Analysis Methods

ALS Method.

The ALS report describes the following methodology used to analyse the two samples.

> After receipt, the samples were dried overnight in an oven to remove excess water. The samples were prepared by crushing any oversize material down to a 1mm top size using a mortar and pestle to limit over-crushing. Samples were then prepared as per normal petrographic samples by mounting the crushed samples in an acrylic resin, which is polished via a multistage polishing procedure on a Struers Tegra polishing system to produce a suitable surface for reflected light microscopy. A manual point count of each sample was conducted with the material under the crosshairs of the microscope being classified as coal, mineral matter or organic matter. 500 points were counted on the sample at 500x magnification. Some example images were included in the LAS Coal report (Appendix 1).

It is my assessment that the samples were prepared and the analyses conducted in accordance with Australian Standards (AS2856 parts 1 and 2) and results were reported on a volume % basis. The photomicrographs in the report showed that these analyses had been undertaken using an oil immersion lens. This is the standard method used when undertaking an assessment of coal samples.

UQMP Method

The analyses were conducted using an Internal UQMP method. Full details of the method are contained in the UQMP report (Appendix 2). Details of this method are summarized below.

> The samples (supplied in jars) consisted of solids and semi solid sludge. The contents of each jar was emptied into a large beaker, large stringy plant debris was removed before mixing, demineralised water was added to allow the solids to de-clump and mix to a smooth homogenous slurry. Three sub samples were created from each slurry for further examination. This was essential due to fine clay particles being present. A plastic pasture pipette was used to remove an aliquot of the slurry. On occasion extraneous vegetation would prevent the slurry from flowing into the pipette and this was removed and returned to the sample. All sub samples were collected whilst mixing to ensure homogeneity was maintained.
>
> - Sub sample 1. A few drops of the slurry were washed onto a cellulose filter with demineralised water. The final sub-sample defined as "Sludge as Received".
> - Sub sample 2. Consists of a few drops of the slurry filtered through a 500-micron filter onto a cellulose membrane under vacuum, the suspended fines pipetted off and retained. This subsample was defined as "Intermediate".
> - Sub sample 3. This sample contains a few drops of the fines removed from Sub sample 2 and placed onto a cellulose membrane. This subsample is defined as "Fines"
>
> The samples were initially examined by stereomicroscopy, using a Nikon SMZ25 stereo microscope at magnifications up to 100X. For each sample a portion of each sample filter was excised and placed onto a conductive carbon tape for Scanning Electron Microscopy (SEM) examination combined with Energy Dispersive Spectroscopy (EDS). The SEM was operated at 20 kV in back-scattered electron composition contrast (BSE) imaging modes. In BSE images the contrast is influenced by the chemical composition of the material being imaged. Dark regions represent low average atomic number (light elements) and bright regions represent high average atomic number (heavy elements). Regions of interest were chemically analysed by energy dispersive X-ray spectroscopy (EDS). The UQMP report stated that the

EDS method is only semi-quantitative, especially when analysing small particles, for the following reasons:

- The significant size of the analysis volume (typically around 3 µm) and hence the difficulty of eliminating interference from surroundings;
- Contamination by carbon on the specimen surface and within the SEM vacuum chamber,
- The inherent sensitivity limits of the instrumentation.

The UQMP report, which is reproduced in full in Appendix 2, contains a table of combined microscopy results for the two samples. The abundances of coal, mineral dust and organic matter (plant debris and filamentous algae) in these samples were reported on a projected area basis. The report does not provide detail for the number of individual measurements that were done by optical microscopy and SEM and how these results were combined.

Results

ALS Coal and UQMP results for CV Shore and CV Wetlands samples results reported on a volume%/projected area basis.

ALS Coal laboratory used a manual point counting method and the reported volume abundances were proportional to the number of individual coal, mineral and organic particulates counted. UQMP reported results on a projected area abundance basis. The results obtained by ALS and UQ for the CV Shore and CV Wetlands samples are shown below (Table 1). For both sediment samples ALS reported more coal than did UQMP.

Table 1: Analysis results from the reports provided by ALS Coal and UQMP. Results are reported on a volume %/ projected area basis.

	Sample	Coal %	Mineral %	Organic %
ALS-DSITI samples	CV Shore	26.8	64.2	9.0
(Volume% basis)	CV Wetlands	15.4	73.0	11.6
UQMP- DSITI samples	CV Shore	10	90	trace
(projected area basis)	CV Wetlands	10	88	2

CSIRO assessed these results to verify that these differences seen between the two methods were statistically significant using the criteria outlined in Australian Standard AS2856.2. The standard deviation and hence repeatability and reproducibility of repeat measurements is determined by the number of points counted during each analysis. The expected repeatability, based on 500 particles being counted are shown in Table 2. The expected reproducibility when analyses are conducted on different samples, by different operators is approximately twice the repeatability values shown in Table 2.

Table 2: Repeatability of point counting methods, based on 500 particles being counted for duplicate analyses conducted by the same operator on the same sample (AS2856.2).

Volume percentage of component	Standard deviation of the volume percentage (s)	Repeatability $(2\sqrt{2})s$
5	1.0	2.8
20	1.8	5.1
50	2.2	6.3
80	1.8	5.1
95	1.0	2.8

The agreement between the results obtained by ALS Coal and UQMP for these two samples are outside of the reproducibility limits defined in AS2856.2 thereby indicating that the ALS Coal and UQMP results were significantly different.

Float and Sink Testing results conducted on CV Shore and CV Wetland samples.

DISITI organised for further testing, using a different analytical method, to be undertaken to investigate why these results reported by ALS and UQMP were significantly different. This testing employed a density separation method (float and sink analysis) to determine the proportion of mineral and the combined proportions of coal and organic material in these two samples. A float and sink test simply involves putting a sample into a liquid of known density and particles of lesser density float and particles of greater density sink. This process is detailed in ISO standard 7936:1992 Hard coal - Determination and presentation of float and sink characteristics - General directions for apparatus and procedures.

This was done using the reserve material for the samples which were supplied to ALS Coal by DSITI. These samples had been crushed to a topsize of 1mm, prior to ALS Coal undertaking their microscopic analyses, so these reserve samples were suited for undertaking this testing. The tests were done using an organic liquid with a density of 1.80g/cc. Thus when the sample was placed in this liquid the individual mineral particles sank and the individual coal and organic particles floated. The initial sample mass used to undertake these tests and the mass and mass % which reported to the F1.80 and S 1.80 density factions are shown in Table 3.

Table 3: ALS float and sink results for CV Shore and CV Wetland samples.

	Mass (g)	Mass%
CV Shore – 58.3g initial mass		
F1.80 – (coal + organic material)	3.5	6.0
S1.80 – (minerals)	54.5	94.0
Total	58.0	100.0
CV Wetland – initial mass 66.8g		
F1.80 – (coal + organic material)	1.8	2.7
S1.80 – (minerals)	64.6	97.3
Total	66.4	100.0

These tests reported that CV Shore contained 94.0% minerals and 6.0% coal and organic material and that the CV Wetland sample contained 97.3% minerals and 2.7% coal and organic material.

ALS Coal and UQMP results for CV Shore and CV Wetlands samples reported on a mass % basis.

To enable the results that were reported by ALS Coal and UQMP to be compared with the float and sink test results CSIRO used the densities of the constituents to calculate their mass abundances. Reporting results on a volume% / projected area basis does not consider that the coal, mineral and organic constituents have different densities. The relative density values for coal, biomass mass (organic matter) and minerals determined in the literature are shown below.

- Relative density coal 1400kg/m^{-3} for coal (Preston & Sanders 1993)
- Relative density biomass 385kg/m^{-3} (Wiemann and Williamson, 2012)
- Relative density of minerals 2600kg/m^{-3} (AS2856.2, 1998)

These relative density values were used to calculate the mass abundance of the coal, mineral and organic matter in each sample (mass = volume X density) to report the results shown in Table 1 on a mass% basis (Table 4).

Table 4: Analysis results reported on a calculated mass % basis

	Sample	Coal %	Mineral %	Organic %
ALS-DSITI samples	CV Shore	18.0	80.3	1.7
	CV Wetlands	10.0	87.9	2.1
UQMP- DSITI samples	CV Shore	5.6	94.4	0.0
	CV Wetlands	5.7	94.0	0.3

The calculated UQMP results showed that the CV Shore sample contained 5.6% coal and the CV Wetlands sample contained about 5.7% coal (by mass) which were significantly less than the coal reported by ALS Coal for these samples. The float and sink tests showed that the CV Shore sample contained 6.0% (by mass) coal plus organic material and the CV Wetland sample contained 2.7% coal plus organic material (by mass).

Discussion

Three different methods, the two microscopic methods and the density separation method were used to determine the proportion of minerals, coal and organic matter in the two sediment samples. The density separation method provided mass abundance for the mineral and mass abundance for the coal plus organic matter whilst the two microscopic methods provided volume/projected area abundances for the mineral, coal and organic matter for these samples. To enable these results to be assessed required them to be reported on the same basis. Therefore, the microscopic results were converted to mass % abundances using referenced values of relative density. Main comments about the results provided by these different methods are:

- The float and sink results did not provide discrimination between coal and organic matter and hence the F1.80 material provides detail on the **maximum amount of coal that could be present** in these samples. If required a further float and sink separation could be undertaken (using a liquid with a specific gravity of between 0.8 and 1.2g/cc) to separate the coal from the organic matter. Alternatively, a microscopic assessment could be conducted on the F1.80 density fraction to provide detail on the amount of coal and other constituents in this fraction. As the microscopic assessment would determine the volume abundance of these constituents these results would need to be converted to a mass % basis for reporting. If there is a need to quantify the abundance of the different mineral particulates in the sediments, SEM analyses could be conducted on the S1.80 fraction.

- When reported on a mass% basis the UQMP results agreed quite well with the float sink results reported, with the caveat that the float and sink results reported a combined amount of coal plus organic matter. The method used by the UQMP (Jones, 2017) stated that "*The contents of the jars were emptied into a large beaker, **large stringy plant debris was removed** before mixing, demineralised water was added to allow the solids to de-clump and mix to a smooth homogenous slurry.* The removal of the plant debris may have had implications for the amount of coal reported as the analyses were conducted on an almost organic matter free basis. If this method is used for future analyses I would recommend that the plant debris and the remaining sediment sample be weighed and the results combined for reporting. The results would then need to be reported on a mass % basis.

- For these two samples, the ALS Coal microscopic method reported significantly more coal than did the other two methods. One reason may be that ALS Coal performed these analyses using the method described in AS2856.2, where immersion oil is placed on the polished surface of the block and the analyses are undertaken using an oil immersion objective. The immersion oil is used as it provides significantly more contrast between the different coal constituents. However, as some of the minerals have a similar refractive index to that of the immersion oil, it is often difficult to identify the liberated mineral particles in the sample. This is demonstrated below in Figure 2.

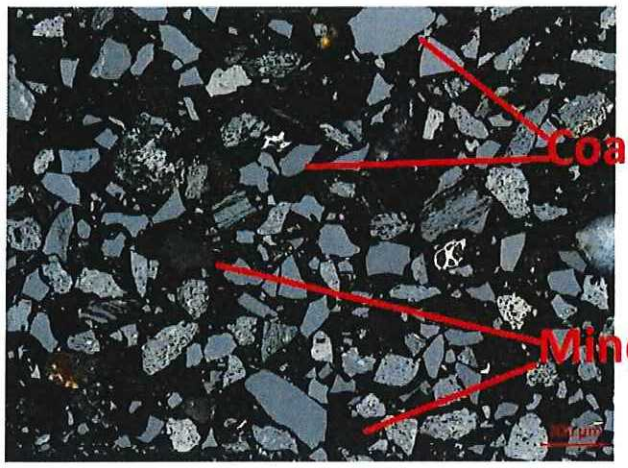

Figure 2a: Optical photomicrograph collected in reflected light using an oil immersion objective of a sample containing coal and mineral particles

Figure 2b: Optical photomicrograph collected in reflected light using an air objective of a sample containing coal and mineral particles

Hence I would recommend that:

- Future analyses of sediment samples should be performed using an air objective
- Results be reported on a mass% basis.

References

AS 2856.1-2000 (R2013) Coal petrography Preparation of coal samples for incident light microscopy

AS 2856.2-1998 (R2013) Coal petrography Maceral analysis

Cash W. (June 7, 2017), DSITI Sediment Samples. ALS Global.

DSITI and EHP, 2017, Protection Caley Valley Wetlands- Preliminary assessment of impacts to Caley Valley Wetlands from Abbot Point Coal Terminal post Tropical Cyclone Debbie. Report prepared by Environmental Monitoring and Assessment Sciences Science Delivery Division Department of Science, Information Technology and Innovation and Conservation and Sustainable Services Department of Environment and Heritage.

ISO 7936:1992 Hard coal - Determination and presentation of float and sink characteristics - General directions for apparatus and procedures

Jones F. (June, 2017), Laboratory report - Examination of sludge deposits by stereomicroscopy and scanning electron microscopy. UQMP

Preston KB and Sanders RH, 1993, Estimating the in situ relative density of coal, Australian Coal Geology vol.9, pp.22–26.

Wiemann Michael C., Williamson G. Bruce, 2012, Density and Specific Gravity Metrics in Biomass Research, United States Department of Agriculture, Forest Service, General Technical Report FPL–GTR–208

Appendix 1

Cash, W. (June 7, 2017). *DSITI Sediment Samples.* ALS Global.

Microscopic Analysis

WILLIAM CASH/DSITI SEDIMENT SAMPLES

June 7, 2017

ALS

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Contents

1. Introduction

ALS Energy – Coal Technology were contacted by Suzanne Vardy from the Department of Science, Information Technology and Innovation to conduct analysis of environmental samples to determine if there is any coal present. Microscopic analysis was conducted on the samples at the ALS Coal Petrography and Imaging Centre at Richlands. The samples received for analysis were the following:

CV Shore

CV Wetlands

2. Procedure

After receipt, samples were dried overnight in an oven to remove excess water. The samples were prepared by crushing any oversize material down to a 1mm top size using a mortar and pestle to limit over-crushing.

Samples were then prepared as per normal petrographic samples by mounting the crushed samples in an acrylic resin, which is polished via a multistage polishing procedure on a Struers Tegra polishing system to produce a suitable surface for reflected light microscopy.

A point count of each sample was conducted with the material under the crosshairs of the microscope being classified as coal, mineral matter or organic matter. 500 points were counted on the sample at 500x magnification. Some example images are included below.

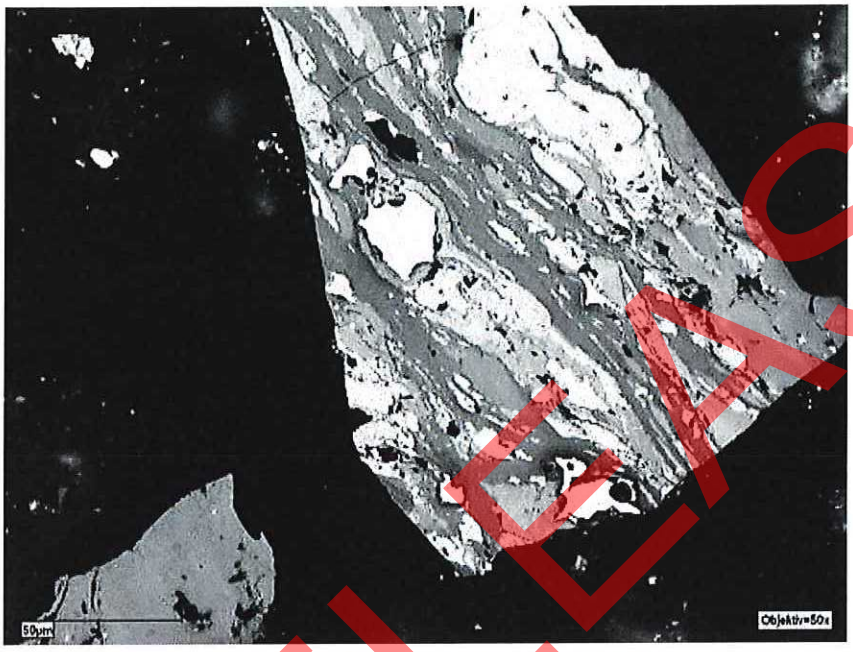

Figure 1: A coal dust particle, with the darker grey Vitrinite and lighter grey/white of Inertinite; 50x objective, oil immersion, reflected white light.

Figure 2: A cluster of Vitrinite grains and some interspersed minerals; 50x objective, oil immersion, reflected white light.

Figure 3: Organic matter; 50x objective, oil immersion, reflected white light.

Figure 4: Organic Matter; 50x objective, oil immersion, reflected white light.

Figure 5: Mineral Matter; 50x objective; oil immersion, reflected white light.

Figure 6: Mineral Matter; 50x objective, oil immersion, reflected white light.

3. Results

The results of the point count are outlined in the following table:

Sample	Coal (%)	Mineral (%)	Organic (%)
CV Shore	26.8	64.2	9.0
CV Wetlands	15.4	73.0	11.6

Quite a significant volume of coal was observed in both of the samples with 26.8% in the CV Shore sample and 15.4% in the CV Wetlands sample. The remainder of the sample was predominantly made up of mineral matter with a small volume of organic material also observed.

Appendix 2

Jones, F. (June 23, 2017). *Laboratory report - Examination of sludge deposits by stereomicroscopy and scanning electron microscopy.* UQMP.

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LABORATORY REPORT

Subject: **EXAMINATION OF SLUDGE DEPOSITS BY STEREOMICROSCOPY AND SCANNING ELECTRON MICROSCOPY**

UQMP Project No. C03136.05

Prepared for: DSITI

Prepared By: Fiona Jones

Date: 23rd June 2017

Sample Description:	**Client Sample Identification #**	**Sample Collection Date**	**UQMP #**
1	EHP S.V CV WETLANDS	28/04/17 12:15	UQMP # 14961
2	CV SHORE	28/04/17 12:20	UQMP # 14962

#Method Ref: Internal UQMP method.

1. SAMPLES AND METHODS

1.1 Samples Preparation

The samples were supplied as sediments in glass jars, consisting of solids and semi solid sludge. The contents of the jars were emptied into a large beaker, large stringy plant debris was removed before mixing, demineralised water was added to allow the solids to de-clump and mix to a smooth homogenous slurry.

Three sub samples were created from each slurry for further examination, this was essential due to fine clay particles present: A plastic pasture pipette was used to remove an aliquot of the slurry on occasion extraneous vegetation would prevent the slurry from flowing into the pipette this was removed and returned to the sample.

Sub sample 1. A few drops of the slurry were washed onto a cellulose filter with demineralised water. The final sub-sample defined as "Sludge as Received".

Sub sample 2. Consists of a few drops of the slurry filtered through a 500-micron filter onto a cellulose membrane under vacuum, the suspended fines pipetted off and retained. This sub-sample was defined as "Intermediate".

Sub sample 3. This sample contains a few drops of the fines removed from Sub sample 2 and placed onto a cellulose membrane. This subsample is defined as "Fines"

All sub samples were collected whilst mixing to ensure homogeneity was maintained.

The particles retained on the 500-micron filter were not examined, however are retained for future reference if required.

1.2 Stereo Microscope Examination

The samples were initially examined by stereomicroscopy, using a Nikon SMZ25 stereo microscope at magnifications up to 100×.

2. SCANNING ELECTRON MICROSCOPY

A portion of each sample filter was excised and placed onto a conductive carbon tape for SEM examination. The samples were examined and analysed using a JEOL 6460LA scanning electron microscope (SEM). The SEM was operated at 20 kV in back-scattered electron composition contrast (BSE) imaging modes. In BSE images the contrast is influenced by the chemical composition (specifically the average atomic number, Z) of the material being imaged. Dark regions represent low average atomic number (light elements) and bright regions represent high average Z (heavy elements).

Regions of interest were chemically analysed by energy dispersive X-ray spectroscopy (EDS). EDS can be used to identify the chemical elements present and in some cases to provide approximate stoichiometric ratios. However, EDS is only semi-quantitative, especially when analysing small particles, for the following reasons:

- The significant size of the analysis volume (typically around 3 μm) and hence the difficulty of eliminating interference from surroundings;
- Contamination by carbon on the specimen surface and within the SEM vacuum chamber,
- The inherent sensitivity limits of the instrumentation.

3. RESULTS

This analysis was performed to determine the presence of coal and approximate percentages present. The deposits consisted predominantly of coarse to very fine grain aluminosilicate based mineral dust, typically rounded weathered particles. Black glossy angular particles examined by stereomicroscopy were identified as coal by SEM. Coal was detected in both samples at 10 %, with minor to trace amounts of plant debris and trace amounts of algae noted.

All sample fractions were examined including Sludge as Received, Intermediate and Fines. Appendix C displays the overall areas of all the fractions examined.

Appendix A attached presents the table of results of the combined microscopy observations.

Appendix B presents colour picture micrographs of the stereomicroscopy images.

Appendix C displays the Illustrative SEM photomicrographs and spectra taken of an overall area of the deposit. The SEM photomicrographs were taken with Back Scattered Electron (BSE) imaging, in which average atomic number is roughly proportional to brightness. For example, coal particles appear darker than siliceous mineral dust and biological particles somewhat darker again.

Appendix D displays an SEM BSE photomicrograph and an SEM/EDS spectrum of a coal particle.

Signed for and on behalf of UQ Materials Performance

Fiona Jones

4. APPENDIX A

4.1 TABLE OF COMBINED MICROSCOPY RESULTS

PARTICLE IDENTITY		PERCENTAGE (Projected area basis)	
	SAMPLE #	UQMP # 14961	UQMP # 14962
	SAMPLE ID / PARTICLE TYPE	EHP S.V CV WETLANDS	CV SHORE
BLACK	COAL	10	10
	SOOT		
	BLACK RUBBER DUST		
INORGANICS & MINERALS	MINERAL DUST (Soil or Rock Dust.)	**88**	**90**
	MINERAL DUST (type = Fly Ash)		
	MINERAL DUST (type = Cement Dust)		
	MINERAL DUST (type =glassy)		
	GLASS FRAGMENTS		
	COPPER SLUDGE		
	P/S SLIME & FUNGI		
	INSECT DEBRIS		
	PLANT DEBRIS	2	tr
	FILAMENTOUS ALGAE	tr	tr
	PLANT DEBRIS (type =)		
GENERAL ORGANIC TYPES	WOOD DUST		
	FIBRES (type = Miscellaneous)		
	STARCH		
	PAINT		
	PLASTIC FRAGMENTS		
	RED RUBBER DUST		
COMMENTS		§ The focus of the analysis was to determine the presence or absence of coal; marine biological material was not examined or classified. Large plant debris fragments were removed, as they obstruct the view of numerous particles.	

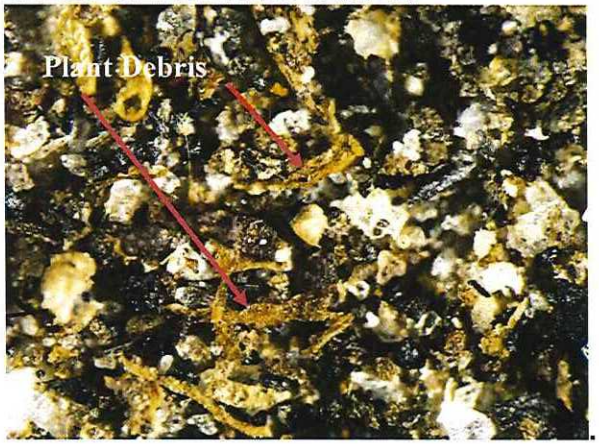
4.2 PARTICLE IDENTITY LEGEND

Insect parts/debris	Includes arachnids. Present as crushed body fragments, trichomes, wing scales, etc.
P/s slime	Polysaccharide slime. This extra-cellular bio-polymeric material may have different sources which might include microbiological growth, vertebrate excreta, decomposing biological matter, etc. Sometimes seen in these samples as a stringy gel binding other particles together. Sometimes fungal hyphae associated with the gel.
Copper sludge	Some well-developed turquoise crystal growths can be found, but usually as subhedral to euhedral grains. Sometimes as blue highlights on a greenish cakey material. This is probably copper salts precipitated from the copper sulfate algaecide solution as the hydroxide, with or without sulfate and or phosphorous inclusion.
Mineral matter	Usually equant siliceous appearance and typically colourless to brown, transparent to translucent, euhedral, rounded grains. The clays very fine particles. Other constituents of siliceous appearance, sand etc.
Plant Debris/ char	Usually as trichomes, fragmented tissue, reproductive products and structures. Sometimes charred particles from incinerator, grass or bush fires.
Fly ash particles	Appears as spheroidal particles - colourless, milky or black
Coal dust	Black, equant, sharp angled grains. Some glossy; some edges dark brown translucent.
Soot	Black glossy spherical to botryoidal aggregates, typically hollow or lacey. Usual source is incompletely burnt organic liquids, eg. fuel oils.

5. APPENDIX B

5.1 STEREOMICROSCOPY IMAGES OF THE SEPERATED DEPOSIT FRACTIONS OF THE EHP S.V CV WETLANDS SAMPLE.

A. EHP S.V CV WETLANDS, UQMP # 14961. As Received Fraction.

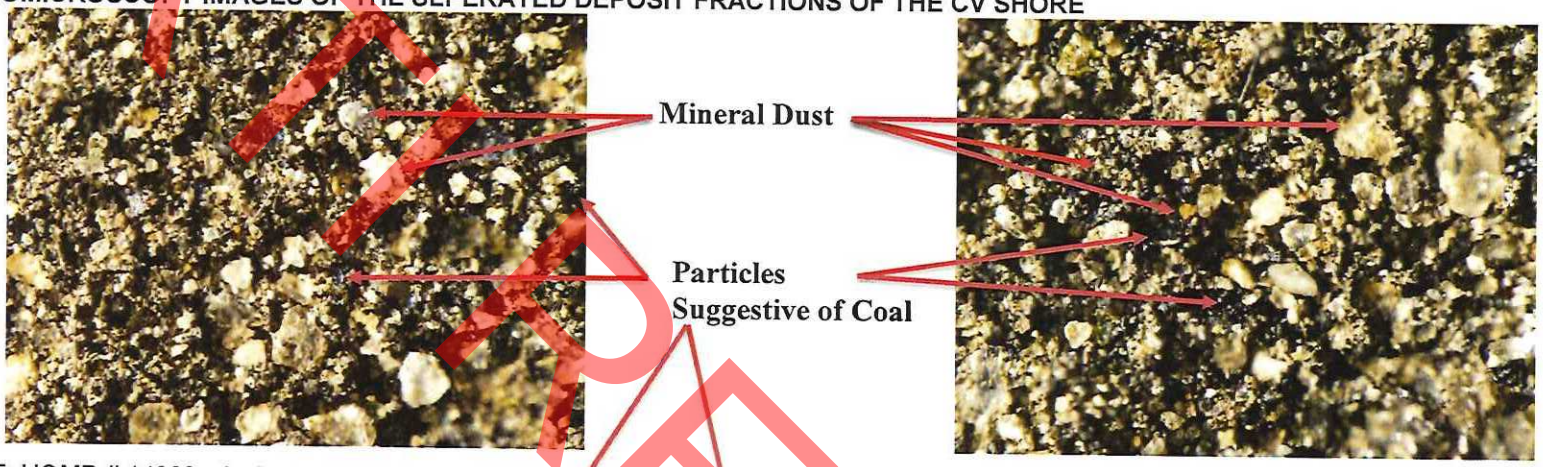


B. EHP S.V CV WETLANDS, UQMP # 14961. Intermediate Fraction.

C. EHP S.V CV WETLANDS, UQMP # 14961. Fine Fraction.

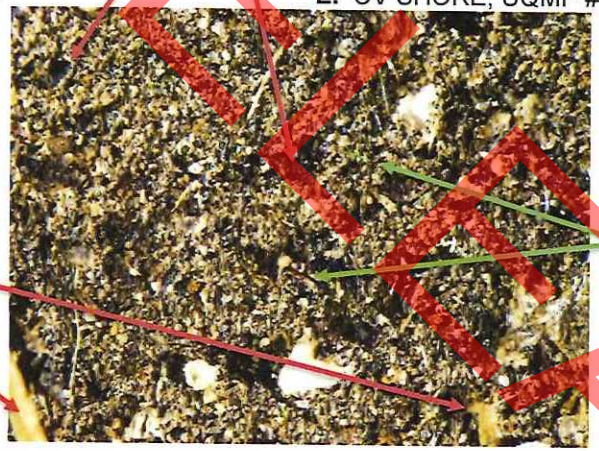
All deposit fractions A, B and C display black sharp angular particulates consistent with the appearance of coal. A and B show coarse grained mineral dust particles with a range of colours from translucent, white, yellow to brown whilst C displays the same colour range with finer mineral dust particulates. The brownish yellow coloured, fibrous appearing particulates are suggestive of plant debris and small green filamentous algae is noted.

5.2 STEREOMICROSCOPY IMAGES OF THE SEPERATED DEPOSIT FRACTIONS OF THE CV SHORE



D. CV SHORE, UQMP # 14962. As Received Fraction.

E. CV SHORE, UQMP # 14962. Intermediate Fraction.

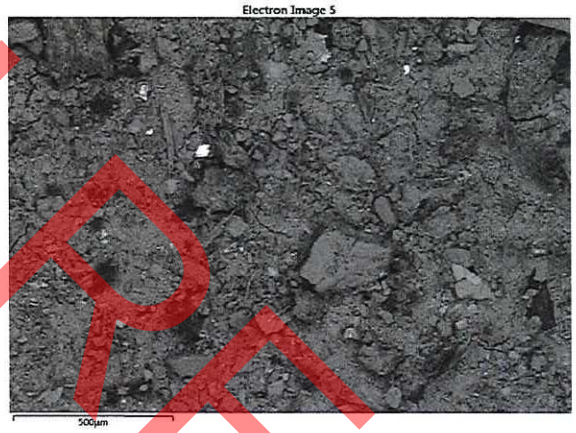


F. CV SHORE, UQMP # 14962. Fine Fraction.

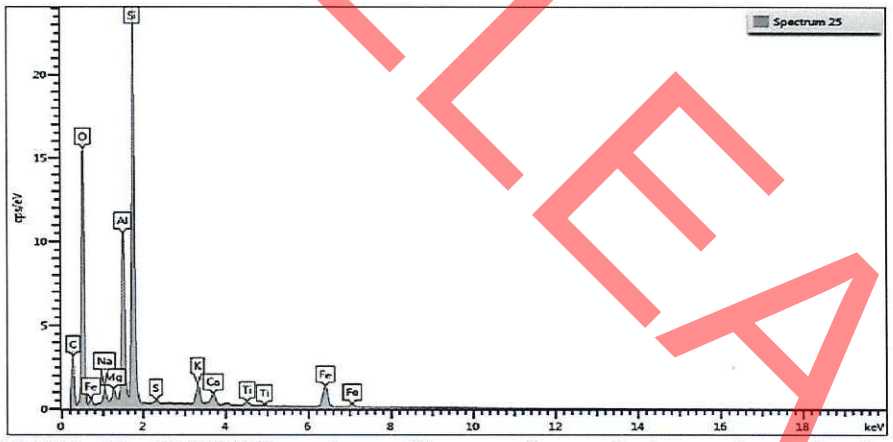
Images D, E and F display coarse and fine grained mineral dust particles from translucent, white, yellow to brown. Black glossy angular particles suggestive of coal are scattered throughout all fractions of the deposit. Plant debris is noted in the fine fraction (F) and several filamentous algae particles are also present.

6. APPENDIX C. SEM/BSE IMAGE AND SEM/EDS ANALYSIS OF THE AS RECEIVED, INTERMEDIATE AND FINE FRACTIONS OF THE SLUDGE SAMPLES.

6.1 AN SEM/BSE IMAGE AND SEM/EDS SPECTRUM OF AN OVERALL AREA AS RECEIVED OF THE OF EHP S.V CV WETLANDS DEPOSIT.



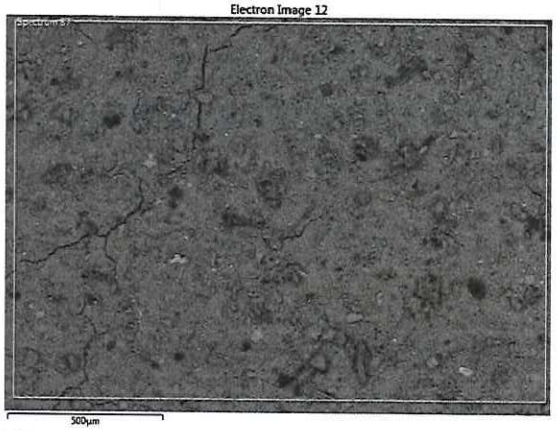
PM1. EHP S.V CV WETLANDS, UQMP # 14961, Sludge as Received Fraction. An SEM/BSE image of an overall area of the As Received Fraction, selected for SEM/EDS analysis.



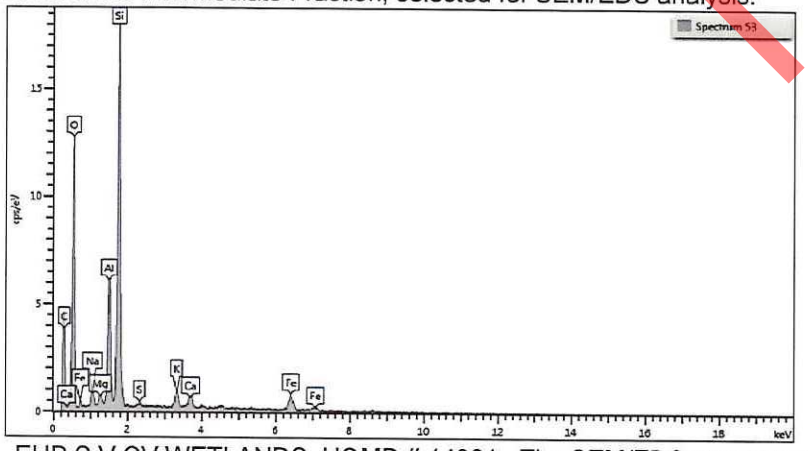
EDS1. EHP S.V CV WETLANDS, UQMP # 14961. The SEM/EDS spectrum of the overall area displays major peaks of oxygen, aluminium and silicon with minor amounts of carbon, sodium, potassium and iron and trace amounts of the balance of the elements. The SEM/EDS elemental profile is consistent with stereomicroscopy observations of the deposit consisting predominantly of mineral dust with a minor amount of organic material.

6.2 AN SEM/BSE IMAGE AND SEM/EDS SPECTRUM OF AN OVERALL AREA OF THE INTERMEDIATE AND FINE FRACTION OF EHP S.V CV WETLANDS DEPOSIT.

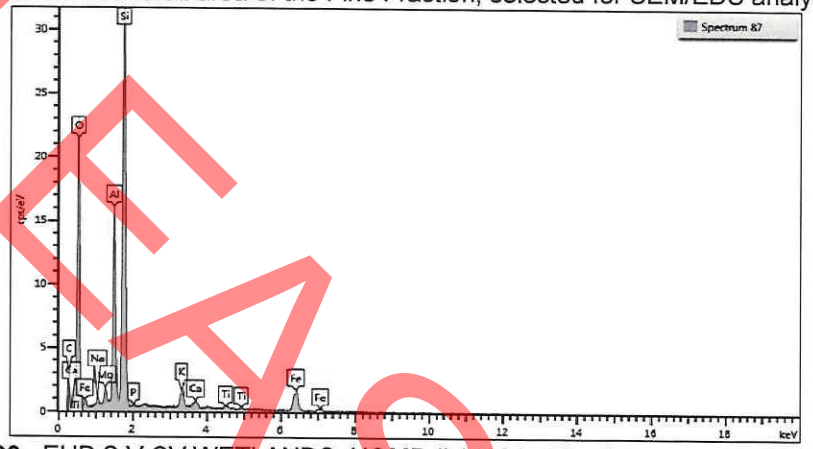
PM2. EHP S.V CV WETLANDS, UQMP # 14961. An SEM/BSE image of an overall area of the Intermediate Fraction, selected for SEM/EDS analysis.



PM3. EHP S.V CV WETLANDS, UQMP # 14961. An SEM/BSE image of a characteristic overall area of the Fine Fraction, selected for SEM/EDS analysis.



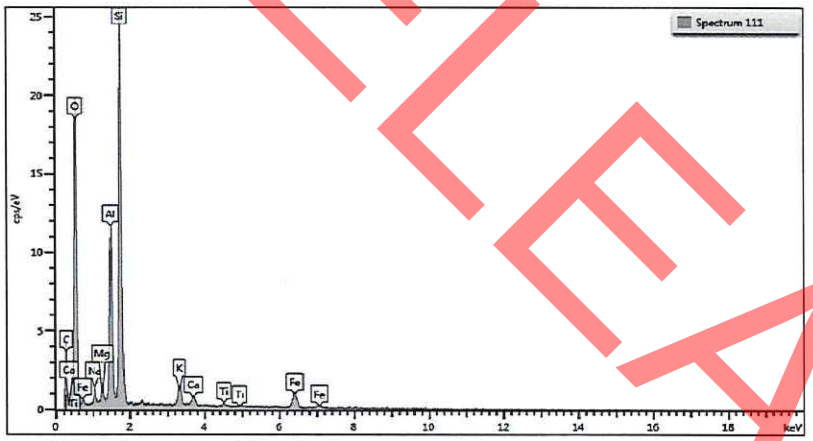
EDS2. EHP S.V CV WETLANDS, UQMP # 14961. The SEM/EDS spectrum of the overall area displays major peaks of oxygen, aluminium and silicon with minor amounts of carbon, sodium, potassium and iron and trace amounts of the balance of the elements. The SEM/EDS elemental profile is consistent with the sludge as received fraction.



EDS3. EHP S.V CV WETLANDS, UQMP # 14961. The SEM/EDS spectrum of the overall area displays major peaks of oxygen, aluminium and silicon with minor amounts of carbon, sodium, potassium and iron and trace amounts of the balance of the elements. The SEM/EDS elemental profile is consistent with the sludge as received fraction and intermediate fraction.

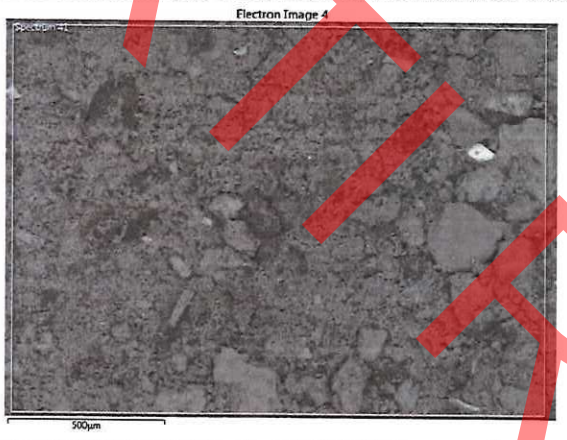
6.3 AN SEM/BSE IMAGE AND SEM/EDS SPECTRUM OF AN OVERALL AREA OF THE SLUDGE AS RECEIVED CV SHORE DEPOSIT.

PM4. CV SHORE, UQMP # 14962. Sludge as Received Fraction. An SEM/BSE image of an overall area of the As Received Fraction, selected for SEM/EDS analysis.

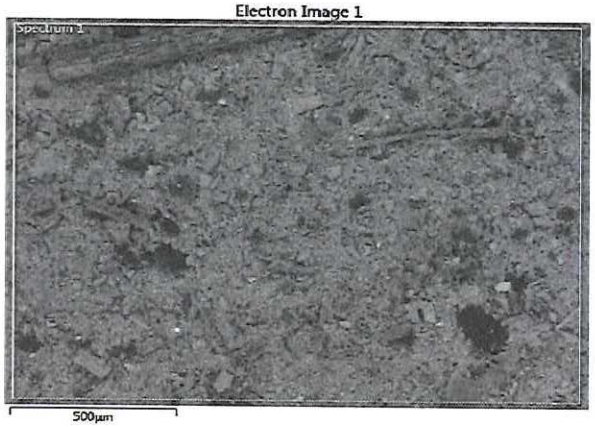


EDS4. CV SHORE, UQMP # 14962. As Received Fraction. The SEM/EDS spectrum of the overall area displays major peaks of oxygen, aluminium and silicon with minor amounts of carbon, sodium, magnesium, potassium and iron and trace amounts of the balance of the elements. This SEM/EDS elemental profile is consistent with the stereomicroscopy observations of a deposit consisting mostly of aluminosilicate based mineral dust with a minor organic component.

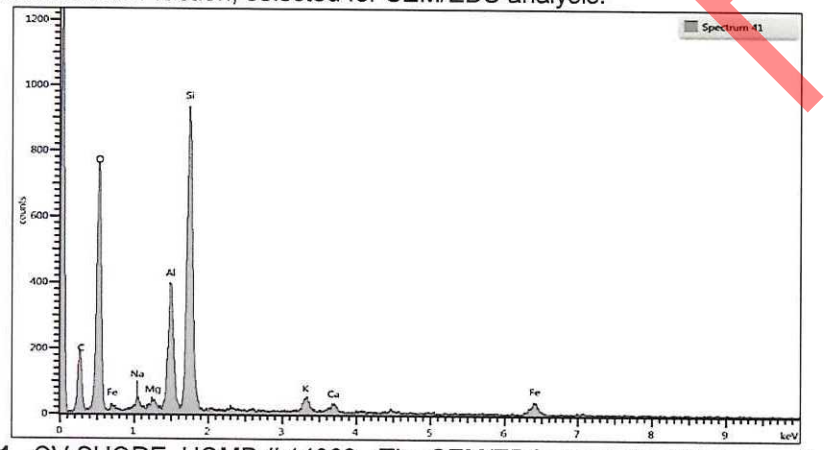
6.4 AN SEM/BSE IMAGE AND SEM/EDS SPECTRUM OF AN OVERALL AREA OF THE CV SHORE INTERMEDIATE AND FINE FRACTION OF THE DEPOSIT.



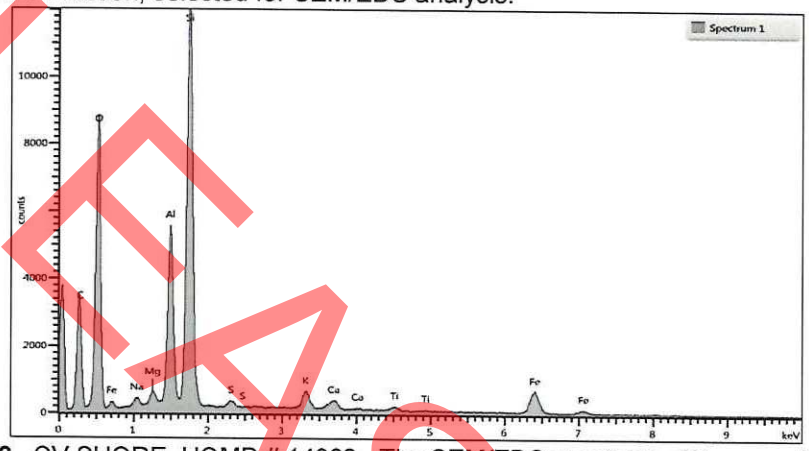
PM5. CV SHORE, UQMP # 14962. An SEM/BSE image of an overall area of the Intermediate Fraction, selected for SEM/EDS analysis.



PM6. CV SHORE, UQMP # 14962. An SEM/BSE image of an overall area of the Fine Fraction, selected for SEM/EDS analysis.



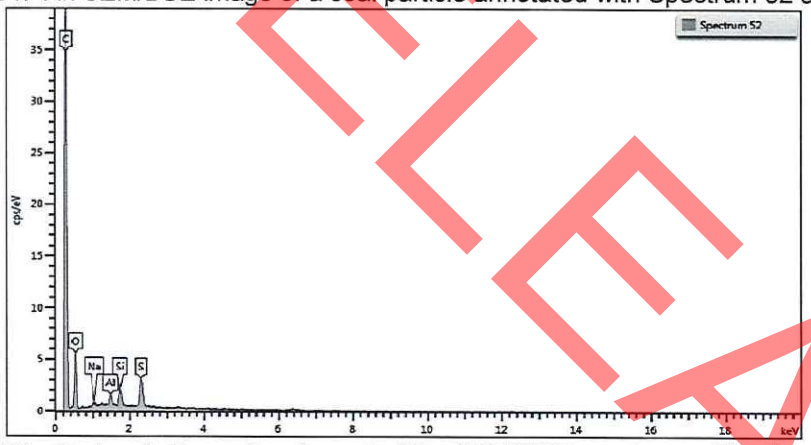
EDS1. CV SHORE, UQMP # 14962. The SEM/EDS spectrum of the overall area displays major peaks of oxygen, aluminium and silicon with minor amounts of carbon, sodium, magnesium, potassium and iron and trace amounts of the balance of the elements.



EDS2. CV SHORE, UQMP # 14962. The SEM/EDS spectrum of the overall area displays major peaks of oxygen, aluminium and silicon with minor amounts of carbon, sodium, magnesium, potassium and iron and trace amounts of the balance of the elements.

7. APPENDIX D. SEM/BSE AND SEM/EDS SPECTRA OF A COAL PARTICLE

PM7. EHP S.V CV WETLANDS, UQMP # 14961. An SEM/BSE image of a coal particle annotated with Spectrum 52 selected for SEM/EDS analysis.



EDS7. EHP S.V CV WETLANDS, UQMP # 14961. Carbon is the major element of the SEM/EDS spectrum, with minor amounts of oxygen and sulfur and trace amounts of the balance of the elements, the elemental profile is characteristic of a low ash coal particle.

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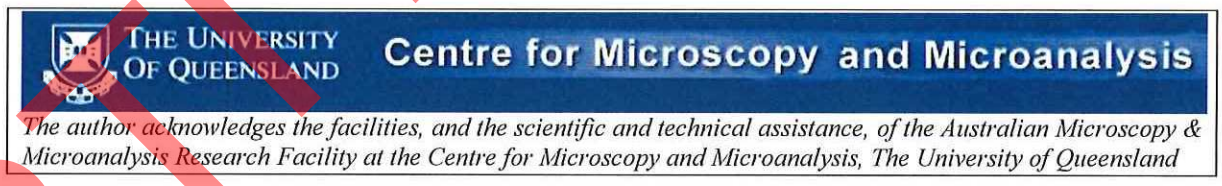

The author acknowledges the facilities, and the scientific and technical assistance, of the Australian Microscopy & Microanalysis Research Facility at the Centre for Microscopy and Microanalysis, The University of Queensland

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Graham O'Brien
t +61 7 3327 4457
e Graham.OBrien@csiro.au

YOUR CSIRO

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Melanie Pilgrim

From: DAUNT Bettina <Bettina.Daunt@ehp.qld.gov.au> on behalf of ELLWOOD Dean <Dean.Ellwood@ehp.qld.gov.au>
Sent: Tuesday, 28 November 2017 4:43 PM
To: Danielle Cohen
Cc: DLO EHP; REEVES Jim
Subject: FW: Abbot Point Bulk Coal matter

Queensland Government

Danielle,

Abbot Point Bulk Coal Pty Ltd (Adani) Investigation – Breach of TEL conditions.

Relevant Parties

- Abbot Point Bulk Coal Pty Ltd (APBC).

Current Status

- APBC was issued a Penalty Infringement Notice for an alleged breach of Temporary Emissions Licence (TEL) on 20 July 2017 for discharging water containing Suspended Solids (SS) to 'waters' which exceeded the permissible limits during Tropical Cyclone Debbie event in March 2017 at discharge location known as 'W2' at their coal loading facility near Bowen. APBC is contesting the PIN on the basis that they believe that the water containing SS did not reach nearby coastal 'waters'.
- An inspection of W2 at APBC (Bowen) and the adjacent North Queensland Bulk Ports (NQBP) land was completed on 15 November 2017 with the assistance of a registered surveyor and EHP Coastal Engineer where survey levels and other data was recorded. It is proposed that data collected from this investigative activity will be used to create flood modelling which may assist in proving the offence.
- The department is seeking further documents from APBC to assist with preparing flood drainage modelling.

Abbot Point Bulk Coal Pty Ltd (Adani) Investigation – Provision of false or misleading information.

Relevant Parties

- Dwayne FREEMAN (Chief Executive Officer – Abbot Point Operations)

Current Status

- The investigation into the failure of APBC to report the higher SS analysis of 834Mg/L (W2B) is continuing.
- APBC has been advised in writing that the scope of the investigation has been extended to examine whether the company has provided false or misleading documents to the department.
- Collation of statements from departmental officers is continuing.

Regards
Dean

Dean Ellwood
Deputy Director-General
Environmental Services & Regulation
Department of Environment and Heritage Protection

P Irrelevant
Level 7, 400 George St, Brisbane QLD 4000
GPO Box 2454, Brisbane QLD 4001

From: Danielle Cohen <Danielle.Cohen@ministerial.qld.gov.au>
Date: 28 November 2017 at 2:58:12 pm AEST
To: Dlo Ehp <DLO.EHP@ehp.qld.gov.au>
Cc: Dean Ellwood <Dean.Ellwood@ehp.qld.gov.au>
Subject: Abbot Point Bulk Coal matter

Hi team

Can you please request an urgent update for me on the Abbot Point Bulk Coal/Caley Valley wetlands matter? At this stage I'm only interested in the matter of the exceedance resulting in a PIN, not the environmental evaluation of the wetlands

Thanks
Dan

Melanie Pilgrim

From:	Alison Brown
Sent:	Monday, 14 August 2017 2:19 PM
To:	Steven Miles
Cc:	Katharine Wright; Danielle Cohen
Subject:	For approval - response- PINS issued to other companies besides ABPC
Attachments:	140817 - Fines for other companies.docx

Hello Minister,
Had a chat to Kat and Dan about this one, and we think it's OK.
Would you be happy to approve the department issuing this response about the other companies (other than Adani) who were fined by EHP?
Thanks,
Alison

Media response

Re: Other companies fined by EHP

Date: 14 August 2017

Please attribute to a Department of Environment and Heritage Protection spokesperson:

Is EHP investigating any other companies or groups, for an unauthorised storm water release that occurred during Tropical Cyclone Debbie, other than Abbot Point Bulk Coal Pty Ltd?

Will EHP fine any other companies or groups?

The Department of Environment and Heritage Protection (EHP) received several media requests about storm water release at Adani and subsequently decided to issue a statement with details.

EHP also investigated other companies for unauthorised storm water release during TC Debbie.

EHP issued a Penalty Infringement Notice to APBC Pty Ltd, Sunland Enterprises Pty Ltd and Yarrabee Coal Company Pty Ltd.

The department also issued a Direction Notice to Glencore Coal Company Pty Ltd and Rockhampton Regional Council.

ENDS

For further media enquiries contact Media Services on Irrelevant or email media@ehp.qld.gov.au.

AGENCY BACKGROUND – NOT FOR PUBLICATION

PINS
PIN6286 Sunland Enterprises Pty Ltd Issued 12/06/2017
PIN6295 Yarrabee Coal Company Pty Ltd Issued 19/07/2017
PIN6298 Abbot Point Bulkcoal Pty Ltd issued 20/07/2017

Direction Notice
STAT1184 Glencore Coal Queensland Pty Limited (Collinsville Coal Mine) issued 07/08/2017
20170113 Rockhampton Regional Council Issued 05/04/2017

Hi – Adani issued a release today saying Abbot Point Bulk Coal is disappointed that Department of Environment and Heritage Protection has released details of the fine to media but did not detail the fine notices issued to other parties following Cyclone Debbie.

Can you confirm other companies were fined – and if so who?

Regards

Personal Information

From: Personal Information
Sent: Friday, 11 August 2017 3:46 PM
To: Media EHP/NPSR
Subject: Media query

Hi,

I'm following up on the media release "Abbot Point Coal fined for storm water release" issued by EHP today.

Is EHP investigating any other companies or groups, for an unauthorised storm water release that occurred during Tropical Cyclone Debbie, other than Abbot Point Bulk Coal Pty Ltd?

Will EHP fine any other companies or groups?

Can you please respond so I know you have received my inquiry?

Regards,

Personal Information

Reporter

Personal Information

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Reporter

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company must be taken not to have been sent or endorsed by that company or any of its related entities. No warranty is made that the e-mail or attachments are free from computer virus or other defect.

Media response

Re: Other companies fined by EHP

Date: 14 August 2017

Please attribute to a Department of Environment and Heritage Protection spokesperson:

Is EHP investigating any other companies or groups, for an unauthorised storm water release that occurred during Tropical Cyclone Debbie, other than Abbot Point Bulk Coal Pty Ltd?

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Direction Notice
STAT1184 Glencore Coal Queensland Pty Limited (Collinsville Coal Mine) issued 07/08/2017
20170113 Rockhampton Regional Council Issued 05/04/2017

Melanie Pilgrim

From: MARKS Zhivana <Zhivana.Marks@ehp.qld.gov.au> on behalf of ESR <ESR@ehp.qld.gov.au>
Sent: Thursday, 7 December 2017 1:10 PM
To: REEVES Jim; Danielle Cohen; MCMAIN Lisa
Cc: ELLWOOD Dean; Media EHP/NPSR
Subject: ESR Alert UPDATE - Abbot Point Coal Terminal EE appeal

ALERT NAME:

- *Abbot Point Bulkcoal Pty Ltd v Chief Executive, administering the Environmental Protection Act 1994 (EHP)*

CUSTOMER DETAILS:

- Abbot Point Bulkcoal Pty Ltd (APBC) (ACN 010 183 534)

SUMMARY OF ISSUE/S:

- APBC operates the Abbot Point Coal Terminal (the site) situated north of Bowen under an environmental authority for activities including bulk material handling.
- On 18 September 2017, EHP issued a notice to APBC to conduct or commission an environmental evaluation (EE) pursuant to section 326B(1)(b) of the *Environmental Protection Act 1994*. APBC applied for an internal review of the decision which resulted in a varied notice issued on 31 October 2017.
- The EE concerns the assessment and management of releases of coal fines to the Caley Valley Wetland which is situated adjacent to the site.
- In summary, the EE requires APBC to conduct a review of its water management strategy and provide a report by 22 December 2017 and develop and implement a receiving environment monitoring plan by November 2018 in respect of the wetland.
- APBC has appealed to the Planning and Environment Court against the issue of the EE and has applied for a stay of the requirements of the EE. The stay is listed to be heard on Wednesday 6 December 2017.
- On 6 December 2017, APBC asked for a stay of the EE and EHP requested an adjournment. The Court granted an adjournment until a date to be agreed next week and ordered the EE be stayed until further order of the Court.
- The hearing next week is limited to the length of the stay and whether any conditions should be imposed on the stay.

POTENTIAL IMPACTS / RISKS:

- It is possible that there will be media interest in the matter. Litigation will liaise with the media unit and other stakeholders as required.

CONTACT DETAILS:

- Name: Stephen Goldsworthy, Senior Director, Litigation
- Phone number: Irrelevant
- Division: Environmental Services and Regulation

END

Zhivana Marks
Senior Program Officer
Office of the Deputy Director General | Environmental Services & Regulation
Department of Environment and Heritage Protection

P Irrelevant
400 George Street BRISBANE QLD 4000
GPO Box 2454, BRISBANE QLD 4001

Queensland Government

Please consider the environment before printing.

Melanie Pilgrim

From: MARKS Zhivana <Zhivana.Marks@ehp.qld.gov.au> on behalf of ESR <ESR@ehp.qld.gov.au>
Sent: Friday, 8 December 2017 9:04 AM
To: REEVES Jim; Danielle Cohen
Cc: MCMAIN Lisa; CAGNEY Justin; ELLWOOD Dean; ESR
Subject: ESR ALERT HIGH RISK - Abbot Point Bulk Coal Pty Ltd (Adani) Investigation – Investigation Update and Public register disclosure to the Environmental Defenders Office (EDO)

ALERT CATEGORY:
- Enforcement activity

ALERT NAME: Abbot Point Bulk Coal Pty Ltd (Adani) Investigation – Investigation Update and Public register disclosure to the Environmental Defenders Office (EDO)

CUSTOMER DETAILS:
- Abbot Point Bulk Coal Pty Ltd
- Dwayne FREEMAN (Chief Executive Officer – Abbot Point Operations)

SUMMARY OF ISSUE/S:
- The purpose of this alert is to provide an update on the investigation of Abbot Point Bulk Coal Pty Ltd (APBC) and advise of the EDO request for information.
- The scope of the investigation has been extended to examine whether the company has provided false and misleading documents to the department.
- An inspection of W2 at APBC (Bowen) and the adjacent North Queensland Bulk Ports (NQBP) land was completed on 15 November 2017 with the assistance of a registered surveyor and EHP Coastal Engineer where survey levels and other data was recorded. It is proposed that data collected from this investigative activity will be used to create flood modelling which may assist in proving the offence.
- Hydraulic modelling by a departmental coastal engineer is progressing.
- The administering authority (the department) must, for the administration of the *Environmental Protection Act 1994* (EP Act), keep a register of documents required to be given under a condition of an environmental authority, amongst other matters.
- In addition, the department must make the register of such documents available for inspection or copying by any person.
- On 24 April 2017, APBC provided the department with a report specifying the monitoring results as per the conditions of their Environmental Authority for a non-compliance with the TEL (806Mg/L SS).
- The APBC monitoring results provided to the department, are subject to public register disclosure requirements.
- The EDO has requested the department make available the APBC monitoring results associated with the alleged SS discharge event as a result of TC Debbie which were provided to the department on 24 April 2017, for inspection or copying, in accordance with the EP Act s542.
- Disclosure of the monitoring results provided by APBC to the EDO is a statutory requirement.
- APBC has been cooperating with the departmental investigation to date.

POTENTIAL IMPACTS / RISKS:
- The disclosure of APBC monitoring results to the EDO subject of their recent enquiry may enable the EDO to determine the omissions in the APBC report which is the current focus of the department's investigation.
- As a consequence, the EDO may make public their findings triggering media and public interest.

PLANNED ACTIONS
- Collation of statements from departmental officers and others is continuing.

- A notice has been issued on 4 December 2017 by the department requiring the APBC Environment and Community Adviser to attend the departments Brisbane office on 13 December 2017 and answer questions in a Record of Interview pertaining to the alleged offences.
- The department will be making available the APBC monitoring results associated with the discharge event as a result of TC Debbie to the EDO.

LOCALITY DETAILS:

- Abbot Point Bulk Coal Pty Ltd
- Lot 48 SP243724
- Bruce Highway, BOWEN

KEY COMMUNICATION MESSAGES:

- The Department is currently investigating the matter and it would be inappropriate to comment at this time.
- Providing false or misleading information to the Department is a serious offence.

CONTACT DETAILS:

- Name: Anne Lenz, Executive Director Strategy, Support and Compliance
- Phone number: Irrelevant
- Division: Environmental Services and Regulation

END

Queensland Government

Zhivana Marks
Senior Program Officer
Office of the Deputy Director General | Environmental Services & Regulation
Department of Environment and Heritage Protection

P Irrelevant
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GPO Box 2454, BRISBANE QLD 4001

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Melanie Pilgrim

From: LOWE Trinity <Trinity.Lowe@ehp.qld.gov.au> on behalf of ESR <ESR@ehp.qld.gov.au>
Sent: Tuesday, 25 July 2017 1:25 PM
To: Alison Brown; Benton Wecker; Danielle Cohen; ELLWOOD Dean; DLO EHP; Media EHP/NPSR; Erin Fentiman; ESR; REEVES Jim; Katharine Wright; MCMAIN Lisa; Naomi van Brug; SENGERS Nathalie; STEELE Mary; Steven Miles; STRYBOS Stacey
Cc: ESR Snr Mgt
Subject: ESR Alert - Penalty Infringement Notice (PIN) issued to Abbot Point Bulk Coal Pty Ltd – Stormwater Release.

ALERT CATEGORY:

- Enforcement Activity.

ALERT NAME:

- Penalty Infringement Notice (PIN) issued to Abbot Point Bulk Coal Pty Ltd – Stormwater Release.

CUSTOMER DETAILS:

- Abbot Point Bulk Coal Pty Ltd.
- Abbot Point Coal Terminal, Bowen, Lot 48 on SP243724, Lot 49 on SP243724, Lot 50 on SP243721, Lot 51 on SP243721, Lot 52 on SP243721, Lot 3 on SP227557, Lot 4 on SP227557, Lot 58 on SP240224 and Lot 49 on SP185904.
- Contact: Dwayne Freeman – Chief Executive Officer, Abbot Point Operations Pty Ltd.
- Environmental Authority (EA) EPPR00577113.
- Temporary Emissions Licence (TEL) ENEL07198317.

SUMMARY OF ISSUE/S:

- On 20 July 2017, the Manager Compliance (Coal) issued a penalty infringement notice (PIN) totalling $12,190 to Abbot Point Bulk Coal Pty Ltd (APBC), for an alleged breach of section 357I of the *Environmental Protection Act 1994* regarding non-compliance with a TEL.
- The non-compliance was identified on 6 April 2017, when APBC advised the department that a stormwater release which occurred from release point W2 during rainfall associated with Tropical Cyclone Debbie was not in compliance with conditions of the TEL or EA. APBC reported a release with a Total Suspended Solids (TSS) concentration of 806mg/L. The TEL release limit was 100mg/L.
- The department contacted APBC on 20 July 2017, to advise of the issue of a PIN for non-compliance with the TEL.
- The department is also considering issue of an administrative tool in relation to the investigation underway into potential impacts to the Caley Valley Wetlands located adjacent to the Abbot Point Coal Terminal.
- The administrative tool, such as a statutory notice or statutory order, may be issued by the department to secure compliance with obligations under the *Environmental Protection Act 1994*. The tool would likely require APBC to consider impacts associated with stormwater releases from the site to the Caley Valley Wetlands and the site's long term water management plan, including any opportunities for infrastructure improvements.

POTENTIAL IMPACTS / RISKS:

- APBC has indicated previously in discussions with the department that the company is likely to contest any PIN in Court.
- There is potential for APBC to make representations at senior departmental or ministerial level regarding the issue of the PIN.

DEPARTMENT ACTIONS:
[HISTORICAL ACTIONS]

- APBC applied for a TEL on 27 March 2017, in response to the forecast of heavy rainfall associated with Tropical Cyclone Debbie and the potential for non-compliance with stormwater release limits.
- On 27 March 2017 (the same day) a TEL was issued to APBC, temporarily authorising elevated Total Suspended Solids (TSS) limits on stormwater released from release point W1 into the Caley Valley Wetlands.
- The TEL increased the TSS limit from the EA authorised limit of 30 mg/L to 100 mg/L.
- On 28 March 2017, the TEL was amended by agreement authorising the same elevated TSS limits on releases from release point W2.
- The TEL remained in force until 30 March 2017.
- On 6 April 2017, APBC advised the department that a stormwater release which occurred from release point W2 during rainfall associated with Tropical Cyclone Debbie was not in compliance with conditions of the TEL or EA.
- Release point W2 is a licensed stormwater discharge sump located on the northern side of the terminal and does not report to the Caley Valley Wetlands. APBC reported a release with a TSS concentration of 806mg/L. The TEL release limit was 100mg/L.
- In preparation for the weather event, APBC installed a back-up pump in addition to the in situ pump installed at release point W2. APBC has advised that rain associated with Tropical Cyclone Debbie exceeded the capacity of both the in situ pump and the back-up pump.
- A series of rock traps are installed off-site from release point W2. Observations made by departmental officers indicated coal-laden water had passed through the first two sediment traps, however no coal fines were observed in the third sediment trap.
- A pre-enforcement letter was sent to APBC on Monday 22 May 2017, inviting the EA holder to make representations as to why enforcement action should not be taken for non-compliances with the conditions of the TEL.
- APBC provided a response to the pre-enforcement letter on 7 June 2017.
- The department reviewed APBC's response to the pre-enforcement letter and a recommendation to issue one (1) PIN for non-compliance with a TEL condition was escalated to the Manager Compliance (Coal) on Thursday 22 June 2017.

[PLANNED ACTIONS]

- The department is currently engaging with the Department of Science, Information Technology and Innovation (DSITI) and has requested assistance with developing appropriate requirements for inclusion within any administrative tool to be issued in relation to impacts on the Caley Valley Wetlands.
- The department is currently engaging with APBC regarding the likely requirements of the administrative tool and the timeframes involved.

KEY COMMUNICATION MESSAGES:

- The issue of a PIN is an appropriate and proportionate enforcement action given the nature of the alleged offence and is consistent with the department's Enforcement Guidelines.

CONTACT DETAILS:

- Name: Reuben Carlos, Executive Director, Coal and Central Queensland Compliance.
- Phone number: Irrelevant
- Division: Environmental Services and Regulation.

This email is an initial alert in respect of this matter.
If further advice or action is required, it will be communicated via normal channels such as a briefing note.

END

Queensland Government

Trinity Lowe
Executive Officer
Office of the Deputy Director General
Environmental Services and Regulation Division
Department of Environment and Heritage Protection

P Irrelevant
Level 7 400 George St Brisbane

Melanie Pilgrim

From: LOWE Trinity <Trinity.Lowe@ehp.qld.gov.au> on behalf of ESR <ESR@ehp.qld.gov.au>
Sent: Friday, 15 September 2017 3:29 PM
To: Alison Brown; ANDERSON Katherine; BAIN Katie; Benton Wecker; Danielle Cohen; ELLWOOD Dean; DLO EHP; Media EHP/NPSR; Erin Fentiman; ESR; REEVES Jim; Katharine Wright; MCMAIN Lisa; Naomi van Brug; SENGERS Nathalie; STEELE Mary; Steven Miles; STRYBOS Stacey
Cc: BROWN Glen; CAGNEY Justin; CARLOS Reuben; CONNOR Andrew; GOLDSWORTHY Stephen; LENZ Anne; LINO Starsky; SULLIVAN Scott (EHP)
Subject: ESR Alert - Abbott Point Bulk Coal Pty Ltd Investigation

ALERT CATEGORY

- Enforcement Activity.

ALERT NAME:

- Contesting of Penalty Infringement Notice (PIN) by Abbot Point Bulk Coal Pty Ltd – Stormwater Release.

CUSTOMER DETAILS:

- Abbot Point Bulk Coal Pty Ltd (APBC).
- Abbot Point Coal Terminal, Bowen, Lot 48 on SP243724, Lot 49 on SP243724, Lot 50 on SP243721, Lot 51 on SP243721, Lot 52 on SP243721, Lot 3 on SP227557, Lot 4 on SP227557, Lot 58 on SP240224 and Lot 49 on SP185904.
- Contact: Derek Neilson – General Counsel, Abbot Point Bulk Coal Pty Ltd .

SUMMARY OF ISSUE/S:

- A penalty infringement notice (for the amount of $12,190) was issued to APBC concerning the operation of the Abbot Point Coal Terminal and a discharge of stormwater in excess of allowable limits.
- APBC, as is their legal right, have indicated that they would like to have the matter heard in court.
- The Department has commenced a formal investigation to gather the relevant evidence and compile a brief of evidence with a view of commencing formal legal proceedings.
- In undertaking this investigation, APBC will be offered a formal record of interview and documents and other material may be sought from them utilising the Department's statutory powers and tools under the Environmental Protection Act 1994.

POTENTIAL IMPACTS / RISKS:

- There is potential for APBC to make representations at senior departmental or ministerial level regarding the commencement of further investigation.
- There is likely to be significant media and conservation group attention to this matter.

CUSTOMER ACTION:

- On 14 August 2017, APBC elected to have the matter heard in Court.

DEPARTMENT ACTIONS:
[HISTORICAL ACTIONS]

- On 27 March 2017 (in response to an application made by APBC due to the impending Cyclone Debbie) the department issued a Temporary Emissions Licence to APBC, authorising elevated Total Suspended Solids (TSS) limits.
- A pre-enforcement letter was sent to APBC on Monday 22 May 2017, inviting the EA holder to make representations as to why enforcement action should not be taken for non-compliances with the conditions of the TEL.

- The department reviewed APBC's response to the pre-enforcement letter and on 20 July 2017, the Manager Compliance (Coal) issued a penalty infringement notice (PIN) to APBC for discharging in non-compliance with that Temporary Emissions Licence.
- On 7 August 2017 the department refused APBC's request (made on 31 July 2017) to withdraw the PIN.
- On 13 September 2017 an Investigator contacted a representative of APBC and was advised that the company confirmed its intention to defend the alleged offence the subject of the PIN.

[PLANNED ACTIONS]

- Contact with APBC early next week concerning the process of the investigation
- Collation of a Brief of Evidence which may include the issue of statutory notices for the provision of documents or other information by the company, interviews with APBC company representatives, site inspections and other investigative actions deemed necessary.

KEY COMMUNICATION MESSAGES:

- APBC has elected to have the alleged offence subject of the PIN issued by the department, heard by a Magistrates Court.
- The department will prepare a Brief of Evidence for the matter with a view to commencing prosecution action against APBC.

CONTACT DETAILS:

- Name: Anne Lenz, Executive Director
- Phone number: Irrelevant
- Division: ESR (SSC)

This email is an initial alert in respect of this matter.
If further advice or action is required, it will be communicated via normal channels such as a briefing note.

END

Queensland Government

Trinity Lowe
Executive Officer
Office of the Deputy Director General
Environmental Services and Regulation Division
Department of Environment and Heritage Protection

P Irrelevant
Level 7 400 George St Brisbane

Melanie Pilgrim

From: MARKS Zhivana <Zhivana.Marks@ehp.qld.gov.au> on behalf of ESR <ESR@ehp.qld.gov.au>
Sent: Monday, 4 December 2017 2:27 PM
To: REEVES Jim; Danielle Cohen; Media EHP/NPSR; MCMAIN Lisa
Cc: ELLWOOD Dean; ESR
Subject: ESR Alert - Abbot Point Coal Terminal EE appeal

ALERT NAME:

- *Abbot Point Bulkcoal Pty Ltd v Chief Executive, administering the Environmental Protection Act 1994 (EHP)*

CUSTOMER DETAILS:

- Abbot Point Bulkcoal Pty Ltd (APBC) (ACN 010 183 534)

SUMMARY OF ISSUE/S:

- APBC operates the Abbot Point Coal Terminal (the site) situated north of Bowen under an environmental authority for activities including bulk material handling.
- On 18 September 2017, EHP issued a notice to APBC to conduct or commission an environmental evaluation (EE) pursuant to section 326B(1)(b) of the *Environmental Protection Act 1994*. APBC applied for an internal review of the decision which resulted in a varied notice issued on 31 October 2017.
- The EE concerns the assessment and management of releases of coal fines to the Caley Valley Wetland which is situated adjacent to the site.
- In summary, the EE requires APBC to conduct a review of its water management strategy and provide a report by 22 December 2017 and develop and implement a receiving environment monitoring plan by November 2018 in respect of the wetland.
- APBC has appealed to the Planning and Environment Court against the issue of the EE and has applied for a stay of the requirements of the EE. The stay is listed to be heard on **Wednesday 6 December 2017**.

POTENTIAL IMPACTS / RISKS:

- It is possible that there will be media interest in the matter. Litigation will liaise with the media unit and other stakeholders as required.

CONTACT DETAILS:

- Name: Stephen Goldsworthy, Senior Director, Litigation
- Phone number: Irrelevant
- Division: Environmental Services and Regulation

END

Queensland Government

Zhivana Marks
Senior Program Officer
Office of the Deputy Director General | Environmental Services & Regulation
Department of Environment and Heritage Protection

P Irrelevant
400 George Street BRISBANE QLD 4000
GPO Box 2454, BRISBANE QLD 4001

Melanie Pilgrim

From: LOWE Trinity <Trinity.Lowe@ehp.qld.gov.au> on behalf of ESR <ESR@ehp.qld.gov.au>
Sent: Wednesday, 25 October 2017 3:36 PM
To: Alison Brown; ANDERSON Katherine; Benton Wecker; Danielle Cohen; ELLWOOD Dean; DLO EHP; Media EHP/NPSR; Erin Fentiman; ESR; JACOBS Nigel; REEVES Jim; Katharine Wright; MCMAIN Lisa; Naomi van Brug; SENGERS Nathalie; STEELE Mary; Steven Miles; STRYBOS Stacey
Cc: SHERMAN Kathrin; BROWN Glen; CAGNEY Justin; CARLOS Reuben; CONNOR Andrew; GOLDSWORTHY Stephen; LENZ Anne; LINO Starsky; SULLIVAN Scott (EHP)
Subject: ESR ALERT – Abbot Point Bulk Coal Pty Ltd (Adani) Investigation
Attachments: Map - Overview of APCT incl W1 and W2.PNG

ALERT CATEGORY:

- Enforcement activity

ALERT NAME: Abbot Point Bulk Coal Pty Ltd (Adani) Investigation – Scope of Investigation

CUSTOMER DETAILS:

- Abbot Point Bulk Coal Pty Ltd
- Dwayne FREEMAN (Chief Executive Officer – Abbot Point Operations)

SUMMARY OF ISSUE/S:

- The purpose of this alert is to advise of a significant development in the investigation of Abbot Point Bulk Coal Pty Ltd (APBC).
- APBC were issued a Penalty Infringement Notice for a suspected breach of Temporary Emissions Licence (TEL) on 20 July 2017 for discharging water containing Suspended Solids (SS) to 'waters' which exceeded the permissible limits during Tropical Cyclone Debbie event in March 2017 at discharge location known as 'W2' (see map attached) at their coal loading facility near Bowen. APBC are contesting the PIN on the basis that they believe that the water containing SS did not reach nearby coastal 'waters'. An investigation into this matter has commenced.
- It is suspected that APBC collected two (2) water samples from rising sample bottles ('W2A' and 'W2B') that were installed at discharge location 'W2' during the event and had both samples analysed for SS amongst other parameters.
- APBC advised the Department in writing on 21 April 2017 of an exceedance at 'W2' as 806 mg/L of SS (exceeding the approved 100mg/L TEL limit) and included 'page 3' of an Australian Laboratory Services Pty Ltd (ALS) 'Certificate of Analysis' (COA) document. The document appeared to have a column missing which required further investigation.
- As a result, a Notice under the *Environmental Protection Act 1994* was issued to ALS who conducted the analysis of the subject water containing SS on behalf of APBC to obtain a complete copy of the relevant documents.
- The documents which were provided by ALS on 23 October 2017 under the notice included a full copy of the COA consisting of 5 pages. Both APBC and ALS documents were compared and was quite evident that the APBC document had been modified to omit reference to analysis of sample 'W2B' which was stated as being 834mg/L of SS.
- It appears that an unknown person has modified the ALS document to omit reference to the analysis of sample water 'W2B' which presented a higher reading of 834mg/L of SS.
- Further investigation will be required to determine the exact circumstances of the document modification, who was responsible and whether there was an intention to mislead the department.
- APBC have not yet been advised that the investigation will be broadened to include the investigation of providing suspected false and misleading documents to the Department.

POTENTIAL IMPACTS / RISKS:

- Should the investigation of APBC for a suspected false and misleading offence become public knowledge, the matter will initiate further interest from lobby groups and will attract significant media interest.

PLANNED ACTIONS

- In accordance with natural justice principles, APBC will be advised in writing that the scope of the investigation has been extended to examine whether the company has provided false and misleading documents to the department.
- An inspection of the APBC discharge location 'W2' is tentatively scheduled for Wednesday 8 November 2017 where investigating officers from the Department with the assistance of surveyors and other experts will attend the APBC site and gather further evidence associated with the suspected breach of the TEL.

LOCALITY DETAILS:

- Abbot Point Bulk Coal Pty Ltd
- Lot 48 SP243724
- Bruce Highway, BOWEN

KEY COMMUNICATION MESSAGES:

- The Department is currently investigating the matter and it would be inappropriate to comment at this time .
- Providing false or misleading information to the Department is a serious offence.

CONTACT DETAILS:

- Name: Anne Lenz, Executive Director Strategy Support and Compliance
- Phone number: Irrelevant
- Division: Environmental Services and Regulation

This email is an initial alert in respect of this matter.
If further advice or action is required, it will be communicated via normal channels such as a briefing note.

Queensland Government

Trinity Lowe
Executive Officer
Office of the Deputy Director General
Environmental Services and Regulation Division
Department of Environment and Heritage Protection

p Irrelevant
Level 7 400 George St Brisbane

Melanie Pilgrim

From: CARLOS Reuben <Reuben.Carlos@ehp.qld.gov.au>
Sent: Thursday, 11 May 2017 6:14 PM
To: Danielle Cohen
Cc: ELLWOOD Dean; ESR
Subject: Dingo Beach Sediment Results
Attachments: image002.png; ATT00001.htm; 45012267 Microscopic Analysis.pdf; ATT00002.htm

Danielle

Please see attached results from our testing at Dingo Beach, Abbot Point. These results indicate only a trace amount of coal was present in the material sampled, however we have requested DSITI provide us with their opinion and a short summary of the results.

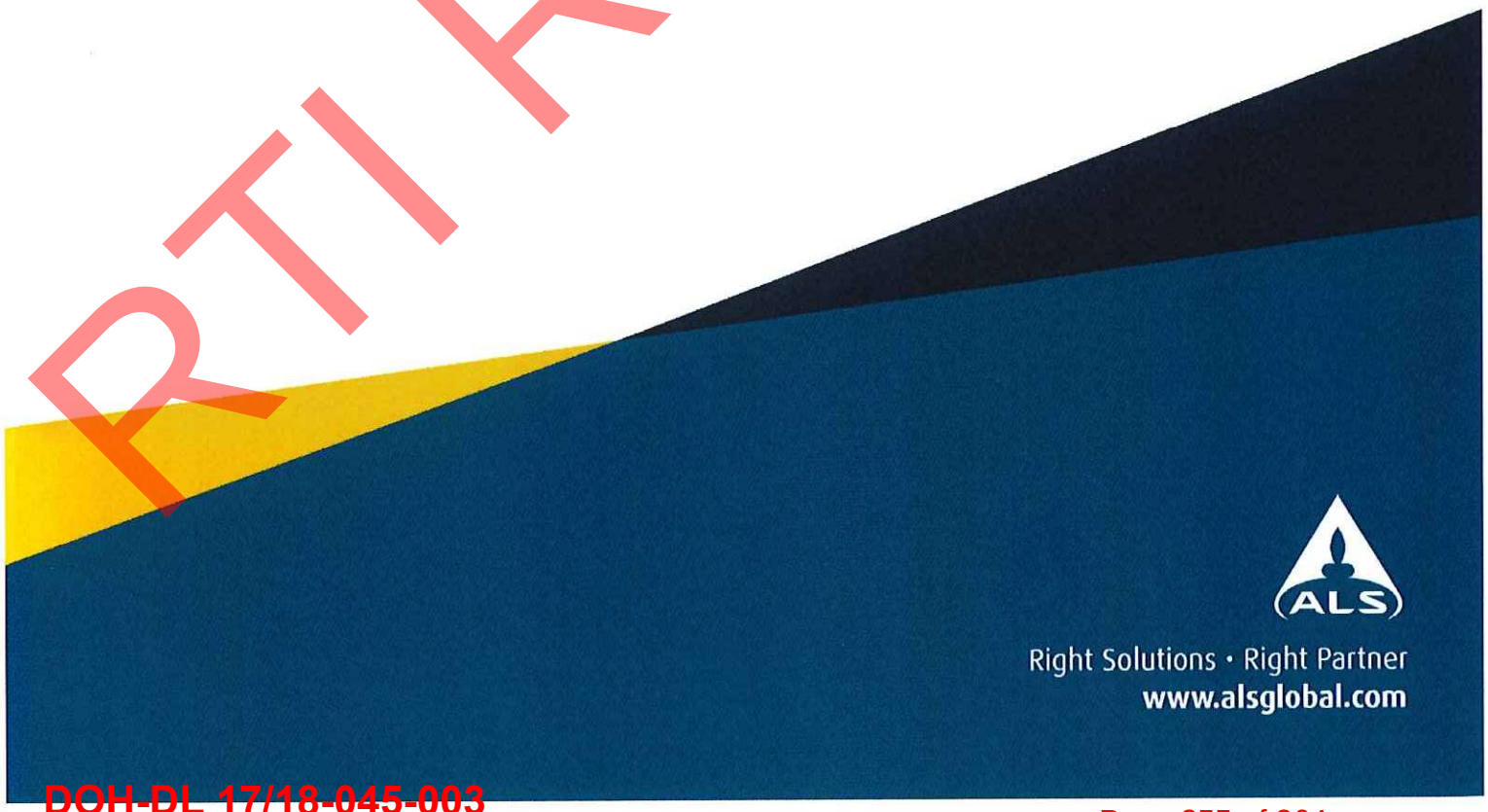
I have been advised that this summary will be provided by COB tomorrow.

Cheers
Reuben

Microscopic Analysis

WILLIAM CASH/EHP ENVIRONMENTAL SAMPLES

May 11, 2017



Australian Laboratory Services Pty Ltd
478 Freeman Road
RICHLANDS QLD 4077
T +61 7 3713 8400 F + 61 7 3217 0774

Contents

1. Introduction

ALS Energy – Coal Technology were contracted by the Department of Environment and Heritage Protection to conduct analysis of environmental samples to determine if there is any coal present. Microscopic analysis was conducted on the samples at the ALS Coal Petrography and Imaging Centre at Richlands. The samples received for analysis were the following:

DB20170420-01

DB20170420-02

DB20170420-03

DB20170420-04

2. Procedure

After receipt, samples were dried overnight in an oven to remove excess moisture. The samples were prepared by crushing any oversize material down to a 1mm top size using a mortar and pestle to limit over-crushing.

Samples were then prepared as per normal petrographic samples by mounting the crushed samples in an acrylic resin, which is polished via a multistage polishing procedure on a Struers Tegra polishing system to produce a suitable surface for reflected light microscopy.

A point count of each sample was conducted with the material under the crosshairs of the microscope being classified as coal, mineral matter or organic matter. 500 points were counted on the sample at 500x magnification. Some example images are included below.

Figure 1: A coal dust particle, areas of Vitrinite and Inertinite are clearly visible; 50x objective, oil immersion, reflected white light.

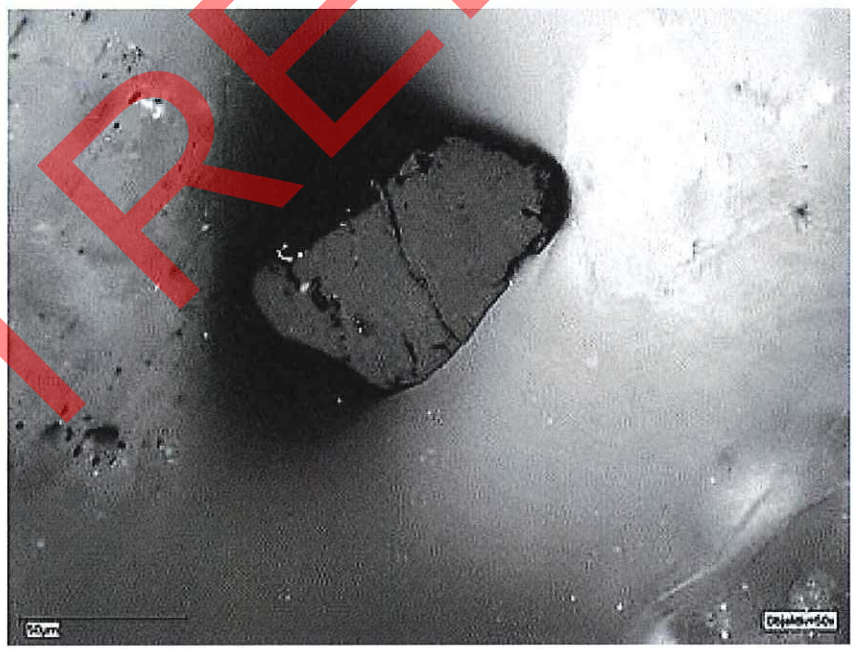


Figure 2: A Vitrinite dominant coal grain; 50x objective, oil immersion, reflected white light.

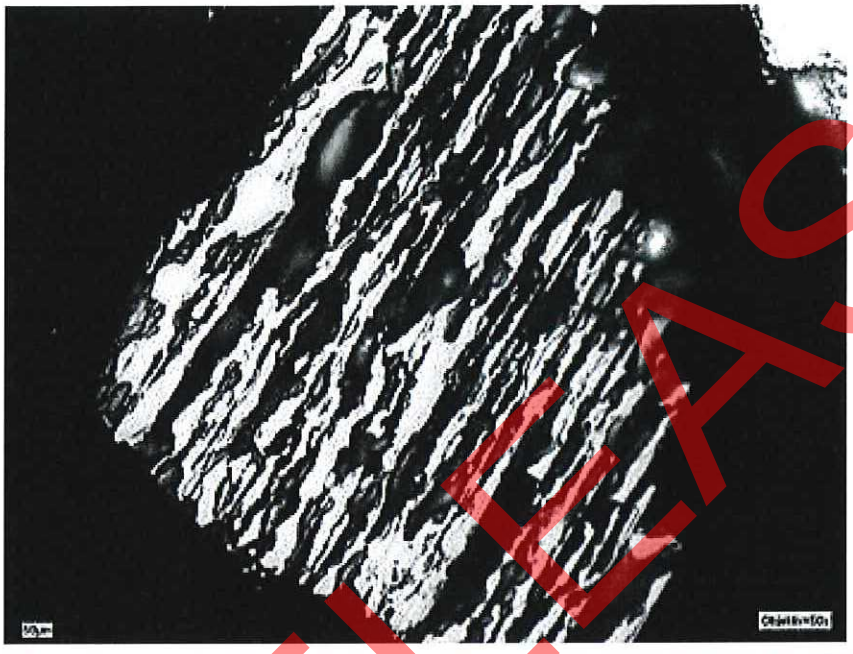


Figure 3: Organic material, although having a similar appearance to coal, can be differentiated microscopically; 50x objective, oil immersion, reflected white light.

Figure 4: Mineral matter; 50x objective, oil immersion, reflected white light.

Figure 5: Mineral matter; 50x objective, oil immersion, reflected white light.

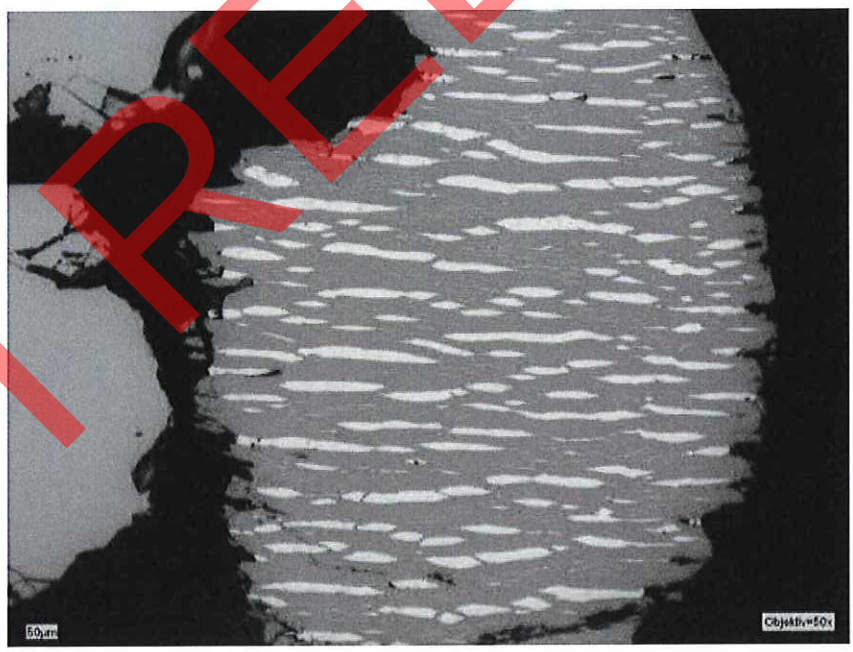


Figure 6: Magnetite; 50x objective, oil immersion, reflected white light.

3. Results

The results of the point count are outlined in the following table:

Sample	Coal (%)	Mineral (%)	Magnetite (%)	Organic (%)
DB20170420-01	1	33	66	0
DB20170420-02	2	17	81	0
DB20170420-03	1	77	22	0
DB20170420-04	1	95	4	0

There was a low volume of coal observed in all three samples. The coal in the samples could clearly be identified by the presence of macerals (macerals are the components that make up a coal) as can be seen in Figure 1. The samples were devoid of organic material. Magnetite was predominant in some of the samples and so has been classified separately from other minerals.

Melanie Pilgrim

From: CARLOS Reuben <Reuben.Carlos@ehp.qld.gov.au>
Sent: Sunday, 14 May 2017 8:02 PM
To: ELLWOOD Dean; Danielle Cohen
Subject: Dingo Beach Sediment Results - Abbot Point
Attachments: 45012267 Microscopic Analysis.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Queensland Government

Dean and Danielle

The results of the sediment samples taken by EHP on Dingo Beach on 20 April 2017 were received on 11 May 2017 (see attached).

The sediment sample results indicate trace amounts (1-2%) of coal in all samples, however mineral and magnetite material comprised the majority of the sediment sampled.

The results were provided to DSITI for assessment and analysis. DSITI have advised that the results indicate that the presence of magnetite in the sand is the most likely reason for the dark colouration observed at Dingo Beach.
The trace amounts of coal (1-2%) in the sediment samples are indicative of sediment that is located in an area adjacent to a coal terminal that has undergone an extreme weather event, such as Cyclone Debbie.

DSITI also advised that the trace amounts of the coal found in the sediment samples would be unlikely to cause any environmental harm to the surrounding area.

Regards
Reuben

Reuben Carlos
Executive Director
Coal and Central QLD Compliance
Department of Environment and Heritage Protection

P Irrelevant
209 Bolsover St Rockhampton 4700
PO Box 413 Rockhampton 4700

Microscopic Analysis

WILLIAM CASH/EHP ENVIRONMENTAL SAMPLES

May 11, 2017

Right Solutions • Right Partner
www.alsglobal.com

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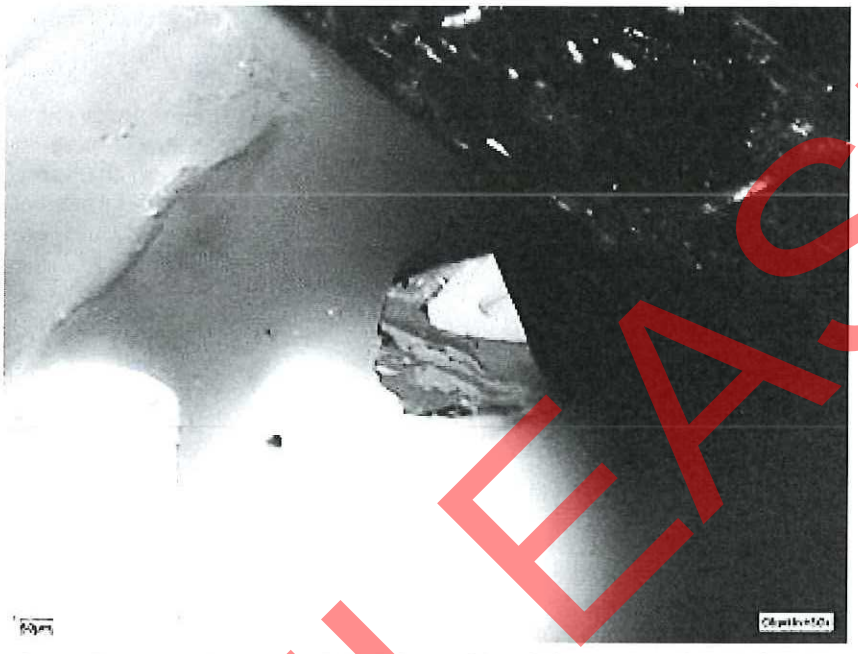

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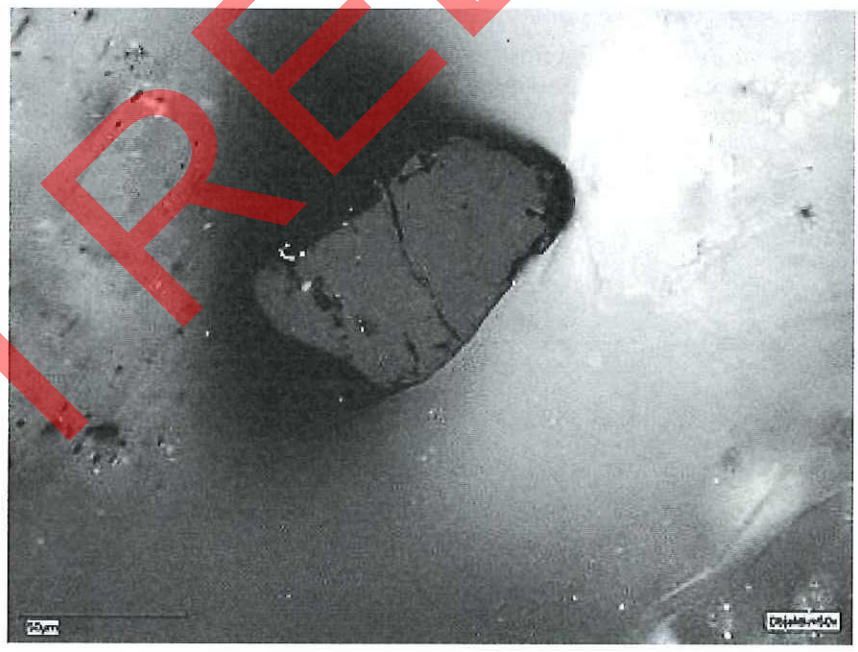

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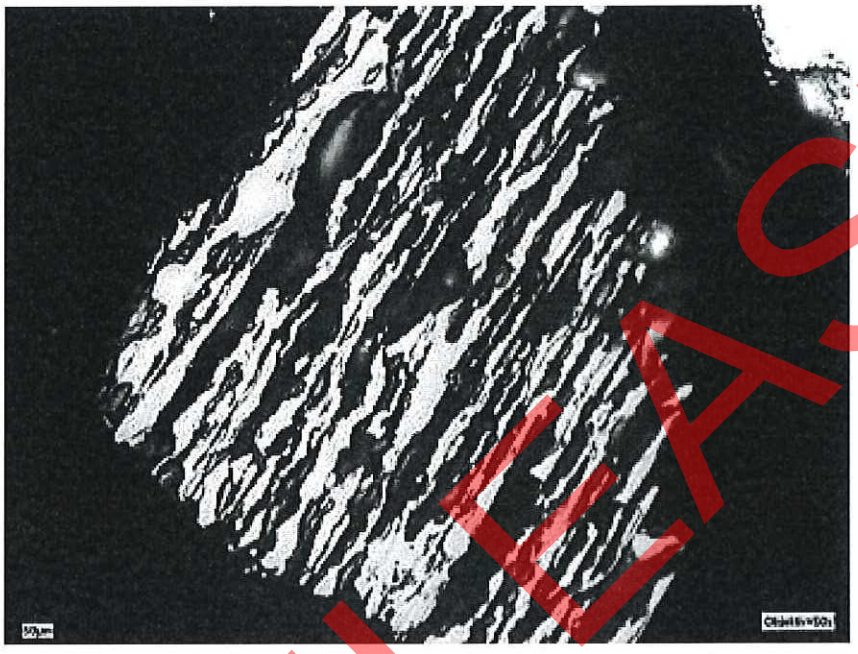

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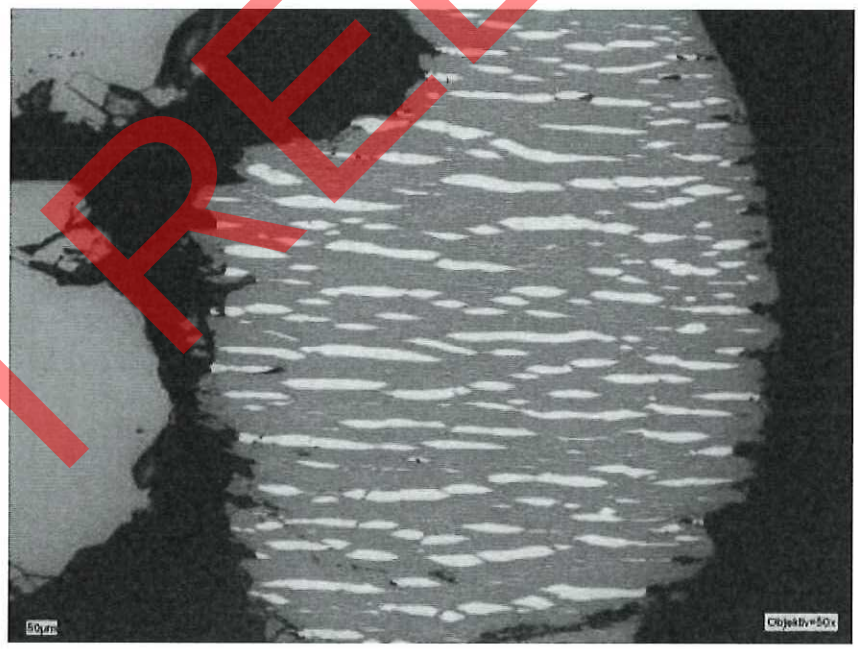

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Melanie Pilgrim

From: LOWE Trinity <Trinity.Lowe@ehp.qld.gov.au>
Sent: Tuesday, 4 July 2017 1:21 PM
To: Danielle Cohen; REEVES Jim
Cc: MCMAIN Lisa; ESR; DLO EHP; Benton Wecker; BROWN Glen; LOVEDAY Chris
Subject: Abbot Point update week ending 7 July 2017
Attachments: Abbot Point Weekly Update 7 July 2017 CAGNEY.docx

Afternoon
Please see the attached Abbot Point update from ESR for the week ending 7 July 2017.
Thanks & Cheers
Trinity

Queensland Government

Trinity Lowe
Executive Officer
Office of the Deputy Director General
Environmental Services and Regulation Division
Department of Environment and Heritage Protection

P Irrelevant
Level 7 400 George St Brisbane

Abbot Point and Caley Valley Wetland Investigation

Weekly Whole of Government update (week ending 7 July 2017) Updates in red below.

Background

- The Department of Environment and Heritage Protection (EHP) issued a temporary emissions licence (TEL) to Abbot Point Bulk Coal Pty Ltd (APBC) from 27 March 2017 to 30 March 2017, due to predictions of a major rainfall event associated with Tropical Cyclone Debbie.
- The TEL permitted a temporary increase of the environmental authority (EA) release limit for total suspended solids (TSS) from 30mg/L to 100mg/L at 2 authorised release points. The 2 release points were W1 from the Secondary Settlement Pond into the Caley Valley Wetland and W2 on the northern side of the terminal, which does not report to the Caley Valley Wetland.
- On 6 April 2017, EHP became aware of aerial photography taken post-Tropical Cyclone Debbie that shows colour variation at release point W1 and the adjacent Caley Valley Wetland.
- EHP immediately commenced an assessment of the Caley Valley Wetland to investigate the potential release of coal and/or coal fines into the wetland and to assess compliance with the TEL.

Monitoring/Sampling

- APBC provided monitoring results from sampling conducted 30 March 2017, which indicated that releases into the Caley Valley Wetland were in compliance with the TEL conditions.
- EHP collected water and sediment samples on 11 April 2017 from several locations within the Caley Valley Wetland.
    - The water sample results indicated that the samples were within the TEL and EA release limits.
    - The sediment sample results indicated the presence of coal in all samples, however mineral and organic (predominantly decaying plant) material comprised the majority (93% - 97%) of the sediment sampled.
- EHP undertook sediment sampling at four locations at Dingo Beach on 20 April 2017 in response to media reports of black material on the beach.
    - The results were provided to the Department of Science, Information Technology and Innovation (DSITI) for assessment and analysis. DSITI have advised that the results indicate that the presence of magnetite in the sand is the most likely reason for the dark colouration observed at Dingo Beach.
    - DSITI have also advised the trace amounts of coal (1-2%) in the sediment samples are indicative of sediment that is located in an area adjacent to a coal terminal that has undergone an extreme weather event, such as Tropical Cyclone Debbie.
    - DSITI advised that the trace amounts of coal would be unlikely to cause any environmental harm to the surrounding area.

- DSITI and EHP took *in situ* water monitoring, sediment samples and water samples across 7 sites in Caley Valley Wetland on 27 April 2017 and 28 April 2017 to determine the state of the relevant areas and the contribution of releases from the terminal.
- DSITI had the samples analysed by an independent laboratory (The University of Queensland (UQ)).
- DSITI's draft preliminary wetland assessment report was provided to EHP on 18 May 2017.
- EHP has reviewed the draft preliminary wetland assessment report and has recommended the report be updated by DSITI to include additional content. The additional content will provide clarity regarding the laboratory analyses and results obtained from the sediment samples collected during the wetland assessment. DSITI is currently adding the additional content and finalising the wetland assessment report. EHP expects to receive the final report by the end of July 2017.
- EHP is seeking advice internally regarding the most appropriate mechanism to publically release the final wetland assessment report on the EHP website.

TEL Non-Compliance

- APBC have advised EHP that a release from release point W2 was not in compliance with conditions of the TEL or their EA.
- Release point W2 is from a licensed discharge sump located on the northern marine side of the terminal and does not report to Caley Valley Wetland. APBC reported a release at 806mg/L of total suspended solids which is in exceedance of the TEL release limit of 100mg/L.
- In preparation for the weather event, APBC installed a back-up pump in addition to the *in situ* pump at W2. Adani have advised that rain associated with Tropical Cyclone Debbie exceeded both the expectation and the capacity of the *in situ* pump and the back-up pump.
- A series of rock traps are installed offsite from the W2 release point. Evidence observed by EHP indicated coal-laden water had passed through the first two sediment traps, however no coal fines were present in the third trap.
- EHP is continuing its investigation into the non-compliances identified under the TEL.
- EHP has a wide range of enforcement measures available to it and the enforcement approach taken will be guided by the principles in the Enforcement Guidelines.
- A pre-enforcement letter was sent to APBC Monday 22 May 2017, inviting the EA holder to make representations as to why enforcement action should not be taken for non-compliances identified under the TEL.
- APBC were provided 10 business days to respond to the pre-enforcement letter (5 June 2017). APBC requested an extension on 22 May 2017 to extend the submission date until 19 June 2017 (an additional 10 business days). APBC were advised that extensions were not routinely provided. APBC proposed a shorter extension of 2 business days to ensure that all information in response to pre-enforcement is provided. EHP accepted the extension, response due 7 June 2017.
- Coal and Central Queensland Compliance Executive Director visited Abbot Point Coal Terminal, Caley Valley Wetlands and the adjacent Dingo Beach on 16 May 2017 to meet with APBC and North Queensland Bulk Ports and discuss the matter.
- APBC provided a response to the pre-enforcement letter at 7:25pm on 7 June 2017. The response will be reviewed to determine EHP's enforcement response.

- EHP has reviewed APBC's response to the pre-enforcement letter and a recommendation regarding the department's approach to the non-compliances was escalated to the Manager (Compliance) Coal on Thursday 22 June 2017.

Key Communication Messages

- EHP has undertaken an assessment in the Caley Valley Wetland to determine the state of the relevant areas in the wetland and the contribution of releases from the terminal.
- EHP is continuing its investigation into the non-compliances identified under the TEL.
- EHP has a wide range of enforcement measures available to it and the enforcement approach taken will be guided by the principles in the Enforcement Guidelines.
- EHP is receiving a high number of requests for information from Commonwealth and Queensland Government departments and media outlets regarding EHP's investigation into the Caley Valley Wetland and the non-compliances identified under the TEL.
- DSITI is currently finalising the wetland assessment report. EHP expects to receive the final wetland assessment report by the end of July 2017.

Melanie Pilgrim

From: CARLOS Reuben <Reuben.Carlos@ehp.qld.gov.au>
Sent: Wednesday, 26 April 2017 1:01 PM
To: Danielle Cohen
Cc: ELLWOOD Dean
Subject: Abbot Point report
Attachments: 20170419_Ltr to DEHP_CR 78081_W2 and Inloading Exceedence_TC Debbie.pdf

Here you go Danielle as requested

Cheers
Reuben

adani™

measured until power was turned off and the Bowen Airport rain gauge broke during the cyclone event. Rainfall data has been sourced from Bureau of Meteorology (BOM) weather station based on proximity to the BOM Bowen Airport Weather Station (BAWS) to provide indicative values, this data is shown below.

Station Name	Distance from BAWS (km)	Rainfall for event (27th - 30th March)
Bowen Pump Station	3.7	501
Mt Dangar	24.71	484.6
Mt Danger Alert	26.24	436
Roma Peak Road	32.1	542

Based on this information, APB predicts site received approximately 501mm of rain during the weather event. This value is consistent with site's historical rainfall data and pond water levels observed in the Secondary Settlement Pond (SSP) and what was observed after the recent Tropical Cyclone and electrical storm. For example, between 2nd and 6th March 2016, 208.8mm of rain was received on site and entered a previously empty SSP. This volume of rain filled the SSP to between one third to half full. Please note the SSP was also empty prior to TC Debbie.

Pond Status Prior to 2nd March 2016

Abbot Point Bulkcoal Pty Ltd
Bruce Highway, Bowen, QLD 4805
PO Box 207, Bowen, QLD 4805
Australia

Tel +61 7 4786 0300
Fax +61 7 4786 0305
info@adani.com
www.adani.com

Registered Office: Level 25 AMP Place, 10 Eagle Street, Brisbane, QLD 4000, Australia
ABN: 23 010 183 534

adani

Pond Status 7th March 2016

Exceedence at W2

Monitoring location	Quality characteristic	Min	Max	Monitoring frequency
W1 (E611876.19, N7800108.34), W2 (E612781.48, N7801060.72)	Suspended solids	-	100mg/L	As soon as practicable and safe during the release
	pH	6	9	
	Electrical conductivity	-	7000µS/cm	

W2 is a licenced discharge sump which is located on the northern marine side of the terminal. APB environmental management framework has been developed on a risk based approach which is why a back-up pump was installed to assist with removing water from this sump during severe weather events. The pump capacity was chosen based on historical rainfall intensities which had been experienced at the terminal.

Tropical Cyclone Debbie has recently been rated a 1 in 500 year weather event that brought rain that exceeded both expectation and the capacity of the insitu pump and the back-up pump at W2.

Rising stage sample bottles are installed at the W2 discharge location to collect any potential discharge. These samples were collected on the 30th March 2017 when site was re-opened for a post cyclone assessment by the Senior Management Team and Environment and Community personnel. Insitu water quality parameters were tested and sample bottles were sent to Australian Laboratory Services (ALS) to test for Total Suspended Solids. The ALS results from sample bottles were received on the 10th April 2017, which concluded the water quality had exceeded the TEL at W2 for Total Suspended Solids (TSS).

Abbot Point Bulkcoal Pty Ltd
Bruce Highway, Bowen, QLD 4805
PO Box 207, Bowen, QLD 4805
Australia

Tel +61 7 4786 0300
Fax +61 7 4786 0305
info@adani.com
www.adani.com

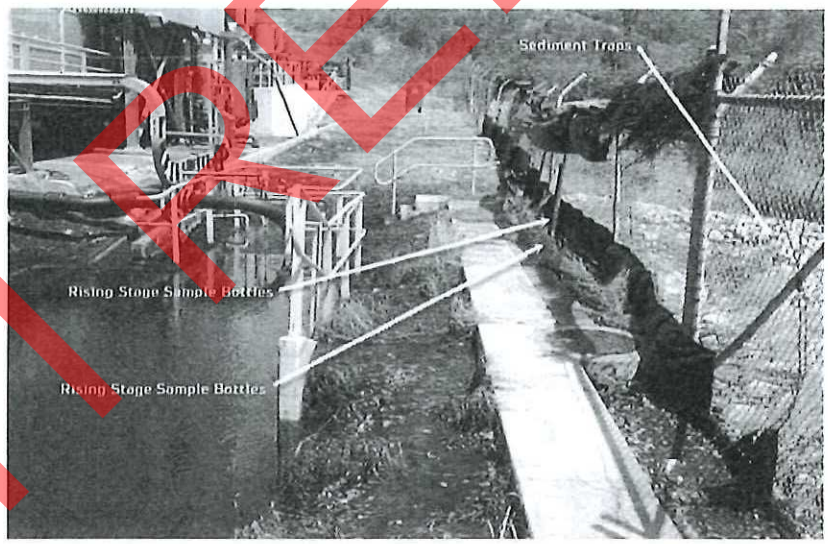
Registered Office: Level 25 AMP Place, 10 Eagle Street, Brisbane, QLD 4000, Australia
ABN: 23 010 183 534

Parameters	TEL Compliance Condition Limits	W2 Water Quality
pH	6-9	6.77
EC µs/cm	7000	374
Total Suspended Solids (mg/L)	100	806

Installed at W2 is a meter that measures the height of water traveling through this licenced discharge location. The measuring meter bleaches colour when in contact with water and measured a flow at 11cm on height. Located between W2 and the beach below are sediment traps which are composed of white rocks to clearly visualise the extent of any water release.

Evidence showed coal laden water had passed through the first two sediment traps, however no coal fines were present on the third trap which indicates that no coal laden water reached this trap, the beach below or the marine environment.

Additionally, there has been no damage to vegetation beyond the sediment traps and no visual impact to environmental values within this area.



W2 Licenced Discharge Location - photo taken 30/3/2017

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Australia

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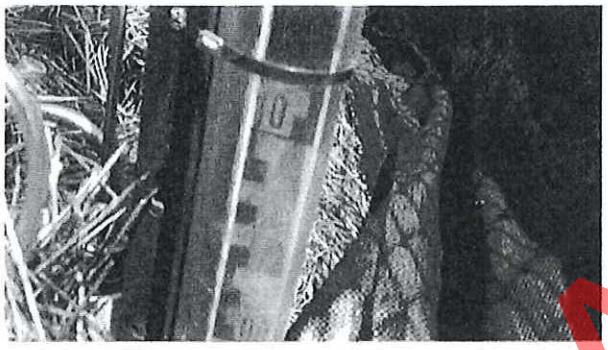
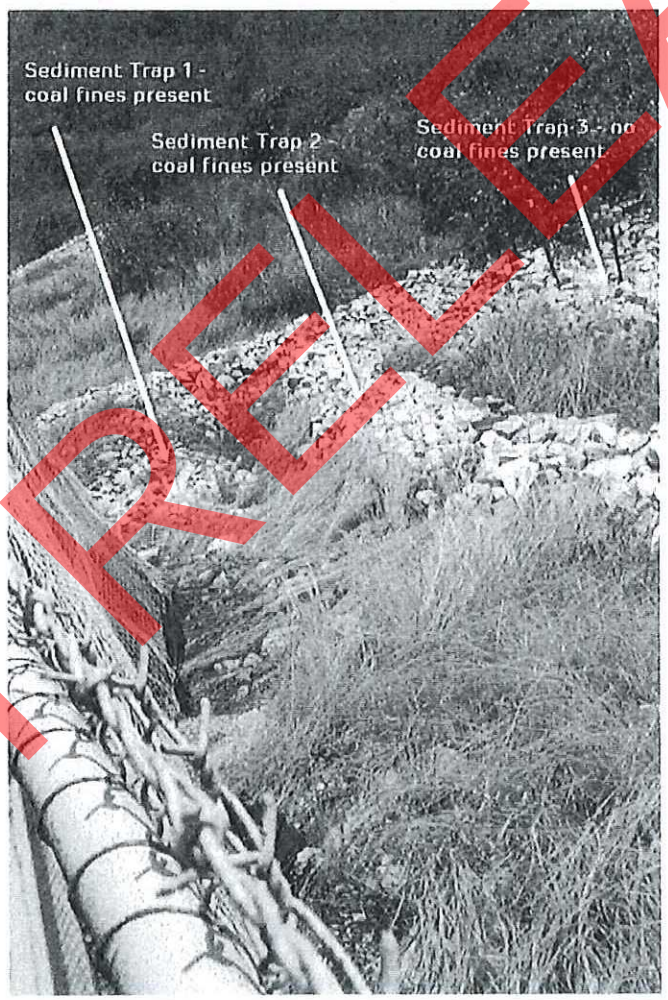
Registered Office: Level 25 AMP Place, 10 Eagle Street, Brisbane, QLD 4000, Australia
ABN: 23 010 183 534

adani™



Water Height Measuring Metre - photo taken 30/3/2017



W2 Sediment Traps - photo taken 30/3/2017

Abbot Point Bulkcoal Pty Ltd
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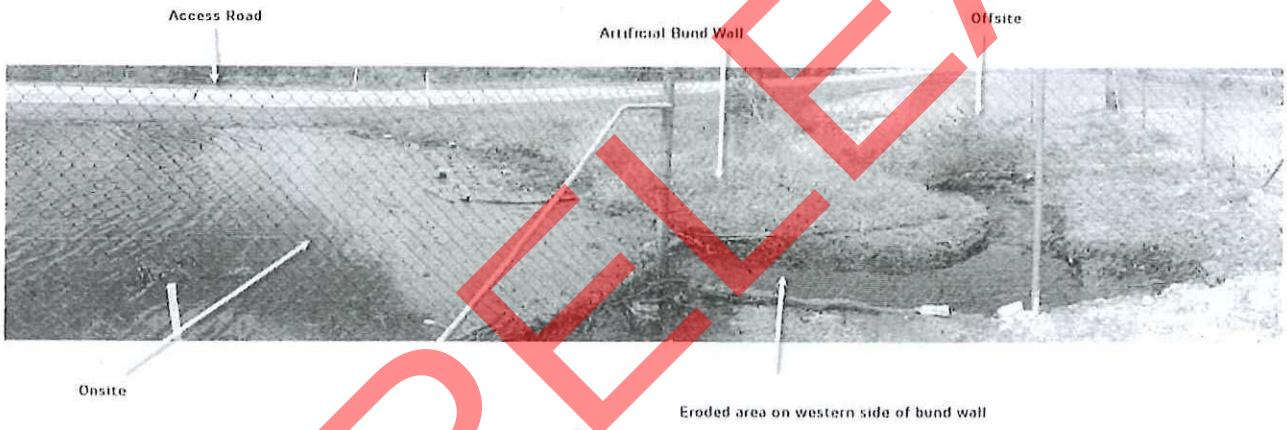
Exceedence at Inloading

The elevated access road, rail line, water tanks pad and an artificial bund wall act as a bund to keep water that may contain contaminants, such as coal fines, from leaving site in heavy rain events. This artificial bund wall located on the southern boundary suffered erosion on the western edge, which was caused by the intensity of the rainfall from Tropical Cyclone Debbie on 28th March and the subsequent electrical storm on 29th March 2017. This ultimately allowed water to exit the site. This uncontrolled release is a potential exceedence of EA condition H1 *Contaminants must not be released to land except as authorised by this environmental authority*, 2017.



Inloading Bund Wall - photo taken 30/3/2017

On identifying this potential breach, a sample of the releasing water was taken and insitu water quality parameters were tested. The sample was sent to ALS and the table below provides a summary of results received from ALS on the 10th April 2017.

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Parameters	EA Compliance Limits at this Location	Water Quality Released at Inloading
pH	Do not release	6.39
EC µs/cm	Do not release	63 µs/cm
Turbidity	Do not release	32.8 NTU
Dissolved Oxygen	Do not release	69% 4.94mg/L
Total Suspended Solids (mg/L)	Do not release	13 mg/L

Site Overview and Location of Potential Exceedence at Inloading

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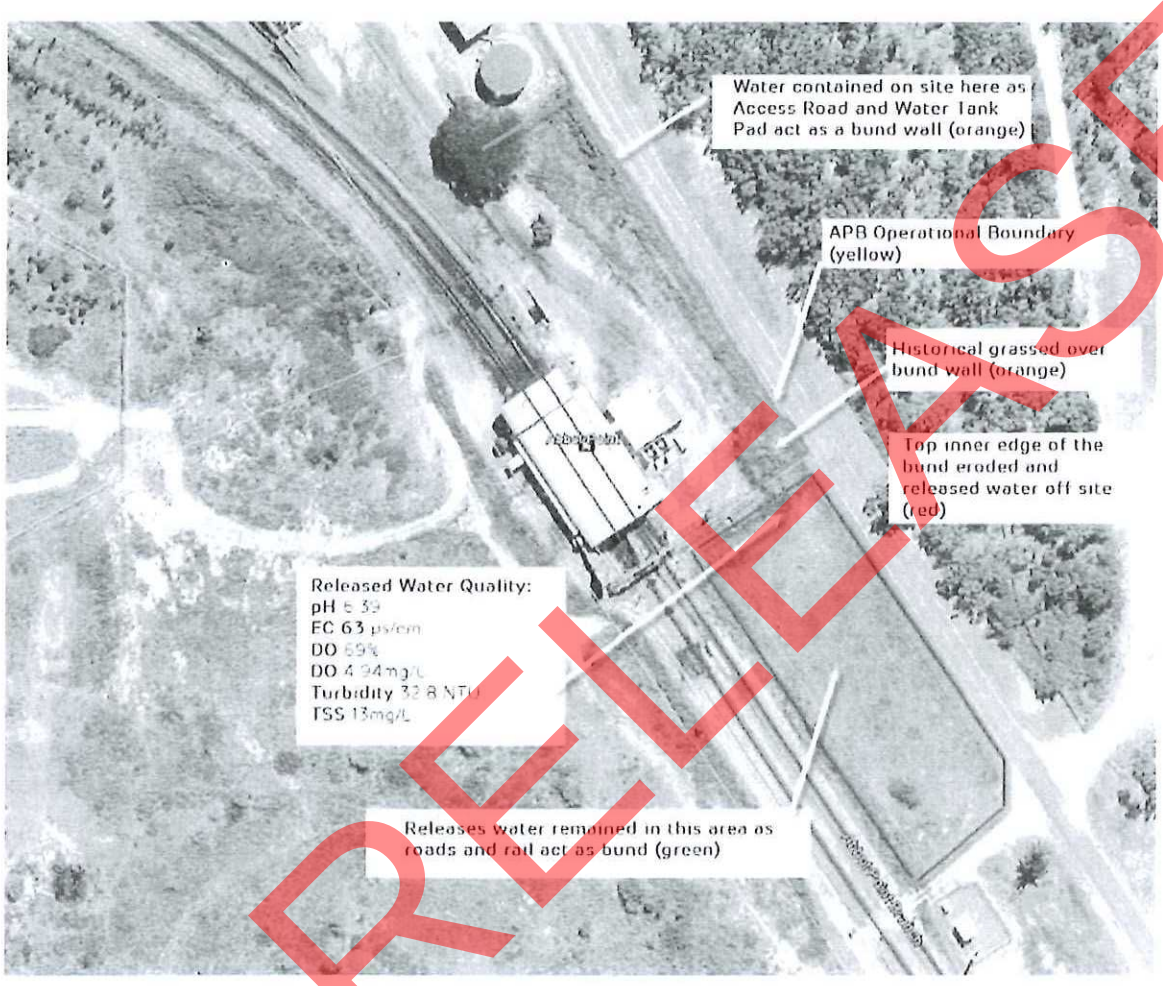

Location of Potential Exceedence at Inloading in Relation to APB Boundary.

The water quality that was released implies it comprised heavily of rain water as the pH was neutral and the EC was very low. TSS and turbidity results also indicate the water was very clear however coal fines were evident and would have contributed to the turbidity and TSS value. The area in which the water was received to is a naturally low lying area which fills with rain water naturally. The vegetation in this area consists of grass that has been introduced and is mowed to maintain visibility to vehicles using the access road. Based on the insitu data, laboratory analysis, incident inspections and an assessment of the environmental values of this area, APB is confident no environmental harm was caused by this release.

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APB's Environmental Authority condition A10 states *within 10 businesses days following the initial notification of an emergency or incident, or receipt of monitoring results, whichever is the latter, further written advise must be provided to the administering authority, including the following:*

a) *Results and interpretation of any samples taken and analysed;*
b) *Outcome of action taken at time to prevent or minimised unlawful environmental harm; and*
c) *Proposed actions to prevent a reoccurrence of the emergency or incident.*

Please find below a summary of action taken at time of incident and further actions to be implemented.

Related Release	Action at time	Further Action
W2	Samples collected	Nib wall to be designed and installed between sump and boundary (approx. 600mm high) to prevent future releases from this location.
	Inspection of incident and potential impact	
	Notification to EHP via Pollution Hotline	
Inloading	Samples collected	Once water has evaporated from this area, repair artificial bund and raise height.
	Inspection of incident and potential impact	
	Notification to EHP via Pollution Hotline	

Regards

Dwayne Freeman
Head of Operations
Adani Abbot Point Bulkcoal

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Appendix A – Laboratory results

ALS

Page	3 of 5
Work Order	ET1700421
Client	ABBOT POINT BULKCOAL PTY LTD
Project	

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)

Compound	CAS Number	LOR	Unit	W2A	Inloading Bund
Client sampling date / time				30-Mar-2017 12:50	30-Mar-2017 15:05
				ET1700421-001	ET1700421-003
				Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C					
Suspended Solids (SS)	----	5	mg/L	306	13
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser					
Nitrite + Nitrate as N	----	0.01	mg/L	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser					
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser					
^ Total Nitrogen as N	----	0.1	mg/L	----	----
EK067G: Total Phosphorus as P by Discrete Analyser					
Total Phosphorus as P	----	0.01	mg/L	----	----
EP026SP: Chemical Oxygen Demand (Spectrophotometric)					
Chemical Oxygen Demand	----	10	mg/L	----	----

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ABN 23 010 183 534

Melanie Pilgrim

From: Danielle Cohen
Sent: Tuesday, 28 November 2017 2:58 PM
To: Dlo Ehp
Cc: Dean Ellwood
Subject: Abbot Point Bulk Coal matter

Hi team

Can you please request an urgent update for me on the Abbot Point Bulk Coal/Caley Valley wetlands matter? At this stage I'm only interested in the matter of the exceedance resulting in a PIN, not the environmental evaluation of the wetlands

Thanks
Dan

Sent from my iPad

Melanie Pilgrim

From: LOWE Trinity <Trinity.Lowe@ehp.qld.gov.au>
Sent: Thursday, 8 June 2017 4:20 PM
To: ESR; Danielle Cohen; DLO EHP; REEVES Jim
Cc: MCMAIN Lisa; ELLWOOD Dean; CARLOS Reuben
Subject: Abbot Point and Caley Valley Wetland Investigation - Weekly update - week beginning 5 June 2017
Attachments: Abbot Point Weekly update 9 June 2017.docx; Attachment 2 - Overview of APCT incl W1 and W2.jpg; Attachment 1 - CVW Point of Truth 2 June 2017.xlsx

Afternoon
Please see the attached update for the week beginning 5 June 2017.
ESR proposes to revise this report to fortnightly – please advise if there are any issues with this?
Thanks & Cheers
Trinity

Queensland Government

Trinity Lowe
Executive Officer
Office of the Deputy Director General
Environmental Services and Regulation Division
Department of Environment and Heritage Protection

P Irrelevant
Level 7 400 George St Brisbane

Abbot Point and Caley Valley Wetland Investigation

Weekly Whole of Government update (week ending 9 June 2017) Updates in red font

Background

- The Department of Environment and Heritage Protection (EHP) issued a temporary emissions licence (TEL) to Abbot Point Bulk Coal Pty Ltd (APBC) from 27 March 2017 to 30 March 2017, due to predictions of a major rainfall event associated with Tropical Cyclone Debbie.
- The TEL permitted a temporary increase of the environmental authority (EA) release limit for total suspended solids (TSS) from 30mg/L to 100mg/L at 2 authorised release points. The 2 release points were W1 from the Secondary Settlement Pond into the Caley Valley Wetland and W2 on the northern side of the terminal, which does not report to the Caley Valley Wetland.
- On 6 April 2017, EHP became aware of aerial photography taken post-Tropical Cyclone Debbie that shows colour variation at release point W1 and the adjacent Caley Valley Wetland.
- EHP immediately commenced an assessment of the Caley Valley Wetland to investigate the potential release of coal and/or coal fines into the wetland and to assess compliance with the TEL.

Monitoring/Sampling

- APBC provided monitoring results from sampling conducted 30 March 2017, which indicated that releases into the Caley Valley Wetland were in compliance with the TEL conditions.
- EHP collected water and sediment samples on 11 April 2017 from several locations within the Caley Valley Wetland.
    - The water sample results indicated that the samples were within the TEL and EA release limits.
    - The sediment sample results indicated the presence of coal in all samples, however mineral and organic (predominantly decaying plant) material comprised the majority (93% - 97%) of the sediment sampled.
- EHP undertook sediment sampling at four locations at Dingo Beach on 20 April 2017 in response to media reports of black material on the beach.
    - The results were provided to the Department of Science, Information Technology and Innovation (DSITI) for assessment and analysis. DSITI have advised that the results indicate that the presence of magnetite in the sand is the most likely reason for the dark colouration observed at Dingo Beach.
    - DSITI have also advised the trace amounts of coal (1-2%) in the sediment samples are indicative of sediment that is located in an area adjacent to a coal terminal that has undergone an extreme weather event, such as Tropical Cyclone Debbie.
    - DSITI advised that the trace amounts of coal would be unlikely to cause any environmental harm to the surrounding area.

- DSITI and EHP took *in situ* water monitoring, sediment samples and water samples across 7 sites in Caley Valley Wetland on 27 April 2017 and 28 April 2017 to determine the state of the relevant areas and the contribution of releases from the terminal.
- DSITI had the samples analysed by an independent laboratory (The University of Queensland (UQ)).
- DSITI's report outlining the results of the Caley Valley Wetland preliminary assessment was provided to EHP on 18 May 2017. EHP sort advice from Right to Information (RTI) Services regarding the administrative release of the wetland assessment report. EHP will consider RTI Services advice, and follow up on any relevant actions, prior to making the report publicly available in the coming weeks.
- Conservation group representatives were invited to observe the monitoring in the Caley Valley Wetland on 27 April 2017.
- The wetland assessment team took water and sediment samples and photographs on behalf of Australian Marine Conservation Society (AMCS) and Queensland Conservation Council (QCC) at the site closest to the Secondary Settlement Pond in the Caley Valley Wetland on 28 April 2017. The wetland assessment team took duplicate samples at the same time the AMCS and QCC samples were collected on 28 April 2017.
- EHP received an ALS report on 29 May 2017 which provided results for AMCS sediment sample analysis.
- DSITI will complete a detailed comparative analysis of results and methodology of sediment samples collected on 28 April 2017 (wetland assessment team samples and conservation group samples).
- The comparative analysis will include a third party review, to be undertaken by CSIRO, of UQ's and ALS's sample analysis methodology. Additionally, DSITI has sent the duplicate samples to both ALS and UQ laboratories for analysis of the percentage of coal.

TEL Non-Compliance

- APBC have advised EHP that a release from release point W2 was not in compliance with conditions of the TEL or their EA.
- Release point W2 is from a licensed discharge sump located on the northern marine side of the terminal and does not report to Caley Valley Wetland. APBC reported a release at 806mg/L of total suspended solids which is in exceedance of the TEL release limit of 100mg/L.
- In preparation for the weather event, APBC installed a back-up pump in addition to the *in situ* pump at W2. Adani have advised that rain associated with Tropical Cyclone Debbie exceeded both the expectation and the capacity of the *in situ* pump and the back-up pump.
- A series of rock traps are installed offsite from the W2 release point. Evidence observed by EHP indicated coal-laden water had passed through the first two sediment traps, however no coal fines were present in the third trap.
- EHP is continuing its investigation into the non-compliances identified under the TEL.
- EHP has a wide range of enforcement measures available to it and the enforcement approach taken will be guided by the principles in the Enforcement Guidelines.
- A pre-enforcement letter was sent to APBC Monday 22 May 2017, inviting the EA holder to make representations as to why enforcement action should not be taken for non-compliances identified under the TEL.

- APBC were provided 10 business days to respond to the pre-enforcement letter (5 June 2017). APBC requested an extension on 22 May 2017 to extend the submission date until 19 June 2017 (an additional 10 business days). APBC were advised that extensions were not routinely provided. APBC proposed a shorter extension of 2 business days to ensure that all information in response to pre-enforcement is provided. EHP accepted the extension, response due 7 June 2017.
- Coal and Central Queensland Compliance Executive Director visited Abbot Point Coal Terminal, Caley Valley Wetlands and the adjacent Dingo Beach on 16 May 2017 to meet with APBC and North Queensland Bulk Ports and discuss the matter.
- APBC provided a response to the pre-enforcement letter at 7:25pm on 7 June 2017. The response will be reviewed to determine EHP's enforcement response.

Key Communication Messages

- EHP has undertaken an assessment in the Caley Valley Wetland to determine the state of the relevant areas in the wetland and the contribution of releases from the terminal.
- EHP is continuing its investigation into the non-compliances identified under the TEL.
- EHP has a wide range of enforcement measures available to it and the enforcement approach taken will be guided by the principles in the Enforcement Guidelines.
- EHP is receiving a high number of requests for information from Commonwealth and Queensland Government departments and media outlets regarding EHP's investigation into the Caley Valley Wetland and the non-compliances identified under the TEL.
- RTI Services have provided advice regarding the administrative release of the Caley Valley Wetland preliminary assessment report. EHP will consider the advice and follow up on any relevant actions, prior to making the report publicly available in the coming weeks.

Attachments:

Attachment 1 – Point of Truth sampling information (including laboratory reports embedded in spreadsheet)

Attachment 2 – Overview of APCT including W1 and W2 release points Map Caley Valley

Incident: Release of stormwater from Abbot Point Coal Terminal to Caley Valley Wetlands

Sampling dates	List of the samples taken	Area samples taken from	Date results expected	Date EHP received results	Results Attachment	Updates
30-Mar-17	In situ Water - Total Suspended Solids (TSS)	At W1 release point from Settlement Pond in Caley Valley Wetlands	10-Apr-17	11-Apr-17		Samples were taken by Abbot Point Bulk Coal (APBC). Analysis undertaken by ALS. W1 releases were compliant with TEL limit of 100mg/L.
11-Apr-17	In situ Water - Total Suspended Solids (TSS)	4 sites in Caley Valley Wetland - see "Attachment 2 - Map sampling locations"	21-Apr-17	21-Apr-17	G:\Environmental Services\ COMPLIANCE\	TSS samples were taken by EHP officers. Analysis undertaken by ALS. TSS in all Caley Valley Wetland locations sampled were compliant with TEL & EA limits (100mg/L and 30mg/L respectively). TSS sample analysis ranged from 7mg/L - 18mg/L.
11-Apr-17	Sediment samples	3 sites in Caley Valley Wetland - see "Attachment 2 - Map sampling locations". NB - No samples were collected from point 033 due to a known crocodile inhabiting the area.	8-May-17	5-May-17	G:\Environmental Services\ COMPLIANCE\	Sediment samples were taken by EHP to determine the presence and proportion of coal or the absence of coal. Analysis undertaken by ALS Coal. The sediment sample results indicated the presence of coal in all samples, however mineral and organic (predominantly decaying plant) material comprised the majority (93% - 97%) of the sediment sampled.
27 April 2017 & 28 April 2017	In situ Water - Total Suspended Solids (TSS)	3 sites within immediate vicinity of W1 release point from the Secondary Settlement Pond in Caley Valley Wetlands. 1 site was revisited for the benefit of conservation groups. 5 additional sites in palustrine area of Caley Valley Wetlands.	Predicted date is 10/05/2017	DSITI advised EHP on 11 May 2017 they have received results water results. DSITI will be providing the results as part of the wetland assessment report findings. DSITI expect to have the report to EHP by 19 May 2017.	G:\Environmental Services\ COMPLIANCE\	TSS samples were taken by DSITI officers. Analysis undertaken by ALS.
27 April 2017 & 28 April 2017	Sediment samples	3 sites within immediate vicinity of W1 release point from the Secondary Settlement Pond in Caley Valley Wetlands. 1 site was revisited for the benefit of conservation groups. 5 additional sites in palustrine area of Caley Valley Wetlands.	Predicted date is 18 May 2017.	DSITI will be providing the results as part of the wetland assessment report findings. DSITI expect to have the report to EHP by 19 May 2017.	See report above	Sediment samples were taken by DSITI officers to determine the presence and proportion of coal or the absence of coal. Analysis will be undertaken by University of Queensland.
28-Apr-17	Sediment samples	DSITI collected sediment samples within the immediate vicinity of W1 release point from the Secondary Settlement Pond in Caley Valley Wetlands. 1 site had 2 samples collected (CV Shore and CV Wetland).		29-May-17	C:\Users\obrienl1\ Desktop\AMCS wetland sediment	Sediment samples were taken by DSITI on behalf of conservation groups AMCS and QCC. AMCS had sediment samples analysed by ALS to determine the presence and proportion of coal. AMCS provided the attached results to the EHP 29 May 2017 which indicated 23% coal at CV Shore and 21% coal at CV Wetland.

EHP sampling
APBC sampling
DSITI sampling
Conservation Group Samples

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB1707514**	Page	: 1 of 2
Client	: **QLD DEPT OF ENVIRONMENT & HERITAGE PROTECTION**	Laboratory	: Environmental Division Brisbane
Contact	: MS REBECCA MUNRO	Contact	: Customer Services EB
Address	: PO BOX 623 MACKAY QLD, AUSTRALIA 4740	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: +61 07 4999 6917	Telephone	: +61-7-3243 7222
Project	: ABBOT POINT INVESTIGATION	Date Samples Received	: 13-Apr-2017 09:00
Order number	: ---	Date Analysis Commenced	: 18-Apr-2017
C-O-C number	: ---	Issue Date	: 21-Apr-2017 13:32
Sampler	: REBECCA MUNRO		
Site	: Abbot Point Bulk Coal		
Quote number	: BNBQ/082/16		
No. of samples received	: 4		
No. of samples analysed	: 4		

ilac-MRA NATA

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Andrew Epps	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	DS1	W1SW	BG1	DS2	----
			Client sampling date / time	11-Apr-2017 14:25	11-Apr-2017 15:10	11-Apr-2017 15:43	11-Apr-2017 16:30	----
Compound	CAS Number	LOR	Unit	EB1707514-001	EB1707514-002	EB1707514-003	EB1707514-004	-------
				Result	Result	Result	Result	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	18	7	10	13	----

Microscopic Analysis

WILLIAM CASH/APB ENVIRONMENTAL SAMPLES

May 4, 2017

ALS

Right Solutions • Right Partner
www.alsglobal.com

Australian Laboratory Services Pty Ltd
478 Freeman Road
RICHLANDS QLD 4077
T +61 7 3713 8400 F + 61 7 3217 0774

Contents

1. Introduction

ALS Energy – Coal Technology were contracted by the Department of Environment and Heritage Protection to conduct analysis of environmental samples to determine if there is any coal present. Microscopic analysis was conducted on the sample at the ALS Coal Petrography and Imaging Centre at Richlands. The samples received for analysis were the following:

BG1

W1SW

DS1

2. Procedure

After receipt, the sample were prepared by crushing any oversize material down to a 1mm top size using a mortar and pestle to limit over-crushing.

Samples were then prepared as per normal petrographic samples by mounting the crushed samples in an acrylic resin, which is polished via a multistage polishing procedure on a Struers Tegra polishing system to produce a suitable surface for reflected light microscopy.

A point count of each sample was conducted with the material under the crosshairs of the microscope being classified as coal, mineral matter or organic matter. 500 points were counted on the sample at 500x magnification. Some example images are included below.

Figure 1: A coal dust particle, areas of Vitrinite and Inertinite are clearly visible; 50x objective, oil immersion, reflected white light.

Figure 2: A Vitrinite dominant coal grain; 50x objective, oil immersion, reflected white light.

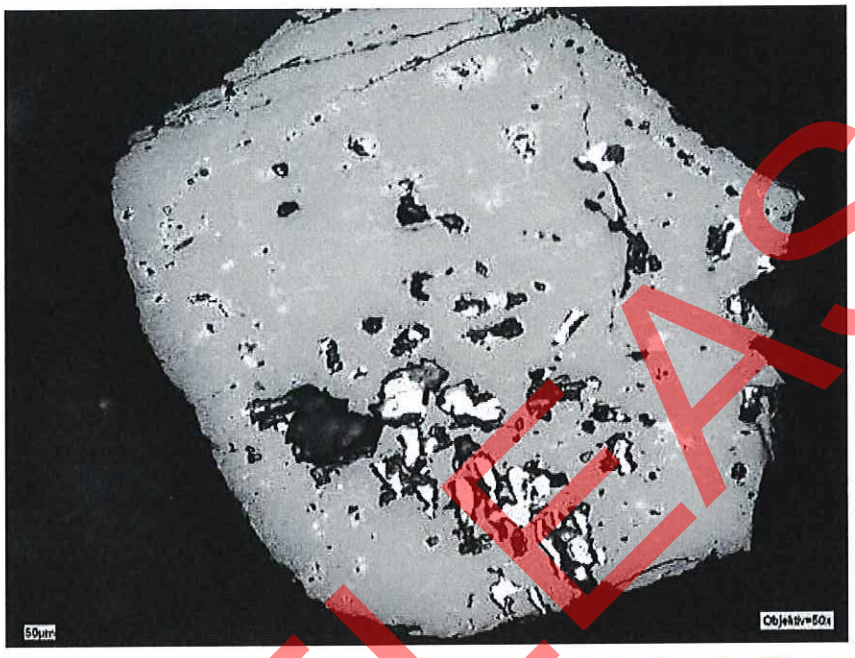


Figure 3: Organic material, although having a similar appearance to coal, can be differentiated microscopically; 50x objective, oil immersion, reflected white light.

Figure 4: Organic material. Although decayed, some cellular structure is still visible; 50x objective, oil immersion, reflected white light.

Figure 5: Organic matter; 50x objective; oil immersion, reflected white light.

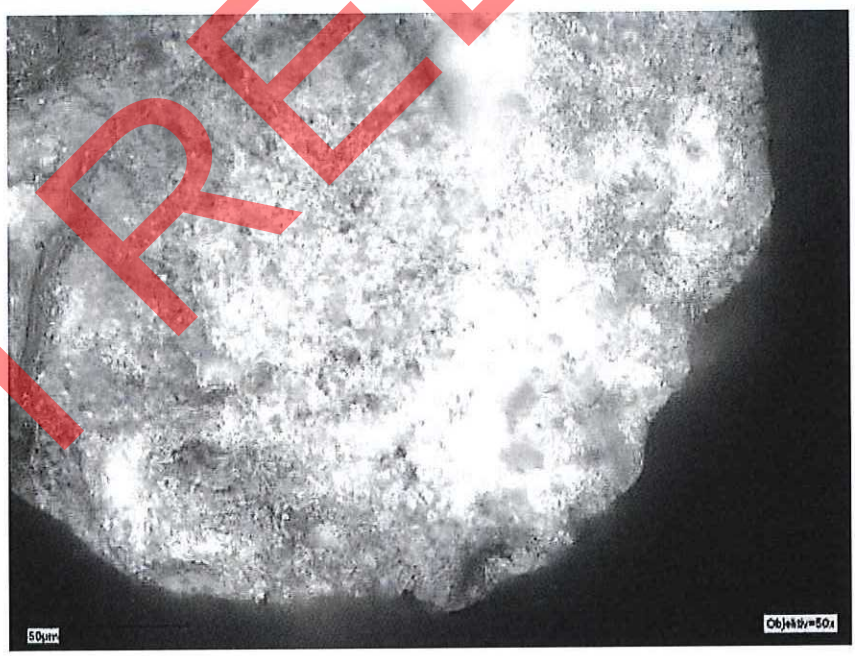


Figure 6: Mineral matter; 50x objective, oil immersion, reflected white light.

Figure 7: Mineral matter; 50x objective, oil immersion, reflected white light.

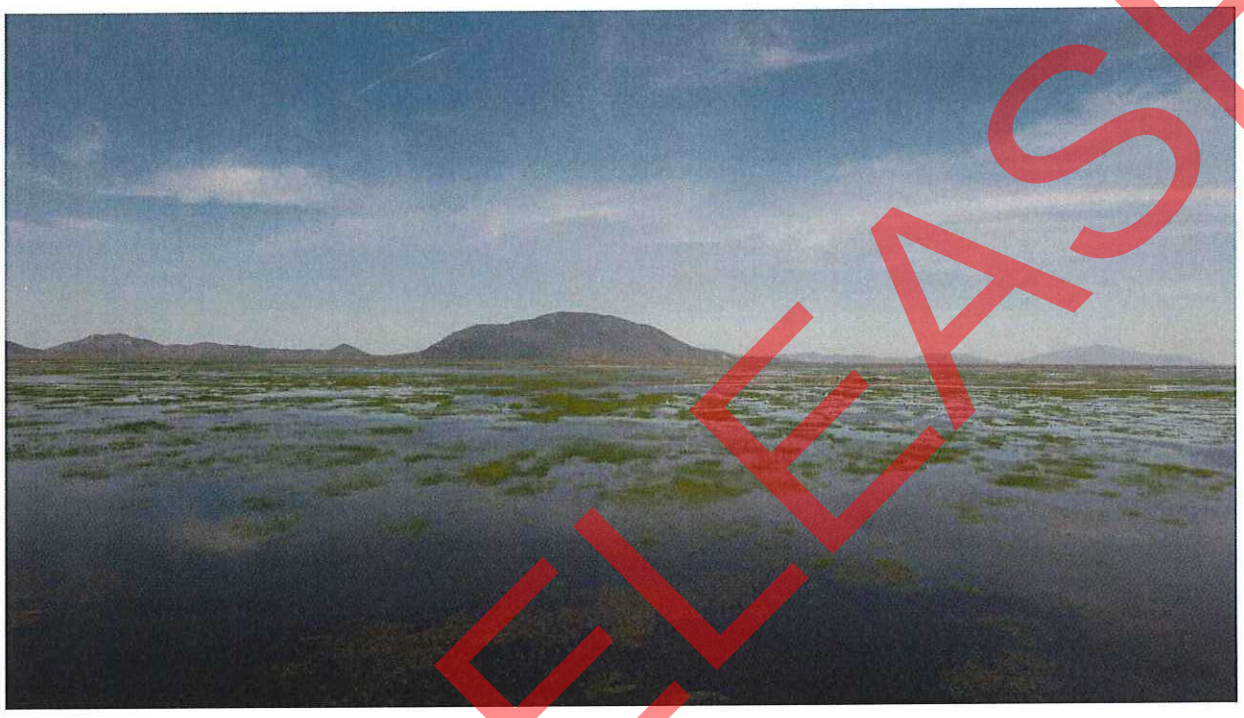
3. Results

The results of the point count are outlined in the following table:

Sample	Coal (%)	Mineral (%)	Organic (%)
BG1	7	68	25
W1SW	3	91	6
DS1	5	10	85

There was a low volume of coal observed in all three samples. The coal in the samples could clearly be identified by the presence of macerals (macerals are the components that make up a coal) as can be seen in Figure 1. Organic matter observed in the samples seemed to be predominantly decaying plant material.

Department of Science, Information Technology and Innovation



Caley Valley Wetlands

Preliminary assessment of impacts to Caley Valley Wetlands from Abbot Point Coal Terminal post Tropical Cyclone Debbie.

May 2017

Queensland Government