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United States Department Of Energy

PROPOSED INTERIM RESPONSE ACTION #3 MATERIAL STAGING AREA

REV. 0

JULY 1988

WELDON SPRING SITE REMEDIAL ACTION PROJECT

PROPOSED INTERIM RESPONSE ACTION #3

MATERIAL STAGING AREA

PREPARED FOR:

U.S. DEPARTMENT OF ENERGY

OAK RIDGE OPERATIONS OFFICE

UNDER CONTRACT NO. DE-AC05-86OR21548

PREPARED BY:

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Geological Cross-Section Site addendum to above

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A MORRISON KNUDSEN COMPANY

WSSRA PROJECT REVIEWS AND APPROVALS

Subject: WSSRAP - CP
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IRA write up

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CONSTRUCTION OF MATERIAL STAGING AREA

1.0 INTRODUCTION

Various interim response actions (IRAs) have been proposed for the cleanup of the Weldon Spring Site. These IRAs include consolidation of debris, dismantling of buildings, and cleanup of contaminated soils. In order for these remedial activities to commence, a proper place for sorting and temporarily storing materials needs to be provided. Consistent with the remedial plan of the Weldon Spring Remedial Action Project (WSSRAP), an IRA is proposed for the construction of a material staging area. This report presents the justification for a material staging area, discusses possible alternatives, and recommends a preferred IRA.

2.0 SITE CHARACTERIZATION

2.1 Site History

From 1941-1944, the U.S. Department of the Army (DA) operated a facility known as the Weldon Spring Ordnance Works for the production of TNT and DNT. In 1955-1957 a feed materials plant was built by the Atomic Energy Commission (AEC) and operated by Mallinckrodt, Inc. for the AEC from 1957-1966. This plant processed uranium ore concentrates and recycled scrap to pure uranium trioxide, uranium tetrafluoride, and uranium metal. Thorium ore concentrates were also processed. The raffinate residues from this processing were disposed of in four large open pits. During the operations of the plant, the buildings, the equipment, the immediate terrain, the process sewer system, and the drainage easement to the Missouri River became contaminated with uranium, thorium, and their decay products.

In 1967 the feed materials plant site was selected for a herbicide production facility. Except for the materials stored in the raffinate pits, the site was transferred back to the Department of the Army and renamed the Weldon Spring Chemical Plant (WSCP). The Army then began a major effort to decontaminate three process buildings for

herbicide production. The cleanup was not totally successful, and subsequently, more stringent environmental cleanup requirements and increased cleanup costs resulted in the cancellation of the project in 1969 without any herbicide production.

In February 1985, the U.S. Department of Energy (DOE) proposed to designate the control and decontamination of the WSS as a major project. This designation occurred on May 14, 1985. In October 1985, custody of the chemical plant was transferred to DOE.

2.2 Site Description

The Weldon Spring Site (WSS) is located in St. Charles County, Missouri, about 30 miles west of St. Louis and 13 miles southwest of the city of St. Charles. Weldon Spring, the nearest community, is located approximately 2.25 miles from the WSS and has a population of about 700. The Francis Howell High School, with an approximate student population of 2,300, is located 0.5-mile northeast of the site. An elementary school is also located nearby (1.5 mile northeast of the site).

The WSS (see Figure 1) consists of three areas: the WSCP, the Weldon Spring Raffinate Pits (WSRP), and the Weldon Spring Quarry (WSQ). The 166 acre WSCP consists of 5 major process buildings, 8 major support buildings, and 31 miscellaneous buildings and support structures. The buildings and structures were used to support the previous chemical plant operations. Random debris (pipe, steel, rubble, etc.) is also scattered throughout the site. The 51-acre WSRP area contains four surface impoundments (raffinate pits) covering approximately 26 acres which contain the residues from uranium and thorium processing operations previously conducted at the WSCP. The 9-acre WSQ is located approximately 4 miles southwest of the WSCP and was used for the disposal of various wastes during previous operations at the WSS.

Adjacent to the WSS are the August A. Busch Memorial Wildlife Area, the Weldon Spring Wildlife Area, the Missouri State Highway Department Maintenance Facility and the U.S. Army Reserve and National Guard Training Area. The two wildlife areas are park-like tracts administered by the Missouri Department of Conservation and are dedicated to various kinds of recreational uses.

2.3 Nature and Extent of Contamination

The WSS is contaminated with radioactive materials, nitroaromatics, heavy metals, asbestos, and various classes of organic compounds. Contamination is found at the chemical plant, raffinate pits, quarry, and the vicinity properties. Preliminary estimates are that a total of 780,000 cubic yards of contaminated materials are currently located at the WSS (Ref. 1). The raffinate sludge and the quarry sludge, which comprise about one-third of the total volume of contaminated materials, contain most of the radioactive contaminants. About two-thirds of the total volume of contaminated materials consist of soil and rubble.

Various radiological surveys have been conducted at the WSS. The most recent was performed by UNC Geotech during the period April through July 1987 (Ref. 2). The purpose of the survey was to determine the horizontal and vertical extent of radioactive contamination within the WSS boundaries. Results of the investigation indicated elevated concentrations of uranium, thorium-230, and thorium-232 were present in soils on the WSCP. Contamination was found primarily near the buildings, in the North and South Dump areas, in the Ash Pond, and in the inlet and outlet drainages of the Frog Pond. Another radiological survey was conducted specifically for the site of the proposed material staging area (Ref. 3). From this study, it was determined that this area was below residual soil contamination guidelines. If disturbed, radiological conditions of the soil will not present measurable hazards to the site, on-site workers, or the environment.

The WSS is also contaminated with non-radiological chemicals. Various metals are prevalent as contaminants at the WSS, especially in the sludges at the WSRP and WSQ. Low concentrations (a few 1 ppm) of nitroaromatics such as TNT and DNT are present at the WSS due to former TNT production activities. Concentrations of these chemicals are far below levels which could present an explosion hazard. Asbestos has been found throughout the buildings as well as in 13,000 linear feet of insulation for overhead piping. An estimated 6,500 gallons of PCB liquids and PCB-contaminated liquids exist on-site in 20 transformers. PCB's are also known to exist on some flooring tile, lighting ballast and soils at the WSS. Containerized wastes of chemicals including solvents and other organic liquids also exist.

Radiological surveys conducted for the Vicinity Properties (Ref. 4 and 5) identified areas of contamination within the U.S. Army Reserve Property, the Busch Wildlife Area and the Weldon Spring Wildlife Area. Contamination of these soils is primarily uranium with slightly elevated concentrations of radium and thorium. During the radiological survey, a chemical survey of the contaminated areas on the U.S. Army Reserve Property (Ref. 6) was conducted. This survey indicated elevated concentrations of a few select metals. Slightly elevated concentrations of nitroaromatics were found in soils on only one of the contaminated locations within the U.S. Army Reserve Property.

As part of the continuing activities at the WSS, additional radiological and chemical characterization surveys are planned to further determine the nature and extent of contaminants.

2.4 Justification for Interim Response Action

The primary purpose of conducting an IRA is to expedite remediation at those sites where cleanup solutions are clear and where an emergency situation does not exist. As part of the WSSRAP, various IRAs have been proposed to reduce hazards to the public and on-site workers as well as provide a more efficient work area for on-going operations. Additional IRAs may be proposed as the project proceeds.

An IRA has been proposed for the consolidation of debris. A potential safety hazard exists due to loose debris (pipe, steel, rubble, etc.) which is scattered throughout the site. Removing this debris would improve site conditions and would permit the completion of characterization studies. EPA and state concurrence on this IRA was received in November 1987. However, a temporary storage and sorting area is needed for the debris.

Radiologically contaminated soils on the Vicinity Properties also pose potential health hazards to the public and environment. Much of this land has unrestricted access by the public. In addition, the Busch Wildlife and Weldon Spring Wildlife areas are popular hunting and fishing areas. IRAs have been proposed for the cleanup of the Vicinity Properties. In order for remediation to begin, a facility to store the contaminated soils on an interim basis must be available.

Various buildings on the WSCP are planned for demolition. Many of them are contaminated or contain contaminated materials. An area needs to be provided where materials can be properly sorted for on- or off-site disposal. Temporary storage also needs to be provided for those materials which must remain on-site until a final disposal facility is available. IRAs for the dismantling of buildings 401 and 409 have received approval from EPA and state. IRAs have also been proposed for the dismantling of other buildings.

The IRAs proposed for the WSS require some type of sorting or temporary storage facility. However, such a facility is not available to support the IRA schedules. Therefore, this IRA is proposed to provide for an interim repository for wastes from the WSS and vicinity properties. This action will facilitate the consolidation and screening of contaminated material. The facility proposed under this IRA will not receive quarry wastes. Disposal of the quarry wastes is being considered and will be presented in a separate Remedial Investigation - Focused Feasibility Study (RI/FFS) report.

3.0 RESPONSE ACTION OBJECTIVES

The objectives of this interim response action are as follows:

1. To provide sorting and temporary storage of materials removed under other IRAs.

2. To reduce the potential health hazards due to radiologically and chemically contaminated materials.

3. To minimize off-site migration of contaminants.

4. To provide safe conditions for characterization and remediation activities.

5. To minimize potential threats to the public health and the environment.

4.0 RESPONSE ACTION ALTERNATIVES

4.1 Identification of Alternatives

The ideal interim response action is one that will protect public health and the environment, provide timely results, is technically feasible, satisfies institutional considerations, and contributes to the efficient performance of long-term remedial action at the site.

Proposed alternatives are as follows:

1. No action.

2. Contain the materials on-site within existing buildings.

3. Construct one large material staging facility on the WSS.

4. Construct several different staging facilities on the WSS.

5. Construct an off-site material staging facility.

6. Transport all materials to an existing off-site disposal facility.

4.2 Analysis of Alternatives

Alternative 1 proposes no action until a disposal facility is ready to accept contaminated materials. Construction of a permanent disposal facility may be delayed for some time. Without a proper storage facility, cleanup of the WSS cannot proceed (i.e., other proposed IRAs will be delayed). Although this alternative presents no technical barriers and costs essentially nothing, there will be no immediate protection to the public and environment. Alternative 1 is effectively precluded from further consideration because it does not satisfy the public's concern for timely response actions at WSS and it is not consistent with the long-term WSSRAP remedial plan for permanent disposition of hazardous wastes.

Alternative 2 is a technically feasible solution that will permit completion of characterization studies and remediation of the WSS. This alternative consists of containing the materials on site within existing buildings. Because construction of new facilities will not be necessary, costs will be less than Alternative 3. Nearly all of the buildings have broken windows and leaking roofs which would require major improvements to control water seepage into underlying aquifers, surface water runoff and wind dispersal. This alternative would not allow the buildings used for storage to be demolished under other IRAs. Also, the sorting and staging of materials would be hindered within the confined areas.

Alternative 3 proposes the construction of one large staging facility on the WSS. This facility, will control surface water, provide an impermeable liner, and protect against wind dispersal. This alternative would protect the public health and the environment by taking the necessary precautions to prevent contamination of groundwater, surface water, and air. The debris, building materials, and contaminated soils would be classified, segregated, and temporarily stored until a final disposal facility is operational. This technically feasible alternative offers better protection of health and environment than Alternatives 1 and 2. As with Alternative 2, completion of the characterization studies and remediation of the WSS will be allowed to proceed in a timely manner. This alternative will satisfy the public's desire for timely responses at the WSS and will contribute to the WSSRAP long-term remedial plan.

Alternative 4 involves the construction of several different interim disposal facilities located throughout the WSS. The facilities would be segregated according to waste type. The same effort for protection from contamination migration will be provided as with Alternative 3. All of the considerations of Alternative 3 apply to this alternative. The main difference would be the increased costs for constructing several facilities and for monitoring.

Alternative 5 proposes the construction of a temporary staging and storage area off-site. This alternative would provide equal protection to public health and the environment as Alternatives 3 and 4. However, the construction of a temporary off-site facility would not be a timely or cost-efficient solution since detailed site selection surveys, characterization studies, and permits for hauling and storage would be required.

Alternative 6 proposes transportation of all materials to an off-site licensed disposal facility. However, there is difficulty in finding an existing facility that will accept mixed wastes. This alternative assumes that all materials are accurately classified and do not need further characterization. Disposal at a facility may be further hindered by the possible difficulties associated with obtaining necessary permits and agreements. In addition, it is not the intent of this IRA to address the permanent disposition of wastes from the WSS, as this is part of the long-term objectives of the WSSRAP. For these reasons, Alternative 6 is precluded from further consideration.

4.3 Recommended Alternative

Based on the analysis presented in Section 4.2, Alternative 3 is the recommended response action. This alternative offers more protection to the public and the environment than Alternative 2 and is more convenient and cost efficient than Alternatives 4 or 5. Construction of one material staging area for the Chemical Plant and vicinity properties on the WSS will protect the health and environment, satisfy the public's desire to clean up the site, and contribute to the long-term remedial actions planned for the WSSRAP. This alternative also provides a technically feasible solution that will permit the timely completion of characterization studies and remediation at the WSS.

The proposed Material Staging Area (MSA) will provide for classification of materials, preparation of materials for disposal, and storage of material on an interim basis until space is available in an on-site cell or transportation is provided to off-site locations. A proposed site location is shown in Figure 2. The design drawings (enclosed with this IRA) are for phase I construction. Space is available for future expansion, if required, within the proposed material staging area.

The MSA will include pads that will be constructed to receive and store materials in a safe manner until final disposition. Two types of pads will be developed. One will provide for non- or slightly contaminated material which contains primarily fixed or non-mobile contamination. A second type of storage will be required for contaminated material from which contamination can be easily removed by air or rainfall.

The proposed pads will have impermeable liners which are compatible with wastes and will prevent seepage of contaminants. A surface water control system will also be provided to minimize the off-site migration of contaminants. A geotechnical fabric cover will provide protection from wind dispersal. Placing the contaminated material into controlled areas will minimize potential hazards to health and environment and will allow efficient monitoring of the contaminated materials.

5.0 CONCLUSION

As part of the WSSRAP, several IRA's have been identified for the Weldon Spring Site. The IRAs have been designed to ensure the health and safety of on-site personnel and to minimize or preclude off-site migration of contaminants. These IRAs include consolidation of debris, dismantling of buildings, and cleanup of contaminated soils. A facility will be needed throughout the project for segregating and classifying materials prior to disposal. This area will also provide temporary storage of materials which must be stored on-site until a final disposal facility is operational. The Material Staging Area proposed by this IRA will satisfy these needs.

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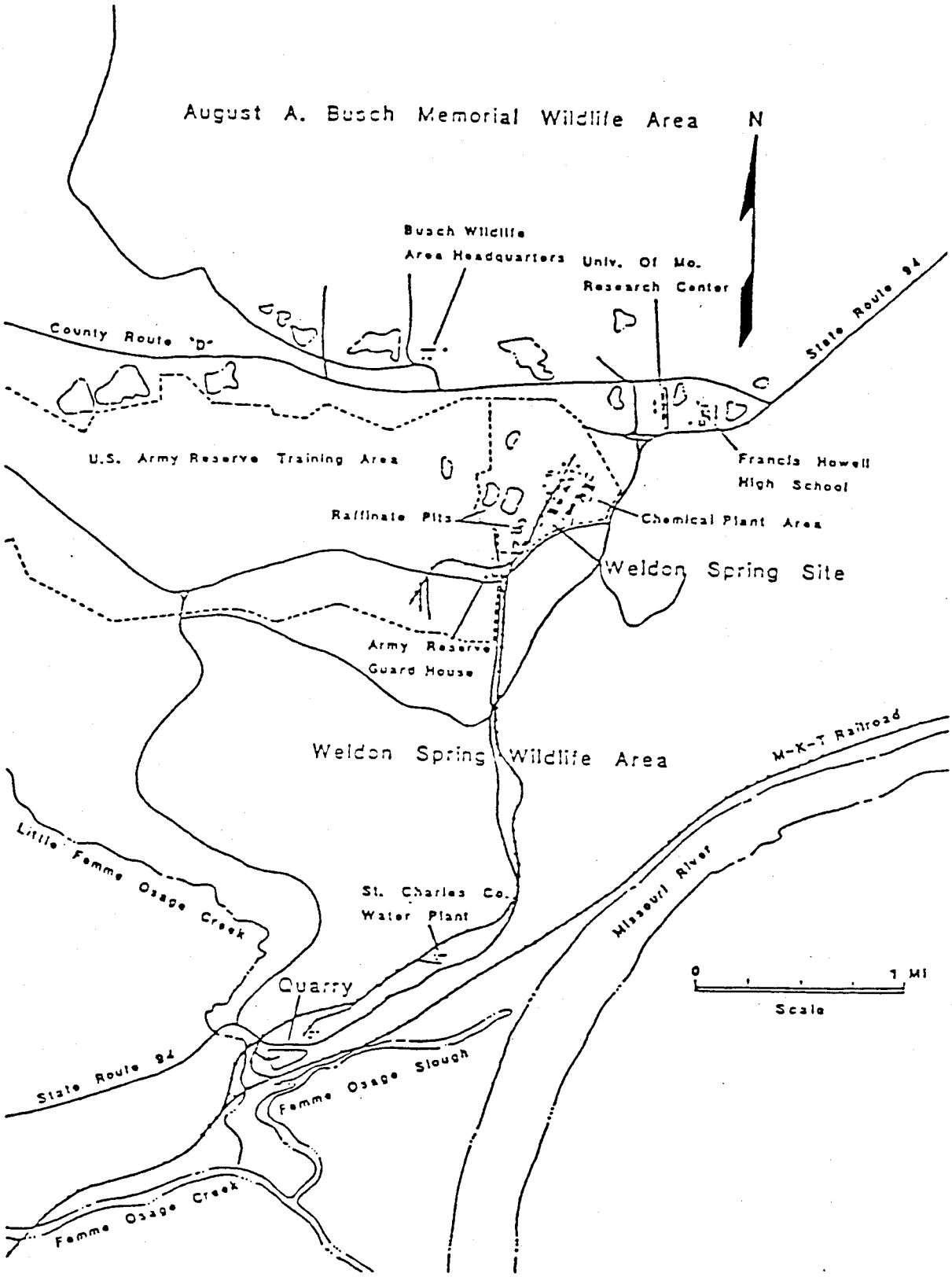

FIGURE 1

WELDON SPRING SITE MAP