hours of operation along the haulage road since Wallerawang Power Station had limited on site storage capacity, prior to ash handling and placement.
With regard to CoA 2.1, which stipulated a goal of 40% re-use of ash by 31 December 2012, can you please advise if that goal was achieved (page 35).	The goal was not achieved by 31 <sup>st</sup> December 2012. However, ash utilisation has been an ongoing focus for the power station. More research to develop new markets has been performed, rather than to solely focus on servicing established market opportunities. Generally the major limitation to further market development is the lack of rail, building and industrial infrastructure and the necessary supply chain deliverables.
It should be noted that the AEMR 2012-2013 also noted the change in the ash placement strategy "from three stages as outlined in the OEMP, to a two-stage approach" (page 5), reflecting that the OEMP update that was requested has not been provided since the previous AEMR.	An updated version of the RMP was sent to the DP&I in a letter dated 3 July 2014. It was noted that the management plan reflects the change in ash placement strategy from a three stage to a two phase strategy.
It would be appreciated if you could provide any outstanding information and update the Department about the current status of the Kerosene Vale Ash Repository project by Thursday, 3 July 2014. I note this in the context of your website regarding Wallerawang Power Station not generating any electricity: <a href="http://www.energyaustralia.com.au/about-us/what-we-do/generation-assets/wallerawang-mtpiper-power-station">http://www.energyaustralia.com.au/about-us/what-we-do/generation-assets/wallerawang-mtpiper-power-station</a> and request that you advise the Department about how this might be reflected in the current use of the repository.	In a letter to the DP&I dated 3 July 2014, Wallerawang has placed no ash at Kerosene Vale Ash Repository since early April 2014. EnergyAustralia is currently reviewing the long term future for operations at Wallerawang.

### 3. Operations during the reporting period

Operations for ash placement are undertaken through contract with LLS Industrial Pty Ltd (Lend Lease's services business). Lend Lease provide operational and maintenance services for relevant aspects of ash and dust management at Wallerawang, which includes overall management of the Kerosene Vale ash placement site.

#### 3.1 Normal operating hours

The normal hours of operation for the Project are between 7 am and 10 pm Monday to Sunday, in accordance with Condition 2.8. Operations outside these hours are defined as abnormal or emergency operating conditions and are subject to specific requirements (Section 3.2).

No operating conditions have occurred outside the normal operating hours during the reporting period.

#### 3.2 Abnormal or emergency operating conditions

Conditions under which operations outside the normal hours of operation can occur have been specified in the Project Approval (CoA 2.10) and can be described as follows:

- Where it is required to avoid the loss of lives, property and/or to prevent environmental harm
- Where a breakdown of plant and/or equipment at the repository or the Wallerawang Power Station can affect or limit the capacity of ash storage at the power station itself outside the normal operating hours
- Where a breakdown of an ash haulage truck(s) prevents haulage during the operating hours stipulated under '*Normal Conditions*' combined with insufficient storage capacity at the Wallerawang Power Station to store ash outside of the normal operating hours
- In the event that the National Electricity Market Management Company (NEMMCO), or a person authorised by NEMMCO, directs EnergyAustralia NSW (as a licensee) under the National Electricity Rules to maintain, increase or be available to increase power generation for system security and there is insufficient ash storage capacity at the Wallerawang Power Station to allow for the ash to be stored.

Under these circumstances, EnergyAustralia NSW is required to notify the OEH, formerly DECC, and nearby sensitive receivers prior to any emergency ash haulage or placement operations, as well as the Director-General of the DP&E, formerly DoP, within 1 week after the emergency operations have occurred.

No operating conditions have occurred outside the normal operating hours during the reporting period.

#### 3.3 Stage 2B construction activities

Construction activities were carried out during the reporting period in conjunction with the Construction Environmental Management Plan (CEMP) and the DoP conditions of Approval for the KVAR Stage 2, in particular CoA 2.36, 3.1, 6.2 and 6.3. Construction activities were carried out between June 2013 and September 2013. The construction works for stage 2B included:

- Excavation of an area within the approved site that will enable ash placement.
- Placement of excavated materials for water management, haulage access road ways and site catchment closure planning. Set-down locations for the soil materials excavated were allocated and included:
  - The permanent capping areas of the final form of Stage 2 as approved by DoP (Stage 2A and 2B);
  - The partial development of a water management area for storm water, that will include processing of water quality through a constructed wetland;



- Upgrade of an existing access road to the south of the repository as previously approved for KVAR Stage 1.

## 4. Environmental management and performance

Environmental monitoring for the KVAR and specifically for the Stage 2 operations is designed to comply with the regulatory requirements specified in Section 2 of this AEMR, and also to provide an ongoing analysis of the condition of the environment surrounding the operations. Environmental monitoring is performed as part of the monitoring program at the sites indicated within Figure 3 and the results are used as indicators of the effectiveness of the environmental controls, and as guidelines for the management and maintenance of key environmental procedures.

Detailed procedures outlining the environmental monitoring responsibilities of key stakeholders and the impacts to be mitigated can be found within the individual sub-plans of the OEMP. Details regarding the environmental responsibilities, key stakeholders and the impacts to be mitigated regarding construction activities can be found with the CEMP. A summary of the environmental management measures and associated performance are provided in the sections below (4.1 – 4.12).

Performance against environmental monitoring and compliance requirements are provided by Lend Lease as a monthly Client Service Report and through external consultant and internal reports. Summaries of these reports are provided in the sections below (4.1 – 4.12) and in Appendices I – L.

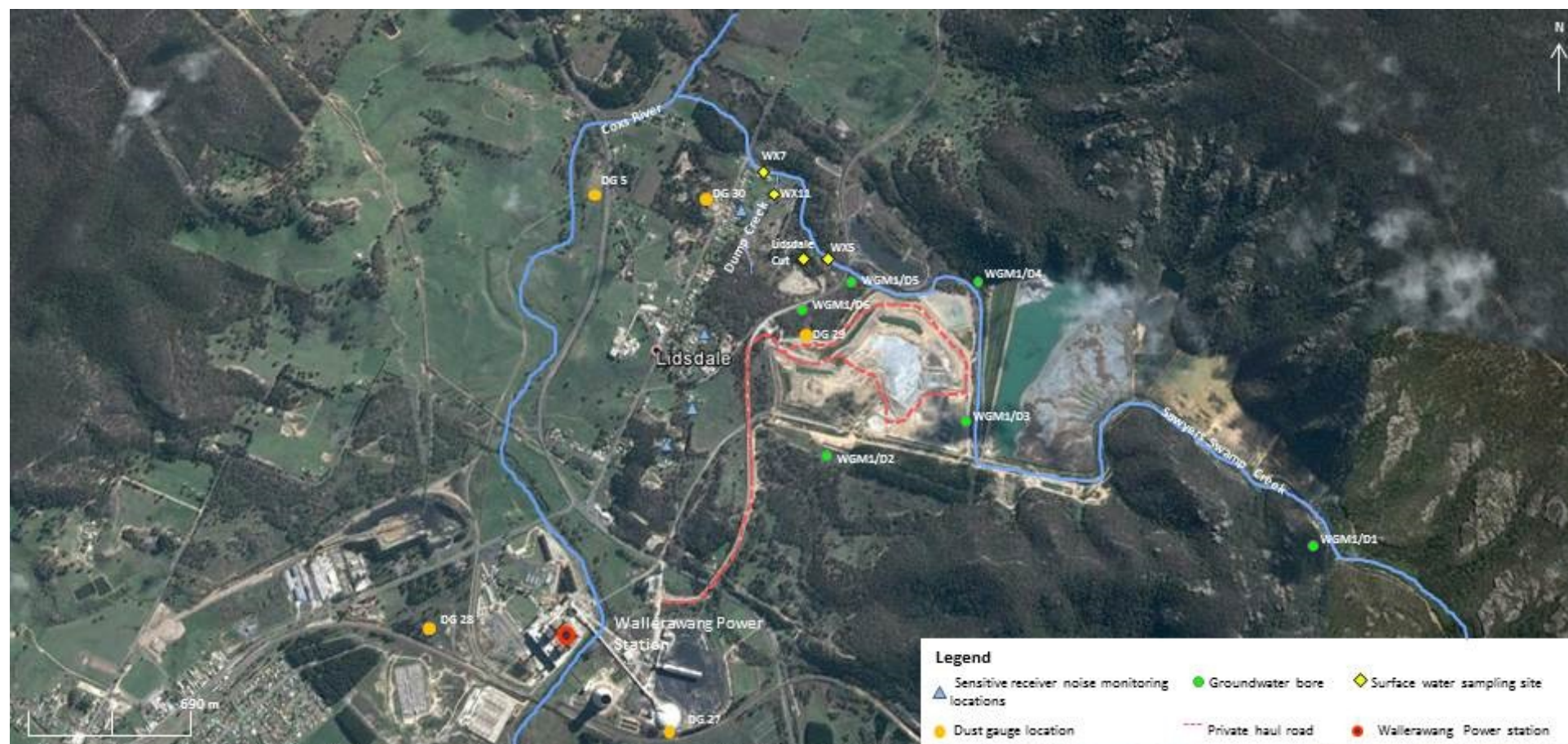


Figure 3: Environmental monitoring locations

## 4.1 Ash delivery and placement

### 4.1.1 Environmental Management

Ash generated as a by-product from the operation of Wallerawang Power Station is conveyed from the power station to two storage silos. The ash is then conditioned to approximately 15-22% moisture content to minimise the potential for dust generation and enhance compaction on placement over the ash repository area. The conditioned ash is transported from the storage silo via an existing haul road via trucks. All truck loads are covered during transport to minimise dust emissions.

On delivery to the Kerosene Vale ash repository area, the dry conditioned ash is deposited at the operating ash placement area. Compactors and bulldozers are then used to place the ash in stable landforms and to establish adequate and appropriate drainage. Ash placement can be broadly described as including the following processes:

- Identifying the current operational location for placement of ash, which has progressed into the Stage 2B area with an approximately 18 metre height as partially completed eastern batter. Ash placement to the west and north sides has been completed to the final design height and these batters are ready for final surface water structure and revegetation works.
- Placing ash at the existing face using truck and shaping of ash with a bulldozer.
- Compaction of the ash material using bulldozer and driving over area of placement.
- Repeat process in 10 m-high benches with batter slopes of 4:1 and 500 mm lifts.
- Once the design height of 940 metres AHD is reached, cap with material to be sourced from the pine plantation area and other locally available material and commence replanting and restoration activities.

Capping of exposed ash areas was undertaken progressively as the Stage 2 area reached the design height of 940 metres AHD. Then on completion of ash placement in the Stage 2 area (Figure 2), the site will be developed through the objectives of site closure planning, with an aim of achieving long-term water and soil management and revegetation as outlined in the revegetation plan (section 4.9).

### 4.1.2 Environmental Performance

Operations of the Stage 2 KVAR are considered to have met the following targets of the Ash Delivery and Placement Sub Plan of the OEMP:

- Compliance with the normal hours of operation condition for at least 98% of the year and its stretch target of 100% of the year - operation records show the Stretch Target has been achieved, i.e. 100% within normal hours; and
- Reduction in the number of days operating under emergency conditions (less than 5 days/year and its stretch target of 0 days/year) – Stretch Target of 0 days/year achieved.
- Compliance with the ash placement and compaction procedures – target of 92% dry density ratio exceeded at monthly testing from April 2013 to March 2014 averaging 95.7%. Note that the average compaction ratio of 92% was met for the period of March 2013 to April 2014.

All management and mitigation measures specified in the approved OEMP were found to be complied with.

### 4.1.3 Reportable Incidents

No reportable incidents have been recorded against ash delivery and placement for the reporting period.

### 4.1.4 Further Improvements

No further improvements have been identified for the next reporting period.

## 4.2 Operational Noise Monitoring

### 4.2.1 Environmental Management

The KVAR Stage 2 Operations, Operational Noise and Vibration Management Plan (ONVMP) has been developed in response to Condition of Approval (CoA) 6.5 of the Department of Environment and Climate Change (DECC) Section 75J Environmental Planning and Assessment Act 1979, Schedule 1 Application 07\_005.

The Operational Noise and Vibration Management Plan identify measures to minimise and mitigate noise impacts on surrounding land uses from the proposed works. The level of noise generated during the proposed works program will depend on the location of the receiver, the type and duration of works and intervening topography, and existing building structures between the noise emission source and receiver.

The residential community of Lidsdale is located to the west of the private haul road and ash repository site. The following residential properties, located within 300m from the haul road, have been identified as the nearest potentially affected sensitive receivers to noise from the repository site:

**Table 5: Representative noise measurement locations**

Sensitive Receiver	Distance to Haulage Road (m)*
60 Skelly Road	300
10 Skelly Road	270
21 Neubeck Street	145

During the reporting period compliance monitoring was conducted during the early morning and evening periods as per the requirements outlined in the ONVMP. The applicable operational noise criteria are outlined in the Project Approval (No. 07\_0005), the Environment Protection Licence (EPL) No. 766 (Section 2.1.1), the OEMP and the ONVMP. The criteria are summarised as follows:

*The cumulative operational noise from the ash placement area and ash haulage activity shall not exceed a  $L_{Aeq}$  (15 minute) of 40 dBA at the nearest most affected sensitive receiver during normal operating hours as defined in condition 2.8.*

*This criterion applies under the following meteorological conditions:*

- Wind speeds up to 3 m/s at 10 meters above ground; and/or*
- Temperature inversion conditions of up to 3°C/100 m and source to receiver gradient winds of up to 2 m/s at 10 m above ground level*

### 4.2.2 Environmental Performance

DP&I reviewed and approved the Kerosene Vale Ash Repository Operational Noise Review in 2009, indicating that the relevant requirements of CoA 3.2 of the Minister's approval had been met. DP&I supported the following recommendations as outlined in Section 9 of the Operational Noise Review to ensure ongoing noise compliance:

- Routine maintenance of fly ash trucks is to be carried out to ensure engine and mechanical component efficiency, minimisation of exhaust noise breakout and appropriate tyre pressure and tread requirements;
- As required by CoA 3.3 and as part of due diligence practice, routine monitoring of ambient noise levels will be undertaken in the surrounding environment for the determination of potential operational influence on noise environs and compliance with the adopted 40 dB(A)  $L_{Aeq}$  15min noise criterion;
- Periodic operational noise monitoring shall be carried out at a minimum 6 monthly frequency. Within 14

days of completing the noise monitoring any non-compliance with the noise criterion shall be reported to the DECC and the Director-General;

- Where Stage 2 fly ash truck operations are increased from typical existing daily movements resulting in an increased frequency of peak 15-minute pass by events daytime 7 trucks day time period or evening 6 trucks evening period; monitoring of ambient noise levels will be undertaken at nearest receiver locations for the determination of compliance with the adopted operational noise criteria;
- The noise monitoring methodology in the KVAR OEMP be amended to include the measurement of fly ash truck sound exposure level pass by events at the nearest receiver locations; and
- Further monitoring of fly ash truck source noise levels is to be undertaken adjacent to the haul road to, where feasible, identify dominant truck operational noise influence and refine fly ash truck sound power level adopted in the operational noise propagation model.

Aurecon was engaged by EnergyAustralia NSW to carry out ongoing operational noise monitoring for the Kerosene Vale Stage 2 Ash Repository (KVAR) located in Wallerawang, NSW (Aurecon, 2012; 2013a). The noise measurements were performed on two occasions – in December 2013 and again in April 2014. Noise monitoring for Stage 2B was performed as per the CEMP insofar that it was conducted at the three most affected sensitive receiver locations to ensure the increase in noise satisfies the requirement of Background noise + 10 dB(A). Routine noise monitoring conducted for the ash placement operations at Kerosene Vale Stage 2 was used as a benchmark for noise during normal operations versus noise generated from construction activities. The noise monitoring conducted over the 6<sup>th</sup> and 7<sup>th</sup> November 2011 by Aurecon was used for this purpose. Evening periods as per the requirements outlined in the KVAR Stage 2 Operations, Operational Noise and Vibration Management Plan.

The noise monitoring report (Aurecon, December 2013) found that:

*During the site visit it was observed that the truck pass-by time (time taken by one truck to cross an arbitrary reference location twice on the haul road) ranged between 7.5 – 8 minutes during peak operating time. This equates to a total of 4 truck bypasses in 15 minute duration if two trucks are operating on the haul road.*

*The primary contributors to the background and ambient noise levels at all the locations were the traffic noise on roads other than haulage road. The noise contribution from KVAR Stage 2 activities alone could not be determined based on ambient noise measurements due to contamination from other ambient noises. Additional Sound Exposure Level measurements of individual truck pass-by events at a closer distance to the truck haulage road were carried out on 22 April 2013 noise monitoring.*

*Based on the SEL measurement results and observations of truck movements on site, a  $L_{Aeq (15 min)}$  noise level was predicted at each of the assessment sensitive noise receivers. The predicted noise levels took into account ash trucks and light commercial vehicle movement associated with Stage 2 KVAR works and distance of the noise source from the receivers. The predicted noise level at each of the noise receivers showed compliance with assessment criteria, thus the operational noise emissions from the Stage 2 KVAR are considered compliant with the Conditions of Approval.*



**Table 6: Noise predictions from truck movements based on SEL measurements – April 2013**

Sensitive Receiver	Distance to haulage road (m)	No. of average truck movements per 15min	Predicted $L_{Aeq}$ (15 min) (dBA)	Criteria $L_{Aeq}$ (15 min) (dBA)
60 Skelly Road	300	4.3	34	40
10 Skelly Road	270	4.3	35	40
21 Neubeck Street	145	4.3	39*	40

Note \* - Include calculated barrier attenuation (-2dBA) provided by earth mound blocking line of sight between the residence and haulage road.

The noise monitoring report (Aurecon, April 2014) found that:

*During the site visit it was observed that the truck pass-by time (time taken by one truck to cross an arbitrary reference location twice on the haulage road) ranged between 7.5 – 8 minutes during peak operating time. This equates to a total of 4 truck bypasses in a 15 minute period if two trucks are operating on the haulage road.*

*The primary contributor to the background and ambient noise levels at all survey locations was the traffic noise on roads other than haulage road. The noise contribution from KVAR Stage 2 activities alone could not be determined based on ambient noise measurements due to contamination from other ambient noises.*

*Additional SEL measurements of individual truck pass-by events at a closer distance to the truck haulage road were carried out on 31<sup>st</sup> March 2014. Based on the SEL measurement results and observations of truck movements on site, a  $L_{Aeq}$  (15 min) noise level was predicted at each of the assessment sensitive noise receivers. The predicted noise levels took into account ash trucks and light commercial vehicle movement associated with Stage 2 KVAR works and distance of the noise source from the receivers. The predicted noise level at each of the noise receivers showed compliance with assessment criteria, thus the operational noise emissions from the Stage 2 KVAR are considered compliant with the Conditions of Approval.*

**Table 7: Noise predictions from truck movements based on SEL measurements – March 2014**

Sensitive Receiver	Distance to haulage road (m)	No. of average truck movements per 15min	Predicted $L_{Aeq}$ (15 min) (dBA)	Criteria $L_{Aeq}$ (15 min) (dBA)
60 Skelly Road	300	2.3	32	40
10 Skelly Road	270	2.3	33	40
21 Neubeck Street	145	2.3	37*	40

Note \* - Include calculated barrier attenuation (-2dBA) provided by the earth mound blocking direct line of sight between the residence and haulage road.

Based on site observations and information reviewed potential noise impacts from the operation of the Kerosene Vale Stage 2 Ash Repository are considered to have been effectively mitigated and managed, with no noise complaints received for the KVAR during the reporting period.

#### 4.2.3 Reportable Incidents

No reportable incidents have been recorded against operational noise for the reporting period.

#### 4.2.4 Further Improvements

No further improvements have been identified for the next reporting period.

### 4.3.1 Environmental Management

In summary the noise criteria is as follows:

$$L_{A10} \text{ dBA (measured)} \leq L_{A90} \text{ dBA (Background noise)} + 10 \text{ dBA}$$

Table 8 and Figure 4 outline the noise measurement locations with respect to the construction site.



**Figure 4: Construction noise monitoring locations**

During the assessment construction activities were concentrated at Stage 2B and Surface Water Detention Pond which included activities related to loading and unloading of earth, water spraying, levelling of the haul road, compacting earth, etc.

**Table 8: Representative locations and construction noise criteria**

Measurement Location	Representative Sensitive Receiver	Elevation	Approximate Distance to Construction Site (m)	Background noise levels (L <sub>A90</sub> dBA)	Noise criteria (L <sub>A90</sub> dBA)
A	60 Skelly Road	915	1300	37	37 + 10 = 47
B	10 Skelly Road	914	1250	36	36 + 10 = 46
C	21 Neubeck Street	912	1200	37	37 + 10 = 47
D	Site 1	946	150	-	-
	Site 2	918	100	-	-

#### 4.3.2 Environmental Performance

Routine noise monitoring conducted for the ash placement operations at Kerosene Vale Stage 2 was used as a benchmark for noise during normal operations versus noise generated from construction activities. The noise monitoring conducted over the 6<sup>th</sup> and 7<sup>th</sup> November 2011 by Aurecon was used for this purpose.

The construction noise monitoring report (Aurecon, 2013b) found that:

*Environmental survey results revealed that the background noise at all the three sensitive receiver locations were due to the noise from Wallerawang Power Station cooling towers and distant traffic. Noise from construction activities from KVAR was inaudible at any of the sensitive locations during the entire noise survey.*

*Based on the noise assessment, the construction noise resulting from the operation of equipment and mobile plant at the KVAR construction site on 18 and 19 June 2013, comply with the CEMP Noise Management plan and the projects Conditions of Approval at all the representative residential receivers. There is no requirement for any additional or modified noise management measures to be employed at this stage.*

**Table 9: Construction Noise Monitoring Predictions**

Date	Measured L <sub>A10</sub> dBA at Location D, 150m away (a)	Noise prediction			Noise Criteria	Compliance	
		Attenuation due to air adsorption and barrier (b)	Attenuation due to distance (c)				Final noise level dBA (a)+(b)+(c)
19 June 2013	69	-7	1300m (Location A)	-19	43	≤ 47	Yes
			1250m (Location B)	-18	44	≤ 46	Yes
			1200m (Location C)	-18	44	≤ 47	Yes

#### 4.3.3 Reportable Incidents

No reportable incidents have been recorded against construction noise management for the reporting period.

#### 4.3.4 Further Improvements

No further improvements have been identified for the next reporting period.

## 4.4 Groundwater Monitoring

### 4.4.1 Environmental Management

The ground waters of Kerosene Vale are monitored regularly to determine the extent of impacts, if any, of Stage 2 operations on regional waters, and to examine the movement of water beneath the site and through the catchment.

The OEMP (Parsons Brinckerhoff, 2008b) and original Repository Management Plan (Conneq, 2010) included a Groundwater Management Plan for KVAR and adjacent KVAD. The main focus of this Management Plan was to not only understand water quality impacts on the immediate area, but to understand the influence of regional groundwater on the stability of the Stage 2 operations, due to the placement of the site over the reclaimed ash dam. The Groundwater quality sub-plan as outlined in the OEMP provided the following indicator:

- Groundwater monitoring results indicating reduction in surface infiltration through use of preventative measures such as ash stacking and compaction techniques; and
- Results of monitoring trends undertaken by NATA accredited specialists as per OEMP.

This process has continued with continued monitoring assessments commissioned for the site (Aurecon, 2011; 2013a).

On site dry ash placement management has mainly involved limiting rainfall infiltration and reducing seepage from KVAD into the local groundwater. The effectiveness of these activities was demonstrated by improved water quality in the local groundwater during Stage 1 placement, from 2003 to 2006, before the toe drains of the Ash Dam became blocked (Aurecon, 2011). The report (Aurecon, 2011) indicates that the quality of groundwater beneath KVAR is not being negatively impacted by ash placement operations, thus meeting the OEMP performance target.

Blocked toe drains of KVAD were cleared in February 2010, and further monitoring of groundwater levels within the Ash Dam and Stage 2 repository were instigated. This included subsurface investigations.

Subsurface investigations and subsurface drainage works (for seepage collection) and installation of additional water monitoring points (Table 6 and Appendix E) have provided for management and assessment of water levels beneath the Stage 1 repository (Golder Associates, 2013).

### 4.4.2 Environmental Performance

The EnergyAustralia NSW Water Quality Assessment for April 2013 to March 2014 (2014) (Appendix L) for the ash placement at KVAR aimed to determine:

- The changes, if any, in surface and groundwater quality due to seepage collection and diversion systems at:
  - The Sawyers Swamp Creek Ash Dam (SSCAD) v-notch pump-back system
  - Sub-surface drains in the Kerosene Vale Ash Dam (KVAD) under the dry ash placement at Kerosene Vale Ash Repository (KVAR)
  - Diversion of the KVAD groundwater to Lidsdale Cut via the unblocked KVAD toe drains
  - Diversion of the Lidsdale Cut discharge from Sawyers Swamp Creek (SSC) to the SSCAD
- The effects of the Stage 1 and Stage 2 dry ash placement on surface and groundwater receiving waters with the effects of the local coal mining and the Springvale Mine water discharge taken into consideration.

The assessment of groundwater quality found that the seepage collection and diversion systems have typically reduced the conductivity, sulphate and trace metals in the local groundwater bores at the KVAD/R such that, other than the local mineral effects, the water quality and trace metals met the local/ANZECC guidelines. The reductions provided evidence that the Stage 1 and Stage 2 dry ash placements are not measurably affecting the groundwater quality.

This, together with the local KVAD/R seepage and more detailed measurements in Sawyers Swamp Creek, indicated no significant effects on the creek receiving water.

In contrast, the water quality within Lidsdale Cut was elevated in trace metals which were above the local/ANZECC guidelines. As this increase was not observed within the groundwater bores, this was associated with the collection of subsurface seepage from KVAD/R at the Lidsdale cut site, which has been conducted since October 2013.

Water samples taken at the main regional bores- WGM1/D2 (DW2), WGM1/D3 (DW3), WGM1/D5 (DW5) and WGM1/D6 (DW6) (Figure 7) provide information about groundwater flow under KVAD and the dry repository storages of KVAR Stage 1 and Stage 2A.

Key observations of groundwater in relation to the KVAD dam-wall drains are as follows:

- Post unblocking of the toe drains (19/2/2010) drain levels have stabilised and main drain outflow indicates levels rise after rainfall and return to normal levels within 7 days;
- Regional groundwater flows (as measured at DW2) from the south-west can be linked to patterns of level change in the Ash Dam at the drain piezometers before outflowing to DW5 and then on to the Lidsdale Cut;
- Drain levels in the dam wall are constant along the northern boundary and rise and fall on the western boundary
- Regional groundwater flows from the east (bore DW3) to the north-west (DW5) and from the south (DW2) to the north-west. This south to north-west flow most likely occurs due to the Lithgow coal seam; and
- Stage 1 and 2 KVAR is located directly on top of the old KVAD, separated by a clay cap. Water quality and flow data show that collection and diversion installations since 2010 by sub-surface drains across the site prevent flow from entering SSC.

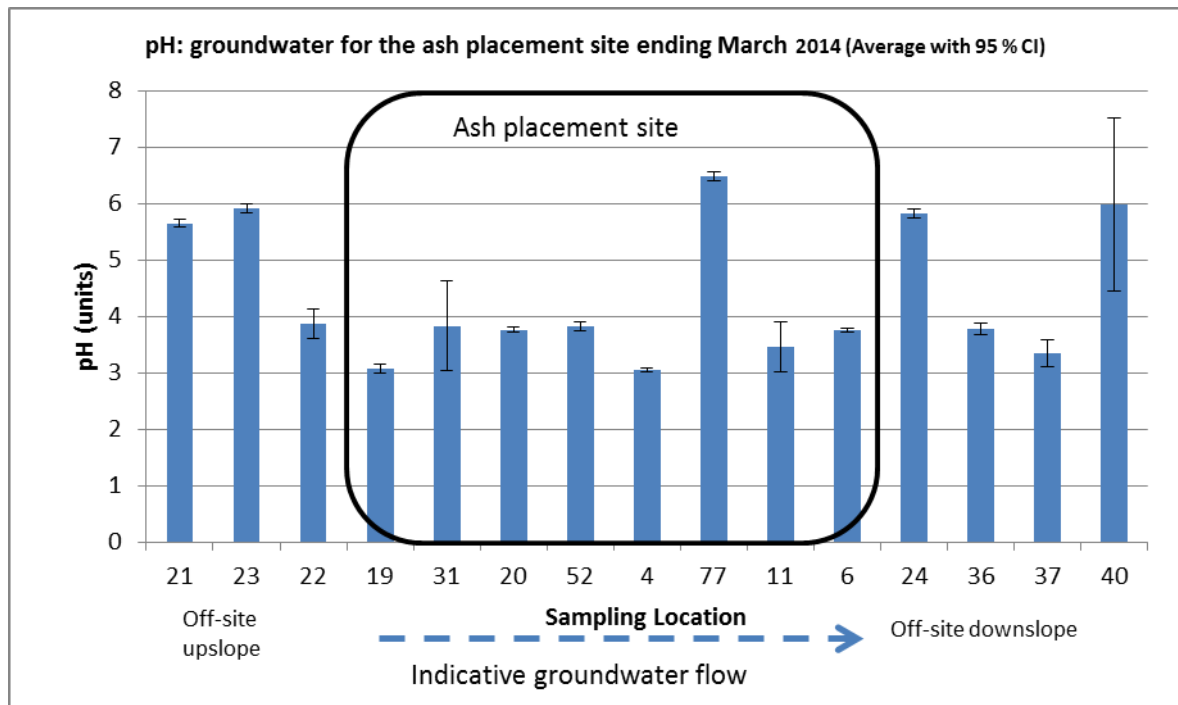
This movement of water has potential impacts on local groundwater quality. Impacts of operations on groundwater quality and interpretation of impacts of groundwater movement (**Error! Reference source not found.** and Figure 6) are presented as pH and electrical conductivity respectively. Data represent annual averages with 95% confidence intervals and identify the ash placement site is represented by acidic and saline groundwater underlying the site and is not significantly impacted by Stage 2 operations. Comparison between data provide for the general observation that very acidic water (pH 4) is associated with very high soluble salts as sulphate and iron. Site notation is as detailed in Table 10 and in Appendix E.

Based on this data it appears that the quality of groundwater underlying the site is not significantly impacted by Stage 2 operations.

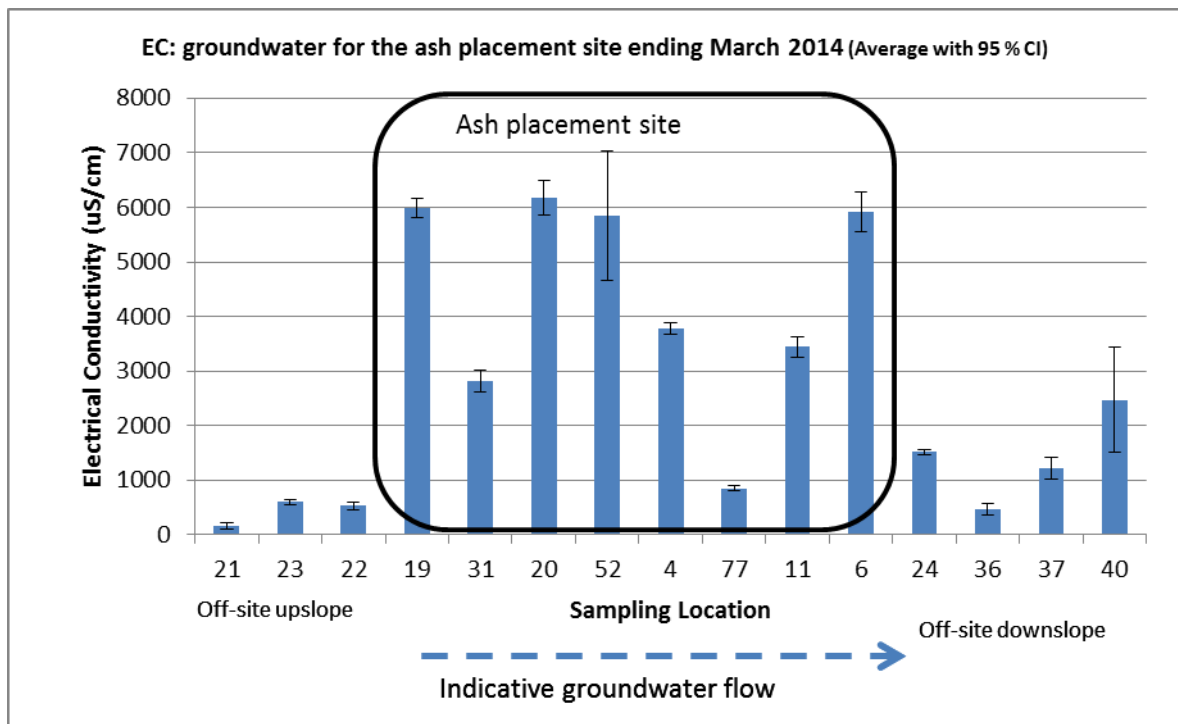


**Table 10: Current Groundwater Monitoring Sites for KVAR**

Upstream Sites	Ash Placement Sites	Downstream Sites
21 – Bore WGM1/D1	19 – Sump 1 South	24 – Bore WGM1/D4
22 – Bore WGM1/D2	31 – North KVAD North Wall	36 – Bore WGM1/D5
23 – Bore WGM1/D3	20 – Sump 2 East KVAD Wall	37 – Bore WGM1/D6
	4 – WX50 outflow West Wall	40 – Lidsdale Cut (Collection)
	8 – KVAD West Toe Drain GW10	
	9 – KVAD West Toe Drain GW11	
	77 – KVAD North Toe Drain AP09	
	11 – KVAD North Toe Drain AP17	
	52 – Sump 3 KVAR Stage 2B	
	6 – North Pond Outflow Collection	



**Figure 5: pH of groundwater for the KVAR ash placement area**



**Figure 6: Conductivity of groundwater within and surrounding the KVAR ash placement area**

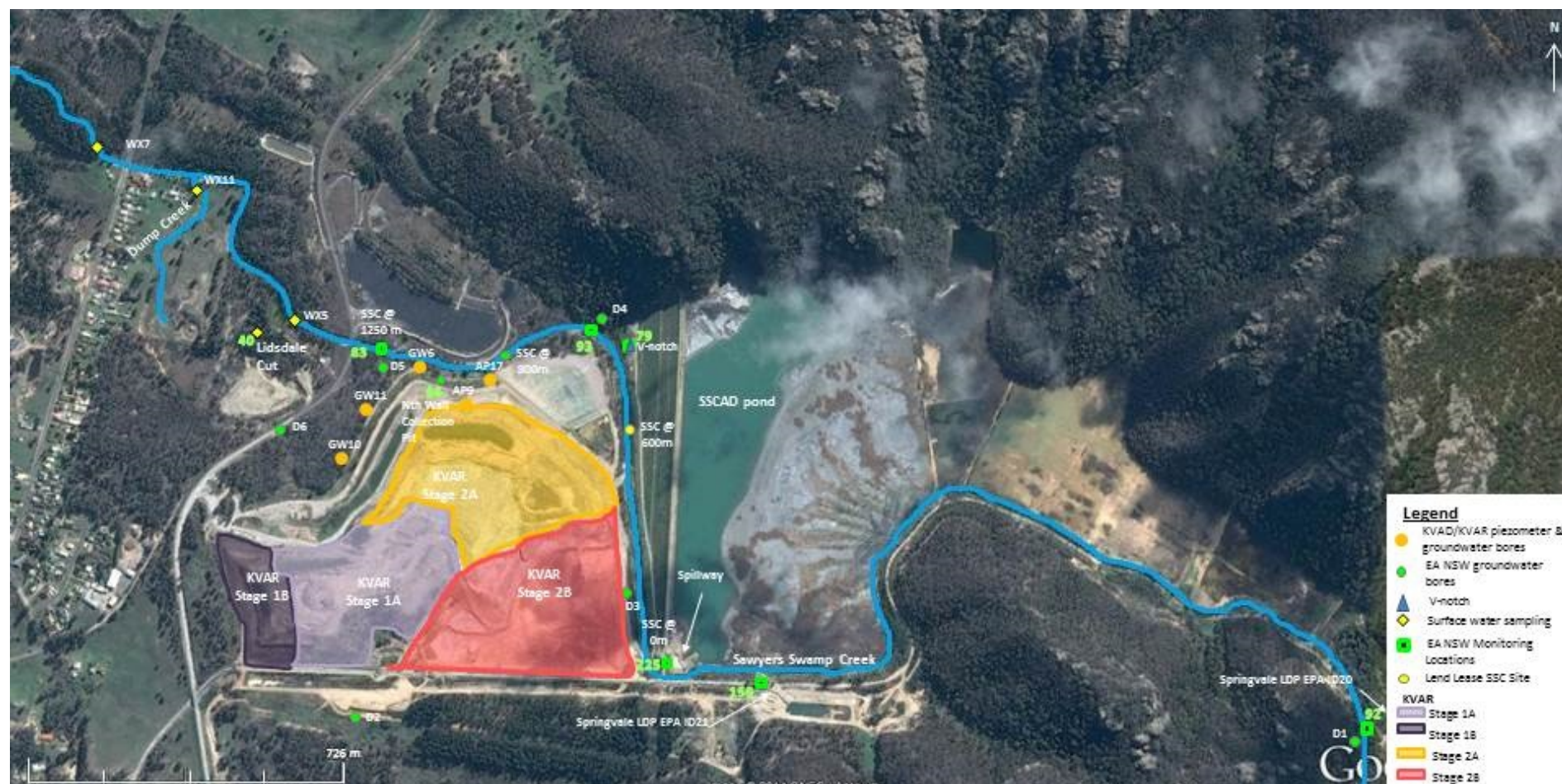


Figure 7: Surface and groundwater monitoring sites for SSCAD and KVAR

#### 4.4.3 Reportable Incidents

No reportable incidents have been recorded against groundwater managed for the reporting period.

#### 4.4.4 Further Improvements

No further improvements have been identified for the next reporting period.

### 4.5 Surface Water Quality Monitoring

#### 4.5.1 Environmental Management

The Surface water quality sub-plan as outlined in the OEMP is comprised of the following targets:

- The water quality within Sawyer's Swamp Creek is not impacted by Stage 2 operations; and
- Zero environmental incidents that relate to pollution of waters at SSC.

Indicators:

- Surface water monitoring results and assessment of water quality in accordance with ANZECC guidelines;
- No visual evidence of erosion and sedimentation impacts on SSC following significant rain events; and
- Records of trend analysis, management procedures and observations for each of the nominated monitoring locations.

The surface waters of Kerosene Vale are mostly comprised of runoff generated within the ash repository site. All runoff from KVAR is restricted from entering SSC, and is contained for reuse for the conditioning of ash and dust suppression. The CoAs stipulate that a monitoring program must be implemented to record and observe water quality and potential impacts from repository operations on regional surface waters. This monitoring included a program following the realignment of SSC- however, as the creek has not been realigned, this aspect of monitoring is no longer necessary.

The original design concept for managing surface water for the repository was outlined in the Repository Management Plan (Conneq, 2010), and based on reducing water pooling or ponding on exposed ash benches, and eliminating flow from these areas over batters managed by controlled outflow structures. Current repository management plan objectives also reiterate this design concept (Lend Lease, 2012b).

The Operational Environment Management Plan for KVAR Stage 2 requires sampling within SSC at four locations- two (2) on SSC, one (1) on Dump Creek to the northwest of the repository, and one (1) in SSC Ash Dam, to ensure operations are not impacting on catchment surface waters, and to comply with Section 120 of the *Protection of the Environment Operations Act 1997*.

Sampling has been undertaken at Site ID numbers 38, 39, 40 and 41 (Appendix B, shaded cells) since January 2003. Sampling commenced at sites 79, 80, 81, 83 and 84 in January 2010. Sampling at the remaining sites (86, 87 and 88) commenced in May 2010.

The other sites (Appendix B, unshaded cells) form part of the Lend Lease monthly water sampling routine for a combined total of 18 locations that are regularly monitored for the project.

Note that SSC realignment did not take place. The other sites (Appendix B, unshaded cells) form part of the Lend Lease monthly water sampling routine that are regularly monitored for the project, with tests performed providing the following information:

- pH;

- Alkalinity (CaCO<sub>3</sub>);
- Sulfate (SO<sub>4</sub>);
- Conductivity;
- Total dissolved solids; and
- Trace metals- including Mercury (Hg), Chloride (Cl), Fluoride (F), Aluminium (Al), Arsenic (As), Barium (Ba), Beryllium (Be), Boron (B), Cadmium (Cd), Calcium (Ca), Chromium (Cr), Copper (Cu), Lead (Pb), Magnesium (Mg), Molybdenum (Mo), Nickel (Ni), Potassium (K), Selenium (Se), Silver (Ag), Sodium (Na), Zinc (Zn), Iron (Fe), Manganese (Mn).

Tests for dissolved oxygen (O<sub>2</sub>), turbidity, total phosphorus (TP) and total nitrogen (TN) were considered unnecessary by the previous AEMR due to SSC not requiring realignment. However, these tests have been conducted for surface waters upon specific request, and have been incorporated into routine sampling at EnergyAustralia's request, as of August 2011.

#### 4.5.2 Environmental Performance

Though no contaminated surface water is allowed to enter the catchment, surface waters are tested to ensure compliance with ANZECC guidelines.

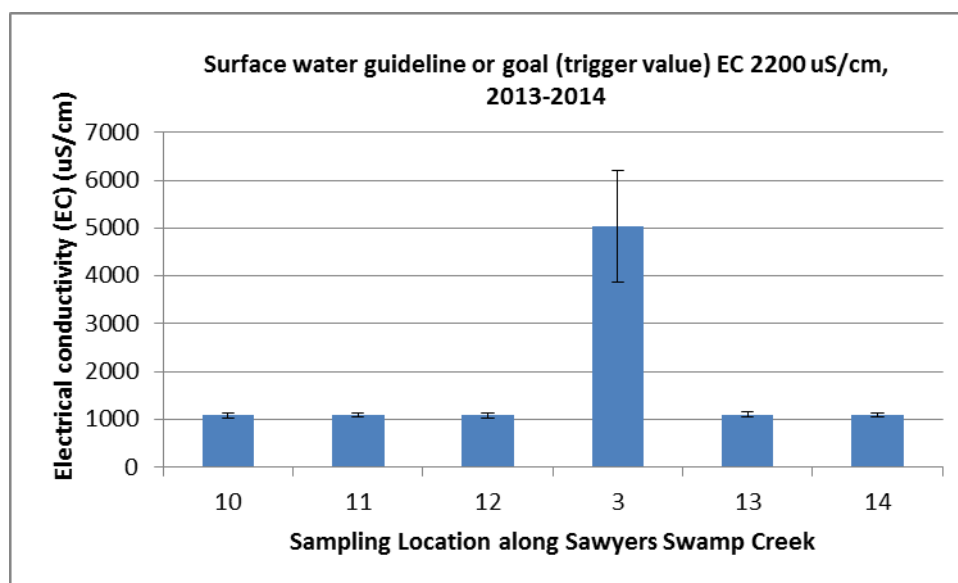
Based on the findings of the April 2013 to March 2014 Water Quality Assessment (EnergyAustralia NSW, 2014), since the commencement of continuous Springvale Mine water discharge, the water quality and trace metal concentrations in Sawyers Swamp Creek have been dramatically altered by this source. The volume of water from this source (in the order of 20ML/day) significantly limits future assessments of the effects of KVAR/D and SSCAD on the creek. However, water quality, including conductivity, continued to meet the local/ANZECC (2000) guideline goals and there was no evidence of the effects of the seepage on trace metals at WX7.

For repository close-out, it is proposed that all clean-water collected from capped batters be directed into a constructed wetland for filtration, before eventual release into the catchment. This proposal was approved by the Department on 16<sup>th</sup> December 2011, within the KVAR Construction Environmental Management Plan. The following graph (Figure 8) indicates through electrical conductivity levels that the surface waters of the adjacent SSC both up- and downstream of the ash placement area (Site 2) remain non-affected by ash emplacement operations. The water quality of the site 3 is water collected from the internal Surface water runoff collection pond which collects surface runoff and groundwater seepage. Data represent averages of monthly sampling with 95% confidence intervals. Site notation is as detailed in Table 11 and referenced in Appendix E.

**Table 11: Current Surface Water Monitoring Sites for KVAR**

Upstream Sites	Ash Placement Site	Downstream Sites
10 – Sawyers Swamp Creek @ 0 m	3 – Surface Water runoff Collection SW Pond 1	13 – Sawyers Swamp Creek @ 800 m
11 – Sawyers Swamp Creek @ 300 m		14 – Sawyers Swamp Creek @ 1200 m
12 – Sawyers Swamp Creek @ 600 m		





**Figure 8: Electrical conductivity of surface waters up- and downstream of the ash placement area**

Based on site observations and information reviewed potential surface and groundwater impacts from the operation of the Kerosene Vale Stage 2 Ash Repository have been effectively mitigated and managed. Operations of the Stage 2 KVAR are considered to have met the target of zero environmental incidents relating to pollution of waters at SSC.

#### 4.5.3 Reportable Incidents

No reportable incidents have been recorded against surface water management for the reporting period

#### 4.5.4 Further Improvements

No further improvements have been identified for the next reporting period.

### 4.6 Hydrological Monitoring

EnergyAustralia NSW has determined that there is no longer any need to realign SSC. As such, hydrological monitoring as required under CoA 3.6 is not required.

### 4.7 Ecological Monitoring

EnergyAustralia NSW has determined that there is no longer any need to realign SSC. Ecological monitoring as required under CoA 3.7 is not required.

### 4.8 Air Quality Monitoring

#### 4.8.1 Environmental Management

The original Repository Site Management Plan (Conneq, 2010) for KVAR Stage 2 operations proposes an Implementation Strategy in accordance with the Air Quality Monitoring Program, as required under the CoAs as stipulated by DP&I and as outlined in the OEMP. The strategy includes specific site management pertaining to the transport and emplacement of ash, managing dust within the ash repository using an extensive sprinkler system and water cart applications, and continuous monitoring for dust/airborne particulates.

Dust management within the site is also included in the responsibilities of all operations, including:

- Wash-down of security roadways, haul road/s and vehicle access roads;

- Use of perimeter sprays at the ash placement area;
- Mobile sprinkler system;
- Ash placement operations;
- Final and temporary capping of ash; and
- General maintenance of the ash placement area (Lend Lease, 2012b).

#### Dust suppression – KVAR sprinkler system

Water application (measured in sprinkler hours) is based on wind velocity, humidity and temperature. The water used for dust suppression in KVAR is sourced from the Sawyer's Swamp Creek Ash Dam return water system- no clean water is used in this application.

The updated Repository Management Plan (Lend Lease, 2012b) provides a guide for sprinkler hours at an optimum of 4 hours per day during low evaporation at less than 3 mm per day to ensure that a target of 5 mm by irrigation application is not exceeded (Table 12).

**Table 12: Guide for sprinkler hours**

Water use guidelines	Water use guidelines
>25° >20km/hr (10hrs/day)	15° <20km/hr (<4 hours/day)
15-24° <20km/hr (8 hrs/day)	
15° <20km/hr (4 hours/day)	
<b>Evaporation 3-7 mm per day</b>	<b>Evaporation &lt; 3 mm per day</b>
Oct, Nov, Dec, Jan, Feb, Mar,	April, May, June, July, Aug, Sept

\* Operation of sprinklers in extreme hot and dry conditions requires extended irrigation hours

#### Dust deposition monitoring

Dust monitoring results are recorded monthly with colour and textural observations. These results indicate that KVAR is managed effectively for dust and as such is in compliance with CoAs 2.33 and 3.8.

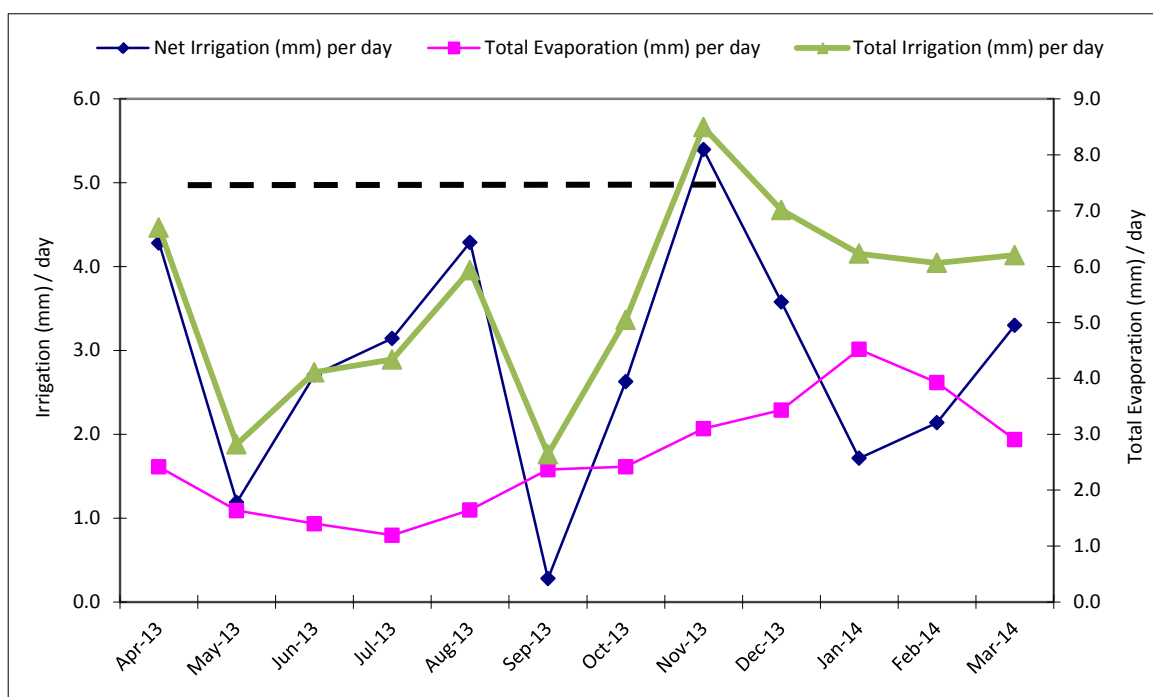
Eight dust monitors are installed on and around KVAR (Figure 10). Data collection commenced in March 2009, with results reported as a rolling site average (g m<sup>-2</sup>) unless otherwise stated.

Data from these depositional dust gauges provide a comprehensive assessment of potential dust impacts from Kerosene Vale Stage 2 Ash Repository.

### 4.8.2 Environmental Performance

#### Dust suppression – KVAR sprinkler system

Figure 9 reflects a relationship between sprinkler application and evaporation to identify that the target or maximum application rates for irrigation at 5 mm / day was achieved. Net irrigation was calculated by subtracting the daily evaporation from the daily sprinkler irrigation.



**Figure 9: Efficacy of irrigation operations April 2013 – March 2014**

#### Dust deposition monitoring

Data from these depositional dust gauges provide a comprehensive assessment of potential dust impacts from Kerosene Vale Stage 2 Ash Repository. Gauges located within the perimeter of the Kerosene Vale Stage 2 Ash Repository recorded annual average deposition rates of  $2.0 \text{ g/m}^2/\text{month}$  (as insoluble solids).

EnergyAustralia NSW undertakes dust monitoring using a series of ambient dust deposition gauges outside the KVAR area, closer to residential areas. All results for the 2013-14 year for total insoluble solids have been  $50.7 \text{ g/m}^2/\text{month}$  or less. The locations of these offsite dust monitors are depicted in Figure 11 below.

Dust gauge data from the 2013-2014 period of KVAR Stage 2 operations do not indicate that KVAR Stage 2 operations have resulted in dust deposition above the OEMP levels that trigger the requirement to implement additional control measures. The rolling average for the period was  $2.9 \text{ g m}^{-2} \text{ month}^{-1}$  Monthly Average insoluble Solids and  $2.1 \text{ g m}^{-2} \text{ month}^{-1}$  Monthly Average Incombustible matter.

Having reviewed all available information/data and from site inspections, the requirements of the OEMP were compliant through 2013-2014.

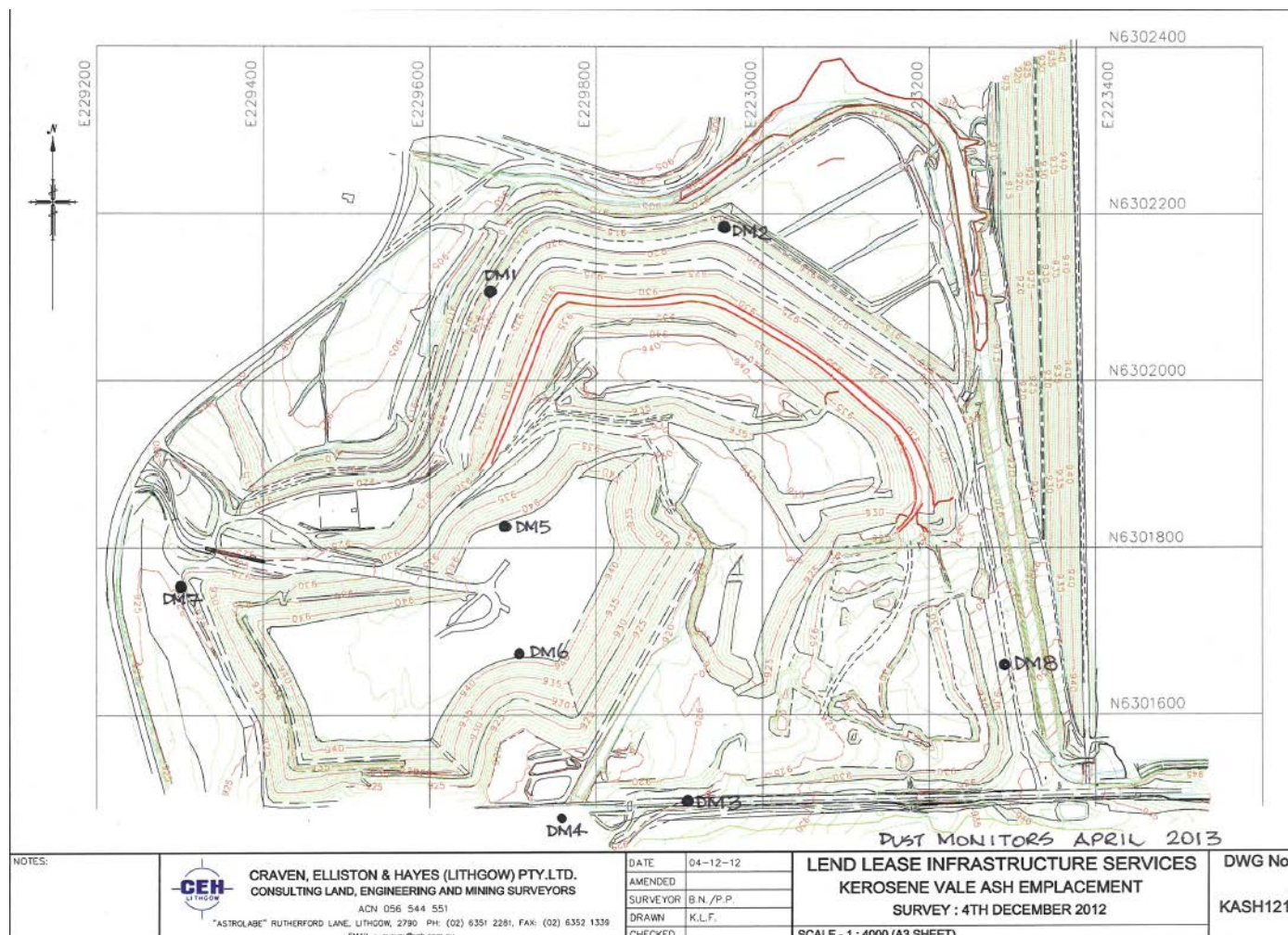


Figure 10: Location of KVAR Stage 2 dust gauges





**Figure 11: Regional dust gauge network for Kerosene Vale monitoring purposes**

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### 4.8.3 Reportable Incidents

No reportable incidents have been recorded against air quality management for the reporting period

### 4.8.4 Further Improvements

No further improvements have been identified for the next reporting period.

## 4.9 Landscape and Revegetation

### 4.9.1 Environmental Management

The statement of landscape and revegetation environmental management is provided in the Site Repository Plan (Lend Lease, 2012b) and is based on an overall requirement to integrate the ash repository into the existing landscape.

The Kerosene Vale Ash Repository (KVAR) is managed by incorporating the following aspects for water management, which all affect the progress of landscape and revegetation practices:

- Clean water (free of ash) off permanently capped batters and laybacks
- Surface water from exposed ash
- Groundwater inflows from the catchment
- Irrigation and dust suppression water sources
- Ash conditioning water sources
- Groundwater outflows from the repository site.

The principle management aim is to mitigate risk against storm damage and the potential for uncontrolled flow patterns. Several basic operational objectives are involved with achieving this aim:

- 1) Detainment and containment
- 2) Mitigation of all runoff over batters (internal or external)
- 3) Control of slope to mitigate erosion
- 4) Water reuse and recycling

Items 1-3 (i.e. detainment, mitigation and control) constitute the primary principle of catchment management – that is to detain water high in the landscape. This applies to all areas, including completed and capped areas and is necessary to develop a staged or cascade system with retention from the highest elevation. The first level of detainment is initially derived using the ash placement benches, with off-flow structures subsequently placed at intervals down-slope. Management structures also include the use of a gradient of 1% and sumps or pond detentions.

This has been the environmental operational policy used by the principal ash contractors, Lend Lease, since 2006 and detainment, mitigation and slope control are now a normal practice for the repository workers. Calculations indicate that this control measure of integrated slopes and detentions built into the exposed ash placement benches will provide a buffer of up to 70 mm rainfall before the water being detained will need to flow across to runoff collection infrastructure.

#### 4.9.2 Environmental Performance

Landscaping and revegetation at the KVAR to date has been limited to the permanent capping of Stage 1. Interim landscaping and revegetation activities have included a series of tree and shrub trials to determine best practice techniques for rehabilitating the whole site upon its completion and in the interim, the use of a composted soil material to cover exposed soil surfaces and reduce soil loss. Tree planting was undertaken in July 2013, planting, on lower level batters of Stage 2.

The majority of the OEMP requirements with respect to landscaping/revegetation were found to be not applicable as ash has yet to reach the design RL (940 m AHD). However, the interim landscaping/revegetation activities undertaken are considered to be in line with the relevant OEMP target, given the project's progress to date.

No non-conformances were identified.



Plate 1: Kerosene Vale Ash Repository Stage 1 rehabilitation earthworks, (batter covered with a green waste compost)



Plate 2: Kerosene Vale Ash Repository planting efforts (planted August 2013, photo taken 7<sup>th</sup> January 2014 after 5 months)

### 4.9.3 Reportable Incidents

No reportable incidents have been recorded against landscape and revegetation management for the reporting period.

### 4.9.4 Further Improvements

No further improvements have been identified for the next reporting period.

## 4.10 Erosion and Sediment Control

### 4.10.1 Environmental Management

The management, collection and monitoring of surface water to ensure site runoff is undertaken as part of the operational and development activities of the KVAR, and is addressed within the surface water quality sub-plan of the OEMP. Site specific management practices are used to prevent site runoff from exposed ash surfaces from entering Sawyers Swamp Creek. Site surface water management measures include:

- Sediment and erosion controls
  - Works in disturbed areas restricted during heavy rainfall events
  - Operations-related earthworks not undertaken within 50m of Sawyers Swamp Creek where reasonable and feasible
  - Cleared vegetation is mulched, chipped or re-used onsite for sediment filter fences or other uses, where appropriate.
- Development of a retention basin (or use of the existing basin) to capture site surface water runoff
- Placement of ash with designated slopes to direct water to retention areas
- Diversion of clean water away from disturbed areas to existing surface water drains and Sawyers Swamp Creek to provide environmental flows (Figure 12)
- Capping and revegetating completed areas to enable the diversion of clean water to site drainage systems





**Figure 12: Existing site drainage system**

Construction works associated with the Stage 2B KVAR development were managed in accordance with the erosion and sediment control plan, developed as part of the CEMP. Condition of Approval 6.3 (c) highlights the need to provide for:

- Identification of activities that could cause soil erosion or discharge sediment or water pollutants
- A description of management methods to minimise soil erosion, discharge sediment, water pollutants, minimise are of bare surfaces, stabilise disturbed areas, and minimise bank erosion
- Demonstrate proposed measures will conform with, or exceed the relevant requirements of Managing Urban Stormwater

Measures to minimise erosion and the discharge of sediment and other pollutants to land and/or water during construction works are identified within the CEMP. In summary the management methods used include:

- a) Management of flow direction away from Sawyers Swamp Creek
- b) Management of flow direction away from all repository external boundaries
- c) Use of existing grades and slopes and their maintenance so that all surface water runoff is controlled to dedicated collection areas
- d) Laybacks and/or haul roads on all external perimeters and for all those used for water runoff are to be constructed with the outside edge 0.5 m higher than the inside
- e) Water flow controlled to prevent onsite erosion
- f) All works and sediment control operations conducted in accordance with the guidelines for Soils and Construction, Managing Urban Stormwater

#### 4.10.2 Environmental Performance

All runoff from external batters and laybacks is currently collected through water monitoring Site 6, the North Holding Pond. To date, all overflows have been collected within the Lidsdale Cut collection system and then pumped back to the Sawyers Swamp Creek Ash Dam. As a result, no rainfall runoff flow has been enabled to enter into the Sawyers Swamp Creek catchment, since it has been contained through a closed water management system.

#### 4.10.3 Reportable Incidents

No reportable incidents have been recorded against erosion and sediment control for the reporting period.

#### 4.10.4 Further Improvements

No further improvements have been identified for the next reporting period.

### 4.11 Waste Management

#### 4.11.1 Environmental Management

Waste disposal practices at the Kerosene Vale Ash Repository are to reflect and be guided by the requirements of Environmental Protection Licence 766 and the Waste Management Sub-Plan (OEMP Section 6.9). As such, the management of waste is guided by the principle that waste shall not be disposed of at the ash repository, unless expressly permitted by the Environmental Protection Licence 766. In addition, all waste materials are assessed, classified, managed and disposed of in accordance with Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-liquid Wastes (EPA, 1999).

EnergyAustralia NSW and associated contractors are not to cause, permit or allow any waste generated outside the ash repository to be received at the ash repository for storage, treatment, processing, reprocessing or disposal, including no wastes other than those as stated on the licence approval to be kept on the site. Waste generated by site personnel shall (including maintenance wastes such as oils and greases) are collected on a regular basis to be recycled or disposed of to an appropriate facility.

All staff involved in the Stage 2 operations are made aware of the waste management procedures as outlined in the OEMP sub-plan. Waste-related documents and records are developed to reflect adherence to these protocols, thereby providing the foundations for a transparent approach to waste management. The OEMP provides further guidance and detail on specific waste streams and applicable management measures (OEMP Section 6.9).

#### 4.11.2 Environmental Performance

Based on the Monthly Client Reports and information reviewed (including discussion with site security and the Security Manager regarding vehicle movements or access of illegal dumpers and site observations made, the operations of the Stage 2 KVAR have met the OEMP targets for waste management for the 2013-14 year. OEMP requirements with respect to waste management were found to be complied with. No non-conformances were identified.

#### 4.11.3 Reportable Incidents

No reportable incidents have been recorded against waste management for the reporting period.

#### 4.11.4 Further Improvements

No further improvements have been identified for the next reporting period.



## 4.12 Heritage Management

### 4.12.1 Environmental Management

The OEMP provides guidance surrounding the management methods required to comply with CoA's 2.37-2.38 regarding the protection of Aboriginal and non-indigenous heritage sites. Specifically this is addressed in the Ash delivery and placement sub-plan.

The Environmental Assessment performed by Parsons Brinckerhoff (2008a) for Kerosene Vale Stage 2 included a preliminary archaeology and heritage assessment. The assessment concluded that the Stage 2 KVAR works pose no threat to the Aboriginal archaeological or heritage values and would not result in any further impact on Aboriginal archaeological potential. Based on these findings, the following statements of commitment, in regards to heritage sites, were made:

- Disturbance to the western portion of the ash repository shall be limited to reduce the potential for inadvertent disturbance of the Aboriginal heritage values of the area.
- In the event that any heritage sites or items be discovered during operation, all works likely to affect the sensitive area are to cease immediately and reported to the DECC Regional Archaeologist, the Bathurst Local Aboriginal Land Council, or the NSW Heritage Office, so that an appropriate course of action can be determined.

All construction and earthworks personnel are educated on their obligations in respect of the protection of Aboriginal and non-indigenous heritage sites and items.

### 4.12.2 Environmental Performance

No additional Aboriginal and non-indigenous heritage sites were identified during the reporting period.

### 4.12.3 Reportable Incidents

No reportable incidents have been recorded against heritage management for the reporting period.

### 4.12.4 Further Improvements

No further improvements have been identified for the next reporting period.

## 5. Inspections and Audits

As stated in the OEMP, Environmental inspections will be undertaken by the Environmental representative and Site Manager, in accordance with the program outlined in Table 13. The inspections assist to identify areas where improvements to the environmental performance of the Stage 2 operations can be achieved. Further detail is provided in section 3.7 of the OEMP. Reports from inspections undertaken are submitted to and reviewed by EnergyAustralia NSW monthly, with all areas discussed in detail during regular client/contractor meetings.

**Table 13: Environmental inspection program**

Potential impact	Locations	Technique	Frequency	Reporting	Responsibility
General Environmental Impacts	All stage 2 operational areas	Site environmental inspections	Daily	Daily site environmental checklists	Contractor
			Monthly	Monthly site environmental	Environmental representative

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				checklists	
Dust related ash delivery and placement impacts	Haul roads and ash placement zones	Environmental inspections targeting haul roads and ash placement zones	Weekly	Weekly ash management checklist	Contract Administrator

Quarterly audits will be undertaken by the Environmental Representative in accordance with the AS/NZ ISO 19011:20–3 - *Guidelines for Quality and/or Environmental Management Systems Auditing*. The audits will incorporate procedures for rectifying any non-compliance issues, and will provide mechanisms for recording environmental incidents and the subsequent actions taken.

In addition to the quarterly auditing undertaken by the Environmental Representative, independent environmental compliance audits will be undertaken by a specialist consultancy firm every 6 months. The independent specialist's report will detail actions proposed in relation to EnergyAustralia NSW's operational schedule and on-site activities, and include a review of compliance with all requirements under the Project Approval and the OEMP.

## 6. Complaints Register

EnergyAustralia NSW maintains a 24 hour hotline for the public to report incidents, complaints or enquiries with contact details available on the EnergyAustralia website.

EnergyAustralia records the details of all complaints received in a Complaints Register.

The register includes:

- The date and time of the complaint
- The means by which the complaint was made (e.g. telephone, email, mail, in person)
- Any personal details of the complainant that were provided
- The nature of the complaint
- The time taken to respond to the complaint
- Any investigations and actions taken in relation to the complaint
- If no action was taken in relation to the complaint, the reason(s) why no action was taken.
- Any follow-up contact with, and feedback from, the complainant

The Contract Administrator, Site Manager and the Environmental Representative ensure that the community relations protocols are communicated to all project personnel involved in the complaints process and that appropriate training covering the protocols is established in site inductions.

The key elements of the on-site complaints management protocol are outlined below:

- All persons wishing to register a complaint to operations personnel will be politely directed to the Commercial Manager, in line with EnergyAustralia NSW's existing complaints procedure.
- The Commercial Manager will deal with the complaint and take down particulars of the complaint as per the criteria listed on the complaints register. Action will then be taken to resolve the issue whilst ensuring that all correspondence relating to the issue is documented. All attempts will be made to resolve the

issue on the same day, however if this is not possible, the complainant will be updated regularly on the progress of the matter.

Written and phone complaints will be directed to the Commercial Manager who will take down the particulars of the complaint as per the criteria listed on the complaints register, and will ensure that the complaint is actioned as quickly as possible.

## 6.1 Community complaints

No complaints were recorded against operations at KVAR Stage 2 in the period from April 2013 to March 2014.

# 7. Activities Proposed in the Next AEMR Period

## 7.1 Environmental Management Targets and Strategies for the Next Year

Environmental operations for the Kerosene Vale Ash placement area will be maintained. These activities will include management of dust through suppression (i.e. sprinklers & water cart), noise monitoring, dust monitoring and management of water collection of sub-surface waters from Lidsdale Cut.

Project development for site closure includes a final capping of open ash areas, grading and placing of capping for water management, and requirements for completion of the northern area water management system as the collection point for sediment and silt. At completion of the final form, the various water management installations such as contour banks, sumps and drop down drains can be installed. Management for soils, erosion and revegetation will continue.

In the event that current and ongoing work can finalise the establishment of supply, markets and manufacturing proposal for ash utilisation of KVAR product, then a site reclamation plan will be required. Consequently, all aspects of environmental management for the site, water collection and site runoff, water reuse and site rehabilitation will be incorporated to any continuing site development and ash utilisation program.

# 8. Conclusions

All of Conditions of Approval for the 2013-2014 reporting period were complied with, or were found to be not applicable to the project.

EnergyAustralia NSW was previously determined to comply partially with Condition of Approval 2.9. However, a review of logistical arrangements had been conducted by principal contractors Lend Lease, and the report was submitted to the Director-General as part of correspondence dated 26<sup>th</sup> April 2012. The review indicated that the capacity for overnight storage at Wallerawang Power Station meant the hours of operation could not be reduced without overloading the available space. As such Lend Lease have successfully implemented the use of an additional ash haulage truck when ash volumes increase due to electricity production increases, and this option will achieve the required capacity for overnight storage within the ash silo after 10 pm and until 7 am. The findings of the logistics review were discussed and reviewed by the nominated Environmental Representative for the project and deemed to be reasonable and feasible.

All of the Conditions of Approval and environmental requirements of the Operation Environmental Management Plan were found to be either complied with or no longer applicable to operations at KVAR Stage 2.

## 9. References

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- Aurecon. (2013b). *Kerosene Vale Ash Repository Stage 2B - Construction Noise Assessment*.
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- DMC. (2010). *Fly Ash: Strategy Development for Aggregates and Other Bulk Use Applications*. DMC Advisory Pty Ltd, NSW.
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Parsons Brinckerhoff. (2008b). *Kerosene Vale - Stage 2 Ash Repository Operation Environmental Management Plan*. Parson Brinckerhoff Australia Pty Ltd, NSW.

Parsons Brinckerhoff. (2009). *Stage 2 Kerosene Vale Ash Repository Operational Noise Review*. Parsons Brinckerhoff Australia Pty Ltd, NSW.

## 10. Glossary of Terms

AEMR	Annual Environmental Management Report
CEMP	Construction Environmental Management Plan
CoA	Condition of Approval (also known as MCoA – Minister’s CoA)
DE	Delta Electricity
DECC	Department of Environment & Climate Change
DoP	Department of Planning
DP&E	Department of Planning and Environment (formerly DP&I / DoP)
DP&I	Department of Planning and Infrastructure
EPL	Environment Protection Licence
KVAD	Kerosene Vale Ash Dam
KVAR	Kerosene Vale Ash Repository
mAHD	Metres Australian Height Datum
NEMMCO	National Electricity Market Management Company
OEH	Office of Environment & Heritage (formerly DECC)
OEMP	Operation Environmental Management Plan
ONVMP	Operational Noise and Vibration Management Plan
RL	Relative Level
SSC	Sawyers Swamp Creek
SSCAD	Sawyers Swamp Creek Ash Dam



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## **Appendix A**

### **Detailed review checklist and Recommendations for Conditions of Approval**

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## Administrative Conditions

### Terms of approval

<b>Minister's Condition of Approval 1.1</b>
<p><i>The proponent shall carry out the project generally in accordance with the:</i></p> <ul style="list-style-type: none"> <li><i>a) Major Project Application 07_0005;</i></li> <li><i>b) Kerosene Vale – Stage 2 Ash Repository Area (two volumes) – Environmental Assessment, prepared by Parsons Brinckerhoff and dated 1 April 2008;</i></li> <li><i>c) Kerosene Vale – Stage 2 Ash Repository Area – Submissions Report, prepared by Parsons Brinckerhoff and dated 30 May 2008; and</i></li> <li><i>d) The conditions of this approval.</i></li> </ul>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>Based on the review undertaken, the Kerosene Vale Stage 2 operations have been carried out in accordance with the above requirements.</p>
<b>Compliance Assessment Finding - Compliant</b>
<b>Minister's Condition of Approval 1.2</b>
<p><i>In the event of an inconsistency between:</i></p> <ul style="list-style-type: none"> <li><i>a) The conditions of this approval and any document listed from condition 1.1a) – 1.1c) inclusive the conditions of this approval shall prevail to the extent of the inconsistency; and</i></li> <li><i>b) Any of the documents listed from the condition 1.1a) – 1.1c) inclusive, the most recent document shall prevail to the extent of the inconsistency.</i></li> </ul>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>No inconsistencies were observed between the documents listed above during implementation of the project or during the course of the review of operations in preparing this AEMR.</p>
<b>Compliance Assessment Finding - Compliant</b>

<b>Minister's Condition of Approval 1.3</b>
<i>The proponent shall comply with the reasonable requirements of the Director-General arising from the Department's assessment of:</i> <i>a) Any reports, plans or correspondence that are submitted in accordance with this approval; and</i> <i>b) The implementation of any actions or measures contained in these reports, plans or correspondence.</i>
<b>Compliance Assessment Observations and Comments</b> No requests from the Director-General of the DP&I were received in the 2013-14 reporting period.
<b>Compliance Assessment Finding - Not Applicable</b>

#### Limits of approval

<b>Minister's Condition of Approval 1.4</b>
<i>This approval shall lapse five years after the date on which it is granted, unless the works that are the subject of this approval are physically commenced on or before that time.</i>
<b>Compliance Assessment Observations and Comments</b> The Project Approval for KVAR Stage 2 is dated 26 November 2008, indicating a 26 November 2013 lapse date. Works on the KVAR Stage 2B project commenced June 2013, well before the 'deadline' date.
<b>Compliance Assessment Finding - Compliant</b>

#### Statutory requirements

<b>Minister's Condition of Approval 1.5</b>
<i>The Proponent shall ensure that all licences, permits and approvals are obtained as required by law and maintained as required with respect to the project. No condition of this approval removes the obligation for the Proponent to obtain, renew or comply with such licences, permits or approvals.</i>
<b>Compliance Assessment Observations and Comments</b> The project complies with the requirements of EnergyAustralia NSW's EPL 766. (See Section 2.1.1).
<b>Compliance Assessment Finding - Compliant</b>

## Specific Environmental Conditions

### Ash management

<b>Minister's Condition of Approval 2.1</b>
<i>The Proponent shall prepare a long-term ash-management strategy including a program for investigation and assessment of alternative ash management measures with a goal of 40% reuse of ash by 31 December 2012. The report shall be submitted to the Director-General within six months of the commencement of operations. The Proponent shall report on the status and outcomes of its investigations to the Director-General every two years from the commencement of the operation of the project, unless otherwise agreed by the Director-General.</i>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>EnergyAustralia NSW commissioned the report <i>Fly Ash: Strategy Development for Aggregates and Other Bulk Use Applications</i> (DMC, 2010). The reports were submitted to DP&amp;I in September 2011.</p> <p>Ash reuse progress is communicated via the Lend Lease Monthly Compliance Report and tracked in Delta Electricity's Annual Sustainability Report. Ash utilisation has been an ongoing program for the power station. At this time, more research and development to develop markets have been performed, rather than to solely focus on servicing established market opportunities. Total ash placed to the repository remains less than 40% of the original approval.</p>
<b>Compliance Assessment Finding - Compliant</b>
<b>Minister's Condition of Approval 2.2</b>
<i>To facilitate assessment of the viability of coal resources in the project area and provide a finite opportunity for their extraction, the Proponent shall undertake revised staging of ash placement activities as described in the document referred to in condition 1.1c) of this approval</i>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>Centennial Coal declined to extract the coal resources in the project area.</p> <p>Ash will not be placed over the coal resource in the project area for another 2 years, which is finite opportunity.</p> <p>As outlined in this report, the pine plantation area now constitutes Stage 2B of KVAR.</p>
<b>Compliance Assessment Finding - Compliant</b>

## Noise impacts

<b>Minister's Condition of Approval 2.3</b>
<p><b><i>Construction activities associated with the project shall only be undertaken during the following hours:</i></b></p> <ul style="list-style-type: none"> <li><b><i>a) 7:00 am to 6:00 pm, Mondays to Fridays, inclusive;</i></b></li> <li><b><i>b) 8:00 am to 1:00 pm on Saturdays; and</i></b></li> <li><b><i>c) At no time on Sundays or public holidays.</i></b></li> </ul>
<p><b><i>Compliance Assessment Observations and Comments</i></b></p> <p>A CEMP was prepared for the works associated with the development of Stage 2B in preparation for ash placement and included a Construction Noise Management Plan and Noise Monitoring Program. This was submitted to DP&amp;I in August 2011 and approved on the 16<sup>th</sup> December 2011.</p> <p>Construction activities were undertaken over the period June – September 2013, with no works undertaken outside the hours listed above.</p>
<b>Compliance Assessment Finding - Compliant</b>
<b>Minister's Condition of Approval 2.4</b>
<p><b><i>Activities resulting in impulsive or tonal noise emission (such as rock breaking or rock hammering) shall be limited to 8:00 am to 12:00 pm, Monday to Saturday and 2:00 pm to 5:00 pm Monday to Friday. The Proponent shall not undertake such activities for more than three continuous hours and must provide a minimum one-hour respite period.</i></b></p>
<p><b><i>Compliance Assessment Observations and Comments</i></b></p> <p>No activities resulting in tonal or impulsive noise emission have occurred during the monitoring period.</p>
<b>Compliance Assessment Finding - Not Applicable</b>



<b>Minister's Condition of Approval 2.5</b>
<p><i>Construction outside the hours stipulated in condition 2.3 of this approval is permitted in the following circumstances:</i></p> <ul style="list-style-type: none"> <li><i>a) Where construction works do not cause audible noise at any sensitive receiver; or</i></li> <li><i>b) For the delivery of materials required outside these hours by the Police or other authorities for safety reasons; or</i></li> <li><i>c) Where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.</i></li> </ul>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>No construction activities have taken place outside the hours stipulated in condition 2.3 of this approval.</p>
<b>Compliance Assessment Finding - Not Applicable</b>
<b>Minister's Condition of Approval 2.6</b>
<p><i>The hours of construction activities specified under condition 2.3 of this approval may be varied with the prior written approval of the Director-General. Any request to alter the hours of construction specified under condition 2.3 shall be:</i></p> <ul style="list-style-type: none"> <li><i>a) Considered on a case-by-case basis;</i></li> <li><i>b) Accompanied by details of the nature and need for activities to be conducted during the varied construction hours; and</i></li> <li><i>c) Accompanied by any information necessary for the Director-General to reasonably determine that activities undertaken during the varied construction hours will not adversely impact on the acoustic amenity of sensitive receivers in the vicinity of the site.</i></li> </ul>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>There has been no requirement to vary hours of construction during the reporting period.</p>
<b>Compliance Assessment Finding - Not Applicable</b>

<b>Minister's Condition of Approval 2.7</b>
<p><i>The construction noise objective for the proponent is to manage noise from construction activities (as measured by <math>L_{A10(15minute)}</math> descriptor) so as not to exceed the background <math>L_{A90}</math> noise level by more than 10dB(A) at any sensitive receiver.</i></p> <p><i>Any activities that have the potential for noise emissions that exceed the objective must be identified and managed in accordance with the Construction Noise Management Plan (as referred under condition 6.3B) of this approval). The Proponent shall implement all reasonable and feasible noise mitigation measures with the aim of achieving the construction noise objective.</i></p>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>Results collected from monitoring conducted over the 6 – 7 November 2011 were used as the benchmark for noise generated from the operation. Attended day noise measurements were conducted on 18 – 19 June 2013 at the boundary of the nearest residential properties to determine compliance. Based on the noise assessment, the construction noise resulting from the operation of equipment and mobile plant at the KVAR construction site on 18 and 19 June 2013, comply with the CEMP Noise Management plan and the projects Conditions of Approval at all the representative residential receivers.</p> <p>No activities with the potential to exceed background noise levels were undertaken during the reporting period.</p>
<b>Compliance Assessment Finding - Compliant</b>
<b>Minister's Condition of Approval 2.8</b>
<p><i>Operational activities associated with the project shall only be undertaken from 7:00am to 10:00pm Monday to Sunday.</i></p>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>Lend Lease have advised that no operational activities have taken place outside the hours designated above.</p> <p>Aurecon reported that: "Trucks were operating during all measurement periods moving from north to south and visa-versa on the haulage road east of Skelly Road. The truck movements observed during the measurement period included ash trucks, small commercial vehicles and possibly coal trucks. Trucks were operating at a constant rate, with approximate 15 - 20 minute circuits for each truck from 7am – 10pm".</p>
<b>Compliance Assessment Finding - Compliant</b>
<b>Minister's Condition of Approval 2.9</b>
<p><i>Within six months of commencement of operation of the project the Proponent shall prepare and submit to the Director-General a review of the logistical arrangements for ash haulage and placement to determine the feasibility of reducing the hours of operation. If, as a result of the review, it is determined that ash haulage and placement times can commence later and/or finish earlier, the Proponent shall aim to observe the reduced hours whenever possible.</i></p>

<b>Compliance Assessment Observations and Comments</b>
The review was conducted within six months of commencement of operations and submitted to the DP&I on the 26 <sup>th</sup> April 2012. The review determined that ash haulage and placement times could not commence later or finish earlier. This review was not submitted to the Director-General.
<b>Compliance Assessment Finding - Compliant</b>
<b>Minister's Condition of Approval 2.10</b>
<p><i>Operations outside the hours stipulated in condition 2.8 of this approval are only permitted in the following emergency situations:</i></p> <ul style="list-style-type: none"> <li><i>a) Where it is required to avoid the loss of live, property and/or to prevent environmental harm; or</i></li> <li><i>b) Breakdown of plant and/or equipment at the repository or the Wallerawang Power Station with the effect of limiting or preventing ash storage at the power station outside the operating hours defined in condition 2.8; or</i></li> <li><i>c) A breakdown of an ash haulage truck(s) preventing haulage during the operating hours stipulated in condition 2.8 combined with insufficient storage capacity at the Wallerawang Power Station to store ash outside of the project operating hours; or</i></li> <li><i>d) In the event that the National Electricity Market Management Company (NEMMCO), or a person authorised by NEMMCO, directs the Proponent (as a licensee) under the National Electricity Rules to maintain, increase or be available to increase power generation for system security and there is insufficient ash storage capacity at the Wallerawang Power Station to allow for the ash to be stored.</i></li> </ul> <p><i>In the event of conditions 2.10b) or 2.10c) arising, the Proponent is to take all reasonable and feasible measures to repair the breakdown in the shortest time possible.</i></p>
<b>Compliance Assessment Observations and Comments</b>
Lend Lease have advised that no operational activities have taken place outside the hours.
<b>Compliance Assessment Finding - Not Applicable</b>

Minister's Conditions of Approval 2.11, 2.12, 2.13 and 2.14
<p><b>2.11- In the event that an emergency situation as referred to under condition 2.10b) or 2.10c) occurs more than once in any two month period, the Proponent shall prepare and submit to the Director-General for approval a report including, but not limited to:</b></p> <ul style="list-style-type: none"> <li><b>a) The dates and a description of the emergency situations;</b></li> <li><b>b) An assessment of all reasonable and feasible mitigation measure to avoid recurrence of the emergency situations;</b></li> <li><b>c) Identification of a preferred mitigation measure(s); and</b></li> <li><b>d) Timing and responsibility for implementation of the mitigation measure (s).</b></li> </ul> <p><b>The report is to be submitted to the Director-General within 60 days of the second exceedence occurring. The Proponent shall implement all reasonable and feasible mitigation measures in accordance with the requirements of the Director-General.</b></p> <p><b>2.12- The Proponent shall notify the DECC prior to undertaking any emergency ash haulage or placement operations outside of the hours of operation stipulated in condition 2.8 of this approval and keep a log of such operations.</b></p> <p><b>2.13- The Proponent shall notify the Director-General in writing within seven days of undertaking any emergency ash haulage or placement operations outside of the hours of operation stipulated in condition 2.8 of this approval.</b></p> <p><b>2.14- The Proponent shall notify nearby sensitive receivers (as defined in the Operational Noise Management Plan required under condition 6.5a) of this approval) prior to 8.00pm where it is known that emergency ash haulage or placement operations will be required outside of the hours of operation stipulated in condition 2.8 of this approval.</b></p>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>No emergency situations have occurred during the reporting period.</p>
<p><b>Compliance Assessment Finding - Not Applicable</b></p>

<b>Minister's Condition of Approval 2.15</b>
<p><i>The cumulative operational noise from the ash placement area and ash haulage activity shall not exceed an <math>L_{Aeq}</math> (15 minute) of 40 dB(A) at the nearest most affected sensitive receiver during normal operating hours as defined in condition 2.8 of this approval.</i></p> <p><i>This noise criterion applies under the following meteorological conditions:</i></p> <ul style="list-style-type: none"> <li><i>a) Wind speeds up to 3m/s at 10 metres above ground; and/or</i></li> <li><i>b) Temperature inversion conditions of up to 3°C/100m and source to receiver gradient winds of up to 2m/s at 10m above ground level.</i></li> </ul> <p><i>This criterion does not apply where the Proponent and the affected landowner have reached a negotiated agreement in regard to noise, and a copy of the agreement has been forwarded to the Director-General and the DECC.</i></p>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>Measured noise levels during December 2013 and March 2014 indicate Stage 2 operations are compliant with operational noise criteria (Aurecon, 2013a). EnergyAustralia NSW has not entered into any agreements regarding noise from KVAR with any potentially affected landholders, nor had any noise related complaints regarding the KVAR Stage 2 project. (See Section 4.3).</p>
<b>Compliance Assessment Finding - Compliant</b>
<b>Minister's Condition of Approval 2.16</b>
<p><i>The Proponent shall implement measures to ensure noise attenuation of trucks. These measures may include, but are not limited to, installation of residential class mufflers, engine shrouds, body dampening, speed limiting, fitting of rubber stoppers to tail gates, limiting the use of compression breaking, and ensuring trucks operate in a one-way system at the ash repository where feasible.</i></p>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>Lend Lease has engaged a fleet of Mercedes-Benz Actros trucks which are compliant with the noise emission standards outlined above. No compression braking is used on the repository, trucks are well maintained with engines enclosed, mufflers in place, and proceed in a unidirectional format according to enforced speed limits. Ash haulage operations comply with all noise emission requirements on the haul road, which remain in place for 2013-2014 operations period.</p>
<b>Compliance Assessment Finding - Compliant</b>
<b>Minister's Condition of Approval 2.17</b>
<p><i>The Proponent shall liaise with the owner/operator of Angus Place Coal Mine with the aim of preparing a protocol which provides for a co-operative approach for the management and mitigation of noise impacts associated with coal and ash truck movements along the private haul road.</i></p>



<p><b>Compliance Assessment Observations and Comments</b></p> <p>EnergyAustralia NSW regularly liaises with Centennial Coal through monthly fuel supply meetings. The protocol developed between Delta and Centennial includes the restriction of movement of trucks along the haul road between 6pm and 7am daily- trucks are diverted from the haul road passage during these hours as necessary. Centennial Coal reports to Delta with any instances that may impact on background noise caused by truck movement through the monthly meetings, and are bound by their Environment Protection Licence 467. Information provided to Delta by Centennial regarding potential Angus Place noise impacts associated with coal and ash truck movements underneath this licence included hours of operation, noise level limits and pollutants.</p>
<b>Compliance Assessment Finding - Compliant</b>
<b>Minister's Condition of Approval 2.18</b>
<p><b>Where noise monitoring (as required by conditions 3.2 or 3.3 of this approval) identifies any non-compliance with the operational noise criterion specified under condition 2.15 of this approval the Proponent shall prepare and submit to the Director-General for approval a report including, but not limited to:</b></p> <ul style="list-style-type: none"> <li>a) <b>An assessment of all reasonable and feasible physical and other mitigation measures for reducing noise at the source including, but not limited to –</b> <ul style="list-style-type: none"> <li>i. <b>Construction of a noise barrier along the haulage road</b></li> <li>ii. <b>Alternative ash haulage routes, and</b></li> <li>iii. <b>Alternative methods of ash conveyance to the repository; and</b></li> </ul> </li> <li>b) <b>Identification of the preferred measure(s) for reducing noise at the source;</b></li> <li>c) <b>Feedback from directly affected property owners and the DECC on the proposed noise mitigation measures; and</b></li> <li>d) <b>Location, type, timing and responsibility for implementation of the noise mitigation measure(s).</b></li> </ul> <p><b>The report is to be submitted to the Director-General within 60 days of undertaking the noise monitoring which has identified exceedences of the operational noise criterion specified under condition 2.15, unless otherwise agreed to by the Director-General. The Proponent shall implement all reasonable and feasible mitigation measures in accordance with the requirements of the Director-General.</b></p>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>EnergyAustralia NSW has implemented annual noise monitoring assessments. No non-compliances were identified during the reporting period.</p> <p>Refer to Appendix I and Appendix J for further details.</p>
<b>Compliance Assessment Finding - Compliant</b>

Minister's Condition of Approval 2.19
<p><i>If, after the implementation of all reasonable and feasible source controls, as identified in the report required by condition 2.18, the noise generated by the project exceeds the criterion stipulated in condition 2.15 at:</i></p> <ul style="list-style-type: none"> <li><i>a) Any sensitive receiver in existence at the date of this approval; or</i></li> <li><i>b) Any residential dwelling for which an approval has been sought or obtained under the Environmental Planning and Assessment Act 1979 no later than six months after the confirmation of operational noise levels;</i></li> </ul> <p><i>Upon receiving a written request from an affected landowner (unless that landowner has acquisition rights under condition 2.20 of this approval and has requested acquisition) the Proponent shall implement additional noise mitigation measures such as double glazing, insulation, air conditioning and or other building acoustic treatments at any residence on the land, in consultation with the landowner.</i></p> <p><i>For the purpose of this condition and condition 2.20, confirmation of operational noise levels means:</i></p> <ul style="list-style-type: none"> <li><i>a) Completion of the operational noise review required under condition 3.2 this approval; and</i></li> <li><i>b) Implementation of any source controls, as required under condition 2.18 of this approval, should the operational noise review indicate noise levels in excess of the operational noise criterion specified in condition 2.15; and</i></li> <li><i>c) Monitoring of operational noise levels, as required under condition 3.3b) of this approval, following the implementation of any source controls.</i></li> </ul> <p><i>The additional mitigation measures must be reasonable and feasible. If within three months of receiving this request from the landowner the Proponent and landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution, whose decision shall be final.</i></p>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>EnergyAustralia NSW has implemented annual noise monitoring assessments. No non-compliances were identified during the reporting period. Refer to Appendix I and Appendix J for further details.</p> <p>EnergyAustralia NSW has received no written requests from affected landowners regarding noise mitigation measures.</p>
<p><b>Compliance Assessment Finding - Compliant</b></p>

<b>Minister's Condition of Approval 2.20</b>
<p><i>If, after the implementation of all reasonable and feasible source controls, as identified in the report required by condition 2.18, the noise generated by the project exceeds the criterion stipulated in condition 2.15 by more than 5dB(A):</i></p> <ul style="list-style-type: none"> <li><i>a) At a sensitive receiver in existence at the date of this approval; or</i></li> <li><i>b) At any residential dwelling for which an approval has been sought or obtained under the Environmental Planning and Assessment Act 1979 prior to the landholder receiving written notification that they are entitled to land acquisition rights, as per condition 2.25 of this approval; or</i></li> <li><i>c) Over 25% or more of the area of a vacant allotment in existence at the date of this approval, and where a dwelling is permissible under the Environmental Planning and Assessment Act 1979 at that date, with the exception of land that is currently used for industrial or mining purposes;</i></li> </ul> <p><i>The Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 2.22 to 2.24 of this approval.</i></p> <p><i>Any landowner that has agreed to, or property that has been the subject of, the application of additional noise mitigation measures under condition 2.19 of this approval waives the right to land acquisition.</i></p>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>EnergyAustralia NSW has received no written or verbal requests from landowners to acquire their land.</p>
<b>Compliance Assessment Finding - Compliant</b>
<b>Minister's Condition of Approval 2.21</b>
<p><i>The land acquisition rights under condition 2.20 of this approval do not apply to landowners who have sought approval to subdivide their land after the date of this approval, unless the subdivision is created pursuant to condition 2.24 of this approval.</i></p>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>No landholders have applied for approval to subdivide their land according to the land acquisition rights.</p>
<b>Compliance Assessment Finding - Not Applicable</b>

Minister's Condition of Approval 2.22
<p><i>Within three months of receiving a written request from a landowner with acquisition rights under condition 2.20 of this approval, the Proponent shall make a binding written offer to the landowner based on:</i></p> <ul style="list-style-type: none"> <li><i>a) The current market value of the landowner's interest in the property at the date of this written request, as if the property were unaffected by the project which is the subject of the project application, having regard to the: <ul style="list-style-type: none"> <li><i>i. Existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and</i></li> <li><i>ii. Presence of improvements on the property and/or any approved building or structure which has been physically commenced at the date of the landowner's written request, and is due to be completed subsequent to that date, but excluding any improvements that have resulted from the implementation of condition 2.19 of this approval;</i></li> </ul> </i></li> <li><i>b) The reasonable costs associated with: <ul style="list-style-type: none"> <li><i>i. Relocating within the Lithgow local government area, or to any other local government area determined by the Director-General;</i></li> <li><i>ii. Obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is required; and</i></li> </ul> </i></li> <li><i>c) Reasonable compensation for any disturbance caused by the land acquisition process.</i></li> </ul> <p><i>However, if at the end of this period, the Proponent and landowner cannot agree on the acquisition price of the land, and/or the terms upon which the land is to be acquired, then either party may refer the matter to the Director-General for resolution.</i></p> <p><i>Upon receiving such a request, the Director-General shall request the President of the NSW Division of the Australian Property Institute to appoint a qualified independent valuer or Fellow of the Institute, to consider submissions from both parties, and determine a fair and reasonable acquisition price for the land, and/or terms upon which the land is to be acquired.</i></p> <p><i>Within 14 days of receiving an independent valuer's determinations, the Proponent shall make a written offer to purchase the land at a price not less than the independent valuer's determination.</i></p> <p><i>If the landowner refuses to accept this offer within six months of the date of the Proponent's offer, the Proponent's obligations to acquire the land shall cease, unless otherwise agreed by the Director-General.</i></p>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>No landholders have applied for approval to subdivide their land according to the land acquisition rights.</p>
<p><b>Compliance Assessment Finding - Not Applicable</b></p>

Minister's Conditions of Approval 2.23, 2.24 and 2.25
<p><b>2.23- The Proponent shall bear the costs of any valuation or survey assessment requested by the independent valuer or the Director-General and the costs of determination referred to above.</b></p> <p><b>2.24- If the Proponent and landowner agree that only part of the land shall be acquired, then the Proponent shall pay all reasonable costs associated with obtaining Council approval for any plan of subdivision (where permissible), and registration of the plan at the Office of the Registrar-General.</b></p> <p><b>2.25- The Proponent shall provide written notice to all landowners that are entitled to rights under conditions 2.19 and 2.20 within 21 days of determining the landholdings where additional noise mitigation measures or land acquisition apply. For the purpose of condition 2.20b), this condition only applies where operational noise levels have been confirmed in accordance with the definition in condition 2.19.</b></p>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>No landholders have applied for approval to subdivide their land according to the land acquisition rights.</p>
<b>Compliance Assessment Finding - Not Applicable</b>

### Sawyers Swamp Creek realignment

EnergyAustralia NSW decided upon commencement of the Project that the realignment of SSC was not necessary. Therefore, the CoAs relating to SSC realignment are not applicable. This refers to CoAs 2.26 (a – m), 2.27, 2.28 and 2.29.



### Surface water quality

<b>Minister's Condition of Approval 2.30</b>
<i>The Proponent shall take all reasonable and feasible measures to prevent discharge of sediments and pollutants from the construction and operation of the project entering waterways.</i>
<i>Note: Section 120 of the Protection of the Environment Operations Act 1997 prohibits the pollution of water except where expressly provided by an Environmental Protection Licence.</i>
<b>Compliance Assessment Observations and Comments</b> No surface waters from KVAR Stage 2 are allowed to enter the SSC catchment. Measures to prevent surface water discharge include a series of collection ponds on site, with water reticulated around KVAR for the treatment of ash and dust suppression.
<b>Compliance Assessment Finding - Compliant</b>
<b>Minister's Condition of Approval 2.31</b>
<i>Earthworks not associated with the realignment of Sawyer Swamp Creek shall not be undertaken within 50m of the creek where reasonable and feasible.</i>
<b>Compliance Assessment Observations and Comments</b> A minimum buffer zone of 50m has been maintained along the riparian area of SSC for all operations.
<b>Compliance Assessment Finding - Compliant</b>
<b>Minister's Condition of Approval 2.32</b>
<i>All equipment, machinery and vehicles associated with the construction and operation of the project shall be operated and maintained in a manner that minimises the potential for oil and grease spills/leaks.</i>
<b>Compliance Assessment Observations and Comments</b> Lend Lease supply EnergyAustralia NSW with Monthly Client Service Reports detailing site safety, ash placement, operations, environmental and maintenance aspects of site management. These maintenance records include general operations (truck maintenance and hours, ash analyses, sensor repairs, vent lines, line trips etc.), projects (unit outages, silo repairs and maintenance, valve repairs and maintenance etc.), incidents /near misses, training and safety. Monthly Client Service Reports may be viewed upon request.
<b>Compliance Assessment Finding - Compliant</b>

**Air quality impacts**

<b>Minister's Condition of Approval 2.33</b>
<i>The Proponent shall construct and operate the project in a manner that minimises dust impacts generated by construction works and operational activities, including wind-blown and traffic generated dust, on the receiving environment. All activities on the site shall be undertaken with the objective of preventing visible emissions of dust from the site. Should such visible dust emissions occur at any time, the Proponent shall identify and implement all practicable dust mitigation measures, including cessation of relevant works, as appropriate, such that emissions of visible dust cease.</i>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>Dust management within the site is included in the responsibilities of all operations, including:</p> <ul style="list-style-type: none"> <li>• Use of perimeter sprays at the ash placement area;</li> <li>• Water cart (20,000 L) on site during all ash placement operations 8 am to 5 pm Mondays to Sundays;</li> <li>• Ash placement operations;</li> <li>• Final capping of ash; and</li> <li>• General maintenance and rehabilitation of the ash placement area.</li> </ul>
<b>Compliance Assessment Finding - Compliant</b>
<b>Minister's Condition of Approval 2.34</b>
<i>The Proponent shall ensure that the load carrying compartment(s) of all ash haulage trucks are covered at all times except when loading or unloading ash material.</i>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>No issues with load coverings were recorded for the 2013-2014 reporting period.</p>
<b>Compliance Assessment Finding - Compliant</b>

**Lighting emissions**

<b>Minister's Condition of Approval 2.35</b>
<b><i>The Proponent shall take all practicable measures to mitigate off-site lighting impacts from the project and ensure all external lighting associated with the project complies with Australian Standard AS4282 1997 – Control of the Obtrusive Effects of Outdoor Lighting.</i></b>
<p><b><i>Compliance Assessment Observations and Comments</i></b></p> <p>Lend Lease Work Procedures Manual contains procedures that apply to all personnel and equipment operating at Kerosene Vale, including mobile lighting towers for ash placement operations, and details the responsibilities, application and procedures for using outdoor lighting for the project, within the project area.</p> <p>Lights used to illuminate the tipping area must face south or east, operators must ensure the horizontal distance of the illuminated area is not less than 40m and as access to the repository for ash transport is between 7am and 10pm lights must be extinguished by 10pm.</p> <p>The lights used at KVAR are the HILITE 4000 hired from Coates Hire Operations Pty Ltd. The specification sheets for these lights form part of the Work Procedures Manual for lighting.</p>
<b>Compliance Assessment Finding - Compliant</b>

**Construction traffic and transport impacts**

<b>Minister's Condition of Approval 2.36</b>
<p><b><i>The Proponent shall ensure that construction vehicles associated with the project:</i></b></p> <ul style="list-style-type: none"> <li><b><i>a) Minimise the use of local roads (though residential streets and town centres) to gain access to the site;</i></b></li> <li><b><i>b) Adhere to any nominated haulage routes identified in the Construction Traffic Management Plan as referred to in condition 6.3a) of this approval; and</i></b></li> <li><b><i>c) Adhere to a Construction Vehicle Code of Conduct prepared to manage driver behaviour along the local road network to address traffic impacts (and associated noise) along nominated haulage routes.</i></b></li> </ul>
<p><b><i>Compliance Assessment Observations and Comments</i></b></p> <p>A Construction Traffic Management Plan was submitted to and approved by the DP&amp;I as part of the Construction Environment Management Plan.</p>
<b>Compliance Assessment Finding - Compliant</b>

## Heritage impacts

<b>Minister's Condition of Approval 2.37</b>
<i>The Proponent shall ensure that all construction personnel are educated on their obligations in respect of the protection of Aboriginal and non-indigenous heritage sites and items.</i>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>The Lend Lease Work Procedures Manual includes Environmental Management Controls for Cultural Heritage and applies to all personnel.</p> <p>No aboriginal or other cultural heritage sites have been identified at Kerosene Vale. All of EnergyAustralia NSW's cultural sites are listed in the Section 170 Heritage and Conservation Register.</p>
<b>Compliance Assessment Finding - Compliant</b>
<b>Minister's Condition of Approval 2.38</b>
<i>If any previously unidentified heritage sites or items (Aboriginal and/or non-indigenous) are discovered during construction works or operational activities, all work likely to affect the heritage sites or item(s) is to cease immediately and the discovery of the objects shall be reported to DECC or the Department as relevant.</i>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>No previously unidentified heritage sites or items were discovered during the reporting period.</p>
<b>Compliance Assessment Finding - Not applicable</b>

## Waste management

<b>Minister's Condition of Approval 2.39</b>
<i>All waste materials shall be assessed, classified, managed and disposed of in accordance with Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-liquid Wastes (EPA, 1999).</i>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>Lend Lease provides Monthly Ash Placement Work Instructions to address all issues of routine site maintenance as part of a monthly work program. Waste management is conducted in accordance with EPA guidelines.</p>
<b>Compliance Assessment Finding - Compliant</b>
<b>Minister's Condition of Approval 2.40</b>
<i>All waste materials removed from the site shall only be directed to a waste management facility lawfully permitted to accept the materials.</i>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>Lend Lease utilises EnergyAustralia NSW's waste management facilities for wastes generated in the operation of the repository, including waste oils, general waste and materials for recycling. These are stored in intermediate storage facilities at Wallerawang Power Station and routinely removed by EnergyAustralia NSW's waste contractors. No additional waste materials were generated during the reporting period.</p>
<b>Compliance Assessment Finding - Compliant</b>
<b>Minister's Condition of Approval 2.41</b>
<i>The Proponent shall not cause, permit or allow any waste generated outside the site to be received at the site for storage, treatment, processing, reprocessing, or disposal on the site, except as expressly permitted by a licence under the Protection of the Environment Operations Act 1997, if such a licence is required in relation to that waste.</i>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>No wastes generated outside the Kerosene Vale site are allowed to enter the area.</p> <p>To prevent the unlawful access to the repository area, regular security patrols are conducted across the site. Both Lend Lease and EnergyAustralia NSW security personnel are required to report if they encounter any rubbish or wastes outside those that are allowed during routine operations.</p>
<b>Compliance Assessment Finding - Compliant</b>



## Environmental Monitoring

### Construction noise monitoring

Minister's Condition of Approval 3.1
<p><i>The Proponent shall prepare and implement a Construction Noise Monitoring Program to confirm the predictions of the noise assessment detailed in the document referred to under condition 1.1b) of this approval and assess compliance against the construction noise criterion stipulated in condition 2.7 of this approval. The noise monitoring program shall be prepared in consultation with, and to the satisfaction of, the DECC. The monitoring program shall form part of the Construction Noise Management Plan referred to in condition 6.3b) of this approval and must include monitoring of the construction noise generated during:</i></p> <ul style="list-style-type: none"> <li><i>a) The realignment of Sawyers Swamp Creek;</i></li> <li><i>b) Construction of the stabilisation berm;</i></li> <li><i>c) Excavation of the former pine plantation area;</i></li> <li><i>d) Relocation and construction of surface water management structures; and</i></li> <li><i>e) Concurrent construction activities.</i></li> </ul> <p><i>The Proponent shall forward to the DECC and the Director-General a report containing the results of each noise assessment and describing any non-compliance within 14 days of conducting a noise assessment.</i></p>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>A CEMP was prepared for the construction works associated with the development of Stage 2B in preparation for ash placement, including a Construction Noise Management Plan and Noise Monitoring Program. This was submitted to DP&amp;I in August 2011 and approved on the 16<sup>th</sup> December 2011.</p> <p>Stage 2B works commenced June 2013 and finished September 2013; refer to Section 3.3 for further details.</p> <p>Results collected from monitoring conducted over the 6 – 7 November 2011 were used as the benchmark for noise generated from the operation. Attended day noise measurements were conducted on 18 – 19 June 2013 at the boundary of the nearest residential properties to determine compliance. Based on the noise assessment, the construction noise resulting from the operation of equipment and mobile plant at the KVAR construction site on 18 and 19 June 2013, comply with the CEMP Noise Management plan and the projects Conditions of Approval at all the representative residential receivers.</p>
<p><b>Compliance Assessment Finding - Compliant</b></p>

## Operational noise review

<b>Minister's Condition of Approval 3.2</b>
<p><i>Within 60 days of the commencement of operation of the project, unless otherwise agreed to by the Director-General, the Proponent shall submit for the approval of the Director-General an Operational Noise Review to confirm the operational noise impacts of the project. The Operational Noise Review must be prepared in consultation with, and to the satisfaction of, the DECC. The Review shall:</i></p> <ul style="list-style-type: none"> <li><i>a) Identify the appropriate operational noise objectives and level for sensitive receivers;</i></li> <li><i>b) Describe the methodologies for noise monitoring including the frequency of measurements and location of monitoring sites;</i></li> <li><i>c) Document the operational noise levels at sensitive receivers as ascertained by the noise monitoring program;</i></li> <li><i>d) Assess the noise performance of the project against the noise criterion specified in condition 2.15 of this approval and the predicted noise levels as detailed in the report referred to under condition 1.1b) of this approval; and</i></li> <li><i>e) Provide details of any entries in the Complaints Register (as required under condition 5.4 of this approval) relating to noise impacts.</i></li> </ul> <p><i>Where monitoring indicates noise levels in excess of the operational noise criterion specified in condition 2.15 of this approval, the Proponent shall prepare a report as required by condition 2.18 of this approval.</i></p>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>The Operational Noise Review (Parsons Brinckerhoff, 2009) was submitted to the DP&amp;I on 16 September 2009, and the Department acknowledged its satisfaction that CoA 3.2 had been met on 18 September 2009.</p>
<b>Compliance Assessment Finding - Compliant</b>

**Ongoing operational noise monitoring**

Minister's Condition of Approval 3.3
<p><i>The Proponent shall prepare and implement an Operational Noise Monitoring Program to assess compliance against the operational noise criterion stipulated in condition 2.15 of this approval, throughout the life of the project. The noise monitoring program shall be prepared in consultation with, and to the satisfaction of, the DECC.</i></p> <p><i>The noise monitoring program shall be prepared in accordance with the requirements of the New South Wales Industrial Noise Policy (EPA, 2000) and must include, but not be limited to:</i></p> <ul style="list-style-type: none"> <li><i>a) Monitoring during ash placement in the far western area of the site adjacent to the haul road; and</i></li> <li><i>b) Monitoring of the effectiveness of any noise mitigation measures implemented under condition 2.18 of this approval, against the noise criterion specified in condition 2.15 of this approval.</i></li> </ul> <p><i>Noise from the project is to be measured at the most affected point on or within the residential boundary, or at the most affected point within 30 metres of a dwelling where the dwelling is more than 30 metres from the boundary, to determine compliance with the noise criterion stipulated in condition 2.15 of this approval. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.</i></p> <p><i>The Proponent shall forward to the DECC and the Director-General a report containing the results of any non-compliance within 14 days of conducting a noise assessment.</i></p> <p><i>Where monitoring indicates noise levels in excess of the operational noise criterion specified in condition 2.15 of this approval, the Proponent shall prepare a report as required by condition 2.18 of this approval.</i></p> <p><i>The monitoring program shall form part of the Operational Noise Management Plan referred to in condition 6.5a) of this approval.</i></p>
Compliance Assessment Observations and Comments
<p>EnergyAustralia NSW continues to implement annual noise monitoring assessments. No non-compliances were identified during the reporting period.</p>
Compliance Assessment Finding - Compliant

## Groundwater monitoring

Minister's Condition of Approval 3.4
<p><i>The Proponent shall prepare and implement a Groundwater Monitoring Program to monitor the impacts of ash placement activities on local groundwater quality and hydrology. The program shall be developed in consultation with, and to the satisfaction of, the SCA, and shall describe the location, frequency, rationale and procedures and protocols for collecting groundwater samples, as well as the parameters analysed and methods of analysis. The monitoring program shall be ongoing for the life of the project and include, but not be limited to:</i></p> <ul style="list-style-type: none"> <li><i>a) Monitoring at established bore sites (or replacement bore sites in the event that existing sites are damaged or lost) as described in the document referred to under condition 1.1b) of this approval; and</i></li> <li><i>b) A schedule for periodic monitoring of groundwater quality, depth and flow at all monitoring sites, at an initial frequency of no less than once every month for the first 12 months of operation.</i></li> </ul> <p><i>The monitoring program shall form part of the Groundwater Management Plan referred to in condition 6.5b) of this approval.</i></p>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>A Groundwater Monitoring Program in the form of the Groundwater Quality sub-plan was developed as part of the OEMP (Parsons Brinckerhoff, 2008b) and provided to Delta to determine the minimum monitoring requirements for groundwater following receipt of approval from the DP&amp;I.</p>
<p><b>Compliance Assessment Finding - Compliant</b></p>

### Surface water quality monitoring

Minister's Condition of Approval 3.5
<p><i>The Proponent is to implement a surface water quality monitoring program to monitor the impacts of the ash placement activities on, and the realignment of, Sawyers Swamp Creek. The Program shall be developed in consultation with and to the satisfaction of the DPI (Fisheries) and SCA, and shall describe the location, frequency, rationale and the procedures and protocols for collecting water samples as well as the parameters analysed and methods of analysis. The program shall include, but not necessarily be limited to:</i></p> <ul style="list-style-type: none"> <li><i>a) Monitoring at the four existing water quality monitoring sites as described in the document referred to under 1.1b) of this approval;</i></li> <li><i>b) Monitoring downstream of the realigned section of Sawyers Swamp Creek;</i></li> <li><i>c) Monitoring at groundwater discharge points into Sawyers Swamp Creek;</i></li> <li><i>d) Wet weather monitoring with a minimum of two events recorded within the first 12 months of both the operation of the project and post realignment of Sawyers Swamp Creek; and</i></li> <li><i>e) A schedule for periodic monitoring of surface quality at all sites throughout the life of the project, at an initial frequency of no less than once every month for the first 12 months and must include, but not be limited to, dissolved oxygen, turbidity, total phosphorus and total nitrogen.</i></li> </ul> <p><i>The monitoring program shall form part of the Surface Water Management Plan referred to in condition 6.5c) of this approval.</i></p>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>A surface water Monitoring Program in the form of the surface water Quality sub-plan was developed as part of the OEMP (Parsons Brinckerhoff, 2008b) and provided to Delta to determine the minimum monitoring requirements for surface water following receipt of approval from the DP&amp;I.</p>
<p><b>Compliance Assessment Finding - Compliant</b></p>

### Sawyers Swamp Creek realignment monitoring

EnergyAustralia NSW decided upon commencement of the Project that the realignment of SSC was not necessary. Therefore, CoAs 3.6 and 3.7 relating to SSC realignment are not applicable.



**Air quality monitoring**

<b>Minister's Condition of Approval 3.8</b>
<p><i>The Proponent shall prepare an Air Quality Monitoring Program, in consultation with, and to the satisfaction of, the DECC. The Program shall include but not necessarily be limited to, monitoring for dust at the monitoring sites identified in the document referred to under condition 1.1b) of this approval. The air quality monitoring program shall be ongoing for the life of the project, including final rehabilitation and stabilisation of the site.</i></p> <p><i>The monitoring program shall form part of the Air Quality Management Plan referred to in condition 6.5d) of this approval.</i></p>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>An air quality monitoring program in the form of the air quality sub-plan was developed as part of the OEMP (PB, 2009) and provided to Delta to determine the minimum monitoring requirements for air quality following receipt of approval from the DP&amp;I.</p> <p>Dust monitoring results are recorded monthly with colour and textural observations. These results indicate that KVAR is managed effectively for ash dust and as such is in compliance with CoAs 2.33 and 3.8.</p>
<b>Compliance Assessment Finding - Compliant</b>

**Compliance Monitoring and Tracking**

<b>Minister's Condition of Approval 4.1</b>
<p><i>Prior to each of the events listed below, the Proponent shall certify in writing to the satisfaction of the Director-General that it has complied with all conditions of this approval applicable prior to that event:</i></p> <ul style="list-style-type: none"> <li><i>a) Commencement of any construction works on the land subject of this approval; and</i></li> <li><i>b) Commencement of operation of the project.</i></li> </ul>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>The DP&amp;I indicated its satisfaction that EnergyAustralia NSW had met the relevant pre-operational requirements of this project before commencement in 2009. This included submission of a Pre-Operation Compliance Report, Compliance Tracking Program, and the Operation Environmental Management Plan.</p>
<b>Compliance Assessment Finding - Compliant</b>

**Minister's Condition of Approval 4.2**

*The Proponent shall develop and implement a Compliance Tracking Program for the project, prior to commencing operations, to track compliance with the requirements of this approval and shall include, but not necessarily be limited to:*

- a) Provisions for periodic review of the compliance status of the project against the requirements of this approval and the Statement of Commitments detailed in the document referred to in condition 1.1c) of this approval;*
- b) Provisions for periodic reporting of the compliance status to the Director-General;*
- c) A program for independent environmental auditing in accordance with AS/NZ ISO 19011:2003 – Guidelines for Quality and/or Environmental Management Systems Auditing;*
- d) Procedures for rectifying any non-compliance identified during environmental auditing or review of compliance;*
- e) Mechanisms for recording environmental incidents and actions taken in response to those incidents;*
- f) Provisions for reporting environmental incidents to the Director-General during construction and operation; and*
- g) Provisions for ensuring all employees, contractors and sub-contractors are aware of, and comply with, the conditions of this approval relevant to their respective activities.*

*The Compliance Tracking Program shall be implemented prior to operation of the project with a copy submitted to the Director-General for approval within four weeks of commencement of the project, unless otherwise agreed by the Director-General.*

**Compliance Assessment Observations and Comments**

Environmental incidents that may occur in respect to KVAR Stage 2 operations are reported in accordance with the Operation Environmental Management Plan (Parsons Brinckerhoff, 2008b) and are captured within Delta's Environmental Management System. Annual reporting requirements are covered by the preparation of the AEMR.

Sections of the Minister approved OEMP that relate to this Condition include:

- Section 3.8 Environmental Audits (CoA 4.2c);
- Section 3.8 Environmental Audits and Section 3.8.1 Non-Compliances (CoA 4.2d);
- Section 3.9 Environmental Incidents Management (CoA 4.2e);
- Section 3.9 Environmental Incidents Management (CoA4.2f); and
- Section 3.5 Environmental Awareness Training and Site Inductions (4.2g).

Lend Lease have included the directive in the Repository Site Management Plan (Conneq, 2010) that formal site management processes be documented monthly and weekly in line with the OEMP and the Repository Management Plan. The Monthly Client Service Reports are used as a method for recording any incidences.

**Compliance Assessment Finding - Compliant**

Report Title: KVAR Stage 2 Annual Environmental Management Report 2013-2014

Objective ID: A705818

Minister's Condition of Approval 4.3 and 4.4
<p><b>CoA 4.3 – Nothing in this approval restricts the Proponent from utilising any existing compliance tracking programs administered by the Proponent to satisfy the requirements of condition 4.2. In doing so, the Proponent must demonstrate to the Director-General how these systems address the requirements and/or have been amended to comply with the requirements of the condition.</b></p> <p><b>CoA 4.4 – The Proponent shall meet the requirements of the Director-General in respect of the implementation of any measure necessary to ensure compliance with the conditions of this approval, and general consistency with the documents listed under condition 1.1 of this approval.</b></p>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>This project has a Minister approved OEMP (April, 2009), and operates under EnergyAustralia NSW's ISO14001 accreditation and Environmental Management System. The Director-General has not issued any requests to implement any additional measure to ensure compliance with the relevant CoAs for the KVAR Stage 2 project.</p>
<p><b>Compliance Assessment Finding - Not applicable</b></p>

## Community Information and Complaints Management

### Provision of Information

Minister's Conditions of Approval 5.1 and 5.2
<p><i>Prior to the commencement of the project, the Proponent shall establish and maintain a website for the provision of electronic information associated with the project. The Proponent shall, subject to confidentiality, publish and maintain up-to-date information on this website or dedicated pages including, but not necessarily limited to:</i></p> <ul style="list-style-type: none"> <li><i>a) The documents referred to under condition 1.1 of this approval;</i></li> <li><i>b) This project approval, Environment Protection Licence and any other relevant environmental approval, licence or permit required and obtained in relation to the project;</i></li> <li><i>c) All strategies, plans and program required under this project approval, or details of where this information can be viewed;</i></li> <li><i>d) Information on construction and operational progress;</i></li> <li><i>e) The outcomes of compliance tracking in accordance with the requirements of this project approval.</i></li> </ul> <p><b>5.2 – The Proponent shall make all documents required to be provided under condition 5.1 of this approval publicly available.</b></p>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>A link to the relevant web page for KVAR Stage 2 operational information is below.</p> <p><a href="http://www.energyaustralia.com.au/about-us/what-we-do/projects/mt-piper-and-wallerawang">http://www.energyaustralia.com.au/about-us/what-we-do/projects/mt-piper-and-wallerawang</a></p> <p>A link to the DP&amp;I project page is included on the website where the following documents can be accessed:</p> <ul style="list-style-type: none"> <li>• Major Project Application 07_0005</li> <li>• Kerosene Vale – Stage 2 Ash Repository Area (two volumes) – Environmental Assessment prepared by Parsons Brinckerhoff and dated 1 April 2008.</li> <li>• Kerosene Vale – Stage 2 Ash Repository Area – Submissions Report prepared by Parsons Brinckerhoff and dated 30 May 2008.</li> <li>• Project Approval (Conditions of Approval) File S07/00001, dated 26 November 2008.</li> </ul>
<b>Compliance Assessment Finding - Compliant</b>

### Complaints and enquiries procedure

Minister's Condition of Approval 5.3
<p><i>Prior to the commencement of the project, the Proponent shall ensure that the following are available for community complaints and enquiries during construction and operation:</i></p> <ul style="list-style-type: none"> <li><i>a) A 24 hour contact number(s) on which complaints and enquiries about construction and operational activities may be registered;</i></li> <li><i>b) A postal address to which written complaints and enquiries may be sent; and</i></li> <li><i>c) An email address to which electronic complaints and enquiries may be sent; and</i></li> <li><i>d) An email address to which electronic complaints and enquiries may be transmitted.</i></li> </ul> <p><i>The telephone number, postal address and email address shall be published in a newspaper circulating in the local area prior to the commencement of the project. The above details shall also be provided on the website required by condition 5.1 of this approval.</i></p>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>The website:  <a href="http://www.energyaustralia.com.au/about-us/what-we-do/generation-assets/wallerawang-mtpiper-power-station">http://www.energyaustralia.com.au/about-us/what-we-do/generation-assets/wallerawang-mtpiper-power-station</a>  lists the following contact details for the project:  24 hour contact number - call Wallerawang Power Station on 02 6352 8611  Postal address:  Western Environment Manager  EnergyAustralia NSW  Locked Bag 1Portland NSW 2847  Electronic complaints contact details – Online enquiry form</p>
<b>Compliance Assessment Finding - Compliant</b>

### Minister's Condition of Approval 5.4

Report Title: KVAR Stage 2 Annual Environmental Management Report 2013-2014  
Objective ID: A705818

***The Proponent shall record the details of all complaints received through the means listed under condition 5.3 of this approval in an up-to-date Complaints Register. The Register shall record, but not necessarily be limited to:***

- a) The date and time of the complaint;***
- b) The means by which the complaint was made (e.g. telephone, email, mail, in person);***
- c) Any personal details of the complainant that were provided, or if no details were provided a note to that effect;***
- d) The nature of the complaint;***
- e) The time taken to respond to the complaint;***
- f) Any investigations and actions taken by the Proponent in relation to the complainant; and***
- g) If no action was taken by the Proponent in relation to the complaint, the reason(s) why no action was taken.***

***The Complaints Register shall be made available for inspection by the Director-General upon request.***

#### ***Compliance Assessment Observations and Comments***

Any complaints called in to EnergyAustralia NSW go via the switchboard (02 6352 8611) and are then redirected to the appropriate area of EnergyAustralia NSW operations.

All complaints are recorded in the Ellipse system in the Incidents and Complaints Register with all details captured including actions to be taken if necessary.

If actions were necessary, a review of those actions is undertaken before the work order is closed.

No complaints were received regarding KVAR for the reporting period.

**Compliance Assessment Finding - Compliant**



## Environmental Management

### Environmental representative

Minister's Condition of Approval 6.1
<p><b><i>Prior to the commencement of any construction or operational activities, or as otherwise agreed by the Director-General, the Proponent shall nominate for the approval of the Director-General a suitably qualified and experienced Environmental Representative(s) independent of the design, construction and operation personnel. The Proponent shall engage the Environmental Representative(s) during any construction activities, and throughout the life of the project, or as otherwise agreed by the Director-General. The Environmental Representative(s) shall:</i></b></p> <ul style="list-style-type: none"> <li><b><i>a) Oversee the implementation of all environmental management plans and monitoring programs required under this approval, and advise the Proponent upon the achievements of these plans/programs;</i></b></li> <li><b><i>b) Have responsibility for considering and advising the Proponent on matters specified in the conditions of this approval and the Statement of Commitments as referred to under condition 1.1c) of this approval;</i></b></li> <li><b><i>c) Oversee the implementation of the environmental auditing of the project in accordance with the requirements of condition 4.2 of this approval and all relevant project Environmental Management System(s); and</i></b></li> <li><b><i>d) Be given the authority and independence to recommend to the Proponent reasonable steps to be taken to avoid or minimise unintended or adverse environmental impacts, and, failing the effectiveness of such steps, to recommend to the Proponent that relevant activities are to be ceased as soon as reasonably practicable if there is a significant risk that an adverse impact on the environment will be likely to occur.</i></b></li> </ul>
<p><b><i>Compliance Assessment Observations and Comments</i></b></p> <p>In March 2009 EnergyAustralia NSW nominated the Environment Manager- Western Nino Di Falco as the Environmental Representative. The Environment Manager oversees the implementation of all operations at KVAR through attendance at Monthly Client Meetings with Lend Lease and regular liaison with the External Plant Manager. The Environment Manager guides the project through site visits, sampling and other regulatory activities to ensure compliance with the environmental requirements of the CoAs and all relevant licences.</p>
<b>Compliance Assessment Finding - Compliant</b>

## Construction environmental management

### Minister's Conditions of Approval 6.2 and 6.3

**6.2 – Prior to the commencement of construction work, the Proponent shall prepare and implement a Construction Environmental Management Plan (CEMP). The CEMP shall outline the environmental management practices and procedures to be followed during construction. The CEMP shall be prepared in accordance with Guideline for the Preparation of Environmental Management Plans (DIPNR, 2004).**

**The Construction Environmental Management Plan for the project (or any stage of the project) shall be submitted to the Director General for approval at least four weeks prior to the commencement of any construction work associated with the project (or stage as relevant), unless otherwise agreed by the Director-General. Construction shall not commence until written approval has been received from the Director-General.**

**6.3 – As part of the Construction Environmental Management Plan for the project, the Proponent shall prepare and implement the following plans:**

- a) A Construction Traffic Management Plan, prepared in consultation with the RTA, the relevant Council and emergency services to manage the construction traffic impacts of the project, including but not limited to:**
  - i. Identifying construction vehicle volumes (construction staff vehicles, heavy vehicles and oversized loads) and haulage routes;**
  - ii. Identifying any road closures and/or traffic detours during the haulage of oversized loads as agreed to by the relevant roads authority;**
  - iii. Detailing a Construction Vehicle Code of Conduct to set driver behaviour controls to minimise impacts on the land uses along haulage routes (including noise minimisation measures); and**
  - iv. Complying with the document Procedures for Use in the Preparation of a Traffic Management Plan (RTA, 2011).**
- b) A Construction Noise Management Plan to detail how construction noise impacts would be minimised and managed. The Strategy shall be developed in consultation with, and to the satisfaction of, the DECC and shall include, but not necessarily be limited to:**
  - i. Details of construction activities and an indicative schedule for construction works;**
  - ii. Identification of construction activities that have the potential to generate noise impacts on sensitive receivers;**
  - iii. Procedures for assessing noise levels at sensitive receivers and compliance;**
  - iv. Details of the reasonable and feasible actions and measures to be implemented to minimise noise impacts and, if any noise exceedence is detected, how any non-compliance would be rectified; and**
  - v. Procedures for notifying sensitive receivers of construction activities that are likely to affect their noise amenity.**
- c) An Erosion and Sediment Control Plan to detail measures to minimise erosion and the discharge of sediment and other pollutants to land and/or water during construction works. The Plan must include, but not necessarily be limited to:**
  - i. Identification of the construction activities that could cause soil erosion or discharge sediment or water pollutants from the site;**
  - ii. A description of the management methods to minimise soil erosion or discharge of sediment or water pollutants from the site, including a strategy to minimise the area of bare surfaces, stabilise disturbed areas, and minimise bank erosion; and**

**Demonstration that the proposed erosion and sediment control measures will conform with, or exceed, the relevant requirements of Managing Urban Stormwater: Soils and Construction (Landcom, 2004).**

**Compliance Assessment Observations and Comments**

A Construction Environmental Management Plan for KVAR Stage 2B was developed in consultation with EnergyAustralia NSW's Western Environment Section and approved by the DP&I in August 2011.

**Compliance Assessment Finding - Compliant**

**Operational environmental management**

**Minister's Conditions of Approval 6.4 and 6.5**

**6.4 – The Proponent shall prepare and implement an Operation Environmental Management Plan to detail an environmental management framework, practices and procedures to be followed during operation of the project. The Plan shall be consistent with Guideline for the Preparation of Environmental Management Plans (DIPNR, 2004) and shall include, but not be limited to:**

- a) Identification of all statutory and other obligations that the Proponent is required to fulfil in relation to operation of the project, including all approvals, licences and consultations;**
- b) A description of the roles and responsibilities for all relevant employees (including contractors) involved in the operation of the project;**
- c) Overall environmental policies and principles to be applied to the operation of the project**
- d) Standards and performance measures to be applied to the project, and a means by which environmental performance can be periodically reviewed and improved, where appropriate;**
- e) Management policies to ensure that environmental performance goals are met and to comply with the conditions of this approval;**
- f) The additional plans listed under condition 6.5 of this approval; and**
- g) The environmental monitoring requirements outlined under conditions 3.3 to 3.5 inclusive and 3.8 of this approval.**

**The Plan shall be submitted for the approval of the Director-General no later than four weeks prior to the commencement of operation of the project, unless otherwise agreed by the Director-General. Operation shall not commence until written approval has been received from the Director-General.**

**Nothing in this approval precludes the Proponent from incorporating the requirements of the Operational Environmental Management Plan into existing environmental management systems and plan administered by the Proponent.**

**6.5 – As part of the Operation Environmental Management Plan for the project, required under condition 6.4 of this approval, the Proponent shall prepare and implement the following Management Plans:**

- a) An Operational Noise Management Plan to detail measures to mitigate and manage noise during operation of the project. The Plan shall be prepared in consultation with, and to the satisfaction of, the DECC and include, but not necessarily be limited to:**

- i. Procedures to ensure that all reasonable and feasible noise mitigation measures are applied during operation of the project;*
  - ii. Identification of all relevant sensitive receivers and the applicable criteria at those receivers commensurate with the noise limit specified under condition 2.15 of this approval;*
  - iii. Identification of activities that will be carried out in relation to the project and the associated noise sources;*
  - iv. Noise monitoring procedures (as referred to in condition 3.3 of this approval) for periodic assessment of noise impacts at the relevant receivers against the noise limits specified under this approval and the predicted noise levels as detailed in the report referred to under condition 1.1b) of this approval;*
  - v. Details of all management methods and procedures that will be implemented to control individual and overall noise emissions from the site during operation;*
  - vi. Procedures and corrective actions to be undertaken if non-compliance against the operational noise criteria is detected; and*
  - vii. Provisions for periodic reporting of results to DECC.*
- b) A Groundwater Management Plan to detail measures to mitigate and manage groundwater impacts. The Plan shall be prepared in consultation with, and to the satisfaction of, the SCA and include, but not necessarily be limited to:**
- i. Baseline data on groundwater quality, depth and flow in the project area;*
  - ii. Groundwater objectives and impact assessment criteria;*
  - iii. A program to monitor groundwater flows and groundwater quality in the project area as required by condition 3.4 of this approval;*
  - iv. A protocol for the investigation of identified exceedences of the groundwater impact assessment criteria;*
  - v. A response plan to address potential exceedences and groundwater impacts; and*
  - vi. Provisions for periodic reporting of results to the SCA.*
- c) A Surface Water Management Plan to outline measures that will be employed to manage water on the site, to minimise soil erosion and the discharge of sediments and other pollutants to land and/or waters throughout the life of the project. The Plan shall be based on best environmental practice and shall be prepared in consultation with, and to the satisfaction of, the SCA and DPI (Fisheries). The Plan shall include, but not necessarily be limited to:**
- i. Baseline data on the water quality and flow in Sawyers Swamp Creek up to the date of this approval;*
  - ii. Water quality objectives and impact assessment criteria for Sawyers Swamp Creek;*
  - iii. A program to monitor surface water quality in Sawyers Swamp Creek as referred to in condition 3.5 of this approval;*
  - iv. A protocol for the investigation of identified exceedences in the impact assessment criteria;*
  - v. A response plan to address potential adverse surface water quality exceedences;*
  - vi. A site water management strategy identifying clean and dirty water areas for Stage A, B and C of the project and the associated water management measures including erosion and sediment controls and provisions for recycling/reuse of water and the procedures for decommissioning water management structures on the site; and*

- vii. Provisions for periodic reporting of results to the DPI (Fisheries) and the SCA.**
- d) An Air Quality Management Plan to outline measures to minimise impacts from the project on local air quality. The Plan shall be prepared in consultation with, and to the satisfaction of, the DECC and include, but not necessarily be limited to:**
- i. Baseline data on dust deposition levels;**
  - ii. Air quality objectives and impact assessment criteria;**
  - iii. An air quality monitoring program as referred to in condition 3.8 of this approval;**
  - iv. An assessment of alternative methods of ash placement to minimise the exposure of active placement areas to prevailing winds;**
  - v. Mitigation measures to be incorporated during emplacement activities and haulage of ash;**
  - vi. An operating protocol for the repository irrigation system including activation rates, application rates and area of coverage;**
  - vii. A protocol for the investigation of visible emissions from the repository area;**
  - viii. A response plan to address visible emissions from the repository area; and**
  - ix. Provisions for periodic reporting of results to the DECC.**
- e) A Landscape/Revegetation Plan to outline measures to minimise the visual impacts of the repository and ensure the long-term stabilisation of the site and compatibility with the surrounding land fabric and land use. The Plan shall include, but not necessarily be limited to:**
- i. Identification of design objectives and standards based on local environmental values, vistas, and land uses;**
  - ii. A description of short- and long-term revegetation measures;**
  - iii. A schedule of species to be used in revegetation;**
  - iv. Timing and progressive implementation of revegetation works as placement areas are completed, including landscape plans; and**
  - v. Procedures and methods to monitor and maintain revegetated areas during the establishment phase and long-term.**
- Revegetation works must incorporate the use of local native species.**

#### **Compliance Assessment Observations and Comments**

The Operation Environmental Management Plan was prepared by Parsons Brinckerhoff. Approval was granted in April 2009 and operations at KVAR Stage 2 commenced in September 2009.

**Compliance Assessment Finding - Compliant**

## Environmental Reporting

### Environmental incident reporting

<b>Minister's Conditions of Approval 7.1 and 7.2</b>
<i><b>7.1 – The Proponent shall notify the Director-General of any environmental incident within 12 hours of becoming aware of the incident. The Proponent shall provide full written details of the incident to the Director-General within seven days of the date on which the incident occurred.</b></i>
<i><b>7.2 – The Proponent shall meet the requirements of the Director-General to address the cause or impact of any environmental incident, as it related to this approval, reported in accordance with condition 7.1 of this approval, within such period as the Director-General may require.</b></i>
<b>Compliance Assessment Observations and Comments</b>
No environmental incidents requiring notification of the Director-General occurred within the April 2013- March 2014 reporting period
<b>Compliance Assessment Finding - Not applicable</b>



## Annual performance reporting

Minister's Condition of Approval 7.3
<p><i>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 6.4 of this approval) and the conditions of this approval. The AEMR shall include, but not necessarily be limited to:</i></p> <ul style="list-style-type: none"> <li><i>a) Details of compliance with the conditions of this approval;</i></li> <li><i>b) A copy of the Complaints Register (refer to 5.4 of this approval) for the preceding twelve-month period (exclusive of personal details), and details of how these complaints were addressed and resolved;</i></li> <li><i>c) 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;</i></li> <li><i>d) Results of all environmental monitoring required under conditions 3.3 to 3.8 of this approval, including interpretations and discussion by a suitably qualified person; and</i></li> <li><i>e) A list of all occasions in the preceding twelve-month period when environmental goals/objectives/impact assessment criteria for the project have not been achieved, indicating the reason for failure to meet the criteria and the action taken to prevent recurrence of that type of failure.</i></li> </ul> <p><i>The Proponent shall submit a copy of the AEMR to the Director-General every year, with the first AEMR to be submitted no later than twelve months after the commencement of operation of the project. The Director-General may require the Proponent to address certain matters in relation to the environmental performance of the project in response to review of the Annual Environmental Report. Any action required to be undertaken shall be completed within such period as the Director-General may require. The Proponent shall make copies of each AEMR available for public inspection on request.</i></p>
<p><b>Compliance Assessment Observations and Comments</b></p> <p>This AEMR satisfies the requirements of CoA 7.3.</p>
<p><b>Compliance Assessment Finding - Compliant</b></p>

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## **Appendix B**

### **OEMP – Table 4-1: Licences, permits and approvals required for the Project**

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Relevant Authority	Source of requirement	Responsibility for obtaining licence/approval /permit	Trigger	Information required	Additional Comments	Approval obtained / Date
NSW Department of Planning (DoP)	Condition of Approval 6.2	EnergyAustralia NSW	Need to construct stabilisation structure on northern embankment and re-alignment of Sawyers Swamp Creek	Prepare a Construction Environment Management Plan (CEMP) CEMP to contain framework outlining construction activities, potential environmental impacts and mitigation measures and procedures.	To be submitted 4 weeks prior to commencement of construction.	Refer to Appendix A
	Condition of Approval 2.26	EnergyAustralia NSW	Need to realign Sawyers Swamp Creek	Prepare the Sawyers Swamp Creek Re-alignment Rehabilitation Plan	To be submitted 2 months prior to the realignment of Sawyers Swamp Creek	Realignment of Sawyers Swamp Creek deemed unnecessary. Not applicable
	Condition of Approval 4.1	EnergyAustralia NSW	Need to comply with Conditions of Approval applicable to commencement of Stage 2 operation	Submit written certification outlining compliance with Conditions of Approval relating to Stage 2 operation commencement.	To be submitted prior to the commencement of operations of Stage 2 works	Refer to Appendix A
	Condition of Approval 4.2	EnergyAustralia NSW	Need to comply with Conditions of Approval throughout Stage 2 operation	Develop Compliance Tracking Program to track compliance with Conditions of Approval relating to Stage 2 operation	To be implemented prior to Stage 2 operations, and submitted for approval within 4 weeks of commencement of Stage 2 works	Refer to Appendix A

Relevant Authority	Source of requirement	Responsibility for obtaining licence/approval /permit	Trigger	Information required	Additional Comments	Approval obtained / Date
	Condition of Approval 6.1	EnergyAustralia NSW	Need to nominate a suitable Environmental Representative	Candidate profile to be provided to Director-General to aid in approval process	ER details to be submitted prior to commencement of Stage 2 works	Refer to Appendix A
	Condition of Approval 7.3	EnergyAustralia NSW	Need to regularly report on environmental performance of project	Submit Annual Environment Management Report, reviewing against OEMP and Conditions of Approval	To be submitted no later than 12 months after commencement of operations, and each year thereafter	Refer to Appendix A
Department of Primary Industries (Fisheries)	Condition of Approval 3.6	EnergyAustralia NSW	Need to realign Sawyers Swamp Creek	Prepare Sawyers Swamp Creek Realignment Hydrological Monitoring Program  Program must include sampling before and after realignment works, with monitoring continuing 5 years post-realignment	To be submitted 2 months prior to the realignment of Sawyers Swamp Creek	Realignment of Sawyers Swamp Creek deemed unnecessary. Not applicable

Relevant Authority	Source of requirement	Responsibility for obtaining licence/approval /permit	Trigger	Information required	Additional Comments	Approval obtained / Date
	Condition of Approval 3.7	EnergyAustralia NSW	Need to realign Sawyers Swamp Creek	Sawyers Swamp Creek Ecological Monitoring Program Program must include sampling and assessment of ecological health before and after realignment works, with monitoring continuing 5 years after final planting.	To be submitted 2 months prior to the realignment of Sawyers Swamp Creek	Realignment of Sawyers Swamp Creek deemed unnecessary. Not applicable
NSW Office of Water (formerly NSW Department of Water and Energy)	Part 5 of the Water Act (1912)	EnergyAustralia NSW	Need to construct groundwater monitoring bores	Application for licence to construct groundwater bore	Licence to be attained prior to construction	Bore licences obtained as required.

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## Appendix C

### OEMP – Table 4-2: Relevant Legislation, Guidelines and Standards

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Relevant Legislation (Administering Authority)	Summary of legislation requirements	General requirements
Australian Standard AS4282 1997 – Control of the Obtrusive Effects of Outdoor Lighting	Deals primarily with obtrusive lighting within residential and urban areas, where a measurement of light on residential windows is considered, but has few references to requirements or locations of illuminated signs in rural areas.	Take all reasonable and practical measures to ensure lighting associated with operation of Stage 2 complies with the AS4282. (Refer to CoA 2.35 in Appendix A)
<i>Environmental Planning and Assessment Act, 1979</i>  (Department of Planning)	Establishes a framework to control development in NSW by prohibiting, permitting, or placing conditions on activities. The legislation also details the process by which approval can be gained, and the relevant authority.	Changes to the Project as currently approved and described in the Environmental Assessment, Submissions Report and the OEMP may require an amendment to the existing Project Approval under Section 75W of the EP&A Act.
<i>Local Government Act, 1993</i>  (Lithgow City Council)	Controls environmental impacts including noise, pollution and nuisance not controlled under the POEO Act.  Provides for infrastructure under the control of council, and identifies requirements for developers.	No requirement for permits, licences or approvals have been identified for the Project. However, the Project area is situated within the Greater Lithgow area.
<i>Mine Subsidence Compensation Act, 1961</i>  (Mine Subsidence Board)	Provides for payment of compensation for damage to properties and structures resulting from subsidence following coal or shale mining.  Works within designated areas must comply with the requirements to ensure they are covered by the scheme.	At the moment, the provisions of this Act do not apply to the operation of the repository.  The potential future mining of an area of the Stage 2 repository may invoke certain provisions of the Act.  To be determined during the approval process associated with the proposed mining activities at the repository site.
<i>Contaminated Land Management Act, 1997</i>  (Department of Environment and Climate Change)	Establishes a process for investigating and where appropriate remediating land where contamination presents a significant risk of harm to the environment.	Environment Protection Licence 766 allows for the placement of certain types of wastes at the repository site.  The repository site would be considered 'contaminated land' under the provisions of this Act.

Relevant Legislation (Administering Authority)	Summary of legislation requirements	General requirements
<i>Drinking Water Catchments Regional Environmental Plan No. 1</i> (Sydney Catchment Authority)	This plan was prepared in accordance with Part 3 of the EP&A Act and the <i>Sydney Water Catchment Management Act 1998</i> . The plan was made to secure the environmental, social and economic future of the catchments that supply drinking water to Sydney, the Blue Mountains and the Illawarra. The plan aims to sustain these catchments so as to create healthy water catchments, improve water quality in degraded areas, and maintain or improve water quality where it is currently suitable.	The Stage 2 operation requires the realignment of a section of Sawyers Swamp Creek, which feeds into the Coffs River, and is part of the Drinking Water Catchment.  The Environmental Assessment indicated that the water quality as defined by the Drinking Water Catchments Regional Environmental Plan No. 1 would be adequately managed under certain conditions. These conditions are outlined in the Surface and Groundwater Sub-plans of the OEMP.
<i>Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-liquid Wastes, 1999</i>	These guidelines aid in the classification, assessment, storage and management of liquid and non-liquid wastes should there be any.	The guidelines are relevant to the Stage 2 operations and have been referenced within the Waste Management Sub-plan (OEMP Section 6.9).
<i>Environmental Hazardous Chemicals Act, 1985</i> (Department of Environment and Climate Change)	Regulates the disposal of wastes issued with a “chemical control order” and designates chemical wastes.  Disposal requirements for designated hazardous waste are identified under the POEO Act.  Chemical wastes designated under this Act include: <ul style="list-style-type: none"> <li>• PCB</li> <li>• Pesticide wastes including used pesticide containers</li> <li>• Copper/chrome/arsenic (CCA) wastes.</li> </ul>	No environmentally hazardous chemicals are to be placed at the Stage 2 repository.  These types of wastes are not permitted under EPL 766.  No requirement for permits, licenses or approvals have been identified for the Project.
<i>Environment Protection and Biodiversity Conservation Act, 1999</i> (Commonwealth Department of Environment and Water Resources)	The Act is triggered by developments that will have a significant impact on Matters of National Environmental Significance including Endangered Ecological Communities, threatened species and migratory species.	No requirement for permits, licenses or approvals have been identified for the Project
<i>Heritage Act, 1977</i> (Heritage Office)	Protects all items of environmental heritage (natural and cultural) in New South Wales. The Act does not apply to Aboriginal “relics”. Applies if any heritage items are identified during operation works.	No requirement for permits, licenses or approvals have been identified for the Project

Relevant Legislation (Administering Authority)	Summary of legislation requirements	General requirements
NSW Industrial Noise Policy 2000 (Department of Environment and Climate Change)	This Policy is set in place to establish noise criteria that would protect the community from excessive intrusive noise and preserve amenity for specific land uses.	The Policy is applicable to the operation of the Project and has been incorporated into the Noise Management Sub-plan (OEMP Section 6.4).
<i>Noxious Weeds Act, 1993</i> (Department of Primary Industries – Agriculture)	Provides for the identification, classification and control of noxious weeds in NSW.  Applies to the management and disposal of noxious weeds if found and removed during the works.	No requirements for permits, licenses or approvals have been identified for the Project.
<i>National Parks and Wildlife Act, 1974</i> (Department of Environment and Climate Change)	Provides protection for most fauna species and protected flora, as well as indigenous heritage, in New South Wales.  It is an offence to harm any animal which is part of a threatened species, population or ecological community; and/or to pick any plant which is part of a threatened species, population or ecological community.  It is also an offence if a person knows that an area of land is the habitat of a threatened species, population or ecological community, to do something or fail to do something, resulting in damage to that habitat.  It is an offence to knowingly destroy, deface or damage, or cause or permit the destruction or defacement or damage to, an Aboriginal object or Aboriginal place without a permit.	No requirement for permits, licenses or approvals have been identified for the Project.  If previously unidentified indigenous heritage items or places are discovered on site, permits may be required.
<i>Soil Conservation Act, 1938</i> (Department of Environment and Climate Change)	Controls activities causing or likely to cause soil erosion or land degradation.  Projects activities must prevent soil erosion or land degradation.	No requirement for permits, licences or approvals have been identified for the project.
<i>Water Act, 1912</i> (Department of Water and Energy)	Regulates the influence of impacts on waterways, outlining control and remedial measures (i.e. groundwater wells), licensing and offences.	No requirement for permits, licenses or approvals have been identified for the Project.

Relevant Legislation (Administering Authority)	Summary of legislation requirements	General requirements
<i>Threatened Species Conservation Act, 1995</i>  (Department of Environment and Climate Change)	This Act protects vulnerable and threatened species, populations and ecological communities	No threatened species, populations or communities were recorded within the site.  No requirement for permits, licenses or approvals have been identified for the Project.
<i>Protection of the Environment Operations Act, 1997</i>  (Department of Environment and Climate Change)	This Act controls how activities should be undertaken in consideration of environmental protection on all aspects, including air, water, soil, and noise pollution, as well as waste.  Scheduled activities are required to obtain a licence to operate from the DECC.	The provisions of EPL 766 apply to the operation of the Project.
<i>Waste Avoidance and Resource Recovery Act, 2001</i>  (Department of Environment and Climate Change)	Promotes the waste management hierarchy (avoidance, resource recovery, and disposal).	The provisions of this Act do not apply to the Project.
<i>Water Management Act. 2000</i> (Department	Controls water use for activities and in areas of NSW>	The Provisions of this Act do not apply to the Project.

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## Appendix D

### Environmental Monitoring Program

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Potential impact	Locations	Parameters	Frequency	Technique	Reporting	Responsibility	OEMP Sub-plan Reference
Noise – Initial 60 day reporting period	4 main locations adopted for a total of 5 monitoring sites: • Skelly Road • Maddox Lane • Neubeck Street • Wolgan Road. (Refer to Figure 5-1)	$L_{Aeq}$ , $L_{A10}$ , $L_{A90}$ and $L_{Amax}$	4 separate days - 3 weekdays and a Sunday	Attended monitoring using hand held sound level meter  Monitoring to be continuous throughout full day of operations for each 15 minute period, including 30 mins prior to and following normal operating hours (7am to 10pm).  Nearest potentially affected receiver to be monitored at 07.00 and at least once between 20.30 – 22.30.	Report to be submitted to DECC within 1 week of monitoring	Specialist consultant on behalf of Delta Electricity	Section 6.5 Operational Noise and Vibration Management Plan – Appendix A
Noise - Normal conditions	Minimum of 3 most affected locations as per the 60 day post commissioning assessment. To include periods of ash placement at far western area of the site and where noise mitigation measures are in place. (as per COA 2.15) (Refer to Figure 5-1)	Noise levels shall not exceed an $L_{Aeq}$ of 40dB(A) at the nearest most affected receiver	During daytime (7am-6pm) and evening time (6pm-10am) Every 6 months or more frequent if adverse trends are noted	Ongoing attended monitoring using hand held sound level meter.	6 monthly noise monitoring report If non-compliance, report is to be forwarded to DoP and DECC within 14-days of conducting monitoring	Specialist consultant on behalf of Delta Electricity	Section 6.5 Operational Noise and Vibration Management Plan – Appendix A
Noise - Emergency conditions	At the complainant's property or nearest available representative location.	Noise levels shall not exceed an $L_{Aeq}$ of 40dB(A) at the nearest most affected receiver	As required	Attended monitoring using hand held sound level meter	6 monthly noise monitoring report	Specialist consultant on behalf of Delta Electricity	Section 6.5 Operational Noise and Vibration Management Plan – Appendix A



Potential impact	Locations	Parameters	Frequency	Technique	Reporting	Responsibility	OEMP Sub-plan Reference
Dust impacts	5 existing dust monitoring locations as per Figure 6.5 2 additional dust monitoring locations as determined by specialist consultant and Delta Electricity (subject to landowner approval) (Refer to Figure 6.5)	Total dust deposition of 4 g/m <sup>2</sup> /month (annual)	Monthly for first year to establish baseline and every 3 months thereafter	Dust deposition gauges	Quarterly air quality monitoring report	NATA approved specialists on behalf of Delta Electricity	Section 6.7
Groundwater quality	3 bores upstream and 6 downstream of repository (Refer to Figure 6.4)	Analytical suite as per Appendix C, water depth and flow direction, and baseline data	Monthly for first year to establish baseline and every 3 months thereafter	Sample collection from the 9 monitoring locations as per procedures outlined in the Groundwater Quality Sub-plan	Quarterly groundwater monitoring report	NATA approved specialists on behalf of Delta Electricity	Section 6.6
		After 12 months of satisfactory results, inclusion of low detection limit analysis for trace metals and key salinity indicators	Every 3 months after the first 12 months	Sample collection from the 9 monitoring locations as per procedures outlined in the Groundwater Quality Sub-plan (Refer Section 6.6)	Quarterly groundwater monitoring report	NATA approved specialists on behalf of Delta Electricity	
Surface water quality	2 in Sawyers Swamp Creek, 1 in Dump Creek, and 1 in Sawyers Swamp Creek Ash Dam (Refer to Figure 6.3)	Analytical suite as per Appendix C, plus dissolved oxygen, turbidity, total phosphorus,	Monthly for first year to establish baseline and every 3 months thereafter	Sample collection from the 4 monitoring locations as per procedures outlined in the Surface Water Management Sub-plan	Quarterly surface water monitoring report	NATA approved specialists on behalf of Delta Electricity	Section 6.5

Potential impact	Locations	Parameters	Frequency	Technique	Reporting	Responsibility	OEMP Sub-plan Reference
		nitrogen and baseline data.	Following wet weather events, with a minimum of 2 events recorded within the first 12 months of operation	Sample collection from the 4 monitoring locations as per procedures outlined in the Surface Water Management Sub-plan	Quarterly surface water monitoring report	NATA approved specialists on behalf of Delta Electricity	Section 6.5

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## Appendix E

### Current water sampling points

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**Current water sampling points surface water monitoring KVAR 2010 - 2014**

Site #	Nalco site ID	Reported origin	Aspect	Sample ID	Note	Easting	Northing
2	Lend Lease	Clean Water Runoff & Holding Pond	North Pond	CW Pond Runoff 2	Monthly	230112	6302059
3	88	Surface Water Runoff Collection	Internal ash surface runoff	SW Pond 1	Monthly		
4	87	West KVAD Wall subsurface	Groundwater through-flow	WX 50 Outflow	Monthly	229661	6302244
5	Lend Lease	Clean Water Collection near compound	Clean Water Runoff Pond 1	Clean Water Runoff-1	Monthly	229396	6301834
6	Lend Lease	KVAR North Holding Pond	Groundwater seepage, and stormwater runoff	North Holding Pond	Monthly	230225	6302106
7	38	Sawyers Swamp Creek Ash Dam	Dam water	Return Water Canal	Monthly	229765	6301461
8	79	Sawyers Swamp Creek Ash Dam	SSCAD seepage into SSC	Seepage @ V notch	Monthly	230260	6302287
9	41	Sawyers Swamp Creek Lower	Catchment Quality Comparison	SSC @ WX7	Monthly	228957	6302712
10	Lend Lease	Inflow of Sawyers Swamp Ck 0 m	Catchment Quality Comparison	SSC Upstream @ 0 m	Indicative	230386	6301545
11	Lend Lease	Sawyers Swamp Creek @ 300 m	Catchment Quality Comparison	SSC @ 300m	Monthly	230284	6301969
12	Lend Lease	Sawyers Swamp Creek @ 600 m	Catchment Quality Comparison	SSC @ 600m	Monthly	230253	6302120
13	84	Sawyers Swamp Creek @ 800 m	Catchment Quality Comparison	SSC @ 800m	Monthly	229954	6302256
14	83	Sawyers Swamp Creek @ 1250 m (nr D5)	Catchment Quality Comparison	SSC @ 1200 m	Monthly	229650	6302253
16	39	Dump Creek	Catchment Quality Comparison	DC	Monthly	229112	6302668
17	80	West KVAD Wall surface right	KVAD Toe Drain seepage	Right	Monthly	229662	6302177
18	81	West KVAD Wall s surface left	KVAD Toe Drain seepage	Left	Monthly	229688	6302194
40	40	Lidsdale Cut	Catchment Quality Comparison	LC @ WX5	Monthly	229490	6302227

**Groundwater level monitoring for KVAR 2010 - 2013**

Site #	Nalco site ID	Reported origin	Aspect	Sample ID	Note	Easting <sup>2</sup>	Northing <sup>2</sup>
8	75	Groundwater Bore GW10	KVAD West Wall	GW10 <sup>2</sup>	Toe Drains	229754	6302228
9	76	Groundwater Bore GW11	KVAD West Wall	GW11 <sup>2</sup>	Toe Drains	229612	6301994
11	78	Groundwater Bore AP17	KVAD North Wall	AP17 <sup>2</sup>	Toe Drains	229915	6302193
19	Lend Lease	South West KVAR subsurface	Groundwater through-flow	Sump 1	Monthly	229441	6301496
20	Lend Lease	East KVAD Wall subsurface	Groundwater through-flow1	Sump 2	Monthly	230218	6302032
21	32	Groundwater Bore WGM1/D1	Regional	D12	Upstream	231988.5	6301410
22	33	Groundwater Bore WGM1/D2	Regional	D22	South East	229680	6301387.7
23	34	Groundwater Bore WGM1/D3	Regional	D32	East below SCAD	230276.1	6301753.2
24	35	Groundwater Bore WGM1/D4	Regional	D42	NE corner SSC	230160.7	6302349.8
27	85	Groundwater Bore GW6	KVAD	GW62	North West at SSC	229754	6302228
31	86	North KVAD Wall subsurface	Groundwater through-flow	North Wall	Monthly	229908	6302216
32	Lend Lease	Groundwater Well APA02	KVAR Stage 2A – Level	APA02	Stage 1A KVAR	229890	6301839.4
33	Lend Lease	Groundwater Well APA09A	KVAR Stage 2A - Level	APA09A	Stage 2A above clay cap north	229849	6302125.4

Site #	Nalco site ID	Reported origin	Aspect	Sample ID	Note	Easting <sup>2</sup>	Northing <sup>2</sup>
34	Lend Lease	Groundwater Well APA09B	KVAR Stage 2A - Level	APA09B	Stage 2A KVAD north	229849.5	6302125.7
35	Lend Lease	Groundwater Well APA10	KVAR Stage 2A - Level	APA10	Stage 2A KVAD west	229694.1	6302054.4
36	36	Groundwater Bore WGM1/D5	Regional	D52	Downstream	229642.5	6302205.9
36	Lend Lease	Groundwater Well APA11	KVAR Stage 2A - Level	APAD11	Stage 2A KVAD subsurface drain	229930	6301886
37	37	Groundwater Bore WGM1/D6	Regional	D62	Up dip coal seam	229412	6302027.8
37	Lend Lease	Groundwater Well APA12	KVAR Stage 2A - Level	APAD12	Stage 2A KVAD subsurface drain	229916	6301846
38	Lend Lease	Groundwater Well APA13	KVAR Stage 2A - Level	APAD13	Stage 2A KVAD subsurface drain	229985	6301931
39	Lend Lease	Groundwater Well APA14	KVAR Stage 2A	APAD14	Stage 2A KVAD subsurface drain	230024	6301949
41	Lend Lease	Groundwater Well APA16A	KVAR Stage 2A	APAD16	Stage 2A KVAD subsurface drain	230174	6301968
42	Lend Lease	Groundwater Well APA17	KVAR Stage 2A	APAD17	Stage 2A KVAD subsurface drain	230169	6301969
43	Lend Lease	Groundwater VWP <sup>1</sup> APA08	KVAR Stage 2A	APA08	Stage 2A above clay cap	229731.2	6301943.1
44	Lend Lease	Groundwater VWP <sup>1</sup> APA07	KVAR Stage 2A	APA07	Stage 2A above clay cap	229891.3	6302057.1
45	Lend Lease	Groundwater VWP <sup>1</sup> APA06	KVAR Stage 2A	APA06	Stage 2A above clay cap	230019.4	6302054.3
46	Lend Lease	Groundwater VWP <sup>1</sup> APA04	KVAR Stage 2A	APA04	Stage 2A above clay cap	229955.8	6301987.5

Site #	Nalco site ID	Reported origin	Aspect	Sample ID	Note	Easting <sup>2</sup>	Northing <sup>2</sup>
47	Lend Lease	Groundwater BH Cent KV_MB	Regional	KV_MB1D	Upslope adjacent to SSCAD	230604.2	6301288.2
48	Lend Lease	Groundwater BH Cent KV_MB	Regional	KV_MB1S	Upslope adjacent to SSCAD	230600	6301290
49	Lend Lease	Groundwater BH Cent KV_MB	Regional	KV_MB6D	KVAR Stage 2B	229982.9	6301782.6
50	Lend Lease	Groundwater BH Cent KV_MB	Regional	KV_MB6S	KVAR Stage 2B	229986.9	6301784.6
51*	Lend Lease	Groundwater BH Cent KV_MB	Regional	KV_MB8A	Offsite comparison un-disturbed	229166.4	6301607.4
52	Lend Lease	Centre APA Stage 1 and Stage 2	KVAR Stage 2A	Sump 3	Stage 2B		
53	Lend Lease level only	Groundwater Well 01	Groundwater through-flow	2012-PVC01	KVAR Stage 1	229468.21	6301620.1
54	Lend Lease level only	Groundwater Well 02	Groundwater through-flow	2012- PVC-02	KVAR Stage 1	229612.67	6301629.2
55	Lend Lease level only	Groundwater Well 03	Groundwater through-flow	2012- PVC-03	KVAR Stage 1	229564.84	6301717.9
56	Lend Lease level only	Groundwater VWP <sup>1</sup> 04	Groundwater through-flow	2012-VWP-04	KVAR Stage 1	229708.16	6301675.2
57	Lend Lease level only	Groundwater VWP <sup>1</sup> 05	Groundwater through-flow	2012-VWP-05	KVAR Stage 1	229815.42	6301684.6
58	Lend Lease level only	Groundwater VWP <sup>1</sup> 06	Groundwater through-flow	2012-VWP-06	KVAR Stage 1	229768.96	6301784.4
59	Lend Lease level only	Groundwater VWP <sup>1</sup> 07	Groundwater through-flow	2012-VWP-07	KVAR Stage 1	229683.52	6301792.7
60	Lend Lease level only	Groundwater Well 08	Groundwater through-flow	2012- PVC-08	KVAR Stage 1	229811.22	6301829.9

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Site #	Nalco site ID	Reported origin	Aspect	Sample ID	Note	Easting <sup>2</sup>	Northing <sup>2</sup>
61	Lend Lease level only	Groundwater VWP <sup>1</sup> 09	Groundwater through-flow	2012-VWP-09	KVAR Stage 1	229851.8	6301752.8
62	Lend Lease	Groundwater Well APA15	KVAR Stage 2A	APAD15	Stage 2A KVAD subsurface drain	230159	6301948

<sup>1</sup> VWP – Vibrating Wire Piezometer – Pressure Transducer located in fly ash

<sup>2</sup> Water Quality Monitoring Results Available Groundwater KVAR Site - 2010 to 2011

\* Previously Centennial Coal bores- now sampled by EnergyAustralia NSW

Water level measured only

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## Appendix F

### Nalco Surface Water Sampling Results 2013 - 2014

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**Nalco surface water sampling results 2013 – 2014 (mg/L, unless specified otherwise)**

Site ID	Reported Origin	Sample Date	pH	Cond	Fluoride	Chloride	SO4	TDS	Turbidity	DO	Alk - M	Na	K	Ca	Mg	Total Nitrogen	Nitrite	NO3	Total Phosphorus (P)
38	Sawyers S Ck Ash Dam	10/04/2013	5.5	1500	2.4	21	691	940	0.55	9	12.5	230	35	58	15	4.2			0.005
39	Dump Creek	10/04/2013	3.1	1800	2.3	24	868	1200	13	7.4	12.5	120	33	78	76	0.85		0.5	0.07
40	Sawyers S Ck WX5	10/04/2013	8.6	1000	1.4	5	26	550	2.1	8.4	500	250	11	5.3	2.9	0.4			0.005
41	Sawyers S Ck WX7	10/04/2013	8.6	1000	1.4	5	28	550	2.2	8.2	510	230	12	5.5	3	0.4			0.005
38	Sawyers S Ck Ash Dam	16/05/2013	5.2	1500	2.3	19	730	1100	1.3	11.7	12.5	220	38	59	16	2.15			0.005
40	Sawyers S Ck WX5	16/05/2013	8.5	1000	1.3	5	26	650	22	9.5	520	240	11	5.1	2.7	0.6			0.005
39	Dump Creek	17/05/2013	3.2	1500	1.8	25	640	960	1.2	9.1	12.5	90	25	59	61	0.9		0.42	0.04
41	Sawyers S Ck WX7	17/05/2013	8.5	1000	1.3	5	27	640	5.9	10.3	510	230	11	5.7	2.9	0.55			0.005
41	Sawyers S Ck WX7	27/05/2013	8.7	1100					1.8										
41	Sawyers S Ck WX7	3/06/2013	8.7	1000					19										
41	Sawyers S Ck WX7	11/06/2013	8.6	1100					3.4										
38	Sawyers S Ck Ash Dam	13/06/2013	5.5	1500	0.05	20	740	1100	1.9	12.1	12.5	210	37	61	16	2.25			0.005
39	Dump Creek	13/06/2013	3.3	1000	1	18	420	590	6.8	11.3	12.5	58	15	39	39	0.75		0.29	0.04
40	Sawyers S Ck WX5	13/06/2013	8.6	1000	1.2	5	30	670	3.5	8.7	550	220	10	6.1	3	0.55			0.005
41	Sawyers S Ck WX7	13/06/2013	8.6	1000	1.2	6	32	680	4.2	8.9	550	240	10	6.5	3	0.55			0.005
41	Sawyers S Ck WX7	17/06/2013	8.7	1100					2.9										
41	Sawyers S Ck WX7	24/06/2013	8.7	1100					5.1										
41	Sawyers S Ck WX7	1/07/2013	8.7	1100					3.4										
41	Sawyers S Ck WX7	8/07/2013	8.7	1100					9										
38	Sawyers S Ck Ash Dam	10/07/2013	5.4	1400	2.1	20	710	1000	0.8	13.9	12.5	230	37	60	17	2.4			0.005
40	Sawyers S Ck WX5	10/07/2013	8.5	1000	1.2	5	30	620	1.7	10.9	580	260	11	5.5	3	0.55			0.005
39	Dump Creek	11/07/2013	3.3	1500	1.9	24	720	1100	0.65	13.8	12.5	110	28	69	69	0.85		0.47	0.02
41	Sawyers S Ck WX7	11/07/2013	8.6	1000	1.2	5	30	650	1.4	12.2	560	260	12	5.8	4	0.55			0.005
41	Sawyers S Ck WX7	15/07/2013	8.7	1100					3.6										

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Site ID	Reported Origin	Sample Date	pH	Cond	Fluoride	Chloride	SO4	TDS	Turbidity	DO	Alk - M	Na	K	Ca	Mg	Total Nitrogen	Nitrite	NO3	Total Phosphorus (P)
41	Sawyers S Ck WX7	22/07/2013	8.7	1100					2.5										
41	Sawyers S Ck WX7	29/07/2013	8.7	1100					2.6										
41	Sawyers S Ck WX7	5/08/2013	8.7	1100					2.2										
41	Sawyers S Ck WX7	12/08/2013	8.7	1100					4.1										
41	Sawyers S Ck WX7	19/08/2013	8.7	1100					14										
38	Sawyers S Ck Ash Dam	22/08/2013	6.8	1300	1.7	19	650	990	5.1	12	12.5	210	34	55	15	2.65	0.5	5	0.005
40	Sawyers S Ck WX5	22/08/2013	8.6	1100	0.05	5	27	640	5.7	9.5	600	240	11	5	3	0.6	0.5	2	0.005
39	Dump Creek	23/08/2013	3.2	1400	1.5	26	660	970	1	12.9	12.5	98	23	64	67	0.6	0.5	0.5	0.01
41	Sawyers S Ck WX7	23/08/2013	8.7	1100	0.05	5	27	670	4.2	9.4	600	260	11	5.2	3	0.6	0.5	2	0.005
41	Sawyers S Ck WX7	26/08/2013	8.7	1100					5.7										
41	Sawyers S Ck WX7	2/09/2013	8.6	1100					5.1										
41	Sawyers S Ck WX7	9/09/2013	8.7	1100					4.1										
41	Sawyers S Ck WX7	16/09/2013	8.6	1100					3.6										
41	Sawyers S Ck WX7	23/09/2013	8.6	1100					10										
38	Sawyers S Ck Ash Dam	26/09/2013	5.6	1400	1.9	19	720	1100	3.3	10	12.5	220	35	59	16	2.85	0.5	5	0.005
39	Dump Creek	26/09/2013	3.3	1400	1.5	27	660	1000	34	3	12.5	93	22	59	60	1.2	0.5	0.5	0.09
40	Sawyers S Ck WX5	26/09/2013	8.7	1100	0.1	5	35	770	7.5	7.9	560	260	11	5.6	3	0.65	0.5	3	0.005
41	Sawyers S Ck WX7	26/09/2013	8.7	1100	0.1	5	38	740	8.1	8.8	550	250	11	6.1	4	0.65	0.5	3	0.005
41	Sawyers S Ck WX7	30/09/2013	8.7	1100					5.2										
41	Sawyers S Ck WX7	8/10/2013	8.7	1100					9.2										
41	Sawyers S Ck WX7	14/10/2013	8.7	1100					16										
41	Sawyers S Ck WX7	21/10/2013	8.7	1200					3.3										
39	Dump Creek	23/10/2013	3.1	1700	2.1	28	810	1200	1.6	5.9	12.5	110	27	70	71	1.35	0.5	0.5	0.1
41	Sawyers S Ck WX7	23/10/2013	8.4	1200	1.2	6	40	800	2.3	5.5	590	270	11	4.9	3	0.5	0.5	2	0.005
38	Sawyers S Ck Ash Dam	24/10/2013	5.4	1600	2.2	20	800	1100	2.1	7.7	12.5	230	36	62	16	3.1	0.5	5	0.005

Site ID	Reported Origin	Sample Date	pH	Cond	Fluoride	Chloride	SO4	TDS	Turbidity	DO	Alk - M	Na	K	Ca	Mg	Total Nitrogen	Nitrite	NO3	Total Phosphorus (P)
40	Lidsdale Cut	24/10/2013	3.3	4900	38	32	3700	5300	1.6	6.6	12.5	330	270	340	120	5.6	0.5	0.5	0.01
41	Sawyers S Ck WX7	28/10/2013	8.7	1200					2.7										
41	Sawyers S Ck WX7	4/11/2013	8.7	1200					4.6										
39	Dump Creek	6/11/2013	3.2	1800	2.4	27	950	1300	18	6	12.5	130	33	81	80	2.4	0.5	0.5	0.1
41	Sawyers S Ck WX7	6/11/2013	8.6	1100	1.1	5	37	710	2.8	5.2	580	260	11	4.5	3	0.6	0.5	3	0.005
38	Sawyers S Ck Ash Dam	7/11/2013	5.8	1500	2	20	820	1100	1.1	6.7	12.5	240	37	61	16	4.9	0.5	5	0.005
40	Lidsdale Cut	7/11/2013	3.3	0.03	37	4900	3900	5800	2.4	5.4	12.5	350	290	0.065	120	5.8	0.5	0.5	0.02
41	Sawyers S Ck WX7	11/11/2013	8.6	1100					18										
41	Sawyers S Ck WX7	18/11/2013	8.7	1100					3.9										
41	Sawyers S Ck WX7	25/11/2013	8.7	1200					4.8										
41	Sawyers S Ck WX7	2/12/2013	8.7	1200					2.3										
38	Sawyers S Ck Ash Dam	5/12/2013	5.3	1700	2.1	22	820	1200	1.7	6.5	12.5	240	38	63	17	6.2	0.5	5	0.005
39	Dump Creek	5/12/2013	3.1	1900	2.9	26	980	1200	8.3	8.9	12.5	130	35	86	84	1.2	0.5	0.5	0.04
40	Lidsdale Cut	5/12/2013	3.3	4200	36	31	3300	4200	0.4	5.7	12.5	270	230	280	91	4.8	0.5	0.5	0.01
41	Sawyers S Ck WX7	5/12/2013	8.7	1100	1.5	5	45	680	1.3	8.1	540	250	10	5.1	3	0.6	0.5	3	0.005
41	Sawyers S Ck WX7	9/12/2013	8.7	1200					2.2										
41	Sawyers S Ck WX7	16/12/2013	8.7	1200					2.2										
41	Sawyers S Ck WX7	23/12/2013	8.7	1200					2.9										
41	Sawyers S Ck WX7	30/12/2013	8.7	1200					2.5										
41	Sawyers S Ck WX7	6/01/2014	8.7	1100					2.9										
41	Sawyers S Ck WX7	13/01/2014	8.7	1200					6.1										
39	Dump Creek	15/01/2014	3.1	2000	2.5	25	1000	1400	25	4.9	12.5	130	39	89	86	0.95	0.5	0.5	0.03
41	Sawyers S Ck WX7	15/01/2014	8.7	1100	1.2	5	39	660	3.4	4.7	560	260	11	5	3	0.65	0.5	3	0.005
38	Sawyers S Ck Ash Dam	16/01/2014	8	1600	1.8	19	690	1100	2.1	5.6	99	260	34	52	14	2.75	0.5	5	0.005

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Site ID	Reported Origin	Sample Date	pH	Cond	Fluoride	Chloride	SO4	TDS	Turbidity	DO	Alk - M	Na	K	Ca	Mg	Total Nitrogen	Nitrite	NO3	Total Phosphorus (P)
40	Lidsdale Cut	16/01/2014	3.5	3700	24	27	2500	3500	6.8	5.4	12.5	320	200	220	72	2.25	0.5	3	0.01
41	Sawyers S Ck WX7	20/01/2014	8.7	1200					3.4										
41	Sawyers S Ck WX7	28/01/2014	8.7	1200					2.9										
41	Sawyers S Ck WX7	3/02/2014	8.7	1200					3.8										
39	Dump Creek	5/02/2014	3	2000	2.4	24	1000	1400	14	6.9	12.5	120	39	93	88	1.3	0.5	0.5	0.13
41	Sawyers S Ck WX7	5/02/2014	8.7	1100	1.1	5	41	660	1.8	6.6	560	230	10	4.5	3	0.6	0.5	3	0.005
38	Sawyers S Ck Ash Dam	6/02/2014	8.1	1500	1.7	19	640	1100	1.4	7.2	98	240	32	51	14	4.5	0.5	5	0.005
40	Lidsdale Cut	6/02/2014	3.4	4000	28	32	3000	4200	3.2	7.6	12.5	320	220	260	85	3.8	0.5	0.5	0.02
41	Sawyers S Ck WX7	10/02/2014	8.7	1200					4.4										
41	Sawyers S Ck WX7	17/02/2014	8.7	1200					4.6										
41	Sawyers S Ck WX7	24/02/2014	8.7	1100					4.6										
41	Sawyers S Ck WX7	3/03/2014	8.7	1100					5.6										
39	Dump Creek	5/03/2014	3.1	2000	2.1	24	980	1500	4.5	5.5	12.5	120	36	91	82	0.9	0.5	0.5	0.02
41	Sawyers S Ck WX7	5/03/2014	8.7	1100	1	5	42	700	5.2	8.4	530	250	12	5	3	0.6	0.5	3	0.005
38	Sawyers S Ck Ash Dam	6/03/2014	7.9	1500	1.8	18	650	1100	1.3	9.5	81	230	33	54	14	4	0.5	6	0.005
40	Lidsdale Cut	6/03/2014	3.5	1800	9	16	1000	1500	3.8	10	12.5	87	73	97	28	1.05	0.5	2	0.09
41	Sawyers S Ck WX7	10/03/2014	8.7	1100					7.9										
41	Sawyers S Ck WX7	17/03/2014	8.7	1100					10										
41	Sawyers S Ck WX7	24/03/2014	8.7	1100					14										
41	Sawyers S Ck WX7	31/03/2014	8.7	1100					9.8										

**Nalco surface water sampling results 2013 – 2014 (Metals (mg/L))**

Site ID	Reported Origin	Sample Date	Ag	Al	As	B	Ba	Cd	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn	Al-F	Cu-F	Fe-F	Mn-F	Zn-F
38	Sawyers S Ck Ash Dam	10/04/2013	0.0005	2	0.002	2	0.073	0.005	0.0005	0.018	0.000025	0.005	0.078	0.0005	0.006	0.24	1.8	0.012	0.05	1.2	0.24
39	Dump Creek	10/04/2013	0.0005	3	0.0005	3.2	0.02	0.0005	0.0005	0.006	0.000025	0.005		0.005	0.001	1.6	2.9	0.002	9.6	7.7	1.6
40	Sawyers S Ck WX5	10/04/2013	0.0005	0.23	0.012	0.1	0.021	0.0001	0.0005	0.005	0.000025	0.033	0.005	0.002	0.001	0.03	0.06	0.0005	0.06	0.006	0.014
41	Sawyers S Ck WX7	10/04/2013	0.0005	0.15	0.012	0.1	0.019	0.0001	0.0005	0.0005	0.000025	0.033	0.005	0.001	0.001	0.028	0.04	0.0005	0.03	0.024	0.009
38	Sawyers S Ck Ash Dam	16/05/2013	0.0005	2.5	0.002	1.7	0.071	0.0053	0.0005	0.01	0.000025	0.005	0.09	0.0005	0.007	0.25	2.5	0.01	0.16	1.5	0.25
40	Sawyers S Ck WX5	16/05/2013	0.0005	0.51	0.016	0.07	0.027	0.0001	0.0005	0.006	0.000025	0.037	0.005	0.002	0.001	0.031	0.04	0.0005	0.05	0.007	0.014
39	Dump Creek	17/05/2013	0.0005	3.7	0.0005	1.8	0.02	0.0008	0.0005	0.007	0.000025	0.005		0.005	0.001	1.1	3.7	0.006	5.4	5.3	1.1
41	Sawyers S Ck WX7	17/05/2013	0.0005	0.24	0.014	0.08	0.02	0.0001	0.0005	0.029	0.000025	0.034	0.005	0.003	0.001	0.037	0.03	0.0005	0.06	0.009	0.008
38	Sawyers S Ck Ash Dam	13/06/2013	0.0005	1.7	0.002	2	0.065	0.0051	0.0005	0.009	0.000025	0.014	0.083	0.0005	0.007	0.29	1.7	0.009	0.04	1.5	0.28
39	Dump Creek	13/06/2013	0.0005	2.4	0.0005	1.2	0.012	0.0008	0.0005	0.004	0.000025	0.0005		0.003	0.001	1	2.2	0.004	3.3	3.8	0.98
40	Sawyers S Ck WX5	13/06/2013	0.0005	0.15	0.017	0.08	0.02	0.0001	0.0005	0.0005	0.000025	0.032	0.004	0.001	0.001	0.028	0.06	0.0005	0.07	0.004	0.011
41	Sawyers S Ck WX7	13/06/2013	0.0005	0.22	0.017	0.09	0.019	0.0001	0.0005	0.003	0.000025	0.034	0.005	0.001	0.001	0.03	0.06	0.0005	0.08	0.003	0.011
38	Sawyers S Ck Ash Dam	10/07/2013	0.0005	1.6	0.002	2.2	0.066	0.005	0.0005	0.009	0.000025	0.015	0.084	0.0005	0.006	0.25	1.6	0.008	0.03	1.5	0.31
40	Sawyers S Ck WX5	10/07/2013	0.0005	0.07	0.015	0.1	0.021	0.0001	0.0005	0.002	0.000025	0.038	0.004	0.0005	0.001	0.024	0.04	0.0005	0.06	0.008	0.009
39	Dump Creek	11/07/2013	0.0005	3.2	0.0005	2.8	0.017	0.0008	0.0005	0.004	0.000025	0.0005		0.004	0.001	1.2	3.1	0.003	9.2	6.2	1.2
41	Sawyers S Ck WX7	11/07/2013	0.0005	0.08	0.014	0.11	0.018	0.0001	0.0005	0.0005	0.000025	0.034	0.004	0.0005	0.001	0.025	0.03	0.0005	0.05	0.014	0.007
38	Sawyers S Ck Ash Dam	22/08/2013	0.0005	0.3	0.001	1.9	0.063	0.0038	0.001	0.0005	0.000025	0.018	0.072	0.0005	0.003	0.19	0.05	0.0005	0.005	1.4	0.19
40	Sawyers S Ck WX5	22/08/2013	0.0005	0.29	0.013	0.08	0.023	0.0001	0.002	0.0005	0.000025	0.032	0.004	0.0005	0.001	0.018	0.04	0.0005	0.04	0.002	0.006
39	Dump Creek	23/08/2013	0.0005	3.6	0.0005	2.2	0.017	0.0007	0.002	0.005	0.000025	0.0005	0.36	0.005	0.001	1.1	3.6	0.005	5.7	5.4	1.1
41	Sawyers S Ck WX7	23/08/2013	0.0005	0.2	0.013	0.09	0.022	0.0001	0.001	0.0005	0.000025	0.034	0.004	0.0005	0.001	0.02	0.02	0.0005	0.06	0.005	0.007
38	Sawyers S Ck Ash Dam	26/09/2013	0.0005	1.2	0.002	2	0.066	0.0041	0.002	0.003	0.000025	0.02	0.094	0.0005	0.004	0.23	1.2	0.003	0.1	1.5	0.23
39	Dump Creek	26/09/2013	0.0005	3.2	0.0005	2	0.022	0.0007	0.002	0.013	0.000025	0.0005	0.41	0.005	0.001	1.2	3.2	0.013	8.7	5.1	1.2
40	Sawyers S Ck WX5	26/09/2013	0.0005	0.37	0.018	0.09	0.028	0.0001	0.002	0.001	0.000025	0.039	0.004	0.001	0.001	0.027	0.16	0.0005	0.32	0.057	0.024
41	Sawyers S Ck WX7	26/09/2013	0.0005	0.33	0.016	0.08	0.027	0.0001	0.002	0.001	0.000025	0.035	0.005	0.001	0.001	0.03	0.16	0.0005	0.35	0.078	0.025

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Objective ID: A705818



Site ID	Reported Origin	Sample Date	Ag	Al	As	B	Ba	Cd	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn	Al-F	Cu-F	Fe-F	Mn-F	Zn-F
39	Dump Creek	23/10/2013	0.0005	4	0.0005	2.7	0.025	0.0008	0.002	0.009	0.000025	0.0005	0.47	0.009	0.001	1.4	4	0.01	8.7	5.8	1.4
41	Sawyers S Ck WX7	23/10/2013	0.0005	0.12	0.018	0.11	0.021	0.0001	0.002	0.0005	0.000025	0.037	0.005	0.0005	0.001	0.023	0.02	0.0005	0.02	0.0005	0.007
38	Sawyers S Ck Ash Dam	24/10/2013	0.0005	1.6	0.003	2.2	0.067	0.0044	0.002	0.004	0.000025	0.016	0.087	0.0005	0.004	0.25	1.4	0.003	0.07	1.5	0.25
40	Lidsdale Cut	24/10/2013	0.0005	220	0.031	19	0.025	0.084	0.036	0.05	0.000025	0.0005	1.6	0.033	0.086	3.9	210	0.05	6.7	17	3.9
39	Dump Creek	6/11/2013	0.0005	4.1	0.001	3	0.024	0.0009	0.003	0.014	0.000025	0.001	0.62	0.009	0.001	1.7	4.7	0.011	11	7.2	1.6
41	Sawyers S Ck WX7	6/11/2013	0.0005	0.12	0.025	0.1	0.022	0.0001	0.002	0.0005	0.000025	0.037	0.005	0.0005	0.001	0.025	0.06	0.0005	0.01	0.002	0.009
38	Sawyers S Ck Ash Dam	7/11/2013	0.0005	1	0.002	1.9	0.078	0.0048	0.002	0.003	0.000025	0.027	0.087	0.0005	0.006	0.24	1.1	0.002	0.02	1.5	0.22
40	Lidsdale Cut	7/11/2013	0.0005	220	17	0.018	340	34	0.05	0.05	0.000025	0.0005	1.6	0.024	0.068	4.3	220	0.04	5.9	18	4.3
38	Sawyers S Ck Ash Dam	5/12/2013	0.0005	1.4	0.002	2	0.077	0.0043	0.002	0.006	0.000025	0.03	0.084	0.0005	0.006	0.24	1.4	0.005	0.08	1.5	0.22
39	Dump Creek	5/12/2013	0.0005	4.1	0.0005	3.3	0.021	0.0009	0.003	0.006	0.000025	0.0005	0.65	0.007	0.001	1.5	4.1	0.005	11	8.2	1.5
40	Lidsdale Cut	5/12/2013	0.0005	180	0.026	14	0.048	0.044	0.023	0.04	0.0001	0.0005	1.2	0.014	0.063	3.2	170	0.03	5.2	14	3.2
41	Sawyers S Ck WX7	5/12/2013	0.0005	0.14	0.024	0.11	0.022	0.0001	0.002	0.0005	0.000025	0.036	0.007	0.0005	0.001	0.029	0.08	0.0005	0.04	0.012	0.006
39	Dump Creek	15/01/2014	0.0005	3.6	0.0005	3.6	0.027	0.0007	0.002	0.016	0.000025	0.0005	0.67	0.008	0.001	1.6	3.6	0.015	13	8.4	1.6
41	Sawyers S Ck WX7	15/01/2014	0.0005	0.17	0.024	0.1	0.026	0.0001	0.002	0.001	0.000025	0.04	0.007	0.0005	0.001	0.021	0.05	0.0005	0.01	0.006	0.0025
38	Sawyers S Ck Ash Dam	16/01/2014	0.0005	0.08	0.004	1.7	0.061	0.0023	0.002	0.002	0.000025	0.037	0.051	0.0005	0.003	0.073	0.05	0.0005	0.005	0.84	0.019
40	Lidsdale Cut	16/01/2014	0.0005	120	0.015	12	0.032	0.036	0.01	0.017	0.000025	0.0005	0.87	0.008	0.046	2.3	120	0.017	2	11	2.5
39	Dump Creek	5/02/2014	0.0005	3.4	0.0005	3.6	0.025	0.0006	0.002	0.008	0.000025	0.0005	0.67	0.006	0.001	1.8	3.3	0.007	13	8.5	1.8
41	Sawyers S Ck WX7	5/02/2014	0.0005	0.13	0.025	0.09	0.025	0.0001	0.002	0.0005	0.000025	0.045	0.008	0.0005	0.001	0.024	0.04	0.0005	0.02	0.01	0.007
38	Sawyers S Ck Ash Dam	6/02/2014	0.0005	0.04	0.003	1.6	0.054	0.0014	0.001	0.004	0.000025	0.043	0.029	0.0005	0.003	0.025	0.04	0.001	0.01	0.43	0.0025
40	Lidsdale Cut	6/02/2014	0.0005	140	0.017	13	0.026	0.034	0.012	0.017	0.000025	0.0005	0.84	0.008	0.062	2.5	140	0.017	2.7	12	2.5
39	Dump Creek	5/03/2014	0.0005	3.6	0.0005	3.4	0.025	0.0009	0.002	0.007	0.000025	0.0005	0.66	0.006	0.001	1.6	3.6	0.006	13	8.8	1.6
41	Sawyers S Ck WX7	5/03/2014	0.0005	0.2	0.025	0.1	0.027	0.0001	0.002	0.001	0.000025	0.042	0.008	0.0005	0.001	0.031	0.05	0.0005	0.03	0.003	0.008
38	Sawyers S Ck Ash Dam	6/03/2014	0.0005	0.15	0.002	1.7	0.05	0.0013	0.002	0.002	0.000025	0.042	0.027	0.0005	0.003	0.032	0.1	0.0005	0.01	0.41	0.011
40	Lidsdale Cut	6/03/2014	0.0005	52	0.009	4.9	0.075	0.017	0.006	0.013	0.000025	0.0005	0.35	0.004	0.024	0.81	52	0.013	1.8	4.8	0.89

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## Appendix G

### Nalco Groundwater Sampling Results 2013 - 2014

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**Nalco groundwater sampling results 2013 – 2014 (mg/L, unless specified otherwise)**

Site ID	Reported Origin	Sample Date	pH	Cond (μS/cm)	Fluoride	Chloride	SO4	TDS	Bore Water Level (m)	Alk - M	Na	K	Ca	Mg
32	WGM1/D1	10/04/2013	5.8	140	0.05	21	20	48	1.9	12.5	17	3.5	1.1	3.5
33	WGM1/D2	10/04/2013	4.8	360	0.05	32	113	260	7.8	12.5	35	4.2	1.1	16
34	WGM1/D3	10/04/2013	6.1	560	0.05	75	69	350	9.5	90	56	6.2	14	17
35	WGM1/D4	10/04/2013	6	1600	0.05	32	846	1300	1	35	130	10	85	75
37	WGM1/D6	10/04/2013	4.4	810	0.3	53	281	580	10.8	12.5	69	5.6	9.3	34
32	WGM1/D1	16/05/2013	5.8	120	0.05	16	14	64	2.9	12.5	15	3	1	3.5
35	WGM1/D4	16/05/2013	5.8	1500	0.05	33	820	1200	1	38	130	10	110	79
33	WGM1/D2	17/05/2013	4.1	480	0.05	29	160	270	7.9	12.5	47	4	2.7	25
34	WGM1/D3	17/05/2013	5.8	520	0.05	78	66	300	9.6	58	61	6	12	16
37	WGM1/D6	17/05/2013	3.3	950	0.05	60	300	540	11.2	12.5	72	6	13	37
32	WGM1/D1	13/06/2013	5.7	130	0.05	19	15	73	3	12.5	16	3	1.6	3
33	WGM1/D2	13/06/2013	4.2	400	0.05	29	130	300	7	12.5	39	4	1.8	20
34	WGM1/D3	13/06/2013	5.7	460	0.05	55	71	280	9.3	55	52	5	13	18
35	WGM1/D4	13/06/2013	5.9	1500	0.05	33	830	1200	0.9	50	130	10	110	77
36	WGM1/D5	13/06/2013	3.7	340	0.4	5	130	200	3.7	12.5	9	7	17	10
37	WGM1/D6	13/06/2013	3.4	1000	0.6	32	560	660	11.1	12.5	82	6	8.7	59
32	WGM1/D1	10/07/2013	5.6	130	0.05	21	11	73	2.9	12.5	18	3	1.4	3
33	WGM1/D2	10/07/2013	4.6	380	0.05	25	120	190	7.6	12.5	39	4	1.5	23
34	WGM1/D3	10/07/2013	5.8	480	0.05	54	83	260	9.4	64	56	6	15	20
35	WGM1/D4	10/07/2013	5.5	1400	0.05	33	790	1200	1	12.5	120	9	110	75
36	WGM1/D5	10/07/2013	3.8	520	0.5	11	220	350	7.7	12.5	24	10	24	21
37	WGM1/D6	10/07/2013	3.6	930	0.6	26	400	630	11	12.5	86	6	5.2	65
32	WGM1/D1	22/08/2013	5.7	130	0.05	24	9	96	3.1	12.5	20	2	1.2	2
33	WGM1/D2	22/08/2013	3.9	480	0.05	34	160	290	7.8	12.5	49	3	2.3	24
34	WGM1/D3	22/08/2013	6	580	0.05	75	74	340	9.7	100	66	6	18	24

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Objective ID: A705818

Site ID	Reported Origin	Sample Date	pH	Cond ( $\mu\text{S}/\text{cm}$ )	Fluoride	Chloride	SO4	TDS	Bore Water Level (m)	Alk - M	Na	K	Ca	Mg
35	WGM1/D4	22/08/2013	5.7	1500	0.05	33	820	1200	1	40	130	9	110	78
36	WGM1/D5	22/08/2013							8.2					
37	WGM1/D6	22/08/2013	3.5	880	0.5	26	370	560	11.2	12.5	77	6	6.3	59
32	WGM1/D1	26/09/2013	5.5	130	0.1	23	8	140	3.5	12.5	21	2	1.3	2
33	WGM1/D2	26/09/2013	3.8	510	0.1	36	160	350	7.7	12.5	56	3	2.2	21
34	WGM1/D3	26/09/2013	6	570	0.1	73	75	380	9.8	100	66	6	16	21
35	WGM1/D4	26/09/2013	5.7	1500	0.1	33	830	1300	1	30	130	9	110	76
36	WGM1/D5	26/09/2013							8					
37	WGM1/D6	26/09/2013	3.3	1000	0.5	31	410	680	11.2	12.5	79	6	8.8	55
32	WGM1/D1	24/10/2013	5.5	140	0.1	26	8	100	3.8	12.5	21	2	1.3	2
33	WGM1/D2	24/10/2013	3.7	590	0.1	38	190	350	7.9	12.5	55	3	2.5	22
34	WGM1/D3	24/10/2013	5.9	660	0.1	85	90	400	10.4	100	81	8	19	25
35	WGM1/D4	24/10/2013	6	1600	0.1	34	910	1300	1	60	140	10	110	81
36	WGM1/D5	24/10/2013							8.3					
37	WGM1/D6	24/10/2013	3.6	980	0.5	35	440	660	11.2	12.5	79	6	10	53
32	WGM1/D1	7/11/2013	5.6	140	0.1	27	8	110	3.9	12.5	21	2	1.3	2
33	WGM1/D2	7/11/2013	3.5	650	0.1	39	190	370	7.9	12.5	59	3	2.8	22
34	WGM1/D3	7/11/2013	6	660	0.1	89	98	380	10.6	87	75	7	18	23
35	WGM1/D4	7/11/2013	5.8	1500	0.1	33	830	1300	1	38	130	9	110	77
36	WGM1/D5	7/11/2013	6.1	840	0.1	36	280	540	8.4	130	59	20	33	39
37	WGM1/D6	7/11/2013	3.1	1400	0.5	36	610	860	11.1	12.5	89	14	29	61
32	WGM1/D1	5/12/2013	5.7	140	0.1	27	8	78	3.9	12.5	20	2	1.3	2
33	WGM1/D2	5/12/2013	3.5	590	0.1	41	180	300	7.7	12.5	57	3	2.5	20
34	WGM1/D3	5/12/2013	6.1	710	0.1	97	130	380	9.5	84	79	7	21	27
35	WGM1/D4	5/12/2013	5.9	1600	0.1	34	880	1200	1	32	130	9	100	74
36	WGM1/D5	5/12/2013							8.3					

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Site ID	Reported Origin	Sample Date	pH	Cond ( $\mu\text{S}/\text{cm}$ )	Fluoride	Chloride	SO4	TDS	Bore Water Level (m)	Alk - M	Na	K	Ca	Mg
37	WGM1/D6	5/12/2013	3	1600	0.8	45	660	870	10.7	12.5	92	8	22	72
32	WGM1/D1	16/01/2014	5.6	390	0.1	28	120	200	4.4	12.5	35	3	15	12
33	WGM1/D2	16/01/2014	3.4	630	0.1	42	190	310	7.9	12.5	60	3	2.5	19
34	WGM1/D3	16/01/2014	6	680	0.1	85	120	360	9.9	90	78	7	20	26
35	WGM1/D4	16/01/2014	5.8	1600	0.1	32	820	1200	1	33	130	10	100	72
36	WGM1/D5	16/01/2014							8.4					
37	WGM1/D6	16/01/2014	3	1600	0.7	44	680	920	10.7	12.5	96	8	23	74
32	WGM1/D1	6/02/2014							4.7					
33	WGM1/D2	6/02/2014	3.4	640	0.1	39	190	330	8	12.5	58	3	2.6	19
34	WGM1/D3	6/02/2014	5.9	680	0.1	85	110	370	9.9	95	75	7	20	26
35	WGM1/D4	6/02/2014	5.8	1500	0.1	32	800	1200	1	35	120	9	96	68
36	WGM1/D5	6/02/2014							8.4					
37	WGM1/D6	6/02/2014	2.9	1700	0.6	44	750	1000	10.7	12.5	86	8	29	75
32	WGM1/D1	6/03/2014							4.9					
33	WGM1/D2	6/03/2014	3.6	610	0.1	40	180	320	7.8	12.5	53	3	2.4	18
34	WGM1/D3	6/03/2014	5.7	660	0.1	80	130	400	8.9	59	65	7	18	23
35	WGM1/D4	6/03/2014	5.9	1400	0.1	32	780	1300	0.9	40	120	9	95	66
36	WGM1/D5	6/03/2014	3.7	400	0.4	6	140	240	4	12.5	10	7	16	10
37	WGM1/D6	6/03/2014	3	1800	0.5	46	770	1200	10.8	12.5	83	8	29	74
33	WGM1/D2	7/03/2014	3.4	700	0.1	38	200	340	7.8	12.5	58	3	2.7	20
34	WGM1/D3	7/03/2014	6.1	700	0.1	79	160	430	8.9	59	70	8	21	25
35	WGM1/D4	7/03/2014	6	1400	0.1	33	780	1200	0.9	31	110	9	91	64
36	WGM1/D5	7/03/2014	3.9	430	0.3	9	160	240	4	12.5	15	9	16	13
37	WGM1/D6	7/03/2014	3	1800	0.4	47	780	1100	10.8	12.5	79	8	33	67

**Nalco groundwater sampling results 2013 – 2014 (Metals (mg/L))**

Site ID	Reported Origin	Sample Date	Ag	Al	As	B	Ba	Cd	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn	Fe-F	Mn-F
32	WGM1/D1	10/04/2013	0.0005	0.23	0.0005	0.05	0.063	0.0001	0.0005	0.002	0.000025	0.005	0.005	0.0005	0.001	0.029	0.01	0.088
33	WGM1/D2	10/04/2013	0.0005	0.22	0.0005	0.025	0.045	0.0001	0.001	0.004	0.000025	0.005	0.049	0.001	0.001	0.06	0.17	0.4
34	WGM1/D3	10/04/2013	0.0005	0.09	0.004	0.025	0.08	0.0001	0.0005	0.011	0.000025	0.005	0.099	0.0005	0.001	0.038	11	0.92
35	WGM1/D4	10/04/2013	0.0005	0.01	0.002	1.9	0.023	0.0001	0.0005	0.004	0.000025	0.005	0.035	0.0005	0.001	0.05	49	19
37	WGM1/D6	10/04/2013	0.0005	1.1	0.002	0.4	0.017	0.0001	0.001	0.009	0.000025	0.005	0.23	0.001	0.001	0.24	3.9	1.9
32	WGM1/D1	16/05/2013	0.0005	0.1	0.0005	0.05	0.044	0.0001	0.0005	0.008	0.000025	0.005	0.005	0.0005	0.001	0.033	0.02	0.03
35	WGM1/D4	16/05/2013	0.0005	0.005	0.003	1.7	0.023	0.0001	0.0005	0.026	0.000025	0.005	0.03	0.002	0.001	0.066	33	19
33	WGM1/D2	17/05/2013	0.0005	0.3	0.0005	0.1	0.04	0.0001	0.0005	0.008	0.000025	0.005	0.08	0.003	0.001	0.11	2	0.78
34	WGM1/D3	17/05/2013	0.0005	0.07	0.003	0.025	0.064	0.0001	0.0005	0.012	0.000025	0.005	0.05	0.004	0.001	0.13	0.005	0.42
37	WGM1/D6	17/05/2013	0.0005	1.5	0.005	0.32	0.02	0.0014	0.002	0.01	0.000025	0.005	0.27	0.01	0.001	0.7	37	2.5
32	WGM1/D1	13/06/2013	0.0005	0.13	0.0005	0.06	0.038	0.0001	0.001	0.003	0.000025	0.0005	0.002	0.0005	0.001	0.054	0.04	0.1
33	WGM1/D2	13/06/2013	0.0005	0.28	0.0005	0.05	0.047	0.0001	0.003	0.004	0.000025	0.0005	0.058	0.002	0.001	0.092	0.1	0.49
34	WGM1/D3	13/06/2013	0.0005	0.1	0.002	0.07	0.069	0.0001	0.003	0.005	0.000025	0.0005	0.087	0.001	0.001	0.096	0.34	0.55
35	WGM1/D4	13/06/2013	0.0005	0.025	0.003	1.8	0.009	0.0001	0.0005	0.0005	0.000025	0.0005	0.037	0.0005	0.001	0.064	22	18
36	WGM1/D5	13/06/2013	0.0005	4	0.0005	0.2	0.02	0.0006	0.004	0.009	0.000025	0.0005	0.097	0.003	0.001	0.25	0.09	1.7
37	WGM1/D6	13/06/2013	0.0005	4.1	0.002	0.45	0.019	0.0006	0.004	0.005	0.000025	0.0005	0.5	0.003	0.001	1.6	1.5	1.5
32	WGM1/D1	10/07/2013	0.0005	0.59	0.0005	0.04	0.036	0.0001	0.001	0.004	0.000025	0.0005	0.002	0.0005	0.001	0.082	0.24	0.06
33	WGM1/D2	10/07/2013	0.0005	0.2	0.0005	0.03	0.04	0.0001	0.001	0.009	0.000025	0.0005	0.054	0.0005	0.001	0.075	0.04	0.48
34	WGM1/D3	10/07/2013	0.0005	0.08	0.003	0.07	0.076	0.0003	0.001	0.007	0.000025	0.001	0.098	0.001	0.001	0.17	1.9	0.57
35	WGM1/D4	10/07/2013	0.0005	0.025	0.003	1.8	0.022	0.0001	0.0005	0.002	0.000025	0.0005	0.034	0.001	0.001	0.053	38	17
36	WGM1/D5	10/07/2013	0.0005	6.6	0.0005	0.7	0.027	0.0007	0.003	0.003	0.000025	0.0005	0.18	0.003	0.001	0.35	0.55	2.9
37	WGM1/D6	10/07/2013	0.0005	4.8	0.002	0.51	0.022	0.0005	0.002	0.006	0.000025	0.0005	0.52	0.002	0.001	1.1	0.76	0.76
32	WGM1/D1	22/08/2013	0.0005	1.3	0.0005	0.025	0.034	0.0001	0.002	0.004	0.000025	0.0005	0.002	0.002	0.001	0.05	0.09	0.043
33	WGM1/D2	22/08/2013	0.0005	0.27	0.0005	0.1	0.038	0.0001	0.002	0.004	0.00005	0.0005	0.068	0.002	0.001	0.087	1.7	0.71
34	WGM1/D3	22/08/2013	0.0005	0.09	0.003	0.025	0.078	0.0001	0.002	0.002	0.0009	0.0005	0.097	0.0005	0.001	0.049	5	0.66

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Site ID	Reported Origin	Sample Date	Ag	Al	As	B	Ba	Cd	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn	Fe-F	Mn-F
35	WGM1/D4	22/08/2013	0.0005	0.04	0.003	1.8	0.023	0.0001	0.001	0.0005	0.000025	0.0005	0.03	0.0005	0.001	0.044	28	18
36	WGM1/D5	22/08/2013																
37	WGM1/D6	22/08/2013	0.0005	3.6	0.002	0.41	0.017	0.0001	0.002	0.001	0.000025	0.0005	0.39	0.0005	0.001	0.9	0.74	1
32	WGM1/D1	26/09/2013	0.0005	1.5	0.0005	0.025	0.031	0.0001	0.002	0.004	0.000025	0.0005	0.003	0.001	0.001	0.068	0.24	0.079
33	WGM1/D2	26/09/2013	0.0005	0.27	0.0005	0.09	0.036	0.0001	0.002	0.007	0.000025	0.0005	0.075	0.002	0.001	0.097	4.7	0.69
34	WGM1/D3	26/09/2013	0.0005	0.51	0.004	0.025	0.084	0.0001	0.002	0.003	0.000025	0.0005	0.099	0.003	0.001	0.044	11	0.62
35	WGM1/D4	26/09/2013	0.0005	0.03	0.005	1.8	0.021	0.0001	0.002	0.001	0.000025	0.0005	0.033	0.0005	0.001	0.053	79	18
36	WGM1/D5	26/09/2013																
37	WGM1/D6	26/09/2013	0.0005	2.8	0.002	0.4	0.019	0.0001	0.003	0.002	0.000025	0.0005	0.46	0.0005	0.001	1.1	25	1.6
32	WGM1/D1	24/10/2013	0.0005	0.74	0.0005	0.025	0.03	0.0001	0.003	0.003	0.000025	0.0005	0.003	0.001	0.001	0.075	0.02	0.26
33	WGM1/D2	24/10/2013	0.0005	0.24	0.0005	0.14	0.035	0.0001	0.003	0.006	0.000025	0.0005	0.086	0.003	0.001	0.12	3.2	0.78
34	WGM1/D3	24/10/2013	0.0005	0.06	0.006	0.025	0.09	0.0001	0.004	0.003	0.000025	0.003	0.1	0.0005	0.001	0.041	0.74	0.58
35	WGM1/D4	24/10/2013	0.0005	0.005	0.004	2	0.02	0.0001	0.002	0.0005	0.000025	0.0005	0.035	0.0005	0.001	0.059	27	18
36	WGM1/D5	24/10/2013																
37	WGM1/D6	24/10/2013	0.0005	2.4	0.002	0.44	0.022	0.0001	0.004	0.003	0.000025	0.0005	0.45	0.0005	0.001	0.99	10	1.9
32	WGM1/D1	7/11/2013	0.0005	0.69	0.0005	0.025	0.027	0.0001	0.002	0.002	0.000025	0.0005	0.003	0.0005	0.001	0.078	0.02	0.34
33	WGM1/D2	7/11/2013	0.0005	0.24	0.0005	0.15	0.033	0.0001	0.003	0.005	0.000025	0.0005	0.094	0.003	0.001	0.13	0.69	0.81
34	WGM1/D3	7/11/2013	0.0005	0.04	0.002	0.025	0.086	0.0001	0.003	0.002	0.000025	0.0005	0.098	0.0005	0.001	0.039	0.02	0.61
35	WGM1/D4	7/11/2013	0.0005	0.005	0.002	1.8	0.02	0.0001	0.002	0.0005	0.000025	0.0005	0.033	0.0005	0.001	0.055	21	18
36	WGM1/D5	7/11/2013	0.0005	27	0.007	1.4	0.086	0.013	0.01	0.044	0.00018	0.003	0.3	0.042	0.01	2.2	2.9	4.8
37	WGM1/D6	7/11/2013	0.0005	2.5	0.003	0.87	0.022	0.0002	0.007	0.01	0.000025	0.002	0.52	0.005	0.001	1.1	15	3.5
32	WGM1/D1	5/12/2013	0.0005	0.46	0.0005	0.025	0.032	0.0001	0.003	0.006	0.000025	0.0005	0.004	0.0005	0.001	0.1	0.04	0.48
33	WGM1/D2	5/12/2013	0.0005	0.28	0.0005	0.13	0.033	0.0001	0.003	0.006	0.000025	0.0005	0.086	0.003	0.001	0.12	0.73	0.75
34	WGM1/D3	5/12/2013	0.0005	0.12	0.004	0.025	0.097	0.0001	0.003	0.003	0.000025	0.0005	0.11	0.0005	0.001	0.051	0.08	0.79
35	WGM1/D4	5/12/2013	0.0005	0.04	0.003	1.8	0.018	0.0001	0.003	0.003	0.000025	0.0005	0.032	0.0005	0.001	0.06	16	18
36	WGM1/D5	5/12/2013																

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Site ID	Reported Origin	Sample Date	Ag	Al	As	B	Ba	Cd	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn	Fe-F	Mn-F
37	WGM1/D6	5/12/2013	0.0005	4	0.006	0.77	0.027	0.0028	0.004	0.009	0.000025	0.0005	0.63	0.008	0.001	2	16	4
32	WGM1/D1	16/01/2014	0.0005	0.14	0.0005	0.28	0.029	0.0001	0.002	0.004	0.000025	0.0005	0.009	0.0005	0.001	0.085	0.54	2.9
33	WGM1/D2	16/01/2014	0.0005	0.2	0.0005	0.16	0.034	0.0001	0.002	0.004	0.000025	0.0005	0.086	0.003	0.001	0.12	0.63	0.75
34	WGM1/D3	16/01/2014	0.0005	0.07	0.004	0.025	0.094	0.0001	0.002	0.011	0.000025	0.0005	0.13	0.005	0.001	0.055	0.51	0.67
35	WGM1/D4	16/01/2014	0.0005	0.01	0.003	1.8	0.019	0.0001	0.002	0.002	0.000025	0.0005	0.036	0.0005	0.001	0.064	15	17
36	WGM1/D5	16/01/2014																
37	WGM1/D6	16/01/2014	0.0005	3.8	0.007	0.82	0.028	0.0009	0.004	0.006	0.000025	0.0005	0.65	0.004	0.001	1.6	22	4.2
32	WGM1/D1	6/02/2014																
33	WGM1/D2	6/02/2014	0.0005	0.18	0.0005	0.15	0.035	0.0001	0.001	0.004	0.000025	0.0005	0.08	0.002	0.001	0.1	0.76	0.75
34	WGM1/D3	6/02/2014	0.0005	0.14	0.003	0.025	0.099	0.0001	0.002	0.006	0.000025	0.0005	0.12	0.004	0.001	0.042	1.5	0.63
35	WGM1/D4	6/02/2014	0.0005	0.005	0.003	1.7	0.02	0.0001	0.001	0.0005	0.000025	0.0005	0.035	0.0005	0.001	0.05	16	16
36	WGM1/D5	6/02/2014																
37	WGM1/D6	6/02/2014	0.0005	3.1	0.006	0.9	0.026	0.0006	0.004	0.009	0.000025	0.0005	0.56	0.003	0.001	1.2	40	5.3
32	WGM1/D1	6/03/2014																
33	WGM1/D2	6/03/2014	0.0005	0.2	0.0005	0.15	0.036	0.0001	0.002	0.009	0.000025	0.0005	0.081	0.002	0.001	0.12	3.8	0.76
34	WGM1/D3	6/03/2014	0.0005	0.08	0.001	0.025	0.093	0.0001	0.002	0.002	0.000025	0.0005	0.1	0.001	0.001	0.069	0.03	0.93
35	WGM1/D4	6/03/2014	0.0005	0.005	0.003	1.9	0.021	0.0001	0.001	0.001	0.000025	0.0005	0.033	0.0005	0.001	0.049	17	17
36	WGM1/D5	6/03/2014	0.0005	3.9	0.0005	0.27	0.025	0.0007	0.002	0.006	0.000025	0.0005	0.1	0.003	0.001	0.23	0.12	1.6
37	WGM1/D6	6/03/2014	0.0005	3.9	0.008	1	0.027	0.0007	0.004	0.005	0.000025	0.0005	0.61	0.004	0.001	1.3	57	6
33	WGM1/D2	7/03/2014	0.0005	0.32	0.0005	0.21	0.03	0.0001	0.0005	0.002	0.000025	0.0005	0.092	0.003	0.001	0.13	0.8	0.88
34	WGM1/D3	7/03/2014	0.0005	0.11	0.005	0.025	0.11	0.0001	0.002	0.003	0.000025	0.0005	0.1	0.003	0.001	0.17	0.005	0.73
35	WGM1/D4	7/03/2014	0.0005	0.02	0.001	1.7	0.018	0.0001	0.001	0.002	0.000025	0.0005	0.035	0.0005	0.001	0.073	21	16
36	WGM1/D5	7/03/2014	0.0005	3.5	0.0005	0.4	0.017	0.0004	0.001	0.002	0.000025	0.0005	0.12	0.003	0.001	0.21	0.43	1.9
37	WGM1/D6	7/03/2014	0.0005	4.9	0.006	1.1	0.028	0.0067	0.002	0.016	0.000025	0.0005	0.48	0.027	0.001	1.8	74	7

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## **Appendix H**

### **Lend Lease Water Results 2013 – 2014**

**(Refer to CD for full Appendix)**

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## **Appendix I**

### **KVAR Noise Report – December 2013**

**(Refer to CD for full Appendix)**

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**Appendix J**  
**KVAR Noise Report – March 2014**  
**(Refer to CD for full Appendix)**

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## **Appendix K**

### **KVAR Construction Noise Assessment Stage 2B – July 2013**

**(Refer to CD for full Appendix)**

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**Appendix L**  
**KVAR Stage 2 Water Quality Assessment – October 2014**  
**(Refer to CD for full Appendix)**

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