



Flinders Power

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4 May 2018

Committee Secretary
Senate Standing Committees on Environment and Communications
PO Box 6100 Parliament House
CANBERRA ACT 2600

Dear Sir / Madam,

Parliamentary Inquiry: Rehabilitation of mining and resources projects as it relates to Commonwealth responsibilities

Flinders Power Partnership (Flinders Power) is the owner of the Port Augusta Power Station site containing an ash dam area. Flinders Power has been the owner of the site since the South Australian Government's privatisation in 2000.

Flinders Power welcomes the opportunity to provide a written submission to the Senate Inquiry on rehabilitation of mining and resources projects and power station ash dams as it relates to Commonwealth responsibilities (the Inquiry).

The submission is set out below. We would be pleased to make representatives available for any public hearings if requested by the Inquiry.

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Executive Summary

The focus of this submission relates to the planning and rehabilitation works undertaken by Flinders Power in relation to the 273ha Ash Storage Area ('ASA') located at Port Augusta, South Australia.

The ASA rehabilitation is the first major project of its type in Australia. As such, it has provided valuable lessons in how to successfully manage the rehabilitation of other such sites.

The location of the ash dam and its proximity to Port Augusta was determined by the State Government at the time of power station construction. As a consequence, an ash dam of 273ha has been created in very close proximity to a populated area, with some residences only 400m from the dam. As a result, the project has a very high public profile in the area. Although, as set out below, there have been some challenges and some instances where local residents have been impacted by the remediation process, many of the public comments made in regards to the rehabilitation are factually inaccurate and untrue. In this respect we would like to advise the Inquiry of the following:

- Flinders Power has and will continue to meet all of its Augusta Power Station closure obligations. Flinders Power will fulfil its obligations with a focus on zero harm and applying Best Practice for the site.
- Flinders Power will remediate the land consistent with its obligations to ensure the power station site is in a safe and stable condition suitable for industrial/commercial use, and the ash storage area is a safe, stable, self-sustaining landform. Very significant progress has been made in achieving this objective.
- The ownership structure of Flinders Power was not changed at the time of closure and has remained substantially the same since privatisation in 2000. The structure always involved offshore vehicles since privatisation and this did not change when the operations were separated from Alinta Energy to start the remediation process.
- At the time of separation, Flinders was fully funded for all the remediation works with sufficient contingencies to meet all foreseeable eventualities. This arrangement was reached with the full supervision and consent of the SA Government. Flinders' obligations were also supported by bank guarantees. The relevant funds are, and have always been, held by local entities.
- Contrary to media reports, the ash dam does not contain significant quantities of fly ash. In fact, fly ash was captured and recycled during the production process. The ash dam contains largely bottom ash. This is an inert, non-toxic by-product from the coal combustion process. The ash can and does support plant growth, as already evidenced at several locations across the site. Tests have shown that the ash dam does not contain unsafe levels of metals or other toxins that cause human or environmental harm or exceed relevant standards.

'Best practice' in relation to the rehabilitation of ash dams is a subjective term. In our experience, every ash dam rehabilitation will be different and may require a completely different approach depending on the size, composition, current state, climate and other factors of the site. Therefore, we consider that 'Best Practice' does not involve a particular set of works, but instead is based on:

- A strong regulatory system which sets clear responsibilities for companies to follow in their remediation efforts.
- An evidence-based approach to remediation, taking and following expert reports which specifically relate to local site conditions.



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- Ongoing supervision and enforcement by regulatory agencies.
- Extensive consultation with the public and a transparent approach which encourages the local community to view work as it progresses and provide input and criticism.
- A clear set of measurable outcomes under which it can be determined that remediation efforts have been completed in line with regulatory requirements.

Based on our experience, the State based legislation and regulation framework has proven in this case to meet these requirements. For a private company involved in a rehabilitation process, it has been critical to be aware of our legal and regulatory responsibilities and to obtain clear feedback if and when changes need to be made to comply with these requirements.

We have made more detailed comments in the body of this submission regarding the determination of 'Best Practice'.

In relation to the specifics of the ASA rehabilitation, the following points may assist in future planning:

- The original plans (included in the provisions made at the time of privatisation) entailed the formation of a series of sand dunes over the ash storage area at approximate 150m spacing, with a partial soil cap on the dunes but not in the swale, plantings of both tubestock and seed followed by drip irrigation.
- Prior to closure, sea water was mixed with ash slurry and deposited in the ash dam. After closure, obviously the ash slurry was no longer available, and it was expected that continual flooding with sea water would retain the existing characteristics of the ash dam, including the salt crust. In fact, without the ash slurry the crust did not remain stable which resulted in episodic ash dust lift-off during strong winds.
- As a result, Flinders decided to cover the ash dam in a dust suppressant, which was the first time that aerial application of such a suppressant had been attempted in Australia. This approach was generally very successful, and we would suggest that early application of suppressant may be a useful tool in similar situations.
- A very extreme weather event in December 2016 severely damaged the dust suppressant and resulted in the lift-off of ash on 1&2 January 2017. Even if we had been able to anticipate weather of this magnitude, it is not clear what additional actions could have been taken. Work on reapplying the suppressant was started immediately and after this time we are not aware of any further lift-off of ash from the site.
- Based on consultations with experts, regulators and in line with Flinders commitments, a comprehensive plan was developed throughout 2015 and 2016 that involved covering the ash surface with soil and seeding it with species of native chenopod, samphire and grasses best suited to the site and collected from across the region. The soil cap provides protection against ash dust lift-off, provides a suitable initial substrate for germination and growth, and over time salt will be flushed through the profile, and organic carbon and nutrients will increase as the ecosystem function develops.
- Obviously, this plan was significantly more extensive and complex than the original proposed at privatisation and which had originally been envisaged for the site at the time of the closure announcement. This emphasises the importance of proper financial provision, regulatory supervision and Best Practice outcomes when planning for remediation. The additional costs were able to be met because adequate contingencies had been agreed.



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- We do not contend that the original plan (e.g. without full soil capping) would not have worked in another environment. As noted, all ASA's will be different, and decisions need to be made based on expert input. Various trials and field tests conducted by Flinders convinced us and the experts that a far more extensive programme would be required.
- We do note that in the event that ASAs are managed during their operational phases by flooding, before major rehabilitation works can commence there will be a period where the ASA will need to 'dry out' before it can be accessed by heavy equipment. In some areas of the Port Augusta ASA this took almost two years. In this period, it may not be safe to access areas of the site, hence ash lift-off may become a concern. As noted, Flinders addressed this problem with the use of dust suppressant. However, this issue needs early consideration in future ASA projects. It is difficult to foresee all future site conditions in advance.
- This long-term rehabilitation approach, incorporating a Dust Management Plan and Trigger Action and Response Plans, has been jointly reviewed and approved by the SA Environment Protection Authority and other regulatory bodies.
- Independent ecological reviews of the site suggest that the approach is progressing as expected (given the limited rain), and there is confidence that rainfall over the Autumn/Winter/Spring period will provide the required vegetation germination and growth. Flinders Power continues to develop and trial contingency options for dust management in the event that growth progresses at varying rates over the coming months. This aligns with Flinders Power's obligation, as land owner, to satisfy post closure monitoring and maintenance obligations over a 10-year period. It also aligns with pre-prepared contingency plans within the ASA Rehabilitation Plan.
- Following the completion of topsoil application, the risk of ash dust has been eliminated. SA EPA (https://www.epa.sa.gov.au/business_and_industry/industry-updates/flinders-power-port-augusta) notes that since the covering of the ash dam with topsoil, there have been no exceedances of the national standard for the finest particles PM2.5 (24-hour average of 25 µg/m3) in Port Augusta at the SA EPA monitoring locations. Flinders Power continues to proactively prepare for inclement weather and responds to actual high wind events in accordance with approved plans. High winds will at times cause some partial lift-off of the red soil, however, this can – and does - occur across the region and is not restricted to the site.
- The major factor affecting the rehabilitation of the Port Augusta ASA is the climate. Flinders is rehabilitating an area the size of the Adelaide CBD, which is almost completely flat and with no natural wind breaks, in an arid climate. As the experts have testified, the approach is sound but will require time for revegetation to be successful. Given the proximity to the local population lift-off of red dust prior to the more extensive growth of plants is possible and Flinders is consistently taking actions, as agreed with regulators, to minimise any impact on the local community. In most cases, dust lift-off that does occur does not leave the site. The dust monitoring data held by Flinders Power and the SA EPA has shown the success of these measures to date.
- Various sources have suggested that an additional depth of soil cap, irrigation and/or artificial windbreaks should be used at the site. These sources have not provided any evidence to support these comments. Based on the multiple experts that Flinders have engaged, these measures would either be unnecessary, unlikely to assist or in some cases would be actively harmful to the outcome.



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In summary, the Port Augusta ash dam rehabilitation project is unprecedented in size and complexity in Australia. Huge progress has already been made and many local residents have taken up our offer to tour the site and have generally been highly impressed with the scale of works that have been performed to meet the declared objectives.

All these projects will have unique features and therefore a strong regulatory framework is required to ensure that not only are responsibilities and outcomes set, but that unexpected events and changes in the plans can be swiftly considered and approved.

The South Australian Government already has a best practice outcomes-based approach to achieve environmental outcomes. Flinders Power has complied with the state regulatory approach and guidelines, which have been complemented through the use of independent technical experts to determine the best outcome.

While Flinders Power believes that states and territories should consider opportunities to be consistent and harmonised in their approaches to environmental matters such as ash dam remediation, the states and territories should continue in the prime role of managing these matters. The states and territories have the local capacity to regulate, monitor, enforce and engage with stakeholders over time as has been proven in this project.

In the event of Commonwealth regulation and oversight being introduced, in our view it would not be appropriate for such a framework to be applied retrospectively to existing approved and funded closure programs. These programs take place over many years and companies require clear rules that they can follow and simple and quick access to regulators to assist with the project implementation.

Overall, Flinders is confident that the rehabilitation plan will be successful and will fully meet both regulatory requirements and community expectations. From an operational point of view, many lessons have been learned that will assist operators in future. However, in our experience, there has been no failure of regulation or an indication that additional regulation is required. The primary lesson is that large ash dams which have been built up over decades will take some time to be successfully rehabilitated and that lift-off of ash and dust during this period is possible and needs active preparation and management to mitigate. Rehabilitation plans should be evidence based, will vary depending on local conditions, and will require a certain amount of time to be completed and therefore engagement with the local community throughout the process is essential.



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Introduction

The Augusta Power Stations have a long and valued history providing reliable generation to the South Australian and National Electricity Market. The 90MW Playford A Power Station was commissioned on reclaimed land at the northern tip of Spencer Gulf in 1954. The site was subsequently expanded to accommodate the 240MW Playford B Power Station, which was commissioned in 1963. Generation was secured through the utilisation of the Leigh Creek Coalfields, and the 260km dedicated rail line connection. In the early 1980's an adjacent site was prepared at Port Augusta, culminating in the construction of the 544MW Northern Power Station in 1985.

In September 2000, the assets were privatised, with the formation of Flinders Power Partnership as the asset owner, and Flinders Operating Services as the operator/maintainer. Jointly, the operations are known as the 'Flinders Operations' under the trading name of Flinders Power. SA Government control was retained under the Electricity Disposal and Restructuring Act (1999) and the Flinders Power Generation Business Sale Agreement (2000), with a number of subordinate leases.

Since 2000, Flinders Power has undergone a series of successive ownership changes, and until 30 June 2016 was wholly owned by Alinta Energy.

In June 2015 it was publicly announced that the closure of the Flinders Power business would occur. The Leigh Creek mine ceased operations on 19 November 2015, and the power stations ceased operations on 9 May 2016.

The Flinders sites were major employers in the Far North region of South Australia. ACIL Allen in a 2015 report estimated an annual contribution by the business to the regional economy in the vicinity of \$180M, and direct employment of over 450 staff. The closure program was anticipated to have a direct social and economic impact on the region, and the project plans were mindful of maintaining a strong valued legacy, while assisting workers and the broader community to prepare for a future without the Flinders Operations.

Extensive planning for closure, demolition and site restoration occurred throughout 2015 and 2016. **The focus of this submission relates to the planning and rehabilitation works undertaken in relation to the 273ha Ash Storage Area (ASA) located at Port Augusta, South Australia.** The ASA is located on Flinders Power owned freehold land.

Ash Dam / Ash Storage Area Operation

The Ash Dam is a large interconnected structure comprising an area of approximately 273ha (Figure 1). The location of the ash dam was determined by the SA Government at the time of construction of the Playford and Northern Power Stations. Bottom ash from Playford B and Northern Power Stations was mixed with seawater, and deposited in the southern end of the Ash Dam since the 1960's. As the ash slurry flows to the north, the ash particles fall from suspension and the resulting supernatant is returned to the Spencer Gulf via the Polishing Pond weir outlet to Hospital Creek. The quality of the discharged water was subject to routine salinity, trace element and nutrient monitoring as per the conditions of the Environmental Compliance Agreement (2000).

Over the years, the bottom ash stored within the Ash Storage Area has been investigated as a source of building material, concrete additive and rare earth extraction, however, to date these concepts have not proven to be economically viable. The ash had been offered by Flinders at no cost to interested parties. Despite various media reports, no party has ever taken up this offer.

During the operation of the Northern and Playford Power Station, the bottom ash deposited at the base of the boilers was collected and mixed with seawater to form a slurry. The slurry was then discharged to the Ash Storage Area. This



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strategy of containment is a common industry method. This process was different to 'flyash', which is a different product, and was collected from the top of the Northern and Playford boilers, stored in silos and sold as a reusable commercial product to the cement and mining industries over decades. Only minor amounts of flyash have been deposited in the ASA over the past decade.

The bottom ash/seawater slurry formed preferential flow paths across the ash dam surface. As the slurry moved north ash particles would fall out of suspension, with typically larger ash particles settling at the southern end of the Ash Storage Area, and smaller clay-like particles depositing at the northern end. A large free-water pool at the northern end assisted this settlement process.

Bottom ash itself is an inert benign aluminosilicate, similar in nature to sand. As it has been quenched in seawater the ash is reasonably saline.

Figure 1 below shows the process flow from the discharge point, to the final stage of settlement being the Polishing Pond. A weir then allowed the seawater to discharge to Spencer Gulf via Hospital Creek. During operations around 15 million litres per day of seawater would return to the gulf via the discharge weir.

As stated, the ASA was an integral part of the Augusta Power Station Operations that commenced in the 1950's. By the 2000s, the 273ha Ash Storage Area consisted of three main parts:

- The Ash Dam: a 212ha dam grading from approximately 8m in height at the southern end to 5m in height at the northern extremity;
- Former Ash Area: a 36ha section of land between the newer northern 'horseshoe' embankment and the polishing pond embankment; and
- The Polishing Pond: a 25ha final shallow settlement pond used prior to seawater release to the Spencer Gulf via Hospital Creek.

The distance between Playford Power Station and the closest residents in Port Augusta to the north is approximately 2.8km. The distance from the polishing pond outlet to Hospital Creek to nearest residents is approximately 400m.

When the power stations ceased operations on 9 May 2016, the slurry mix no longer 'benefited' from the addition of ash and therefore the levelling salt crust was not developing as effectively. This created the potential for dust generation and the development of erosion. This was a concern to Flinders Power as well as various stakeholders including the Environmental Protection Authority (EPA), particularly because of the site's proximity to the townships of Port Augusta and Stirling North, and the wider Port Augusta community.



Figure 1: The Port Augusta Ash Storage Area



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Legal Obligations

Flinders Power is committed to achieving its closure obligations by applying best practice appropriate for the Flinders site and a core focus on zero harm. Compliance obligations considered within the ASA rehabilitation process under State and Federal legislation included:

- Environment Protection Act 1993 (SA)
- Native Vegetation Act 1991 (SA)
- Natural Resources Management Act 2004 (SA)
- Environment Protection and Biodiversity Conservation Act 1999 (Cth)
- National Parks and Wildlife Act 1972 (SA)
- Work Health and Safety Act 2012 (SA)
- Aboriginal Heritage Act 1998 (SA)

The 'Environmental Compliance Agreement' (2000) formed at privatisation sets out the baseline rehabilitation plan for the Ash Storage Area, as per the 'Flinders Power APS Ash Storage Area End of Life Plan Draft Cost Estimate' (14th February 2000). The rehabilitation strategy subsequently defined throughout 2015 and 2016, and as set out within this submission, was intended to enhance and refine the baseline plan to ensure that the project guiding principles were achieved. The Environmental Compliance Agreement also sets out obligations relating to the operational environmental performance of the power stations and the monitoring activities required.

In accordance with the Environmental Protection Act (1993), the site is regulated by EPA Licence No.13006 that imposes conditions to the prescribed activities undertaken on the APS site that may cause harm to the environment. This licence forms an enforceable agreement between the EPA and the parties defined within the licence. In February 2016, Flinders consented to changes to the EPA licence to insert closure-specific conditions. Specifically, this included Condition U-251 'Develop and Implement Closure and Post-Closure Plan'. Condition S-9 'Dust Prevention' remained a key element of the licence condition. Specific licence conditions require:

- S-9 Dust Prevention, specifically requiring a Dust Management Plan to be prepared to the satisfaction of the EPA;
- U-251 Develop and Implement Closure and Post-Closure Plan. Specifically, the Plan must address:
 - decommissioning of coal burning plant and equipment/prescribed electricity assets;
 - decommissioning and decontamination of fuel and chemical storage areas;
 - removal of fuels, oils, lubricants, chemical substances and waste from the site, including but not limited to materials within above and below ground storage tanks, storage areas, pipe lines, sumps, refuelling points, transfer points and other equipment;
 - removal of coal from the coal stockpile area and other coal storage and handling areas, silos, bins, conveyors, mills and burners;
 - decommissioning and rehabilitation of the ash dams;



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- decommissioning and rehabilitation of the polishing pond including removal of cenospheres;
- surface water management, including minimisation of ponded stormwater, prevention of contamination of stormwater and discharge of waters offsite; and
- removal of waste (including asbestos and scrap metal) from the site generated by decommissioning activities;
- S-120 Generic Contingency Plan;
- U-574 Ambient Air Monitoring; and
- U-660 Ambient Monitoring and Reporting.

Flinders Power is required to meet specified actions, timeframes and milestones in regards to each of the above environmental considerations in its Closure and Post Closure Plan. The principles of risk management and ecologically sustainable development, as per Part 2 of the SA Environmental Protection Act (1993), are fundamental pillars of the Closure Plan. A detailed environmental risk assessment for closure was conducted and the Closure Plan commits:

- Identified risks will be reduced to as low as is reasonably practicable; and
- An increased focus will be applied to those issues of high residual risk.

The Closure Plan addresses environmental and social risks to neighbouring ecosystems, landholders and communities. The environmental and social values that have been considered in relation to closure include:

- The health and safety of people;
- The sensitivity of associated ecosystems;
- Maintaining water quality and flows in surface waterways;
- Maintaining water quality in groundwater;
- Maintaining air quality;
- The creation of safe, stable, non-polluting and sustainable landforms.

The ultimate program objective for the entire site is to dismantle the Northern and Playford Power Stations in a safe manner and return the site in a safe and stable condition suitable for future industrial/commercial use. Specifically, the Closure Objective for leased land (Lot 1 and 8) is to dismantle Generating Plant, demolish infrastructure and conduct any necessary site remediation. Once the program is completed to the satisfaction of both the State and Flinders, as per the requirements of the Generating and Land Leases, the leased land will ultimately transfer from the Generator Lessor Corporation to FPP. Specifically, the Closure Objective for FPP-freehold land, including the Ash Storage Area, is the creation of a safe, stable, self-sustaining landform that is in an appropriate state for future on-sale. Monitoring and ongoing maintenance of the Ash Storage Area will occur as outlined in the Post-Completion Monitoring & Maintenance Plan (Flinders Power Alliance, March 2017).

A quarterly progress meeting is held with the EPA; supplemented by frequent site compliance inspections.



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To address site contamination investigation and assessment, in accordance with sections 103l and 103k of the Environmental Protection Act (1993), Flinders Power has entered into a voluntary site contamination assessment proposal (VSCAP) and voluntary site remediation proposal (VSRP) with the EPA. **An independent accredited site contamination auditor has been appointed to undertake an audit of the site.** The audit provides independent assurance:

- To determine the nature and extent of any contamination present or remaining on or below the surface; and
- To determine what remediation is or remains necessary for a specified use or a range of uses. The defined future land use for the site is commercial/industrial, in accordance with existing land zoning.

Flinders Power is required to comply with all legislation that currently exists, and it has done so throughout the project. Compliance, risk management and the use of advice from independent technical experts results in best practice outcomes for the site.

What is 'Best Practice?'

There are no specific guidelines, codes of practice or laws to stipulate the 'Best Practice' closure and rehabilitation process for power station sites and, in particular, the rehabilitation of redundant bottom ash dams. Existing regulatory guidance only covers elements of the process, such as site contamination investigations. This is appropriate as every site is unique and therefore a unique plan needs to be developed based on the scientific evidence at hand. This requires a collective industry/regulator/community mindset of innovation to complement compliance.

Flinders Power considers 'Best Practice' closure and rehabilitation to entail a site-specific approach, encompassing:

- Compliance with legislative, lease and licence obligations as a baseline standard;
- The collation of years of objective evidence regarding site-specific conditions and performance;
- The use of clearly defined and jointly agreed objectives for the final land use, and guiding principles for rehabilitation;
- The application of a risk-based framework to articulate key rehabilitation risks and short, medium and long-term strategies to eliminate or mitigate those risks. Critically, this risk-based approach is adopted and supported by South Australian environmental legislation;
- The engagement of a broad range of technical experts to advise on potential strategies;
- Acknowledging and incorporating learnings from similar rehabilitation projects;
- Close collaboration with regulators throughout the project planning, execution, monitoring and completion phases;
- Open and frequent engagement with the community and key stakeholders;
- Engaging contract partners who have both the technical ability to complete the works, and a shared sense of project values and behaviours;
- Applying a comprehensive monitoring strategy with a proactive and reactive adaptive management plan to facilitate objective review of project performance and appropriate response strategies; and



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- Being flexible and dynamic in approach. Project risks will change during the execution phase and not all elements of the rehabilitation can be controlled (for example, weather) therefore all parties may need to 'think on their feet'.

Strictly, Flinders Power could have referred to the previous rehabilitation plan for the Ash Storage Area as agreed, and as obliged, at the time of privatisation in 2000. The former plan entailed the formation of a series of sand dunes over the ash storage area at approximate 150m spacing, with a partial soil cap on the dunes but not in the swale, plantings of both tubestock and seed followed by drip irrigation. While the power station was operational, and the ash storage area was a saturated slurry, this approach would seem reasonable. However, the lessons learnt following the cessation of power generation in May 2016 clearly highlighted that the approach would not be safely constructible and would leave the site severely exposed to ash dust events. Flinders therefore elected a bespoke approach based on assessed risks and adopted an improved strategy which was approved by the relevant regulators.

Flinders Power considers its approach to be Best Practice. This is supported by numerous site visits by other electricity generation companies who are keen to witness the pioneering closure project unfold.

Of note, in December 2016 the SA EPA issued a new guideline 'Preparation and implementation of closure and post-closure plans' modelled largely on the plans supplied by Flinders Power as part of the closure process and the regulatory assessment of same.

ASA Rehabilitation Planning

To determine the best approach to this complex site Flinders Power has sought expert advice, international best practice and consulted extensively to achieve this. Each ash dam is unique, dependent on the:

- Chemical composition. e.g. saltwater vs freshwater system; acidic vs neutral vs alkaline; metals and nutrient content; leachability
- Physical composition: e.g. coarse vs fine particles, water content, geotechnical risks, constructability
- Climatic conditions. e.g. rainfall vs evaporation – influences surface water runoff (erosion) and extent of leachate; seasonal wind patterns.
- Geographical context. e.g. groundwater interaction, topography
- Proximity to sensitive environmental and social receptors
- Final land use. e.g. public use vs replicate natural system vs agriculture vs commercial/industrial,
- Legal and regulatory context.

These factors will determine what constitutes Best Practice for the site.

Flinders Power remains committed to the agreed closure obligations and its stated objective of a safe, stable and self-sustaining landform across the former ash storage area. Early in the planning cycle the following guiding principles were agreed:

- Efficient construction: the concept is safe and efficient to construct
- Reliable design: the solution is safe for the community and the environment in the long-term



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- Dust is suppressed: the concept reduces the potential of dust leaving the site
- Water is managed: the concept allows for safe discharge of water
- Realistic costs: the concept considers costs to Flinders Power through design, minimal maintenance and allows for re-use of the site
- The landform is self-sustaining: zero or minimal ongoing maintenance
- Public nuisance: risks associated with odour and insect breeding in ponded water are managed

The key risks influencing the design solution were identified as public safety (reducing public trespass during construction and thereafter), dust control, constructability and OHS challenges of the site given its size and saturation, nutrient value of the ash, stormwater management, structural stability of the outer levee banks, and managing odour and insect breeding due to ponded water and degrading vegetative matter in the Polishing Pond.

Flinders will continue to manage the site in accordance with its agreed fully-funded plans, including the Post-Completion Monitoring and Maintenance Plan that is required as part of the approval process.

These plans have been developed within the various existing regulatory environment. Full details of the plans are contained on the EPA website (www.epa.sa.gov.au/). Flinders meets with the EPA on a quarterly basis to review progress against the Environmental Closure & Post-Closure Plan for the Augusta Power Stations and support regular EPA site visits to monitor progress. The obligations of the land owner will continue for 10 years after completion of the agreed rehabilitation plans later this year.

The following table illustrates the detailed timeline pertaining to the planning for the ASA rehabilitation works between the time of the closure announcement in June 2015 until the present (April 2018).

	Operational dust control strategy	ASA rehabilitation planning & regulatory engagement
June 2015	Standard power station operation	At the time of the closure announcement, Flinders was committed to delivering the rehabilitation of the ash dam in accordance with the 'APS Ash Storage Area End of Life Plan' (14 February 2000) as per the conditions under the Environmental Compliance Agreement (20 September 2000).
Closure Announcement	The ash dam continued to be managed in accordance with the Dust Management Plan, using an ash/seawater slurry.	Initial preliminary cost estimates were received from McMahon Services in April 2015 and May 2015 for the rehabilitation of the ash dam in accordance with the 'APS Ash Storage Area End of Life Plan' (14 February 2000). The ash dam continued to be managed in accordance with the Dust Management Plan, using an ash/seawater slurry.
August – November 2015	As above	Flinders engagement of Golders Associates Pty Ltd to provide an assessment of the existing plan with specific reference to: <ul style="list-style-type: none"> - A summary of the environmental risks associated with the ash dam - A summary of the methods available to stabilize the ash to prevent dust migration



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		<ul style="list-style-type: none"> - A summary of the geotechnical properties and what opportunities/risk this may present to future development of the dam. <p>Golders site visit and sample collection</p> <p>Final report received 'Environmental and Geotechnical Assessment. Port Augusta Power Station Ash Dam' Golder Associates Pty Ltd, 1539676-001-R-Rev0</p>
December – May 2016	As above	<p>Flinders engagement of Golder Associates Pty Ltd to:</p> <ul style="list-style-type: none"> - Develop a product specification for the bottom ash, to assist with re-use potential. Report: Technical Memorandum, 4 March 2016, Geotechnical and Chemical Assessment of Ash for Reuse as Waste Derived Fill, Ash Storage Area, Port Augusta, Ref: 1539676-003-L-Rev0. - Conduct a joint workshop in Port Augusta with Flinders staff, Golder Associates staff and a solar development company - Develop a Concept Options report detailing available rehabilitation strategies <p>Final report received 'Ash Dam Closure Concept Development. Port Augusta Power Stations'. Golder Associates Pty Ltd, 1539676-004-R-RevA, May 2016.</p>
May - July 2016	<p>Cessation of Northern Power Station operation.</p> <p>Construction of new pipeline to ensure continued seawater supply to the ASA</p> <p>Construction of new levee banks.</p> <p>Filling of coffer dams and strategic breaching to flood sections of the ASA.</p>	<p>Final report received: 'Vegetation Trials, Port Augusta Power Station', Golder Associates Pty Ltd, 1539676, 7 June 2016'.</p> <p>Flinders submitted Concept Options report to EPA. Meeting with EPA to discuss concept options. EPA provided response of 13 May 2016 indicating a preference from Concept Option 2, being the construction of parallel embankments of ash with hydromulch seeding.</p> <p>Flinders issued tender package to ~10 prospective companies. Tenderers invited to prepare a submission based on the Option 2 preference, however to also provide costed alternate innovative solutions for consideration.</p> <p>Vegetation trials commence on the ASA.</p>
August - October 2016	<p>FP decision to seal a 15ha portion of the ASA at the outfall that could not be reached by continued seawater flooding. Proposal to EPA approved. Engaged McMahon Services to oversee application of Vital Bon-Matt Stonewall via crop-duster. Commenced 31 August, complete 1st September.</p> <p>Continued seawater flooding on east and</p>	<p>Review of tender submissions. On-site meetings with shortlisted tenderers. Submission feedback and tenderer submission revisions.</p> <p>EPA site visit and joint workshop on ASA management – consideration of risks of continued seawater flooding.</p> <p>Selection of McMahon Services as preferred contractor and preferred concept design, being a soil capping solution utilising an</p>



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	west banks. Increased erosion and damage.	on-site borrow pit. Submission of Interim Ash Dam Sealing Proposal and Risk Assessment, with supporting documents, to the EPA. Receipt of letter from EPA re approval of APS Environmental Closure & Post-Closure Plan.
November 2016	Decision to cease seawater flooding. Engaged McMahon Services to seal entire 212ha ASA with Vital Bon-Matt Stonewall. Commenced 7th November, complete by 22nd November with inspection by Vital Chemicals on 23rd November	Receipt of letter from EPA re approval of the Dust Management Plan, inclusive of Ash Dam Sealing Proposal and Risk Assessment, however further amendments to documentation required. FP lodge email request to EPA for the use of Anotec Pro5L odour suppressant on exposed sections of the Polishing Pond. Approval received from EPA for the use of Anotec Pro5L odour suppressant on exposed sections of the Polishing Pond Receipt of letter from EPA re approval of the Dust Management Plan, inclusive of the proposal to seal the ASA with Vital Bon-Matt Stonewall and the accompanying risk assessment. Approval from Native Vegetation Council to clear native vegetation for the purposes of establishing an on-site borrow pit, subject to meeting consent conditions.
December 2016	Severe unprecedented storms impacted the Port Augusta region between 24 – 28 December 2016. Localised damage to the dust suppressant seal caused by hail, rain and gale force winds.	Approval granted by EPA to commence mobilisation and site preparatory works for the long-term soil capping solution. EPA provides approval of the Polishing Pond – Interim Sealing Plan and accompanying risk assessment, pending further amendments. FP submits draft Ash Dam Rehabilitation Plan, draft Revegetation Management Plan and the draft Trigger Action Response Plan for the Ash Storage Area to the EPA. FP received feedback from the EPA regarding the draft plans. FP completed installation of 3 x new real-time PM10 dust monitors around the ASA.
January 2017	On 1 and 2 January warm days with moderate southerly winds resulted in ash dust lift-off. Flinders determine to re-seal with dust suppressant, with land-based application works commencing 3 January and aerial application commencing 4 January.	Implementation of the long-term rehabilitation strategy commenced on 4 January as scheduled with the construction of soil access fingers (Figure 4). Balance of supporting rehabilitation documents provided to EPA on 5 January 2017, including a Project Risk Assessment Register, WHS Management Plan and Construction Management Plan. Environmental Protection Order issued. FP completed the installation of 2 x new real-time PM10 dust monitors in the Port Augusta and Stirling North community. These



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		units complemented the pre-existing air quality monitoring network.
February – October 2017	Real-time monitoring via visual observation and dust monitor alerts. Operational responses in accordance with the Dust Management Plan and Trigger Action and Response Plan.	<p>Site contamination auditor endorsement of ASA rehabilitation plans March 2017.</p> <p>EPA approval of the ASA rehabilitation plans March 2017. Approval enabled the spreading of soil from the constructed access fingers.</p> <p>Completion of capping application on accessible areas of the Ash Storage Area. 181ha covered and seeded.</p> <p>Trial of a hydromulch seeding application at the northern, saturated areas of the ASA.</p> <p>Approval from Native Vegetation Council to clear native vegetation for the purposes of expanding the on-site borrow pit, subject to meeting consent conditions.</p>
November 2017 – April 2018	As above	<p>Recommencement of soil capping on the outer banks and roadways, northern ASA, former ASA and Polishing Pond.</p> <p>Risk workshop for dust control over the summer 2017/18 period conducted with EPA, DEWNR, Succession Ecology and McMahon Services on 19 December 2017.</p> <p>Contingency planning for improved dust control commenced. Risk workshop with EPA, DEWNR, Succession Ecology and McMahon Services on 10 April 2018.</p>

Table 2: Rehabilitation Planning

In planning for the delivery of a safe, stable and self-sustaining landform for the ash storage area, **Flinders Power sought advice from independent environmental, hydrological and ecological experts**, including:

- Golder Environmental – environmental consultant
- McMahon Services – Principal Contractor and rehabilitation plan development
- Coffey Environments – site contamination consultant
- Kirsas Environmental – site contamination auditor
- Succession Ecology – revegetation technical partner – seed collection and sowing, post-completion monitoring plan
- Eyre Native Seeds – independent revegetation advisor, post-completion monitoring plan
- Greenhill Engineers – stormwater modelling and concept design
- Integrated Heritage Services – Native Heritage survey and monitoring
- Lester Franks – survey

- Vital Chemicals – dust suppressant supply and technical support
- Tonkin Consulting – peer review of stormwater design and dust control
- MWH – US Coal-fired Power Station closure and rehabilitation international expert

The preferred approach, recommended by all experts, involved covering the ash surface with soil and seeding it with species of native chenopod, samphire and grasses best suited to the site and collected from across the region. This long-term rehabilitation approach, incorporating a Dust Management Plan and Trigger Action and Response Plans, has been jointly reviewed and approved by the Environment Protection Authority and other regulatory bodies.

The bottom ash stored in the Ash Storage Area is an inert non-toxic by-product from the coal combustion process. **The ash can and does support plant growth, as already evidenced at several locations across the site** (Figure 3). A capping layer of soil was chosen to prevent ash dust movement and to provide an ideal growth medium for plants. Given the site is flat, water erosion is not predicted to be a significant concern. A series of east-west access fingers at 500mm height above the surrounding profile creates individual catchment areas to prevent surface water movement and erosion and to enhance infiltration to support plant growth. A minimum 150mm of soil is deemed to be a suitable capping layer, however the average actual capping depth is considerably higher. Over a 273ha site, almost the size of the Adelaide CBD, this represents a huge volume of soil. A deeper soil cap would have had no additional benefit, as chenopod/samphire shrublands is the target ecosystem. These species already grow directly into the ash. There is no evidence that the ash is toxic to plant growth. The key limiting factor for sustaining vegetation directly into the ash is ash dust control, the salinity of the ash and the low organic carbon and nutrient value of the ash. **A soil cap provides protection against ash dust lift-off, provides a suitable initial substrate for germination and growth, and over time salt will be flushed through the profile and organic carbon and nutrient will increase as the ecosystem function develops.**



Figure 3 Self-seeded vegetation growing directly in the Former ASA ash

The soil used is a sandy clay, suitable for use as it is:

- endemic to the region and is proven to support plant growth,
- contains a seed source, mycorrhizae and biota that will stimulate ecosystem development,
- has ideal surface crusting characteristics to restrict dust lift-off in strong winds,
- is available on Flinders freehold land, directly adjacent the ASA. Borrow pits were previously operated in the vicinity during the construction of Northern and Playford power stations.

Commentary regarding leachate from the Ash Storage Area impacting the nearby Gulf is contrary to the extensive evidence, including groundwater, surface water, mangrove and seagrass monitoring spanning decades. APS ash is chemically and physically stable and inert. It does not leach metals/nutrients to levels that cause human or environmental harm or exceed relevant standards. This is evidenced by laboratory testing; groundwater testing / site contamination investigations, auditor endorsement; a 2010 South Australian Research and Development Institute study investigating the impact of ASA outfall on neighbouring Spencer Gulf, biannual mangrove and seagrass monitoring; and annual independent verification of the Marine Monitoring Program.

Prior to implementation, Flinders Power, together with the EPA, DSD, DEWNR, Site Contamination Auditor, Ecological advisors and Principal Contractor agreed that a topsoil cover and revegetation approach best meet the project objectives, manages the above risks and meets regulatory requirements.



Figure 4 Ash Storage Area as at June 2017 demonstrating the access finger construction and spreading approach



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Bird Lake

The Electricity Trust of South Australia (ETSA), Flinders and the Port Augusta City Council have long enjoyed a sound working relationship regarding the Augusta Lakes. The Augusta Lakes, on the south-eastern approach to Port Augusta, is a salt-lake system that originally stretched from Railway Lake, on the northern side of the Railway Line through to Port Paterson and Spencer Gulf in the south.

Following the construction of Playford A and B in the 1950's/60's, the bottom ash and seawater slurry was discharged to the salt flats to the north of the Power Stations. The area acted as a large evaporation basin. Limited amounts of seawater would flow north towards where Bird Lake is situated today. Perimeter bunds were progressively constructed by ETSA to contain the ash. Bird Lake land is predominantly owned by the Port Augusta City Council with smaller parcels owned by other parties.

Water was never directed into Bird Lake as part of the ash management process or discharge into Spencer Gulf.

In the late 1960's the City of Port Augusta formally requested that ETSA cooperate to maintain a permanent water supply in Bird Lake. The creation of the permanent water supply presented unforeseen challenges, particularly in relation to odour, midge flies and the creation of foam.

While both parties have worked collaboratively, ETSA/Flinders has always been concerned about the quality of water discharging from Bird Lake back onto Flinders Power Land (Hospital Creek) and ultimately Spencer Gulf. This was due to the risks associated with seawater from the Polishing Pond being contaminated with stormwater and other sources of contaminants within Bird Lake. In September 2000 a formal easement was agreed between Flinders Power and the City of Port Augusta to enable Council employees to access Flinders land and operate the weir, releasing water into Bird Lake. Water released into Bird Lake was done so only under the discretion and control of the Port Augusta City Council.

Since the closure announcement in June 2015, Flinders has been in constant open dialogue with all stakeholders regarding potential management options for Bird Lake. In 2017, the Port Augusta City Council commissioned Tonkin Consulting to prepare a management plan for Bird Lake. Flinders is committed to completing rehabilitation works for its 8ha owned portion of Bird Lake in accordance with the recommendations of the Tonkins Report.

ASA Current Status

McMahon Services Australia (MSA) was engaged by Flinders Power to undertake the Ash Storage Area Rehabilitation works. A design and construct delivery methodology was enacted for the Ash Storage Area Rehabilitation project with MSA developing innovative processes to rehabilitate the site with minimal impacts on the surrounding environment.

The first stage required covering the ASA with a liquid dust suppressant called Vital Bon-Matt Stonewall. Diluted in water in concentrations of 10%, the Vital Bon-Matt Stonewall formed a strong, flexible and long acting surface coating, penetrating and binding the surface of ash. The chemical provides an environmentally sound, biodegradable, immobile formula, free of heavy metals, minerals or solvents. A green dye was added to the suppressant to assist the application process. This was the first application of a dust suppressant using aerial methods over such a large area within Australia. Vital Chemicals provided quality assurance and quality control over the application process. **The seal enabled seawater flooding methods to cease and provided dust control during the long-term rehabilitation construction.**

Unfortunately, during the period 24-28 December 2016, the Port Augusta region was impacted by a severe storm front with unprecedented rainfall intensity, hail and gale-force winds. The extent of such a weather event was unforeseen. The storm impacted the seal and on 1 January 2017 and 2 January 2017, following a short period of drying, strong

winds caused ash dust lift-off to occur from patches of the ASA and blew ash in a northerly direction. Flinders acted immediately to control dust lift-off using hand and watercart, and aerial application of suppressant was initiated on 4 January. Flinders elected to re-seal the ASA using suppressant and this was completed on 25 January 2017.

The event on 1 January 2017 has been thoroughly investigated by independent parties which have confirmed that it posed limited threat to human health and as advised by SA Heath (refer EPA website):

“Dust in Port Augusta comes from a range of sources mostly from bare soil, including the ash dam. Analysis of dust that has come from the Flinders Power ash dam has shown it to be very similar to dusts from the desert. The levels of metals are low. However, dust particles themselves are well known for their potential to cause respiratory and cardiovascular health problems. They can also irritate eyes, throat and skin.”

MSA commenced the long-term rehabilitation works on 4 January 2017 as had been planned.

The site of the ash storage area covered and seeded in mid-2017 is displaying good progress - with plant growth at varied rates across the site. Despite the lower than average rainfall over the period June 2017 to the present which has limited germination, the February 2018 monitoring recorded 37 native species on the ASA, with *Atriplex vesicaria* (bladder saltbush) being the dominant species. Despite the hot and dry summer conditions, the monitoring indicated a 91% survival rate, and 28% recruitment courtesy of an early January 2018 rainfall event. 38% of the plants recorded during the survey had attained reproductive maturity and were setting seed. This is a positive for the development of the seed bank and the onset of natural processes of succession. **Independent ecological reviews of the site suggest that the approach is progressing as expected (given the limited rain), and there is confidence that rainfall over the Autumn/Winter/Spring period will provide the required vegetation germination and growth.**

The ash surface has now been largely covered (250ha of the 273ha site completed) with soil sourced from the Flinders Power's site (Figure 5). No ash dust has emanated from the site since the extreme weather events of 1 and 2 January 2017. **Flinders Power continues to proactively prepare for inclement weather and respond to actual high wind events in accordance with approved plans.** High winds will at times cause some partial lift-off of the red soil, however, this can – and does - occur across the region and is not restricted to the site, as witnessed across the region in April 2018.



Figure 5: ASA Rehabilitation Status as at April 2018 (view towards the south, Polishing Pond in foreground)


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Stakeholder and Community Engagement

Flinders Power has a long and proud history of community engagement and support. At the time of the closure announcement, Flinders Power engaged extensively with the Port Augusta community and key stakeholders.

Table 2 below, as extracted from the APS Environmental Closure and Post-Closure Plan, outlines the range of stakeholder and community engagement mechanisms utilised throughout the project.

Mechanism	Target Group							Posted on FP website?	Frequency	Notes
	Residents	PACC	MP	Media	EPA	NRM Board	Special- interest groups			
Weekly progress report		X	X		X			No	Weekly	A summary of activities at the site, including demolition and ash dam rehabilitation
Face-to-Face meetings / site visits		X						N/A	Monthly	Monthly meetings with PACC CEO and Mayor, when available.
Annual environmental presentation		X						Yes	Annual	Annual presentation to PACC – open public forum.
Media release/ Infomercials	X			X				Yes	Ad-hoc	Strategic media release e.g. felling of PPS A station stack
Works Progress Fact Sheet	X	X	X	X				Yes	Monthly / Quarterly	A monthly progress update. Letter drop
Focus topic fact sheet	X	X	X	X	X	X	X	Yes	Ad-hoc	A brochure on a particular topic (e.g. ash dam, Playford A building demolition). Letter drops.
Flinders Power website	X	X	X	X	X	X	X	Yes	Regular updates	Information portal. Links to FP YouTube account. FP contact details.
Flinders Power hotline & email	X			X			X	Yes	N/A	All community complaints are logged.
Special-interest presentations							X	N/A	On request	Presentations or site visits on request (e.g. Rotary, schools).



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Community site visits	X							Yes	On request	Actively invite community members
Community forum/ reference group	X	X						Yes	Monthly	Group now established
Community information days	X							Yes	TBA	May include site tours
SMS distribution list	X	X	X	X	X	X	X	Yes	Ad-hoc	Rapid notification of dust incidents.

Table 2: Community and Stakeholder Engagement Plan

An independently-facilitated Community Reference Group (CRG) was formed in February 2017 and has now met on ten occasions. The CRG comprises interested local residents, the Port Augusta City Council and the local MP. The CRG is also attended by the EPA and subject matter experts as requested by the CRG. Two community open days have been conducted with a third scheduled for coming months. An open invitation has been extended to local residents to register for tours of the site to observe directly the work that has been completed. Over the last seven weeks, more than 170 local people have visited the site with more tours are being arranged for the coming weeks.

Future State

The two optimal germination windows are April/May and October/November, depending on seasonal conditions. Should rainfall not occur during Autumn/Winter/Spring 2018 Flinders Power and its alliance partners are currently investigating additional options for dust control for areas with limited growth including, supplementary seeding, alternate suppressants and irrigation.

Works at the northern end of the ASA are nearing completion. The monitoring and maintenance phase has commenced with Succession Ecology conducting monthly site inspections and vegetation surveys in accordance with the Post-Completion Monitoring and Maintenance Plan ('PCMMP', March 2017). The PCMMP is a requirement under the Native Vegetation Council clearance consent and is an approved document by the SA EPA. The PCMMP is required to occur for a period of 10 years and is a legal requirement under the Native Vegetation Act to be conducted by the landholder. The PCMMP:

- Proactively identifies project risks and potential adverse outcomes that may impede success;
- Monitors project outcomes to identify any detrimental outcomes early; and
- Establishes an adaptive management plan to facilitate appropriate amelioration and maintenance.

Monitoring strategies include routine site inspections, vegetation surveys, photo points, drone surveys and groundwater and surface water quality monitoring.

Potential management strategies include seeking technical advice, seed bank testing, pest control, weed management, dust control, irrigation and civil repair works. Maintenance activities will occur throughout as / when required according to a proactive risk management plan that will be adaptive in response to monitoring and maintenance feedback.



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While the majority of works will be complete by July 2018, Flinders Power is responsible to make sure the program of works they have undertaken is effective. This includes site monitoring at the cost of the owner for 10 years from this date.

Social, economic and environmental benefits of the rehabilitation work

While the loss of ongoing employment and the impacts on the community were acknowledged earlier in the submission, demolition and rehabilitation works at the Augusta Power Stations are designed to deliver both short and long-term social, economic and environmental benefits. Flinders Power is strongly focused on ensuring an enduring and valued legacy. Specific examples include:

- All Flinders employees received full redundancy and entitlement payments. Flinders also provided extensive training, support and outplacement services.
- The inclusion of project Key Performance Indicators (KPI) that require a minimum 20% local employment and 20% local supply component. Throughout the works program these KPIs have consistently achieved a 30 -40% range. This is achieved through a local hire preference (where required technical competencies are able to be met), local supply of goods and services and the leasing of local housing to accommodate drive-in-drive-out workers. The project workforce has averaged 100 Full Time Equivalents, which delivers flow-on economic benefits to local businesses throughout project duration.
- The project has a strong focus on the upskilling of the workforce. This is achieved via experiential exposure to a unique closure program, and the formal qualification of accredited skills. Each month 'personal growth opportunities' are assessed and documented as part of the project KPI structure.
- The targeted final land use for the site is as industrial/commercial land, in accordance with existing land zoning. Flinders Power and SA Government mutually agreed to retain existing useful infrastructure at the site on completion that will promote future development at the site. For example, roadways, a workshop, utilities, stormwater infrastructure, site fencing, etc. will remain. This presents the best opportunity for the site to foster ongoing commercial/industrial use. Throughout the program Flinders has been approached by multiple parties expressing interest in all or parts of the site for future economic ventures. Flinders has actively supported and promoted these approaches and continues to do so.
- In agreeing the closure funding arrangements with the SA Government, Flinders formed a Community Development Fund that would be used to support community initiatives at either Port Augusta or Leigh Creek that would provide ongoing benefit to the community.
- Flinders has worked closely with current and former employees and the community to preserve items of significant historic value.



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Fully funded and Independently audited

Prior to financial separation from Alinta Energy, Flinders Power determined the future estimated cash flows including appropriate contingency amounts to complete closure and rehabilitation of sites. The cash flow estimate is based on the planned scope and cost of closure, rehabilitation activities and appropriate contingencies.

The financial provision is included in the Financial Statements which are subject to independent external financial audit. **The provision was fully funded, and the amount was subject to a further independent audit initiated by the SA Government and supported by Financial Assurances through Bank Guarantees.**

Project Learnings

As outlined above, in a large, complex site with challenging climatic conditions, it is important to consider project risks in advance. Risk and control strategies are point-in-time assessments based on existing knowledge and foreseeable events. A dynamic approach to risk assessment and control is required throughout the project duration as new or unforeseeable risks emerge and new information becomes available as to the most effective risk treatment mechanisms.

An example is the ash dust event of 1 and 2 January 2017. Despite significant planning and successful implementation of dust suppressant seal only one month earlier, severe unprecedented weather conditions led to damage and an ash dust lift-off event. This event prompted immediate rectification action and the review of project risks and contingency plans. **Since January 2017 there have been no further ash dust events at the site which have impacted local residents.**

Throughout the construction phase, while there have been several short duration dust events of red topsoil, these events correlate with strong or severe weather events in the region. The majority were caused by strong northerly winds, causing dust to be blown in the opposite direction to residents. The most significant event occurred on 27 December 2017 when a moderate northerly was followed by a strong southerly change late in the day. The event caused red dust to be lifted from the Ash Storage Area soil cap and residual coal dust to be lifted from the former coal stockpile area. While visually unpleasant, the dust largely migrated directly north of the site and over the Augusta Lakes, thereby not adversely affecting local residents. The PM10 daily average was marginally exceeded on that day at Lea Memorial Oval but not exceeded at Stirling North. It is difficult to determine the contribution of regional dust blowing from a northerly vector as opposed to dust attributable from the Flinders Power site (from a south/south-easterly vector) for the day. To the best of our knowledge, there have been no other occasions where the daily PM10 limit of 50µg/m³ has been exceeded at either Lea Memorial Oval or Stirling North that are directly attributable to conditions at the site. Further, SA EPA (https://www.epa.sa.gov.au/business_and_industry/industry-updates/flinders-power-port-augusta) notes that since the covering of the ash dam with topsoil, there have been no exceedences of the national standard for the finest particles PM2.5 (24-hour average of 25 µg/m³) in Port Augusta at the SA EPA monitoring locations.

Another example of unforeseeable change in conditions was the loss of a salt crust seal when seawater flooding was commenced following the cessation of generation. Seemingly, the inclusion of the fine ash within the seawater slurry was essential in assisting the formation of a crust. When generation ceased, and flooding was conducted with pure seawater, the behaviour of the Ash Storage Area changed and flooding soon led to the formation of erosion gullies. As this condition was new, it required a rapid change in control strategy and led to the implementation of a dust suppressant seal.



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Throughout the rehabilitation implementation there will undoubtedly be other key learnings that can and will be shared with others in the electricity generation sector. The industry has a long and proud history of collaboration, particularly in relation to environmental and safety improvements, and Flinders encourages sharing of information and experience.

The role of Federal and State Governments

The South Australian Government already has a best practice outcomes-based approach to achieve environmental outcomes. Flinders Power has found all State Government agencies to be professional and collaborative throughout a challenging and unique closure program. The state regulatory approach and guidelines, complemented through the use of independent technical experts to determine the best outcome, has been effective.

While Flinders Power believes that states and territories should consider opportunities to be consistent and harmonised in their approaches to environmental matters such as ash dam remediation, the states and territories should continue in the prime role of managing these matters. The states and territories have the local capacity to regulate, monitor, enforce and engage with stakeholders over time.

Existing projects that have complied with all current applicable regulatory frameworks should continue under those frameworks. The introduction of any future regulatory framework should not be applied retrospectively to existing approved and funded closure programs.

Conclusion

The ASA rehabilitation program was comprehensively designed utilising input from multiple independent experts and has complied with all regulatory requirements. The South Australian regulators have been closely involved in project planning and execution and maintain close scrutiny of project progress. This approach has resulted in the development of a best practice approach specifically for the Port Augusta site.

Prior to implementation, Flinders Power, together with the EPA, DSD, DEWNR, Site Contamination Auditor, Ecological advisors and Principal Contractor agreed that a topsoil cover and revegetation approach best meets the project objectives, manages the project risks and meets regulatory requirements.

Independent ecological reviews of the site suggest that the approach is progressing as expected (given the limited rain), and there is confidence that rainfall over the Autumn/Winter/Spring period will provide the required vegetation germination and growth. Flinders Power continues to develop contingency options for dust management in the event that growth progresses at varying rates over the coming months.

No ash dust has emanated from the site since the extreme weather events of 1 and 2 January 2017 and following the completion of topsoil application, the risk of ash dust has been eliminated. Flinders Power continues to proactively prepare for inclement weather and responds to actual high wind events in accordance with approved plans. High winds will at times cause some partial lift-off of the red soil, however, this can – and does - occur across the region and is not restricted to the site, as witnessed across the region in April 2018.

Flinders Power has a contractual obligation with the SA Government to meet its closure obligations. In 2016 Flinders Power was fully funded to meet its closure obligations.

Flinders Power has committed considerable time and resources investigating and applying best practice to a complex rehabilitation task specific to the Port Augusta site. This has been completed with an effective existing regulatory



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framework. Flinders Power is confident that the rehabilitation of the ash dam will be successfully completed, and the site will be commencing a 10-year monitoring and maintenance program at the end of closure works.

While Flinders Power believes that states and territories should consider opportunities to be consistent and harmonised in their approaches to environmental matters such as ash dam remediation, the states and territories should continue in the prime role of managing these matters. The states and territories have the local capacity to regulate, monitor, enforce and engage with stakeholders over time.

Existing projects that have complied with all current applicable regulatory frameworks should continue under those frameworks. The introduction of any future regulatory framework should not be applied retrospectively to existing approved and funded closure programs.