

# CULTURAL, TECHNICAL AND ENVIRONMENTAL HURDLES OVERCOME: THE STORY OF CORTEZ PIPELINE BEFORE CONSTRUCTION

by Roger G. Ryman, SR/WA

Shell Pipe Line Corp., a subsidiary of Shell Oil Co., plans to begin construction of one of the largest pipelines in recent company history this summer. But the magnitude of the 30-inch line, which will span about 500 miles from southwestern Colorado to West Texas, isn't the only thing setting it apart from the company's other lines.

That's because it is not designed to carry oil or petrochemical products like the others. This line will transport carbon dioxide (CO<sub>2</sub>)—a common gas used to make dry ice and carbonate soft drinks.

However, the carbon dioxide being pipelined from CO<sub>2</sub> source fields near Cortez, Colorado, to the Denver City, Texas, area will have another job. It will increase oil recovery from old oil fields in West Texas and New Mexico. The probable first large user of the CO<sub>2</sub> will be the Denver Unit of the Wasson field. Shell Oil, as operator of the unit, expects that injection of the carbon dioxide will produce about 280 million barrels of crude oil that otherwise would not be recovered.

The development of this project, which could be operational by 1984, is expected to cost about \$1.9 billion in terms of 1982 dollars. About \$800 million is set aside for developing the carbon dioxide fields near Cortez and the field facilities for dehydrating and pressurizing the carbon dioxide (so it can enter the pipeline); approximately \$700 million for the 30-inch pipeline and associated compressor stations; and \$400 million for field facilities, a gas treating plant and other construction at the Denver Unit. Plans call for these costs to be shared between Shell Oil and partners in the project.

Development of the carbon dioxide source fields near Cortez, which will be conducted by Shell's Western Exploration and Production operations, will be a massive effort in itself as up to 200 carbon dioxide wells ultimately will be drilled. Exploration and Production also will construct several dehydration stations and many miles of pipeline from the wells to the dehydration facilities in Colorado and other facilities within the Denver Unit.

Besides constructing the 500-mile pipeline, Shell Pipe Line will construct a dry CO<sub>2</sub> gathering pipeline system near Cortez. The company will operate and maintain both the gathering system and main line when construction is completed.

Acquiring right of way and governmental clearances for a large project is always complex. However, Shell Pipe Line's Land and Environmental Department faced several unique challenges as project preparations began. The greatest of these challenges concerned the area around Cortez—where the proposed pipeline and carbon dioxide wells will be constructed in the midst of a wealth of historical artifacts left behind by the Anasazi Indians.

The Anasazi farmed the mesa tops of southwestern Colorado and northwestern New Mexico, growing beans, squash and corn before they abandoned the area about 700 years ago. They lived in pithouses or pueblos on the mesa tops in addition to cliff dwellings like those open to the public at what is now Mesa Verde National Park. These "ancient ones" left behind an abundance of pottery and other relics, vivid evidence of their society and lifestyle. Archaeo-



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logists suspect there may be as many as 100 buried Anasazi occupation sites per square mile in some places.

Because of this potential wealth of cultural antiquity, Shell representatives informed the Bureau of Land  
(see Cortez, pg. 18)

**Cortez (cont. from pg. 17)**

Management (BLM), a U.S. Department of the Interior agency, about the proposed construction during initial exploration efforts.

Working with the BLM and the Department of Anthropology at the University of Colorado, Shell and Woodward-Clyde, an independent environmental consulting firm from San Francisco, found a way to predict which areas around Cortez were likely to have archaeological sites—areas to avoid in planning pipeline and well sites. To do this, a predictive model was developed, showing known sites where the Anasazi lived, farmed and hunted, and keyed this data into the computer along with geographical factors such as distance to streams and direction faced by the site. This data was used to locate potential sites on a sophisticated color-coded map. Computer-produced maps also indicated what the probable impact of the project would be on wildlife and soil conditions, pinpointing which areas near Cortez would be affected the most and which would be affected the least.

This was only part of the planning effort needed to satisfy the requirements of applicable federal laws and regulations. Largely because the pipeline will extend across a large area and because about 40 percent of the line crosses federal and state lands, Shell furnished a large amount of data which was used to compile a two-volume environmental impact statement. Among other things, the information developed by the company and Woodward-Clyde indicated the probable effects of the pipeline and the CO<sub>2</sub> field on communities, farm lands, water, aesthetics, national forests, wilderness areas, air quality and other areas of environmental concern.

Planning for the environmental impact statement started in 1976, and it was finalized in 1980 following public hearings in Cortez; Albuquerque, N.M.; and Roswell, N.M. This cleared the way for the BLM to grant a pipeline easement for 129 miles of federal lands administered by the agency in Colorado and New Mexico.

A particularly important part of preparing the environmental impact

statement was surveying the effects of the main pipeline on cultural resources—historic artifacts and ruins left by the Anasazi and other early civilizations. This work was separate from the computer mapping of the Anasazi sites near Cortez and concerned long sections of the proposed pipeline route in New Mexico and Colorado where cultural resources are abundant.

Shell conducted extensive on-the-ground cultural resource inventories to insure that potential sites were located, reported and avoided during pipeline construction. Regarding such surveys, the BLM stipulated in the easement on BLM lands that Shell was required to perform cultural inventories on all lands, including private and other non-federal tracts, along the route, as a

*(see Cultural, pg. 19)*

*Ruins of Anasazi houses like these dot much of the landscape near Cortez, Colo.,—where Shell Pipe Line is beginning construction of a carbon dioxide line which will stretch about 500 miles to West Texas. The pipeline is being routed far away from such visible historical landmarks.*

