

SNWA IPS-2 By-Pass Pipeline, Lake Mead, Nevada

- One of the first public works water/wastewater design-build (DB) project awarded in Nevada
- Our approach achieved a cost savings of over \$1.7 million to the Southern Nevada Water Authority (SNWA) compared to competitors' solutions
- 2006 Construction Management Association of America (CMAA) Project Achievement Award
- Winner of 2007 Design-Build Institute of America Excellence Award for water/wastewater projects under \$15 million
- On-time completion with minimal disruption to existing pipelines

In anticipation of declining lake levels, SNWA initiated this project which will ultimately prevent any disruption of the water supply to the Alfred Merritt Smith Water Treatment Facility (AMSWTF) during drought conditions. SNWA selected CH2M HILL as the design-builder of this \$14-million project, one of the first public works water/wastewater DB project in Nevada.

Through a series of design workshops, CH2M HILL discussed design approaches with SNWA's staff, keeping them involved in the project design to better tailor the facilities to meet the project's needs.

Key concerns during design and construction were the upstream and downstream connections and the need to avoid shutdowns and plan all connections to avoid disruptions. The 96-inch diameter pipe connects to the 144-inch AWWA C300 pipe on the upstream end. This is a heavy-walled concrete cylinder pipe with a 5/8-inch steel cylinder. Due to the high pressures (up to 300 psi), the outlet is supported by crotch plates.

The selected approach saved SNWA considerable time and money. It involved a special design developed to provide a weld-on outlet saddle with a wrapper and crotch plate that could be welded to the 144-inch pipe while in service. Through a series of planned shutdowns, the coupon was cut out by hand.

The original low pressure system delivers water to the AMSWTF. With the completion of the IPS-2 high

pressure system, water can now be delivered to the River Mountains Water Treatment Facility (RMWTF), located in the Las Vegas Valley, and if needed, provide a backup water supply to the AMSWTF if lake levels were to fall below the operable range of the original pumping station or during station maintenance activities, thus alleviating any future water supply issues with the AMSWTF.

The IPS-2 By-Pass Pipeline project delivers 365-mgd flow and consists of the following elements: approximately 2,500 feet of 96-inch diameter high pressure pipeline; 2 isolation valve vaults with 96-inch diameter butterfly valves; a large scale FCF; connection of the 96-inch diameter pipe to the 144-inch diameter Bay Aqueduct; and connection of the 96-inch diameter pipe to the 180-inch diameter Ozone Facility Inlet Piping.

One key project feature is the FCF that breaks the head between the high and low pressure systems. This facility consists of 4, 48-inch diameter pipe trains, each with a sleeve-type flow control valve, a high performance butterfly valve for upstream isolation, and ball valve for downstream isolation. Each flow train also has an ultrasonic flow meter. The sleeve valves were selected for their superior cavitation flow characteristics. The station is designed so the treatment plant control room can call for a desired flow rate and the sleeve valve(s) will modulate to provide the required flow. The ball valves were used for downstream isolation as they provide a full-port, uninterrupted flow way. Other types of valves are prone to damage from the turbulent flow conditions exiting the sleeve valves.

CH2M HILL's low-cost solution met all of SNWA's requirements at a cost savings of over \$1.7 million and delivered on-schedule in June 2006 without any cost change orders to the original contract. In recognition of outstanding design-build project delivery, the facility received the 2006 CMAA Project Achievement Award and the 2007 DBIA Excellence Award.

