Kerosene Vale Ash Repository Stage 2– Air Quality Review

April 2010 – March 2012

Prepared for

For Delta Electricity

By

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SUMMARY

In 2002, Delta Electricity obtained approval for conversion of the wet slurry ash placement process at Wallerawang Power Station to dry ash. The dry ash repository was established at the Kerosene Vale open cut coal mine void site, on top of the original wet ash dam, Kerosene Vale Ash Dam (KVAD). When the KVAD was full of ash, wet ash placement was directed to the Sawyers Swamp Creek Ash Dam (SSCAD) from 1980, and ultimately the KVAD was capped with clay so dry ash placement could be undertaken.

The dry placement is called the Kerosene Vale Ash Repository (KVAR). Stage 1 of the placement was completed and capped in February 2009. Approval was obtained for further placement in the Stage 2 Area at the KVAR in November, 2008. The Stage 2 Area is in two parts: Stages 2A and 2B. Placement in the Stage 2A area began in April, 2009. Placement in the Stage 2B Area began on 19th January, 2012.

Stage 2A of KVAR (KVAR2A) was subject to assessment under Part 3A of the Environmental Planning and Assessment Act 1979 and was approved in November, 2008. As required by the Approval Conditions, Delta Electricity prepared an Operation Environmental Management Plan (OEMP) prior to the commencement of KVAR2A. As KVAR2A was nearing capacity, Delta was required to develop a Construction Environmental Management Plan (CEMP) to develop Section 2B. This was required as the OEMP for KVAR Stage 1 and 2 did not cover specific construction activities required for ash placement in Section 2B.

The OEMP includes an Air Quality Management Plan, which contains monitoring and reporting requirements, including the operation of seven dust deposition gauges in the vicinity of KVAR2.

In 2010, Malfroy Environmental Strategies Pty Ltd (M_E_S) was engaged by Delta Electricity to review the air quality monitoring data collected during the first year of KVAR2 operations (April 2009 – March 2010) and to report on the results against the requirements of the OEMP (M_E_S, 2012).

The current report presents the dust data collected in the second and third years of KVAR2 operations, from April 2010 to March 2012, and similarly reviews the results against the requirements of the OEMP.

Conclusions and recommendations arising from the review of the air quality monitoring data collected during the second and third years of KVAR2 operations appear below. In undertaking this data review some comments and observations are made on the operation of the air quality management plan.

1. Annual average dust deposition results in the second and third years of the Kerosene Vale Ash Repository Stage 2 (KVAR2) operations were below the criterion of 4 g/m^2/month at 6 of the 7 Operation Environmental Management Plan (OEMP) gauges.

2. Dust deposition results at the one gauge that exceeded 4 g/m^2/month in both 2010 – 2011 and 2011 – 2012 are unlikely to be related to KVAR2 operations.

3. A number of gauges in the OEMP network are poorly located for the purpose of identifying impacts from KVAR2 and as such consideration should be given to the reviewing the OEMP dust gauge monitoring network.

4. The dust gauge data from the first three years of KVAR2 operations do not indicate that KVAR2 operations have resulted in dust deposition above the OEMP levels that trigger the requirement to implement additional control measures.

5. The OEMP requirement that: *If the 4 g/m^2/month limit is exceeded by more than 2 g/m^2/month a review of the effectiveness of the dust suppression regime and further mitigation measures shall be undertaken*, should be amended to require an assessment of the likely contribution of KVAR2 operations to the dust deposition levels prior to undertaking a review of the control measures.

6. Should further, more detailed investigation into the potential impacts of KVAR2 and other sources be required in the future, consideration could be given to installing directional dust gauges in addition to the current standard dust gauges. Consideration could also be given to microscopic examination of a representative number of collected samples.

7. No complaints regarding dust emissions from KVAR2 were received by either Delta Electricity or the KVAR2 site contractor during the second and third years of KVAR2 operations.

8. It is not possible with the data available to make any comment regarding the OEMP objective of *zero visible dust events in vicinity of KVAR2 operations*, although the camera installed at KVAR2 might be used to assess performance against this objective.

9. It is considered that the monitoring and reporting requirements of the OEMP are being met.

1. INTRODUCTION

In 2002, Delta Electricity obtained approval for conversion of the wet slurry ash placement process at Wallerawang Power Station to dry ash. The dry ash repository was established at the Kerosene Vale open cut coal mine void site, on top of the original wet ash dam, Kerosene Vale Ash Dam (KVAD). When the KVAD was full of ash, wet ash placement was directed to the Sawyers Swamp Creek Ash Dam (SSCAD) from 1980, and ultimately the KVAD was capped with clay so dry ash placement could be undertaken.

The dry placement is called the Kerosene Vale Ash Repository (KVAR). Stage 1 of the placement was completed and capped in February 2009. Approval was obtained for further placement in the Stage 2 Area at the KVAR in November, 2008. The Stage 2 Area is in two parts: Stages 2A and 2B. Placement in the Stage 2A area began in April, 2009. Placement in the Stage 2B Area began on 19th January, 2012. The locations of the various ash dams and repositories are shown in Fugure1.

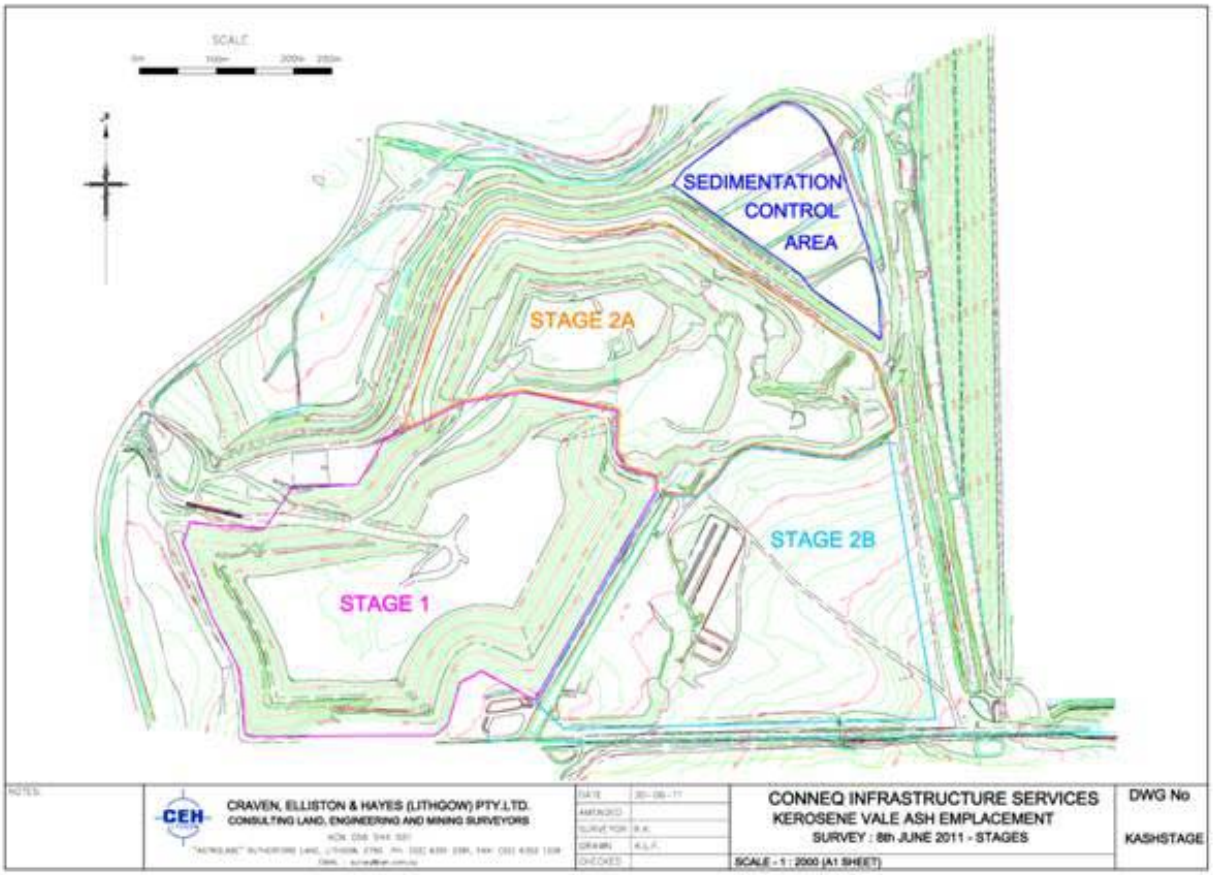


Figure 1: Location of Stage 1, 2A and 2B operational areas in the Kerosene Vale Ash Repository.

Stage 2A of KVAR (KVAR2A) was subject to assessment under Part 3A of the Environmental Planning and Assessment Act 1979 and was approved in November, 2008. As required by the Approval Conditions, Delta Electricity prepared an Operation Environmental Management Plan

(OEMP) prior to the commencement of KVAR2A. As KVAR2A was nearing capacity, Delta was required to develop a Construction Environmental Management Plan (CEMP) to develop Section 2B. This was required as the OEMP for KVAR Stage 1 and 2 did not cover specific construction activities required for ash placement in Section 2B.

Current KVAR Stage 2 activities are primarily being managed in accordance with the following documents and associated sub-plans:

- Operational Environmental Management Plan (Parsons Brinckerhoff, 2008)
- Construction Environmental Management Plan (Lend Lease and Delta Electricity, 2011)

The OEMP includes an Air Quality Management Plan, which contains monitoring and reporting requirements.

In 2010, Malfroy Environmental Strategies Pty Ltd (M_E_S) was engaged by Delta Electricity to review the air quality monitoring data collected during the first year of KVAR2 operations (April 2009 – March 2010) and to report on the results against the requirements of the OEMP (M_E_S, 2012).

The current report presents the dust deposition data collected in the second and third years of KVAR2 operations, from April 2010 to March 2012, and similarly reviews the results against the requirements of the OEMP.

2. THE KVAR2 AIR QUALITY MANAGEMENT PLAN

The key objective of the KVAR2 air quality management plan is "*to manage resources effectively to ensure the prevention of conditions that may lead to visible dust emissions."* (PB 2009, p. 77)

The air quality management plan includes the following performance measures.

Targets:

- The local air quality in the vicinity of the KVAR is not impacted by Stage 2 operations;
- Zero incidence of dust-related complaints

Indicators:

- Zero visible dust events in vicinity of Kerosene Vale Ash Repository during Stage 2 operations
- Complaints register demonstrating zero occurrence of dust related complaints.

The Plan states that "*Through the use of dust suppression equipment and the implementation of air quality management procedures, dust events can be controlled*." (PB, 2009 p. 77)

The detailed list of management and mitigation measures in the Plan is included in **Appendix 1.** These measures are monitored by Delta's Ash Placement Contractor, Lend Lease Infrastructure (LLI, formerly Conneq and Bilfinger Berger Services), and are reported at LLIs Monthly Contract Review Meetings. The measures include:

- Moisture conditioning of ash;
- Covering of ash loads in trucks;
- Wheel and undercarriage washes;

- Temporary capping of ash faces not currently in use and where irrigation systems are not in operation;
- Routine maintenance of truck washes, and washout/surface drainage pits;
- Routine washing of private haul roads within KVAR2;
- Use of water cart, as required;
- Dedicated sprinkler system;

2.1 Air quality monitoring

The air quality management plan includes the following monitoring requirements (PB, 2009):

- *A total of 7 deposition gauges shall be used to monitor dust emissions at the perimeter of the ash repository area, and at key locations adjacent to residential properties and Wallerawang Power Station. This includes the existing 5 dust deposition gauges and the installation of an additional 2 dust deposition gauges*

  Note: The positioning of the additional 2 gauges has been reviewed by specialist consultants based on a review of local weather patterns and the sensitivity of surrounding properties and will be subject to landowner approval.

- *Samples shall be removed from the dust deposition gauges on a monthly basis by a NATA approved laboratory and assessed for compliance with the appropriate air quality criteria.*

- *The DECC amenity-based criteria for dust fallout is a maximum total dust deposition of 4 g/m²/month (annual). The Stage 2 operations shall aim to achieve compliance with this limit.*

- *If the 4 g/m²/month limit is exceeded by more than 2 g/m², a review of the effectiveness of the dust suppression regime and further mitigation measures shall be undertaken including:*

  - *increased application rates of the irrigation system at the ash working face*
  - *increased application rates of water on haul roads, particularly during high wind events*
  - *further reduction in the ash face working area below1.5 hectares*
  - *increased implementation of temporary capping such as PVA, lignosulphate or tar where un-worked ash faces still exist*
  - *the application of higher ash moisture rates through the silo humidifier.*

2.2 Reporting

The air quality management plan includes the following reporting requirements (PB, 2009):

- *Delta Electricity shall issue a report to the DECC every 12 months from commencement of operations. The report shall contain the location, frequency, rationale and the procedures and protocols for collecting air quality samples as well as the parameters analysed and methods of analysis.*

- *The results and analysis of the monitoring data shall also be included and assessed against the air quality criteria (4 g/m²/month) and the baseline data provided in Table D of Appendix C. In the case of exceedences; the response taken must be documented within the report. Any deviations from the proposed monitoring program must also be justified.*

- *The Annual Environmental Management Report will be submitted to the Director-General complete with air quality monitoring data gathered throughout the year.*

3. THE MONITORING PROGRAM

3.1 OEMP dust gauge locations

The locations of the 5 dust gauges existing at the commencement of KVAR2 operations in 2009 and 2 new dust gauge locations required by the OEMP are shown in **Figure 2**. The 2 new gauges (31 and 32) are located in or near the residential area of Lidsdale and were installed in October, 2010. Gauge 31 is located about 100 metres south of where planned at the time of preparing the OEMP

The approximate distances of the gauges from the nearest KVAR2 boundary are shown in **Table 1**. With the exception of Gauge 29, all gauges are well beyond the perimeter of KVAR2 and from **Figure 2** it can be seen that, in some cases the gauges are nearby other potential dust sources, such as disturbed areas, mining activities and other power station operations.

Table 1: Existing dust gauges – distances from KVAR2

Gauge number	Approximate distance (m) from KVAR2 boundary
5	1,000
27	1,300
28	1,500
29	50
30	1,000
31	300
32	450

Figure 2: The location of the 7 OEMP dust gauges

3.2 KVAR2 on-site gauges

In addition to the gauges included in the OEMP, LLI, maintain a network of 8 dust gauges located on the perimeter of KVAR2, inside the working-area of KVAR2 and one additional gauge at the silo at Wallerawang Power Station where ash is conditioned and transferred to truck for transport to KVAR2. The locations of these gauges are shown in **Figure 3**.

These gauges are primarily used for Workplace Health and Safety monitoring, and inclusion of the results is not a project Approval Condition or a requirement of the OEMP, however these data are considered in this report to provide a more comprehensive assessment of potential dust impacts from KVAR2.

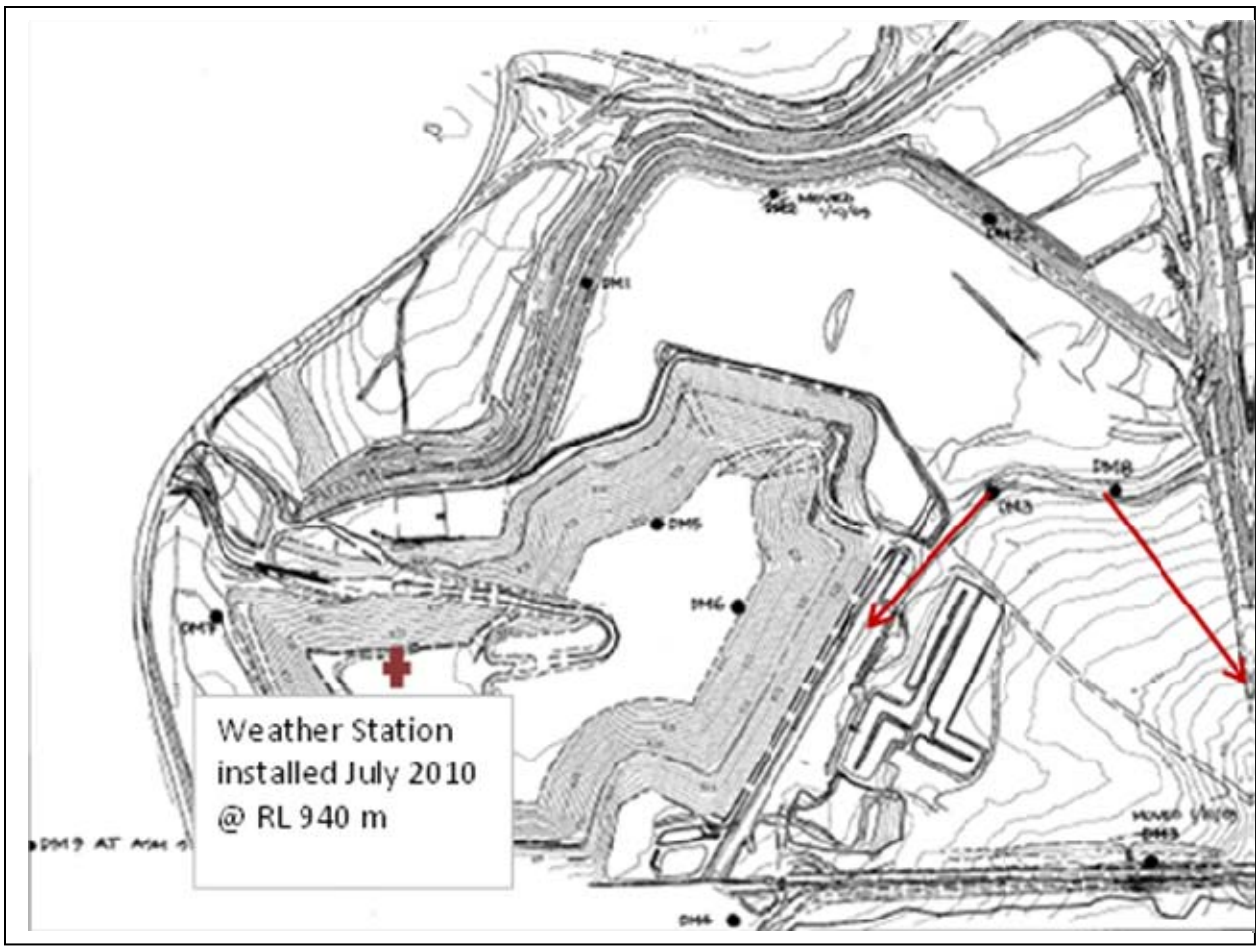


Figure 3: Location of dust gauges operated in and on the perimeter of KVAR2 by the site contractors.

Note that DM9 is located at the ash silo about 1,500m to the south-west at Wallerawang Power Station. Gauges 3 and 8 were relocated at time of Stage 2B commencement April, 2012, as indicated by the arrows.

3.3 Other Delta Electricity dust gauges

The existing OEMP dust gauges shown in **Figure 2** and **Table 1** form part of a broader regional dust gauge network operated by Delta Electricity for several decades. The current Delta Electricity dust gauge network is shown in **Appendix 2** and data from the network are considered in this report.

3.4 Anemometer

As was recommended in the 2009-10 Air Quality Review, a weather station, including an anemometer and rain gauge, was installed at the KVAR2 site in July 2010 to provide relevant climatic data to the site contractor. Prior to the availability of on-site data, the site contractor made use of wind data collected at the Mt Piper ash disposal area about 7 km to the north-west of KVAR2.

3.5 Frequency and methods

Table 2 presents details regarding the installation and operation of the dust monitoring network equipment.

The Delta Electricity and LLI gauges are maintained by, and samples analysed by ALS (formerly ACIRL Ltd) who have NATA accreditation for the relevant Australian Standard.

Table 2: Frequency of Measurements and Monitoring Methods

Parameter	*Frequency of measurement*	*NSW Approved Method (AM)and Australian Standard (AS)*
Dust gauges	Monthly	• AM-1 Guide for the siting of sampling units (AS 2922 – 1987) • AM-19 Particulates – deposited matter – gravimetric method (AS 3580.10.1 1991)

The collected samples are analysed in the laboratory according to AS 3580 for:

- Insoluble solids: this is the matter that does not dissolve in water.
- Incombustible (ash)[1] content: this is the matter that remains after the sample has been combusted in the laboratory.

Results for insoluble solids and incombustible material are expressed as g/m^2/month.

The insoluble solids and incombustible (ash) content of a collected dust sample can provide information on possible sources of the dust but due to the time-scale over which data are collected (monthly) and the fact that many disparate sources can contribute to deposited dust, it is often not possible to use dust gauge data to positively identify the contributing sources.

4. RESULTS

In this section data are presented for the second and third years of ash placement in KVAR2:

- April 2010 – March 2011
- April 2011 – March 2012

4.1 OEMP gauges

Tables 3 and 4 present the monthly dust deposition results for the 7 OEMP gauges during 2010 - 2011 and 2011 – 2012, respectively.

In 2010 – 2011 annual average dust deposition at 6 of the 7[2] gauges in the OEMP network was less than 3 g/m^2/month.

The annual average dust deposition was greater than 6 g/m^2/month at one Gauge (27). This was the result of deposition at Gauge 27 being greater than 6 g/m^2/month in six months of the year

[1] Ash content does not refer to coal ash, but could include ash from coal combustion and other mineral matter derived from soil, for example.
[2] Only 4 months of results available for gauges 31 and 32.

and greater than 20 g/m^2/month in 3 months. As can be seen from **Figure 2 and Table 1**, Gauge 27 is located about 1,500m from KVAR2 on Wallerawang Power Station land and in close proximity to a live coal storage area and adjacent to a public road. Dust deposition at Gauge 27 was higher, and often significantly and anomalously higher, than at the other 6 sites in 11 of the 12 months of the year. Given the location of Gauge 27 adjacent to a public road, human interference in the operation of the gauge can not be rule out. It is considered unlikely that KVAR2 is the source of high dust deposition at Gauge 27. The results from Gauge 27 are considered further in this section and also in Sections 6 and 7.

Results from Gauge 29, the closest of the gauges to KVAR2, exceeded 4 g/m^2/month in 3 months, averaging 2.6 g/m^2/month for the year. The average incombustible (ash) fraction of 0.7 was the highest of the OEMP gauges.

Deposition results for 4 months from the 2 new gauges (31 and 32) averaged 1.1 and 1.5 g/m^2/month. The highest monthly result was 2.8 g/m^2/month observed at Gauge 32 in February 2011.

Results for Gauges 5 and 30, to the north-west of KVAR2, were very low, averaging less than 1 g/m^2/month for the year with a very low incombustible fraction of less than 0.5.

In 2011 – 2012 (**Table 4**), the annual average deposition rates were generally lower than in the previous year. Excluding Gauge 27, the highest annual average was 2.1 g/m^2/month (5 annual averages were less than 2.0 g/m^2/month) with only one individual monthly average deposition in excess of 4 g/m^2/month.

As was the case in the previous year, results from Gauge 27 were significantly and anomalously high compared with results from the other gauges suggesting that results from this gauge should be used with caution when assessing potential impacts from KVAR2.

Full-year results for the 2 new gauges (31 and 32) were 1.0 and 1.6 g/m^2/month, respectively.

As in the previous year, results for Gauges 5 and 30 were very low, averaging less than 1 g/m^2/month for the year with a low incombustible fraction.

Results from Gauge 29 exceeded 4 g/m^2/month in 1 month averaging 2.1 g/m^2/month for the year. The average incombustible fraction of 0.7 was again the highest of the 7 gauges.

Table 3: Dust gauge data from the OEMP gauges for the second year of KVAR2 operations (April 2010 – March 2011)
Insol – Insoluble solids, g/m^2/month, **Frac**. – Incombustible (ash) fraction of insoluble solids.
Insoluble solid results of 0.1 g/m^2/month are reported Limit of Detection, in which case ash fraction not determined.

Gauge	5		27		28		29		30		31*		32*	
Month	**Insol.**	**Frac.**	**Insol.**	**Frac.**	**Insol.**	**Frac.**	**Insol.**	**Frac.**	**Insol.**	**Frac.**	**Insol.**	**Frac.**	**Insol.**	**Frac.**
April	0.4	0.3	3.3	0.3	0.9	0.7	1.0	0.7	0.8	0.3	-	-	-	-
May	1.7	0.6	4.2	0.4	0.7	0.4	2.4	0.8	0.7	0.3	-	-	-	-
June	3.9	0.9	24.6	0.4	0.9	0.4	2.7	0.8	0.2	0.0	-	-	-	-
July	0.9	0.3	25.6	0.8	6.3	0.9	4.2	0.8	1.0	0.5	-	-	-	-
August	0.2	0.5	13.7	0.7	2.0	0.7	1.4	0.6	0.7	0.3	-	-	-	-
September	0.7	0.1	87.2	0.2	1.3	0.5	2.6	0.8	0.6	0.7	-	-	-	-
October	*0.1*	-	4.2	0.4	1.9	0.6	4.1	0.8	*0.1*	-	-	-	-	-
November	*0.1*	-	7.4	0.5	0.4	0.3	2.0	0.7	0.5	0.2	-	-	-	-
December	*0.1*	-	15.3	0.6	1.0	0.2	1.7	0.6	0.7	0.3	0.4	0.3	0.6	0.3
January	1.7	0.1	4.8	0.4	1.7	0.6	1.6	0.7	1.3	0.4	0.8	0.4	1.0	0.2
February	0.3	0.3	2.8	0.5	1.4	0.6	2.9	0.8	0.6	0.2	2.0	0.3	2.8	0.8
March	0.7	0.3	3.5	0.5	8.0	0.2	5.1	0.8	1.0	0.3	1.0	0.5	1.6	0.8
Average(1)	**0.9**	**0.4**	**16.4**	**0.5**	**2.2**	**0.5**	**2.6**	**0.7**	**0.7**	**0.3**	**1.1**	**0.3**	**1.5**	**0.5**
Average(2)		0.5		0.4		0.5		0.8		0.3		0.3		0.7
Months > 4	0	-	9	-	2	-	3	-	0	-	0	-	0	-
Months > 6	0	-	6	-	2	-	0	-	0	-	0	-	0	-

* Commenced December, 2010
1. Average of monthly incombustible fractions
2. Average = total annual incombustible / total annual insoluble

Table 4: Dust gauge data from the OEMP gauges for the third year of KVAR2 operations (April 2011 – March 2012)

Insol – Insoluble solids, g/m2/month, Frac. – Incombustible (ash) fraction of insoluble solids.

Gauge / Month	5		27		28		29		30		31		32	
	Insol.	**Frac.**	**Insol.**	**Frac.**	**Insol.**	**Frac.**	**Insol.**	**Frac.**	**Insol.**	**Frac.**	**Insol.**	**Frac.**	**Insol.**	**Frac.**
April	*0.1*	-	4.0	0.3	1.2	0.6	1.6	0.8	0.2	0.5	2.9	0.3	1.0	0.6
May	1.0	0.4	5.9	0.6	1.3	0.5	5.5	0.8	0.6	1.0	0.8	0.5	1.7	0.8
June	0.5	0.2	2.0	0.7	1.2	0.8	2.6	0.7	0.8	0.4	0.3	0.3	1.0	0.7
July	0.1	-	3.9	0.9	0.8	-	2.0	0.7	0.7	0.1	0.4	1.0	1.8	0.8
August	1.4	0.6	5.3	0.8	2.1	0.7	3.7	0.8	1.0	0.2	0.6	0.5	3.3	0.8
September	0.6	0.7	10.2	0.7	2.7	0.6	3.1	0.8	0.7	0.3	0.3	0.3	2.4	0.7
October	1.1	0.2	3.0	0.5	2.1	0.6	1.6	0.8	0.9	0.6	0.9	0.4	2.6	0.7
November	0.9	0.2	22.7	0.5	1.9	0.6	2.3	0.7	0.8	0.4	2.3	0.5	1.4	0.6
December	0.5	0.0	2.6	0.7	1.9	0.6	1.4	0.6	0.3	0.3	0.1	-	0.5	0.4
January	1.0	0.7	5.5	0.6	0.8	0.5	0.7	0.7	0.3	0.3	1.7	0.4	1.2	0.7
February	0.5	0.2	2.8	0.3	0.2	0.5	0.3	0.3	*0.1*	-	0.3	0.3	1.7	0.4
March	1.2	0.5	4.4	0.7	0.8	0.6	0.9	0.6	-	-	0.8	0.5	0.7	0.4
Average(1)	**0.7**	**0.4**	**6.0**	**0.6**	**1.4**	**0.6**	**2.1**	**0.7**	**0.6**	**0.4**	**1.0**	**0.5**	**1.6**	**0.6**
Average(2)		0.4		0.6		0.6		0.7		0.4		0.5		0.7
Months > 4	0	-	6	-	0	-	1	-	0	-	0	-	0	-
Months > 6	0	-	2	-	0	-	0	-	0	-	0	-	0	-

1. Average of monthly incombustible fractions
2. Total annual incombustible / total annual insoluble

Figure 4 shows the annual average deposition rates of the incombustible ("ash") component of the deposited dust at the 7 OEMP gauges and 15 other Delta deposition gauges in the region over 6 calendar years (and first 4 months of 2012). The "ash" component is plotted on the understanding that if emissions from KVAR2 were impacting in the local area, these impacts would show up in increased deposition of incombustible (ash) material. As would be expected, results show year-to-year variation. The relatively high deposition rates in 2009 at all gauges in the region are due to the exceptional dust storms which occurred over south eastern Australia in September of that year As reported in the previous year's report (M_E_S, 2012) and shown in **Table 7**, dust deposition during several dust storms significantly elevated annual dust deposition rates.

Excluding the unusual 2009 averages, **Figure 4** indicates that in most years, the deposition of incombustible material is less than approximately 1 g/m^2/month at most sites and that results in 2010 – 2012 were similar to, or lower, than those from between 2006 – 2008, prior to the commencement of KVAR2.

Figure 4 also shows that a number of gauges show consistently higher rates of incombustible material depositions than the bulk of the gauges, and in particular:

- Gauge 25 is notable as it is located within about 100m of KVAR2, but not included in the OEMP network, and adjacent to the Wallerawang coal haul road. Vehicle generated dust from this road (due to re-suspension of fugitive ash particles) would appear to be the probable source of the high deposition rates at this gauge relative to other sites in the network;
- Gauge 27, an OEMP gauge, has previously been discussed as being over 1km from the KVAR2 site, and probably impacted by activities unrelated to KVAR2;
- Gauge 24 is located nearby significant mining operations and the Mt Piper ash storage area (see Appendix 2 for location);
- Gauge 29 is the OEMP gauge nearest KVAR2 and Figure 4 indicates deposition of incombustible material was lower in 2010 – 2012 compared with 2006 – 2008. As shown in Tables 3 and 4, a high proportion of the deposition at Gauge 29 is incombustible.

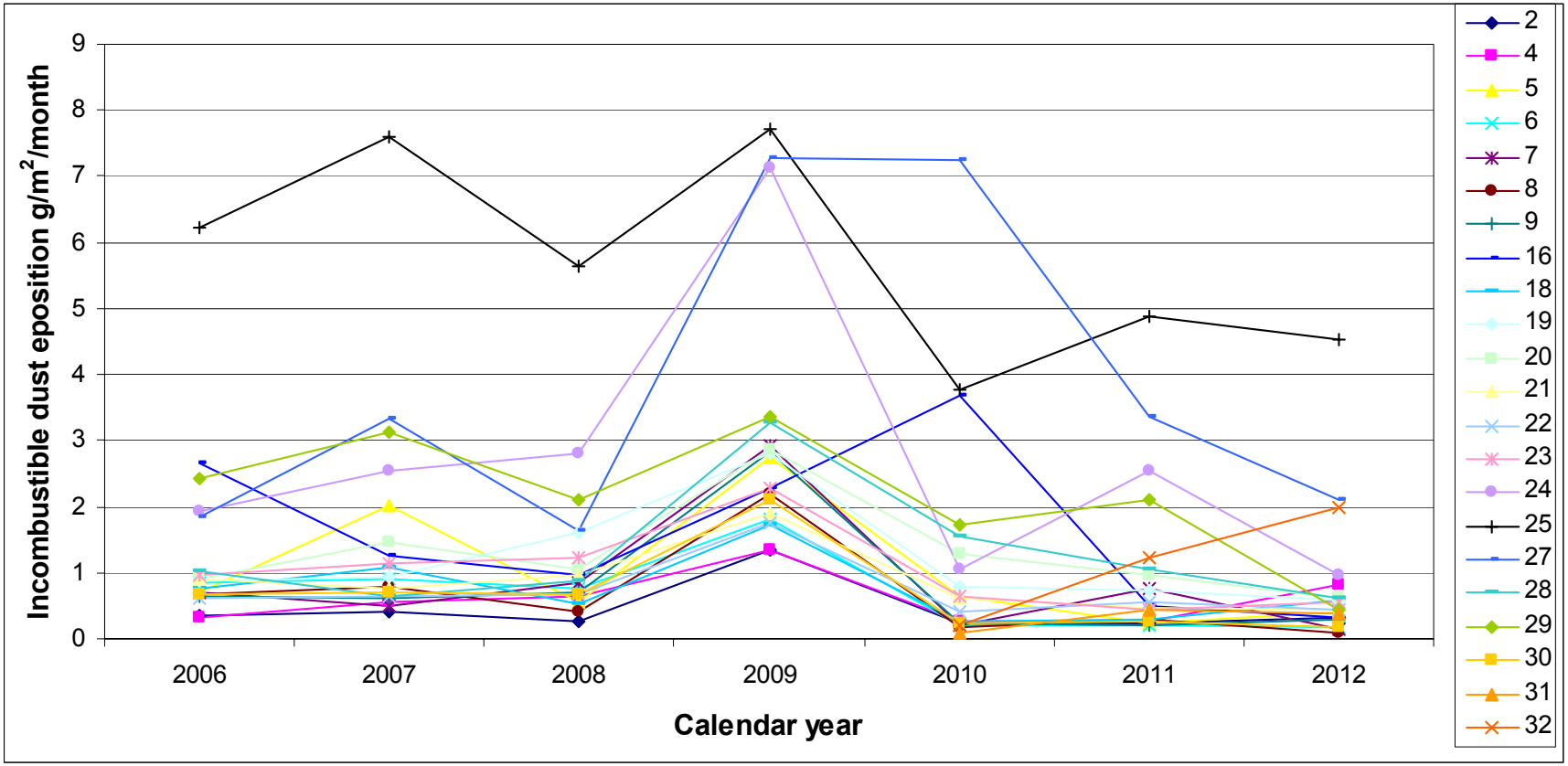


Figure 4: Annual deposition of the incombustible (ash) fraction of total dust deposition at the 7 OEMP gauges and 15 other Delta Electricity gauges.

4.2 KVAR2 on-site gauges

While the OEMP does not require that results from LLI's on-site gauges be included in the annual report, the results for the second and third years of operation are included in **Tables 5 and 6**, respectively, for completeness. These data demonstrate that gauges located at the perimeter of KVAR2 and to the west of the site (1, 4 and 7) nearer residential areas, recorded annual average deposition rates below 4 g/m^2/month in both years, with very few individual monthly results above 4g/m^2/month.

Gauge 9 is located adjacent to the ash loading silo at Wallerawang Power Station, about 1,500m from KVAR2, and it would appear to be influenced by the ash transfer operations at the silo. This is indicated by the high average ash fraction of 0.8 compared with the other sites, which despite being located on or adjacent to the ash placement area, are influenced by other dust sources with a lower incombustible (ash) fraction.

The highest on-site monthly deposition rates generally occur at Gauges 3, 5, 6 and 8, which from **Figure 3** can be seen to be located well inside the perimeter of KVAR2.

5. COMPLAINT REGISTERS

Both Delta Electricity and LLI maintain registers which record the details of any complaints received by members of the public and a description of any investigation and corrective action taken in response to the complaint.

No complaints were received by either organisation in relation to KVAR2 operations in the 2 years covered by this report (2010 - 11, 2011 - 12).

Since the commencement of KVAR2, Delta Electricity has not received any complaints directly related to emissions from the facility. There was one complaint in May 2009, which was documented in the previous report, regarding ash trucks operating on the coal haulage road with ash uncovered and therefore a potential source of dust in the ambient environment.

Table 5: Dust gauge data from the on-site gauges for the second year of KVAR2 operations (April 2010 – March 2011).

Insol – Insoluble solids, g/m^2/month, **Frac**. – Incombustible (ash) fraction of insoluble solids

Gauge / Month	1		2		3		4		5	
	Insol.	**Frac.**	**Insol.**	**Frac.**	**Insol.**	**Frac.**	**Insol.**	**Frac.**	**Insol.**	**Frac.**
April	0.1	-	0.4	0.3	11.6	0.8	2.3	0.5	10.2	0.4
May	1.0	0.8	2.0	0.7	2.2	0.8	1.6	0.7	25.9	0.5
June	3.2	0.5	1.0	0.5	0.5	0.6	1.2	0.3	4.7	0.6
July	0.5	0.4	1.6	0.6	19.0	0.8	1.5	0.6	3.2	0.4
August	4.1	0.8	1.1	0.7	5.9	0.9	0.8	0.5	1.7	0.5
September	2.0	0.8	7.3	0.7	3.4	0.6	2.5	0.6	6.4	0.5
October	11.0	0.8	2.4	0.8	1.9	0.8	3.0	0.5	50.4	0.5
November	3.2	0.8	0.6	0.7	1.3	0.8	2.7	0.4	11.6	0.8
December	2.7	0.7	0.3	0.3	1.6	0.6	1.3	0.2	14.2	0.7
January	3.6	0.9	1.2	0.8	0.1	-	0.2	-	3.1	0.7
February	3.6	0.9	2.5	0.8	5.9	0.7	3.0	0.7	6.3	0.7
March	0.8	0.6	3.1	0.9	1.2	0.8	1.4	0.7	29.2	0.6
Average(1)										
Average(2)	3.0	0.7	2.0	0.6	4.6	0.7	1.8	0.5	13.9	0.6
Months > 4	2	-	1	-	4	-	0	-	9	-
Months > 6	1	-	1	-	2	-	0	-	8	-

1. Average of monthly incombustible fractions
2. Weighted average = total annual incombustible / total annual insoluble

Table 5 (continued): Dust gauge data from the on-site gauges for the second year of KVAR2 operations (April 2010 – March 2011).

Insol – Insoluble solids, g/m^2/month, **Frac**. – Incombustible (ash) fraction of insoluble solids

Gauge / Month	6		7		8		9	
	Insol.	**Frac.**	**Insol.**	**Frac.**	**Insol.**	**Frac.**	**Insol.**	**Frac.**
April	10.8	0.5	2.2	0.7	1.7	0.6	6.9	0.9
May	2.9	0.4	1.8	0.7	4.3	0.7	7.5	0.9
June	3.7	0.5	0.3	0.3	0.2	0.0	5.6	0.9
July	7.3	0.6	2.1	0.8	1.1	0.5	6.4	0.8
August	7.2	0.7	3.2	0.8	5.0	0.9	5.6	0.8
September	4.0	0.8	1.0	0.7	5.2	0.8	4.2	0.9
October	5.1	0.3	3.6	0.8	5.5	0.9	6.4	0.9
November	11.5	0.5	2.8	0.8	1.5	0.7	4.5	0.8
December	12.2	0.3	3.6	0.8	1.8	0.6	4.4	0.8
January	4.2	0.5	1.6	0.8	0.3	0.7	2.5	0.7
February	5.1	0.5	4.9	0.8	7.8	0.9	10.8	0.3
March	6.5	0.8	3.2	0.8	0.9	0.8	8.8	0.8
Average(1)								
Average(2)	6.7	0.5	2.5	0.7	2.9	0.7	6.1	0.8
Months > 4	9	-	1	-	5	-	11	-
Months > 6	6	-	0	-	1	-	6	-

1. Average of monthly incombustible fractions
2. Weighted average = total annual incombustible / total annual insoluble

Table 6: Dust gauge data from the on-site gauges for the third of KVAR2 operations (April 2011 – March 2012).

Insol – Insoluble solids, g/m^2/month, **Frac**. – Incombustible (ash) fraction of insoluble solids

Gauge / Month	1		2		3		4		5	
	Insol.	**Frac.**	**Insol.**	**Frac.**	**Insol.**	**Frac.**	**Insol.**	**Frac.**	**Insol.**	**Frac.**
April	1.6	0.3	2.9	0.9	1.6	0.8	2.6	0.6	15.0	0.6
May	3.2	0.7	3.4	0.9	5.2	0.9	2.6	0.7	10.9	0.7
June	1.0	0.6	1.5	0.9	1.4	0.9	1.3	0.6	7.6	0.7
July	2.1	0.6	1.4	0.8	1.7	0.9	8.2	0.8	2.5	0.8
August	4.7	0.8	1.2	0.8	7.4	0.9	2.4	0.8	23.8	0.7
September	2.9	0.7	0.9	0.8	1.4	0.8	2.4	0.8	10.6	0.7
October	4.8	0.9	0.8	0.6	1.7	0.8	1.1	0.6	28.2	0.7
November	0.1	-	0.3	0.7	-	-	0.7	0.6	28.3	0.6
December	2.0	0.9	0.9	0.9	-	-	0.8	0.4	5.0	0.6
January	2.1	0.9	1.0	0.8	-	-	0.8	0.4	5.0	0.6
February	17.1	0.4	1.7	0.8	-	-	1.7	0.3	6.3	0.4
March	3.6	0.3	0.7	0.4	-	-	2.6	0.7	15.3	0.2
Average(1) ***Average(2)***	3.8	0.6	1.4	0.8	2.9	0.9	2.3	0.6	13.2	0.6
Months > 4	3	-	0	-	2	-	1	-	11	-
Months > 6	1	-	0	-	1	-	1	-	9	-

1. Average of monthly incombustible fractions
2. Weighted average = total annual incombustible / total annual insoluble

Table 6 (continued): Dust gauge data from the on-site gauges for the third year of KVAR2 operations (April 2011 – March 2012).

Insol – Insoluble solids, g/m^2/month, **Frac**. – Incombustible (ash) fraction of insoluble solids

Gauge / Month	6		7		8		9	
	Insol.	**Frac.**	**Insol.**	**Frac.**	**Insol.**	**Frac.**	**Insol.**	**Frac.**
April	0.5	0.2	0.9	0.6	0.1	-	2.0	0.7
May	7.0	0.5	3.5	0.8	3.4	0.8	13.9	0.9
June	0.8	0.6	1.2	0.8	2.8	0.9	4.7	0.9
July	0.7	0.6	2.0	0.8	10.5	0.9	19.4	0.9
August	13.0	1.0	3.1	0.8	3.7	0.9	17.7	0.9
September	3.4	0.6	2.0	0.7	2.0	0.9	9.7	0.8
October	3.8	0.8	3.0	0.8	0.9	0.9	1.8	0.7
November	5.1	0.8	1.8	0.8	-	-	4.8	0.9
December	2.7	0.4	1.2	0.8	-	-	2.0	0.8
January	2.7	0.4	1.3	0.8	-	-	2.1	0.8
February	7.2	0.6	0.9	0.8	-	-	4.6	0.8
March	0.9	0.6	0.3	0.3	-	-	0.7	0.7
Average(1) ***Average(2)***	4.0	0.6	1.8	0.7	3.3	0.9	7.0	0.8
Months > 4	4	-	0	-	1	-	7	-
Months > 6	3	-	0	-	1	-	4	-

1. Average of monthly incombustible fractions
2. Weighted average = total annual incombustible / total annual insoluble

6. AIR QUALITY MANAGEMENT PLAN REQUIREMENTS

Although addressed, at least in part, in previous sections, this section explicitly addresses the specific requirements of the KVAR2 OEMP and Air Quality Management Plan.

The key objective of the KVAR2 air quality management plan is "*to manage resources effectively to ensure the prevention of conditions that may lead to visible dust emissions."* (PB, 2009 p. 77)

While not specifically included in the M_E_S reporting brief, during an inspection of KVAR2 and surrounding areas on the 27th April, 2010, the range of management measures included in the OEMP to minimise dust emissions were observed to be operating and no visible dust was being generated by KVAR2 operations.

The OEMP includes the following performance measures:

Targets:

- The local air quality in the vicinity of the KVAR is not impacted by Stage 2 operations;
- Zero incidence of dust-related complaints

Indicators:

- Zero visible dust events in vicinity of Kerosene Vale Ash Repository during Stage 2 operations
- Complaints register demonstrating zero occurrence of dust related complaints.

With respect to the first target, data presented in Section 4 demonstrated that Stage 2 operations are not adversely impacting on dust deposition levels in the vicinity of KVAR2.

As noted in the previous section, both Delta Electricity and LLI have systems in place to receive, record and respond to complaints. During the first three years of operation of KVAR2 no complaints related to dust emissions from the facility were received by either Delta Electricity or the site contractors.

It is not possible with the data available to make any comment regarding the indicator of *zero visible dust events in vicinity of KVAR2 operations*, although as discussed in the next section, the camera installed at KVAR2 might be used in the future to assess performance against this objective.

Air quality monitoring

The OEMP specifies 5 existing dust gauges and 2 new gauges. With the installation of Gauges 31 and 32 (**Figure 2**) in October, 2010, all 7 gauges are operational.

The OEMP adopts the aim of complying with the 4 g/m^2/month (as an annual average) amenity limit. As documented in **Tables 3** and **4** and **Table 7** dust deposition at 6 of the 7 OEMP gauges was less than the 4 g/m^2/month (annual) in the second and third years of operation.

Dust deposition at Gauge 27 exceeded 4 g/m^2/month (annual) in both years and exceeded 6 g/m^2/month in 2010 - 2011 but as discussed previously, and further in the next section, elevated OEMP dust gauge results are not necessarily caused by emissions from KVAR2 and some of the OEMP gauges, in particular Gauges 27 and 28, are poorly located for the purpose of identifying

impacts from KVAR2. The elevated results recorded at Gauge 27 are most unlikely to be significantly affected by emissions from KVAR2.

Reporting

The OEMP includes reporting requirements, such as *location frequency, rationale and the procedures and protocols for collecting air quality samples as well as the parameters analysed and methods of analysis.* These requirements have been addressed in Section 3 of this report.

The reporting requirement for the OEMP data to be assessed against the 4 g/m^2/month criterion has been addressed immediately above and in Section 4.

The OEMP also requires the data *to be assessed against the baseline data provided in Table D of Appendix C* (of the air quality assessment). **Table 7** reproduces the data from the referenced Table D and adds more recently collected data to it, including data from the first three years of KVAR2 operations (April 2009 – March 2012).

Table 7 demonstrates that average dust levels at the OEMP gauges vary from year-to-year, as expected.

For 4 of the 5 gauges operating prior to the commencement of KVAR2, deposition rates in the first year of KVAR2 were within the range recorded in previous years, while deposition in the subsequent 2 years was generally lower than prior to commencement of KVAR2. The results do not indicate any adverse change due to KVAR2 operations, particularly at Gauge 29 which is closest to KVAR2. Results from Gauge 29 during toperation.

As discussed above, Gauges 27 and 28 are poorly located for the purpose of identifying impacts from KVAR2. The elevated results recorded at Gauge 27 are most unlikely to be significantly affected by emissions from KVAR2.

Table 7: Annual average dust deposition recorded by OEMP gauges

	Year	Dust Gauge, Annual average g/m^2/annual average						
		DG5	**DG27**	**DG28**	**DG29**	**DG30**	**DG31***	**DG32**
From Table D. Calendar years	**2002**	-	1.7	2.2	1.2	0.8	-	-
	2003	-	1.3	2.1	7.4	0.8	-	-
	2004	-	1.8	1.3	5.3	0.7	-	-
	2005	-	5.7	2.0	4.9	1.0	-	-
	2006	1.2	3.2	4.9	3.0	1.0	-	-
	Jan – Jun 2007	1.0	3.9	1.8	3.0	1.1	-	-
Calendar years	**2007**	2.7	5.0	1.1	3.7	1.0	-	-
	2008	1.0	2.8	1.8	2.6	1.2	-	-
KVAR2 April – March	**2009 – 2010 (Excluding dust storms)**	1.4	10.3	2.6	2.7	1.0	-	-
	2009 – 2010 (Including dust storms)	3.9	14.4	4.6	4.1	2.7	-	-
	2010 - 2011	0.9	16.4	2.2	2.6	0.7	1.1	1.5
	2011 – 2012	0.7	6.0	1.4	2.1	0.6	1.0	1.6

***** Last 4 months on the year only

7. DISCUSSION

Dust gauges are often positioned adjacent to dust generating activities to assess possible nuisance impacts at nearby receptors. As a passive collection system they are inexpensive to install and maintain but are subject to a number of limitations:

- They are more effective in collecting coarse particles than fine particles;
- Results are often influenced by things like insects, bird droppings and occasionally human interference;
- The collection period of a month makes the assessment of short-term, individual events impossible;
- Without further analysis, it is difficult, if not impossible, to use dust gauge results to discriminate between a number of possible sources.

Notwithstanding these limitations, dust gauge data, have the potential to provide some relevant information regarding the potential dust impacts arising from KVAR2 when used cautiously.

It is noted that in relation to dust gauge samples, "ash" refers to the incombustible, inorganic fraction of the sample and the "ash" fraction of a sample can not be directly related to coal-ash. This point was illustrated in the previous report (M_E_S, 2012) using data from September 2009, during which time the KVAR2 dust gauge results were clearly influenced by the regional dust events. The ash fractions of the samples collected during this month were generally high at about 0.8, indicating the dominance of inorganic, crustal material. KVAR2 Gauge 9, which is located near the ash silo at Wallerawang Power Station, shows ash fractions of 0.8, or higher, in most months and in this case the high ash content is probably due to fugitive ash emissions from the transfer process. The emissions are the inorganic, incombustible remains following coal combustion. This point is considered further later in this discussion, but here it is noted that a high "ash" fraction does not necessarily indicate ash from coal combustion.

Related to the above discussion is the OEMP's requirement that:

If the 4 g/m^2/month limit is exceeded by more than 2 g/m^2/month a review of the effectiveness of the dust suppression regime and further mitigation measures shall be undertaken…

This requirement appears to be based on the simplistic assumption that any measured increase in dust deposition at OEMP gauges is the result of emissions from KVAR2. A diverse range of sources (including regional dust storms, as noted above) can contribute to dust gauge results and, as noted previously, some OEMP dust gauges are poorly located for the purpose of identifying impacts from KVAR2. Care must be exercised in attempting to relate dust deposition results to potential dust sources. The contributing source, or sources, to an elevated result can not always simply or easily be determined. It follows that prior to reviewing *the effectiveness of the (KVAR2) dust suppression regime* that some effort should be made to determine the likely contribution of KVAR2 operations to the dust event(s).

As noted above dust gauges are most commonly used adjacent to, or in close proximity to, potentially "dusty" activities. With respect to the location of the OEMP gauges it should be noted that data obtained from gauges located at some distance from KVAR2 are unlikely to provide robust, useful information regarding potential impacts from the KVAR2. Of the existing 7 OEMP gauges it is considered that Gauge 29, which is adjacent to KVAR2 and Gauges 31 and 32 (**Figure 2**) are likely to provide information which is useful in assessing potential impacts

from KVAR2. In 2010 – 2011 and 2011 – 2012 the annual average deposition at these 3 sites was, at most, 2.6 g/m^2/month and exceeded 4 g/m^2/month in only 4 individual months. The trigger threshold of 6g/m^2/month was not exceeded in any single month during the reporting period for Gauges 29, 31 and 32.

It is considered that OEMP Gauges 5, 27, 28 and 30 are too far away to provide data relevant to assessing KVAR2 impacts. Gauge 5 might be considered to provide "background" data, but the only use for gauge locations 27 and 28 should be to monitor potential dust deposition from Wallerawang Power Station's operations, including the coal stack. The elevated results recorded at Gauge 27 are often associated with a relatively low "ash" fraction and are most unlikely to be related to KVAR2 operations, but as discussed in Section 4, may well be significantly influenced by human interference.

Results for Gauges 5 and 30 in 2010 – 2011 and 2011 – 2012 were very low, averaging less than 1 g/m^2/month in both years.

Dust data from the first three years of operation of KVAR2 showed no indication of an increase in dust deposition levels when compared with data collected in the years immediately preceding KVAR2 operations, particularly at Gauge 29, the closest to KVAR2. If considered necessary, further information on the contribution that ash particles from KVAR2 make to dust deposition beyond the site's perimeter could be provided by the use of microscopic examination of a number of collected samples. Such examination could distinguish crustal material and "ash" resulting from coal combustion, the latter being characterised by spherical particles of varying diameter. Consideration could also be given to installing directional dust gauges, as well as standard dust gauges, at OEMP sites to provide additional information on potential dust sources.

While a number of results from the KVAR2 on-site gauges recorded annual results equal to and above 6 g/m^2/month, it should be noted that these gauges are positioned primarily for monitoring Work Place Safety requirements and are located well within the perimeter of KVAR2. Results from gauges located on the perimeter of the site (2, 1, 4, 7) were less than 4g/m^2/month, on average, indicating that elevated dust levels were not leaving the site (in these directions). It is also of note that the average ash fraction of the on-site gauges of approximately 0.6 to 0.8, indicates that sources with a significant combustible fraction contribute to the dust results on KVAR2.

When the dust gauge material is analysed on a monthly basis for insoluble solids, ash and combustible fractions, the analysts provide a description of the collected material, based on visual inspection including colour, size (fine, coarse etc) and if possible the composition of the collected material, which might typically include the following: bugs, organics, plant material, spiders, bird droppings – as well as the more generic "dust". The colour of the collected dust is variously described as black, brown, grey and green (perhaps due to biological activity). If coal-ash from KVAR2 were making a significant contribution to deposited dust levels, it might be expected that the collected ash would be described as grey (the colour of the coal-ash varies from light to dark grey), on a regular basis.

LLS Gauge 9 is located at the ash transfer facility at Wallerawang Power Station – and 20 of the 24 monthly samples in 2010-11 and 2011-12 included "grey" as a descriptor, suggesting coal-ash may be contributing at this site –and this possibility is supported by the high "ash" fraction of about 0.8 at this site compared with other sites. Of the LLS gauges located at KVAR2, 79 out of 192 monthly samples (about 40%) included "grey" as a descriptor. The OEMP Gauge 29 is

closest to KVAR2 and 20 of the 24 samples (83%) included "grey" as a descriptor compared with 43 out of 128 (34%) for the remaining 6 OEMP gauges.

Finally, as commented upon during the previous annual report, the images collected from the camera installed at KVAR2 could be very useful in confirming or dismissing KVAR2 as a source of visible dust emissions. Should visible dust emissions be confirmed, data collected at the weather station on KVAR2, installed in July 2010, would be useful in recording the conditions under which dusting occurs, which then might enable effective corrective measures to be implemented. It suggested that the collected camera images and weather data be routinely reviewed to ensure that the instruments are working satisfactorily. It is also noted that another camera has been installed at the ash transfer silo at Wallerawang Power Station.

8. CONCLUSIONS and RECOMMENDATIONS

1. Annual average dust deposition results in the second and third years of the Kerosene Vale Ash Repository Stage 2 (KVAR2) operations were below the criterion of 4 g/m^2/month at 6 of the 7 Operation Environmental Management Plan (OEMP) gauges.

2. Dust deposition results at the one gauge that exceeded 4 g/m2/month in both 2010 – 2011 and 2011 – 2012 are unlikely to be related to KVAR2 operations.

3. A number of gauges in the OEMP network are poorly located for the purpose of identifying impacts from KVAR2 and as such the OEMP dust gauge monitoring network should be reviewed.

4. The dust gauge data from the first three years of KVAR2 operations do not indicate that KVAR2 operations have resulted in dust deposition above the OEMP levels that trigger the requirement to implement additional control measures.

5. The OEMP requirement that: *If the 4 g/m^2/month limit is exceeded by more than 2 g/m^2/month a review of the effectiveness of the dust suppression regime and further mitigation measures shall be undertaken,* should be amended to require an assessment of the likely contribution of KVAR2 operations to the dust deposition levels prior to undertaking a review of the control measures.

6. Should further, more detailed investigation into the potential impacts of KVAR2 and other sources be required in the future, consideration could be given to installing directional dust gauges in addition to the current standard dust gauges. Consideration could also be given to microscopic examination of a representative number of collected samples.

7. No complaints regarding dust emissions from KVAR2 were received by either Delta Electricity or the KVAR2 site contractor during the second and third years of KVAR2 operations.

8. It is not possible with the data available to make any comment regarding the OEMP objective of zero visible dust events in vicinity of KVAR2 operations, although the camera installed at KVAR2 might be used to assess performance against this objective.

9. It is considered that the monitoring and reporting requirements of the OEMP are being met.

9. REFERENCES

DEC (2005) Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, Department of Environment and Conservation, ISBN 1 74137 488 X, Sydney

DustWatch website

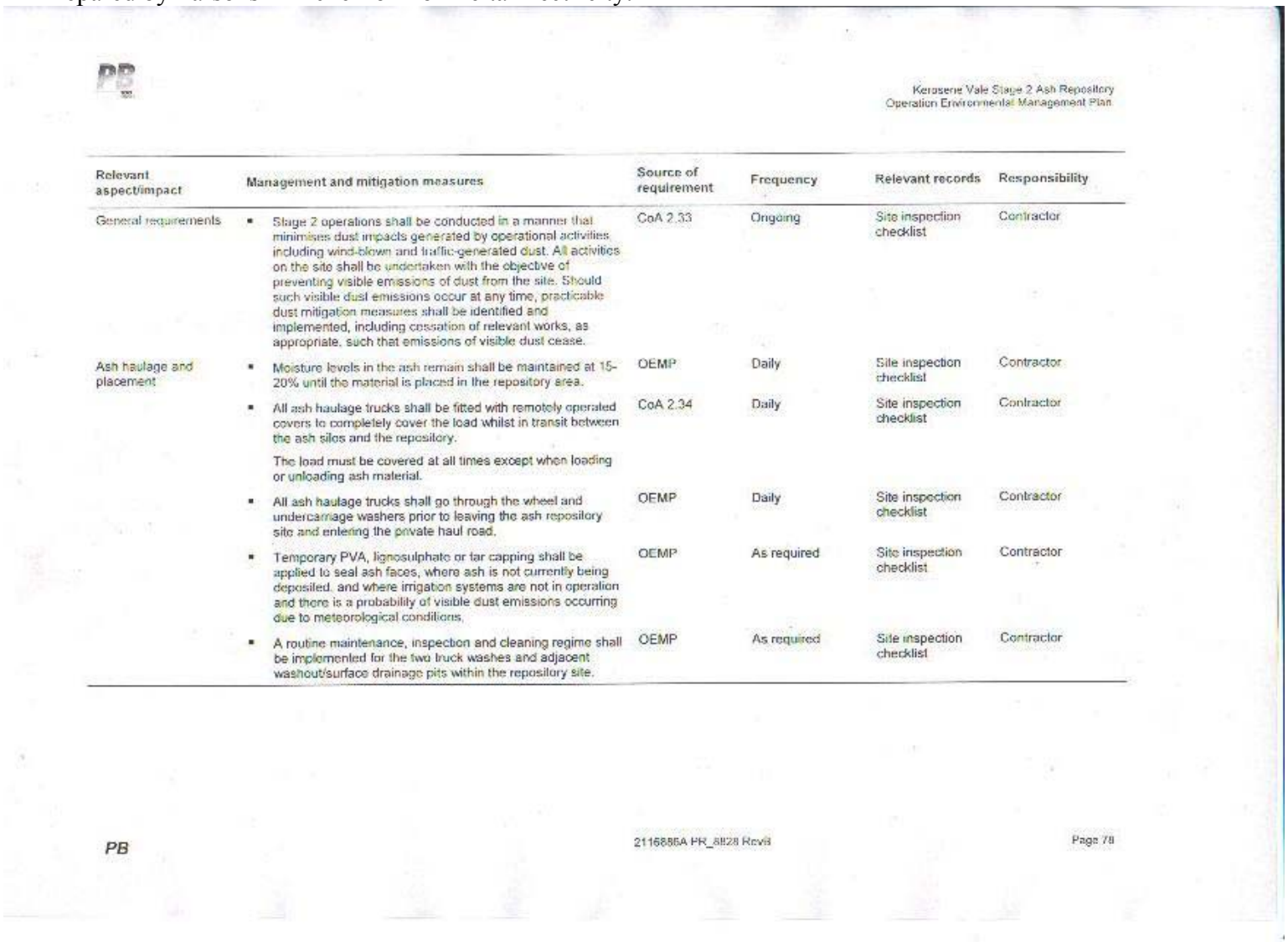
Lend Lease and Delta Electricity (2011) Kerosene Vale Ash Repository Stage 2B Construction Environmental Management Plan.

Malfroy Environmental Strategies (2012) Kerosene Vale Ash Repository Stage 2– Air Quality Review April 2009 – March 2010. Prepared for Delta Electricity

Parsons Brinckerhoff (2009) Kerosene Vale Stage 2 Ash Repository Operation Environmental Management Plan. Prepared for Delta Electricity.

10. APPENDIX 1: THE AIR QUALITY MANAGEMENT PLAN

Prepared by Parsons Brinckerhoff for Delta Electricity.



PB

Kerosene Vale Stage 2 Ash Repository
Operation Environmental Management Plan

Relevant aspect/impact	Management and mitigation measures	Source of requirement	Frequency	Relevant records	Responsibility
General requirements	▪ Stage 2 operations shall be conducted in a manner that minimises dust impacts generated by operational activities including wind-blown and traffic-generated dust. 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, practicable dust mitigation measures shall be identified and implemented, including cessation of relevant works, as appropriate, such that emissions of visible dust cease.	CoA 2.33	Ongoing	Site inspection checklist	Contractor
Ash haulage and placement	▪ Moisture levels in the ash remain shall be maintained at 15-20% until the material is placed in the repository area.	OEMP	Daily	Site inspection checklist	Contractor
	▪ All ash haulage trucks shall be fitted with remotely operated covers to completely cover the load whilst in transit between the ash silos and the repository. The load must be covered at all times except when loading or unloading ash material.	CoA 2.34	Daily	Site inspection checklist	Contractor
	▪ All ash haulage trucks shall go through the wheel and undercarriage washers prior to leaving the ash repository site and entering the private haul road.	OEMP	Daily	Site inspection checklist	Contractor
	▪ Temporary PVA, lignosulphate or tar capping shall be applied to seal ash faces, where ash is not currently being deposited, and where irrigation systems are not in operation and there is a probability of visible dust emissions occurring due to meteorological conditions.	OEMP	As required	Site inspection checklist	Contractor
	▪ A routine maintenance, inspection and cleaning regime shall be implemented for the two truck washes and adjacent washout/surface drainage pits within the repository site.	OEMP	As required	Site inspection checklist	Contractor

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Relevant aspect/impact	Management and mitigation measures	Source of requirement	Frequency	Relevant records	Responsibility
Ash haulage and placement	▪ The private haulage roads shall be maintained in a clean condition by routinely washing the surface. This applies to the haul roads within the repository zone and does not include the private haul road from the power station. Particular attention must be paid during wet periods when muddy water is drawn from the repository area and deposited on the haul roads.	OEMP	As required	Site inspection checklist	Contractor
Dust controls	▪ A water cart shall be used to undertake dust suppression activities throughout the repository site, as required.	OEMP	As required	Site inspection checklist	Contractor
	▪ A dedicated water sprinkler and surface irrigation system shall be installed to cover the active ash placement area. The system will be in place prior to the commencement of ash placement activities and will be operated for the entire daily operating period or when 15 minute wind speed thresholds exceed 5 metres per second.	OEMP	As required	Site inspection checklist	Contractor
	▪ Note: Application rates and the coverage area shall have the capacity to ensure that no visible emissions from the repository area occur.				
	▪ In the event of visible dust emissions from the repository area, personnel shall notify the Site Manager or Repository Team Leader immediately, who will immediately direct the water cart operator to spray the area and review the location and application rate of the sprinkler system.	OEMP	As required	Site inspection checklist	Contractor
Air quality monitoring	▪ A total of 7 deposition gauges shall be used to monitor dust emissions at the perimeter of the ash repository area, and at key locations adjacent to residential properties and Wallerawang Power Station. This includes the existing 5 dust deposition gauges and the installation of an additional 2 dust deposition gauges. Note: The positioning of the additional 2 gauges has been reviewed by specialist consultants based on a review of local weather patterns and the sensitivity of surrounding properties and will be subject to landowner approval. Refer to Figure 6-5 for further details.	OEMP	Establishment prior to commencement of operations. Monthly to contribute to baseline data and monthly thereafter to monitor operations	Air monitoring records	Delta Electricity Specialist consultant

Relevant aspect/impact	Management and mitigation measures	Source of requirement	Frequency	Relevant records	Responsibility
Air quality monitoring	▪ Samples shall be removed from the dust deposition gauges on a monthly basis by a NATA approved laboratory and assessed for compliance with the appropriate air quality criteria.	OEMP	Monthly	Air monitoring report	Delta Electricity Specialist consultant
	▪ The DECC amenity-based criteria for dust fallout is a maximum total dust deposition of 4 g/m²/month (annual). The Stage 2 operations shall aim to achieve compliance with this limit.	OEMP	Ongoing	Air monitoring records	Delta Electricity Contractor
Air quality monitoring	▪ If the 4 g/m²/month limit is exceeded by more than 2 g/m², a review of the effectiveness of the dust suppression regime and further mitigation measures shall be undertaken, including: ‣ increased application rates of the irrigation system at the ash working face ‣ increased application rates of water on haul roads, particularly during high wind events ‣ further reduction in the ash face working area below 1.5 hectares ‣ increased implementation of temporary capping such as PVA, lignosulphate or tar where un-worked ash faces still exist ‣ the application of higher ash moisture rates through the silo humidifier.	OEMP	Ongoing	Air monitoring records	Delta Electricity Contractor
Reporting	▪ Delta Electricity shall issue a report to the DECC every 12 months from commencement of operations. The report shall contain the location, frequency, rationale and the procedures and protocols for collecting air quality samples as well as the parameters analysed and methods of analysis.	CoA 7.3	Annually from commencement of operations	Report to DECC	Delta Electricity Specialist Consultant

Relevant aspect/impact	Management and mitigation measures	Source of requirement	Frequency	Relevant records	Responsibility
Reporting	▪ The results and analysis of the monitoring data shall also be included and assessed against the air quality criteria (4 g/m²/month) and the baseline data provided in Table D of Appendix C. In the case of exceedances; the response taken must be documented within the report. Any deviations from the proposed monitoring program must also be justified.	CoA 7.3	Annually from commencement of operations	Report to DECC	Delta Electricity Specialist Consultant
	▪ The Annual Environmental Management Report will be submitted to the Director-General complete with air quality monitoring data gathered throughout the year.	CoA 7.3	Annually	Annual Environmental Management Report	Delta Electricity

11. APPENDIX 2: THE REGIONAL DUST GAUGE NETWORK