DOE/EH-0195

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Environmental Audit
Weldon Spring Site
Remedial Action Project

U.S. Department of Energy
Office of Environmental Audit

June 1991

DOE/EH--0195

DE91 014549

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U.S. Department of Energy
Office of Environmental Audit
Washington, DC 20585

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PREFACE
U.S. DEPARTMENT OF ENERGY
ENVIRONMENTAL AUDIT
AT
WELDON SPRING, MISSOURI

On June 27, 1989, the Secretary of Energy announced a 10-point Initiative to strengthen environmental protection within the U.S. Department of Energy (DOE). Consistent with this Initiative, the Secretary emphasizes and strengthens independent internal oversight as a management reform in Secretary of Energy Notice (SEN)-11-89, which would monitor the effectiveness of DOE management in complying with operational, environmental, safety, health, and security standards established by law, regulation, and DOE policy.

As part of the internal oversight responsibilities within DOE, the Office of Environment, Safety, and Health (ES&H) has established a program within the Office of Environmental Audit, EH-24, to conduct multi-disciplinary environmental audits at DOE's operating facilities. The initial audits in this program are designed to gather baseline information on the environmental compliance and management at facilities that have not undergone a Tiger Team Assessment, and are not expected to be scheduled for a Tiger Team Assessment through Fiscal Year 1992.

The Audit objective is to provide the Secretary with information on the compliance status of DOE facilities with regard to environmental requirements, root causes for concerns identified, adequacy of DOE environmental management programs, and corrective actions to address the identified problem areas.

Washington, DC
June 1991

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EXECUTIVE SUMMARY

This report documents the results of the Environmental Audit conducted at the Weldon Spring Site Remedial Action Project (WSSRAP) in St. Charles, Missouri. The Audit was conducted by the U.S. Department of Energy's (DOE) Office of Environmental Audit, beginning April 15, 1991, and ending April 30, 1991.

The scope of the Audit at WSSRAP was comprehensive, addressing environmental activities in the technical areas of air; surface water; groundwater; soils, sediment, and biota; waste management; toxic and chemical materials; quality assurance; radiation; inactive waste sites; and environmental management. The National Environmental Policy Act (NEPA) was not audited since it is the responsibility of DOE Headquarters (HQ), Office of NEPA Project Assistance. Also assessed was compliance with applicable Federal, state, and local regulations and requirements; internal operating requirements; DOE Orders; and best management practices (BMPs). On-site activities included document review; interviews with site personnel (both DOE and contractor), as well as representatives from state and local regulatory agencies; reviews of previous audits and self-assessments; and daily Team debriefs that were open to DOE and site personnel, and regulatory officials. Using these sources of information, the Environmental Audit Team developed findings which fall into three general categories: compliance findings (CF), best management practice (BMP) findings, and noteworthy practices (NP). Each finding also identifies the causal factor(s) that contributed to the finding.

Consistent with the Secretary of Energy's objectives to have DOE programs and operations strive for excellence and go beyond compliance in the daily performance of environmental compliance activities, WSSRAP management and operations excels in meeting these objectives. The cultural attitude of WSSRAP to treat environmental protection as a top priority is pervasive and is exhibited throughout the WSSRAP line management organization on down through every level of the Project Management Contractor, MK Ferguson and Jacobs Engineering. This may be in part attributable to the fact that there is a single focus to WSSRAP activities (environmental protection) and much more adequate resources in the environmental area than at many other restoration sites. Communication within and among WSSRAP's organization and programs is outstanding, with all levels of management operating in a proactive mode to ensure compliance with ES&H goals and responsibilities. Much of WSSRAP's performance may be attributed to the employees' high degree of professionalism, commitment and pride in their work, as well as the longevity and low turnover in key WSSRAP management personnel.

The Audit Team identified a total of 32 findings: 10 findings associated with the lack of conformance with Federal and state laws and regulations and DOE Orders, and 22 findings in which best management practices were not achieved. While the corrective actions for each of the findings vary in importance and priority, none indicate programmatic problems and certainly none reflect situations that present near-term threats to public health and the environment. The findings, instead, are indicative of (1) some inattention to details contained in internal policies and procedures, (2) insufficient supervisory oversight to ensure that the highest quality performance standards are consistently obtained and maintained, (3) some inadequate WSSRAP

procedures to document in detail how to achieve the expected results or requirements, and (4) occasionally incomplete training sufficient to adequately meet certain specified requirements in regulations, procedures and/or programs. WSSRAP was aware of nearly half of these deficiencies and already has in preparation draft plans, programs or procedures to correct them. Two noteworthy practices, Management of Work Packages and Support of Science and Education, were also identified during this Audit. The noteworthy practices relate to the proactive approach that WSSRAP management and staff exhibit in their continued efforts to treat environmental protection as a top priority.

1.0 INTRODUCTION

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This report documents the results of the Environmental Baseline Audit of DOE's Weldon Spring Site Remedial Action Project (WSSRAP), located in St. Charles, Missouri.

Secretary of Energy Notice (SEN) 6B-90 assigns the Office of Environment, Safety, and Health (ES&H) the responsibility for conducting independent internal oversight audits to assure compliance with applicable laws related to environmental protection. SEN-20-90 emphasizes the need for and value of audits by authorized oversight organizations such as EH, to ensure that DOE activities are undertaken in an "environmentally sound manner". SEN 29-91 establishes the performance indicators and trending program to be in place by DOE operations beginning June, 1991. This program sets out to "establish a uniform system of Performance Indicators for trending and analyzing operational data to help assess and support progress in improving performance, "as well as strengthen line management control of operations relating or ES&H activities." The Environmental Audit Program is designed to evaluate and improve the environmental compliance status of DOE facilities, and to reflect the responsibility of line management for conducting operations in an environmentally safe and sound manner.

1.1 PURPOSE

The purpose of the Environmental Baseline Audit is to provide the Secretary of Energy with concise information pertaining to the following issues:

- compliance status with applicable environmental regulations (with the exception of National Environmental Policy Act [NEPA] requirements);
- adherence to best management and accepted industry practices;
- DOE vulnerabilities and liabilities associated with compliance status, environmental conditions, and management practices;
- root causes of compliance findings (CF) and best management practice (BMP) findings;
- adequacy of environmental management programs and organizations; and
- noteworthy practices

This information will assist DOE in determining patterns and trends in environmental compliance, BMPs, and root causes, and will provide the information necessary for line management to take appropriate corrective actions.

1.2 SCOPE

The scope of the Environmental Audit was comprehensive, addressing most environmental media and applicable Federal, state, and local regulations, with the exception of NEPA. Also addressed were DOE Orders and formalized facility

or program operating procedures, as well as BMPs. The technical disciplines addressed were air, surface water, soils, sediments, biota, groundwater, waste management, toxic and chemical materials, quality assurance, radiation, inactive waste sites, and environmental management. In addition, the Audit included a review of the environmental monitoring programs, and the effectiveness of environmental management programs. Because auditing of NEPA requirements is the responsibility of the DOE Headquarters Office of NEPA Project Assistance NEPA compliance issues were not audited and, therefore, are not addressed in this report.

1.3 APPROACH

The Environmental Audit followed accepted audit techniques and was guided by implementation of procedures and programs cited in the draft DOE Environmental Audit Guidance Manual (June 1990), and the DOE Environmental Audit Program Manual (DOE/EH-0125). The Audit was conducted by a Team of professionals managed by a DOE Headquarters Audit Team Leader and Assistant Team Leader from the Office of Environmental Audit, and staffed by contractor technical support personnel. The names, area of responsibility, affiliations, and biographical sketches of the Team members are provided in Appendix A. The Audit included three phases: planning, on-site activities, and reporting.

During the planning phase, a memorandum was sent to WSSRAP announcing the Environmental Audit and requesting information about the selected sites and the program in general. A pre-Audit site visit was conducted March 19-20, 1991. The site's response to the information request memorandum combined with the pre-Audit site visit formed the basis for the Audit Plan (Appendix B), including the on-site agenda. Once on-site, the Audit Team modified the original agenda as more information was obtained, and additional areas of interest were identified. The final daily agenda is contained in Appendix C.

On-site activities were conducted from April 15 through 30, 1991, and included interviews with site personnel (both DOE and contractor), as well as representatives from Federal, state and local regulatory agencies; document reviews, including previous audits and self-assessment reports; physical inspection of facilities; and observation of on-site activities. The Audit Team conducted daily debriefings that were open to DOE and site personnel, and regulatory officials. Lists of site documents reviewed and interviews performed are provided in Appendices D and E, respectively. Using these sources of information, the Audit Team developed findings as discussed in Sections 2 and 3 of this report.

The problems identified are categorized as either "compliance" findings, or "BMP" findings. Compliance findings (CF) are conditions that, in the judgment of the Audit Team, may not satisfy applicable environmental regulations, DOE Orders (including directional memoranda, where referenced), Secretary of Energy Notices (SENs), internal environmental policies and formal procedures, Federal Facility Agreements (FFAs), Records of Decision (RODs), other enforcement actions, and permit conditions. BMP findings are derived from regulatory agency guidance, accepted industry practice or technical standards, draft DOE Orders or guidance, and professional judgement.

Within the "compliance" and "BMP" categories, each finding is prefaced by a Performance Objective(s). The Performance Objectives specify the particular compliance or BMP standards against which the finding is being evaluated. The findings are not arranged in order of relative significance.

Special issues were also identified. These are not findings but are topics or situations requiring further discussion based on the set of circumstances surrounding the issue. A special issue is generally a regulatory requirement, policy direction, or management practice. Because special issues do not meet the criteria of findings, probable causal factors are not included in their discussion.

Site activities were reviewed for any noteworthy practices, activities, or programs that could have DOE complex-wide applications for the purpose of information transfer among DOE facilities. A practice may be noteworthy because its design and/or execution successfully addresses activities that have frequently resulted in compliance problems at other facilities. The presence or absence of noteworthy practices at a facility should not be viewed as a measure of a facility's performance. The purpose of this activity is for information transfer and problem solving across the DOE complex (rather than for the purpose of commendation). It provides the opportunity to identify innovative and cost-efficient solutions, thereby improving the effectiveness of DOE in meeting production goals in a way that is consistent with environmental goals.

It is the intent of this Environmental Audit to go beyond the findings and to identify the probably causal factors or root causes for certain environmental deficiencies. Probable causal factors can be defined as the factors contributing to the observed environmental deficiencies. When developing root causes, an identification of the causal factors contributing to each finding is essential. If one or more of these causal factors can be identified as contributing to a specific finding it will be included in the supporting information of each finding. The causal factors are then used to determine the corrective actions required to rectify identified findings.

1.4 HISTORICAL BACKGROUND AND FACILITY DESCRIPTION

The Weldon Spring Site Remedial Action Project is being conducted as a Major System Acquisition under the Surplus Facilities Management Program (SFMP) of the U.S. Department of Energy (DOE). The major goals of the SFMP are to eliminate potential hazards to the public and the environment that are associated with contamination at SFMP sites and to make surplus real property available for other uses to the extent possible.

WSSRAP is a National Priorities List (NPL) site. In 1987, EPA placed the Weldon Spring Quarry (WSQ) on the NPL and then, in 1989, expanded the designated area to include the Weldon Spring Chemical Plant (WSCP). These two sites are separated by a distance of four miles, but because they are related as to history and purpose, and are compatible with regard to remediation approach, they are considered as one Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site. The total area to be remediated under the NPL designation is approximately 220 acres. Because of

prior use of this property by the Department of the Army (DA), clean-up costs of WSSRAP will be shared by both DOE and DA.

Since WSSRAP is an NPL site, DOE is responsible for evaluating damages to vicinity properties. Vicinity properties to WSSRAP include the Department of the Army (DA) Weldon Spring Ordnance Work which incorporates the August A. Busch Wildlife Preserve. The DA's property was designated as a separate NPL site by the EPA in 1989.

WSSRAP is located near Weldon Spring in St. Charles, Missouri, approximately 30 miles west of St. Louis (Figures 1 and 2). The site was used by the U.S. Department of the Army (DA) from 1941 to 1944 for the production of dinitrotoluene (DNT) and trinitrotoluene (TNT). In 1957, the Atomic Energy Commission (AEC) acquired 220 acres of the original Weldon Spring Ordnance Works from the DA for use as a uranium feed material plant. The plant was operated as an integrated facility for the conversion of uranium ore concentrates to pure uranium trioxide, intermediate compounds, and uranium metal. A relatively small amount of thorium was also processed. Wastes generated during these operations were stored in four raffinate pits (WSRP) at the facility. The feed materials plant ceased operations in 1966 and closed in 1968.

Following the shutdown of the feed materials plant in 1966, the AEC returned the facility to the DA in 1967 for planned use as a defoliant production plant (to be known as the Weldon Spring Chemical Plant [WSCP]). The DA began removing equipment and decontaminating buildings in 1968. Approximately 5,555 cubic yards of contaminated materials were hauled to the Weldon Spring Quarry (WSQ) approximately four miles south-southwest of the WSRP and WSCP areas. In addition, an undetermined amount of contaminated piping, ducting, drums, and other scrap were disposed of into raffinate pit #4. The defoliant project, however, was canceled in 1968 before production began. The DA retained responsibility for the site with the exception of the raffinate pits and quarry which were transferred back to the AEC. Custody of the Chemical Plant was transferred to the DOE (successor to the AEC) in 1985. In conjunction with this transfer, the Weldon Spring Site Remedial Action Project (WSSRAP) was created in 1985. Consistent with the DOE mission under the Surplus Facilities Management Program (SFMP), the WSSRAP will eliminate potential hazards to the public and the environment and make surplus real property available for other uses to the extent possible.

Weldon Spring Raffinate Pits (WSRP)

The 52-acre WSRP area includes four pits that cover approximately 26 acres. These pits contain radioactive residues (called raffinates) from uranium and thorium processing operations at the former Weldon Spring Feed Materials Plant (now the WSCP). Access to the area is controlled by a 7-foot high fence that encloses the DOE property. The pit drains and all transfer lines from the pits to the WSCP storm sewer have been sealed.

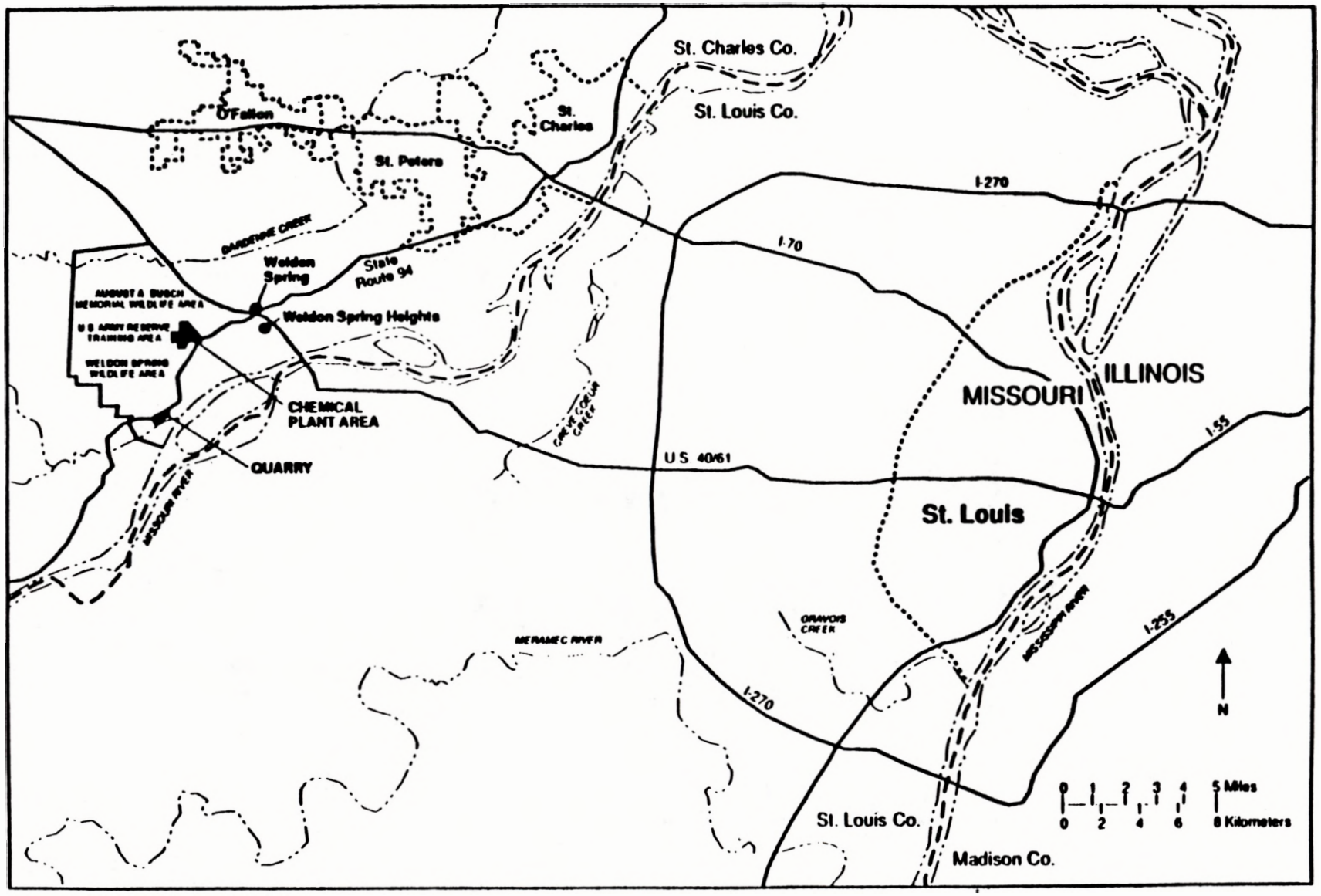

FIGURE 1

LOCATION OF THE WELDON SPRING SITE, WELDON SPRING, MISSOURI

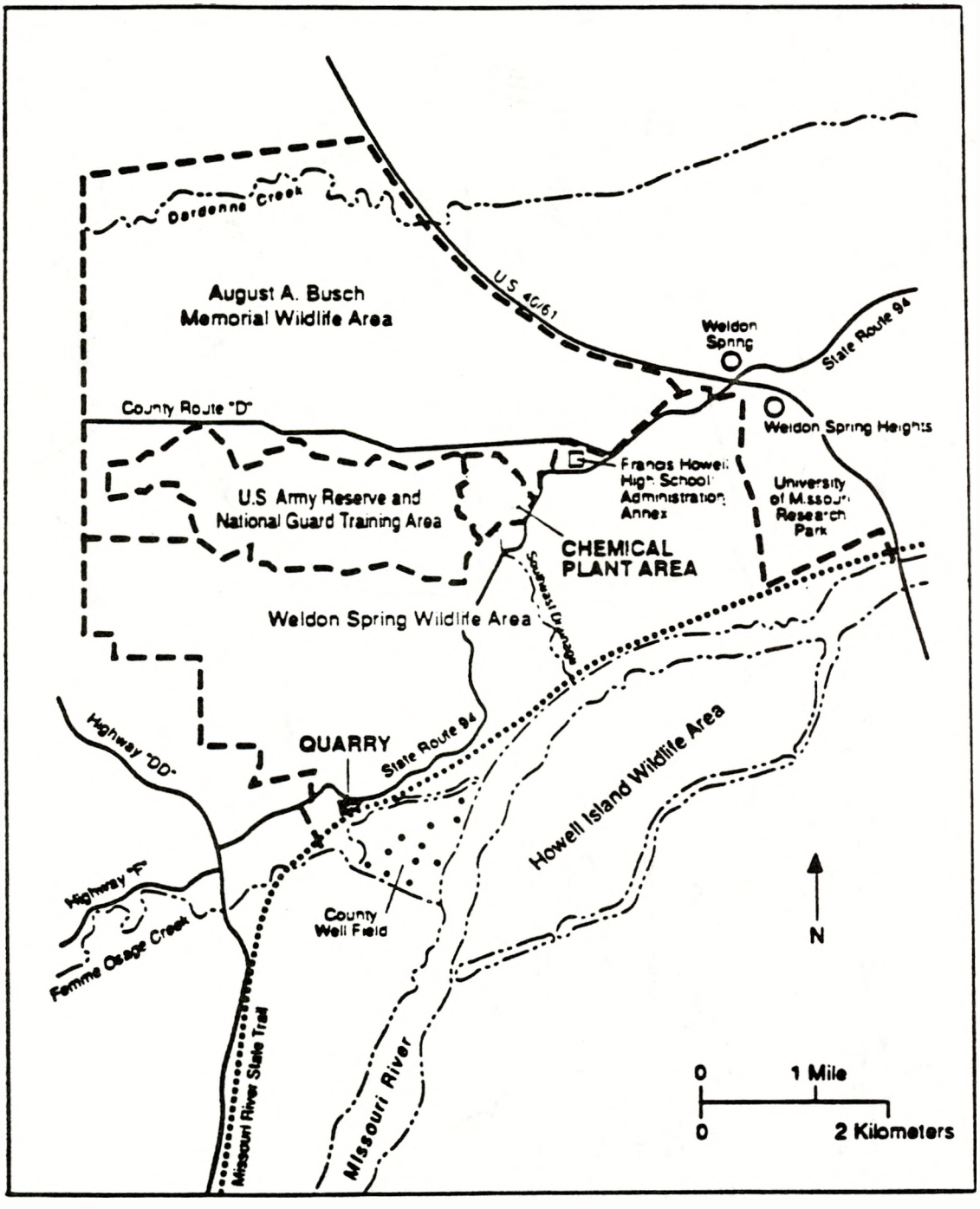

FIGURE 2

MAP OF THE WELDON SPRING SITE AND VICINITY

Weldon Spring Chemical Plant (WSCP)

The 169-acre WSCP is located immediately east of the WSRP area. The WSCP, which operated as the Weldon Spring Feed Materials Plant until 1966, comprises 13 major buildings and approximately 30 smaller buildings. Of the 13 buildings, five were used as process buildings, and eight were major support buildings. The entire site is fenced and access is controlled at a manned security gate-house that is operated 24 hours.

Weldon Spring Quarry (WSQ)

The WSQ is a 9-acre limestone quarry located approximately 4 miles south-southwest of the WSRP/WSCP areas. A gravel road enters the site from Route 94 at the quarry floor, and a short dirt road provides access to the security gate at the upper level. The WSQ is essentially a closed basin; surface water within the rim flows to the quarry floor and into a sump pond, which covers approximately .5 acres. The pond contains approximately 3 million gallons of water and is up to 40 feet deep. The amount of water in the pond varies according to seasonal variations in precipitation and temperature. Access to the site is restricted by a locked, 7-foot high chain-link fence topped by three strands of barbed wire.

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2.0 SUMMARY OF ENVIRONMENTAL AUDIT CONCLUSIONS AND NOTEWORTHY PRACTICES

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Discussions in the following sections focus on the Weldon Spring Site Remedial Action Project's (WSSRAP) understanding of environmental laws, regulations, and best management practices relative to its mission to conduct total remediation and clean-up activities at an NPL Surplus facility. Typically, this chapter would focus on key findings where significant weaknesses or failings of the facility are noted and where identified root causes are indicative of shortcomings in the site's environmental protection programs; however, such a discussion is not warranted in this report. Based on this Audit Team's evaluation, WSSRAP understands well the meaning of environmental protection and, as the following sections conclude, incorporates this understanding in every program and activity it performs and at every level of performance of that activity.

Though there were 32 findings (10 compliance and 22 best management practice findings) identified during the Audit, none indicate programmatic problems and certainly none reflect situations that present near-term threats to public health and the environment. The findings, instead, are indicative of (1) some inattention to details contained in internal policies and procedures, (2) insufficient supervisory oversight to ensure that prescribed high quality performance standards are consistently obtained and maintained, (3) inadequate WSSRAP procedures documenting in detail how to achieve the expected results or requirements, and (4) incomplete training sufficient to adequately meet certain specified requirements in regulations, procedures and/or programs. WSSRAP was aware of nearly half of these deficiencies and already has in preparation draft plans, programs or procedures to address them.

The results of this Audit determined that the staff and programs at WSSRAP demonstrate a high degree of professionalism in complying with CERCLA requirements and in instituting proactive programs in environmental protection and compliance. The success of these programs can be partially attributed to the high level of staff commitment and the low turnover rate of key WSSRAP management personnel. Based on the qualities exhibited by WSSRAP, it is appropriate that the following sections of this chapter highlight the positive elements of WSSRAP's program.

2.1 WSSRAP STRENGTHS AND NOTEWORTHY PRACTICES

The WSSRAP Community Relations Department is committed to developing and maintaining a close relationship with the surrounding communities. This goal has been achieved through participation in a variety of innovative programs.

The semi-monthly, "NEWSSRAP" publication, and quarterly "All Hands Meeting" are site-sponsored programs designed to instill a high level of employee appreciation and understanding of site activities. "WSSRAP Updates", a biannual publication addressing current and proposed site activities, is distributed to over 70,000 St. Charles County residents as an insert to the St. Charles Journal newspaper. Participation in the local school districts' "Partners in Education" program encourages WSSRAP employees' involvement in

various educational activities including the following: guest speaker participation, support of school science fair projects, site tours for faculty and students, and sponsorship of a Geosciences Workshop.

The unique programs developed and/or supported by WSSRAP's Community Relations Department instill pride and promote high morale throughout the WSSRAP community, while serving as an example of what a facility can achieve when it is committed to excellence.

In the area of environmental protection and the interest of maintaining openness and full disclosure with the public at large, WSSRAP issues Quarterly Environmental Data Summary Reports (WEL0112) in addition to the Annual Site Environmental Reports. Because of the late issuance of the 1988 and 1989 Annual Site Environmental Reports (see SI-1) and public interest in knowing what was transpiring at WSSRAP, WSSRAP implemented a policy of issuing quarterly preliminary Environmental Data Summary Reports for public information. Two quarterly reports, one dated September 1990 and another dated January 1991, have been issued. The quarterly report presents the data without analysis, validation, or DOE-HQ review, as stated in a disclosure statement in the report. The report contains no trending information (though this may be added in the future), and where there is missing data (due to incomplete analyses), these are included in subsequent reports when the data become available. The quarterly reports are generated solely to inform the public of the results of the WSSRAP Environmental Monitoring Program.

Two Noteworthy Practices were identified during this Audit that demonstrate the proactive approach that WSSRAP is taking towards meeting the goals of environmental protection. Noteworthy Practice 1 (NP-1) points to the development by the Planning and Analysis Group of a Responsibility Assignment Matrix to ensure full and complete awareness and accountability for each Work Package on-site. The system functions by having an individual from specific work groups assigned to each work package. These assignments are made during the work package planning process so that the concerns and perspectives of each of the applicable groups are present during the planning, design, and implementation of site activities.

Noteworthy Practice 2 (NP-2) deals with the Department's policy, as stated in SEN-23-90, to have its organizational elements work to support science and mathematics education at both the precollege and university levels. Since 1989 as an active participant in the "Partners in Education" program, WSSRAP's staff and facility have made significant and long-term contributions to improving U.S. science and mathematics education.

2.2 LINE MANAGEMENT AND ENVIRONMENTAL OVERSIGHT

Consistent with the Secretary of Energy's objectives to have DOE programs and operations strive for excellence in the performance of their environmental compliance activities, WSSRAP management meets that objective. The cultural attitude of WSSRAP to treat environmental protection as a top priority is pervasive and is exhibited throughout the WSSRAP line management organization on down through every level of the Project Management Contractor (PMC). The PMC for WSSRAP is MK Ferguson and Jacobs Engineering.

Environment, Safety and Health (ES&H) authority and responsibilities for WSSRAP are well defined and understood, though there is no current documentation that clearly and accurately defines reporting relationships, roles, and responsibilities for DOE Oak Ridge (OR) and DOE Headquarters (HQ) organizations. The WSSRAP Project Charter and Project Plan predate SARA and the establishment of the Office of Environmental Restoration and Waste Management. WSSRAP, however, is in the process of updating both the Charter and Plan in light of increased site activity in the next year.

As part of its oversight roles and responsibilities, DOE-OR recently (October 1990) conducted an ES&H and Quality Assurance (QA) functional appraisal of the WSSRAP facility. The review of the WSSRAP ES&H & QA Compliance activities included the following: National Environmental Policy Act (NEPA) and related programs, Water Pollution Control Program, Toxic and Hazardous Substance and Control, Asbestos Management, Hazardous/Mixed Waste Management, Inactive Waste Sites Remediation Program, Environmental Quality Assurance, Radioactive Waste Management and Emissions, Groundwater Programs, Environmental Monitoring, Health Physics, Industrial Hygiene, Industrial and Construction Safety, Fire Protection, and the plant-wide Quality Assurance Program. There were no serious deficiencies identified in this appraisal and several programs were judged to be outstanding.

Though the on-site DOE organization is small, it is, nonetheless, very effective. Communications within and among WSSRAP organizations are outstanding. The PMC and other DOE contractors appear to work well together with on-site DOE management. The PMC only recently reorganized (within the last year) and already has well conceived, effective, comprehensive procedural documentation and ongoing training programs to attain and maintain the high performance standards expected of them. All levels of management operate in a proactive mode and have implemented well thought out, comprehensive management systems to ensure compliance with ES&H goals.

Assessment of the three levels of oversight during this Audit (DOE-HQ and DOE-OR of DOE-WSSRAP and PMC; DOE-WSSRAP of PMC; and PMC "internal audits") indicated that oversight functions were adequate and comprehensive. However, as on-site activity increases over the next year when WSSRAP steps up demolition activities, it will be important that this level of oversight be maintained and possibly enhanced, particularly for subcontractor work.

2.3 SELF-ASSESSMENT

While DOE-WSSRAP has not conducted a self-assessment (see EM/BMPF-4) of its management and functional programs to date (June 1991 is the anticipated implementation start date of their Self-Assessment Program), management appears to be keenly aware of the performance of activities throughout the project. This is evidenced by the absence of any areas of significant deficiencies being identified during this Audit. Functional and management appraisals of the PMC (by DOE-OR) have been performed, as well as internal appraisals by the PMC. The PMC has developed a procedure (MGT-1a) that addresses the administration and conduct of self-assessments (three self-assessments have been completed to date). WSSRAP does have formal reporting systems to document, communicate, and track findings and corrective actions

through its SWATS database which is used as a management tool to track WSSRAP deficiencies. However, this Audit did have a finding (EM/BMPF-2) which determined that WSSRAP had no defined procedure or mechanism to close out external Audit findings from the SWATS database. WSSRAP was aware of this problem but has not yet been able to address it adequately.

Though DOE-WSSRAP has not yet implemented its Self-Assessment Program, this Audit Team feels that WSSRAP is achieving the goals of the Secretary of Energy for setting a new course of accountability and excellence in the areas of ES&H at DOE. Management systems and controls seem to be well-established and include accountability, monitoring, feedback reporting (Work Packages), and oversight of performance to ensure implementation of ES&H requirements and objectives.

2.4 REGULATORY AGENCY CONCERNS

The U.S. Environmental Protection Agency (EPA) Region VII and the Missouri Department of Natural Resources (MDNR) were invited to participate in the Audit as observers, and their concerns with the WSSRAP site were solicited. Both Federal and state regulators attended the pre-Audit site visit meeting on March 19, 1991, and expressed some of the following concerns.

EPA Region VII expressed that as the lead in the EIS activities for the CERCLA RI/FS process, data verification and control are of primary concern. Both EPA and the state confirmed, however, that they are not in total agreement, one with the other, concerning the "applicability" of RCRA ARARs when it comes to the treatment of the Weldon Spring Quarry (WSQ) wastewater because of the presence of nitroaromatics.

The MDNR expressed that the public in general had concerns about the drinking water supply that could be affected by the leaking WSQ wastewater. The state also mentioned that the leaking raffinate pits raised potential concerns relative to groundwater contamination since the aquifer under the site was fairly shallow. The state does do some of its own independent monitoring on groundwater wells and their own geologist does review the site's groundwater well construction. Also, as the Material Staging Area (MSA) and Temporary Storage Area (TSA) are built (one to store non-RCRA regulated bulk waste from building demolition and the other to store the potentially hazardous bulk waste and mixed waste from the WSQ, respectively), the state will be reviewing the construction and feasibility designs for them.

2.5 SUMMARY OF FINDINGS

The WSSRAP Environmental Baseline Audit identified 32 findings, one Special Issue, and two Noteworthy Practices. None of the findings reflect situations that present near-term threats to public health or the environment. Ten findings represent conditions which do not meet the requirements of Federal, state, or local regulations, DOE Orders, or internal WSSRAP procedures. Twenty-two findings represent situations where conditions or practices do not adhere to best management practices (BMPs). Table 2-1, Environmental Audit Findings, presents the findings and an indication of whether WSSRAP personnel were aware of the situation leading to the finding (or any portion of the

TABLE 2-1
ENVIRONMENTAL AUDIT FINDINGS

Finding Number	Finding Title	Finding Previously Identified by WSSRAP* (Yes/No)	Reason (D,I,R)**
AIR/BMPF-1	Asbestos Storage Procedures	Partially	
SW/CF-1	Surface Water Sampling Procedure	No	I
SW/BMPF-1	Calibration and Maintenance of Flow Measuring Devices	No	
SW/BMPF-2	Oversight of NPDES Reporting	Yes	
SW/BMPF-3	Inspection of Aboveground Storage Tanks	No	
GW/CF-1	Well Abandonment Documentation	No	I
GW/BMPF-1	Groundwater Sampling Procedures	No	
GW/BMPF-2	Disposal of Purge Water	No	
GW/BMPF-3	Well Inventory Plan	Yes	
SSB/CF-1	Biological Surveillance Plan/Program	Yes	D
WM/CF-1	Closure of Underground Storage Tanks	No	R
WM/CF-2	RCRA Facility Training Programs	Yes	R
WM/CF-3	RCRA Contingency Plan	Yes	R
WM/BMPF-1	Waste Transfer Procedures	No	
WM/BMPF-2	Management of Bulk Waste Storage Areas	No	

TABLE 2-1
ENVIRONMENTAL AUDIT FINDINGS

Finding Number	Finding Title	Finding Previously Identified by WSSRAP* (Yes/No)	Reason (D,I,R)**
WM/BMPF-3	Logkeeping Procedures	No	
TS/CF-1	Storage of PCB Contaminated Material	Yes	R
TS/CF-2	Tracking of PCB Wastes in Storage	No	R
QA/BMPF-1	Analytical QA/QC Program for Radon Monitoring	Yes	
QA/BMPF-2	DOE Laboratory Quality Assurance Program for Radioactive Material	No	
QA/BMPF-3	QA Audits for Surface Water Sampling	No	
RAD/CF-1	Emergency Preparedness Plan	Yes	D
RAD/CF-2	Annual Site Environmental Report Documentation for Radionuclides and Methodology for Dose Assessment	No	D
RAD/BMPF-1	Evaluation of Atmospheric Emmissions	No	
RAD/BMPF-2	Documentation of Standards and Operating Procedures in the Site Environmental Monitoring Plan	No	
RAD/BMPF-3	Contamination Monitoring of Personnel and Vehicles	Partially	
RAD/BMPF-4	Determination of Doses to the Public	No	
IWS/BMPF-1	Meeting Project Milestones	Yes	
EM/BMPF-1	DOE Review of Work Packages in the Consent to Award Process	No	

TABLE 2-1
ENVIRONMENTAL AUDIT FINDINGS

Finding Number	Finding Title	Finding Previously Identified by WSSRAP* (Yes/No)	Reason (D,I,R)**
EM/BMPF-2	Close-out of External Audit Findings from the Site-Wide Audit Tracking System (SWATS)	Yes	
EM/BMPF-3	Plans, Programs, and Procedures Documentation	Partially	
EM/BMPF-4	Self Assessment Plan	Yes	
SI-1	Annual Site Environmental Report		
NP-1	Management of Work Practices		
NP-2	Support of Science and Education		

* Finding previously identified in 1990 Oak Ridge Functional Appraisal, 1991 PMC ES&H Compliance Report and/or WSSRAP's SEN-7A Report

** D = DOE Orders
I = Internal Requirement
R = Regulatory (EPA, State of Missouri) requirement

finding), and whether the finding was identified in any of the previous audits or appraisals which the Audit Team reviewed. The final column of the table indicates the source (regulation, DOE Order, or internal WSSRAP procedure) of the Performance Objective for each finding.

Figure 3 presents the total number of findings (compliance and BMP) for each medium or discipline audited. As can be seen, both Waste Management and Radiation had the largest number of findings, each having 6.

The following paragraphs represent a summary of the findings identified in the Environmental Audit, by discipline.

Air - There was one best management practice finding related to storage of radioactively contaminated friable asbestos waste.

Surface Water - One compliance finding and three best management findings were identified related to sample collection, maintenance of equipment, regulatory reporting, and tank inspections. Samples bottles used for collecting surface water samples are not rinsed with the water being sampled prior to collecting the final sample. There is no program for routine calibration and maintenance of flow measuring devices owned by the Missouri Department of Natural Resources. Mid-Missouri Environmental Inc. consistently fills out weekly flow data reports incorrectly and Discharge Monitoring Reports (DMR) continue to be submitted monthly, rather than quarterly according to the change in the last permit modification. Tanks which are believed, but not confirmed, to be empty, and previously contained hazardous materials, are not inspected on a regular basis.

Groundwater - One compliance finding and three best management practice findings were identified related to well abandonment documentation, groundwater sample collection, lack of a procedure in the 1991 Environmental Monitoring Plan for disposal of monitoring well purge water, and lack of a well inventory plan. The abandonment of well 1025 in January 1991 was not documented in the QA file. The ES&H procedure for groundwater sampling does not include sample container and preservation requirements for volatile organic compounds nor the requirement for water quality indicator monitoring during the well purging process and thus may not ensure that analytical results accurately represent the contaminants in the water. Field observations of monitoring well purging indicates that proper disposal practices are being employed for the purge water; however, there is no final procedure included in, or referenced in, the 1991 Environmental Monitoring Plan. Borings and monitoring wells constructed prior to 1986 have not been identified and may act as conduits for vertical transport of contaminants into the underlying aquifer. This is of special concern in the areas where construction activities are scheduled.

Soils, Sediment, Biota - There was one compliance finding related to the lack of a site-wide surveillance program or plan for monitoring site-derived contaminant impacts to biota and foodstuffs.

Total Findings
By Discipline

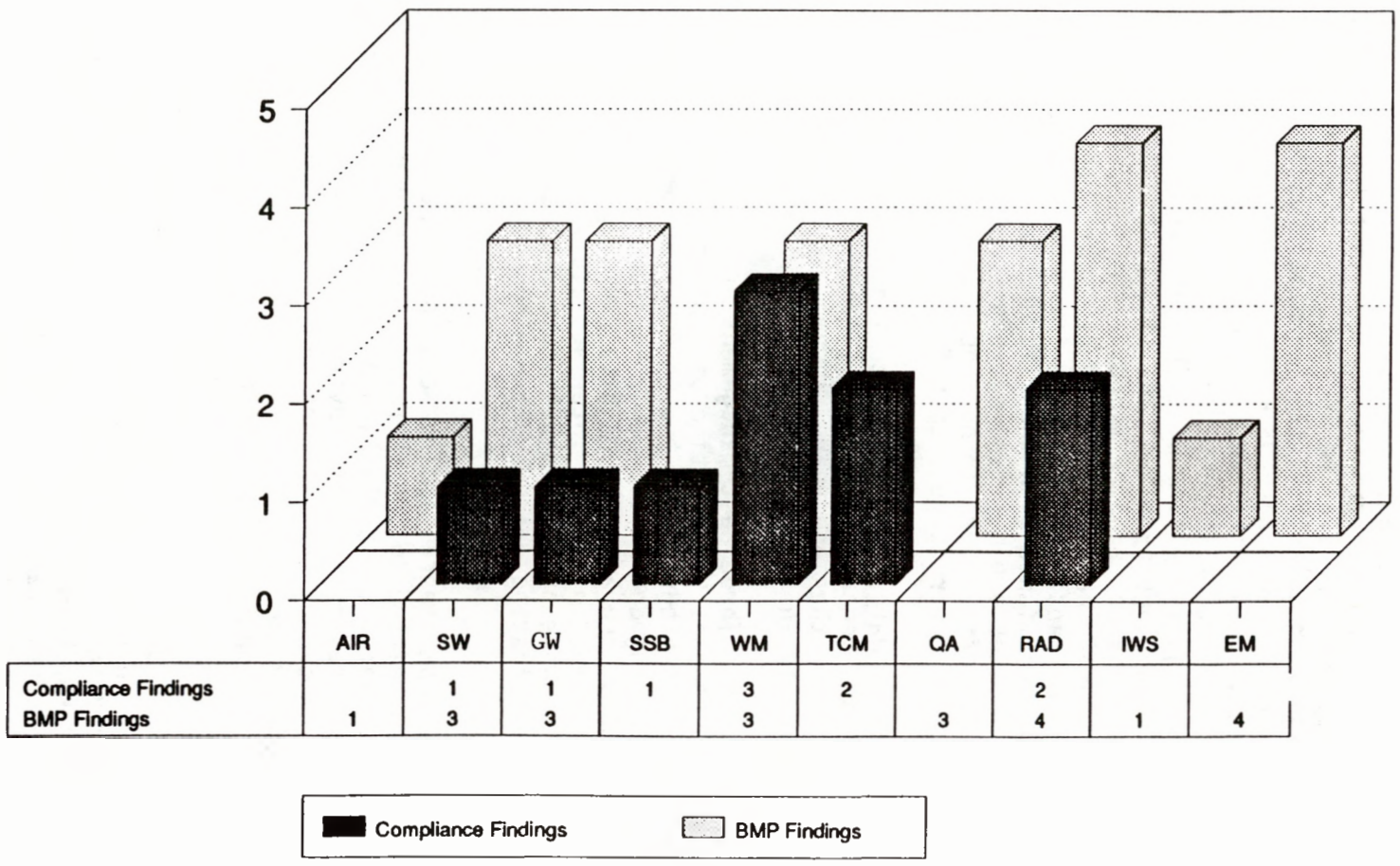

Figure 3

Waste Management - Three compliance findings and three best management findings were identified related to closure of underground storage tanks, the hazardous waste management training program, the hazardous waste contingency plan, procedures for hazardous waste transfers, and management of storage of bulk wastes. The five underground storage tanks (UST), which have been out-of-service since the WSCP closure in 1966, have not been closed according to US EPA and Missouri regulations. The training program does not ensure that all personnel are trained in hazardous waste management procedures within six months of assignment to a position with hazardous waste management responsibilities. Further, the written training program does not include all of the required regulatory elements. The facility does not have a written hazardous waste contingency plan. The site procedure related to transfers of hazardous waste does not require segregation of responsibilities with respect to request, approval, and confirmation of waste transfers, and there is no provision for the transfer forms to be forwarded to the building manager responsible for compliance with the hazardous waste storage requirements. Non-hazardous bulk wastes are not managed to prevent the generation of potentially contaminated run-off. There is no procedure for document control of inspection logs and corrective action forms.

Toxic and Chemical Materials - Two compliance findings were identified related to PCB storage and recordkeeping. PCB liquids and PCB items have been in storage for greater than one year. Incomplete recordkeeping for PCB items under WITS resulted in an inaccurate 1989 PCB Annual Report.

Quality Assurance - Three best management practice findings were identified related to independent verification of contract lab data, participation in the interlaboratory QA program, and the QA Audit procedure. The WSSRAP program for radon monitoring does not include an independent verification of the contract lab data accuracy. The on-site radiological monitoring laboratory does not participate in the DOE interlaboratory quality assurance program. The quality assurance procedure that addresses audits does not include a provision for indicating which auditable procedures were omitted from an audit.

Radiation - Two compliance findings and four best management practice findings were identified related to the Emergency Preparedness Plan, the Annual Site Environmental Report, the evaluation of atmospheric emissions, standard operating procedures in the site Environmental Monitoring Plan, contamination monitoring of personnel and vehicles, and determination of doses to the public. The WSSRAP Emergency Preparedness Plan does not specifically address radiological emergencies. The 1989 Annual Site Environmental Report does not include documentation of the total quantity of radioactivity released by radionuclide or the modeling and calculation methodology used for dose assessment. An assessment of the potential for release of radionuclides from the hood in the on-site radiological analysis sample laboratory has not been performed. Documentation of preoperational assessment radiological air monitoring for the Weldon Spring Quarry wastewater treatment plant and laboratory procedures have not been included in the Environmental Monitoring Plan. Contamination monitoring of personnel and vehicles may not be adequate to verify that contamination is not being removed from the controlled area to uncontrolled areas. Even though the method used exceeds DOE requirements, the

calculated doses to the public reported in the Annual Site Environmental Report were not performed using a methodology discussed in DOE Orders, and the alternative methodology used did not receive approval of the Assistant Secretary of Environment, Safety, and Health.

Inactive Waste Sites - There was one best management practice finding related to the instances of milestones, project deadlines, and revised deadlines for the implementation of the RI/FS-EIS and Statements of Work not being met.

Environmental Management - Four best management practices findings were identified related to general environmental management including DOE review of work packages in the Consent to Award process; management of external audit findings; documentation of environmental plans, programs, and procedures; and the Self-Assessment Plan. The detailed analyses of environmental compliance requirements, for each work package prepared for subcontractors by the PMC, is not being reviewed by DOE. There is no defined WSSRAP procedure or mechanism to close out external audit findings from the SWATS database. Several plans, programs and procedures (some with important environmental implications), which are to be used to implement various federal and state regulatory requirements, DOE Orders, Secretary of Energy Notices, and site requirements, are either under development or out of date. Neither DOE nor the PMC have completed development and implementation of the Self-Assessment Plans required by the DOE Memorandum of July 31, 1990.

2.6 CAUSAL FACTORS SUMMARY

In an effort to understand why a finding occurred, a systematic approach was implemented to perform a "probable causal factor" analysis. This approach is initiated by a series of "why" questions concerning the apparent cause(s) of a finding. The cause(s) and rationale are identified and placed in the supporting information for each finding. The causal factors are then used to determine the corrective actions required to rectify the identified findings. Definitions of the causal factors used in this Audit appear in Appendix F, and a summary of the causal factors identified at WSSRAP appears in Figure 4.

The results of the Environmental Audit identified eight probable causal factors which contributed to the 32 compliance and best management practice findings. The eight causal factors identified were: appraisals, audits and reviews, policy implementation, procedures, training, supervision, policy, resources, and design. These causal factors are discussed below.

Appraisals, Audits, and Reviews - appeared most frequently, in approximately 56 percent of the findings, and was evident in all disciplines except air, environmental management, toxic substances, and inactive waste sites. Either a lack of or inadequate Appraisals, Audits and Reviews contributed to this causal factor appearing in 18 findings.

Policy Implementation - also appeared in approximately 56 percent of the findings, and was evident in the same disciplines as those appearing in Appraisals, Audits, and Reviews. In at least seven findings, the inability of

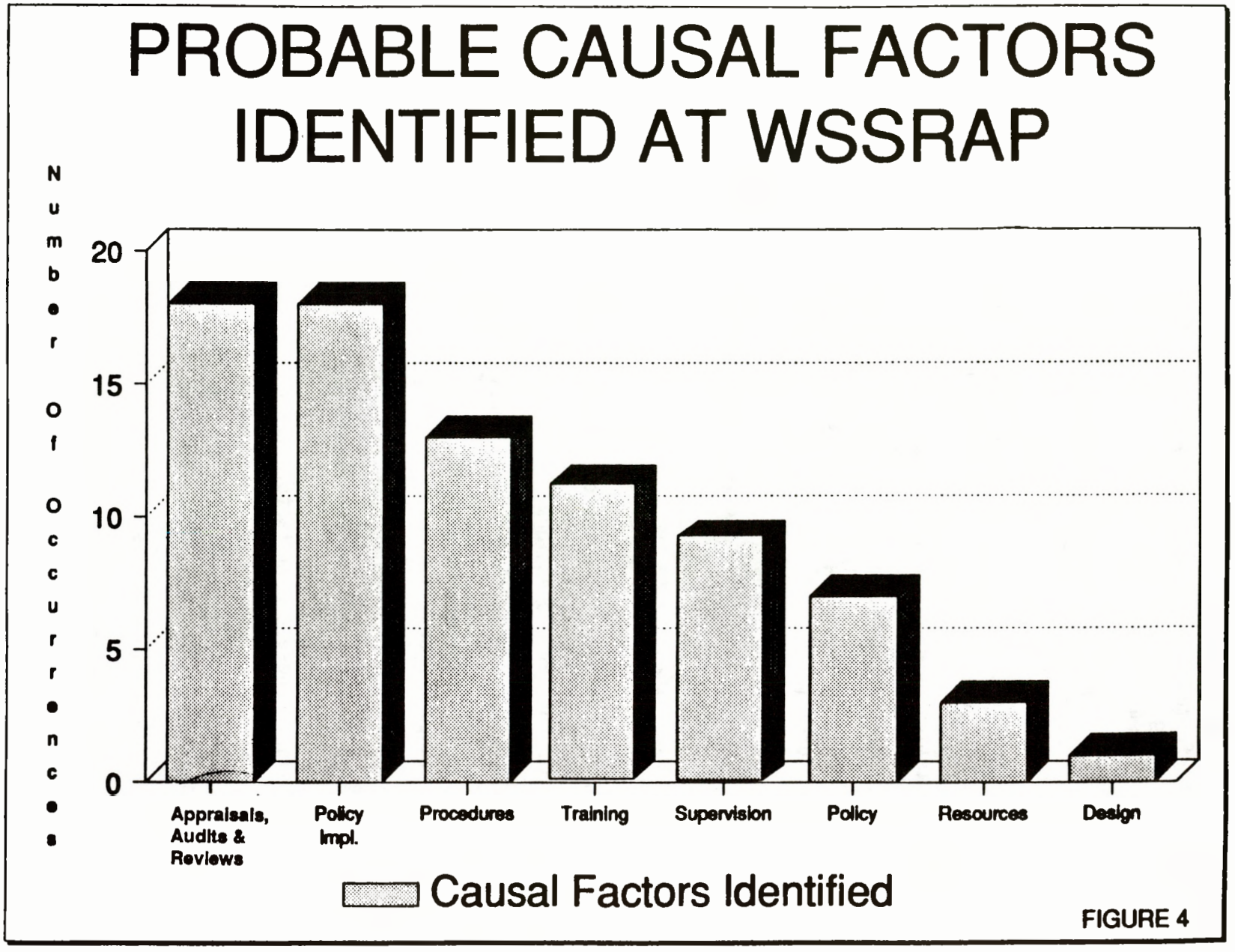
PROBABLE CAUSAL FACTORS IDENTIFIED AT WSSRAP
Number Of Occurrences
20
15
10
5
0
Appraisals, Audits & Reviews
Policy Impl.
Procedures
Training
Supervision
Policy
Resources
Design
Causal Factors Identified

FIGURE 4

WSSRAP to fully implement Federal and state regulations, DOE Orders, or WSSRAP procedures appeared to result from additional factors, including ineffective supervisory oversight, lack of or inadequate training, and lack of policy.

Procedures - appeared as a causal factor in approximately 37 percent of the findings, and was evident in the waste management, groundwater, radiation, quality assurance, and environmental management disciplines. WSSRAP's procedures to ensure implementation of Federal and state regulations, DOE Orders, and WSSRAP policies were either lacking or inadequate, with the latter being most prevalent.

Training - appeared as a causal factor in approximately 34 percent of the findings, occurring in the air, surface water, radiation, and groundwater disciplines. WSSRAP personnel have not received proper training due to both a lack of training programs and inadequate supervisory oversight.

Supervision - appeared as a causal factor in approximately 28 percent of the findings and occurred in all of the disciplines audited with the exception of quality assurance, toxic substances, and soil, sediment, and biota. Supervisory oversight was inadequate to ensure that program goals and procedures were being implemented.

Policy - appeared as a causal factor in approximately 21 percent of the findings and was evident in the inactive waste sites, surface water, groundwater, air, waste management, and toxic substances disciplines. Lack of policies was evident at both the DOE-HQ and WSSRAP levels and contributed to at least six findings.

Resources - appeared as a causal factor in approximately nine percent of the findings and occurred in two environmental management and one toxic substances findings. A lack of "human" resources contributed to all three findings.

Design - appeared as a causal factor only in the air finding and represents three percent of the total number of causal factors identified.

No other causal factors were identified in the findings.

The following sections present the 32 compliance and best management practice findings, by discipline, identified during the Environmental Audit, and discuss in greater detail the causal factors that appeared to contribute to the findings.

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3.0 ENVIRONMENTAL AUDIT FINDINGS

3.0 ENVIRONMENTAL AUDIT FINDINGS

This section contains the findings identified by the Environmental Audit Team and presents them in the following subsections by discipline.

3.1 AIR

3.1.1 Overview

The purpose of the air portion of the Environmental Audit was to assess the current operational practices at WSSRAP. The Environmental Audit evaluated the compliance status of the facility with regard to: 1) regulations promulgated by the U.S. Environmental Protection Agency (EPA) under the Clean Air Act; 2) air pollution control laws of the State of Missouri; 3) U.S. Department of Energy (DOE) Orders WSSRAP policies and procedures; and 4) best management practices (BMPs) associated with air pollution control. Table 3-1 lists applicable regulations and DOE Orders used to evaluate the air-related practices.

The general approach to the air portion of the Audit included the following activities: 1) tours of the facilities to locate potential or existing sources of air pollutant emissions; 2) interviews with WSSRAP personnel, Federal and state regulators; and 3) review of pertinent documentation.

WSSRAP is a Superfund (CERCLA) site undergoing remediation. As such, WSSRAP is not required to have air permits for normally regulated emission sources. Because of the WSSRAP remediation activities (e.g., demolition), asbestos is the substance of concern and the primary focus of this area of the Audit.

WSSRAP was monitored through off-site perimeter ambient air sampling for asbestos from May 1988 to June 1990. WSSRAP concluded that the monitoring was not warranted and ceased routine sampling. However, during remediation, abatement or construction activities, routine air sampling is instituted at two perimeter sampling sites on a weekly basis and at the Francis Howell High School on a daily basis.

The monitoring of asbestos abatement workers and work place environments is assigned to the responsible registered subcontractor as a prerequisite of the asbestos abatement contract award. Daily job inspections by the Project Management Contractor (PMC) are conducted under WSSRAP Industrial Hygiene Procedures. Asbestos air monitoring samples are generally sent to Engineering Science and Engineering (ESE) Laboratory in Gainesville, Florida (an American Industrial Hygiene Association and National Institute of Standards Accredited Laboratory.) The samples are analyzed by Phase Contrast Microscopy and Transmission Electron Microscopy on an as-needed basis.

Asbestos abatement activities have focused on 1) the removal of outside overhead piping that was used for steam and material transport during WSSRAP's previous operation; and 2) demolition of Building 401 (Steam Plant) and Building 409 (the old Administration building). These activities took place

TABLE 3-1
LIST OF APPLICABLE AIR
REGULATIONS/REQUIREMENTS/GUIDELINES

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
DOE Order 5400.1	General Environmental Protection Program	DOE
40 CFR 50-88	Clean Air Act Implementing Regulations	EPA
Title 40, Annotated Missouri Statutes, Section 6430.10	Missouri Air Conservation Law	MDNR

in 1988 and 1989, in response to occupational health hazards from the highly deteriorated condition of the asbestos. Ongoing asbestos abatement activities address the abatement of deteriorating asbestos material on piping or in buildings. Current plans for 1991 take a prioritized approach for the demolition of Buildings 302, 435, 436, 437 and the aboveground storage tanks located near Pad 109. Asbestos characterization and abatement will precede demolition of the buildings. The asbestos abatement was projected to begin in early 1991, but no action has been initiated as of April 22, 1991. WSSRAP staff now project the abatement and demolition to begin in November 1991.

The asbestos waste management program is not complete due to the lack of a disposal option for the radiologically contaminated asbestos. Release criteria for bulk wastes (i.e., asbestos) contaminated with radionuclides have not yet been established. WSSRAP is currently assuming that all asbestos that is characterized and determined radioactively contaminated, or which has not been characterized but has the potential to be radioactively contaminated, is being stored as radioactive. No off-site shipments of asbestos are planned for future asbestos abatement operations.

Fugitive dust generated by construction, remediation, or demolition will be controlled by best management practices such as spraying with water and localized ambient air sampling by WSSRAP staff. Localized air monitoring will be instituted upon the initiation of remedial activities.

The Environmental Audit identified one best management practice finding (BMPF) related to air. This BMPF relates to the lack of comprehensive asbestos storage procedures for radiologically contaminated asbestos waste stored in Building 103.

3.1.2 Compliance Findings

FINDING AIR/BMPF-1 Asbestos Storage Procedures

Performance Objective

Best management practices suggest that a comprehensive storage and monitoring program is required to facilitate the safe storage of radioactively contaminated asbestos waste prior to disposal. Standard operating procedures, such as containerized storage of bagged asbestos, maintenance of wet conditions for asbestos, and the close tracking of waste are necessary implementing procedures to minimize the potential release of harmful, friable asbestos. Asbestos or asbestos-containing materials do not necessarily pose a human health hazard unless they are in a friable condition and not contained.

Finding

Inspection of the radioactively contaminated asbestos storage areas in Building 103 revealed four ripped bags (integrity of inner bag unknown) containing asbestos, asbestos stored in undesignated areas, no procedures to re-wet or maintain wet conditions for stored asbestos, and the inability to completely survey piles of asbestos-containing bags for bag integrity.

Discussion

Current WSSRAP management procedures rely on inspection of previously bagged radioactively contaminated asbestos waste, stored in Building 103 on-site, to ensure conformance with Federal regulations (40 CFR 152) which define the "standard for waste disposal for manufacturing, demolition, renovation, spraying, and fabricating operations." Inspection of the asbestos storage areas in Building 103 revealed 1) four ripped bags containing asbestos where the outer bag was ripped, but the inner bag's integrity was uncertain; 2) asbestos stored in undesignated areas; 3) no procedures to re-wet or maintain wet conditions for potentially exposed asbestos, and 4) limited access to adequately survey the piles of asbestos-containing bags for bag integrity. Auditors observed a bag labeled asbestos in an undesignated storage area in the corner of Building 103. Based on the observations described above, it is not possible to determine whether asbestos is being released to the surrounding environment.

The practice of double bagging wet asbestos during abatement is documented in 40 CFR 61.147 and was practiced at WSSRAP during the actual abatement (1988-1990). However, the regulatory standards are premised on the bagged waste being further contained in sealed areas such as trucks or dumpsters and maintained wet until disposal at an approved landfill. WSSRAP does not follow all best management practices listed above for asbestos storage Building 103 (I-A-003). Building 103 does not provide containment in a sealed area. Broken windows and holes in the walls offer the opportunity for asbestos to be released into the environment, if the integrity of the asbestos-containing bags is breached.

A visual walk-through inspection, as a standard WSSRAP management practice, verifies that most of the bags retain integrity since bags are piled in excess of four feet high and do not allow for a means to access bags for a total visual inspection. Only a limited number of bags at the accessible perimeter can be visually inspected. Inspection is conducted on a weekly basis, but the limitations imposed by the practice of piling up bags does not facilitate or ensure adequate surveillance. The observation by the Audit Team of a bag containing asbestos in an undesignated storage area is indicative that not all waste is tracked while in storage. WSSRAP does not regularly monitor the air in Building 103 for the presence of asbestos. Routine air monitoring in the storage area is only conducted on personnel when planned activities move, disturb, or handle the asbestos-containing bags. Personnel monitoring is instituted on a case-by-case basis, depending on the potential for worker exposures (I-A-003). This monitoring is not necessarily instituted except when routine corrective actions are initiated in response to conditions found during weekly inspections. Environmental air monitoring occurs at two perimeter receptors and at the Francis Howell High School during asbestos abatement removal activities.

Earlier asbestos findings from the 1990 Oak Ridge Functional Appraisal (WEL0075) were not the focus and were not duplicated in the finding.

Site's Prior Knowledge

WSSRAP was partially aware of this finding. The finding of the presence of ripped asbestos storage bags was identified in the 1990 Oak Ridge Functional Appraisal (WEL0075). However, the ripped bags observed during this Audit are not assumed to be the same bags from that finding. The finding concerning no comprehensive asbestos waste storage procedures in conformance with best management practices was not identified in earlier audits. This finding also was not included in WSSRAP SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors contributing to this finding are an incomplete design for a comprehensive asbestos storage containment system that ensures radioactively contaminated asbestos remains confined. Other contributing causal factors for this finding include inadequate training of personnel, and inadequate supervisory controls and oversight of the asbestos abatement program.

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3.2 SURFACE WATER/SPCC

3.2.1 Overview

The purpose of the surface water/SPCC portion of the WSSRAP Environmental Audit was to evaluate compliance with regulations promulgated in response to the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA) (see Table 3-2). Surface water pollution control at WSSRAP consists of four elements: (1) administration of two NPDES permits, one for the Weldon Spring Chemical Plant (WSCP), MO-0108987 (WEL0091), and another for the Weldon Spring Quarry (WSQ), MO-010770; (2) coordination of surface water monitoring portions of the environmental surveillance program that WSSRAP conducts in order to comply with DOE Order 5400.1; (3) development and implementation of erosion control measures; and (4) administration of the Spill Prevention Control and Countermeasures (SPCC) Plan.

The general approach to the surface water portion of the Environmental Audit included the following activities: 1) tours of the surface water sampling locations and observation of the sampling procedures; 2) interviews with WSSRAP personnel, Federal and state regulators; and 3) review of pertinent documentation. While some work assignments are somewhat informal, roles and responsibilities of personnel are clearly understood. The key program elements are adequately staffed with well trained personnel.

Field inspections were conducted at a number of site locations, including NPDES outfalls NP-0001 through NP-0006 at the WSCP (NPDES Permit MO-0107701), the Quarry Pond Wastewater Treatment Facility construction-site, the Material Staging Area (MSA) construction-site, and environmental monitoring locations SW-1011, SW-1012, and SW-1013 on the Missouri River.

Overall, WSSRAP's management of their NPDES Program is excellent. The personnel managing and conducting the program are adequately trained and are familiar with the substantive requirements of the permits. While the monitoring stations are not currently equipped with state-of-the-art equipment, the facilities are adequate to meet the requirements of the permit, although a regular WSSRAP calibration program would be beneficial. In addition, WSSRAP has plans in place to upgrade these facilities. For the sampling program, the necessary sampling, chain of custody, data verification and validation procedures are in place. These procedures are adequate and, for the most part, are being followed.

Laboratory analysis is performed by two off-site contractor labs, JTC Environmental Consultants (wet chemistry) and Acculab Research (radiological analysis). The use of these contractors has resulted in successfully addressing some of WSSRAP's problems related to laboratory turn-around time for samples; a problem WSSRAP previously experienced with IT Corporation's labs in Oak Ridge, Tennessee. WSSRAP is in the process of developing a group of available qualified labs to enhance the quality and timeliness of analytical services. This Audit reviewed two months (July and October 1990) of Discharge Monitoring Reports (DMR) submitted by WSSRAP. These were found to correlate with the field log book, field data sheets, chain of custody forms, and lab data sheets on file.

TABLE 3-2
LIST OF APPLICABLE SURFACE WATER
REGULATIONS/REQUIREMENTS/GUIDELINES

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
40 CFR 112	Oil Pollution Prevention	EPA
40 CFR 122, 123, 124	National Pollutant Discharge Elimination System Regulations	EPA
40 CFR 136	Guidelines Establishing Test Procedures for the Analysis of Pollutants	EPA
40 CFR 141 & 142	National Primary Drinking Water Regulations	EPA
40 CFR 143	National Secondary Drinking Water Regulations	EPA
10 CSR 20	Missouri Water Pollution Control Regulations	MDNR
10 CSR 40	Missouri Drinking Water Regulations	MDNR

All significant planning for the proposed surface water management programs to support the Weldon Spring Quarry (WSQ) and Weldon Spring Chemical Plant (WSCP) remedial actions were found essentially in place. NPDES permits have been issued or modified to cover discharges from the proposed wastewater treatment plants to be located at both sites. The WSQ wastewater treatment plant was under construction at the time of this Environmental Audit. The conceptual design for the WSCP wastewater treatment plant has been completed and was the subject of a past public hearing held in August 1990.

Concerns by the state and public relating to the WSQ and WSCP wastewater treatment plant discharges have been resolved by the strict discharge limits that approach drinking water quality standards. According to personnel at the MDNR (I-SW-021), the one remaining concern is the potential for resuspended radiological or chemical contaminants in the southeast drainage channel. The concern is that these contaminants would be carried to the Missouri River. While a pipeline to convey the discharge all or part of the way to the River has been discussed, the potential exists for increased adverse environmental impacts due to the construction of such a pipeline. Plans are presently underway to assess the potential for resuspension of ditch contaminants by releasing water into the ditch at a flow rate comparable to that of the planned WSCP Wastewater Treatment Plant. Samples will be obtained at various locations and analyzed for contaminants. Appropriate follow-up action will be taken based on the results of this testing.

WSSRAP conducts extensive surface water sampling as part of its overall environmental surveillance program. Two programs, one for the WSCP and WSRP area, and one for the WSQ area are in place. A total of twelve surface water sampling locations are monitored in the WSCP and WSRP program, including six on-site and six off-site locations. In addition, eleven springs which are potentially affected by surface and/or groundwater flows are monitored. Past data indicate that uranium is the principal element of concern, and each location is monitored for uranium on a quarterly basis. In addition, some of the springs are monitored for nitrate, metals, and nitroaromatics where past data indicate that these elements may be of concern.

The surface water monitoring program at the WSQ includes thirteen sampling locations which are monitored quarterly for uranium and annually for arsenic and barium. The locations monitored include the Quarry pond, Femme Osage Slough, Little Femme Osage Creek, and the Missouri River. This program meets the requirements for an Environmental Surveillance Program as defined in DOE Order 5400.1, although the requirements for soils, sediments and biota monitoring may dictate an increase in the number of elements that need to be monitored.

Inspections of the construction-sites for the WSQ wastewater treatment plant and the WSCP Material Staging Area revealed that appropriate erosion control measures are being taken. Straw bale lines are used to minimize sediment runoff into the Little Femme Osage Creek at the WSQ and NPDES discharge NP-0003 at the WSCP. The bale lines appeared to be well maintained and functioning properly. This observation was confirmed by a review of Total Settleable Solids data from each receiving water body. The data indicate that the requirements of the NPDES permits for settleable solids are being met.

Although a BMP plan for erosion control is not specifically required by the NPDES Permits, the development of a formal Surface Water and Erosion Control Plan is ongoing.

WSSRAP has an ongoing program to characterize all of the over 100 aboveground tanks remaining on-site from past operations of the site. All of these tanks are suspected to be empty based on the records of the plant closing. It is anticipated that this program will be complete during 1991. The data will allow the safe removal of all tanks remaining on-site.

Four surface water findings were identified at WSSRAP. One is a compliance finding and three are BMP findings. The compliance finding deals with a failure to fully comply with WSSRAP procedures. The BMP findings involve the oversight of NPDES reporting calibration and maintenance of flow monitoring devices at three of WSSRAP's NPDES outfalls, and the inspection of aboveground storage tanks.

3.2.2 Compliance Findings

FINDING SW/CF-1 Surface Water Sampling Procedure

Performance Objective

WSSRAP Standard Operating Procedure (SOP) ES&H 4.3.1 rev. 4, Surface Water Sampling, states that samples should be collected by the chosen method, including "rinsing sample container with water from the body of water being sampled prior to collection of the actual sample."

Finding

Observation of sampling procedures applied in the field for surface water samples taken at NPDES outfalls NP-0001 and NP-0005 revealed that the sample bottles used for collecting surface water samples are not rinsed with the same surface water from which the sample is to be taken.

Discussion

In a review of surface water sampling procedures at WSSRAP, the auditor observed that none of the fourteen sample bottles used at NPDES outfalls NP-0001 and NP-0005 was rinsed with water from the outfalls prior to the collection of the sample. Rinsing the bottles is required by WSSRAP ES&H 4.3.1 to minimize the possibility of contaminating the sample with foreign material which may be inside of the sample bottle. The process of rinsing the bottles prior to collecting surface water samples is particularly important since the samples are analyzed for low concentrations of contaminants.

Site's Prior Knowledge

WSSRAP was not aware of this finding. The finding was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) or in the 1990 PMC ES&H Compliance Report (WEL0184). While one QA audit of water sampling was performed in December 1989, QA Audit #3589-031 (WEL0192), it did not include observation of surface water sampling. This finding also was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors contributing to this finding are a lack of training and supervisory oversight in the specific part of the procedures for sampling, and incomplete appraisals, audits, and reviews of the procedures, since this finding was not previously identified.

3.2.3 Best Management Practice Findings

FINDING SW/BMPF-1 Calibration and Maintenance of Flow Measuring Devices

Performance Objective

Weldon Spring Chemical Plant (WSCP) NPDES permit MO-0107701 (WEL0091) states "the permittee shall operate and maintain flow measuring devices capable of measuring flow to within ±10% of actual flow." This applies to NPDES outfalls NP-0002, NP-0003, and NP-0005. Best management practice suggests that WSSRAP, as the permittee, have a program in place for routine maintenance and calibration of flow measuring devices to ensure that the required level of accuracy is met.

Finding

WSSRAP does not have a program for routine calibration and maintenance of flow measuring devices for NPDES outfalls NP-0002, NP-0003 and NP-0005.

Discussion

WSSRAP does not have a program in place to ensure that calibration and maintenance of the flow measuring devices on their NPDES outfalls are performed on a regular basis and in compliance with the requirements of their NPDES permit. Each flow measuring device consists of a v-notch weir and a stilling well. Flow is measured by monitoring the water level in the stilling wells using a mechanical float and data logging system. Presently, the flow measuring equipment at NPDES outfalls NP-0002, NP-0003, and NP-0005 is owned by the Missouri Department of Natural Resources (MDNR). MDNR performs periodic maintenance and calibration of this equipment, often in response to problems identified by WSSRAP personnel during their monthly sampling activities. However, as the permittee, WSSRAP is responsible for the calibration and maintenance of the equipment but does not have a program in place to perform these functions.

WSSRAP is aware that their present flow measuring devices are not state-of-the-art, and is currently planning to upgrade them at outfalls NP-0002, NP-0003, and NP-0005 as part of an upcoming work package (WEL0187). This package includes the replacement of state-owned flow measuring equipment with more modern DOE-owned devices. WSSRAP recognizes the need to take responsibility for calibrating and maintaining their equipment and plans to do so after the work package is complete.

Site's Prior Knowledge

WSSRAP was not aware of this finding. The finding was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) or in the 1991 PMC ES&H Compliance Report (WEL0184). This finding also was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors contributing to this finding are lack of a WSSRAP policy or program for calibrating and maintaining flow measuring devices, inadequate policy implementation of requirements stipulated in the NPDES permit, and incomplete audits, appraisals and reviews since this finding was not previously identified. WSSRAP has not developed a program to calibrate and maintain flow measuring devices primarily because the equipment is owned and maintained by the MDNR.

FINDING SW/BMPF-2 Oversight of NPDES Reporting

Performance Objective

It is considered a best management practice for an NPDES discharge facility to have in place a mechanism to ensure that NPDES discharge reports are completed properly.

Finding

WSSRAP has a management system in place to oversee the preparation and submission of NPDES reports; however, it failed to identify two minor issues observed by the auditor. The two issues observed are incorrect completion of the Discharge Monitoring Reports (DMR) for NPDES outfall NP-0006, and the continued submission of monthly NPDES reports after the permit was modified to require quarterly reports.

Discussion

WSSRAP has two NPDES permits, one for the Weldon Spring Chemical Plant (WSCP), MO-0107701 (WEL0091) and one for the quarry, MO-0108987 (WEL0092), which require quarterly reporting of effluent monitoring. The monitoring results are to be reported using Discharge Monitoring Report (DMR) forms provided by the state. A separate DMR for each discharge point must be filed quarterly.

The following two minor issues associated with the NPDES reports identified during this Audit should have been addressed by the existing management system. The DMR for outfall NP-0006, which is prepared by the subcontractor, Mid-Missouri Environmental Inc. (MMEI), for the administration building sanitary treatment plant, has consistently filled out weekly flow data reports incorrectly. The Permitted Final Discharge Column reflects discharge results which should have been reported in the Results Column.

In October 1990, the WSCP permit was modified to include the planned WSCP Wastewater Treatment Plant outfall, NP-0007. This modification dictated a change in reporting requirements from monthly to quarterly. Despite this change, WSSRAP has continued to submit monthly reports since October 1990. Based on interviews with PMC personnel (I-SW-020), responsible WSSRAP personnel were unaware of the change in the reporting requirements. The two issues cited above indicate that the management system in place at WSSRAP failed to ensure that NPDES reports are submitted properly and that changes in the NPDES permit requirements are properly communicated to responsible WSSRAP personnel.

Site's Prior Knowledge

The site was not aware of this finding. The finding was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) or in the 1991 PMC ES&H Compliance Report (WEL0184). Minor issues with NPDES reports were identified in the Oak Ridge National Laboratory's October 1990 Environmental Compliance

Assessment Findings (WEL0115) and a review procedure for NPDES reports was included in WSSRAP's response (WEL0116). This corrective action has not been implemented. This finding also was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors contributing to this finding are insufficient appraisals, audits, and reviews in that the issue was not previously identified, and inadequate policy implementation because there is no management program in place to ensure that permit changes are communicated to responsible personnel.

FINDING SW/BMPF-3 Inspection of Aboveground Storage Tanks

Performance Objective

Best management practice suggests that all aboveground storage tanks that are not known to be free of potentially hazardous substances should be inspected on a regular basis.

Finding

WSSRAP does not routinely inspect all of the aboveground storage tanks remaining on-site from the previous operation of the Weldon Spring Chemical Plant (WSCP). While these tanks are believed by WSSRAP to be empty and, therefore, free of hazardous substances, this has not been confirmed.

Discussion

There are approximately 250 aboveground storage tanks remaining on-site from the previous operation of the WSCP. WSSRAP does not have a program to inspect these tanks on a regular basis. Because of the potential for adverse environmental impacts due to a spill, best management practice suggests that WSSRAP should conduct regular inspections of all tanks that have not been positively identified as being empty and free of hazardous substances.

Many of the WSSRAP tanks were used to store hazardous materials, such as ammonia, potassium hydroxide, and hydrofluoric acid, during the operation of WSCP. Interviews with WSSRAP staff (I-WM-003 and I-WM-010) indicate that the ammonia tanks were removed from their original location but their present location is unknown. In addition, when WSCP was shut down, a work order was issued to empty all tanks and process piping. However, there are no records to confirm or deny that these tasks were actually undertaken.

A program (the Buildings Characterization Work Plan, WEL0140) is currently under way to verify the type and hazard potential of the contents, if any, of the aboveground storage tanks at WSSRAP. It is anticipated that this program will be completed during 1991.

Site's Prior Knowledge

WSSRAP was not aware of this finding. However, the need to fully and definitively characterize the content of aboveground storage tanks was recognized by WSSRAP and is evidenced by their ongoing program to do so. The finding was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) or in the 1991 PMC ES&H Compliance Assessment Report (WEL0184). This finding also was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors contributing to this finding are a lack of a policy to inspect the aboveground tanks, and incomplete audits, appraisals and reviews since the issue was not previously raised.

3.3 GROUNDWATER

3.3.1 Overview

The purpose of the groundwater portion of the Environmental Audit of the Weldon Spring Site Remedial Action Project (WSSRAP) was to evaluate the status and technical execution of the groundwater protection and monitoring programs as they are related to applicable regulations, guidance documents, and best management practices (BMPs). Applicable regulations include U.S. Department of Energy (DOE) Orders, Missouri Department of Natural Resources regulations, and the substantive requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Recovery and Conservation Act (RCRA). Guidance documents include publications developed as part of the CERCLA and RCRA programs by the U.S. Environmental Protection Agency (US EPA). BMPs reflect currently acceptable best practices in industry and government programs.

The general approach to the groundwater assessment included review of WSSRAP documents and reports, interviews with WSSRAP staff and observation of field procedures. In addition, on-site and off-site tours were conducted to verify the information from the assessment. Data and information collected from these activities were evaluated with respect to DOE Orders, Federal and state guidelines, as identified in Table 3-3.

The Weldon Spring Chemical Plant/Raffinate Pits (WSCP/RP) site is located on the axis of the drainage divide between the Mississippi and Missouri river basins. The surface and groundwater divides are essentially coincident. The majority of the WSCP/RP site drains to the north and northwest into the Mississippi River basin. The southeast portion of the WSCP/RP site and the Weldon Spring Quarry (WSQ) site drain south and southeast into the Missouri River basin.

The WSCP/RP is underlain by up to 60 feet of unconsolidated fine grained sands, silts and clays with variable low hydraulic conductivity. The bedrock at the site is limestone. The upper portion of the limestone is fractured and weathered and is the uppermost aquifer in the area. The deeper limestone is competent and has little primary hydraulic conductivity; however, moderate to high secondary permeability may exist in the lower portion of the limestone.

The unconsolidated material at WSQ includes up to 30 feet of fine-grained silts and clays, with a layer of residual soil locally present between the sediment and bedrock. The unconsolidated sediments overlie fractured limestone bedrock. The bedrock is a different (deeper) unit from that at the WSCP/RP. Silts and clays constitute the primary sediments between the bluff where the WSQ is located, and the Femme Osage Slough to the south. Coarse-grained sands and gravel underlie the fine-grained sediments and thicken to the south of the Femme Osage Slough to the Missouri River.

TABLE 3-3
LIST OF APPLICABLE GROUNDWATER
REGULATIONS/REQUIREMENTS/GUIDELINES

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
DOE Order 5400.1	General Environmental Protection Program	DOE
40 CFR 136	Guidelines Establishing Test Procedures for the Analysis of Pollutants	EPA
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Groundwater at the WSCP/RP is found primarily in the weathered bedrock at depths up to 80 feet below the surface, with local occurrences of groundwater in the residual soil layer near the sediment/bedrock interface. Groundwater in the vicinity of the WSQ is typically shallower, and is found in the alluvium and weathered bedrock.

Groundwater and surface water interact in the vicinity of the site. Some of the surface and groundwater from the WSCP/RP site emerge off-site as surface water in the various seeps, springs and streams. The significant receptors of surface water and groundwater north of the site include Lakes 34, 35, and 36 and Burgermeister Spring in the August A. Busch Memorial Wildlife Area (Busch Area). The Busch Area is open to the public and is used for recreational activities including fishing in Lakes 34, 35, and 36. Surface water draining to the south of WSSRAP enters the southeast drainage, some of which is lost to groundwater. The ultimate discharge point of the southeast drainage is the Missouri River, approximately 2.4 km (1.5 mi) south.

Water from the WSQ flows from the quarry through bedrock to the unconsolidated material several hundred feet south of the quarry. The water ultimately discharges to the Missouri River sediments. Femme Osage Slough, located approximately 500 feet south of the Quarry, is a stagnant body of water formed by the construction of levees in the early 1960's. Hydrogeologic investigations indicate that the Femme Osage Slough is in poor hydraulic connection with the alluvium. The St. Charles County Municipal well field is located approximately 3,000 feet downgradient of the Quarry and is a drinking water source for residents of St. Charles County. The wells draw water from the thick alluvial sediments of the Missouri River deposits.

The groundwater monitoring network at WSSRAP includes 43 wells at WSCP/RP, 51 wells at WSQ, and 23 off-site wells. All wells are monitored on a semiannual basis for uranium, nitrate, sulfate and nitroaromatic compounds, the primary contaminants of concern. Quarterly sampling of 10 selected wells at WSCP/RP and off-site locations include additional monitoring for geochemical parameters (nitrite, chloride, bromide, Fe, Mn, Ca, Mg, Na, K, Li, P, Ni, Ar, Ba, Sr, Cr, Si), nitrate and sulfate. Bi-monthly sampling is performed at WSQ area wells north of the Femme Osage Slough. Active production wells at the St. Charles County Well Field, raw and treated water from the active county water treatment plant, and select monitoring wells in the Quarry area are sampled quarterly for uranium, nitroaromatic compounds, nitrate, sulfate, arsenic and barium. Annual monitoring of pumping wells is conducted in cooperation with the state, county and EPA and includes radiological parameters (U, Th-230, Th-232, Ra-226, Ra-228, gross alpha and gross beta), organic parameters (volatile and semi-volatile compounds), PCBs, pesticides, and metals (As, Ba, Hg, Pb, Cd, nitrate and sulfate). Primary contaminants at the site include nitroaromatic compounds resulting from the former ordinance works and uranium, nitrate and sulfate from the raffinate pits and building demolition materials in the quarry.

The following findings detail the specific aspects of the WSSRAP groundwater monitoring and characterization program that do not meet compliance requirements and BMPs. The compliance finding for groundwater deals with the lack of documentation in the QA file for well abandonment. The three BMPFs

are related to groundwater sampling procedures, groundwater protection through identification and proper abandonment of old borings and monitoring wells, and documenting the procedure for the disposal of purge water.

3.3.2 Compliance Findings

FINDING GW/CF-1 Well Abandonment Documentation

Performance Objective

WSSRAP ES&H procedure (4.4.4s) for the plugging and abandonment of obsolete subsurface monitoring structures requires, upon completion, transmittal of appropriate documentation to quality assurance for processing and retention as soon as practicable.

Finding

The QA file does not contain documentation, as required by WSSRAP ES&H procedures, for the abandonment of monitoring well 1025 which was abandoned on January 3, 1991.

Discussion

The WSSRAP ES&H procedure (4.4.4s) for subsurface monitoring device (i.e., wells, monitoring wells, piezometers, borings, deep test pits) plugging and abandonment (WEL0098), became effective October 16, 1990. This WSSRAP procedure requires that prior to removal of any earth penetrating monitoring structure, "The ES&H department shall notify the Construction Management and Operation (CM&O) and the Engineering Departments in writing that a well requires plugging and abandonment." The procedure also requires that the notification be transmitted to QA along with the Well Plugging and Abandonment Log, Form 4.4.4.1 (WEL0098) and a copy of any letters that document variances from the procedure.

Monitoring well 1025 was abandoned on January 2 and 3, 1991, because it was located within the new alignment of Route 94, now under construction. Review of the QA files revealed that documentation was not in the QA files relative to the abandonment of monitoring well 1025 (I-GW-15). The WSSRAP Geologic Compendium (a storage system for all documents related to monitoring wells and aquifer testing) maintained by the ES&H Department, included the well abandonment form and a memorandum summarizing the field action, but did not include a notification for plugging and abandonment, which was to be sent to the Engineering and CM&O Department.

Prior to termination of this Environmental Audit, WSSRAP implemented corrective action by transmitting the required documentation to QA. The adequacy of the corrective action was verified by the auditor's inspection of the transmittal document and the corrective action was determined adequate.

Site's Prior Knowledge

WSSRAP was not aware of this finding. This finding was not included in WSSRAP's SEN 7A report to DOE-HQ or in the 1991 PMC ES&H Compliance Report (WEL0184). Additionally, the finding was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075), since the well was abandoned after the Oak Ridge appraisal was conducted.

Probable Causal Factors

The probable causal factors contributing to this finding are inadequate policy implementation to ensure that WSSRAP procedures are followed, insufficient supervisory oversight to ensure WSSRAP policy was being implemented, and inadequate training on implementing site policy and procedures.

3.3.3 Best Management Practice Findings

FINDING GW/BMPF-1 Groundwater Sampling Procedures

Performance Objective

Best management practice for groundwater sampling activities suggests that sample collection procedures must be conducted in a manner such that analytical results accurately represent the level of contaminants in the groundwater.

Finding

WSSRAP ES&H procedure 4.4.1s, "Groundwater Sampling", does not include sample container and preservation requirements for volatile organic compounds or water quality indicator monitoring during the well purging process.

Discussion

Review of the WSSRAP groundwater sampling procedures for collecting groundwater samples (WEL0098, 4.4.1s), including observation of the techniques applied in the field, indicates that there may be a more representative groundwater sampling procedure available than the one presently in use. Two aspects of the sampling protocol that should be updated include:

- Sample container and preservation requirements for volatile organic compounds (VOCs); and

- Water quality indicator monitoring during the well purging process.

The 1991 Environmental Monitoring Plan (EMP) (WEL0074) calls for annual monitoring of VOCs at the St. Charles County Well Field. Future groundwater monitoring programs at the Weldon Spring Quarry and at the Weldon Spring Chemical Plant may also include monitoring for VOCs. The protocol for the collection of groundwater samples as outlined in the WSSRAP ES&H 4.4.1s (WEL0098), does not include information on the type of sample container or preservation requirements for VOCs. Standard industry practice is to preserve all VOC samples. Under 40 CFR 136.3(e), US EPA requires the use of hydrochloric acid as a preservative for surface water VOC samples that will not be extracted before seven days. Outside laboratories under contract to WSSRAP are required to use Contract Laboratory Program (CLP) procedures. CLP protocol requires that VOC samples be analyzed within 10 days, but does not require preservation with hydrochloric acid. US EPA, Region VII does not require the preservation of all VOC samples with hydrochloric acid but does recommend it for volatile aromatic compounds (benzene, ethylbenzene, toluene and xylene) (I-GW-22). EPA also requires that VOC samples be collected in glass containers with a Teflon lined septum. Review of sample tracking forms indicated that 40 milliliter glass vials with Teflon septa were used for VOC sample collection.

The second finding is the lack of water quality indicator monitoring during the well-purging process. Well purging is performed to remove standing

groundwater from the well casing and sand pack so that a representative sample of the aquifer in the vicinity of the well can be collected. Review of groundwater protocols (WEL0098) and observations of well purging and sampling procedures indicate that no comparison of measurements of field parameters are taken to ensure that the groundwater has reached equilibrium before the sample is taken. Standard industry practice includes measuring field parameters (pH, temperature and conductivity) at two intervals during purging and then comparing them to determine if the well has reached equilibrium.

Prior to termination of this Environmental Audit, WSSRAP implemented corrective action by revising Procedure 4.4.1s to include VOC sample preservation and container requirements and modifying well purging procedures. The adequacy of the corrective action was verified by visual inspection of the modified procedure, that it was signed and dated appropriately.

Site's Prior Knowledge

WSSRAP was not aware of this finding. The finding was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) or in the 1991 PMC ES&H Compliance Report (WEL0184). This finding also was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors contributing to this finding are ineffective audits, appraisals and reviews, since this issue was not previously identified, lack of training programs to ensure that protocol writers are familiar with new and updated industry practices, and an inadequate groundwater sampling procedure.

FINDING GW/BMPF-2 Disposal of Purge Water

Performance Objective

The WSSRAP Waste Minimization/Pollution Prevention Awareness Plan (WEL0027) requires that applicable waste disposal practices be incorporated into planning documents governing the respective task. Under this Plan, the 1991 Environmental Monitoring Plan (WEL0074) must include a procedure for disposal of purge water.

Finding

The 1991 Environmental Monitoring Plan (EMP) (WEL0074) refers to a WSSRAP Regulatory Compliance Procedure, RC-30s (WEL0097) for disposal of purge water that exists as a draft document (WEL0217).

Discussion

Groundwater removed from monitoring wells during purging and development may contain elevated levels of contaminants and therefore should be disposed of in an environmentally sound manner. The EMP (WEL0074) refers to a Regulatory Compliance Procedure, RC-30s (WEL0097) for disposal of purge water. This procedure is not included in any of the three copies of Regulatory Compliance Procedures that were reviewed by the auditor at WSSRAP. Subsequent interviews indicated that the procedure is still in draft form (I-GW-19). The Groundwater Protection Program Management Plan (GPPMP) (WEL0147) includes a description of the protocol for disposal of purge water and the supporting documentation for the selection of action levels; however, the GPPMP is not referenced in the EMP. Field observations indicate that proper disposal practices are being employed during sampling as outlined in the GPPMP.

Site's Prior Knowledge

WSSRAP was not aware of this finding. The finding was not identified in the 1991 PMC ES&H Compliance Report (WEL0184) or in the WSSRAP's SEN 7A report to DOE-HQ. Additionally, the finding was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075), since the WMP was prepared in 1991 (WEL0074).

Probable Causal Factors

The probable causal factors contributing to this finding are incomplete previous appraisals, audits and reviews since this issue was not identified earlier, and inadequate WSSRAP policy and/or procedure since WSSRAP RC-30s document is not yet finalized for use.

FINDING GW/BMPF-3 Well Inventory Plan

Performance Objective

DOE Order 5400.1 requires that the Groundwater Protection Management Program include "...a management program for groundwater protection and remediation; a summary and identification of areas that may be contaminated with hazardous substances; and strategies for controlling sources of these contaminants."

Finding

Borings and monitoring wells, constructed prior to 1986, have not been completely identified, nor do records exist to indicate well abandonment locations or abandonment procedures used.

Discussion

Identification and mitigation of potential sources and pathways of groundwater contamination is a primary component of the Groundwater Protection Management Program. Borings and monitoring wells were installed by the Army and Atomic Energy Commission (AEC) at Weldon Spring as early as 1944 (WEL0008). Since that time, numerous Army and AEC contractors have constructed other borings and monitoring wells to gather data on subsurface conditions. Many wells penetrate the fine grained sediments in the upper 20 to 50 feet of the stratigraphic column, with other wells and borings penetrating into bedrock. Review of the WSSRAP files indicated that there are no records of well abandonment or abandonment procedures that were used to permanently close older wells and borings.

WSSRAP construction activities are scheduled to be performed in the same areas where potentially improperly abandoned borings and monitoring wells may be located.

Improperly abandoned borings and monitoring wells can act as pathways for vertical contaminant migration through the low permeability surficial sediments into the more permeable bedrock aquifer. An effort to inventory all monitoring wells and borings constructed at WSSRAP must be made in areas where construction or demolition activities are scheduled to begin so that measures can be taken to properly abandon the structures or so that additional engineering controls may be designed to minimize the potential for vertical migration of contaminants.

Site's Prior Knowledge

WSSRAP was already aware of this finding prior to this Audit and has proposed that a well inventory program be instituted. This finding was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) or in the 1991 PMC ES&H Compliance Report (WEL0184). This finding also was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factor contributing to this finding includes incomplete previous audits, appraisals and reviews since this finding was not identified earlier.

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3.4 SOILS, SEDIMENT, AND BIOTA

3.4.1 Overview

This audit component was conducted to evaluate compliance with applicable regulations, DOE policies, and regulatory guidelines summarized in Table 3-4 and permit conditions regarding the assessment and monitoring of facility impacts to soils, sediments, and biota found on-site and in off-site areas that receive site-derived contaminants via groundwater and surface water migration routes.

A combination of facility and off-site "vicinity property" tours, document reviews, and interviews with WSSRAP and Argonne National Laboratory personnel formed the basis for evaluating permit compliance and the adequacy of the soil, sediment, and biotic components of the WSSRAP Environmental Surveillance Program for monitoring facility impacts and supporting environmental risk assessments. Contaminant fate, transport, and partitioning among soil, ground and surface water, sediment, and biota were discussed with other Audit Team Specialists in the areas of Surface Water, Groundwater, and Inactive Waste Sites to evaluate potential linkages between physical and biological contamination. We also evaluated the need for an expanded program of multimedia environmental sampling and analysis, to map on-site and off-site transport and distribution patterns of radionuclides and non-radioactive contaminants, and thereby support baseline ecological and human health risk assessments, the development of site cleanup criteria, and the selection of remedial action alternatives.

Contaminants of concern found at, and/or migrating from, the Weldon Spring Chemical Plant (WSCP) Area, raffinate pits, ash and storm water retention ponds, and the Weldon Spring Quarry (WSQ) include radionuclides, heavy metals, and nitroaromatic compounds in soil, sediment, groundwater and surface water. Due to the past focus on monitoring uranium and other radionuclides, the spacial distribution and biouptake patterns of potentially site-derived heavy metals and nitroaromatic compounds are poorly understood, both on-site and off-site. Soils of the municipal wellfield in the Missouri River floodplain and sediments of the Femme Osage Slough, are not yet well characterized for non-radiological contaminants that could be migrating toward the slough and river from the WSQ.

Although some attenuation of uranium concentrations occurs in groundwater, surface water, and sediments along the northerly drainage into the Busch Wildlife Area, the exact biogeochemical transport processes and partitioning patterns along this migration route are not well understood. Past non-routine sampling of fish and wildlife for analysis of uranium and other metal concentrations in biological tissues, nevertheless, have verified the following:

TABLE 3-4
LIST OF APPLICABLE SOIL, SEDIMENT, AND BIOTA
REGULATIONS/REQUIREMENTS/GUIDELINES

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
DOE Order 5400.1	General Environmental Protection Program	DOE
DOE Order 5400.4	Comprehensive Environmental Response, Compensation, and Liability Act Requirements	DOE
DOE Order 5400.5	Radiation Protection of the Public and the Environment	DOE
DOE Order 5400.xy	Radiological Effluent Monitoring and Environmental Surveillance	DOE
DOE Order 5440.1C	National Environmental Policy Act	DOE
40 CFR 404	The Clean Water Act (Discharge of dredge and fill into waters of the U.S.)	DOE
43 CFR 11	Natural Resource Damage Assessments	DOI
Title 16 USC 661	The Fish and Wildlife Coordination Act	DOI
Title 16 USC 1531	The Endangered Species Act of 1973	DOE
SEN-15-90	National Environmental Policy Act	DOE

TABLE 3-4 (continued)
LIST OF APPLICABLE SOIL, SEDIMENT, AND BIOTA
REGULATIONS/REQUIREMENTS/GUIDELINES

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
Executive Order 11988	Wetlands Protection	EPA
Executive Order 11990	Floodplain Management	EPA
Public Law 91-190	The National Environmental Policy Act of 1969	EPA
Public Law 96-510	Comprehensive Environmental Response, Compensation, and Liability Act, as amended	EPA
Public Law 99-499	Superfund Amendments and Reauthorization Act of 1986	EPA

- Radionuclides have been detected in bluegill et al. fish species from Busch Wildlife Area lakes and Femme Osage Slough by Missouri Department of Conservation in 1983-198 . There have been no detectable levels (i.e., > 0.01 pCi/g) of uranium in fish, collected by WSSRAP staff, from Femme Osage Slough.

- There has been evidence of uranium biouptake and preferential accumulation within target organs of small mammals and waterfowl collected by WSSRAP staff at the raffinate pits in 1987 and 1990.

- Vertebrates, invertebrates, and plants in the Ash Pond and the Frog Pond contain uranium and radium above background as long ago as 1977.

- There has been evidence of bioaccumulation of non-radioactive heavy metal, potentially derived from the WSSRAP site, such as arsenic, cadmium, mercury, and lead, in fish collected by the MDOC from Busch Wildlife Area lakes 35, 36, and 37, in 1989.

These preliminary data on contaminant biouptake in receptor aquatic ecosystems, together with data on uranium migration to these same areas, underscore the need for a multimedia sampling and analysis program, for radionuclides, nitroaromatics, and heavy metals in on-site and off-site physical and biological media.

Although WSSRAP routinely conducts surveillance of physical environmental media, as required by DOE orders and various permits, past sampling and analysis of fish and wildlife has been done opportunistically, and has focused mostly on radionuclides. No routine and systematic program for monitoring of all site-derived contaminants in biota and foodstuffs of local, natural, and managed aquatic and terrestrial ecosystems yet exists. The facility's draft work plan for aquatic biological screening investigation is scientifically adequate, since it is based on the ecological concept of multimedia sampling at coincident points in time and space. Hence, this program will be capable of clarifying the very complex, biogeochemical partitioning patterns of site-derived contaminants in downstream aquatic ecosystems.

At this time, no biological surveillance plan exists for agricultural crops grown in the floodplain wellfield or in other areas within 16 km of the WSSRAP site, pursuant to DOE Orders 5400.1 and 5400.5, and DOE Draft Order 5400.xy. However, WSSRAP intends to develop a program that will include both agricultural soil and edible crop analyses for radionuclides.

Following startup of the WSQ wastewater treatment plant (WWTP), the new WWTP NPDES discharge permit will require monitoring of uranium levels in the surface water, sediments, and aquatic and terrestrial vegetation upstream and downstream of the outfall on the Missouri River. Some voluntary pre-operational monitoring has been initiated along the river, and this program should be incorporated into the comprehensive environmental surveillance plan for 1992.

No plan or program is currently in place for surveillance of native, terrestrial flora and fauna. One may prove warranted, however, following a baseline ecological risk assessment (ERA) for on-site fauna (e.g., deer, waterfowl), that may be directly exposed to radionuclide and non-radionuclide contaminants by ingestion of water and/or food from the raffinate pits, Frog Pond, and Ash Pond. Since prior studies have confirmed on-site contaminant biouptake, some as yet undetermined level of ecological impact and risk to local biota is to be expected from site-derived contaminants. These existing bioaccumulation data have not yet been fully integrated into an evaluation of contamination effects and risks to non-human receptors (local biota, food chains, and ecosystems), but are sufficient to support more comprehensive evaluations of ecological risk that have been performed previously. If an ERA based on resident indicator species and existing site contamination data indicates significant on-site risk, a systematic, terrestrial surveillance program for on-site fauna could be developed.

Interrelated issues and findings of biological and ecological significance are discussed in Sections 3.2 (Surface Water), 3.3 (Groundwater), and 3.9 (Inactive Waste Sites).

One compliance finding was identified which was related to the lack of a biological surveillance plan and program.

3.4.2 Compliance Findings

FINDING SSB/CF-1 Biological Surveillance Plan/Program

Performance Objective

Compliance with DOE Order 5400.5 which incorporates Draft DOE Order 5400.xy, requires an environmental surveillance program. The environmental surveillance program is defined under DOE Order 5400.5, Section 10.f.(2), as including "...the collection and analysis of samples of air, water, soil, foodstuffs, biota, and other media from DOE sites and their environs ..." DOE Order 5400.5 incorporates, by reference, other Orders of the 5400 series, that guide the development of such plans/programs. Chapter V of Draft DOE Order 5400.xy, for example, provides guidance for the development of plans/programs for the sampling and analysis of "terrestrial foodstuffs" (including "agricultural products", "game animals") and "aquatic foodstuffs" (including "freshwater foods" such as fish and waterfowl).

Finding

A complete WSSRAP site-wide surveillance plan or program does not exist for monitoring site-derived contaminant impacts to biota and foodstuffs as required by DOE Order 5400.5 and Draft DOE Order 5400.xy.

Discussion

A more comprehensive site-wide biological surveillance program is needed to develop an adequate biota and foodstuffs contamination database with which to facilitate compliance with environmental regulations, and to:

- Clarify and assess existing contamination levels/patterns in on-site and off-site biota and foodstuffs; and
- Ensure that all site-attributed impacts to biota, foodstuffs, human health, and the environment are systematically reviewed and monitored as appropriate.

Locations where site-derived contaminant impacts to foodstuffs could occur include the sorghum field adjacent to the northwest perimeter of the Weldon Spring Chemical Plant (WSCP) (last harvested in 1989), and the municipal well field along the floodplain of the Missouri River, where sharecropped agricultural produce is grown. Although there is presently no sampling program for agricultural produce, such a program to sample crops is planned within a 15-kilometer (9.3 miles) radius of WSCP. Draft DOE Order 5400.xy suggests that collection and analysis of samples of biota and foodstuffs be evaluated for "purposes of... assessing radiation exposure to members of the public, and assessing effects, if any, on the local environment." Although no biological surveillance plan or program exists for surveillance of foodstuffs (I-SSB-2), one is reportedly going to be developed for use in 1992. Best management practices suggest that biological surveillance should continue as long as on-site disturbances--capable of promoting contaminant migration to off-site receptors--are evaluated at least until disturbances are terminated.

Non-routine, opportunistic sampling and analyses of contaminant body burdens in fish, game, and/or waterfowl have been performed on samples collected on-site by WSSRAP staff (I-SSB-4), and in the August A. Busch Wildlife Area in conjunction with the Missouri Department of Conservation (WEL0072; I-SSB-1). The Missouri Department of Health (MDOH) assessment of fish for elevated levels of heavy metals also indicates that local human consumption of fish from the August A. Busch Wildlife Area (Busch Area) has elevated daily intake of cadmium (Cd) and mercury (Hg) slightly above the daily intake guidelines (WEL0072). Although MDOH found that "consumption of fish from Lakes 35, 36, and 37...does not present a significant increased risk of adverse health effects...", they concluded that continued monitoring of contaminants in fish from these lakes is warranted (WEL0172).

Past studies of body and tissue uranium burdens in fish, small mammals, one snapping turtle (raffinate pit), and waterfowl, both on-site (e.g., in ducks, rabbits, squirrels from on or near the raffinate pits in 1987) and off-site (in fish in the Busch Area lakes), also have verified higher levels of uranium in target organs (bone, kidneys, liver) as compared with the flesh of fish and waterfowl ingested by humans (I-SSB-4). These patterns of biological contamination and tissue/organ partitioning within organisms is typical of most organic and inorganic contaminants. Thus, the ingestion of whole fish by non-human piscivores may pose a more significant threat of exposure to wildlife, than does ingestion of fish fillets to humans.

This evidence underscores the need for a surveillance program in support of exposure and toxicity assessments for both non-radioactive contaminants and non-human species. If carefully designed and implemented, such a plan/program will enhance the scientific quality and cost-effectiveness of current and future environmental review processes and documents under NEPA/CERCLA.

Discussions with WSSRAP environmental protection staff (I-SSB-4; I-SSB-5), and a review of their partially completed work plan for an aquatic biological screening investigation (WEL0169), indicate their progress and commitment towards compliance with the DOE Orders. This partially completed work plan is of excellent quality, and incorporates critical elements for the collection of water, sediment, and biotic contamination data, as well as pertinent ecological data on the taxonomic composition, abundance, and pollution tolerance of zooplankton and benthos populations. This screening investigation is considered by WSSRAP as a prerequisite to the design of a multimedia environmental surveillance plan or program, at coincident points in time and space, that is needed to evaluate contaminant fate, transport, and partitioning among off-site surface water, sediment, and biological compartments of the affected environment.

Completion of the work plan for this aquatic biological screening investigation is expected within weeks (study kickoff date is early May 1991). The WSSRAP goal (for 1991) is to collect preliminary data this year with which to develop a biological surveillance plan to be implemented in 1992. Once implemented, the aquatic biological surveillance plan also will support the continued monitoring of ecological and public health impacts/risks from site-derived contaminants.

Since Chapter I, Part 8.a. of DOE Order 5400.5 seeks "to ensure that...environmental surveillance programs are of good quality...", surveillance programs of high caliber also may be warranted for waterfowl, terrestrial fauna (on-site/off-site game animals), and agricultural products that are potentially affected by site-derived contaminants, depending on the results of a baseline ecological risk assessment focused on these categories of indicator species.

Site's Prior Knowledge

WSSRAP was aware of this finding, and the need for compliance with DOE Orders 5400.1 and 5400.xy was acknowledged in past WSSRAP documents (WEL0124 and WEL0125). This finding was partially identified in the 1990 Oak Ridge Functional Appraisal (need for fish sampling noted, but lack of biological surveillance was not cited as a deficiency because compliance with Order 5400.5 was not required until November 9, 1990, which was after the end of the appraisal (WEL0075). This finding was not identified in the 1991 PMC ES&H Compliance Report (WEL0184) or in the WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors contributing to this finding are a lack of policy implementation and incomplete prior appraisals, audits and reviews to identify the missing elements of a site-wide biological surveillance plan or program that monitors site-derived contaminant impacts to biota and foodstuffs.

3.5 WASTE MANAGEMENT

3.5.1 Overview

The purpose of the waste management portion of the WSSRAP Environmental Audit was to 1) evaluate the current hazardous, non-hazardous, mixed waste management, and underground storage tank (UST) practices at the site; 2) evaluate the compliance status of WSSRAP with regard to Federal, state, and local waste management and UST regulations, with U.S. DOE Orders and policies, and with regard to WSSRAP policies and procedures (Table 3-5); and 3) evaluate the waste management and UST practices at the WSSRAP with respect to best management practices.

The approach to the waste management portion of the Audit was to review documents associated with remedial activities (particularly the waste management plans and procedures) and field inspections of ongoing remedial activities. The document review and field inspections were followed by interviews with site personnel and Federal and state regulators. All information gathered from conducting the above activities was evaluated against applicable Federal and state regulations, WSSRAP policies and procedures, DOE Orders, Secretary of Energy Notices and best management or current industry practices.

Waste is generated on the WSSRAP site in two primary ways: 1) from the identification, characterization and consolidation of chemicals and materials which were used during the chemical plant's operation; and 2) from the decontamination and dismantling of buildings on the site.

Hazardous wastes generated at Weldon Spring during its period of operation from 1957 to 1966, consisted primarily of chemicals used during the process of uranium concentration and separation. However, during the next 20 years, the site was idle. Records on chemicals used in the uranium processes were found to be incomplete at best or absent, and site personnel and operators with process knowledge were no longer around by the time remedial action was started. Given these circumstances, the specific composition of many of the chemicals was largely unknown. Since the startup of remedial activities in 1987, detailed chemical analysis of unknown substances has been initiated and is an ongoing process at WSSRAP. Based on the results of the analyses, the material is managed according to its characterization as a RCRA listed waste, RCRA characteristic waste (those that exhibit defined traits of ignitability, corrosivity, reactivity, and/or toxicity) or non-RCRA waste.

WSSRAP's status as a National Priority List site and a CERCLA remedial action-site allows it to be exempted from RCRA's permitting and administrative requirements. However, the substantive requirements of the RCRA Subtitle C regulations apply to hazardous materials management, treatment, storage and disposal.

TABLE 3-5
LIST OF APPLICABLE WASTE MANAGEMENT
REGULATIONS/REQUIREMENTS/GUIDELINES

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
DOE Order 5400.1	General Environmental Protection Program	DOE
DOE Order 5400.3	Hazardous and Radioactive Mixed Waste Program	DOE
DOE Order 5820.2A	Radioactive Waste Management	DOE
40 CFR 260	Hazardous Waste Management System: General	EPA
40 CFR 261	Identification and Listing of Hazardous Waste	EPA
40 CFR 262	Standards Applicable to Generators of Hazardous Waste	EPA
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste	EPA
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities	EPA
40 CFR 268	Land Disposal Restrictions	EPA

TABLE 3-5 (continued)
LIST OF APPLICABLE WASTE MANAGEMENT
REGULATIONS/REQUIREMENTS/GUIDELINES

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
40 CFR 280	Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks	EPA
10 CSR 10	Underground Storage Tanks	MDNR
10 CSR 25	Hazardous Waste Management	MDNR
SEN 7A	Policy on Line Management's Responsibility to Achieve Environmental Compliance	DOE

WSSRAP has completed two phases of chemical characterization and consolidation over the past three years. This process is now substantially complete. The chemicals were first identified and moved to Building 406 for field analysis. The results of these tests, performed under the Waste Analysis Plan (WEL0026) and the Waste Management Plan (WEL0015), enabled the site to consolidate and store the materials according to 40 CFR 261 (Identification and Listing of Hazardous Waste).

Hazardous materials were initially stored by WSSRAP in Building 406. This structure was poorly suited for such storage and was the source of several compliance findings in previous audits. In late 1989, the site converted Building 434 to a RCRA storage facility. As of April 1991, substantially all of the hazardous materials on-site were segregated and approximately 300 drums stored in Building 434. In addition, Building 434 houses approximately 800 drums of non-hazardous but radioactively contaminated waste.

Future hazardous waste generation will result from the dismantling of buildings at the Weldon Spring Chemical Plant (WSCP) site and from the Weldon Spring Quarry (WSQ) bulk waste removal. In April 1991, a Buildings Characterization Work Plan (WEL0140) was issued to begin the process of investigating and characterizing the WSCP wastes. This work will precede all building dismantling and will be performed in sequence with the building dismantling schedule. WSCP wastes will include wastes from tank, sump, piping, sewer, and other systems in the old process buildings.

Bulk waste removal at the WSQ could potentially generate hazardous wastes. The Record of Decision (ROD) (WEL0051) for the quarry remedial action concludes that RCRA ARARs are not applicable due to an inability to specifically identify the source of nitroaromatic contamination in the WSQ sump. This conclusion is borne out by the National Contingency Plan (WEL0128) and was agreed to by EPA (WEL0127). An additional concern with regard to the quarry bulk waste removal concerns the possibility for explosion of the nitroaromatic compounds as the bulk waste is removed (WEL0050). A report prepared by Hercules, Inc. (WEL0106) concluded that "excavation can proceed without undue risk" (p. 1). The report made several operational recommendations which will be incorporated into the actual bulk waste removal (I-WM-006).

WSSRAP has a detailed conceptual plan to prioritize and characterize the potentially hazardous wastes that will be removed from the WSQ. The plan details how the bulk wastes can be managed to reduce both the risk of explosion and the mishandling of potentially hazardous materials. Interviews with WSSRAP staff (I-WM-006 and I-WM-009) indicate that the potentially hazardous wastes will be removed from the quarry and field tested for hazardous characteristics. The wastes will then be handled as hazardous wastes and transported over a dedicated haul road to the planned Temporary Storage Area (TSA) to be constructed at the chemical plant site. Further detailed sampling and characterization will take place at the TSA. Given the concerns expressed during the public review and comment period for the WSQ ROD, it would be beneficial for WSSRAP to document the conceptual plan and/or

communicate it to the public and appropriate regulators as soon as is practicable, considering it was not a part of the WSQ ROD or in other supporting documents.

The Land Disposal Restrictions (LDRs), defined in 40 CFR 268 for hazardous waste disposal will also be an issue facing WSSRAP in the near future as demolition activities increase. As discussed earlier, the hazardous wastes on-site fall into the category of "characteristic" wastes as defined in 40 CFR 261 Subpart C. Because these are "third third" wastes in the LDR regulations, and are radioactively contaminated, their prohibition from land disposal is delayed until May 8, 1992. The site is aware of this issue and has taken several proactive steps to prepare for the upcoming LDR restrictions:

- A working group has been established by the Regulatory Compliance Group to seek solutions to the problem. This group will send letters to all permitted TSDFs requesting their acceptance criteria for radioactively contaminated material.

- In addition, WSSRAP has requested that Oak Ridge destroy the waste in its hazardous waste incinerator.

DOE Headquarters is aware of this issue and is pursuing solutions at a national level to address the disposal of mixed wastes (hazardous and radioactive) (I-WM-018 and I-WM-019). Finally, the WSSRAP has notified EPA Region VII (December 1989) of the presence of on-site mixed wastes subject to LDR restrictions; this letter needs to be updated, however, to include the waste accumulation in Building 434.

The second area of waste generation at WSSRAP is non-hazardous bulk wastes. These include the debris from the decontamination and dismantling of Building 401 (the steam plant), Building 409 (the administration building), and Building 301. Bulk wastes also remain from several Interim Response Actions (IRAs) including the removal of utility poles and asbestos abatement efforts. With the exception of asbestos waste, these bulk wastes are stored in three primary areas: on Pad 109/110, in the old Coal Storage Area behind Building 401, and on Pad 303. These wastes will be moved to the Material Staging Area (MSA) when construction is completed.

Other non-hazardous, radioactively contaminated wastes include bagged asbestos wastes, as well as bagged discarded personal protective equipment (PPE), all of which are stored in Building 103.

Future non-hazardous waste generation at WSSRAP will be primarily bulk waste from building dismantling on the chemical plant site. While rough decontamination of the buildings will take place before dismantling, most of these wastes are expected to be radioactively contaminated and therefore unsuitable for off-site disposal. The MSA will be used to store these bulk wastes until a final disposal decision has been made for the chemical plant remediation. The MSA, situated on nine acres located to the west of the chemical plant buildings and on the northern side of the site, is being constructed during 1991. Interviews with WSSRAP engineering staff (I-WM-022) indicate that the MSA will be constructed with gravel on top of compacted

clay. Run-on from precipitation will be controlled by four-foot high berms around the entire MSA and run-off will be channeled through a series of drains to a settling pond located at the southern edge of the MSA. Water from this pond will be monitored for compliance with NPDES permits and discharged to the NPDES-0003 outfall at the western edge of the site. While WSSRAP expects the settling pond water to meet the NPDES standards, in the event that it does not, the water will be treated by the WSCP wastewater treatment plant. Prior to this wastewater treatment plant's construction, any water from the settling pond that exceeds the discharge limits will be pumped into the raffinate pits. Other uses of the MSA will include the consolidation and storage of existing bulk waste piles that are presently located around the site.

An important waste management function at WSSRAP is tracking the quantities and locations of the various waste materials. This will become increasingly important as the quarry bulk waste removal commences and as the pace of building dismantling accelerates. To this end, WSSRAP has developed a number of procedures (WSSRAP RC-9s: Containerized Waste Labelling, WSSRAP RC-12a: Transferring Waste Material, and WSSRAP RC-13a: Waste Material Inventory and Tracking System) to account for waste generated and stored on-site.

The linchpin of the waste tracking system is the computerized Waste Inventory and Tracking System (WITS). Currently, the system is operated by one member of the Waste Management Group on a part-time basis, and, as such, the system suffers from lack of resources. Specifically, during an observation of its operation (I-WM-005), the system "crashed" several times due to a lack of memory, and searching the system for specific wastes took about fifteen minutes per waste item due to hardware limitations. In addition, time and personnel constraints prevent needed enhancements from being made to the system. As the waste management issues faced by the site grow, WITS will need additional personnel and computer hardware resources.

Overall, waste generating, tracking, and storage activities at the WSSRAP are well managed and have good systems and procedures. The characterization, consolidation and proper storage of the containerized chemicals on-site represents the completion of a major body of work that had previously resulted in a number of past compliance findings. Waste Management Group personnel are motivated, quality-conscious, and well-trained for their jobs.

A total of six waste management findings were identified at the WSSRAP. These findings address the lack of programmatic elements to address underground storage tanks, a RCRA facility training program, and a RCRA Contingency Plan. In addition, best management practice findings address areas for improvement in waste transfer procedures, bulk waste storage, and waste log keeping.

3.5.2 Compliance Findings

FINDING WM/CF-1 Closure of Underground Storage Tanks

Performance Objective

40 CFR Subpart G regulates the technical standards and corrective action requirements for underground storage tanks (USTs). When first promulgated, these regulations required formal notification to state regulatory authorities of all non-excluded tanks placed into service after January 1, 1974. These regulations were expanded in 1988 to incorporate temporary and permanent closure requirements for out-of-service USTs. Closure requirements include:

- Site assessment prior to closure;
- Notification of the implementing agency prior to closure;
- Emptying the tank(s); and
- Removing the tanks from the ground or filling them with an inert material.

In addition, 40 CFR 280.70(c) enables the implementing agency to extend the temporary closure period for up to twelve months. The Missouri regulation, 10 MCSR Chapter 10, mirrors the Federal regulations with regard to UST closure.

Finding

WSSRAP has five out-of-service USTs which have not been closed according to Federal and Missouri state regulations.

Discussion

There are five out-of-service hydrocarbon USTs (tank numbers 6, 7, 8, 14, and 15 on WEL0183) on-site which have not been closed. These tanks have been out-of-service since the Weldon Spring Chemical Plant (WSCP) closure in 1966. These five tank sites must be assessed for previous releases and the tanks must be permanently closed by either removal from the ground or filling with an inert substance as required by Federal and Missouri state regulations.

WSSRAP has plans to remove all of the USTs as part of the overall site remediation. To this end, in November 1990, WSSRAP issued and began implementation of an Underground Storage Tank Sampling Plan (WEL0014) to identify the location of all USTs. The initial research done under the sampling plan was based upon reviews of historical documents and as-built drawings which identified 17 possible UST locations. Implementation of the sampling plan, however, has not yet assessed the potential for past releases having occurred from the tanks.

Interviews with WSSRAP staff (I-WM-003, I-WM-008) indicate that field testing was undertaken in late 1990 which confirmed the presence of five regulated USTs. Of the five tanks, three (numbers 6, 14, and 15) have been identified

as WSCP fuel tanks from the as-built drawings. Based upon their location, the other two tanks (numbers 7 and 8) probably served the fuel pumps adjacent to Building 436.

WSSRAP site document number WEL0113, dated February 19, 1991, indicates that preliminary characterization work has been done on the USTs described above. Field observations and tests indicate that at least four of the tanks contain water and that the soils around all of the tanks show traces of hydrocarbons. None of the tank contents have been sampled to characterize sludge which may be present.

Site's Prior Knowledge

WSSRAP was not aware of this finding. The finding was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) or in the 1991 PMC ES&H Compliance Report (WEL0184). While WSSRAP was aware of the underground storage tanks and has initiated long-term plans to remove them, WSSRAP was not aware of the compliance issue. This finding also was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors contributing to this finding are ineffective policy implementation of the requirements in Federal and state regulations and ineffective appraisals, audits and reviews since this finding was not previously identified.

FINDING WM/CF-2 RCRA Facility Training Program

Performance Objective

40 CFR 264.16(a) states that hazardous waste "facility personnel must successfully complete a program of classroom instruction or on-the-job training that teaches them to perform their duties....At a minimum, the training program must be designed to ensure that facility personnel are able to respond effectively to emergencies by familiarizing themselves with emergency procedures, emergency equipment, and emergency systems, including, where applicable:

(i) Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment...
(iii) Communications or alarm systems;
(iv) Response to fires or explosions;
(v) Response to ground-water contamination incidents; and
(vi) Shutdown of operations."

Further, 40 CFR 264.16(b) states that "[f]acility personnel must successfully complete the program...within...six months after the date of employment or assignment to a facility..." and 40 CFR 264.16(c) states that "[f]acility personnel must take part in an annual review of the initial training required..."

Finding

Building 434 personnel are not receiving training within the specified period of time mandated by Federal regulation; and the Waste Management Training Plan is missing certain key elements required by 40 CFR 264.

Discussion

RCRA requirements state that (1) hazardous waste facility personnel must be trained in facility procedures within six months of employment or assignment to the facility, and (2) that facility personnel receive annual reviews of their initial training. The current Waste Management Training Plan (WEL0160) states that "[p]ersonnel must complete the [training] program within one year after their date of employment or within one year after assuming job responsibilities within the Waste Management Group....As a minimum, each employee should receive retraining at least every two years."

An audit of the training records of personnel working in the Waste Management Group of the PMC indicated that training in certain key WSSRAP Regulatory Compliance Procedures (RC-2, RC-6, RC-9s, and RC-13a) (WEL0097) was not completed within the six months required by RCRA. These procedures include:

- RC-2: Building 434 Operations Procedures;
- RC-6: Surveillance of Bulk Waste Storage Areas;
- RC-9s: Containerized Waste Labelling; and
- RC-13a: Waste Inventory Tracking System.

In addition, specific requirements of 40 CFR 264.16(a)(3) are not included in the Waste Management Training Program (WEL0160):

(i) Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment...
(iii) Communications or alarm systems...
(v) Response to ground-water contamination incidents; and
(vi) Shutdown of operations.

The Waste Management Training Program (WEL0160) identifies specific training Modules for each job description (Figure 1 in WEL0160) that include both general and specific information on environmental regulations, regulatory compliance, and hazardous and radioactive materials transportation. In addition, Waste Management Group personnel receive training in Hazardous Waste Operations and Emergency Response from the WSSRAP Safety Group and in WSSRAP remedial operations through the Productivity Improvement Program (PIP). However, the 40 CFR 264 requirements listed above (i, iii, v, and vi) are not specifically included in the Waste Management Training Plan or in the audited personnel training records.

Interviews with Waste Management Group personnel (I-WM-016) and PIP personnel responsible for WSSRAP overall training (I-WM-023) have indicated that the site is aware of both the need for timeliness of the RCRA training and the need to integrate Waste Management Group training with other training programs offered at WSSRAP. The PIP has initiated a program to formalize all required training and timing for each job description, including those of the Waste Management Group, at WSSRAP.

Site's Prior Knowledge

WSSRAP was aware of this finding. The finding, however, was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) or in the 1991 PMC ES&H Compliance Report (WEL0184). This finding also was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors contributing to this finding were ineffective policy implementation of 40 CFR 264.16, and inadequate training to meet requirements stipulated in Federal regulations, and incomplete appraisal, audits and reviews of the various training programs performed on-site since this issue was not previously identified.

FINDING WM/CF-3 RCRA Contingency Plan

Performance Objective

40 CFR Subpart D requires that owners and operators of hazardous waste facilities have a facility contingency plan. Requirements this plan must incorporate include:

- 40 CFR 264.51(a) which states that hazardous waste facilities must have a plan in place "to minimize hazards to human health or the environment from fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste constituents to air, soil, or surface water."

- 40 CFR 264.52(b) which allows amendment of a Spill Prevention Control and Countermeasures (SPCC) Plan to "incorporate hazardous waste management provisions that are sufficient to comply with" 40 CFR 264.

- 40 CFR 264.52(c) which states that a facility contingency plan "must describe...arrangements agreed to by local police departments, fire departments, hospitals, contractors, and State and local emergency response teams to coordinate emergency services..."

- 40 CFR 264.52(e) which states that the plan "must include a list of the emergency equipment at the facility (such as fire extinguishing systems...communication and alarm systems (internal and external), and decontamination equipment)..."

- 40 CFR 264.52(f) which states that the plan "must include an evacuation plan for facility personnel..."

- 40 CFR 264.53 which states that the plan must be "[s]ubmitted to all local police departments, fire departments, hospitals, and State and local emergency response teams..."

Finding

WSSRAP does not have a RCRA Contingency Plan.

Discussion

WSSRAP does not have in place a RCRA Contingency Plan for its hazardous waste storage facility, but does have an SPCC Plan (WEL0028) that was issued in 1989. According to conditions stipulated in 40 CFR 264.52(b), WSSRAP does not need a separate RCRA Contingency Plan if an SPCC Plan is in place that incorporates the requirements of 40 CFR 264 for a RCRA Contingency Plan. WSSRAP's Building 434 is a hazardous waste storage facility and, therefore, WSSRAP needs a RCRA Contingency Plan or equivalent provisions in the existing SPCC Plan. Review of the existing SPCC Plan, however, revealed that no reference is made to Building 434 as a hazardous waste storage facility, that the document is out of date, and that it does not meet several of the specific requirements of 40 CFR 264.52 including:

- Description of the "arrangements agreed to by local police departments, fire departments, hospitals, contractors, and state and local emergency response teams to coordinate emergency services..."

- "A list of the emergency equipment at the facility (such as fire extinguishing systems...communication and alarm systems (internal and external), and decontamination equipment)..."

- "An evacuation plan for facility personnel..."

Interviews with Personnel Protection (I-WM-015) and Construction Safety staff (I-WM-025) indicate that two documents are being prepared that will meet the RCRA Contingency Plan requirements. The first of these is the Emergency Preparedness Plan which will address the broad issues related to a variety of emergency response actions that may be needed at WSSRAP. The second document is the Emergency Response Manual which addresses specific responses to a variety of scenarios as well as delineation of emergency response and emergency management teams.

Site's Prior Knowledge

WSSRAP was aware of this finding. The finding was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) or in the 1991 PMC ES&H Compliance Report (WEL0184). This finding also was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factor contributing to this finding was ineffective supervisory oversight to ensure that a RCRA Contingency Plan, or its equivalent, was in place. The existing Spill Prevention Control and Countermeasures Plan should have been updated and amended to incorporate the requirements of the RCRA Contingency Plan or a separate RCRA Contingency Plan should have been written.

3.5.3 Best Management Practice Findings

FINDING WM/BMPF-1 Waste Transfer Procedures

Performance Objective

Best management practice suggests that, to ensure accountability and checks and balances in the movement and storage of hazardous material, the same individual can not both request and approve the transfer and storage of hazardous waste. In addition, best management practice suggests that hazardous waste facility managers be accountable for and receive adequate information to effectively segregate, store and contain hazardous wastes.

Finding

WSSRAP Regulatory Compliance Procedure RC-12a does not ensure adequate checks and balances in the transfer of waste on-site or provide for supervisory oversight of hazardous waste segregation and storage.

Discussion

The WSSRAP Procedure RC-12a does not fully take into account two specific issues with regard to waste transfers at WSSRAP. First, it does not provide for adequate checks and balances in the waste transfer process in that it allows for the same individual to request, authorize and confirm waste transfers. Second, it is possible for waste transfers to the hazardous waste storage facility (Building 434) to be approved without the manager of that facility receiving the RC-12a forms; he/she is, therefore, unable to ensure proper segregation and placement of drums in Building 434.

Waste transfers at WSSRAP must be approved by the Waste Management Group through WSSRAP Regulatory Compliance Procedure RC-12a. This procedure applies to all transfers of hazardous waste, asbestos waste, toxic wastes, bulk wastes, and solid wastes. The purpose of WSSRAP Regulatory Compliance Procedure RC-12a is to ensure proper documentation, accountability, and placement of the waste transfers.

A review of RC-12a forms indicated that on 3 of 38 sampled forms (out of a total of 151) the same individual requested a waste transfer, approved the transfer and confirmed the transfer (WEL0129). While in each of these cases the approver was a member of the Waste Management Group and was, therefore, authorized to approve transfer forms as required by RC-12a, it is not a good management practice to have the same person initiate and authorize the same waste transfer. In order to better ensure an uncompromised transfer and placement of waste, only an individual independent of the transfer requestor should be allowed to approve the transfer request.

Another concern is regarding the hazardous waste materials at WSSRAP that are stored in Building 434. This facility is operated as a RCRA facility and contains seven bermed areas to enable effective segregation, storage, and containment of hazardous wastes. The Building 434 manager is responsible for supervisory oversight of Building 434 and for ensuring that waste being stored

in the facility is properly segregated into the appropriate bermed area(s), as well as ensuring that those areas do not exceed their containment capacity. While the Building 434 manager routinely approves placement of containers in Building 434 in accordance with WSSRAP Regulatory Compliance Procedure RC-12a, he/she is not routinely sent copies of forms verifying waste transfers into the building. To ensure that containers stored in Building 434 do not exceed the storage capacity of the bermed areas in that facility, copies of all WSSRAP RC-12a forms should be sent to the Building 434 manager. He/she can then confirm the placement of waste in the storage building with regard to proper segregation and containment.

Site's Prior Knowledge

WSSRAP was not aware of this finding. The finding was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) or in the 1991 PMC ES&H Compliance Report (WEL0184). This finding also was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factor contributing to this finding was an inadequate procedure that failed to completely address the need for independence in the checks and balances of the waste transfer system. Additionally, the audits, appraisals and reviews previously conducted were not complete in that the finding was not previously addressed.

FINDING WM/BMPF-2 Management of Bulk Waste Storage Areas

Performance Objective

Best management practice suggests that non-hazardous bulk waste stored outside should be managed to protect the surrounding area, groundwater and surface water from contaminated run-off.

Finding

Non-hazardous bulk waste stored outside on Pads 109/110 and Pad 303 is not being managed to prevent the generation of potentially contaminated run-off.

Discussion

WSSRAP stores a variety of non-hazardous bulk wastes outside, such as building debris, utility poles and old machinery on pads located throughout the site. With the exception of the pipe pile on Pad 109/110, these storage piles are not managed to prevent the generation of storm water run-off which could further contaminate surface waters in Frog Pond and surface water outfall NPDES-0003.

On Pad 109/110 there are several roll-off containers containing railroad ties covered with tarpaulins. Pad 109/110 also contains a variety of machinery from the demolition of Building 401 (the steam plant). These materials are stored under a leaky shed roof. This area is not bermed and the pad slopes to the north toward the Frog Pond, which could result in run-off.

Pad 303 is not roofed and contains a pile of mixed debris including utility poles, fencing material and broken roofing. Approximately half of the pile is under a weighted tarpaulin to prevent wind dispersion and precipitation intrusion. The remainder of the debris pile is not covered in any way. The pad slopes to the north and visible run-off moving toward the old Ash Pond drainage area was evident during a site tour. There is no berming or other measures to prevent run-off to the surrounding environment.

WSSRAP is in the process of constructing a Material Staging Area (MSA) located near the northern boundary of the site for storage of existing non-hazardous wastes and non-hazardous wastes that will be generated in future operations. The design of the MSA incorporates substantial protection against contaminant run-off. However, until the MSA is complete, and the bulk wastes are transferred from storage, preventive measures are needed to eliminate any risk from potentially contaminated run-off going to the surrounding environment.

Prior to termination of this Environmental Audit, WSSRAP implemented corrective action by installing sandbag berms at the east and northeast perimeter of Pad 109/110 and at the northern edge of Pad 303. The corrective action was visually inspected by the auditor and determined to be adequate.

Site's Prior Knowledge

WSSRAP was not aware of this finding. However, the construction of the MSA was initiated as a result of WSSRAP's recognition of the need for better overall non-hazardous bulk waste management and storage. The finding was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) or in the 1991 PMC ES&H Compliance Report (WEL0184). This finding also was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors contributing to this finding were the lack of a policy to address run-off from the Bulk Waste Storage piles and incomplete appraisals, audits or reviews since this issue has not been previously identified.

FINDING WM/BMPF-3 Logkeeping Procedures

Performance Objective

DOE Order 5480.19 defines the standards for conduct of operations at DOE facilities which "should result in improved quality and uniformity of operations." The policy requires facilities to manage "with a consistent and auditable set of requirements, standards, and responsibilities." The procedures must be in place to "control the conduct of operations."

Finding

A survey of the inspection and corrective response action forms for containerized material storage and surveillance of bulk waste revealed that four weekly reports were not in the file.

Discussion

The Regulatory Compliance Group maintains the binders of inspection forms documenting corrective actions under the requirements of written procedures found in WSSRAP RC-6 and WSSRAP RC-10s (I-TS-005, I-TS-007, WEL0097). A review of the binders maintained in the Regulatory Compliance Group's office indicated that documentation of four weekly inspections and related corrective action forms for bulk storage and containerized waste areas were not in the binder. The binders contained no information on the whereabouts of these reports, no documentation that the required weekly inspections occurred or that logging in of these documents had taken place. Staff indicated these forms were being utilized for report preparation.

Interviews with personnel indicated that individuals informally track these inspection records and related corrective action responses during day-to-day operations. No written WSSRAP procedure exists to maintain document control over the inspection forms and/or the corrective action responses until the forms are sent to the QA section for file retention (RC-10s, QAPP-9).

The WSSRAP procedure used to track the documents does not, therefore, meet all of the requirements of DOE Order 5480.19 because it does not provide a consistently auditable set of responsibilities.

Site's Prior Knowledge

WSSRAP was not aware of this finding. The finding was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) or in the 1991 PMC ES&H Compliance Report (WEL0184). This finding was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors contributing to this finding are inadequate policy implementation, inadequate WSSRAP procedures for tracking site actions, and ineffective supervisory oversight.

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3.6 TOXIC AND CHEMICAL MATERIALS

3.6.1 Overview

The purpose of the toxic and chemical materials portion of the Environmental Audit at WSSRAP was to evaluate the status of operations with regard to regulations promulgated under the Toxic Substances Control Act (TSCA), the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), applicable U.S. Department of Energy (DOE) Orders, and WSSRAP policies and procedures. These regulations and DOE Orders establish basic requirements for the use, storage, and disposal of toxic and hazardous materials. In addition, the concept of best management practice (BMP) was applied to assess activities with regard to the protection of the environment and public health. WSSRAP has stated its intention to comply substantively with TSCA for Superfund activities and to employ TSCA regulations as an ARAR.

Emphasis of this Environmental Audit was placed on the management and control of polychlorinated biphenyls (PCBs), pesticides, and chemicals. Petroleum and petroleum products management and control are an issue, and these are addressed in the Surface Water Section of this report (refer to Section 3.2). In the case of waste management and minimization procedures/policies, these are discussed in the Waste Management Section of this report (refer to Section 3.5). Table 3-6 presents the applicable regulations and DOE Orders used for auditing toxic and chemical materials.

The Environmental Audit was conducted by reviewing pertinent WSSRAP documents including procedures, policies, inspection logs, inventories, and audit reports; interviewing WSSRAP personnel, and Federal and state regulators; and inspecting the WSSRAP facility.

WSSRAP's staff focused their activities in complying with the regulations governing the storage and disposal of PCBs. WSSRAP's policy is to dispose of PCB materials in approved disposal facilities, whenever possible (I-TS-002). The prior use of PCBs in capacitors, transformers, electrical equipment, or process activities has prompted WSSRAP to take a proactive approach to minimizing the potential for PCB releases at this non-operating facility. PCBs have been adequately surveyed, drained and consolidated from old equipment, and have been sampled, inventoried, and stored to comply with all Federal reporting, storage, and disposal regulations. Disposal of non-radiologically contaminated PCB wastes was undertaken after the waste was analyzed to determine if radiological contamination was present. These proactive processes are continuing and will be maintained throughout the planned remediation efforts. WSSRAP staff acknowledged that demolition of buildings and subsequent remediation have the potential for discovering additional PCB waste and equipment and will generate an increase in the volume of PCB contaminated bulk waste (e.g., concrete pads, flooring, sumps). In instances of non-radiologically contaminated PCB wastes, WSSRAP has documented, manifested and disposed of wastes at approved off-site disposal facilities and intends to pursue this activity during future remediation efforts.

TABLE 3-6
LIST OF APPLICABLE TOXIC AND CHEMICAL MATERIALS
REGULATIONS/REQUIREMENTS/GUIDELINES

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
DOE Order 5400.1	General Environmental Protection Program	DOE
DOE Order 5482.1	Environment, Safety, and Health Appraisal Programs	DOE
40 CFR 165	(FIFRA) Pesticide Storage/Disposal Regulations	EPA
40 CFR 171	(FIFRA) Certification of Pesticide Applicators	EPA
40 CFR 761	(TSCA) Polychlorinated Biphenyls (PCBs)-- Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions	EPA

Radiologically contaminated PCB waste meets the criteria for mixed (commingled hazardous and radioactive) waste. No permitted treatment, storage or disposal facilities (TSDF) are currently capable of accepting mixed waste. Presently, DOE is pursuing the development of a comprehensive policy for the management of DOE mixed waste, but a permitted disposal site has not yet been identified. Because of its inability to dispose of its waste, WSSRAP is in violation of Federal regulations which require PCB wastes to be disposed of within one year of their removal from use. For example, the tributyl phosphate (TBP) tanks have resulted in a recurring finding from earlier audits. Such mixed wastes are an example of the need for a comprehensive DOE mixed waste policy. Most of the PCB wastes are radiologically contaminated and currently stored at WSSRAP in the hazardous waste storage facility (Building 434).

WSSRAP has demonstrated a proactive environmental attitude in its policy to identify, track, and sample PCB wastes both on and off-site. Two examples included a PCB transformer of questionable DOE ownership that was identified off-site at Pad 411 and a previously unidentified transformer found in Building 407. In both instances, the PCB waste was drained from the transformers, sampled and put into the hazardous waste storage facility, Building 434.

WSSRAP presently uses pesticides and herbicides for weed control and pest control. Pesticides and herbicides are currently applied by licensed subcontractors. Application standards are inserted into each contract to ensure that the appropriate procedures are followed. Therefore, WSSRAP complies with FIFRA requirements through its supervision of subcontractor activities.

The toxic and chemical materials portion of this Audit identified two compliance findings. These findings relate to the incomplete tracking of PCB wastes in storage and to the exceedance of allowable storage time for PCB wastes prior to disposal.

3.6.2 Compliance Findings

FINDING TS/CF-1 Storage of PCB Contaminated Material

Performance Objective

40 CFR 761.65 requires that "[a]ny PCB Article or PCB Container stored for disposal before January 1, 1983, shall be...disposed of...before January 1, 1984. Any PCB Article or PCB Container stored for disposal after January 1, 1983, shall be...disposed of...within one year from the date when it was first placed into storage."

Finding

WSSRAP is storing PCBs and PCB contaminated material in two tanks west of the chemical plant as well as in WSSRAP's hazardous waste storage facility (Building 434) beyond the one-year limit regulated by 40 CFR 761.65.

Discussion

Since the chemical plant's closure in 1966, approximately 7,400 gallons of PCB and radioactively contaminated tributyl phosphate have been stored in two large tanks located directly west of the chemical plant in violation of the one-year storage limit. On December 6, 1989, WSSRAP notified the EPA Region VII of the existence of the material and requested an exemption to the storage limit (WEL0171). To date, EPA has taken no action on this request.

In addition, PCB wastes and capacitors have been taken out of service and placed into storage in WSSRAP's hazardous waste storage facility (Building 434) on a continuing basis since 1989. These materials also exceed the one-year storage limit.

Interviews with Regulatory Compliance staff (I-WM-014) indicate that WSSRAP has attempted to have the material disposed of but that the radiological contamination has prevented hazardous waste treatment, storage, and disposal facilities (TSDFs) from accepting the waste. Further, WSSRAP is pursuing several paths to correct this compliance issue. First, it has contacted the Oak Ridge K-25 facility with regard to the possible acceptance of the waste at their hazardous waste incinerator. Second, according to Regulatory Compliance staff (I-WM-014), WSSRAP is contacting all other permitted TSDFs in the country with regard to their standards for accepting radioactively contaminated PCB waste. Third, an internal working group has been established to develop a disposal plan for wastes being stored beyond regulatory limits (WEL0161).

Site's Prior Knowledge

WSSRAP was aware of this finding. The finding was identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) and in the 1991 PMC ES&H Compliance Report (WEL0184). This finding also was included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factor contributing to this finding is the lack of a DOE policy to deal with disposal of mixed waste.

FINDING TS/CF-2 Tracking of PCB Wastes in Storage

Performance Objective

40 CFR 761.180(a) requires an annual inventory of PCBs or PCB items "...be prepared for each facility by July 1 covering the previous calendar year," for the items that remain in service or are projected for disposal. 40 CFR 761.180(a)(2)(ii)(C) requires that the annual records for unmanifested waste should include "a unique number identifying each PCB container." The WSSRAP procedure (RC-12a) defines the system to "...have the WITS Coordinator assign a WITS number according to RC-13a. The WITS Coordinator shall have the Building 434 Manager review and initial the Transfer of Waste form...One copy shall be provided to the WITS Coordinator and filed for tracking purposes." Under WSSRAP RC-13a, containers of waste are required to be tracked through "...assigned WSSRAP WITS numbers which shall be affixed to the sides of containers. Label markings shall be made with permanent paint or marker before containers are placed for final storage."

Finding

Incomplete tracking and recordkeeping for PCB wastes in storage have resulted in incorrect location and descriptions for PCB wastes in the 1989 inventory.

Discussion

WSSRAP is actively surveying, tracking, and consolidating PCB wastes into Building 434 for off-site disposal. WSSRAP has established a Waste Inventory and Tracking System (WITS) in its Waste Minimization/Pollution Prevention Awareness Plan (WEL0027) which is a computer program used to facilitate waste tracking. WITS information forms the basis for the annual PCB inventory. The WITS computerized database "identifies the locations of waste products during all phases...by tracking their movement through final disposition." Procedures are implemented by the Waste Management Group to designate hazardous materials as waste which then become subject to tracking until final disposal (WSSRAP RC-11, WSSRAP RC-12a). For containerized waste, an individual WITS number is assigned prior to the waste being stored in Building 434 (WSSRAP RC-13a).

The WITS system represents a sound effort to track waste in storage, but inconsistent application of the procedures or lack of methods to verify the completeness of the data have resulted in inaccuracies in previous annual reports (I-TS-017). The data system is the primary tool used to support current efforts to inventory all wastes, including PCBs.

One hundred twenty-seven capacitors, each filled with PCBs, and a transformer have not been assigned WITS numbers or other identifying numbers. This decision does not conform with WSSRAP RC-12a, RC-13a or 40 CFR 761.180(a). The PCB capacitors and the transformer were not assigned WITS numbers because they were not defined as "containerized waste" by WSSRAP. Without the assignment of a unique number, each transformer or capacitor placed in storage cannot be individually tracked or monitored should potential leaks occur. The

incomplete recordkeeping under WITS for these PCB containers, therefore, contributes to an incomplete record of PCB wastes and/or inaccurate annual reporting.

Site's Prior Knowledge

WSSRAP was not aware of this finding. This finding was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) or in the 1991 PMC ES&H Compliance Report (WEL0184). This finding also was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors contributing to this finding are the lack of policy implementation of existing WSSRAP procedures, the limits of those procedures to address special categories of waste (i.e., PCB capacitors), and the lack of a comprehensive design to verify and validate the tracking of waste to ensure compliance with Federal regulations. Resources are also a probable causal factor as the entry of WITS data and the PCB inventory are among a range of duties assigned to only one staff member.

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3.7 QUALITY ASSURANCE

3.7.1 Overview

The quality assurance/quality control (QA/QC) portion of the Environmental Audit evaluated the capability of WSSRAP's environmental sampling and analysis programs to generate scientifically valid and defensible data. These data are primarily required to demonstrate compliance with Federal, state, and local regulations, as well as DOE Orders, site policies and procedures. Table 3-7 contains the specific regulations, requirements, and guidelines used to evaluate WSSRAP during this Audit.

The Audit was accomplished through a review of WSSRAP QA policies (WEL0045), sampling procedures, QA plans/procedures for contractor laboratories (on or off-site), laboratory data, analytical contracting agreements, and interviews with appropriate personnel.

WSSRAP has two analytical laboratories on-site. One laboratory conducts alpha and gamma spectroscopy analyses for radioactive samples. The second is a field laboratory which analyzes chemical wastes generated by past activities at WSSRAP to promote safe containerization and consolidation. Additional special testing procedures (e.g., Total Organic Carbon analysis) are developed to conduct special testing, as needed. A significant percentage of the analyses are performed by off-site contract laboratories. Sampling is conducted by WSSRAP contractor personnel (I-QA-001). The sampling analysis projects are predominantly for the analysis of environmental monitoring of soil, sediment, groundwater, surface water and radionuclide emissions. Specific procedures are developed for each environmental medium (I-QA-001).

The Environmental Audit identified three best management practice (BMP) findings. Two of these findings relate to WSSRAP's radiological monitoring and sampling program. WSSRAP lacks an analytical QA/QC program for radon monitoring and it does not participate in the DOE interlaboratory quality assurance program for radiological monitoring. The third (BMP) finding addresses incomplete audits of surface water sampling procedures, and analyses of sampling procedures during audits.

TABLE 3-7
LIST OF APPLICABLE QUALITY ASSURANCE
REGULATIONS/REQUIREMENTS/GUIDELINES

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
DOE Order 5400.1	General Environmental Protection Program	DOE
DOE Order 5700.6B	Quality Assurance	DOE
EPA/QAMS-005/80	Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans	EPA
EPA/SW 846	Chemical and Physical Analysis of Wastes	EPA

3.7.2 Best Management Practice Findings

FINDING QA/BMPF-1 Analytical QA/QC Program for Radon Monitoring

Performance Objective

DOE Order 5400.1, Chapter IV.10.a, states, " A quality assurance program consistent with DOE Order 5700.6B shall be established covering each element of environmental monitoring and surveillance programs commensurate with its nature and complexity." Draft DOE Order 5400.xy, Chapter 10.5.b, states, "Each site is required to maintain an analytical QC program adequate to document and control the accuracy and precision of the analytical results." Chapter IV.1.b, states, "All requirements contained in Chapter IV shall be implemented no later than 36 months after the effective date of this Order, unless otherwise required by other DOE Orders, or by applicable Federal, state, or local legislation or regulation."

Finding

WSSRAP does not have a Quality Assurance/Quality Control (QA/QC) program for radon monitoring that meets all the requirements of DOE Order 5400.1.

Discussion

DOE Order 5400.1 requires a quality assurance program that covers each element of environmental monitoring and surveillance programs. WSSRAP has an extensive radon monitoring program which measures radon concentrations at the Weldon Spring Chemical Plant (WSCP) perimeter, the Weldon Spring Site Quarry (WSSQ) perimeter and at six off-site location; however, WSSRAP does not have a QA/QC program to support the program. The monitoring program specified in the WSSRAP Environmental Monitoring Plan (EMP) uses one pair of radon track etch detectors at 22 permanent locations. The analysis of these detectors is performed by one contract laboratory (Terradex), however, WSSRAP has no independent verification of data accuracy other than Terradex's QC checks. WSSRAP has not developed a QA/QC program to evaluate Terradex's analytical program. Best management practice suggests that WSSRAP, in anticipation of having to be in compliance with Chapter IV of DOE Order 5400.1 by November 1991, should initiate development of a QA/QC program for its analytical laboratories.

Site's Prior Knowledge

WSSRAP was aware of this finding. The finding was identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) but was not identified in the 1991 PMC ES&H Compliance Report (WEL0184). This finding was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factor contributing to this finding is inadequate policy implementation. WSSRAP has an extensive QA/QC program, but has neglected to include radon monitoring in their program.

FINDING QA/BMPF-2 **DOE Laboratory Quality Assurance Program for Radioactive Material**

Performance Objective

DOE Order 5400.1, Chapter IV.10.c, states, "All DOE and contractor laboratories that conduct analytical work in support of DOE environmental radiological monitoring programs for radioactive materials shall participate in the DOE interlaboratory quality assurance program ..." This will be a non-compliance issue as of November 1991 when implementation of that portion of DOE Order 5400.1 on Environmental Monitoring comes into regulatory effect.

Finding

WSSRAP radiological monitoring laboratory does not participate in, nor has it initiated participation in, the DOE interlaboratory quality assurance program that is required by DOE Order 5400.1 by November 1991.

Discussion

DOE Order 5400.1 requires DOE laboratories that conduct analytical work in support of their environmental monitoring programs to participate in the DOE interlaboratory quality assurance program. The WSSRAP radiological monitoring laboratory, located on-site, performs analytical work, including alpha and gamma spectrometry, in support of WSSRAP's radiological monitoring programs. While these analyses are only used as a screening for quantitative work performed by contractor laboratories, these analyses result in decisions being made on controls needed in the environmental monitoring program. Best management practice warrants WSSRAP's initiation of procedures to participate in the DOE interlaboratory quality assurance program in anticipation of this portion of the Order becoming compliant.

Site's Prior Knowledge

WSSRAP was not aware of this finding. The finding was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) or in the 1991 PMC ES&H Compliance Report (WEL0184). This finding was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors contributing to this finding appear to be inadequate policy implementation and incomplete appraisals, audits and reviews (since the finding was not previously identified).

FINDING QA/BMPF-3 QA Audits for Surface Water Sampling

Performance Objective

Best management practice for performing QA audits suggests that if a procedure is included in the scope of a QA audit, all elements of that procedure should be audited unless they are specifically excluded from the scope of the audit.

Finding

The QA Audit #3589-031 includes procedures for the collection of surface water samples, but the actual collection of surface water samples was not observed and, therefore, was not audited. The final QA audit report did not specifically exclude the elements concerning the actual collection of samples; therefore, they were considered to be within the scope of the QA audit.

Discussion

The report for QA Audit #3589-031 (WEL0192), conducted in December 1989, includes Standard Operating Procedure (SOP) 4.3.1, Rev 0, Surface Water Sampling, as a procedure that was audited. In reviewing the report, it was implied that all of SOP 4.3.1 Rev. 0 was audited and no exclusions were identified. However, the actual QA audit only addressed the documentation and sample handling portions of SOP 4.3.1 Rev. 0, and excluded the portions of the SOP that dealt with actual collection of samples. Best management practice is to clearly note on the list of procedures what procedures were audited and which ones were excluded or not actually field audited. The Quality Assurance Procedure that addresses audits, QAPP-10 (WEL0045), requires audits to be performed using checklists developed by the Audit Team, but does not address the issue of how to deal with audits that cover only portions of auditable procedures or those not expected to be included in the audit process.

Site's Prior Knowledge

WSSRAP was not aware of this finding. The finding was not identified in the 1990 Oak Ridge Functional Appraisal(WEL0075) or in the 1991 PMC ES&H Compliance Report (WEL0184). This finding also was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors contributing to this finding are inadequate procedures. The QAPP procedure for audits (QAPP 10, WEL0045) does not address this issue.

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3.8 RADIATION

3.8.1 Overview

The purpose of the radiation portion of the Environmental Audit was to evaluate the Weldon Spring Site Remedial Action Project's (WSSRAP's) compliance with applicable Department of Energy (DOE), Federal and state regulations and conformance with referenced guidelines and best management practices as they relate to protection of the members of the public and the environment against undue risk from radiation. Radiation issues were evaluated against the applicable guidelines and regulations listed in Table 3-8.

The general approach to the radiation portion of the Environmental Audit included the following activities: 1) tours of the facilities to locate sources or potential sources of air emissions and to review waste storage practices; 2) interviews with WSSRAP personnel, and Federal and state regulators; and 3) review of pertinent documentation.

Programs and systems to control and monitor radiological releases and to evaluate the environmental impact of the radiological contamination have been developed and implemented by WSSRAP. Of particular interest from an environmental radiological viewpoint are potential airborne radionuclide emissions and liquid radionuclide discharges (i.e., uranium, thorium, and radium) and waste management practices.

Airborne radionuclide emissions from WSSRAP are restricted to fugitive emissions from contaminated buildings and soil from the Weldon Spring Chemical Plant (WSCP) area, and radon emissions from the Weldon Spring Quarry (WSQ) and Weldon Spring Raffinate Pits (WSRP) on WSSRAP and vicinity properties.

Numerous surface water bodies are located on WSSRAP and on vicinity properties adjacent to WSSRAP. Three of these surface water bodies receive potentially contaminated effluents from on-site surface water run-off and from movement through groundwater. A diversion structure has been established to reroute surface water run-off around known areas of contamination near the Ash Pond. Samples of liquid releases are collected at discharge points, streams and numerous groundwater wells located both on-site and off-site. Previous radionuclide releases have resulted in low-level contamination of groundwater and some stream and lake sediments on WSSRAP and vicinity properties.

WSSRAP radiological wastes include low-level solid and liquid forms and mixed waste in solid and liquid forms. The liquid wastes and liquid mixed wastes are stored in barrels in Building 434. Solid and mixed solid wastes are stored in Building 434, Building 103, and on various storage pads on-site. The WSQ contains a large volume of mixed solid and mixed liquid waste, otherwise referred to as bulk waste. There are deteriorated barrels of solid waste located on various portions of the WSCP. Wastes that are generated as a result of former and present WSSRAP activities are stored on-site awaiting disposal; however, the ultimate disposal site has not yet been determined.

TABLE 3-8
LIST OF APPLICABLE RADIATION
REGULATIONS/REQUIREMENTS/GUIDELINES

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
DOE Order 5400.1	General Environmental Protection Program	DOE
DOE Order 5400.3	Hazardous and Radioactive Mixed Waste Program	DOE
DOE Order 5400.5	Radiation Protection of the Public and the Environment	DOE
DOE Order 5400.xy (Draft)	Radiological Effluent Monitoring and Environmental Surveillance	DOE
DOE Order 5480.4	Environmental Protection, Safety and Health Protection Standards	DOE
DOE Order 5480.11	Radiation Protection for Occupational Workers	DOE
DOE Order 5480.19	Conduct of Operations Requirements for DOE Facilities	DOE
DOE Order 5500.3	Reactor and Nonreactor Nuclear Facility Emergency Planning Preparedness and Response Program for DOE Operations	DOE
DOE 5820.2A	Radioactive Waste Management	DOE
DOE SEN-7A	Policy on Line Management's Responsibility to Achieve Environmental Compliance	DOE

TABLE 3-8 (continued)
LIST OF APPLICABLE RADIATION
REGULATIONS/REQUIREMENTS/GUIDELINES

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
10 CFR 20	Standards for Protection Against Radiation	EPA
10 CFR 834 (Draft)	Radiation Protection of the Public and the Environment	EPA
40 CFR 61 (Subpart H)	National Emission Standards for Radionuclide Emissions from DOE Facilities	EPA
40 CFR 192	Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings	EPA
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities	EPA
ANSI N13.1-1969	Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities	ANSI
ASME NQA-1	Quality Assurance Program Requirements for Nuclear Facilities	ASME

There is an extensive program for monitoring radiological contaminants in effluents and the environment at WSSRAP. The program is comprehensive and meets the monitoring requirements of the applicable regulations. WSSRAP is committed to a dynamic program for protection of the public and the environment.

The radiation portion of the Environmental Audit identified two compliance issues: (1) Annual Site Environmental Report Documentation for Radionuclides and Methodology for Dose Assessment; and (2) Emergency Preparedness Planning. In addition, four best management practices findings were identified: (1) Evaluation of Atmospheric Emissions; (2) Documentation of Standards and Operating Procedures in the Site Environmental Monitoring Plan; (3) Determination of Doses to the Public; and (4) Radiological Contamination Monitoring of Personnel and Vehicles.

3.8.2 Compliance Findings

FINDING RAD/CF-1 Emergency Preparedness Plan

Performance Objective

DOE Order 5500.3 "establishes the requirements for the development of Department of Energy (DOE) site specific emergency plans and procedures for radiological emergencies occurring in existing or planned DOE reactors and nonreactor nuclear facilities." The purpose of Attachment 1 "is to establish the minimally acceptable criteria for the development of site specific emergency plans and procedures for radiological emergencies occurring at DOE reactor and nonreactor nuclear sites." Section 2 of Attachment 1 states, "The following requirements shall be addressed in the written documents of the emergency planning, preparedness, and response programs of all DOE organizations and contractors. The degree of implementation of each of these requirements will depend upon the facilities, operations, and the identified potential emergencies. Safety analysis reports, environmental impact statement, and similar documents may be helpful in the identification of such emergencies." The DOE Order then lists the requirements on the subsequent pages.

Finding

The WSSRAP Emergency Preparedness Plan (EPP) does not adequately address radiological emergencies as required by DOE Order 5500.3.

Discussion

WSSRAP has a Draft EPP which it is developing to prepare WSSRAP personnel for handling potential emergencies (for radiological emergencies, the Draft EPP is a working document). The EPP and other task specific documents have identified potential emergencies and, in general, WSSRAP responds to the emergencies. The draft document, however, does not include how personnel are to respond to a radiological emergency. While the potential for significant radiological emergencies at WSSRAP is considered low, based on the fact that WSSRAP is not an operating facility and the emergency scenarios for release of radioactivity to the environment are limited, WSSRAP has not incorporated Section 2 of Attachment 1 of DOE Order 5500.3 into its EPP. This section of the DOE Order lists the requirements which must be addressed in the written emergency planning documents.

Site's Prior Knowledge

WSSRAP was aware of this finding. The finding was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) or in the 1991 PMC ES&H Compliance Report (WEL0184). This finding was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors leading to this finding appear to be inadequate policy implementation, incomplete appraisals, audits and reviews (since the finding was not previously identified), and lack of resources to complete the Emergency Preparedness Plan.

FINDING RAD/CF-2 **Annual Site Environmental Report Documentation for Radionuclides and Methodology for Dose Assessment**

Performance Objective

DOE Order 5400.1, Attachment II.5, states, "The total quantity of radioactivity by radionuclide released as airborne and liquid effluents should be included [in the Annual Site Environmental Report], along with descriptive information on nonradioactive effluents." DOE Order 5400.1, Attachment II.1.8.c, states, "The Environmental Report should contain an assessment of the potential radiation exposure to the public which could have resulted from site operations during the calendar year. The assessment should be as accurate and realistic as possible. The modeling and calculation methodology used in the dose assessment should be included or referenced."

Finding

The 1989 Annual Site Environmental Report (ASER) does not include documentation of the total quantity of radioactivity released by radionuclide or the modeling and calculation methodology used for dose assessment.

Discussion

The 1989 ASER does not contain a quantitative isotopic breakdown of radioactivity as required by DOE 5400.1, nor does it contain the modeling and calculation methodology used to determine doses to the public which could have resulted from site operations. This report is supposed to include a comprehensive evaluation of the environmental monitoring performed by WSSRAP. The report lists the total discharge volume released through WSSRAP outfalls and the total amount of uranium discharged in that volume; however, there is not an isotopic breakdown of radionuclides as required by DOE Order 5400.1, Attachment II.5. The report also contains a complete and thorough evaluation of potential doses to the public which could have resulted from WSSRAP operations during the previous calendar year; however, it does not include or reference the calculation methodology used to perform the dose assessment as required by DOE Order 5400.1, Attachment II.1.8.c.

Site's Prior Knowledge

WSSRAP was not aware of this finding. The finding was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075), since the 1989 ASER was not issued by the time the 1990 Oak Ridge Functional Appraisal was performed, or in the 1991 PMC ES&H Compliance Report (WEL0184). This finding was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors contributing to this finding appear to be inadequate training, inadequate policy implementation and incomplete appraisals, audits and reviews (since the finding was not previously identified).

3.8.3 Best Management Practice Findings

FINDING RAD/BMPF-1 Evaluation of Atmospheric Emissions

Performance Objective

Draft DOE Order 5400.xy, Chapter III.1.a, states, "All effluents released to the atmosphere from DOE-controlled facilities shall be evaluated and their potential for release of radionuclides assessed. This assessment is required to determine whether any such releases are adequately controlled and their environmental impacts properly evaluated. The results of this evaluation also provide the basis for the site's effluent monitoring program ... which shall be documented in the site Environmental Monitoring Plan (as discussed in DOE 5400.1)..."

Finding

WSSRAP has not performed, or documented in its Environmental Monitoring Plan, an assessment of the potential for release of radionuclides from the hood in its radiological analysis sample laboratory.

Discussion

The radiological sample analysis laboratory has a hood which serves as a point source for discharge of radioactive particulates from the laboratory. Grinding of radiologically contaminated soil samples for analysis was performed in this hood until July 1989. Since that time the grinding of soil samples has been performed in the soil preparation room using an HEPA filtered vacuum. The hood is currently used for spiking air filter samples with thorium in support of the QA program. While under current use the potential for releasing radioactive particulates from this hood is low, it has not been evaluated by WSSRAP as required by Draft DOE Order 5400.xy.

Prior to termination of this Environmental Audit, WSSRAP implemented the corrective action for this finding by assessing the potential for release of radionuclides in the laboratory. An evaluation and assessment of the documentation for the corrective action was verified and determined adequate.

Site's Prior Knowledge

WSSRAP was not aware of this finding. The finding was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) or in the 1991 PMC ES&H Compliance Report (WEL0184). This finding also was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors contributing to this finding appear to be inadequate training, inadequate policy implementation and incomplete appraisals, audits and reviews (since the finding was not previously identified).

FINDING RAD/BMPF-2 **Documentation of Standards and Operating Procedures in the Site Environmental Monitoring Plan**

Performance Objective

Draft DOE Order 5400.xy, Chapter III.4, states, "For all new or modified facilities coming on line, a preoperational assessment shall be made and documented in the site Environmental Monitoring Plan to determine the types and quantities of atmospheric emissions to be expected from the facility, and to establish the associated atmospheric emission monitoring needs of the facility." Draft DOE Order 5400.xy, Chapter VI.1, states, "The establishment of good laboratory practices is paramount to obtaining quality results from samples collected under the effluent monitoring and environmental surveillance program specified in DOE Order 5400.1. Laboratory procedures and practices shall be documented in the site Environmental Monitoring Plan ..."

Finding

Documentation of preoperational assessment radiological air monitoring for the quarry wastewater treatment plant and laboratory procedures have not been included in the WSSRAP Environmental Monitoring Plan (EMP) as required by the Draft DOE Order 5400.xy, Chapter III.4 and Chapter VI.1.

Discussion

The preoperational environmental assessment of the quarry wastewater treatment facility area appears to be adequate to allow for later environmental assessments for impacts from operations at the plant, however, documentation in the EMP for the air portion of this assessment has not been performed. Also, laboratory procedures and practices have not been documented in the EMP.

Site's Prior Knowledge

WSSRAP was not aware of this finding. The finding was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) or in the 1991 PMC ES&H Compliance Report (WEL0184). This finding also was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors contributing to this finding appear to be inadequate policy implementation and incomplete appraisals, audits, and reviews (since the finding was not previously identified).

FINDING RAD/BMPF-3 Contamination Monitoring of Personnel and Vehicles

Performance Objective

DOE Order 5480.11, Section 9.g.4.c, states, "Personnel and personal property contamination monitoring shall be provided, as appropriate, and used immediately prior to or after exits from radiological areas established to control surface or airborne contamination." DOE Order 5400.5, Chapter IV.5.a, establishes residual radioactive material surface contamination guidelines. ES&H Procedure 2.3.3s, "Personnel Access Control Monitoring," step 7.5, states, "All potentially contaminated areas of the individual and equipment shall be surveyed ..." Step 7.6 of the procedure states, "Survey, at a minimum, the following areas: 1) Both sides of each hand; 2) Bottoms of shoes or boots; 3) Pant legs and knees if these areas came into contact with potentially contaminated materials; 4) All loose potentially contaminated equipment to be removed from the controlled area (papers, clipboards, materials, etc.) excluding vehicles. Vehicles are surveyed periodically by the methods described in ES&H 2.3.8." ES&H Procedure 2.3.2, "WSS Vehicle Access Control," step 7.2, states, "All Government-furnished Equipment (GFE) vehicles which exit the controlled areas at the Weldon Spring Site may have their tires scanned for radioactive contamination before leaving the access control point. The frequency of scanning shall be determined by the Radiation Protection Manager (RPM)."

Finding

The present levels of contamination monitoring of WSSRAP personnel may not be adequate in the near future (when demolition activities increase significantly) to verify that contamination is not being removed from the controlled area to uncontrolled areas. Presently, contamination monitoring of vehicles may not be adequate to verify that contamination is not being removed from the controlled area to uncontrolled areas.

Discussion

DOE Order 5480.11 requires personnel and personal property contamination monitoring, as appropriate, after exits from radiological areas. ES&H Procedure 2.3.3s requires that personnel, at a minimum, frisk their hands, feet and bottoms of pants to verify that they are free of contamination. Under present work conditions and based on cumulative and historic results of personnel contamination monitoring at WSSRAP, this level of personnel monitoring appears to be adequate. However, upon initiation of building demolition or other remedial actions where the potential for airborne contamination will be increased, the risk of personnel contamination will also be elevated. To facilitate verification of lack of personnel contamination, personnel exiting these higher risk areas should monitor their whole bodies.

ES&H Procedure 2.3.2, step 7.2, states, "All Government-furnished Equipment (GFE) vehicles which exit the controlled areas at the Weldon Spring Site may have their tires scanned for radioactive contamination before leaving the access control point. The frequency of scanning shall be determined by the Radiation Protection Manager (RPM)." Conversations with the RPM revealed that

the frequency of monitoring was determined to be 100%. However, further conversations revealed that the security guards who make rounds of the WSSRAP property are not trained to perform vehicle surveys. During off-shift hours, the security guards enter the controlled area to perform routine inspections of the property and buildings. Because the security guards are not trained to perform vehicle surveys and do not survey their vehicles when exiting the controlled area, WSSRAP can not be in compliance with the directives of the RPM.

Site's Prior Knowledge

WSSRAP was aware of the personnel frisking portion of this finding, but was not aware that security guards did not survey their vehicles. No portion of this finding was identified in the 1990 Oak Ridge Functional Appraisal (WEL0075). The personnel frisking portion of this finding was identified in the 1991 PMC ES&H Compliance Report (WEL0184) but the vehicle survey portion of the finding was not identified. This finding was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors contributing to this finding appear to be inadequate training of personnel on the requirements of contamination monitoring, inadequate policy implementation of DOE Orders and WSSRAP procedures to survey vehicles, and incomplete appraisals, audits, and reviews (since portions of the finding were not previously identified).

FINDING RAD/BMPF-4 Determination of Doses to the Public

Performance Objective

DOE Order 5400.5, Chapter II.6.b, lists the requirements for evaluating doses to the public which could have resulted from site operations during the calendar year. The Order states, "Except as provided in paragraph II.6b(2)(d), tables of approved dose conversion factors II.6b(2)(a), (b), and (c), below, shall be used to evaluate doses unless otherwise legally required, e.g., use of AIRDOSE/RADRISK codes pursuant to 40 CFR 61 than those discussed above and as prescribed in applicable regulations shall be submitted to EH-1 for approval. EH-1 may approve the alternative method, if appropriate." Draft DOE Order 5400.xy Chapter VIII lists the implementing requirements of DOE Order 5400.5.

Finding

The calculated doses to the public, as reported in the Annual Site Environmental Report, were not performed using a methodology discussed in DOE Orders. The alternative methodology used also did not receive EH-1 approval as required by DOE Order 5400.5.

Discussion

WSSRAP performs very complete dose estimates to the public based on critical receptor data obtained through their site Environmental Monitoring Plan. The methodology used is more accurate and complete and provides better results than the methodology prescribed in the DOE Orders. However, the methodology used by WSSRAP has not been approved by EH-1 as is required by DOE Order 5400.5.

Site's Prior Knowledge

WSSRAP was not aware of this finding. The finding was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) or in the 1991 PMC ES&H Compliance Report (WEL0184). This finding was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors contributing to this finding are inadequate supervisory oversight for not knowing that DOE policy was not being followed, inadequate training in the requirements of the DOE Orders and inadequate policy implementation.

3.9 INACTIVE WASTE SITES

3.9.1 Overview

The purpose of the inactive waste sites portion of the WSSRAP Environmental Audit was to evaluate the compliance status of its facilities relative to the identification and management of past disposal sites and spills or releases of hazardous substances.

The WSSRAP inactive waste sites were evaluated against applicable laws, regulations, and U.S. Department of Energy (DOE) Orders including the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA); the National Oil and Hazardous Substances Pollution Contingency Plan (NCP); the provisions of the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1987, a stand-alone title (Title III) of SARA; and applicable DOE Orders and WSSRAP Policies and Procedures. The standards and regulations used for evaluating the inactive waste sites at WSSRAP are shown in Table 3-9. In particular, the requirements of CERCLA and SARA, in 40 CFR 300, are implemented to ensure the overall protection of public health and the environment from the risks associated with the WSSRAP facility. The specific hazards at WSSRAP include organic, heavy metal, asbestos, radioactive and mixed waste contamination. These hazards are found in the site's abandoned buildings, debris, soils, surface water, sediments and groundwater.

Based on the results of this Audit, the staff and programs which are in place at WSSRAP have demonstrated a high degree of professionalism in complying with CERCLA requirements and in instituting proactive programs. The success of this program can be partially attributed to the high level of staff commitment and the low staff turnover of key WSSRAP management personnel at DOE WSSRAP and Argonne National Laboratory.

Originally, the National Environmental Policy Act (NEPA) was the initial environmental compliance action taken at WSSRAP. NEPA activities were instituted in 1984 when DOE initiated efforts to manage the waste left by operations from 1941 through 1966. CERCLA superseded NEPA authority during the Environmental Impact Statement (EIS) process. A Draft EIS was issued in 1987, but during the period between the commencement of the EIS process and the report's issuance, a CERCLA National Priorities List (NPL) site ranking occurred at WSSRAP. Once WSSRAP was listed, a decision was made by EPA, Region VII, to coordinate the EIS activities with the CERCLA RI/FS process. This decision resulted in WSSRAP's reports being titled as "RI/FS-EIS" documents. The NEPA compliance portion of WSSRAP's activities was not assessed in this Audit because it was beyond the scope of this review.

The Federal response actions (otherwise known as Interim Response Actions [IRAs]) performed under CERCLA at WSSRAP stem from the site's nomination to be placed on the NPL list beginning in 1985. In 1987, EPA placed the Weldon Spring Quarry (WSQ) (15 acres) on the NPL. This listing was expanded in 1989 to include the Weldon Spring Chemical Plant (WSCP) area (205 acres), thus combining the WSQ and WSCP into one NPL site. In 1990, the adjacent Weldon Spring Ordnance Works property of 17,000 acres, (which includes the August A.

TABLE 3-9
LIST OF APPLICABLE INACTIVE WASTE SITES
REGULATIONS/REQUIREMENTS/GUIDELINES

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
Public Law 96-510	Comprehensive Environmental Response, Compensation, and Liability Act, as amended	EPA
Public Law 99-499	Superfund Amendments and Reauthorization Act of 1986	EPA
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan	EPA
40 CFR 302	Designation, Reportable Quantities, and Notification	EPA
40 CFR 355	Emergency Planning and Notification	EPA
40 CFR 370	Hazardous Chemical Reporting: Community Right-to-Know	EPA
43 CFR 11	Natural Resource Damage Assessments	DOI
DOE Order 5400.1	General Environmental Protection Program	DOE
DOE Order 5400.4	Comprehensive Environmental Response, Compensation, and Liability Act Requirements	DOE
Federal Facility Agreement under CERCLA 120	U.S. EPA Region VII and DOE Federal Facility Agreement	EPA/DOE

Busch Wildlife Preserve) was listed as a separate NPL site. The U.S. Department of the Army has taken full responsibility for this other NPL site, which was used by them as an Ordnance Works.

As originally agreed, DOE has taken full responsibility for all of the cleanup costs at the WSQ. However, the costs associated with the WSCP remediation are shared equally with the DA because of the DA's historical use and ownership. The total overall cost share allocation is projected to result in the DA providing 1/3 of the total cleanup costs for WSSRAP.

In order to coordinate and manage the complex and varied elements required for investigation and remediation at WSSRAP under CERCLA, an operable unit approach was initially proposed in the 1988 Work Plan for RI/FS-EIS activities at the Weldon Spring Site. The WSQ response activities were organized around remediating five components: (1) management of contaminated buildings and other structures, (2) management of surface water (raffinate pits and ponds), (3) contaminated soil, (4) contaminated sediment, (5) contaminated groundwater, and (6) vicinity properties. These components have been modified and expanded as a result of discussions with the EPA and the state of Missouri. New information discovered during the characterization studies was integrated into the individual response activities. This information will be presented in a modified Work Plan scheduled for release in fiscal year (FY) 1992. Figure 5 depicts the coordination of the various components for both the WSQ and WSCP areas.

To date, the major characterization and remedial studies which address the components of WSSRAP include the RI/FS-EA, Baseline Risk Evaluation (BRE), and Record of Decision (ROD) for the Management of Bulk Wastes at the WSQ (RI/FS-EA; BRE - February 1990; ROD - March 1991), the RI/FS-EIS for the WSCP (scheduled for public release in January 1992), and various IRA documents such as the Engineering Evaluation/Cost Analyses (EE/CA) and conceptual design documents.

Ecological risk assessments have not been performed in the past due to a lack of guidance from EPA and DOE on such assessments. Available data on contaminant levels in physical environmental media, however, are sufficient to perform ecological risk assessments (ERAs) in support of continuing RI/FS activities. As recommended in DOE's Draft Guidance Memorandum on natural resource trusteeship and ecological evaluations (WEL0175), ERAs can be performed in lieu of natural resource damage assessments pursuant to CERCLA, while supporting DOE-required environmental reviews, such as human health risk assessments, biological surveillance programs, and the development of cleanup criteria and remedial action alternatives. Currently, however, comprehensive ecological risk assessments are either planned for the WSQ (for residual contamination) or are now underway at the WSCP area. These ERAs being prepared for the entire WSSRAP site and vicinity properties are appropriate because they offer the following benefits to WSSRAP:

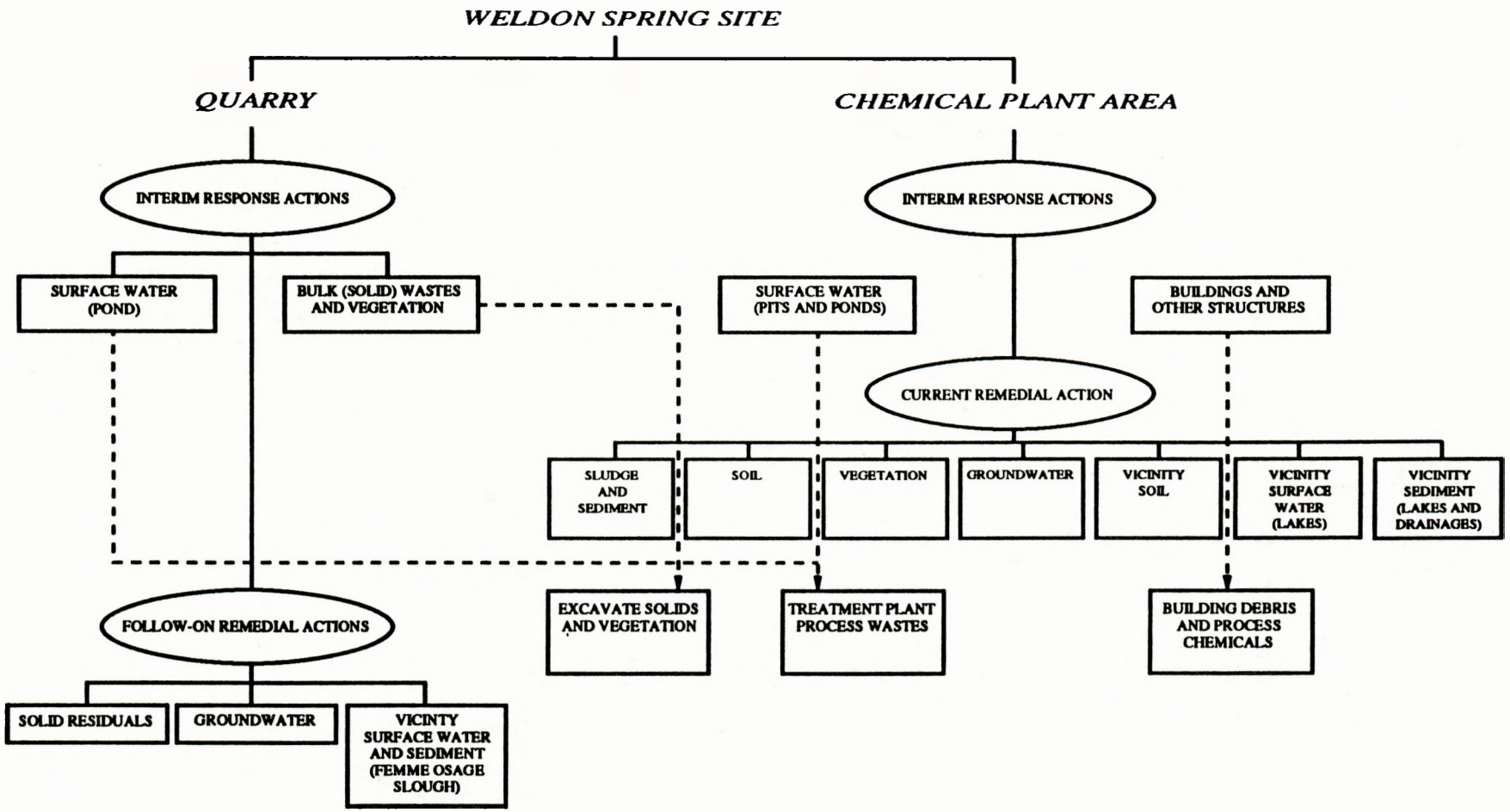


FIGURE 5. COMPONENTS OF SITE REMEDIATION (NOTE THAT THE DISPOSITION OF CONTAMINATED MATERIAL THAT COULD RESULT FROM FOLLOW-ON ACTIONS IS ADDRESSED IN THE CURRENT REMEDIAL ACTION)

- Proactive compliance with Draft DOE Guidance Memorandum on natural resource trusteeship and ecological evaluations (WEL0175).

- The ERA can be based entirely on existing data on-site contamination, off-site contaminant migration patterns, and local biological resource inventories (including rare and endangered species as potential indicator organisms for the ERA).

- A "reality check" of the theoretical predictions of contaminant biouptake and bioconcentration levels in biota and affected food chains. Also, the literature-based models of contaminants, typically used for ERAs in the absence of site-specific biouptake data, can be recalibrated on the basis of available and future data on actual contaminant body burdens to be gathered in WSSRAP's aquatic biological surveillance program.

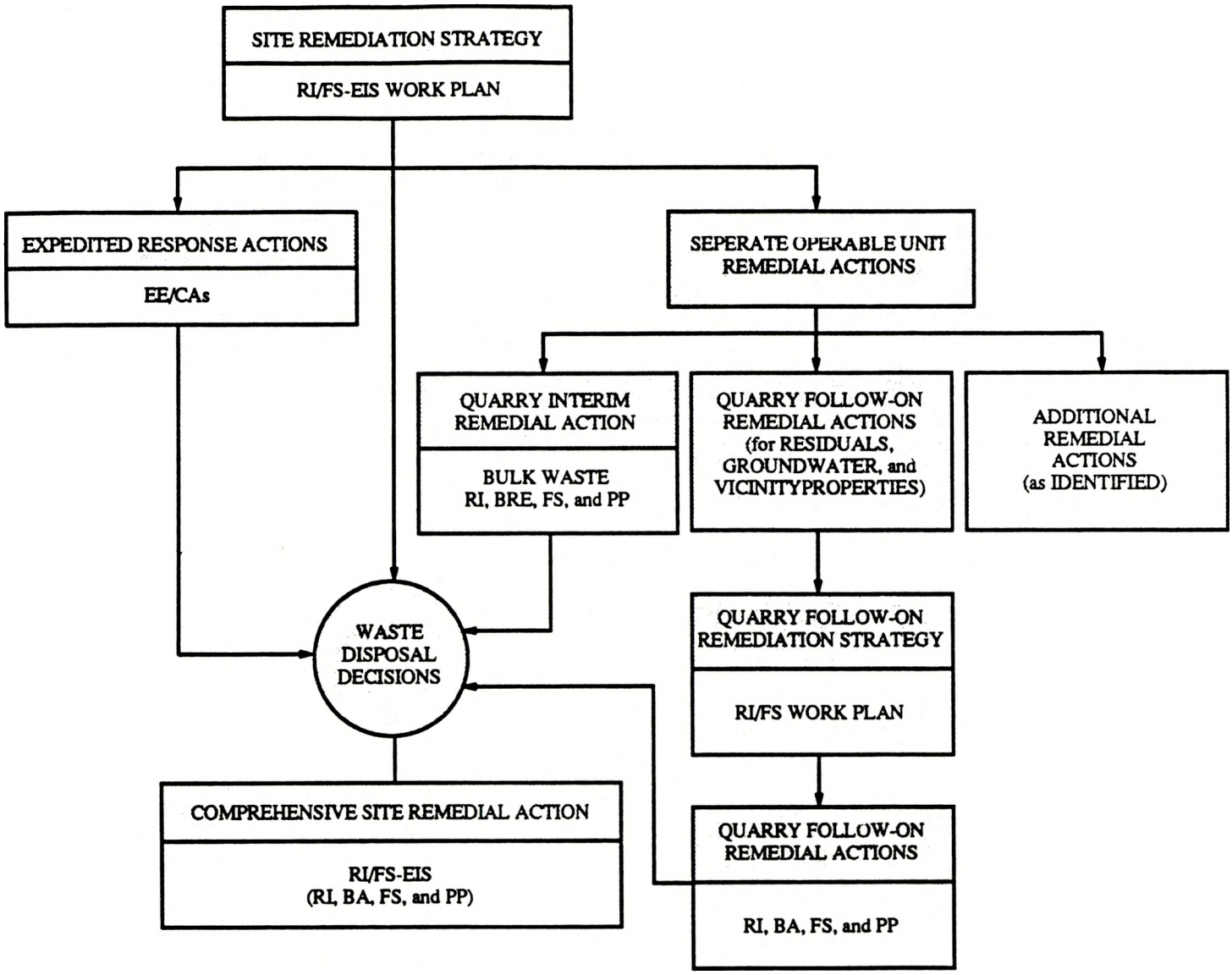
- A scientifically defensible ERA which could verify insignificant baseline contamination risks to on-site and off-site biota, and thus the potential to justify both the discontinuation of biological surveillance and a waiver of an otherwise difficult and costly natural resources damage assessment after site remediation.

- An ERA which will provide valuable feedback to the biological surveillance program, by identifying those contaminants of greatest ecotoxicological concern and those organisms most threatened by site-derived contaminants.

- An ERA which would facilitate other NEPA/CERCLA and RI/FS decision making, by providing a politically defensible, scientific basis for future RI/FS decisions regarding cleanup criteria, remedial action alternatives, impact mitigation strategies, ecological restoration requirements, and the need for continued, long-term environmental monitoring following site remediation.

At the WSQ, one future operable unit study will address (1) contaminated groundwater, (2) contaminated vicinity properties, and (3) residual materials remaining on the WSQ's walls and floor. At the WSCP, future operable units will be coordinated with the DA's RI/FS activities associated with the their Weldon Spring Ordnance site. The study of groundwater and other vicinity properties will be included in and be a part of the future operable units. Figure 6 depicts the corresponding CERCLA compliance documents associated with WSSRAP's WSQ and WSCP response actions.

To achieve remedial goals, CERCLA allows flexibility through two distinct processes. The two processes are the IRA, which leads to an EE/CA or the RI/FS, which leads to a ROD and Remedial Design/Remedial Action (RD/RA). A key element of response activities at WSSRAP has been the reliance on the implementation of the IRAs. A total of 21 separate IRAs have been implemented at the WSQ, the WSCP and vicinity properties. At the WSQ, the most



BA	=	BASELINE ASSESSMENT
BRE	=	BASELINE RISK ASSESSMENT
EE/CA	=	ENGINEERING EVALUATION/COST ANALYSIS
EIS	=	ENVIRONMENTAL IMPACT STATEMENT
FS	=	FEASIBILITY STUDY
PP	=	PROPOSED PLAN
RI	=	REMEDIAL INVESTIGATION

FIGURE 6. MAJOR ENVIRONMENTAL COMPLIANCE ACTIVITIES AND RELATED DOCUMENTS FOR THE WELDON SPRING SITE REMEDIAL ACTION PROJECT

significant IRA is the construction of the waste water treatment plant which will dewater the WSQ pond. This action is scheduled prior to the implementation of the ROD (signed March 1991) to remove, transport and segregate WSQ bulk wastes. The WSQ bulk wastes will be transported to the WSCP and will be segregated and stored at the Temporary Storage Area (TSA).

The major IRAs at the WSCP have included the removal of PCB-contaminated transformers, overhead piping, and asbestos. In addition, the planned demolition of process and non-process buildings will store debris at the designated Material Staging Area (MSA) presently under construction. Another IRA has resulted in the construction of the dike around the WSCP's Ash Pond which has significantly reduced the amount of off-site contaminant migration from the facility.

WSSRAP is continuing its investigations and remedial actions. An ROD for the WSCP is planned for 1992. It will address the long-term fate of the materials stored in both the TSA (WSQ bulk wastes) and MSA (building demolition wastes), as well as the remediation of sludge in the raffinate pits.

Presently, WSSRAP is at a critical stage in the implementation of the CERCLA/NEPA process. The majority of characterization and remedial studies have been or are nearing completion and, thus, the project will enter into the RD/RA phase. The timing, scheduling and phasing of all of the WSSRAP's operable units must be carefully coordinated. It is essential that proper planning documents and community relations programs are well established in order to assure continued success of WSSRAP's inactive waste site remedial program. As a result of this Audit, only one management practice finding was made in the area of meeting project milestones.

3.9.2 Best Management Practice Findings

FINDING IWS/BMPF-1 Meeting Project Milestones

Performance Objective

Best management practice suggests that project milestones proposed in RI/FS-EIS Work Plans and Statements of Work (WEL0047, WEL0095) should be realistic and achievable in the time frame agreed upon for completion.

Finding

Milestones, project deadlines, and revised deadlines established in the 1988 WSSRAP RI/FS-EIS Work Plan for implementation of the RI/FS-EIS and Statements of Work are not being met.

Discussion

Project milestones, such as the issuance dates of the Weldon Spring Chemical Plant (WSCP) RI/FS-EIS report and the Record of Decision (ROD) deadline scheduled in the Work Plan for the RI/FS-EIS, have not met their planned target dates. For example, the RI/FS-EIS Work Plan proposes a July 1990 target date for the public release of the draft RI/FS-EIS for the WSCP. This date has already been missed and the anticipated completion date is now December 1991 (WEL0191). As another example, the Statement of Work proposes a WSCP ROD in the second quarter of 1988. The present anticipated completion date is October 1992.

Site's Prior Knowledge

WSSRAP was aware of this finding. The finding, however, was not identified in the 1990 Oak Ridge Functional Appraisal (WEL0075) or in the 1990 PMC ES&H Compliance Report (WEL0184). This finding was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factor contributing to this finding is inadequate supervisory oversight to ensure that more realistic deadlines are proposed in the planning documents which reflect anticipated changes in the scope of WSSRAP activities. In addition, there needs to be an NEPA/CERCLA integration guidance document developed by DOE Headquarters and the establishment of a protocol or standard for document review and approval procedures.

3.10 ENVIRONMENTAL MANAGEMENT

3.10.1 Overview

The environmental management assessment evaluated the adequacy and effectiveness of environmental management systems in place to ensure conformance with Federal, state, and local statutes and regulations, DOE Orders, and Secretary of Energy Notices (SENs) (Table 3-10). More specifically, the assessment focused on:

- Top management support;
- Oversight activities;
- Organization structure and functional reporting relationships;
- Line responsibility and accountability;
- Quality and quantity of resources;
- Internal and external communications; and
- Overall ES&H awareness at all levels within WSSRAP.

Performance criteria used in the assessment included, in part, the Recommended Management Performance Objectives and Criteria for Tiger Team Management Assessments (June 14, 1990).

The assessment was largely conducted through the use of interviews and document reviews. The personnel interviewed included DOE-HQ and DOE Oak Ridge (OR) management, on-site DOE management, Project Management Contractor (PMC) senior management, PMC functional managers and staff and Argonne National Laboratory personnel. Interviews were also conducted with EPA Region VII, the Missouri Department of Natural Resources (MDNR) and other WSSRAP contractors. Close cooperation with Audit Team specialists assessing other functional areas provided important input into the environmental management assessment.

There are several organizations involved in WSSRAP. DOE's Oak Ridge Office is the field organization responsible for implementation of the project, with DOE's Office of Environmental Restoration and Waste Management having overall responsibility and authority for WSSRAP operations. At the WSSRAP site, DOE has a small staff of seven managing and overseeing the on-site operations of the PMC, which totals approximately 150 employees. Two other entities are under contract to DOE. One, Argonne National Laboratory (ANL), is responsible for environmental documentation. Their activities have included completing the Baseline Risk Evaluation (BRE), various Engineering Evaluation/Cost Analyses (EE/CAs), the Weldon Spring Quarry (WSQ) Feasibility Study (FS) and the WSQ Record of Decision (ROD), as well as working on the Weldon Spring Chemical Plant (WSCP) Feasibility Study/Environmental Impact Study (FS/EIS). The other contractor, PEER Consultants, provides support services to the project. Their activities have included budgeting, environmental technical support and clerical support.

MDNR and EPA (Region VII) have an active and strong interest in WSSRAP. Their involvement is primarily focused on review and approval of relevant regulatory activities and environmental documentation. In addition to project management, technical experts from DOE, the PMC, and ANL have routine, direct

TABLE 3-10
LIST OF APPLICABLE ENVIRONMENTAL MANAGEMENT
REGULATIONS/REQUIREMENTS/GUIDELINES

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
DOE Order 5000.3A	Occurrence Reporting and Processing of Operations Information	DOE
DOE Order 5400.1	General Environmental Protection Programs	DOE
DOE Order 5400.2A	Environmental Compliance Issue Coordination	DOE
DOE Order 5480.1B	Environment, Safety and Health Appraisal Program	DOE
DOE Order 5480.19	Conduct of Operations Requirements for DOE Facilities	DOE
DOE Order 5480.4	Environmental Protection, Safety and Health Protection Standards	DOE
DOE Order 5482.1B	Environment, Safety and Health Appraisal Program	DOE
DOE Order 5484.1	Environmental Protection, Safety and Health Protection Information Reporting Requirements	DOE
DOE Order 5500.2A	Emergency Notification Reporting and Response Levels	DOE
SEN-6B-90	Departmental Organizational and Management Arrangements	DOE

TABLE 3-10 (continued)
LIST OF APPLICABLE ENVIRONMENTAL MANAGEMENT
REGULATIONS/REQUIREMENTS/GUIDELINES

Regulations/ Requirements/ Guidelines	Sections/Title	Authority
SEN-7A-90	Policy of Line Management's Responsibility to Achieve Environmental Compliance	DOE
SEN-20-90	Interaction with Internal and External Oversight Organizations	DOE
SEN-29-91	Performance Indicators and Trending Program for Department of Energy Operations	DOE
DOE Memorandum, July 31, 1990	Guidance on Environment, Safety, and Health (ES&H) Self-Assessment	DOE

contact with these organizations as appropriate. Key public interest groups include the Francis Howell High School, the St. Charles Countians Against Hazardous Waste, and St. Charles County government officials.

The PMC, MK Ferguson (MKF), is working closely with the Jacobs Engineering Group (JEG) to complete this project. MKF focuses on overall project management, construction and operations, with JEG providing environmental and scientific input. Staff from both organizations are interspersed in each functional area. Together, these organizations function effectively as one organization. As such, all references to the PMC in this section refer to both organizations unless otherwise specified.

As the project moves into a phase with an increasing level of construction and demolition activity, adequate and effective management systems are considered critical elements to ensuring the project's future success. Procedures must be in place, people must be trained and management and oversight responsibilities must be clearly understood and functional.

Overall, the environmental management systems in place at WSSRAP are very good. An assessment of some key elements of effective environmental management systems are summarized below.

Management Support: It is apparent that management at both DOE and the PMC strongly support this project. They have allocated adequate resources to WSSRAP and the project is highly visible for both organizations.

Oversight: Three levels of oversight were assessed. DOE-WSSRAP oversight of the PMC, DOE-OR and DOE-HQ oversight of DOE-WSSRAP and the PMC, and PMC "internal audit" activities. These three levels together adequately cover all functional areas. However, as on-site activity increases, it is important that this level of oversight is maintained and possibly enhanced, particularly for subcontractor work.

Resources: Staffing levels appear adequate and are generally of high quality within the PMC. There appears to be a good mix of project management, construction and operations expertise with environmental and scientific expertise. However, as construction and demolition activity increases, there may be a need to allocate additional resources to Quality Assurance (QA), Waste Management, Environmental Protection (sampling) and subcontractor oversight activities. Managers of these functions are aware of staffing needs. DOE staffing appears adequate in light of the Environmental Engineer position recently added (but not yet filled).

Internal Communications: Communications within and among WSSRAP organizations is outstanding. The PMC and other DOE contractors appear to work together with on-site DOE management. DOE management should continue to carefully maintain its management and oversight perspective.

External Communications: Relations with the EPA, MDNR, and the local community are also strong. WSSRAP has several proactive community relations initiatives including educational workshops for the community and technical professionals, the Partners in Education Program, and quarterly publications. The MDNR and EPA both appear satisfied with the direction and progress of WSSRAP.

Awareness: Interviews with managers and staff indicated a strong commitment by all to their mission of completing this project in an environmentally sound manner. For all who work at WSSRAP, the cultural attitude is one of excellence and to go beyond compliance.

Organization Structure, Roles, and Responsibilities: The PMC recently reorganized. The new organization is well-conceived and effective. Activities are supported by comprehensive procedural documentation and ongoing training. Adequate staffing and good communications further make the organization effective. While the on-site DOE organization is small, it is, nonetheless, very effective. However, there are indications that there is an opportunity for improving the coordination of DOE-OR and DOE-HQ organizations that oversee, manage and guide WSSRAP activities.

The Oak Ridge Operations' Office of the Assistant Manager for Environmental Restoration and Waste Management (OR-AMERWM) is the field organization with "line management authority, responsibility and accountability for overall project implementation and contract administration in a manner consistent with approved WSSRAP goals (e.g., mission, work scope, functional requirements, design criteria, cost, and schedule)..." (from the Project Charter, WEL0201). OR-AMERWM provides the budget for DOE's WSSRAP staff and reviews their performance. Another Oak Ridge group, the Office of Assistant Manager for Environment, Safety, and Quality, provides WSSRAP with technical support as needed and performs independent appraisals of WSSRAP operations.

Organizationally, the DOE-OR reports up to the Assistant Secretary of Nuclear Energy. In the context of WSSRAP, OR-AMERWM reports up to DOE-HQ through the Office of Environmental Restoration and Waste Management. Depending on the nature of the issue, OR-AMERWM's primary contact with DOE-HQ will be at the level of the Office of Environmental Restoration or directly with the Office of Environmental Restoration and Waste Management.

Similarly, the WSSRAP project manager has two reporting relationships. The direct reporting relationship is to OR-AMERWM. However, on a day-to-day basis, there is substantial direct contact with the Decontamination and Decommissioning Branch of Eastern Area Programs within the Office of Environmental Restoration at DOE-HQ. All management reports go up both organizational hierarchies. Also, all key environmental documentation is reviewed by both organizations.

Another DOE-HQ organization, Environment, Safety, and Health (DOE-ES&H), is involved with WSSRAP. DOE-ES&H also reviews key environmental documentation, in addition to conducting Environmental Audits of WSSRAP operations, and setting policy and standards for related environmental, health, and safety issues.

There is no current documentation that clearly and accurately defines reporting relationships, roles, and responsibilities for DOE-OR and DOE-HQ organizations. The project charter (WEL0201), which describes organizational responsibilities, is five years old, pre-SARA, and before the establishment of the Office of Environmental Restoration and Waste Management. The need for clarity is furthered by the increasing level of activity at WSSRAP and the potentially deeper level of involvement of the U.S. Department of the Army (DA) in the future. WSSRAP is currently developing a revised Project Charter and Project Plan which should address role and responsibility issues.

The DOE system is complex and is dependent on the knowledge and skill of the Project Manager to operate effectively. By understanding the concerns and interests of the various individuals and organizations involved with WSSRAP (including DOE-OR, the Office of Environmental Restoration and Waste Management, and the Assistant Secretary of Environment, Safety, and Health), the WSSRAP Project Manager gets the right people involved as needed.

While there are presently no serious problems created by this situation, some manifestations of what appear to be organizational-related inefficiencies are described briefly below:

- The Self-Assessment Program is being developed from both the top down and the bottom up simultaneously.

- WSSRAP had to create two separate, but similar, budget/funding documents for FY 1992 last year; one for DOE-OR, another for DOE-HQ. The situation improved somewhat this year with the development of the 1993 budget coordinated primarily through DOE-OR.

- DOE-HQ has been the source of delays for issuing the last two Annual Site Environmental Reports.

- Modifications to the PMC contract (Contract Modification 008) are taking a considerable amount of time to resolve.

- The BRE document was delayed for several months awaiting DOE-HQ review.

Finally, the current organization appears to be inconsistent with the Project Charter. OR-AMERWM is responsible and accountable for project implementation, yet much day-to-day contact and management is through DOE-HQ. DOE-HQ appears to be assuming significant responsibility for the project. This situation may be a reflection of internal changes in the DOE organization and how they conduct their operations.

There are no compliance findings, but there are four best management practice findings. On-site DOE management and the PMC were aware of most of the findings, but had not yet implemented corrective actions. Today, none of the individual findings are viewed as serious. However, all management systems findings are important in the context of the expected increased level of construction and demolition activities over the next year. What is now a small issue could grow to have significant implications. In addition to the four findings, one Special Issue and one Noteworthy Practice were identified.

3.10.2 Best Management Practice Findings

FINDING EM/BMPF-1 **DOE Review of Work Packages in the Consent to Award Process**

Performance Objective

Best management practice suggests that DOE, in overseeing the process by which its Project Management Contractor (PMC) issues subcontracts, should review all available PMC environmental compliance analyses to ensure specifications are in full compliance with all relevant DOE and environmental regulatory requirements.

Finding

DOE is not reviewing comprehensive analyses of environmental compliance issues specific to each work package generated by the PMC as part of the Consent to Award process.

Discussion

The PMC Environmental Compliance (EC) Department performs detailed analyses of environmental compliance requirements, "fact sheets" (WEL0205), for all work packages proposed to be subcontracted out by the PMC through invitation for bid (IFB) or request for proposal (RFP) processes. These fact sheets address requirements related to environmental documentation, ARARs, waste management, and the FFA, in addition to other regulatory and environmental considerations.

This comprehensive environmental compliance analysis is summarized and tracked in the EC Matrix (WEL0207). For a given work package, the EC matrix is further summarized as part of the Scheduling Matrix (WEL0208). Only the Scheduling Matrix, however, is included in the documents DOE reviews when approving PMC work package specifications that need to be subcontracted.

Of particular concern is the fact that more and larger subcontracts will be issued in the coming months and years as construction and demolition activities increase. This demands a careful DOE review of all work packages for environmental compliance issues. To ensure that DOE provides the highest quality review and that WSSRAP maintains its commitment to treat environmental protection and compliance as a top priority, the fact sheet should be included with the documentation package forwarded to their design engineer. With that information, which already exists, the DOE will be better able to evaluate environmental compliance of work package specifications with DOE policies and regulatory requirements for proposed subcontracts.

Site's Prior Knowledge

WSSRAP was not aware of this finding. However, the EC Manager maintained that access to the fact sheet was offered to the DOE in the past, but they declined it. The finding was not identified in the 1990 Oak Ridge Functional Appraisal or in the 1991 PMC ES&H Compliance Report. This finding was not included in

WSSRAP SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factor contributing to this finding is a lack of supervisory oversight and knowledge of EC's analysis of work package specifications that are proposed for subcontract under a Consent to Award.

FINDING EM/BMPF-2 **Close-Out of External Audit Findings from the Site-Wide Audit Tracking System (SWATS)**

Performance Objective

Best management practice suggests that audit findings should be effectively tracked, reported, and closed out to facilitate management's ability to manage identified deficiencies at the WSSRAP facility.

Finding

There is no defined WSSRAP procedure or mechanism to close out external audit findings from the Site-Wide Audit Tracking System (SWATS) database, which is used as a management tool to track WSSRAP deficiencies.

Discussion

The SWATS database was created in response to the Oak Ridge Management Appraisal issued in February 1990 (WEL0199). The database is a Dbase IV program that was developed internally by the Project Management Contractor (PMC) and is managed by the QA function. There are two separate databases: one to track internal audit findings (from QA audits) and another to track external audit findings (from Oak Ridge, Headquarters, MK-Ferguson, etc.). SWATS is an important management tool to ensure that corrective actions to audit findings are tracked and implemented appropriately. For each finding, SWATS identifies when a corrective action should be implemented and the responsible department, in addition to other relevant information.

Currently there is no formal mechanism to close out external audit findings, resulting in many findings which have been closed "internally" (by the PMC), but not "externally" (by DOE or the auditor). For example, in response to an Oak Ridge Operations Office (OR) appraisal or audit, a corrective action plan will be developed by WSSRAP. Assuming the proposed corrective actions have been deemed adequate by DOE-OR, WSSRAP will implement the corrective action. However, there is no definition as to who determines when a finding is considered closed (corrected) and can then be removed from the database. As such, the database is a less effective management tool because it includes many findings which may have already been satisfactorily addressed and could essentially be closed.

Site's Prior Knowledge

WSSRAP was aware of this problem, but it has not yet been addressed. The finding was not identified in the 1990 Oak Ridge Functional Appraisal or in the 1991 PMC ES&H Compliance Report. This finding was not included in WSSRAP SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factor contributing to this finding is a lack of procedural guidance on how to close out external audit findings.

FINDING EM/BMPF-3 Plans, Programs, and Procedures Documentation

Performance Objective

Best management practice suggests that all required plans, programs and procedures should be in final form and current.

Finding

Several programs and plans which are being used as implementing WSSRAP documents are in draft form or out of date.

Discussion

There are a large number of plans, programs and procedures which need to be documented in conformance with Federal and state regulations, DOE Orders, Secretary of Energy Notices (SENs) and other WSSRAP requirements. Several of these documents, including some with important ES&H implications, are still in draft form and, in some cases, out of date. For example:

- The Project Charter (WEL0201) is significantly outdated (May 1986) and the Project Plan (WEL0202) is a draft document (May 1989). The WSSRAP Project Manager has indicated that revised versions of these two documents are under development and will be issued in the coming months.

- The Emergency Preparedness Plan is a draft document. It is intended to cover the RCRA Contingency Plan and the SPCC Plan among other requirements (see finding WM/CF-3). There is an official version of the SPCC Plan, but it is out of date (WEL0028). WSSRAP expects the final version of the Emergency Preparedness Plan to be issued in the coming months.

- A draft procedure for Waste Minimization Feasibility Analysis (RC-15a) was used as a WSSRAP implementing document for nearly one year. This procedure was referenced in the Waste Minimization/Pollution Prevention Awareness Plan (WEL0027).

- The Community Relations Plan (CRP) is currently out of date (WEL0030). Because it has not been updated since October 1988, it does not reflect new Interim Response Actions occurring at WSSRAP (particularly those whose response actions extend beyond 120 days), changes in points of contact (including DOE and federally elected officials), and current practices for document distribution.

These examples may indicate the need for a management system to ensure that all guidance documents are in final form and current.

Site's Prior Knowledge

With the exception of the CRP, WSSRAP was aware of these individual examples. However, the site was not aware of this finding as a management issue. The finding was not identified in the 1990 Oak Ridge Functional Appraisal or in the 1991 PMC ES&H Compliance Report. This finding was not included in WSSRAP's SEN 7A report to DOE-HQ.

Probable Causal Factors

The probable causal factors contributing to this finding are both a lack of human resources to maintain and manage the significant documentation requirements and the lack of a management system to ensure that all documentation is maintained current.

FINDING EM/BMPF-4 Self-Assessment Plan

Performance Objective

Best management practice suggests that a comprehensive Self-Assessment Plan (SAP) should be in place currently per DOE Memorandum, Guidance on Environmental, Safety, and Health (ES&H) Self-Assessment, dated July 31, 1990 (WEL0122).

Finding

Self-Assessment Plans (SAP) for both DOE and the Project Management Contractor (PMC) are not yet up to the standard described in the DOE Memorandum of July 31, 1990 (WEL0122).

Discussion

Per the DOE Memorandum of July 31, 1990, both DOE and the PMC have initiated development of SAPs. Both organizations are in different stages of SAP development and implementation.

The PMC has developed a procedure (MGT-1a) that addresses the administration and conduct of self-assessments. The PMC has also recently completed three self-assessments: NEPA compliance (WEL0120), Radiology Lab operations (WEL0210), and incident investigation and reporting (WEL0211). Finally, the PMC has put together a schedule of self-assessments, two attributes (departmental procedures) per month, through June of this year (WEL0212). However, to date, only the PMC's ES&H Department and Environmental Compliance Department have begun to develop comprehensive programs. In addition, self-assessment findings have not yet been entered into the Site-Wide Audit Tracking System per MGT-1a.

DOE-WSSRAP and DOE-Oak Ridge are in different stages of development for SAPs. Oak Ridge has worked with WSSRAP to develop a draft self-assessment procedure for WSSRAP (WEL0203). It is consistent with the DOE guidance memorandum, but has not yet been implemented. However, DOE-HQ (Office of Environmental Restoration and Waste Management) has not yet completed its guidance document as to how it would like its Operations and field offices to develop SAPs. Meanwhile, DOE-WSSRAP and DOE-OR are nonetheless moving forward with development of their own programs.

Site's Prior Knowledge

WSSRAP was aware of this finding and is working towards full implementation of an SAP. The finding was not identified in the 1990 Oak Ridge Functional Appraisal or in the 1991 PMC ES&H Compliance Report. This finding was not included in WSSRAP SEN 7A to DOE-HQ.

Probable Causal Factors

For both the PMC and DOE, the probable causal factor contributing to this finding is a lack of human resources available to allocate to developing this program.

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3.11 SPECIAL ISSUES

3.11.1 Overview

Special issues are not findings, but are topics or situations requiring further discussion based on the matter or set of circumstances surrounding the issue. A special issue is generally a regulatory requirement, policy direction, or management practice. Such topics or situations tend to be contemporary environmental compliance issues that affect many U.S. Department of Energy (DOE) sites overseen by a variety of Program Offices, or a case where environmental compliance deficiencies recur at many DOE facilities. Because special issues do not meet the criteria of findings, probable causal factors are not included in this discussion.

SI-1 Annual Site Environmental Report

DOE Order 5400.1 Chapter II.4.c states that, "All DOE facilities that conduct significant environmental protection programs shall prepare an Annual Site Environmental Report (ASER). Environmental reports covering the previous calendar year shall be prepared annually and distributed by June 1 ..." This timing is reiterated in WSSRAP's Environmental Protection Implementation Plan. Both the 1988 and 1989 ASERs were issued more than six months late, primarily due to DOE-HQ review delays (WEL0209). Based on the current schedule, it is likely that the 1990 report will also be delinquent.

The draft 1988 ASER was submitted to the Oak Ridge Operations Office (OR) on 5/9/89, with OR review completed on 5/17/89. The final PMC 1988 ASER was submitted back to DOE-HQ on 5/31/89. Significant delays in DOE-HQ review and approval resulted in the ASER not being issued until December 1989, more than six months late.

The draft 1989 ASER was submitted by the PMC to DOE-OR on 4/20/90, with comments returned to WSSRAP in mid-May 1990. The final PMC 1989 ASER was submitted to DOE-HQ on 5/30/90. Again, significant delays in DOE-HQ review and approval resulted in final issuance of the ASER on December 4, 1990, more than six months late.

WSSRAP has been aware of this problem and has been working with DOE-OR and DOE-HQ on a revised 1990 ASER schedule. This schedule projects the draft 1990 ASER to be submitted by the PMC to DOE-OR by 4/26/91, with comments scheduled to be returned to WSSRAP by 5/10/91. It appears that WSSRAP will meet this revised schedule, although it extends slightly beyond the schedule dictated by DOE Order 5400.1. The final PMC 1990 ASER is projected to be completed by 5/20/91, with DOE-HQ review and approval anticipated by 7/1/91. It is too early to know whether DOE-HQ will meet this revised schedule. Nonetheless, based on this schedule, issuance of the 1990 ASER is expected to be one month late per DOE Order 5400.1.

To mitigate any public concern about the consistently delinquent issuance of the ASER, WSSRAP has decided to issue quarterly reports. While these quarterly reports are currently not subject to the same detailed review, scrutiny, or quality assurance, it illustrates an openness with the public and a commitment by WSSRAP to maintain a strong community relations program.

3.12 NOTEWORTHY PRACTICES

3.12.1 Overview

A practice may be noteworthy because its design and/or execution successfully addresses activities that have frequently resulted in compliance problems at other facilities. The presence or absence of noteworthy practices at a facility should not be viewed as a measure of a facility's performance. The purpose of this activity is for information transfer and problem solving across the DOE complex (rather than for the purpose of commendation). It provides the opportunity to identify innovative and cost-efficient solutions, thereby improving the effectiveness of DOE in meeting production goals in a way that is consistent with environmental goals.

NP-1 Management of Work Packages

The Planning and Analysis Group has developed a Responsibility Assignment Matrix to ensure full and complete awareness and accountability for each Work Package on-site. This system functions by having an individual from each of the following groups assigned to each work package: Engineering, Environmental Compliance, Procurement, Construction Operations, Construction Safety, Quality, Project Controls, Waste Management, and Environmental Health and Safety. These assignments are made during the work package planning process so that the concerns and perspectives of each of the applicable groups are present during the planning, design and implementation of site activities.

For each work package, the Environmental Compliance Group develops a "fact sheet" that documents all requirements related to environmental documentation, ARARs, waste management, and the FFA, in addition to other regulatory and environmental considerations. This information is summarized in and tracked using the Environmental Compliance Matrix. The fact sheet and the matrix are the key documents used to ensure that the specifications of all work packages and the actual completion of the work are in full compliance with all applicable environmental requirements. Any changes to work package specifications must be approved by the Environmental Compliance Department.

NP-2 Support of Science and Education

The DOE in SEN-23-90 describes a Departmental policy which emphasizes the need for "All of the Department's organizational elements (to) take appropriate steps to use their resources in a way that supports science and mathematics education at both the precollege and university levels." WSSRAP has responded to this policy in two ways: 1) working with Southeast Missouri State University to identify courses with which to develop a Master's degree curriculum in Environmental Science (WEL0197), and 2) as a participant in the innovative Partners in Education program with the Francis Howell School District.

Since 1989 as an active participant in the Partners in Education program, WSSRAP's staff and facility have made significant and long-term contributions to improving U.S. science and mathematics education, including the pre-college level. The program involves 31 volunteers from WSSRAP who work with all

grade levels in the public school system to encourage science and science-related careers. Volunteer activities with the school system involve classroom presentations by WSSRAP personnel, allowing students to follow WSSRAP employees through their workday (the Shadows program), performing workshops (Geosciences Workshop and a planned Technology Workshop) and assisting students with science fair projects. One student in particular became actively involved in an air monitoring experiment performed at the Francis Howell High School. WSSRAP has loaned scientific equipment to the schools for classroom use in demonstrations and experiments.

In return for the Partners in Education program, WSSRAP has earned respect from, and instilled confidence in, the community at large. Future plans for the program are considering grant-funded university students for internships in waste management or related fields.

APPENDICES

APPENDIX A
BIOGRAPHICAL SKETCHES OF AUDIT TEAM PERSONNEL

NAME: Andrea J. Heintzelman

AREA OF RESP.: Team Leader

ASSOCIATION: Headquarters, U.S. Department of Energy, Office of Environmental Audit

EXPERIENCE: 17 years

- U.S. Department of Energy
  - Assistant Team Leader and Environmental Protection Specialist in the Office of Environmental Audit. Team Leader for the Western Area Power Administration Environmental Audit, Assistant Team Leader for Tiger Team Environmental Assessments at the Savannah River Site, Y-12 Plant, Kansas City Plant, and Hanford Site. Assistant Program Manager for Prioritization of Environmental Survey findings for DOE-wide, major defense and nondefense production facilities.

- U.S. Federal Energy Regulatory Commission
  - Project Coordinator and Environmental Compliance Specialist in the Federal Energy Regulatory Commission (Washington, D.C.), assessing cumulative environmental impacts on proposed and existing hydroelectric dams, and noncompliances on operating hydroelectric facilities nationwide.

- Historical Enterprises
  - Resources Management Consultant for many environmental engineering development and planning projects (local, State, and Federal) conducted throughout the Mid-Atlantic region.

- Delew, Cather/Parsons
  - Project Site Director and Site Resources Manager at Delew, Cather/Parsons, Consulting Engineers based out of Washington, D.C., reviewing engineering construction design impacts and assessing environmental impacts on the upgrading of the Northeast Corridor (Amtrak corridor between Washington D.C. and Boston, MA).

- James F. MacLaren, Ltd.
  - Project Coordinator and Site Resources Manager based out of Toronto, Ontario, assessing environmental impacts from the proposed construction of hexafluoride, thermal, coal-fired, and hydrogenerating nuclear facilities located in five Provinces of Canada.

EDUCATION: B.A., Anthropology, Kansas State University
M.A., Applied Anthropology, American University
Technical Course Training:
Superfund RI/FS Workshop 1990-1991
Managing Hazardous Substances at Federal Facilities, 1990
40-Hour Personnel Protection and Safety Course (OSHA 29 CFR 1910.20)
24-Hour Hazardous Waste Operations Training
Compliance with Federal Environmental Laws and Regulations

NAME: Leroy H. Banicki

AREA OF RESP.: Assistant Team Leader

ASSOCIATION: Headquarters, U.S. Department of Energy, Office of Environmental Audit

EXPERIENCE: 14 years

- U.S. Department of Energy, Washington, D.C.
  - Environmental Protection Specialist responsible for providing guidance, direction and assistance to a multi-disciplined group of professionals performing Tiger Team Assessments and Environmental Audits at DOE facilities.

- Headquarters, Air National Guard, Andrews Air Force Base, MD
  - Project Officer for Installation Restoration Program activities at Air Guard bases nationwide.

- White Sands Missile Range, NM
  - Deputy Director, Environmental and Natural Resources Office, with responsibility for hazardous waste, asbestos abatement, spill control and countermeasures, and environmental training programs.

- Department of the Army, Fort Carson, CO
  - Environmentalist, responsible for hazardous waste, asbestos abatement, cultural and natural resources programs.

- Army Corps of Engineers, Jacksonville, FL
  - Biological Scientist, responsible for EA/EIS preparation and Endangered Species programs.

- Department of Agriculture, Soil Conservation Service, Prosser, WA
  - Soil Conservationist

- Menominee Indian Nation, Neopit, WI
  - Forest Inventory Specialist

EDUCATION: B.S., Wildlife Management, McNeese State University
M.S., Biology, University of Texas at El Paso
Graduate Studies, Forest Pathology, Louisiana State University

NAME: Debra A. Granger

AREA OF RESP.: Team Coordinator

ASSOCIATION: Arthur D. Little, Inc.

EXPERIENCE: 16 years

- Arthur D. Little, Inc.
  - Led and conducted more than 70 environmental, health, and safety audits in a wide variety of industrial settings, including manufacturing and power-generating facilities. The audits resulted in improved compliance status for the facilities involved.

  - Planned, developed, and conducted training workshops aimed at familiarizing participants with environmental, health, and safety regulations and auditing fundamentals and techniques. Issues and topics addressed within the workshops relate to the full range of regulatory requirements and provide participants with a comprehensive understanding of audit methodology and an opportunity to practice it. This included conducting a training workshop and a pilot audit at a DOE facility.

- Monsanto Chemical Company
  - Conducted a risk assessment of an ethylene oxide raw material storage and processing unit. Subsequently managed a project to upgrade the environmental, safety, and fire protection of the unit.

  - Chaired an eight-member Waste Minimization Team which achieved a 50 percent reduction in the generation of styrene and maleic anhydride hazardous waste, while lowering disposal costs and increasing product yields.

- U.S. Steel Chemicals
  - Managed the restart-up of a 50M pounds capacity, 35 year-old resins plant. Directed a staff of 25, including interviewing, hiring, and training technical and union employees, while preventing environmental releases and achieving zero OSHA recordable injuries.

  - Managed a project to modify a hazardous waste incinerator. Achieved a 20 percent reduction in natural gas usage while maintaining compliance with air emission standards.

EDUCATION: B.S., Chemical Engineering, University of Pittsburgh

<u>Technical Course Training</u>:
24-Hour Hazardous Waste Operations Training
Auditing Skills and Techniques
Environmental, Health, and Safety Regulations
The New Clean Air Act Workshop

NAME: David Persampieri

AREA OF RESP.: Surface Water/SPCC

ASSOCIATION: Arthur D. Little, Inc.

EXPERIENCE: 8 years

- Arthur D. Little, Inc.
  - Identified and evaluated process-based water reduction alternatives for a commercial client faced with a zero-discharge permit requirements. The process modifications identified, resulted in a reduction in wastewater generation of over 90 percent. This allowed the client to utilize evaporative ponds economically to achieve zero discharge.

  - Prepared water use permit application for a specialty metal smelting and refining operation. The permit application included a detailed description of all discharges as well as a spill prevention, control and countermeasures plan.

  - Prepared a schedule of compliance for a metals refinery as part of a water pollution permit application. This schedule outlined all significant plant operations and provided details of construction activities required to comply with permit requirements.

  - Identified and evaluated processing alternatives for salt cake waste generated by a secondary aluminum smelter. Changing regulations eliminated landfilling as a disposal alternative and dictated one of several recycling alternatives. These were evaluated based on capital and operating costs as well as environmental regulations.

- Pfizer, Inc.
  - Responsible for all process engineering activities for the production of calcium based products. This activity included compliance with OSHA, NFPA, and Environmental resolutions.

EDUCATION: A.B., Engineering Sciences, Dartmouth College
M.E., Materials Science, Dartmouth College

NAME: James E. Rice

AREA OF RESP.: Groundwater, Soils and Sediment

ASSOCIATION: Arthur D. Little, Inc.

EXPERIENCE: 8 years

- Weston Geophysical Corporation
  - Performed review of technical reports and prepared documents for the High Level Radioactive Waste Disposal Siting Program for the Nuclear Regulatory Commission.
  - Prepared Standard Operating Procedures for groundwater monitoring and geophysical investigations for the Massachusetts Department of Environmental Protection.
  - Conducted regional and local assessment of geologic conditions in the vicinity of a magnitude 5.0 earthquake for a nuclear utility client.
  - Conducted numerous environmental assessments at industrial and light manufacturing facilities including gas stations, machine shops, petroleum storage facilities, maintenance facilities and automobile repair shops.
- Schlumberger Well Services
  - Conducted geophysical logging for petroleum exploration clients. Logging techniques included nuclear, electrical and acoustic methods. Responsible for nuclear, explosives and occupational health and safety of three person field crew.
- Los Alamos National Laboratory
  - Performed routine soil, sediment, surface water and groundwater sampling in support of quarterly, annual and special environmental monitoring programs.

EDUCATION: B.S., Geology, New Mexico Institute of Mining and Technology
M.S., Geology, New Mexico Institute of Mining and Technology

NAME: Phillip M. Rury, Ph.D

AREA OF RESP.: Soils, Sediment and Biota

ASSOCIATION: Arthur D. Little, Inc.

EXPERIENCE: 16 years

- Arthur D. Little, Inc.
  - Baseline biological, ecological, and floristic surveys. Due diligence assessments and environmental audits. Ecological risk assessment for Superfund sites (for U.S. EPA Region 1). Ecosystem functional analysis: aquatic, wetland, and terrestrial. Endangered species biology, ecology, and evolution. Environmental impact analysis and mitigation design. Landscape ecological damage assessment and restoration design. Natural resource damage assessments at industrial facilities. Regulatory analysis/permitting: NEPA, wetlands, and water quality. Wetlands creation/design for stormwater/wastewater pollution control. Wildlife habitat evaluations.

- The BSC Group-Environmental Engineering (Boston; Senior Ecologist)
  - Directed field studies, impact analysis, and the design of mitigation strategies for EIS. Environmental permitting for commercial/residential and utility projects. Designed vegetated wetland treatment systems to renovate surface water quality. Endangered species survey, mapping, impact assessment, mitigation, and monitoring. Wetland damage assessments and permit/regulatory reviews for municipal authorities. Client representation at meetings and public hearings with regulatory authorities.

- Wellesley College: Assistant Professor of Biology
  - Introductory Biology; Developmental Biology; Horticulture

- Harvard University: Postdoctoral Research Fellow
  - Dept. Biochemistry and Molecular Biology
    Botanical research on "Yellow Rain," alleged chemical warfare agent in SE Asia.

  - Dept. Organismal and Evolutionary Biology
    Field, greenhouse, and laboratory research on wild and domesticated Coca species. Expeditionary floristic and ecological research in the Ecuadorean and Peruvian Amazon. Botanical research on economically important tropical plant species.

EDUCATION: B.S., Biological Sciences, State University of New York at Binghamton
M.A., Botany, University of North Carolina at Chapel Hill
Ph.D., Botany, University of North Carolina at Chapel Hill

NAME: Ralph Earle

AREA OF RESP.: Waste Management

ASSOCIATION: Arthur D. Little, Inc.

EXPERIENCE: 11 years

- Arthur D. Little, Inc.
  - Performed an assessment of the RCRA Corrective Action Program with regard to the pace of its implementation and the remedial alternatives.
  - Evaluated the regulatory structure, current and prospective, for medical waste handling and disposal and developed recommendations on the future of that market.
  - Assessed regional market structure and size for firms undertaking remedial action projects under RCRA and Superfund.
- Commonwealth of Massachusetts
  - Conceived, developed, and managed the issuance of a ten-year Solid Waste Master Plan for Massachusetts. Plan components included new regulations, enforcement activities, recycling programs, landfill permitting restrictions and combustion rules.
  - Participated in siting decisions for hazardous waste treatment and disposal facilities.
  - Developed and implemented a market development program for recycled materials for the Massachusetts Department of Environmental Protection.
  - Developed, drafted, and promulgated regulations regarding composting of municipal solid waste and residential yard waste.
  - Coordinated interstate efforts in the areas of market development, solid waste combustion policy, source reduction and recycling program development.

EDUCATION: B.A., cum laude, American History, Harvard College
M.S., Public and Private Management, Yale School of Management, Yale University

NAME: Linda S. Wennerberg, Ph.D

AREA OF RESP.: Toxic and Hazardous Chemicals

ASSOCIATION: Arthur D. Little, Inc.

EXPERIENCE: 16 years

- Arthur D. Little, Inc.
  - Negotiated the Statement of Work with the Environmental Protection Agency at a combination CERCLA/FUSRAP site.
  - Assessed the availability and efficacy of new technologies developed to treat and remediate radioactive (including NORM), hazardous, and mixed waste contamination.
  - Developed the analysis of potential release scenarios for the high-level radioactive waste repository at Yucca Mountain, Nevada.
  - Provided oversight to a commercial client developing a comprehensive TSCA program for all employees.
- Commonwealth of Massachusetts
  - Served as Department of Environmental Protection Low-Level Radioactive Waste Coordinator and supported development of mixed waste regulation under state RCRA authority.
  - Drafted Low-Level Radioactive Waste Disposal Siting Criteria for Massachusetts efforts to develop disposal capacity.
  - Drafted the framework for the state-wide Environmental Impact Report of 1976, analyzing the performance of all Massachusetts's hazardous waste programs.
- State of Michigan
  - Audited the environmental compliance program of the Geological Survey Division on oil and gas drilling operations.
- Michigan State University
  - Assessed the implementation of TSCA regulations and the impact on the regulated industries.

EDUCATION: B.S., Terrestrial Ecology, Michigan State University
M.S., Environmental Law and Resources Economics, Michigan State University
Ph.D., Environmental Law and Resources Economics, Michigan State University

NAME: Paul H. Jones, Jr.

AREA OF RESP.: Radiation

ASSOCIATION: Arthur D. Little, Inc.

EXPERIENCE: 9 years

- Arthur D. Little, Inc.
  - Provided radiological data for nuclear power facility exercises. This program included generation of in-plant, on-site and off-site radiological data and development and analysis of data for reentry/recovery and ingestion pathway drills. Responsible for developing training programs for emergency response.

- General Electric Company, Knolls Atomic Power Laboratory
  - Served as the site radiological controls auditor. Conducted comprehensive evaluations, audits and surveillances of laboratory and prototype radiological work activities and provided comprehensive assessments useful to management in assuring a high degree of compliance with radiological controls requirements, improvement in radiological work practices and attainment of high and uniform radiological standards.

  - Responsible for preparation and review of radiological work permits, procedures and packages, including comprehensive ALARA review. Responsible for technical evaluation of work practices and implementation of proper radiological controls for site facilities including radioactive waste disposal, critical facilities, fuel processing, chemistry laboratories and materials characterization laboratories.

EDUCATION: B.S., cum laude, Civil Engineering, University of Lowell
M.S., Environmental Engineering, University of Lowell
M.S., Radiological Sciences and Protection Physics, University of Lowell
Engineer in Training in Massachusetts
Passed Part I of the American Board of Health Physics Certification Exam

NAME: Robert A. Shatten

AREA OF RESP.: CERCLA

ASSOCIATION: Arthur D. Little, Inc.

EXPERIENCE: 9 years

- Arthur D. Little, Inc.
  - Performed eleven environmental audits/assessments of lighting manufacturing facilities in Hungary. Functional area experience included solid and hazardous waste management, soil and groundwater contamination, underground storage tanks and water pollution control.

  - Managed and performed environmental due diligence assessments at manufacturing facilities in the U.S. and Europe. Assessments involved facility inspections, and a review of environmental management systems and past disposal practices. Where necessary, soil, groundwater and waste stream sampling were performed and remedial recommendations developed.

  - Managed a remedial investigation and feasibility study at a manufacturing facility in Beauvais, France. Developed and implemented the sampling plan, was responsible for site health and safety activities, interpreted analytical results and proposed remedial cleanup alternatives.

- U.S. EPA - Superfund Program
  - Managed $1.6 million remedial investigation and feasibility study at a Superfund site in Massachusetts. Developed work plans, sampling plans, and was responsible for and supervised site health and safety activities, budgeting and financial expenditures. Maintained intergovernmental cooperation and coordination throughout the RI/FS process.

  - Managed the $2.5 million design and construction of a water main, building demolition, waste removal, landfill and impervious capping installation, and land reclamation, at a Superfund site in Massachusetts. Developed procedures for segregation, consolidation and disposal of contaminated demolition debris, and air monitoring action levels.

  - Developed a $44 million long-term cleanup plan involving on-site soil incineration, groundwater interception and treatment and wetland restoration at a Superfund site in Massachusetts. Conceptual design included health and safety considerations and procedures to minimize adverse effects of construction and incineration.

EDUCATION: B.S., Environmental Engineering, Northwestern University
M.S., Environmental Engineering, Stanford University

NAME: James Margolis

AREA OF RESP.: Management and Organization

ASSOCIATION: Arthur D. Little, Inc.

EXPERIENCE: 8 years

- Arthur D. Little, Inc.
  - Performed an assessment of environmental management systems for a multi-billion dollar specialty chemicals company.
  - Evaluated staffing and organization structure at the corporate, division and facility levels for a multi-billion dollar Canadian natural resources company.
  - Assessed hazardous materials management programs at each of the 20 campuses which are part of a state university system.
  - Developed management decision-making framework, including policies and procedures, to evaluate environmental risks in loan and foreclosure transactions for a large national bank.
- Deloitte & Touche
  - Performed several organizational restructuring and operations improvement projects in the manufacturing, energy and health care industries.
  - Developed entry strategies and financial projections for new business ventures for several clients in manufacturing and service companies.
  - Developed damage calculations and expert testimony to support clients' litigation.
- Texaco, Inc.
  - Designed piping systems and structural supports at an oil refinery.
  - Operated and maintained mechanical equipment and process units (in addition to engineering design duties as a result of a long strike).

EDUCATION: B.S., Civil Engineering, Tufts University
M.S., Management, Kellogg Graduate School of Management, Northwestern University

APPENDIX B
ENVIRONMENTAL AUDIT PLAN

AUDIT PLAN
for
WELDON SPRING SITE
ST. CHARLES, MISSOURI

APRIL 1991

1.0 Introduction

On June 27, 1989, Secretary of Energy Watkins announced a 10-point Initiative to strengthen environmental protection and waste management activities in the Department of Energy (DOE). One of the initiatives involves conducting Environmental Assessments at DOE's operating facilities.

The purpose of the Environmental Audit (Audit) of the Weldon Spring Site is to provide the Secretary with information on the current environmental regulatory compliance status and associated vulnerabilities of the facility, root causes for noncompliance, adequacy of environmental management programs, and response actions to address the identified problem areas.

The scope of the Weldon Spring Environmental Audit is comprehensive, covering all environmental media and applicable Federal, State, and local regulations, requirements, and best management practices. The environmental disciplines to be addressed in this audit include air, soil, surface water, hydrogeology, waste management, toxic and chemical materials, radiation, quality assurance, and inactive waste sites. The Audit also addresses the performance of environmental management functions.

The Weldon Spring Site is part of the Department of Energy Surplus Facilities Management Program, one of the remedial action programs under the direction of the DOE Division of Facility and Site Decommissioning Projects. The Weldon Spring Site is comprised of the Weldon Spring Raffinate Pits (WSRP), the Weldon Spring Chemical Plant (WSCP), and the Weldon Spring Quarry (WSQ). These areas encompass 51, 166, and 9 acres, respectively. The WSRP and WSCP areas are contiguous. The WSQ is approximately 4 miles to the south-southwest of the main site. The Missouri River is located approximately 1.5 miles southeast of the WSRP and WSCP areas and 1 mile east of the WSQ. The Mississippi River lies approximately 14 miles northeast of the WSRP and WSCP areas and roughly 18 miles northeast of the WSQ.

Uranium and thorium residues, waste materials, and contaminated rubble are stored at the Weldon Spring Site. In addition to environmental monitoring, engineering activities are being conducted to minimize the migration of contaminants from these facilities into surface water and groundwater.

During the years 1981 through 1985, the WSRP and WSQ were under DOE caretaker status. The WSCP was controlled by the Department of the Army (DA). When the WSCP was transferred to the DOE in 1985, the DOE began revision of the overall Environmental Monitoring Program to more adequately determine the levels of contamination in and around the WSCP, WSRP, and the WSQ.

2.0 Environmental Audit Implementation

The Audit of Weldon Spring will be conducted by a Team managed by a Team Leader and an Assistant Team Leader from the DOE's Office of Environmental Audit (OEV) and technical specialists from Arthur D. Little, Inc. (ADL). The names and responsibilities of the team members are listed below:

Andrea Heintzelman	DOE	Team Leader
Lee Banicki	DOE	Assistant Team Leader
Debra Granger	ADL	Team Coordinator
Paul Jones	ADL	Radiation
Linda Wennenberg	ADL	Toxic and Chemical Materials/QA, Air
Robert Shatten	ADL	Inactive Waste Sites
Ralph Earle	ADL	Waste Management
David Persampieri	ADL	Surface Water
James Rice	ADL	Groundwater
James Margolis	ADL	Environmental Management
Phillip Rury	ADL	Soils, Sediment and Biota
Heather Haley	ADL	Administrative Support

2.1 Pre-Audit Activities

Pre-Audit activities for the Weldon Spring Environmental Audit included the issuance of an introduction and information request memorandum, a pre-Audit site visit, and initial review of documentation which was sent to the Environmental Team by Weldon Spring as a result of the information request memorandum.

A pre-Audit site visit was conducted on March 19-20, 1991 by the Team Leader, Assistant Team Leader, and the ADL Team Coordinator. The purpose of the pre-Audit visit was to become familiar with the site, to review information being supplied and request additional information, and to coordinate plans for the upcoming Audit with Weldon Spring Site personnel.

This Environmental Audit Plan is based on the information received by the Environmental Team as of April 2, 1991.

2.2 On-Site Activities and Reports

The on-site activities for the Environmental Audit will take place from April 15, 1991 through April 26, 1991. On-site activities will include field inspections, file/record reviews, and interviews with site personnel and regulatory personnel. A map of the main Weldon Spring Site (see Figure 1), identifies the raffinate pits, chemical plant, and other major buildings and features that will be the focus of the environmental audit at this location. The Weldon Spring Quarry (WSQ) site, located approximately 4 miles south-southwest of the main site, will also be evaluated during the environmental audit. The preliminary daily activity schedule for the audit is shown in Appendix A. The daily agenda will be updated and expanded once the on-site audit commences on April 15. Any and all modifications to the daily agenda will be coordinated with the principal contacts from the Weldon Spring Site on an ongoing daily basis.

A daily debriefing with site/facility personnel will be held each afternoon, at which time team specialists will relate their activities for the day, as well as any observations and concerns that they think may develop into findings.

A formal site close-out briefing will be conducted at the conclusion of the on-site audit activities. A draft report containing findings from the Environmental Audit will be presented to the site at this time. The Weldon Spring Site will have two weeks from the date of the site close-out to review and comment on the technical accuracy of the findings identified in the draft report prior to the report becoming final.

3.0 Air

The air-related portion of the Environmental Audit at Weldon Spring will include activities and sources that emit or have a potential to emit one or more air-contaminating materials, and controls or procedures applied to restrict those emissions. The audit will address air contaminants for which air quality standards (criteria pollutants) or emissions standards (new source performance standards or emissions standards for hazardous air pollutants) have been established by the United States Environmental Protection Agency (EPA) or by state or local agencies and contaminants considered by the State of Missouri to be toxic air pollutants. Adherence to the requirements of DOE Orders and Secretary of Energy Notices (SENs) will also be evaluated.

The assessment focuses on the remediation efforts being conducted at the Weldon Spring Site. Air contaminants of greatest concern are the release of asbestos, particulates, and radioactive contaminants during site remediation and decontamination activities.

3.1 Issue Identification

The general approach to the Audit will include the following activities: (1) an examination of remediation activities at the Chemical Plant and the Quarry to identify air-contaminant emission sources and their controls; (2) interviews with DOE staff, contractor, and subcontractor personnel at the Weldon Spring Site; and (3) review of relevant documentation.

Specific areas of interest to be investigated while on-site include, but are not limited to, the following: (1) past and pending projects that require demolition of buildings or facilities in which asbestos-containing materials are involved; (2) activities or techniques used to control or abate emissions of fugitive dust from areas of disturbed soil; (3) emissions of substances considered to be toxic air pollutants in the State of Missouri.

Releases of radioactive gaseous effluents are of particular importance at this site. The air specialist will collaborate with the radiation specialist to review the choice of release points; the design of gaseous or particulate monitoring, the sampling plan, and calibration and maintenance of sampling equipment; and the relevant ALARA techniques. Emanation of Radon, Thoron and their daughters will receive focused assessment.

3.2 Records Required

Documents will be reviewed as part of the audit that relate to potential air concerns. Several items of particular interest will include:

- Agency notification of past or pending plans for asbestos removal projects;
- Documentation of procedures for asbestos emission control;
- Scope-of-work for any contracted asbestos removal projects;

- Reports of asbestos disposal;
- Documentation of any efforts to abate fugitive dust emissions;
- Annual Environmental Monitoring Reports;
- Radioactivity related ambient air quality information;
- Radioactivity data for all sampled media;
- Inventories of air radionuclide release points and quantities;
- Unscheduled or unplanned release reports;
- Radioanalytical quality assurance programs and procedures;
- Dose assessment methodologies, including assumptions, calculations, reporting, etc.
- Description of radiation monitoring equipment, practices and procedures (e.g., calibration, maintenance, source checks, etc.);
- Radioactive waste management practices, policies, procedures, treatment, storage and disposal;
- Reports required by NESHAP Subpart H 61.90-61.98;
- Environmental Protection Implementation Plan;
- Environmental Monitoring Plan;
- Radioactive Waste Management Implementation Plan;
- Radioactive Waste Management Plan;
- Waste Minimization Plan;
- Site Emergency Plan; and
- Decontamination and Decommissioning information, plans and data.

4.0 Surface Water/Drinking Water

The surface water portion of the Environmental Audit at the Weldon Spring Site will encompass activities that may cause liquid releases to the environment, as well as controls or administrative procedures designed to minimize or eliminate the potential for such releases. The audit will address domestic wastewaters and their disposal via local sanitary wastewater collection and treatment systems, septic tanks or other practices; wastewaters from maintenance and service operations, design and maintenance of stormwater collection and control ditches, interceptors, and outfalls. Weldon Spring's methods for preventing possible cross-connections between potable and nonpotable water distribution systems will be reviewed as part of the drinking water portion of the Environmental Audit.

Emphasis will also be placed on compliance with Federal, state, and local water pollution control requirements established in conformance with NPDES permits; the Clean Water Act (CWA), and with drinking water rules promulgated as part of the Safe Drinking Water Act (SDWA) requirements.

In addition, the Weldon Spring Site will be evaluated to determine whether requirements expressed in DOE Orders and Secretary of Energy Notices (SEN) are being addressed in an appropriate manner. As well, the audit will evaluate water pollution control practices with respect to industry-accepted best management practices (BMPs).

4.1 Issue Identification

The audit plan will involve site tours of the Weldon Spring chemical plant, raffinate pits and quarry. Site personnel will be interviewed and documents reviewed in order to evaluate DOE's and its contractor's environmental management of contaminated wastewaters to surface waters, sanitary sewer system, and/or septic tank systems. Pathways for off-site migration of pollutants include:

- spills or releases into permeable soil areas;
- releases (accidental or planned) to sanitary sewers and/or storm water drains without retention, chemical and radiological analysis, or treatment; and
- contaminated surface run-off into drains or sewers leading to local surface water features or into permeable soil areas.

Specific areas of interest with respect to surface water/drinking water issues include, but are not limited to:

- Inspecting NPDES outfalls (NP-0001-NP0006).
- Inspecting WSQ area and treatment plant.
- Reviewing spill prevention, control and countermeasure plans where appropriate.

- Review training of treatment plant operators and maintenance personnel.
- Assessing the effectiveness of sewage treatment systems and/or septic tank operations.
- Identifying whether WSSRAP's controls for eliminating cross-connections and preventing backflow from non-potable water systems into potable water distribution lines is adequate.
- Observe sampling of surface water and sample preparation.
- Examining any sampling and analysis data for waters and wastewaters on and around the WSSRAP site.

4.2 Records Required

The following items serve as examples of the types of documentation to be covered during the surface water/drinking water audit:

- NPDES permits and applications;
- Correspondence with state or county regulatory agencies regarding water or wastewater controls and requirements;
- Communications between WSSRAP and DOE offices pertaining to water or wastewater issues;
- Sampling and analytical plans and data, e.g., sampling plans;
- Records relating to training staff in environmental controls related to liquid releases;
- Meteorological data related to rainfall events;
- Notices of unusual occurrences as reported in memos or in operator logbooks, if they have any impact on water or wastewater;
- Plans or diagrams showing where building floor drains and roof drains discharge;
- An inventory of oil storage tanks complete with volumes typically stored in each tank;
- Any other information pertaining to liquids used at the site; and
- SPCC plan.

5.0 Soils, Sediment and Biota

The Soils, Sediment and Biota (SSB) portion of the Environmental Audit at the Weldon Spring Site will focus on the programmatic and technical status of environmental monitoring of soils, sediment and biota in the site area. The monitoring activities will be evaluated based on applicable requirements and regulations, guidance documents and best management practices. Applicable requirements may include DOE Orders, CERCLA, and Missouri Department of Natural Resources regulations.

5.1 Issue Identification

Several key issues have been identified during preliminary review of site documents. The Audit will examine the environmental monitoring and reporting requirements relative to on-site and off-site areas including:

- August A. Busch Memorial Wildlife Area;
- Weldon Spring Wildlife Area;
- Femme Osage Slough;
- U.S. Army Training Center; and
- Sediment and soil conditions in source and non-source areas of the site.

5.2 Records Required

Documents and records will be required to be reviewed as part of the audit. Documents of particular concern include:

- Environmental Monitoring Reports and RI/FS Documents;
- Field Operations Plans (with supporting SOP's);
- Federal, state and local correspondence regarding SSB issues;
- Environmental Monitoring Plans;
- Natural Resource Damage Assessment Reports; and
- Baseline Risk Assessment Studies.

6.0 Groundwater

The purpose of the groundwater and soils portion of the Environmental Audit is to evaluate the status and technical execution of groundwater protection and monitoring, and environmental monitoring programs as they are related to applicable Federal, state and local regulations, guidance documents, and best management practices (BMPs). This effort will be coordinated with the efforts of specialists evaluating RCRA, inactive waste sites (CERCLA) and surface water. Applicable regulations include U.S. Department of Energy Orders, Missouri Department of Natural Resources regulations, the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the Resource Recovery and Conservation Act (RCRA).

6.1 Issue Identification

Key issues relative to groundwater monitoring programs were identified from preliminary review of information provided by DOE. Specific issues to be investigated further include, but are not limited to

- Program Management - the interaction and implementation of state and federal groundwater monitoring requirements and the relationship with off-site areas (Army, Busch Lakes) will be evaluated.
- Sampling Procedures - the appropriateness and technical execution of the groundwater sampling program will be investigated.
- Sample QA/QC and Chain-of-Custody - the appropriateness and technical execution of the groundwater and soil sampling program will be investigated.
- Laboratory Analytical Procedures - the appropriateness and enforcement of laboratory analytical procedures will be investigated.
- Data Validation - the level of data validation and personnel qualifications employed in the data validation will be investigated.
- Data Management.
- Characterization of the groundwater regime.

These issues will be investigated through review of reports, written records, and documents, direct observation of field operations, and interviews with key technical and management personnel. Applicable regulatory agencies will also be contacted if needed.

6.2 Records Required

Documents to be reviewed include:

- Groundwater Protection Management Plan, required under DOE Order 5400.1;
- Any site-specific reports of surface or subsurface soils or groundwater investigations;
- Any data and maps concerning subsurface geology and hydrology; and
- Field Operations Plans for conducting groundwater and soils investigations.
- Sampling data and recordkeeping documents.

7.0 Waste Management

The purpose of the waste management section of the Environmental Audit is to examine the compliance of the Weldon Spring programs with the relevant and applicable Federal and state regulations, DOE Orders, Secretary of Energy Notices and Weldon Spring policies with respect to the generation and management of solid and hazardous wastes, including the accumulation, labelling, characterization, transportation, storage, and disposal of such wastes.

7.1 Issue Identification

The audit process will include interviews and site tours with site operators and personnel and with environmental regulators as necessary. Relevant documents concerning Weldon Spring waste management practices and facility programs will also be reviewed. Specific issues that have been identified from both preliminary information supplied by Weldon Spring and from previous audit experience that will be investigated further include, but are not limited to:

- Status of the on-site hazardous waste storage facility (Building 434) including operating procedures and practices, characterization of waste being stored, amount of waste being stored, and waste storage periods;
- Status and characterization of waste containers and above-ground storage tanks located throughout the Weldon Spring Site including specifically wastes previously identified in Buildings 101, 102, 201, 202, 301, 302, 403, 404, 407, 428;
- Manifesting and tracking of identified and unidentified wastes;
- Status of underground storage tanks including notification, registration, sampling plans, and removal plans;
- Transportation of wastes between the WSQ and the Weldon Spring Chemical Plant (WSCP) by Weldon Spring and/or contract personnel; and
- Status of training programs for generators and for hazardous waste facility employees including program design and implementation.

In addition, the presence of mixed radioactive and hazardous wastes have been identified as an issue throughout the Weldon Spring Site. These wastes, and their management systems, will be reviewed by the entire audit team, especially the individuals charged with Waste Management, Toxic and Chemical Materials, Inactive Waste Sites, and Radiation.

7.2 Records Required

Documents and records will be required to be reviewed as part of the audit. Documents of particular concern include, but are not limited to:

- Copies of internal policies and procedures with regard to waste management activities including management plans and guidance documents;
- Any inspection reports or notices of violation from Federal, state or local authorities with regard to waste management activities including any corrective actions taken by Weldon Spring personnel;
- Any Federal, state or local permits or permit applications related to the Weldon Spring waste management activities;
- Copies of any exclusions, waivers, or other form of exemptions from regulation or DOE policies and Orders that have been obtained or that are planned to be obtained;
- Copies of the Weldon Spring Site Remedial Action Plan (WSSRAP) Field Analysis Data Sheets for waste containers found on the site;
- Last three years of manifests and waste generator reports;
- Copies of hazardous waste training programs; and
- Copies of waste minimization plans.

8.0 Toxic and Chemical Materials

The Weldon Spring Site is a DOE surplus facility that is presently undergoing extensive characterization and remediation. Toxic substances at the site represent a legacy of past activities. The Environmental Audit will emphasize the current management systems for significant waste materials such as for PCBs, asbestos, pesticides and herbicides.

8.1 Issue Identification

The Environmental Audit will address the management and use of chemical products used at the Weldon Spring Site with emphasis on handling, storage, and disposal. Primary emphasis will be given to the substances regulated by the Toxic Substance Control Act (TSCA), polychlorinated biphenyls (PCBs) and asbestos, and the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). Management and control of the toxic and hazardous substances will be determined through interviews with appropriate site personnel, inspections of pertinent facilities, and a review of relevant documents. The information obtained will be evaluated to assess whether Weldon Spring's management and control of toxic and hazardous substances are in compliance with Federal, state, and local regulations and pertinent DOE Orders. In addition, for those situations not covered by regulations, the concept of Best Management Practice (BMP) will be applied to prevent or minimize releases of toxic substances to the environment.

The management of electrical equipment which contains or has contained PCB and PCB-contaminated fluids will be reviewed during the assessment. Weldon Spring documents reviewed indicate that there was extensive use of power transformers and switches in service during the site's productive years. Contaminated buildings, soil, equipment, and waste remain on the site. Equipment will be inspected to determine its condition, the potential for leakage, and spill control systems. PCB fluid and equipment disposal practices will be reviewed for current and past inventories to determine the methods of disposal and the locations of disposal sites. Procedures for PCB analysis, removal, and handling will be reviewed. Inspection and reporting requirements for PCB equipment and any past spills will be evaluated to determine any potential problem areas.

Extensive use of asbestos has resulted in plans to remove, store, and dispose of the material from contaminated buildings, soil, water, and equipment. Evaluation of procedures, recordkeeping, storage, and monitoring for asbestos will be conducted at Weldon Spring.

Herbicides and pesticides are used at Weldon Spring. Pesticide/herbicide usage on the site will be reviewed to determine the risks of environmental contamination. The assessment will focus on application records, storage, disposal practices, labelling, and environmental monitoring procedures.

Many other toxic/chemical substances were used at Weldon Spring prior to its closure more than twenty years ago. As many as possible of these locations of past use and storage will be inspected during this assessment. The management and handling of these materials to prevent or minimize releases to the environment will also be evaluated.

8.2 Records Required

Files will be reviewed as part of the environmental assessment, including documents not yet reviewed or received (e.g., classified documents, individual files, documents not yet identified). Specific documents and files to be reviewed as part of the assessment include, but will not be limited to, the following:

- Toxic substances labeling and tracing system;
- Procedures for handling, control, and management of toxic substances;
- PCB annual inventory documents (1985-1990);
- Inventory of current PCB-contaminated electrical equipment, or documentation of its removal;
- Records of inspections of PCB transformers (1985 to present);
- PCB handling, storage, and disposal procedures;
- Correspondence with the fire department on PCB equipment;
- Pesticide training, handling, storage, disposal records, and environmental monitoring;
- SOPs for pesticides;
- Pesticide reports to regulatory agencies;
- SOPs for herbicides;
- Herbicide reports to regulatory agencies;
- Special procedures involving handling, storage, use and disposal of asbestos;
- Inventories/monitoring records for uncontained asbestos;
- Spill control and emergency preparedness plans for management of PCBs;
- Audits or inspections pertaining to the toxic substances program; and
- Other records, as determined, on-site.

9.0 Radiation

The radiation portion of the environmental assessment at Weldon Spring (WS) will include reviewing all activities, facilities and areas that involve or potentially involve radiation or radioactive material. Environmental radiation protection programs at WS will be assessed to determine compliance with the documents listed in the Environmental Audit Manual, applicable Federal and state regulations and DOE Orders. These programs will also be reviewed against commonly accepted best industry practices and standards of performance.

The assessment will consist of evaluating environmental radiation protection programs in the following six areas: environmental surveillance, effluent monitoring, radioactive waste management, radiological analyses, decontamination and decommissioning and inactive waste sites. Radiation issues cut across all media and areas to be evaluated during the environmental assessment; hence, the radiation specialist will coordinate his reviews with the other team specialists to ensure all radiation related issues are reviewed in sufficient detail.

9.1 Issue Identification

The general approach used in conducting the assessment will consist of interviews with WS employees and contracted personnel; interviews with DOE personnel; inspections of selected WS facilities and locations; observation of various operational processes; and review of documents, procedures and records associated with each of the program areas reviewed. In addition, each of these program areas will be evaluated by reviewing its defined scope, design bases, data quality and the effectiveness of program implementation. Facility design, safety analyses, engineered safety features and monitoring and control devices will be evaluated as they pertain to the environmental release of radioactive materials.

Radiological Environmental Surveillance Program assessment will include evaluating the pathways monitored, their associated sampling locations and the bases for selection. Monitoring equipment and the associated maintenance and calibration requirements will be reviewed. Analytical requirements will be reviewed for each medium sampled, including lower limits of detection, warning levels and action levels. The analytical techniques, collection methods and sampling frequency will be evaluated for the following media: air, surface water, groundwater, storm drain water, sanitary system water, soil, sediment, sludge, vegetation, direct radiation and wildlife samples. Off-site dose assessment methodologies, for the maximum exposed individual, and population dose calculations will be reviewed and evaluated including data validity, calculation methods and analysis documentation. The methods used for data review and preparation of the radiological portion of the Annual Environmental Monitoring Report will be reviewed. Also included in this area will be site emergency planning.

Review of the Radioactive Effluent Monitoring Program will include both liquid and gaseous effluents. The radiation specialist will coordinate these reviews with the water and air specialists, respectively. The gaseous effluent review

will include the following: release points monitored and the bases for selection; effluent monitor design, design basis, calibration and maintenance; and ALARA techniques utilized (special attention will be paid to emanation of Radon and Thoron and their daughters). The liquid effluent review will include the following: continuous and batch release monitoring (including surface run-off, continuous monitoring design, design basis, maintenance and calibration); positive control of batch releases; and ALARA techniques utilized. Analytical requirements will be reviewed for each release point and groundwater monitoring station sampled, including lower limits of detection, warning labels and action levels. In addition, the team will evaluate WS's ability to identify, control, mitigate, evaluate and quantify unmonitored or unplanned effluent releases.

Radioactive Waste Management Program review will include both solid and liquid radioactive and mixed wastes. The radiation specialist will coordinate this review with the waste management specialist. Waste generation and subsequent transportation to storage or process facilities will be evaluated. Waste decontamination, processing, segregation, incineration, solidification, compaction and drumming operations will be evaluated as part of this review. Waste container characterization, packaging, labeling, storage and shipment of low level radioactive waste and mixed waste will be reviewed. Compliance with waste site acceptance criteria will be reviewed, as applicable. This review will also include an evaluation of the site's waste minimization and volume reduction programs.

The Program for Decommissioning and Decontamination (D&D) of facilities will be evaluated. Historical records for facilities that have undergone D&D, or decontamination and subsequent release for unrestricted use will be reviewed. Plans for existing facilities awaiting D&D will also be reviewed.

Inactive radioactive material waste sites and radioactively contaminated areas will be reviewed. The radiation specialist will coordinate these reviews with the groundwater and inactive waste site specialists. The radiation specialist's concerns are limited to radiological monitoring of these sites, to the degree to which radioactivity is migrating off-site into the environment, and the associated off-site impact, if any.

All of the above programs require radiological analyses of various sample media. Laboratories performing these analyses will be evaluated to ensure that analytical techniques, records, equipment and Quality Assurance (QA) and Quality Control (QC) are adequate to produce accurate, high quality data in a manner consistent with regulatory requirements. The radiation specialist will coordinate this review with the quality assurance specialist.

9.2 Records Required

Files will be reviewed as part of this survey, including documents not yet reviewed or received (e.g., individual files, documents not yet identified). Specific documents and files to be reviewed as part of the assessment include, but will not be limited to, the following:

- Annual Environmental Monitoring Reports;
- Radioactivity related ambient air quality information;
- Radioactivity data for all sampled media;
- Inventories of air, soil, surface water and groundwater radionuclide release points and quantities;
- Unscheduled or unplanned release reports;
- Radioanalytical quality assurance programs and procedures;
- Dose assessment methodologies, including assumptions, calculations, reporting, etc.;
- Building plot plans showing equipment and locations;
- Description of radiation monitoring equipment, practices and procedures (e.g., calibration, maintenance, source checks, etc.);
- Reports or recommendations for upgrading radiation monitoring systems;
- Reports prioritizing new radionuclide sampling point criteria;
- Radioactive waste management practices, policies, procedures, treatment, storage and disposal;
- Reports required by NESHAP Subpart H 61.90-61.98;
- Environmental Protection Implementation Plan;
- Environmental Monitoring Plan;
- Radioactive Waste Management Implementation Plan;
- Radioactive Waste Management Plan;
- Waste Minimization Plan;
- Site Emergency Plan; and
- Decontamination and Decommissioning information, plans and data.

10.0 Inactive Waste Sites

The inactive waste sites portion of the audit at Weldon Springs will assess the compliance of the facility's activities regarding past disposal sites, contaminated structures, and areas which have received releases or spills of hazardous materials or wastes. The compliance audit will be based on the requirements in CERCLA, SARA (including the Emergency Planning and Community Right to Know Act of SARA Title III), and guidelines set forth in the National Contingency Plan (NCP). In addition, DOE Orders (e.g., DOE Order 5400.4 which references CERCLA compliance) will be included in the audit.

Since the implementation of CERCLA involves identification of contamination, remediation and protection of environmental areas and the public health, close coordination and communication with the other Audit team members will be maintained throughout the Audit process.

10.1 Issue Identification

The audit will examine and review the inactive waste site activities with emphasis on the following areas:

- Interim Response Actions (IRAs);
- RI/FS and ROD concerning the management of quarry waste;
- SARA Title III spill reporting;
- Compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (including EPCRA, SARA Title III);
- Other site characterization studies, such as the ongoing chemical plant RI/FS and work performed associated with the wildlife refuge;
- Evaluation of vicinity properties;
- ARARs; and
- The community relations program.

The current status of the ongoing studies and response actions will be determined. Schedules will be reviewed to determine whether reporting and construction commitments have been met. Documents will be reviewed, site inspections performed and key personnel will be interviewed to aid in the determination of CERCLA compliance.

10.2 Records Required

- RI/FS concerning the management of quarry wastes;
- ROD concerning the management of quarry wastes;
- Community Relations Plans;

- EE/CA Reports
  - Management of 15 nonprocess buildings,
  - Management of contaminated structures,
  - Management of contaminated impounded water,
  - Management of contaminated water at the quarry;
- Engineering Design Plan 1991;
- Environmental Annual Report 1989;
- FS for Remedial Action at the chemical plant 1990;
- IRAs (now EE/CAs)
  - #13 Army vicinity properties,
  - #3 Material staging area,
  - #5 Wildlife area,
  - Ash pond isolation system,
  - Others; and
- Proposed Plan for bulk waste management at the quarry.

11.0 Quality Assurance

Weldon Spring is currently undergoing site characterization and remediation due to a legacy of past activities and its present designation as an NPL site. The Quality Assurance programs are evaluated as they are implemented under the specified functional areas of air, surface water, groundwater, CERCLA-related activities, waste management, radiation protection, and toxic substances control. These focused evaluations will be integrated by one team member into a comprehensive review of Quality Assurance activities at the Weldon Spring Site.

11.1 Issue Identification

The Quality Assurance part of the Weldon Spring Audit will consist of evaluations of current sampling and analysis (S&A) procedures performed by any on-site and off-site contractors conducting analyses on Weldon Spring environmental samples to ensure that they result in the generation of scientifically valid and defensible data. Most of the environmental S&A is conducted by designated contractors, subcontractors, or DOE staff. The objective will be to assess the QA procedures for collecting process effluents and environmental samples, for performing the laboratory analyses to identify and quantify contaminants, as well as for evaluating the reporting of data. Aspects of the QA program relating to environmental management at Weldon Spring which will be evaluated and will include: training; instrument calibration and maintenance; sample collection, preservation, handling, and chain-of-custody procedures; blank, replicate and spiked sample results; data reduction and reporting; and data documentation (including logbook and calculation reviews, and archival data storage).

S&A procedures will be reviewed to ensure that they conform to regulatory requirements and/or accepted industry practice. These procedures will also be evaluated to determine if they are being properly implemented by Weldon Spring Site personnel, contractors, and subcontractors. Also, the interlaboratory test programs participated in by the various laboratories, as administered by the DOE's Environmental Measurements Laboratory and the EPA, will be evaluated for the laboratories' performance and corrective action plans.

The QA procedures for the general environmental program will be reviewed for their effectiveness and compliance with DOE requirements. This will include an assessment of the QA organization and structure.

Primary contacts at Weldon Spring are expected to be the QA representatives and personnel from the environmental monitoring facilities.

11.2 Records Required

Part of the assessment will consist of a review of pertinent documents and files. This will include documents not previously reviewed or received, individual files, and documents which have not been identified at this time. Some specific documents and files to be reviewed in this phase of the assessment include, but will not be limited to, the following:

- QA plans for Weldon Spring characterization and remediation activities and the supporting analytical laboratories;
- Weldon Spring environmental sampling and analysis procedures manuals;
- QA audits of environmental sampling and analysis at Weldon Spring (1985-present);
- QA manuals and implementing procedures for the environmental monitoring and surveillance programs;
- Periodic or annual QA summary reports for Weldon Spring;
- Summaries of results of QA sample analysis of external performance evaluation samples (e.g., from DOE's Environmental Measurements Laboratory and from the EPA);
- Training records for sample collection personnel for any Weldon Spring contractor, subcontractor, or DOE laboratory staff;
- Laboratory notebooks, standard data reporting forms and sampling logbooks;
- Instrument maintenance, repair and calibration records for laboratory and field equipment; and
- Results of internal precision and accuracy studies of environmental analysis.

12.0 Environmental Management

The environmental management portion of the Environmental Audit at Weldon Spring will include an assessment of the adequacy and effectiveness of environmental management systems in place to ensure conformance with Federal, state, and local statutes and regulations, DOE orders, and Secretary of Energy Notices. More specifically, the assessment will address:

- Top management support and oversight;
- Quantity and quality of resources;
- Line responsibility and accountability;
- Organization structure and functional reporting relationships;
- Internal and external communications; and
- Ongoing Environment, Safety and Health (ES&H) awareness and training.

12.1 Issue Identification

The general approach to assessing the environmental management systems at Weldon Spring includes extensive interviewing of DOE and contractor site management personnel(Oak Ridge and Argonne interviews will probably be completed over the phone), review of selected documents (see below) and a physical inspection of the site. Particular emphasis will be placed on coordinating the management assessment with the activities and findings of the other team members who are focusing on specific environmental issues (RCRA, CERCLA, TSCA, radiation, hydrogeology, etc.). Two mechanisms will be used to ensure adequate intra-team communication:

- Daily one-on-ones - The management specialist will have daily one-on-one discussions with each team member in order to identify relevant management issues in each functional area.
- Common issues list - Prior to arrival on-site, a list of management issues will be distributed to each team member (similar to the six bullet points listed above, but more specific). The team members will be asked to evaluate each issue in the context of their interviews, document reviews and inspections. This assures that the management assessment includes structured input from a wide range of organizational levels and disciplines.

12.2 Records Required

- Environmental implementation program;
- Weldon Spring environmental policies, procedures and other management-provided guidance;

- Environmental compliance audits, self-assessment/appraisal reports and related internal follow-up documents;
- Ongoing/institutionalized environmental management reporting;
- Job descriptions (or equivalent documentation) of key management positions (both within and outside of the ES&H function); and
- Contractual or other documentation describing the roles and responsibilities of the various contractor entities.

APPENDIX C
DAILY ACTIVITY SCHEDULE

WEEKLY SCHEDULE
APRIL 15 - APRIL 20, 1991

	Monday April 15	Tuesday April 16	Wednesday April 17	Thursday April 18	Friday April 19	Saturday April 20
TSCA, QA/QC, AIR	Site Orient. Safety Orient. Site Tour	Interviews: PCB Storage WITS Inspections Corrective Actions SPCC Asbestos Mgmt ANL Oversight Document Review	Interviews: Waste Tracking Haz Mat Tracking PCB Mgmt SPCC QA Procedures Asbestos Mgmt Site Tour: Bldgs. 103, 434 Document Review	Site Tour: Bldg. 103 Interviews: Haz Mat Tracking WITS PCB Storage Document Review	Interviews: PCB Storage Controlled Access Document Review	Write Findings
CERCLA, AIR	Site Orient. Safety Orient. Site Tour	Interviews: Community Relations PPE Air Baseline Risk Assessment FS ATSDR IRAs RI Document Review	Interviews: RI/FS - EIS IRAs RD/RA Ecological Issues Document Review	Interviews: IAGs/FFA Air EE/CAs Archeology Document Review	Interviews: IRAs EE/CAs RI/FS - EIS Ecology Document Review	Write Findings
RCRA	Site Orient. Safety Orient. Site Tour Interview: USTs Document Reviews	Interviews: Waste Piles Quarry Bulk Waste USTs Waste Mgmt Procedures Waste Characterization WITS Bldg. 434 TBP Tanks Document Reviews	Interviews: MSA Above Ground Tanks Site Tours: Pad 109/110 Pad 303 Bldg. 406 Bldg. 103 Bldg. 434 USTs Document Review	Interviews: Land Disposal Restrictions Training RCRA Contingency Plan MSA Document Reviews Training Land Disposal Restrictions Bldg. Characterization	Interviews: Responsibility Assignment Matrix Mixed Waste MSA Training Document Reviews Training RCRA Contingency Plan	Write Findings

WEEKLY SCHEDULE
APRIL 15 - APRIL 20, 1991

	Monday April 15	Tuesday April 16	Wednesday April 17	Thursday April 18	Friday April 19	Saturday April 20
SURFACE WATER	Site Orient. Safety Orient. Site Tour Observe NPDES Sampling	Interviews: Environmental Protection Field Operations Surface Water Sampling Personnel Document Reviews	Site Tour NPDES Outfalls Interviews: QA/QC Off-site Labs On-site Labs Data Verification Document Reviews	Observe Surface Water Sampling Interviews: Data Validation NPDES Sampling Personnel DOE Document Reviews	Interviews: Erosion Control DOE Manager Document Reviews	Write Findings
RADIATION, AIR	Site Orient. Safety Orient. Site Tour Interview: Radiation Prot. Mgr. Document Reviews	Interviews: Air Sampling Water Sampling Env. Monitoring ASER Laboratory ANL - RI/FS Document Reviews	Site Tours: Air Sampling Stations Interviews: Air Sampling Emergency Planning QA/QC Laboratory Procedures Groundwater ALARA Document Reviews	Site Tours: Bldg. 103 Interviews: Waste Storage PPE Dose Assessment Emergency Planning Document Reviews Write Findings	Site Tours: Bldg. 434 Waste Mgmt Pad 109/110 Pad 303 MSA Interviews: Waste Mgmt Mixed Waste Document Reviews Write Findings	Write Findings
SOILS, SEDIMENT, AND BIOTA	---	---	Health & Safety Briefing Site Tours: Chemical Plant Raffinate Pits Interviews: Permitting Site Layout Env/Biological/ Ecological Monitoring Document Reviews	Site Tours: Quarry WTP Slough/River Busch Wildlife Area Interviews: Env. Protection Biological Monitoring Document Reviews	Interviews: CERCLA/NEPA Review Process Quarry WTP Permits NEPA Ecological Survey & Impact Assessment Document Reviews Write Findings	Document Reviews Write Findings

WEEKLY SCHEDULE
APRIL 15 - APRIL 20, 1991

	Monday April 15	Tuesday April 16	Wednesday April 17	Thursday April 18	Friday April 19	Saturday April 20
GROUNDWATER	Site Orient. Safety Orient. Site Tour	Interviews: Env. Protection Field Operations ANL Hydrogeology OR EPD-Hydrogeology Document Reviews	Site Tours: Groundwater Sampling Interviews: Groundwater SOU QA/QC On-site Labs Data Verification Sample Shipping QA Document Reviews	Interviews: Data Verification Data Validation QA-Well Abandonment Off-site Labs QA/QC Purge Water Disposal Document Reviews	Site Tours: Well Conditions Well Abandonment Well Locations Document Reviews	Write Findings
MANAGEMENT	Site Orient. Safety Orient. Site Tour	Interviews: ES&H Mgmt Envtl Compliance Mgmt Engineering/Ops Mgmt Document Review	Interviews: QA/QC Mgmt PMC Safety Mgmt DOE Project Mgmt Document Review	Interviews: DOE Project Mgmt Regulatory Compliance Oak Ridge Document Review	Interviews: DOE Envtl Engineering DOE Project Mgmt Procurement Envtl Compliance Oak Ridge PMC Mgmt Training Document Review	Write Findings

WEEKLY SCHEDULE
APRIL 22 - APRIL 27, 1991

	Monday April 22	Tuesday April 23	Wednesday April 24	Thursday April 25	Friday April 26	Saturday April 27
ISCA, QA/QC, AIR	Review Findings	Review Findings	Review Findings	Review Findings	Review Findings	Review Findings
CERCLA, AIR	Review Findings	Review Findings	Review Findings	Review Findings	Review Findings	Review Findings
RCRA	Review Findings	Review Findings	Review Findings	Review Findings	Review Findings	Review Findings
SURFACE WATER	Review Findings	Review Findings	Review Findings	Review Findings	Review Findings	Review Findings
RADIATION, AIR	Review Findings	Review Findings	Review Findings	Review Findings	Review Findings	Review Findings
SOILS, SEDIMENT, AND BIOTA	Review Findings	Review Findings	Review Findings	Review Findings	Review Findings	Review Findings
GROUNDWATER	Review Findings	Review Findings	Review Findings	Review Findings	Review Findings	Review Findings
MANAGEMENT	Interviews: PEER Consultants DOE Project Management DOE Headquarters Oversight DOE Oversight Subcontracting Argonne National Labs Write Overview Section	Interviews: DOE Headquarters Oversight Write Overview Section Review Findings	Interviews: DOE Oversight Review Findings	Review Findings	Review Findings	Review Findings

APPENDIX D
LIST OF SITE DOCUMENTS REVIEWED BY THE AUDIT TEAM

List of Site Documents Reviewed by the Audit Team

Document Number	Title/Description	Author/Organization/Recipient	Document Date
WEL0001	DISMANTLING OF BUILDING 401	ARGONNE	11/11/11
WEL0002	PCB TRANSFORMERS, REMOVAL OF	ARGONNE	11/11/11
WEL0003	PROPOSED INTERIM RESPONSE ACTION #5 AUGUST A. BUSCH AND WS WILDLIFE AREA VICINITY PROPERTIES REV. 0	PMC	08/01/88
WEL0004	PROPOSED INTERIM RESPONSE ACTION: CONSTRUCTION OF ASH POND ISOLATION SYSTEM AT THE WS SITE	ARGONNE	05/01/88
WEL0005	DISMANTLING OF BUILDING 409	ARGONNE	11/11/11
WEL0006	DEBRIS CONSOLIDATION	ARGONNE	11/11/11
WEL0007	PROPOSED INTERIM RESPONSE ACTION #13 ARMY VICINITY PROPERTIES	PMC	08/01/88
WEL0008	HYDROGEOLOGICAL CHARACTERIZATION REPORT FOR WS CHEMICAL PLANT	BECHTEL NATIONAL, INC.	02/01/87
WEL0009	ELECTRICAL POWER LINE AND POLE REMOVAL RADIOLOGICAL SURVEY COMPLETION REPORT	PMC	02/01/89
WEL0010	PROPOSED INTERIM RESPONSE ACTION #3 MATERIAL STAGING AREA REV. 0	PMC	07/01/88
WEL0011	BUILDINGS RADIOLOGICAL CHARACTERIZATION REPORT	PMC	04/01/90
WEL0012	CHEMICAL PLANT CONCEPTUAL DESIGN	PMC	02/01/91
WEL0013	HAZARD COMMUNICATION PROGRAM	PMC	10/01/88
WEL0014	UNDERGROUND STORAGE TANK SAMPLING PLAN, WS CHEMICAL PLANT REV. 0	PMC	11/01/91
WEL0015	WASTE MANAGEMENT PLAN	PMC	01/01/91

List of Site Documents Reviewed by the Audit Team

Document Number	Title/Description	Author/Organization/Recipient	Document Date
WEL0016	WASTE MANAGEMENT IMPLEMENTATION PLAN	PMC	03/01/89
WEL0017	CHEMICAL PLANT CONCEPTUAL DESIGN	PMC	03/01/89
WEL0018	ENGINEERING ANALYSIS OF REMEDIAL ACTION ALTERNATIVES, DRAFT	PMC	12/01/90
WEL0019	WSSRAP QUARRY PRELIMINARY ENGINEERING REPORT	PMC	01/01/90
WEL0020	VICINITY PROPERTIES CONCEPTUAL DESIGN REPORT, DRAFT	PMC	04/01/89
WEL0021	CONCEPTUAL DESIGN REORT VOLUME I TECHNICAL INFORMATION	PMC	09/28/90
WEL0022	GENERIC TECHNICAL SPECIFICATIONS VICINITY PROPERTIES REMEDIATION	PMC	03/02/88
WEL0023	PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS MANUAL	PMC	08/01/90
WEL0024	PCB ANNUAL REPORT 1989	PMC	01/01/90
WEL0025	PCB ANNUAL REPORT 1988	PMC	10/31/89
WEL0026	WASTE ANALYSIS PLAN	PMC	02/01/91
WEL0027	WASTE MINIMIZATION/POLLUTION PREVENTION AWARENESS PLAN	PMC	05/08/90
WEL0028	SPILL PREVENTION, CONTROL, AND COUNTERMEASURE PLAN	PMC	07/01/89
WEL0029	BUILDING 434 CLOSURE PLAN	PMC	05/01/90
WEL0030	COMMUNITY RELATIONS PLAN	DOE	10/21/88
WEL0031	DISPOSAL FACILITY SITING WORK PLAN	DOE	11/11/11

List of Site Documents Reviewed by the Audit Team

Document Number	Title/Description	Author/Organization/Recipient	Document Date
WEL0032	ENVIRONMENTAL COMPLIANCE REPORTS 1989, MEMOS	PMC	07/31/89
WEL0033	NPDES REPORTS 1988, MEMOS	PMC	10/04/88
WEL0034	REMEDIAL INVESTIGATION REPORT, VOLUME I, DRAFT	PMC	09/01/89
WEL0035	REMEDIAL INVESTIGATION REOPRT, VOLUME II - FIGURES	PMC	09/01/89
WEL0036	REMEDIAL INVESTIGATION REPORT, VOLUME III - APPENDICES, DRAFT	PMC	09/01/89
WEL0037	FEASIBILITY STUDY FOR REMEDIAL ACTION AT THE CHEMICAL PLANT AREA OF THE WS SITE, DRAFT, DECEMBER 1990	ARGONNE	12/01/90
WEL0038	BASELINE RISK EVALUATION FOR EXPOSURE TO BULK WASTES AT WS QUARRY	ARGONNE	01/01/90
WEL0039	REMEDIAL INVESTIGATIONS FOR QUARRY BULK WASTES, DECEMBER, 1989	PMC	12/01/89
WEL0040	PROPOSED PLAN FOR MANAGEMENT OF BULK WASTES AT WS QUARRY	ARGONNE	02/01/90
WEL0041	ENGINEERING EVALUATION/COST ANALYSIS FOR PROPOSED MANAGEMENT OF 15 NONPROCESS BUILDINGS AT WS CHEMICAL PLANT - MAY, 1989	ARGONNE	05/01/89
WEL0042	ADDENDUM TO ENGINEERING EVALUATION/COST ANALYSIS FOR PROPOSED MANAGEMENT OF 15 NONPROCESS BUILDINGS - AUG., 1990	ARGONNE	08/01/90
WEL0043	RESPONSIVENESS SUMMARY FOR THE ENGINEERING EVAL/COST ANALYSIS FOR PROPOSED MANAGEMENT OF CONTAMINATED WATER IMPOUNDED AT WS	ARGONNE	01/01/91
WEL0044	WSSRAP PROJECT PROCEDURES/ORGANIZATIONAL CHART	PMC	08/28/90
WEL0045	QUALITY ASSURANCE SOP	PMC	11/06/90

List of Site Documents Reviewed by the Audit Team

Document Number	Title/Description	Author/Organization/Recipient	Document Date
WEL0046	SURVEILLANCE OF BULK WASTE STORAGE AREAS	PMC	07/16/90
WEL0047	WORK PLAN FOR REMEDIAL INVESTIGATION/FEASIBILITY STUDY-ENVIRONMENTAL IMPACT STATEMENT FOR WS	ARGONNE/PMC	08/01/88
WEL0048	RESPONSIVENESS SUMMARY FOR REMEDIAL INVESTIGATION REPORT	PMC	12/01/90
WEL0049	FEASIBILITY STUDY FOR MANAGEMENT OF THE BULK WASTES AT WS	ARGONNE	02/01/90
WEL0050	RESPONSIVENESS SUMMARY FOR REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR MANAGEMENT OF BULK WASTES WS - JUNE, 1990	ARGONNE	06/01/90
WEL0051	RECORD OF DECISION FOR THE MANAGEMENT OF THE BULK WASTES AT WS QUARRY	ARGONNE	09/01/90
WEL0052	ENGINEERING EVALUATION/COST ANALYSIS FOR PROPOSED MANAGEMENT OF CONTAMINATED STRUCTURES AT WS	ARGONNE	01/01/91
WEL0053	ENGINEERING EVALUATION/COST ANALYSIS FOR THE PROPOSED MANAGEMENT OF CONTAMINATED WATER IMPOUNDED AT WS - JULY, 1990	ARGONNE	07/01/90
WEL0054	ENGINEERING EVALUATION/COST ANALYSIS FOR THE PROPOSED MANAGEMENT OF CONTAMINATED WATER IN THE WS QUARRY - JAN, 1989	ARGONNE	01/01/89
WEL0055	ANNUAL ENVIRONMENTAL MONITORING REPORT, 1987	PMC	01/01/88
WEL0056	ENVIRONMENTAL REPORT, 1989 - ANNUAL SITE	PMC	11/01/90
WEL0057	RESPONSIVENESS SUMMARY FOR THE ENGINEERING EVALUATION/COST ANALYSIS FOR THE PROPOSED MANAGEMENT OF CONTAMINATED WATER	ARGONNE	06/01/89
WEL0058	ENGINEERING DESIGN PLAN, FEBRUARY 1991, REVISION C	PMC	02/01/91

List of Site Documents Reviewed by the Audit Team

Document Number	Title/Description	Author/Organization/Recipient	Document Date
WEL0059	ENVIRONMENTAL MONITORING REPORT, 1988	PMC	06/01/89
WEL0060	UNDERGROUND STORAGE TANK CORRESPONDENCE	PMC	11/13/90
WEL0061	WSSRAP - DC/RP RAFFINATE PITS CONTAMINATED WATER TREATMENT ENGINEERING EVALUATION/COST ANALYSIS	PMC	07/15/88
WEL0062	GEOSCIENCES WORKSHOP	PMC	02/21/91
WEL0063	CONTACT PERSONS	UNKNOWN	04/01/91
WEL0064	INVENTORY, CLASSIFICATION, SEGREGATION, BULKING AND DISPOSAL OF MIXED CONTAINERIZED WASTE URANIUM FEED MATERIALS PLANT	ROBERT H. MILLER, ROGER A. NELSON	06/01/89
WEL0065	ENVIRONMENTAL AUDIT OF WS, ST. CHARLES, MO, MEMO	DOE	03/04/91
WEL0066	ENVIRONMENTAL AUDIT OF WELDON SPRING, PRE-AUDIT SITE VISIT	PMC	03/19/91
WEL0067	WSSRAP PROJECT ORGANIZATIONAL CHART	PMC	03/14/91
WEL0068	WSSRAP VISITORS SITE ORIENTATION	PMC	11/11/11
WEL0069	MAP - RAFFINATE PITS AND CHEMICAL PLANT	PMC	11/11/11
WEL0070	ES&H RESPONSIBILITIES	PMC	11/11/11
WEL0071	REMEDIAL ACTION PROJECT MEDICAL EVALUATION REPORT	PMC	11/11/11
WEL0072	PERMITS, WASTE MANAGEMENT & ENVIRONMENTAL RESTORATION	PMC	03/29/91
WEL0073	RESPONSE TO OAK RIDGE OFFICE APPRAISAL OF ES&H & QUALITY ASSURRANCE PROCEDURES - OCTOBER 15-19, 1989	PMC	01/01/91

List of Site Documents Reviewed by the Audit Team

Document Number	Title/Description	Author/Organization/Recipient	Document Date
WEL0074	ENVIRONMENTAL MONITORING PLAN, 1991	PMC	02/01/91
WEL0075	ES&H AND QA FUNCTIONAL APPRAISAL OF WS	OAK RIDGE	10/19/91
WEL0076	PRESENTATION ON THE WELDON SPRING ENVIRONMENTAL PROTECTION GROUP 3/19/91	PMC	03/19/91
WEL0077	CLOSURE PLAN: DRUM STORAGE AREA	PMC	03/01/89
WEL0078	FEDERAL FACILITIES AGREEMENT	EPA	11/29/89
WEL0078A	FEDERAL FACILITIES AGREEMENT (NEW, PROPOSED)	EPA	08/15/90
WEL0079	PCB INVENTORY TSCA WASTE (WITS)	PMC	04/05/91
WEL0080	STATE OF MISSOURI RADIATION STANDARDS	STATE OF MISSOURI	11/11/11
WEL0081	SAMPLING PROCEDURES FOR ALL MATRICES - INCLUDES PROTOCOL FOR RADIOACTIVE MATERIALS	PMC	11/02/89
WEL0083	LIST OF INTERIM REPONSE ACTION	PMC	02/14/89
WEL0084	EMERGENCY PREPAREDNESS PLAN	PMC	08/01/90
WEL0085	DOE PERSONNEL JOB DESCRIPTIONS	DOE	11/11/11
WEL0086	PHASE I WATER QUALITY TESTING	PMC	08/11/87
WEL0087	PHASE II WATER QUALITY TESTING	PMC	08/01/89
WEL0088	IDENTIFICATIONS AND INVENTORY OF DEMOLITION WASTE AREAS	PMC	03/27/91

List of Site Documents Reviewed by the Audit Team

Document Number	Title/Description	Author/Organization/Recipient	Document Date
WEL0089	ASBESTOS PLAN FOR DISPOSAL - STORAGE/LABELING	UNKNOWN	11/11/11
WEL0090	PCB DISPOSAL CERTIFICATION HAZARDOUS WASTE MANIFESTS	INTEGRATED WASTE SYSTEMS, INC.	01/24/90
WEL0091	NPDES PERMIT - WSCP	MDNR	10/01/90
WEL0092	NPDES PERMIT - WSQ	MDNR	05/05/89
WEL0093	ES&H DEPARTMENT CHARTER	PMC	04/01/90
WEL0094	DRAFT PROJECT MANAGEMENT PLAN FOR WSSRAP	PMC	01/01/90
WEL0095	STATEMENT OF WORK	DOE/PMC	11/11/11
WEL0096	ENVIRONMENTAL SAFETY AND HEALTH PLAN	PMC	02/01/91
WEL0097	REGULATORY COMPLIANCE PROCEDURES RC1 - RC26S	PMC	11/11/11
WEL0098	ES&H PROCEDURES	PMC	11/11/11
WEL0099	EXPEDITING CLEANUP AT THE WS SITE UNDER CERCLA & NEPA (ARTICLE FROM WASTE MANAGEMENT '89	PETERSON, MADDONELL, HAROUN	06/01/90
WEL0101	ENVIRONMENTAL PROTECTION PROGRAM IMPLEMENTATION PLAN	PMC	03/01/91
WEL0102	MAYWOOD SITE ENVIRONMENTAL AUDIT	DOE	12/01/90
WEL0103	PINELLAS TIGER TEAM ASSESSMENT	DOE	05/01/90
WEL0104	KANSAS CITY TIGER TEAM ASSESSMENT	DOE	05/01/90
WEL0105	WESTERN AREA POWER AUTHORITY ENVIRONMENTAL AUDIT	DOE	01/01/90

List of Site Documents Reviewed by the Audit Team

Document Number	Title/Description	Author/Organization/Recipient	Document Date
WEL0106	EXPLOSIVE HAZARD REVIEW FOR THE WSSRAP QUARRY EXCAVATION	HERCULES, INC.	06/01/90
WEL0107	LETTER TO KAY DREY FROM STEVE MCKRACKEN	STEVE MCCRACKEN	04/08/91
WEL0108	UST CORRESPONDENCE	TO DOE FROM PMC	11/07/90
WEL0110	REPORT OF TELECON RE: WASTE PILES BILL GOLDKAMP	B. GOLDKAMP	05/03/89
WEL0111	PLAN FOR MONITORING RADIONUCLIDE EMISSIONS OTHER THAN RADON AT WELDON SPRING SITE CRITICAL RECEPTORS	DOE	05/01/90
WEL0112	QUARTERLY ENVIRONMENTAL DATA SUMMARY FOURTH QUARTER 1990	PMC	03/01/91
WEL0113	UST CHARACTERIZATION STATUS	TO DISTRIBUTION FROM K. WARBRITTON	02/19/91
WEL0114	RESPONSIVENESS SURVEY FOR RI/FS FOR THE QUARRY	DOE	08/01/90
WEL0115	ORNL ENVIRONMENTAL COMPREHENSIVE ASSESSMENT FINDINGS	ORNL	10/19/90
WEL0116	CORRECTIVE ACTION PLAN FOR ORNL ASSESSMENT	PMC	12/07/90
WEL0117	ENVIRONMENTAL COMPLIANCE DEPARTMENT SELF-ASSESSMENT	PMC	02/25/91
WEL0118	ENVIRONMENTAL COMPLIANCE QUARTERLY REPORT - 1Q91	DOE	04/08/91
WEL0119	ENVIRONMENTAL COMPLIANCE DEPARTMENT FY91 DEPARTMENT PLAN	PMC	10/01/90
WEL0120	NEPA SELF-ASSESSSMENT FINDING	PM	02/19/91
WEL0121	ENVIRONMENTAL DATA ADMINISTRATION PLAN	PMC	05/01/90
WEL0122	GUIDANCE ON ES&H SELF-ASSESSMENT	DOE	07/31/90

List of Site Documents Reviewed by the Audit Team

Document Number	Title/Description	Author/Organization/Recipient	Document Date
WEL0123	1987 ENVIRONMENTAL MONITORING PLAN	DOE/PMC	01/24/87
WEL0124	1989 ENVIRONMENTAL MONITORING PROGRAM PLAN	PMC/DOE	07/01/89
WEL0125	1990 ENVIRONMENTAL MONITORING PLAN (for 1991, please see WEL0074)	PMC/DOE	02/01/90
WEL0126	CHEMICAL PLANT SITE REMEDIAL INVESTIGATION/FEASABILITY STUDY DATA VALIDATION REPORT	PMC	01/01/91
WEL0127	QUARRY ARAR CORRESPONDENCE	DOE	10/04/90
WEL0128	EXCERPT FROM NCP (55FR8763)	EPA	03/08/90
WEL0129	WASTE MATERIAL TRANSFER PERMIT	PMC	11/11/11
WEL0130	WASTE MANAGEMENT 5-YEAR PLAN	DOE	06/01/90
WEL0131	CONTRACT MASTER MILESTONE	PMC	02/01/91
WEL0132	MISCELLANEOUS COMMUNITY RELATIONS INFO	VARIOUS	11/11/11
WEL0133	TRUSTEE FOR NATURAL RESOURCES NOTIFICATION	DOE TO MDNR	04/10/91
WEL0134	REMOVAL ACTION DECISION DOCUMENT (RADD) FOR MANAGEMENT OF CONTAMINATED WATER AT CHEMICAL PLANT	PMC	11/01/90
WEL0135	RADD - MANAGEMENT OF 15 NON-PROCESS BUILDINGS AT CHEMICAL PLANT	PMC	11/01/90
WEL0136	WS SITE REMEDIAL ACTION PROJECT CATEGORIZATION OF EMERGENCIES AND NON-EMERGENCY INCIDENTS	PMC	11/27/90
WEL0137	WSSRAP PROCEDURE (PROCEDURE FOR NOTIFICATION AND REPORTING OF NON-ROUTINE (NON-EMERGENCY) EVENTS	PMC	01/23/90

List of Site Documents Reviewed by the Audit Team

Document Number	Title/Description	Author/Organization/Recipient	Document Date
WEL0138	WSSRAP PROJECT PROCEDURES (PROCEDURE FOR NOTIFICATION AND REPORTING OF EMERGENCY EVENTS	PMC	01/23/90
WEL0139	WS CHEMICAL PLANT AERIAL RADIOLOGICAL SURVEY	EG&G	07/01/80
WEL0140	BUILDINGS CHARACTERIZATION WORK PLAN	PMC	04/01/91
WEL0141	LIST OF LABORATORIES USED CURRENTLY AT WSSRAP	UNKNOWN	11/11/11
WEL0142	LIST OF ENVIRONMENTAL MONITORING PARAMETERS	COMPUTER PRINTOUT	11/11/11
WEL0143	OPERATIONAL PROCEDURES FOR MK-FERGUSON ADMINISTRATION BUILDING WWTP	MMEI	10/12/90
WEL0144	QUALITY ASSURANCE PROGRAM	PMC	03/28/91
WEL0145	WSSRAP REMOVAL OF ELECTRICAL TRANSFORMERS	PMC (ORIGINAL RETURNED TO SWWRAP SITE R. OWENS)	03/28/91
WEL0146	QUALITY ASSURANCE PROGRAM PLAN	PMC	11/11/11
WEL0147	GROUNDWATER PROTECTION PROGRAM MANAGEMENT PLAN	PMC	05/01/90
WEL0148	FEASIBILITY STUDY SUPPORT DOCUMENTS - VITRIFICATION TECHNOLOGIES FOR WS RAFFINATE SLUDGES & CONTAMINATED SOILS	PMC	12/01/90
WEL0149	WSSRAP PROJECT PROCEDURES (PURCHASE REQUISITION PROCEDURE	PMC	09/12/90
WEL0150	INTERNAL MEMO - WASTE MANAGEMENT REVIEW OF INCOMING HAZARDOUS MATERIALS	PMC	09/09/90
WEL0151	INTERNAL MEMO - WASTE MINIMIZATION APPROVED MATERIALS LIST	PMC	09/20/90

List of Site Documents Reviewed by the Audit Team

Document Number	Title/Description	Author/Organization/Recipient	Document Date
WEL0152	DESIGN SPECIFICATION FOR QUARRY WATER TREATMENT PLANT	PMC	04/14/89
WEL0153	REPORT ON WATER BALANCE STUDIES FROM 1983-1985 WS RAFFINATE PITS	BECHTEL	03/01/86
WEL0154	AQUIFER CHARACTERISTICS DATA REPORT FOR THE WS SITE CHEMICAL PLANT/RAFFINATE PITS & VICINITY PROPERTIES	PMC	12/01/90
WEL0155	STANDARD PRACTICES FOR SAMPLING WATER ASTM D-3370-82	ASTM	11/11/11
WEL0156	FS REVIEW MEETING MINUTES OF FEBRUARY 11-14, 1991	DOE	02/22/91
WEL0157	REVISIONS TO THE FS-E15	DOE	03/15/91
WEL0158	NPDES FIELD LOGBOOK	(ORIGINAL RETURNED TO WSSRAP FILES - E. HOPSON)	11/11/11
WEL0159	MEMO OF UNDERSTANDING BETWEEN DOE AND ARMY CONCTRACT TRANSFER OF CUSTODY AND ACCOUNTABILITY AND FUNDING OF REM. ACTIONS AT WS		10/09/85
WEL0160	WASTE MANAGEMENT TRAINING PLAN	PMC	12/01/90
WEL0161	MEMO RE: OFF-SITE DISPOSAL OF CHEMICAL WASTE	PMC	02/25/91
WEL0162	MDNR CORRESPONDENCE RE: WASTE REGISTRATION NUMBERS	MDNR	09/11/89
WEL0163	RESPONSIVENESS SUMMARY FOR THE EE/CA FOR THE PROPOSED MANAGEMENT OF CONTMINATED WATER IN THE WS QUARRY	ARGONNE	06/01/89
WEL0164	FONSI FOR THE QUARRY WATER TREATMENT PLANT	DOE	02/06/90
WEL0165	INTERNAL MEMO RE: CONTRACT NO. DE-AC05-860R21548 TANKS CONTAINING PCB CONTAMINATED TRIBUTLYPHOSPHATE	PMC	09/28/89

List of Site Documents Reviewed by the Audit Team

Document Number	Title/Description	Author/Organization/Recipient	Document Date
WEL0166	SUBCONTRACTOR GENERATED WASTE - MINIMIZATION DISPOSAL AND CLEANUP	PMC	11/11/11
WEL0167	REPORT MEETING ON 1/2/90 TO IDENTIFY PLANT SPECIES/ASSAY FOR UPTAKE STUDIES AT OUTFALL OF PROP. PIPELINE FOR CLEANUP-QUARRY	UNIVERSITY OF ST. LOUIS, COALITION FOR THE ENVIRONMENT	01/25/90
WEL0168	MOTION FOR ORDER DISMISSING APPEAL AND AMMENDING PERMIT BEFORE THE MO CLEAN WATER COMMISSION	MDNR	05/02/90
WEL0169	SPECIFICATION SECTION AQUATIC BIOLOGICAL SCREENING (WP-181)	PMC	04/10/91
WEL0170	LETTER RE: STORAGE OF PCB WASTE AT WS SITE BEYOND ALLOWABLE TIME LIMITS 40CFR 761.65(A)	DOE	12/06/89
WEL0171	LETTER TO MDNR RE: PCB STORAGE	DOE	12/06/89
WEL0172	MISSOURI DOC FISH CONTAMINATED DATA (LETTER)	MDOC	04/09/90
WEL0173	CHARACTERIZATION OF CHEM AND RAD CONTAMINATION IN LAKE AND STREAM SEDIMENTS ON PROPERTIES SURROUNDING WS SITE	PMC	08/01/89
WEL0174	LETTER RE: SIGNING AUTHORITY FROM W.K. LOVE TO R. HLAVACEK	DOE	10/25/88
WEL0175	NATURAL RESOURCE TRUSTEESHIP RESPONSIBILITIES AND ECOLOGICAL EVALUATION REQUIREMENTS	DOE	07/01/90
WEL0176	QUALITY ASSURANCE REQUIREMENTS ON NUCLEAR FACILITIES ASME NQA-1-1989 - EDITION	ASME	11/11/11
WEL0178	LETTER SAYING AUTHORITY - POWERS TO LOVE - 2/20/91	PMC	02/20/91
WEL0179	NPDES PERMIT APPLICATION - WSQ	PMC (RETURNED TO E. HOPSON)	11/11/11

List of Site Documents Reviewed by the Audit Team

Document Number	Title/Description	Author/Organization/Recipient	Document Date
WEL0180	NPDES PERMIT APPLICATION - WSCP	PMC (RETURNED TO E. HOPSON)	11/11/11
WEL0181	CONTRACT - DOE/MK FERGUSON	PMC	11/11/11
WEL0182	LETTER TO K. LAWVER FROM DEPT OF CONSERVATION RE: FROG POND		11/11/11
WEL0183	UST MAP	PMC	03/09/87
WEL0184	ES&H COMPLIANCE REPORT	PMC	03/20/91
WEL0185	WSSRAP TRANSFER OF WASTE MATERIAL PERMIT	PMC	08/24/90
WEL0186	SECTION 02090 REMOVAL OF OIL FILLED EQUIP ELECTRICAL SUBSTATION 411	PMC	04/08/91
WEL0187	WORK PACKAGE FOR WEIR IMPROVEMENTS	PMC	02/14/91
WEL0188	WITS TSCA WASTE INVENTORY	PMC	04/18/91
WEL0189	SCREENING LEVEL CHARACTERIZATION OF ELECTRICAL SUBSTATION 411	PMC	11/01/90
WEL0190	RESPONSIBILTY ASSIGNMENT MATRIX	PMC	12/17/90
WEL0191	WSSRAP SITE RI/FS - EIS MILESTONE CHRONOLOGY	PMC	04/18/91
WEL0192	QA AUDIT #3589-031	PMC	01/25/90
WEL0193	COMMUNITY RELATIONS REQUIREMENTS AND POLICIES	EPA	11/11/11
WEL0194	ENGINEERING PLAN	PMC (RETURNED TO E. HOPSON)	03/26/91
WEL0195	SURFACE WATER AND EROSION CONTROL PLANS	PMC (RETURNED TO E. HOPSON)	03/26/91

List of Site Documents Reviewed by the Audit Team

Document Number	Title/Description	Author/Organization/Recipient	Document Date
WEL0196	ANNUAL CHEMICAL INVENTORY REPORTS	PMC	11/11/11
WEL0197	GENERAL CORRESPONDENCE RE:SEMSU	UNKNOWN	04/15/91
WEL0198	SUPPLEMENTAL ORGANIZATIONAL CHARTS	DOE	11/11/11
WEL0199	OAK RIDGE OPERATIONS MANAGEMENT APPRAISAL OF WSSRAP	ORNL	02/01/90
WEL0200	SITE WIDE AUDIT TRACKING SYSTEM	PMC	04/01/91
WEL0201	PROJECT CHARTER FOR WSSRAP	DOE	05/01/86
WEL0203	DOE-WSRAP SELF ASSESSMENT PROCEDURE - DRAFT	DOE/OR	04/12/91
WEL0204	PMC SELF ASSESSMENT PROCEDURE - MGT-1A	PMC	02/27/91
WEL0205	ENVIRONMENTAL COMPLIANCE FACT SHEET	PML	11/11/11
WEL0206	ENVIRONMENTAL REPORTS TRACKING MATRIX	PMC	04/01/91
WEL0207	ENVIRONMENTAL COMPLIANCE MATRIX	PMC	04/08/91
WEL0208	SCHEDULING MATRIX	PMC	04/19/91
WEL0209	ANNUAL ENVIRONMENTAL REPORT REPARATION HISTORY	PMC	04/19/91
WEL0210	RADIOLOGY LAB SELF-ASSESSMENT	PMC	03/20/91
WEL0211	INCIDENT INVESTIGATION AND REPORTING SELF-ASSESSMENT	DOE	04/10/91
WEL0212	SCHEDULE FOR SELF ASSESSMENTS	DOE	02/22/91

List of Site Documents Reviewed by the Audit Team

Document Number	Title/Description	Author/Organization/Recipient	Document Date
WEL0213	EPA COMMUNITY RELATIONS LETTER	EPA	04/24/91
WEL0214	WEEKLY ACTIVITY REPORTS: 4/5/91, 4/1291	PMC	11/11/11
WEL0215	QA AUDITS ON ENVIRONMENTAL TOPICS (1990-91)	PMC	11/11/11
WEL0216	CORPORATE MKF/JEG AUDIT OF PMC ACTIVITIES (2/91) AND PMC RESPONSE	PMC	02/01/91
WEL0217	WELL GENERATED MATERIALS PROCEURE-DRAFT RC-30S)	PMC	11/11/11
WEL0218	PROPOSAL FOR BORE HOLE ABONDONMENT PLAN	PMC	03/18/91
WEL00219	CROP TESTING LETTER	DOE	10/22/90

APPENDIX E
LISTS OF CONTACTS/INTERVIEWS CONDUCTED BY THE AUDIT TEAM

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE AUDIT TEAM

REFERENCE NUMBER	DATE	AUDITOR	ORGANIZATION	POSITION	TOPIC
I-A-001	04/09/91	L. Wennerberg	MDNR	Asbestos Coordinator	Asbestos
I-A-002	04/17/91	L. Wennerberg	PMC	IH - ES&H	Asbestos
I-A-003	04/18/91	L. Wennerberg	PMC	Waste Management Manager - Env. Compl.	Building 103
I-A-004	04/18/91	L. Wennerberg	PMC	Personnel Protection Manager - ES&H	Building 103
I-A-005	04/18/91	L. Wennerberg	DOE	Environmental Engineer	Building 103
I-A-006	04/19/91	L. Wennerberg	PMC	Access Control Monitor	Building 103
I-A-007	04/19/91	L. Wennerberg	PMC	HP Technician - ES&H	Building 103

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE AUDIT TEAM

REFERENCE NUMBER	DATE	AUDITOR	ORGANIZATION	POSITION	TOPIC
I-SW-001	04/15/91	D. Persampieri	PMC	Env. Protection, ES&H	NPDES Sampling
I-SW-002	04/15/91	D. Persampieri	PMC	Env. Protection, ES&H	NPDES Sampling
I-SW-003	04/16/91	D. Persampieri	PMC	Env. Prot. Mgr., ES&H	Env. Monitoring
I-SW-004	04/16/91	D. Persampieri	PMC	Field Ops. Mgr., ES&H	Field Operations
I-SW-005	04/16/91	D. Persampieri	PMC	Env. Prot., ES&H	NPDES/Drinking Water
I-SW-006	04/16/91	D. Persampieri	PMC	Engineer, Env. Doc. & Concep. Design	NPDES
I-SW-007	04/17/91	D. Persampieri	PMC	Env. Doc. & Concep. Design	NPDES Outfalls
I-SW-008	04/17/91	D. Persampieri	PMC	QA Manager	QA/QC
I-SW-009	04/17/91	D. Persampieri	PMC	Env. Prot., ES&H	QA/QC
I-SW-010	04/17/91	D. Persampieri	PMC	Env. Prot., ES&H	QA/QC
I-SW-011	04/17/91	D. Persampieri	PMC	QA Engineer	QA/QC
I-SW-012	04/17/91	D. Persampieri	PMC	Data Verification, ES&H	Data Verification
I-SW-013	04/18/91	D. Persampieri	PMC	Field Operations, ES&H	SW Sampling
I-SW-014	04/18/91	D. Persampieri	PMC	Field Operations, ES&H	SW Sampling
I-SW-015	04/18/91	D. Persampieri	PMC	Data Validation, ES&H	Data Validation
I-SW-016	04/18/91	D. Persampieri	PMC	Env. Compliance, ES&H	NPDES

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE AUDIT TEAM

REFERENCE NUMBER	DATE	AUDITOR	ORGANIZATION	POSITION	TOPIC
I-SW-017	04/18/91	D. Persampieri	ADL	Engineer, EH&S	Weir Calibration
I-SW-018	04/19/91	D. Persampieri	PMC	Engineer, Env. Doc. Concept & Design	NPDES Reports
I-SW-019	04/11/91	D. Persampieri	MDNR		General
I-SW-020	04/18/91	D. Persampieri	DOE	Project Manger	Sign. Authority
I-SW-021	04/19/91	D. Persampieri	PMC	Data Verification, ES&H	Logbook Data
I-SW-022	04/22/91	D. Persampieri	PMC	Env. Prot, ES&H	Erosion Control
I-SW-023	04/22/91	D. Persampieri	PMC	Env. Prot., ES&H	Erosion Control

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE AUDIT TEAM

REFERENCE NUMBER	DATE	AUDITOR	ORGANIZATION	POSITION	TOPIC
I-GW-001	04/02/91	J. Rice	Argonne	Project Manager	ANL Role GW
I-GW-002	04/04/91	J. Rice	DOE		DOE/Army Relationship
I-GW-003	04/08/91	J. Rice	EPA Region VII	Remedial Project Manager	EPA Role
I-GW-004	04/10/91	J. Rice	MDNR	State Project Manager	GW issues at WSSRAP
I-GW-005	04/16/91	J. Rice	PMC	Env. Prot. Mgr, Field Op. Mgr, ES&H	Env. Mon. Program
I-GW-006	04/16/91	J. Rice	Argonne	Groundwater Analyst	GW Modeling
I-GW-007	04/16/91	J. Rice	Oak Ridge	Hydrogeologist	GW Prog. Concerns
I-GW-008	04/17/91	J. Rice	PMC	Env. Tech. Field Support, ES&H	Field Audit
I-GW-009	04/17/91	J. Rice	DOE	Project Manager	GW-SOU
I-GW-010	04/17/91	J. Rice	PMC	Lab Coord., Act. Lab Sup., QA Man., ES&H	QA
I-GW-011	04/17/91	J. Rice	PMc	Field Sup., Enc. Tech, ES&H	Sample Shipping
I-GW-012	04/17/91	J. Rice	PMC	Data Verification, ES&H	Data Verification
I-GW-013	04/18/91	J. Rice	PMC	Manager, Data Verification	Data Verification
I-GW-014	04/18/91	J. Rice	PMC	Data Validation Mgr., Env. Compliance	Data Validation
I-GW-015	04/18/91	J. Rice	PMC	QA Man., Env. Specialist, ES&H	Well Abandonment Documentation
I-GW-016	04/18/91	J. Rice	IT Labs - Oak Ridge	Disposal Man., Subcontractor	Disposal of Samples

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE AUDIT TEAM

REFERENCE NUMBER	DATE	AUDITOR	ORGANIZATION	POSITION	TOPIC
I-GW-017	04/18/91	J. Rice	Acculabs, Golden, CO	Disposal Man., Subcontractor	Disposal/Return of Env. Samples
I-GW-018	04/18/91	J. Rice	GP Env. Labs	Disposal Man., Subcontractor	Disposal/Return Env. Samples
I-GW-019	04/18/91	J. Rice	PMC	QA Manager	Status of RC-30
I-GW-020	04/18/91	J. Rice	MDNR	State Project Manager	General Overview-Well Abandonment
I-GW-021	04/19/91	J. Rice	PMC	Env. Specialist, ES&H	Cond. of MWs & Well Abondonment
I-GW-022	04/25/91	J. Rice	EPA Region VII	Chemist	Sample Preservation

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE AUDIT TEAM

REFERENCE NUMBER	DATE	AUDITOR	ORGANIZATION	POSITION	TOPIC
I-SSB-001	04/11/91	P. Rury	Missouri Dept. Natural Resources	Site Project Manager	Gen. Quest. on WS Biota/Ecosystem
I-SSB-002	04/17/91	P. Rury	PMC	Environemental Engineer, ES&H	WS Chemical Plant Tour/Perimeter
I-SSB-003	04/17/91	P. Rury	PMC	Manager Env. Doc. & Concept. Des.	Wetlands/Floodplains/NEPA
I-SSB-004	04/18/91	P. Rury	PMC	Environmental Protection Manager	Biological Ecol. Monitoring Impacts
I-SSB-005	04/18/91	P. Rury	PMC	Env. Protection	Biol. Surveillance Plan/Program
I-SSB-006	04/19/91	P. Rury	DOE-WSSRAP	Project manager	CERCLA/NEPA Review Process
I-SSB-007	04/19/91	P. Rury	PMC	QY/FS Supv., Env. Doc. & Concept. Des.	Quarry
I-SSB-008	04/19/91	P. Rury	Argonne	Project Manager	Rare and Endang. Biota CERCLA/NEPA

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE AUDIT TEAM

REFERENCE NUMBER	DATE	AUDITOR	ORGANIZATION	POSITION	TOPIC
I-WM-001	04/02/91	R. Earle	Argonne		Site Overview
I-WM-002	04/11/91	R. Earle	MDNR	Remedial Action Coordinator	WSWRAP RCRA Issues
I-WM-003	04/15/91	R. Earle	PMC	RI/FS Engineer, Env. Document & Conc. Design	USTs
I-WM-004	04/16/91	R. Earle	PMC	Waste Management Group, Env. Compliance	RCs, Waste Management Plan, Piles, System
I-WM-005	04/16/91	R. Earle	PMC	Waste Management Group, Env. Compliance	WITS
I-WM-006	04/16/91	R. Earle	DOE	Project Manager	Quarry Bulk Waste
I-WM-007	04/10/91	R. Earle	PMC	Reg. Compliance Manager, Env. Compliance	Regulatory Compliance
I-WM-008	04/16/91	R. Earle	PMC	Waste Management Group, Env. Compliance	USTs
I-WM-009	04/16/91	R. Earle	PMC	CERCLA Coordinator, Env. Doc. & Concept Des.	General CERCLA
I-WM-010	04/17/91	R. Earle	PMC	Waste Mgmt. Manager, Env. Compliance	Waste Management Practices
I-WM-011	04/17/91	R. Earle	PMC	Reg. Compliance, Env. Compliance	USTs
I-WM-012	04/17/91	R. Earle	PMC	Waste Management Group, Env. Compliance	Site Tour
I-WM-013	04/17/91	R. Earle	PMC	Waste Management Group, Env. Compliance	Site Tour
I-WM-014	04/18/91	R. Earle	PMC	Regulatory Compl., Env. Compliance	Land Disposal Restrictions
I-WM-015	04/18/91	R. Earle	PMC	Industrial Hygiene, ES&H	Material Safety Data Sheets
I-WM-016	04/18/91	R. Earle	PMC	Waste Management Manager, Env. Compliance	Training

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE AUDIT TEAM

REFERENCE NUMBER	DATE	AUDITOR	ORGANIZATION	POSITION	TOPIC
I-WM-017	04/18/91	R. Earle	DOE	Project Manager	Quarry MSA
I-WM-018	04/18/91	R. Earle	DOE-HQ		Land Disposal Restrictions
I-WM-019	04/18/91	R. Earle	DOE-HQ		Land Disposal Restrictions
I-WM-020	04/19/91	R. Earle	PMC	Waste Disposal Group, Env. Compliance	Mixed Waste
I-WM-021	04/19/91	R. Earle	PMC	Waste Disposal Group, Env. Compliance	Mixed Waste
I-WM-022	04/19/91	R. Earle	PMC	Construction Management, Engineering	Material Storage Area
I-WM-023	04/19/91	R. Earle	PMC	PIP Manager, Communication Services	Training
I-WM-024	04/19/91	R. Earle	DOE	Project Manager	Training
I-WM-025	04/19/91	R. Earle	PMC	Safety Supervisor, Construction Safety	RCRA Contingency Plan

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE AUDIT TEAM

REFERENCE NUMBER	DATE	AUDITOR	ORGANIZATION	POSITION	TOPIC
I-TS-001	04/02/91	L. Wennerberg	Argonne	Project Manager	Oversight
I-TS-002	04/02/91	L. Wennerberg	Argonne	Asst. Project Manager	Oversight
I-TS-003	04/08/91	L. Wennerberg	PMC	Waste Management Manager	PCB's
I-TS-004	04/08/91	L. Wennerberg	EPA, Region VII	RPM	Oversight
I-TS-005	04/10/91	L. Wennerberg	MDNR	State Project Leader	Oversight
I-TS-006	04/16/91	L. Wennerberg	PMC	Acting Reg. Compl. Coord. - Env. Compl.	Compliance Inspections
I-TS-007	04/16/91	L. Wennerberg	PMC	Personnel Protection Manager - ES&H	SPCC, Asbestos
I-TS-008	04/16/91	L. Wennerberg	PMC	Reg. Compl. Coord. - Env. Compl.	Compliance Inspections
I-TS-009	04/16/91	L. Wennerberg	Argonne	Project Manager	Oversight
I-TS-010	04/16/91	L. Wennerberg	Argonne	Asst. Project Manager	Oversight
I-TS-011	04/16/91	L. Wennerberg	PMC	Waste Management Engineer - Env. Compl.	Waste Tracking
I-TS-012	04/16/91	L. Wennerberg	PMC	Waste Management Engineer - Env. Compl.	WITS
I-TS-013	04/16/91	L. Wennerberg	PMC	Waste Management Engineer - Env. Compl.	PCB Removal
I-TS-014	04/17/91	L. Wennerberg	PMC	Procurement Manager - Procurement	Procurement
I-TS-015	04/17/91	L. Wennerberg	PMC	Buyer - Procurement	Procurement
I-TS-016	04/17/91	L. Wennerberg	PMC	Waste Management Engineer - Env. Compl.	PCB's

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE AUDIT TEAM

REFERENCE NUMBER	DATE	AUDITOR	ORGANIZATION	POSITION	TOPIC
I-TS-017	04/17/94	L. Wennerberg	PMC	Const./Safety Supervisor - Const. Safety	SPCC/MSD
I-TS-018	04/18/91	L. Wennerberg	PMC	Manager - Construction and Management Oper.	Tracking Hazardous Materials
I-TS-019	04/18/91	L. Wennerberg	PMC	Waste Management Manager - Env. Compl.	WITS, PCB
I-TS-020	04/18/91	L. Wennerberg	PMC	Waste Management Engineer - Env. Compl.	WITS, PCB
I-TS-021	04/18/91	L. Wennerberg	PMC	Waste Management Engineer - Env. Compl.	WITS, PCB
I-TS-022	04/18/91	L. Wennerberg	PMC	Manager - Construction Safety	Hazardous Materials
I-TS-023	04/19/91	L. Wennerberg	EPA - HQ	Environmental Protection Technician	PCB Storage

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE AUDIT TEAM

REFERENCE NUMBER	DATE	AUDITOR	ORGANIZATION	POSITION	TOPIC
I-QA-001	04/17/91	L. Wennerberg	PMC	Lab Coordinator - ES&H	QA Procedures
I-QA-002	04/17/91	L. Wennerberg	PMC	Acting Lab Supervisor - ES&H	QA Procedures
I-QA-003	04/17/91	L. Wennerberg	PMC	QA Manager - Quality Assurance	QA Procedures
I-QA-004	04/17/91	L. Wennerberg	PMC	QA Engineer - Quality Assurance	QA Procedures

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE AUDIT TEAM

REFERENCE NUMBER	DATE	AUDITOR	ORGANIZATION	POSITION	TOPIC
I-RAD-001	03/28/91	P. Jones	PMC	Deputy Manager, ES&H	General
I-RAD-002	04/09/91	P. Jones	PMC	Deputy Manager, ES&H	Frisking/Bioassay
I-RAD-003	04/11/91	P. Jones	PMS	Deputy Manager, ES&H	Personal Protective Equipment
I-RAD-004	04/15/91	P. Jones	PMC	Deputy Manager, ES&H	Air
I-RAD-005	04/16/91	P. Jones	PMC	Deputy Manager, ES&H	Air
I-RAD-006	04/16/91	P. Jones	PMC	Lab Technician, ES&H	Air
I-RAD-007	04/16/91	P. Jones	PMC	Environmental Protection Manager, ES&H	Environmental Monitoring
I-RAD-008	04/16/91	P. Jones	Argonne	Project Engineer	RI/FS
I-RAD-009	04/16/91	P. Jones	PMC	Project Engineer, ES&H	Environmental Monitoring
I-RAD-010	04/17/91	P. Jones	PMC	Lab Technician, ES&H	Air Sampling
I-RAD-011	04/17/91	P. Jones	PMC	Environmental Protection Manager, ES&H	Groundwater
I-RAD-012	04/17/91	P. Jones	PMC	Construction Safety Supervisor	Emer. Prep.
I-RAD-013	04/17/91	P. Jones	PMC	QA Engineer	QA
I-RAD-014	04/17/91	P. Jones	PMC	QA Manager	QA
I-RAD-015	04/17/91	P. Jones	PMC	Environmental Engineer, ES&H	QA
I-RAD-016	04/17/91	P. Jones	PMC	Lab Technician, ES&H	QA

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE AUDIT TEAM

REFERENCE NUMBER	DATE	AUDITOR	ORGANIZATION	POSITION	TOPIC
I-RAD-017	04/17/91	P. Jones	PMC	ALARA Engineer, ES&H	ALARA
I-RAD-018	04/18/91	P. Jones	DOE	Envinronmental Engineer, ES&H	Waste Storage
I-RAD-019	04/18/91	P. Jones	PMC	Waste Management Manager	Waste Storage
I-RAD-020	04/18/91	P. Jones	PMC	Personnel Protection Manager, ES&H	Waste Storage
I-RAD-021	04/18/91	P. Jones	PMC	Deputy Manager, ES&H	PPE/frisking
I-RAD-022	04/18/91	P. Jones	PMC	Engineering, ES&H	Dose Assessment
I-RAD-023	04/18/91	P. Jones	DOE	Project Manager	Analytical Laboratory
I-RAD-024	04/18/91	P. Jones	PMC	Personnel Protection Manager, ES&H	Emergency Prep.
I-RAD-025	04/19/91	P. Jones	PMC	Waste Management Manager, Env. Compliance	
I-RAD-026	04/19/91	P. Jones	PMC	Waste Management Engineer, Env. Compliance	Waste Mangement

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE AUDIT TEAM

REFERENCE NUMBER	DATE	AUDITOR	ORGANIZATION	POSITION	TOPIC
I-IWS-001	04/15/91	B. Shatten	DOE	Project Manager	General CERCLA
I-IWS-002	04/16/91	B. Shatten	PMC	Man. Personnel Protection, ES&H	Personnel Protection
I-IWS-003	04/16/91	B. Shatten	PMC	Deputy Project Manager, ES&H	General CERCLA
I-IWS-004	04/16/91	B. Shatten	PMC	Manager Community Relations	Community Relations
I-IWS-005	04/16/91	B. Shatten	PMC	Community Relations	Community Relations Plan
I-IWS-006	04/16/91	B. Shatten	Citizen	Member St. Charles Citizens Agnst Haz. Waste	Community Relations
I-IWS-007	04/16/91	B. Shatten	Argonne	Project Manager	FS-CERCLA
I-IWS-008	04/16/91	B. Shatten	Argonne	Assistant Project manager	FS/CERCLA
I-IWS-009	04/17/91	B. Shatten	PMC	Manager Env. Doc. & Concept. Design	RI/FS IRAs
I-IWS-010	04/17/91	B. Shatten	PMC	Construction Operations Manager	RD/RA
I-IWS-011	04/18/91	B. Shatten	EPA Region VII	RPM DOD Facility	IAGs/GW
I-IWS-012	04/18/91	B. Shatten	PMC	Reg. Compliance Coordinator	General Compliance
I-IWS-013	04/18/91	B. Shatten	MDNR	Environmental Engineer	Air
I-IWS-014	04/18/91	B. Shatten	PMC	Environmental Engineer	EECAs/Quarry
I-IWS-015	04/18/91	B. Shatten	PMC	RI/FS Sup., Env. Doc. & Concept. Des.	Archeology
I-IWS-016	04/18/91	B. Shatten	DOE	Environmental Prot. Specialist	NRDA/Archeology

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE AUDIT TEAM

REFERENCE NUMBER	DATE	AUDITOR	ORGANIZATION	POSITION	TOPIC
I-IWS-017	04/18/91	B. Shatten	PMC	Dept. Manager, ES&H	Air Monitoring
I-IWS-018	04/19/91	B. Shatten	DOE	Project Manager	Risk Assessment
I-IWS-019	04/19/91	B. Shatten	DOE	Environmental Engineer	EE/CAs
I-IWS-020	04/19/91	B. Shatten	Agronne	Project Manager	EE/CAs BRA
I-IWS-021	04/22/91	B. Shatten	Boooze, Allen & Hamilton	Contractor to EPA	SARA

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE AUDIT TEAM

REFERENCE NUMBER	DATE	AUDITOR	ORGANIZATION	POSITION	TOPIC
I-EM-001	04/16/91	J. Margolis	PMC	ES&H Manager	Organization & Functions, Roles & Resp.
I-EM-002	04/16/91	J. Margolis	PMC	Env. Compliance Manager,	Organization & Functions, Roles & Resp.
I-EM-003	04/16/91	J. Margolis	PMC	Deputy Project Director	Organization & Functions, Roles & Resp.
I-EM-004	04/16/91	J. Margolis	PMC	Deputy Project Director	Organization & Functions, Roles & Resp.
I-EM-0005	04/17/91	J. Margolis	PMC	QA/QC	Organization & Functions, Roles & Resp.
I-EM-006	04/17/91	J. Margolis	DOE-WSSRAP	Deputy Project Manager	Organization & Functions, Roles & Resp.
I-EM-007	04/17/91	J. Margolis	PMC	Construction Safety Manager	Organization & Functions, Roles & Resp.
I-EM-008	04/18/91	J. Margolis	DOE-WSSRAP	Project Manager	Organization & Functions, Roles & Resp.
I-EM-009	04/18/91	J. Margolis	PMC	Reg. Compliance Coordinator	Organization & Functions, Roles & Resp.
I-EM-010	04/18/91	J. Margolis	DOE-OR	Deputy Management Manager	OR Oversight, Org.
I-EM-011	04/19/91	J. Margolis	DOE-WSSRAP	Environmental Engineer	Oversight of PMC
I-EM-012	04/19/91	J. Margolis	DOE-WSSRAP	Project Manager	Oversight of PMC OR-HQ org.
I-EM-013	04/19/91	J. Margolis	PMC	Procurement Manager	Subcontracting
I-EM-014	04/19/91	J. Margolis	PMC	Procurement Manager	Subcontracting
I-EM-015	04/19/91	J. Margolis	DOE-OR	Deputy Assistant Manager	OR Oversight
I-EM-016	04/19/91	J. Margolis	PMC	Site Rep.	Issues, View of DOE

LIST OF CONTACTS/INTERVIEWS CONDUCTED BY THE AUDIT TEAM

REFERENCE NUMBER	DATE	AUDITOR	ORGANIZATION	POSITION	TOPIC
I-EM-017	04/19/91	J. Margolis	PMC	Project Director	Issues, View of DOE
I-EM-018	04/19/91	J. Margolis	PMC	PIP Manager	Training
I-EM-019	04/22/91	J. Margolis	PEER	Site Office Manager	Peer's Role, View of DOE
I-EM-020	04/22/91	J. Margolis	DOE-Env. Rest.	Acting Director	OR & HQ Oversight
I-EM-021	04/22/91	J. Margolis	DOE-WSSRAP	Deputy Project Manager	Subcontracting
I-EM-022	04/22/91	J. Margolis	DOE-OR-ES&Q	Assistant Manger	OR-HQ Org./ Activities
I-EM-023	04/22/91	J. Margolis	Argonne	Project Manager	Role, View of DOE
I-EM-024	04/22/91	J. Margolis	PMC	Env. Compliance Director	Subcontracting
I-EM-025	04/23/91	J. Margolis	DOE-OR		Self Assessment Program
I-EM-026	04/23/91	J. Margolis	DOE-OR	Assistant Manager-FUSRAP	Self Assess. Prog./OR-HQ Roles & Resp.
I-EM-027	04/23/91	J. Margolis	DOE-Env. Rest.	Acting Director	OR/HQ Roles
I-EM-028	04/24/91	J. Margolis	DOE-OR	Asistant Manager	OR Management

APPENDIX F
DEFINITION OF CAUSAL FACTORS

POLICY

Evaluate if ineffective, outdated, or nonexistent policies contributed to the finding.

POLICY IMPLEMENTATION

Ascertain if written policies reflecting federal, state, and local laws and regulations, codes, and standards were appropriately disseminated, implemented, and updated. If not, evaluate if this is a contributing factor to the finding.

RISK

Evaluate if the site personnel responsible for a situation contributing to a finding have assessed and were aware of the relative degree of risk involved in the action.

PROCEDURES

Identify if written procedures that have been prepared to effectively implement site policy, DOE Orders, and federal, state, and local laws and regulations were a contributing factor to the finding. Determine if unfamiliarity with or unavailability of those procedures contributed to the finding.

PERSONNEL

Identify if the educational and work experience backgrounds for personnel holding responsible positions contributed to the finding. Determine if the level of personnel knowledge about the technical and safety aspects of their jobs contributed to the finding.

RESOURCES

Ascertain if the number of personnel assigned to a job was contributing factor in the finding. Determine if the level of personnel knowledge about the technical and safety aspects of their jobs contributed to the finding.

TRAINING

Identify if adequate personnel training on implementing site policy, DO Orders, and applicable federal, state, and local laws and regulations was a contributing factor to the finding.

CHANGE

Evaluate if changes in site mission, function, operation and established requirements, which rendered existing policies or procedures inadequate or inappropriate, were contributing factors to the finding. Evaluate if the timeliness and effectiveness of changes to site and DOE policy, and the implementing procedures, were a contributing factor to the finding.

APPRAISALS, AUDITS, AND REVIEWS

Determine if ineffective or insufficient appraisals, audits, and reviews, and/or inadequate followup, were contributing factors to the finding.

DESIGN

Evaluate if inadequate design of a system was a contributing factor to the finding.

HUMAN FACTORS

Ascertain if human factors, such as fatigue or deliberate circumvention of a safety system, were contributing factors to the finding.

BARRIERS AND CONTROLS

Determine if inadequacies in established barriers and controls, both administrative and physical, including operational readiness, routine inspections and preventative maintenance, and/or a lack of these controls, contributed to the finding.

SUPERVISION

Identify if ineffective supervisory controls for implementing policies, procedures, standards, laws, etc. were contributing factors to the finding.

APPENDIX G
LIST OF ACRONYMS

WELDON SPRING
ACRONYMS AND ABBREVIATIONS

ACM	Asbestos Containing Material
AEC	Atomic Energy Commission
ALARA	As Low As Reasonably Achievable
ANL	Argonne National Laboratory
ARARS	Applicable or Relevant and Appropriate Requirements
ASER	Annual Site Environmental Report
AST	Aboveground Storage Tank
BMP	Best Management Practice
BMPF	Best Management Practice Finding
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CF	Compliance Finding
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
CM&O	Construction Management and Operations
CO	Certificate to Operate
COE	U.S. Army Corps. Of Engineers
CRP	Community Relations Plan
CWA	Clean Water Act
CY	Calendar Year
DA	Department of the Army
DMR	Discharge Monitoring Report
DNT	Dinitrotoluene
DOE	Department of Energy
DOE-HQ	Department of Energy, Headquarters
DOE-OR	Department of Energy, Oak Ridge Operations Office
DOI	Department of the Interior
EA	Environmental Assessment
EC	Environmental Compliance
EE/CA	Engineering Evaluation/Cost Analysis
EH	Office of the Assistant Secretary for Environment, Safety, and Health
EIS	Environmental Impact Statement
EM	Environmental Management
EMC	Environmental Monitoring and Compliance
EMP	Environmental Monitoring Plan
EMPP	Environmental Program Plan
EPA	Environmental Protection Agency

EPCRA	Emergency Planning and Community Right-to-Know Act (Also known as SARA Title III)
EPPIP	Environmental Protection Program Implementation Plan
EPP	Emergency Plans and Procedures
ER	Environmental Restoration
ES&H	Environment, Safety, and Health
FFA	Federal Facilities Agreement
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FS	Feasibility Study
FY	Fiscal Year
GFE	Government Furnished Equipment
GPPMP	Groundwater Protection Management Plan
GW	Groundwater
HEPA	High-Efficiency Particulate Air
IFB	Invitation for Bid
IRA	Interim Response Action
IWS	Inactive Waste Sites
JE	Jacobs Engineering
LDR	Land Disposal Restricted
LLLW	Low-Level Liquid Waste
MDNR	Missouri Department of Natural Resources
MDOC	Missouri Department of Conservation
MDOH	Missouri Department of Health
MKF	M.K. Ferguson
MREM	Millirem
MSA	Material Staging Area
MSDS	Material Safety Data Sheet
NCP	National Oil and Hazardous Substances Pollution Contingency Plan (Also known as National Contingency Plan)
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NP	Noteworthy Practice
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
PCB	Polychlorinated Biphenyls
PIP	Productivity Improvement Program
PMC	Project Management Contractor

PPB	Parts Per Billion
PPM	Parts Per Million
PRP	Potentially Responsible Party
PSO	Program Senior Official
QA	Quality Assurance
QAPP	Quality Assurance Program Plan
RAD	Radiation
R&D	Research and Development
RC	Regulatory Compliance
RCRA	Resource Conservation and Recovery Act
RD/RA	Remedial Design/Remedial Action
FP	Request for Proposal
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RQ	Reportable Quantity
SAP	Self Assessment Plan
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SEN	Secretary of Energy Notice
SI	Special Issue
SOP	Standard Operating Procedure
SPCC	Spill Prevention, Control, and Countermeasures
SSB	Soils, Sediment and Biota
SW	Surface Water
SWMU	Solid Waste Management Unit
SWATS	Site-Wide Audit Tracking System
TBP	Tributyl Phosphate
TCA	Trichloroethane
TCLP	Toxic Characteristic Leaching Procedure
TNT	Trinitrotoluene
TRU	Transuranic
TS	Toxic Substances
TSA	Temporary Storage Area
TSCA	Toxic Substances Control Act
TSDF	Treatment, Storage, and Disposal Facility
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WITS	Waste Inventory and Tracking System

WM	Waste Management
WMP	Waste Management Plan
WM/PPAP	Waste Management/Pollution Prevention Awareness Plan
WSCP	Weldon Spring Chemical Plant
WSOW	Weldon Spring Ordnance Works
WSQ	Weldon Spring Quarry
WSRP	Weldon Spring Raffinate Pits
WSS	Weldon Spring Site
WSSRAP	Weldon Spring Site Remedial Action Project
WSVP	Weldon Spring Vicinity Property
WWTP	Waste Water Treatment Plant