Case Example

Occidental Petroleum Corporation: Conserving Fresh Water in a New Mexico Oil Field Expansion Project

Occidental routinely integrates environmental considerations into its oil and gas production activities underway in the Permian Basin region of west Texas and southeast New Mexico. A good example is the freshwater use minimization project undertaken in 2002 by Occidental's Hobbs (New Mexico) reservoir management team, which was pursuing a field expansion project.

For the Hobbs oil field development project, water was essential to maintain field performance during secondary recovery operations. Typically, an oil field is developed in three phases. In the first phase, known as primary recovery, oil and/or gas is produced using the natural pressure of the reservoir as the driving force to push the material to the surface. Wells are often "stimulated" through the injection of fluids, which fracture the hydrocarbon-bearing formation to improve the flow of oil and gas from the reservoir to the wellhead. Other techniques, such as pumping and gas lift help production when the reservoir pressure dissipates. The next phase, which is called secondary recovery, uses other mechanisms—such as gas reinjection and waterflooding—to displace fluids not produced in the primary recovery phase. The final phase, know as enhanced oil recovery, involves the injection of other liquids or gases (surfactants, carbon dioxide, and so on) or heat (such as steam) to stimulate oil and gas flow and displace fluids bypassed in the primary and secondary recovery phases.

Occidental's Hobbs reservoir team considered gas reinjection for the secondary recovery project, but determined that sufficient gas supplies were not available, making waterflooding the only feasible option. Working in the desert southwest, Occidental knows well that the availability of fresh water supplies to meet growing water demands is an increasingly important issue.

Consequently, the Hobbs project team developed a way to use a nontraditional water resource—treated municipal wastewater—to supplement limited fresh water supplies. However, in addition to overcoming technical challenges, the team recognized that addressing stakeholder interests was an essential element of the project. Occidental representatives worked successfully with the city of Hobbs and New Mexico state officials to address potential issues and secure needed authorizations.

The work by Occidental's Hobbs project team and city and state officials created a win-win scenario for all parties involved. Occidental now receives approximately five to eight million gallons per month of wastewater effluent from the city of Hobbs treatment facility and beneficially uses it for secondary oil recovery operations in the Hobbs field. The city of Hobbs benefited in two ways. Facing tighter restrictions on the discharge of its treated wastewater stream, the city avoided capital expenditures for additional treatment and handling technology by sending the water to Occidental's operations. In addition, the project helped the city achieve a 100 percent beneficial use designation for the effluent from the wastewater treatment facility. Benefits to the citizens of Hobbs include lower sewage treatment costs and the preservation of a corresponding amount of fresh water from the underground aquifer. Finally, the state of New Mexico benefits through taxes and royalties from the additional oil production from the secondary recovery operations. Occidental was recognized for its part in the project by an environmental merit award from the Energy, Minerals, and Natural Resources Department of the State of New Mexico.

Occidental Petroleum Corporation: Conserving Fresh Water in a New Mexico Oil Field Expansion Project (Cont.)

Occidental Petroleum is the largest oil producer in the Permian Basin, which is the largest oil basin in the lower 48 states. Occidental's Permian operations include more than 13,000 producing and injector wells, along with related pipelines, gas separation plants, and support infrastructure.