



Project Summary

Organization

International Power Australia Pty Ltd

Solutions

Mining and Metals,
Water and Wastewater

Location

Morwell, Victoria, Australia

Project Objectives

- Maximizing the mine's output while incorporating high standards and safety measures
- Optimizing the design of the network for the mine fire service water system for a safe and compliant mining operation
- Bringing water modeling expertise in-house to quickly analyze the impact of any changes in the mine

Products Used

WaterCAD®, MicroStation®

Fast Facts

- Outsourced modeling services were costly and time consuming because of the fast-changing mining environment
- WaterCAD's interoperability with MicroStation (which was already in use) enabled mine engineers to leverage the existing data and CAD models
- The reduction of main sizes allowed for significant savings without increasing the risk profile of the design

ROI

- The project has generated an estimated savings in the CAPEX budget of approximately AU\$15.8 million for the life of the mine
- Low software expenditures enabled an approximate 450-times return on investment
- The optimization of the network for the mine fire service water system has also saved field work man-hours

International Power plc Achieves 450-times Return on Software Investment With WaterCAD

In-house Water Modeling Enables Optimization of Hazelwood Coal Mine's Fire Water Services, While Ensuring High Safety Standards

Competitive and Political Constraints Drive Need for Maximum Efficiency

International Power - GDF SUEZ Australia's (IPR - GDF SUEZ) Hazelwood mine engineers used Bentley's WaterCAD, water distribution analysis and design application, to model the mine fire service water system. With WaterCAD, the engineers were able to create design scenarios for optimizing the network for the mine fire service water.

The Hazelwood brown coal mine with an electricity-generating power station in the Latrobe Valley, Victoria, Australia, supplies approximately 25 percent of Victoria's electricity. In the current competitive commercial and dynamic political environment, it is particularly important that mining operations maximize efficiencies for output while incorporating high standards and safety measures. Using Bentley's WaterCAD, water distribution analysis and design application, the engineers at Hazelwood mine were able to bring fire service modeling in-house, which allowed

them to optimize the mine's water system design, saving approximately AU\$15.8 million over the life of the mine in the process.

Mining operations face many challenges including reducing CO₂ emissions, pricing models, and legislation that affect electricity production. As a result, IPR - GDF SUEZ Hazelwood is focusing on ways to improve the efficiency of its business in this environment. One step in this direction is establishing a better-performing mine fire service water network.

The network is an integral system in an open cut brown coal mine. Brown coal is extremely combustible, making it critical to have a water system nearby to prevent large-scale fires. Changes in the Hazelwood mine's long-term plan created a need to review the fire service water plan, which, in turn, created an opportunity to review the entire system and make it more efficient.



An example of modeling the mine fire service water system in WaterCAD.

"The use of WaterCAD has meant that IPR - GDF SUEZ Hazelwood mine engineers now have the knowledge and skills in-house to better understand and optimize our system."

*– Duncan Orr,
mine civil engineer, IPR - GDF*

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The mine engineers previously outsourced fire services water modeling work to external design consultants. But, because the mining environment is dynamic and fast-changing, this process proved costly and time consuming. Hazelwood determined during the water plan and system review that designing the project in-house would be more cost-effective.

WaterCAD Enables Efficient In-House Modeling

Hazelwood chose WaterCAD to model the mine fire services water system for its superior interoperability and ease of use. The ability to interoperate with Bentley's MicroStation CAD platform – used by IPR - GDF SUEZ – as well as other drafting packages meant that data did not need to be re-entered to create the water distribution model. In addition, WaterCAD's industry-wide usage meant that Hazelwood could easily employ external contractors for design review.

Because WaterCAD is easy to use and learn, training and implementation costs were low. Its ability to create multiple scenarios quickly and simply enabled engineers to analyze multiple case scenarios when required, and synchronize the changes in the mine and the fire water services on an ongoing basis.

Duncan Orr, mine civil engineer at IPR - GDF SUEZ Australia, explained: "By completing the design internally, a number of ways to optimize the mine water system were

identified, including reducing the size of mains that were oversized for their requirements and removing mains that were redundant over and above the built-in redundancy of the system.

"These optimizations enabled a number of savings in the ongoing capital works program without compromising the overall efficiency and objectives of the fire service system as a whole."

IPR - GDF SUEZ used WaterCAD to model the entire fire service network based on the existing design. It then used WaterCAD to check the system for effectiveness and redundant components. This review led to a reduction in size of the pipes on the Northern Batters for Block 1 and both the head and tail end feeds for Block 2. This reduced the need for two DN600 (diameter nominal in millimeters) mains, and a DN750 main on the Western Batters at the conclusion of Block 1, consolidating the system down to one DN600 main. The result was significant savings without increasing the risk profile of the design.

It also enabled the mine engineers to generate an estimated savings on capital expenditure of approximately AU\$15.8 million over the life of the mine to 2030. Implementing WaterCAD has also created further savings in design man-hours and field work, and helped ensure optimum design for a safe and compliant mining operation.

Overall, this equates to approximately a 450-times return on investment.