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Brine Management – End-of-life Perspective

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ABSTRACT

Bayswater Power Station is a coal-powered thermal power station that was built in 1985 and is located between Muswellbrook and Singleton in the Upper Hunter Valley of NSW. In line with the organisation's Climate Transition Action Plan, released in 2022, Bayswater is scheduled for closure between 2031 and 2033.

Bayswater draws its cooling water from the Hunter River. The salt in the water in the form of brine is removed by the Bayswater Power Station Circulating Water Treatment Plants. The brine from the treatment process is stored in a dam called decant basin. The capacity of the decant basin is 690 ML. The brine stored in the decant basin is 6 times saltier than sea water. The main constituents of the brine solutions are calcium sulfate, magnesium chloride, sodium chloride, sodium sulfate, other highly soluble salts and biological/organic matter. The decant basin must be remediated within 5 years of power station closure.

To meet the end-of-life requirement of the decant basin, a brine study was commissioned to identify options and further develop the selected option. The options selected and further assessed included, direct offsite disposal, combinations of evaporation and processing, processing and dewatering salts and disposal in the purpose-built landfill. The paper discusses the approach undertaken to select the final option of repurposing an existing underutilised asset to provide the organisation with an assured pathway for managing brine waste from end-of-life perspective in the available timeframe.

KEY WORDS

Brine Waste, Brine Management, Water Chemistry, Salts, Environmental Social Governance, Process Optimisation, Sustainability, Process Engineering, Dewatering, Landfills, End-of-life

BIOGRAPHY

Prashant is a chemical engineer with 20 years of experience in process industry including last 15 years working at coal fired power station external engineering team managing water treatment assets from whole of life perspective. The assets managed are demineralising plants, condensate polishing plants, boiler cycle chemistry, circulating water treatment plants comprising clarification, alkalinity reduction, reverse osmosis and brine concentrator plants for water recovery and associated whole of life of the assets. Recent experience includes commissioning and delivering end of life study on brine waste management encompassing process development to treat brine waste leading into concept design development.

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