

EXPERIENCE AND INSIGHT DELIVERS WATERTIGHT RESULTS

The \$30million Hume Dam Southern Training Wall Upgrade involves the construction of a mass concrete buttress wall to improve the dam's capacity to withstand extreme floods and earthquakes.

Keeping a civil construction operation environmentally responsible is important on any project, yet it's even more so at the Hume Dam Southern Training Wall project site, where McConnell Dowell is working adjacent to the River Murray; the source of domestic water supplies for the major regional centre of Albury-Wodonga, other towns further down stream and irrigation requirements downstream. The works at the Hume Dam Southern Training Wall involve the construction of a mass concrete buttress in front of the existing wall. The Southern Training Wall buttress is the second stage of a three-stage upgrade which is being undertaken by the State Water Corporation (State Water), New South Wales' rural bulk water delivery business, who

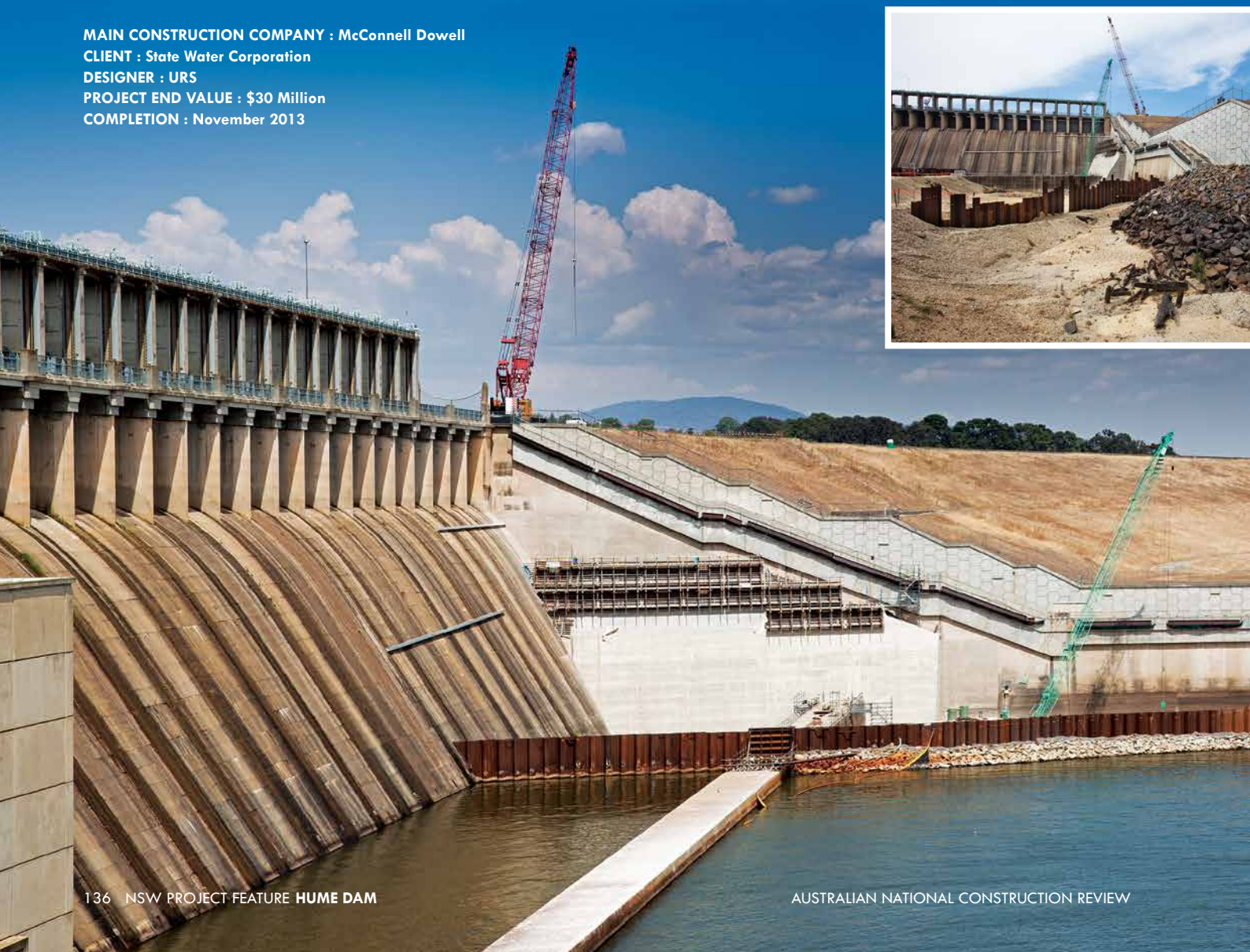
manage Hume Dam on behalf of the partner governments of Australia, NSW, Victoria and South Australia through the Murray-Darling Basin Authority. These works are to ensure the dam continues to meet contemporary best practice and is better able to withstand major flood events and earthquake activity. The works build on the extensive remedial works carried out by State Water between 1996 and 2003.

The first construction task for McConnell Dowell was to design and construct a gravel fill coffer dam in the river at the base of the spillway, adjacent to the existing wall. This task involved the importing and placing of 32,000 tonnes of river gravel, the installation of 200 metres of sheet pile walling, geofabric and armour rock

protection. In all, the coffer dam construction took ten weeks. Steel bulkheads up to 12m high were constructed which are incorporated into the coffer dam and spillway base. These bulkheads were required in the event that State Water needs to release flood water through the spillway gates adjacent to the coffer dam wall. Gutters were also been added to the face of the spillway above the worksite, to divert any leakage through the gates above the worksite.

On completion of the cofferdam, the area inside was pumped out, the native fauna retrieved and a pad constructed in the base of the coffer dam to provide a flat working area for the next stage of works which involved the installation of 92 secant piles 1300mm and 1180mm in diameter

MAIN CONSTRUCTION COMPANY : McConnell Dowell
CLIENT : State Water Corporation
DESIGNER : URS
PROJECT END VALUE : \$30 Million
COMPLETION : November 2013



and 16m deep to form five cells approx 10m x 8m. These cells were then excavated to firm rock at a depth of up to 13m and filled with mass concrete to form a solid 4,500m³ foundation for the downstream part of the concrete buttress block extending along the dam's Southern Training Wall. Two crawler cranes have been used for tasks including installation and jumping of the form work, handling steel reinforcing bars and concrete placement by large kipples. An onsite concrete batching plant was mobilised for production of all concrete required. Constant dewatering of the cofferdam has been required due to the fractured bedrock at the site.

"Prior to concrete works commencing, a concrete mix trial program was conducted to prove that the various mixes met the specified parameters in URS's design for State Water and suited the project's requirements," said McConnell Dowell Project Manager, Don Webster.

"The trials included tests for strength, workability (for placement) and temperature rise of the mix. Several trial pours were also conducted to prove the vibration of the 60mm aggregate and surface finish. The construction environmental management plan (CEMP) had to go to external

agencies including Department of Fisheries for approval – and we believe this is the first time a CEMP has been approved without requiring amendments. Because we are working on a river where people are relying on it for drinking water, the environmental conditions to be met by the CEMP are quite stringent."

McConnell Dowell installed booms in the river for silt protection, have placed silt traps throughout the site, and are using a 'SiltBuster' plant to remove sediments and solids from the water pumped out by the dewatering system, which is then returned clean to the river.

The project has had regular audits and inspections by State Water for Environmental, Quality and Safety management.

One of the big challenges has been the weather, with high temperatures over the 2012-2013 summer period making it necessary for concrete works to start at 4am. The mass concrete was poured in 1.5m thick layers, with a minimum time before the next layer can be placed of 3 days to minimise the temperature rise in the concrete mass. On completion, the 50 000 tonnes buttress

block will be up to 33m in height below the spillway and along the Southern Training Wall. Once the buttress wall is completed, the final stages of the project include demolishing the existing access stairs above the training wall, and constructing new stairs which comply with current codes; decommissioning the wall horizontal anchor system, removing the sheet piling and coffer dam; reinstating the spoil disposal area; and demobilising and stabilising the work site.

"This is a two-year long and very linear works program," commented Don Webster.

"There has been an excellent and co-operative team approach, and excellent safety management. We have used local labour and subcontractors wherever possible, and our own design department provided engineering expertise in designing temporary works and resolving constructability issues. The program has been able to proceed smoothly from one task to the next."

As a major engineering, construction, building and maintenance contractor, McConnell Dowell's project track record includes numerous



water-related projects such as the Meander RCC Dam in Tasmania; the Northern Pipeline Interconnector Stage 2 in Queensland; and the remote and extremely challenging Ambuklao and Binga Hydropower Plant project in the Philippines, which received a silver award for the 'Best Renewable Energy Power Plant of the Year' in the 2011 Asian Power Awards.

The project is being funded by the partner governments of Australia, NSW, Victoria and South Australia through the Murray-Darling Basin Authority. The activities at Hume are part of dam improvement programs occurring across NSW, Victoria and South Australia.

For more information contact McConnell Dowell Constructors (Aust) P/L, phone 03 9816 2400, website: www.mcconnelldowell.com

A HIGHLY SKILLED TEAM
THAT CAN HANDLE EXTREMES





In terms of challenge, welding in the dark while under water ranks high on the risky business scale. For Professional Diving Services (PDS), performing such a task safely comes down to impeccable training, excellent planning and substantial experience. PDS are one of the country's most proficient, multi-skilled commercial diving operations, with a team that ranges from civil construction professionals through to marine biologists, archaeologists and engineers. On any one day, the company may have up to ten dive crews working on a wide variety of projects across South Australia, Victoria and New South Wales from bases in Melbourne, Portland and Albury.

For the Hume Dam project, PDS assisted McConnell Dowell with surveying of the existing dam structure, developed the detailed design and plans for the coffer dam adjacent to the Southern Training Wall, and assisted with the coffer dam installation.

"There were decades of silt, rock, trees and other debris built up in the survey area," said PDS Director, Malcolm Venturoni. "We cleared all of the area at the base of the Southern Training Wall. Our divers would guide the excavators for the bulk underwater excavation, and then complete the fine detail work by hand – in nil visibility. Most of what we do is by feel. Once we had exposed the training wall surface, then we installed the coffer dam. We had to drill into the dissipater, dam and apron, and bolt down and seal off the dissipator structure and coffer dam."

The work required a high level of detail, with the added challenge of trying to measure up a structure built in the 1930s, in the dark, in order to develop the detail coffer dam design.

PDS succeeds at these complex and difficult tasks due to the calibre of their people and high standards for training, planning and safety. PDS is one of only four accredited commercial diver training agencies in Australia, and is annually audited for compliance to standards by bodies including Bureau Veritas, SAI Global and Lloyds of London. The diligence with which PDS manages and implements safety can be seen in the company's incident-free record for the past 30 years.

"Amongst our 50-plus divers, we look at past experience before they were divers," said Malcolm. "Our divers' backgrounds include structural engineers, boilermakers, carpenters, materials engineers, paramedics, archaeologists, aquatic and marine ecologists, non-destructive investigators, police, surveyors and concreters. We look at having as much experience as possible among our team."

This solid foundation of skills enables PDS to undertake an extremely wide range of projects from subsurface civil works and maritime

construction through to specialist industrial inspection repair and maintenance tasks.

PDS are currently working on another McConnell Dowell project at Robin Vale in North east Victoria. The project to upgrade Lock 15 on the Murray River is a major project which involves underwater works to upgrade the lock and strengthen and upgrade the weir. The scope includes installing a range of coffer dams; thirty 30m stainless steel strengthening strips; and over 1,000 stainless steel anchors, which are being embedded 300mm into the concrete upstream of the weir. Five dive crews will be rotated through the project over a six to eight month period.

"We rotate divers through the different projects so they gain as much experience as possible of a variety of works, including ships, contaminated environments, marine and freshwater situations.

PDS also currently has 20 divers working on the Appleton Dock project at Port of Melbourne, where over 2,000 piles are being refurbished. The works program includes encasing the timber piles in concrete by installing Kevlar strengthening mesh and a fibreglass form, then pumping high-strength cementitious grout.

Since 1997, PDS has been assisting with the Victorian Channel deepening project for the Port of Melbourne Corporation. At the peak of works through 2008-9, PDS had up to 15-20 divers in the water on a daily basis, and since then has supplied regular crews for environmental monitoring. PDS also provide environmental monitoring services to Parks Victoria and the Department of the Environment, undertake pre- and post-construction environmental surveys, and provide marine vessel repair, inspection and maintenance services.

Water is not the only liquid environment the company works in, with their expertise also extending to sewerage plants, chemical factories and waste water treatment plants.

"One of the toughest environments we dive in is a methane reactor at a milk and butter factory. The dam for the reactor is 150m long x 100m wide x 8m deep, and contains 90 million litres of waste cheese. So our divers are working in something the consistency of cottage cheese at 40 degrees Celsius inspecting pipework and undertaking repairs," said Malcolm. "A lot goes into preparing the procedures for our operations. We make sure everything is safe before we proceed."

For more information contact Professional Diving Services, Head Office - Melbourne, 2 Sonia Street Carrum Downs VIC 3201, phone 03 9775 0998, fax 03 9775 1758, website: www.profdivers.com



STRONG SOLUTIONS FOR HEAVY-DUTY SITUATIONS

In a region where floods can come fast and rivers rise rapidly, ensuring the work site at the Hume Dam Upgrade project is protected from potential swirling waters meant taking precautions. J Steel Australasia has contributed to the integrity of the cofferdam constructed to protect the Southern Training Wall works with the supply of AZ type sheet piles.

The piles have been driven in on the river edge of the earthen cofferdam, to provide protection from flood waters, and from the daily erosive force of the river which flows adjacent to the dam.

The Hot Rolled AZ sheet piles are an ecologically responsible product made from 100% recycled scrap steel. At the end of the project life, McConnell Dowell and J Steel have plans for the reuse of the piles on another project.

“The sheet piles are fabricated from scrap steel in an electric furnace, which has a much smaller pollution footprint than a coke-burning furnace,” said J Steel spokesman, Davide Cantali. “Our piles have the capability of being re-used many times, and clients can purchase them outright for ongoing use, rent them, or purchase them with a buy back agreement.”

J Steel Australasia is an Australian owned company which offers integrated and customised steel solutions for a wide range of civil, marine and general engineering and construction applications throughout Australia, New Zealand and the South Pacific. As the exclusive Australian representative for ArcelorMittal, the world’s largest fully integrated steel producer, J Steel can draw on a global wealth of engineering and materials expertise to provide sound designs, engineering expertise and constructability advice for steel structures.

Being the region’s largest supplier and stockist of steel and vinyl sheet piles with strategically located stocks, J Steel can quickly provide solutions for a wide range of construction needs. The company’s extensive range of integrated piling solutions includes steel sheet piles in Z Profile, U Profile, Straight Web Sheet Piles, HZ Combined Walls, Tubular Combined Walls, Corner Sections and Non Ferrous Sheet Piles which include Vinyl, Fibre Reinforced Plastic and Aluminium.

J Steel’s diverse range of products also includes both Tubular Piles and Pipes (Spirally and Longitudinally Welded Tubular Hollow Sections, Seamless Pipe and Electric Resistance Welded Pipe); Anchor systems for marine and general construction; Plate and Coil; Structural Sections including Jumbo high steel grade Steel Beams, Columns and Equal Angles; Transport Rail for Resource and Passenger railways; and custom Fabricated Structural Components for wharves, materials handling structures and building.

For projects which require tailored solutions, J Steel’s in-house expertise enables them to offer services such as design assistance or complete certified designs, project management, logistics, quality inspections and audit in order to provide a unique product and delivery solutions that suit client’s technical requirements and budget.

J Steel’s client base crosses all major development sectors, with a diverse range of projects completed for government authorities, port corporations, major construction and engineering contractors, private developers and local councils. For every project, J Steel applies a level of capability and integrity which matches the strength and quality of their products.

For more information contact J Steel Australasia, phone 02 8198 9500, fax 02 8198 9599, email: contact@jsteel.com.au, website: www.jsteel.com.au

