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SUCCESS STORY NUMBER W06: WELDING EXPERTISE, AND SOME LOCAL KNOWLEDGE, GET PUMP BACK IN SERVICE – *WTIA Engineers help SA Water successfully complete a difficult repair job on an austenitic cast stainless steel pump*

With its relatively low rainfall and long, dry summers, South Australia depends heavily on water flowing down the River Murray to meet its requirements. In an average year, the River Murray supplies about 40% of the State's urban water needs. In dry years, this can increase to as much as 90%.



Swan Reach-Stockwell Pipeline

The main purpose of the Swan Reach-Stockwell Pipeline is to supplement supplies to the Barossa Valley, Lower North and Yorke Peninsula areas and to supply townships and farming lands along its route. The pipeline, which is 54 kilometres long, can pump 24,000 megalitres per year and was commissioned in 1969.

The pipeline, and the critical pumping equipment are part of the South Australian infrastructure maintained by SA Water, a member of the NDNP Water Industry Sectoral Project.

The project

WTIA's Technology Manager Greg Terrell, based at CSIRO premises in Adelaide, was called in to assist with the repair of an extremely large pump serving the pipeline. The pump, originally manufactured in 1962, weighed in at more than half a tonne, and measured some 2.5 by 1.5 by 1.5 metres.

The cast iron pump body was found to be suffering corrosion and cracking through the wear and tear of its work. With a nine-month lead-time to source a replacement pump, it was decided by SA Water to undertake repairs.

The first important job was to identify the materials the pump was made from, in order to specify the repair procedure, welding consumables and process to be used.

A special Welding Procedure Specification was drawn up by Greg incorporating the use of nickel electrodes and stress relief by peening. Most weldment surfaces are under tension due to shrinkage after being exposed to welding heat. Peening can reduce tensile stress by inducing compressive stress on the part. In this application peening was done by using mechanical impact hammers.

A critical element in the repair procedure was the requirement to pre-heat the entire pump casing, and to maintain the temperature over the 3-day duration of the repair – not such an easy job with a component of this size.

The solution was provided by SA Water's tradesmen, to wrap the entire piece in aluminium foil-coated insulation, and to apply heat using a domestic fan heater. Simple, but extremely effective.

Outcome

At the end of the repair, the casing was subjected to a hydro-test that found nearly all of the 40 cracks had been successfully repaired. To safeguard the future integrity of the seal, the unit was lined with a composite, and then returned to active service.

The procedure was so successful that it has been used in the repair of a further pump with similar repair requirements.

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