UMTRA Ground Water Project

FACT SHEET

U.S. Department of Energy
Grand Junction Office

Uranium Mill Tailings Remedial Action (UMTRA) Ground Water Project at Lakeview, Oregon

This fact sheet provides information about the UMTRA Ground Water Project site located at Lakeview, Oregon. The U.S. Department of Energy Grand Junction Office in Grand Junction, Colorado, manages the UMTRA Ground Water Project.

Site Description and History

The former millsite at Lakeview, Oregon, is located on private land east of County Road 2–18 and north of Missouri Avenue in Section 4, Township 39S, Range 20E (Figure 1). The 258-acre site includes areas formerly occupied by seven raffinate or evaporation ponds and a tailings pile (Figure 2). A barbwire fence encloses the former evaporation ponds; the former tailings pile area is in an open field. The entire site is zoned for commercial light-industrial use.

Uranium ore was processed at the Lakeview site between 1958 and 1974. The mill was owned and operated by the Lakeview Mining Company from 1958 to 1961, by Kermac Nuclear Fuels Corporation from 1961 to 1968, and by the Atlantic Richfield Company from 1968 to 1974. Uranium ore was hauled to the millsite from the White King and Lucky Lass mines located about 10 miles northwest of Lakeview.

Surface cleanup, which was completed in 1989, consisted of decontaminating most mill buildings and demolishing others, excavating contaminated soils, and transporting the contaminated material to the disposal cell. Approximately 926,000 cubic yards of contaminated materials from the site and from areas near the site that received windblown contamination were relocated to the Collins Ranch disposal site approximately 7 miles north of Lakeview. The tailings were moved because seismic and geothermal activity in the area prevented on-site stabilization and disposal. The disposal site was selected on the basis of public input, environmental considerations, and design criteria acceptable to the State of Oregon and the U.S. Nuclear Regulatory Commission.

The alluvial fill below the former millsite is estimated to be more than 2,000 feet thick and consists of gravels, sands, silts, and clays derived from surrounding highlands and from reworked lake deposits. Ground water quality is a function of its proximity to the basin margin and to its depth farther out in the basin. Fresh water recharge from the east-flanking Warner Mountains produces better quality ground water near the base of the mountains. Farther out in the basin, near-surface water usually has elevated concentrations

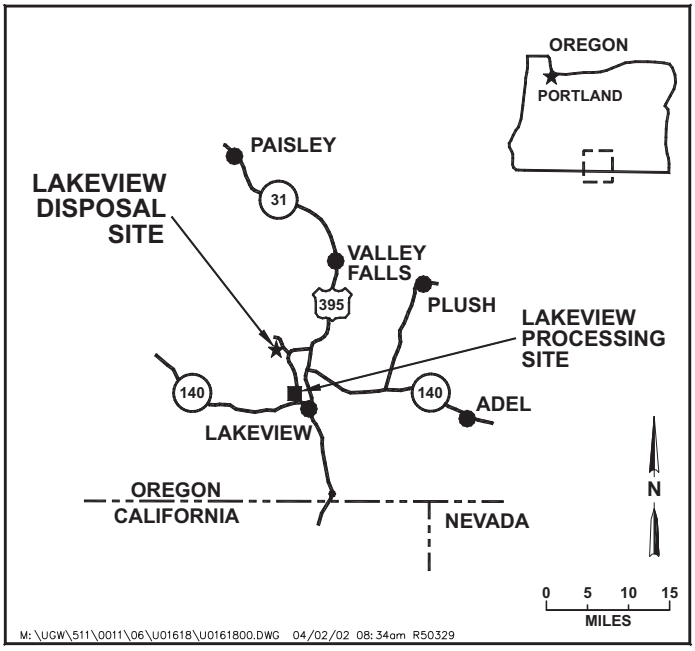

Figure 1. Location of Lakeview UMTRA Ground Water Project Site

of dissolved salts because mineral salts were deposited in sediments during historical periods of lake evaporation. Discontinuous clays and clayey silts act as effective hydrologic barriers, preventing downward movement of poorer quality, shallow ground water. Therefore, the quality of ground water in more central portions of the basin improves with depth so that water production from sediments deeper than 100 feet is generally of good quality. Ground water flows slowly away from the Warner Mountains at rates ranging from 60 to 170 feet per year.

Shallow ground water at the former uranium ore-processing millsite contains elevated concentrations of manganese, sulfate, chloride, and sodium. These constituents were probably released from salts already deposited in lake sediments when water seeped into the ground from evaporation ponds used during former uranium ore-processing and lumber milling operations. Similar concentrations of these constituents have been identified in ground water samples from other locations that are not associated with uranium ore milling operations. Geothermal springs located along the western upgradient side of the site contribute

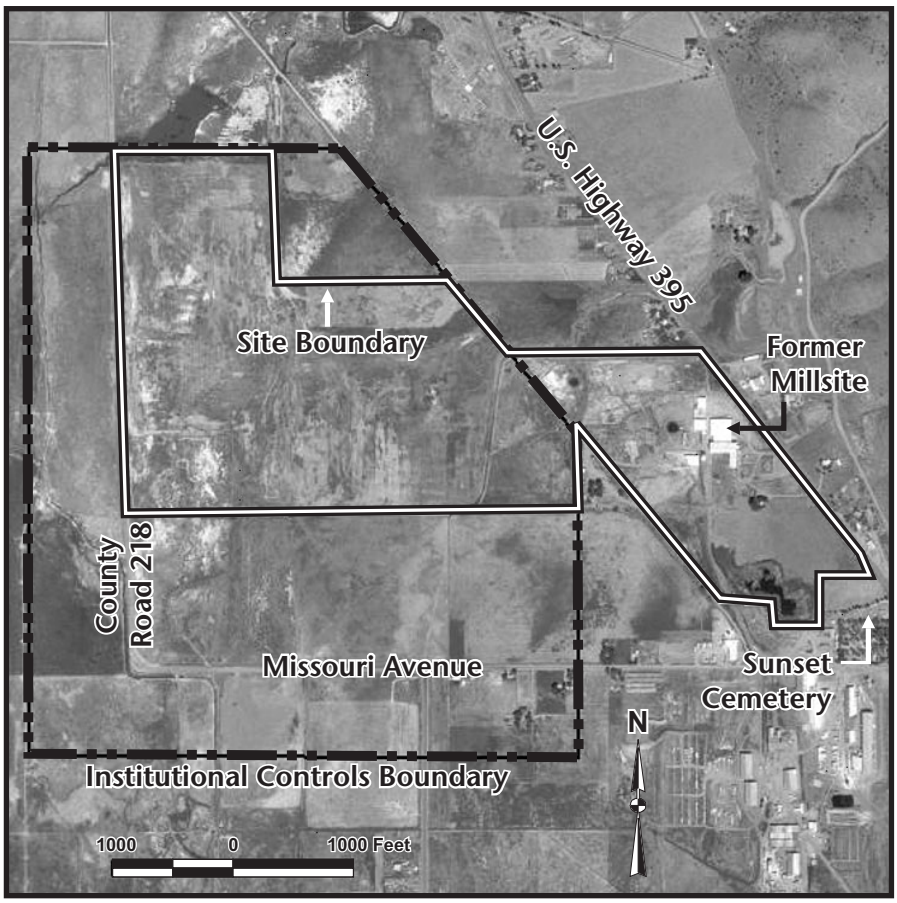

Figure 2. UMTRA Ground Water Project Site and Institutional Controls Boundary

elevated concentrations of arsenic and boron to ground water. These constituents are higher in geothermal spring water than in ground water on the former millsite, and their continued presence is attributed to the geothermal activity.

Compliance Strategy

The targeted compliance strategy for the Lakeview site is the application of supplemental standards based on the classification of the surficial aquifer as limited-use ground water. According to regulations, limited use applies to ground water that is not a current or potential source of drinking water because (1) the concentration of total dissolved solids is greater than 10,000 milligrams per liter; (2) widespread, ambient contamination that is not due to activities involving residual radioactive materials from a designated processing site exists that cannot be cleaned up using treatment methods reasonably employed in public water systems; or (3) the quantity of water reasonably available for sustained continuous use is less than 150 gallons per day.

Ground water at the Lakeview site meets the second criterion because samples contain levels of arsenic that exceed Uranium Mill Tailings Radiation Control Act and State of Oregon maximum concentration limits. Arsenic is derived from geothermal waters that surface at Hunter Hot Springs and other unnamed springs north of the site. Uranium ore also contained arsenic, but samples of current hot-spring waters contain higher concentrations of this constituent than samples from monitoring wells located on the former processing site. In addition, sulfate, chloride, sodium, and manganese concentrations exceed some secondary water standards or health-based risk value in ground water samples collected in locations south of the site that were not influenced by milling-related processes. Therefore, these concentrations of arsenic, sulfate, chloride, sodium, and manganese are considered indicators of widespread ambient contamination, thereby satisfying the second criterion.

Institutional Controls

Institutional controls are "checks and balances" that effectively protect public health and the environment. Typically, institutional controls depend on some legal order such as zoning ordinances and laws to ensure that protection is effective. U.S. Environmental Protection Agency (EPA) ground water standards permit the use of institutional controls at sites where "passive remediation" can occur through natural flushing of the aquifer within 100 years. Institutional controls may also be used to protect public health or the environment if at any time during the cleanup process the U.S. Department of Energy (DOE) finds them necessary and appropriate.

For the UMTRA Ground Water Project, institutional controls reduce exposure to or reduce health risks by (1) preventing inappropriate intrusion into contaminated ground water or (2) restricting access to or use of contaminated ground water for unacceptable purposes (domestic-household use).

The EPA standards require that institutional controls

- Have a high degree of permanence.
- Protect public health and the environment.
- Satisfy beneficial uses of ground water.
- Are enforceable by administrative or judicial branches of government entities.
- Can be effectively maintained and verified.

EPA recognizes that a combination of controls may be needed to protect public health and safety. Key to

identifying, implementing, and enforcing institutional controls is participation by local and state governments in the development process. While DOE is responsible for compliance with EPA standards at UMTRA Ground Water Project sites, its authority to implement and enforce institutional controls is limited. This is particularly true where ground-water contamination from uranium processing may have moved beyond the millsite to areas that are not within DOE jurisdiction.

The need for, and the duration of, institutional controls depends on the compliance strategy selected for a site, the type and level of risk to humans and the environment, and existing site conditions. Movement of contaminated ground water may require restrictions for an extended period of time. As risks decrease over time, so should the need for institutional controls. Therefore, to ensure protection of human health and the environment and to satisfy requirements for beneficial uses of the water, it is important that the effectiveness of institutional controls be verified and modified as necessary.

An institutional control boundary was established around the former processing site where contamination, possibly caused by millsite activities, exists or could exist in the future (Figure 2). This boundary is based on the distribution of sulfate as it migrates from the former evaporation ponds. People living within or moving into this area will not be allowed to drink the contaminated ground water. Other uses of ground water are permissible, such as watering yards, fields, or livestock. A waterline was constructed in 2002 that connects a new prison, which is being constructed north of the town, to municipal water. DOE paid $200,000 to the State of Oregon to increase the size of this waterline through a corridor along the southern and eastern sides of the institutional control boundary so that individuals living or moving into this area could have city water to drink. For this consideration, the Town of Lakeview and Lake County passed ordinances prohibiting people from drilling a well and using water for drinking purposes in the shallow ground-water system. People who live inside this institutional control boundary could drill a well to a depth of 250 feet or greater and use the water for drinking purposes. This depth will be protective of humans because possible contamination is not expected to ever reach this depth. DOE will continue a limited ground-water sampling program to ensure that no one drinks water that could possibly be contaminated by milling-related activities in the future.

Long-Term Surveillance and Maintenance

Once the compliance strategy has been finalized and accepted by the U.S. Nuclear Regulatory Commission and the State of Oregon, it is the responsibility of DOE to ensure that the selected compliance strategy continues to be protective of human health and the environment. Ground water sites become part of the Long-Term Surveillance and Maintenance (LTSM) Program administered by the DOE Grand Junction Office. The LTSM Program manages the site according to a Long-Term Surveillance Plan prepared specifically for the Lakeview site.

Documents Available

Instructions are available on the DOE Grand Junction Office Internet website at http://www.gjo.doe.gov/ugw to order a copy of the *Baseline Risk Assessment* for the Lakeview site.

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