

Water Treatment Plant

PROJECT REPORT

CLIENT: SOLID ENERGY, NEW ZEALAND



CONCEPT

DESIGN

MANUFACTURE

INSTALL

COMMISSION

OPERATE

INNOVATIVE SOLUTIONS TO INDUSTRY



The Situation

Solid Energy New Zealand operate an open cast coal mine on the Stockton Plateau, 35km north of Westport, on the West Coast of the South Island, New Zealand. The Stockton Mine produces high quality coal for steel making.

The Mine operates within an environmentally sensitive area, and site discharge water quality must be maintained to satisfy Local Authority discharge consents. Annual rainfall for the Stockton Plateau is approximately 6 metres. Run-off water from the mine is particularly acidic and contains high levels of undissolved solids.

The Solution

Solid Energy engaged Brightwater as the head contractor to provide a lump sum Engineering, Procurement and Construction (EPC) contract. The project was to be fast tracked, delivery of the lamella parts being the critical path, with the two process streams nominated as Stages 1 & 2 so that the plant could commence processing in the shortest time duration.

Solid Energy carried out the platform earthworks and civil works were negotiated on a cost plus basis as no geological data was available at the time of contract signing.

Site run-off water is collected into two dams on the mine site. The run-off water is fed from one dam by gravity pipeline to the WTP and is fed by pumped pipeline from the second dam. Design influent flow can vary between 50 and 400 litres per second.

Hydrated lime is used for water pH correction. The lime is delivered in powder form and stored in silos. From time to time the lime is batched into solution.



The inflow water is mixed in a blend tank from where the flow can then be split into two streams. Each stream leads to a flash mixer where pH correction takes place by the addition of lime solution at a ratio to suit the influent flow and acidity.

From the flash mixer the water passes to flocculator tanks. Each flocculator tank has five bays, an initial distributor bay followed by three process bays and a final outflow collector bay.

A flocculant agent is added in the outflow flume before the lamella thickeners. Clarified water is discharged to the site's main drainage stream. The lamella underflow sludge is pumped to solid bowl centrifuges from where the decanted water is returned to process for further cleaning and the 'caked' solid waste is returned to the mine as reclaim fill.

A re-seed system is also available to encourage flocculation of the metal rich influent.

Key Features

- The plant required process flexibility due to the fact that the influent water sources and chemistry changed with the mining plan.
- Close client liaison ensured that correct environmental controls were achieved.
- The plant is fully automated with both local and remote control. Even though the plant is a 24/7 operation, operator attendance is limited to day shift only.
- The plant has two process streams with process capacity of 200 litres per second per side, but a capability of 400 litres per second hydraulic flow per side.
- The plant capacity allows the dams to be drawn down very quickly, leaving capacity for extreme rain events.



The Benefits

Designing and constructing the WTP on the Stockton Plateau brought a number of challenges. Brightwater through innovation and experience provided technical and practical solutions equal to the task.

Flocculator tanks were modularised for transportation and trial fitted at Brightwater's workshops. The benefit of in-house Engineers and Designers being immediately available to the fabrication team allowed the fast track program to become reality.

The facility has greatly improved the site run-off water discharge.

The Specifications

Weather Wind	6m annual rainfall, FOG, Snow, 256km/hr peak
WTP Process Capacity	1,440m ³ /hour
Method of Supply	Overland pipelines from two dams
Influent Water ions.	Site run-off containing coal fines, clay silts, predominantly Al & Fe
pH Modifier	Hydrated lime
Flocculant Agent flocculators, decanters	High density polymer – low density polymer –
Discharge Water Quality	pH 5.5 to 7 Turbidity 25 NTU TSS 25 g/m ³ Dissolved Al 1 g/m ³ Dissolved Fe 1 g/m ³



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