

## Williams Gas Pipeline Company Kern River Expansion Project

**G**ulf Interstate Engineering (Gulf) provided project management, engineering and procurement services on the Kern River Expansion Project.

The Kern River Gas Transmission system was owned by Williams Gas Pipeline (WGP) at the time of the contract; it was subsequently acquired by the Kern River Gas Transmission Company. The expansion was initiated as a response to the 2001 energy crisis in the state of California with a long term goal to double the amount of natural gas transported in the existing 926-mile pipeline system. The project involved installation of temporary emergency action facilities to satisfy the immediate need for energy carriers in the state followed by the overall expansion of the system which included modification and addition of compression and metering facilities, and installation of the pipeline looping of 712 miles adjacent to the existing gas transportation system.

The expansion project was completed in July 2003, leaving the pipeline with the capacity to transport 1.73 Bcf/d of natural gas, an increase of 906 MMcf/d. This expansion provides new access for gas producers in Wyoming and Utah to premium markets in the West and serve 6,000 MW of new electric power generation facilities.

### PROJECT OVERVIEW

The initial scope of the Kern River Expansion Project involved addition of two compressor units to an existing station, and conversion of a meter station to use ultrasonic flow meters. However, with the development of the natural gas shortage in California, this scope of work was put on hold, and California Emergency Action Project was initiated with the goal of increasing the capacity of the Kern River Pipeline by July 01, 2001. This project was followed by a permanent expansion of the entire 926-mile gas transportation system, which involved addition and modification of the compression and metering facilities and installation of 712 miles of looping of the existing system. Gulf provided project management, engineering and procurement services on all phases of this major expansion project.

### CALIFORNIA EMERGENCY ACTION

In March 2001, Gulf, Ranger Plant Constructional Co., and Solar Gas Turbines undertook the California Emergency Action Project under the direction of WGP. Ranger and Gulf's scope of

work included the detailed design of the facilities, procurement of the materials, installation of facilities, and assistance during the start-up of two compressor stations Dagget and Veyo. 15,000 HP Solar Mars turbine driven Dresser-Rand compressor

packages were supplied by Solar. While a project of this magnitude would normally take 9 - 12 months to complete, the two stations were on-line just 4 months after the design started. Quick design completion was achieved in part by the

efficient production of the piping isometric drawings which, in turn, sped up the material takeoff for piping material purchases. Expedited purchasing procedures were also initiated by the Gulf procurement group to insure all materials arrived on site as needed.

### KERN RIVER 2002 EXPANSION

Immediately following the start-up of the Daggett temporary turbine station, Ranger/Gulf were awarded the design, procurement, installation and start-up assistance for the Daggett permanent station facilities - a grassroots, 8,000 to 10,000 HP electric motor-driven compressor station located adjacent to the temporary facilities. The air permit limitations on operating the Emergency Action Station gas turbine required that the permanent electric motor driven station be in operation by July 01, 2002. Due to permitting delays, the start of construction was postponed from the originally scheduled October 2001 to mid February 2002. Although the normal installation period for a station is about 7 months, this station was completed in



less than six months to compensate for the time lost in the permitting process. The original start-up schedule was effectively maintained, and the operation of the Daggett station commenced on July 1, 2002.

### **KERN RIVER 2003 EXPANSION**

#### ***Preliminary Engineering Compressor Stations***

In July 2001, WGP selected Gulf to develop the basis of the 2003 Compressor Station Expansion bid document for the EPC contract. Gulf prepared the scope of work, construction summary, preliminary P&IDs, plot plans and electrical one line drawings to define the detailed design, procurement, and construction of nine compressor stations.

#### ***Detailed Engineering Compressor Stations***

Knowledge gained during the preliminary engineering phase gave Gulf a strong competitive edge in winning the bid for the detailed design of the Kern River Compressor Stations. In February 2002 Gulf was awarded a contract for the engineering, design, drafting and procurement assistance for the turbine compressor trains, station facilities, and auxiliary

equipment at Fillmore, Veyo, Goodsprings, and Dry Lake Compressor Stations all located in the state of Utah. This expansion consisted of installation of additional 15,000 HP Solar Mars 100 turbine compressor trains and auxiliary equipment at the existing Fillmore and Veyo Stations; and installation of single 15,000 HP combustion turbine driven compressor trains and new station facilities at the new Dry Lake and the existing Goodsprings Stations.

#### ***FERC Filing***

In 2001, Gulf provided engineering services in support of the Federal Energy Regulatory Commission (FERC) 7c Application filing for existing Kern River system. Gulf's project team applied their extensive knowledge of the FERC application techniques and requirements to the Kern River Project. That experience allowed WGP to meet the tight five-month schedule and complete on time all of the FERC application prerequisites, including preliminary engineering, mapping and FERC exhibits.



#### ***Detailed Engineering Pipeline & Meter Stations***

Following the successful filing of the FERC application, Gulf was awarded a contract for detailed design of 712 miles of the pipeline loop and modifications of five meter stations. Gulf also provided technical support to WGP throughout the FERC application process, and furnished similar support for other federal and state agency permits and approvals. Using WGP technical specifications as the basis for the design decisions, Gulf developed a comprehensive design of the pipeline and the metering facilities. Development of the design entailed preparation of studies, calculations and materials specifications, as well as generation of the final alignment sheets, P&IDs, and construction, permit and site drawings. Gulf's project team was also responsible for the provision of the technical content to the construction bid packages.

To assist WGP with the procurement of the materials and equipment, Gulf prepared bills-of-material for all pipeline and meter station facilities.

The approval of the FERC application was received by Williams in July 2002, and construction of the pipeline looping began in August 2002.

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The Kern River Pipeline System was put in service on May 01, 2003.



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