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U.S. DEPARTMENT
of **ENERGY**

Office of Legacy Management



CALIFORNIA

SACRAMENTO

GEOTHERMAL
TEST FACILITY

Geothermal Test Facility, California

A STATE WATER QUALITY STANDARDS SITE

This fact sheet provides information about the **Geothermal Test Facility site**. Long-term stewardship responsibilities for this site are managed by the **U.S. Department of Energy Office of Legacy Management** as a **State Water Quality Standards Site**.

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Site Information and History

The Bureau of Land Management (BLM) began studies of the geothermal resources of an area known as the East Mesa site in 1968. In 1978, the U.S. Department of Energy (DOE) became the exclusive operator of the site, which was called the Geothermal Test Facility (GTF), and negotiated a right-of-way agreement with BLM to operate the facility. Geothermal test activities were discontinued in 1987 as development of commercial-scale geothermal power began to flourish in the region. In 1993, DOE agreed to remediate the site and return it to BLM.

GTF is an 82-acre site located on the eastern edge of the Imperial Valley in Imperial County, California. The site is 140 miles east of San Diego and 10 miles north of the Mexico border. Topography of the area is generally flat; the site is at an elevation of about 28 feet above sea level. The Salton Sea is approximately 40 miles northwest of the site at 235 feet below sea level; the Colorado River is about 30 miles east of the site.

Hydrologic studies conducted in 1989 identified three aquifers beneath the site. Depth to groundwater in the

uppermost aquifer ranged from 10 to 16 feet below ground surface. Groundwater in the uppermost aquifer is of poor quality and has no beneficial uses. The deepest groundwater occurs in a geothermal aquifer at a depth of about 2,000 feet. Screened intervals in geothermal production wells in the area typically ranged from 2,000 to 7,500 feet below ground surface. Water temperature in the geothermal aquifer exceeds 300 °F and is generally saline.

GTF was originally used to promote the commercialization of geothermal energy. Under the auspices of BLM, and later DOE, the federal government provided the site to interested parties to conduct research and experiments. The facility consisted of five geothermal production/injection wells, a 6-acre brine pond, a 1-acre spray pond, two prefabricated buildings, fencing, cooling tower, water tank, septic system and drains, experimental apparatus, piping, concrete pads, and road base.

The facility provided all the equipment, including a fully equipped laboratory for chemical and materials analyses, necessary to support major geothermal power plant-related tests.

Operation of three pilot-scale geothermal desalting plants was among several research activities performed at the site. Public, academic, and private organizations used the facility throughout its operational period for field tests of geothermal energy conversion systems and components.

During site operations from 1972 to 1975, saline water pumped from the geothermal aquifer was discharged into a brine holding pond. As site activities increased, the disposal capacity of the pond was inadequate to handle the increased volume of liquid, and a waste injection system was installed in 1976. The injection system returned unused or waste geothermal water back to the geothermal aquifer. The holding pond was used intermittently after installation of the injection system, both to supplement the injection system and to provide brine storage when the injection system was not in operation. Loss rates from the pond because of evaporation were estimated to be as high as 60 gallons per minute in the summer but were negligible during the winter.

DOE conducted characterization and cleanup of the site in 1996 and 1997. Contamination at the site was minimal and consisted of soil contamination in the 6-acre brine pond and asbestos in pipe insulation, transite cooling tower boards, and floor tiles. Soil contamination accumulated as saline geothermal groundwater was pumped to the surface and evaporated in the brine pond, leaving a residue of salts (mainly sodium chloride) and other constituents. Soluble arsenic was detected in the residue at concentrations that exceeded the California hazardous waste regulatory limit in three composite samples, and concentrations of naturally occurring radioactive materials in the residue were high enough to meet U.S. Department of Transportation hazardous materials transportation regulations in Title 49 *Code of Federal Regulations*, Parts 171 through 178. The brine pond was underlain by a 0.01-inch-thick polyvinyl chloride liner, which effectively prevented downward migration of contaminants. Brine pond residue was excavated and hauled by truck to a disposal facility licensed to receive Class I waste. The mobilization, brine waste removal, and disposal and demobilization were completed between August and November 1996.

Four geothermal wells were transferred to commercial companies; a fifth well was decommissioned. Transfer of the wells released DOE from responsibility for them, and the commercial companies accepted ultimate responsibility for decommissioning the wells at the end of the wells' operation.

The buildings, scrap metal, water tank, fencing, copper wire, concrete, asphalt, and septic tank were reused and recycled where possible. About 300 cubic yards of non recyclable material was disposed of in a local landfill.

Regulatory Setting

The California Regional Water Quality Control Board (CRWQCB), a California state agency, issued a Waste Discharge Requirement Order in 1989. This order required removal and disposal of all geothermal waste to an approved disposal site. The CRWQCB was the lead oversight agency in the cleanup effort because residue in the brine pond was not considered hazardous under the Resource Conservation and Recovery Act, and the arsenic concentration was at or slightly above soluble threshold limits in samples from only three of 27 sample locations. The residue was therefore not considered California-designated hazardous waste.

DOE also coordinated with BLM as part of the site closure. DOE used the site under the right-of-way agreement with BLM, which had to approve and accept the restoration activities at the site before DOE could terminate the right-of-way agreement.

A National Environmental Policy Act Categorical Exclusion was issued for the site in December 1995. "Categorical Exclusion" refers to a category of actions that do not individually or cumulatively have a significant effect on human health and the environment and are therefore excluded from undergoing more significant evaluation, such as an Environmental Assessment or an Environmental Impact Statement. In December 1996, DOE formally requested CRWQCB Waste Discharge Requirement Order 89-027 be closed as well as Cleanup and Abatement Order No. 96-023 be rescinded since DOE completed the restoration of the brine pond at GTF.

As documented in the July 1998 *East Mesa Geothermal Test Facility Closure Report*, CRWQCB did concur with the closure and rescission of the orders, thus complying with the restoration activities at GTF. Lastly, as documented in the closure report, BLM relinquished and terminated the GTF right-of-way reservation.

Legacy Management Activities

The DOE Office of Legacy Management (LM) responsibilities consist of managing site records and responding to stakeholder inquiries.

Contact Information

In case of an emergency at the site, contact 911.

LM toll-free emergency hotline: **(877) 695-5322**

Site-specific documents related to the **Geothermal Test Facility, California, Site** are available on the LM website at www.energy.gov/lm/geothermal-test-facility-california-site.

For more information about LM activities at the **Geothermal Test Facility, California, Site**, contact:

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