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QUARRY RESIDUALS RI/FS SCOPING DOCUMENT

Weldon Spring Site Remedial Action Project
Weldon Spring, Missouri

OCTOBER 1991

REV. 0

U.S. Department of Energy
Oak Ridge Operations Office
Weldon Spring Site Remedial Action Project

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Quarry Residuals RI/FS Scoping Document

Revision 0

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1 INTRODUCTION

1.1 Background

The Weldon Spring quarry (WSQ) is located near Weldon Spring, Missouri, about 48 km (30 mi) west of St. Louis on Route 94 (Figure 1-1). The 3.6 ha (9-acre) site is situated about 1.61 km (1 mi) northwest of the Missouri River and about 915 m (3,000 ft) north of the St. Charles County Municipal Well Field (Figure 1-2). The quarry residual activity work area encompasses the quarry and surrounding land including the Femme Osage Slough. The exact boundaries are to be determined during the remedial investigation studies. However, a proposed area of interest for the residual activity is shown in Figure 1-3.

Prior to 1942, the quarry was mined for limestone aggregate in construction of the Weldon Spring Ordnance Works. The Department of the Army utilized the quarry for disposal of trinitrotoluene/dinitrotoluene (TNT/DNT) contaminated residues between 1942 and 1957. Subsequently, under the ownership of the Atomic Energy Commission, natural series uranium and thorium residues were added until about 1969. Table 1-1 summarizes the known disposal activities at the quarry.

The Weldon Spring quarry was listed by the Environmental Protection Agency (EPA) on the National Priorities List (NPL) on July 30, 1987. Site cleanup is being conducted as a major system acquisition under the Surplus Facilities Management Program (SFMP) of the U.S. Department of Energy (DOE). The 1988 Work Plan (Peterson et al. 1988) identified three separate operable units at the Weldon Spring Site Remedial Action Project (WSSRAP); (1) chemical plant and raffinate pits, (2) quarry bulk waste and the focus of this document, the (3) quarry residuals. Another unit has since been added; the chemical plant site groundwater.

1.2 Purpose

The purpose of this document is to serve as a planning tool for the implementation of the *Quarry Residual Remedial Investigation/Feasibility Study* (RI/FS) process and to provide

0 1/2 1 MI
0 .8 1.6 KM
SCALE

MAP OF THE WELDON SPRING SITE AND VICINITY

FIGURE 1-2

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TABLE 1-1 History of Disposal Activities at the Weldon Spring Quarry

TIME PERIOD	WASTE TYPE	ESTIMATED VOLUME ^(a)	
		m ³	yd ³
1942 - 1945	TNT and DNT waste	---	---
1946	TNT and DNT waste	(b)	(b)
1946 - 1957	TNT and DNT residues and contaminated rubble from cleanup of the ordnance works (in deepest part and in northeast corner of quarry)	---	---
1959	3.8% thorium residues (drummed, currently below water level)	150	200
1960 - 1963	Uranium- and radium-contaminated rubble from demolition of the St. Louis Destrehan Street feed plant (covering 0.4 ha [1 acre] to a 9-m [30 ft] depth in deepest part of quarry)	38,000	50,000
1963 - 1966	High-thorium-content waste (in northeast corner of quarry) ^(c)	760	1,000
1963 - 1966	Uranium and thorium residues from the chemical plant and off-site facilities; building rubble and process equipment (both drummed and uncontained)	---	---
1966	3.0% thorium residues (drummed, placed above water level in northeast corner of quarry); TNT residues from cleanup of the ordnance works (placed to cover the drums)	460	600
1968 - 1969	Uranium- and thorium-contaminated rubble and equipment from interiors of some chemical plant buildings (101, 103, and 105)	4,600	6,000

(a) A hyphen indicates that the waste volume estimate is not available.

(b) An estimated 90 tons of TNT/DNT waste was disposed of in 1946.

(c) This was a portion of the waste originally stored at the Army arsenal in Granite City, Illinois; most of this material was subsequently removed from the quarry for the purpose of recovering rare earth elements.

direct input to revising and updating the 1988 *Work Plan for the Weldon Spring Site Remedial Action Project (WSSRAP) Remedial Investigation/Feasibility Study-Environmental Impact Statement for the Weldon Spring Site* (RI/FS-EIS) (Peterson et al. 1988) for this effort. The scoping process is intended to outline the tasks necessary to develop and implement activities in compliance with the Comprehensive Environmental Response, Compensation and Liability Act-National Environmental Policy Act (CERCLA-NEPA) process from detailed planning through the appropriate decision document. In addition to scoping the entire process, this document will serve as the primary tool for planning and accomplishing all activities to be developed in the *Quarry Residual RI/FS Work Plan*. Subsequent tasks are difficult to plan at this time.

1.3 Project Status

Waste cleanup at the WSQ has been divided into logical units. Each unit has been scoped according to a logical sequence of activities.

The first step in remediation is the management of ponded water in the quarry sump and the interstitial water dispersed throughout the bulk waste. The drawdown may reduce the hydraulic head and reverse the downstream groundwater flow toward the sump. A water treatment plant and associated engineering facilities have been designed and are currently being constructed. The environmental documentation for the water treatment plant was addressed in an *Engineering Evaluation/Cost Analysis* (EE/CA) (MacDonnel et al. 1989) report. This document and associated *Responsiveness Summary* (ANL 1989) were completed in January 1989 and June 1989, respectively. A Finding of No Significant Impact (FONSI) was issued for this action by the DOE on February 6, 1990. Operation of the water treatment plant is scheduled to begin in September 1991 and continue throughout residual remediation.

The next step involves removal of the bulk wastes present in the quarry. Bulk waste removal will alleviate the primary source of contamination in the area and will permit characterization of the quarry floor for residual contamination. The RI/FS to support bulk waste removal is complete and a *Record of Decision* (ROD) was signed by the U.S. Environmental Protection Agency (EPA) and DOE on September 28, 1990 and March 7, 1991, respectively. A FONSI was issued for this action by the DOE on November 15, 1990. Conceptual design for the excavation, transportation and temporary storage of the

waste is complete and will be followed by detailed design. Bulk waste removal is scheduled to begin in May 1992, and be concluded by November of 1994.

The final step in accomplishing long-term remediation of the quarry and surrounding area is the residual RI/FS effort addressed in this scoping document. This process includes characterization and environmental documentation to reach ultimate remedial action decisions with respect to groundwater, residual quarry contamination, and vicinity properties. While the residual RI/FS process cannot be completed until the bulk wastes have been removed, a substantial portion can be accomplished in parallel with the excavation activities.

2 SITE MANAGEMENT STRATEGY

2.1 Activity Sequence

The sequence of activities necessary to reach a decision for residual remedial action and the type of action, if required, will follow the traditional approach outlined in *Environmental Protection Agency Guidance* (EPA 1988). This approach was used to obtain the *Quarry Bulk Waste Record of Decision (ROD)* and is currently being utilized for the *Chemical Plant Remedial Investigation/Feasibility Study (RI/FS)*. Details of the activities required to obtain the residual ROD will be described in the RI/FS work plan.

Scoping represents the first step in the process (Figure 2-1). Existing data are being collected and analyzed to develop a conceptual site model. From this information, additional data needs and data quality objectives will be identified. The *Quarry Residual RI/FS Work Plan* will be developed based on these needs and objectives and will also include preliminary remedial action objectives and a preliminary applicable or relevant and appropriate requirement (ARAR) analysis. Detailed field sampling plans will be prepared for each characterization activity required to address data needs. Data quality objectives will be defined within the sampling plans and data quality assured through implementation of the *Environmental Quality Assurance Program Plan* (EQAPP) (MKF and JEG 1991c) requirements. Health and safety plans will also be prepared. The *Community Relations Plan* (MKF and JEG 1991) for the Weldon Spring Site Remedial Action Project (WSSRAP) be will updated to encompass the residuals activity.

Site characterization follows the planning activities and will support a phased RI report. Phase I of this report will focus on the area surrounding the Weldon Spring Quarry. Characterization studies for this phase will be conducted during removal of bulk waste from the quarry. Phase II activities will be conducted within the quarry area after the bulk waste has been removed. Phase II characterization will also address data gaps uncovered during Phase I. Characterization is designed to further define the physical characteristics of the site, the chemical and radiological characteristics of the contaminants, and the nature and extent of contamination. Based on the results of these additional characterization activities, it may be necessary to refine a specific work activity such as the groundwater monitoring network. The need for additional information will be addressed as characterization data are evaluated.

As the characterization effort nears completion, the data will be utilized to develop a comprehensive Baseline Risk Assessment (BRA). The BRA will serve as the no-action alternative to satisfy National Environmental Policy Act (NEPA) requirements. The BRA will identify the contaminants of concern, environmental fate and transport mechanisms, and potential exposure pathways and receptors. From this information, associated risks will be calculated and impacts to the environment in addition to human health risks will be addressed. The BRA results will assist in determining the need for remedial action and will then be used to guide the selection of protective alternatives in the *Feasibility Study* (FS).

Parallel with the RI and BRA, remedial alternatives will be developed and screened. The screening process will be refined as more data on the nature and extent of contamination becomes available. Remedial action options which warrant further consideration will undergo detailed analysis to select the appropriate technology for remediation of each affected medium. Environmental documentation satisfying the requirements of the NEPA will be integrated into the residual RI/FS documentation process.

The residual RI/FS process will culminate in a ROD describing the remedial action activity as agreed upon by the U.S. Department of Energy (DOE) and the Environmental Protection Agency (EPA). A schedule for the proposed RI/FS environmental documentation activities is shown in Section 5.

2.2 Interim Actions

Although the 1988 *RI/FS-Environmental Impact Statement (EIS)* work plan established various interim actions and separate operable units, it is important to refine the need for interim actions within the scope of the residual RI/FS process. These interim actions may affect groundwater, residual contamination, and/or vicinity properties. The need for interim actions will be assessed by evaluating data from characterization activities and groundwater monitoring. Because bulk waste removal will be in progress concurrent with much of the residual RI/FS characterization activity, priorities must be established such that additional monitoring or characterization data are available to support removal of the bulk waste and to allow timely decisions for interim actions that may be necessary based on new data.

Hydrogeologic characterization will provide four separate but overlapping functions:
(1) data necessary to ensure the adequacy of the groundwater monitoring system designed

to assess the safety of the St. Charles County well field; (2) data necessary to establish the adequacy of the system to monitor groundwater elevations and concentrations during bulk waste removal; (3) data necessary to define the extent of groundwater contamination; and (4) data necessary to establish potential long term effects on the environment due to contaminant migration within the residual area after bulk waste removal. Additional groundwater information may be needed to support bulk waste removal. An interim characterization effort may be required to address these data needs if the overall residual RI characterization can not be accomplished in the necessary time frame.

The need for interim actions to address groundwater contamination will be continually analyzed as more information becomes available. One alternative to be evaluated during bulk waste removal is the excavation of the sump below the original quarry floor. This may be required if removal of the ponded water has not been effective in reversing groundwater flow toward the sump, and it becomes necessary to increase the radius of influence for groundwater gradient reversal. Under worst-case conditions, i.e., significant contamination in the well field, interim actions could include the identification of water resource replacement for the volume of water currently being provided by the St. Charles County well field. Treatment of contaminated groundwater could be accomplished by utilizing the existing water treatment plant at the quarry if pumping and treating were determined to be a feasible alternative. This plant has been designed to treat ponded water from the sump and interstitial bulk waste water. The contaminants of concern identified in the quarry pond water (manganese, arsenic, uranium, and 2,4-dinitrotoluene) are likely to be similar to the residual contaminants of concern since the bulk waste is the common source.

Interim actions may be required for the vicinity properties if sites are identified which pose a threat to human health or the environment. Interim actions may also be necessary to minimize health and safety risks to on-site personnel. These will be evaluated as characterization studies progress.

Interim action requiring environmental documentation will be addressed using the Engineering Evaluation/Cost Analysis (EE/CA) report format. This report will describe the specific removal action objectives and alternatives along with a description of the proposed action and an analysis of the potential impacts of implementing the proposal action. Approval of this report by the regulatory agencies will allow the removal action to commence prior to issuance of the *Residual Record of Decision*.

2.3 Streamlining Techniques

Development of the residual RI/FS documents will proceed in a manner which will minimize the amount of time spent developing and revising formal interim review deliverables. The RI/FS and BRA reports will not be considered as final stand-alone documents at the time of completion. Rather, all reports must be read jointly to present a complete picture of the RI/FS process and of the proposed remedial action program.

Interim progress reports, including results of field characterization activities, risk assessment studies, and evaluation of remedial alternatives, will be provided as the information becomes available. The interim progress reports will also assist in identifying additional data needs. As each need is identified, a work assignment will be developed to address the need. Each work assignment will have a definite scope and schedule, and a work assignment manager will be designated. Each work assignment will result in a report or paper that will be made available to all organizational units working on the project. This approach will produce needed information in the most timely manner.

A senior level review team will be assembled to assist in scoping, trouble-shooting, and to provide quality overviews. This review team will also help identify data needs and ensure that the completed reports fully support the remedial action decision.

Value Engineering (VE) studies may be utilized at various stages throughout the residual RI/FS process. VE studies can be used as a streamlining technique because sound, logical, and viable alternatives can be developed in a short period of time.

The observational approach will be utilized to provide a structural plan for handling uncertain conditions. The observational approach identifies probable conditions when uncertainty exists along with potential deviations and associated contingency plans while observations continue. This approach can be integrated into the residual characterization and environmental documentation.

The various progress and work assignment reports will serve to meet the open communications requirement of the RI/FS process. These reports will fulfill two purposes. The first is to keep the regulatory agencies abreast of progress on the project. Second, the public must be informed and involved as findings are made and conclusions developed. A

community relations plan will be developed to address specific requirements of the quarry residuals effort. A brief discussion of the community relations plan can be found in Section 4.4 of this document.

2.4 Concurrency

The residual *RI/FS Work Plan* and associated field sampling plans will be submitted to EPA Region VII, DOE-Headquarters, and the Missouri Department of Natural Resources (MDNR) for their review, comment, and approval for a 60 day review prior to issuing the document to the public for comment.

The work plan will provide the framework for initiating the quarry residuals environmental remediation documentation. EPA Region VII, DOE-Headquarters, and the MDNR will be involved in the review and approval process of all appropriate documents throughout the residual RI/FS process in accordance with the provisions of the Federal Facilities Agreement.

3 PRELIMINARY DATA ANALYSIS

This section discusses the various tasks completed during the preliminary stages of the scoping process in preparation for the residual work plan. These analyses establish a management baseline and will be revisited and updated throughout the data gathering process.

3.1 Compilation of Existing Data

Data pertaining to the Weldon Spring quarry and the surrounding residual activity area have been reviewed and entered into a computerized data management system. Currently, the data file consists of documents pertaining to the general quarry area. It will be updated as additional relevant data are encountered. A current list of the file contents can be found in Appendix A. Each item in the list includes the following information, if available.

- Type of data.
- Title.
- Date issued or published.
- Document number.
- Author.
- Keywords.
- Whether or not it is Project Management Contractor (PMC) generated data.
- Sequential file number.

3.2 Data Analysis

The existing data was reviewed to determine the quality and quantity of the existing residual information. Specific topics targeted for review were:

- Pumping test locations and results.
- Aquifer characteristics.
- Vertical head distribution.
- Water table maps.
- Stratigraphy.

- Groundwater flow data.
- Contaminant distribution.
- Recharge/discharge.
- Geochemistry.
- Biological studies.
- Surface water data.
- Soils data.
- Slough sediments.
- Creek sediments.
- Rock contaminants.
- Air quality.
- Land use.

Nearly every topic was found to have a lack of quality and/or quantity to various degrees regarding the residual *Remedial Investigation/Feasibility Study (RI/FS)* effort. Details of these findings are addressed in Section 3.4, Data Needs.

3.3 Conceptual Site Model

A preliminary conceptual site model was developed based upon the available data. The physical properties and concepts will be evaluated and revised as data collection and interpretation activities yield additional information from the quarry residuals characterization efforts. The model identifies contaminant sources, release mechanisms, migration pathways, exposure routes and receptors. Figure 3-1 is a graphic representation of the quarry residual conceptual site model.

Receptors consist of humans and biota. Human receptor scenarios are classified as individuals who live within an 8 km (5 mi) radius of the project area (resident), those who temporarily visit the wildlife area within the project area (visitor) and individuals who might climb over or under the fence surrounding the quarry and enter the contaminated area (trespasser). Biota receptors include plants and animals including avian receptors, land (terrestrial), and those within creeks, sloughs, and rivers (aquatic).

Primary Sources	Primary Release Mechanism	Secondary Sources	Secondary Release Mechanism	Pathway	Exposure Route	Human			Biota	
						Resident	Visitor	Tresspass	Terrest.	Aquatic
Residual Material	Particulate Or Gaseous Emissions			Wind	Ingestion					
					Inhalation					
					Dermal Contact					
					Ingestion					
Contaminated Soil				Direct Contact	Inhalation					
					Dermal Contact					
					Ingestion					
					Dermal Contact					
	Infiltration/ Percolation	Groundwater	Pumping	Groundwater	Ingestion					
					Inhalation					
					Dermal Contact					
					Ingestion					
	Runoff	S. Water/Sed.		Surface Water	Inhalation					
					Dermal Contact					
					Ingestion					
					Dermal Contact					
Groundwater				Wind	Ingestion					
					Inhalation					
					Dermal Contact					
					Ingestion					
	Pumping	Groundwater		Direct Contact	Inhalation					
					Dermal Contact					
					Ingestion					
					Dermal Contact					
	Disch. To SW	Surface Water			Ingestion					
					Inhalation					
					Dermal Contact					
					Ingestion					

GRAPHIC REPRESENTATION OF THE
QUARRY RESIDUAL CONCEPTUAL
SITE MODEL

FIGURE 3-1

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3.4 Data Needs

Data analysis and the development of a preliminary conceptual site model have led to the establishment of various data needs for the quarry residual area of interest. These needs are outlined below.

- The horizontal and vertical extent of groundwater contamination within the Kimmswick, Decorah, and Platin formations needs to be determined.
- Water quality measurements north and west of the quarry.
- Several aquifer characteristics need to be verified or determined within the bedrock and overburden.
- Additional elevation, recharge, and discharge information is needed to understand the hydrology of the area.
- Additional geological and geochemical data are needed, including the location of contacts between the alluvial deposits and Kimmswick Limestone and Decorah shale.
- Additional biological data are required.
- Additional chemical, radiological, and physical data on slough and creek sediments are required.
- Data pertaining to rock and soil contaminants are required.
- Air quality data for the area between the quarry bluff and the slough are needed.
- Additional data on Weldon Spring Wildlife Area land use, especially Katy Trail usage, population densities, and a local well survey.

These data needs must be reviewed in detail and appropriate data to support the BRA and RI must be obtained. Programs designed to satisfy the data needs will be outlined

in the residual work plan with details developed during Phase I and Phase II characterization planning.

Data analysis efforts and the development of the conceptual site model uncovered the need for a limited field study prior to public and agency approval of the residual work plan. The completion of several slug tests will be required prior to the initiation of quarry dewatering activities to provide an actual measurement of hydraulic conductivity values prior to pumping, i.e., while the aquifer is at equilibrium. Sampling and Quality Assurance (QA) plans are currently being developed along with the scoping and scheduling of this activity. Field work to obtain the necessary data should begin in August 1991, prior to the dewatering currently scheduled for September 1991. A sampling plan will be transmitted to the Environmental Protection Agency (EPA) Region VII and the Missouri Department of Natural Resources (MDNR) for review prior to initiating the limited field study.

3.5 Media of Concern

The following media of concern have been identified as a result of the limited data analysis and preliminary development of the conceptual site model.

- Groundwater.
- Soil.
- Surface water.
- Sediment.
- Structures (water treatment plant facilities).
- Sludges (water treatment plant facilities and quarry sump).

Air is not listed as a media of concern, although the data analysis indicated that air quality data are not available. It is assumed that the removal of bulk wastes eliminates air as a media of concern because the major source of particulate contamination and radon will be removed. Characterization studies will be conducted prior to completion of the RI and baseline risk assessment (BRA). These studies may identify air as a media of concern, and will therefore be analyzed at that time. However, air quality will be monitored during the bulk waste and residual remedial actions.

3.6 Preliminary Remedial Action Objectives and Response Actions

Remedial action objectives, general response actions, technology types and process options will be determined by media of concern as previously identified in Section 3.5. Specific remedial action objectives will be identified as a result of characterization studies. These objectives and corresponding actions will be finalized in the Feasibility Study, but developed through the RI/FS process.

3.7 Preliminary Identification of Applicable or Relevant and Appropriate Requirements

Remedial actions for the Weldon Spring quarry residual activity will be undertaken in accordance with all applicable or relevant and appropriate requirements (ARARs). The identification of ARARs is an iterative process. As the remedial action planning process moves from data gathering in the RI phase to selection of a remedial action alternative in the FS phase, the list of ARARs will be finalized to those required for implementation of the selected alternative.

Any regulation, standard, requirement, criterion, or limitation under any Federal or State environmental law may be either *applicable* or *relevant and appropriate* to a remedial action, but not both. A regulation, standard, requirement, criterion, or limitation is *applicable* if it legally applies to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance. A regulation, standard, requirement, criterion, or limitation is *relevant and appropriate* if it addresses problems or situations sufficiently similar to those encountered at the site and its use is well suited to the particular site. A requirement determined to be relevant and appropriate must be complied with to the same extent as an applicable requirement. However, a determination of relevance and appropriateness may be applied only to portions of a requirement; whereas applicability can be determined only for the requirement as a whole. Only those State laws that are more stringent than Federal laws may become ARARs.

The ARARs may be classified into three general categories:

- Contaminant-specific -- related to the level of contamination allowed for a specific pollutant in various environmental media (i.e., soil, water, and air).

- Location-specific -- related to the presence of a special geographical (e.g., floodplain or wetland) or archeological area at or near the site.
- Action-specific -- related to a method of remedial action identified as an alternative for the site (e.g., disposal requirements or incineration standards).

The ARARs are identified on a project-specific basis, i.e., site-specific contamination, proposed remedial action alternatives, and site characteristics influence the selection of ARARs. The selection of ARARs will be addressed at various stages in the RI/FS process as additional information becomes available:

- RI/FS work plan -- potential ARARs identified (contaminant-and location-specific).
- Completion of RI phase -- ARARs used to identify cleanup goals (contaminant-and location-specific).
- Development of alternatives -- alternatives evaluated with respect to ARARs (action-, contaminant- and location-specific).

For an alternative to be selected, it must meet the associated ARARs -- unless waiver conditions identified in Superfund Amendments and Reauthorization (SARA), Section 121(d)(4), are met.

Potential ARARs for the Weldon Spring quarry residuals activity are listed in Table 3-1. Additional Federal and State requirements may also be ARARs, depending upon the alternatives identified during the RI/FS process or as a result of changes in Federal or State laws. A complete list of ARARs identified for the various remedial action alternatives will be provided in the FS.

3.8 Initial Data Quality Objectives

Data quality objectives (DQOs) are qualitative and quantitative statements which specify the quality of the data required to support decisions during response activities.

TABLE 3-1 Laws and Orders Potentially Applicable or Relevant and Appropriate to the Weldon Spring Site Quarry Residuals Activity

Federal Laws

Archeological and Historic Preservation Act of 1974
 Archeological Resources Protection Act of 1979
 Atomic Energy Act of 1954, as amended
 Clean Air Act of 1963, as amended
 Clean Water Act, as amended (also referred to as Federal Water Pollution Control Act of 1972, as amended)
 Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended
 Department of Energy Organization Act of 1977
 Endangered Species Act of 1973, as amended
 Fish and Wildlife Coordination Act of 1934, as amended
 Hazardous Materials Transportation Act of 1974, as amended
 National Environmental Policy Act of 1969, as amended
 National Historic Preservation Act of 1966, as amended
 Noise Control Act of 1972
 Noise Pollution and Abatement Act of 1970
 Occupational Safety and Health Act of 1970
 Safe Drinking Water Act of 1974
 Soil and Water Resources Conservation Act of 1977
 Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984
 Superfund Amendments and Reauthorization Act of 1986
 Toxic Substances Control Act of 1976
 Uranium Mill Tailings Radiation Control Act of 1978

Executive Orders

Executive Order 11490, Assigning Emergency Preparedness Functions to Federal Departments and Agencies
 Executive Order 11514, Protection and Enhancement of Environmental Quality
 Executive Order 11543, Protection and Enhancement of the Cultural Environment
 Executive Order 11738, Providing for Administration of the Clean Air Act and the Federal Water Pollution Control Act with Respect to Federal Contracts, Grants, or Loans
 Executive Order 11807, Occupational Safety and Health Programs for Federal Employees
 Executive Order 11988, Floodplain Management
 Executive Order 11990, Protection of Wetlands
 Executive Order 11991, Relating to the Protection and Enhancement of Environmental Quality
 Executive Order 12088, Federal Compliance with Pollution Control Standards
 Executive Order 12146, Management of Federal Legal Resources
 Executive Order 12580, Superfund Implementation

Department of Energy Orders

Order 1540.1	Materials Transportation and Traffic Management
Order 4240.1H	Designation of Major System Acquisition and Major Projects
Order 4320.1A	Site Development and Facility Utilization Planning
Order 4700.1	Project Management System
Order 5000.3	Unusual Occurrence Reporting System
Order 5400.1	General Environmental Protection Program
Order 5400.4	Integration of Environmental Compliance Process
Order 5400.5	Radiation Protection of Public and the Environment
Order 5440.1C	Implementation of the National Environmental Policy Act
Order 5480.1B	Environment, Safety, and Health Program for Department of Energy Operations – Note: Chapter XI of Order 5480.1B has been amended (see Vaughan [1985] and subsequent updates of Derived Concentration Guides)
Order 5480.4	Environmental Protection, Safety, and Health Protection Standards

**TABLE 3-1 Laws and Orders Potentially Applicable or Relevant and Appropriate to the
Weldon Spring Site Quarry Residuals Activity (Continued)**

Order 5480.11	Radiation Protection for Occupational Workers
Order 5480.14	Comprehensive Environmental Response, Compensation, and Liability Act Program
Order 5481.1	Environmental Protection, Safety, and Health Protection Information Reporting Requirements
Order 5481.1B	Safety Analysis Review System
Order 5482.1B	Environmental Protection, Safety, and Health Protection Appraisal Program
Order 5483.1A	Occupational Safety and Health Program for Government-Owned Contractor-Operated Facilities
Order 5500.2	Emergency Planning, Preparedness, and Response for Operations
Order 5700.6B	Quality Assurance
Order 5820.2	Radioactive Waste Management

Missouri State Environmental Laws

Missouri Clean Water Act
 Missouri Clean Air Act
 Missouri Hazardous Waste Management Law
 Missouri Solid Waste Management Law
 Missouri Land Reclamation Act
 Governor's Executive Order 82-19 on Flood Plain Management
 Missouri 401 Water Quality Certification
 Missouri Wildlife Code
 Missouri Radiation Regulations
 Missouri Air Conservation Law; Public Health and Welfare

DQOs are determined based on the end uses of the data to be collected and are applicable to all data collection activities.

Each sampling and analysis plan will implement the Data Quality Objective process as presented in the *Environmental Data Administration Plan* (EDAP) (MKF and JEG 1991b), to address the data quality requirements for the quarry residual activities.

The U.S. Department of Energy (DOE) and EPA will review the DQOs when evaluating each sampling and analysis plan. Objectives for the residual work plan will include parameters presently anticipated, updated, and/or revised during the preparation of the sampling plans for characterization and possibly again during the treatability studies for the feasibility studies.

4 FIELD PLANNING DOCUMENTS

The preparation of several documents will be required prior to initiating field activities during the residual activities. These plans ensure proper guidance when obtaining field data, quality assurance and quality control protocols necessary to achieve data quality objectives, and to clearly define potential health and safety problems that may be encountered during characterization activities. The documents that address these issues are the field sampling plan (FSP), the *Environmental Quality Assurance Program Plan (EQAPP)* (MKF and JEG 1991), the *Health and Safety Plan (HASP)*, and the *Community Relations Plan*.

4.1 Field Sampling Plan

The purpose of the field sampling activities is to obtain data to confirm the presence or absence of contaminants, the contaminant sources, modes of transport, direction of contaminant migration, and the effect of the contaminants on public health and the environment. Field sampling plans include a description of objectives, work tasks, specific quality assurance procedures, and level of effort required for site characterization. They provide a detailed sampling rationale--including the sampling locations and the types and number of samples--which, coupled with standard operating procedures and analytical methods/detection limits, will offer a well-defined approach. These plans are designed to permit detailed characterization of the wastes, soil, groundwater, surface water, and sediments at the quarry residuals area. Remedial measures can be identified, evaluated, and selected from these investigations. Details of the required field sampling plans will be presented in the residual work plan.

4.2 Quality Assurance Program Plan Update

The *Quality Assurance Program Plan (QAPP)* establishes the quality program for those activities performed by the Project Management Contractor (PMC) during the Weldon Spring Site Remedial Action Project (WSSRAP). This QAPP requires compliance with the criteria of ANSI/ASME NQA-1 1986, and U.S. Department of Energy (DOE) Order 5700.6C, which are required by the PMC and DOE contract document DE-AC05-86OR21548 and the MK-Environmental Services NQA-1 *Quality Assurance Manual*. The purpose of this QAPP is to assure compliance with these documents.

All criteria of NQA-1 are applicable to WSSRAP. The MK-Environmental Services NQA-1 Quality Assurance program provides guidance for the development of requisites to implement quality at WSSRAP. However, not all criteria are addressed within this QAPP; only criteria that describe Quality Assurance (QA) departmental actions are described. Compliance with the criteria not described by this QAPP is assured through performance of QA Audits, QA surveillances, and by implementation of the WSSRAP self-assessment program.

The QAPP shall be used as the generic working document to control and document the quality of work at the WSSRAP. This document requires that specific procedures and plans be generated to address Quality Level 1 and Quality Level 2 work activities and inspection criteria. These specific procedures shall detail the requirements of all applicable documents, codes, standards, and regulations.

Certain environmental compliance issues are addressed in the *WSSRAP Environmental Assurance Program Plan (EQAPP)* (MKF and JEG 1991) which addresses the specific EPA/QAMS 005-80 Quality Assurance requirements for the characterization of the WSSRAP. The EQAPP does not supersede the QAPP, but rather it expands on specific requirements required by DOE Order 5700.6C.

4.3 Health and Safety Plans

Subcontractor health and safety plans will be developed to ensure the health and safety of personnel during the performance of site characterization and response action activities. The plans include the safety standards that must be met by subcontractors during the performance of their assignments. Addressing the health and safety of on-site personnel will also serve to minimize any potential impacts to the general public and the nearby environment. Key elements of these plans are the use of appropriate protective equipment and safeguards and the performance of specific tasks under the supervision of trained technicians and safety specialists. On-site personnel are trained to be cognizant of all appropriate safety equipment and procedures, locations and types of on-site hazards, standard operating procedures, and procedures to be followed in emergency situations. Health and safety training and medical surveillance of all potentially exposed personnel are required elements of these plans.

4.4 Community Relations Plan

The *Community Relations Plan* (MKF and JEG 1991) describes the policy and procedures guiding interaction of personnel responsible for implementing the WSSRAP activities with the general public. The plan will be reviewed and revised accordingly to reflect the quarry residuals activity. The purpose of the community relations program is to ensure meaningful exchanges of information on such matters as potential health impacts, environmental issues, response action construction plans, project costs, and specific site activities.

5 ENVIRONMENTAL DOCUMENTATION SCHEDULE

5.1 Schedule and Responsibilities

Table 5-1 shows the planning schedule for completing the quarry residuals environmental documentation. The schedule indicates that the work plan begins in April of 1991 and ends with a Record of Decision in January of 1998. The table also shows the lead organization that will have the responsibility for completing each document along with the required support agencies. Document review will be required by the organizations listed in the table. The initial project schedule showing activity durations by task is shown on Table 5-2. Detailed schedules and manpower requirements will be developed as the documentation process proceeds. For example, Table 5-3 indicates the current schedule developed to show accelerated sampling plan development for input into the work plan prior to agency review.

TABLE 5-1 Quarry Residuals Environmental Documentation Schedule and Responsibilities

DOCUMENT/TASK	BEGIN	END	LEAD	SUPPORT	REVIEW
Work Plan	April 1991	December 1991	PMC	MK/JEG/ANL	ANL/DOE/Agency
Phase I Characterization Plans	November 1991	June 1992	PMC	MK/JEG	ANL/DOE/Agency
Phase I Characterization Procurement	June 1992	December 1992	PMC	PMC	PMC
Phase I Characterization	December 1992	August 1993	PMC	MK/JEG/SC	PMC
Phase I RI	August 1993	May 1994	PMC	MK/JEG	ANL/DOE/Agency
Phase I BRA	November 1993	November 1994	ANL	PMC/MK/JEG	PMC/DOE/Agency
Phase I/II FS-NEPA	April 1994	December 1994	ANL	PMC/MK/JEG	PMC/DOE/Agency
Phase II Characterization Plan	January 1994	July 1994	PMC	MK/JEG	ANL/DOE/Agency
Phase II Characterization Procurement	June 1994	September 1994	PMC	PMC	PMC
Phase II Characterization	November 1994	April 1995	PMC	MK/JEG/SC	PMC
Phase I/II RI	April 1995	October 1995	PMC	MK/JEG	ANL/DOE/Agency
Phase I/II BRA	June 1995	February 1996	ANL	PMC/MK/JEG	PMC/DOE/Agency
FS Engineering Studies	June 1995	January 1996	PMC	MK/JEG	ANL/DOE
FS-NEPA/Proposed Plan	January 1996	December 1996	ANL	PMC/MK/JEG	PMC/DOE/Agency
RS/ROD	January 1997	January 1998	ANL	PMC/MK/JEG	PMC/DOE/Agency

Acronyms/Definitions

- Document/Task
 - RI; Remedial Investigation
 - BRA; Baseline Risk Assessment
 - FS; Feasibility Study
 - NEPA; National Environmental Policy Act of 1969, as amended
 - RS; Responsiveness Summary
 - ROD; Record of Decision

Lead/Support/Review

- PMC; Project Management Contractor
- ANL; Argonne National Laboratories
- MK; Morrison-Knudsen Environmental Services (Boise/San Francisco)
- JEG; Jacobs Engineering Group (Pasadena/Denver)
- SC; Subcontractor (as selected by procurement process)
- DOE; Department of Energy representatives at WSSRAP
- Agency;
 - EPA - Environmental Protection Agency
 - MDNR - Missouri Department of Natural Resources
 - DOE - Oak Ridge and Headquarters (Washington, D.C.)

TABLE 5-2 Quarry Residuals Detailed Planning Schedule

QUARRY RESIDUAL ENVIRONMENTAL DOCUMENTATION PROCESS											
PLANNING SCHEDULE											
ACTIVITY DESCRIPTION		TARGET START	TARGET FINISH	1991	1992	1993	1994	1995	1996	1997	1998
TASK 1 - SCOPING/WORK PLAN				OC	J	A	P	J	J	J	J
1	COMPLETE EXISTING CHARACTERIZATION DATA	10CT90	30OCT90								
2	DATA ANALYSIS	31OCT90	29NOV90								
3	IDENTIFY DATA NEEDS	30NOV90	20DEC90								
4	DEVELOP CONCEPTUAL SITE MODEL	21DEC90	10JAN91								
5	PREPARE/ISSUE QUARRY RESIDUAL SCOPING DOCUMENT	11JAN91	11MAR91								
6	PMC/ANL REVIEW OF QUARRY RESIDUAL SCOPING DOCUMENT	12MAR91	31MAR91								
7	PREPARE/ISSUE QUARRY RESIDUAL WORK PLAN	14PR91	30MAY91								
8	PMC REVIEW/ANL REVIEW OF QUARRY RESIDUAL WORK PLAN	31MAY91	19JUN91								
9	INCCORP COMMENTS/ISSUE QUARRY RESIDUAL WORK PLAN FOR AGENCY REVIEW	20JUN91	9JUL91								
10	DOE-HQ/EPA/DNR REVIEW OF QUARRY RESIDUAL WORK PLAN	10JUL91	7SEP91								
11	INCCORP COMMENTS/ISSUE FINAL DRAFT QUARRY RESIDUAL WORK PLAN FOR PUBLIC REVIEW	8SEP91	7OCT91								
12	PUBLIC REVIEW OF DRAFT QUARRY RESIDUAL WORK PLAN	8OCT91	6NOV91								
13	INCCORP COMMENTS/ISSUE QUARRY RESIDUAL WORK PLAN RESPONSIVENESS SUMMARY	7NOV91	6DEC91								
14	PREPARE/ISSUE FINAL QUARRY RESIDUAL WORK PLAN	7DEC91	16DEC91								
PHASE 1 CHARACTERIZATION - UPDATE GAP											
15	REVISE RIQAPP DOCUMENT	15FEB92	15MAR92								
16	EPA/DNR REVIEW OF REVISED SITE RIQAPP	16MAR92	14MAY92								
17	INCCORP COMMENTS/REVISE RIQAPP BASED EPA/DNR COMMENTS	15MAY92	14JUN92								
18	ISSUE REVISION #2 OF SITE RIQAPP	15JUN92	15JUN92								
HYDROGEOLOGICAL SAMPLING PLAN - PHYSICAL											
19	WRITE HYDROGEOLOGICAL SAMPLING PLAN	17NOV91	15JAN92								
20	PMC/DOE REVIEW OF HYDROGEOLOGICAL SAMPLING PLAN	16JAN92	14FEB92								
21	REVISE/FINAL DRAFT OF HYDROGEOLOGICAL SAMPLING PLAN	15FEB92	15MAR92								
22	EPA/DNR REVIEW OF HYDROGEOLOGICAL SAMPLING PLAN	16MAR92	14MAY92								
23	REVISE/INCCORP COMMENTS FINALIZE PLAN	15MAY92	14JUN92								
24	ISSUE FINAL PLAN TO EPA/DNR	15JUN92	15JUN92								
PHASE 1 CHARACTERIZATION - GEOPHYSICAL INVESTIGATIONS											
25	DEVELOP DRAFT GEOPHYSICAL INVESTIGATIONS SPECIFICATIONS	16JUN92	14AUG92								
26	PMC REVIEW OF DRAFT GEOPHYSICAL INVESTIGATIONS SPECS	15AUG92	15SEP92								
				OC	J	A	P	J	J	J	J
				1991	1992	1993	1994	1995	1996	1997	1998

TABLE 5-2 Quarry Residuals Detailed Planning Schedule (Continued)

QUARRY RESIDUAL ENVIRONMENTAL DOCUMENTATION PROCESS PLANNING SCHEDULE																									
		1991	1992	1993	1994	1995	1996	1997	1998																
		OC	J	A	P	J	U	OC	J	A	P	J	U	OC	J	A	P	J	U	OC	J	A	P	J	U
ACTIVITY DESCRIPTION		TARGET START	TARGET FINISH																						
PHASE I CHARACTERIZATION - GEOPHYSICAL INVESTIGATIONS																									
27	INCORP/REVISE GEOPHYSICAL INVESTIGATIONS	16SEP92	13OCT92																						
28	GEOPHYSICAL INVESTIGATIONS BID/AMARD	14OCT92	15DEC92																						
29	GEOPHYSICAL INVESTIGATIONS	16DEC92	19MAY93																						
30	GEOPHYSICAL INVESTIGATIONS ANALYSIS/REPORT	20MAY93	1AUG93																						
PHASE I CHARACTERIZATION - PUMP WELL/PUMP TEST																									
31	DEVELOP DRAFT PUMP WELL/PUMP TEST	16JUN92	14AUG92																						
32	PMC REVIEW OF DRAFT PUMP WELL/PUMP TEST	15AUG92	15SEP92																						
33	INCORP/REVISE PUMP WELL/PUMP TEST	16SEP92	13OCT92																						
34	PUMP WELL/PUMP TESTS BID/AMARD	14OCT92	15DEC92																						
35	PERFORM PUMP WELL/PUMP TESTS	16DEC92	19MAY93																						
36	PUMP WELL/PUMP TESTS ANALYSIS/REPORT	20MAY93	1AUG93																						
CONTAMINANTS SAMPLING PLAN																									
37	WRITE CONTAMINANTS SAMPLING PLAN	17NOV91	15JAN92																						
38	REVISE/FINAL DRAFT OF CONTAMINANTS SAMPLING PLAN	15JAN92	15MAR92																						
39	PMC/DOE REVIEW OF CONTAMINANTS SAMPLING PLAN	16JAN92	14JAN92																						
40	EPA/DNR REVIEW OF CONTAMINANTS SAMPLING PLAN	16MAR92	15MAY92																						
41	REVISE-INCORP COMMENTS FINALIZE PLAN	16MAY92	14JUN92																						
42	ISSUE FINAL PLAN TO EPA/DNR	15JUN92	15JUN92																						
PHASE I CHARACTERIZATION - MONITORING WELL INSTALLATION																									
43	DEVELOP DRAFT DRILLING/MONITORING WELL	16JUN92	14AUG92																						
44	PMC REVIEW OF DRILLING/MONITORING WELL	15AUG92	15SEP92																						
45	INCORP/REVISE DRILLING/MONITORING WELL	16SEP92	13OCT92																						
46	DRILLING/MONITORING WELL BID/AMARD	14OCT92	15DEC92																						
47	DRILLING/INSTALL MONITORING WELLS	16DEC92	19MAY93																						
48	DRILLING/MONITORING WELL ANALYSIS/REPORT	20MAY93	1AUG93																						
PHASE I CHARACTERIZATION - SOILS DRILLING																									
49	DEVELOP DRAFT SOILS-DRILLING SPECIFICATIONS	16JUN92	14AUG92																						
50	PMC REVIEW OF SOILS-DRILLING SPECIFICATIONS	15AUG92	15SEP92																						
51	INCORP/REVISE SOILS-DRILLING SPECIFICATIONS	16SEP92	13OCT92																						
52	SOILS-DRILLING BID/AMARD	14OCT92	15DEC92																						
53	DRILLING - SOILS	16DEC92	19MAY93																						
54	DRILLING-SOILS ANALYSIS/REPORT	20MAY93	1AUG93																						

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CONTRACT 3589

QUARRY RESIDUAL ENVIRONMENTAL DOCUMENTATION PROCESS
PLANNING SCHEDULE

9.00 am 22-AUG-91

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TABLE 5-2 Quarry Residuals Detailed Planning Schedule (Continued)

QUARRY RESIDUAL ENVIRONMENTAL DOCUMENTATION PROCESS PLANNING SCHEDULE											
		1991	1992	1993	1994	1995	1996	1997	1998		
ACTIVITY DESCRIPTION		OC	JA	AP	UU	OC	JA	AP	UU	OC	JA
TASK 7 - PHASE I BASELINE RISK ASSESSMENT											

TARGET	TARGET										
START	FINISH										
80	DRAFT BASELINE RISK ASSESSMENT REPORT - PHASE I										
81	PMC/ANL REVIEW OF DRAFT BASELINE RISK ASSESSMENT REPORT - PHASE I										
82	INCCORP COMMENTS/REVISE DRAFT BASELINE RISK ASSESSMENT REPORT - PHASE I										
83	EPA/DNR REVIEW OF DRAFT BASELINE RISK ASSESSMENT REPORT - PHASE I										
84	INCCORP COMMENTS/PREPARE RESPONSIVENESS SUMMARY ON BASELINE RISK ASSESSMENT - PHASE I										
TASK 8 - PHASE I/II FS-NEPA											

85	DRAFT QUARRY RESIDUAL FEASIBILITY STUDY - PHASE I/II										
86	PMC/ANL REVIEW OF QUARRY RESIDUAL FEASIBILITY STUDY - PHASE I/II										
87	INCCORP COMMENTS/REVISE QUARRY RESIDUAL FEASIBILITY STUDY - PHASE I/II										
88	EPA/DOE-HQ REVIEW OF QUARRY RESIDUAL FEASIBILITY STUDY - PHASE I/II										
89	INCCORP COMMENTS/PREPARE RESPONSIVENESS SUMMARY ON QUARRY FEASIBILITY - PHASE I/II										
TASK 9 - PHASE II CHARACTERIZATION PLANS											

90	DRAFT QUARRY RESIDUAL CHARACTERIZATION-PHASE II SAMPLING PLANS										
91	PMC/ANL REVIEW OF QUARRY RESIDUAL CHARACTERIZATION - PHASE II SAMPLING PLANS										
92	INCCORP COMMENTS/REVISE QUARRY RESIDUAL CHARACTERIZATION - PHASE II SAMPLING PLANS										
93	EPA/DNR REVIEW OF QUARRY RESIDUAL CHARACTERIZATION - PHASE II SAMPLING PLANS										
TASK 10 - PHASE II CHARACTERIZATION PROCEDURE											

94	DEVELOP SPECIFICATIONS FOR QUARRY RESIDUAL CHARACTERIZATION - PHASE II										
95	QUARRY RESIDUAL CHARACTERIZATION - PHASE II BID/AWARD										
TASK 11 - PHASE II CHARACTERIZATION											

96	QUARRY RESIDUAL CHARACTERIZATION-PHASE II FIELD WORK										
97	QUARRY RESIDUAL CHARACTERIZATION-PHASE II LAB ANALYSIS										
98	QUARRY RESIDUAL CHARACTERIZATION-PHASE II DATA INTERPRETATIONS										
		OC	JA	AP	UU	OC	JA	AP	UU	OC	JA
		1991	1992	1993	1994	1995	1996	1997	1998		

TABLE 5-2 Quarry Residuals Detailed Planning Schedule (Continued)

QUARRY RESIDUAL ENVIRONMENTAL DOCUMENTATION PROCESS PLANNING SCHEDULE											
		1991	1992	1993	1994	1995	1996	1997	1998		
ACTIVITY DESCRIPTION		OC	JA	AP	UU	OC	JA	AP	UU	OC	JA
TASK 12- PHASE II REMEDIAL INVESTIGATIONS		OC	JA	AP	UU	OC	JA	AP	UU	OC	JA
99	DRAFT QUARRY RESIDUAL REMEDIAL INVESTIGATIONS (RI) REPORT - PHASE II										
100	PMC/ANL REVIEW OF QUARRY RESIDUAL RI REPORT - PHASE II										
101	REVISE QUARRY RESIDUAL RI REPORT - PHASE II										
102	EPA/DNR REVIEW OF QUARRY RESIDUAL RI REPORT - PHASE II										
103	INCORP. COMMENTS/PREPARE RESPONSIVENESS SUMMARY - RI REPORT - PHASE II										
TASK 13- BASELINE RISK ASSESSMENT											
104	DRAFT QUARRY RESIDUAL BASELINE RISK ASSESSMENT - PHASE II										
105	PMC/ANL REVIEW OF QUARRY RESIDUAL BASELINE RISK ASSESSMENT - PHASE II										
106	INCORP COMMENTS/REVISE QUARRY RESIDUAL BASELINE RISK ASSESSMENT - PHASE II										
107	EPA/DNR REVIEW OF QUARRY RESIDUAL BASELINE RISK ASSESSMENT - PHASE II										
108	INCORP COMMENTS/PREPARE RESPONSIVENESS SUMMARY ON BASELINE RISK ASSESSMENT - PHASE II										
TASK 14 - FS ENGINEERING STUDIES											
109	BEGIN SCOPING FOR QUARRY RESIDUAL ENGINEERING STUDIES										
110	PMC/ANL REVIEW OF QUARRY RESIDUAL ENGINEERING SCOPING STUDIES										
111	INCORP COMMENTS/PERFORM QUARRY RESIDUAL ENGINEERING STUDIES										
TASK 15 - FS-NEPA / PROPOSED PLAN											
112	DRAFT QUARRY RESIDUAL FEASIBILITY STUDY - PHASE III										
113	PMC/DOE REVIEW OF QUARRY RESIDUAL FEASIBILITY STUDY - PHASE III										
114	INCORP COMMENTS/REVISE QUARRY RESIDUAL FEASIBILITY STUDY - PHASE III										
115	EPA/DOE-HQ REVIEW OF QUARRY RESIDUAL FEASIBILITY STUDY - PHASE III										
116	CONCUR ON CHANGES/INCORP COMMENTS ON QUARRY RESIDUAL FEASIBILITY STUDY- PHASE III										
117	PUBLIC REVIEW OF QUARRY RESIDUAL FS REPORT										
TASK 16 - RESPONSIVENESS SUMMARY/RECORD OF DECISION											
118	REVIEW WRITTEN COMMENTS/ORGANIZE/INCORP COMMENTS ON DRAFT FS-NEPA										
119	PREPARE RESPONSIVENESS SUMMARY/RECORD OF DECISION										
		OC	JA	AP	UU	OC	JA	AP	UU	OC	JA
		1991	1992	1993	1994	1995	1996	1997	1998

[illegible]

TABLE 5-3 Quarry Residuals Environmental Documentation Process (Continued)

WSSRAP DE-AC05-B60R21548 MK-Ferguson CONTRACT 3589												
QUARRY RESIDUAL ENVIRONMENTAL DOCUMENTATION PROCESS												
SCHEDULE												
1991 1992 1993 1994 1995 1996 1997 1998												
0 J A J												

TABLE 5-3 Quarry Residuals Environmental Documentation Process (Continued)

WSSRAP DE-AC05-860R21548 MK-Ferguson CONTRACT 3589		QUARRY RESIDUAL ENVIRONMENTAL DOCUMENTATION PROCESS SCHEDULE												19911992199319941995199619971998 OJAJJ											
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 5-3 Quarry Residuals Environmental Documentation Process (Continued)

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Mk-Ferguson
CONTRACT. 3589

Barchart Drawing System	10.34 am 18-SEP-91
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APPENDIX A
CURRENT CONTENTS OF THE RESIDUALS
COMPUTERIZED DATA MANAGEMENT SYSTEM

TYPE | DOCUMENT
TITLE | NOTEBOOK II
DATE_ISSUED/PUBLISHED | 00/00/89
DOCUMENT_NUMBER |
AUTHOR | PRO/TEM
KEYWORDS | SOFTWARE MANUAL
PMC? | N
FILE_NUMBER | 1

TYPE | DOCUMENT
TITLE | NOTEBOOK II PLUS WORKBOOK: A TUTORIAL
DATE_ISSUED/PUBLISHED | 00/00/90
DOCUMENT_NUMBER |
AUTHOR | OBERON RESOURCES
KEYWORDS | SOFTWARE MANUAL
PMC? | N
FILE_NUMBER | 2

TYPE | DOCUMENT
TITLE | REMEDIAL INVESTIGATIONS FOR QUARRY BULK WASTES
DATE_ISSUED/PUBLISHED | 12/00/89
DOCUMENT_NUMBER | DOE/OR/21548-066
AUTHOR | MKF - JEG
KEYWORDS | GEOLOGY -- FRACTURES/JOINTING, GEOLOGY -- LITHOLOGY, HYDROGEOLOGY,
| CHEMISTRY -- GROUNDWATER, CHEMISTRY -- SEDIMENT, CHEMISTRY -- SOIL,
| CHEMISTRY -- SURFACE WATER, RADIOLOGICAL -- AIR, RADIOLOGICAL --
| GROUNDWATER, RADIOLOGICAL -- SEDIMENT, RADIOLOGICAL -- SOIL,
| RADIOLOGICAL -- SURFACE WATER, TOPOGRAPHY
PMC? | Y
FILE_NUMBER | 3

TYPE | DOCUMENT
TITLE | ANNUAL SITE ENVIRONMENTAL REPORT 1989
| REV. 1
DATE_ISSUED/PUBLISHED | 11/00/90
DOCUMENT_NUMBER | DOE/OR/21548-129
AUTHOR | MKF - JEG
KEYWORDS | CHEMISTRY -- SURFACE WATER, CHEMISTRY -- GROUNDWATER, RADIOLOGICAL --
| GROUNDWATER, RADIOLOGICAL -- SURFACE WATER, RADIOLOGICAL -- AIR,
| GEOLOGY -- FRACTURES/JOINTING, GEOLOGY -- LITHOLOGY, HISTORY,
| METEOROLOGY, TOPOGRAPHY
PMC? | Y
FILE_NUMBER | 4

TYPE | DOCUMENT
TITLE | QUARRY DETECTION MONITORING WELLS
| SUBCONTRACT DOCUMENTS WP-166
| REV. 0
DATE_ISSUED/PUBLISHED | 08/00/90
DOCUMENT_NUMBER |

AUTHOR |MKF - JEG
 KEYWORDS |GEOLOGY -- LITHOLOGY
 PMC? |Y
 FILE_NUMBER |5

TYPE |DOCUMENT
 TITLE |WSSRAP QUARRY
 |FOCUSED REMEDIAL INVESTIGATION/FEASIBILITY STUDIES
 |DRAFT

DATE_ISSUED/PUBLISHED |07/08/88
 DOCUMENT_NUMBER |5121R-302-B
 AUTHOR |MORRISON-KNUDSEN ENGINEERS, INC.
 |SAN FRANCISCO

KEYWORDS |BIOLOGY -- ECOLOGY, CHEMISTRY -- GROUNDWATER, CHEMISTRY -- SEDIMENT,
 |CHEMISTRY -- SOIL, CHEMISTRY -- SURFACE WATER, CONTAMINANT
 |TRANSPORT/MIGRATION, GEOLOGY -- FRACTURES/JOINTING, GEOLOGY --
 |LITHOLOGY, HISTORY, HYDROGEOLOGY -- AQUIFER PROPERTIES, HYDROGEOLOGY
 |-- LOCAL, HYDROGEOLOGY -- WATER LEVELS, METEOROLOGY, RADIOLOGICAL --
 |AIR, RADIOLOGICAL -- GROUNDWATER, RADIOLOGICAL -- SEDIMENT,
 |RADIOLOGICAL -- SOIL, RADIOLOGICAL -- SURFACE WATER, SOIL -- SCS
 |TYPE, TOPOGRAPHY

PMC? |Y
 FILE_NUMBER |6

TYPE |DOCUMENT
 TITLE |ANNUAL ENVIRONMENTAL MONITORING REPORT 1988

DATE_ISSUED/PUBLISHED |06/00/89
 DOCUMENT_NUMBER |DOE/OR/21548-079
 AUTHOR |MKF - JEG

KEYWORDS |CHEMISTRY -- GROUNDWATER, CHEMISTRY -- SEDIMENT, CHEMISTRY -- SURFACE
 |WATER, GEOLOGY -- FRACTURES/JOINTING, GEOLOGY -- LITHOLOGY, HISTORY,
 |METEOROLOGY, RADIOLOGICAL -- AIR, RADIOLOGICAL -- GROUNDWATER,
 |RADIOLOGICAL -- SEDIMENT, RADIOLOGICAL -- SURFACE WATER, TOPOGRAPHY

PMC? |Y
 FILE_NUMBER |7

TYPE |DOCUMENT
 TITLE |ANNUAL ENVIRONMENTAL MONITORING REPORT
 |WELDON SPRING, MISSOURI
 |CALENDAR YEAR 1987

DATE_ISSUED/PUBLISHED |00/00/88
 DOCUMENT_NUMBER |DOE/OR/21548-015
 AUTHOR |MKF - JEG

KEYWORDS |CHEMISTRY -- GROUNDWATER, CHEMISTRY -- SURFACE WATER, GEOLOGY --
 |FRACTURES/JOINTING, GEOLOGY -- LITHOLOGY, HISTORY, METEOROLOGY,
 |RADIOLOGICAL -- AIR, RADIOLOGICAL -- GROUNDWATER, RADIOLOGICAL --
 |SURFACE WATER, TOPOGRAPHY

PMC? |Y
 FILE_NUMBER |8

TYPE | DOCUMENT
TITLE | REPORT ON GROUND-WATER MONITORING WELL REHABILITATION AND
| RADIOLOGICAL CHARACTERIZATION DRILLING, WELDON SPRING QUARRY
DATE_ISSUED/PUBLISHED | 12/00/85
DOCUMENT_NUMBER | DOE/OR/20722-63
AUTHOR | BECHTEL NATIONAL, INC.
KEYWORDS | GEOLOGY -- LITHOLOGY
PMC? | N
FILE_NUMBER | 9

TYPE | DOCUMENT
TITLE | CHEMICAL CHARACTERIZATION REPORT FOR THE WELDON SPRING QUARRY
DATE_ISSUED/PUBLISHED | 08/00/87
DOCUMENT_NUMBER | DOE/OR/20722-176
AUTHOR | BECHTEL NATIONAL, INC.
KEYWORDS | CHEMISTRY -- SOIL, CHEMISTRY -- SEDIMENT
PMC? | N
FILE_NUMBER | 10

TYPE | DOCUMENT
TITLE | RESPONSIVENESS SUMMARY FOR THE ENGINEERING EVALUATION/COST ANALYSIS
| FOR THE PROPOSED MANAGEMENT OF CONTAMINATED WATER IN THE WELDON
| SPRING QUARRY
DATE_ISSUED/PUBLISHED | 06/00/89
DOCUMENT_NUMBER | NOT APPLICABLE
AUTHOR | ENERGY AND ENVIRONMENTAL SYSTEMS DIVISION
KEYWORDS | BIOLOGY -- RISK ANALYSIS, ENGINEERING
PMC? | N
FILE_NUMBER | 11

TYPE | DOCUMENT
TITLE | REPORT ON PRELIMINARY GEOLOGICAL, HYDROLOGICAL AND RADIOLOGICAL
| SURVEY AT THE WELDON SPRING QUARRY DURING 1976 AND 1977
DATE_ISSUED/PUBLISHED | 12/14/78
DOCUMENT_NUMBER | NOT APPLICABLE
AUTHOR | E. A. HUEY (NATIONAL LEAD COMPANY OF OHIO)
KEYWORDS | GEOLOGY -- LITHOLOGY, CHEMICAL -- GROUNDWATER, RADIOLOGICAL --
| GROUNDWATER
PMC? | N
FILE_NUMBER | 12

TYPE | DOCUMENT
TITLE | CHARACTERIZATION AND ASSESSMENT FOR THE WELDON SPRING QUARRY
| LOW-LEVEL RADIOACTIVE WASTE STORAGE SITE
DATE_ISSUED/PUBLISHED | 09/00/84
DOCUMENT_NUMBER | DOE/OR-853 (DE85005424)
AUTHOR | BERKELEY GEOSCIENCES ASSOCIATES
KEYWORDS | GEOLOGY, HYDROGEOLOGY, RADIOLOGICAL -- AIR, RADIOLOGICAL -- SOIL,
| RADIOLOGICAL -- SEDIMENT, GEOCHEMICAL
PMC? | N

FILE_NUMBER |13

TYPE |IOC

TITLE |IOC, MONITORING WELL AND BENCHMARK VALIDATION

|*** (SUPERCEDES ALL PRIOR TO 12/17/90) ***

DATE_ISSUED/PUBLISHED |12/17/90

DOCUMENT_NUMBER |NOT APPLICABLE

AUTHOR |MKF (FRED FRY)

KEYWORDS |TOPOGRAPHY

PMC? |Y

FILE_NUMBER |14

TYPE |IOC

TITLE |TRIP REPORT

DATE_ISSUED/PUBLISHED |04/25/88

DOCUMENT_NUMBER |NOT APPLICABLE

AUTHOR |MARVIN V. DAMM (MKF-BOISE)

KEYWORDS |RADIOLOGICAL -- GROUNDWATER

PMC? |Y

FILE_NUMBER |15

TYPE |DOCUMENT

TITLE |WELDON SPRING SITE (WSS) ENVIRONMENTAL MONITORING REPORT

|CALENDAR YEAR 1981

DATE_ISSUED/PUBLISHED |05/00/83

DOCUMENT_NUMBER |EV-0005

AUTHOR |BECHTEL NATIONAL, INC.

KEYWORDS |CHEMISTRY -- SURFACE WATER, HISTORY, RADIOLOGICAL -- SOIL,

|RADIOLOGICAL -- SURFACE WATER

PMC? |N

FILE_NUMBER |16

TYPE |DOCUMENT

TITLE |WELDON SPRING SITE (WSS) ENVIRONMENTAL MONITORING REPORT

|CALENDAR YEAR 1982

DATE_ISSUED/PUBLISHED |06/00/83

DOCUMENT_NUMBER |EV-0008

AUTHOR |BECHTEL NATIONAL, INC.

KEYWORDS |CHEMISTRY -- GROUNDWATER, CHEMISTRY -- SURFACE WATER, HISTORY,

|METEOROLOGY, RADIOLOGICAL -- AIR, RADIOLOGICAL -- GROUNDWATER,

|RADIOLOGICAL -- SURFACE WATER

PMC? |N

FILE_NUMBER |17

TYPE |DOCUMENT

TITLE |WELDON SPRING SITE ENVIRONMENTAL MONITORING REPORT CALENDAR YEAR 1984

DATE_ISSUED/PUBLISHED |07/00/85

DOCUMENT_NUMBER |DOE/OR/20722-58

AUTHOR |BECHTEL NATIONAL, INC.

KEYWORDS |CHEMISTRY -- SURFACE WATER, HISTORY, METEOROLOGY, RADIOLOGICAL --

AIR, RADIOLOGICAL -- GROUNDWATER, RADIOLOGICAL -- SURFACE WATER
PMC? |N
FILE_NUMBER |18

TYPE |DOCUMENT
TITLE |WELDON SPRING SITE ANNUAL SITE ENVIRONMENTAL MONITORING REPORT
|CALENDAR YEAR 1985

DATE_ISSUED/PUBLISHED |09/00/86
DOCUMENT_NUMBER |DOE/OR/20722-101
AUTHOR |BECHTEL NATIONAL, INC.
KEYWORDS |HISTORY, RADIOLOGICAL -- AIR, RADIOLOGICAL -- GROUNDWATER,
|RADIOLOGICAL -- SEDIMENT, RADIOLOGICAL -- SURFACE WATER
PMC? |N
FILE_NUMBER |19

TYPE |DOCUMENT
TITLE |THE CONTAMINATION OF GROUND AND SURFACE WATERS BY LIQUID WASTES FROM
|THE WELDON SPRING ORDNANCE WORKS, MISSOURI
DATE_ISSUED/PUBLISHED |01/00/44
DOCUMENT_NUMBER |23-17
AUTHOR |U.S. DEPT. OF INTERIOR, GEOLOGICAL SURVEY
KEYWORDS |GEOLOGY -- LITHOLOGY, HISTORY, HYDROGEOLOGY -- REGIONAL, HYDROGEOLOGY
|-- WATER LEVELS
PMC? |N
FILE_NUMBER |20

TYPE |DOCUMENT
TITLE |WELDON SPRING SITE ENVIRONMENTAL MONITORING REPORT,
|CALENDAR YEAR 1983
DATE_ISSUED/PUBLISHED |06/00/84
DOCUMENT_NUMBER |DOE/OR/20722-16
AUTHOR |BECHTEL NATIONAL, INC.
KEYWORDS |HISTORY, RADIOLOGICAL -- AIR, RADIOLOGICAL -- GROUNDWATER,
|RADIOLOGICAL -- SURFACE WATER
PMC? |N
FILE_NUMBER |21

TYPE |DOCUMENT
TITLE |ANNUAL ENVIRONMENTAL MONITORING REPORT,
|WELDON SPRING, MISSOURI,
|CAL. YEAR 1986
DATE_ISSUED/PUBLISHED |00/00/87
DOCUMENT_NUMBER |
AUTHOR |MKF - JEG
KEYWORDS |HISTORY, RADIOLOGICAL -- AIR, RADIOLOGICAL -- GROUNDWATER,
|RADIOLOGICAL -- SURFACE WATER
PMC? |Y
FILE_NUMBER |22

TYPE |DOCUMENT

TITLE |PRELIMINARY INVESTIGATIONS OF GROUND-WATER OCCURRENCES IN THE WELDON
|SPRING AREA, ST. CHARLES COUNTY, MISSOURI
DATE_ISSUED/PUBLISHED |12/00/51
DOCUMENT_NUMBER |00102
AUTHOR |US DEPT. OF THE INTERIOR, GEOLOGICAL SURVEY
KEYWORDS |GEOLOGY -- FRACTURES/JOINTING, GEOLOGY -- LITHOLOGY, HYDROGEOLOGY --
|WATER LEVELS
PMC? |N
FILE_NUMBER |23

TYPE |DOCUMENT
TITLE |A PHASE I SURVEY AND EVALUATION OF THE WELDON SPRING QUARRY POTABLE
|WATERLINE PROJECT AND PHASE II TESTING OF ARCHAEOLOGICAL SITES
|23SC80, 23SC81, AND 23SC83, ST. CHARLES COUNTY, MISSOURI
DATE_ISSUED/PUBLISHED |10/05/89
DOCUMENT_NUMBER |
AUTHOR |TRIAD RESEARCH SERVICES, GARY REX WALTERS
KEYWORDS |ARCHAEOLOGICAL
PMC? |N
FILE_NUMBER |24

TYPE |DOCUMENT
TITLE |WELDON SPRING EEA ADDENDUM ALTERNATIVE #3A (REV 2)
DATE_ISSUED/PUBLISHED |08/29/84
DOCUMENT_NUMBER |21745
AUTHOR |BECHTEL
KEYWORDS |ENGINEERING
PMC? |N
FILE_NUMBER |25

TYPE |DOCUMENT
TITLE |FATE AND TRANSPORT OF CONTAMINANTS IN THE VADOSE ZONE
DATE_ISSUED/PUBLISHED |08/24/89
DOCUMENT_NUMBER |GE-0028
AUTHOR |MICHAEL E. BEDAN
KEYWORDS |CHEMISTRY -- SOIL, CONTAMINANT TRANSPORT/MIGRATION, GEOCHEMICAL
PMC? |N
FILE_NUMBER |26

TYPE |DOCUMENT
TITLE |PRELIMINARY DRAFT: RADIOLOGICAL, HYDROGEOLOGICAL, GEOCHEMICAL AND
|GEOPHYSICAL ASSESSMENT OF THE WELDON SPRING QUARRY, MISSOURI
|DISPOSAL SITE
DATE_ISSUED/PUBLISHED |01/00/80
DOCUMENT_NUMBER |LBID-152
AUTHOR |EARTH SCIENCES DIVISION, LAWRENCE BERKELEY LAB.
KEYWORDS |BULK WASTE, CHEMISTRY -- GROUNDWATER, GEOLOGY -- FRACTURE/JOINTING,
|GEOLOGY -- LITHOLOGY, HISTORY, HYDROGEOLOGY -- REGIONAL,
|HYDROGEOLOGY -- WATER LEVELS, RADIOLOGICAL -- GROUNDWATER,
|RADIOLOGICAL -- SOIL

PMC? |N
FILE_NUMBER |27

TYPE |DOCUMENT
TITLE |POSSIBLE USE OF QUARRY AT MALLINCKRODT CHEMICAL WORKS, WELDON SPRING,
|MISSOURI, FOR THE DISPOSAL OF URANIUM CONTAMINATED BUILDING DEBRIS
|AND RUBBLE AND RESIDUES CONTAINING THORIUM AND URANIUM

DATE_ISSUED/PUBLISHED |06/00/60
DOCUMENT_NUMBER |4887
AUTHOR |U. S. GEOLOGICAL SURVEY, OAK RIDGE, TENN.
KEYWORDS |BULK WASTE, HISTORY, HYDROGEOLOGY -- WATER LEVELS
PMC? |N
FILE_NUMBER |28

TYPE |DOCUMENT
TITLE |HYDROLOGIC DATA FOR THE WELDON SPRING RADIOACTIVE WASTE-DISPOSAL
|SITES, ST. CHARLES COUNTY, MISSOURI
|1984-1986

DATE_ISSUED/PUBLISHED |00/00/86
DOCUMENT_NUMBER |OPEN FILE REPORT 86-488
AUTHOR |U. S. GEOLOGICAL SURVEY, OPEN-FILE REPORT 86-488
KEYWORDS |CHEMISTRY -- GROUNDWATER, CHEMISTRY -- SURFACE WATER, RADIOLOGICAL --
|GROUNDWATER, RADIOLOGICAL -- SURFACE WATER
PMC? |N
FILE_NUMBER |29

TYPE |DOCUMENT
TITLE |CHEMICAL CHARACTERIZATION REPORT FOR THE WELDON SPRING QUARRY, ST.
|CHARLES COUNTY, MISSOURI

DATE_ISSUED/PUBLISHED |08/00/87
DOCUMENT_NUMBER |DOE/OR/20722-176
AUTHOR |BECHTEL NATIONAL, INC.
KEYWORDS |CHEMISTRY -- SOIL, GEOLOGY -- LITHOLOGY
PMC? |N
FILE_NUMBER |30

TYPE |DOCUMENT
TITLE |HYDROLOGY AND WATER QUALITY AT THE WELDON SPRING RADIOACTIVE
|WASTE-DISPOSAL SITES, ST. CHARLES COUNTY, MISSOURI

DATE_ISSUED/PUBLISHED |00/00/87
DOCUMENT_NUMBER |REPORT 87-4169
AUTHOR |U. S. GEOLOGICAL SURVEY
KEYWORDS |GEOLOGY -- LITHOLOGY, HYDROGEOLOGY -- AQUIFER PROPERTIES,
|HYDROGEOLOGY -- POTENTIOMETRIC SURFACE RADIOLOGICAL -- SURFACE WATER
PMC? |N
FILE_NUMBER |31

TYPE |DOCUMENT
TITLE |COMPILATION AND PRELIMINARY INTERPRETATION OF HYDROLOGIC DATA FOR THE
|WELDON SPRING RADIOACTIVE WASTE-DISPOSAL SITES, ST. CHARLES

DATE_ISSUED/PUBLISHED | COUNTY, MISSOURI A PROGRESS REPORT
DOCUMENT_NUMBER | 00/00/86
AUTHOR | REPORT 85-4272
KEYWORDS | U. S. GEOLOGICAL SURVEY
| BULK WASTE, CHEMISTRY -- GROUNDWATER, GEOLOGY -- LITHOLOGY, HISTORY,
| HYDROGEOLOGY -- AQUIFER PROPERTIES, HYDROGEOLOGY -- REGIONAL,
| RADIOLOGICAL -- SURFACE WATER
PMC? | N
FILE_NUMBER | 32

TYPE | DOCUMENT
TITLE | RESPONSIVENESS SUMMARY FOR THE REMEDIAL INVESTIGATION/FEASIBILITY
| STUDY FOR MANAGEMENT OF THE BULK WASTES AT THE WELDON SPRING QUARRY,
| WELDON SPRING, MISSOURI

DATE_ISSUED/PUBLISHED | 08/00/90
DOCUMENT_NUMBER | DOE/OR/21548-135
AUTHOR | ARGONNE NATIONAL LABORATORY
KEYWORDS | SUPPORTING DOCUMENTATION -- RI, SUPPORTING DOCUMENTATION -- FS
PMC? | N
FILE_NUMBER | 33

TYPE | DOCUMENT
TITLE | RECORD OF DECISION FOR THE MANAGEMENT OF THE BULK WASTES AT THE
| WELDON SPRING QUARRY

DATE_ISSUED/PUBLISHED | 09/00/90
DOCUMENT_NUMBER |
AUTHOR | MKF - JEG
KEYWORDS | SUPPORTING DOCUMENTATION -- RI, SUPPORTING DOCUMENTATION -- FS
PMC? | Y
FILE_NUMBER | 34

TYPE | DOCUMENT
TITLE | GROUNDWATER HYDROLOGY INVESTIGATION, WELDON SPRING, MO, VOLUME 1
DATE_ISSUED/PUBLISHED | 01/08/86
DOCUMENT_NUMBER |
AUTHOR | LAYNE WESTERN COMPANY, INC.
KEYWORDS | CHEMISTRY -- GROUNDWATER, GEOLOGY -- LITHOLOGY, HYDROGEOLOGY --
| AQUIFER PROPERTIES, HYDROGEOLOGY -- LOCAL, HYDROGEOLOGY --
| POTENTIOMETRIC SURFACE, HYDROGEOLOGY -- RECHARGE/DISCHARGE,
| HYDROGEOLOGY -- WATER LEVELS, RADIOLOGICAL -- GROUNDWATER
PMC? | N
FILE_NUMBER | 35

TYPE | DOCUMENT
TITLE | THE MCW URANIUM DIVISION 1959 ANNUAL OFF-SITE ENVIRONMENTAL
| MONITORING REPORT
DATE_ISSUED/PUBLISHED | 00/00/60
DOCUMENT_NUMBER | 24388
AUTHOR | MALLINCKRODT CHEMICAL WORKS, URANIUM DIV.
KEYWORDS | RADIOLOGICAL -- AIR, RADIOLOGICAL -- GROUNDWATER, RADIOLOGICAL --

PMCT? |SURFACE WATER, RADIOLOGICAL -- SOIL, RADIOLOGICAL -- SEDIMENT
FILE_NUMBER |N
|36

TYPE |DOCUMENT
TITLE |INITIAL ASSESSMENT OF THE EFFECT OF DROUGHT CONDITIONS ON
|CONTAMINATION MIGRATION FROM THE WELDON SPRING QUARRY, REV 0
DATE_ISSUED/PUBLISHED |11/00/88
DOCUMENT_NUMBER |DOE/OR/21548-036
AUTHOR |MKF - JEG
KEYWORDS |RADIOLOGICAL -- GROUNDWATER, HYDROGEOLOGY -- WATER LEVELS
PMCT? |Y
FILE_NUMBER |37

TYPE |DOCUMENT
TITLE |THE EFFECT OF A ZERO-CONCENTRATION SINK ON CONTAMINANT TRANSPORT AND
|REMEDIAL-ACTION DESIGNS FOR THE WELDON SPRING QUARRY, WELDON SPRING,
|MO (DRAFT)
DATE_ISSUED/PUBLISHED |04/00/88
DOCUMENT_NUMBER |
AUTHOR |U. S. DOE, OAK RIDGE
KEYWORDS |HYDROGEOLOGY -- AQUIFER PROPERTIES
PMCT? |N
FILE_NUMBER |38

TYPE |DOCUMENT
TITLE |THE RESOURCES OF ST. CHARLES COUNTY, MISSOURI LAND, WATER, AND
|MINERALS
DATE_ISSUED/PUBLISHED |04/00/77
DOCUMENT_NUMBER |GR-51
AUTHOR |MISSOURI GEOLOGICAL SURVEY, DEPT. OF NAT. RESOURCES
KEYWORDS |GEOLOGY -- LITHOLOGY, HYDROGEOLOGY -- REGIONAL
PMCT? |N
FILE_NUMBER |39

TYPE |DOCUMENT
TITLE |RADIOLOGIC CHARACTERIZATION OF THE WELDON SPRING, MISSOURI, REMEDIAL
|ACTION SITE
DATE_ISSUED/PUBLISHED |02/00/88
DOCUMENT_NUMBER |DOE/ID/12584-22
AUTHOR |UNC GEOTECH, INC.
KEYWORDS |RADIOLOGICAL --SOIL
PMCT? |N
FILE_NUMBER |40

TYPE |DOCUMENT
TITLE |WELDON SPRING SITE REMEDIAL ACTION PROJECT VICINITY PROPERTIES, FEMME
|OSAGE SLOUGH SPECIAL STUDY
DATE_ISSUED/PUBLISHED |06/09/89
DOCUMENT_NUMBER |5121-VP:EN-R-01-0064-A

AUTHOR |MK-F, SAN FRANCISCO
KEYWORDS |HYDROGEOLOGY - WATER LEVELS, HYDROGEOLOGY - AQUIFER CHARACTERISTICS,
|RADIOLOGICAL - SOIL, RADIOLOGICAL - SEDIMENT, RADIOLOGICAL - SURFACE
|WATER, CHEMISTRY - GROUNDWATER, RADIOLOGICAL - GROUNDWATER

PMC? |Y
FILE_NUMBER |41

TYPE |MEMORANDUM
TITLE |REGARDING QUARRY AS DISPOSAL OF RADIOLOGICAL WASTE FOR MALLINCKROOT
DATE_ISSUED/PUBLISHED |11/07/60
DOCUMENT_NUMBER |

AUTHOR |R.M. RICHARDSON, U.S. DEPT. OF THE INTERIOR GEOLOGICAL SURVEY
KEYWORDS |HYDROGEOLOGICAL - AQUIFER CHARACTERISTICS
PMC? |N
FILE_NUMBER |42

TYPE |MEMORANDUM
TITLE |POSSIBLE USE OF QUARRY AT MALLINCKROOT CHEMICAL WORKS, WELDON SPRING,
|MISSOURI, FOR THE DISPOSAL OF URANIUM CONTAMINATED BUILDING DEBRIS
|AND RUBBLE AND RESIDUALS CONTAINING THORIUM AND URANIUM
DATE_ISSUED/PUBLISHED |06/00/60

DOCUMENT_NUMBER |
AUTHOR |R.M. RICHARDSON, U.S. GEOLOGICAL SURVEY
KEYWORDS |HYDROGEOLOGY - REGIONAL, GEOLOGY, TOPOGRAPHY
PMC? |N
FILE_NUMBER |43

TYPE |DOCUMENT
TITLE |WELDON SPRINGS QUARRY ENGINEERING EVALUATION PROGRAM PLAN
DATE_ISSUED/PUBLISHED |07/17/81
DOCUMENT_NUMBER |SAI-148-055
AUTHOR |HUGH E. COTHRAN, JR., AND ROBERT G. LEBO
KEYWORDS |HISTORY, ENGINEERING
PMC? |N
FILE_NUMBER |44

TYPE |DOCUMENT
TITLE |EXPLOSIVE HAZARD REVIEW FOR THE WELDON SPRING SITE REMEDIAL ACTION
|PROJECT QUARRY EXCAVATION
DATE_ISSUED/PUBLISHED |06/00/90
DOCUMENT_NUMBER |A08300-520-03
AUTHOR |MK-F
KEYWORDS |HISTORY, ENGINEERING
PMC? |Y
FILE_NUMBER |45

TYPE |DOCUMENT
TITLE |PHASE II TESTING AND EVALUATION OF ARCHAEOLOGICAL SITE 23SC21, ST.
|CHARLES COUNTY, MISSOURI
DATE_ISSUED/PUBLISHED |07/31/89

DOCUMENT_NUMBER	GR-0054
AUTHOR	TRIAD RESEARCH SERVICES
KEYWORDS	ARCHAEOLOGICAL
PMC?	N
FILE_NUMBER	46
TYPE	DOCUMENT
TITLE	PRELIMINARY RISK ASSESSMENT OF THE WELDON SPRING ROCK QUARRY
DATE_ISSUED/PUBLISHED	09/00/79
DOCUMENT_NUMBER	SAI-OR-79-135-01
AUTHOR	SCIENCE APPLICATIONS, INC
KEYWORDS	RADIOLOGICAL - GROUNDWATER, HYDROGEOLOGICAL - REGIONAL, RADIOLOGICAL - AIR, ENGINEERING
PMC?	N
FILE_NUMBER	47
TYPE	DOCUMENT
TITLE	AN ENGINEERING EVALUATION OF WASTE DISPOSAL OPTIONS AT WELDON SPRING QUARRY
DATE_ISSUED/PUBLISHED	12/01/81
DOCUMENT_NUMBER	SAI-148-WSQ
AUTHOR	HUGH E. COTHRAN
KEYWORDS	HISTORY, ENGINEERING, SUPPORTING DOCUMENTATION -- FS
PMC?	N
FILE_NUMBER	48
TYPE	DOCUMENT
TITLE	WORK PLAN FOR THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY-ENVIRONMENTAL IMPACT STATEMENT FOR THE WELDON SPRING SITE, WELDON SPRING, MISSOURI
DATE_ISSUED/PUBLISHED	08/00/88
DOCUMENT_NUMBER	DOE/OR/21548-033
AUTHOR	MK-F, JEG
KEYWORDS	HISTORY, ENGINEERING, SUPPORTING DOCUMENT -- RI, SUPPORTING DOCUMENT -- FS, RADIOLOGICAL -- GROUNDWATER, RADIOLOGICAL -- SURFACE WATER, CHEMISTRY -- GROUNDWATER, CHEMISTRY -- SURFACE WATER
PMC?	Y
FILE_NUMBER	49
TYPE	DOCUMENT
TITLE	WELDON SPRING ORDNANCE WORKS COMPLETION REPORT
DATE_ISSUED/PUBLISHED	NOT AVAILABLE
DOCUMENT_NUMBER	
AUTHOR	WELDON SPRING ORDNANCE WORKS
KEYWORDS	HISTORY
PMC?	N
FILE_NUMBER	50
TYPE	MEMORANDUM
TITLE	STATUS REPORT ON SURVEYS OF WELDON SPRINGS VICINITY PROPERTIES

DATE_ISSUED/PUBLISHED 09/27/84

DOCUMENT_NUMBER

AUTHOR ORAU

KEYWORDS RADIOLOGICAL -- SOILS

PMC? N

FILE_NUMBER 51

TYPE DOCUMENT

TITLE RADIOLOGICAL SURVEY, US ARMY RESERVE PROPERTY, WELDON SPRING SITE,
ST. CHARLES COUNTY, MISSOURI

DATE_ISSUED/PUBLISHED JANUARY, 1986

DOCUMENT_NUMBER

AUTHOR ORAU

KEYWORDS RADIOLOGICAL -- SOIL, RADIOLOGICAL -- SURFACE WATER, RADIOLOGICAL --
GROUNDWATER, RADIOLOGICAL -- SEDIMENT

PMC? N

FILE_NUMBER 52

TYPE DOCUMENT

TITLE RADIOLOGICAL SURVEY OF THE AUGUST A. BUSCH AND WELDON SPRING WILDLIFE
AREAS, WELDON SPRING SITE, ST. CHARLES COUNTY, MISSOURI

DATE_ISSUED/PUBLISHED APRIL, 1986

DOCUMENT_NUMBER

AUTHOR ORAU

KEYWORDS RADIOLOGICAL -- SOIL, RADIOLOGICAL -- SURFACE WATER, RADIOLOGICAL --
GROUNDWATER, RADIOLOGICAL -- SEDIMENT

PMC? N

FILE_NUMBER 53

TYPE DOCUMENT

TITLE RADIOLOGICAL SURVEY REPORT FOR THE WELDON SPRING QUARRY

DATE_ISSUED/PUBLISHED 09/85

DOCUMENT_NUMBER DOE/OR/20722-70

AUTHOR BECHTEL NATIONAL, INC

KEYWORDS RADIOLOGICAL -- GROUNDWATER, RADIOLOGICAL -- SURFACE WATER,
RADIOLOGICAL -- SOIL, RADIOLOGICAL -- SEDIMENT

PMC? N

FILE_NUMBER 54

TYPE DOCUMENT

TITLE RECREATIONAL USE OF WELDON SPRING WILDLIFE AREA 1989-1990

DATE_ISSUED/PUBLISHED JUNE 1991

DOCUMENT_NUMBER

AUTHOR MISSOURI DEPARTMENT OF CONSERVATION

KEYWORDS HISTORY

PMC? NO

FILE_NUMBER 55

TYPE DOCUMENT

TITLE WELDON SPRING STORAGE SITE ENVIRONMENTAL MONITORING REPORT, 1979 AND

1980
 DATE_ISSUED/PUBLISHED APRIL 19, 1982
 DOCUMENT_NUMBER
 AUTHOR R.B. WEIDNER & M. W. BOBACK
 KEYWORDS HISTORY, RADIOLOGICAL -- SURFACE WATER, CHEMICAL -- SURFACE WATER
 PMC? NO
 FILE_NUMBER 56

TYPE DOCUMENT
 TITLE QUARTERLY REPORT, ST. CHARLES COUNTY WELL FIELD MONITORING PROJECT
 DATE_ISSUED/PUBLISHED APRIL, MAY AND JUNE, 1991
 DOCUMENT_NUMBER
 AUTHOR STANLEY M. REMINGTON
 KEYWORDS RADIOLOGICAL -- GROUNDWATER, CHEMICAL -- GROUNDWATER
 PMC? NO
 FILE_NUMBER 57

TYPE DOCUMENT
 TITLE STUDY OF RADIOACTIVE WASTE STORAGE AREAS AT ERDA-WELDON SPRING SITE
 DATE_ISSUED/PUBLISHED AUGUST, 1981
 DOCUMENT_NUMBER
 AUTHOR NATIONAL LEAD COMPANY OF OHIO
 KEYWORDS RADIOLOGICAL -- SURFACE WATER, CHEMICAL -- SURFACE WATER, GEOLOGY
 PMC? NO
 FILE_NUMBER 58

TYPE DOCUMENT
 TITLE ERDA-WELDON SPRING DECOMMISSIONING STUDY
 DATE_ISSUED/PUBLISHED JUNE 20, 1975
 DOCUMENT_NUMBER
 AUTHOR NATIONAL LEAD COMPANY OF OHIO
 KEYWORDS HISTORY, ENGINEERING
 PMC? NO
 FILE_NUMBER 59

TYPE DOCUMENT
 TITLE ERDA-WELDON SPRING DECOMMISSIONING STUDY, QUARRY SUPPLEMENT
 DATE_ISSUED/PUBLISHED SEPTEMBER 10, 1975
 DOCUMENT_NUMBER
 AUTHOR NATIONAL LEAD COMPANY OF OHIO
 KEYWORDS HISTORY, ENGINEERING
 PMC? NO
 FILE_NUMBER 60

TYPE DOCUMENT
 TITLE ECONOMICAL AND SAFE DISPOSAL OF T.N.T. WASTE WATERS AT WELDON SPRING
 ORDNANCE WORKS
 DATE_ISSUED/PUBLISHED JULY, 1942
 DOCUMENT_NUMBER
 AUTHOR DR. F.W. MOHLMAN

KEYWORDS | HISTORY, ENGINEERING
PMC? | NO
FILE_NUMBER | 61

TYPE | DOCUMENT
TITLE | DRAFT: VICINITY PROPERTIES CONCEPTUAL DESIGN REPORT
DATE_ISSUED/PUBLISHED | APRIL, 1989
DOCUMENT_NUMBER | DOE/OR/21548-001
AUTHOR | MKF-JEG
KEYWORDS | ENGINEERING
PMC? | YES
FILE_NUMBER | 62

END

**DATE
FILMED**

01 / 23 / 92