Removal Action Decision Document for the Management of Contaminated Water Impounded at the Weldon Spring Chemical Plant Area

DOE/OR/21548-150

November 1990

Statement and Basis of Purpose

The purpose of a decision document is to describe a specific removal action proposed for a contaminated site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended. This decision document presents the removal action selected for managing contaminated water impounded at the chemical plant area of the Weldon Spring site located in St. Charles, Missouri. The document is based on the administrative record file for this proposed action.

Response actions at the Weldon Spring site are being conducted by the U.S. Department of Energy (DOE) in accordance with the requirements of CERCLA, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), and the National Environmental Policy Act (NEPA). The NEPA compliance process for the proposed action has been completed with the issuance of a Finding of No Significant Impact. This decision document is prepared in accordance with the NCP, and it completes the CERCLA compliance process for the proposed action. Issuance of this decision document also closes the administrative record for the action.

Site Background

The Weldon Spring site is located in St. Charles County, Missouri, about 48 km (30 mi) west of St. Louis. It is surrounded by large tracts of land owned by the federal government and the state of Missouri. The site consists of two noncontiguous areas: an 88-ha (220-acre) chemical plant area and a 3.6-ha (9-acre) limestone quarry. The chemical plant area is about 3.2 km (2 mi) southwest of the community of Weldon Spring and the junction of Missouri (State) Route 94 and U.S. Route 40/61. The quarry is about 6.4 km (4 mi) south-southwest of the chemical plant area. Both locations are accessible from State 94 but are fenced and closed to the public.

In 1941, the U.S. Department of the Army acquired about 7,000 ha (17,000 acres) of land in St. Charles County to construct an ordnance works. The Army produced dinitrotoluene and trinitrotoluene explosives at the ordnance works from 1941 to 1944 and again from 1945 to 1946. In 1955, 83 ha (205 acres) of the former ordnance works property was transferred to the U.S. Atomic Energy Commission (AEC, a predecessor of DOE) to construct a uranium feed materials plant, also referred to as the chemical plant; an additional 6 ha (15 acres) were later transferred to expand waste storage capacity. Uranium and some thorium ore concentrates were processed at the plant from 1957 to 1966. Most of the contaminated solid waste generated by both ordnance works and feed materials plant operations and subsequent decontamination efforts was disposed of in the quarry between 1942 and 1969.

Between 1958 and 1964, four raffinate pits were constructed from existing clay in the southwest portion of the chemical plant area to contain chemical and radioactive process slurries that were piped from the plant. Solid materials, e.g., metal oxide and hydroxide precipitates, settled to the bottom of the pits, and some supernatant liquids were decanted to the plant process sewer that drained off-site. Frog Pond was excavated from an existing drainage near the eastern boundary of the chemical plant area to provide water for fire control and for use as a settling

basin. Ash Pond, a natural topographic low near the northern boundary of the chemical plant area, received fly ash piped from the coal-fired steam plant during the site's operational period.

The Army reacquired the chemical plant in 1967 following closure by the AEC and began converting the facility for herbicide production. Some of the 44 buildings and miscellaneous structures were partially decontaminated and some equipment was dismantled. Most of the contaminated rubble and equipment was placed in the quarry; however, some was placed on the ground outside the process buildings or within nonprocess buildings, and a limited amount was placed in raffinate pit 4. The herbicide project was canceled in 1969 prior to becoming operational, and the plant has remained essentially unused and in caretaker status since that time.

In 1971, the Army returned a portion of the chemical plant property to the AEC but retained control of the buildings. After conducting some building maintenance and decontamination activities in 1984, the Army transferred custody of the remaining property to DOE in 1985. The quarry was listed on the National Priorities List (NPL) of the U.S. Environmental Protection Agency in 1987, and the chemical plant area was added in 1989. The balance of the original Weldon Spring Ordnance Works property, which is adjacent to the DOE portion and for which the Army has responsibility, was listed on the NPL in 1990.

Assessment of Site Surface Water Impoundments

Surface waters impounded in the raffinate pits, Frog Pond, and Ash Pond at the chemical plant area of the Weldon Spring site are sources of potential contaminant releases. As a result of past processing and decontamination activities, the raffinate pits contain various solid wastes; these wastes include silica and other insoluble oxides and metals associated with the ore materials, washed slag (magnesium fluoride) residues, and hydroxides and other precipitates formed by lime neutralization. The surface waters in contact with these wastes contain uranium, radium, arsenic, manganese, selenium, cyanide, fluoride, chloride, and nitrate. Results of site characterization and monitoring indicate that certain contaminants (e.g., uranium and nitrate) have migrated through the soil underlying the raffinate pits into the shallow aquifer at the site.

The surface waters in Frog Pond and Ash Pond are contaminated as a result of both past discharges during the plant's operational period and subsequent surface runoff, e.g., over localized areas of nearby contaminated soil. Frog Pond contains uranium and chloride, and Ash Pond contains uranium and nitrate. Results of site characterization and monitoring indicate that contaminants have migrated from both ponds into off-site drainages and nearby surface waters (i.e., a spring and lakes in the adjacent wildlife area).

No drinking water supply is adversely impacted under current conditions. However, off-site migration of contaminants from the raffinate pits via groundwater and related ingestion exposure could potentially occur over time if no response action is taken. Similarly, no adverse impacts to biota appear to be associated with either the on-site impoundments or the areas impacted by contaminants migrating therefrom via overflow, runoff, or groundwater recharge; however, such impacts could potentially occur over time if no response action is taken. A

timely response action for these impoundments would reduce potential threats to human health and the environment from releases of chemical and radioactive contaminants.

Scope and Objectives of the Removal Action

The scope of the proposed removal action is management of contaminated water impounded at the chemical plant area of the Weldon Spring site. The disposition of solid wastes is beyond the scope of the proposed action. That is, decisions for the permanent disposition of both underlying sludges and sediments and of process wastes generated as a result of implementing the response for the impounded water are beyond the scope of this action. Such decisions are being addressed in the environmental documentation currently being prepared for comprehensive remediation of the chemical plant area.

The objectives of the proposed removal action are to:

- Mitigate the potential release of radioactive and chemical contaminants from the water;
- Minimize threats to human health and the environment resulting from potential exposures to these contaminants; and
- Support comprehensive site remediation.

As identified by the last objective, the response selected for managing contaminated water currently impounded at the chemical plant area is also expected to support the management of contaminated water that could be generated as a result of upcoming site cleanup activities.

Description of the Removal Action

The removal action selected for managing the impounded water is to construct and operate a water treatment system at the chemical plant area. This action includes the following sequence of activities:

- Remove the water from impoundments at the chemical plant area;
- Treat the water to remove radioactive and chemical contaminants;
- Containerize the process wastes from the treatment plant and place them in controlled storage at the chemical plant area, pending disposal decisions that will be made pursuant to the comprehensive environmental documentation currently being prepared;
- Test the treated water prior to batch discharge to ensure that it meets the stringent effluent quality limits established in coordination with the state of Missouri; and

- Release the treated water to the Missouri River via a 2.4-km (1.5-mi) natural drainage channel, in compliance with requirements established by the state of Missouri.

The selected treatment system is being designed to effectively treat the water that is currently impounded, as well as future potential sources of contaminated water, e.g., wash water that will be used during upcoming site cleanup activities.

Highlights of Community Participation

An engineering evaluation/cost analysis (EE/CA) report has been prepared to develop and evaluate alternatives for managing the contaminated water impounded at the chemical plant area of the Weldon Spring site. The EE/CA was issued for public review and comment on July 25, 1990. Prior to issuance, DOE held several meetings with local officials, school administrators, special interest groups, and members of the general public to receive input on the proposed action. A public meeting was held on August 16 to receive additional input from the community.

Notices of both the availability of the EE/CA and the scheduling of the public meeting were published in the St. Charles Journal on July 27 and again on August 3. In addition to these notices, the proposed action was discussed in several articles in local newspapers (i.e., the St. Charles Journal, St. Charles Post, St. Louis Post-Dispatch, and Riverfront Times), and a number of related stories were broadcast on local radio and television reports prior to the public meeting. Furthermore, copies of the EE/CA report and meeting notification were mailed to certain individual members of the community who had previously expressed interest in the project, including those who chair local environmental groups.

The EE/CA report was made available to the public in the reading room at the Weldon Spring site and at five other nearby repositories: Francis Howell High School (St. Charles, Missouri); Memorial Arts Building at Lindenwood College (St. Charles, Missouri); and three branches of the St. Charles City/County Library -- the Spencer Creek Branch (St. Peters, Missouri), the Kisker Road Branch (St. Peters, Missouri), and the Kathryn M. Linneman Branch (St. Charles, Missouri).

The public comment period for the proposed action extended from July 25 through August 27, during which three comment letters were received. A responsiveness summary has been prepared to address the issues raised in these letters and those raised orally at the public meeting. The *Responsiveness Summary for the Management of Contaminated Water Impounded at the Weldon Spring Chemical Plant Area* (DOE/OR/21548-144) accompanies this decision document in the information repositories.

Declaration of Statutory Determinations

The removal action selected for managing contaminated water impounded at the chemical plant area -- i.e., construction and operation of a water treatment plant -- is protective of human health and the environment, can be implemented with standard technologies, and is cost-effective. This action is also consistent with and will contribute to the overall remedial action for the Weldon Spring site. Further, the action satisfies the statutory preference for treatment as a principal element of the response. In accordance with CERCLA and the NCP, the selected action complies with federal and state requirements that are legally applicable or relevant and appropriate to the scope of the removal action, and it utilizes permanent solutions and resource recovery technologies, to the maximum extent practicable.

The permanent disposition of process wastes that will result from treating the impounded water under the proposed action, including potential applicability of various waste treatment technologies, will be addressed in the environmental documentation currently being prepared for comprehensive remediation of the chemical plant area. The need for a 5-year review of the site relative to the disposition of these and other solid wastes will be assessed in the subsequent record of decision.