



Industrial Systems

Client

Multiple Confidential Clients

Location

Queensland, Australia

Key Highlights

- ✓ *Comprehensive water cycle support to confidential clients for produced water treatment from coal bed methane extraction*
- ✓ *Supporting three of the four major energy companies currently operating in Queensland*

Coal Bed Methane Produced Water Treatment, Queensland

Conceptual Produced Water Treatment Plant Design

CH2M HILL was engaged in early 2009 by a major coal seam methane gas producer in Queensland, Australia to prepare conceptual designs for several different sized water treatment facilities (ranging from 10 to 40 million litres per day (ML/d)). CH2M HILL considered various types of treatment processes selecting membrane filtration and reverse osmosis (MF/RO) as a basis of design. Various brine/salt management options were considered and treatment of 20% of the RO brine concentrate flow via mechanical concentration and evaporation was selected as the basis for development of a cost estimate for planning and scheme budgeting purposes.

CH2M HILL selected the highest energy efficient equipment to minimise the site power requirement (at these remote sites), and selected designs that were considered proven, robust and reliable. CH2M HILL included redundancy to achieve high reliability and availability to ensure continuous uninterrupted gas operations, as well as conceptualizing modular WTP designs that are easily interchangeable between facilities (to account for produced water volume fluctuations across various gas tenements). Dimensional requirements set in ISO R-668 Series 1 Freight Containers (to improve ease of shipping to various remote sites of the scheme) were used as a basis of sizing treatment modules. Salt extraction plant options including brine concentrators and brine crystallisers were included to treat 20% of the RO brine concentrate flow. The remaining 80% brine concentrate flow will be directed to existing evaporation storage ponds while the client conducts further studies on other brine disposal options. Produced water gathering and storage ponds were used in the design to act as a sedimentation process as part of pre-treatment prior to the membrane-based water treatment systems.

Project Characteristics

Comprehensive support to multiple clients for the overall produced water cycle associated with coal bed methane

Project Results

- Increased energy efficiency of treatment systems*
- Innovative brine disposal solutions*
- Designs completed on fast-track milestone schedules*

Treatment System Design and Procurement Support

CH2M HILL was engaged in late 2008 by a major coal seam methane gas producer in Queensland, Australia to prepare balance-of-plant engineering design around this client's pre-purchased vendor technology (for use in treatment of produced water from coal seam methane gas wells).

Detailed design work to date has included development of detailed Process & Instrumentation Drawings, General Arrangement Drawings, and mechanical and civil drawings to incorporate the clients preferred 10 ML/day membrane-based treatment technology. CH2M HILL also identified long-lead time items - assisting the client in its procurement of pumps, variable speed drives, and other specialty materials of construction. CH2M HILL conducted a Hazards and Operability (HAZOP) assessment workshop with the client during detail design, and is currently providing further design, procurement and construction support advice to this self-performing client. CH2M HILL will also provide support during upcoming commissioning phases for this facility.

Produced Water Treatability Studies

CH2M HILL commenced Treatability Studies for Origin Energy's Spring Gully CSMG Project in 2005/6 (a full-scale MF/RO plant of 12-15 ML/d capacity is now in operation by Origin Energy).

CH2M HILL conducted desktop studies to select and trial various treatment technologies in a proposed pilot plant. A containerized pilot plant was constructed and shipped to site with 2 shortlisted technologies for pre-treatment of the produced water. A 3 month trial was conducted and treatability assessment determined an MF/RO-based technology was suited to water treatment to required discharge standards. CH2M HILL provided a comprehensive feasibility assessment and study outcomes report, and produced a detailed cost estimate for an 18 ML/d full-scale plant (Origin subsequently constructed a 9 ML/d plant, recently expanded to 12-15 ML/d).

CH2M HILL is currently building an \$800M (AUD) 600 MW CSMG-fired combined cycle power station for Origin Energy outside Dalby, Queensland.
